COMPLETE MONOGRAPH

2022 GROUP B PROPOSED CHANGES TO THE I-CODES ROCHESTER COMMITTEE ACTION HEARINGS

March 27 - April 6, 2022
Rochester Riverside Convention Center, Rochester, NY

INTERNATIONAL CODE COUNCIL®

2021-2022 Code Development Cycle, Group B (2022) Proposed Changes to the 2021 *International Codes*

First Printing

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(2022 Group B)

INTRODUCTION

As utilized during the previous Cycles, code change modifications will be submitted and presented for committee and public viewing at the Committee Action Hearing through the cdpACCESS system. Detailed instructions for modifications will be available at the cdpACCESS website. In addition, printed instructions will be supplied at the CAH hearings. See page vi for details on the modification submittal process.

The proposed changes published herein have been submitted in accordance with established procedures [Council Policy 28 Code Development (CP 28)] (see page xv) and are posted for review. The publication of these changes constitutes neither endorsement nor question of them but is in accordance with established procedures so that any interested individuals may make their views known to the relevant code committee and others similarly interested. In furtherance of this purpose, the committee will hold an open public hearing at the date and place shown below for the purpose of receiving comments and arguments for or against such proposed changes. Those who are interested in testifying on any of the published changes are expected to be represented at these hearings.

This compilation of code change proposals is available in electronic form only. ICC no longer prints and distributes this document. The compilation of code change proposals is posted on two locations on the ICC website: the customary posting which is the linked from the Code Development webpage and from the cdpACCESS webpage.

2021 – 2022 CODE GROUPINGS

Codes to be considered in Group B Cycle:

- Administrative Provisions
- IBC – Structural
- IEBC
- ICCPC
- IgCC (Chapter 1) – to be heard by the Administrative Committee. See page xlix
- IRC – Building

See page x for the 2021 – 2022 ICC Code Development Schedule

2022 ICC COMMITTEE ACTION HEARINGS

These proposed changes will be discussed in public hearings to be held on March 27 – April 6, 2022 at the Rochester Riverside Convention Center in Rochester, NY. The code committees will conduct their public hearings in accordance with the schedule shown on page xlix.

MEMBERSHIP COUNCILS/PMG ROUND TABLE PRIOR TO THE HEARINGS

Prior to the hearings, some of the Membership Councils will be holding meetings from 8-10am CT, Sunday, March 27th. This has been identified on the hearing schedule that was posted February14th.

ADVANCED REGISTRATION AND VOTING

ICC members in attendance will be allowed to vote on procedural "points of order" in accordance with Section 5.4.8.1 of CP 28 (see page xxviii) **For identification purposes, all hearing participants must register. There is no cost to register or participate in the hearings.**

You are encouraged to advance register. Click here to register online.

The registration desk will be open in the lobby of the convention center according to the following schedule:

Sunday, March 27th	12:00 pm to 5:00 pm
Monday, March 28th through Saturday, April 2nd	7:00 am to 5:00 pm
Sunday, April 3rd	9:00 am to 5:00 pm
Monday, April 4th through Wednesday, April 6th	7:00 am to 5:00 pm

In order to be eligible to vote at the 2022 Annual Conference, Public Comment Hearings and the Online Governmental Consensus Vote, CP 28 requires that applications for new and reinstating Governmental Memberships must be received by the ICC at least 30 days prior to the Committee Action Hearing. This deadline is February 25, 2022. Recent revisions to CP 28 require voter validation only once during each code development cycle. (See Section 9.1 bold below). Applicable CP 28 sections noted below:

> **9.1 Eligible Final Action Voters:** Eligible Final Action voters include ICC Governmental Member Voting Representatives and Honorary Members in good standing who have been confirmed by ICC in accordance with the Electronic Voter Validation System. **Such confirmations are required to be revalidated once each code development cycle. After initial validation, changes to the list of GMVRs for the remainder of the code development cycle shall be made in accordance with Section 9.2.** Eligible Final Action voters in attendance at the Public Comment Hearing and those participating in the Online Governmental Consensus Vote shall have one vote per eligible voter on all Codes. Individuals who represent more than one Governmental Member shall be limited to a single vote.
>
> **9.2 Applications:** Applications for Governmental Membership must be received by the ICC at least 30 days prior to the Committee Action Hearing in order for its designated representatives to be eligible to vote at the Public Comment Hearing or Online Governmental Consensus Vote. Applications, whether new or updated, for Governmental Member Voting Representative status must be received by the Code Council 30 days prior to the commencement of the first day of the Public Comment Hearing in order for any designated representative to be eligible to vote. An individual designated as a Governmental Member Voting Representative shall provide sufficient information to establish eligibility as defined in the ICC Bylaws. The Executive Committee of the ICC Board, in its discretion, shall have the authority to address questions related to eligibility.

As such, new and reinstating Governmental Member membership applications must be received by ICC's Member Services Department by February 25, 2022. For information on application for new membership and membership renewal, click here or call ICC Member Services at 1-888-ICC SAFE (422-7233)

2022 GROUP B CODE DEVELOPMENT COMMITTEE RESPONSIBILITIES

Some sections of the International Codes have a letter designation in brackets in front of them. Code change proposals submitted for such code sections that have a bracketed letter designation in front of them will be heard by the respective committee responsible for such code sections. Because different committees will meet in different years, some proposals for a given code will be heard by a committee in a different year than the year in which the primary committee for this code meets.

For instance, Section 1404.10.2 of the IBC has a [BS] in front of it, meaning that this section is the responsibility of the IBC – Structural Code Development Committee. However, the technical content of Chapter 14 is generally fire safety and as such, code change proposals are designated with the fire safety designation: IBC – FS. In this current 2022 Group B Cycle, there are 11 such IBC – FS proposals, to be heard by the IBC – Structural Code Development Committee. Another example is several sections of the IEBC have [BS] in front of them, meaning that these sections are the responsibility of the IBC – Structural Code Development Committee. However, the technical content of the IEBC is generally existing building and as such, code change proposals are designated with the existing building designation: EB. In this current 2022 Group B Cycle, there are 48 such EB proposals, to be heard by the IBC – Structural Code Development Committee. Be sure to consult the respective Tentative Order of Discussion for the individual committees.

A complete summary of the 2021 – 2022 Group A and Group B Code Development Committees' responsibilities can be viewed at the ICC Website.

ANALYSIS STATEMENTS

Various proposed changes published herein contain an "analysis" that appears after the proponent's reason. These comments do not advocate action by the code committees or the voting membership for or against a proposal. The purpose of such comments is to identify pertinent information that is relevant to the consideration of the proposed change by all interested parties, including those testifying, the code committees and the voting membership. Staff analyses customarily identify such things as: conflicts and duplication within a proposed change and with other proposed changes and/or current code text; deficiencies in proposed text and/or substantiation; text problems such as wording defects and vagueness; background information on the development of current text; and staff's review of proposed reference standards for compliance with the Procedures. Lack of an analysis indicates neither support for, nor opposition to a proposal.

NEW REFERENCE STANDARDS

Proposed changes that include the addition of a reference to a new standard (a standard that is not currently referenced in the current edition of the I-Codes) will include in the proposal the number, title and edition of the proposed standard. This identifies to all interested parties the precise document that is being proposed and which would be included in the referenced standards chapter of the code if the proposed change is approved. Section 3.6.3.1.1 of CP 28 requires that a code change proposal will not be processed unless a consensus draft of the standard has been provided. Proponents of code changes which propose a new standard have been requested to provide copies of the standard to the code development committee. An analysis statement will be posted on the ICC website providing information regarding standard content, such as enforceable language, references to proprietary products or services, and references to consensus procedure. The analysis statements for referenced standards will be posted on or before March 16, 2022. This information will also be published and made available at the hearings.

Proposed new reference standards must be completed and readily available prior to the 2022 Public Comment Hearing in accordance with Section 3.6.3.1.1 of CP28.

REFERENCED STANDARDS UPDATES

Updates to currently referenced standards in any of the 2021 Codes will be considered by the Administrative Code Development Committee in the 2022 Group B Cycle.

Note that based on recent changes to Section 3.6.3.1 of CP28, updates to existing referenced standards that are part of a code change proposal that includes technical revisions to code text to coordinate with such proposed standard(s) update are to be processed as proposed new standards in accordance with Sections 3.4 and 3.6.3.1.2 of CP28. Accordingly, drafts of the revisions would have needed to be supplied at the time of the code change submittal and the standard update will be required to be completed and published on or before the Public Comment Hearing for this 2022 Cycle, September 14, 2022.

It should be noted that, in accordance with Section 4.6 and 4.6.1 of CP 28, standards promulgators will have until December 1, 2023 to finalize and publish any updates to standards in the administrative update. If the standard update is not finalized and published by December 1, 2023, the respective I-Codes will be revised to reference the previously listed year edition of the standard. (See Section 4.6.1 below)

> **4.6.1 Updating ICC Standards Referenced in the Codes.** All standards developed by ICC and referenced by the Codes which are undergoing an update shall be announced by ICC to allow stakeholders to participate in the update process. Where the updated standard is completed and available by December 1 of the third year of the code cycle, the published version of the new edition of the Code which references the standard shall refer to the updated edition of the standard. If the standard is not available by the December 1st deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued.

ICC WEBSITE

This document is posted on the ICC Website. While great care has been exercised in the publication of this document, errata to proposed changes may occur. Errata, if any, will be identified in updates posted prior to the Committee Action Hearing. Users are encouraged to periodically review the ICC Website. Additionally, analysis statements for code changes which propose a new referenced standard will be updated and posted to reflect the staff review of the standard for compliance with select portions of Section 3.6 of the Procedures.

PROPONENT CONTACT INFORMATION

In accordance with procedures, proponents are under no obligation to provide an email address for their posted proposal. For most of the code change proposals, an email address for the proponent has been provided. In an effort to continue to provide for proponent's privacy and at the same time allow an initial contact between an interested party and the proponent, we will be utilizing cdpACCESS to allow an interested party to initiate contact with the proponent without identifying the proponent's email address. The process is follows:

- Interested party logs into cdpACCESS and searches for the subject code change.
- Interested party locates the button "Contact the Proponent" to request that cdpACCESS contact the proponent, providing the interested party's name and email address.
- cdpACCESS uses the proponent email address on file and sends a notification to the proponent indicating the name of the interested party and their email address and that the interested party would like to discuss the code change.
- The interested party receives an email noting that the cdpACCESS system has sent the request to the proponent.
- It is up to the proponent to determine if they would like to respond and contact the interested party.
- The proponent is under no obligation to respond to the cdpACCESS request for contact or to contact the interested party. The proponent's contact information is not revealed to the interested party as part of this initial contact.

Screen shots for the process noted above are under development and will be posted on the ICC website.

HEARING ORDER CHANGES AND TABLING OF PROPOSALS

The Code Change Agenda that places the code change proposals in a logical order for each hearing committee is shown at the beginning of the respective committee's group of code change proposals. In accordance with Section 5.4.4 of CP28, any attendee at the hearing is allowed make a motion to revise the hearing order at any time during the hearings except while a code change is being discussed, but usually as the first order of business at the hearing. Preference is given to grouping like subjects together, and moving items back to a later position on the agenda.

This motion is considered in order unless the proponent(s) of the moved code change proposals are in attendance and object to the move. If there is objection to the move, the motion is ruled out of order by the Moderator. This ruling is final and not debatable. If the motion is not ruled out of order, the motion is subject to a 2/3 vote of those present.

A motion to table a code change proposal is allowed in accordance with Section 5.4.5 of CP28. Just as with a motion to move a code change proposal in the hearing order, this motion is in order only if there is no objection from the proponent(s) in attendance at the hearing. When the proponent(s) object, the motion to table is ruled out of order by the Moderator. The ruling is final and not subject to debate.
The motion to table must identify the location to where the code change proposal consideration will be resumed by either identifying a specific date and time within the timeframe of the Code Change Agenda for the group of code change proposals under consideration or by designating a specific location in the Code Change Agenda. If the motion to table is not ruled out of order, the motion is subject to a $^{2}/_{3}$ vote of those present.

FLOOR MODIFICATIONS

With the implementation of the cdpACCESS online system, CP 28 was revised to reflect that floor modifications would be submitted electronically at the Committee Action Hearing (CAH).

The only aspect of the modification process that has changed is the way the modification is submitted and viewed. It is required to be submitted electronically via cdpACCESS. All other aspects of the modification process are unchanged. As in the past, the proponent of the modification must be in attendance at the CAH to present the modification as part of his/her testimony.

Those who are submitting a modification for consideration by the respective Code Development Committee are required to sign a Copyright Release in order to have their modification(s) considered (Section 3.3.5.5 of CP 28). This feature is built into cdpACCESS similar to the way the release is executed for code change and public comment submittals.

The Chair rules the modification in or out of order. Note that this is a procedural ruling to determine if the modification is to be permitted to be considered at the hearing. It is not a technical ruling. The ruling is final, with no challenge allowed.

The modification proponent is required to identify the specific text of the code change proposal that is being revised and the revision itself. In this way, it is very similar to the public comment process and that is the way cdpACCESS was developed to process modifications.

Example:
Original code change proposal.
The original code change proposal requested the following change to Section 1506.2 of the IBC: (Note that the example is fictional.)

S15-22
1506.2

Proponent: John West representing self

Revise as follows:

1506.2 Material specifications and physical characteristics. Roof-covering materials shall conform to the applicable standards listed in this chapter.

> **Exception:** Roof-covering materials qualified in accordance with Section 104.11 and approved by the code official.

Proposed modification:

A modification to the code change proposal is proposed:

1. To change roof-covering materials to roof-covering systems.
2. To change "conform to" to "comply with"
3. To remove "and approved by the code official" from the exception

The cdpACCESS system will provide the text of the original code change proposal with the proposed change incorporated into the text. Using the cdpACCESS system, the proponent of the modification locates the original change in the system.

The proponent of the modification will need to manually install strikethrough (ex:" ~~delete~~) and underline (ex: add) formatting showing the additional revisions to the original proposal.

cdpACCESS will show the modification as follows:

S15-22
1506.2

Proponent: John West representing self

Revise as follows:

1506.2 Material specifications and physical characteristics. Roof-covering systems shall comply with ~~to~~ the applicable standards listed in this chapter.

> **Exception:** Roof-covering systems qualified in accordance with Section 104.11 ~~and approved by the code official~~.

Among the benefits of using cdpACCESS to submit modifications are:

- Modification proponents will be able to access the system in advance of the hearings to develop their modification (see "Detailed Steps of the Modification Submission Process via cdpACCESS" on the following pages).
- 20 hard copies of the modification for distribution to the committee are no longer required.
- You can preview your modification at any time by downloading a pdf via cdpACCESS.

OVERVIEW OF THE MODIFICATION PROCESS (see CP28 Section 5.5.2 on page xxviii)

1. Modification submitted electronically via cdpACCESS. As in the past, this submittal is required well in advance of the code change proposal being brought to the floor.

2. The code change proposal is brought to the floor by the Moderator.
   IMPORTANT NOTE: ONCE A CODE CHANGE PROPOSAL IS BROUGHT TO THE FLOOR, ALL MODIFICATIONS MUST BE IN THE cdpACCESS SYSTEM. SEE NOTE 1.

3. Modification proponent suggests the modification from the floor at the hearing.

4. Modification posted to cdpACCESS for public viewing (including the hearing room via WiFi) and committee viewing.

5. Modification displayed on the screen in the hearing room.

6. Chair rules the modification in or out of order.

7. If ruled in order, testimony on the modification is initiated.

EDITORIAL CODE CHANGES - CODE CORRELATION COMMITTEE

In a typical code change cycle, there are code change proposals that are considered strictly editorial. Section 4.4 of CP 28 (see below) establishes a process by which the Code Correlation Committee (CCC) considers such proposals.

> **4.4 Editorial Code Change Proposals.** When a code change proposal is submitted that proposes an editorial or format change that, in the opinion of the Secretariat, does not affect the scope or application of the code, the proposal shall be submitted to the Code Correlation Committee who shall deem the code change proposal as editorial or send the proposal back to the Secretariat to be considered by the appropriate code development committee. To be deemed editorial, such proposal shall require a majority vote of the Code Correlation Committee. Editorial proposals shall be published in the Code Change Agenda. Such proposals shall be added to the hearing agenda for consideration by the appropriate code development committee upon written request to ICC by any individual. The deadline to submit such requests shall be 14 days prior to the first day of the Committee Action Hearing. Code Correlation Committee proposals that are not added to a code development committee hearing agenda shall be published in the next edition of the code with no further consideration.

There are 21 such proposals in the current 2022 Cycle. The proposals are located after the last code change in the CAH Agenda and are identified by a code change prefix of CCC.

As noted in Section 4.4, anyone may request that either of these proposals be added to the hearing agenda. The deadline to make such a request is 11: 59 pm Pacific on Sunday, March 13, 2022 via email. Be sure to identify the code change number noted above. Such requests must be sent to:

Ed Wirtschoreck
Director, Codes
ewirtschoreck@iccsafe.org

CODE COUNCIL BOARD RESTRUCTURES CODE DEVELOPMENT PROCESS STARTING IN 2024

As noted in the January 13, 2022 BSJ Weekly, at the December/2021 Code Council Board meeting, the Board approved a recommendation by the Long Term Code Development Process Committee (LTCDP) to restructure the code development process to include two Committee Action Hearings (CAH) for each Code Grouping (A & B). This will allow the committees to evaluate and act on comments received based on the action taken at the first CAH. This new process is expected to realize the benefit of the code committees' expertise by acting on the comments, resulting not only in improvements in the code but also the reduction of the number of public comments to be considered at the Public Comment Hearing (PCH)/Online Governmental Consensus Vote (OGCV) due to the additional vetting of the initial code change proposals and first round of public comments. The following is a snap shot of the new process:

- Year one (2024): Group A
    - Jan: Group A code changes due
    - April: CAH # 1
    - Submission of public comments to CAH #1 actions
    - Fall Annual Conference; CAH #2 (No PCH) – AC/CAH #2 can be held jointly or separately

- Year two (2025): Group B
    - Jan: Group B code changes due
    - Jan: Group A public comments due – allows staff to initiate code production of approved Group A code changes that did not receive a public comment
    - April: CAH # 1
    - Submission of public comments to CAH #1 actions
    - Fall Annual Conference; CAH # 2 (No PCH) – AC/CAH #2 can be held jointly or separately

- Year three (2026 partial): Groups A & B
    - Jan: Group B public comments due
    - April: Combined PCH for Group A & B Codes
    - May: OGCV for Group A & B Codes
    - Continue the publication process of the 2027 editions of the I-Codes
    - Fall Annual Conference: No hearings

This process will take effect in 2024 for the development of the 2027 International Codes. Staff is currently working on the implementation plan for the new process. Additional communications on the new process will be forthcoming.

2021/2022 ICC CODE DEVELOPMENT SCHEDULE

(Posted March 17, 2020)

(Updated December 1, 2020 - red)

(Updated January 20, 2021- strikeout/underline)

(Updated May 24, 2021 – see Notes 1 & 2)

(Updated November 8, 2021 – updated Note 2)

STEP IN CODE DEVELOPMENT CYCLE	DATE	
	2021 – Group A Codes **IBC- E, IBC - FS, IBC -G, IFC, IFGC, IMC, IPC, IPMC, IPSDC, IRC – M, IRC- P, ISPSC, IWUIC, IZC**	**2022 – Group B Codes** **Admin, IBC-S, IEBC, IgCC (Ch. 1),** **IRC – B** **(see note 2)**
2021 EDITION OF I-CODES PUBLISHED	IMC and IPC are published. Remaining I-Codes in the Fall/2020 (See Group B Codes on page xi for the 2021 IgCC)	
DEADLINE FOR RECEIPT OF APPLICATIONS FOR ALL CODE COMMITTEES	June 1, 2020 for the 2021/2022 Cycle. Call for Committee posted in March/2020.	
DEADLINE FOR cdpACCESS ONLINE RECEIPT OF CODE CHANGE PROPOSALS	January 11, 2021	January 10, 2022
WEB POSTING OF "PROPOSED CHANGES TO THE I-CODES"	March 1, 2021*	February 23, 2022*
COMMITTEE ACTION HEARING (CAH)	2021 CAH to be held virtually during the period of April 11 – May 5, 2021 See general notes	March 27 – April 6, 2022 Rochester Riverside Convention Center Rochester, NY
~~ONLINE CAH ASSEMBLY FLOOR MOTION VOTE~~	Assembly consideration removed from process. See CP 28 dated 12/3/20; Section 5.7 (see notes)	Assembly consideration removed from process. See CP 28 dated 12/3/20; Section 5.7 (see notes)
WEB POSTING OF "REPORT OF THE COMMITTEE ACTION HEARING"	May 24, 2021	May 9, 2022
DEADLINE FOR cdpACCESS ONLINE RECEIPT OF PUBLIC COMMENTS	July 2, 2021	June 20, 2022
WEB POSTING OF "PUBLIC COMMENT AGENDA"	August 13, 2021*	August 4, 2022*

STEP IN CODE DEVELOPMENT CYCLE	DATE	
	2021 – Group A Codes **IBC- E, IBC - FS, IBC -G, IFC, IFGC, IMC, IPC, IPMC, IPSDC, IRC – M, IRC- P, ISPSC, IWUIC, IZC**	**2022 – Group B Codes** **Admin, IBC-S, IEBC, IgCC (Ch. 1),** **IRC – B** **(see note 2)**
PUBLIC COMMENT HEARING (PCH) ANNUAL CONFERENCE DATES NOTED BY AC	September 21 –28, 2021 David L Lawrence Convention Center Pittsburgh, PA AC: September 19 – 22 (see note 1)	September 14 - 21, 2022 Kentucky International Convention Center Louisville, KY AC: September 11 - 14
ONLINE GOVERNMENTAL CONSENUS VOTE (OGCV)	Starts approx. two weeks after last day of the PCH. Open for 2 weeks.	Starts approx. two weeks after last day of the PCH. Open for 2 weeks.
WEB POSTING OF FINAL ACTION	Following Validation Committee certification of OGCV and ICC Board confirmation.	Following Validation Committee certification of OGCV and ICC Board confirmation.

* Web posting of the “Proposed Changes to the I-Codes” and “Public Comment Agenda” will be posted no later than scheduled. ICC will make every effort to post these documents earlier, subject to code change/public comment volume and processing time.

2021/2022 Cycle notes referenced from the table:

Note 1: PCH dates revised from the original schedule dates of September 22 – 29 to September 21 – 28

Note 2: The 2022 Group B codes noted in the table reflect the Code Council Board of Directors decision to update the energy provisions of the 2021 International Energy Conservation Code and Chapter 11 of the International Residential Code by utilizing ICC’s Consensus Procedures for developing and updating standards. Both codes will be published with the remaining I-Codes in the fall of 2023.

Note 2 update 11/8/21: The 2022 Group B Committee Action Hearing will be held in-person in Rochester, NY during the period of March 27 – April 6, 2022 as originally scheduled. The hearings will be held in a single track with the schedule of code order to be determined.

SEE NEXT PAGE FOR IDENTIFICATION OF THE 2021 GROUP A & 2022 GROUP B CODES/CODE COMMITTEES AS WELL AS OTHER CODE DEVELOPMENT PROCESS NOTES.

2021 Group A Codes/Code committees:

- IBC-E: IBC Egress provisions. Chapters 10 and 11.
- IBC-FS: IBC Fire Safety provisions. Chapters 7, 8, 9 (partial), 14 and 26. Majority of IBC Chapter 9 is maintained by the IFC. See notes.
- IBC-G: IBC General provisions. Chapters 3 – 6, 12, 13, 27 – 33.
- IFC: The majority of IFC Chapter 10 is maintained by IBC-E. See notes.
- IFGC
- IMC
- IPC
- IPMC: Code changes heard by the IPM/ZC (combined IPMC & IZC code committee)
- IPSDC (code changes heard by the IPC code committee)
- IRC-M: IRC Mechanical provisions. Chapters 12 – 23 (code changes heard by the IRC - MP code committee)
- IRC-P: IRC Plumbing provisions. Chapters 25 – 33 (code changes heard by the IRC - MP code committee)
- ISPSC
- IWUIC (code changes heard by the IFC code committee)
- IZC: Code changes heard by the IPM/ZC (combined IPMC & IZC code committee)

2022 Group B Codes/Code committees:

- Admin: Chapter 1 of all the I-Codes except the IECC, IgCC and IRC. Also includes the update of currently referenced standards in all of the 2021 Codes, except the IgCC.
- IBC-S: IBC Structural provisions. IBC Chapters 15 – 25 and IEBC structural provisions. See notes.
- IEBC: IEBC Non-structural provisions. See notes.
- IgCC: Chapter 1 of the IgCC. Remainder of the code is based on the provisions of ASHRAE Standard 189.1 *Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings*. The 2021 IgCC is scheduled to be published in the Spring/2021.
- IRC-B: IRC Building provisions. Chapters 1 – 10.

Process Notes:

- **2021 Virtual CAH**: The 2021 CAH, originally scheduled for April 11 – 21, 2021 in Rochester, NY has been rescheduled to be held virtually. The hearings will be held in two consecutive tracks, with a break in between. The tentative schedule is as follows:
    - Track 1: April 11 – 21, 2021: IBC – E; IBC – FS; IBC – G; IPMC/IZC; ISPSC
    - No Hearings: April 22 – 24
    - Track 2: April 25 – May 5, 2021: IFC/IWUIC; IFGC; IMC; IPC/IPSDC; IRC – M; IRC - P

Definitive tracks, codes, order of codes and track end date(s) may change based on code change volume and the creation of the hearing schedule. This document as well as all other updates are posted on a dedicated webpage to keep participants apprised of the virtual CAH progress/logistics. The webpage is also linked from the top of the 2021/2022 Cycle webpage.

Be sure to consult updated Council Policy 28 (12/3/20) for procedural revisions applicable to the 2021 Virtual CAH (noted in CP 28 section titles as “2021 virtual CAH only”).

- Be sure to review the document entitled “2021/2022 Code Committee Responsibilities” which will be posted. This identifies responsibilities which are different than Group A and B codes and committees which may impact the applicable code change cycle and resulting code change deadline. As an example, throughout Chapter 9 of the IBC (IBC- Fire Safety), there are numerous sections which include the designation “[F]” which indicates that the provisions of the section are maintained by the IFC code committee. Similarly, there are numerous sections in the IEBC which include the designation “[BS]”. These are structural provisions which will be heard by the IBC – Structural committee. The designations in the code are identified in the Code Committee Responsibilities document.
- I-Code Chapter 1: Proposed changes to the provisions in Chapter 1 of the majority of the I-Codes are heard in Group B (see Admin above for exceptions). Be sure to review the brackets ([ ]) of the applicable code.
- Definitions. Be sure to review the brackets ([ ]) in Chapter 2 of the applicable code and the Code Committee Responsibilities document to determine which code committee will consider proposed changes to the definitions.

Proposed changes to the ICC Performance Code will be heard by the code committee noted in brackets ([ ]) in the section of the code and in the Code Committee Responsibilities document.

2021 - 2022 STAFF SECRETARIES

GROUP A (2021)

IBC – Egress Chapters 10, 11	IBC – Fire Safety Chapters 7, 8, 9, 14, 26	IBC – General Chapters 1-6, 12, 13, 27-34	IFC	IFGC
Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org	Samhar Hoz Chicago Regional Office Ext 4284 shoz@iccsafe.org	Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org Lawrence Novak Chicago Regional Office Ext 4405 lnovak@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org
IMC	**IPC/IPSDC**	**IPMC**	**IRC Mechanical**	**IRC Plumbing**
LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org	Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org	Ed Wirtschoreck Chicago Regional Office Ext 4317 ewirtschoreck@iccsafe.org	LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org	Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org
ISPSC	**IWUIC**	**IZC**		
Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org Keith Enstrom Chicago Regional	Ed Wirtschoreck Chicago Regional Office Ext 4317 ewirtschoreck@iccsafe.org		

GROUP B (2022)

ADMINISTRATIVE Chapter 1 All Codes except the IECC, IgCC, and IRC	IBC- Structural Chapters 15-25 IEBC Structural	IEBC	ICC Performance	IRC-Building
Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	Lawrence Novak Chicago Regional Office Ext 4405 lnovak@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org	Kim Paarlberg Indianapolis, IN Ext 4306 kpearlberg@iccsafe.org Samhar Hoz Chicago Regional Office Ext 4284 shoz@iccsafe.org
IgCC proposals to Chapter 1 to be heard by the Administrative Committee.				

CP#28-05 – Code Development

Approved: 09/24/05 **|** **Revised:** 07/16/21

1.0 Introduction

1.1 Purpose of Council Policy: The purpose of this Council Policy is to prescribe the Rules of Procedure utilized in the continued development and maintenance of the International Codes (Codes).

1.2 Objectives: The ICC Code Development Process has the following objectives:

1.2.1 The timely evaluation and recognition of technological developments pertaining to construction regulations.
1.2.2 The open discussion of code change proposals by all parties desiring to participate.
1.2.3 The final determination of Code text by public officials actively engaged in the administration, formulation or enforcement of laws, ordinances, rules or regulations relating to the public health, safety and welfare and by honorary members.
1.2.4 The increased participation of all parties desiring to participate through an online submittal and voting process that includes opportunities for online collaboration.

1.3 Code Publication: The ICC Board of Directors (ICC Board) shall determine the title and the general purpose and scope of each Code published by the ICC.

1.3.1 Code Correlation: The provisions of all Codes shall be consistent with one another so that conflicts between the Codes do not occur. A Code Scoping Coordination Matrix shall determine which Code shall be the primary document, and therefore which code development committee shall be responsible for maintenance of the code text where a given subject matter or code text could appear in more than one Code. The Code Scoping Coordination Matrix shall be administered by the Code Correlation Committee as approved by the ICC Board. Duplication of content or text between Codes shall be limited to the minimum extent necessary for practical usability of the Codes, as determined in accordance with Section 4.5.

1.4 Process Maintenance: The review and maintenance of the Code Development Process and these Rules of Procedure shall be by the ICC Board. The manner in which Codes are developed embodies core principles of the organization. One of those principles is that the final content of the Codes is determined by a majority vote of the governmental and honorary members. It is the policy of the ICC Board that there shall be no change to this principle without the affirmation of two-thirds of the governmental and honorary members responding.

1.5 Secretariat: The Chief Executive Officer shall assign a Secretariat for each of the Codes. All correspondence relating to code change proposals and public comments shall be addressed to the Secretariat. The Secretariat shall have the authority to facilitate unforeseen situations which arise in the implementation of this council policy. Staff shall maintain a record of such actions.

1.6 Recording: Individuals requesting permission to record any meeting or hearing, or portion thereof, shall be required to provide the ICC with a release of responsibility disclaimer and shall acknowledge that ICC shall retain sole ownership of the recording, and that they have insurance coverage for liability and misuse of recording materials. Equipment and the process used to record shall, in the judgment of the ICC Secretariat, be conducted in a manner that is not disruptive to the meeting. The ICC shall not be responsible for equipment, personnel or any other provision necessary to accomplish the recording. An unedited copy of the recording shall be forwarded to ICC within 30 days of the meeting. Recordings shall not otherwise be copied, reproduced or distributed in any manner. Recordings shall be returned to ICC or destroyed upon the request of ICC.

2.0 Code Development Cycle

2.1 Intent: The code development cycle shall consist of the complete consideration of code change proposals in accordance with the procedures herein specified, commencing with the deadline for submission of code change proposals (see Section 3.5) and ending with publication of the Final Action on the code change proposals (see Section 10.4).

2.2 New Editions: The ICC Board shall determine the schedule for publishing new editions of the Codes. Each new edition shall incorporate the results of the code development activity since the previous edition.

2.3 Supplements: The results of code development activity between editions may be published.

2.4 Interim Code Amendments: All revisions to the International Codes shall be processed in accordance with other sections of this Council Policy except for Emergency Actions by the ICC Board complying with Section 2.4.1 and Interim Critical Amendments (ICA) complying with Section 2.4.2.

2.4.1 Emergency Actions by the ICC Board: Emergency actions by the ICC Board are limited to those issues representing an immediate threat to health and safety that warrant a more timely response than allowed by the Code Development Process schedule.

2.4.1.1 Initial Request: A request for an emergency action shall be based upon perceived immediate threats to health and safety and shall be reviewed by the Codes and Standards Council for referral to the ICC Board for action with their analysis and recommendation.

2.4.1.2 Board and Member Action: In the event that the ICC Board determines that an emergency amendment to any Code or supplement thereto is warranted, the same may be adopted by the ICC Board. Such action shall require an affirmative vote of at least two-thirds of the ICC Board.

The ICC membership shall be notified within ten days after the ICC Boards' official action of any emergency amendment. At the next Annual Business Meeting, any emergency amendment shall be presented to the members for ratification by a majority of the Governmental Member Voting Representatives and Honorary Members present and voting.

All code revisions pursuant to these emergency procedures and the reasons for such corrective action shall be published as soon as practicable after ICC Board action. Such revisions shall be identified as an emergency amendment.

Emergency amendments to any Code shall not be considered as a retro-active requirement to the Code. Incorporation of the emergency amendment into the adopted Code shall be subjected to the process established by the adopting authority.

2.4.2 Interim Critical Amendments (ICA)

2.4.2.1 Submittal. Anyone may propose an ICA by providing the following information:

a) Name of submitter
b) Contact information
c) Submitters representation
d) Date
e) Relevant section(s) and code edition(s) under consideration
f) Proposed modifications with text changes identified using underlines for new text and strikethroughs for deleted text
g) A statement that substantiates the need for proposed changes and why the proposed submission is of such a critical nature in accordance with Section 2.4.2.3 that it cannot be left to be addressed during the next code development cycle.
h) Written endorsement of the proposed ICA by not less than two members of the Code Development Committee(s) responsible for maintaining the affected code section(s)

2.4.2.2 Preliminary Review. An ICA will only be processed if the Codes and Standards Council determines that the proposed ICA appears to be of a critical nature requiring prompt action based on the criteria specified in Section 2.4.2.3. If processed, the question of critical nature shall be further considered by the responsible Code Development Committee(s) and the Codes and Standards Council. The text of a proposed ICA shall be processed as submitted or shall be changed with the approval of the submitter. The Codes and Standards Council shall process their preliminary "critical nature" determination within 45 days of the ICA submission.

2.4.2.3 Determination of Critical Nature. Qualification for critical nature shall be based on one or more of the following factors:

a) The proposed ICA corrects an error or an omission that was overlooked during a regular code development process.
b) The proposed ICA resolves a conflict within an individual code or a conflict involving two or more ICC codes.
c) The proposed ICA mitigates a previously unknown hazard.

2.4.2.4 Code Development Committee. A proposed ICA that meets the provisions in Sections 2.4.2.2 and 2.4.2.3 shall be submitted to the Code Development Committee(s) responsible for the affected section(s) for a ballot and comment period of 30 calendar days. The committee(s) shall be separately balloted on both the technical merit of the ICA and whether the ICA satisfies the critical nature criteria. Negative votes in the initial ballot, if any, shall require a reason statement and shall be circulated to the full committee(s) to allow initial ballot votes to be changed.

A committee recommendation for approval shall require an affirmative vote of at least three-fourths of members who voted, on both technical merit and critical nature. The following shall be omitted from the three-fourths vote calculation:

a) Committee members who have abstained.
b) Committee members whose negative ballots do not include a statement conveying the reason for casting a negative vote.

c) Committee members who do not return their ballots prior to the announced ballot return deadline.

In addition to the three-fourths majority described above, the number of affirmative votes shall be not less than 50% of all committee members who are eligible to vote. Committee members eligible to vote shall be the total number of individuals who are members of the committee on the date of ballot distribution and shall not be adjusted based on abstentions or ballots that were not returned.

ICAs that achieve the required number of affirmative votes on both technical merit and critical nature are approved for further processing in accordance with Sections 2.4.2.5 through 2.4.2.9. ICAs that do not achieve the required number of affirmative votes on both technical merit and critical nature are rejected.

2.4.2.5 Publication of Proposed ICA for Public Comment. An ICA that is approved in accordance with Section 2.4.2.4 shall be published by ICC in appropriate media with a notice inviting public comments on the proposed ICA. The public comment period shall be open for at least 30 calendar days from the date of posting of the notice. When a proposed ICA revises text that was changed in the most recent code development cycle, the ICA public comment notice shall also be directly provided to submitters of proposals and public comments to the affected section in the most recent code development cycle.

2.4.2.6 Additional Code Development Committee Review. All public comments shall be circulated to the responsible Code Development Committee(s) for a 30-calendar day ballot and comment period allowing an opportunity for committee members to change votes taken prior to the public comment period. If any votes are changed to negative, negative votes shall be circulated to the full committee, followed by a final ballot following the voting procedures Section 2.4.2.4.

Approved ICAs shall be forwarded to the Codes and Standards Council with a staff report that includes all public comments, ballots, committee member comments on ballots and concurrence by staff on which code editions should be affected by the ICA.

2.4.2.7 Action of the Codes and Standards Council. The Codes and Standards Council shall review the material submitted in accordance with Section 2.4.2.6 at the next Codes and Standards Council meeting. Approval of an ICA shall require an affirmative vote of at least two-thirds of the Codes and Standards Council members who cast a vote at the meeting.

2.4.2.8 Effective Date and Publication. ICAs that are approved by the Codes and Standards Council shall become effective 30 calendar days after approval, or in the case of an appeal in accordance with Section 2.4.2.9, 30 calendar days after a decision by the ICC Board upholding a Codes and Standards Council decision to issue an ICA.

An ICA shall apply to code editions specified by the ICC Codes and Standards Council, and ICC staff shall, by an appropriate method, publish approved ICAs and ensure that approved ICAs are distributed with future sales of affected codes. ICAs shall be distributed as a separate document and shall not be incorporated into the text of a published code until such time that the ICA has been approved by the full code development process, following submittal as a proposal in accordance with Section 2.4.2.11.

2.4.2.9 Appeals. A decision of the Codes and Standards Council to approve an ICA shall be appealable to the ICC Board in accordance with Council Policy 1.

2.4.2.10 Applicability. ICAs shall not be considered retroactive requirements.

2.4.2.11 Subsequent Processing. An approved ICA shall automatically become a code change proposal from the Codes and Standards Council in the following code cycle.

2.5 Code Development Record. The code development record shall include the official documents and records developed in support of the given code development cycle. This includes the following:

1. Code Change Agenda (Section 4.8)
2. Audio and video recording of the Committee Action Hearing (Section 5.1)
3. Report of the Committee Action Hearing (Section 5.8)
4. Public Comment Agenda (Section 6.6)
5. Public Comment Hearing results (Section 7.5.8.10)
6. Audio and video recording of the Public Comment Hearing (Section 7.1)
7. The Online Governmental Consensus Ballot (Section 8.2)
8. Final Action results (Section 10.4)
9. Errata to the documents noted above

The information resulting from online collaboration between interested parties shall not be part of the code development record.

3.0 Submittal of Code Change Proposals

3.1 Intent: Any interested person, persons or group may submit a code change proposal which will be duly considered when in conformance to these Rules of Procedure.

3.2 Withdrawal of Proposal: A code change proposal may be withdrawn by the proponent (WP) at any time prior to membership action on the consent agenda at the Public Comment Hearing or prior to testimony on the code change proposal on the individual consideration agenda at the Public Comment Hearing. All actions on the code change proposal shall cease immediately upon the withdrawal of the code change proposal.

3.3 Form and Content of Code Change Submittals: Each code change proposal shall be submitted separately and shall be complete in itself. Each submittal shall contain the following information:

3.3.1 Proponent: Each code change proposal shall include the name, title, mailing address, telephone number, and email address of the proponent. Email addresses shall be published with the code change proposals unless the proponent otherwise requests on the submittal form.

3.3.1.1 If a group, organization or committee submits a code change proposal, an individual with prime responsibility shall be indicated.

3.3.1.2 If a proponent submits a code change proposal on behalf of a client, group, organization or committee, the name and mailing address of the client, group, organization or committee shall be indicated.

3.3.2 Code Reference: Each code change proposal shall relate to the applicable code sections(s) in the latest edition of the Code.

3.3.2.1 If more than one section in the Code is affected by a code change proposal, appropriate proposals shall be included for all such affected sections.

3.3.2.2 If more than one Code is affected by a code change proposal, appropriate proposals shall be included for all such affected Codes and appropriate cross referencing shall be included in the supporting information.

3.3.3 Multiple Code Change Proposals to a Code Section. A proponent shall not submit multiple code change proposals to the same code section. When a proponent submits multiple code change proposals to the same section, the proposals shall be considered as incomplete proposals and processed in accordance with Section 4.3. This restriction shall not apply to code change proposals that attempt to address differing subject matter within a code section.

3.3.4 Text Presentation: The text of the code change proposal shall be presented in the specific wording desired with deletions shown struck out with a single line and additions shown underlined with a single line.

3.3.4.1 A charging statement shall indicate the referenced code section(s) and whether the code change proposal is intended to be an addition, a deletion or a revision to existing Code text.

3.3.4.2 Whenever practical, the existing wording of the text shall be preserved with only such deletions and additions as necessary to accomplish the desired change.

3.3.4.3 Each code change proposal shall be in proper code format and terminology.

3.3.4.4 Each code change proposal shall be complete and specific in the text to eliminate unnecessary confusion or misinterpretation.

3.3.4.5 The proposed text shall be in mandatory terms.

3.3.5 Supporting Information: Each code change proposal shall include sufficient supporting information to indicate how the code change proposal is intended to affect the intent and application of the Code.

3.3.5.1 **Purpose:** The proponent shall clearly state the purpose of the code change proposal (e.g. clarify the Code; revise outdated material; substitute new or revised material for current provisions of the Code; add new requirements to the Code; delete current requirements, etc.)

3.3.5.2 **Reasons:** The proponent shall justify changing the current Code provisions, stating why the code change proposal is superior to the current provisions of the Code. Code change proposals which add or delete requirements shall be supported by a logical explanation which clearly shows why the current Code provisions are inadequate or overly restrictive, specifies the shortcomings of the current Code provisions and explains how such code change proposals will improve the Code.

3.3.5.3 **Substantiation:** The proponent shall substantiate the code change proposal based on technical information and substantiation. Substantiation provided which is reviewed in accordance with Section 4.2 and determined as not germane to the technical issues addressed in the code change proposal may be identified as such. The proponent shall be notified that the code change proposal is considered an incomplete proposal in accordance with Section 4.3 and the proposal shall be held until the deficiencies are corrected. The proponent shall have the right to appeal this action in accordance with the policy of the ICC Board. The burden of providing substantiating material lies with the proponent of the code change proposal. Supporting documentation may be provided via a link to a website provided by the proponent and included in the reason statement. The reason statement shall include the date the link was created. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

3.3.5.4 **Bibliography (2021 virtual CAH only):** The proponent shall submit a bibliography of any substantiating material submitted with the code change proposal. The bibliography shall be published with the code change proposal and the proponent shall submit the substantiating materials electronically to the appropriate ICC office. The substantiating information will be posted on the ICC website. Supporting documentation may be provided via a link to a website provided by the proponent and included in the bibliography. The reason statement shall include the date the link was created.

3.3.5.4.1 Bibliography (2022 CAH and after): The proponent shall submit a bibliography of any substantiating material submitted with the code change proposal. The bibliography shall be published with the code change proposal and the proponent shall make the substantiating materials available for review at the appropriate ICC office and during the public hearing. Supporting documentation may be provided via a link to a website provided by the proponent and included in the bibliography. The reason statement shall include the date the link was created.

3.3.5.5 **Copyright Release:** The proponent of code change proposals, floor modifications and public comments shall sign a copyright release developed and posted by ICC.

3.3.5.6 **Cost Impact:** The proponent shall indicate one of the following regarding the cost impact of the code change proposal:

1) The code change proposal will increase the cost of construction;
2) The code change proposal will decrease the cost of construction; or
3) The code change proposal will not increase or decrease the cost of construction.

The proponent shall submit information which substantiates such assertion. This information will be considered by the code development committee and will be included in the published code change proposal. Supporting documentation may be provided via a link to a website provided by the proponent and included in the cost substantiation statement. The cost substantiation statement shall include the date the link was created.

Any proposal submitted which does not include the requisite cost impact information shall be considered incomplete and shall not be processed.

3.4 Online Submittal: Each code change proposal and all substantiating information shall be submitted online at the website designated by ICC. Two copies of each proposed new referenced standard in hard copy or one copy in electronic form shall be submitted. Additional copies may be requested when determined necessary by the Secretariat to allow such information to be distributed to the code development committee. Where such additional copies are requested, it shall be the responsibility of the proponent to send such copies to the respective code development committee.

3.5 Submittal Deadline: ICC shall establish and post the submittal deadline for each cycle. The posting of the deadline shall occur no later than 120 days prior to the code change deadline. Each code change proposal shall be submitted online at the website designated by ICC by the posted deadline. The submitter of a code change proposal is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.

3.6 Referenced Standards: In order for a standard to be considered for reference or to continue to be referenced by the Codes, a standard shall meet the following criteria:

3.6.1 Code References:

3.6.1.1 The standard, including title and date, and the manner in which it is to be utilized shall be specifically referenced in the Code text.
3.6.1.2 The need for the standard to be referenced shall be established.

3.6.2 Standard Content:

3.6.2.1 A standard or portions of a standard intended to be enforced shall be written in mandatory language.
3.6.2.2 The standard shall be appropriate for the subject covered.
3.6.2.3 All terms shall be defined when they deviate from an ordinarily accepted meaning or a dictionary definition.
3.6.2.4 The scope or application of a standard shall be clearly described.
3.6.2.5 The standard shall not have the effect of requiring proprietary materials.
3.6.2.6 The standard shall not prescribe a proprietary agency for quality control or testing.
3.6.2.7 The test standard shall describe, in detail, preparation of the test sample, sample selection or both.
3.6.2.8 The test standard shall prescribe the reporting format for the test results. The format shall identify the key performance criteria for the element(s) tested.
3.6.2.9 The measure of performance for which the test is conducted shall be clearly defined in either the test standard or in Code text.
3.6.2.10 The standard shall not state that its provisions shall govern whenever the referenced standard is in conflict with the requirements of the referencing Code.
3.6.2.11 The preface to the standard shall announce that the standard is promulgated according to a consensus procedure.

3.6.3 Standard Promulgation:

3.6.3.1 Code change proposals with corresponding changes to the code text which include a reference to a proposed new standard or a proposed update of an existing referenced standard shall comply with this section.

3.6.3.1.1 Proposed New Standards. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding proposed changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing. If the committee action at the Committee Action Hearing is Disapproval, further consideration on the Public Comment Agenda shall include a recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing.

3.6.3.1.2 Update of Existing Standards. Code change proposals which include technical revisions to the code text to coordinate with a proposed update of an existing referenced standard shall include the submission of the proposed update to the standard in at least a consensus draft form in accordance with Section 3.4. If the proposed update of the existing standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal, including the update of the existing referenced standard, shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the updated standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the updated standard shall be completed and readily available prior to the Public Comment Hearing. If the committee action at the Committee Action Hearing is Disapproval, further consideration on the Public Comment Agenda shall include a recommendation stating that in order for the public comment to be considered, the updated standard shall be completed and readily available prior to the Public Comment Hearing.

Updating of standards without corresponding code text changes shall be accomplished administratively in accordance with Section 4.6.

3.6.3.2 The standard shall be developed and maintained through a consensus process such as ASTM or ANSI.

4.0 Processing of Code Change Proposals

4.1 Intent: The processing of code change proposals is intended to ensure that each proposal complies with these Rules of Procedure and that the resulting published code change proposal accurately reflects that proponent's intent.

4.2 Review: Upon receipt in the Secretariat's office, the code change proposals will be checked for compliance with these Rules of Procedure as to division, separation, number of copies, form, language, terminology, supporting statements and substantiating data. Where a code change proposal consists of multiple parts which fall under the maintenance responsibilities of different code committees, the Secretariat shall determine the code committee responsible for determining the committee action in accordance with Section 5.6 and the Code Scoping Coordination Matrix (see Section 1.3.1).

4.3 Incomplete Code Change Proposals: When a code change proposal is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the Secretariat shall notify the proponent of the specific deficiencies and the proposal shall be held until the deficiencies are corrected, with a final date set for receipt of a corrected submittal. If the Secretariat receives the corrected code change proposal after the final date, the proposal shall be held over until the next code development cycle. Where there are otherwise no deficiencies addressed by this section, a code change proposal that incorporates a new referenced standard shall be processed with an analysis of the referenced standard's compliance with the criteria set forth in Section 3.6.

4.4 Editorial Code Change Proposals. When a code change proposal is submitted that proposes an editorial or format change that, in the opinion of the Secretariat, does not affect the scope or application of the code, the proposal shall be submitted to the Code Correlation Committee who shall deem the code change proposal as editorial or send the proposal back to the Secretariat to be considered by the appropriate code development committee. To be deemed editorial, such proposal shall require a majority vote of the Code Correlation Committee. Editorial proposals shall be published in the Code Change Agenda. Such proposals shall be added to the hearing agenda for consideration by the appropriate code development committee upon written request to ICC by any individual. The deadline to submit such requests shall be 14 days prior to the first day of the Committee Action Hearing. Code Correlation Committee proposals that are not added to a code development committee hearing agenda shall be published in the next edition of the code with no further consideration.

4.5 Copy Editing Code Text: The Chief Executive Officer shall have the authority at all times to make editorial style and format changes to the Code text, or any approved changes, consistent with the intent, provisions and style of the Code. Such editorial style or format changes shall not affect the scope or application of the Code requirements.

4.6 Updating Standards Referenced in the Codes: Standards referenced by the Codes that do not require coordination with a code change proposal to the code text shall be updated administratively by the Administrative Code Development Committee in accordance with these full procedures except that the deadline for availability of the updated standard and receipt by the Secretariat shall be December 1 of the third year of each code cycle. The published version of the new edition of the Code which references the standard will refer to the updated edition of the standard. If the standard is not available by the December 1st deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued. Multiple standards to be updated may be included in a single proposal.

4.6.1 Updating ICC Standards Referenced in the Codes. All standards developed by ICC and referenced by the Codes which are undergoing an update shall be announced by ICC to allow stakeholders to participate in the update process. Where the updated standard is completed and available by December 1 of the third year of the code cycle, the published version of the new edition of the Code which references the standard shall refer to the updated edition of the standard. If the standard is not available by the December 1st deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued.

4.7 **Preparation:** All code change proposals in compliance with these procedures shall be prepared in a standard manner by the Secretariat and be assigned separate, distinct and consecutive numbers. The Secretariat shall coordinate related proposals submitted in accordance with Section 3.3.2 to facilitate the hearing process.

4.8 **Code Change Agenda:** All code change proposals shall be posted on the ICC website at least 30 days prior to the Committee Action Hearing on those proposals and shall constitute the agenda for the Committee Action Hearing. Any errata to the Code Change Agenda shall be posted on the ICC website as soon as possible. Code change proposals which have not been published in the original posting or subsequent errata shall not be considered.

5.0 Committee Action Hearing

5.1 **Intent:** The intent of the Committee Action Hearing is to permit interested parties to present their views including the cost and benefits on the code change proposals on the published agenda. The code development committee will consider such comments as may be presented in the development of their action on the disposition of such code change proposals.

5.2 **Committee:** The Codes and Standards Council shall review all applications and make committee appointment recommendations to the ICC Board. The Code Development Committees shall be appointed by the ICC Board.

5.2.1 **Chairman/Moderator:** The Chairman and Vice-Chairman shall be appointed by the Codes and Standards Council from the appointed members of the committee. The ICC President shall appoint one or more Moderators who shall act as presiding officer for the Committee Action Hearing.

5.2.2 **Conflict of Interest:** A committee member shall withdraw from and take no part in those matters with which the committee member has an undisclosed financial, business or property interest. The committee member shall not participate in any committee discussion or any committee vote on the matter in which they have an undisclosed interest. A committee member who is a proponent of a code change proposal shall not participate in any committee discussion on the matter or any committee vote. Such committee member shall be permitted to participate in the floor discussion in accordance with Section 5.5 by stepping down from the dais.

5.2.3 **Representation of Interest:** Committee members shall not represent themselves as official or unofficial representatives of the ICC except at regularly convened meetings of the committee.

5.2.4 **Committee Composition:** The committee may consist of representation from multiple interests. A minimum of thirty-three and one-third percent (33.3%) of the committee members shall be regulators.

5.3 **Date and Location:** The date and location of the Committee Action Hearing shall be announced not less than 60 days prior to the date of the hearing.

5.4 **General Procedures:** *The Robert's Rules of Order* shall be the formal procedure for the conduct of the Committee Action Hearing except as a specific provision of these Rules of Procedure may otherwise dictate. A quorum shall consist of a majority of the voting members of the committee.

5.4.1 **Chair Voting:** The Chairman of the committee shall vote only when the vote cast will break a tie vote of the committee.

5.4.2 Open Hearing: The Committee Action Hearing is an open hearing. Any interested person may attend and participate in the floor discussion. Only code development committee members may participate in the committee action portion of the hearings (see Section 5.6). Participants shall not advocate a position on specific code change proposals with committee members other than through the methods provided in this policy.

5.4.3 Presentation of Material at the Public Hearing (2021 virtual CAH only): Information to be provided at the hearing shall be limited to verbal presentations and modifications submitted in accordance with Section 5.5.2. Each individual presenting information at the hearing shall state their name and affiliation, and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 3.3.5.3 and other material submitted in response to a code change proposal shall be submitted electronically to the appropriate ICC office. The material will be posted on the ICC website..

5.4.3.1 Presentation of Material at the Public Hearing (2022 CAH and after): Information to be provided at the hearing shall be limited to verbal presentations and modifications submitted in accordance with Section 5.5.2. Each individual presenting information at the hearing shall state their name and affiliation, and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 3.3.5.3 and other material submitted in response to a code change proposal shall be located in a designated area in the hearing room and shall not be distributed to the code development committee at the public hearing.

5.4.4 Agenda Order: The Secretariat shall publish a Code Change Agenda for the Committee Action Hearing, placing individual code change proposals in a logical order to facilitate the hearing. Any public hearing attendee may move to revise the agenda order as the first order of business at the public hearing, or at any time during the hearing except while another code change proposal is being discussed. Preference shall be given to grouping like subjects together, and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position.

5.4.4.1 Proponent Approval (2021 virtual CAH only): A motion to revise the agenda order is considered in order unless the proponent(s) of the moved code change proposals are participating in the virtual hearing and object to the move. Where such objections are raised, the motion to revise the hearing order shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to change the hearing order is not debatable.

5.4.4.2 Proponent Approval (2022 CAH and after): A motion to revise the agenda order is considered in order unless the proponent(s) of the moved code change proposals are in attendance in the hearing room and object to the move. Where such objections are raised, the motion to revise the hearing order shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to change the hearing order is not debatable.

5.4.4.3 Revised Agenda Order Approved (2021 virtual CAH only): If the motion to revise the agenda order is not ruled out of order, the Moderator shall declare the motion approved.

5.4.4.4 Revised Agenda Order Approved (2022 CAH and after): A motion to revise the agenda order is subject to a 2/3 vote of those present.

5.4.5 Tabling (2021 virtual CAH only): Tabling of code change proposals shall be permitted. The motion to table is considered in order unless the proponent(s) of the tabled code change proposals are participating in the virtual hearing and object to the tabling. Where such objections are raised, the motion to table shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to table is not debatable.

The motion to table must identify one of the following as to the location in the agenda when or where the code change proposal(s) will be considered:

1. To a specific date and time within the timeframe of the Code Change Agenda for the code change proposals under consideration, or
2. To a specific location in the Code Change Agenda for the code change proposals under consideration.

5.4.5.1 Tabling (2022 CAH and after): Tabling of code change proposals shall be permitted. The motion to table is considered in order unless the proponent(s) of the tabled code change proposals are in attendance at the hearing and object to the tabling. Where such objections are raised, the motion to table shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to table is not debatable.

The motion to table must identify one of the following as to the location in the agenda when or where the code change proposal(s) will be considered:

1. To a specific date and time within the timeframe of the Code Change Agenda for the code change proposals under consideration, or
2. To a specific location in the Code Change Agenda for the code change proposals under consideration.

5.4.5.2 Tabling approved (2021 virtual CAH only): If the motion to table is not ruled out of order, the Moderator shall declare the motion approved.

5.4.5.3 Tabling approved (2022 CAH and after): A motion to table is subject to a 2/3 vote of those present.

5.4.5.4 Tabled code change proposals back to the floor: The Moderator shall bring the tabled code change proposal(s) back to the floor at the applicable time/agenda location in accordance with Section 5.4.5 Items 1 or 2. The testimony on the code change proposal shall resume at the point in the process where the tabling occurred.

5.4.6 Reconsideration: There shall be no reconsideration of a code change proposal after it has been voted on by the committee in accordance with Section 5.6.

5.4.7 Time Limits: Time limits shall be established as part of the agenda for testimony on all code change proposals at the beginning of each hearing session. Each person requesting to testify on a code change proposal shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall have limited authority to modify time limitations on debate. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.

5.4.7.1 Time Keeping: Keeping of time for testimony by an individual shall be by an automatic timing device. Remaining time shall be evident to the person testifying. Interruptions during testimony shall not be tolerated. The Moderator shall maintain appropriate decorum during all testimony.

5.4.7.2 Proponent Testimony: The Proponent is permitted to waive an initial statement. The Proponent shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where the code change proposal is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to be allotted additional time for rebuttal.

5.4.8 Points of Order (2021 virtual CAH): Any person participating in the public hearing may challenge a procedural ruling of the Moderator or the Chairman. The decision on such challenges shall be determined by a vote of the committee, which requires a majority vote.

5.4.8.1 Points of Order (2022 CAH and after): Any person participating in the public hearing may challenge a procedural ruling of the Moderator or the Chairman. A majority vote of ICC Members in attendance shall determine the decision.

5.5 Floor Discussion: The Moderator shall place each code change proposal before the hearing for discussion by identifying the proposal and by regulating discussion as follows:

5.5.1 Discussion Order:

1. Proponents. The Moderator shall begin by asking the proponent and then others in support of the code change proposal for their comments.
2. Opponents*.* After discussion by those in support of a code change proposal, those opposed hereto, if any, shall have the opportunity to present their views.
3. Rebuttal in support. Proponents shall then have the opportunity to rebut points raised by the opponents.
4. Re-rebuttal in opposition. Opponents shall then have the opportunity to respond to the proponent's rebuttal.

5.5.2 Modifications: Modifications to code change proposals may be suggested from the floor by any person participating in the public hearing. The person proposing the modification, or his/her designee, is deemed to be the proponent of the modification.

5.5.2.1 Submission. All modifications shall be submitted electronically to the ICC Secretariat in a format determined by ICC unless determined by the Chairman to be either editorial or minor in nature. The modification will be forwarded electronically to the members of the code development committee during the hearing and will be projected on the screen in the hearing room.

5.5.2.2 Criteria. The Chairman shall rule proposed modifications in or out of order before they are discussed on the floor. A proposed modification shall be ruled out of order if it:

1. changes the scope of the original code change proposal; or

2. is not readily understood to allow a proper assessment of its impact on the original code change proposal or the Code.

The ruling of the Chairman on whether or not the modification is in or out of order shall be final and is not subject to a point of order in accordance with Section 5.4.8.

5.5.2.3 **Testimony.** When a modification is offered from the floor and ruled in order by the Chairman, a specific floor discussion on that modification is to commence in accordance with the procedures listed in Section 5.5.1.

5.6 **Committee Action:** Following the floor discussion of each code change proposal, one of the following motions shall be made and seconded by members of the committee:

1. Approve the code change proposal As Submitted (AS) or
2. Approve the code change proposal As Modified with specific modifications (AM), or
3. Disapprove the code change proposal (D)

Discussion on this motion shall be limited to code development committee members. If a committee member proposes a modification which had not been proposed during floor discussion, the Chairman shall rule on the modification in accordance with Section 5.5.2.2. If a committee member raises a matter of issue, including a proposed modification, which has not been proposed or discussed during the floor discussion, the Moderator shall suspend the committee discussion and shall reopen the floor discussion for comments on the specific matter or issue. Upon receipt of all comments from the floor, the Moderator shall resume committee discussion.

The code development committee shall vote on each motion with the majority dictating the committee's action. Committee action on each code change proposal shall be completed when one of the motions noted above has been approved. Each committee vote shall be supported by a reason.

The code development committee shall maintain a record of its proceedings including the action on each code change proposal.

5.7 *[Deleted as part of November 2, 2020 Revision]*

5.8 **Report of the Committee Action Hearing:** The results of the Committee Action Hearing, including committee action and reason, shall be posted on the ICC website not less than 60 days prior to the Public Comment Hearing, except as approved by the ICC Board.

6.0 Public Comments

6.1 **Intent:** The public comment process gives attendees at the Public Comment Hearing an opportunity to consider specific objections to the results of the Committee Action Hearing and more thoughtfully prepare for the discussion for public comment consideration. The public comment process expedites the Public Comment Hearing by limiting the items discussed to consideration of items for which a public comment has been submitted.

6.2 **Deadline:** The deadline for receipt of a public comment to the results of the Committee Action Hearing shall be announced at the Committee Action Hearing but shall not be less than 30 days subsequent to the availability of the Report of the Committee Action Hearing (see Section 5.8).

6.3 Withdrawal of Public Comment: A public comment may be withdrawn by the public commenter at any time prior to public comment consideration of that comment. A withdrawn public comment shall not be subject to public comment consideration. If the only public comment to a code change proposal is withdrawn by the public commenter prior to the vote on the consent agenda in accordance with Section 7.5.5, the proposal shall be considered as part of the consent agenda. If the only public comment to a code change proposal is withdrawn by the public commenter after the vote on the consent agenda in accordance with Section 7.5.5, the proposal shall continue as part of the individual consideration agenda in accordance with Section 7.5.6, however the public comment shall not be subject to public comment consideration.

6.4 Form and Content of Public Comments: Any interested person, persons, or group may submit a public comment to the results of the Committee Action Hearing which will be considered when in conformance to these requirements. Each public comment to a code change proposal shall be submitted separately and shall be complete in itself. Each public comment shall contain the following information:

6.4.1 Public comment: Each public comment shall include the name, title, mailing address, telephone number and email address of the public commenter. Email addresses shall be published with the public comments unless the commenter otherwise requests on the submittal form.

If a group, organization, or committee submits a public comment, an individual with prime responsibility shall be indicated. If a public comment is submitted on behalf a client, group, organization or committee, the name and mailing address of the client, group, organization or committee shall be indicated. The scope of the public comment shall be consistent with the scope of the original code change proposal or committee action. Public comments which are determined as not within the scope of the code change proposal or committee action shall be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public comment in accordance with Section 6.5.1 and the public comment shall be held until the deficiencies are corrected. A copyright release in accordance with Section 3.3.5.5 shall be provided with the public comment.

6.4.2 Code Reference: Each public comment shall include the code change proposal number.

6.4.3 Multiple public comments to a code change proposal. A proponent shall not submit multiple public comments to the same code change proposal. When a proponent submits multiple public comments to the same code change proposal, the public comments shall be considered as incomplete public comments and processed in accordance with Section 6.5.1. This restriction shall not apply to public comments that attempt to address differing subject matter within a code section.

6.4.4 Desired Final Action: In order for a public comment to be considered, the public comment shall indicate the desired Final Action as one of the following:

1. Approve the code change proposal As Submitted (AS), or
2. Approve the code change proposal As Modified by the committee modification published in the Report of the Committee Action Hearing (AM) or published in a public comment in the Public Comment Agenda (AMPC), or
3. Disapprove the code change proposal (D)

6.4.5 Supporting Information: The public comment shall include a statement containing a reason and justification for the desired Final Action on the code change proposal. Reasons and justification which are reviewed in accordance with Section 6.5 and determined as not germane to the technical issues addressed in the code change proposal or committee action may be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public comment in accordance with Section 6.5.1 and the public comment shall be held until the deficiencies are corrected. The public commenter shall have the right to appeal this action in accordance with the policy of the ICC Board. A bibliography of any substantiating material submitted with a public comment shall be published with the public comment and the substantiating material shall be made available at the Public Comment_Hearing. Supporting documentation may be provided via a link to a website provided by the public commenter and included in the reason statement and bibliography. The reason statement shall include the date the link was created. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

6.4.6 Cost Impact: The proponent of the public comment shall indicate one of the following regarding the cost impact of the public comment to the code change proposal:

1) The net effect of the public comment and code change proposal will increase the cost of construction;
2) The net effect of the public comment and code change proposal will decrease the cost of construction; or
3) The net effect of the public comment and code change proposal will not increase or decrease the cost of construction.

The public commenter shall submit information which substantiates such assertion. This information will be considered at the Public Comment Hearing and will be included in the published public comment. Supporting documentation may be provided via a link to a website provided by the public commenter and included in the cost substantiation statement. The cost substantiation statement shall include the date the link was created.

Any public comment submitted which does not include the requisite cost impact information shall be considered incomplete and shall not be processed.

6.4.7 Online submittal: Each public comment and substantiating information shall be submitted online at the website designated by ICC. Additional copies may be requested when determined necessary by the Secretariat.

6.4.8 Submittal Deadline: ICC shall establish and post the submittal deadline for each cycle. The posting of the deadline shall occur no later than 120 days prior to the public comment deadline. Each public comment shall be submitted online at the website designated by ICC by the posted deadline. The submitter of a public comment is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.

6.5 Review: The Secretariat shall be responsible for reviewing all submitted public comments from an editorial and technical viewpoint similar to the review of code change proposals (see Section 4.2).

6.5.1 Incomplete Public Comment: When a public comment is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the public comment shall not be processed. The Secretariat shall notify the public commenter of the specific deficiencies and the public comment shall be held until the deficiencies are corrected, or the public comment shall be returned to the public commenter with instructions to correct the deficiencies with a final date set for receipt of the corrected public comment.

6.5.2 Duplications: On receipt of duplicate or parallel public comments, the Secretariat may consolidate such public comments for public comment consideration. Each public commenter shall be notified of this action when it occurs.

6.5.3 Deadline: Public comments received by the Secretariat after the deadline set for receipt shall not be published and shall not be considered as part of the public comment consideration. This deadline shall not apply to public comments submitted by the Code Correlation Committee. In order to correlate submitted public comments with action taken at the Committee Action Hearing on code change proposals that did receive a public comment, the Code Correlation Committee, in conjunction with staff processing of public comments, shall review the submitted public comments and submit the necessary public comments in order to facilitate the coordination of code change proposals. Such review and submittal shall not delay the posting of the Public Comment Agenda as required in Section 6.6.

6.6 Public Comment Agenda: The Committee Action Hearing results on code change proposals that have not received a public comment and code change proposals which received public comments shall constitute the Public Comment Agenda. The Public Comment Agenda shall be posted on the ICC website at least 30 days prior the Public Comment Hearing. Any errata to the Public Comment Agenda shall be posted on the ICC website as soon as possible. Code change proposals and public comments which have not been published in the original posting or subsequent errata shall not be considered.

7.0 Public Comment Hearing

7.1 Intent: The Public Comment Hearing is the first of two steps to make a final determination on all code change proposals which have been considered in a code development cycle by a vote cast by eligible voters (see Section 9.0). The second step, which follows the Public Comment Hearing, is the Online Governmental Consensus Vote that is conducted in accordance with Section 8.0.

7.2 Date and Location: The date and location of the Public Comment Hearing shall be announced not less than 60 days prior to the date of the hearing.

7.3 Moderator: The ICC President shall appoint one or more Moderators who shall act as presiding officer for the Public Comment Hearing.

7.4 Public Comment Agenda: The Public Comment Consent Agenda shall be comprised of code change proposals which have not received a public comment. The agenda for public testimony and individual consideration shall be comprised of proposals which have a public comment (see Section 6.1).

7.5 Procedure: *The Robert's Rules of Order* shall be the formal procedure for the conduct of the Public Comment Hearing except as these Rules of Procedure may otherwise dictate.

7.5.1 Open Hearing: The Public Comment Hearing is an open hearing. Any interested person may attend and participate in the floor discussion.

7.5.2 Agenda Order: The Secretariat shall publish a Public Comment Agenda for the Public Comment Hearing, placing individual code change proposals and public comments in a logical order to facilitate the hearing. The proponents or opponents of any code change proposal or public comment may move to revise the agenda order as the first order of business at the public hearing, or at any time during the hearing except while another proposal is being discussed. Preference shall be given to grouping like subjects together and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position.

7.5.2.1 Proponent Approval: A motion to revise the agenda order is considered in order unless the proponent(s) of the moved code change proposals are in attendance at the hearing and object to the move. Where such objections are raised, the motion to revise the hearing order shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to change the hearing order is not debatable.

7.5.2.2 Revised Agenda Order Approved: A motion to revise the agenda order is subject to a 2/3 vote of those present.

7.5.3 Tabling: Tabling of code change proposals shall be permitted. The motion to table is considered in order unless the proponent(s) of the tabled code change proposals are in attendance at the hearing and object to the tabling. Where such objections are raised, the motion to table shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to table is not debatable.

The motion to table must identify one of the following as to the location in the agenda when or where the code change proposal(s) will be considered:

1. To a specific date and time within the timeframe of the Public Comment Agenda for the code change proposals under consideration, or
2. To a specific location in the Public Comment Agenda for the code change proposals under consideration.

7.5.3.1 Tabling approved: A motion to table is subject to a 2/3 vote of those present.

7.5.3.2 Tabled code change proposals back to the floor: The Moderator shall bring the tabled code change proposal(s) back to the floor at the applicable time/agenda location in accordance with Section 7.5.3 Items 1 or 2. The testimony on the code change proposal shall resume at the point in the process where the tabling occurred.

7.5.4 Presentation of Material at the Public Comment Hearing: Information to be provided at the hearing shall be limited to verbal presentations. Each individual presenting information at the hearing shall state their name and affiliation, and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 6.4.5 and other material submitted in response to a code change proposal or public comment shall be located in a designated area in the hearing room.

7.5.5 Public Comment Consent Agenda: The Public Comment Consent Agenda (see Section 7.4) shall be placed before the assembly with a single motion for Final Action in accordance with the results of the Committee Action Hearing. When the motion has been seconded, the vote shall be taken with no testimony being allowed. A simple majority (50% plus one) based on the number of votes cast by eligible voters shall decide the motion. This action shall not be subject to the Online Governmental Consensus Vote following the Public Comment Hearing (see Section 8.0).

7.5.6 Public Comment Individual Consideration Agenda: Upon completion of the Public Comment Consent Agenda vote, all code change proposals not on the Public Comment Consent Agenda shall be placed before the assembly for individual consideration of each item (see Section 7.4).

7.5.7 Reconsideration: There shall be no reconsideration of a code change proposal after it has been voted on in accordance with Section 7.5.9.

7.5.8 Time Limits: Time limits shall be established as part of the agenda for testimony on all code change proposals at the beginning of each hearing session. Each person requesting to testify on a code change proposal shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall have limited authority to modify time limitations on debate. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.

7.5.8.1 Time Keeping: Keeping of time for testimony by an individual shall be by an automatic timing device. Remaining time shall be evident to the person testifying. Interruptions during testimony shall not be tolerated. The Moderator shall maintain appropriate decorum during all testimony.

7.5.9 Discussion and Voting: Discussion and voting on code change proposals being individually considered shall be in accordance with the following procedures and the voting majorities in Section 7.6:

7.5.9.1 Proponent testimony: The Proponent of a public comment is permitted to waive an initial statement. The Proponent of the public comment shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where a public comment is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to waive an initial statement.

7.5.9.2 Points of Order: Any person participating in the public hearing may challenge a procedural ruling of the Moderator. A majority vote of ICC Members in attendance shall determine the decision.

7.5.9.3 Eligible voters: Voting shall be limited to eligible voters in accordance with Section 9.0.

7.5.9.4 Allowable Final Action Motions: The only allowable motions for Final Action are Approval as Submitted (AS), Approval as Modified by the committee (AM) or by one or more modifications published in the Public Comment Agenda (AMPC), and Disapproval (D).

7.5.9.5 Initial Motion: The code development committee action shall be the initial motion considered.

7.5.9.6 Motions for Modifications: Whenever a motion under consideration is for Approval as Submitted or Approval as Modified, a subsequent motion and second for a modification published in the Public Comment Agenda may be made (see Section 6.4.4). Each subsequent motion for modification, if any, shall be individually discussed and voted before returning to the main motion. A two-thirds majority based on the number of votes cast by eligible voters shall be required for a successful motion on all modifications.

7.5.9.7 **Voting:** After dispensing with all motions for modifications, if any, and upon completion of discussion on the main motion, the Moderator shall then ask for the vote on the main motion. The vote on the main motion shall be taken electronically with the vote recorded and each vote assigned to the eligible voting member. In the event the electronic voting system is determined not to be used by ICC, a hand/standing count will be taken by the Moderator. If the motion fails to receive the majority required in Section 7.6, the Moderator shall ask for a new motion.

7.5.9.8 **Subsequent Motion:** If the initial motion is unsuccessful, a motion for either Approval as Submitted or Approval as Modified by one or more published modifications is in order. A motion for Disapproval is not in order. The vote on the main motion shall be taken electronically with the vote recorded and each vote assigned to the eligible voting member. In the event the electronic voting system is determined not to be used by ICC, a hand/standing count will be taken by the Moderator. If a successful vote is not achieved, Section 7.5.9.9 shall apply.

7.5.9.9 **Failure to Achieve Majority Vote at the Public Comment Hearing.** In the event that a code change proposal does not receive any of the required majorities in Section 7.6, the results of the Public Comment Hearing for the code change proposal in question shall be Disapproval. The vote count that will be reported as the Public Comment Hearing result will be the vote count on the main motion in accordance with Section 7.5.9.7.

7.5.9.10 **Public Comment Hearing Results:** The result and vote count on each code change proposal considered at the Public Comment Hearing shall be announced at the hearing. In the event the electronic voting system is not utilized and a hand/standing count is taken in accordance with Sections 7.5.9.7 and 7.5.9.8, the vote count will not be announced if an individual standing vote count is not taken. The results shall be posted and included in the Online Governmental Consensus Ballot (see Section 8.2).

7.6 **Majorities for Final Action:** The required voting majority for code change proposals individually considered shall be based on the number of votes cast of eligible voters at the Public Comment Hearing shall be in accordance with the following table:

Committee Action	**Desired Final Action**		
	AS	**AM/AMPC**	**D**
AS	Simple Majority	2/3 Majority	Simple Majority
AM	2/3 Majority	Simple Majority to sustain the Committee Action or; 2/3 Majority on each additional modification and 2/3 Majority on entire code change proposal for AMPC	Simple Majority
D	2/3 Majority	2/3 Majority	Simple Majority

8.0 Online Governmental Consensus Vote

8.1 **Public Comment Hearing Results:** The results from the Individual Consideration Agenda at the Public Comment Hearing (see Sections 7.5.6 and 7.5.9.10) shall be the basis for the Online Governmental Consensus Vote. The ballot shall include the voting options in accordance with the following table:

Committee Action	Public Comment Hearing result and Voting Majority	Online Governmental Consensus Ballot and Voting Majority	
AS	**AS:** Simple Majority	**AS:** Simple Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AS:** Simple Majority	**D:** Simple Majority
AM	**AS:** 2/3 Majority	**AS:** 2/3 Majority	**D:** Simple Majority
	AM: Simple Majority	**AM:** Simple Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AM:** Simple Majority	**D:** Simple Majority
D	**AS:** 2/3 Majority	**AS:** 2/3 Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AS:** 2/3 Majority	**D:** Simple Majority

8.2 Online Governmental Consensus Vote Voter Statement: In order to vote on the Online Governmental Consensus Vote, the eligible voter is required to acknowledge the following in order to proceed to the ballot:

1. I am currently an employee or public official actively engaged either full or part time in the administration, formulation, implementation or enforcement of laws, ordinances, rules or regulations relating to the public health, safety and welfare, or have Honorary Member status.
2. I am participating in this ICC activity in compliance with the ICC Code of Ethics, and I will avoid any circumstance that could create the appearance of a conflict of interest or otherwise compromise professional integrity.
3. As an eligible voting member, I have done my due diligence to become an informed voter on the matters that I am voting on, or as a representative of an ICC Governmental Member, my vote is being directed by the Governmental Member.
4. I am aware that voter guides that seek to influence or recommend voter positions are not endorsed by the International Code Council, and I understand that I am under no obligation to vote in accordance with any such voter guides.
5. I will not vote on any code change that would provide me with a direct personal financial benefit.
6. I will not vote on any code change that would provide a direct financial benefit to any individual or company with which I have a business interest or relationship.

8.3 Online Governmental Consensus Ballot: The ballot for each code change proposal considered at the Public Comment Hearing will include:

1. The Public Comment Hearing result and vote count.
2. The allowable Online Governmental Consensus Vote actions in accordance with Section 8.1.
3. Where the Public Comment Hearing result is As Submitted (AS) or Disapproval (D), the original code change proposal will be presented.
4. Where the Public Comment Hearing result is As Modified by the committee (AM) or As Modified by one or more Public Comments (AMPC), the original code change and approved modification(s) will be presented.
5. The committee action taken at the Committee Action Hearing.
6. ICC staff identification of correlation issues.
7. For those who voted at the Public Comment Hearing, the ballot will indicate how they voted, unless an electronic vote count is not taken in accordance with Section 7.5.9.10.
8. An optional comment box to provide comments.
9. Access to the Public Comment Agenda which includes: the original code change, the

report of the committee action and the submitted public comments.
10. Access to the audio and video of the Committee Action and Public Comment Hearing proceedings.
11. Identification of the ballot period for which the online balloting will be open.

8.4 **Voting process:** Voting shall be limited to eligible voters in accordance with Section 9.0. Eligible voters are authorized to vote during the Public Comment Hearing and during the Online Governmental Consensus Vote; however, only the last vote cast will be included in the final vote tabulation. The ballot period will not be extended beyond the published period except as approved by the ICC Board.

8.4.1 **Participation requirement**: A minimum number of participants to conduct the Online Governmental Consensus Vote shall not be required unless the code change proposal(s) were not voted upon utilizing the electronic voting devices at the Public Comment Hearing and the resulting vote was not assigned to each eligible voting member in accordance with Sections 7.5.9.7 and 7.5.9.8 . If this occurs, a minimum number of participants shall be required for those code change proposal(s) based on an assessment of the minimum number of votes cast during the entire Public Comment Hearing and the Online Governmental Consensus Vote shall determine the final on action on the code change proposal(s) in accordance with Section 10.1.

9.0 Eligible Final Action Voters

9.1 **Eligible Final Action Voters:** Eligible Final Action voters include ICC Governmental Member Voting Representatives and Honorary Members in good standing who have been confirmed by ICC in accordance with the Electronic Voter Validation System. Such confirmations are required to be revalidated once each code development cycle. After initial validation, changes to the list of GMVRs for the remainder of the code development cycle shall be made in accordance with Section 9.2. Eligible Final Action voters in attendance at the Public Comment Hearing and those participating in the Online Governmental Consensus Vote shall have one vote per eligible voter on all Codes. Individuals who represent more than one Governmental Member shall be limited to a single vote.

9.2 **Applications:** Applications for Governmental Membership must be received by the ICC at least 30 days prior to the Committee Action Hearing in order for its designated representatives to be eligible to vote at the Public Comment Hearing or Online Governmental Consensus Vote. Applications, whether new or updated, for Governmental Member Voting Representative status must be received by the Code Council 30 days prior to the commencement of the first day of the Public Comment Hearing in order for any designated representative to be eligible to vote. An individual designated as a Governmental Member Voting Representative shall provide sufficient information to establish eligibility as defined in the ICC Bylaws. The Executive Committee of the ICC Board, in its discretion, shall have the authority to address questions related to eligibility.

10.0 Tabulation, certification and posting of results

10.1 **Tabulation and Validation:** Following the closing of the online ballot period, the votes received will be combined with the vote tally at the Public Comment Hearing to determine the final vote on the code change proposal. If a hand/standing count is utilized per Subsection 7.5.9.7 or 7.5.9.8, those votes of the Public Comment Hearing will not be combined with the online ballot. ICC shall retain a record of the votes cast and the results shall be certified by a validation committee appointed by the ICC Board. The validation committee shall report the results to the ICC Board, either confirming a valid voting process and result or citing irregularities in accordance with Section 10.2.

10.2 Voting Irregularities: Where voting irregularities or other concerns with the Online Governmental Consensus Voting process which are material to the outcome or the disposition of a code change proposal(s) are identified by the validation committee, such irregularities or concerns shall be immediately brought to the attention of the ICC Board. The ICC Board shall take whatever action necessary to ensure a fair and impartial Final Action vote on all code change proposals, including but not limited to:

1. Set aside the results of the Online Governmental Consensus Vote and have the vote taken again.
2. Set aside the results of the Online Governmental Consensus Vote and declare the Final Action on all code change proposals to be in accordance with the results of the Public Comment Hearing.
3. Other actions as determined by the ICC Board.

10.3 Failure to Achieve Majority Vote: In the event a code change proposal does not receive any of the required majorities for Final Action in Section 8.0, Final Action on the code change proposal in question shall be Disapproval.

10.4 Final Action Results: The Final Action on all code change proposals shall be published as soon as practicable after certification of the results. The results shall include the Final Action taken, including the vote tallies from both the Public Comment Hearing and Online Governmental Consensus Vote, as well the required majority in accordance with Section 8.0. ICC shall maintain a record of individual votes for auditing purposes, however, the record shall not be made public. The exact wording of any resulting text modifications shall be made available to any interested party.

11.0 Code Publication

11.1 Next Edition of the Codes: The Final Action results on code change proposals shall be the basis for the subsequent edition of the respective Code.

11.2 Code Correlation: The Code Correlation Committee is authorized to resolve technical or editorial inconsistencies resulting from actions taken during the code development process by making appropriate changes to the text of the affected code. The process to resolve technical or editorial inconsistencies shall be conducted in accordance with CP#44 Code Correlation Committee.

12.0 Appeals

12.1 Right to Appeal: Any person may appeal an action or inaction in accordance with Council Policy 1 Appeals. Any appeal made regarding voter eligibility, voter fraud, voter misrepresentation or breach of ethical conduct must be supported by credible evidence and must be material to the outcome of the final disposition of a code change proposal(s).

The following actions are not appealable:

1. Variations of the results of the Public Comment Hearing compared to the Final Action result in accordance with Section 10.4.
2. Denied requests to extend the voter balloting period in accordance with Sections 5.7.4 or 8.3.
3. Lack of access to the internet based online collaboration and voting platform to submit a code change proposal, to submit a public comment or to vote.
4. Code Correlation Committee changes made in accordance with Section 11.2.

13.0 Violations

13.1 ICC Board Action on Violations: Violations of the policies and procedures contained in this Council Policy shall be brought to the immediate attention of the ICC Board for response and resolution. Additionally, the ICC Board may take any actions it deems necessary to maintain the integrity of the code development process.

Sections revised in July 16, 2021 revision to CP-28:
8.2

Sections revised in December 3, 2020 revision to CP-28:
3.3.5.4
3.3.5.4.1
5.4.3
5.4.3.1
5.4.4.1
5.4.4.2
5.4.4.3
5.4.4.4
5.4.5
5.4.5.1
5.4.5.2
5.4.5.3
5.4.5.4
5.4.8
5.4.8.1

Sections revised in November 2, 2020 revisions to CP-28:
5.7 (removal of entire section)
2.5
5.1
5.4.2
5.8
6.1
6.4.1
6.6
7.4

Section revised in January 1, 2019 revision to CP-28:
9.1

Sections revised in October 20, 2018 revision to CP-28:
2.4
2.4.1
2.4.1.1
2.4.1.2
2.4.2
2.4.2.1
2.4.2.2
2.4.2.3
2.4.2.4
2.4.2.5
2.4.2.6
2.4.2.7
2.4.2.8
2.4.2.9
2.4.2.10
2.4.2.11

Sections revised in July 27, 2018 revision to CP-28:

4.6.1

Sections revised in December 8, 2017 revision to CP-28:

3.3.5.5
8.3.1

Sections revised in September 9, 2017 revision to CP-28:

3.2
3.3.5.3
3.3.5.4
3.3.5.6
3.6.3.1.1
3.6.3.1.2
4.6
5.4.4
5.4.4.1
5.4.4.2
5.4.5
5.4.5.1
5.4.5.2
5.5.2
5.5.2.2
6.4.5
6.4.6
7.5.2
7.5.2.1
7.5.2.2
7.5.3
7.5.3.1
7.5.3.2
7.5.9.10
8.2 – Number 7
11.2

2022 GROUP B ICC CODE DEVELOPMENT CYCLE
CROSS INDEX OF PROPOSED CODE CHANGES

Some of the proposed code changes include sections that are outside of the scope of the chapters or the code listed in the table of 2021-2022 Staff Secretaries on page xiv. This is done in order to facilitate coordination among the International Codes which is one of the fundamental principles of the International Codes.

Listed in this cross index are proposed code changes that include sections of codes or codes other than those listed on page ix. For example, IBC Section 3102.1.2 is proposed for revision in code change S116-22 which is to be heard by the IBC-Structural Committee (IBC-S). Chapter 31 of the IBC is typically the responsibility of the IBC-General Committee as listed in the table of 2021-2022 Staff Secretaries. It is therefore identified in this cross index. Another example is Section 703.1 of the International Fuel Gas Code. The International Fuel Gas Code is normally maintained by the IFGC Committee, but Section 302.3 will be considered for revision in proposed code change S224-22 which will be placed on the IBC-S Committee agenda. In some instances, there are other subsections that are revised by an identified code change that is not included in the cross index. For example all sections of Chapter 1 of every code are designated ADM unless specifically noted in the respective Code listing. For instance there are 22 ADM changes that include proposed revisions to the IEBC Chapter 1. In addition, the International Existing Building Code (EB) lists several code change proposals where IEBC Chapter 1 sections are part of the code change proposal. This was done to keep the cross index brief enough for easy reference.

This information is provided to assist users in locating all of the proposed code changes that would affect a certain section or chapter. For example, to find all of the proposed code changes that would affect Chapter 7 of the IEBC, review the proposed code changes in the portion of the monograph for the IEBC Code Development Committee (listed with a EB prefix) then review this cross reference for Chapter 7 of the IEBC for proposed code changes published in other code change groups. While care has been taken to be accurate, there may be some omissions in this list.

Letter prefix: Each proposed change number has a letter prefix that will identify where the proposal is published. The letter designations for proposed changes and the corresponding publications are as follows:

PREFIX	**PROPOSED CHANGE GROUP (see monograph table of contents for location)**
ADM	Administrative
E	International Building Code - Means of Egress
EB	International Existing Building Code
F	International Fire Code
FG	International Fuel Gas Code
FS	International Building Code - Fire Safety
G	International Building Code – General
M	International Mechanical Code
PC	ICC Performance Code
P	International Plumbing Code
PSD	International Private Sewage Disposal Code
RB	International Residential Code - Building
S	International Building Code – Structural
SP	International Swimming Pool and Spa Code
WUIC	International Wildland-Urban Interface Code

INTERNATIONAL BUILDING CODE	
Section #	**Code Change #**
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
[A] 108.1	S116-22
[A] 110.3.6	S58-22
[A] 110.3.12.1	S125-22 Part I
116.5	EB1-22
Chapter 2	
[A] APPROVED AGENCY	ADM13-22 Part I, ADM16-22 Part I
[BS] BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) PRODUCT	S18-22
BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) ROOF COVERING (New)	S21-22
CARBON DIOXIDE EQUIVALENT (CO2e) (New)	S178-22
CAST-IN-PLACE CONCRETE EQUIVALENT DIAPHRAGM (New)	S175-22
COMMUNITY RENEWABLE ENERGY FACILITY (New)	S178-22
[BS] CONCRETE	S178-22
CONCRETE, LIGHTWEIGHT (New)	S178-22
[BS] CRIPPLE WALL CLEAR HEIGHT (New)	S222-22
DANGEROUS	EB2-22
DECORATIVE GLAZING	CCC IRC9-22
DETAILED PLAIN CONCRETE STRUCTURAL WALL	S175-22
FINANCIAL RENEWABLE ENERGY POWER PURCHASE AGREEMENT (PPA) (New)	S178-22
FLAT GLASS (New)	S178-22
GROUND SNOW LOAD GEODATABASE (New)	S64-22
GROUND SNOW LOAD, p_g (New)	S64-22
GROUND SNOW LOAD, $p_{g(asd)}$ (New)	S64-22
[BS] HURRICANE-PRONE REGIONS	S9-22
[A] LISTED	ADM1-22 Part I
LOW-SLOPE (New)	S8-22
METAL BUILDING SYSTEM (New)	S197-22
METAL BUILDING SYSTEMS (New)	S142-22
ON-SITE RENEWABLE ENERGY (New)	S178-22
ORDINARY STRUCTURAL PLAIN CONCRETE WALL	S175-22
PEER REVIEW (New)	ADM13-22 Part I
[BS] PHOTOVOLTAIC SHINGLES	S21-22
PHYSICAL RENEWABLE ENERGY POWER	S178-22

PLATE GLASS (New)	S178-22
PRECAST CONCRETE DIAPHRAGM (New)	S175-22
PUBLIC-OCCUPANCY TEMPORARY STRUCTURE (New)	S116-22
PURCHASE AGREEMENT (PPA) (New)	S178-22
RENEWABLE ENERGY RESOURCES (New)	S178-22
[BS] RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCER) GROUND MOTION RESPONSE ACCELERATIONS	S128-22
[BS] ROOF COATING	S29-22
ROOF COVERING SYSTEM	S29-22
SERVICE LIFE (New)	S116-22
SHEET GLASS (New)	S178-22
[BS] SITE CLASS	S128-22
[BS] SITE COEFFICIENTS	S128-22
[BF] STEEP SLOPE	S8-22
[BS] SUSCEPTIBLE BAY	S117-22
TEMPORARY EVENT (New)	S116-22
TEMPORARY STRUCTURE (New)	S116-22
[A] TOWNHOUSE	ADM2-22
TOWNHOUSE UNIT (New)	ADM2-22
[BS] WINDBORNE DEBRIS REGION	S9-22
[BS] WINDBORNE DEBRIS REGION	S62-22
[BS] WIND DESIGN GEODATABASE (New)	S62-22
[BS] WIND SPEED, *V*	S9-22
Chapter 14	
[BS] 1404.16	S9-22
[BS] 1404.18	S9-22
Chapter 31	
3001.3	S122-22
3001.6 (New)	S122-22
Chapter 31	
3103.1	S116-22
3103.1.1 (New)	S116-22
3102.1.2	S116-22
3103.1.3	S116-22
3103.5 (New)	S116-22
3102.5.1 (New)	S116-22

TABLE 3103.5.1 (New)	S116-22
3103.5.1.1 (New)	S116-22
3103.5.1.2 (New)	S116-22
3103.5.1.3 (New)	S116-22
3103.5.1.4 (New)	S116-22
3103.5.1.5 (New)	S116-22
3103.5.1.6 (New)	S116-22
3103.5.1.7 (New)	S116-22
3103.5.1.8 (New)	S116-22
3103.5.2 (New)	S116-22
3103.5.3 (New)	S116-22
3103.5.4 (New)	S116-22
3103.5.5 (New)	S116-22
3103.5.6 (New)	S116-22
3103.5.7 (New)	S116-22
3103.5.7.1 (New)	S116-22
3103.5.7.2 (New)	S116-22
3103.5.7.3 (New)	S116-22
3111.3.6 (New)	S41-22
Chapter 33	
[BS] 3301.2.1	S29-22
Appendix J	
J104.4	S128-22
Appendix L	
L101.1	S128-22
INTERNATIONAL EXISTING BUILDING CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
101.2	RB2-22 Part II
101.4	RB2-22 Part II
[A] 109.3.5	S58-22 Part I
109.3.10	S125-22 Part II
Chapter 2	
APPROVED AGENCY (New)	ADM13-22 Part I, ADM16-22 Part I, ADM20-22
APPROVED SOURCE (New)	ADM16-22 Part I
[A] LISTED	ADM1-22 Part I
PEER REVIEW (New)	ADM13-22 Part I
Chapter 3	
302.2	RB2-22 Part II

Chapter 7	
[BS] 705.1	S25-22, S46-22, S47-22
[BS] 705.2	S48-22, S49-22, S53-22
[BS] 705.3	S58-22
[BS] 705.4	S59-22, S60-22
705.4 (New)	S57-22
[BS] 705.5	S60-22
705.5 (New)	S60-22
705.5.1 (New)	S60-22
INTERNATIONAL FIRE CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS AND THE FOLLOWING
114.6	EB1-22
Chapter 2	
APPROVED AGENCY (New)	ADM13-22 Part I, ADM16-22 Part I, ADM19-22
APPROVED SOURCE (New)	ADM16-22 Part I
[A] LISTED	ADM1-22 Part I
PEER REVIEW (New)	ADM13-22 Part I
[A] TOWNHOUSE	ADM2-22
TOWNHOUSE UNIT (New)	ADM2-22
INTERNATIONAL FUEL GAS CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
Chapter 2	
[A] APPROVED AGENCY	ADM14-22, ADM16-22 Part I
APPROVED SOURCE (New)	ADM16-22 Part I
[A] LISTED	ADM1-22 Part I
PEER REVIEW (New)	ADM14-22
Chapter 3	
[BS] 302.3	S224-22
[BS] 302.3.2	S224-22
[BS] 302.3.3	S224-22
[BS] 302.3.4	S224-22
[BS] 302.6	S196-22
[BS] 302.7	S196-22
INTERNATIONAL GREEN CONSTRUCTION CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
Appendix M	
M101, M201 (New)	ADM51-22
FLOOR AREA, GROSS	ADM51-22

INTERNATIONAL MECHANICAL CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
Chapter 2	
[A] APPROVED AGENCY	ADM14-22, ADM16-22 Part I
APPROVED SOURCE (New)	ADM16-22 Part I
[A] LISTED	ADM1-22 Part I
PEER REVIEW (New)	ADM14-22
Chapter 3	
[BS] 302.3	S224-22
[BS] 302.3.1	S224-22
[BS] 302.3.2	S224-22
[BS] 302.3.3	S224-22
[BS] 302.5	S196-22
[BS] 302.5.2	S196-22
[BS] 302.5.3	S196-22
INTERNATIONAL PLUMBING CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
Chapter 2	
[A] APPROVED AGENCY	ADM14-22, ADM16-22 Part I
APPROVED SOURCE (New)	ADM16-22 Part I
PEER REVIEW (New)	ADM14-22
Chapter 3	
307.2	S196-22
307.2	S224-22
307.3 (New)	S196-22
307.3 (New)	S224-22
Appendix C	
[BS] C101.1	S224-22
[BS] C101.2	S224-22
[BS] C101.3	S224-22
[BS] C101.5	S196-22
[BS] C101.6	S196-22
INTERNATIONAL PROPERTY MAINTENANCE CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
111.9	EB1-22
Chapter 2	
APPROVED AGENCY (New)	ADM13-22 Part I, ADM16-22 Part I

APPROVED SOURCE (New)	ADM16-22 Part I
PEER REVIEW (New)	ADM13-22 Part I
INTERNATIONAL PRIVATE SEWAGE DISPOSAL CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
Chapter 2	
APPROVED AGENCY (New)	ADM14-22, ADM16-22 Part I
APPROVED SOURCE (New)	ADM16-22 Part I
PEER REVIEW (New)	ADM14-22
INTERNATIONAL RESIDENTIAL CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
R109.1.5.1	S58-22 Part II
Chapter 2	
[RB]LISTED	ADM1-22 Part II
[RB]APPROVED AGENCY	ADM13-22 Part II, ADM16-22 Part II
PEER REVIEW	ADM13-22 Part II
Chapter 3	
R301.2.1.2.1	S119-22 Part II
Chapter 7	
R703.7.3	S240-22 Part II
R703.7.3.1	S241-22 Part II
R703.7.3.2	S243-22 Part II
Chapter 9	
R905.1.1	S22-22 Part II, S24-22 Part II
Table R905.1.1(1)	S24-22 Part II
Table R905.1.1(2)	S24-22 Part II
Table R905.1.1(3)	S24-22 Part II
R905.8	S59-22 Part II
R905.16.4	S35-22 Part II
R905.17.5	S35-22 Part II
R908.3	S48-22 Part II, S49-22 Part II
Chapter 13	
M1307.2	RB39-22
Chapter 23	
M2301.2.13	RB39-22

Chapter 24	
G2404.8	RB39-22
Chapter 28	
P2801.8	RB39-22
Appendix G	
TABLE AG101.1 P	RB50-22
Appendix P	
P2902.5.4	RB50-22
P2904	RB50-22
P2904.3.1	RB50-22
INTERNATIONAL SWIMMING POOL AND SPA CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
Chapter 2	
[A] APPROVED AGENCY	ADM14-22, ADM16-22 Part I
APPROVED SOURCE (New)	ADM16-22 Part I
[A] LISTED	ADM1-22 Part I
PEER REVIEW (New)	ADM14-22
REGISTERED DESIGN PROFESSIONAL (New)	ADM14-22
INTERNATIONAL WILDLAND-URBAN INTERFACE CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
Chapter 2	
APPROVED AGENCY (New)	ADM13-22 Part I, ADM16-22 Part I
APPROVED SOURCE (New)	ADM16-22 Part I
PEER REVIEW (New)	ADM13-22 Part I
REGISTERED DESIGN PROFESSIONAL (New)	ADM13-22 Part I
INTERNATIONAL PERFORMANCE CODE	
Chapter 1	SEE ADM CODE CHANGE PROPOSALS
Chapter 2	
Appendix C	
[A] C101.2	ADM50-22

2022 GROUP B COMMITTEE ACTION HEARING SCHEDULE

March 27 – April 6, 2022

Rochester Riverside Convention Center
Rochester, New York

The hearings will start at 1:00 pm on Sunday, March 27th. This will allow for Membership Council meetings to be held prior to the start of the hearings. The hearings will be conducted in-person only.

Unless noted by "Start no earlier than 8 am" each Code Committee will begin immediately upon completion of the hearings for the prior Committee. This includes moving a Committee forward or back from the day indicated based on hearing progress. The actual start times for the various Committees are not stipulated because of uncertainties in hearing progress. The schedule anticipates that the hearings will finish on the date noted as "Finish". This may require going beyond the scheduled finish time.

The IgCC code change proposals to coordinate the administrative provision of the I-Codes and to update IgCC referenced standards will be heard by the Administrative Code Committee. See Code Committees/Codes on page l.

	Sunday March 27	Monday March 28	Tuesday March 29	Wednesday March 30	Thursday March 31	Friday April 1
TRACK 1	Start 1 pm ADMIN IEBC End 7 pm	Start 8 am IEBC End 7 pm	Start 8 am IEBC IRC – B (Start no earlier than 8 am) End 7 pm	Start 8 am IRC – B End 7 pm	Start 8 am IRC – B End 7 pm	Start 8 am IRC – B End 7 pm

	Saturday April 2	Sunday April 3	Monday April 4	Tuesday April 5	Wednesday April 6
TRACK 1	Start 8 am IRC – B IEBC – S / IBC – S (Start no earlier than 8 am) End 7 pm	Start 10 am IBC – S End 7 pm	Start 8 am IBC – S End 7 pm	Start 8 am IBC – S End 7 pm	Start 8 am IBC – S Finish 7 pm

SEE NEXT PAGE FOR SCHEDULE NOTES AND CODE COMMITTEE DESIGNATIONS

Notes:

- All the Group B codes will be heard in a single track.
- Code change agenda to be posted on or before February 23rd.
- Hearing times may be modified at the discretion of the Chair based on hearing progress.
- Morning and afternoon breaks will be announced. A lunch break is planned. A dinner break is not planned. The hearings are scheduled to adjourn for dinner and resume the next day, unless otherwise necessary to complete the agenda.
- Because of uncertainties in hearing progress, the start time indicated as "Start no earlier than 8 am" is conservatively estimated and is not intended to be a hearing progress target.
- Consult the hearing order in the posted code change agenda for:
  - Code changes to be heard by a Committee other than the Committee under which the code change is designated.
  - Code changes comprised of multiple parts where each part is heard by a different Committee.
  - Code changes to the definitions to determine the applicable Committee who will hear the change to the definition for the respective code.

Code Committees/Codes:

- ADMIN: Chapter 1 of all the I-Codes (except the IECC and IRC) and selected appendices. Also includes the update of currently referenced standards in the 2021 I-Codes.
- IBC-S: IBC Structural provisions. IBC Chapters 15 – 25 and selected appendices.
- IEBC: IEBC Non-structural provisions and selected appendices.
- IEBC – S: IEBC Structural provisions (including appendices) to be heard by the IBC – S Code Committee.
- IgCC: There will not be dedicated IgCC hearings at the 2022 Group B CAH. There were 7 code changes submitted to the IgCC, 6 of which address coordination of Chapter 1 provisions among family of I-Codes and the seventh code change which proposes an update of an IgCC referenced standard. These code changes fall under the responsibility of the Administrative Code Committee and will be on the agenda for the "ADMIN" hearings noted on the schedule.
- IRC – B: IRC Building provisions. Chapters 1 – 10 and selected appendices.

2022 PROPOSED CHANGES TO THE INTERNATIONAL CODES

<u>CODE</u> **<u>PAGE</u>**

TENTATIVE ORDER OF DISCUSSION
2022 PROPOSED CHANGES TO THE
ADMINISTRATIVE PROVISIONS CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some ADM code change proposals may not be included on this list, as they are being heard by another committee.

ADM1-22 Part I
ADM2-22
ADM3-22 Part I
ADM4-22 Part I
    RB2-22 Part II
ADM5-22
ADM6-22
ADM7-22 Part I
ADM8-22
ADM9-22
ADM10-22
ADM11-22
ADM12-22
ADM13-22 Part I
ADM14-22
ADM15-22 Part I
ADM16-22 Part I
ADM17-22 Part I
ADM18-22
ADM19-22
ADM20-22
ADM21-22
ADM22-22
ADM23-22
ADM24-22 Part I
ADM25-22
ADM26-22
ADM27-22
ADM28-22
ADM29-22
ADM30-22
ADM31-22
ADM32-22
ADM33-22
ADM34-22 Part I
ADM35-22
ADM36-22 Part I
ADM37-22 Part I
ADM38-22 Part I
ADM39-22
ADM40-22
ADM41-22 Part I
ADM42-22
ADM43-22 Part I
    S125-22 Part II
ADM44-22
ADM45-22 Part I
ADM46-22
ADM47-22
ADM48-22 Part I
ADM49-22
ADM50-22
ADM51-22
ADM52-22

ADM1-22 Part I

IBC: SECTION 202; IEBC: SECTION 202 (New); IFC: SECTION 202; IFGC: SECTION 202 (New); IMC: SECTION 202 (New); ISPSC: SECTION 202 (New)

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the *building official* and concerned with evaluation of products or services that maintains periodic inspection of production of *listed* equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. Terms that are used to identify listed equipment, products, or materials include “listed”, “certified”, “classified” or other terms as determined appropriate by the listing organization.

2021 International Existing Building Code

Add new definition as follows:

[A] LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the code official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. Terms that are used to identify listed equipment, products, or materials include “listed”, “certified”, “classified” or other terms as determined appropriate by the listing organization.

2021 International Fire Code

Revise as follows:

[A] LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the *fire code official* and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. Terms that are used to identify listed equipment, products, or materials include “listed”, “certified”, “classified” or other terms as determined appropriate by the listing organization.

2021 International Fuel Gas Code

Revise as follows:

[A] LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the code official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. Terms that are used to identify listed equipment, products, or materials include “listed”, “certified”, “classified” or other terms as determined appropriate by the listing organization.

2021 International Mechanical Code

Revise as follows:

[A] LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the code official and concerned with evaluation of products orservices that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. Terms that are used to identify listed equipment, products, or materials include “listed”, “certified”, “classified” or other terms as determined appropriate by the listing organization.

2021 International Swimming Pool and Spa Code

Revise as follows:

[A] LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the code official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. <u>Terms that are used to identify listed equipment, products, or materials include “listed”, “certified”, “classified” or other terms as determined appropriate by the listing organization.</u>

ADM1-22 Part I

ADM1-22 Part II

IRC: SECTION 202

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Residential Code

Revise as follows:

[RB] LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the code official and concerned with evaluation of products or services that maintains periodic inspection of production of *listed equipment* or materials or periodic evaluation of services and whose listing states either that the *equipment*, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. <u>Terms that are used to identify listed equipment, products, or materials include “listed”, “certified”, “classified” or other terms as determined appropriate by the listing organization.</u> For the definition applicable in Chapter 11, see Section N1101.6.

Reason Statement: The proposed revision to the definitions for “Listed” recognizes that listing organizations may use other terms to identify “listed” equipment, products, or materials. Two examples of other terms used meet the definition of listed include “certified” and “classified”. The term “certified” is a more globally recognized term used by listing organizations compared to the term “listed”. The term “classified” has historically referred to building materials evaluated for specific performance aspects such as surface burning characteristics that has also been accepted by code officials as meeting the definition of “Listed".

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply modifying the existing definitions of Listed, and adding a definition of Listed where one does not exist.

ADM1-22 Part II

ADM2-22

IBC: SECTION 202, SECTION 202 (New); IFC: SECTION 202, SECTION 202 (New)

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Building Code

Revise as follows:

[A] TOWNHOUSE. A building that contains three or more attached townhouse units. ~~A single-family *dwelling unit* constructed in a group of three or more attached units in which each unit extends from the foundation to roof and with open space on at least two sides.~~

Add new definition as follows:

TOWNHOUSE UNIT. A single-family dwelling unit in a townhouse that extends from foundation to roof and that has a yard or public way on not less than two sides.

2021 International Fire Code

Revise as follows:

[A] TOWNHOUSE. A building that contains three or more attached townhouse units. ~~A single-family *dwelling unit* constructed in a group of three or more attached units in which each unit extends from the foundation to roof and with open space on not less than two sides.~~

Add new definition as follows:

TOWNHOUSE UNIT. A single-family dwelling unit in a townhouse that extends from foundation to roof and that has a yard or public way on not less than two sides.

Reason Statement: This proposal coordinates with changes made by ADM5-19, Part 2, which was approved by the ICC membership last cycle. Part 2 included IRC changes to implement dividing the term "townhouse" into "townhouse" and "townhouse unit." Most occurrences of the term "townhouse" (which is a building containing 3 or more townhouse units) follow a phrase "one- and two-family dwellings," and it should be noted that a "townhouse unit" is defined as a single-family dwelling. Therefore, a phrase "one- and two-family dwelling and townhouse" conveys buildings with one-, two-, and three- or more dwelling units. There is no need to mention "townhouse unit" in these cases because a townhouse unit is a one-family dwelling located in a townhouse (which is a building containing 3 or more such units).
With this in mind, I reviewed the occurrences of the terms "townhouse" and "townhouses" in the IBC and IFC and determined that no additional changes are needed to correlate with the new definitions. There is no impact of the term "townhouse unit" in either code, beyond being needed to support the updated definition of "townhouse."

The IFC uses the term "townhouse" in Sections 903.3.1.3 and 1001.1, in addition to Appendix B. The townhouse unit definition must also be added because that term is used in the definition of townhouse. Last cycle, ICC members voted on ADM5-19 to support these updated definitions at the public comment hearing in response to a comment submitted by the Washington Association of Building Officials. That vote was affirmed in the OGCV by a substantial margin (84% support). To finish what was started last cycle in the IRC, the IFC and IBC need to be updated to correlate with the 2021 IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is intended to be editorial. It is simply updating terminology to match the IRC. There are no changes to how buildings are constructed.

ADM2-22

ADM3-22 Part I

IEBC: [A] 101.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Existing Building Code

Revise as follows:

[A] 101.2 Scope. The provisions of this code shall apply to the *repair*, *alteration*, *change of occupancy*, *addition* to and relocation of *existing buildings* , unless otherwise stated.

> ~~**Exception:** Detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height,~~ Existing buildings whose size and occupancy are within the scope of the *International Residential Code* for new construction shall comply with ~~this code or~~ the *International Residential Code.*

Staff Analysis: The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

ADM3-22 Part I

ADM3-22 Part II

IRC: R101.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, *change of occupancy*, location, removal and demolition of detached one- and two-family dwellings and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures* not more than three stories above *grade plane* in height.

> ~~**Exception:** The following shall be permitted to be constructed in accordance with this code~~ The provisions of this code shall also apply to the construction, repair, alteration, *change of occupancy*, addition to, and relocation of the following where provided with an automatic sprinkler system complying with Section P2904:
>
> 1. Live/work units located in townhouses and complying with the requirements of Section 508.5 of the International Building Code.
> 2. Owner-occupied *lodging houses* with five or fewer guestrooms.
> 3. A care facility with five or fewer persons receiving custodial care within a *dwelling unit*.
> 4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
> 5. A care facility for five or fewer persons receiving care that are within a single-family dwelling.

Staff Analysis: The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

Reason Statement: This proposal directs certain existing buildings from the IEBC to the IRC. It arises from the simple premise that if you can design or construct a certain building with the IRC, you should be able to – and in fact you should – regulate that same *existing* building with the IRC. The proposal is consistent with past positions of IRC supporters and developers who have advocated for the IRC to be a standalone code covering both new construction and existing building projects.
The IEBC portion of this proposal sends certain existing buildings to the IRC. The IRC portion of this proposal prepares the IRC to receive them.

First, consider the scope of the IRC. Currently, IRC Section R101.2 recognizes two categories of buildings:

- Dwellings, townhouses, and their accessory structures up to three stories. For these buildings, the IRC already covers both their new construction and a range of existing building project types.
- Five listed uses, given in the current exception to Section R101.2: certain live/work townhouses, small lodging houses, and certain small care facilities, all with qualifying sprinkler systems. For these buildings, the current IRC covers their new construction. But as existing buildings, these 5 uses must use the IEBC.

It appears that the only reason the 5 uses are listed in an “exception” is to make a distinction between the types of projects allowed for the first group, and those allowed for the 5 uses in the second group. Therefore, if we want to allow these 5 listed uses to use the IRC for existing building projects too, all we need to do is remove the “exception” and clarify the existing building project types of interest. Those project types are simply the ones already covered in IEBC Section 101.2: repair, alteration, change of occupancy, addition, and relocation.

Is there any reason *not* to allow these 5 uses to be regulated as existing buildings with the IRC? After all, the IRC already has basic existing building provisions in Sections R102.7.1 (“do no harm”), R105.3.1.1 (flood), and R110.2 (change of occupancy), as well as a variety of system-specific existing building provisions throughout the code. These current provisions are already deemed adequate to regulate typical 3-story townhouses, so they should be equally suitable to the 5 listed uses.

One possible objection to allowing these uses to use the IRC is that they would then avoid some of the IEBC’s upgrade triggers for wind, seismic, and other causes. For example, in the IEBC, substantial structural damage or a major alteration could trigger a seismic evaluation and possibly a seismic retrofit. In the IRC, the same intended project would only need to show (per Section R102.7.1) that the repaired or altered building is “no less compliant” when the work is done. Thus, this proposal **will often result in the applicable code being *less* onerous (and construction *less* costly)** than it is currently. While we support the IEBC’s upgrade triggers, we are nevertheless proposing here to trade that reduction in conservatism for clearer and more consistent code applicability. (The reduced conservatism would be limited to the 5 listed uses. Any townhouse up to three stories can already avoid any IEBC triggers by using the current exception to IEBC Section 101.2.)

So the IRC portion of the proposal expands the scope of the IRC to cover the 5 listed uses as existing buildings. Now consider the IEBC portion of the proposal. The IEBC portion directs both of the building groups discussed above – the usual dwellings and townhouses, as well as the 5 listed uses – to use the IRC instead of the IEBC.

In a separate proposal, we propose that the first group – dwellings and townhouses and their accessory structures – should be *required* to use the IRC. If that proposal is disapproved, then there is no need for this proposal's expansion to the second group. In fact, directing the 5 uses – but not the dwellings and townhouses – to the IRC would create a whole new level of confusion. But if the first proposal is approved, then one of the arguments in its favor applies here too: if a building is designed and built new with the IRC, and it *can* be regulated as an existing building with the IRC, then for consistency, clarity, and usability, it *should* be regulated as an existing building with the IRC.

A note about coordination of the two proposals: The first proposal included a few changes and additions to the IRC to ensure that no building using it would lose any advantages it would have had under the IEBC. This proposal is only a supplement (not an alternative) to that first proposal. Therefore, if that first proposal is approved, there is no need to repeat the extra changes here.

The proposal makes the following specific changes:

IEBC Section 101.2: The edits to this section do two things:

- The scope of the exception is widened to include all of the buildings that would be covered by the IRC as new construction – the dwellings, townhouses, and accessory structures up to three stories (which are already covered by the current exception) and the 5 listed uses within the IRC scope.
- It changes the use of the IRC from an option to a requirement. Currently, the 5 listed uses would be required to use the IEBC for existing building projects. With this proposal, they will be required to use the IRC. Since the IEBC would no longer be an option, the second paragraph is no longer an "exception."

IRC Section R101.2: The edits to this section do two things:

- In the first sentence, the "change of occupancy" project type is added to the current list. This ensures that the IRC scope covers all five IEBC project types – addition (i.e. enlargement), alteration, repair, relocation (i.e. movement) and, now, change of occupancy. Current R101.2 already lists "use and occupancy," so it's possible that the current IRC already intends to cover change of occupancy, but the edit is recommended in any case for completeness and consistency. There is no doubt that the IRC does intend to cover change of occupancy, since that project type is already defined in IRC Chapter 2 and mentioned in IRC Sections R102.7.1, R105.1, and R110.2.
- The exception is changed to an additional scope statement. The only reason the 5 listed uses are given in an "exception" is to make clear that the IRC covers them only for new construction, not for any of the existing building project types. The point of this proposal is to expand the IRC scope to cover the 5 listed uses also as existing buildings, so the "exception" no longer applies. "Construction" of the 5 uses is already covered. This edit adds the IEBC project types – repair, alteration, change of occupancy, addition, and relocation – to the IRC scope.

Cost Impact: The code change proposal will decrease the cost of construction
By requiring use of the IRC for the 5 special uses listed in IRC Section R101.2, this proposal removes all the upgrade triggers that might have applied in the IEBC. In addition, since this proposal will only work together with a separate proposal that adds certain IEBC cost advantages (allowances for existing materials, etc.) to the IRC, there can be no increase in cost by using the IRC. Therefore, the cost of any existing building project for these 5 listed uses will be the same (for small projects) or less (for large projects that would have triggered more work in the IEBC).

ADM3-22 Part II

ADM4-22 Part I

IEBC: [A] 101.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Existing Building Code

Revise as follows:

[A] 101.2 Scope. The provisions of this code shall apply to the *repair*, *alteration*, *change of occupancy*, *addition* to and relocation of *existing buildings* , unless otherwise stated.

> ~~**Exception:** Detached one- and two-family dwellings and townhousesnot more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height,~~ Existing buildings whose size and occupancy are within the scope of the *International Residential Code* for repair, alteration, *change of occupancy*, addition, and relocation shall comply with ~~this code or~~ the *International Residential Code.*

Staff Analysis: The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

ADM4-22 Part I

ADM4-22 Part II

IRC: R101.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, <u>*change of occupancy*,</u> location, removal and demolition of detached one- and two-family dwellings and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures* not more than three stories above *grade plane* in height.

> ~~**Exception:** The following shall be permitted to be constructed in accordance with this code~~ <u>The provisions of this code shall also apply to the construction of the following</u> where provided with an automatic sprinkler system complying with Section P2904<u> , and to the repair, alteration, *change of occupancy*, addition to and relocation of of the following regardless of the presence of an automatic sprinkler system</u>:
>
> 1. Live/work units located in townhouses and complying with the requirements of Section 508.5 of the International Building Code.
> 2. Owner-occupied *lodging houses* with five or fewer guestrooms.
> 3. A care facility with five or fewer persons receiving custodial care within a *dwelling unit*.
> 4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
> 5. A care facility for five or fewer persons receiving care that are within a single-family dwelling.

Staff Analysis: The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

Reason Statement: This proposal directs certain existing buildings from the IEBC to the IRC. It expands the scope of the IRC as a code for existing buildings. It is consistent with past positions of IRC supporters and developers who have advocated for the IRC to be a standalone code covering both new construction and existing building projects.
The proposal assumes that a separate proposal, expanding the scope of the IRC to certain existing buildings with automatic sprinkler systems, will be approved. If those buildings – the five listed uses in the current exception to IRC Section R101.2 – are going to use the IRC for existing building projects, then similar buildings with deficiencies or non-conforming conditions should use the IRC too. (The only difference between this proposal and that separate proposal is the inclusion here of buildings without qualifying sprinkler systems. If that separate proposal is disapproved, then we expect this proposal to be disapproved for the same reasons.)

Current IRC Section R101.2 (plus R102.7.1, R110.2, etc.) makes clear that the IRC is meant to function as a code for existing buildings. And any code for existing buildings must be able to accommodate non-conforming conditions, and even deficiencies. **Indeed, that is the main purpose of an existing building code.** The lack of a qualifying sprinkler system is just one type of deficiency or non-conforming condition.

The current IRC already admits any number of deficient and non-conforming buildings within its scope. Nothing in the first sentence of current Section R101.2 limits the code's application based on a building's age, condition, location, exposure to environmental loads, or obsolete construction. Similarly, the current exception to IEBC Section 101.2, which was added to the 2018 code, encourages certain dwellings and townhouses to use the IRC even if they're deficient or would be ineligible for the IRC as new construction.

And consider the separate proposal that points the 5 listed uses to the IRC if they *do* have sprinklers. Even in those cases the building can be non-conforming in terms of its structure, energy efficiency, plumbing, accessibility, etc. and is still allowed to use the IRC.

Two other considerations, both of which argue for approval of this proposal:

- If this proposal is disapproved, these non-sprinklered existing buildings would be regulated by the IEBC, but that won't get them sprinklered. So if the intent is to encourage sprinklers, keeping these existing buildings out of the IRC doesn't make a difference.
- The current code doesn't only require sprinklers, it requires compliance with Section P2904, which could change in the future. Thus, every time a building with one of the 5 listed uses has an existing building project, you would have to check its existing sprinkler system just to know which code to use. Better to just bring it under the IRC at the start.

The specific changes to IEBC Section 101.2 and IRC Section R101.2 are essentially the same as those in the separate proposal that expanded the existing building scope to the 5 listed uses. The only difference between this proposal and that separate proposal is the inclusion here of buildings without qualifying sprinkler systems.

Cost Impact: The code change proposal will decrease the cost of construction

By requiring use of the IRC for the 5 special uses listed in IRC Section R101.2, this proposal removes all the upgrade triggers that might have applied in the IEBC. In addition, since this proposal will only work together with a separate proposal that adds certain IEBC cost advantages (allowances for existing materials, etc.) to the IRC, there can be no increase in cost by using the IRC. Therefore, the cost of any existing building project for these 5 listed uses will be the same (for small projects) or less (for large projects that would have triggered more work in the IEBC).

ADM4-22 Part II

ADM5-22

ISPSC: [A] 101.2, [A] 102.4

Proponents: Nicholas Capezza, Pool & Hot Tub Alliance, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jhatfield@phta.org)

2021 International Swimming Pool and Spa Code

Revise as follows:

[A] 101.2 Scope. The provisions of this code shall apply to the construction, alteration, movement~~, renovation~~, replacement, repair and maintenance of aquatic recreation facilities, pools and spas. The pools and spas covered by this code are either permanent or temporary, and shall be only those that are designed and manufactured to be connected to a circulation system and that are intended for swimming, bathing or wading.

[A] 102.4 Additions, alterations or repairs. ~~Additions,~~ ~~*alterations*~~ *Alterations*, ~~renovations~~ or *repairs* to any pool, spa or related system shall conform to that required for a new system without requiring the existing systems to comply with the requirements of this code. Additions, alterations or repairs shall not cause existing systems to become unsafe, insanitary or overloaded.
Minor additions, alterations, ~~renovations~~ and repairs to existing systems shall be permitted in the same manner and arrangement as in the existing system, provided that such repairs or replacement are not hazardous and are *approved*.

Reason Statement: The term renovation is not defined in the I-Codes including the International Swimming Pool and Spa Code. Alteration is defined and includes renovation as part of its definition; use of the word renovation is redundant, unnecessary and potentially confusing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

ADM5-22

ADM6-22

IWUIC: [A] 101.2

Proponents: Dennis Richardson, representing self (dennisrichardsonpe@yahoo.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

[A] 101.2 Scope. The provisions of this code shall apply to the construction, alteration, movement, repair, <u>rebuilding,</u> maintenance and use of any building, structure or premises within the *wildland-urban interface areas* in this jurisdiction.
<u>When a fire incident spreads outside of a wildland-urban interface area into an area that is not regulated by this code, rebuilding of new replacement buildings shall comply with this code as applied in the area where the fire spread from.</u>

Buildings or conditions in existence at the time of the adoption of this code are allowed to have their use or occupancy continued, if such condition, use or occupancy was legal at the time of the adoption of this code, provided that such continued use does not constitute a distinct danger to life or property.

Buildings or structures moved into or within the jurisdiction shall comply with the provisions of this code for new buildings or structures.

Reason Statement: Numerous recent fires in CA have shown that destructive WUI fires are not limited to WUI areas. A misattributed quote "The definition of insanity is doing the same thing over and over again and expecting different results" is applicable to WUI fires. For example: in Santa Rosa, CA, the Tubbs fire traveled over 15 miles in one night before jumping a freeway and burning thousands of home in Coffey Park as well as other neighborhoods. Nearly all of those homes are now rebuilt to non-WUI standards in Coffey Park which is located outside of the official WUI area.

Coffey Park is a flat urban area located west of a canyon regulated by the WUI provisions. Diablo winds from the east to west appear regularly in the fall and can serve to push embers from the WUI area into the non WUI urban area. By the time that happens there is little fire resource to protect those non WUI areas. When portions or entire neighborhoods burn down, these homes can be reasonably be expected to exposed to a similar hazard again some day in the future. The WUI provisions are more effective if all of the homes in a group comply with this code. Clearly homes burned down in mass from a WUI fire should be rebuilt to the WUI standards. Waiting for the wheels of government to reclassify areas after a conflagration does not result in WUI hardened structures being built as replacements.

Cost Impact: The code change proposal will increase the cost of construction
I am the design professional for a homeowner in Coffey Park, Santa Rosa, who wanted to rebuild and have a chance of surviving the next conflagration. Experience has shown it is very difficult and costly to design a single home that can survive such a conflagration when surrounded by homes that do not meet any WUI provisions. Though more costly, it is more effective for a neighborhood to require the WUI provisions spread throughout the neighborhood as a form of herd immunity from blowing embers rather than trying to make single homes have the ability to withstand a future conflagration. If the code requires the WUI provisions for rebuilds then many insurance policies offer coverage for rebuilding under more stringent code requirements.

ADM6-22

ADM7-22 Part I

ICCPC: 101.3.3 (New); IEBC: 101.2.1 (New), [A] 101.6; IFGC: [A] 101.3; IPC: [A] 101.2, 101.2.1 (New); IPMC: 101.2.1 (New); ISPSC: 101.2.1 (New); IGCC: 101.3.2 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Code Council Performance Code

Add new text as follows:

101.3.3 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

2021 International Existing Building Code

Add new text as follows:

101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

Delete without substitution:

~~**[A] 101.6 Appendices.** The *code official* is authorized to require retrofit of buildings, structures or individual structural members in accordance with the appendices of this code if such appendices have been individually adopted.~~

2021 International Fuel Gas Code

Revise as follows:

[A] 101.2.1 ~~101.3~~ Appendices. Provisions in the appendices shall not apply unless specifically adopted.

2021 International Plumbing Code

Revise as follows:

[A] 101.2 Scope. The provisions of this code shall apply to the erection, installation, alteration, repairs, relocation, replacement, addition to, use or maintenance of plumbing systems within this jurisdiction. This code shall regulate nonflammable medical gas, inhalation anesthetic, vacuum piping, nonmedical oxygen systems and sanitary and condensate vacuum collection systems. The installation of fuel gas distribution piping and equipment, fuel-gas-fired water heaters and water heater venting systems shall be regulated by the *International Fuel Gas Code* . ~~Provisions in the appendices shall not apply unless specifically adopted.~~

> **Exception:** Detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height, shall comply with this code or the International Residential Code.

Add new text as follows:

101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

2021 International Property Maintenance Code

Add new text as follows:

101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

2021 International Swimming Pool and Spa Code

Add new text as follows:

101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

2021 International Green Construction Code

Add new text as follows:

101.3.2 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

ADM7-22 Part II

IRC: R102.5

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

~~**R102.5**~~ **R101.2.1** **Appendices.** Provisions in the appendices shall not apply unless specifically ~~referenced in the adopting ordinance~~ adopted.

Reason Statement: Appendices are in all of the codes except for IZC. The intent is to put information about their adoption for inclusion in the same location in all of the codes immediately following the section on scope. This is already the case in the IBC, IFC, IMC, IPSDC and IWUIC. This section is added to ICCPC, IGCC, IPMC, and ISPSC. This section is relocated in the IEBC, IFGC, IPC and IRC. This will also be proposed to the first public draft of the IECC.
This proposal is submitted by the ICC Building Code Action Committee (BCAC) and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial coordination item.

ADM7-22 Part II

ADM8-22

IFC: [A] 101.3; IWUIC: [A] 101.3

Proponents: Carl Baldassarra, representing Self (cbaldassarra@wje.com)

2021 International Fire Code

Revise as follows:

[A] 101.3 Purpose. The purpose of this code is to establish the minimum requirements ~~consistent with nationally recognized good practice~~ for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises, and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

2021 International Wildland-Urban Interface Code

Revise as follows:

[A] 101.3 Purpose. The purpose of this code is to establish minimum regulations ~~consistent with nationally recognized good practice~~ for the safeguarding of life and for property protection. Regulations in this code are intended to mitigate the risk to life and structures from intrusion of fire from wildland fire exposures and fire exposures from adjacent structures and to mitigate structure fires from spreading to wildland fuels. The extent of this regulation is intended to be tiered commensurate with the relative level of hazard present.
The unrestricted use of property in *wildland-urban interface areas* is a potential threat to life and property from fire and resulting erosion. Safeguards to prevent the occurrence of fires and to provide adequate fire protection facilities to control the spread of fire in *wildland-urban interface areas* shall be in accordance with this code.

This code shall supplement the jurisdiction's building and fire codes, if such codes have been adopted, to provide for special regulations to mitigate the fire- and life-safety hazards of the *wildland-urban interface areas*.

Reason Statement: This section of the code is often used in matters involving litigation and is, therefore, important to correctly reflect its purpose. This is an editorial change to assure consistency among the similar provisions in the I-codes.
The statement that the IFC and IWUIC are "consistent with nationally recognized good practice" is not always true and could be used to challenge certain requirements that may be found to be inconsistent. Why allow such a challenge?

In fact, the IFC and IWUIC are in themselves documents establishing "nationally-recognized good practice."

It is recognized that the IFC and IWUIC adopt other nationally-recognized codes and standards by reference, but there are numerous amendments in those adoptions that contradict the statement about being consistent.

Also, there is no such language in the I-codes other than the IFC and the IWUIC.

This change is part of an effort to assure consistency among the similar provisions in the I-codes that I initiated a few cycles ago.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add or delete requirements affecting cost.

ADM8-22

ADM9-22

ICCPC: CHAPTER 1, [A] 101.3.1, [A] 101.3.2

Proponents: David Collins, representing Self; Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org)

2021 International Code Council Performance Code

CHAPTER 1
SCOPE AND ADMINISTRATION

Revise as follows:

[A] 101.3~~.1~~ ~~Building~~ Scope. ~~Part II of t~~ This code provides requirements for buildings and structures and includes provisions for structural strength, stability, sanitation, means of access and egress, light and ventilation, safety to life and protection of property from fire and, in general, to secure life and property from other hazards affecting the built environment. This code includes provisions for the use and occupancy of buildings, structures, facilities and premises, their alteration, repair, maintenance, removal, demolition, and the installation and maintenance of amenities including, but not limited to, such services as the electrical, gas, mechanical, plumbing, energy conservation and building transportation systems; and for the storage, handling and use of explosive, flammable and combustuble materials, hazardous materials and dangerous operations and processes.

[A] ~~101.3.2 Fire.~~ ~~Part III of this code establishes requirements applicable to the use and occupancy of buildings, structures and facilities; and to the prevention, control and mitigation of fire, life safety and property hazards arising from this use and from the storage, handling and use of explosive, flammable and combustible materials, hazardous materials and dangerous operations and processes.~~

Reason Statement: In 2018, the president of the AIA established a Blue Ribbon Panel to examine the future of the architectural profession and its relationship to codes and standards as part of AIA's public policies.
We stand for protecting communities from the impact of climate change. Global warming and man-made hazards pose an increasing threat to the safety of the public and the vitality of our nation. Rising sea levels and devastating natural disasters result in unacceptable losses of life and property. Resilient and adaptable buildings are a community's fires line of defense against disasters and changing conditions of life and property. This is why we advocate for robust building codes and policies that make our communities more resilient.

A key finding of the Blue Ribbon Panel was the need to direct the architect's practices toward higher performing buildings, while meeting and exceeding the standards adopted in our communities. AIA's 2019 and 2020 Codes and Standards Committee began that effort by reviewing the ICC's Performance Building Code that has remained largely unchanged since its initial publication in 2003.

This effort has led to the development of a series of changes intended to improve the usefulness of the International Code Council Performance Code for Buildings and Facilities (ICCPC). Many of these changes are proposed to clarify and coordinate the ICCPC with the family of I-Codes that have been advanced since the initial effort to create this performance based code. Some findings are best addressed in the guide for the use of the ICCPC. AIA has already reached out to the ICC staff to facilitate that effort following the completion of these code change.

A significant part of the proposed changes in Group A consolidate various requirements on the same subject that are currently located in different parts of the code for no apparent reason. Doing so left some things unsaid in one part that are stated in another without reference. Design and evaluation of performance designs and the disparate elements of a building aren't done independently, but are a part of a comprehensive examination of the involved systems and materials associated with the design. In the Group A hearings we submitted Code Changes PC1, PC10, PC11, PC12, PC13, PC14, PC15, PC16, PC17 and PC18 that were all approved.

This change is proposed to continue the effort to make the Performance Code better.

In addition, ICC's Board of Directors has authorized a study being performed by Brian Meachum, FSFPE to evaluate the future of the ICCPC. To date the results of that work appear encouraging. To help forward that effort, AIA Codes and Standards Committee has prepared a series of changes that take the next step in Group B changes to improve the code for all to use. The need to split the ICCPC into three parts that can be adopted independently defeats the purpose of having a single, comprehensive performance code. The proposed changes approved during the Group A hearings reorganized similar content that was included in both Parts II and III into a single location; thus, eliminating duplicative content.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The consolidation of the scope provisions in the ICCPC from Part II and Part III does not cause the design or construction of buildings using this code to change. This proposal addresses changes already approved by ICC voters in Group A in 2021. There is no change to the technical content of the provisions, only the reorganization of the original content, which should not cause any cost impact when approving this proposal.

ADM9-22

ADM10-22

ICCPC: [A] 101.4.1, [A] 101.4.2

Proponents: David Collins, representing Self (dcollins@preview-group.com); Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org)

2021 International Code Council Performance Code

Revise as follows:

[A] 101.4.1 Building. The purpose of this code is to provide an acceptable level of health, safety, and general welfare and to limit damage to property from events that are expected to impact buildings and structures. Accordingly, Part II of this code intends buildings and structures to provide for the following:

~~1.~~ ~~An environment free of unreasonable risk of death and injury from fires.~~

1. ~~2.~~ A structure that will withstand loads associated with normal use and of the severity associated with the location in which the structure is constructed.

2. ~~3.~~ Means of egress and access for normal and emergency circumstances.

~~4.~~ ~~Limited spread of fire both within the building and to adjacent properties.~~

3. ~~5.~~ Ventilation and sanitation facilities to maintain the health of the occupants.

4. ~~6.~~ Natural light, heating, cooking and other amenities necessary for the well being of the occupants.

5. ~~7.~~ Efficient use of energy.

~~8.~~ ~~Safety to fire fighters and emergency responders during emergency operations.~~

[A] 101.4.2 Fire. Part III of this code establishes requirements necessary to provide a reasonable level of life safety and property from the hazards of fire, explosion or dangerous conditions in facilities, equipment and processes. <u>accordingly, Part III of this code intends buildings and structures to provide for the following:</u>

<u>1.</u> <u>An environment free of unreasonable risk of death and injury from fires.</u>

<u>2.</u> <u>Limited spread of fire both within the building and to adjacent properties.</u>

<u>3.</u> <u>Safety to fire fighters and emergency responders during emergency operations.</u>

Reason Statement: In 1998, the president of the AIA established a Blue Ribbon Panel to examine the future of the architectural profession and its relationship to codes and standards as part of AIA's public policies.
We stand for protecting communities from the impact of climate change. Global warming and man-made hazards pose an increasing threat to the safety of the public and the vitality of our nation. Rising sea levels and devastating natural disasters result in unacceptable losses of life and property. Resilient and adaptable buildings are a community's fires line of defense against disasters and changing conditions of life and property. This is why we advocate for robust building codes and policies that make our communities more resilient.

A key finding of the Blue Ribbon Panel was the need to direct the architect's practices toward higher performing buildings, while meeting and exceeding the standards adopted in our communities. AIA's 2019 and 2020 Codes and Standards Committee began that effort by reviewing the ICC's Performance Building Code that has remained largely unchanged since its initial publication in 2003.This effort has led to the development of a series of changes intended to improve the usefulness of the International Code Council Performance Code for Buildings and Facilities (ICCPC). Many of these changes are proposed to clarify and coordinate the ICCPC with the family of I-Codes that have been advanced since the initial effort to create this performance based code. Some findings are best addressed in the guide for the use of the ICCPC. AIA has already reached out to the ICC staff to facilitate that effort following the completion of these code change.

A significant part of the proposed changes in Group A consolidate various requirements on the same subject that are currently located in different parts of the code for no apparent reason. Doing so left some things unsaid in one part that are stated in another without reference. Design and evaluation of performance designs and the disparate elements of a building aren't done independently, but are a part of a comprehensive examination of the involved systems and materials associated with the design. In the Group A hearings we submitted Code Changes PC1, PC10, PC11, PC12, PC13, PC14, PC15, PC16, PC17 and PC18 that were all approved.

In addition, ICC's Board of Directors has authorized a study currently being performed by Bryan Meachum, Ph.D., P.E. (CT&MA), CEng. (UK), EUR ING, FIFireE, FSFPE, to evaluate the future of the ICCPC. To date the results appear encouraging. To that end we have prepared a series of changes that take the next step in Group B changes to improve the code for all to use.

This change is proposed to continue the effort to make the Performance Code better.

This change responds to the fire-related content located in Part II that was modified in the Group A changes and added to the similar content located in Part III. Revising these two sections aligns them with content that is located within the two Parts.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only revises the content to correlate the section with previously approved changes.

ADM10-22

ADM11-22

ICCPC: [A] 102.2.10, [A] 102.2.11, [A] 102.3.4.2, [A] 102.3.9.2, [A] 102.3.9.2.1, [A] 102.3.9.2.2, [A] 102.3.9.2.3, [A] 102.3.9.2.4 (New), [A] 102.3.10.2, [A] 102.3.10.3

Proponents: David Collins, representing Self (dcollins@preview-group.com); Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org)

2021 International Code Council Performance Code

Revise as follows:

[A] 102.2.10 Maintenance. Maintenance of the performance-based design shall be ensured through the issuance and renewal of certificates over the life of the building in compliance with Sections 102.3.9.2 and 102.3.10.

[A] 102.2.11 Management of change. The owner or the owner's authorized agent shall prepare ~~Written~~ written procedures for managing ~~change~~ changes to original *construction documents*, system processes, technology, equipment and facilities ~~shall be established and implemented~~. These procedures shall also include procedures for the inspection and renewal of the certificate of compliance by the code official in compliance with Section 102.3.9.2.

[A] 102.3.4.2 Reports and manuals. Where required by the code official, design documentation shall include a concept report, design report and operations and maintenance manual. When using performance-based design for alternative materials, design and methods of construction in accordance with one or more of the following, the design documentation shall only be required to the extend ot the perfornace-based design.

1. Section 104.11 of the *International Building Code.*
2. Section 104.11 of the *International Existing Building Code.*
3. Section 104.10 of the *International Fire Code.*
4. Section 105.2 of the *International Plumbing Code*.
5. Section 105.2 of the *International Mechanical Code.*
6. Section 105.2 of the *International Fuel Gas Code*.
7. Section 105.2 of the *International Private Sewage Disposal Code.*

[A] 102.3.9.2 Certificate of compliance. Prior to use of a building, facility, process or premises subject to ~~Part III of~~ this code, a certificate of compliance shall be obtained from the code official.

[A] 102.3.9.2.1 Continued use. A certificate of compliance is required for the continued use or occupancy of a facility, process or equipment subject to ~~Part III of~~ this code throughout the life of the facility.

[A] 102.3.9.2.2 Renewal frequency. The certificate of compliance issued subject to ~~Part III of~~ this code shall be renewed at a frequency ~~as determined in the design and approved by the code official.~~ of not more than every 2 years. The certificate of compliances shall also be renewed when the building, facilities, equipment, processes, materials, contents, or policies are changed or modified in accordance with Section 102.2.11. Requests for inspections by the building official required for renewal of the certificate of compliance shall be the responsibility of the owner or the owner's authorized agent.

[A] 102.3.9.2.3 Revocation and renewal. Failure of the owner or the owner's authorized agent to demonstrate compliance with this section is cause to revoke or not renew the certificate of compliance.

Add new text as follows:

[A] 102.3.9.2.4 Certificate of compliance renewal inspector. The code official may choose to have the building, facilities, equipment, processes, materials, contents, or policies inspected for the certificate of compliance by a special expert. The special expert for the renewal of each certificate of compliance shall meet the requirements of Appendix D101.4.

Revise as follows:

[A] 102.3.10.2 Continued compliance. Compliance with the operations and maintenance manual and bounding conditions shall be verified throughout the life of the building or facility at a frequency in accordance with the approved documents.

[A] 102.3.10.3 Compliance verification. Documents verifying that the building, facilities, premises, processes and contents are in compliance with the approved *construction documents* and are maintained in a safe manner shall be filed with the code official at a frequency approved by the code official.

Reason Statement: In 2018, the president of the AIA established a Blue Ribbon Panel to examine the future of the architectural profession and its relationship to codes and standards as part of AIA's public policies.
We stand for protecting communities from the impact of climate change. Global warming and man-made hazards pose an increasing threat to the

safety of the public and the vitality of our nation. Rising sea levels and devastating natural disasters result in unacceptable losses of life and property. Resilient and adaptable buildings are a community's fires line of defense against disasters and changing conditions of life and property. This is why we advocate for robust building codes and policies that make our communities more resilient.

A key finding of the Blue Ribbon Panel was the need to direct the architect's practices toward higher performing buildings, while meeting and exceeding the standards adopted in our communities. AIA's 2019 and 2020 Codes and Standards Committee began that effort by reviewing the ICC's Performance Building Code that has remained largely unchanged since its initial publication in 2003.

This effort has led to the development of a series of changes intended to improve the usefulness of the International Code Council Performance Code for Buildings and Facilities (ICCPC). Many of these changes are proposed to clarify and coordinate the ICCPC with the family of I-Codes that have been advanced since the initial effort to create this performance based code. Some findings are best addressed in the guide for the use of the ICCPC. AIA has already reached out to the ICC staff to facilitate that effort following the completion of these code change.

A significant part of the proposed changes in Group A consolidate various requirements on the same subject that are currently located in different parts of the code for no apparent reason. Doing so left some things unsaid in one part that are stated in another without reference. Design and evaluation of performance designs and the disparate elements of a building aren't done independently, but are a part of a comprehensive examination of the involved systems and materials associated with the design. In the Group A hearings we submitted Code Changes PC1, PC10, PC11, PC12, PC13, PC14, PC15, PC16, PC17 and PC18 that were all approved.

In addition, ICC's Board of Directors has authorized a study currently being performed by Brian Meachum, Ph.D., P.E. (CT&MA), CEng. (UK), EUR ING, FIFireE, FSFPE, to evaluate the future of the ICCPC. To date the results appear encouraging. To that end we have prepared a series of changes that take the next step in Group B changes to improve the code for all to use.

This change is proposed to continue the effort to make the Performance Code better. The following are specific to each change.

102.2.10 and 102.2.11:

This change will tie some of the sections of the code together for a more cohesive and direct requirement for inspection and renewal of the certificate of compliance. As most buildings do experience change, we are making it clear that the code requires procedures for how changes are handled that become part of the construction documents for approval by the code official.

102.3.4.2:

The ICC Performance Code (ICCPC) should not be considered solely for whole building designs, but also as another pathway for evaluating alternative materials, designs, and methods of construction. When projects are designed per the prescriptive requirements of any ICC code, there are situations where a single material, element, or system cannot conform to the prescriptive requirements. Also, new materials, elements, or systems are entering the construction market at a pace that the prescriptive codes cannot keep up.

Although the prescriptive provisions in each of the codes provides one pathway for approval of alternative materials, designs, and methods of construction, the ICCPC should not be overlooked as an alternative pathway. The ICCPC may be considered by the building official as an alternative method in and of itself per any of the sections listed, by including it within the text of each section will draw much greater attention to the ICCPC and thereby increase its use and adoption.

102.3.9.2 and 102.3.10:

This change makes it clear that the requirements for when the certificate of compliance is required is not just for just Part III of this code, but is applicable to all Performance Code designs. In addition this change will make it clear that the certificate is to be reviewed on a maximum timeframe of two years, and requires the review to occur when changes are made to any part of the building, facilities, equipment, processes, materials, contents, or policies. It also specifically makes the owner responsible for the renewals.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is connected with seven other code change proposals offered by AIA modifying the administration and enforcement requirements in Chapter 1 of seven other I-Codes (IBC, IEBC, IFC, IFGC, IPC, IPSDC, and IMC). It provides an additional option connecting those codes to the ICCPC for those projects that wish to pursue more performance-based solutions. It clarifies the scope of the application of the ICCPC in the situations when one of these new proposed options would be used by an individual project. Clarification within the code will allow the owner, designer, and code official a clear path toward approval of projects and clear responsibility for the development of procedures to do so.

This change to the ICCPC does not add a requirement that individual projects must comply with. ICC's Cost Impact Guide cites code change proposals that modify the design requirements (e.g. greater number of design options, design process efficiencies) as recognized instances of proposals that do not affect the construction or construction cost. Providing projects a route to use the ICC Performance Code to evaluate materials, designs and methods of construction does not impact the cost of construction.

ADM12-22

IGCC: TABLE 101.5.1

Proponents: Emily Toto, representing ASHRAE (etoto@ashrae.org)

2021 International Green Construction Code

Revise as follows:

TABLE 101.5.1 REQUIREMENTS DETERMINED BY THE JURISDICTION

SECTION	SECTION TITLE	JURISDICTIONAL REQUIREMENT
Chapter 5—Site Sustainability		
501.3.5.2 (5.3.5.2)	Mitigation of Heat Island Effect—Walls	__ No
501.3.6 (5.3.6)	Reduction of Light Pollution	__ No
501.3.7.2.2 (5.3.7.2.2)	Bicycle Parking Location	__ No
501.3.7.2.3 (5.3.7.2.3)	Bicycle Parking, Horizontal Parking Racks	__ No
501.3.7.2.5 (5.3.7.2.5)	Bicycle Parking, Security and Visibility	__ No
501.3.8.1 (5.3.8.1)	Building Site Waste Management—Diversion Percentage	__ 75% __ 50%
Chapter 6—Water Use Efficiency		
601.3.1.2.1(a,3) [6.3.1.2.1(a,3)]	Irrigation System Design, Master Valve	__ No
601.3.1.2.1(a,4) [6.3.1.2.1(a,4)]	Irrigation System Design, Flow Sensors	__ No
601.3.4 (6.3.4)	Special Water Features	__ No
601.3.5.2 (6.3.5.2)	Consumption Data Collection	__ No
601.3.5.3 (6.3.5.3)	Data Storage and Retrieval	__ No
601.3.9 (6.3.9)	Dual Water Supply Plumbing	__ No
Chapter 7—Energy Efficiency		
701.4.2.1 (7.4.2.1)	Building Envelope Requirements	__ No
701.4.2.3 (7.4.2.3)	Single Rafter Roof Insulation	__ No
701.4.2.4 (7.4.2.4)	High-speed Doors	__ No
701.4.2.7 (7.4.2.7)	Permanent Projections	__ No
701.4.2.10 (7.4.2.10)	Orientation	__ No
701.4.3.2 (7.4.3.2)	Ventilation Controls for Densely Occupied Spaces	__ No
701.4.3.4 (7.4.3.4)	Economizers	__ No
701.4.3.5 (7.4.3.5)	Zone Controls	__ No
701.4.3.7 (7.4.3.7)	Exhaust Air Energy Recovery	__ No
701.4.3.8 (7.4.3.8)	Kitchen Exhaust Systems	__ No
701.4.4.3 (7.4.4.3)	Insulation for Spa Pools	__ No
701.4.6.3.1 (7.4.6.3.1)	Occupancy Sensor Controls in Commercial and Industrial Storage Stacks	__ No
701.4.6.3.2 (7.4.6.3.2)	Automatic Controls for Egress and Security Lighting	__ No
701.4.7.2 (7.4.7.2)	Supermarket Heat Recovery	__ No
701.4.7.4 (7.4.7.4)	Programmable Thermostats	__ No
701.4.7.5 (7.4.7.5)	Refrigerated Display Cases	__ No
701.5.4 (7.5.4)	Energy Simulation Aided Design	__ No
Chapter 8—Indoor Environmental Quality		
~~801.3.1.3(b) [8.3.1.3(b)]~~	~~Outdoor Air Ozone Removal~~	~~__ No~~
801.3.1.4.2 (8.3.1.4.2)	Exfiltration	__ No
801.3.3.4 (8.3.3.4)	Interior Sound Reverberation	__ No
801.3.9 [8.3.9]	Exterior Views	__ No
801.4.1.3 (8.4.1.3)	Shading for Offices	__ No
Chapter 9—Materials and Resources		
901.3.1.2 (9.3.1.2)	Total Waste	__ No
Chapter 10—Construction and Plans for Operation		
1001.4.4 (10.4.4)	Construction Activity Pollution Prevention: Protection of Occupied Areas	__ No

SECTION	SECTION TITLE	JURISDICTIONAL REQUIREMENT
1001.7 (10.7)	Postconstruction Building Flush-out and Air Monitoring	__ No
1001.10 (10.10)	Service Life Plan	__ No
1001.11.2 (10.11.2)	Transportation Management Plan, Owner-occupied Building Projects or Portions of Building Projects	__ No
1001.11.3 (10.11.3)	Transportation Management Plan, Building Tenant	__ No

Reason Statement: Table 101.5.1 is being updated to reflect the latest published technical requirements in Standard 189.1. Since the release of the 2021 IgCC, Outdoor Air Ozone Removal has been made a core requirement. Additional changes to 101.5.1 are expected prior to the final publication of Standard 189.1-2023. ASHRAE staff will continue to monitor changes to the standard that impact the information being report Section 1 of the IgCC, and will submit public comments as necessary.

Bibliography: ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2020 with Addendum br, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Adjustments to Table 101.5.1 reflect changes made in Standard 189.1 that were not necessarily subject to a cost analysis.

ADM12-22

ADM13-22 Part I

IBC: SECTION 104, 202; IEBC: SECTION 104, 202; IFC: SECTION 104, 202; IPMC: SECTION 105, 202; IWUIC: SECTION 104, 105, 202; IZC: [A] 104.7, [A] 104.7.1; IGCC: SECTION 104

Proponents: Robert Marshall, representing FCAC (fcac@iccsafe.org); Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Jeffrey Shapiro, representing Lake Travis Fire Rescue (jeff.shapiro@intlcodeconsultants.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Primary sections and titles shown as deleted include the deletion of all sections and subsections within them. For clarity, the full text of these deletions are not shown.

2021 International Building Code

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such ~~agency~~ organization has been *approved* by the *building official*.

Add new definition as follows:

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

Revise as follows:

~~SECTION 104~~
~~DUTIES AND POWERS OF THE BUILDING OFFICIAL~~
(Delete entire section and replace as follows)

Add new text as follows:

SECTION 104
DUTIES AND POWERS OF THE BUILDING OFFICIAL.

[A] 104.1 General. The building official is hereby authorized and directed to enforce the provisions of this code.

[A] 104.2 Determination of Compliance. The building official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the building official upon request.

[A] 104.2.2 Technical assistance. To determine compliance with this code, the building official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

[A] 104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the building official. The building official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the building official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the building official shall approve the testing procedures. Tests shall be performed by a party acceptable to the building official.

[A] 104.2.3 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

[A] 104.2.3.1 Approval authority. An alternative material, design or method of construction shall be approved where the building official finds that the proposed alternative is satisfactory and complies with Sections 104.2.3 through 104.2.3.7, as applicable.

[A] 104.2.3.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the building official for approval. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code,

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

[A] 104.2.3.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the building official.

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public and made available for review by the public.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the building official. The building official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.3.7 Peer review. The building official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the building official.

[A] 104.2.4 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the building official shall have the authority to grant modifications for individual cases provided that the building official shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code, and that such modification does not lessen health, accessibility, life and fire safety or structural requirements. The details of the written request for and action granting modifications shall be recorded and entered in the files of the department of building safety.

[A] 104.2.4.1 Flood hazard areas. The building official shall not grant modifications to any provision required in flood hazard areas as established by Section 1612.3 unless a determination has been made that:

1. A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section 1612 inappropriate.
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.

5. Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.

[A] 104.3 Applications and permits. The building official shall receive applications, review construction documents and issue permits for the erection, and alteration, demolition and moving of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] 104.3.1 Determination of substantially improved or substantially damaged existing buildings and structures in flood hazard areas. For applications for reconstruction, rehabilitation, repair, alteration, addition or other improvement of existing buildings or structures located in flood hazard areas, the building official shall determine if the proposed work constitutes substantial improvement or repair of substantial damage. Where the building official determines that the proposed work constitutes substantial improvement or repair of substantial damage, and where required by this code, the building official shall require the building to meet the requirements of Section 1612 or Section R322 of the International Residential Code, as applicable.

[A] 104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the building official has reasonable cause to believe that there exists in a structure or on a premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, dangerous or hazardous, the building official is authorized to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed by this code. If such structure or premises is occupied, the building official shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the building official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the building official shall have recourse to every remedy provided by law to secure entry.

[A] 104.4.1 Warrant. Where the building official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the building official for the purpose of inspection and examination pursuant to this code.

[A] 104.5 Identification. The building official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Notices and orders. The building official shall issue necessary notices or orders to ensure compliance with this code in accordance with Section 114.

[A] 104.7 Official records. The building official shall keep official records as required by Sections 104.7.1 through 104.7.5. Such official records shall be retained for not less than 5 years or for as long as the building or structure to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 104.7.1 Approvals. A record of approvals shall be maintained by the building official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 104.7.2 Inspections. The building official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

[A] 104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.3; modifications in accordance with Section 104.2.4; and documentation of the final decision of the building official for either shall be in writing and shall be retained in the official records.

[A] 104.7.4 Tests. The building official shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.3.5.

[A] 104.7.5 Fees. The building official shall keep a record of fees collected and refunded in accordance with Section 109.

[A] 104.8 Liability. The building official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The building official or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices approved by the building official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Material and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and approved.

2021 International Existing Building Code

Add new definition as follows:

APPROVED AGENCY. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been approved by the code official.

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

Revise as follows:

~~SECTION 104~~
~~DUTIES AND POWERS OF THE CODE OFFICIAL~~
(Delete entire section and replace as follows)

Add new text as follows:

SECTION 104
DUTIES AND POWERS OF THE CODE OFFICIAL

[A] 104.1 General. The code official is hereby authorized and directed to enforce the provisions of this code.

[A] 104.2 Determination of Compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the code official upon request.

[A] 104.2.2 Technical assistance. To determine compliance with this code, the code official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

[A] 104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the fire safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the code official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the code official shall approve the testing procedures. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3 Alternative materials, design and methods of construction, and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

[A] 104.2.3.1 Approval authority. An alternative material, design or method of construction shall be approved where the code official finds that the proposed alternative is satisfactory and complies with Sections 104.2.3.2 through 104.2.3.7, as applicable.

[A] 104.2.3.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the code official for approval. Where the alternative material, design or method of construction is not approved, the code official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code.

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

[A] 104.2.3.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternative material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and made available for review by the public.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence. The report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the fire code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.3.7 Peer review. The code official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the code official.

[A] 104.2.4 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases, provided that the code official shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code, and that such modification does not lessen health, accessibility, life and fire safety, or structural requirements. The details of the written request for and action granting modifications shall be recorded and entered in the files of the department of building safety.

[A] 104.2.4.1 Flood hazard areas. For existing buildings located in flood hazard areas for which repairs, alterations and additions constitute substantial improvement, the code official shall not grant modifications to provisions related to flood resistance unless a determination is made that:

1. The applicant has presented good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render compliance with the flood-resistant construction provisions inappropriate.
2. Failure to grant the modification would result in exceptional hardship.
3. The granting of the modification will not result in increased flood heights, additional threats to public safety, extraordinary public expense nor create nuisances, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. The modification is the minimum necessary to afford relief, considering the flood hazard.

A written notice will be provided to the applicant specifying, if applicable, the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation and that construction below the design flood elevation increases risks to life and property.

[A] 104.3 Applications and permits. The code official is authorized to receive applications, review construction documents and issue permits for the repair and construction regulated by this code; inspect the premises for which such permits have been issued; and enforce compliance with the provisions of this code.

[A] 104.3.1 Determination of substantially improved or substantially damaged existing buildings and structures in flood hazard areas. For applications for reconstruction, rehabilitation, repair, alteration, addition or other improvement of existing buildings or structures located in flood hazard areas, the code official shall determine where the proposed work constitutes substantial improvement or repair of substantial damage. Where the code official determines that the proposed work constitutes substantial improvement or repair of substantial damage, and where required by this code, the code official shall require the building to meet the requirements of Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

[A] 104.3.2 Preliminary meeting. When requested by the permit applicant or the code official, the code official shall meet with the permit applicant prior to the application for a construction permit to discuss plans for the proposed work or change of occupancy in order to establish the specific applicability of the provisions of this code.

Exception: Repairs and Level 1 alterations.

[A] 104.3.3 Building evaluation. The code official is authorized to require an existing building to be investigated and evaluated by a registered design professional based on the circumstances agreed on at the preliminary meeting. The design professional shall notify the code official if any potential noncompliance with the provisions of this code is identified.

[A] 104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the code official has reasonable cause to believe that there exists in a structure or on a premises any conditions or violations of this code that makes the structure or premises unsafe, dangerous or hazardous, the code official shall have the authority to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed on the code official by this code. If such structure or premises is occupied, the code official shall present credentials to the occupant and request entry. If such structure or premises be unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the code official shall have recourse to every remedy provided by law to secure entry.

[A] 104.4.1 Warrant. Where the code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

[A] 104.5 Identification. The code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Notices and orders. The code official is authorized to issue such notices or orders as are required to affect compliance with this code in accordance with Section 113.

[A] 104.7 Official records. The code official shall keep official records as required by Sections 104.7.1 through 104.7.5. Such official records shall be retained for not less than 5 years or for as long as the structure or activity to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 104.7.1 Approvals. A record of approvals shall be maintained by the code official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 104.7.2 Inspections. The code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

[A] 104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.3; modifications in accordance with Section 104.2.4; and documentation of the final decision of the code official for either shall be in writing and shall be officially recorded in the permanent records of the code official.

[A] 104.7.4 Tests. The code official shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.3.5.

[A] 104.7.5 Fees. The code official shall keep a record of fees collected and refunded in accordance with Section 108.

[A] 104.8 Liability. The code official, member of the Board of Appeals, officer or employee charged with the enforcement of this code, while acting for the jurisdiction, in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Material and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and approved.

2021 International Fire Code

Add new definition as follows:

APPROVED AGENCY. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been approved by the fire code official.

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

Revise as follows:

~~SECTION 104~~
~~DUTIES AND POWERS OF THE FIRE CODE OFFICIAL~~
(Delete entire section and replace as follows)

Add new text as follows:

SECTION 104
DUTIES AND POWERS OF THE FIRE CODE OFFICIAL

[A] 104.1 General. The fire code official is hereby authorized to enforce the provisions of this code.

[A] 104.2 Determination of compliance. The fire code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the fire code official upon request.

[A] 104.2.2 Technical assistance. To determine compliance with this code, the fire code official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

[A] 104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the fire code official. The fire code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the fire safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the fire code official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the fire code official shall approve the testing procedures. Tests shall be performed by a party acceptable to the fire code official.

[A] 104.2.3 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

[A] 104.2.3.1 Approval authority. An alternative material, design or method of construction shall be approved where the fire code official finds that the proposed alternative is satisfactory and complies with Sections 104.2.3.2 through 104.2.3.7, as applicable.

[A] 104.2.3.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the fire code official for approval. Where the alternative material, design or method of construction is not approved, the fire code official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code.

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength

3. Effectiveness
4. Durability
5. Safety

[A] 104.2.3.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the fire code official.

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternative material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and made available for review by the public.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence. The report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the fire code official. The fire code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.3.7 Peer review. The fire code official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the fire code official.

[A] 104.2.4 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the fire code official shall have the authority to grant modifications for individual cases, provided that the fire code official shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code, and that such modification does not lessen health, life and fire safety requirements. The details of the written request for and action granting modifications shall be recorded and entered in the files of the department of fire prevention.

[A] 104.3 Applications and permits. The fire code official is authorized to receive applications, review construction documents and issue permits for construction regulated by this code, issue permits for operations regulated by this code, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] 104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the fire code official has reasonable cause to believe that there exists in a structure or on a premises any conditions or violations of this code that make the structure or premises unsafe, dangerous or hazardous, the fire code official shall have the authority to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed on the fire code official by this code. If such structure or premises is occupied, the fire code official shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the fire code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the fire code official shall have recourse to every remedy provided by law to secure entry.

[A] 104.4.1 Warrant. Where the fire code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the fire code official for the purpose of inspection and examination pursuant to this code.

[A] 104.5 Identification. The fire code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Notices and orders. The fire code official is authorized to issue such notices or orders as are required to affect compliance with this code in accordance with Sections 112.1 and 112.2.

[A] 104.7 Official records. The fire code official shall keep official records as required by Sections 104.7.1 through 104.7.6. Such official records shall be retained for not less than 5 years or for as long as the structure or activity to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 104.7.1 Approvals. A record of approvals shall be maintained by the fire code official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 104.7.2 Inspections. The fire code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

104.7.3 Fire records. The fire code official fire department shall keep a record of fires occurring within its jurisdiction and of facts concerning the same, including statistics as to the extent of such fires and the damage caused thereby, together with other information as required by the fire code official.

[A] 104.7.4 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.3; modifications in accordance with Section 104.2.4; and documentation of the final decision of the fire code official for either shall be in writing and shall be officially recorded in the permanent records of the fire code official.

[A] 104.7.5 Tests. The fire code official shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.3.5.

[A] 104.7.6 Fees. The fire code official shall keep a record of fees collected and refunded in accordance with Section 107.

[A] 104.8 Liability. The fire code official, member of the board of appeals, officer or employee charged with the enforcement of this code, while acting for the jurisdiction, in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not be personally liable, either civilly or criminally, and is hereby relieved from all personal liability for any damage accruing to persons or property as a result of an act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties under the provisions of this code shall be defended by the legal representatives of the jurisdiction until the final termination of the proceedings. The fire code official or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code; and any officer of the department of fire prevention, acting in good faith and without malice, shall be free from liability for acts performed under any of its provisions or by reason of any act or omission in the performance of official duties in connection therewith.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices approved by the fire code official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Material and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and approved.

104.10 Fire investigations. The fire code official, the fire department or other responsible authority shall have the authority to investigate the cause, origin and circumstances of any fire, explosion or other hazardous condition. Information that could be related to trade secrets or processes shall not be made part of the public record, except as directed by a court of law.

104.10.1 Assistance from other agencies. Police and other enforcement agencies shall have authority to render necessary assistance in the investigation of fires when requested to do so.

104.11 Authority at fires and other emergencies. The fire chief or officer of the fire department in charge at the scene of a fire or other emergency involving the protection of life or property, or any part thereof, shall have the authority to direct such operation as necessary to extinguish or control any fire, perform any rescue operation, investigate the existence of suspected or reported fires, gas leaks or other hazardous conditions or situations, or take any other action necessary in the reasonable performance of duty. In the exercise of such power, the fire chief is authorized to prohibit any person, vehicle, vessel or thing from approaching the scene, and is authorized to remove, or cause to be removed or kept away from the scene, any vehicle, vessel or thing that could impede or interfere with the operations of the fire department and, in the judgment of the fire chief, any person not actually and usefully employed in the extinguishing of such fire or in the preservation of property in the vicinity thereof.

104.11.1 Barricades. The fire chief or officer of the fire department in charge at the scene of an emergency is authorized to place ropes, guards, barricades or other obstructions across any street, alley, place or private property in the vicinity of such operation so as to prevent accidents or interference with the lawful efforts of the fire department to manage and control the situation and to handle fire apparatus.

104.11.2 Obstructing operations. Persons shall not obstruct the operations of the fire department in connection with extinguishment or control of any fire, or actions relative to other emergencies, or disobey any lawful command of the fire chief or officer of the fire department in charge of the emergency, or any part thereof, or any lawful order of a police officer assisting the fire department.

104.11.3 Systems and devices. Persons shall not render a system or device inoperative during an emergency unless by direction of the fire chief or fire department official in charge of the incident.

2021 International Property Maintenance Code

Add new definition as follows:

APPROVED AGENCY.. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been approved by the code official.

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

Revise as follows:

~~SECTION 105~~
~~DUTIES AND POWERS OF THE CODE OFFICIAL~~
(Delete entire section and replace as follows)

~~SECTION 106~~
~~APPROVAL~~
(Delete entire section and replace as follows)

Add new text as follows:

SECTION 105
DUTIES AND POWERS OF THE CODE OFFICIAL

[A] 105.1 General. The code official is hereby authorized and directed to enforce the provisions of this code.

[A] 105.2 Determination of compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 105.2.1 Technical assistance. To determine compliance with this code, the code official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

[A] 105.2.1.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 105.2.1.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 105.2.1.3 Content. The technical opinion and report shall analyze the safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 105.2.1.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the code official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the code official shall approve the testing procedures. Tests shall be performed by a party acceptable to the code official.

[A] 105.2.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that such alternative is not specifically prohibited by this code and has been approved.

[A] 105.2.2.1 Approval authority. An alternative material, design or method of construction shall be approved where the code official finds that the proposed alternative is satisfactory and complies with Sections 105.2.2 through 105.2.2.7, as applicable.

[A] 105.2.2.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the code official for approval. Where the alternative material, design or method of construction is not approved, the code official shall respond in writing, stating the reasons the alternative was not approved.

[A] 105.2.2.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code.

[A] 105.2.2.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Strength
2. Quality
3. Strength
4. Durability
5. Safety

[A] 105.2.2.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 105.2.2.5 **Tests.** Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict safety performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

[A] 105.2.2.6 **Reports.** Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 105.2.2.6.1 and 105.2.2.6.2.

[A] 105.2.2.6.1 **Evaluation reports.** Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public and made available for review by the public.

[A] 105.2.2.6.2 **Other reports.** Reports not complying with Section 105.2.2.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.[A] 105.2.2.6.2 Other reports. Reports not complying with Section 105.2.2.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 105.2.2.7 **Peer review.** The code official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the code official.

[A] 105.2.3 **Modifications.** Whenever there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases provided that the code official shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of the written request for and action granting modifications shall be recorded and entered in the department files.

[A] 105.3 **Inspections.** The code official shall have the authority to conduct inspections, or shall accept reports of inspection by approved agencies or individuals. Reports of such inspections shall be in writing and be certified by a responsible officer of such approved agency or by the responsible individual.

[A] 105.4 **Right of entry.** Where it is necessary to make an inspection to enforce the provisions of this code, or whenever the code official has reasonable cause to believe that there exists in a structure or upon a premises a condition in violation of this code, the code official is authorized to enter the structure or premises at all reasonable times to inspect or perform the duties imposed by this code. If such structure or premises is occupied the code official shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the code official shall have recourse to every remedy provided by law to secure entry.

[A] 105.4.1 **Warrant.** Where the code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

[A] 105.5 **Identification.** The code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 105.6 **Notices and orders.** The code official shall issue all necessary notices or orders to ensure compliance with this code in accordance with Section 111.4.

[A] 105.7 **Official records.** The code official shall keep official records as required by Sections 105.7.1 through 105.7.5. Such official records shall be retained for not less than 5 years or for as long as the building or structure to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 105.7.1 **Approvals.** A record of approvals shall be maintained by the code official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 105.7.2 **Inspections.** The building official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

[A] 105.7.3 **Code alternatives and modifications.** Application for alternative materials, design and methods of construction and equipment in accordance with Section 105.2.2; modifications in accordance with Section 105.2.3; and documentation of the final decision of the code official for either shall be in writing and shall be retained in the official records.

[A] 105.7.4 Tests. The code official shall keep a record of tests conducted to comply with Sections 105.2.1.4 and 105.2.2.5.

[A] 105.7.5 Fees. The code official shall keep a record of fees collected and refunded in accordance with Section 104.

[A] 105.8 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of an act or by reason of an act or omission in the discharge of official duties.

[A] 105.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by the legal representative of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code.

[A] 105.9 Approved materials and equipment. Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

[A] 105.9.1 Material and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and approved.

2021 International Wildland-Urban Interface Code

Add new definition as follows:

APPROVED AGENCY. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been approved by the code official.

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

REGISTERED DESIGN PROFESSIONAL. An architect or engineer, registered or licensed to practice professional architecture or engineering, as defined by the statutory requirements of the professional registration laws of the state in which the project is to be constructed.

Revise as follows:

[A] 102.5 ~~104.4~~ Subjects not regulated by this code. Where applicable standards or requirements are not set forth in this code, or are contained within other laws, codes, regulations, ordinances or policies adopted by the jurisdiction, compliance with applicable standards of other nationally recognized safety standards, as *approved*, shall be deemed as prima facie evidence of compliance with the intent of this code. Nothing herein shall derogate from the authority of the code official to determine compliance with codes or standards for those activities or installations within the code official's jurisdiction or responsibility.

[A] 102.6 ~~104.5~~ Matters not provided for. Requirements that are essential for the public safety of an existing or proposed activity, building or structure, or for the safety of the occupants thereof, which are not specifically provided for by this code, shall be determined by the *code official* consistent with the necessity to establish the minimum requirements to safeguard the public health, safety and general welfare.

~~SECTION 104~~
~~AURHORITY OF THE CODE OFFICIAL~~
(Delete Section 104.1 through 104.3.1, 104.6 and 104.7 and replace as follows)

~~SECTION 105~~
~~COMPLIANCE ALTERNATIVES~~
(Delete entire section and replace as follows)

Add new text as follows:

SECTION 104
DUTIES AND POWERS OF THE CODE OFFICIAL

[A] 104.1 Powers and duties of the code official. The code official is hereby authorized to enforce the provisions of this code.

[A] 104.2 Determination of compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.

2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Technical assistance. To determine compliance with this code, the code official is authorized to require the owner, the owner's authorized agent or the person in possession or control of the building or premises to provide a technical opinion and report.

[A] 104.2.1.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 104.2.1.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.1.3 Content. The technical opinion and report shall analyze the fire safety of the design, operation or use of the building or premises, the facilities and appurtenances situated thereon and fuel management to identify and propose necessary recommendations.

[A] 104.2.1.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the code official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the code official shall approve the testing procedures. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.2 Alternative materials, design and methods. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

[A] 104.2.2.1 Approval authority. An alternative material, design or method shall be approved where the code official in concurrence with the code official finds that the proposed alternative is satisfactory and complies with Sections 104.2.2.2 through 104.2.2.7. as applicable.

[A] 104.2.2.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the code official for approval. Where the alternative material, design or method of construction is not approved, the code official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.2.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code.

[A] 104.2.2.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

[A] 104.2.2.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.2.2.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.2.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.2.6.1 and 104.2.2.6.2.

[A] 104.2.2.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternative material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and made available for review by the public.

[A] 104.2.2.6.2 Other reports. Reports not complying with Section 104.2.2.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence. The report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the fire code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.2.7 Peer review. The code official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the code official.

[A] 104.2.3 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases provided that the code official shall first find that one or more special individual reasons make enforcement of the strict letter of this code impractical, that the modification is in conformance to with the intent and purpose of this code, and that such modification does not lessen health, life and fire safety requirements. The details of the written request and action granting modifications shall be recorded and entered into the files of the code enforcement agency.

[A] 104.3 Applications and permits. The code official is authorized to receive applications, review construction documents and issue permits for construction regulated by this code, issue permits for operations regulated by this code, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] 104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the code official has reasonable cause to believe that there exists in a structure or on a premises any conditions or violations that makes such building or premises unsafe, the code official shall have the authority to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed by this code. If such structure or premises is occupied, the code official shall present proper credentials to the occupant and request entry. If such structure or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent, or other persons having charge or control of the structure or premises and request entry. If such entry is refused, then the code official shall have recourse to every remedy provided by law to secure entry.

[A] 104.4.1 Warrant. Where the code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owners, the owner's authorized agent or occupants or persons having charge, care or control of the building or premises, shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

[A] 104.5 Identification. The code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Notices and orders. The code official is authorized to issue such notices or orders as are required to affect compliance with this code in accordance with Section 110.2.

[A] 104.7 Official records. The code official shall keep official records as required by Sections 104.7.1 through 104.7.5. Such official records shall be retained for not less than 5 years or for as long as the structure or activity to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 104.7.1 Approvals. A record of approvals shall be maintained by the code official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 104.7.2 Inspections. The code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

[A] 104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.2; modifications in accordance with Section 104.2.3; and documentation of the final decision of the code official for either shall be in writing and shall be officially recorded in the permanent records of the code official.

[A] 104.7.4 Tests. The code official shall keep a record of tests conducted to comply with Sections 104.2.1.4 and 104.2.2.5.

[A] 104.7.5 Fees. The code official shall keep a record of fees collected and refunded in accordance with Section 109.

[A] 104.8 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction, in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from all personal liability for damages accruing to persons or property as a result of an act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by the legal representatives of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code; and any officer of the department of fire prevention, acting in good faith and without malice, shall be free from liability for acts performed under any of its provisions or by reason of any act or omission in the performance of official duties in connection therewith.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Material and equipment reuse. Materials, equipment and devices shall not be reused or reinstalled unless such elements have been reconditioned, tested and placed in good and proper working condition and approved.

[A] 104.10 Other agencies. When requested to do so by the code official, other officials of this jurisdiction shall assist and cooperate with the code official in the discharge of the duties required by this code.

2021 International Zoning Code

Revise as follows:

[A] 104.7 Liability. The code official, ~~or designee,~~ member of the board of adjustment or employee charged with the enforcement of this code, while acting in good faith and without malice in the discharge of the duties ~~described~~ required in this code or other pertinent law or ordinance, shall not be personally liable, either civilly or criminally , and is hereby relieved from personal liability ~~liable~~ for any damage ~~that may accrue~~ accruing to persons or property as a result of an act or by reason of an act or omission in the discharge of such duties.

[A] 104.7.1 Legal defense. ~~A~~ Any suit or criminal complaint ~~brought~~ instituted against the code official or employee because ~~such~~ of an act or omission performed by the code official or employee in the ~~enforcement of any provision of such codes~~ lawful discharge of duties under the provisions of this code or other pertinent laws or ordinances implemented through the enforcement of this code or ~~enforced by the enforcement agency~~ other laws or ordinances implemented through the enforcement of this code shall be defended by the jurisdiction until final termination of such proceedings. ~~Any judgment resulting therefrom shall be assumed by the jurisdiction.~~ The code official or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code. This code shall not be construed to relieve from or lessen the responsibility of any person owning, operating or controlling any building or parcel of land for any damages to persons or property caused by defects, nor shall the enforcement agency or its jurisdiction be held as assuming any such liability by reason of the reviews or permits issued under this code.

2021 International Green Construction Code

Revise as follows:

~~SECTION 104~~
~~DUTIES AND POWERS OF THE AUTHORITY HAVING JURISDICTION~~

(Delete entire section and replace as follows)

~~SECTION 105~~
~~APPROVAL~~

(Delete entire section and replace as follows)

Add new text as follows:

SECTION 104
DUTIES AND POWERS OF THE AUTHORITY HAVING JURISDICTION

104.1 General. The authority having jurisdiction is hereby authorized and directed to enforce the provisions of this code.

104.2 Determination of compliance. The authority having jurisdiction shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code or other applicable codes and ordinances.

104.2.1 Listed compliance. Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the authority having jurisdiction upon request.

104.2.2 Technical assistance. To determine compliance with this code, the authority having jurisdiction is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the authority having jurisdiction. The authority having jurisdiction is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

104.2.2.3 Content. The technical opinion and report shall analyze the properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the authority having jurisdiction is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the authority having jurisdiction shall approve the testing procedures. Tests shall be performed by a party acceptable to the authority having jurisdiction.

104.2.3 Compliance materials. The authority having jurisdiction shall be permitted to approve specific computer software, worksheets, compliance manuals and other similar materials that meet the intent of this code.

104.2.4 Approved programs. The authority having jurisdiction shall have the authority to deem a national, state or local program as meeting or exceeding this code. Buildings approved in writing by such a program shall be considered to be in compliance with this code.

104.2.4.1 Specific approval. The authority having jurisdiction shall have the authority to approve programs or compliance tools for a specified application, limited scope or specific locale, including approval that is applicable to a specific section or chapter of this code.

104.2.5 Innovative approaches and alternative materials, design, and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design, innovative approach, or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

104.2.5.1 Approval authority. An alternative material, design, innovative approach or method of construction shall be approved where the authority having jurisdiction finds that the proposed alternative is satisfactory and complies with Sections 104.2.5 through 104.2.7, as applicable.

104.2.5.2 Application and disposition. A request to use an alternative material, design, innovative approach or method of construction shall be submitted in writing to the authority having jurisdiction for approval. Where the alternative material, design, innovative approach or method of construction is not approved, the authority having jurisdiction shall respond in writing, stating the reasons the alternative was not approved.

104.2.5.3 Compliance with code intent. An alternative material, design, innovative approach or method of construction shall comply with the intent of the provisions of this code.

104.2.5.4 Equivalency criteria. An alternative material, design, innovative approach or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

104.2.5.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

104.2.5.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the authority having jurisdiction.

104.2.5.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.5.6.1 and 104.2.5.6.2.

104.2.5.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public and made available for review by the public.

104.2.5.6.2 Other reports. Reports not complying with Section 104.2.5.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the authority having jurisdiction. The authority having jurisdiction is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

104.2.5.7 Peer review. The authority having jurisdiction is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the authority having jurisdiction.

104.2.6 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the authority having jurisdiction shall have the authority to grant modifications for individual cases, provided the authority having jurisdiction shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code, and that such modification does not lessen the minimum requirements of this code. The details of the written request for and granting modifications shall be recorded and entered in the files of the department.

104.3 Enforcement. The authority having jurisdiction shall enforce compliance with the provisions of this code as part of the enforcement of other applicable codes and regulations, including the referenced codes listed in Section 102.4.

104.4 Inspections. The authority having jurisdiction shall have the authority to conduct inspections, as required, to determine code compliance, or the authority having jurisdiction shall have the authority to accept reports of inspection by approved agencies or individuals.

104.5 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the authority having jurisdiction has reasonable cause to believe that there exists in a structure or on a premises any conditions or violations of this code that make the structure or premises unsafe, dangerous or hazardous, the authority having jurisdiction shall have the authority to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed on the authority having jurisdiction by this code. If such structure or premises is occupied, the authority having jurisdiction shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the authority having jurisdiction shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the authority having jurisdiction has recourse to every remedy provided by law to secure entry.

104.5.1 Warrant. Where the authority having jurisdiction has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the authority having jurisdiction for the purpose of inspection and examination pursuant to this code.

104.6 Identification. The authority having jurisdiction shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

104.7 Notices and orders. The authority having jurisdiction shall issue all necessary notices or orders to ensure compliance with this code.

104.8 Official records. The authority having jurisdiction shall keep official records as required by Sections 104.8.1 through 104.8.5. Such official records shall be retained for not less than 5 years or for as long as the building or structure to which such records relate remains in existence, unless otherwise provided by other regulations.

104.8.1 Approvals. A record of approvals shall be maintained by the authority having jurisdiction and shall be available for public inspection during business hours in accordance with applicable laws.

104.8.2 Inspections. The authority having jurisdiction shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

104.8.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.5; modifications in accordance with Section 104.2.6; and documentation of the final decision of the authority having jurisdiction for either shall be in writing and shall be retained in the official records.

104.8.4 Tests. The authority having jurisdiction shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.5.5.

104.8.5 Fees. The authority having jurisdiction shall keep a record of fees collected and refunded in accordance with Section 108.

104.9 Liability. The authority having jurisdiction, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

104.9.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The authority having jurisdiction or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

104.10 Approved materials and equipment. Materials, equipment, devices and innovative approaches approved by the authority having jurisdiction shall be constructed, installed and maintained in accordance with such approval.

104.10.1 Material, product and equipment reuse. Materials, products, equipment and devices shall not be reused unless such elements are in good working condition and approved.

ADM13-22 Part I

ADM13-22 Part II

IRC: SECTION 202, R104

Proponents: Robert Marshall, representing FCAC (fcac@iccsafe.org); Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Jeffrey Shapiro, representing Lake Travis Fire Rescue (jeff.shapiro@intlcodeconsultants.com)

Primary sections and titles shown as deleted include the deletion of all sections and subsections within them. For clarity, the full text of these deletions are not shown.

2021 International Residential Code

Revise as follows:

[RB] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification~~, and~~ where such organization has been *approved* ~~by the building official~~.

Add new definition as follows:

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

Revise as follows:

~~SECTION R104~~

~~DUTIES AND POWERS OF THE BUILDING OFFICIAL~~

(Delete entire section and replace as follows)

Add new text as follows:

SECTION R104

DUTIES AND POWERS OF THE BUILDING OFFICIAL

R104.1 General. The building official is hereby authorized and directed to enforce the provisions of this code.

R104.2 Determination of compliance. The building official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

R104.2.1 Listed compliance. Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the building official upon request.

R104.2.2 Technical assistance. To determine compliance with this code, the building official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

R104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

R104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the building official. The building official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

R104.2.2.3 Content. The technical opinion and report shall analyze the safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

R104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the building official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the building official shall approve the testing procedures. Tests shall be performed by a party acceptable to the building official.

R104.2.3 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

R104.2.3.1 Approval authority. An alternative material, design or method of construction shall be approved where the building official finds that the proposed alternative is satisfactory and complies with Sections 104.2.3 through 104.2.3.7, as applicable.

R104.2.3.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the building official for approval. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

R104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code.

R104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

R104.2.3.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to flame spread, heat release rate, heat of combustion, smoke development and fire resistance.

R104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the building official.

R104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections R104.2.3.6.1 and R104.2.3.6.2.

R104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public and made available for review by the public.

R104.2.3.6.2 Other reports. Reports not complying with Section R104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the building official. The building official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

R104.2.3.7 Peer review. The building official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the building official.

R104.2.4 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the building official shall have the authority to grant modifications for individual cases, provided the building official shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code, and that the modification does not lessen health, life and fire safety or structural requirements. The details of the written request for and action granting modifications shall be recorded and entered in the files of the department of building safety.

R104.2.4.1 Flood hazard areas. The building official shall not grant modifications to any provisions required in flood hazard areas as established by Table R301.2 unless a determination has been made that:

1. There is good and sufficient cause showing that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section R322 inappropriate.
2. Failure to grant the modification would result in exceptional hardship by rendering the lot undevelopable.
3. The granting of modification will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. The modification is the minimum necessary to afford relief, considering the flood hazard.
5. Written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation and stating that construction below the design flood elevation increases risks to life and property, has been submitted to the applicant.

R104.3 Applications and permits. The building official shall receive applications, review construction documents and issue permits for the erection and alteration of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

R104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the building official has reasonable cause to believe that there exists in a structure or upon a premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, dangerous or hazardous, the building official is authorized to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed by this code. If such structure or premises is occupied, the building official shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the building official shall first make a reasonable effort to locate the owner, the owner's authorized agent, or other person having charge or control of the structure or premises and request entry. If entry is refused, the building official shall have recourse to every remedy provided by law to secure entry.

R104.4.1 Warrant. Where the building code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the building code official for the purpose of inspection and examination pursuant to this code.

R104.5 Identification. The building official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

R104.6 Notices and orders. The building official shall issue necessary notices or orders to ensure compliance with this code in accordance with Section R113.2.

R104.7 Official records. The building official shall keep official records as required in Sections R104.7.1 through R104.7.5. Such official records shall be retained for not less than 5 years or for as long as the building or structure to which such records relate remains in existence, unless otherwise provided by other regulations.

R104.7.1 Approvals. A record of approvals shall be maintained by the building official and shall be available for public inspection during business hours in accordance with applicable laws.

R104.7.2 Inspections. The building official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

R104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section R104.2.3; modifications in accordance with Section R104.2.4; and documentation of the final decision of the building official for either shall be in writing and shall be retained in the official records.

R104.7.4 Tests. The building official shall keep a record of tests conducted to comply with Sections R104.2.2.4 and R104.2.3.5.

R104.7.5 Fees. The building official shall keep a record of fees collected and refunded in accordance with Section R108.

R104.8 Liability. The building official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

R104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The building official or any subordinate shall not be liable for cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

R104.9 Approved materials and equipment. Materials, equipment and devices approved by the building official shall be constructed and installed in accordance with such approval.

R104.9.1 Materials and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and approved.

Reason Statement: Section 104 (Section 105 in the IPMC) appears in the IFC, IWUIC, IBC, IEBC, IRC, IgCC and IPMC and contains general requirements for the authority and duties of the code official. Among these authorities and duties is the review and approval of alternate methods. The primary purpose of this code change is to update Section 104 to reflect the current manner that alternate methods and materials are evaluated, and to differentiate between evaluations from accredited evaluation agencies and evaluations from others, such as engineers. These provisions have basically been the same since the first edition in 2000, with the exception that the section on "Research Reports" was added in 2003. Industry terminology and methods have evolved over the years.
This proposal revises general code enforcement provisions to improve organization, improve clarity, and supplement existing provisions to better align the code text with how the code is commonly applied. The end goal is to provide the same wording and procedures in all of the I-Codes with regard to the Duties and Responsibilities of the Code Official. Some of the codes contain unique provisions applicable to only that code. Those nuances are retained so there are some slight differences, but the formatting will be the same in each code and the language will generally bee the

same in each code.

As stated earlier, this section has been in the code a long time, and it is believed that it initially envisioned an alternative product or method review and approval process on a project-by-project basis, with substantiating tests and calculations or analyses provided with each permit application. Currently, a more efficient system has evolved where the same product evaluation reports are used in numerous projects, across many jurisdictions, and for many conditions. This evolution causes the need to revise this section to reflect current procedures.

However, the need for designers to be able to apply for one-time approval needs to be maintained, and that is the reason that "research reports" is maintained. In this case, though, when a method or material is not addressed by the code, the code official needs more information on the process that the evaluator used to determine that the method or material complies with the intent of the code.

To achieve the common format, a template is shown below which includes comments on each of the sections. Since the wording in each code is intended to be the same, the outline is not shown for every code, however there is an underline/strikeout version for each code provided. The code change for each code is provided as delete and substitute. This was done because the autoformatting process in cdpACCESS did not provide a document to easily follow. The underline/strikeout versions show the specific changes.

The following template is from the IBC. The IBC, IFC, IRC, IEBC, IPMC, and IWUIC are formatted the same as this template, however some codes have additional unique provisions, and other codes don't contain all of these sections if they are not appropriate for the code content.

OUTLINE FOR PROPOSED SECTION 104

SECTION 104 DUTIES AND POWERS OF BUILDING OFFICIAL – same title used for each code

104.1 General. – This section has been subdivided with numbered/titled subsections to break up the existing paragraph and specifically state that the code official is authorized to determine compliance with the code. While always implied and applied in this manner, the code never specifically states this important fact.

<u>104.2 Determination of Compliance.</u> – reformatted to identify that when reviewing projects for compliance with the code, the code official can develop policies and procedures. It also specifically states that the developed policies and the project approvals are to be based on the intent of the code.

<u>104.2.1 Listed compliance.</u> – In cases where the code specifies a listing standard, it is common for a code official to accept things listed to that standard without further evaluating whether the standard is germane. When a product listing is appropriate, then the fact that the product is listed and installed in accordance with the listing specifications and the manufacturer's instructions becomes the approval of the product. This section is not included in all codes since not all codes require listed equipment.

<u>104.2.2 Technical assistance.</u> – Nearly all the codes provide for the code official to utilize technical assistance in some form or another. This section is included as a subsection for determining compliance and will be consistent throughout the I-Codes. It is derived from, and replaces, previous text that was originally developed for and limited to hazardous materials related provisions.

<u>104.2.2.1 Cost.</u> – the cost for technical assistance is borne by the applicant or owner. This was previously included in a preceding paragraph and has been separated into its own subsection.

<u>104.2.2.2 Preparer qualifications.</u> – states that the person or agency providing the technical report must be qualified. The code official has the ability to require that the report is stamped by a registered design professional, since not all reports may need to provide this. For example, a hazardous materials classification report often does not include engineering or design. The definition is added to codes that do not currently contain the definition, such as the IWUIC. This was previously included in a preceding paragraph and has been separated into its own subsection. The new text

goes beyond simply recommending changes, recognizing that the report may be a source document, as opposed to a review of documentation prepared by others.

104.2.2.3 Content. – the technical report shall include an analysis and any recommended or necessary changes.

104.2.2.4 Tests. – Tests can often provide valuable information. Where a test standard isn't specified by this code or a reference standard, the code official may wish to conduct further evaluation of the suitability of the test method used as a basis. Testing can be performed by an approved agency or by any other party/organization approved by the code official. Proposed provisions for tests are largely derived from existing code text on this topic.

104.2.3 ~~104.11~~ Alternative materials, design and methods of construction and equipment. – All codes make reference to accepting some type of alternative. This section is placed under the general compliance approval section and revised to state that a proposed alternative cannot be something that is specifically prohibited by the code. If ICC members have previously voted to specifically disallow something, alternative methods should not be a means of avoiding such a prohibition. Nevertheless, a code modification would still provide an option to make exceptions for unique cases, as opposed to the door being open for an applicant to end run the intent of the code by presenting an analysis or alternative that suggests an alternative to a prohibition is OK. It is important to note that something not contemplated by the code would not be impacted by this statement. Not contemplated is not the same as a specific prohibition in the code.

104.2.3.1 Approval authority. – if the alternative is acceptable, then it is to be approved by the code official. This is from existing text.

104.2.3.2 Application and disposition. – the submittal for an alternative must be accomplished in writing. If it is not approved, the code official must so state in writing and provide reasons why it was not acceptable. This is largely from existing text, however, the requirement for a written application for alternatives was not previously located in this section, where it is appropriate to reference.

104.2.3.3 Compliance with code intent. – the alternative must comply with the code's intent.

104.2.3.4 Equivalency criteria. – the alternative must provide equivalency to the code's provisions. The list of characteristics to be addressed is included from the current code. The reference to fire-resistance is removed from the list and fire-resistance is included under safety with additional criteria regarding fire characteristics identified in Section 104.2.3.4.1.

104.2.3.4.1 Fire safety equivalency. – this section was added because "fire-resistance" was removed from the list in Section 104.2.3.4 and recognizing that fire-resistance is not the only fire related characteristic to be addressed. Fire-resistance is only one characteristic of safety with respect to fire. This section is added to clarify that the entire issue of performance under fire conditions is the concern. Previously, aspects of fire safety beyond fire resistance would have been evaluated as part of "safety" in the list with no additional guidance on what to consider. Performance under fire conditions also includes equivalency as to how the alternate will perform structurally when exposed to fire.

104.2.3.5 Tests. – this section is added so the code official can ensure that any testing conducted is performed to a scale that adequately represents the end use of the alternate. This has primarily been added in response to concerns related to Code Change F60-21, which modified Section 2603 to defer alternatives related to fire performance of foam plastics to Section 104.

104.2.3.6 ~~104.11.1 Research~~ Reports. This section is relocated and revised to address two different types of reports currently submitted for alternatives.

104.2.3.6.1 Evaluation reports. – This section is added to address reports generate by an approved agency. The definition of "approved agency" was added to several codes in the 2018 editions. The definition is proposed to be revised, as in the IBC, or added as a new definition codes do not contain this definition, as in the IFC. This evaluation report is conducted by an approved agency that is accredited to conduct the tests or evaluations appropriate for the alternative involved. When the applicant provides a product evaluation from an accredited product evaluation agency that uses publicly developed and available criteria for the evaluation, the code official may have increased confidence that the method used for the evaluation does result in a method or material that meets the intent of the code and is at least equivalent to code-prescribed construction. Public development of criteria allows for input from industry experts, the public, and building officials in determining the methods used to evaluate code intent and equivalence, somewhat similar to the code development process where consensus is important. The accreditation ensures that the organization uses a consistent process to perform the evaluations. This section is meant to reflect the current use of evaluation reports from accredited evaluation agencies or organizations.

104.2.3.6.2 Other reports. – this section is added to address reports generated by persons or agencies other than an approved agency. It specifies that the person or agency providing the report must be qualified and must be approved by the code official. The code official has the authority to require the stamp of a registered design professional. When an applicant provides an evaluation from other than an accredited agency, or from a source that does not use publicly developed and available criteria, the code official needs more information in order to perform a proper review. Not only does the code official need to evaluate the product, but also evaluate the method that the applicant has used to determine compliance with code intent and code equivalence. So, in that case, it is proposed that the applicant would also have to provide the criteria that was used to do the evaluation, justification for use of that criteria, and data used for the evaluation, so a complete review can be made.

104.2.3.7 Peer review. – this section is added to address a method of review currently utilized by many jurisdictions. The peer review is an outside, third-party review that is submitted to the code official for use in cases where a jurisdiction may not have qualified resource in-house to perform a sufficient review of an alternative compliance proposal. Again, the peer reviewer must be qualified and approved by the code official.

104.2.4 ~~104.10~~ Modifications. – this section is relocated under the section of compliance. Minor edits occurred to provide consistent language throughout the codes.

104.2.4.1 ~~104.10.1~~ Flood hazard areas. – this section on flood hazard areas only appears in the IBC, IRC and IEBC. This section is relocated to follow the provisions for modifications.

104.3 ~~104.2~~ Applications and permits. – this section is relocated and revised to provide consistent wording.

104.3.1 ~~104.2.1~~ Determination of substantially improved or substantially damaged existing buildings and structures in flood hazard areas. – this section on flood hazard areas only appears in the IBC, IRC and IEBC. This section is relocated to follow the provisions for modifications.

104.4 ~~104.6~~ Right of entry. – This section is relocated and revised to provide consistent wording. The issue of right of entry is the same with all enforcement issues.

104.4.1 Warrant. – this section was not found in all codes, so it was added to the IBC to provide the ability to utilize a warrant. This function is allowed by the courts and currently utilized by jurisdictions.

104.5 Identification. – no change

104.6 ~~104.3~~ Notices and orders. – relocated and revised for consistent wording.

104.7 ~~Department~~ Official records. – This section revised to provide consistent wording and is reformatted by creating subsections. Each subsection addresses a different type of record that the is to be retained. This format clarifies that these records are required to be maintained.

104.7.1 Approvals.

104.7.2 Inspections.

104.7.3 Code alternatives and modifications.

104.7.4 Tests.

104.7.5 Fees.

104.8 Liability. – this section deals with protection from liability of the code official. The sections are revised to provide consistent wording throughout all I-Codes.

104.8.1 Legal defense. – this section deals with legal defense for the code official. The sections are revised to provide consistent wording throughout all I-Codes.

104.9 Approved materials and equipment. – no change

104.9.1 ~~Used materials~~ Material and equipment reuse. – this section addresses the reuse of materials and equipment. The section is revised to provide consistent wording throughout the codes to say that the code official must approve any materials to be reused.

~~104.4 Inspections.~~ – this section is relocated to 104.2.2. Some of the language in this section is not relocated since those portions are already covered in Section 110.

~~104.10 Modifications~~ – this section is relocated to 104.2.4 for formatting.

~~104.10.1 Flood hazard areas~~ – this section is relocated to 104.2.4.1 for formatting.

~~104.11 Alternative materials, design and methods of construction and equipment.~~ – this section is relocated to 104.2.3 for formatting.

~~104.11.1 Research reports.~~ – this section is relocated to 104.2.3.6 for formatting.

~~104.11.2 Tests.~~ – this section is relocated 104.2.2.4, 104.2.3.5 and 104.8.4 for formatting.

Additional unique changes are as follows:

1. Sections in IWUIC 105 are relocated to IWUIC 104, so Section 105 is deleted. This also occurs in the IgCC and IPMC.
2. The IZC has a completely different approach application and therefore, only the duplicated sections in the IZC are revised.
3. IWUIC 104.4 Subjects Not Regulated by this Code is relocated to Section 102.5 and IWUIC 104.5 Matters Not Provided For is relocated to Section 102.6 for consistency with IFC format. A minor change was made to the definition of "approved agency" which removes the repeat of the word that is to be defined, agency, and replaces it with organization. Another revision allows the agency to furnish product evaluation in addition to certification, since evaluation and certification are two different things. Evaluation is for materials and methods not addressed by the code, and certification is for materials and methods that are addressed by the code. It is intended that all I-Codes will be formatted in this fashion. There was not sufficient time to process these revisions through the PMG CAC, so only the codes under the review of the Fire CAC and Building CAC are submitted at this time. The revisions for the other codes will occur during Public Comment.

A strikeout/underline version of each code follows to identify specific revisions.

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/.

The proposal in strikeout and underline text format can be viewed here:

https://www.cdpaccess.com/proposal/8550/25693/files/download/2955/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply reformats the code sections and provides consistency across the codes.

ADM13-22 Part II

ADM14-22

IMC: SECTION 104, 202; IFGC: SECTION 104, SECTION 105, 202; IPC: SECTION 104, 202; ISPSC: SECTION 104, 202; IPSDC: SECTION 104, 202

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com)

Primary sections and titles shown as deleted include the deletion of all sections and subsections within them. For clarity, the full text of these deletions are not shown.

2021 International Mechanical Code

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such ~~agency~~ organization has been approved by the code official.

Add new definition as follows:

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

Revise as follows:

~~SECTION 104~~
~~DUTIES AND POWERS OF THE CODE OFFICIAL~~
(Delete entire section and replace as follows)

Add new text as follows:

SECTION 104
DUTIES AND POWERS OF THE CODE OFFICIAL

[A] 104.1 General. The code official is hereby authorized and directed to enforce the provisions of this code.

[A] 104.2 Determination of compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code or other applicable codes and ordinances.

104.2.1 Listed compliance. Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the code official upon request.

[A] 104.2.2 Technical assistance. To determine compliance with this code, the code official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

[A] 104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by and bear the stamp of a registered design professional.

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the code official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the code official shall approve the testing procedures. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

[A] 104.2.3.1 Approval authority. An alternative material, design or method of construction shall be approved where the code official finds that the proposed alternative is satisfactory and complies with Sections 104.2.3 through 104.2.3.7, as applicable.

[A] 104.2.3.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the code official for approval. Where the alternative material, design or method of construction is not approved, the code official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code,

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

[A] 104.2.3.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public and made available for review by the public.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.3.7 Peer review. The code official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the code official.

[A] 104.2.4 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases provided that the code official shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code, and that such modification does not lessen health, accessibility, life and fire safety or structural requirements. The details of the written request for and action granting modifications shall be recorded and entered in the files of the department of building safety.

[A] 104.2.4.1 Flood hazard areas. The code official shall not grant modifications to any provision required in flood hazard areas as established by Section 1612.3 unless a determination has been made that:

1. A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section 1612 inappropriate.
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.
5. Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.

[A] 104.3 Applications and permits. The code official shall receive applications, review construction documents and issue permits for the erection, and alteration, demolition and moving of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] 104.3.1 Determination of substantially improved or substantially damaged existing buildings and structures in flood hazard areas. For applications for reconstruction, rehabilitation, repair, alteration, addition or other improvement of existing buildings or structures located in flood hazard areas, the code official shall determine if the proposed work constitutes substantial improvement or repair of substantial damage. Where the code official determines that the proposed work constitutes substantial improvement or repair of substantial damage, and where required by this code, the code official shall require the building to meet the requirements of Section 1612 or Section R322 of the International Residential Code, as applicable.

[A] 104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the code official has reasonable cause to believe that there exists in a structure or on a premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, dangerous or hazardous, the code official is authorized to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed by this code. If such structure or premises is occupied, the code official shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the code official shall have recourse to every remedy provided by law to secure entry.

[A] 104.4.1 Warrant. Where the code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

[A] 104.5 Identification. The code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Notices and orders. The code official shall issue necessary notices or orders to ensure compliance with this code in accordance with Section 114.

[A] 104.7 Official records. The code official shall keep official records as required by Sections 104.7.1 through 104.7.5. Such official records shall be retained for not less than 5 years or for as long as the building or structure to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 104.7.1 Approvals. A record of approvals shall be maintained by the code official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 104.7.2 Inspections. The code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

[A] 104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.3; modifications in accordance with Section 104.2.4; and documentation of the final decision of the code official for either shall be in writing and shall be retained in the official records.

[A] 104.7.4 Tests. The code official shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.3.5.

[A] 104.7.5 Fees. The code official shall keep a record of fees collected and refunded in accordance with Section 109.

[A] 104.8 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Material and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and approved.

2021 International Fuel Gas Code

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing evaluation or certification, where such ~~agency~~ organization has been *approved* by the *code official*.

Add new definition as follows:

PEER REVIEW. An independent and objective technical review conducted by and approved third party.

Revise as follows:

~~SECTION 104~~
~~DUTIES AND POWERS OF THE CODE OFFICIAL~~
(Delete entire section and replace as follows)

~~SECTION 105~~
~~APPROVAL~~
(Delete entire section and replace as follows)

Add new text as follows:

SECTION 104
DUTIES AND POWERS OF THE CODE OFFICIAL

[A] 104.1 General. The code official is hereby authorized and directed to enforce the provisions of this code.

[A] 104.2 Determination of Compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the code official upon request.

[A] 104.2.2 Technical assistance. To determine compliance with this code, the code official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

[A] 104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by and bear the stamp of a registered design professional.

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the code official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the code official shall approve the testing procedures. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3 Alternative materials, design and methods of construction equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

[A] 104.2.3.1 Approved authority. An alternative material, design or method of construction shall be approved where the code official finds that the proposed alternative is satisfactory and complies with Sections 104.2.3 through 104.2.3.7, as applicable.

[A] 104.2.3.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the code official for approval. Where the alternative material, design or method of construction is not approved, the code official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code,

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

[A] 104.2.3.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public and made available for review by the public.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.3.7 Peer review. The code official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the code official.

[A] 104.2.4 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases provided that the code official shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code, and that such modification does not lessen health, accessibility, life and fire safety or structural requirements. The details of the written request for and action granting modifications shall be recorded and entered in the files of the department of building safety.

[A] 104.2.4.1 Flood Hazard Areas. The code official shall not grant modifications to any provision required in flood hazard areas as established by Section 1612.3 unless a determination has been made that:

1. A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section 1612 inappropriate.
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.
5. Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.

[A] 104.3 Applications and permits. The code official shall receive applications, review construction documents and issue permits for the erection, and alteration, demolition and moving of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] 104.3.1 Determination of substantially damaged existing buildings and structures in flood hazard areas. For applications for reconstruction, rehabilitation, repair, alteration, addition or other improvement of existing buildings or structures located in flood hazard areas, the code official shall determine if the proposed work constitutes substantial improvement or repair of substantial damage. Where the code official determines that the proposed work constitutes substantial improvement or repair of substantial damage, and where required by this code, the code official shall require the building to meet the requirements of Section 1612 or Section R322 of the International Residential Code, as applicable.

[A] 104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the code official has reasonable cause to believe that there exists in a structure or on a premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, dangerous or hazardous, the code official is authorized to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed by this code. If such structure or premises is occupied, the code official shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the code official shall have recourse to every remedy provided by law to secure entry.

[A] 104.4.1 Warrant. Where the code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

[A] 104.5 Identification. The code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Notices and orders. The code official shall issue necessary notices or orders to ensure compliance with this code in accordance with Section 114.

[A] 104.7 Official records. The code official shall keep official records as required by Sections 104.7.1 through 104.7.5. Such official records shall be retained for not less than 5 years or for as long as the building or structure to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 104.7.1 Approvals. A record of approvals shall be maintained by the code official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 104.7.2 Inspections. The code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

[A] 104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.3; modifications in accordance with Section 104.2.4; and documentation of the final decision of the code official for either shall be in writing and shall be retained in the official records.

[A] 104.7.4 Tests. The code official shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.3.5.

[A] 104.7.4 Fees. The code official shall keep a record of fees collected and refunded in accordance with Section 109.

[A] 104.8 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Materials and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and approved.

2021 International Plumbing Code

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests or furnishing inspection services, or furnishing product evaluation or certification where such ~~agency~~ organization has been *approved* by the code official.

Add new definition as follows:

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

Revise as follows:

~~SECTION 104~~
~~DUTIES AND POWERS OF THE CODE OFFICIAL~~

(Delete entire section and replace as follows)

Add new text as follows:

SECTION 104
DUTIES AND POWERS OF THE CODE OFFICIAL

[A] 104.1 General. The code official is hereby authorized and directed to enforce the provisions of this code.

[A] 104.2 Determination of compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the code official upon request.

[A] 104.2.2 Technical assistance. To determine compliance with this code, the code official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

[A] 104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by and bear the stamp of a registered design professional.

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the code official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the code official shall approve the testing procedures. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

[A] 104.2.3.1 Approval authority. An alternative material, design or method of construction shall be approved where the code official finds that the proposed alternative is satisfactory and complies with Sections 104.2.3 through 104.2.3.7, as applicable.

[A] 104.2.3.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the code official for approval. Where the alternative material, design or method of construction is not approved, the code official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code,

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

[A] 104.2.3.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public and made available for review by the public.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.3.7 Peer review. The code official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the code official.

[A] 104.2.4 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases provided that the code official shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code, and that such modification does not lessen health, accessibility, life and fire safety or structural requirements. The details of the written request for and action granting modifications shall be recorded and entered in the files of the department of building safety.

[A] 104.2.4.1 Flood hazard areas. The code official shall not grant modifications to any provision required in flood hazard areas as established by Section 1612.3 unless a determination has been made that:

1. A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section 1612 inappropriate.
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.
5. Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.

[A] 104.3 Applications and permits. The code official shall receive applications, review construction documents and issue permits for the erection, and alteration, demolition and moving of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] 104.3.1 Determination of substantially damaged existing buildings and structures in flood hazard areas. For applications for reconstruction, rehabilitation, repair, alteration, addition or other improvement of existing buildings or structures located in flood hazard areas, the code official shall determine if the proposed work constitutes substantial improvement or repair of substantial damage. Where the code official determines that the proposed work constitutes substantial improvement or repair of substantial damage, and where required by this code, the code official shall require the building to meet the requirements of Section 1612 or Section R322 of the International Residential Code, as applicable.

[A] 104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the code official has reasonable cause to believe that there exists in a structure or on a premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, dangerous or hazardous, the code official is authorized to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed by this code. If such structure or premises is occupied, the code official shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the code official shall have recourse to every remedy provided by law to secure entry.

[A] 104.4.1 Warrant. Where the code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

[A] 104.5 Identification. The code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Notices and orders. The code official shall issue necessary notices or orders to ensure compliance with this code in accordance with Section 114.

[A] 104.7 Official records. The code official shall keep official records as required by Sections 104.7.1 through 104.7.5. Such official records shall be retained for not less than 5 years or for as long as the building or structure to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 104.7.1 Approvals. A record of approvals shall be maintained by the code official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 104.7.2 Inspections. The code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

[A] 104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.3; modifications in accordance with Section 104.2.4; and documentation of the final decision of the code official for either shall be in writing and shall be retained in the official records.

[A] 104.7.4 Tests. The code official shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.3.5.

[A] 104.7.5 Fees. The code official shall keep a record of fees collected and refunded in accordance with Section 109.

[A] 104.8 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Material and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and approved.

2021 International Swimming Pool and Spa Code

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization regularly engaged in conducting tests or furnishing inspection services, or furnishing product evaluation or certification where such ~~agency~~ organization has been *approved* by the *code official*.

Add new definition as follows:

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

Add new text as follows:

REGISTERED DESIGN PROFESSIONAL. An architect or engineer, registered or licensed to practice professional architecture or engineering, as defined by the statutory requirements of the professional registration laws of the state in which the project is to be constructed.

Revise as follows:

~~SECTION 104~~
~~DUTIES AND POWERS OF THE CODE OFFICIAL~~
(Delete entire section and replace as follows)

Add new text as follows:

SECTION 104
DUTIES AND POWERS OF THE CODE OFFICIAL

[A] 104.1 General. The code official is hereby authorized and directed to enforce the provisions of this code.

[A] 104.2 Determination of compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the code official upon request.

[A] 104.2.2 Technical assistance. To determine compliance with this code, the code official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

[A] 104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by and bear the stamp of a registered design professional.

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the code official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the code official shall approve the testing procedures. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

[A] 104.2.3.1 Approval authority. An alternative material, design or method of construction shall be approved where the code official finds that the proposed alternative is satisfactory and complies with Sections 104.2.3 through 104.2.3.7, as applicable.

[A] 104.2.3.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the code official for approval. Where the alternative material, design or method of construction is not approved, the code official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code,

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

[A] 104.2.3.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public and made available for review by the public.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.3.7 Peer review. The code official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the code official.

[A] 104.2.4 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases provided that the code official shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code, and that such modification does not lessen health, accessibility, life and fire safety or structural requirements. The details of the written request for and action granting modifications shall be recorded and entered in the files of the department of building safety.

[A] 104.2.4.1 Flood hazard areas. The code official shall not grant modifications to any provision required in flood hazard areas as established by Section 1612.3 unless a determination has been made that:

1. A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section 1612 inappropriate.
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.
5. Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.

[A] 104.3 Applications and permits. The code official shall receive applications, review construction documents and issue permits for the erection, and alteration, demolition and moving of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] 104.3.1 Determination of substantially damaged existing buildings and structures in flood hazard areas. For applications for reconstruction, rehabilitation, repair, alteration, addition or other improvement of existing buildings or structures located in flood hazard areas, the code official shall determine if the proposed work constitutes substantial improvement or repair of substantial damage. Where the code official determines that the proposed work constitutes substantial improvement or repair of substantial damage, and where required by this code, the code official shall require the building to meet the requirements of Section 1612 or Section R322 of the International Residential Code, as applicable.

[A] 104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the code official has reasonable cause to believe that there exists in a structure or on a premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, dangerous or hazardous, the code official is authorized to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed by this code. If such structure or premises is occupied, the code official shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the code official shall have recourse to every remedy provided by law to secure entry.

[A] 104.4.1 Warrant. Where the code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

[A] 104.5 Identification. The code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Notice and orders. The code official shall issue necessary notices or orders to ensure compliance with this code in accordance with Section 114.

[A] 104.7 Official records. The code official shall keep official records as required by Sections 104.7.1 through 104.7.5. Such official records shall be retained for not less than 5 years or for as long as the building or structure to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 104.7.1 Approvals. A record of approvals shall be maintained by the code official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 104.7.2 Inspections. The code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

[A] 104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.3; modifications in accordance with Section 104.2.4; and documentation of the final decision of the code official for either shall be in writing and shall be retained in the official records.

[A] 104.7.4 Tests. The code official shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.3.5.

[A] 104.7.5 Fees. The code official shall keep a record of fees collected and refunded in accordance with Section 109.

[A] 104.8 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Material and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and approved.

2021 International Private Sewage Disposal Code

Add new definition as follows:

APPROVED AGENCY. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been approved by the code official.

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

Revise as follows:

~~SECTION 104~~
~~DUTIES AND POWERS OF THE CODE OFFICIAL~~
(Delete entire section and replace as follows)

Add new text as follows:

SECTION 104
DUTIES AND POWERS OF THE CODE OFFICIAL

[A] 104.1 General. The code official is hereby authorized and directed to enforce the provisions of this code.

[A] 104.2 Determination of compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the code official upon request.

[A] 104.2.2 Technical assistance. To determine compliance with this code, the code official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

[A] 104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by and bear the stamp of a registered design professional.

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the code official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the code official shall approve the testing procedures. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

[A] 104.2.3.1 Approval authority. An alternative material, design or method of construction shall be approved where the code official finds that the proposed alternative is satisfactory and complies with Sections 104.2.3 through 104.2.3.7, as applicable.

[A] 104.2.3.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the code official for approval. Where the alternative material, design or method of construction is not approved, the code official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code,

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

[A] 104.2.3.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public and made available for review by the public.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.3.7 Peer review. The code official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the code official.

[A] 104.2.4 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases provided that the code official shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code, and that such modification does not lessen health, accessibility, life and fire safety or structural requirements. The details of the written request for and action granting modifications shall be recorded and entered in the files of the department of building safety.

[A] 104.2.4.1 Flood hazard areas. The code official shall not grant modifications to any provision required in flood hazard areas as established by Section 1612.3 unless a determination has been made that:

1. A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section 1612 inappropriate.
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.
5. Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.

[A] 104.3 Applications and permits. The code official shall receive applications, review construction documents and issue permits for the erection, and alteration, demolition and moving of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] 104.3.1 Determination of substantially damaged existing buildings and structures in flood hazard areas. For applications for reconstruction, rehabilitation, repair, alteration, addition or other improvement of existing buildings or structures located in flood hazard areas, the code official shall determine if the proposed work constitutes substantial improvement or repair of substantial damage. Where the code official determines that the proposed work constitutes substantial improvement or repair of substantial damage, and where required by this code, the code official shall require the building to meet the requirements of Section 1612 or Section R322 of the International Residential Code, as applicable.

[A] 104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the code official has reasonable cause to believe that there exists in a structure or on a premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, dangerous or hazardous, the code official is authorized to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed by this code. If such structure or premises is occupied, the code official shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the code official shall have recourse to every remedy provided by law to secure entry.

[A] 104.4.1 Warrant. Where the code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

104.5 Identification. The code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Notices and ordet. The code official shall issue necessary notices or orders to ensure compliance with this code in accordance with Section 114.

[A] 104.7 Official records. The code official shall keep official records as required by Sections 104.7.1 through 104.7.5. Such official records shall be retained for not less than 5 years or for as long as the building or structure to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 104.7.1 Approvals. A record of approvals shall be maintained by the code official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 104.7.2 Inspections. The code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

[A} 104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.3; modifications in accordance with Section 104.2.4; and documentation of the final decision of the code official for either shall be in writing and shall be retained in the official records.

[A] 104.7.4 Tests. The code official shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.3.5.

[A] 104.7.5 Fees. The code official shall keep a record of fees collected and refunded in accordance with Section 109.

[A] 104.8 Liability. The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Material and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and approved.

Reason Statement: Section 104 appears in the IMC, IFGC, IPC, ISPSC and IPSDC and contains general requirements for the authority and duties of the code official. Among these authorities and duties is the review and approval of alternate methods. The primary purpose of this code change is to update Section 104 to reflect the current manner that alternate methods and materials are evaluated, and to differentiate between evaluations from accredited evaluation agencies and evaluations from others, such as engineers. These provisions have basically been the same since the first edition in 2000, with the exception that the section on "Research Reports" was added in 2003. Industry terminology and methods have evolved over the years.
This proposal revises general code enforcement provisions to improve organization, improve clarity, and supplement existing provisions to better align the code text with how the code is commonly applied. The end goal is to provide the same wording and procedures in all of the I-Codes with regard to the Duties and Responsibilities of the Code Official. Some of the codes contain unique provisions applicable to only that code. Those nuances are retained so there are some slight differences, but the formatting will be the same in each code and the language will generally be the same in each code.

A separate code change proposal was submitted for the IFC, IWUIC, IBC, IEBC, IRC, IgCC and IPMC. The proposals are separate, however, the content and purpose is the same. Time restraints did not allow for this package to be reviewed by the PMG CAC. Therefore, it is submitted separately, however the content and format is identical.

As stated earlier, this section has been in the code a long time, and it is believed that it initially envisioned an alternative product or method review and approval process on a project-by-project basis, with substantiating tests and calculations or analyses provided with each permit application. Currently, a more efficient system has evolved where the same product evaluation reports are used in numerous projects, across many jurisdictions, and for many conditions. This evolution causes the need to revise this section to reflect current procedures.

However, the need for designers to be able to apply for one-time approval needs to be maintained, and that is the reason that "research reports" is maintained. In this case, though, when a method or material is not addressed by the code, the code official needs more information on the process that the evaluator used to determine that the method or material complies with the intent of the code.

To achieve the common format, a template is shown below which includes comments on each of the sections. Since the wording in each code is intended to be the same, the outline is not shown for every code, however there is an underline/strikeout version for each code provided. The code change for each code is provided as delete and substitute. This was done because the autoformatting process in cdpACCESS did not provide a document to easily follow. The underline/strikeout versions show the specific changes.

The following template is from the IBC. The IMC, IFGC, IPC, ISPSC and IPSDC provisions are formatted the same as this template, however some codes have additional unique provisions, and other codes don't contain all of these sections if they are not appropriate for the code content. This is the same template used for the other code change for the remaining I-Codes.

OUTLINE FOR PROPOSED SECTION 104

SECTION 104 DUTIES AND POWERS OF BUILDING OFFICIAL – same title used for each code

104.1 General. – This section has been subdivided with numbered/titled subsections to break up the existing paragraph and specifically state that the code official is authorized to determine compliance with the code. While always implied and applied in this manner, the code never specifically states this important fact.

104.2 Determination of Compliance. – reformatted to identify that when reviewing projects for compliance with the code, the code official can develop policies and procedures. It also specifically states that the developed policies and the project approvals are to be based on the intent of the code.

104.2.1 Listed compliance. – In cases where the code specifies a listing standard, it is common for a code official to accept things listed to that standard without further evaluating whether the standard is germane. When a product listing is appropriate, then the fact that the product is listed and installed in accordance with the listing specifications and the manufacturer's instructions becomes the approval of the product. This section is not included in all codes since not all codes require listed equipment.

104.2.2 Technical assistance. – Nearly all the codes provide for the code official to utilize technical assistance in some form or another. This section is included as a subsection for determining compliance and will be consistent throughout the I-Codes. It is derived from, and replaces, previous text that was originally developed for and limited to hazardous materials related provisions.

104.2.2.1 Cost. – the cost for technical assistance is borne by the applicant or owner. This was previously included in a preceding paragraph and has been separated into its own subsection.

104.2.2.2 Preparer qualifications. – states that the person or agency providing the technical report must be qualified. The code official has the ability to require that the report is stamped by a registered design professional, since not all reports may need to provide this. For example, a hazardous materials classification report often does not include engineering or design. The definition is added to codes that do not currently contain the definition, such as the IWUIC. This was previously included in a preceding paragraph and has been separated into its own subsection. The new text goes beyond simply recommending changes, recognizing that the report may be a source document, as opposed to a review of documentation prepared by others.

104.2.2.3 Content. – the technical report shall include an analysis and any recommended or necessary changes.

104.2.2.4 Tests. – Tests can often provide valuable information. Where a test standard isn't specified by this code or a reference standard, the code official may wish to conduct further evaluation of the suitability of the test method used as a basis. Testing can be performed by an approved agency or by any other party/organization approved by the code official. Proposed provisions for tests are largely derived from existing code text on this topic.

104.2.3 ~~104.11~~ Alternative materials, design and methods of construction and equipment. – All codes make reference to accepting some type of alternative. This section is placed under the general compliance approval section and revised to state that a proposed alternative cannot be something that is specifically prohibited by the code. If ICC members have previously voted to specifically disallow something, alternative methods should not be a means of avoiding such a prohibition. Nevertheless, a code modification would still provide an option to make exceptions for unique cases, as opposed to the door being open for an applicant to end run the intent of the code by presenting an analysis or alternative that suggests an alternative to a prohibition is OK. It is important to note that something not contemplated by the code would not be impacted by this statement. Not contemplated is not the same as a specific prohibition in the code.

104.2.3.1 Approval authority. – if the alternative is acceptable, then it is to be approved by the code official. This is from existing text.

104.2.3.2 Application and disposition. – the submittal for an alternative must be accomplished in writing. If it is not approved, the code official must so state in writing and provide reasons why it was not acceptable. This is largely from existing text, however, the requirement for a written application for alternatives was not previously located in this section, where it is appropriate to reference.

104.2.3.3 Compliance with code intent. – the alternative must comply with the code's intent.

104.2.3.4 Equivalency criteria. – the alternative must provide equivalency to the code's provisions. The list of characteristics to be addressed is included from the current code. The reference to fire-resistance is removed from the list and fire-resistance is included under safety with additional criteria regarding fire characteristics identified in Section 104.2.3.4.1.

104.2.3.4.1 Fire safety equivalency. – this section was added because "fire-resistance" was removed from the list in Section 104.2.3.4 and recognizing that fire-resistance is not the only fire related characteristic to be addressed. Fire-resistance is only one characteristic of safety with respect to fire. This section is added to clarify that the entire issue of performance under fire conditions is the concern. Previously, aspects of fire safety beyond fire resistance would have been evaluated as part of "safety" in the list with no additional guidance on what to consider. Performance under fire conditions also includes equivalency as to how the alternate will perform structurally when exposed to fire.

104.2.3.5 Tests. – this section is added so the code official can ensure that any testing conducted is performed to a scale that adequately represents the end use of the alternate. This has primarily been added in response to concerns related to Code Change F60-21, which modified Section 2603 to defer alternatives related to fire performance of foam plastics to Section 104.

104.2.3.6 ~~104.11.1 Research~~ Reports. This section is relocated and revised to address two different types of reports currently submitted for alternatives.

104.2.3.6.1 Evaluation reports. – This section is added to address reports generate by an approved agency. The definition of "approved agency" was added to several codes in the 2018 editions. The definition is proposed to be revised, as in the IBC, or added as a new definition codes do not contain this definition, as in the IFC. This evaluation report is conducted by an approved agency that is accredited to conduct the tests or evaluations appropriate for the alternative involved. When the applicant provides a product evaluation from an accredited product evaluation agency that uses publicly developed and available criteria for the evaluation, the code official may have increased confidence that the method used for the evaluation does result in a method or material that meets the intent of the code and is at least equivalent to code-prescribed construction. Public development of criteria allows for input from industry experts, the public, and building officials in determining the methods used to evaluate code intent and equivalence, somewhat similar to the code development process where consensus is important. The accreditation ensures that the organization uses a consistent process to perform the evaluations. This section is meant to reflect the current use of evaluation reports from accredited evaluation agencies or organizations.

104.2.3.6.2 Other reports. – this section is added to address reports generated by persons or agencies other than an approved agency. It specifies that the person or agency providing the report must be qualified and must be approved by the code official. The code official has the authority to require the stamp of a registered design professional. When an applicant provides an evaluation from other than an accredited agency, or from a source that does not use publicly developed and available criteria, the code official needs more information in order to perform a proper review. Not only does the code official need to evaluate the product, but also evaluate the method that the applicant has used to determine compliance with code intent and code equivalence. So, in that case, it is proposed that the applicant would also have to provide the criteria that was used to do the evaluation, justification for use of that criteria, and data used for the evaluation, so a complete review can be made.

104.2.3.7 Peer review. – this section is added to address a method of review currently utilized by many jurisdictions. The peer review is an outside, third-party review that is submitted to the code official for use in cases where a jurisdiction may not have qualified resource in-house to perform a sufficient review of an alternative compliance proposal. Again, the peer reviewer must be qualified and approved by the code official.

104.2.4 ~~104.10~~ Modifications. – this section is relocated under the section of compliance. Minor edits occurred to provide consistent language throughout the codes.

104.3 ~~104.2~~ Applications and permits. – this section is relocated and revised to provide consistent wording.

~~104.4 Inspections.~~ – this section is relocated to 104.2.2. Some of the language in this section is not relocated since those portions are already covered in Section 110. 104.4 ~~104.6~~ Right of entry. – This section is relocated and revised to provide consistent wording. The issue of right of entry is the same with all enforcement issues.

104.4.1 Warrant. – this section was not found in all codes, so it was added to the IBC to provide the ability to utilize a warrant. This function is allowed by the courts and currently utilized by jurisdictions.

104.5 Identification. – no change

104.6 ~~104.3~~ Notices and orders. – relocated and revised for consistent wording.

104.7 ~~Department~~ Official records. – This section revised to provide consistent wording and is reformatted by creating subsections. Each subsection addresses a different type of record that the is to be retained. This format clarifies that these records are required to be maintained.

104.7.1 Approvals.

104.7.2 Inspections.

104.7.3 Code alternatives and modifications.

104.7.4 Tests.

104.7.5 Fees.

104.8 Liability. – this section deals with protection from liability of the code official. The sections are revised to provide consistent wording throughout all I-Codes.

104.8.1 Legal defense. – this section deals with legal defense for the code official. The sections are revised to provide consistent wording throughout all I-Codes.

104.9 ~~105.5~~ Approved materials and equipment. – no change

104.9.1 ~~105.4 Used materials~~ Material and equipment reuse. – this section addresses the reuse of materials and equipment. The section is revised to provide consistent wording throughout the codes to say that the code official must approve any materials to be reused.

~~104.10 Modifications~~ – this section is relocated to 104.2.4 for formatting.

~~104.11 Alternative materials, design and methods of construction and equipment.~~ – this section is relocated to 104.2.3 for formatting.

~~104.11.1 Research reports.~~ – this section is relocated to 104.2.3.6 for formatting.

~~104.11.2 Tests.~~ – this section is relocated 104.2.2.4, 104.2.3.5 and 104.8.4 for formatting.

Additional unique changes are as follows:

1. Sections in IMC 105 are relocated to IMC 104, so Section 105 is deleted. This also occurs in the IFGC and IPSDC.
2. A minor change was made to the definition of “approved agency” which removes the repeat of the word that is to be defined, agency, and replaces it with organization. Another revision allows the agency to furnish product evaluation in addition to certification, since evaluation and certification are two different things. Evaluation is for materials and methods not addressed by the code, and certification is for materials and methods that are addressed by the code.

A strikeout/underline version of each code follows to identify specific revisions.

The proposal in strikeout and underline text format can be viewed here:

https://www.cdpaccess.com/proposal/8835/25768/files/download/3016/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a reformatting and clarification of the requirements already in the codes.

ADM14-22

ADM15-22 Part I

IBC: [A] 104.9, 104.9.1 (New), 104.9.1.1 (New), 104.9.1.2 (New), [A] 104.9.1; IEBC: [A] 104.9, 104.9.1 (New), 104.9.1.1 (New), 104.9.1.2 (New), [A] 104.9.1; IFC: [A] 104.8, 104.8.1 (New), 104.8.1.1 (New), 104.8.1.2 (New), [A] 104.8.1; IFGC: [A] 105.5, 105.4.1 (New), 105.4.1.1 (New), 105.4.1.2 (New), [A] 105.4; IGCC: 105.2, 105.2.1 (New), 105.2.1.1 (New), 105.2.1.2 (New), 105.2.1; IMC: [A] 105.4, 105.4.1 (New), 105.4.1.1 (New), 105.4.1.2 (New), [A] 105.5; IPC: [A] 105.4, 105.4.1 (New), 105.4.1.1 (New), 105.4.1.2 (New), [A] 105.4.1; IPSDC: [A] 105.5, 105.4.1 (New), 105.4.1.1 (New), 105.4.1.2 (New), [A] 105.4; IPMC: [A] 106.5, 106.4.1 (New), 106.4.1.1 (New), 106.4.1.2 (New), [A] 106.4; ISPSC: 104.9 (New), 104.9.1 (New), 104.9.1.1 (New), 104.9.1.2 (New), [A] 104.13; IWUIC: 105.3 (New), 105.3.1 (New), 105.3.1.1 (New), 105.3.1.2 (New), 105.3.2 (New)

Proponents: Chris Chwedyk, representing Compliance Code Action Committee (ccac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

[A] 104.9 Approved materials and equipment. Materials, equipment and devices *approved* by the *building official* shall be constructed and installed in accordance with such approval.

Add new text as follows:

104.9.1 Materials and equipment standards. Materials, equipment and devices required by this code to conform to referenced standards shall comply with Section 104.9.1.1 and 104.9.1.2.

104.9.1.1 Identification. Materials, equipment and devices required to conform to standards referenced in this code shall bear the identification of the manufacturer and any markings required by those referenced standards.

104.9.1.2 Listing and labeling. Where the code requires listing and labeling, or where required by the *building official*, the materials, equipment and devices shall be certified as complying with those standards by an *approved agency*. The agency shall be accredited to provide certification of materials, equipment and devices that are within the scope of the agency's accreditation. Certification of materials, equipment and devices shall incorporate initial testing, assessment and surveillance of a manufacturer's quality control system. The use of these materials, equipment and devices shall be in accordance with their listing.

Revise as follows:

[A] 104.9.2 ~~104.9.1 Used materials~~ Material and equipment reuse. Materials that are reused shall comply with the requirements of this code for new materials. Used equipment and devices shall not be reused unless *approved* by the *building official*.

2021 International Existing Building Code

Revise as follows:

[A] 104.9 Approved materials and equipment. Materials, equipment and devices *approved* by the *code official* shall be constructed and installed in accordance with such approval.

Add new text as follows:

104.9.1 Materials and equipment standards . Materials, equipment and devices required by this code to conform to referenced standards shall comply with Sections 104.9.1.1 and 104.9.1.2.

104.9.1.1 Identification. Materials, equipment and devices required by this code to conform to referenced standards shall bear the identification of the manufacturer and any markings required by those referenced standards.

104.9.1.2 Listing and labeling. Where the code requires a product to be *listed* and *labeled*, or where required by the *building official*, these materials, equipment and devices shall be certified as complying with those standards by an *approved agency*. The agency shall be accredited to provide product certification, and the material and equipment shall be within the scope of the agency's accreditation. Certification shall incorporate initial product testing, assessment and surveillance of a manufacturer's quality control system.

Revise as follows:

[A] ~~104.9.1~~ 104.9.2 ~~Used materials~~ Material and equipment reuse. The use of used materials that meet the requirements of this code for new materials is permitted. Used equipment and devices shall be permitted to be reused subject to the approval of the *code official*.

2021 International Fire Code

Revise as follows:

[A] 104.8 Approved materials and equipment. Materials, equipment and devices *approved* by the *fire code official* shall be constructed and installed in accordance with such approval.

Add new text as follows:

104.8.1 Materials and equipment standards. Materials, equipment and devices required by this code to conform to referenced standards shall comply with Sections 104.8.1.1 and 104.8.1.2.

104.8.1.1 Identification. Materials, equipment and devices required to conform to standards referenced in this code shall bear the identification of the manufacturer and any markings required by those referenced standards.

104.8.1.2 Listing and labeling. Where the code requires listing and labeling, or where required by the building official, the materials, equipment and devices shall be certified as complying with those standards by an approved agency. The agency shall be accredited to provide certification of materials, equipment and devices that are within the scope of the agency's accreditation. Certification of materials, equipment and devices shall incorporate initial testing, assessment and surveillance of a manufacturer's quality control system. The use of these materials, equipment and devices shall be in accordance with their listing.

Revise as follows:

[A] ~~104.8.1~~ 104.8.2 Material and equipment reuse. Materials, equipment and devices shall not be reused or reinstalled unless such elements have been reconditioned, tested and placed in good and proper working condition and *approved*.

2021 International Fuel Gas Code

Revise as follows:

[A] ~~105.5~~ 105.4 Approved materials and equipment. Materials, *equipment* and devices *approved* by the *code official* shall be constructed and installed in accordance with such approval.

Add new text as follows:

105.4.1 Materials and equipment standards. Materials, equipment and devices required by this code to conform to referenced standards shall comply with Sections 105.4.1.1 and 105.4.1.2.

105.4.1.1 Identification. Materials, equipment and devices required to conform to standards referenced in this code shall bear the identification of the manufacturer and any markings required by those referenced standards.

105.4.1.2 Listing and labeling. Where the code requires listing and labeling, or where required by the building official, the materials, equipment and devices shall be certified as complying with those standards by an approved agency. The agency shall be accredited to provide certification of materials, equipment and devices that are within the scope of the agency's accreditation. Certification of materials, equipment and devices shall incorporate initial testing, assessment and surveillance of a manufacturer's quality control system. The use of these materials, equipment and devices shall be in accordance with their listing.

Revise as follows:

[A] ~~105.4~~ 105.4.2 ~~Used material~~ Material, appliances and equipment reuse. The use of used materials that meet the requirements of this code for new materials is permitted. Used appliances, *equipment* and devices shall not be reused unless such elements have been reconditioned, tested and placed in good and proper working condition, and *approved* by the *code official*.

2021 International Green Construction Code

105.2 Approved materials and equipment. Materials, equipment, devices and innovative approaches *approved* by the authority having jurisdiction shall be constructed, installed and maintained in accordance with such approval.

Add new text as follows:

105.2.1 Materials and equipment standards. Materials, equipment and devices required by this code to conform to referenced standards shall comply with Sections 105.2.1.1 and 105.2.1.2.

105.2.1.1 Identification. Materials, equipment and devices required to conform to standards referenced in this code shall bear the identification of the manufacturer and any markings required by those referenced standards.

105.2.1.2 Listing and labeling. Where the code requires listing and labeling, or where required by the building official, the materials, equipment and devices shall be certified as complying with those standards by an approved agency. The agency shall be accredited to provide certification of materials, equipment and devices that are within the scope of the agency's accreditation. Certification of materials, equipment and devices shall incorporate initial testing, assessment and surveillance of a manufacturer's quality control system. The use of these materials, equipment and devices shall be in accordance with their listing.

Revise as follows:

~~105.2.1~~ <u>105.2.2</u> **~~Used materials~~ <u>Material</u>, products and equipment <u>reuse</u>.** Used materials, products and equipment that are to be reused shall meet the requirements of this code for new materials. Used equipment and devices that are to be reused are subject to the approval of the authority having jurisdiction.

2021 International Mechanical Code

[A] 105.4 Approved materials and equipment. Materials, *equipment* and devices *approved* by the code official shall be constructed and installed in accordance with such approval.

Add new text as follows:

<u>**105.4.1** **Materials and equipment standards.** Materials, equipment and devices required by this code to conform to referenced standards shall comply with Sections 105.4.1.1 and 105.4.1.2.</u>

<u>**105.4.1.1** **Identification.** Materials, equipment and devices required to conform to standards referenced in this code shall bear the identification of the manufacturer and any markings required by those referenced standards.</u>

<u>**105.4.1.2** **Listing and labeling.** Where the code requires listing and labeling, or where required by the building official, the materials, equipment and devices shall be certified as complying with those standards by an approved agency. The agency shall be accredited to provide certification of materials, equipment and devices that are within the scope of the agency's accreditation. Certification of materials, equipment and devices shall incorporate initial testing, assessment and surveillance of a manufacturer's quality control system. The use of these materials, equipment and devices shall be in accordance with their listing.</u>

Revise as follows:

[A] ~~105.5~~ <u>105.4.2</u> ~~Material~~ <u>Used material</u>, equipment and appliance ~~reuse~~. Materials, *equipment*, *appliances* and devices shall not be reused unless such elements have been reconditioned, tested and placed in good and proper working condition and *approved*.

2021 International Plumbing Code

[A] 105.4 Approved materials and equipment. Materials, equipment and devices *approved* by the code official shall be constructed and installed in accordance with such approval.

Add new text as follows:

<u>**105.4.1** **Materials and equipment standards.** Materials, equipment and devices required by this code to conform to referenced standards shall comply with Sections 105.4.1.1 and 105.4.1.2.</u>

<u>**105.4.1.1** **Identification.** Materials, equipment and devices required to conform to standards referenced in this code shall bear the identification of the manufacturer and any markings required by those referenced standards.</u>

<u>**105.4.1.2** **Listing and labeling.** Where the code requires listing and labeling, or where required by the building official, the materials, equipment and devices shall be certified as complying with those standards by an approved agency. The agency shall be accredited to provide certification of materials, equipment and devices that are within the scope of the agency's accreditation. Certification of materials, equipment and devices shall incorporate initial testing, assessment and surveillance of a manufacturer's quality control system. The use of these materials, equipment and devices shall be in accordance with their listing.</u>

Revise as follows:

[A] ~~105.4.1~~ <u>105.4.2</u> Material and equipment reuse. Materials, equipment and devices shall not be reused unless such elements have been reconditioned, tested, placed in good and proper working condition and *approved*.

2021 International Private Sewage Disposal Code

Revise as follows:

[A] ~~105.5~~ <u>105.4</u> Approved materials and equipment. Materials, equipment and devices approved by the *code official* shall be constructed and installed in accordance with such approval.

Add new text as follows:

<u>**105.4.1** **Materials and equipment standards.** Materials, equipment and devices required by this code to conform to referenced standards shall comply with Sections 105.4.1.1 and 105.4.1.2.</u>

<u>**105.4.1.1** **Identification.** Materials, equipment and devices required to conform to standards referenced in this code shall bear the identification of the manufacturer and any markings required by those referenced standards.</u>

<u>**105.4.1.2** **Listing and labeling.** Where the code requires listing and labeling, or where required by the building official, the materials, equipment and devices shall be certified as complying with those standards by an approved agency. The agency shall be accredited to provide certification of</u>

materials, equipment and devices that are within the scope of the agency's accreditation. Certification of materials, equipment and devices shall incorporate initial testing, assessment and surveillance of a manufacturer's quality control system. The use of these materials, equipment and devices shall be in accordance with their listing.

Revise as follows:

[A] ~~105.4~~ 105.4.2 ~~Used material~~ Material and equipment reuse. Materials that are reused shall comply with the requirements of this code for new materials. Materials, equipment and devices shall not be reused unless such elements have been reconditioned, tested and placed in good and proper working condition and approved by the *code official*.

2021 International Property Maintenance Code

Revise as follows:

[A] ~~106.5~~ 106.4 Approved materials and equipment. Materials, equipment and devices *approved* by the *code official* shall be constructed and installed in accordance with such approval.

Add new text as follows:

106.4.1 Materials and equipment standards . Materials, equipment and devices required by this code to conform to referenced standards shall comply with Sections 106.4.1.1 and 106.4.1.2.

106.4.1.1 Identification. Materials, equipment and devices required to conform to standards referenced in this code shall bear the identification of the manufacturer and any markings required by those referenced standards.

106.4.1.2 Listing and labeling. Where the code requires listing and labeling, or where required by the building official, the materials, equipment and devices shall be certified as complying with those standards by an approved agency. The agency shall be accredited to provide certification of materials, equipment and devices that are within the scope of the agency's accreditation. Certification of materials, equipment and devices shall incorporate initial testing, assessment and surveillance of a manufacturer's quality control system. The use of these materials, equipment and devices shall be in accordance with their listing.

Revise as follows:

[A] ~~106.4~~ 106.4.2 ~~Used material~~ Material and equipment reuse. Materials that are reused shall comply with the requirements of this code for new materials. Materials, equipment and devices shall not be reused unless such elements are in good repair or have been reconditioned and tested where necessary, placed in good and proper working condition and *approved* by the *code official*.

2021 International Swimming Pool and Spa Code

Add new text as follows:

104.9 Approved materials and equipment. Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

104.9.1 Materials and equipment standards. Materials, equipment and devices required by this code to conform to referenced standards shall comply with Sections 104.9.1.1 and 104.9.1.2.

104.9.1.1 Identification. Materials, equipment and devices required to conform to standards referenced in this code shall bear the identification of the manufacturer and any markings required by those referenced standards.

104.9.1.2 Listing and labeling. Where the code requires listing and labeling, or where required by the building official, the materials, equipment and devices shall be certified as complying with those standards by an approved agency. The agency shall be accredited to provide certification of materials, equipment and devices that are within the scope of the agency's accreditation. Certification of materials, equipment and devices shall incorporate initial testing, assessment and surveillance of a manufacturer's quality control system. The use of these materials, equipment and devices shall be in accordance with their listing.

Revise as follows:

[A] ~~104.13~~ 104.9.2 Material and equipment reuse. Materials, equipment and devices shall not be reused unless such elements have been reconditioned, tested, placed in good and proper working condition and *approved*.

2021 International Wildland-Urban Interface Code

Add new text as follows:

105.3 Approved materials and equipment. Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

105.3.1 Materials and equipment standards . Materials, equipment and devices required by this code to conform to referenced standards shall comply with Sections 105.3.1.1 and 105.3.1.2.

105.3.1.1 Identification. Materials, equipment and devices required to conform to standards referenced in this code shall bear the identification of the manufacturer and any markings required by those referenced standards.

105.3.1.2 Listing and labeling. Where the code requires listing and labeling, or where required by the building official, the materials, equipment and devices shall be certified as complying with those standards by an approved agency. The agency shall be accredited to provide certification of materials, equipment and devices that are within the scope of the agency's accreditation. Certification of materials, equipment and devices shall incorporate initial testing, assessment and surveillance of a manufacturer's quality control system. The use of these materials, equipment and devices shall be in accordance with their listing.

105.3.2 Materials and equipment reuse. Materials that are reused shall comply with the requirements of this code for new materials. Used equipment and devices shall not be reused unless approved by the code official.

ADM15-22 Part I

ADM15-22 Part II

IRC: R104.9, R104.9.1 (New), R104.9.1.1 (New), R104.9.1.2 (New), R104.9.1

Proponents: Chris Chwedyk, representing Compliance Code Action Committee (ccac@iccsafe.org)

2021 International Residential Code

R104.9 Approved materials and equipment. Materials, *equipment* and devices *approved* by the *building official* shall be constructed and installed in accordance with such approval.

Add new text as follows:

R104.9.1 Materials and equipment standards . Materials, equipment and devices required by this code to conform to referenced standards shall comply with Sections R104.9.1.1 and R104.9.1.2.

R104.9.1.1 Identification. Materials, equipment and devices required to conform to standards referenced in this code shall bear the identification of the manufacturer and any markings required by those referenced standards.

R104.9.1.2 Listing and labeling. Where the code requires listing and labeling, or where required by the *building official*, the materials, equipment and devices shall be certified as complying with those standards by an *approved agency*. The agency shall be accredited to provide certification of materials, equipment and devices that are within the scope of the agency's accreditation. Certification of materials, equipment and devices shall incorporate initial testing, assessment and surveillance of a manufacturer's quality control system. The use of these materials, equipment and devices shall be in accordance with their listing.

Revise as follows:

~~R104.9.1~~ R104.9.2 ~~Used materials~~ Material and equipment reuse. Used materials, *equipment* and devices shall not be reused unless *approved* by the *building official.*

Reason Statement: The code is currently silent on how the building official is to determine code compliance of products that are required to meet certain standards in the code. In all codes, there is currently a section on Alternate Materials and Methods, which might be used for this process, but that section clearly states that it applies to "*any design or method of construction not specifically prescribed by this code.*" So for products that have requirements that ARE prescribed by the code, the code is currently silent on how to determine code compliance.
This change proposes to add a section to "*Approved materials and equipment*" that does three things. First, it reinforces the information required on the product or its packaging. Second, it requires that where the code requires listing and labeling, or when required by the building official, the manufacturer must provide a product certification from an approved agency. Finally, it clarifies that the approved agency must be accredited to certify the type of product that is being evaluated. This proposal is describing the typical process currently used in the industry and will help to clarify better understanding of certification requirements.

It is important to include "*where required by the building official*", because there are some products that are minor in nature and are not related to life safety that should not always require certification. The term "*approved agency*" is already defined by the code and clearly already describes the type of organization that provides this type of certification. Requirements that the agency be accredited to provide certification of materials, equipment and devices better ensure that the agency's processes are consistent, transparent, and impartial.

Further, it is important to spell out exactly what the certification entails. The next to last sentence in the section on Listing and Labeling ensures that the certification of the product includes any required testing and other assessment, and also review of the manufacturer's quality control system to ensure that the product that was tested will continue to be produced in the same way so it will continue to comply with the code. This matches the wording in the International Plumbing Code in the definition of "Third-party Certification Agency".

Finally, the last sentence ensures that the materials, equipment and devices are installed in accordance with their listing which ensures that the installation complies with the code.

This change provides some consistency with other International Codes on how product certification is handled. For example, the International Plumbing Code, in Section 303.4, states "*Plumbing products and materials required by the code to be in compliance with a referenced standard shall be listed by a third-party certification agency as complying with the referenced standards. Products and materials shall be identified in accordance with Section 303.1.*"

The International Mechanical Code contains similar requirements. Section 301.5 states "*Piping, tubing and fittings shall comply with the applicable referenced standards, specifications and performance criteria of this code and shall be identified in accordance with Section 301.3. Piping, tubing and fittings shall either be tested by an approved third-party testing agency or certified by an approved third-party certification agency*." Further, Section 301.7 states that "*Appliances regulated by this code shall be listed and labeled for the application in which they are installed and used, unless otherwise approved in accordance with Section 105.*"

The change to the section for "Material and equipment reuse" is to make this a subsection of "Approved materials and equipment" and to provide a section title that is similar across codes. There are no proposed changes to the text in these sections in this proposal.

The proposal in strikeout and underline text format can be viewed here:

https://www.cdpaccess.com/proposal/8552/25322/files/download/2907/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of this requirement is primarily on the manufacturer and the certification agency and is fairly negligible as many material manufacturers and certification organizations already engage in the described process.

ADM15-22 Part II

ADM16-22 Part I

IBC: SECTION 202, [A] 104.11, 104.11.1 (New), [A] 104.11.1, 104.11.1.2 (New), [A] 104.11.2, 104.12.1 (New), 104.12.2 (New), 104.12.3 (New); IEBC: SECTION 202 (New), [A] 104.11, 104.11.1 (New), [A] 104.11.1, 104.11.1.2 (New), [A] 104.11.2, 1104.12.1 (New), 104.12.2 (New), 104.12.3 (New); IFC: SECTION 202 (New), [A] 104.10, 104.10.1 (New), [A] 104.10.1, 104.10.1.2 (New), [A] 104.10.2, 104.11.1 (New), 104.11.2 (New), 104.11.3 (New); IFGC: SECTION 202, SECTION 202 (New), [A] 105.2, 105.2.1 (New), [A] 105.2.1, 105.2.1.2 (New), [A] 105.3, [A] 105.3.1, [A] 105.3.2, [A] 105.3.3; IGCC: 105.4, 105.4.1 (New), 105.4.1, 105.4.1.2 (New), 105.4.2, 105.5.1 (New), 105.5.2 (New), 105.5.3 (New); IMC: SECTION 202, SECTION 202 (New), [A] 105.2, 105.2.1 (New), [A] 105.2.1, 105.2.1.2 (New), [A] 105.3, [A] 105.3.1, [A] 105.3.2, [A] 105.3.3; IPSDC: SECTION 202 (New), [A] 105.2, 105.2.1 (New), [A] 105.2.1, 105.2.1.2 (New), [A] 105.3, [A] 105.3.1, [A] 105.3.2, [A] 105.3.3; IPC: SECTION 202, SECTION 202 (New), [A] 105.2, 105.2.1 (New), [A] 105.2.1, 105.2.1.2 (New), [A] 105.3, [A] 105.3.1, [A] 105.3.2, [A] 105.3.3; IPMC: SECTION 202 (New), [A] 106.2, 106.2.1 (New), [A] 106.6, 106.2.1.2 (New), [A] 106.3, [A] 106.3.1, 106.3.2 (New), [A] 106.3.2; ISPSC: SECTION 202, SECTION 202 (New), [A] 104.10, 104.10.1 (New), 104.10.1.1 (New), 104.10.1.2 (New), [A] 104.11, [A] 104.11.1, [A] 104.11.2, [A] 104.11.3; IWUIC: SECTION 202 (New), [A] 105.3, 105.3.1 (New), 105.3.1.1 (New), 105.3.1.2 (New), 105.4 (New), 105.4.1 (New), 105.4.2 (New), 105.4.3 (New)

Proponents: Chris Chwedyk, representing Compliance Code Action Committee (ccac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ <u>organization</u> that is regularly engaged in conducting tests, furnishing inspection services or furnishing product <u>evaluation or</u> certification where such ~~agency~~ <u>organization</u> has been *approved* by the *building official*.

[A] APPROVED SOURCE. An independent person, firm or corporation, *approved* by the *building official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

Revise as follows:

[A] 104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code,
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:

   2.1. Quality.

   2.2. Strength.

   2.3. Effectiveness.

   2.4. *Fire resistance*.

   2.5. Durability.

   2.6. Safety.

~~Where the alternative material, design or method of construction is not approved, the *building official* shall respond in writing, stating the reasons why the alternative was not approved.~~

Add new text as follows:

<u>**104.11.1 Verification of code intent and equivalence.** Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section 104.11.1.1 or evaluation reports from an approved agency in accordance with Section 104.11.1.2. The building official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.</u>

Delete and substitute as follows:

~~**[A] 104.11.1 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.~~

[A] 104.11.1.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the building official's review of the materials, design or method of construction and equipment.

Add new text as follows:

104.11.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

Revise as follows:

[A] ~~104.11.2~~ 104.12 ~~Tests~~ Required testing. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *building official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction.

104.12.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the code official shall approve the testing procedures.

104.12.2 Testing agency. Tests shall be performed by an approved agency.

104.12.3 Test reports. Reports of tests shall be retained by the code official for the period required for retention of public records.

2021 International Existing Building Code

Add new definition as follows:

APPROVED AGENCY. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been *approved* by the *building official*.

APPROVED SOURCE. An independent person, firm or corporation, *approved* by the *code official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

Revise as follows:

[A] 104.11 Alternative materials, design and methods of construction, and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. ~~Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.~~

Add new text as follows:

104.11.1 Verification of code intent and equivalence. Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section 104.11.1.1 or evaluation reports from an approved agency in accordance with Section 104.11.1.2. The code official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.

Delete and substitute as follows:

~~**[A] 104.11.1 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.~~

[A] 104.11.1.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the code official's review of the materials, design or method of construction and equipment.

Add new text as follows:

104.11.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

Revise as follows:

[A] ~~104.11.2~~ 104.12 ~~Tests~~ Required testing. Where there is insufficient evidence of compliance with the provisions of this code or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *code official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction.

1104.12.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the code official shall approve the testing procedures.

104.12.2 Testing agency. Tests shall be performed by an approved agency.

104.12.3 Test reports. Reports of tests shall be retained by the code official for the period required for retention of public records.

2021 International Fire Code

Add new definition as follows:

APPROVED AGENCY. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been *approved* by the *building official*.

APPROVED SOURCE. An independent person, firm or corporation, *approved* by the *code official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

Revise as follows:

[A] 104.10 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *fire code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, *fire resistance*, durability and safety. ~~Where the alternative material, design or method of construction is not *approved*, the *fire code official* shall respond in writing, stating the reasons why the alternative was not *approved*.~~

Add new text as follows:

104.10.1 Verification of code intent and equivalence. Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section 104.10.1.1 or evaluation reports from an approved agency in accordance with Section 104.10.1.2. The code official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.

Delete and substitute as follows:

~~**[A] 104.10.1 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.~~

[A] 104.10.1.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the code official's review of the materials, design or method of construction and equipment.

Add new text as follows:

104.10.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

Revise as follows:

[A] ~~104.10.2~~ 104.11 ~~Tests~~ Required testing. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *fire code official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction.

104.11.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the code official shall approve the testing procedures.

104.11.2 Testing agency. Tests shall be performed by an approved agency.

104.11.3 Test reports. Reports of tests shall be retained by the code official for the period required for retention of public records.

2021 International Fuel Gas Code

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such ~~agency~~ organization has been *approved* by the *code official*.

Add new definition as follows:

APPROVED SOURCE. An independent person, firm or corporation, *approved* by the *code official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. ~~Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.~~

Add new text as follows:

105.2.1 Verification of code intent and equivalence. Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section 105.2.1.1 or evaluation reports from an approved agency in accordance with Section 105.2.1.2. The code official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.

Delete and substitute as follows:

~~**[A] 105.2.1 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.~~

[A] 105.2.1.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the code official's review of the materials, design or method of construction and equipment.

Add new text as follows:

105.2.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

[A] 105.3 Required testing. Where there is insufficient evidence of compliance with the provisions of this code or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *code official* shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction.

Revise as follows:

[A] 105.3.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *code official* shall approve the testing procedures.

[A] 105.3.2 Testing agency. Tests shall be performed by an *approved* agency.

[A] 105.3.3 Test reports. Reports of tests shall be retained by the *code official* for the period required for retention of public records.

2021 International Green Construction Code

Revise as follows:

105.4 ~~Innovative approaches and alternative~~ Alternative materials, design, and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design~~, innovative approach,~~ or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design~~, innovative approach~~ or method of construction shall be reviewed and *approved* where the authority having jurisdiction finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, design, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code The details of granting the use of alternative materials, designs, innovative approach and methods of construction shall be recorded and entered in the files of the department. ~~Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.~~

Add new text as follows:

105.4.1 Verification of code intent and equivalence. Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section 105.4.1.1 or evaluation reports from an approved agency in accordance with Section 105.4.1.2. The code official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.

Delete and substitute as follows:

~~**105.4.1 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.~~

105.4.1.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the code official's review of the materials, design or method of construction and equipment.

Add new text as follows:

105.4.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

Revise as follows:

~~105.4.2~~ 105.5 ~~Tests~~ Required testing. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the authority having jurisdiction shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction.

105.5.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the code official shall approve the testing procedures.

105.5.2 Testing agency. Tests shall be performed by an approved agency.

105.5.3 Test reports. Reports of tests shall be retained by the code official for the period required for retention of public records.

2021 International Mechanical Code

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such ~~agency~~ organization has been *approved* by the *code official*.

Add new definition as follows:

APPROVED SOURCE. An independent person, firm or corporation, *approved* by the *code official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. ~~Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.~~

Add new text as follows:

105.2.1 Verification of code intent and equivalence. Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section 105.2.1.1 or evaluation reports from an approved agency in accordance with Section 105.2.1.2. The code official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.

Delete and substitute as follows:

~~**[A] 105.2.1 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.~~

[A] 105.2.1.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the code official's review of the materials, design or method of construction and equipment.

Add new text as follows:

105.2.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

[A] 105.3 Required testing. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the code official shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction.

[A] 105.3.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the code official shall approve the testing procedures.

[A] 105.3.2 Testing agency. Tests shall be performed by an *approved* agency.

[A] 105.3.3 Test reports. Reports of tests shall be retained by the code official for the period required for retention of public records.

2021 International Private Sewage Disposal Code

Add new definition as follows:

APPROVED AGENCY. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been *approved* by the *code official*.

APPROVED SOURCE. An independent person, firm or corporation, *approved* by the *code official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. ~~Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons why the alternative was not approved.~~

Add new text as follows:

105.2.1 Verification of code intent and equivalence. Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section 105.2.1.1 or evaluation reports from an approved agency in accordance with Section 105.2.1.2. The code official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.

Delete and substitute as follows:

~~**[A] 105.2.1 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.~~

[A] 105.2.1.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the code official's review of the materials, design or method of construction and equipment.

Add new text as follows:

105.2.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

[A] 105.3 Required testing. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternate materials or methods, the *code official* shall have the authority to require testing as evidence of compliance at no expense to the jurisdiction.

[A] 105.3.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *code official* shall approve the testing procedures.

[A] 105.3.2 Testing agency. Tests shall be performed by an approved agency.

[A] 105.3.3 Test reports. Reports of tests shall be retained by the *code official* for the period required for retention of public records.

2021 International Plumbing Code

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such ~~agency~~ organization has been *approved* by the *code official*.

Add new definition as follows:

APPROVED SOURCE. An independent person, firm or corporation, *approved* by the *code official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. ~~Where the alternative material, design or method of construction is not *approved*, the code official shall respond in writing, stating the reasons why the alternative was not *approved*.~~

Add new text as follows:

105.2.1 Verification of code intent and equivalence. Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section 104.11.1.1 or evaluation reports from an approved agency in accordance with Section 104.11.1.2. The code official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.

Delete and substitute as follows:

~~**[A] 105.2.1 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.~~

[A] 105.2.1.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the code official's review of the materials, design or method of construction and equipment.

Add new text as follows:

105.2.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

[A] 105.3 Required testing. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the code official shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction.

[A] 105.3.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the code official shall approve the testing procedures.

[A] 105.3.2 Testing agency. Tests shall be performed by an *approved agency*.

[A] 105.3.3 Test reports. Reports of tests shall be retained by the code official for the period required for retention of public records.

2021 International Property Maintenance Code

Add new definition as follows:

APPROVED AGENCY. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been *approved* by the *code official*.

APPROVED SOURCE. An independent person, firm or corporation, *approved* by the *code official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

Revise as follows:

[A] 106.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. ~~Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.~~

Add new text as follows:

106.2.1 Verification of code intent and equivalence. Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section 104.11.1.1 or evaluation reports from an approved agency in accordance with Section 104.11.1.2. The code official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.

Delete and substitute as follows:

~~**[A] 106.6 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.~~

[A] 106.2.1.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the code official's review of the materials, design or method of construction and equipment.

Add new text as follows:

106.2.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

[A] 106.3 Required testing. Whenever there is insufficient evidence of compliance with the provisions of this code or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *code official* shall have the authority to require tests to be made as evidence of compliance without expense to the jurisdiction.

Revise as follows:

[A] 106.3.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *code official* shall ~~be permitted to~~ approve ~~appropriate~~ the testing procedures ~~performed by an *approved* agency~~.

Add new text as follows:

106.3.2 Testing agency. Tests shall be performed by an approved agency.

Revise as follows:

[A] ~~106.3.2~~ 106.3.3 Test reports. Reports of tests shall be retained by the *code official* for the period required for retention of public records.

2021 International Swimming Pool and Spa Code

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such ~~agency~~ organization has been *approved* by the *code official*.

Add new definition as follows:

APPROVED SOURCE. An independent person, firm or corporation, *approved* by the *code official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

Revise as follows:

[A] 104.10 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any design or material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, durability and safety. ~~Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.~~

Add new text as follows:

104.10.1 Verification of code intent and equivalence. Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section 104.10.1.1 or evaluation reports from an approved agency in accordance with Section 104.10.1.2. The code official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.

104.10.1.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the code official's review of the materials, design or method of construction and equipment.

104.10.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

Revise as follows:

[A] 104.11 Required testing. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *code official* shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction.

[A] 104.11.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *code official* shall approve the testing procedures.

[A] 104.11.2 Testing agency. Tests shall be performed by an *approved* agency.

[A] 104.11.3 Test reports. Reports of tests shall be retained by the *code official* for the period required for retention of public records.

2021 International Wildland-Urban Interface Code

Add new definition as follows:

APPROVED AGENCY. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been *approved* by the *code official*.

APPROVED SOURCE. An independent person, firm or corporation, *approved* by the *code official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

Revise as follows:

[A] 105.3 Alternative materials, design and methods. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method shall be *approved* where the *building official* in concurrence with the fire chief finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, *fire resistance*, durability and safety.
~~Where the alternative material, design or method is not *approved*, the *building official* shall respond in writing, stating the reasons why the alternative was not *approved*.~~

Add new text as follows:

105.3.1 Verification of code intent and equivalence. Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section 105.3.1.1 or evaluation reports from an approved agency in accordance with Section 105.3.1.2. The code official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.

105.3.1.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the code official's review of the materials, design or method of construction and equipment.

105.3.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

105.4 Required testing. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the code official shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction.

105.4.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the code official shall approve the testing procedures.

105.4.2 Testing agency. Tests shall be performed by an approved agency.

105.4.3 Test reports. Reports of tests shall be retained by the code official for the period required for retention of public records.

ADM16-22 Part I

ADM16-22 Part II

IRC: SECTION 202, R104.11, R104.11.1 (New), R104.11.1.2 (New), R104.11.1, R104.12.1 (New), R104.12.2 (New), R104.12.3 (New)

Proponents: Chris Chwedyk, representing Compliance Code Action Committee (ccac@iccsafe.org)

2021 International Residential Code

Revise as follows:

[RB] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such ~~agency~~ organization has been *approved* by the *building official*.

[MP] APPROVED SOURCE. An independent person, firm or corporation, *approved* by the *building official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

Revise as follows:

R104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. The *building official* shall have the authority to approve an alternative material, design or method of construction upon application of the *owner* or the owner's authorized agent. The *building official* shall first find that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Compliance with the specific performance-based provisions of the International Codes shall be an alternative to the specific requirements of this code. ~~Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons why the alternative was not *approved*.~~

Add new text as follows:

R104.11.1 Verification of code intent and equivalence. Demonstration of compliance with code intent and code equivalence of a material, design or method of construction and equipment not specifically provided for in this code shall be through either research reports from an approved source in accordance with Section R104.11.1.1 or evaluation reports from an approved agency in accordance with Section R104.11.1.2. The building official shall notify the permit holder or permit holder's agent when an alternate material, design, or method of construction is not approved.

R104.11.1 Research reports. Research reports shall describe the test standards or methods and criteria used to determine compliance with code intent and code equivalence, justification for such criteria, and supporting tests and analysis necessary to assist in the building official's review of the materials, design or method of construction and equipment.

R104.11.1.2 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and equipment evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public, and available for review by the public.

Revise as follows:

~~R104.11.1~~ R104.12 ~~Tests~~ Required testing. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *building official* shall have the authority to require tests as evidence of compliance to be made at no expense to the *jurisdiction*.

R104.12.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the code official shall approve the testing procedures.

R104.12.2 Testing agency. Tests shall be performed by an approved agency.

R104.12.3 Test reports. Reports of tests shall be retained by the building official for the period required for retention of public records.

Reason Statement: The reason for this code change is to update the Alternate Methods and Materials Section to reflect the current way that alternate methods and materials are evaluated, and to differentiate between evaluations from accredited evaluation agencies and evaluations from others, such as engineers. The section on Alternate Methods and Materials has basically been the same since the codes were first combined in 2000, with the exception that the section on "Research Reports" was added in 2003 to some codes. The industry now uses some different terminology and methods.

This section governs materials, designs, and methods of construction that are not currently addressed by the code, either with design requirements or referenced standards. So it is important that the building official understand what methods the approved agency or source used to determine that the method or material meets code intent and equivalence. The intent of this change is to recognize the two primary processes of alternative material and method approval used in the industry currently:

1. When the applicant provides a product evaluation from an accredited product evaluation agency that uses publically developed and available criteria for the evaluation, the building official can have more confidence that the method used for the evaluation does result in a method or material

that meets the intent of the code and is at least equivalent to code-prescribed construction. Public development of criteria allows for input from industry experts, the public, and building officials in determining the methods used to evaluate code intent and equivalence, somewhat similar to the code development process where consensus is important. The accreditation ensures that the organization uses a consistent process to perform the evaluations. This section is meant to reflect the current use of evaluation reports from accredited evaluation agencies or organizations.

2. When an applicant provides an evaluation from other than an accredited agency, or from a source that does not use publically developed and available criteria, the building official needs more information in order to perform a proper review. Not only does the building official need to evaluate the product, but also evaluate the method that the applicant has used to determine compliance with code intent and code equivalence. So in that case, it is proposed that the applicant would also have to provide the criteria that was used to do the evaluation, justification for use of that criteria, and data used for the evaluation, so a complete review can be made.

As stated earlier, this section has been in the code a long time, and we believe that it initially envisioned an alternative product or method review and approval process on a project-by-project basis, with substantiating tests and calculations or analyses provided with each permit application. Currently, a more efficient system has evolved where the same product evaluation reports are used in numerous projects, across many jurisdictions, and for many conditions. This evolution causes the need to revise this section to reflect current procedures.

However, the need for designers to be able to apply for one-time approval needs to be maintained, and that is the reason that “research reports” is maintained. In this case, though, when a method or material is not addressed by the code, the building official needs more information on the process that the evaluator used to determine that the method or material complies with the intent of the code.

The part of this section that deals with notification was revised to be consistent with Section 110.6, which states that when an inspection has failed, the building official has to “notify the permit holder or the permit holder’s agent”. It seems like disapproval of an alternate method or material is very similar to disapproval of an inspection, so the notification should be the same.

Finally, a minor change to the definition of “approved agency” removes the repeat of the word that is to be defined, agency, and replaces it with organization. Another revision allows the agency to furnish product evaluation in addition to certification, since evaluation and certification are two different things. Evaluation is for materials and methods not addressed by the code, and certification is for materials and methods that are addressed by the code.

For some codes, the definition of “approved agency” and “approved source” needed to be added.

The section on testing was renumbered to follow these new sections and put in the same format in all the codes. There are no technical changes.

There is a separate CCAC code change proposal that clarifies the use of certification, so that is not covered here.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of this requirement is primarily on the manufacturer and the certification agency and is fairly negligible as many material manufacturers and certification organizations already engage in the described process.

ADM16-22 Part II

ADM17-22 Part I

IBC: [A] 104.1; IEBC: [A] 104.1; IFC: [A] 104.1; IFGC: [A] 104.1; IMC: [A] 104.1; IPC: [A] 104.1; IPMC: [A] 105.1; IPSDC: [A] 104.1; ISPSC: [A] 104.1; IWUIC: [A] 104.1; IGCC: 104.1

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 104.1 General. The *building official* is hereby authorized and directed to enforce the provisions of this code. The *building official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such <u>interpretations,</u> policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

2021 International Existing Building Code

Revise as follows:

[A] 104.1 General. The *code official* is hereby authorized and directed to enforce the provisions of this code. The *code official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such <u>interpretations,</u> policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

2021 International Fire Code

Revise as follows:

[A] 104.1 General. The *fire code official* is hereby authorized to enforce the provisions of this code. The *fire code official* shall have the authority to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of its provisions. Such interpretations, policies, procedures, rules and regulations shall be in compliance with the intent and purpose of this code. Such <u>interpretations,</u> policies, procedures, rules and regulations shall not have the effect of waiving requirements specifically provided for in this code.

2021 International Fuel Gas Code

Revise as follows:

[A] 104.1 General. The *code official* is hereby authorized and directed to enforce the provisions of this code. The *code official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such <u>interpretations,</u> policies and procedures shall not have the effect of waiving requirements specifically provided in this code.

2021 International Mechanical Code

Revise as follows:

[A] 104.1 General. The code official is hereby authorized and directed to enforce the provisions of this code. The code official shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such <u>interpretations,</u> policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

2021 International Plumbing Code

Revise as follows:

[A] 104.1 General. The code official is hereby authorized and directed to enforce the provisions of this code. The code official shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such <u>interpretations,</u> policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

2021 International Property Maintenance Code

Revise as follows:

[A] 105.1 General. The *code official* is hereby authorized and directed to enforce the provisions of this code. The *code official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such interpretations, policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

2021 International Private Sewage Disposal Code

Revise as follows:

[A] 104.1 General. The *code official* is hereby authorized and directed to enforce the provisions of this code. The *code official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such interpretations, policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

2021 International Swimming Pool and Spa Code

Revise as follows:

[A] 104.1 General. The *code official* is hereby authorized and directed to enforce the provisions of this code. The *code official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such interpretations, policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

2021 International Wildland-Urban Interface Code

Revise as follows:

[A] 104.1 Powers and duties of the code official. The *code official* is hereby authorized to enforce the provisions of this code. The *code official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies~~y~~ and procedures shall not have the effect of waiving requirements specifically provided for in this code.

2021 International Green Construction Code

Revise as follows:

104.1 General. The authority having jurisdiction is hereby authorized and directed to enforce the provisions of this code. The authority having jurisdiction shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions and how this code relates to other applicable codes and ordinances. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code and other applicable codes and ordinances. Such interpretations, policies and procedures shall not have the effect of waiving requirements specifically provided for in this code or other applicable codes and ordinances.

ADM17-22 Part I

ADM17-22 Part II

IRC: R104.1

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Residential Code

Revise as follows:

R104.1 General. The *building official* is hereby authorized and directed to enforce the provisions of this code. The *building official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such <u>interpretations, </u>policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

Reason Statement: Not only can policies and procedures not waive requirements of the code, but it is also the intent that individual case-by-case interpretations not waive the specific requirements of the code. The current absence of this word leaves an odd situation where it is potentially OK for a building or code official to waive code requirements on case-by-case situations, but not in policies. This type of approach could leave to favoritism in enforcement of the code and every code section being optional and up to the discretion of the building or code official.
Code modifications and alternatives are already present in the code, and as such when those provisions are used code requirements are not being waived.

This one word change is already present in the International Wildland-Urban Interface Code (good job IWUIC!) and this proposal only slightly changes the wording in that code to exactly agree.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact since the proposed word addition is only clarifying what is already stated and required by the code section.

ADM17-22 Part II

ADM18-22

IFC: [A] 104.1, [A] 104.9, [A] 104.9.1 (New), [A] 104.9.2 (New)

Proponents: Jeffrey Shapiro, Lake Travis Fire Rescue, representing Lake Travis Fire Rescue (jshapiro@ltfr.org)

2021 International Fire Code

Revise as follows:

[A] 104.1 General. The *fire code official* is hereby authorized to enforce the provisions of this code. The *fire code official* shall have the authority to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of its provisions. Such interpretations, policies, procedures, rules and regulations shall be in compliance with the intent and purpose of this code. Such policies, procedures, rules and regulations shall not have the effect of waiving requirements specifically provided for in this code , except as provided in Section 104.9.

[A] 104.9 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the *fire code official* shall have the authority to grant modifications. ~~The *fire code official* shall have the authority to grant modifications for individual cases, provided that the *fire code official* shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the department of fire prevention.~~

Add new text as follows:

[A] 104.9.1 Individual cases. The *fire code official* shall have the authority to grant modifications for individual cases, provided that the *fire code official* shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the department of fire prevention.

[A] 104.9.2 Natural disasters. In preparation for, during and after a natural disaster event, as determined by the *fire code official*, the *fire code official* shall have the authority to issue written policies, procedures, rules or regulations that modify this code as necessary to protect life and property. Such policies, procedures, rules or regulations shall be made available to the public and shall include start and end dates, which can be extended at the *fire code official's discretion.*

Reason Statement: Winter Storm Uri in 2021 is a good example demonstrating the need for granting authority to the fire code official to allow, by policy, conditions that would otherwise constitute code violations. For example, long-term power outages will eventually render many alarm systems non-functional, and extended loss of heat in buildings can lead to catastrophic freezing of fire suppression systems. Shutting down such systems and draining them can prevent catastrophic damage, allowing a system that might otherwise take months to repair to be placed back into service more quickly. If water remains in a system and freezing occurs, the system is non-functional anyway, so whether drained or not, protection is going to be impaired for some period of time. But, allowing more of a system to freeze vs. draining can be expected to result in increased water damage when the system thaws and much more extensive and time consuming repairs, This section could also be used to allow temporary emergency shelters that may not fully meet code requirements for a congregate residential use.
By adding text to the code that specifically addresses this concern, the fire code official will be guided to develop written documentation that should globally address special allowances that will be permitted during a disaster event, and as written, the authority to make any such allowances will remain solely in the hands of the fire code official.

This text is proposed only for the IFC because the IFC is unique among ICC codes with respect to its application to operation of existing buildings and to emergency response.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal does not apply to construction, except to the possible extent that it might influence construction of emergency shelters or similar uses, in which case costs would presumably be reduced by allowing what might otherwise constitute non-compliant uses. There is no way to quantitatively measure any such cost impact.

ADM18-22

ADM19-22

IFC: SECTION 202 (New)

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Fire Code

Add new definition as follows:

APPROVED AGENCY. An established and recognized agency that is regularly engaged in conducting tests, furnishing inspection services or furnishing product certification where such agency has been approved by the fire code official.

Reason Statement: The term "approved agency" appears in the IFC and should, therefore, be defined in Chapter 2. This will provide consistency with the IBC and the IRC which already have this definition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is only defining a term used in the IFC.

ADM19-22

ADM20-22

IEBC: SECTION 202 (New)

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Existing Building Code

Add new definition as follows:

[A] APPROVED AGENCY. An established and recognized agency that is regularly engaged in conducting tests, furnishing inspection services or furnishing product certification where such agency has been approved by the fire code official.

Reason Statement: The term "approved agency" appears in the IEBC and should, therefore, be defined in Chapter 2. This will provide consistency with the IBC and the IRC which already have this definition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is only defining a term in the IEBC to be consistent with the IBC and IRC.

ADM20-22

ADM21-22

IBC: [A] 104.1

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Building Code

Add new text as follows:

[A] 104.1.1 Listed compliance. Listings required by this code shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the building official upon request.

Reason Statement: When the code requires something to be listed, the test standard used or the listing evaluation must be germane to the code provision that is requiring the listing. Additionally, the installation must be in accordance with the manufacturer's instructions and copies of the listing standard and manufacturer's instructions must be made available to the code official.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This only clarifies that when something is required to be listed, the test standard used or the listing evaluation must be germane to the code provision that is requiring the listing. As with any listing, the installation must be in accordance with the manufacturer's instructions and the building official must have access to the listing standard and manufacturer's instructions.

ADM21-22

ADM22-22

IEBC: [A] 104.1

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Existing Building Code

Add new text as follows:

[A] 104.1.1 Listed compliance. Listings required by this code shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the code official upon request.

Reason Statement: When the code requires something to be listed, the test standard used or the listing evaluation must be germane to the code provision that is requiring the listing. Additionally, the installation must be in accordance with the manufacturer's instructions and copies of the listing standard and manufacturer's instructions must be made available to the code official.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This only clarifies that when something is required to be listed, the test standard used or the listing evaluation must be germane to the code provision that is requiring the listing. As with any listing, the installation must be in accordance with the manufacturer's instructions and the building official must have access to the listing standard and manufacturer's instructions.

ADM22-22

ADM23-22

IFC: [A] 104.2

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Fire Code

Add new text as follows:

[A] 104.2.1 Listed compliance. Listings required by this code shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the fire code official upon request.

Reason Statement: When the code requires something to be listed, the test standard used or the listing evaluation must be germane to the code provision that is requiring the listing. Additionally, the installation must be in accordance with the manufacturer's instructions and copies of the listing standard and manufacturer's instructions must be made available to the fire code official.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This only clarifies that when something is required to be listed, the test standard used or the listing evaluation must be germane to the code provision that is requiring the listing. As with any listing, the installation must be in accordance with the manufacturer's instructions and the fire code official must have access to the listing standard and manufacturer's instructions.

ADM23-22

ADM24-22 Part I

IBC: [A] 104.8 (New), [A] 104.11.2; IEBC: 104.8 (New), [A] 104.11.2; IFC: 104.8 (New), [A] 104.10.2

Proponents: William Koffel, representing Spray Foam Coalition (wkoffel@koffel.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new text as follows:

[A] 104.8 Listed products. Where *listed* products are required by this code or a reference standard, the testing of the product shall be germane to the application of the product requirement in this code. Products used to comply with listing requirements in this code or a reference standard shall be tested and found suitable by the listing agency for the purpose specified by this code or the reference standard. As a condition of approval, the *building official* is authorized to require submittal of a listing standard to validate the applicability of the listing standard.

Revise as follows:

[A] 104.11.2 Tests. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *building official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. Tests used to demonstrate equivalent fire safety performance properties shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. In the absence of recognized and accepted test methods, the *building official* shall approve the testing procedures. Tests shall be performed by an *approved agency*. Reports of such tests shall be retained by the *building official* for the period required for retention of public records.

2021 International Existing Building Code

Add new text as follows:

104.8 Listed products. Where *listed* products are required by this code or a reference standard, the testing of the product shall be germane to the application of the product requirement in this code. Products used to comply with listing requirements in this code or a reference standard shall be tested and found suitable by the listing agency for the purpose specified by this code or the reference standard. As a condition of approval, the *building official* is authorized to require submittal of a listing standard to validate the applicability of the listing standard.

Revise as follows:

[A] 104.11.2 Tests. Where there is insufficient evidence of compliance with the provisions of this code or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *code official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. Tests used to demonstrate equivalent fire safety performance properties shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. In the absence of recognized and accepted test methods, the *code official* shall approve the testing procedures. Tests shall be performed by an *approved* agency. Reports of such tests shall be retained by the *code official* for the period required for retention.

2021 International Fire Code

Add new text as follows:

104.8 Listed products. Where *listed* products are required by this code or a reference standard, the testing of the product shall be germane to the application of the product requirement in this code. Products used to comply with listing requirements in this code or a reference standard shall be tested and found suitable by the listing agency for the purpose specified by this code or the reference standard. As a condition of approval, the *fire code official* is authorized to require submittal of a listing standard to validate the applicability of the listing standard.

Revise as follows:

[A] 104.10.2 Tests. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *fire code official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. Tests used to demonstrate equivalent fire safety performance properties shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. In the absence of recognized and accepted test methods, the *fire code official* shall approve the testing procedures. Tests shall be performed by an *approved* agency. Reports of such tests shall be retained by the *fire code official* for the period required for retention of public records.

ADM24-22 Part II

IRC: R104.9 (New), R104.11.1

Proponents: William Koffel, representing Spray Foam Coalition (wkoffel@koffel.com)

2021 International Residential Code

Add new text as follows:

R104.9 Listed products. Where *listed* products are required by this code or a reference standard, the testing of the product shall be germane to the application of the product requirement in this code. Products used to comply with listing requirements in this code or a reference standard shall be tested and found suitable by the listing agency for the purpose specified by this code or the reference standard. As a condition of approval, the *building official* is authorized to require submittal of a listing standard to validate the applicability of the listing standard.

Revise as follows:

R104.11.1 Tests. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *building official* shall have the authority to require tests as evidence of compliance to be made at no expense to the *jurisdiction*. Test methods shall be as specified in this code or by other recognized test standards. Tests used to demonstrate equivalent fire safety performance properties shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. In the absence of recognized and accepted test methods, the *building official* shall approve the testing procedures. Tests shall be performed by an *approved* agency. Reports of such tests shall be retained by the *building official* for the period required for retention of public records.

Reason Statement: During the hearings on F60-21 it was noted, by both proponents and opponents, that with respect to the use of the Alternative Methods section for evaluating foam plastics there were concerns regarding the scale of fire tests to be used and the fact that the test needed to be representative of end-use configuration. That discussion has resulted in a major review and revision of the Alternate Methods provisions by an FCAC Working Group. This proposal intends to include two provisions of the proposal that was developed by the FCAC Working Group, and subsequently supported by BCAC, in the event that the overall proposal is not approved. The overall proposal was being developed at the same time as this proposal and therefore this proposal has been limited to the codes intended to be addressed by the overall proposal and that were impacted by the F60-21 action. The Committee may wish to expand the codes for which this language is being revised.
The first section from the broader proposal is a new paragraph regarding listed products. The language of the broader proposal has been revised but the intent remains the same. Where the Code requires a product to be listed, the standard use to list the project shall be germane the code requirement that requires the product to be listed.

The second section is a revision to the paragraph that addresses the use of tests as a means to document that the Alternative Method is acceptable. The sentence proposed to be added is exactly the same as what is in the broader proposal.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
With respect to the new paragraph addressing listed products, the proposed language is consistent with the existing intent of the Codes and how it is enforced in most jurisdictions.

With respect to the additional language regarding fire tests, it would only apply when an Alternate Method is used. The proposed language is consistent with current requirements for foam plastics. Presumably, with respect to other products the proposed language is consistent with how the codes are enforced in most jurisdictions.

ADM24-22 Part II

ADM25-22

IFC: [A] 104.10

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Fire Code

Revise as follows:

[A] 104.10 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *fire code official* finds that the proposed alternate meets all of the following:

1. The alternate material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The ~~the~~ material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   - 2.1. Quality ~~quality~~ .~~,~~
   - 2.2. Strength ~~strength~~ .~~,~~
   - 2.3. Effectiveness ~~effectiveness~~ .~~,~~
   - 2.4. Fire ~~fire~~ resistance .,
   - 2.5. Durability ~~durability~~ . ~~and~~
   - 2.6. Safety ~~safety~~.

Where the alternative material, design or method of construction is not *approved*, the *fire code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Reason Statement: This section can be written more clearly as to the various criteria that must be met in order to be approved as an alternate material, design
or method of construction. This will make it easier for the building official to make the necessary evaluation and decision. Should the alternate not be approved, it will also make it easier for the building official to cite the reasons for disapproval. There are no changes to the various requirements that the building official or fire code official must consider. During the last code cycle, this change was approved in the IBC and was well received by the committee and membership who agreed that it made it easier to read.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no changes to the requirements in this section.

ADM25-22

ADM26-22

IEBC: [A] 104.11

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Existing Building Code

Revise as follows:

[A] 104.11 Alternative materials, design and methods of construction, and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed alternate meets all of the following:

1. The alternate material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The ~~the~~ material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   - 2.1. Quality ~~quality~~ .~~,~~
   - 2.2. Strength ~~strength~~ .~~,~~
   - 2.3. Effectiveness ~~effectiveness~~ .~~,~~
   - 2.4. Fire ~~fire~~ resistance .,
   - 2.5. Durability ~~durability~~ . ~~and~~
   - 2.6. Safety ~~safety~~.

Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Reason Statement: This section can be written more clearly as to the various criteria that must be met in order to be approved as an alternate material, design
or method of construction. This will make it easier for the building official to make the necessary evaluation and decision. Should the alternate not be approved, it will also make it easier for the building official to cite the reasons for disapproval. There are no changes to the various requirements that the building official must consider. During the last code cycle, this change was approved in the IBC and was well received by the committee and membership who agreed that it made it easier to read.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no changes to the existing requirements.

ADM26-22

ADM27-22

IWUIC: [A] 105.3

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

[A] 105.3 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* in concurrence with the fire chief finds that the proposed alternate meets all of the following:

1. The alternate material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The ~~the~~ material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   - 2.1. Quality ~~quality~~ .~~,~~
   - 2.2. Strength ~~strength~~ .~~,~~
   - 2.3. Effectiveness ~~effectiveness~~ .~~,~~
   - 2.4. Fire ~~fire~~ resistance .,
   - 2.5. Durability ~~durability~~ . ~~and~~
   - 2.6. Safety ~~safety~~.

Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Reason Statement: This section can be written more clearly as to the various criteria that must be met in order to be approved as an alternate material, design or method of construction. This will make it easier for the building official to make the necessary evaluation and decision. Should the alternate not be approved, it will also make it easier for the building official to cite the reasons for disapproval. The word “construction” has been added after the word “method” and the word “equipment” has been added in the heading so it is consistent with the IBC, IEBC, IFC, and IRC. There are no changes to the various requirements that the building official or fire code official must consider. During the last code cycle, this change was approved in the IBC and was well received by the committee and membership who agreed that it made it easier to read.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no changes to the requirements in this section.

ADM27-22

ADM28-22

IWUIC: [A] 105.3

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

[A] 105.3 Alternative materials, design and methods. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method shall be submitted in writing and be *approved* where the *building official* in concurrence with the fire chief finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, *fire resistance*, durability and safety. Where the alternative material, design or method is not *approved*, the *building official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Reason Statement: A request to use an alternative material, design or method of construction must be explained and documented in writing so a proper evaluation can be made. Placing this requirement in this section makes it clear that a request for an alternate must be submitted in writing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This will avoid needless delays and misunderstandings over a verbal request for an alternate.

ADM28-22

ADM29-22

IEBC: [A] 104.11

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Existing Building Code

Revise as follows:

[A] 104.11 Alternative materials, design and methods of construction, and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be <u>submitted in writing and be</u> *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Reason Statement: A request to use an alternative material, design or method of construction must be explained and documented in writing so a proper evaluation can be made. Placing this requirement in this section makes it clear that a request for an alternate must be submitted in writing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This will avoid needless delays and misunderstandings over a verbal request for an alternate

ADM29-22

ADM30-22

IBC: [A] 104.11.1

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Building Code

Revise as follows:

[A] 104.11.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from an *approved* ~~sources~~ agency accredited to evaluate or certify products. The alternative material, design or method of construction and product evaluated shall be within the scope of accreditation and the criteria used for the evaluation shall be referenced within the report.

Reason Statement: It is sometimes difficult to determine the legitimacy of a research report. Agency accreditation is an excellent way to determine the legitimacy and reliability of research reports issued by such agencies. This will be valuable when the building official reviews a research report.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The new language only requires that the approved agency be accredited to evaluate or certify products.

ADM30-22

ADM31-22

IEBC: [A] 104.11.1

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Existing Building Code

Revise as follows:

[A] 104.11.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from an *approved* ~~sources~~ agency accredited to evaluate or certify products. The alternative material, design or method of construction and product evaluated shall be within the scope of accreditation and the criteria used for the evaluation shall be referenced within the report.

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Reason Statement: It is sometimes difficult to determine the legitimacy of a research report. Agency accreditation is an excellent way to determine the legitimacy and reliability of research reports issued by such agencies. This will be valuable when the building official reviews a research report.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The new language only requires that the approved agency be accredited to evaluate or certify products.

ADM31-22

ADM32-22

IFC: [A] 104.10.1

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Fire Code

Revise as follows:

[A] 104.10.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from an *approved* ~~sources~~ agency accredited to evaluate or certify products. The alternative material, design or method of construction and product evaluated shall be within the scope of accreditation and the criteria used for the evaluation shall be referenced within the report.

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Reason Statement: It is sometimes difficult to determine the legitimacy of a research report. Agency accreditation is an excellent way to determine the legitimacy and reliability of research reports issued by such agencies. This will be valuable when the building official reviews a research report.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The new language only requires that the approved agency be accredited to evaluate or certify products.

ADM32-22

ADM33-22

IWUIC: [A] 105.3

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Wildland-Urban Interface Code

Add new text as follows:

[A] 105.3.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from an approved agency accredited to evaluate or certify products. The alternative material, design or method of construction and product evaluated shall be within the scope of accreditation and the criteria used for the evaluation shall be referenced within the report.

Reason Statement: It is sometimes difficult to determine the legitimacy of a research report. Agency accreditation is an excellent way to determine the legitimacy and reliability of research reports issued by such agencies. The IBC, IEBC, IFC, IFGC, IMC, IPC, IPMC, IPSDC have provisions for the use of valid research reports as an aid to alternate approval.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This new section does not require that a research report be submitted when requesting an alternate, only that when one is submitted to support a request for an alternate, the issuing agency be accredited to evaluate or certify products and that the alternative material, design or method of construction and product evaluated be within the scope of accreditation and the criteria used for the evaluation be referenced within the report.

ADM33-22

ADM34-22 Part I

IEBC: [A] 104.11, [A] 104.11.1; IFC: [A] 104.10, [A] 104.10.1; IFGC: [A] 105.2, [A] 105.2.1; IMC: [A] 105.2, [A] 105.2.1; IPC: [A] 105.2, [A] 105.2.1; IPMC: [A] 106.2, [A] 106.6; IPSDC: [A] 105.2, [A] 105.2.1; ISPSC: [A] 104.10, 104.10.1 (New); IWUIC: [A] 105.3, 105.3.1 (New); IGCC: 105.4, 105.4.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Existing Building Code

Revise as follows:

[A] 104.11 Alternative materials, design and methods of construction, and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:

   2.1. Quality,

   2.2. Strength,

   2.3. Effectiveness,

   2.4. Fire resistance,

   2.5. Durability, ~~and~~

   2.6 Safety.

Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

[A] 104.11.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

2021 International Fire Code

Revise as follows:

[A] 104.10 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *fire code official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~ .
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:

   2.1. Quality~~,~~

   2.2. Strength~~,~~

   2.3. Effectiveness~~,~~

   2.4. Fire resistance~~,~~

   2.5. Durability~~, and~~

   2.6. Safety.

Where the alternative material, design or method of construction is not *approved*, the *fire code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

[A] 104.10.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

2021 International Fuel Gas Code

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   - 2.1. Quality~~,~~
   - 2.2. Strength~~,~~
   - 2.3. Effectiveness~~,~~
   - 2.4. Fire effectiveness~~,~~
   - 2.5. Durability ~~and~~
   - 2.6 Safety.

Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

[A] 105.2.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

2021 International Mechanical Code

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   - 2.1. Quality~~,~~
   - 2.2. Strength~~,~~
   - 2.3. Effectiveness~~,~~
   - 2.4. Fire effectiveness~~,~~
   - 2.5. Durability ~~and~~
   - 2.6 Safety.

Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

[A] 105.2.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

2021 International Plumbing Code

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   2.1. Quality~~,~~
   2.2. Strength~~,~~
   2.3. Effectiveness~~,~~
   2.4. Fire effectiveness~~,~~
   2.5. Durability ~~and~~
   2.6 Safety.

Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

[A] 105.2.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

2021 International Property Maintenance Code

Revise as follows:

[A] 106.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   2.1. Quality~~,~~
   2.2. Strength~~,~~
   2.3. Effectiveness~~,~~
   2.4. Fire effectiveness~~,~~
   2.5. Durability ~~and~~
   2.6 Safety.

Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

[A] ~~106.6~~ 106.2.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

2021 International Private Sewage Disposal Code

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   2.1. Quality~~,~~
   2.2. Strength~~,~~
   2.3. Effectiveness~~,~~
   2.4. Fire effectiveness~~,~~
   2.5. Durability ~~and~~
   2.6 Safety.

Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

[A] 105.2.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

2021 International Swimming Pool and Spa Code

Revise as follows:

[A] 104.10 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   2.1. Quality~~,~~
   2.2. Strength~~,~~
   2.3. Effectiveness~~,~~
   2.4. Fire effectiveness~~,~~
   2.5. Durability ~~and~~
   2.6 Safety.

Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Add new text as follows:

104.10.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

2021 International Wildland-Urban Interface Code

Revise as follows:

[A] 105.3 Alternative materials, design and methods. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method shall be *approved* where the *building official* in concurrence with the fire chief finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, *fire resistance*, durability and safety.
The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the

building official in concurrence with the fire chief
finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   2.1. Quality~~,~~
   2.2. Strength~~,~~
   2.3. Effectiveness~~,~~
   2.4. Fire effectiveness~~,~~
   2.5. Durability ~~and~~
   2.6 Safety.

Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Add new text as follows:

105.3.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

2021 International Green Construction Code

Revise as follows:

105.4 ~~Innovative approaches and alternative~~ Alternative materials, design, and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design, ~~innovative approach,~~ or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design~~, innovative approach~~ or method of construction shall be reviewed and *approved* where the authority having jurisdiction finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The material, ~~design,~~ method or work offered is, for the purpose intended, not less than ~~at least~~ the equivalent of that prescribed in this code.

~~The details of granting the use of alternative materials, designs, innovative approach and methods of construction shall be recorded and entered in the files of the department.~~

Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

105.4.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

ADM34-22 Part I

ADM34-22 Part II

IRC: R104.11, R104.11.1 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

R104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. ~~The *building official* shall have the authority to approve an~~ An alternative material, design or method of construction ~~upon application of the *owner* or the owner's authorized agent. The~~ shall be approved where the *building official* ~~shall first find~~ finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code~~, and that~~
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   - 2.1. Quality~~,~~
   - 2.2. Strength~~,~~
   - 2.3. Effectiveness~~,~~
   - 2.4. Fire effectiveness~~,~~
   - 2.5. Durability ~~and~~
   - 2.6 Safety.

~~Compliance with the specific performance-based provisions of the International Codes shall be an alternative to the specific requirements of this code.~~ Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Add new text as follows:

R104.11.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

Reason Statement: ADM19-19 modified IBC Section 104.11, but did not make the same suggestion across all the codes. The changes to this section were primarily formatting, with some slight reordering. This same change to be applicable to all the codes. It was also noted that not all of the codes included a subsection on research reports as an aid to alternative approval.
This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (FCAC) and . ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is primarily a format change.

ADM34-22 Part II

ADM35-22

IBC: [A] 104.11; IEBC: [A] 104.11; IFC: [A] 104.10; IFGC: [A] 105.2; IMC: [A] 105.2; IPC: [A] 105.2; IPSDC: [A] 105.2

Proponents: David Collins, representing Self (dcollins@preview-group.com); Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org)

2021 International Building Code

Revise as follows:

[A] 104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code,
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:

    2.1. Quality.

    2.2. Strength.

    2.3. Effectiveness.

    2.4. *Fire resistance*.

    2.5. Durability.

    2.6. Safety.

Where the alternative material, design or method of construction is not approved, the *building official* shall respond in writing, stating the reasons why the alternative was not approved.

Exception: Performance-based alternative materials, designs or methods of construction complying with the *ICC Performance Code*.

2021 International Existing Building Code

Revise as follows:

[A] 104.11 Alternative materials, design and methods of construction, and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Exception: Performance-based alternative materials, designs or methods of construction complying with the *ICC Performance Code*

2021 International Fire Code

Revise as follows:

[A] 104.10 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *fire code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, *fire resistance*, durability and safety. Where the alternative material, design or method of construction is not *approved*, the *fire code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Exception: Performance-based alternative materials, designs or methods of construction and equipment complying with the *ICC Performance Code*.

2021 International Fuel Gas Code

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Exception: Performance-based alternative materials, designs or methods of construction and equipment complying with the *ICC Performance Code.*

2021 International Mechanical Code

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Exception: Performance-based alternative materials, designs or methods of construction and equipment complying with the *ICC Performance Code.*

2021 International Plumbing Code

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not *approved*, the code official shall respond in writing, stating the reasons why the alternative was not *approved*.

Exception: Performance-based alternative materials, designs or methods of construction and equipment complying with the *ICC Performance Code.*

2021 International Private Sewage Disposal Code

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons why the alternative was not approved.

Exception: Performance-based alternative materials, designs or methods of construction and equipment complying with the *ICC Performance Code.*

Reason Statement: The ICC Performance Code (ICCPC) should not be considered solely for whole building designs, but also as another pathway for evaluating alternative materials, designs, and methods of construction. When projects are designed per the prescriptive requirements of any ICC code, there are situations where a single material, element, or system cannot conform to the prescriptive requirements. Also, new materials, elements, or systems are entering the construction market at a pace that the prescriptive codes cannot keep up. This provision will allow owners, designers and building officials to consider such advances in such materials, elements of designs using the Performance Code for guidance. Although the prescriptive provisions in each of the codes provides one pathway for approval of alternative materials, designs, and methods of construction, the ICCPC should not be overlooked as an alternative pathway. The ICCPC may be considered by the building official as an alternative method in and of itself per any of the sections listed, by including it within the text of each section will draw much greater attention to the ICCPC and thereby increase its use and adoption.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change to the above mentioned codes do not add a requirement that individual projects must comply with. It provides an additional option for those projects that wish to pursue more performance-based solutions. ICC's Cost Impact Guide cites code change proposals that modify the design requirements (e.g. greater number of design options, design process efficiencies) as recognized instance of proposals that do not affect the construction or construction cost. Providing projects a route to use the ICC Performance Code to evaluate materials, designs and methods of construction does not impact the cost of construction.

ADM35-22

ADM36-22 Part I

IBC: [A] 104.11, [A] 104.11.1 (New), [A] 104.11.2 (New), [A] 104.11.1, [A] 104.11.2; IEBC: [A] 104.11, [A] 104.11.1 (New), [A] 104.11.2 (New), [A] 104.11.1, [A] 104.11.2; IFC: [A] 104.10, [A] 104.10.1 (New), [A] 104.10.2 (New), [A] 104.10.1, [A] 104.10.2; IFGC: [A] 105.2, [A] 105.2.1 (New), [A] 105.2.2 (New), [A] 105.2.1; IMC: [A] 105.2, [A] 105.2.1 (New), [A] 105.2.2 (New), [A] 105.2.1; IPC: [A] 105.2, [A] 105.2.1 (New), [A] 105.2.2 (New), [A] 105.2.1; IPMC: [A] 106.2, [A] 106.2.1 (New), [A] 106.2.2 (New); IWUIC: [A] 105.3, [A] 105.3.1 (New), [A] 105.3.2 (New)

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code,
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:

   2.1. Quality.

   2.2. Strength.

   2.3. Effectiveness.

   2.4. ~~Fire resistance.~~

   ~~2.5~~ 2.4. Durability.

   ~~2.6~~ 2.5. Safety.

Where the alternative material, design or method of construction is not approved, the *building official* shall respond in writing, stating the reasons why the alternative was not approved.

Add new text as follows:

[A] 104.11.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.11.2 Fire Tests. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

Revise as follows:

[A] ~~104.11.1~~ 104.11.3 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

[A] ~~104.11.2~~ 104.11.4 Tests. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *building official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *building official* shall approve the testing procedures. Tests shall be performed by an *approved agency*. Reports of such tests shall be retained by the *building official* for the period required for retention of public records.

2021 International Existing Building Code

Revise as follows:

[A] 104.11 Alternative materials, design and methods of construction, and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, ~~fire resistance,~~ durability and safety. Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Add new text as follows:

[A] 104.11.1 Fire safety equivalency.. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.11.2 Fire Tests.. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

Revise as follows:

[A] ~~104.11.1~~ 104.11.3 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

[A] ~~104.11.2~~ 104.11.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *code official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *code official* shall approve the testing procedures. Tests shall be performed by an *approved* agency. Reports of such tests shall be retained by the *code official* for the period required for retention.

2021 International Fire Code

Revise as follows:

[A] 104.10 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *fire code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, ~~*fire resistance*,~~ durability and safety. Where the alternative material, design or method of construction is not *approved*, the *fire code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Add new text as follows:

[A] 104.10.1 Fire safety equivalency.. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.10.2 Fire tests.. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. Tests shall be performed by a party acceptable to the fire code official.

Revise as follows:

[A] ~~104.10.1~~ 104.10.3 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

[A] ~~104.10.2~~ 104.10.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *fire code official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *fire code official* shall approve the testing procedures. Tests shall be performed by an *approved* agency. Reports of such tests shall be retained by the *fire code official* for the period required for retention of public records.

2021 International Fuel Gas Code

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, ~~fire resistance,~~ durability and safety. Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Add new text as follows:

[A] 105.2.1 Fire safety equivalency.. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 105.2.2 Fire tests.. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

Revise as follows:

[A] ~~105.2.1~~ 105.2.3 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

2021 International Mechanical Code

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, ~~fire resistance,~~ durability and safety. Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Add new text as follows:

[A] 105.2.1 Fire safety equivalency.. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 105.2.2 Fire tests.. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

Revise as follows:

[A] ~~105.2.1~~ 105.2.3 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

2021 International Plumbing Code

Revise as follows:

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, ~~fire resistance,~~ durability and safety. Where the alternative material, design or method of construction is not *approved*, the code official shall respond in writing, stating the reasons why the alternative was not *approved*.

Add new text as follows:

[A] 105.2.1 Fire safety equivalency.. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 105.2.2 Fire tests.. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

Revise as follows:

[A] ~~105.2.1~~ 105.2.3 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

2021 International Property Maintenance Code

Revise as follows:

[A] 106.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, ~~fire resistance,~~ durability and safety. Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Add new text as follows:

[A] 106.2.1 Fire safety equivalency.. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 106.2.2 Fire tests.. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

2021 International Wildland-Urban Interface Code

Revise as follows:

[A] 105.3 Alternative materials, design and methods. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method shall be *approved* where the *building official* in concurrence with the fire chief finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, ~~*fire resistance*,~~ durability and safety.
Where the alternative material, design or method is not *approved*, the *building official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Add new text as follows:

[A] 105.3.1 Fire safety equivalency.. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 105.3.2 Fire tests.. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. Tests shall be performed by a party acceptable to the building official.

Reason Statement: The intent of this code proposal is to clarify equivalency in terms of fire safety, which is incorrect and misleading as described simply in terms of fire resistance at present. In fact, fire resistance is only a subset of all aspects of fire safety. Therefore, it is better to have a safety analysis look at the issue of fire safety more comprehensively.
As revised, fire resistance would be deleted from the list, and a separate section added that more fully addresses fire safety. A proper fire safety analysis performed under this section should always have taken these considerations into account, but having them specifically stated, and removing the incorrect term “fire resistance” item from the list will help code officials and code users by providing more thorough guidance for preparation of alternative method proposals. Additional guidance has also been provided to ensure that fire testing done in support of an alternative method proposal is of a sufficient scale to be relevant to the end use application.

This proposal is a portion of a more wide-ranging proposal that revises the entire section 104. The language relating to the fire safety aspects is identical to that agreed to for that proposal.

Equivalent changes are being proposed to all 9 ICC codes for which fire safety is a relevant issue in terms of alternate materials and methods.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact since this code proposal only clarifies the intent of the section and provides clearer guidance to the building, fire or code official.

ADM36-22 Part I

ADM36-22 Part II

IRC: R104.11, R104.11.1 (New), R104.11.2 (New), R104.11.1

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2021 International Residential Code

Revise as follows:

R104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. The *building official* shall have the authority to approve an alternative material, design or method of construction upon application of the *owner* or the owner's authorized agent. The *building official* shall first find that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, ~~fire resistance,~~ durability and safety. Compliance with the specific performance-based provisions of the International Codes shall be an alternative to the specific requirements of this code. Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Add new text as follows:

R104.11.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

R104.11.2 Fire tests. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. Tests shall be performed by a party acceptable to the building official.

Revise as follows:

~~**R104.11.1**~~ **R104.11.3 Tests.** Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *building official* shall have the authority to require tests as evidence of compliance to be made at no expense to the *jurisdiction*. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *building official* shall approve the testing procedures. Tests shall be performed by an *approved* agency. Reports of such tests shall be retained by the *building official* for the period required for retention of public records.

Reason Statement: The intent of this code proposal is to clarify equivalency in terms of fire safety, which is incorrect and misleading as described simply in terms of fire resistance at present. In fact, fire resistance is only a subset of all aspects of fire safety. Therefore, it is better to have a safety analysis look at the issue of fire safety more comprehensively.
As revised, fire resistance would be deleted from the list, and a separate section added that more fully addresses fire safety. A proper fire safety analysis performed under this section should always have taken these considerations into account, but having them specifically stated, and removing the incorrect term "fire resistance" item from the list will help code officials and code users by providing more thorough guidance for preparation of alternative method proposals. Additional guidance has also been provided to ensure that fire testing done in support of an alternative method proposal is of a sufficient scale to be relevant to the end use application.

This proposal is a portion of a more wide-ranging proposal that revises the entire section 104. The language relating to the fire safety aspects is identical to that agreed to for that proposal.

Equivalent changes are being proposed to all 9 ICC codes for which fire safety is a relevant issue in terms of alternate materials and methods.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact since this code proposal only clarifies the intent of the section and provides clearer guidance to the building official.

ADM36-22 Part II

ADM37-22 Part I

PART 1 - IBC: [A] 105.2

PART 2 - IRC: R105.2

Proponents: Peter Zvingilas, ICC Region VI, representing Region VI (pzvingilas@groton-ct.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 105.2 Work exempt from permit. Exemptions from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. *Permits* shall not be required for the following:

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided that the floor area is not greater than 120 square feet (11 m^2).
2. Fences not over 7 feet (2134 mm) high.
3. Oil derricks.
4. Retaining walls that are not over 4 feet (1219 mm) in height measured from ~~the bottom of the footing to~~ the top of the wall to the finish grade unless supporting a surcharge or impounding Class I, II or IIIA liquids.
5. Water tanks supported directly on grade if the capacity is not greater than 5,000 gallons (18 925 L) and the ratio of height to diameter or width is not greater than 2:1.
6. Sidewalks and driveways not more than 30 inches (762 mm) above adjacent grade, and not over any *basement* or *story* below and are not part of an *accessible route*.
7. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
8. Temporary motion picture, television and theater stage sets and scenery.
9. Prefabricated *swimming pools* accessory to a Group R-3 occupancy that are less than 24 inches (610 mm) deep, are not greater than 5,000 gallons (18 925 L) and are installed entirely above ground.
10. Shade cloth structures constructed for nursery or agricultural purposes, not including service systems.
11. Swings and other playground equipment accessory to detached one- and two-family *dwellings*.
12. Window awnings in Group R-3 and U occupancies, supported by an *exterior wall* that do not project more than 54 inches (1372 mm) from the *exterior wall* and do not require additional support.
13. Nonfixed and movable fixtures, cases, racks, counters and partitions not over 5 feet 9 inches (1753 mm) in height.

Electrical:

1. **Repairs and maintenance:** Minor repair work, including the replacement of lamps or the connection of *approved* portable electrical equipment to *approved* permanently installed receptacles.
2. **Radio and television transmitting stations:** The provisions of this code shall not apply to electrical equipment used for radio and television transmissions, but do apply to equipment and wiring for a power supply and the installations of towers and antennas.
3. **Temporary testing systems:** A *permit* shall not be required for the installation of any temporary system required for the testing or servicing of electrical equipment or apparatus.

Gas:

1. Portable heating appliance.
2. Replacement of any minor part that does not alter approval of equipment or make such equipment unsafe.

Mechanical:

1. Portable heating appliance.
2. Portable ventilation equipment.
3. Portable cooling unit.
4. Steam, hot or chilled water piping within any heating or cooling equipment regulated by this code.
5. Replacement of any part that does not alter its approval or make it unsafe.
6. Portable evaporative cooler.
7. Self-contained refrigeration system containing 10 pounds (4.54 kg) or less of refrigerant and actuated by motors of 1 horsepower (0.75 kW) or less.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe, provided, however, that if any concealed trap, drain pipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a *permit* shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures and the removal and reinstallation of water closets, provided that such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

ADM37-22 Part I

ADM37-22 Part II

PART 1 - IBC: [A] 105.2

PART 2 - IRC: R105.2

Proponents: Peter Zvingilas, ICC Region VI, representing Region VI (pzvingilas@voluntown.gov)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE ADMINSTRATIVE COMMITTEE AND PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

R105.2 Work exempt from permit. Exemption from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this *jurisdiction*. *Permits* shall not be required for the following:

Building:

1. Other than *storm shelters*, one-*story* detached *accessory structures,* provided that the floor area does not exceed 200 square feet (18.58 m^2).
2. Fences not over 7 feet (2134 mm) high.
3. Retaining walls that are not over 4 feet (1219 mm) in height measured from ~~the bottom of the footing to~~ the top of the wall <u>to the finish grade</u>, unless supporting a surcharge.
4. Water tanks supported directly upon *grade* if the capacity does not exceed 5,000 gallons (18 927 L) and the ratio of height to diameter or width does not exceed 2 to 1.
5. Sidewalks and driveways.
6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Prefabricated swimming pools that are less than 24 inches (610 mm) deep.
8. Swings and other playground equipment.
9. Window awnings supported by an exterior wall that do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.
10. Decks not exceeding 200 square feet (18.58 m^2) in area, that are not more than 30 inches (762 mm) above *grade* at any point, are not attached to a dwelling and do not serve the exit door required by Section R311.4.

Electrical:

1. *Listed* cord-and-plug connected temporary decorative lighting.
2. Reinstallation of attachment plug receptacles but not the outlets therefor.
3. Replacement of branch circuit overcurrent devices of the required capacity in the same location.
4. Electrical wiring, devices, *appliances,* apparatus or *equipment* operating at less than 25 volts and not capable of supplying more than 50 watts of energy.
5. Minor repair work, including the replacement of lamps or the connection of *approved* portable electrical equipment to *approved* permanently installed receptacles.

Gas:

1. Portable heating, cooking or clothes drying *appliances*.
2. Replacement of any minor part that does not alter approval of *equipment* or make such *equipment* unsafe.
3. Portable-fuel-cell *appliances* that are not connected to a fixed piping system and are not interconnected to a power grid.

Mechanical:

1. Portable heating *appliances*.

2. Portable ventilation *appliances*.
3. Portable cooling units.
4. Steam, hot- or chilled-water piping within any heating or cooling *equipment* regulated by this code.
5. Replacement of any minor part that does not alter approval of *equipment* or make such *equipment* unsafe.
6. Portable evaporative coolers.
7. Self-contained refrigeration systems containing 10 pounds (4.54 kg) or less of refrigerant or that are actuated by motors of 1 horsepower (746 W) or less.
8. Portable-fuel-cell *appliances* that are not connected to a fixed piping system and are not interconnected to a power grid.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe; provided, however, that if any concealed trap, drainpipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a*permit* shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures, and the removal and reinstallation of water closets, provided such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

Reason Statement: The current code defines the measurement by height measured from the bottom of the footing to the top of the wall. Footing depth varies due to frost protection requirements. By changing the language to measuring a difference in finished grade, this will be consistent on all applications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This will have no cost impact on the cost of construction, it is showing a different way of measuring a retaining wall.

ADM37-22 Part II

ADM38-22 Part I

IBC: [A] 105.2

Proponents: Joseph Summers, representing ICC Region VI (summersj@cityofgroton-ct.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 105.2 Work exempt from permit. Exemptions from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. *Permits* shall not be required for the following:

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided that the floor area is not greater than 120 square feet (11 m^2).
2. Fences<u>, other than *swimming pool* barriers,</u> not over 7 feet (2134 mm) high.
3. Oil derricks.
4. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding Class I, II or IIIA liquids.
5. Water tanks supported directly on grade if the capacity is not greater than 5,000 gallons (18 925 L) and the ratio of height to diameter or width is not greater than 2:1.
6. Sidewalks and driveways not more than 30 inches (762 mm) above adjacent grade, and not over any *basement* or *story* below and are not part of an *accessible route*.
7. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
8. Temporary motion picture, television and theater stage sets and scenery.
9. Prefabricated *swimming pools* accessory to a Group R-3 occupancy that are less than 24 inches (610 mm) deep, are not greater than 5,000 gallons (18 925 L) and are installed entirely above ground.
10. Shade cloth structures constructed for nursery or agricultural purposes, not including service systems.
11. Swings and other playground equipment accessory to detached one- and two-family *dwellings*.
12. Window awnings in Group R-3 and U occupancies, supported by an *exterior wall* that do not project more than 54 inches (1372 mm) from the *exterior wall* and do not require additional support.
13. Nonfixed and movable fixtures, cases, racks, counters and partitions not over 5 feet 9 inches (1753 mm) in height.

Electrical:

1. **Repairs and maintenance:** Minor repair work, including the replacement of lamps or the connection of *approved* portable electrical equipment to *approved* permanently installed receptacles.
2. **Radio and television transmitting stations:** The provisions of this code shall not apply to electrical equipment used for radio and television transmissions, but do apply to equipment and wiring for a power supply and the installations of towers and antennas.
3. **Temporary testing systems:** A *permit* shall not be required for the installation of any temporary system required for the testing or servicing of electrical equipment or apparatus.

Gas:

1. Portable heating appliance.
2. Replacement of any minor part that does not alter approval of equipment or make such equipment unsafe.

Mechanical:

1. Portable heating appliance.
2. Portable ventilation equipment.
3. Portable cooling unit.
4. Steam, hot or chilled water piping within any heating or cooling equipment regulated by this code.
5. Replacement of any part that does not alter its approval or make it unsafe.
6. Portable evaporative cooler.
7. Self-contained refrigeration system containing 10 pounds (4.54 kg) or less of refrigerant and actuated by motors of 1 horsepower (0.75 kW) or less.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe, provided, however, that if any concealed trap, drain pipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a *permit* shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures and the removal and reinstallation of water closets, provided that such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

ADM38-22 Part I

ADM38-22 Part II

IRC: R105.2

Proponents: Joseph Summers, representing ICC Region VI (summersj@cityofgroton-ct.gov)

2021 International Residential Code

Revise as follows:

R105.2 Work exempt from permit. Exemption from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this *jurisdiction*. *Permits* shall not be required for the following:

Building:

1. Other than *storm shelters*, one-*story* detached *accessory structures,* provided that the floor area does not exceed 200 square feet (18.58 m^2).
2. Fences, other than *swimming pool* barriers, not over 7 feet (2134 mm) high.
3. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge.
4. Water tanks supported directly upon *grade* if the capacity does not exceed 5,000 gallons (18 927 L) and the ratio of height to diameter or width does not exceed 2 to 1.
5. Sidewalks and driveways.
6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Prefabricated swimming pools that are less than 24 inches (610 mm) deep.
8. Swings and other playground equipment.
9. Window awnings supported by an exterior wall that do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.
10. Decks not exceeding 200 square feet (18.58 m^2) in area, that are not more than 30 inches (762 mm) above *grade* at any point, are not attached to a dwelling and do not serve the exit door required by Section R311.4.

Electrical:

1. *Listed* cord-and-plug connected temporary decorative lighting.
2. Reinstallation of attachment plug receptacles but not the outlets therefor.
3. Replacement of branch circuit overcurrent devices of the required capacity in the same location.
4. Electrical wiring, devices, *appliances,* apparatus or *equipment* operating at less than 25 volts and not capable of supplying more than 50 watts of energy.
5. Minor repair work, including the replacement of lamps or the connection of *approved* portable electrical equipment to *approved* permanently installed receptacles.

Gas:

1. Portable heating, cooking or clothes drying *appliances*.
2. Replacement of any minor part that does not alter approval of *equipment* or make such *equipment* unsafe.
3. Portable-fuel-cell *appliances* that are not connected to a fixed piping system and are not interconnected to a power grid.

Mechanical:

1. Portable heating *appliances*.
2. Portable ventilation *appliances*.
3. Portable cooling units.
4. Steam, hot- or chilled-water piping within any heating or cooling *equipment* regulated by this code.

5. Replacement of any minor part that does not alter approval of *equipment* or make such *equipment* unsafe.
6. Portable evaporative coolers.
7. Self-contained refrigeration systems containing 10 pounds (4.54 kg) or less of refrigerant or that are actuated by motors of 1 horsepower (746 W) or less.
8. Portable-fuel-cell *appliances* that are not connected to a fixed piping system and are not interconnected to a power grid.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe; provided, however, that if any concealed trap, drainpipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a*permit* shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures, and the removal and reinstallation of water closets, provided such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

Reason Statement: Fences are used as the barrier to a swimming pool and this proposal provides continuity with the ISPSC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This only provides clarification

ADM38-22 Part II

ADM39-22

IFC: 105.6.25 (New)

Proponents: Jeffrey Hugo, representing NFSA (hugo@nfsa.org)

2021 International Fire Code

Add new text as follows:

105.6.25 Automatic sprinkler systems. A construction permit is required for installation of or modification to an automatic sprinkler system. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

Reason Statement: The automatic fire-extinguishing system, as defined and applied throughout the code, does not apply to automatic sprinkler systems. This new section would specifically apply to automatic sprinkler systems. The text mimics other construction permit sections.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The automatic fire-extinguishing section may have been used for fire sprinkler construction permits in the past. This proposal correlates and provide consistent use of the defined terms.

ADM39-22

ADM40-22

IPSDC: SECTION 107 (New), [A] 106.4, 107.2 (New), [A] 106.4.2, 107.3 (New), [A] 106.4.1, [A] 106.4.3, 107.5 (New), 107.6 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Private Sewage Disposal Code

Add new text as follows:

SECTION 107
FEES

Revise as follows:

[A] ~~106.4~~ 107.1 ~~Fees~~ Payment of fees. A permit shall not be ~~issued~~ valid until the fees prescribed ~~in Section 106.4.2~~ by law have been paid . ~~, and an~~ An amendment to a permit shall not be released until the additional fee, if any, ~~due to an increase of the *private sewage disposal system*,~~ has been paid.

Add new text as follows:

107.2 Schedule of permit fees. Where work requires a permit, a fee for each permit shall be paid as required, in accordance with the schedule as established by the applicable governing authority.

Delete without substitution:

~~**[A] 106.4.2 Fee schedule.** The fees for all private sewage disposal work shall be as indicated in the following schedule:~~
~~[JURISDICTION TO INSERT APPROPRIATE SCHEDULE].~~

Add new text as follows:

107.3 Permit valuations. The applicant for a *permit* shall provide an estimated value of the work for which the permit is being issued at time of application. Such estimated valuations shall include the total value of work, including materials and labor, for which the *permit* is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. Where, in the opinion of the *building official*, the valuation is underestimated, the *permit* shall be denied, unless the applicant can show detailed estimates acceptable to the *building official*. The building official shall have the authority to adjust the final valuation for permit fees.

Revise as follows:

[A] ~~106.4.1~~ 107.4 Work commencing before permit issuance. Any person who commences any work on a *private sewage disposal system* before obtaining the necessary permits shall be subject to ~~100 percent of the usual permit fee~~ a fee established by the code official that shall be in addition to the required permit fees.

Delete without substitution:

~~**[A] 106.4.3 Fee refunds.** The *code official* shall authorize the refunding of fees as follows:~~

1. ~~The full amount of any fee paid hereunder that was erroneously paid or collected.~~
2. ~~Not more than [SPECIFY PERCENTAGE] percent of the permit fee paid where no work has been done under a permit issued in accordance with this code.~~
3. ~~Not more than [SPECIFY PERCENTAGE] percent of the plan review fee paid where an application for a permit for which a plan review fee has been paid is withdrawn or canceled before any plan review effort has been expended.~~

~~The *code official* shall not authorize the refunding of any fee paid except upon written application filed by the original permittee no later than 180 days after the date of fee payment.~~

Add new text as follows:

107.5 Related fees. The payment of the fee for the construction, alteration, removal or demolition for work done in connection to or concurrently with the work authorized by a permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

107.6 Refunds. The code official is authorized to establish a refund policy.

Reason Statement: The intent of this proposal is coordination for the section Fees in IPSDC with the other ICC codes. Since one city department will handle permit fees for construction, the requirements for administration should be the same across codes.
There were two different proposals to address consistency in the Fees section (ADM 27-19 and ADM 33-19) – the end result was coordination

between the 2021 codes. for – IBC, IFC, IEBC, IMC, IPC, IPMC, IFGC, ISPSC, IWUIC and IZC. ADM27-19 should have included IPSDC, however it was missed.

The IPSDC required the insertion of a table for fees and sets a policy for refunds. If the jurisdiction is on a code for 3 to 6 years, this would prohibit them from adjusting their fees. What the policy is for refunds should also be determined by the department. ADM27-19 removed similar text in the IMC, IPC, IPMC, IFGC, and ISPSC.

The current text does not address permit valuations or related fees. The more generic language for refunds allows for the department to establish a policy rather than have that set in the codes.

The BCAC is working from the philosophy that ICC is a family of codes, so administrative requirements should be consistent across books. Most administrative and enforcement matters are the same for any code. Those matters unique for a specific code remain unchanged. This is one of a series of proposals being submitted relating to technical, editorial and organizational changes proposed for the Administrative chapters (Chapter 1) in all of the I-Codes.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC) in coordination with the ICC Building Code Action Committee (BCAC).

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change that provides consistency between I-codes.

ADM40-22

ADM41-22 Part I

IBC: SECTION 108, [A] 108.1, [A] 108.2, [A] 108.3, [A] 108.4, SECTION 112, [A] 112.1, [A] 112.2, [A] 112.3; IEBC: SECTION 107, [A] 107.1, [A] 107.2, [A] 107.3, [A] 107.4, SECTION 111, [A] 111.1, [A] 111.2, [A] 111.3; IFC: SECTION 106 (New), 106.1 (New), 106.2 (New), 106.3 (New), 106.4 (New), SECTION 110, [A] 110.1; IFGC: SECTION 110, [A] 110.1, [A] 110.2, 110.3, SECTION 111, [A] 111.1, [A] 111.2, [A] 111.3, [A] 111.4; IMC: SECTION 107, [A] 107.1, [A] 107.2, [A] 107.3, [A] 107.4, SECTION 112, [A] 112.1, [A] 112.2, [A] 112.3; IPC: SECTION 107, [A] 107.1, [A] 107.2, [A] 107.3, [A] 107.4, SECTION 112, [A] 112.1, [A] 112.2, [A] 112.3; IPSDC: SECTION 109, [A] 109.1, [A] 109.2, [A] 109.3, [A] 109.4, SECTION 110, [A] 110.1, [A] 110.2, [A] 110.3; ISPSC: SECTION 106 (New), 106.1 (New), 106.2 (New), 106.3 (New), 106.4 (New), SECTION 109, [A] 109.1, [A] 109.2, [A] 109.3; IWUIC: SECTION 108, [A] 108.1, [A] 108.2, 108.3 (New), [A] 108.3, SECTION 112, [A] 112.1, [A] 112.2, [A] 112.3

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

SECTION 108
TEMPORARY STRUCTURES ~~AND USES~~ , EQUIPMENT AND SYSTEMS

[A] 108.1 General. The *building official* is authorized to issue a *permit* for temporary structures ~~and temporary uses~~ , equipment or systems. Such *permits* shall be limited as to time of service, but shall not be permitted for more than 180 days. The *building official* is authorized to grant extensions for demonstrated cause.

[A] 108.2 Conformance. Temporary structures ~~and uses~~ shall comply with the requirements in Section 3103.

[A] 108.3 Temporary ~~power~~ service utilities. The *building official* is authorized to give permission to temporarily supply service utilities in accordance with Section 112. ~~and use power in part of an electric installation before such installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in NFPA 70.~~

[A] 108.4 Termination of approval. The *building official* is authorized to terminate such *permit* for a temporary structure , equipment, or ~~use~~ system and to order the ~~temporary structure or use~~ same to be discontinued.

SECTION 112
SERVICE UTILITIES

[A] 112.1 Connection of service utilities. A person shall not make connections from a utility, a source of energy, fuel, or power, or a water system or sewer system to any building or system that is regulated by this code for which a *permit* is required, until approved by the *building official*.

[A] 112.2 Temporary connection. The *building official* shall have the authority to authorize the temporary connection of the building or system to the utility, the source of energy, fuel, or power, or the water system or sewer system for the purpose of testing systems or for use under a temporary approval.

[A] 112.3 Authority to disconnect service utilities. The *building official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 112.1 or 112.2. The *building official* shall notify the serving utility, and wherever possible the *owner* or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the *owner* or the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

2021 International Existing Building Code

Revise as follows:

SECTION 107
TEMPORARY ~~STRUCTURES AND~~ USES , EQUIPMENT AND SYSTEMS

[A] 107.1 General. The *code official* is authorized to issue a permit for temporary uses , equipment and systems. Such permits shall be limited as to time of service but shall not be permitted for more than 180 days. The *code official* is authorized to grant extensions for demonstrated cause.

[A] 107.2 Conformance. Temporary uses shall conform to the ~~structural strength, fire safety, means of egress, accessibility, light, ventilation and~~

~~sanitary~~ requirements of this code as necessary to ensure ~~the public~~ health, safety and general welfare.

[A] 107.3 Temporary ~~power~~ <u>service utilities</u>. The *code official* is authorized to give permission to temporarily supply <u>service utilities in accordance with Section 111.</u> ~~and use power in part of an electric installation before such installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in NFPA 70.~~

[A] 107.4 Termination of approval. The *code official* is authorized to terminate such permit for a temporary use and to order the ~~temporary use~~ <u>same</u> to be discontinued.

SECTION 111
SERVICE UTILITIES

[A] 111.1 Connection of service utilities. A person shall not make connections from a utility, source of energy, fuel, power, water system or sewer system to any building or system that is regulated by this code for which a permit is required, until *approved* by the *code official*.

[A] 111.2 Temporary connection. The *code official* shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel, power, water system or sewer system for the purpose of testing systems or for use under a temporary approval.

[A] 111.3 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 111.1 or 111.2. The *code official* shall notify the serving utility and, wherever possible, the owner or the owner's authorized agent and the occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

2021 International Fire Code

Add new text as follows:

<u>SECTION 106</u>
<u>TEMPORARY STRUCTURES, USES, EQUIPMENT AND SYSTEMS</u>

<u>**106.1 General.** The fire code official is authorized to issue a permit for temporary structures, uses, equipment or systems as required in Sections 105.5 and 105.6. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The fire code official is authorized to grant extensions for demonstrated cause.</u>

<u>**106.2 Conformance.** Temporary uses, equipment and systems shall conform to the requirements of this code as necessary to ensure health, safety and general welfare.</u>

<u>**106.3 Temporary service utilities.** The fire code official is authorized to give permission to temporarily supply service utilities in accordance with Section 110.</u>

<u>**106.4 Termination of approval.** The fire code official is authorized to terminate such permit for a temporary uses, equipment, or system and to order the same to be discontinued.</u>

SECTION 110
SERVICE UTILITIES

[A] 110.1 Authority to disconnect service utilities. The *fire code official* shall have the authority to authorize disconnection of utility service to the building, structure or system in order to safely execute emergency operations or to eliminate an immediate hazard. The *fire code official* shall notify the serving utility and, where possible, the *owner* or the *owner 's* authorized agent and the occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnection, then the *owner*, the *owner 's* authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

2021 International Fuel Gas Code

SECTION 110
SERVICE UTILITIES

[A] 110.1 Connection of service utilities. A person shall not make connections from a utility, source of energy, fuel or power to any building or system that is regulated by this code for which a permit is required until authorized by the *code official*.

[A] 110.2 Temporary connection. The *code official* shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel, power, water system or sewer system for the purpose of testing the installation or for use under a temporary approval.

110.3 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 112.1 or 112.2. The *code official* shall notify the serving utility, and wherever possible the owner or the owner's authorized agent and occupant of the building, structure or service system, of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

Revise as follows:

SECTION 111
TEMPORARY USES, EQUIPMENT~~,~~ AND SYSTEMS ~~AND USES~~

[A] 111.1 General. The *code official* is authorized to issue a permit for temporary uses, *equipment*~~,~~ and systems ~~and uses~~. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The *code official* is authorized to grant extensions for demonstrated cause.

[A] 111.2 Conformance. Temporary uses, *equipment*~~,~~ and systems ~~and uses~~ shall conform to the ~~structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary~~ requirements of this code as necessary to ensure ~~the public~~ health, safety and general welfare.

[A] 111.3 Temporary utilities. The *code official* is authorized to give permission to temporarily supply service utilities in accordance with Section 110. ~~before an installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in the code.~~

[A] 111.4 Termination of approval. The *code official* is authorized to terminate such permit for ~~a~~ temporary ~~structure or use~~ uses, equipment or systems and to order the ~~temporary structure or use~~ same to be discontinued.

2021 International Mechanical Code

Revise as follows:

SECTION 107
TEMPORARY USES, EQUIPMENT, AND SYSTEMS ~~AND USES~~

[A] 107.1 General. The code official is authorized to issue a permit for temporary uses, *equipment*, and systems ~~and uses~~. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The code official is authorized to grant extensions for demonstrated cause.

[A] 107.2 Conformance. Temporary uses, *equipment*, and systems ~~and uses~~ shall conform to the ~~structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary~~ requirements of this code as necessary to ensure ~~the public~~ health, safety and general welfare.

[A] 107.3 Temporary service utilities. The code official is authorized to give permission to temporarily supply service utilities in accordance with Section 112. ~~before an installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in the code.~~

[A] 107.4 Termination of approval. The code official is authorized to terminate such permit for temporary uses, *equipment*, or systems ~~or uses~~ and to order the ~~temporary *equipment*, systems or uses~~ same to be discontinued.

SECTION 112
SERVICE UTILITIES

[A] 112.1 Connection of service utilities. A person shall not make connections from a utility, source of energy, fuel or power to any building or system that is regulated by this code for which a permit is required, until authorized by the code official.

[A] 112.2 Temporary connection. The code official shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel, power, water system or sewer system for the purpose of testing systems or for use under a temporary approval.

[A] 112.3 Authority to disconnect service utilities. The code official shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 112.1 or 112.2. The code official shall notify the serving utility, and wherever possible the owner or the owner's authorized agent and occupant of the building, structure or service system, of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

2021 International Plumbing Code

Revise as follows:

SECTION 107
TEMPORARY USES, EQUIPMENT, AND SYSTEMS ~~AND USES~~

[A] 107.1 General. The code official is authorized to issue a permit for temporary uses, equipment~~,~~ and systems ~~and uses~~. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The code official is authorized to grant extensions for demonstrated cause.

[A] 107.2 Conformance. Temporary uses, equipment~~,~~ and systems ~~and uses~~ shall conform to the ~~structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary~~ requirements of this code as necessary to ensure ~~the public~~ health, safety and general welfare.

[A] 107.3 Temporary service utilities. The code official is authorized to give permission to temporarily supply service utilities in accordance with Section 112. ~~before an installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in the code.~~

[A] 107.4 Termination of approval. The code official is authorized to terminate such permit for temporary uses, equipment~~,~~ or systems ~~or uses~~ and to order the ~~temporary equipment, systems or uses~~ same to be discontinued.

SECTION 112
SERVICE UTILITIES

[A] 112.1 Connection of service utilities. A person shall not make connections from a utility, source of energy, fuel, power, water system or *sewer* system to any building or system that is regulated by this code for which a permit is required until authorized by the code official.

[A] 112.2 Temporary connection. The code official shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel, power, water system or sewer system for the purpose of testing plumbing systems or for use under a temporary approval.

[A] 112.3 Authority to disconnect service utilities. The code official shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 112.1 or 112.2. The code official shall notify the serving utility, and wherever possible the owner or the owner's authorized agent and occupant of the building, structure or service system, of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

2021 International Private Sewage Disposal Code

Revise as follows:

SECTION 109
TEMPORARY USES, EQUIPMENT~~,~~ AND SYSTEMS ~~AND USES~~

[A] 109.1 General. The *code official* is authorized to issue a permit for temporary uses, equipment, or systems. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The *code official* is authorized to grant extensions for demonstrated cause.

Revise as follows:

[A] 109.2 Conformance. Temporary uses, equipment and systems shall conform to the ~~structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary~~ requirements of this code as necessary to ensure ~~the~~ health, safety and general welfare.

[A] 109.3 Temporary utilities. The *code official* is authorized to give permission to temporarily supply service utilities in accordance with Section 110. ~~, sources of energy, fuel, power, water systems or sewer systems before an installation has been fully completed and the final approval has been issued. The part covered by the temporary approval shall comply with the requirements specified for temporary lighting, heat or power in this code.~~

[A] 109.4 Termination of approval. The *code official* is authorized to terminate such permit for temporary uses, equipment or system and to order the same to be discontinued.

SECTION 110
SERVICE UTILITIES

[A] 110.1 Connection of service utilities. No person shall make connections from a utility, source of energy, fuel or power to any building or system that is regulated by this code for which a permit is required until authorized by the *code official*.

[A] 110.2 Temporary connection. The *code official* shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel, water system or sewer system for the purpose of testing systems or for use under a temporary approval.

[A] 110.3 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 110.1 or 110.2. The *code official* shall notify the serving utility, and wherever possible the owner or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

2021 International Swimming Pool and Spa Code

Add new text as follows:

SECTION 106
TEMPORARY STRUCTURES, EQUIPMENT AND SYSTEMS

106.1 General. The code official is authorized to issue a permit for temporary structures, equipment or systems. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The code official is authorized to grant extensions for demonstrated cause.

106.2 Conformance. Temporary structures, equipment and systems shall conform to the requirements of this code as necessary to ensure health, safety and general welfare.

106.3 Temporary service utilities. The code official is authorized to give permission to temporarily supply service utilities in accordance with Section 109.

106.4 Termination of approval. The code official is authorized to terminate such permit for a temporary structures, equipment, or system and to order the same to be discontinued.

SECTION 109
SERVICE UTILITIES

[A] 109.1 Connection of service utilities. A person shall not make connections from a utility, source of energy, fuel, power, water system or sewer system to any building or system that is regulated by this code for which a permit is required until authorized by the *code official*.

[A] 109.2 Temporary connection. The *code official* shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel, power, water system or sewer system for the purpose of testing systems or for use under a temporary approval.

[A] 109.3 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 108.2 or 108.3. The *code official* shall notify the serving utility, and wherever possible the owner or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

2021 International Wildland-Urban Interface Code

Revise as follows:

SECTION 108
TEMPORARY ~~STRUCTURES AND~~ USES , EQUIPMENT AND SYSTEMS

[A] 108.1 General. The *code official* is authorized to issue a permit for temporary ~~structures and temporary~~ uses , equipment and systems. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The *code official* is authorized to grant extensions for demonstrated cause.

[A] 108.2 Conformance. Temporary ~~structures and~~ uses , equipment and systems shall conform to the ~~structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary~~ requirements of this code as necessary to ensure ~~the public~~ health, safety and general welfare.

Add new text as follows:

108.3 Temporary service utilities. The *code official* is authorized to give permission to temporarily supply service utilities in accordance with Section 112.

Revise as follows:

[A] ~~108.3~~ 108.4 Termination of approval. The *code official* is authorized to terminate such permit for a temporary ~~structure or~~ use , equipment or systems and to order the ~~temporary structure or use~~ same to be discontinued.

SECTION 112
SERVICE UTILITIES

[A] 112.1 Connection of service utilities. A person shall not make connections from a utility, source of energy, fuel, power, water system or sewer system to any building or system that is regulated by this code for which a permit is required until authorized by the *code official*.

[A] 112.2 Temporary connection. The *code official* shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel, power, water system or sewer system for the purpose of testing systems or for use under a temporary approval.

[A] 112.3 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Sections 112.1 and 112.2. The *code official* shall notify the serving utility and, where possible, the owner or the owner's authorized agent and the occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnection, the owner, the owner's authorized agent or the occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

ADM41-22 Part I

ADM41-22 Part II

IRC: SECTION R107, R107.1, R107.2, R107.3, R107.4, SECTION R111, R111.1, R111.2, R111.3

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

SECTION R107
TEMPORARY STRUCTURES, USES, EQUIPMENT AND ~~USES~~ SYSTEMS

R107.1 General. The *building official* is authorized to issue a *permit* for temporary structures, ~~and temporary~~ uses, equipment or systems. Such *permits* shall be limited as to time of service, but shall not be permitted for more than 180 days. The *building official* is authorized to grant extensions for demonstrated cause.

R107.2 Conformance. Temporary structures, ~~and~~ uses, equipment or systems shall conform to the ~~structural strength, fire safety, means of egress, light, *ventilation* and sanitary~~ requirements of this code as necessary to ensure ~~the public~~ health, safety and general welfare.

R107.3 Temporary ~~power~~ service utilities. The *building official* is authorized to give permission to temporarily supply service utilities in accordance with Section R111. ~~and use power in part of an electric installation before such installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in NFPA 70.~~

R107.4 Termination of approval. The *building official* is authorized to terminate such *permit* for ~~a~~ temporary structures, uses, equipment or ~~use~~ systems and to order the ~~temporary structure or use~~ same to be discontinued.

SECTION R111
SERVICE UTILITIES

R111.1 Connection of service utilities. A *person* shall not make connections from a utility, a source of energy, fuel, or power to any building or system that is regulated by this code for which a *permit* is required, until *approved* by the *building official*.

R111.2 Temporary connection. The *building official* shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel or power.

R111.3 Authority to disconnect service utilities. The *building official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards set forth in Section R102.4 in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section R111.1 or R111.2. The *building official* shall notify the serving utility and where possible the *owner* or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnection, the *owner*, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

Reason Statement: The purpose of this proposal is coordination between codes for the section on temporary structures. A version was proposed last cycle, ADM32-19. As requested by the development committee, the BCAC worked with FCAC and PMGCAC to develop this proposal.
This proposal modified the section for temporary facilities where it was already in the code. The committee felt that it was very important to add these safety options to the IFC as well, so this proposal adds this section to IFC and ISPSC. When looking for coordination, some of the codes did not include 'structure' and some did. The residential committee felt it was important to keep 'structures', so that is remaining in the proposed text.

Generally - The word use is moved to the front, and the lists are made the same throughout.

Temporary power - The allowances for temporary connection under inspection and testing address more than just utilities, so the language in this section should match. The phrase "certificate of completion" is not defined, so "approved" would be a better choice.

The section on Conformance includes a laundry list " structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary", that is not needed for the section and includes provisions that are not addressed in all of the codes (e.g. IPC does not address structural strength, means of egress, or light).

The BCAC is working from the philosophy that ICC is a family of codes, so administrative requirements should be consistent across books. Most administrative and enforcement matters are the same for any code. Those matters unique for a specific code remain unchanged. This is one of a series of proposals being submitted relating to technical, editorial and organizational changes proposed for the Administrative chapters (Chapter 1) in all of the I-Codes.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (FCAC) and . ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is only removing repeating requirements, therefore this revision is strictly editorial and will not have any changes to the construction requirements.

ADM41-22 Part II

ADM42-22

IPC: 109.3 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Plumbing Code

Add new text as follows:

109.3 Permit valuations. The applicant for a *permit* shall provide an estimated value of the work for which the permit is being issued at time of application. Such estimated valuations shall include the total value of work, including materials and labor, for which the *permit* is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. Where, in the opinion of the *building official*, the valuation is underestimated, the *permit* shall be denied, unless the applicant can show detailed estimates acceptable to the *building official*. The building official shall have the authority to adjust the final valuation for permit fees.

Reason Statement: ADM27-19 was approved last cycle for the coordination of the Fees section in IMC, IPC, IPMC, IFGC, ISPSC. This section was left out of IPC by accident. There is another proposal from BCAC that has some adjustment to this section across codes. That revised language has been incorporated into this proposal.
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC) in coordination with the ICC Building Code Action Committee (BCAC).

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an administrative section and will not change the cost of construction.

ADM42-22

ADM43-22 Part I

IBC: [A] 109.3; IEBC: [A] 108.3; IFC: 107.3; IFGC: 109.3; IMC: [A] 109.3; ISPSC: [A] 108.3; IWUIC: [A] 109.3; IGCC: 108.3

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 109.3 Permit valuations. The applicant for a *permit* shall provide an estimated ~~*permit*~~ value of the work for which the permit is being issued at time of application. ~~*Permit* valuations shall reflect~~ Such estimated valuations shall include the total value of work, including materials and labor, for which the *permit* is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. ~~If~~ Where, in the opinion of the *building official*, the valuation is underestimated ~~on the application~~, the *permit* shall be denied, unless the applicant can show detailed estimates ~~to meet the approval of~~ acceptable to the *building official*. ~~Final building *permit* valuation shall be set by the *building official*.~~ The building official shall have the authority to adjust the final valuation for permit fees.

2021 International Existing Building Code

Revise as follows:

[A] 108.3 Permit valuations. The applicant for a *permit* shall provide an estimated ~~*permit*~~value of the work for which the permit is being issued at time of application. ~~*Permit* valuations shall reflect~~ Such estimated valuations shall include the total value of work, including materials and labor, for which the *permit* is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. ~~If~~ Where, in the opinion of the *code official*, the valuation is underestimated ~~on the application~~, the permit shall be denied unless the applicant can show detailed estimates ~~to meet the approval of~~ acceptable to the *code official*. ~~Final building permit valuation shall be set by the *code official*.~~ The code official shall have the authority to adjust the final valuation for permit fees.

2021 International Fire Code

Revise as follows:

107.3 Permit valuations. The applicant for a *permit* shall provide an estimated ~~*permit*~~value of the work for which the permit is being issued at time of application. ~~*Permit* valuations shall reflect~~ Such estimated valuations shall include the total value of work, including materials and labor, for which the *permit* is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. ~~If~~ Where, in the opinion of the *fire code official*, the valuation is underestimated ~~on the application~~, the permit shall be denied unless the applicant can show detailed estimates ~~to meet the approval of~~ acceptable to the *fire code official*. ~~Final permit valuation shall be set by the *fire code official*.~~ The fire code official shall have the authority to adjust the final valuation for permit fees.

2021 International Fuel Gas Code

Revise as follows:

109.3 Permit valuations. The applicant for a *permit* shall provide an estimated ~~*permit*~~value of the work for which the permit is being issued at time of application. ~~*Permit* valuations shall reflect~~ Such estimated valuations shall include the total value of work, including materials and labor, for which the *permit* is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. ~~If~~ Where, in the opinion of the *code official*, the valuation is underestimated ~~on the application~~, the permit shall be denied, unless the applicant can show detailed estimates ~~to meet the approval of~~ acceptable to the *code official*. ~~Final building permit valuation shall be set by the *code official*.~~ The code official shall have the authority to adjust the final valuation for permit fees.

2021 International Mechanical Code

Revise as follows:

[A] 109.3 Permit valuations . The applicant for a *permit* shall provide an estimated ~~*permit*~~value of the work for which the permit is being issued at time of application. ~~*Permit* valuations shall reflect~~ Such estimated valuations shall include the total value of work, including materials and labor, for which the *permit* is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. ~~If~~ Where, in the opinion of the *code official*, the valuation is underestimated ~~on the application~~, the permit shall be denied, unless the applicant can show detailed estimates ~~to meet the approval of~~ acceptable to the *code official*. ~~Final building permit valuation shall be set by the *code official*.~~ The code official shall have the authority to adjust the final valuation for permit fees.

2021 International Swimming Pool and Spa Code

Revise as follows:

[A] 108.3 Permit valuations. The applicant for a *permit* shall provide an estimated ~~*permit*~~value of the work for which the permit is being issued at time of application. ~~*Permit* valuations shall reflect~~ Such estimated valuations shall include the total value of work, including materials and labor, for which the *permit* is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. ~~If~~ Where, in the opinion of the *code official*, the valuation is underestimated ~~on the application~~, the permit shall be denied, unless the applicant can show detailed estimates ~~to meet the approval of~~ acceptable to the *code official*. ~~Final building permit valuation shall be set by the *code official*.~~ The code official shall have the authority to adjust the final valuation for permit fees.

2021 International Wildland-Urban Interface Code

Revise as follows:

[A] 109.3 Permit valuations. The applicant for a permit shall provide an estimated ~~permit~~ value of the work for which the permit is being issued at time of application. ~~Permit valuations shall reflect~~ Such estimated valuations shall include the total value of work, including materials and labor, for which the permit is being issued. ~~If~~ Where, in the opinion of the applicable governing authority, the valuation is underestimated ~~on the application~~, the permit shall be denied, unless the applicant can show detailed estimates ~~to meet the approval of~~ acceptable to the applicable governing authority. ~~Final building permit valuation shall be set by the applicable governing authority.~~ The applicable governing authority shall have the authority to adjust the final valuation for permit fees.

2021 International Green Construction Code

Revise as follows:

108.3 Permit valuations. The applicant for a permit shall provide an estimated ~~permit~~ value of the work for which the permit is being issued at the time of application. ~~Permit valuations shall consist of~~ Such estimated valuations shall include the total value of work, including materials and labor, for which the permit is being issued, such as electrical, gas, mechanical, and plumbing equipment and permanent systems. ~~If~~ Where, in the opinion of the building official, the valuation is underestimated ~~on the application~~, the permit shall be denied unless the applicant can show detailed estimates ~~to meet the approval of~~ acceptable to the building official. ~~Final building permit valuation shall be set by the building official.~~ The building official shall have the authority to adjust the final valuation for permit fees.

ADM43-22 Part I

ADM43-22 Part II

IRC: R108.3, R108.6, R108.4, R108.5

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

R108.3 ~~Building permit~~ Permit valuations. The applicant for a *permit* shall provide an estimated value of the work for which the permit is being issued at time of application. Such estimated ~~Building permit~~ valuations shall include the total value of work, including materials and labor, for which the *permit* is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems, ~~including materials and labor~~. Where, in the opinion of the *building official*, the valuation is underestimated, the *permit* shall be denied, unless the applicant can show detailed estimates acceptable to the *building official*. The building official shall have the authority to adjust the final valuation for permit fees.

~~R108.6~~ R108.4 Work commencing before permit issuance. Any *person* who commences work requiring a *permit* on a building, structure, electrical, gas, mechanical or plumbing system before obtaining the necessary *permits* shall be subject to a fee established by the applicable governing authority that shall be in addition to the required *permit* fees.

~~R108.4~~ R108.5 Related fees. The payment of the fee for the construction, *alteration*, removal or demolition for work done in connection to or concurrently with the work authorized by a building *permit* shall not relieve the applicant or holder of the*permit* from the payment of other fees that are prescribed by law.

~~R108.5~~ R108.6 Refunds. The *building official* is authorized to establish a refund policy.

Reason Statement: The intent of this proposal is to coordinate the provisions for fees in the I-codes. Last cycle there were two different proposals to address consistency in the Fees section (ADM 27-19 and ADM 33-19) – the end result was coordination between the 2021 codes. for – IBC, IFC, IEBC, IMC, IPC, IPMC, IFGC, ISPSC, IWUIC and IZC.
The revisions to Section 109.3 is based on some concerns raised during discussion. The change to the first and second sentence is a clarification of application. The cost of the permit is the value of the work being performed, not the value of the permit. The current last sentence could be read to say the code official can arbitrarily set the permit valuation, or it could be read to say the code official had to calculate the valuation. The proposed language allows for the code official to make adjustments if warranted.

There is another code change to add this section to IPC. ADM27-19 was approved last cycle for the coordination of the Fees section in IMC, IPC, IPMC, IFGC, IPSPC. This section was left out of IPC by accident. This revised text has been submitted to be added to the IPC Section 109.3.

The BCAC is working from the philosophy that ICC is a family of codes, so administrative requirements should be consistent across books. Most administrative and enforcement matters are the same for any code. Those matters unique for a specific code remain unchanged. This is one of a series of proposals being submitted relating to technical, editorial and organizational changes proposed for the Administrative chapters (Chapter 1) in all of the I-Codes.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (FCAC) and . ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change that provides consistency between I-codes.

ADM44-22

IFGC: SECTION 110, 110.3, SECTION 115, [A] 115.6.2; IMC: SECTION 112, [A] 112.3, SECTION 115, [A] 115.6.2; IPC: SECTION 112, [A] 112.3, SECTION 115, [A] 115.6.2; IPSDC: SECTION 110, [A] 110.3, SECTION 114, [A] 114.6.2; ISPSC: SECTION 109, [A] 109.3, SECTION 113, [A] 113.6.2

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Fuel Gas Code

SECTION 110
SERVICE UTILITIES

Revise as follows:

[A] 110.3 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 112.1 or 112.2. The *code official* shall notify the serving utility, and wherever possible the owner or the owner's authorized agent and occupant of the building, structure or service system, of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

SECTION 115
VIOLATIONS

Revise as follows:

[A] 115.6.2 Authority to disconnect service utilities. The *code official* shall have the authority to require disconnection of utility service in accordance with Section 110.3 ~~to the building, structure or system regulated by the technical codes in case of emergency where necessary to eliminate an immediate hazard to life or property. The *code official* shall notify the serving utility and, where possible, the owner or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnection, the owner or occupant of the building, structure or service system shall be notified in writing, as soon as practicable thereafter~~.

2021 International Mechanical Code

SECTION 112
SERVICE UTILITIES

[A] 112.3 Authority to disconnect service utilities. The code official shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 112.1 or 112.2. The code official shall notify the serving utility, and wherever possible the owner or the owner's authorized agent and occupant of the building, structure or service system, of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

SECTION 115
VIOLATIONS

Revise as follows:

[A] 115.6.2 Authority to order ~~disconnection of energy sources~~ disconnect service utilities. The code official shall have the authority to ~~order~~ authorize disconnection of utility services in accordance with Section 112.3 ~~energy sources supplied to a building, structure or mechanical system regulated by this code, where it is determined that the mechanical system or any portion thereof has become hazardous or unsafe. Written notice of such order to disconnect service and the causes therefor shall be given within 24 hours to the owner, the owner's authorized agent and occupant of such building, structure or premises, provided, however, that in cases of immediate danger to life or property, such disconnection shall be made immediately without such notice. Where energy sources are provided by a public utility, the code official shall immediately notify the serving utility in writing of the issuance of such order to disconnect~~.

2021 International Plumbing Code

SECTION 112
SERVICE UTILITIES

[A] 112.3 Authority to disconnect service utilities. The code official shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 112.1 or 112.2. The code official shall notify the serving utility, and wherever possible the owner or the owner's authorized agent and occupant of the building, structure or service system, of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

SECTION 115
VIOLATIONS

Revise as follows:

[A] 115.6.2 Authority to disconnect service utilities. The code official shall have the authority to authorize disconnection of utility service in accordance with Section 112.3 ~~to the building, structure or system regulated by the technical codes in case of an emergency, where necessary, to eliminate an immediate danger to life or property. Where possible, the owner or the owner's authorized agent and occupant of the building, structure or service system shall be notified of the decision to disconnect utility service prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service systems shall be notified in writing, as soon as practical thereafter~~.

2021 International Private Sewage Disposal Code

SECTION 110
SERVICE UTILITIES

[A] 110.3 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 110.1 or 110.2. The *code official* shall notify the serving utility, and wherever possible the owner or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

SECTION 114
VIOLATIONS

Revise as follows:

[A] 114.6.2 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service in accordance with Section 110.3 ~~to the building, structure or system regulated by the technical codes in case of emergency, where necessary, to eliminate an immediate danger to life or property. Where possible, the owner, the owners's authorized agent and occupant of the building, structure or service system shall be notified of the decision to disconnect utility service prior to taking such action. If not notified prior to disconnecting, the owner or occupant of the building, structure or service systems shall be notified in writing as soon as is practical thereafter~~.

2021 International Swimming Pool and Spa Code

SECTION 109
SERVICE UTILITIES

[A] 109.3 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 108.2 or 108.3. The *code official* shall notify the serving utility, and wherever possible the owner or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

SECTION 113
VIOLATIONS

Revise as follows:

[A] 113.6.2 Authority to disconnect service utilities. The *code official* shall have the authority to authorize disconnection of utility service in accordance with Section 109.3 ~~to the pool or spa regulated by the technical codes in case of an emergency, where necessary, to eliminate an immediate danger to life or property. Where possible, the owner or the owner's authorized agent and occupant of the building where the pool or spa is located shall be notified of the decision to disconnect utility service prior to taking such action. If not notified prior to disconnecting, the owner, the~~

~~owner's authorized agent or the occupant of the building shall be notified in writing, as soon as practical thereafter~~.

Reason Statement: ADM 39-19 was a coordinating proposal for Service Utilities. There was an inadvertent duplication of language in the section on Violations. This proposal is intended to editorially remove the repeated sections. A reference to the same section in Service Utilities is provided instead.
This proposal is submitted by the Plumbing/Mechanical/Gas Code Action Committee (PMGCAC) working with the Building Code Action Committee (BCAC).

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These are administration requirements, so there will be no change in construction requirements.

ADM44-22

ADM45-22 Part I

IBC: SECTION 111, [A] 111.1, [A] 111.4; IEBC: SECTION 110, [A] 110.1, [A] 110.5 (New)

Proponents: Joseph Summers, representing ICC Region VI (summersj@cityofgroton-ct.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

SECTION 111
CERTIFICATE OF OCCUPANCY

Revise as follows:

[A] 111.1 Change of occupancy. A building or structure shall not be used or occupied in whole or in part, and a *change of occupancy* of a building or structure or portion thereof shall not be made, until the *building official* has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the *jurisdiction*. Certificates presuming to give authority to violate or cancel the provisions of this code or other ordinances of the *jurisdiction* shall not be valid.

~~Exception~~ Exceptions:

1. Certificates of occupancy are not required for work exempt from *permits* in accordance with Section 105.2.
2. Work for which a certificate of approval is issued in accordance with Section 111.5.

Add new text as follows:

[A] 111.5 Certificate of Approval. The *building official* shall issue a certificate of approval indicating substantial compliance with the requirements of this code for all of the completed work that requires a *permit* but does not require a certificate of occupancy. Such work shall include, but not limited to: fences greater than 7 feet in height, retaining walls greater than 3 feet in height, roofing, siding, electrical, plumbing, and mechanical *repairs* and *alterations*.

2021 International Existing Building Code

SECTION 110
CERTIFICATE OF OCCUPANCY

Revise as follows:

[A] 110.1 Change of occupancy. A structure shall not be used or occupied in whole or in part, and a *change of occupancy* of a structure or portion thereof shall not be made until the *code official* has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Certificates presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid.

~~Exception~~ Exceptions:

1. Certificates of occupancy are not required for work exempt from permits in accordance with Section 105.2.
2. Work for which a certificate of approval is issued in accordance with Section 110.5.

Add new text as follows:

[A] 110.5 Certificate of Approval.. The *building official* shall issue a certificate of approval indicating substantial compliance with the requirements of this code for all of the completed work that requires a *permit* but does not require a certificate of occupancy. Such work shall include, but not limited to: fences greater than 7 feet in height, retaining walls greater than 3 feet in height, roofing, siding, electrical, plumbing, and mechanical *repairs* and *alterations*.

ADM45-22 Part I

ADM45-22 Part II

IRC: SECTION R110, R110.1, R110.5

Proponents: Joseph Summers, representing ICC Region VI (summersj@cityofgroton-ct.gov)

2021 International Residential Code

SECTION R110
CERTIFICATE OF OCCUPANCY

Revise as follows:

R110.1 Use and change of occupancy. A building or structure shall not be used or occupied in whole or in part, and a *change of occupancy* of a building or structure or portion thereof shall not be made, until the *building official* has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the *jurisdiction*. Certificates presuming to give authority to violate or cancel the provisions of this code or other ordinances of the *jurisdiction* shall not be valid.

Exceptions:

1. Certificate of occupancy are not required for work exempt from *permits* under Section R105.2.
2. Accessory buildings or structures.
3. <u>Work for which a certificate of approval is issued in accordance with Section R110.6</u>

Add new text as follows:

<u>**R110.6 Certificate of Approval.** The *building official* shall issue a certificate of approval indicating substantial compliance with the requirements of this code for all of the completed work that requires a *permit* but does not require a certificate of occupancy. Such work shall include, but not limited to: fences greater than 7 feet in height, retaining walls greater than 3 feet in height, decks, garages, *swimming pools*, *basements* and *attics* converted to *habitable space*, roofing, siding, electrical, plumbing, and mechanical *repairs* and *alterations*.</u>

Reason Statement: Once a building has a valid certificate of occupancy, their is no reason to create a new certificate of occupancy when minor alterations and repairs are performed. This will expedite the closing of permits.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This will expedite the approval process. Currently the way the code reads you would need to issue a certificate of occupancy for permits such as window replacements, siding, roofing, service upgrade, boiler replacement, etc. The reasoning for expediting the approval process is the AHJ can then rely on the field inspection record to close out the permit or they could create their own certificate of approval form. Why do you need to specify the type of construction, design occupant load, if sprinklers are required for these types of permits. This requires research and considerable amount of time from the department staff to determine this.

CT adopted the language for certificate of approval and some jurisdictions have a check box on the inspection form stating the inspection is also the certificate of approval and many others have a separate form that has similar language as a C of O but only provides the permit number, address, description of work, code edition and an area for the BO to sign.

ADM45-22 Part II

ADM46-22

ISPSC: SECTION 112, [A] 112.1; IPSDC: SECTION 113, 113.1; IFGC: SECTION 114 (IFGC), 114.1; IPMC: SECTION 108, [A] 108.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Swimming Pool and Spa Code

Delete without substitution:

~~SECTION 112~~
~~BOARD OF APPEALS~~

~~**[A] 112.1 Membership of board.** The board of appeals shall consist of five members appointed by the chief appointing authority as follows: one for 5 years, one for 4 years, one for 3 years, one for 2 years and one for 1 year. Thereafter, each new member shall serve for 5 years or until a successor has been appointed.~~

2021 International Private Sewage Disposal Code

Delete without substitution:

~~SECTION 113~~
~~BOARD OF APPEALS~~

~~**113.1 Membership of board.** The board of appeals shall consist of five members appointed by the chief appointing authority as follows: one for 5 years, one for 4 years, one for 3 years, one for 2 years and one for 1 year. Thereafter, each new member shall serve for 5 years or until a successor has been appointed.~~

2021 International Fuel Gas Code

Delete without substitution:

~~SECTION 114 (IFGC)~~
~~BOARD OF APPEALS~~

~~**114.1 Membership of board.** The board of appeals shall consist of five members appointed by the chief appointing authority as follows: one for 5 years; one for 4 years; one for 3 years; one for 2 years and one for 1 year. Thereafter, each new member shall serve for 5 years or until a successor has been appointed.~~

2021 International Property Maintenance Code

Delete without substitution:

~~SECTION 108~~
~~BOARD OF APPEALS~~

~~**[A] 108.1 Membership of board.** The board of appeals shall consist of not less than three members who are qualified by experience and training to pass on matters pertaining to property maintenance and who are not employees of the jurisdiction. The *code official* shall be an ex-officio member but shall not vote on any matter before the board. The board shall be appointed by the chief appointing authority, and shall serve staggered and overlapping terms.~~

Reason Statement: ADM40-19 and ADM 43-19 were companion code changes. ADM 40-19 revised the sections for Means of Appeals. ADM 43-19 added an appendix for Board of Appeals that included the size and appointment of the Board of appeals to IBC, IEBC, IFC, IWUIC, IPC, IMC, IFGC, ISPSC, IPMC, IPSDC, IECC-C & R, IGCC and IRC. This text for the board size is only in these four codes. For consistency in the family of codes, and to not have a conflict with the appendix, this section should be deleted. Below is the relevant section from the appendix.
[A] 101.3 Membership of board. The board shall consist of five voting members appointed by the chief appointing authority of the jurisdiction. Each member shall serve for **[NUMBER OF YEARS]** years or until a successor has been appointed. The board member's terms shall be staggered at intervals, so as to provide continuity. The code official shall be an ex officio member of said board but shall not vote on any matter before the board.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC) in coordination with the ICC Building Code Action Committee (BCAC).

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is removing redundant text.

ADM46-22

ADM47-22

IFC: [A] 112.3.2, 112.3.2.1 (New), 112.3.2.2 (New)

Proponents: John Catlett, representing BOMA International (catlettcodeconsulting@gmail.com)

2021 International Fire Code

[A] 112.3.2 Compliance with orders and notices. A notice of violation issued or served as provided by this code shall be complied with by the *owner*, the *owner 's* authorized agent, operator, occupant or other person responsible for the condition or violation to which the notice of violation pertains.

Add new text as follows:

112.3.2.1 Compliance with the provisions of Chapter 11. With exception of buildings of use Groups I or H, a notice to comply with the provisions of Chapter 11 shall provide for thirty days from date of issuance for the building owner, owner's authorized agent, or the *fire code official to* request a meeting with the *fire code official* to discuss the compliance path and compliance date(s) for completion of work.

112.3.2.2 Applicability to the *International Existing Building Code*. In correlation with *International Existing Building Code* Section 101.2.1, the fire code official shall consider planned building alterations presented by the owner or owner's agent that will facilitate, minimize disruptions of occupants, and building operations when establishing the compliance path and compliance date(s) for completion of work.

Reason Statement: On behalf of building owners represented by BOMA International's 17,000 plus members, we propose the language above to fix short notices issued for Chapter 11 requirements that have occurred around the country. There are some jurisdictions that have previously adopted chapter 11, but never enforced the provisions. What typically happens is there is a new adoption or a change in code official due to fire department staff rotations that bring in new eyes that see that compliance has not been achieved. Many fire code officials have voiced that these buildings are unsafe and need to comply immediately.
BOMA contends that these buildings are not inherently unsafe with many complying with building codes when they were built. Chapter 11 is intended to make existing building safer, not to fix unsafe conditions. Several members of the Group A Fire Code Committee commented during the hearings on a change BOMA submitted to Chapter 11 that they are aware of the issues we raised during the group A hearings.

In a recent "casual" survey conducted by ICC Government Relations staff requested by the Industry Advisory Committee in preparation for the 2021 code cycle, it was found that the United States is almost completely split between jurisdictions that adopt or are allowed to adopt Chapter 11 and those who are not authorized or prohibited to enforce retrofitting provisions.

The survey can be viewed here:

https://www.cdpaccess.com/proposal/8779/25482/files/download/2983/

In fact, IFC Section 114 makes no mention of Chapter 11 nor does compliance fit any of the specific provisions of Section 114.1.1. Compliance with Chapter 11 is intended to bring existing buildings to a level of safety achieved by newer codes and technology. Section 114.1 clearly states that an unsafe condition is one that, "…in whole or in part, constitute a clear and inimical threat…". Failing to have a system that was not required a building was constructed in itself does not present an imminently hazardous condition. The two new sections above establish a slightly different path for compliance for chapter 11. The first utilizes similar language found in the IEBC for meeting requirements with the code official. The second provides a tie to IEBC Section 101.2.1 and recognition that compliance with many of the provisions chapter 11 can occur most proficiently and cost effectively when a building or portion thereof undergoes alterations. It should be a consideration for the fire code official when working with the building owner when establishing a path to compliance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code changes will not increase or decrease the cost of compliance. However. many provisions of chapter 11 contain high price tags and potential for disruption of existing building operations. Providing a minimum notice of 30 days and establishing a conversation between the fire code official and the building owner will allow the building owner to plan, secure designers and contractors, and possibly coordinate compliance with other building alterations the owner has planned.

ADM47-22

ADM48-22 Part I

IBC: SECTION 113, [A] 113.1, [A] 113.2, [A] 113.3, [A] 113.4; IEBC: SECTION 112, [A] 112.1, [A] 112.2, [A] 112.3, [A] 112.4; IFC: SECTION 111, [A] 111.1, [A] 111.2, [A] 111.3, [A] 111.4; IFGC: SECTION 113, 113.1, [A] 113.2, 113.3, 113.4; IMC: SECTION 114, [A] 114.1, [A] 114.2, [A] 114.3, [A] 114.4; IPC: SECTION 114, [A] 114.1, [A] 114.2, [A] 114.3, [A] 114.4; IPMC: SECTION 107, 107.1, [A] 107.2, 107.3, 107.4; IPSDC: SECTION 112, [A] 112.1, 112.2, [A] 112.3, [A] 112.4; ISPSC: SECTION 111, [A] 111.1, [A] 111.2, [A] 111.3, [A] 111.4; IWUIC: SECTION 113, [A] 113.1, [A] 113.2, [A] 113.3, [A] 113.4; IGCC: SECTION 111, 111.1, 111.2, 111.3, 111.4

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

SECTION 113
MEANS OF APPEALS

[A] 113.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the *building official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *building of ficial.*

Revise as follows:

[A] 113.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code~~ or interpret the administration of this code~~.

[A] 113.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training ~~to pass~~ on matters pertaining to~~ building construction~~ <u>provisions of this code</u> and are not employees of the jurisdiction.

[A] 113.4 Administration . The *building official* shall take ~~immediate~~ action in accordance with the decision of the board.

2021 International Existing Building Code

SECTION 112
MEANS OF APPEALS

[A] 112.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the *code official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *code official*.

Revise as follows:

[A] 112.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code~~ or interpret the administration of this code~~.

[A] 112.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training to pass on matters pertaining to~~ building construction~~ <u>the provisions of this code</u> and are not employees of the jurisdiction.

[A] 112.4 Administration. The *code official* shall take ~~immediate~~ action in accordance with the decision of the board.

2021 International Fire Code

SECTION 111
MEANS OF APPEALS

Revise as follows:

[A] 111.1 ~~Board of appeals established~~ <u>General</u>. In order to hear and decide appeals of orders, decisions or determinations made by the *fire code official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *fire code official*.

[A] 111.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code~~ or interpret the administration of this code~~.

[A] 111.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training ~~to pass~~ on matters pertaining to ~~hazards of fire, explosions, hazardous conditions or *fire protection systems*,~~ the provisions of this code and are not employees of the jurisdiction.

[A] 111.4 Administration. The *fire code official* shall take ~~immediate~~ action in accordance with the decision of the board.

2021 International Fuel Gas Code

Revise as follows:

SECTION 113
MEANS OF APPEALS

113.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the *code official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *code official*.

Revise as follows:

[A] 113.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code~~ or interpret the administration of this code~~.

113.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training on matters pertaining to the provisions of this code and are not employees of the jurisdiction.

113.4 Administration. The *code official* shall take ~~immediate~~ action in accordance with the decision of the board.

2021 International Mechanical Code

SECTION 114
MEANS OF APPEALS

[A] 114.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the code official relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the code official.

Revise as follows:

[A] 114.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have the authority to waive requirements of this code ~~or interpret the administration of this code~~.

[A] 114.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training on matters pertaining to the provisions of this code and are not employees of the jurisdiction.

[A] 114.4 Administration. The code official shall take ~~immediate~~ action in accordance with the decision of the board.

2021 International Plumbing Code

SECTION 114
MEANS OF APPEALS

[A] 114.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the code official relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the code official.

Revise as follows:

[A] 114.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply, or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code~~ or interpret the administration of this code~~.

[A] 114.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training on matters pertaining to the provisions of this code and are not employees of the jurisdiction.

[A] 114.4 Administration. The code official shall take ~~immediate~~ action in accordance with the decision of the board.

2021 International Property Maintenance Code

Revise as follows:

SECTION 107
MEANS OF APPEALS

107.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the *code official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *code official*.

Revise as follows:

[A] 107.2 Limitations of authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code~~ or interpret the administration of this code~~.

107.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training on matters pertaining to the provisions of this code and are not employees of the jurisdiction.

107.4 Administration. The *code official* shall take ~~immediate~~ action in accordance with the decision of the board.

2021 International Private Sewage Disposal Code

Revise as follows:

SECTION 112
MEANS OF APPEALS

[A] 112.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the *code official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *code official*.

Revise as follows:

112.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code~~ or interpret the administration of this code~~.

[A] 112.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training on matters pertaining to the provisions of this code and are not employees of the jurisdiction.

[A] 112.4 Administration. The *code official* shall take ~~immediate~~ action in accordance with the decision of the board.

2021 International Swimming Pool and Spa Code

Revise as follows:

SECTION 111
MEANS OF APPEALS

[A] 111.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the *code official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *code official*.

Revise as follows:

[A] 111.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply, or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code~~ or interpret the administration of this code~~.

[A] 111.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training <u>on matters pertaining to the provisions of this code </u>and are not employees of the jurisdiction.

[A] 111.4 Administration. The *code official* shall take ~~immediate ~~action in accordance with the decision of the board.

2021 International Wildland-Urban Interface Code

SECTION 113
MEANS OF APPEALS

[A] 113.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the code official relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant, with a duplicate copy to the code official.

Revise as follows:

[A] 113.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code~~ or interpret the administration of this code~~.

[A] 113.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training <u>on matters pertaining to the provisions of this code </u>and are not employees of the jurisdiction.

[A] 113.4 Administration. The *code official* shall take ~~immediate ~~action in accordance with the decision of the board.

2021 International Green Construction Code

SECTION 111
MEANS OF APPEALS

111.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the authority having jurisdiction relative to the application and interpretation of this code, there shall be, and is hereby created, a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the authority having jurisdiction.

Revise as follows:

111.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply, or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code~~ or interpret the administration of this code~~.

111.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training ~~to pass ~~on matters pertaining to <u>the provisions of this code</u> ~~building construction~~ and are not employees of the jurisdiction.

111.4 Administration. The authority having jurisdiction shall take ~~immediate ~~action in accordance with the decision of the board.

ADM48-22 Part I

ADM48-22 Part II

IRC: SECTION R112, R112.1, R112.2, R112.3, R112.4

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

SECTION R112
~~BOARD~~ MEANS OF APPEALS

R112.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the *building official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. ~~The *building official* shall be an ex officio member of said board but shall not have a vote on any matter before the board.~~ The board of appeals shall be appointed by the applicable governing ~~body~~ authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business, and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *building official*.

R112.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an ~~equally good~~ equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code.

R112.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training ~~to pass judgment~~ on matters pertaining to ~~building construction~~ the provisions of this code and are not employees of the *jurisdiction*.

R112.4 Administration. The *building official* shall take ~~immediate~~ action in accordance with the decision of the board.

Reason Statement: ADM40-19 was approved for IBC, IEBC, IFC, IWUIC, IPC, IMC, IFGC, ISPSC, IPMC, IPSDC, IECC-R and IGCC for revisions to the section on Means of Appeals. This item was disapproved for IECC Commercial and IRC. The result is an inconsistency with IECC Commercial and IRC.
The intent of this proposal is coordination for the means of appeals within the family of codes. Most of this was accomplished through ADM40-19 during the last cycle. Comments during the testimony, from the code development committees and subsequent discussions have suggested some improvements.

General: In the IRC and IECC Residential, the sentence about the code official not being a voting member of the board of appeals is proposed to be deleted. The fact about city employees not being a voting member of the board is already included in the section on qualifications. The code official is an important advisor for the Board of Appeals. The deletion of this sentence will not change that.

Limitation on authority. The deletion of ‘or interpret the administration of this code’ is proposed to be deleted so that the board could consider appeals on any part of the codes.

Qualifications: The phrase for experience and training is slightly different in each code. Adding this idea to all codes would provide consistency.

Administration: The IRC code change committee felt that ‘immediate’ was unreasonable. With the word removed, the board, or jurisdiction can set a reasonable timeframe.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (FCAC) and . ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These are administration requirements, so there will be no change in construction requirements.

ADM48-22 Part II

ADM49-22

IEBC: SECTION 117, [A] 117.1; IPMC: SECTION 113, 113.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Existing Building Code

SECTION 117
DEMOLITION

Revise as follows:

[A] 117.1 General. ~~The *code official* shall order the owner or owner's authorized agent of any premises on which is located any structure that in the *code official's* judgment is so old or dilapidated, or has become so out of *repair* as to be *dangerous*, *unsafe*, insanitary or otherwise unfit for human habitation of occupancy, and such that it is unreasonable to *repair* the structure, to demolish and remove such structure; or if such structure is capable of being made safe by *repairs*, to *repair* and make safe and sanitary or to demolish and remove to the owner's or the owner's authorized agent's option; or where there has been a cessation of normal construction of any structure for a period of more than two years, to demolish and remove such structure.~~
When the code official determines any structure is so old, dilapidated or has become so out of repair and is dangerous, unsafe, insanitary and otherwise unfit for human habitation or occupancy the code official can order either of the following:

1. The code official is permitted to authorize the owner or owner's authorized agent to make the structure safe by repairs in order to make the structure safe and sanitary. Where there has been a cessation of construction repairs of any structure for a period of more than two years the structure will be ordered demolished and removed.
2. The code official is permitted to order the owner or owner's authorized agent to demolish and remove any such structure.

2021 International Property Maintenance Code

SECTION 113
DEMOLITION

Revise as follows:

113.1 General. ~~The *code official* shall order the *owner* or *owner*'s authorized agent of any *premises* upon which is located any *structure*, which in the *code official's* or *owner*'s authorized agent judgment after review is so deteriorated or dilapidated or has become so out of repair as to be dangerous, unsafe, insanitary or otherwise unfit for human habitation or *occupancy*, and such that it is unreasonable to repair the *structure*, to demolish and remove such *structure*; or if such *structure* is capable of being made safe by repairs, to repair and make safe and sanitary, or to board up and hold for future repair or to demolish and remove at the *owner's* option; or where there has been a cessation of normal construction of any *structure* for a period of more than two years, the *code official* shall order the *owner* or owner's authorized agent to demolish and remove such *structure*, or board up until future repair. Boarding the building up for future repair shall not extend beyond one year, unless *approved* by the building official.~~
When the code official determines any structure is so old, dilapidated or has become so out of repair and is dangerous, unsafe, insanitary and otherwise unfit for human habitation or occupancy the code official can order either of the following:

1. The code official is permitted to authorize the owner or owner's authorized agent to make the structure safe by repairs in order to make the structure safe and sanitary. Where there has been a cessation of construction repairs of any structure for a period of more than two years the structure will be ordered demolished and removed.
2. The code official is permitted to order the owner or owner's authorized agent to demolish and remove any such structure.

Reason Statement: This is a run on sentence. The intent is only to clarify.

This proposal was submitted by the Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial.

ADM49-22

ADM50-22

ICCPC: [A] C101.2, [A] 102.3.4.2.1, [A] 102.3.4.2.2

Proponents: David Collins, representing Self; Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org)

2021 International Code Council Performance Code

Revise as follows:

[A] C101.2 Criteria. Individually substantiated design methods shall comply with one or more of the following:

1. A process to evaluate design options against the performance objectives and functional statements shall be provided.
2. A comparison, signed and sealed by the *registered design professional in responsible charge*, between the prescriptive requirements and this design method shall be provided.
3. Peer review shall be provided.
4. ~~Reports prepared by the evaluation services shall be documented.~~

~~5.~~ 4. This method shall not negatively impact the remainder of the building that complies with the prescriptive codes.

~~6. The data substantiating the building performance as a whole shall accompany the design solution.~~

~~7.~~ 5. This method shall address the actual use of the building, including but not limited to the number of people, fuel load, awareness and mobility of the people.

~~8.~~ 6. The methodology for validation of this method for the project shall be acceptable to the *registered design professional in responsible charge* and the code official.

~~9.~~ This method shall be substantiated by a system-based approach using not less than two acceptable scenarios to demonstrate compliance with design objectives and code provisions.

Where applicable to the proposed design, individually substantiated design methods shall comply with the following:

1. Reports prepared by the evaluation services shall be documented.
2. The data substantiating the building performance as a whole shall accompany the design solution.
3. Where multiple scenarios are applicable, the method shall be substantiated by an approach using not less than two scenarios acceptable to the code official to demonstrate compliance with the design objectives and code provisions.

[A] 102.3.4.2.1 Concept report. The concept report shall document the preliminary details of the project, identify the parties involved in the project, and define the goals and objectives to be utilized in the performance-based design analysis. The concept report shall be submitted to the code official as a means of communicating the programming and early schematic phase of a proposed project and to obtain concurrence between the code official and the project design team on the goals and objectives to be utilized in the analysis. The concept report shall address but not be limited to the following:

1. General project information, including schematic layout and site plan.
2. Definition of project scope.
3. Description of building and occupant characteristics.
4. Project goals and objectives.
5. Selected event scenarios.
6. Methods of evaluation.
7. Qualification statements for the *registered design professional in responsible charge*, *registered design professionals, peer reviewers* and special experts.
8. Proposed performance and prescriptive code usage.
9. Conceptual site and building plan.

[A] 102.3.4.2.2 Design report. The design report shall document the steps taken in the design analysis, clearly identifying the criteria, parameters, inputs, assumptions, sensitivities and limitations involved in the analysis. The design report shall clearly identify bounding conditions, assumptions and sensitivities that clarify the expected uses and limitations of the performance analysis. This report shall verify that the design approach is in compliance with the applicable codes and *acceptable methods* and shall be submitted for concurrence by the code official prior to the *construction documents* being completed. The report shall document the design features to be incorporated based on the analysis. The design report shall address but not be limited to the following:

1. Project scope.
2. Goals and objectives.
3. Performance criteria.
4. Hazard scenarios.
5. Design fire loads and hazards.
6. Final design.
7. Evaluation and peer review.
8. Bounding conditions and critical design assumptions.
9. Critical design features.
10. System design and operational requirements.
11. Operational and maintenance requirements.
12. Commissioning testing requirements and acceptance criteria.
13. Frequency of certificate renewal.
14. Supporting documents and references.
15. Preliminary site and floor plans.

Reason Statement: Before providing a reason for the proposed changes, it is necessary to explain the use of Appendices in the ICCPC. Unlike other ICC codes which require individual adoption of each appendix to make them enforceable by the code officials, appendices to the ICCPC are additional requirements that are specifically referenced within various sections of the ICCPC. ICCPC appendices are not intended to be adopted individually, but are a part of the code like any other chapter or section.
The current language in the appendix is vague and suggests that some of the listed items may not be required, but does not provide a method to determine if any one line item is required for a given method. Given that the method is being substantiated by the person requesting approval, it seems appropriate to require most line items.

The change of language from the deleted Item 9 to the new Item 3 of the new second paragraph is due to the vague language. The original Item 9 implies that everything has multiple possible applicable "scenarios." Additionally, "system-based" is undefined and unclear. Finally, Item 9 did not identify the entity to whom the scenarios must be acceptable.

Peer reviews are retained as a required substantiation method. Requiring the use of peer reviews provides an additional level of risk mitigation that would make the approval of performance-based design solutions more acceptable to code officials. According to preliminary results from a 10/16/2021 survey conducted by Brian Meacham for ICC's project "Reimagining the ICCPC", 71% of respondents either agreed or strongly agreed with the concept of performance-based codes. However, 55% of the respondents either disagreed or strongly disagreed that performance-based codes *currently* available could be used with a high degree of confidence. When asked if they could be comfortable with performance-based codes, 79% agreed or strongly agreed. The survey also indicated that “[t]he importance of peer/independent review is higher” was overwhelmingly (approximately 75%) attributed to performance-based codes. Similarly, over 80% considered the qualifications of those reviewing and approving performance-based design is “very important.” One of the key summary points stated was “increasing confidence in verification,” and that peer review is “essential.” Select items in Sections 102.3.4.2.1 and 102.3.4.2.2 are revised to include the required peer review qualification statements and evaluations in the respective reports.

Cost Impact: The code change proposal will increase the cost of construction
This proposal would increase the design costs associated with the construction due to the need to hire a third-party consultant to perform the peer reviews. It is possible, however, that these increased design costs could be offset for larger projects (those more likely to elect performance-based design) due to the savings generated from not having to comply with the prescriptive requirements of the other I-Codes.

ADM50-22

ADM51-22

IGCC: INFORMATIVE APPENDIX M, SECTION M101, M101.1, M101.1.1, M101.1.2, M101.1.3, M101.1.4, M101.1.5, M101.1.6 (New), M101.1.7 (New), SECTION M201 (New), SECTION 202 (New)

Proponents: Vladimir Kochkin, representing NAHB (vkochkin@nahb.org)

2021 International Green Construction Code

INFORMATIVE APPENDIX M
OPTION FOR RESIDENTIAL COMPLIANCE USING THE NATIONAL GREEN BUILDING STANDARD

SECTION M101
GENERAL

M101.1 Residential requirements determined by the authority having jurisdiction. The authority having jurisdiction shall determine if one or more of the following sections apply.

Revise as follows:

M101.1.1 . Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories in height above grade plane with a separate means of egress, their accessory structures, and the site or lot upon which these buildings are located shall comply with ICC~~/ASHRAE~~ 700~~–2015~~ 2020 *National Green Building Standard*.

M101.1.2 . Group R-3 residential buildings, their accessory structures, and the site or lot upon which these buildings are located shall comply with ICC~~/ASHRAE~~ 700~~–2015~~ 2020 *National Green Building Standard*.

M101.1.3 . Group R-2 and R-4 residential buildings three stories or less in height above grade plane, their accessory structures, and the site or lot upon which these buildings are located shall comply with ICC~~/ASHRAE~~ 700~~–2015~~ 2020 *National Green Building Standard*.

M101.1.4 . Group R-2 and R-4 residential buildings four stories or more in height above grade plane, their accessory structures, and the site or lot upon which these buildings are located shall comply with the provisions of this code or ICC~~/ASHRAE~~ 700~~–2015~~ 2020 *National Green Building Standard*.

M101.1.5 . Where the non-residential portions of a mixed use building are 50 percent or more of the *gross floor area*, Group R-2 and R-4 portions ~~of mixed use buildings~~ shall comply with the provisions of this code or ICC~~/ASHRAE~~ 700~~–2015~~ 2020 *National Green Building Standard*. The remainder of the building and the site upon which the building is located shall comply with the provisions of this code.

Add new text as follows:

M101.1.6 . Where the residential portions of a mixed use building are greater than 50 percent of the gross floor area, the building and the site or lot upon which the building is located shall comply with the provisions of this code or ICC 700–2020 *National Green Building Standard.*

M101.1.7 . Assisted living facilities, residential board and care facilities, and group homes classified as I-1 occupancy by the International Building Code shall comply with the provisions of this code or ICC 700–2020 *National Green Building Standard.*

SECTION M201
DEFINITIONS

Add new definition as follows:

FLOOR AREA, GROSS. The floor area within the inside perimeter of the exterior walls of the building under consideration, exclusive of vent shafts and courts, without deduction for corridors, stairways, ramps, closets, the thickness of interior walls, columns or other features. The floor area of a building, or portion thereof, not provided with surrounding exterior walls shall be the usable area under the horizontal projection of the roof or floor above. The gross floor area shall not include shafts with no openings or interior courts.

Reason Statement: This change updates the reference to the latest edition of ICC-700 and provides complete alignment with the scope of ICC-700. The 2020 ICC-700 is an ANSI approved standard developed with a broad stakeholder involvement and input. The definition of *gross floor area* is added because it is not a defined term in IgCC. The definition is consistent with the IBC.

Cost Impact: The code change proposal will increase the cost of construction
The 2020 ICC-700 is a more stringent standard than its predecessor. Therefore, there will be an increase in the cost of design and construction to achieve compliance with the 2020 edition of ICC-700.

ADM51-22

ADM52-22

ACCA	Air Conditioning Contractors of America		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/ACCA 1 Manual D~~—2016~~ 2023	Residential Duct Systems	IMC	IRC
ANSI/ACCA 10 Manual SPS ~~—2010 RA~~ 2017	~~HVAC~~ Design for Swimming Pools and Spas	IMC	
ANSI/ACCA 3 Manual S~~—14~~ 2023	Residential Equipment Selection	IECC®	
ANSI/ACCA 3 Manual S~~—2014~~ 2023	Residential Equipment Selection	IRC	
ANSI/ASHRAE/ACCA 183—2007 (reaffirmed 2014)	Peak Cooling and Heating Load Calculations in Buildings Except Low-rise Residential Buildings	IMC	

AFSI	Architectural Fabric Structures Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~FSAAS—16~~ AFSI-77	~~Fabric Structures Associated Air Structures 2016~~ Air Structures Design and Standards Manual	IFC

AHAM	Association of Home Appliance Manufacturers	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/AHAM RAC-1~~—2015~~ 2020	Room Air Conditioners	IECC®

AHRI	Air-Conditioning, Heating, & Refrigeration Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
1160 (I-P) ~~—2014~~ 2022	Performance Rating of Heat Pump Pool Heaters ~~(with Addendum 1)~~	IECC®
1160 (I-P)~~—2014~~ 2022	Performance Rating of Heat Pump Pool Heaters ~~(with Addendum 1)~~	ISPSC

1200 (I-P)~~—2013~~ 2022	Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets	IECC®
1230 (I-P)~~—2014~~ 2021	Performance Rating of Variable Refrigerant Flow (VRF) Multi-split Air-Conditioning and Heat Pump Equipment~~(with Addendum 1)~~	IECC®
1250 (I-P)~~—2014~~ (2020)	Standard for Performance Rating in Walk-in Coolers and Freezers	IECC®
1360 (I-P)—2017	Performance Rating of Computer and Data Processing Room Air Conditioners	IECC®
210/240~~—2017 and~~ 2023 (2020)	Performance Rating of Unitary Air-conditioning and Air-source Heat Pump Equipment	IECC®
340/360~~—2019~~ 2022	Performance Rating of Commercial and Industrial Unitary Air-conditioning and Heat Pump Equipment	IECC®
390 (I-P)~~—2003~~ 2021	Performance Rating of Single Package Vertical Air-conditioners and Heat Pumps	IECC®
440 (I-P)~~—2008~~ 2019	Performance Rating of Room Fan Coils~~—with Addendum 1~~	IECC®
550/590 (I-P)~~—2018~~ 2022	Performance Rating of Water-chilling and Heat Pump Water-heating Packages Using the Vapor Compression Cycle	IECC®
560~~—2018~~ 2000	Absorption Water Chilling and Water Heating Packages	IECC®
700~~—2017~~ 2019	~~with Addendum 1:~~ Specifications for Refrigerants	IMC
910 (I-P)—2014	Performance Rating of Indoor Pool Dehumidifiers	IECC®
920 (I-P)~~—2015~~ 2020	Performance Rating of DX-Dedicated Outdoor Air System Units	IECC®

AISC	American Institute of Steel	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/AISC 341—~~16~~ 22	Seismic Provisions for Structural Steel Buildings	IBC
ANSI/AISC 360—~~16~~ 22	Specification for Structural Steel Buildings	IBC
ANSI/AISC 358~~—16/s1—18~~ 22	Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications, ~~IncludingSupplement No. 1~~	IBC

AISI	American Iron and Steel Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
AISI S100—16 (2020) w/S2—20:	~~North American~~ Specification for the Design of Cold-Formed Steel Structural Members, 2016 Edition (Reaffirmed 2020), with Supplement 2, 2020 Edition	IBC
AISI S100—16 (2020) w/S2—20	~~North American~~ Specification for the Design of Cold-Formed Steel Structural Members, 2016 Edition (Reaffirmed 2020), with Supplement 2, 2020 Edition	IRC®

ALI	Automotive Lift Institute, Inc.	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ALI ALCTV—~~2016~~ 2022	Standard for Automotive Lifts—Safety Requirements for Construction, Testing and Validation (ANSI)	IBC

AMCA	Air Movement and Control Association International	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~ANSI/~~AMCA 550~~—09 (Rev. 09/18)~~ 22	Test Method for High Velocity Wind Driven Rain Resistant Louvers	IMC

ANSI/AMCA 220~~—19~~ 21	Laboratory Methods of Testing Air Curtain Units for Aerodynamic Performance Rating	IECC®		
ANSI/AMCA 230~~—15~~ 23	Laboratory Methods of Testing Air Circulating Fans for Rating and Certification	IMC	IECC®	
ANSI/AMCA 540~~—13~~ 23	Test Method for Louvers Impacted by Wind Borne Debris	IBC		
ANSI/AMCA 210-ANSI/ASHRAE 51~~—16~~ 23	Laboratory Methods of Testing Fans for Aerodynamic Performance Rating	IRC®		
ANSI/AMCA 210—16/ANSI/ASHRAE 51—16	Laboratory Methods of Testing Fans for Aerodynamic Performance Rating	IMC		

ANSI	American National Standards Institute			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
~~ANSI LC 4/CSA 6.32—2012~~ CSA/ANSI LC 4:23/CSA 6.32:23	Press-connect Metallic Fittings and valves for Use in Fuel Gas Distribution Systems	IFGC	IRC	
~~ANSI/CSA FC 1—2014~~ CSA/ANSI FC 1:21/CSA C22.2 NO. 62282-3-100:21	Fuel Cell Technologies—Part 3-100: Stationary Fuel Cell Power Systems—Safety	IFGC	IMC	IRC®
~~LC1/CSA 6.26—2016~~ CSA/ANSI LC 1:19/CSA 6.26:19	Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST)	IFGC	IRC®	
ANSI Z21.41 (R2019)/CSA 6.9-~~2014~~ (R2019)	Quick Disconnect Devices for Use with Gas Fuel Appliances	IFGC	IRC®	
ANSI Z21.22~~—99 (R2003)~~ 2015 (R2020)/CSA 4.4-2015(R2020)	Relief Valves for Hot Water Supply Systems~~ with Addenda Z21.22a—2000 (R2003) and Z21.22b—2001 (R2003)~~	IPC	IRC®	
ANSI Z21.24 -2015(R2020)/CSA 6.10— 2015(R2020)	Connectors for Gas Appliances	IFGC	IRC®	
ANSI Z21.40.1-1996 (R2017)/CGA 2.91~~—1996~~ M96(R2017)	Gas-fired Heat Activated Air Conditioning and Heat Pump ~~Appliances~~	IFGC	IRC	

ANSI Z21.50 :19/CSA 2.22~~—2016~~ :19	Vented Decorative Gas Fireplaces	IFGC		IRC®
ANSI Z21.69 -2015 (R2020)/CSA 6.16—2015 (R2020)	Connectors for Movable Gas Appliances	IFGC		IRC®
ANSI Z21.75 -2016/CSA 6.27—2016 (R2020)	Connectors for Outdoor Gas Appliances and Manufactured Homes	IFGC		IRC®
ANSI Z83.11 -2016 (R2021)/CSA 1.8—2016 (R2021)	Gas Food Service Equipment	IFGC		
ANSI Z83.18—2017 (R2021)	Recirculating Direct Gas-fired Heating and Forced Ventilation Appliances for Commercial and Industrial Applications	IFGC		
CSA/ANSI Z21.11.2~~—2016~~ :19	Gas-fired Room Heaters—Volume II—Unvented Room Heaters	IFGC		IRC®
CSA/ANSI Z21.56 :19/CSA 4.7~~—17~~ :19	Gas-fired Pool Heaters	IFGC	ISPSC	IRC®
CSA/ANSI Z21.10.3 :19/CSA 4.3~~—2017~~ :19	Gas Water Heaters—Volume III—Storage, Water Heaters with Input Ratings above 75,000 Btu per Hour, Circulating and Instantaneous	IFGC	IECC®	IRC®
CSA/ANSI Z21.15 :22/CSA 9.1~~—09(R2014)~~ :22	Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves	IFGC		IRC®
CSA/ANSI Z21.19 :19/CSA 1.4~~—2014~~ :19	Refrigerators Using Gas Fuel	IFGC		
CSA/ANSI Z21.42~~—20~~13 (R2018)	Gas-fired Illuminating Appliances	IFGC		IRC®
CSA/ANSI Z21.47 :21/CSA 2.3~~—16~~ :21	Gas-fired Central Furnaces	IECC®		
CSA/ANSI Z21.58 :22/CSA 1.6~~—2015~~ :22	Outdoor Cooking Gas Appliances	IFGC		IRC®
CSA/ANSI Z21.80 :19CSA 6.22~~—11(R2016)~~ :19	Line Pressure Regulators	IFGC		IRC®

CSA/ANSI Z21.90 :19/CSA 6.24~~–2015~~ :19	Gas Convenience Outlets and Optional Enclosures	IRC®	
CSA/ANSI Z21.91~~—2017~~ :20	Ventless Firebox Enclosures for Gas-fired Unvented Decorative Room Heaters	IFGC	IRC®
CSA/ANSI Z21.10.1 :19/CSA 4.1 ~~—2017~~ :19	Gas Water Heaters—Volume I—Storage, Water Heaters with Input Ratings of 75,000 Btu per Hour or Less	IFGC	IRC®
CSA/ANSI Z21.54 :19~~—2014~~ /CSA 8.4:19	Gas Hose Connectors for Portable Outdoor Gas-fired Appliances	IFGC	IRC®
A108.11~~—10~~ 18	Interior Installation of Cementitious Backer Units	IRC®	
A108.4~~—09~~ 19	Installation of Ceramic Tile with Organic Adhesives or Water-cleanable Tile-setting Epoxy Adhesive	IBC	IRC®
A108.5~~—19~~ 21	~~Installation of Ceramic Tile with Dry-set Portland Cement Mortar or Latex-Portland Cement Mortar~~ Setting of Ceramic Tile with Dry-Set Cement Mortar, Modified Dry Set Cement Mortar, EGP (Exterior Glue Plywood) Modified Dry-Set Cement Mortar, or Improved Modified Dry-Set Cement Mortar	IBC	IRC®
A108.6~~—19~~ 99(R2019)	Installation of Ceramic Tile with Chemical-resistant, Water Cleanable Tile-setting and -grouting Epoxy	IBC	IRC®
A108.8~~—19~~ 99(R2019)	Installation of Ceramic Tile with Chemical-resistant Furan Resin Mortar and Grout	IBC	
A108.9~~—19~~ 99(2019)	Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout	IBC	
A118.10— 14(R2019)	Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin - Set Ceramic Tile and Dimension Stone Installation	IPC	IRC®

A118.1—~~18~~ 19	American National Standard Specifications for Dry-set ~~Portland~~ Cement Mortar	IBC	IRC®
A118.3—~~20~~ 21	American National Standard Specifications for Chemical~~-~~resistant, Water-cleanable Tile-setting and -grouting Epoxy and Water Cleanable Tile-setting Epoxy Adhesive	IBC	IRC®
A118.4—~~18~~ 19	American National Standard Specifications for Modified Dry-set Cement Mortar	IBC	IRC®
A118.5—99(R2021)	American National Standard Specifications for Chemical Resistant Furan Mortar and Grouts for Tile Installation	IBC	
A118.6—19	American National Standard Specifications for Standard Cement Grouts for Tile Installation	IBC	
A136.1—~~19~~ 20	American National Standard Specifications for Organic Adhesives for ~~the~~ Installation of Ceramic Tile	IBC	IRC®
A137.1—~~19~~ 22	American National Standard Specifications for Ceramic Tile	IBC	IRC®
A137.3—~~17~~ 22	American National Standard Specifications for Gauged Porcelain Tiles and Gauged Porcelain Tile Panel/Slabs	IBC	
ANSI E1.21—~~2013~~ 2020	Entertainment Technology: Temporary Structures Used for Technical Production of Outdoor Entertainment Events	IFC	
CSA/ANSI NGV 5.1~~—2016~~ :22	Residential Fueling Appliances	IFGC	
CSA/ANSI NGV 5.2~~—2017~~ :22	Vehicle Fueling Appliances (VFA)	IFGC	
CSA/ANSI Z21.88:19/CSA 2.33~~—16~~ : 19	Vented Gas Fireplace Heaters	IFGC	IRC®

LC 1/CSA 6.26~~—2016~~ :19	Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing ~~(CSST)~~	IFGC		
LC4/CSA 6.32—12	Press-connect Metallic Fittings for Use in Fuel Gas Distribution Systems	IRC®		
Z21.1/CSA 1.1—~~2016~~ 2018	Household Cooking Gas Appliances	IFGC	IMC	IRC
Z21.40.2/CGA 2.92—1996 (R2017)	Gas-fired Work Activated Air Conditioning and Heat Pump Appliances (Internal Combustion)	IFGC		
Z21.40.2/CSA 2.92—96 (R2017)	Gas-fired Work Activated Air-conditioning and Heat Pump Appliances (Internal Combustion)	IRC®		
Z21.41(R2019)/CSA 6.9—2014 (R2019)	Quick Disconnect Devices for use with Gas Fuel Appliances	IFGC		
Z21.47/CSA 2.3—2016	Gas-fired Central Furnaces	IFGC	IRC®	
Z21.56/CSA 4.7—2017	Gas-fired Pool Heaters	IFGC		
Z21.56a:19/CSA 4.7~~—2017~~ :19	Gas Fired Pool Heaters	ISPSC		
Z21.88/CSA 2.33~~—2016~~ :19	Vented Gas Fireplace Heaters	IFGC		
Z21.8~~—1994 (R2012)~~ 94(R2017)	Installation of Domestic Gas Conversion Burners	IFGC	IMC	IRC
Z83.20~~—08~~ 2016	Gas-fired Tubular Low-intensity Infrared Heaters Outdoor Decorative Appliances	IFGC	IRC®	
Z97.1~~—2014~~ 2015(R2020)	Safety Glazing Materials Used in Buildings—Safety Performance Specifications and Methods of Test	IBC	IRC®	
APA	**APA - Engineered Wood Association**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
ANSI/A190.1~~—2017~~ 2022	Product Standard for Structural Glued-laminated Timber	IRC®		

ANSI/APA A190.1—~~2017~~ 2022	Product Standard for Structural Glued Laminated Timber	IBC
ANSI/APA PRR 410—~~16~~ 2021	Standard for Performance-Rated Engineered Wood Rim Boards	IBC
ANSI/APA PRR 410—~~2016~~ 2021	Standard for Performance-rated Engineered Wood Rim Boards	IRC®
ANSI/APA PRS 610.1—~~2018~~ 2023	Standard for Performance-Rated Structural Insulated Panels in Wall Applications	IRC®
APA PDS Supplement 1—~~12~~ 23	Design and Fabrication of Plywood Curved Panels ~~(revised 2013)~~	IBC
APA PDS Supplement 2—~~12~~ 23	Design and Fabrication of Plywood-lumber Beams ~~(revised 2013)~~	IBC
APA PDS Supplement 3—~~12~~ 23	Design and Fabrication of Plywood Stressed-skin Panels ~~(revised 2013)~~	IBC
APA PDS Supplement 4—~~12~~ 23	Design and Fabrication of Plywood Sandwich Panels ~~(revised 2013)~~	IBC
APA PDS Supplement 5—~~16~~ 23	Design and Fabrication of All-plywood Beams ~~(revised 2013)~~	IBC
APA T300—~~16~~ 23	Glulam Connection Details	IBC
APA X440—~~17~~ 23	Product Guide: Glulam	IBC
APA X450—~~18~~ 23	Glulam in Residential Construction—Building—Construction Guide	IBC

API	**American Petroleum Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~Publ~~ RP 2028 ~~3rd~~ 4th Edition~~—(2002, R2010)~~ (2024)	Flame Arrestors in Piping Systems	IFC
~~Publ~~ RP 2009~~—7th~~ 8th Edition ~~(2002, R2012)~~ (2022)	Safe Welding and Cutting Practices in Refineries, Gas Plants and Petrochemical Plants	IFC

Publ 2201 ~~5th~~ 6th Edition~~—(2003, R2010)~~ (2023)	Procedures for Welding or Hot Tapping on Equipment in Service	IFC
RP 1604—3rd Edition ~~(1996 R2010)~~ (1996) (4th edition 2021)	Closure of Underground Petroleum Storage Tanks	IFC
RP 1615—(1996) (6th Edition R2020) ~~(2011)~~	Installation of Underground-petroleum Storage Systems	IFC
RP 2001~~—9th~~ 10th Edition ~~(2012)~~ (2022)	Fire Protection in Refineries~~, 8th Edition~~	IFC
RP 2003~~—8th~~ 9th Edition ~~(2015)~~ (2023)	Protection Against Ignitions Arising out of Static, Lightning and Stray Currents	IFC
RP 2023~~—3rd~~ 4th Edition ~~(2001, R2006)~~ (2023)	Guide for Safe Storage and Handling of Heated Petroleum-derived Asphalt Products and Crude-oil Residue	IFC
RP 651~~—4th~~ 5th Edition ~~(2014)~~ (2022)	Cathodic Protection of Aboveground Petroleum Storage Tanks	IFC
RP 752— ~~3rd~~ 4th Edition ~~(2009)~~ (2022)	Management of Hazards Associated with Location of Process Plant Buildings, CMA Managers Guide	IFC
Std 2000~~—7th Edition (2014)~~ (7th edition R2020) 8th edition (2023)	Venting Atmosphere and Low-pressure Storage Tanks: Nonrefrigerated and Refrigerated	IFC
Std 2015~~—8th Edition 2001 (2018)~~ (2023)	Requirements for Safe Entry and Clearing of Petroleum Storage Tanks	IFC
Std 2350— ~~4th~~ 5th Edition ~~(2012)~~ (2021)	Overfill Protection for Storage Tanks in Petroleum Facilities	IFC
Std 653 Addendum 3,~~—~~5th Edition ~~(2018)~~ (2022)	Tank Inspection, Repair, Alteration and Reconstruction	IFC

ASABE	**American Society of Agricultural and Biological Engineers**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
EP 484.3 DEC2017 (R2022)	Diaphragm Design of Metal-clad, Wood-frame Rectangular Buildings	IBC

EP 486.3 SEP2017 (R2021)	Shallow-post and Pier Foundation Design	IBC			
EP 559.1 ~~W/Corr.~~ AUG2010~~(R2014)~~ (R2019)	Design Requirements and Bending Properties for Mechanically Laminated Wood Assemblies	IBC			
S640—JUL2017 (R2022)	Quantities and Units of Electromagnetic Radiation for Plants (Photosynthetic Organisms)	IECC®			

ASCE/SEI	**American Society of Civil Engineers Structural Engineering Institute**				
Standard Reference Number	**Title**	**Referenced in Code(s):**			
19 ~~16~~ 22	Structural Applications of Steel Cables for Buildings	IBC			
29 ~~19~~ 05	Standard Calculation Methods for Structural Fire Protection	IBC			
49 ~~12~~ 21	Wind Tunnel Testing for Buildings and Other Structures	IBC			
55 ~~16~~ 22	Tensile Membrane Structures	IBC			
7 ~~16~~ 22	Minimum Design Loads and Associated Criteria for Buildings and Other Structures	IBC	IRC®		
8 ~~20~~ 21	Standard Specification for the Design of Cold-formed Stainless Steel Structural Members	IBC			
ASCE/SEI 24 ~~20~~ 14	Flood Resistant Design and Construction	IFC	IRC	ISPSC	IBC

ASHRAE	**ASHRAE**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
140 ~~2014~~ 2020	~~Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs~~ Method of Test for Evaluating Building Performance Simulation Software	IECC®

146 ~~—2011~~ 2020	~~Testing~~ Method of Test for Rating Pool Heaters	IECC®		
15 ~~—2019~~ 2022	Safety Standard for Refrigeration Systems	IMC	IFC	
170 ~~—2017~~ 2021	Ventilation of Health Care Facilities	IMC	IBC	IFC
34 ~~—2019~~ 2022	Designation ~~and Safety~~ Classification of Refrigerants	IMC	IRC®	
55 ~~—2017~~ 2020	Thermal Environmental Conditions for Human Occupancy	IECC®		
62.1 ~~-2019~~ 2022	Ventilation for Acceptable Air Quality	ISPSC		
62.1 ~~—2019~~ 2022	Ventilation for Acceptable Indoor Air Quality	IMC	IEBC	IECC®
90.1 ~~—2016~~ 2022	Energy Standard for Buildings Except Low-rise Residential Buildings	IMC	IECC®	
90.1 ~~—2019~~ 2022	Energy Standard for Buildings Except Low-rise Residential Buildings	IECC®		
90.4 ~~—2016~~ 2022	Energy Standard for Data Centers	IECC®		
ANSI/ASHRAE/ACCA Standard 183 ~~—(RA2017)~~ 2007 (RA 2020)	Peak Cooling and Heating Load Calculations in Buildings~~,~~ Except Low-rise Residential Buildings	IECC®		

ASME	**American Society of Mechanical Engineers**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
A112.1.3—2000 (R~~eaffirmed 2020~~ 2024)	Air Gap Fittings for Use with Plumbing Fixtures, Appliances and Appurtenances	IRC®
A112.1.3 ~~—2000 (R2020)~~ 2024	Air Gap Fittings for Use with Plumbing Fixtures, Appliances and Appurtenances	IPC

A112.14.1—2003 (R2022)	Backwater Valves	IPC	
A112.14.1—2003 ~~(R2017)~~ (2022)	Backwater Valves	IRC®	
A112.14.3~~—2021~~ 2023	Grease Interceptors	IPC	
A112.14.4—2001 ~~(R2017)~~ (R2022)	Grease Removal Devices	IPC	
A112.14.6—2010 ~~(R2020)~~ (R2024)	FOG (Fats, Oils and Greases) Disposal Systems	IPC	
A112.18.1~~—2020~~ /CSA B125.1 ~~—2020~~ 2023	Plumbing Supply Fittings	IPC	IRC®
A112.18.2~~—2019~~ 2023/CSA B125.2~~—19~~ 2023	Plumbing Waste Fittings	IPC	
A112.18.2~~—2019~~ 2023 /CSA B125.2~~—2019~~ 2023	Plumbing Waste Fittings	IRC®	
A112.18.3~~M~~—2002~~(R2020)~~ (R2022)	Performance Requirements for Backflow Protection Devices and Systems in Plumbing Fixture Fittings	IRC®	
A112.18.6—2021/CSA B125.6—21	Flexible Water Connectors	IPC	IRC®
A112.19.12~~—2019~~ 2024	Wall Mounted and Pedestal Mounted, Adjustable, Elevating, Tilting and Pivoting Lavatory, Sink, and Shampoo Bowl Carrier Systems and Drain Waste Systems	IPC	IRC®
A112.19.14—2013 (R~~2018~~ 2023)	Six-Liter Water Closets Equipped with Dual Flushing Device	IRC®	
A112.19.14—2013 ~~(R2018)~~ (R2023)	Six-liter Water Closets Equipped with a Dual Flushing Device	IPC	
A112.19.15~~—2012 () R201~~ 2012 (R2022)	Bathtub/Whirlpool Bathtubs with Pressure Sealed Doors	IPC	IRC
A112.19.19 ~~2016 (R2021) —~~ 2021	Vitreous China Nonwater Urinals	IPC	
A112.19.1~~—2020~~ 2022/CSA B45.2~~—20~~ 2022	Enameled Cast Iron and Enameled Steel Plumbing Fixtures	IPC	

A112.19.1~~—2020~~ 2022/CSA B45.2~~—2020~~ 2022	Enameled Cast-iron and Enameled Steel Plumbing Fixtures	IRC®	
A112.19.2—/CSA B45.1~~—20 2020 20~~ 2021	Ceramic Plumbing Fixtures	IPC	
A112.19.2~~—2020~~ 2021/CSA B45.1~~—2020~~ 2021	Ceramic Plumbing Fixtures	IPC	IRC®
A112.19.3—2021/CSA B45.4~~—08 (R~~2021~~)~~	Stainless Steel Plumbing Fixtures	IPC	IRC®
A112.19.5~~—2021~~ 2022/CSA B45.15~~—2021~~ 2022	Flush Valves and Spuds for Water Closets, Urinals, and Tanks	IPC	IRC®
A112.19.7-~~2012~~ 2023/CSA B45.10~~—2012 (R2021)~~ 2023	Hydromassage Bathtub Systems	IRC®	
A112.19.7—CSA B45.10~~—R 2012/ 2012 (2021)~~ 2012(R2023)	Hydromassage Bathtub Systems	IPC	
A112.21.3~~—1985 (R2017)~~ 2022	Hydrants for Utility and Maintenance Use	IPC	
A112.3.4~~—2020~~ 2022/CSA B45.9 ~~—20~~ 2022	Macerating Toilet Systems and Related Components	IRC®	
A112.36.2M—1991 ~~(R2017)~~ (R2022)	Cleanouts	IPC	IRC®
A112.4.14~~—2004 (R2019)~~ 2022	Manually Operated, Quarter-Turn Shutoff Valves for Use in Plumbing Systems	IPC	IRC®
A112.4.14~~—2019~~ 2022/CSA B125.14-~~19~~ 2022	Manually Operated Valves for Use in Plumbing Systems	IPC	IRC®
A112.4.1~~—2019~~ 2024	Water Heater Relief Valve Drain Tubes	IRC®	
A112.4.2~~—2020~~ 2021/CSA B45.16~~—20~~ 2021	Water Closet Personal Hygiene Devices	IPC	
A112.4.3~~—1999 (R2020)~~ 2024	Plastic Fittings for Connecting Water Closets to the Sanitary Drainage System	IPC	IRC®

A112.4.4~~—2017~~ 2022	Plastic Push~~-~~Fit Drain, Waste, and Vent (DWV) Fittings	IPC		IRC®	
A112.6.1M — ~~1997(R2017)~~ 2022	Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use	IPC			
A112.6.2~~—2017~~ 2022	Framing-Affixed Supports for Off-the-Floor Water Closets with Concealed Tanks	IPC		IRC®	
A112.6.3~~—2019~~ 2022	Floor and Trench Drains	IPC		IRC®	
A112.6.4~~—2003 (R2012)~~ (R2020)	Roof, Deck, and Balcony Drains	IPC			
A112.6.7—2010 ~~(R2020)~~ (R2024)	Sanitary Floor Sinks	IPC			
A112.6.9—2005 ~~(R2020)~~ (R2024)	Siphonic Roof Drains	IPC			
A17.1~~—2019~~ 2022/CSA B44~~—19~~ 2022	Safety Code for Elevators and Escalators	IBC	IEBC	IFC	IRC®
A17.3~~—2020~~ 2023	Safety Code for Existing Elevators and Escalators	IEBC		IFC	
A18.1~~—2020~~ 2023	Safety Standard for Platform Lifts and Stairway Chairlifts	IBC	IEBC	IRC®	
ASME A17.1~~—2019~~ 2022/CSA B44~~—19~~ 2022	Safety Code for Elevators and Escalators	IPMC		IECC®	
ASME A17.1~~—2019~~ 2022/CSA B44~~—2019~~ 2022	Safety Code for Elevators and Escalators	IRC®			
ASSE 1016~~—2020~~ 2021/ASME 112.1016~~—2020~~ 2021/CSA B125.16~~—2020~~ 2021	Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations	IPC		IRC®	
B1.13M~~—2006~~ 2020	Metric Screw Threads: M Profile	IMC			
B1.1~~—2003~~ 2024	Unified Inch Screw Threads, UN and UNR Thread Form	IMC			
B1.20.1~~—2019~~ 2023	Pipe Threads, General Purpose (inch)	IFGC	IMC	IPC	IRC®

B1.20.3—~~1976~~ 2023	Dryseal Pipe Threads, Inch	IMC				
B16.12—~~2009 (R2019)~~ 2024	Cast Iron Threaded Drainage Fittings	IPC	IRC®			
B16.15—~~2013~~ 2023	Cast Alloy Threaded Fittings~~:~~ ~~Classes 125 and 250~~	ISPSC				
B16.15—~~2018~~ 2023	Cast Alloy Threaded Fittings~~:~~ ~~Classes 125 and 250~~	IMC	IPC	IRC®		
B16.18—~~2018~~ 2023	Cast Copper Alloy Solder Joint Pressure Fittings	IMC	IPC	IBC	IFC	IRC®
B16.22—~~2018~~ 2023	Wrought-Copper and Copper-Alloy Solder Joint Pressure Fittings	IMC	IPC	IBC	IFC	IRC®
B16.26—~~2018~~ 2023	Cast Copper Alloy Fittings for Flared Copper Tubes	IMC	IPC	IRC®		
B16.29—~~2017~~ 2022	Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings (DWV)	IPC	IRC®			
B16.33—~~2012 (R2017)~~ 2022	Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 psig (Sizes $^1/_2$ through 2)	IRC®				
B16.33—~~2012(2017)~~ 2022	Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 psig (Sizes $^1/_2$ through 2)	IFGC				
B16.34—~~2020~~ 2023	Valves—Flanged, Threaded and Welding End	IPC	IRC®			
B16.44—~~2012 (R2017)~~ 2022	Manually Operated Metallic Gas Valves for Use in Above-ground Piping Systems up to 5 psi	IFGC	IRC®			
B16.47—~~2020~~ 2023	Large Diameter Steel Flanges: NPS 26 through NPS 60 Metric/Inch Standard	IFGC				
B16.5—~~2019~~ 2024	Pipe Flanges and Flanged Fittings: NPS $^1/_2$ through NFPS 24 Metric/Inch Standard	IFGC	IMC			

B16.9—~~2018~~ 2023	Factory-Made Wrought Steel Buttwelding Fittings	IMC	IPC	IRC®	
B20.1—~~2021~~ 2024	Safety Standard for Conveyors and Related Equipment	IBC			
B251/B251M—2017	Specification for General Requirements for Wrought Seamless Copper and Copper-alloy Tube	IPSDC			
B31.12—~~2019~~ 2024	Hydrogen Piping and Pipelines	IFGC			
B31.1—~~2020~~ 2022	Power Piping	IFC			
B31.3—~~2020~~ 2022	Process Piping	IFGC	IBC	IFC	
B31.4—~~2019~~ 2022	Pipeline Transportation Systems for Liquids and Slurries	IFC			
B31.5—~~2019~~ 2022	Refrigeration Piping and Heat Transfer Components	IMC	IPC		
B31.9—~~2020~~ 2023	Building Services Piping	IMC	IFC		
B36.10M—~~2018~~ 2023	Welded and Seamless Wrought-steel Pipe	IFGC	IRC®		
BPVC—~~2019~~ 2023	ASME Boiler and Pressure Vessel Code (Sections I, II, IV, V & VI, VIII)	IFGC	IMC	IFC	IRC®
CSD-1—~~2021~~ 2024	Controls and Safety Devices for Automatically Fired Boilers	IFGC	IMC	IRC®	

ASPE	**American Society of Plumbing Engineers**
Standard Reference Number	**Title**	**Referenced in Code(s):**

Standard Reference Number	Title	Referenced in Code(s):
45—~~2013~~ 2018	Siphonic Roof Drainage ~~Systems~~	IPC
ASPE/IAPMO Z1034—2015 (R2020)	Test Method for Evaluating Roof Drain Performance	IPC

ASSE	**ASSE International**	
Standard Reference Number	**Title**	**Referenced in Code(s):**

1003~~—09~~ 2020	Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution	IPC	
1003~~—2011~~ 2020	Performance Requirements for Water-pressure-reducing Valves for Domestic Water Distribution Systems	IRC®	
1008~~—06~~ 2020	Performance Requirements for Plumbing Aspects of Food Waste Disposer Units	IPC	
1008~~—2006~~ 2020	Performance Requirements for Plumbing Aspects of Residential Food Waste Disposer Units	IRC®	
1013~~—2017~~ 2021	Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies ~~Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers~~	IRC®	
1015~~—2017~~ 2021	Performance Requirements for Double Check Backflow Prevention Assemblies ~~and Double Check Fire Protection Backflow Prevention Assemblies~~	IPC	IRC®
1018~~—2001~~ 2021	Performance Requirements for Trap Seal Primer Valves; Potable Water Supplied	IPC	IRC®
1019~~—2011~~ ~~(~~R2016~~)~~	~~Performance Requirements for Vacuum Breaker Wall Hydrants, Freeze Resistant, Automatic Draining Type~~ Performance Requirements for Freeze-resistant, Wall Hydrants, Vacuum Breaker, Draining Types	IPC	IRC®
1020~~—04~~ 2020	Performance Requirements for Pressure Vacuum Breaker Assembly	IPC	
1020~~—2004~~ 2020	Performance Requirements for Pressure Vacuum Breaker Assembly	IRC®	
1022~~—2017~~ 2021	Performance Requirements for Backflow Preventer for Beverage Dispensing Equipment	IPC	

1023—~~1979~~ 2020	Performance Requirements for Electrically Heated or Cooled ~~Hot~~ Water Dispensers~~, Household storage type—Electrical~~	IRC®	
1024—~~2017~~ 2021	Performance Requirements for Dual Check Valve Type Backflow Preventers, Anti-siphon-type, Residential Applications	IPC	IRC®
1035—~~08~~ 2020	Performance Requirements for Laboratory Faucet Backflow Preventers	IPC	
1035—~~2008~~ 2020	Performance Requirements for Laboratory Faucet Backflow Preventers	IRC®	
1044—~~2015~~ 2020	Performance Requirements for Trap Seal Primer Devices—Drainage Types and Electronic Design Types	IPC	IRC®
1047—~~2011~~ 2021	Performance Requirements for Reduced Pressure Detector Fire Protection Backflow Prevention Assemblies	IPC	IRC®
1048—~~2011~~ 2021	Performance Requirements for Double Check Detector Fire Protection Backflow Prevention Assemblies	IPC	IRC®
1049—~~2009~~ 2021	Performance Requirements for Individual and Branch Type Air Admittance Valves for Chemical Waste Systems	IPC	
1050—~~2009~~ 2021	Performance Requirements for Stack Air Admittance Valves for Sanitary Drainage Systems	IPC	IRC®
1051—~~2009~~ 2021	Performance Requirements for Individual and Branch Type Air Admittance Valves for Sanitary Drainage Systems ~~fixture and Branch Devices~~	IPC	IRC®
1056—~~2013~~ 2021	Performance Requirements for Spill-Resistant Vacuum Breaker	IPC	IRC®

1060—~~2016~~ 2020	Performance Requirements for Outdoor Enclosures for Fluid-conveying Components	IRC®		
1060—~~2017~~ 2020	Performance Requirements for Outdoor Enclosures for Fluid Conveying Components	IPC		
1061—~~2015~~ 2020	Performance Requirements for Push Fit Fittings	IMC	IPC	IRC®
1062—~~2017~~ 2021	Performance Requirements for Temperature Actuated, Flow Reduction (TAFR) Valves to Individual Supply Fittings	IPC	IRC®	
1064—~~2006 (R2011)~~ 2020	Performance Requirements for Backflow Prevention Assembly Field Test Kits	IPC		
1069—~~05~~ 2020	Performance Requirements for Automatic Temperature Control Mixing Valves	IPC		
1071—~~2012~~ 2021	~~Performance Requirements for~~ Temperature Actuated Mixing Valves for Plumbed Emergency Equipment	IPC		
1072—~~07~~ 2020	Performance Requirements for Barrier Type Floor Drain Tap Seal Protection Devices	IPC		
1072—~~2007~~ 2020	Performance Requirements for Barrier-type Trap Seal Protection for Floor Drain s ~~Trap Seal Protection Devices~~	IRC®		
1079—~~2005~~ 2021	Performance Requirements for Dielectric Pipe Unions	IMC	IPC	
1081—~~2014~~ 2020	Performance Requirements for Backflow Preventers with Integral Pressure Reducing Boiler Feed Valve and Intermediate Atmospheric Vent Style for Domestic and Light Commercial Water Distribution Systems	IPC	IRC®	

5013—2015	~~Performance Requirements for Testing~~ Reduced Pressure Principle Backflow ~~Prevention Assembly~~ Preventers (RPA) and Reduced Pressure Principle Fire Protection Backflow Preventers (RFP)	IPC		
ASSE/IAPMO 1055—~~2018~~ 2020	Performance Requirements for Chemical Dispensing Systems with Integral Backflow Protection	IPC		

ASSP	American Society of Safety Professionals			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
ANSI/ASSP Z359.1 -2020	The Fall Protection Code	IFGC		
ANSI/ASSE Z359.1—~~2019~~ 2020	The Fall Protection Code	IBC		
ANSI/ASSP Z359.1—~~2019~~ 2020	The Fall Protection Code	IMC	IFC	

ASTM	ASTM International			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
A105/A105M—~~18~~ 21	Standard Specification for Carbon Steel Forgings for Piping Applications	IMC		
A106/A106M—~~2018~~ 2019a	Specification for Seamless Carbon Steel Pipe for High-temperature Service	IFGC	IMC	IRC®
A126—04(~~2014~~ 2019)	Standard Specification for Gray Iron Castings for Valves, Flanges , and Pipe Fittings	IMC	IRC®	
A181/A181M—14(2020)	Standard Specification for Carbon Steel Forgings, for General-purpose Piping	IMC		
A182/A182M—~~2018A~~ 21	Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-temperature Service	ISPSC		

A193/A193M—~~19~~ 20	Standard Specification for Alloy-steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications	IMC

A234/A234M—~~18A~~ 19	Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service	IMC

A240/A240M—~~17~~ 20a	Standard Specification for Chromium and Chromium-~~n~~ Nickel Stainless Steel Plate, Sheet , and Strip for Pressure Vessels and for General Applications	IMC	IBC	ISPSC	IRC®

A252—~~2010(2018)~~ /A252M-19	Specification for Welded and Seamless Steel Pipe Piles	IBC

A254—~~2010(2018)~~ /A254M-12(2019)	Specification for Copper Brazed Steel Tubing	IFGC	IMC	IRC®

A268/A268M—~~2010(16)~~ 20	Standard Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service	IRC®

A268/A268—~~2010(16)~~ 20	Standard Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service	IFGC

A269/A269M-15a 2019	Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service	IFGC	IMC	IPC	IRC®

A307—~~2014E1~~ 21	Specification for Carbon Steel Bolts ~~and~~ Studs, and Threaded Rod 60,000 ~~psi~~ PSI Tensile Strength	IRC®

A312/A312M— ~~2018~~ 21	Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes	IPC

A312/A312M—~~2018~~ 21	Standard Specification for Seamless, Welded and Heavily Cold Worked Austenitic Stainless Steel Pipes	IFGC	ISPSC

A312/A312M ~~—17~~ 21	Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes	IMC		
A312/A312M~~—2018~~ 21	Specification for Seamless, Welded and Heavily Cold Worked Austenitic Stainless Steel Pipes	IRC®		
A334/A334M—04a(~~2016~~ 2021)	Standard Specification for Seamless and Welded Carbon and Alloy-steel Tubes for Low-temperature Service	IMC		
A36/A36M~~—14~~ 19	Specification for Carbon Structural Steel	IBC	IRC®	
A395/A395M—99(~~2014~~) 2018	Standard Specification for Ferritic Ductile Iron Pressure-retaining Castings for Use at Elevated Temperatures	IMC		
A403/A403M~~—2018A~~ 20	Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings	ISPSC		
A416/A416M~~—2017A~~ 18	Standard Specification for Low-Relaxation , ~~Uncoated~~ Seven-W~~w~~ire Steel Strand for Prestressed Concrete	IBC		
A420/A420M~~—2016~~ 20	Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-temperature Service	IMC		
A463/A463M—15 (2020)e1	Standard Specification for Steel Sheet, Aluminum-coated, by the Hot-dip Process	IBC	IRC®	
A53/A53M— ~~2018~~ 2020	Specification for Pipe, Steel, Black and Hot-dipped, Zinc-coated Welded and Seamless	IPC		
A53/A53M~~—2018~~ 2020	Specification for Pipe, Steel, Black and Hot Dipped Zinc-coated Welded and Seamless	IFGC	IMC	IRC®
A536—84~~(2014)~~ (2019)e1	Standard Specification for Ductile Iron Castings	IMC		
A563/A563M~~—15~~ 21a	Standard Specification for Carbon and Alloy Steel Nuts	IRC®		

A572/A572M~~—2018~~ 21e1	Specification for High-strength Low-alloy Columbium-Vanadium Structural Steel	IBC	
A588/A588M~~—15~~ 19	Standard Specification for High-~~s~~Strength Low-~~a~~ Alloy Structural Steel , ~~with~~ up to 50 ksi ~~(~~ [345 MPa~~)~~] Minimum Yield Point with Atmospheric Corrosion Resistance	IBC	
A6/A6M~~—2017A~~ 2019	Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling	IBC	
A615/A615M~~—15ae1~~ 20	StandardSpecification for Deformed and Plain Carbon-~~s~~ Steel Bars for Concrete Reinforcement	IBC	
A615/A615M~~—2015aE1~~ 20	Standard Specification for Deformed and Plain Carbon- s Steel Bars for Concrete Reinforcement	IRC®	
A641/A641M~~—09a(2014)~~ 19	Specification for Zinc-coated (Galvanized) Carbon Steel Wire	IRC®	
A653/A653M~~—2017~~ 2020	Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-iron Alloy-coated (Galvannealed) by the Hot-dip Process	IRC®	
A653/A653M~~—2017~~ 2020	Specification for Steel Sheet, Zinc-coated Galvanized or Zinc-iron Alloy-coated Galvannealed by the Hot-dip Process	IBC	
A706/A706M—2016	Standard Specification for Deformed and Plain Low-~~a~~ Alloy Steel Bars for Concrete Reinforcement	IBC	IRC®
A74— ~~17~~ 2021	Specification for Cast-iron Soil Pipe and Fittings	IPC	
A74—2017	Specification for Cast-iron Soil Pipe and Fittings	IRC®	

A755/A755M~~—2016E1~~ 18	Specification for Steel Sheet, Metallic-coated by the Hot-dip Process and Prepainted by the Coil-coating Process for Exterior Exposed Building Products	IBC	
A755M/A755M~~—2016E1~~ 18	Specification for Steel Sheet, Metallic Coated by the Hot-dip Process and Prepainted by the Coil-coating Process for Exterior Exposed Building Products	IRC®	
A778/A778M— 16(2021)	Specification for Welded Unannealed Austenitic Stainless Steel Tubular Products	IPC	
A778M/A778M~~—20~~16 (2021)	Specification for Welded Unannealed Austenitic Stainless Steel Tubular Products	IRC®	
A792/A792M~~—10(2015)~~ 21a	Specification for Steel Sheet, 55% Aluminum-zinc Alloy-coated by the Hot-dip Process	IBC	IRC®
A875/A875M~~—13~~ 21	Standard Specification for Steel Sheet, Zinc-5%, Aluminum Alloy-coated by the Hot-dip Process	IBC	IRC®
A888— ~~2018~~ 21a	Specification for Hubless Cast-iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Application	IPC	IRC®
A924/A924M~~—2017A~~ 20	Standard Specification for General Requirements for Steel Sheet, Metallic-coated by the Hot-dip Process	IBC	
A924M~~—2017A~~ 20	Standard Specification for General Requirements for Steel Sheet, Metallic-coated by the Hot-dip Process	IRC®	
B101—12(2019)	Specification for Lead-coated Copper Sheet and Strip for Building Construction	IBC	IRC®
B152/B152M~~—13~~ 19	Standard Specification for Copper Sheet, Strip , Plate , and Rolled Bar	IPC	
B209~~—14~~ 21	Specification for Aluminum and Aluminum Alloy Steel and Plate	IBC	IRC®

B210/B210M—19a	Standard Specification for Aluminum and Aluminum-alloy Drawn Seamless Tubes	IFGC	IMC					
B280—~~18~~ 20	Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service	IFGC	IMC	IFC	IRC	IBC		
B306—~~13~~ 20	Specification for Copper Drainage Tube (DWV)	IPC	IRC®					
B32—~~08(2014)~~ 20	Specification for Solder Metal	IMC	IPC	IRC®				
B370—12(2019)	Specification for Copper Sheet and Strip for Building Construction	IBC	IRC®					
B42—~~15a~~ 20	Specification for Seamless Copper Pipe, Standard Sizes	IMC	IPC	IFC	IRC	IBC		
B43—~~15~~ 20	Specification for Seamless Red Brass Pipe, Standard Sizes	IMC	IPC	IBC	IFC	IRC®		
B447—12a(2021)	Specification for Welded Copper Tube	IPC	ISPSC	IRC®				
B68/B68M—~~11~~ 19	Standard Specification for Seamless Copper Tube, Bright Annealed ~~(Metric)~~	IMC	IBC	IFC				
B75/B75M—~~11~~ 20	Specification for Seamless Copper Tube	IMC	IPC	IRC®				
B819—~~2018~~ 19	Standard Specification for Seamless Copper Tube for Medical Gas Systems	IMC						
B88—~~2016~~ 20	Specification for Seamless Copper Water Tube	IFGC	IMC	IPC	IBC	IFC	ISPSC	IRC®
C1002—~~2018~~ 20	Specification for Steel Self-piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs	IBC	IRC®					
C1007—~~11a(2015)~~ 20	Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories	IBC						

C1029—~~15~~ 20	Specification for Spray-applied Rigid Cellular Polyurethane Thermal Insulation	IBC	IRC®	
C1047—~~14a~~ 19	Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base	IRC®		
C1063—~~2018B~~ 21	Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-based Plaster	IBC	IRC®	
C1088—~~2018~~ 20	Specification for Thin Veneer Brick Units Made from Clay or Shale	IBC	IRC®	
C1107/C1107M—~~2017~~ 20	Standard Specification for Packaged Dry, Hydraulic-cement Grout (Nonshrink)	IRC®		
C1157/C1157M—~~2017~~ 20a	Standard Performance Specification for Hydraulic Cement	IBC		
C126—~~2017~~ 19	Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units	IRC®		
C1277—~~2018~~ 20	Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings	IPC	IPSDC	IRC®
C1280—~~13a~~ 18	Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing	IBC		
C1283—2015(2021)	Practice for Installing Clay Flue Lining	IBC	IRC®	
C1288—2017	Standard Specification for ~~Discrete Nonasbestos~~ Fiber-~~c~~ Cement Interior Substrate Sheets	IBC	IRC®	
C1289—~~2018~~ 21	Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board	IBC	IRC®	
C1313/C1313M—13(2019)	Standard Specification for Sheet Radiant Barriers for Building Construction Applications	IBC		

C1325—~~2018~~ 21	Standard Specification for Nonasbestos Fiber-mat Reinforced Cement Backer Units	IBC	IRC®	
C1328/C1328M—~~12~~ 19	Specification for Plastic (Stucco Cement)	IBC	IRC®	
C1363—~~11~~ 19	Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus	IECC®	IRC®	
C1364—~~2017~~ 19	Standard Specification for Architectural Cast Stone	IBC	IRC®	
C140/C140M—~~2018~~ 21	Test Method Sampling and Testing Concrete Masonry Units and Related Units	IBC		
C1405—~~2016~~ 20a	Standard Specification for Glazed Brick (Single Fired, Brick Units)	IRC®		
C143/C143M—~~15A~~ 20	Test Method for Slump of Hydraulic Cement Concrete	IRC®		
C1440— ~~2017~~ 21	Specification for Thermoplastic Elastomeric (TPE) Gasket Materials for Drain, Waste, and Vent (DWV), Sewer, Sanitary and Storm Plumbing Systems	IPC	IPSDC	IRC
C1440—~~2017~~ 21	Specification for Thermoplastic Elastomeric (TPE) Gasket Materials for Drain, Waste and Vent (DWV), Sewer, Sanitary and Storm Plumbing Systems	IRC®		
C1460— ~~2017~~ 21	Specification for Shielded Transition Couplings for Use with Dissimilar DWV Pipe and Fittings Above Ground	IPC	IPSDC	IRC®
C1460—~~2017~~ 21	Specification for Shielded Transition Couplings for Use with Dissimilar DWV Pipe and Fittings Above Ground	IRC®		

C1461— ~~2008(2017)~~ 21	Specification for Mechanical Couplings Using Thermoplastic Elastomeric (TPE) Gaskets for Joining Drain, Waste and Vent (DWV) Sewer, Sanitary and Storm Plumbing Systems for Above and Below Ground Use	IPC	
C14~~—15a~~ 20	Specification for Nonreinforced Concrete Sewer, Storm Drain and Culvert Pipe	IPC	IRC®
C150/C150M~~—2018~~ 21	Specification for Portland Cement	IBC	IRC®
C1540— ~~2018~~ 20	Specification for Heavy Duty Shielded Couplings Joining Hubless Cast-iron Soil Pipe and Fittings	IPC	
C1563— 2008~~(201 7)~~ (2021)	Standard Test Method for Gaskets for Use in Connection with Hub and Spigot Cast Iron Soil Pipe and Fittings for Sanitary Drain, Waste, Vent and Storm Piping Applications	IPC	
C1568—08~~(2013)~~ (2020)	Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Mechanical Uplift Resistance Method)	IBC	
C1600/C1600M~~—2017~~ 19	Standard Specification for Rapid Hardening Hydraulic Cement	IBC	
C1629/C1629M~~—2018A~~ 19	Standard Classification for Abuse-resistant Nondecorated Interior Gypsum Panel Products and Fiber-reinforced Cement Panels	IBC	
C1634~~—2017~~ 20	Standard Specification for Concrete Facing Brick and Other Concrete Masonry Facing Units	IRC®	
C1658/C1658M~~—2018~~ 19e1	Standard Specification for Glass Mat Gypsum Panels	IBC	IRC®
C1668~~—13a~~ 20	Standard Specification for Externally Applied Reflective Insulation Systems on Rigid Duct in Heating, Ventilation, and Air Conditioning (HVAC) Systems	IRC®	

C1670/1670M—~~2018~~ 2021a	Standard Specification for Adhered Manufactured Stone Masonry Veneer Units	IRC®			
C1670/C1670M—~~2018~~ 21a	Standard Specification for Adhered Manufactured Stone Masonry Veneer Units	IBC			
C1766—2015(2019)	Standard Specification for Factory-laminated Gypsum Panel Products	IBC	IRC®		
C1788—~~14~~ 20	Standard Specification for Non Metallic Plaster Bases (Lath) Used with Portland Cement Based Plaster in Vertical WallApplications	IBC			
C208—2012(2017)~~E1~~ e2	Specification for Cellulosic Fiber Insulating Board	IBC	IRC®		
C212—~~2017~~ 21	Standard Specification for Structural Clay Facing Tile	IRC®			
C216—~~2017A~~ 21	Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)	IBC	IRC®		
C22/C22M—00~~(2015)~~ (2021)	Specification for Gypsum	IBC	IRC®		
C270—~~14A~~ 19ae1	Specification for Mortar for Unit Masonry	IRC®			
C28/C28M—10~~(2015)~~ 2020	Specification for Gypsum Plasters	IBC	IRC®		
C31/C31M—~~2018B~~ 21a	Practice for Making and Curing Concrete Test Specimens in the Field	IBC			
C315—2007~~(2016)~~ (2021)	Specification for Clay Flue Liners and Chimney Pots	IFGC	IMC	IBC	IRC®
C317/C317M—2000 ~~(2015)~~ (2019)	Specification for Gypsum Concrete	IBC			
C34—2017	Standard Specification for Structural Clay ~~Load-bearing~~ Loadbearing Wall Tile	IRC®			

C35/C35M~~—(2014)~~ 01(2019)	Specification for Inorganic Aggregates for Use in Gypsum Plaster	IRC®		
C35/C35—01~~(2014)~~ (2019)	Specification for Inorganic Aggregates for Use in Gypsum Plaster	IBC		
C411—~~2017~~ 2019	Test Method for Hot-surface Performance of High-temperature Thermal Insulation	IMC	IRC®	
C425— ~~2004(2018)~~ 21	Specification for Compression Joints for Vitrified Clay Pipe and Fittings	IPC	IPSDC	IRC
C443— ~~2012(2017)~~ 20	Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets	IPC		
C443—~~2012(2017)~~ 20	Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets	IRC®		
C472—~~99(2014)~~ 20	Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete	IBC		
C473—~~2017~~ 2019	Test Methods for Physical Testing of Gypsum Panel Products	IBC		
C474—15(2020)	Test Methods for Joint Treatment Materials for Gypsum Board Construction	IBC		
C475M—2017	Specification for Joint Compound and Joint Tape for Finishing Gypsum Wallboard	IRC®		
C476—~~2018~~ 2020	Specification for Grout for Masonry	IRC®		
C503M/C503M—2015	Standard Specification for Marble Dimension Stone	IRC®		
C514—04~~(2014)~~ (2020)	Specification for Nails for the Application of Gypsum Board	IBC	IRC®	
C516—~~2008(2014)E1~~ 19	Specifications for Vermiculite Loose Fill Thermal Insulation	IBC		

C547—~~2017~~ 19	Specification for Mineral Fiber Pipe Insulation	IBC	
C549—~~06(2012)~~ 18	Specification for Perlite Loose Fill Insulation	IBC	
C552—~~2017E1~~ 21a	Standard Specification for Cellular Glass Thermal Insulation	IBC	IRC®
C564—~~14~~ 20a	Specification for Rubber Gaskets for Cast-iron Soil Pipe and Fittings	IPC	IRC®
C578—~~2018~~ 19	Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation	IBC	IRC®
C59/C59M—00~~(2015)~~ (2020)	Specification for Gypsum Casting Plaster and Molding Plaster	IBC	IRC®
C595/C595M—~~2018~~ 21	Specification for Blended Hydraulic Cements	IBC	IRC®
C61/C61M—00~~(2015)~~ (2020)	Specification for Gypsum Keene's Cement	IBC	IRC®
C631—09~~(2014)~~ 2020	Specification for Bonding Compounds for Interior Gypsum Plastering	IBC	IRC®
C636/C636M—~~13~~ 19	Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels	IBC	
C652—~~2017A~~ 21	Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale)	IBC	IRC®
C67/C67M—~~2018~~ 21	Test Methods of Sampling and Testing Brick and Structural Clay Tile	IBC	
C754—~~2018~~ 20	Specification for Installation of Steel Framing Members to Receive Screw-attached Gypsum Panel Products	IBC	
C76— ~~2018A~~ 20	Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe	IPC	

C76—~~2018A~~ 20	Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe	IPC	IPSDC	IRC®
C840—~~2018A~~ 20	Specification for Application and Finishing of Gypsum Board	IBC		
C842—05~~(2015)~~ (2021)	Specification for Application of Interior Gypsum Plaster	IBC	IRC®	
C844—2015 (2021)	Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster	IBC	IRC®	
C847—~~14a~~ 2018	Specification for Metal Lath	IBC		
C887—~~13~~ 20	Specification for Packaged, Dry Combined Materials for Surface Bonding Mortar	IBC	IRC®	
C897—15 (2020)	Specification for Aggregate for Job-mixed Portland Cement-based Plaster	IBC	IRC®	
C926—~~2018B~~ 20b	Specification for Application of Portland Cement-based Plaster	IBC	IRC®	
C932—06~~(2013)~~ (2019)	Specification for Surface-applied Bonding Compounds for Exterior Plastering	IBC		
C94/C94M—~~17A~~ 21b	Specification for Ready-mixed Concrete	IEBC		
C94/C94M—~~2017A~~ 21b	Specification for Ready-mixed Concrete	IBC	IRC®	
C956—04~~(2015)~~ (2019)	Specification for Installation of Cast-in-place Reinforced Gypsum Concrete	IBC		
D1003—~~13~~ 21	Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics	IECC®		
D1143/D1143M—~~2007(2013)E1~~ 20	Standard Test Methods for Deep Foundation~~s~~ Elements Under Static Axial Compressive Load	IBC		

D1227—13(2019)e1	Specification for Emulsified Asphalt Used as a Protective Coating for Roofing	IBC	IRC®

D1557—12~~e1~~ (2021)	Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort [56,000 ft-lb/ft^3 (2,700 kN m/m^3)]	IBC

D1593—~~13~~ 19	Standard Specification for Nonrigid Vinyl Chloride Plastic Film and Sheeting	ISPSC

D1693—15e1	Test Method for Environmental Stress-cracking of Ethylene Plastics	IMC	IRC®

D1784—~~11~~ 20	Standard ~~Specification~~ Classification System and Basis for Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds	IRC®

D1785— ~~2015E1~~ 21a	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120	IPC

D1785—15E1	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120	IMC	ISPSC	IRC®

D1929—~~16~~ 20	Standard Test Method for Determining Ignition Temperature of Plastics	IBC

D1970/D1970M—~~2017A~~ 21	Specification for Self-adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roof Underlayment for Ice Dam Protection	IBC	IRC®

D2178/D2178M—15A(2021)	Specification for Asphalt Glass Felt Used in Roofing and Waterproofing	IBC	IRC®

D2239—~~12A~~ 21	Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter	IRC®

D2241—~~15~~ 20	Specification for Poly (Vinyl Chloride) (PVC) Pressure-rated Pipe (SDR-Series)	IMC	IPC	ISPSC	IRC®
D2412—~~11(2018)~~ 21	Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-plate Loading	IMC			
D2466— ~~2017~~ 21	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40	IMC	IPC	ISPSC	IRC
D2466—~~2017~~ 21	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40	IMC	ISPSC	IRC®	
D2467—~~15~~ 20	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80	IMC	IPC	ISPSC	IRC®
D2487—~~2017~~ 17e1	Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)	IBC			
D2513—~~2018A~~ 20	Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing and Fittings	IFGC	IRC®		
D2564— ~~2012(2018)~~ 20	Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems	IMC	IPC	IRC	
D2609—~~15~~ 21	Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe	IPC	IRC®		
D2626/D2626M—04 ~~(2012)e1~~ (2020)	Specification for Asphalt-saturated and Coated Organic Felt Base Sheet Used in Roofing	IBC	IRC®		
D2665— ~~2014~~ 20	Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	IPC			
D2672—~~14~~ 20e1	Specification for Joints for IPS PVC Pipe Using Solvent Cement	IPC	ISPSC	IRC®	
D2680—~~01(2014)~~ 20	Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping	IPC	IRC®		

D2683—~~14~~ 20	Specification for Socket-type Polyethylene Fittings for Outside Diameter-controlled Polyethylene Pipe and Tubing	IMC	IPC	IRC®
D2737—~~12a~~ 21	Standard Specification for Polyethylene (PE) Plastic Tubing	IMC	IPC	IBC
D2822/D2822M—2005(2011)e1	Specification for Asphalt Roof Cement, Asbestos Containing	IBC	IRC®	
D2843—~~16~~ 19	Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics	IBC		
D2846/D2846M— ~~2017BE1~~ 19a	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems	IPC		
D2846/D2846M—2017BE1	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-water Distribution Systems	IMC	ISPSC	IRC®
D2855— ~~2015~~ 2020	~~Standard Practice for Making Solvent-cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings~~ Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets	IPC		
D2859—2016	Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials	IBC		
D2859—~~16~~ 2016(2021)	Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials	IFC		
D2949—~~10~~ 18	Specification for 3.25-in. Outside Diameter Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	IPC	IRC®	
D3035—~~15~~ 21	Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter	IMC	IPC	IRC®

D312/D312M—2016~~M~~ a	Specification for Asphalt Used in Roofing	IBC	IRC®	
D3138—04(2011)	Standard Specification for Solvent Cements for Transition Joints Between Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Non-Pressure Piping Components	IRC®		
D3139~~—98(2011)~~ 19	Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals	IPC		
D3161/D3161M~~—2016A~~ 20	Test Method for Wind Resistance of Steep Slope Roofing Products (Fan Induced Method)	IBC	IRC®	
D3201/D3201M~~—13~~ 20	Test Method for Hygroscopic Properties of Fire-retardant-treated Wood and Wood-based Products	IBC	IRC®	
D3212~~—07(2013)~~ 20	Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals	IPC	IRC®	
D323~~—15A~~ 20a	Test Method for Vapor Pressure of Petroleum Products (Reid Method)	IFC		
D3278~~—96(2011)~~ 21	Test Methods for Flash Point of Liquids by Small Scale Closed-cup Apparatus	IMC	IBC	IFC
D3350~~—14~~ 21	Specification for Polyethylene Plastic Pipe and Fitting Materials	IRC®		
D3462/D3462M—2016	Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules	IBC		
D3462/D3462M~~—10A~~ 19	Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules	IRC®		
D3468/D3468M—99~~(2013)E1~~ (2020)	Specification for Liquid-applied Neoprene and Chlorosulfanated Polyethylene Used in Roofing and Waterproofing	IBC	IRC®	

D3498~~—03(2011)~~ 19a	~~Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems~~ Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing	IBC	
D3679~~—2017~~ 21	Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding	IBC	IRC®
D3957—2009~~(2015)~~ (2020)	Standard Practices for Establishing Stress Grades for Structural Members Used in Log Buildings	IBC	
D4434/D4434M~~—2015~~ 21	Specification for Poly (Vinyl Chloride) Sheet Roofing	IBC	IRC®
D449/D449M~~—03(2014)E1~~ 2003(2021)	Specification for Asphalt Used in Dampproofing and Waterproofing	IRC®	
D4601/D4601M—04~~(2012)e1~~ (2020)	Specification for Asphalt-coated Glass Fiber Base Sheet Used in Roofing	IBC	IRC®
D4829~~—11~~ 21	Test Method for Expansion Index of Soils	IBC	IRC®
D4869/D4869M—2016A(2021)	Specification for Asphalt-saturated (Organic Felt) Underlayment Used in Steep Slope Roofing	IBC	IRC®
D4990—1997a~~(2013)~~ (2020)	Specification for Coal Tar Glass Felt Used in Roofing and Waterproofing	IRC®	
D4990—97a(2013)	Specification for Coal Tar Glass Felt Used in Roofing and Waterproofing	IBC	
D5055~~—2016~~ 2019e1	Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-joists	IBC	IRC®
D5456~~—2018~~ 21e1	Specification for Evaluation of Structural Composite Lumber Products	IBC	IRC®

D56—2016A	Test Method for Flash Point by Tag Closed Cup Tester	IMC	IBC
D56—~~16a~~ 21	Test Method for Flash Point by Tag Closed Cup Tester	IFC	
D5726—98~~(2013)~~ (2020)	Specification for Thermoplastic Fabrics Used in Hot-applied Roofing and Waterproofing	IBC	IRC®
D6083/D6083M—~~2018~~ 21	Specification for Liquid Applied Acrylic Coating Used in Roofing	IBC	IRC®
D6305—~~08(2015)E1~~ 21	Practice for Calculating Bending Strength Design Adjustment Factors for Fire-retardant-treated Plywood Roof Sheathing	IRC®	
D635—~~14~~ 18	Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position	IBC	
D6841—~~2016~~ 21	Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-retardant Treated Lumber	IBC	IRC®
D6878/D6878M—~~2017~~ 19	Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing	IBC	IRC®
D7147—~~2011(2018)~~ 21	Specification for Testing and Establishing Allowable Loads of Joist Hangers	IBC	
D7158/D7158M—~~2019~~ 20	Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)	IBC	IRC®
D7254—~~2017~~ 20	Standard Specification for Polypropylene (PP) Siding	IBC	IRC®
D7425/D7425M—13(2019)	Standard Specification for Spray Polyurethane Foam Used for Roofing Applications	IBC	IRC®
D7672—~~14E1~~ 19	Standard Specification for Evaluating Structural Capacities of Rim Board Products and Assemblies	IBC	IRC®

D86—~~2017~~ 20b	Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure	IBC				
D93—~~18~~ 20	Test Method for Flash Point by Pensky-Martens Closed Up Tester	IMC	IFC			
D93—~~2018~~ 20	Test Methods for Flash Point by Pensky-Martens Closed Cup Tester	IMC	IBC	IFC		
E1007—~~16~~ 21	Test Method f or Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures	IBC				
E108—~~17~~ 20a	Standard Test Methods for Fire Tests of Roof Coverings	IWUIC	IEBC	IFC	IRC	
E108—~~2017~~ 20a	Standard Test Methods for Fire Tests of Roof Coverings	IWUIC	IBC	IRC®		
E119—~~2018B~~ 20	Standard Test Methods for Fire Tests of Building Construction and Materials	IMC	IWUIC	IBC	IRC®	
E119—~~2018b~~ 20	Standard Test Methods for Fire Tests of Building Construction and Materials	IWUIC				
E136—2019a	Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C	IFGC	IMC	IWUIC	IBC	IRC®
E136—~~16A~~ 19a	Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C	IEBC				
E1677—~~11~~ 19	Specification for Air Barrier (AB) Material or Systems for Low-rise Framed Building Walls	IECC®				
E1886—~~2013A~~ 19	Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials	IBC	IRC®			

E1918—~~06(2016)~~ 21	Standard Test Method for Measuring Solar Reflectance of Horizontal or Low-sloped Surfaces in the Field	IECC®		
E1966—15(2019)	Standard Test Method for Fire-resistant Joint Systems	IFC	IBC	
E1980—11(2019)	Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-sloped Opaque Surfaces	IECC®		
E1996—~~2017~~ 20	Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes	IBC	IRC®	
E2174—~~2018~~ 20a	Standard Practice for On-site Inspection of Installed Fire Stops	IBC		
E2178—~~13~~ 21a	Standard Test Method ~~for Air Permeance of Building Materials~~ for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials	IBC	IRC	IECC®
E2178—~~2013~~ 21a	Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permanence of Building Materials	IECC®	IRC®	
E2231—~~2018~~ 19	Standard Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics	IMC	IRC®	
E2307—~~15BE1~~ 20	Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using the Intermediate-scale, Multistory Test Apparatus	IBC		
E2336—~~16~~ 20	Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems	IMC		
E2353—~~2016~~ 21	Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards and Balustrades	IBC		

E2393—~~10a(2015)~~ 20a	Standard Practice for On-site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers	IBC	
E2570/E2570M—07~~(2014)E1~~ (2019)	Standard Test Methods for Evaluating Water-resistive Barrier (WRB) Coatings Used Under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage	IRC®	
E2573—~~17~~ 19	Standard Practice for Specimen Preparation and Mounting of Site-fabricated Stretch Systems to Assess Surface Burning Characteristics	IFC	
E2579—~~15~~ 21	Standard Practice for Specimen Preparation and Mounting of Wood Products to Assess Surface Burning Characteristics	IFC	IBC
E2652—~~16~~ 18	Standard Test Method for ~~Behavior~~ Assessing Combustibility of Materials Using ~~in~~ a Tube Furnace with a Cone-shaped Airflow Stabilizer at 750ºC	IBC	
E283/E283M—~~04(2012)~~ 19	Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences across the Specimen	IBC	
E2925—~~17~~ 19a	Standard Specification for Manufactured Polymeric Drainage and Ventilation Materials Used to Provide a Rainscreen Function	IBC	IRC®
E3082—~~17~~ 20	Standard Test Methods for Determining the Effectiveness of Fire-retardant Treatments for Natural Christmas Trees	IFC	

E336—~~17a~~ 20	Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings	IBC	
E408—13(2019)	Test Methods for Total Normal Emittance of Surfaces Using Inspection-meter Techniques	IECC®	
E605/E605M—~~93(2015)e1~~ 19	Test Method for Thickness and Density of Sprayed Fire-resistive Material (SFRM) Applied to Structural Members	IBC	
E648—~~17a~~ 19ae1	Standard Test Method for Critical Radiant Flux of Floor-covering Systems Using a Radiant Heat Energy Source	IFC	
E736/E736M—~~2017~~ 19	Test Method for Cohesion/Adhesion of Sprayed Fire-resistive Materials Applied to Structural Members	IBC	
E779—2010(2018)	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	IECC®	IRC®
E779—~~10(2018)~~ 19	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	IECC®	
E84—~~18b~~ 21a	Standard Test Method for Surface Burning Characteristics of Building Materials	IFC	
E903—~~2012~~ 20	Standard Test Method Solar Absorptance, Reflectance and Transmittance of Materials Using Integrating Spheres ~~(Withdrawn 2005)~~	IECC®	
E96/E96M—2016	Standard Test Methods for Water Vapor Transmission of Materials	IBC	IRC®
F1085—~~14~~ 19	Standard Specification for Mattress and Box Springs for Use in Berths in Marine Vessels	IFC	
F1361—~~2017~~ 21	Standard Test Method for Performance of Open ~~Deep Fat~~ Vat Fryers	IECC®	

F1476—07~~(2013)~~ (2019)	Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications	IMC	IPC
F1488~~—14E1~~ 14(2019)	Specification for Coextruded Composite Pipe	IRC®	
F1495~~—2014a~~ 20	Standard Specification for Combination Oven Electric or Gas Fired	IECC®	
F1496~~—2013~~ 13(2019)	Standard Test Method for Performance of Convection Ovens	IECC®	
F1504~~—2014~~ 21	Standard Specification for Folded Poly (Vinyl Chloride) (PVC) for Existing Sewer and Conduit Rehabilitation	IRC®	
F1554~~—2018~~ 20	Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength	IRC®	
F1667~~—2018~~ 21	Specification for Driven Fasteners: Nails, Spikes and Staples	IBC	IRC®
F1696~~—2018~~ 20	Standard Test Method for Energy Performance of Stationary-Rack, Door-Type Commercial Dishwashing Machines	IECC®	
F1807— ~~2018~~ 19b	Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring, or Alternate Stainless Steel Clamps, for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	IPC	
F1871~~—2011~~ 20	Standard Specification for Folded/Formed Poly (Vinyl Chloride) Pipe Type A for Existing Sewer and Conduit Rehabilitation	IRC®	
F1920~~—2015~~ 20	Standard Test Method for Performance of Rack Conveyor Commercial Dishwashing Machines	IECC®	

F1924—~~12~~ 19	Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing	IMC	IRC®

F1960— ~~2018~~ 21	Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing	IPC

F1970— ~~2018~~ 19	Special Engineered Fittings, Appurtenances or Valves for Use in Poly (Vinyl Chloride) (PVC) OR Chlorinated Poly (Vinyl Chloride) (CPVC) Systems	IPC

F1974—09~~(2015)~~ (2020)	Specification for Metal Insert Fittings for Polyethylene/Aluminum/Polyethylene and Cross-linked Polyethylene/ Aluminum/Cross-linked Polyethylene Composite Pressure Pipe	IPC	IRC®

F2006—~~17~~ 21	Standard/Safety Specification for Window Fall Prevention Devices for Nonemergency Escape (Egress) and Rescue (Ingress) Windows	IBC	IEBC	IFC

F2080— ~~2016~~ 2019	~~Specifications for Cold-expansion Fittings with Metal Compression-sleeves for Cross-linked Polyethylene (PEX) Pipe~~ Standard Specification for Cold-Expansion Fittings with Metal Compression-Sleeves for Crosslinked Polyethylene (PEX) Pipe and SDR9 Polyethylene of Raised Temperature (PE-RT) Pipe	IMC	IPC	IRC

F2090—~~17~~ 21	Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms	IBC	IEBC	IFC	IRC®

F2098— ~~2015~~ 2018	Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) to Metal Insert and Plastic Fittings	IPC

F2098—~~2015~~ 2018	Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) to Metal Insert and Plastic Insert Fittings	IMC	IRC®	
F2144—~~2017~~ 21	Standard Test Method for Performance of Large Open Vat Fryers	IECC®		
F2159— ~~2018~~ 21	Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring , or Alternate Stainless Steel Clamps for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	IPC		
F2159—~~2018~~ 21	Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring or Alternate Stainless Steel Clamps for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	IMC	IRC®	
F2200—~~17~~ 20	Standard Specification for Automated Vehicular Gate Construction	IFC		
F2306/F2306M— ~~2018~~ 20	12″ to 60″ Annular Corrugated Profile-wall Polyethylene (PE) Pipe and Fittings for Gravity Flow Storm Sewer and Subsurface Drainage Applications	IPC		
F2389— ~~2017A~~ 21	Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems	IPC		
F2389—2017A	Specification for Pressure-rated Polypropylene Piping Systems	IMC	IRC®	
F2434—~~14~~ 19	Standard Specification for ~~Metal~~ Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene (PEX-AL-PEX) Tubing	IMC	IPC	IRC®

F2561—~~17~~ 20	Standard Practice for Rehabilitation of a Sewer Service Lateral and its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner	IPC		
F2599—~~16~~ 20	Standard Practice for The Sectional Repair of Damaged Pipe by Means of an Inverted Cured-in-Place Liner	IPC		
F2623—~~14~~ 19	Standard Specification for Polyethylene of Raised Temperature (PE-RT) Systems for Non-Potable Water Applications ~~SDR9 Tubing~~	IMC	IRC®	
F2648/F2648M— ~~2017~~ 20	Standard Specification for 2 to 60 inch [50 to 1500 mm] Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Land Drainage Applications	IPC		
F2735— ~~2009 (2016)~~ 21	Standard Specification for Plastic Insert Fittings for SDR9 Cross-linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing	IPC		
F2764/F2764M— ~~2018~~ 19	~~Standard Specification for 30 to 60 in. [750 to 1500 mm] Polypropylene (PP) Triple Wall Pipe and Fittings for Non-pressure Sanitary Sewer Applications~~ Standard Specification for 6 to 60 in. [150 to 1500 mm] Polypropylene (PP) Corrugated Double and Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications	IPC		
F2769— 2018	Standard Specification for Polyethylene or Raised Temperature (PE-RT) Plastic Hot- and Cold-water Tubing and Distribution Systems	IMC	IPC	IRC
F2806—~~10(2015)~~ 20	Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (Metric SDR-PR)	IMC	IRC®	

F2831— ~~2012(2017)~~ 19	Standard Practice for Internal Non Structural Epoxy Barrier Coating Material Used in Rehabilitation of Metallic Pressurized Piping Systems	IPC

F2855—~~12~~ 19	Standard Specification for Chlorinated Poly(Vinyl Chloride)/Aluminum/Chlorinated Poly(Vinyl Chloride) (CPVC-AL-CPVC) Composite Pressure Tubing	IMC	IPC	IRC®

F2861—~~2017~~ 20	Standard Test Method for Enhanced Performance of Combination Oven in Various Modes	IECC®

F2881 /F2881M— ~~2018~~ 21	Standard Specification for 12 to 60 in. [300 to 1500 mm] Polypropylene (PP) Dual Wall Pipe and Fittings for Non-pressure Storm Sewer Applications	IPC

F2969—12(2020)	Standard Specification for Acrylonitrile-butadiene-styrene (ABS) IPS Dimensioned Pressure Pipe	IRC®

F3226/F3226M—~~16~~ 19	Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems	IPC	IRC®

F3240—~~17~~ 19e1	Standard Practice for Installation of Seamless Molded Hydrophilic Gaskets (SMHG) for Long Term Watertightness of Cured-in-Place Rehabilitation of Main and Lateral Pipelines	IPC

F3253—~~2017~~ 19	Standard Specification for Crosslinked Polyethylene (PEX) Tubing with Oxygen Barrier for Hot- and Cold-water Hydronic Distribution Systems	IMC	IRC®

F437—~~15~~ 21	Specification for Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80	IMC	IPC	ISPSC	IRC®

F439—~~13~~ 19	Specification for Socket Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80	IMC	IPC	ISPSC	IRC®
F441/F441M—~~15~~ 20	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80	IMC	IPC	IRC®	
F442/F442M—~~13E1~~ 20	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)	IRC®			
F477—14(2021)	Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe	IPC	IRC®		
F493—~~14~~ 20	Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings	IMC	IPC	IRC®	
F656— ~~2015~~ 21	Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings	IPC			
F667 /F667M — ~~20~~16 (2021)	Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings	IPC			
F714—~~13~~ 21a	Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter	IMC	IRC®		
F844~~—07a(2013)~~ 19	Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use	IRC®			
F876— ~~2017~~ 20b	Specification for Cross-linked Polyethylene (PEX) Tubing	IPC			
F876—2018A	Specification for Cross-linked Polyethylene (PEX) Tubing	IMC			
F877— ~~2018A~~ 20	Specification for Cross-linked Polyethylene (PEX) Hot- and Cold-water Distribution Systems	IPC			

G152—13(2021)	Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials	IBC	
G154—2016~~A~~	Standard Practice for Operating Fluorescent Ultraviolet (UV) ~~Light~~ Lamp Apparatus for ~~UV~~ Exposure of Nonmetallic Materials	IBC	
G155—~~13~~ 21	Standard Practice for Operating Xenon Arc ~~Light~~ Lamp Apparatus for Exposure of ~~Nonmetallic~~ Materials	IBC	
AWC	**American Wood Council**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/AWC NDS—~~2018~~ 2024	National Design Specification (NDS) for Wood Construction—with 2018 NDS Supplement	IBC	IRC®
ANSI/AWC WFCM—~~2018~~ 2024	Wood Frame Construction Manual for One- and Two-Family Dwellings	IBC	IRC®
AWC STJR—~~2021~~ 2024	Span Tables for Joists and Rafters	IBC	IRC®
AWPA	**American Wood Protection Association**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
M4—~~15~~ 21	Standard for the Handling, Storage, Field Fabrication, and Field Treatment of ~~Care~~ of Preservative-treated Wood Products	IBC	IRC®
U1—~~20~~ 23	USE CATEGORY SYSTEM: User Specification for Treated Wood Except Commodity Specification H	IBC	IRC®
AWS	**American Welding Society**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
A5.8/A5.8~~—2011-AMD1~~ :2019	Specifications for Filler Metals for Brazing and Braze Welding	IMC	

A5.8M/A5.8~~—2011-AMD1~~ :2019	Specifications for Filler Metals for Brazing and Braze Welding	IPC
A5.8M/A5.8~~—2011—AMD1~~ :2019	Specifications for Filler Metals for Brazing and Braze Welding	IRC®
D1.4/D1.4M—2018-AMD1	Structural Welding Code—Steel Reinforcing Bars	IBC

AWWA	American Water Work Association		
Standard Reference Number	**Title**	**Referenced in Code(s):**		
C110/A21.10—~~12~~ 21	~~Standard for~~ Ductile Iron & Gray Iron Fittings	IMC	IPC	IRC®
C115/A21.15—~~11~~ 20	~~Standard for~~ Flanged Ductile-iron Pipe with Ductile Iron or Grey-iron Threaded Flanges	IMC	IPC	IRC®
C153/A21.53—~~11~~ 19	Ductile-iron Compact Fittings for Water Service	IMC	IRC®	
C500—~~09~~ 19	Standard for Metal-seated Gate Valves for Water Supply Service	IPC	IRC®	
C507—~~15~~ 18	Standard for Ball Valves, 6 In. Through 60 in. (150 mm through 1,500 mm).	IPC	IRC®	
C510—~~07~~ 17	Double Check Valve Backflow Prevention Assembly	IRC®		
C652—~~11~~ 19	Disinfection of Water-storage Facilities	IPC		
C901—~~16~~ 20	Polyethylene (PE) Pressure Pipe and Tubing, 3/4 in. (19 mm) through 3 in. (76 mm) for Water Service	IMC	IPC	IRC®
C903—~~16~~ 21	Polyethylene-aluminum-polyethylene (PE-AL-PE) Composite Pressure Pipe, 12 mm ($^1/_2$ in.) through 50 mm (2 in.), for Water Service	IRC®		

CGA	Compressed Gas Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**

ANSI/CGA P-18~~—(2013)~~ (2018)	Standard for Bulk Inert Gas Systems	IFC	
C-7~~—(2014)~~ (2020)	Guide to Classification and Labeling of Compressed Gases	IFC	
S-1.1~~—(2011)~~ (2019)	Pressure Relief Device Standards—Part 1—Cylinders for Compressed Gases	IFGC	IFC
S-1.2~~—(2009)~~ 2019	Pressure Relief Device Standards—Part 2—Cargo and Portable Tanks for Compressed Gases	IFGC	IFC
S-1.3~~—(2008)~~ (2020)	Pressure Relief Device Standards—Part 3—Stationary Storage Containers for Compressed Gases	IFGC	IFC
V-1~~—(2013)~~ (2021)	Standard for Gas Cylinder Valve Outlet and Inlet Connections	IFC	

CISPI	Cast Iron Soil Pipe Institute			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
301—~~18~~ 21	Standard Specification for Hubless Cast-iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications	IPC	IPSDC	IRC®
310—~~18~~ 20	Standard Specification for Coupling for Use in Connection with Hubless Cast-iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications	IPC	IPSDC	IRC®

CPA	Composite Panel Association		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI A135.4—2012 (R2020)	Basic Hardboard	IBC	IRC®
ANSI A135.5—2012 (R2020)	Prefinished Hardboard Paneling	IBC	IRC®
ANSI A135.6~~—2012~~ (R2020)	Engineered Wood Siding	IBC	IRC®

ANSI A135.7—2012 (R2020)	Engineered Wood Trim	IRC®		

CRRC	Cool Roof Rating Council			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
ANSI/CRRC-S100~~—2020~~ 2021	Standard Test Methods for Determining Radiative Properties of Materials	IECC®		

CSA	Canadian Standards Association			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
~~ANSI/CSA FC I—2014~~ CSA/ANSI FC 1:21/CSA C22.2 NO. 62282-2-100:21	Fuel Cell Technologies—Part 3-100; Stationary fuel cell power systems—Safety	IFGC	IMC	IRC®
~~ANSI/CSA FC1—2014~~ CSA/ANSI FC 1:21/CSA C22.2 NO. 62282-3-100:21	Fuel Cell Technologies—Part 3-100; Stationary fuel cell power systems-Safety	IFGC	IMC	
~~ANSI/CSA~~ CSA/ANSI NGV 5.1~~—2016~~ :22	Residential Fueling Appliances	IFGC		
~~CAN/~~CSA~~/~~C22.2 No. 60335-2-40 ~~—2012~~ :19	~~Safety of~~ Household and Similar Electrical Appliances, Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers	IMC	ISPSC	IRC®
A257.1~~—14~~ :19	Non-reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe and Fittings	IPC		
A257.2~~—14~~ :19	Reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe and Fittings	IPC	IPSDC	IRC®
A257.3~~—14~~ : 19	Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections and Fittings Using Rubber Gaskets	IPC	IPSDC	IRC®
AAMA/WDMA/CSA 101/I.S.2/A440~~—17~~ 22	North American Fenestration Standard/Specifications for Windows, Doors and Unit Skylights	IBC	IECC®	IRC®
ANSI Z21.69-2015 (R2020)/CSA 6.16~~—2015~~ (R2020)	Connectors for Movable Gas Appliances	IFC	IRC	

ANSI Z83.26/CSA 2.37—2014	Gas-fired Outdoor Infrared Patio Heaters	IFC	
ANSI/CSA/IGSHPA C448 Series —16 (R2021)	Design and Installation of Ground Source Heat Pump Systems for Commercial and Residential Buildings	IMC	IRC®
ASME A112.18.1—~~2018~~ 2022/CSA B125.1~~—18~~ :22	Plumbing Supply Fittings	IPC	
ASME A112.18.1—~~2018~~ 2023/CSA B125.1~~—2018~~ :23	Plumbing Supply Fittings	IRC®	
ASME A112.18.2—2019/CSA B125.2~~—2019~~ 2023	Plumbing Waste Fittings	IRC®	
ASME A112.18.2—~~2015~~ 2023/CSA B125.2—~~2015~~ 2023	Plumbing Waste Fittings	IPC	
ASME A112.18.6—~~2017~~/CSA B125.6— 17(R2022)	Flexible Water Connectors	IPC	
ASME A112.19.1—~~2018~~ 2023/CSA B45.2~~—18~~ :23	Enameled Cast-iron and Enameled Steel Plumbing Fixtures	IRC®	
ASME A112.19.1—~~2020~~ 2023/CSA B45.2—~~20~~ :23	Enameled Cast-iron and Enameled Steel Plumbing Fixtures	IPC	
ASME A112.19.2—~~2018~~ 2023/CSA B45.1~~—18~~ :23	Ceramic Plumbing Fixtures	IRC®	
ASME A112.19.2—~~2020~~ :23/B45.1—~~2020~~ :23	Ceramic Plumbing Fixtures	IPC	
ASME A112.19.3—~~2017~~ 2022/CSA B45.4~~—2017~~ 22	Stainless Steel Plumbing Fixtures	IRC®	
ASME A112.19.3—~~2021~~ 2022/CSA B45.4— ~~2021~~ :22	Stainless Steel Plumbing Fixtures	IPC	
ASME A112.19.5—~~2021~~ 22/CSA B45.15—~~21~~ 22	Flush Valves and Spuds for Water Closets, Urinals and Tanks	IPC	
ASME A112.19.7—2020/CSA B45.10 :20~~1221 2012 (R20)~~	Hydromassage Bathtub Systems	IPC	

ASME A112.3.4~~—2013~~ 2018/CSA B45.9—18 (R2023)	Macerating Toilet Systems and Related Components	IRC®		
ASME A112.3.4—2018/CSA B45.9— 2018 ~~18~~ (R2023)	Macerating Toilet Systems and Waste Pumping Systems for Plumbing Fixtures	IPC		
ASME A112.4.2~~—2020~~ 2021/CSA B45.16~~—20~~ 21	Personal Hygiene Devices for Water Closet s	IPC		
ASME A112.4.2~~—2015~~ 2021/CSA B45.16~~—15~~ 21	Personal Hygiene Devices for Water-closet s	IRC®		
ASME A17.1/CSA B44~~—2019~~ 2022	Safety Code for Elevators and Escalators	IRC®		
ASME A17.1~~—2019~~ 2023/CSA B44-— 23	Safety Code for Elevators and Escalators	IBC		
ASME A17.7—2007/CSA B44.7 ~~—07(R2017)~~ 07(R2021)	Performance-based Safety Code for Elevators and Escalators	IBC		
ASSE 1002—2020/ASME A112.1002—2020/CSA B125.12 —2020	Anti-Siphon Fill Valves for Water Closet Tanks	IPC		
ASSE 1016—2017/ASME 112.1016—2017/CSA B125.16 ~~—2017~~ (R2022)	Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations	IPC	IRC®	
ASSE 1037~~—2015~~ 2020/ASME A112.1037~~—2015~~ 2020/CSA B125.37~~—15~~ :20	Performance requirements for Pressurized Flushing Devices for Plumbing Fixtures	IPC		
ASSE 1070—2020/ASME A112.1070—2020/CSA B125.~~1070—~~ :20	Performance requirements for Water Temperature Limiting Devices	IPC		
ASSE 1070~~—2015~~ 2020/ASME A112.1070~~—2015~~ 2020/CSA B125.70~~—15~~ :20	Performance Requirements for Water-temperature-limiting Devices	IRC®		
B125.3~~—18~~ :23	Plumbing Fittings	IPC	IRC®	
B137.10~~—17~~ :23	Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene (PEX-AL-PEX) Composite Pressure-pipe Systems	IMC	IPC	IRC®

B137.11—~~17~~ :23	Polypropylene (PP-R) Pipe and Fittings for Pressure Applications	IMC	IPC	IRC®		
B137.18—~~17~~ :23	Polyethylene of Raised Temperature Resistance (PE-RT) Tubing Systems for Pressure Applications	IMC	IPC	IRC®		
B137.1—~~17~~ : 23	Polyethylene (PE) Pipe, Tubing and Fittings for Cold-water Pressure Services	IMC	IPC	IRC®		
B137.2—~~17~~ :23	Polyvinylchloride (PVC) Injection-moulded Gasketed Fittings for Pressure Applications	IMC	IPC	ISPSC	IRC®	
B137.3—~~17~~ :23	Rigid ~~Poly (Vinyl Chloride)~~ polvinylchloride (PVC) Pipe and Fittings for Pressure Applications	IMC	IPC	IPSDC	ISPSC	IRC®
B137.5—~~17~~ :23	Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications	IMC	IPC	IRC®		
B137.6—~~17~~ :23	Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing and Fittings for Hot- and Cold-water Distribution Systems	IMC	IPC	ISPSC	IRC®	
B137.9—~~17~~ :23	Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure-pipe Systems	IMC	IPC	IRC®		
B181.1—~~18~~ :21	Acrylonitrile-Butadiene-Styrene ABS Drain, Waste and Vent Pipe and Pipe Fittings	IPC	IPSDC	IRC®		
B181.2—~~18~~ :21	Polyvinylchloride PVC and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings	IPC	IPSDC	IRC®		
B181.3—~~18~~ :21	Polyolefin and Polyvinylidene Fluoride (PVDF) Laboratory Drainage Systems	IPC	IRC®			
B182.13—~~18~~ :21	Profile Polypropylene (PP) Sewer Pipe and Fittings for Leak-proof Sewer Applications	IPC				
B182.1—~~18~~ :21	Plastic Drain and Sewer Pipe and Pipe Fittings	IPC	IPSDC	IRC®		

B182.2~~—18~~ :21	PSM Type Polyvinylchloride PVC Sewer Pipe and Fittings	IPC	IPSDC	IRC®
B182.4~~—18~~ :21	Profile Polyvinylchloride PVC Sewer Pipe and Fittings	IPC	IPSDC	IRC®
B182.6~~—18~~ :21	Profile Polyethylene (PE) Sewer Pipe and Fittings for Leak-proof Sewer Applications	IPC		IRC®
B182.8~~—18~~ :21	Profile Polyethylene (PE) Storm Sewer and Drainage Pipe and Fittings	IPC		IRC®
B481.1—12(R2017)	Testing and Rating of Grease Interceptors Using Lard		IPC	
B481.3—12(R2017)	Sizing, Selection, Location and Installation of Grease Interceptors		IPC	
B483.1~~—07(R2017)~~ :22	Drinking Water Treatment Systems	IPC		IRC®
B55.1—~~2015~~ 20	Test Method for Measuring Efficiency and Pressure Loss of Drain Water Heat Recovery Units	IECC®		IRC®
B55.2—~~2015~~ :20	Drain Water Heat Recovery Units		IRC®	
B602~~—16~~ :20	Mechanical Couplings for Drain, Waste and Vent Pipe and Sewer Pipe	IPC	IPSDC	IRC®
B64.1.1~~—11(R2016)~~ :21	Atmospheric Type Vacuum Breakers, (AVB)	IPC		IRC®
B64.1.2~~—11(R2016)~~ :21	Pressure Vacuum Breakers, (PVB)	IPC		IRC®
B64.1.3~~—11(R2016)~~ :21	Spill-r~~R~~esistant p~~P~~ressure v~~V~~acuum b~~B~~reakers (SRPVB)	IPC		IRC®
B64.10—17	~~Manual for the~~ Selection and Installation of Backflow ~~Prevention Devices~~ Preventers		IPC	
B64.2.1.1~~—11(2016)~~ :21	Hose Connection Dual Check Vacuum Breakers (HCDVB)	IPC		IRC®

B64.2.1~~—11(2016)~~ :21	Hose Connection Vacuum Breakers, (HCVB) with Manual Draining Feature	IPC	
B64.2.1~~—11(R2016)~~ :21	Hose Connection Vacuum Breakers (HCVB) with Manual Draining Feature	IRC®	
B64.2.2~~—11(2016)~~ :21	Hose Connection Vacuum Breakers, ~~Type~~ (HCVB) with Automatic Draining Feature	IPC	IRC®
B64.2~~—11(R2016)~~ :21	Hose Connection Vacuum Breakers, ~~Type~~ (HCVB)	IPC	IRC®
B64.3~~—11(2016)~~ :21	Dual Check Valve Backflow Preventers with Atmospheric Port (DCAP)	IRC®	
B64.3~~—11(R2016)~~ :21	Backflow Preventers, Dual Check Valve Type with Atmospheric Port (DCAP)	IPC	
B64.4.1~~—11(2016)~~ :21	Reduced Pressure Principle backflow preventers for Fire ~~Sprinklers (RPF)~~ protection systems (RPF)	IPC	IRC®
B64.4.1~~—11(R2016)~~ :21	Reduced Pressure Principle for Fire Sprinklers (RPF)	IPC	
B64.4~~—11(2016)~~ :21	Reduced Pressure Principle ~~Type~~ (RP) Backflow Preventers~~,~~	IRC®	
B64.4~~—11(R2016)~~ :21	Backflow Preventers, Reduced Pressure Principle Type (RP)	IPC	
B64.5.1~~—11(R2016)~~ :21	Double Check Valve Backflow Preventers for Fire Protection Systems (DCVAF)	IPC	
B64.5.1~~—11(2016)~~ :21	Double Check Valve Backflow Preventers, Type for Fire Systems (DCVAF)	IRC®	
B64.5~~—11(R2016)~~ :21	Double Check Valve Backflow Preventers (DCVA)	IPC	
B64.5~~—11(2016)~~ :21	Double Check Valve Backflow Preventers (DCVA)	IRC®	

B64.6~~—11(2016)~~ :21	Dual Check Valve Backflow Preventers (DuC)	IRC®		
B64.6~~—11(R2016)~~ :21	Dual Check Valve (DuC) Backflow Preventers	IPC		
B64.7~~—11(2016)~~ :21	Laboratory Faucet Vacuum Breakers (LFVB)	IRC®		
B64.7~~—11(R2016)~~ :21	Laboratory Faucet Vacuum Breakers (LFVB)	IPC		
B79—08(R2018)	Commercial and Residential Drains and Cleanouts	IPC		
C22.2 No. 108—14(R2019)	Liquid Pumps	ISPSC		
C22.2 No. 236—15	Heating and Cooling Equipment	IMC	ISPSC	IRC®
CSA B45.5~~—17~~ :22/IAPMO Z124 ~~—2017 with errata dated August 2017~~ 2022	Plastic Plumbing Fixtures	IPC		
CSA B45.5~~—2017~~ :22/IAPMO Z124~~—2017 with Errata dated August 2017~~ 2022	Plastic Plumbing Fixtures	IRC®		
CSA B55.1~~—2015~~ :20	Test Method for Measuring Efficiency and Pressure Loss of Drain Water Heat Recovery Units	IECC®		
CSA B55.2~~—2015~~ :20	Drain Water Heat Recovery Units	IECC®	IRC®	
CSA B805~~-18-~~ 17/ICC 805-2018 (R2023)	Rainwater Harvesting Systems	IPC		
CSA O325~~—16~~ :21	Construction Sheathing	IRC®		
CSA/ANSI NGV 2~~—2016~~ :19	Compressed Natural Gas Vehicle Fuel Containers	IFC		
CSA/ANSI NGV 5.1~~—2016~~ :22	Residential Fueling Appliances	IFC		
CSA/ANSI NGV 5.2~~—2017~~ :22	Vehicle Fueling Appliances (VFA)	IFGC	IFC	
Z21.56a/CSA 4.7—2017	Gas Fired Pool Heaters	ISPSC		

CTI	Cooling Technology Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ATC 105DS~~—2018~~ 2019	Acceptance Test Code for Dry Fluid Coolers	IECC®
ATC 105S~~—11~~ 2021	Acceptance Test Code for Closed Circuit Cooling Towers	IECC®
CTI STD 201 RS~~(17)~~ 2021	Performance Rating of Evaporative Heat Rejection Equipment	IECC®

DASMA	Door & Access Systems Manufacturers Association International		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/DASMA 105~~—2017~~ 2020	Test Method for Thermal Transmittance and Air Infiltration of Garage Doors and Rolling Doors	IECC®	IRC®
ANSI/DASMA 107~~—2017~~ 2020	Room Fire Test Standard for Garage Doors Using Foam Plastic Insulation	IBC	

DHA	Decorative Hardwoods Association		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/HPVA HP-1~~—2016~~ 2022	American National Standard for Hardwood and Decorative Plywood	IBC	IRC®

DOC	U.S. Department of Commerce		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
PS 1~~—19~~ 22	Structural Plywood	IBC	IRC®
PS 20~~—05~~ 20	American Softwood Lumber Standard	IBC	IRC®
PS 2—18	Performance Standard for Wood~~-based~~ Structural~~-use~~ Panels	IBC	IRC®

FEMA	Federal Emergency Management Agency

Standard Reference Number	Title	Referenced in Code(s):	
FEMA TB-11—~~01~~ 23	Crawlspace Construction for Buildings Located in Special Flood Hazard Area	IRC®	
FEMA TB-2—~~08~~ 23	Flood Damage-resistant Materials Requirements	IRC®	
FEMA-TB-11—~~01~~ 23	Crawlspace Construction for Buildings Located in Special Flood Hazard Areas	IBC	

FGIA	Fenestration & Glazing Alliance (formerly AAMA)		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
711—~~20~~ 23	Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products	IBC	IRC®
712—~~14~~ 23	Voluntary Specification for Mechanically Attached Flexible Flashing	IRC®	
714—~~20~~ 23	Voluntary Specification for Liquid Applied Flashing Used to Create a Water-resistive Seal around Exterior Wall Openings in Buildings	IBC	IRC®
AAMA/NSA 2100—~~20~~ 22	Specifications for Sunrooms	IRC®	
AAMA/WDMA/CSA 101/I.S.2/A ~~C~~440—~~17~~ 22	North American Fenestration Standard/Specifications for Windows, Doors and Unit Skylights	IECC®	

FM	FM Approvals		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
4474—~~2011~~ 2020	American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures	IBC	IRC®

GA	Gypsum Association

Standard Reference Number	Title	Referenced in Code(s):
GA 216~~—2018~~ 2021	Application and Finishing of Gypsum Panel Products	IBC
GA 600~~—2018~~ 2021	Fire-resistance and Sound Control Design Manual, ~~22nd~~ 23rd Edition	IBC
GA-253~~—2018~~ 2021	Application of Gypsum Sheathing	IRC®

IAPMO	IAPMO Group	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/CAN/IAPMO Z1001~~—2016~~ 2021	Prefabricated Gravity Grease Interceptors	IPC
ASPE/IAPMO Z1034-2015(R2020)	Test Method for Evaluating Roof Drain Performance	IPC
CSA B45.5~~—17~~ :22 /IAPMO Z124~~—2017~~ 2022 ~~with errata dated August 2017~~	Plastic Plumbing Fixtures	IPC
IAPMO Z124.7—2013(R2018)	Prefabricated Plastic Spa Shells	ISPSC
IAPMO/ANSI Z1157—2014e1(R2019)	Ball Valves	IPC

IES	Illuminating Engineering Society	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/ASHRAE/IES~~NA~~ 90.1 ~~—2019~~ 2022	Energy Standard for Buildings, Except Low-rise Residential Buildings	IECC®

IIAR	International Institute of Ammonia Refrigeration	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/IIAR 2~~—2014, including Addendum A~~ 2021	Design of Safe Closed-circuit Ammonia Refrigeration Systems	IFC

ANSI/IIAR 9~~—2018~~ 2020	~~Standard for Recognized and Generally Accepted Good Engineering Practices (RAGAGEP) for Existing Closed-circuit Ammonia Refrigeration Systems~~ Minimum System Safety Requirements for Existing Closed-Circuit Ammonia Refrigeration Systems	IFC

IKECA	**International Kitchen Exhaust Cleaning Association**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/IKECA C10~~—2016~~ 2021	Standard for the Methodology for Cleaning of Commercial Kitchen Exhaust Systems	IFC

MHI	**Material Handling Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI MH29.1~~—08~~ 2020	Safety Requirements for Industrial Scissors Lifts	IBC
ANSI/MH16.1~~—12~~ 2021	Design, Testing and Utilization of Industrial Steel Storage Racks	IBC

MSS	**Manufacturers Standardization Society of the Valve and Fittings Industry**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
ANSI SP 58~~—2018~~ 2023	Pipe Hangers and Supports—Materials, Design and Manufacture, Selection, Application and Installation	IFGC	IMC	IRC®
SP-110~~—2010~~ 2023	Ball Valves, Threaded, Socket Welding, Solder Joint, Grooved and Flared Ends (incl. a 2010 Errata Sheet)	IPC	IRC®	
SP-122~~—2017~~ 2023	Plastic Industrial Ball Valves	IPC	IRC®	
SP-139~~—2014~~ 2022	Copper Alloy Gate, Globe, Angle and Check Valves for Low Pressure/Low Temperature Plumbing Applications	IPC	IRC®	

SP-42—~~2013~~ 2022	Corrosion Resistant Gate, Globe, Angle and Check Valves with Flanged and Butt Weld Ends (Glasses 150, 300 & 600)	IRC®	
SP-67—~~2011~~ 2022	Butterfly Valves	IPC	IRC
SP-70—~~2011~~ 2023	Gray Iron Gate Valves, Flanged and Threaded Ends	IPC	IRC®
SP-70—~~2013~~ 2023	Gray Iron Gate Valves, Flanged and Threaded Ends	IPC	
SP-72—~~2010a~~ 2023	Ball Valves with Flanged or Butt-welding Ends for General Service	IPC	IRC®
SP-78—~~2011~~ 2023	Cast Iron Plug Valves, Flanged and Threaded Ends	IPC	
SP-78—~~2011~~ 2023	Cast Iron Plug Valves, Flanged and Threaded Ends	IRC®	
SP-80—~~2013~~ 2019	Bronze Gate, Globe, Angle and Check Valves	IPC	IRC®

NBBI	**National Board of Boiler and Pressure Vessel Inspectors**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
NBIC—~~2017~~ 2023	National Board Inspection Code, Part 3 (ANSI/NB23)	IMC

NCMA	**National Concrete Masonry Association**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
TEK 5—~~84~~ B(2005)	~~Details~~ Detailing ~~for~~ Concrete Masonry Fire Walls	IBC

NEMA	**National Electrical Manufacturers Association**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
250—~~2018~~ 2020	Enclosures for Electrical Equipment (1,000 Volt Maximum)	IFC
~~NEMA~~ ANSI Z535.1—2017	~~ANSI/NEMA Color Chart~~ American National Standard for Safety Colors	ISPSC

NEMA MG1—2016	Motors and Generators	IECC®			

NFPA	National Fire Protection Association				
Standard Reference Number	**Title**	**Referenced in Code(s):**			
02—~~19~~ 23	Hydrogen Technologies Code	IFC			
04—~~21~~ 24	Standard for Integrated Fire Protection and Life Safety System Testing	IBC	IFC		
105—~~19~~ 22	Standard for Smoke Door Assemblies and Other Opening Protectives	IMC	IPMC	IBC	IFC
10—~~21~~ 22	Standard for Portable Fire Extinguishers	IPMC	IBC	IFC	
110—~~19~~ 22	Standard for Emergency and Standby Power Systems	IBC	IFC		
111—~~19~~ 22	Standard on Stored Electrical Energy Emergency and Standby Power Systems	IBC	IFC		
1123—~~18~~ 22	Code for Fireworks Display	IFC			
1124—~~06~~ 22	Code for the Manufacture, Transportation, Storage and Retail Sales of Fireworks and Pyrotechnic Articles	IFC			
1124—~~17~~ 22	Code for the Manufacture, Transportation and Storage of Fireworks and Pyrotechnic Articles	IBC	IFC		
1125—~~17~~ 22	Code for the Manufacture of Model Rocket and High-power Rocket Motors	IFC			
1142—~~17~~ 22	Standard on Water Supplies for Suburban and Rural Fire Fighting	IFC			
11—~~16~~ 21	Standard for Low-, Medium, and High Expansion Foam	IBC	IFC		
12A—~~18~~ 22	Standard on Halon 1301 Fire Extinguishing Systems	IPMC	IBC	IFC	

12—~~15~~ 22	Standard on Carbon Dioxide Extinguishing Systems	IBC			
12—~~18~~ 22	Standard on Carbon Dioxide Extinguishing Systems	IPMC	IFC		
13D—~~19~~ 22	Standard for the Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes	IBC	IFC	IRC®	
13R—~~19~~ 22	Standard for the Installation of Sprinkler Systems in Low-rise Residential Occupancies	IBC	IFC	IRC®	
13—~~19~~ 22	Standard for Installation of Sprinkler Systems, 2022 and 2019 editions	IBC	IFC		
14—~~19~~ 22	Standard for the Installation of Standpipe and Hose System	IBC	IFC		
15—~~17~~ 22	Standard for Water Spray Fixed Systems for Fire Protection	IFC			
170—~~18~~ 21	Standard for Fire Safety and Emergency Symbols	IBC	IFC		
2001—~~18~~ 22	Standard on Clean Agent Fire Extinguishing Systems	IPMC	IBC	IFC	
204—~~18~~ 21	Standard for Smoke and Heat Venting	IPMC	IFC		
20—~~19~~ 22	Standard for the Installation of Stationary Pumps for Fire Protection	IBC	IFC		
211—~~19~~ 22	Standard for Chimneys, Fireplaces, Vents and Solid Fuel-burning Appliances	IFGC	IMC	IBC	IRC®
221—~~21~~ 24	Standard for High Challenge Fire Walls, Fire Walls and Fire Barrier Walls	IBC			
22—~~18~~ 23	Standard for Water Tanks for Private Fire Protection	IFC			
232—~~17~~ 22	Standard for the Protection of Records	IFC			

241—~~19~~ 22	Standard for Safeguarding Construction, Alteration and Demolition Operations	IFC	
24—~~19~~ 22	Standard for Installation of Private Fire Service Mains and Their Appurtenances	IFC	
252—~~17~~ 22	Standard Methods of Fire Tests of Door Assemblies	IBC	
253—~~19~~ 23	Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source	IBC	IFC
257—~~17~~ 22	Standard for Fire Test for Window and Glass Block Assemblies	IBC	
259—~~18~~ 23	Standard Test Method for Potential Heat of Building Materials	IBC	IRC®
25—~~20~~ 23	Standard for the Inspection, Testing and Maintenance of Water-based Fire Protection Systems	IPMC	IFC
260—~~19~~ 23	Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture	IFC	
261—~~18~~ 23	Standard Method of Test for Determining Resistance of Mock-up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes	IFC	
262—~~19~~ 23	Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-handling Spaces	IMC	
265—~~19~~ 23	Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile or Expanded Vinyl Wall Coverings on Full Height Panels and Walls	IBC	IFC

268—~~19~~ 22	Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source	IBC			
275—~~17~~ 22	Standard Method of Fire Tests for the Evaluation of Thermal Barriers	IBC	IRC®		
276—19	Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-deck Roofing Components	IBC			
276—~~15~~ 23	Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-Deck Roofing Components	IRC®			
285—~~19~~ 22	Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior ~~Nonload-bearing Wall Assemblies Containing Combustible Components~~	IBC			
286—~~15~~ 23	Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth	IBC			
288—~~17~~ 22	Standard Methods of Fire Tests of Horizontal Fire Door Assemblies Installed in Horizontal in Fire-resistance ~~related floor Systems~~ Rated Assemblies	IBC			
289—~~19~~ 23	Standard Method of Fire Test for Individual Fuel Packages	IBC	IFC		
2—19	Hydrogen Technologies Code	IFGC	IMC		
30A—~~21~~ 24	Code for Motor Fuel Dispensing Facilities and Repair Garages	IFGC	IMC	IBC	IFC
30B—~~19~~ 23	Code for the Manufacture and Storage of Aerosol Products	IFC			
30—~~21~~ 24	Flammable and Combustible Liquids Code	IBC	IFC		

318—~~18~~ 22	Standard for the Protection of Semiconductor Fabrication Facilities	IFC		
32—~~16~~ 21	Standard for Dry Cleaning Facilities	IBC	IFC	
33—~~18~~ 21	Standard for Spray Application Using Flammable or Combustible Materials	IFC		
34—~~18~~ 21	Standard for Dipping, Coating and Printing Processes Using Flammable or Combustible Liquids	IFC		
35—~~16~~ 21	Standard for the Manufacture of Organic Coatings	IFC		
37—~~18~~ 21	Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	IFGC	IMC	
385—~~17~~ 22	Standard for Tank Vehicles for Flammable and Combustible Liquids	IFC		
400—~~19~~ 22	Hazardous Materials Code	IFC		
407—~~17~~ 22	Standard for Aircraft Fuel Servicing	IFC		
409—~~16~~ 22	Standard ~~for~~ on Aircraft Hangars	IFGC	IBC	IFC
40—~~19~~ 22	Standard for the Storage and Handling of Cellulose Nitrate Film	IBC	IFC	
418—~~16~~ 21	Standard for Heliports	IBC		
45—~~19~~ 23	Standard on Fire Protection Laboratories Using Chemicals (2015 Edition)	IBC	IFC	
484—~~19~~ 22	Standard for Combustible Metals	IBC	IFC	
495—~~18~~ 23	Explosive Materials Code	IFC		
498—~~18~~ 23	Standard for Safe Havens and Interchange Lots for Vehicles Transporting Explosives	IFC		

501—~~17~~ 22	Standard on Manufactured Housing	IRC®			
505—~~18~~ 23	Fire Safety Standard for Powered Industrial Trucks, Including Type Designations, Areas of Use, Maintenance and Operation	IFC			
51—~~18~~ 23	Design and Installation of Oxygen-fuel Gas Systems for Welding, Cutting and Allied Processes	IFGC	IPC	IFC	
52—~~19~~ 22	Vehicular Gaseous Fuel System Code	IFC			
55—~~19~~ 23	Compressed Gases and Cryogenic Fluids Code	IPC	IFC		
56—~~20~~ 23	Standard for Fire and Explosion Prevention during Cleaning and Purging of Flammable Gas Piping Systems	IFC			
58—~~17~~ 23	Liquefied Petroleum Gas Code	IFGC			
58—~~20~~ 23	Liquefied Petroleum Gas Code	IMC	IBC	IFC	IRC®
59A—~~19~~ 22	Standard for the Production, Storage and Handling of Liquefied Natural Gas (LNG)	IFC			
655—~~17~~ 19	Standard for the Prevention of Sulfur Fires and Explosions	IBC	IFC		
68—~~13~~ 23	Standard on Explosion Protection by Deflagration Venting	IFC			
701—~~19~~ 23	Standard Methods of Fire Tests for Flame Propagation of Textiles and Films	IBC	IFC		
703—~~21~~ 24	Standard for Fire Retardant-treated Wood and Fire-retardant Coatings for Building Materials	IFC			
704—~~17~~ 22	Standard System for the Identification of the Hazards of Materials for Emergency Response	IMC	IBC	IFC	

72—~~19~~ 22	National Fire Alarm and Signaling Code	IMC				
750—~~19~~ 23	Standard on Water Mist Fire Protection Systems	IPMC	IBC	IFC		
76—~~16~~ 20	Standard for the Fire Protection of Telecommunications Facilities	IFC				
77—~~14~~ 24	Recommended Practice on Static Electricity	IFC				
780—~~17~~ 23	Standard for the Installation of Lightning Protection Systems	IFC				
80—~~19~~ 22	Standard for Fire Doors and Other Opening Protectives	IMC	IPMC	IBC	IFC	
85—~~19~~ 23	Boiler and Combustion System Hazards Code	IFGC	IMC	IBC	IFC	IRC®
86—~~19~~ 23	Standard for Ovens and Furnaces	IFC				
88A—~~19~~ 23	Standard for Parking Structures	IFGC				
914—~~19~~ 23	Code for Fire Protection of Historic Structures	IFC				
92—~~18~~ 21	Standard for Smoke Control Systems	IMC	IBC	IFC		
96—~~20~~ 24	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations	IMC	IFC			
99—~~21~~ 24	Health Care Facilities Code	IMC	IPC	IBC	IFC	
~~1221~~ 1225—~~19~~ 2022	Standard for the ~~Installation, Maintenance and Use of~~ Emergency Services Communications ~~Systems~~	IFC				
NFPA 101—~~21~~ 24	Life Safety Code	IEBC				
NFPA 13R—19	Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height	IEBC				

NFPA 99—21	Health Care Facilities Code	IEBC	

NFRC	National Fenestration Rating Council, Inc.		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
100—~~2020~~ 2023	Procedure for Determining Fenestration Products *U*-factors	IECC®	IRC®
200—~~2020~~ 2023	Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence	IECC®	IRC®
203—~~2017~~ 2023	~~Procedure for Determining Translucent Fenestration Product Visible Transmittance at Normal Incidence~~ Procedure for Determining Visible Transmittance of Tubular Daylighting Devices	IECC®	
400—~~2020~~ 2023	Procedure for Determining Fenestration Product Air Leakage	IECC®	IRC®

NSF	NSF International		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
14—~~2017~~ 2020	Plastic Piping System Components and Related Materials	IMC	IRC®
14—~~2018~~ 2020	Plastic Piping System Components and Related Materials	IPC	
184—~~2014~~ 2019	Residential Dishwashers	IPC	
18—~~2016~~ 2020	Manual Food and Beverage Dispensing Equipment	IPC	
350—~~2017a~~ 2020	Onsite Residential and Commercial Water Reuse Treatment Systems	IPC	IRC®
358-1—~~2017~~ 2021	Polyethylene Pipe and Fittings for Water-based Ground-source “Geothermal” Heat Pump Systems	IMC	IRC®

358-3~~—2016~~ 2021	Cross-linked Polyethylene (PEX) Pipe and Fittings for Water-based Ground-source (Geothermal) Heat Pump Systems	IMC	IRC®
358-4~~—2017~~ 2018	Polyethylene of Raised Temperature (PE-RT) Pipe and Fittings for Water-based Ground-source (Geothermal) Heat Pump Systems	IMC	IRC®
359~~—2011(R2016)~~ 2018	Valves for Crosslinked Polyethylene (PEX) Water Distribution Tubing Systems	IPC	IRC®
372~~—2016~~ 2020	Drinking Water Systems Components—Lead Content	IPC	IRC®
3~~—2017~~ 2019	Commercial Warewashing Equipment	IPC	
40~~—2018~~ 2020	Residential Wastewater Treatment Systems	IPSDC	
41~~—2016~~ 2018	Nonliquid Saturated Treatment Systems (Composing Toilets)	IPSDC	IRC®
42~~—2017~~ 2021	Drinking Water Treatment Units—Aesthetic Effects	IRC®	
50~~—2017~~ 2020	Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities	IPC	IRC®
53~~—2017~~ 2020	Drinking Water Treatment Units—Health Effects	IPC	IRC®
58~~—2017~~ 2020	Reverse Osmosis Drinking Water Treatment Systems	IPC	IRC®
61~~—2018~~ 2020	Drinking Water System Components—Health Effects	IPC	IRC®
62~~—2017~~ 2021	Drinking Water Distillation Systems	IPC	IRC®

PDI	**Plumbing and Drainage Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**

PDI G101 ~~(2012)~~ (2017)	Testing and Rating Procedure for Hydro Mechanical Grease Interceptors with Appendix of ~~Sizing and~~ Installation ~~Data~~ and Maintenance	IPC

PHTA	Pool & Hot Tub Alliance (formerly APSP)	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/APSP/ICC 15~~—2011~~ 2021	American National Standard for Residential Swimming Pool and Spa Energy Efficiency ~~Includes Addenda A Approved January 9, 2013~~	ISPSC
ANSI/APSP/ICC 16~~—2017~~ 2022	American National Standard for Suction Outlet Fittings (SOFA) for Use in Pools, Spas, and Hot Tubs	ISPSC
ANSI/APSP/ICC 4~~—2012~~ 2022	American National Standard for Aboveground/Onground Residential Swimming Pools~~—Includes Addenda A Approved April 4, 2013~~	ISPSC
ANSI/APSP/ICC/NPC 12 - ~~2016~~ 2023	American National Standard for the Plastering of Swimming Pools	ISPSC

PLIB	Pacific Lumber Inspection Bureau (formerly WCLIB)	
Standard Reference Number	**Title**	**Referenced in Code(s):**
AITC 200~~—09~~ 20	Manufacturing Quality Control Systems Manual for Structural Glued Laminated Timber	IBC

PSAI	Portable Sanitation Association International	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~PSAI/ANSI~~ ANSI/PSAI Z4.3—2016	American National Standard: for Sanitation: ~~for~~ Non-sewered Waste-disposal Systems: Minimum Requirements	IPC

RESNET	Residential Energy Services Network, Inc.	
Standard Reference Number	**Title**	**Referenced in Code(s):**

ANSI/RESNET/ICC 301—~~2019~~ 2022	Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index	IECC®
ANSI/RESNET/ICC 380—~~2019~~ 2022	Standard for Testing Airtightness of Building, Dwelling Unit and Sleeping Unit Enclosures; Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems	IECC®

RMI	Rack Manufacturers Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/MH16.1—~~12~~ 21	~~Specification for~~ Design, Testing and Utilization of Industrial Steel Storage Racks	IBC

SDI	Steel Deck Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
SDI-~~QA/QC~~ SD—~~2017~~ 2022	~~Standard for Quality Control and Quality Assurance for Installation of Steel Deck~~ Standard for Steel Deck	IBC

SJI	Steel Joist Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
SJI 100—2020	45th Edition Standard Specifications, Load Tables and Weight Tables for K-Series, LH-Series, DLH-Series and Joist Girders	IBC

SMACNA	Sheet Metal and Air Conditioning Contractors' National Association, Inc.			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
~~SMACNA/ANSI~~ ANSI/SMACNA 4th Edition~~—2016~~ 2020	HVAC Duct Construction Standards—Metal and Flexible, ~~4th Edition (ANSI)~~ (ANSI/SMACNA 006-2020)	IFGC	IMC	IRC®

~~SMACNA/ANSI~~ ANSI/SMACNA ~~—~~ 2nd edition 2013	Round Industrial Duct Construction Standards~~, 3rd Edition~~ (ANSI/SMACNA 005-2013)	IMC
~~SMACNA/ANSI~~ ANSI/SMACNA ~~—2011~~ 2nd Edition 2004	Rectangular Industrial Duct Construction Standards, ~~2nd Edition~~ (ANSI/SMACNA 002-2004)	IMC
SMACNA— 1st edition 2015	~~SMACNA~~ Phenolic Duct Construction Standards~~, 1st Edition (ANSI)~~ (ANSI/SMACNA 022-2015)	IMC
SMACNA—~~10~~ 2021	Fibrous Glass Duct Construction Standards ~~7th~~ 8th edition	IRC®
SMACNA—~~2010~~ 2021	Fibrous Glass Duct Construction Standards~~, 7th Edition~~ 8th edition	IMC
SMACNA—2nd edition 2012	HVAC Air Duct Leakage Test Manual ~~Second Edition~~ (ANSI/SMACNA 016-2012)	IECC®
SPRI	**Single-Ply Roofing Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/SPRI GT-1—~~2016~~ 21	Test Standard for Gutter Systems	IBC
ANSI/SPRI VF-1—~~17~~ 21	External Fire Design Standard for Vegetative Roofs	IBC
ANSI/SPRI/FM 4435-ES-1—~~17~~ 21	Wind Test Design Standard for Edge Systems Used with Low Slope Roofing Systems	IBC
TIA	**Telecommunications Industry Association**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/TIA 222-~~H—2017~~ I-2023	Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures	IBC
TMS	**The Masonry Society**	

Standard Reference Number	Title	Referenced in Code(s):	
216—~~2013~~ 14 (19)	~~Standard Method~~ Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies	IBC	
302—2018	Standard Method for Determining the Sound Transmission ~~Class~~ Rating s for Masonry ~~Walls~~ Assemblies	IBC	
402—~~2016~~ 2022	Building Code Requirements for Masonry Structures	IBC	IRC®
404—~~2016~~ 2023	Standard for the Design of Architectural Cast Stone	IBC	IRC®
504—~~2016~~ 2023	Standard for the Fabrication of Architectural Cast Stone	IBC	
602—~~2016~~ 2022	Specification for Masonry Structures	IBC	IRC®
604—~~2016~~ 2023	Standard for the Installation of Architectural Cast Stone	IBC	

TPI	Truss Plate Institute		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/TPI 1—~~2014~~ 2022	National Design Standard for Metal~~-plate-~~connected Wood Truss Construction	IBC	IRC®

UL	UL LLC		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
1004-1—12	Rotating Electrical Machines General Requirements—with revisions through ~~August 2018~~ November 2020	ISPSC	
1026—2012	Electric Household Cooking and Food Serving Appliances—with revisions through ~~July 2018~~ March 2021	IRC®	

103—2010	Factory-built Chimneys, for Residential Type and Building Heating Appliances—with Revisions through ~~March 2017~~ September 2021	IFGC	IMC	IBC	IRC®	
1042—2009	Electric Baseboard Heating Equipment—with revisions through ~~December 2016~~ February 2021	IRC®				
1081—2016	Swimming Pool Pumps, Filters and Chlorinators—with revisions through ~~October 2017~~ July 2020	ISPSC				
109—97	Tube Fittings for Flammable and Combustible Fluids, Refrigeration Service and Marine Use with revisions through May 2020	IMC				
10A—2009	Tin Clad Fire Doors—with Revisions through July 20, 2018	IBC				
10B—2008	Fire Tests of Door Assemblies—with Revisions through ~~February 2015~~ May 2020	IBC				
10C—2016	Positive Pressure Fire Tests of Door Assemblies - with revisions through May 2021	IBC	IFC			
10D—2017	~~Standard for~~ Fire Tests of Fire Protective Curtain Assemblies	IBC				
1240—2005	Electric Commercial Clothes-Drying Equipment—with revisions through ~~March 2018~~ September 2021	IMC				
1261—2001	Electric Water Heaters for Pools and Tubs—with revisions through September 2017	IMC				
1275—~~2014~~ 2021	Flammable Liquid Storage Cabinets~~—with revisions through February 2018~~	IFC				
127—2011	Factory-built Fireplaces—with Revisions through ~~July 2016~~ February 2020	IFGC	IMC	IBC	IECC®	IRC®

1316~~—1994~~ 2018	~~Glass~~ Fiber Reinforced ~~Plastic~~ Underground ~~Storage~~ Tanks for ~~Petroleum Products~~, ~~Alcohols and Alcohol-gasoline Mixtures~~ Flammable and Combustible Liquids—with revisions through ~~May 2006~~ March 2019	IFC		
1369—18	~~Standard for~~ Aboveground Piping for Flammable and Combustible Liquids -with revisions through August 2020	IMC		
1370—11	Unvented Alcohol Fuel Burning Decorative Appliances—with revisions through March ~~25,~~ 2016	IMC		
1389~~—2017~~ 19	Plant Oil Extraction ~~Units~~ Equipment for Installation and Use in Ordinary (Unclassified) Locations and Hazardous (Classified) Locations - with revisions through October 2020	IFC		
142—2006	Steel Aboveground Tanks for Flammable and Combustible Liquids—with revisions through ~~August 2014~~ January 2021	IFC		
1479—2015	Fire Tests of Penetration Firestops with revisions through May 2021	IMC	IBC	IRC®
1482—2011	Solid-fuel Type Room Heaters—with Revisions through ~~August 2015~~ February 2020	IMC	IBC	IRC®
1489—2016	Fire Tests of Fire Resistant Pipe Protection Systems Carrying Combustible Liquids -with revisions through October 2021	IBC	IFC	
14B—2008	Sliding Hardware for Standard Horizontally Mounted Tin Clad Fire Doors—with Revisions through ~~July 2017~~ September 2021	IBC		
14C—2006	Swinging Hardware for Standard Tin Clad Fire Doors Mounted Singly and in Pairs—with Revisions through ~~July 2017~~ October 2021	IBC		

1563—2009	Standard for Electric Spas, Hot Tubs and Associated Equipment —with revisions through ~~October 2017~~ September 2020	IMC	ISPSC	IRC®
1703—2002	Flat-plate Photovoltaic Modules and Panels—with Revisions through ~~September 2018~~ November 2019	IBC	IRC®	
1738—2010	Venting Systems for Gas Burning Appliances, Categories II, III and IV ~~with revisions through November 2014~~ August 2021	IFGC	IRC®	
1741—2010	Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources—with Revisions through ~~February 2018~~ June 2021	IBC	IFC	IRC®
174—04	Household Electric Storage Tank Water Heaters—with revisions through ~~December 2016~~ October 2021	IMC		
1777—~~2007~~ 2015	Chimney Liners—with Revisions through April ~~2014~~ 2019	IFGC	IMC	IBC
1784—2015	Air Leakage Tests of Door Assemblies-with revisions through February 2020	IBC		
180—~~2012~~ 2019	Liquid-level Indicating Gauges for Oil Burner Fuels and Other Combustible Liquids—with revisions through ~~May 2017~~ August 2021	IMC	IRC®	
1812—2013	Ducted Heat Recovery Ventilators—with revisions through ~~July 2018~~ April 2021	IMC		
1815—2012	Nonducted Heat Recovery Ventilators—with revisions through ~~July 2018~~ April 2021	IMC		
181—~~05~~ 13	Factory-made Air Ducts and Air Connectors~~—with revisions through April 2017~~	IMC		

1887—04	Fire Tests of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics—with revisions through ~~July 2017~~ October 2021	IMC			
1897—2015	Uplift Tests for Roof Covering Systems-with revisions through September 2020	IBC	IRC®		
1974—~~2017~~ 2018	~~Standard for~~ Evaluation for Repurposing Batteries	IFC			
1978—2010	Grease Ducts—with revisions through ~~April 2017~~ October 2021	IMC			
1994—2015	Luminous Egress Path Marking Systems with revisions through July 2020	IBC	IFC		
1996—2009	Electric Duct Heaters—with revisions through ~~July 2016~~ September 2021	IMC	IRC®		
2011—2019	Outline for investigation for Machinery with revisions through October 2020	IFC			
2017—2008	General-purpose Signaling Devices and Systems—with revisions through ~~January 2016~~ December 2016	IFC	ISPSC		
2024—2014	~~Safety Optical-fiber~~ Cable Routing Assemblies and Communications Cable Raceway—with revisions through August 2015	IMC			
2075—2013	~~Standard for~~ Gas and Vapor Detectors and Sensors-with Revisions through ~~December 2017~~ August 2021	IMC	IBC	IFC	IRC®
2079—2015	Tests for Fire Resistance of Building Joint Systems - with revisions through July 2020	IBC	IFC		
207—2009	Refrigerant-containing Components and Accessories, Nonelectrical—with revisions through ~~June 2014~~ January 2020	IMC			

2152—~~2016~~ 2021	Outline of Investigation for Special Purpose Nonmetallic Containers and Tanks for Specific Combustible or Noncombustible Liquids	IFC				
2158A—2013	~~Outline of Investigation for~~ Clothes Dryer Transition Duct—with revisions through ~~April 2017~~ October 2021	IFGC	IMC	IRC®		
2158—~~2018~~ 2021	Electric Clothes Dryers	IMC				
2162—2014	~~Outline of Investigation for~~ Commercial Wood-fired Baking Ovens—Refractory Type -with revisions through August 2019	IMC				
217—2015	Single and Multiple Station Smoke Alarms—with Revisions through ~~November 2016~~ April 2021	IBC	IFC	IRC®		
2196—2017	~~Standard for~~ Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables - with revisions through December 2020	IBC	IFC			
2200—~~2012~~ 2020	Stationary Engine Generator Assemblies~~—with Revisions through October 2015~~	IFGC	IMC	IBC	IFC	IRC®
2208—2010	Solvent Distillation Units—with revisions through June 2020	IFC				
2518—2016	Air Dispersion Systems - with revisions June 2021	IMC				
2524—2019	~~Standard for~~ In-building 2-way Emergency Radio Communication Enhancement Systems - revisions through February 2019	IFC				
263—11	Fire Test~~s~~ of Building Construction and Materials—with Revisions through ~~March 2018~~ August 2021	IBC				
268A—2008	Smoke Detectors for Duct Application—with revisions through August ~~2016~~ 2020	IMC				

268—2016	Smoke Detectors for Fire Alarm Systems-with revisions through ~~July 2016~~ October 2019	IMC	IPMC	IBC	IFC	IRC®
2703—2014	Mounting Systems, Mounting Devices, Clamping/Retention Devices and Ground Lugs for Use with Flat-plate Photovoltaic Modules and Panels-with Revisions through ~~December 2019~~ March 2021	IBC	IRC®			
2846—2014	Fire Test of Plastic Water Distribution Plumbing Pipe for Visible Flame and Smoke Characteristics—with revisions through ~~December 2016~~ January 2021	IMC				
300—~~2005~~ 2019	Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment~~—with revisions through December 2014~~	IFC				
30—1995	Metal Safety Cans—with revisions through ~~June 2014~~ September 2019	IFC				
325—2017	Door, Drapery, Gate, Louver and Window Operations and Systems with revisions through February 2020	IBC	IFC	IRC®		
343—~~2017~~ 2008	Pumps for Oil-burning Appliances with revisions through December 2017	IMC	IRC®			
372—2007	Automatic Electrical Controls for Household and Similar Use—Part 2: Particular Requirements for Burner Ignition Systems and Components—with revisions through ~~July 2012~~ June 2012	ISPSC				
391—2010	Solid-fuel and Combination-fuel Central and Supplementary Furnaces—with revisions through ~~June 2014~~ August 2019	IMC				
399—2017	Drinking-Water Coolers—with revisions through ~~August 2018~~ July 2020	IPC				

427—11	Standard for Refrigerating Units with revisions through February 2014	IMC		
430—2015	Waste Disposers—with revisions through ~~February 2018~~ September 2021	IPC		
441—16	Gas Vents—with revisions through ~~July 2016~~ August 2019	IRC®		
471—2010	Commercial Refrigerators and Freezers—with revisions through ~~November 2018~~ September 2019	IMC		
484—14	~~Standard for~~ Room Air Conditioners with revisions through May 2019	IMC		
507—2017	Electric Fans—with revisions through ~~August 2018~~ May 2020	IMC	IRC®	
508—2018	Industrial Control Equipment with revisions through July 2021	IMC	IPC	IRC®
515—2015	~~Standard for~~ Electric~~al~~ Resistance Trace Heating for Commercial Applications	IECC®		
536—~~2014~~ 2021	Flexible Metallic Hose	IMC	IRC®	
555C—2014	Ceiling Dampers—with Revisions through ~~May 2017~~ January 2021	IMC	IBC	
555S—2014	Smoke Dampers—with Revisions through October ~~2016~~ 2020	IMC	IBC	
555—2006	Fire Dampers—with Revisions through October ~~2016~~ 2020	IBC		
55A—2004	Materials for Built-up Roof Coverings	IBC	IRC®	
580—2006	Test for Uplift Resistance of Roof Assemblies—with Revisions through ~~October 2018~~ March 2019	IBC	IRC®	

60335-2-1000-17	~~Standard for~~ Household and Similar Electrical Appliances: Particular Requirements for Electrically Powered Pool Lifts~~, with revisions through September 29, 2017~~	ISPSC		
60601-1—2003	Medical Electrical Equipment, Part I: General Requirements for Safety - with revisions through April 2006	IFC		
60950-1—~~2014~~ 2007	Information Technology Equipment—Safety Requirements with revisions through May 2019	IFC		
61730-1—2017	Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction - with revisions through April 2020	IBC	IRC®	
61730-2—2017	Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing - with revisions through April 2020	IBC	IRC®	
62368-1—~~2014~~ ~~19~~	Audio/video, Information and Communication Technology Equipment—Safety Requirements - with revisions through October 2021	IFC		
651—2011	Schedule 40 and Schedule 80~~, Type EB and A~~ Rigid PVC Conduit and Fittings—with Revisions through ~~June 2016~~ March 2020	IFGC	IRC®	
705—2017	Power Ventilators—with revisions through ~~October 2018~~ August 2021	IFGC	IMC	IRC®
710B—2011	Recirculating Systems—with Revisions through ~~August 2014~~ February 2019	IMC	IBC	IFC
710—12	Exhaust Hoods for Commercial Cooking Equipment—with Revisions through ~~November 2013~~ February 2021	IECC®		

791—2006	~~Standard for~~ Residential Incinerators—with revisions through ~~November 2014~~ February 2021	IMC	IFC

795—2016	Commercial-Industrial Gas Heating Equipment with revisions through 2020	IFGC	IRC®

80—2007	Steel Tanks for Oil-burner Fuels and Other Combustible Liquids—with revisions through ~~January 2014~~ April 2019	IFC	IRC®

817—2015	~~Standard for~~ Cord Sets and Power-supply Cords—with revisions through ~~August 2018~~ September 2021	IFC

834—04	Heating, Water Supply and Power Boilers Electric—with revisions through ~~September 2018~~ July 2019	IMC

834—2004	Heating, Water Supply and Power Boilers—Electric—with revisions through ~~September 2018~~ July 2019	IRC®

842—~~2015~~ 2019	Valves for Flammable Fluids~~—with revisions through May 2015~~	IMC	IRC®

858—2014	Household Electric Ranges—with revisions through ~~June 2018~~ September 2019	IMC	IRC®

864—2014	Control Units and Accessories for Fire Alarm Systems—with Revisions through ~~March 2018~~ May 2020	IMC	IBC	IFC

867—2011	Electrostatic Air Cleaners—with revisions through August ~~2018~~ 2021	IMC

875—09	Electric Dry-bath Heaters—with revisions through ~~September 2017~~ January 2021	IRC®

87A—2015	Power-operated Dispensing Devices for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent—with revisions through ~~June 2017~~ September 2019	IFC		
923—2013	Microwave Cooking Appliances—with revisions through ~~July 2017~~ August 2020	IMC	IRC®	
924—2016	Standard for Safety Emergency Lighting and Power Equipment—with Revisions through May ~~2018~~ 2020	IBC	IFC	
9540A~~—2017~~ 2019	Standard for Safety Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems	IFC		
9540~~—2016~~ 2020	Energy Storage Systems and Equipment - with revisions through April 2021	IFC	IRC®	
959—2010	Medium Heat Appliance Factory-built Chimneys—with Revisions through ~~June 2014~~ August 2019	IFGC	IMC	IRC®
9—2009	Fire Tests of Window Assemblies—with Revisions through ~~February 2015~~ March 2020	IBC		
UL/CSA 60335-2-40—~~17~~ 2019	Household and Similar Electrical Appliances—Safety—Part 2~~-40~~: Particular Requirements for ~~Electrical Heat Pumps, Air-Conditioners and Dehumidifiers~~ Motor-Compressors	IMC		
UL/CSA 60335-2-89—~~17~~ 21	Household and Similar Electrical Appliances—Safety—Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor	IMC		

WDMA	**Window and Door Manufacturers Association**	
Standard Reference Number	**Title**	**Referenced in Code(s):**

AAMA/WDMA/CSA 101/I.S.2/A440—~~17~~ 22	Specifications for Windows, Doors and Unit Skylights	IBC	IECC®	IRC®

I.S. 11—~~16~~ 23	Industry Standard Analytical Method for Design Pressure (DP) Ratings of Fenestration Products	IRC®

WMA	World Millwork Alliance (formerly Association of Millwork Distributors Standards AMD)	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI WMA 100—~~2018~~ 2023	Standard Method of Determining Structural Performance Ratings of Side-Hinged Exterior Door Systems and Procedures for Component Substitution	IRC®

Reason: The CP28 Code Development Policy, Section 4.6 requires the updating of referenced standards to be accomplished administratively, and be processed as a Code Change Proposal for consideration by the Administrative Code Change Committee. In September 2021, a letter was sent to each developer of standards that is referenced in the International Codes, asking them to provide ICC with a list of their standards in order to update to the current edition. Listed are the referenced standards that are to be updated based upon responses received from standard developers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Not applicable.

IBC Fire Safety Code Change Proposals

The following code change proposals are labeled as Fire Safety code change proposals because they are proposals for changes to sections in chapters of the International Building Code that are designated as the responsibility of the IBC-Fire Safety Code Development Committee (see page xii of the Introductory pages of this monograph). However the changes included in this Group B code development cycle are to sections of the code that have been prefaced with a [S], meaning that they are the responsibility of a different IBC Code Development Committee—IBC-Structural Committee [S].

The committee assigned for each code change proposal is indicated in a banner statement near the beginning of the proposal.

FS1-22

IBC: 1401.1, [BS] 1402.3, 1404.1.1 (New), SECTION 1410 (New), 1410.1 (New), 1410.2 (New), 1410.3 (New), FIGURE 1410.3(1) (New), FIGURE 1410.3.1(2) (New), 1410.4 (New), TABLE 1410.4.2.4 (New), 1410.5 (New), 1410.6 (New), 1410.7 (New), 1410.7.1 (New), 1410.7.2 (New)

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety (testafford@charter.net); Glenn Overcash, representing Federal Emergency Management Agency (glenn.overcash@aecom.com); Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org); Pataya Scott, representing Federal Emergency Management Agency (pataya.scott@fema.dhs.gov)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

1401.1 Scope. The provisions of this chapter shall establish the minimum requirements for *exterior walls*; *exterior wall coverings*; *exterior wall* openings; exterior windows and doors; exterior soffits and fascias; and architectural *trim.*

[BS] 1402.3 ~~Structural~~ Wind resistance. *Exterior walls*, exterior wall coverings, exterior soffits, fascias, and the associated openings, shall be designed and constructed to resist safely the superimposed *loads* required by Chapter 16.

Add new text as follows:

1404.1.1 Soffits and fascias. Soffits and fascias installed as part of roof overhangs shall comply with Section 1410.

SECTION 1410
SOFFITS AND FASCIAS AT ROOF OVERHANGS

1410.1 General. Soffits and fascias at roof overhangs shall be designed and constructed in accordance with the applicable provisions of this section.

1410.2 General wind requirements. Soffits and fascias shall be capable of resisting the component and cladding loads for walls determined in accordance with Chapter 16 using an effective wind area of 10 square feet (0.93 m^2).

1410.3 Vinyl and aluminum soffit panels. Vinyl and aluminum soffit panels shall comply with Section 1410.2 and shall be installed using fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia or subfascia component in accordance with Figure 1410.3.1(1). Where the unsupported span of soffit panels is greater than 12 inches (406 mm) where the design wind pressure is greater than 30 psf or greater than 16 inches where the wind pressure is 30 psf or less, intermediate nailing strips shall be provided in accordance with Figure 1410.3.1(2). Vinyl and aluminum soffit panels shall be installed in accordance with the manufacturer's installation instructions. Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire.

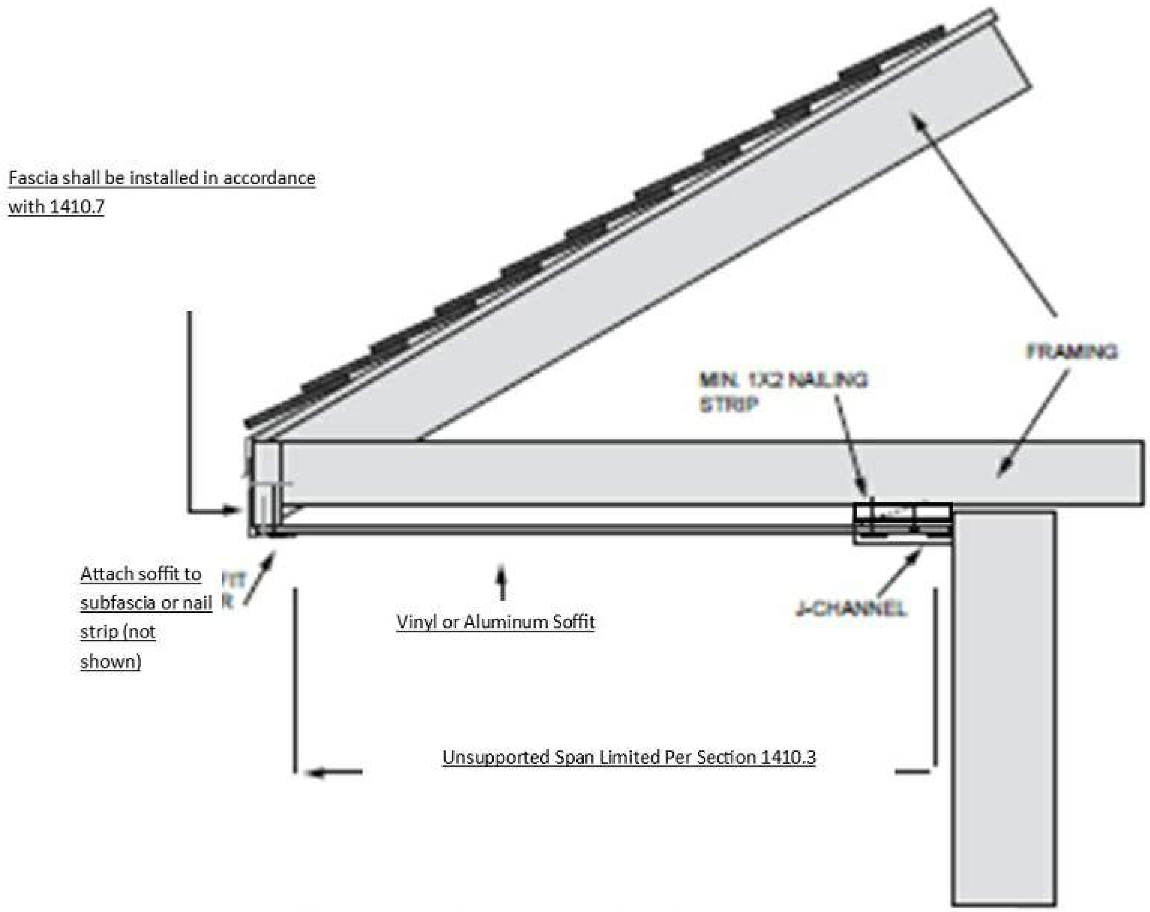


FIGURE 1410.3(1) SINGLE-SPAN VINYL OR ALUMINUM SOFFIT PANEL SUPPORT

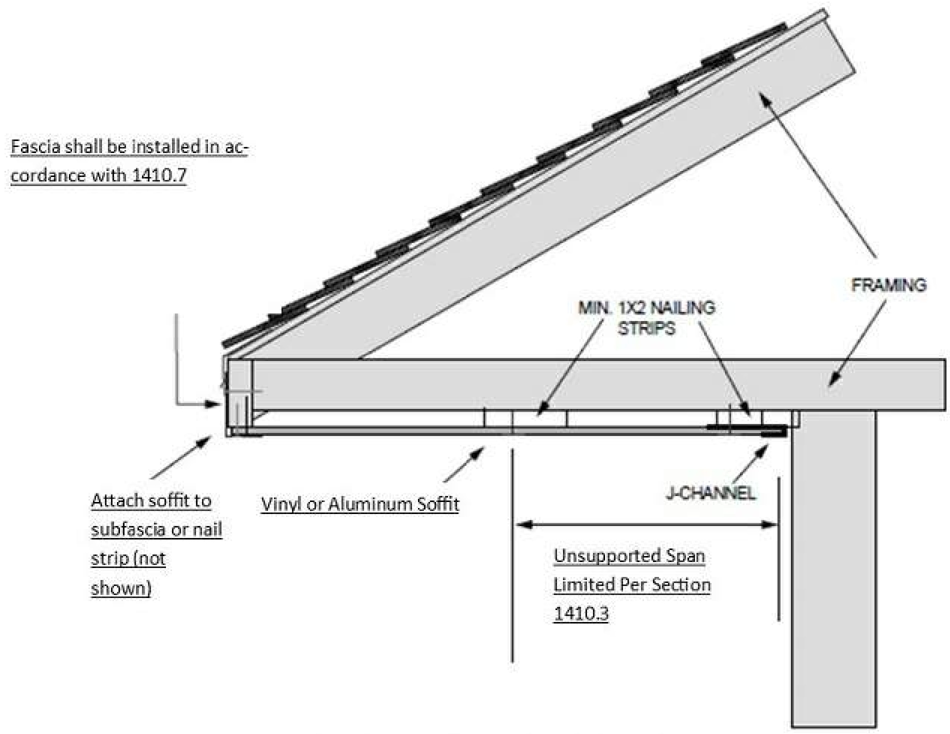


FIGURE 1410.3.1(2) DOUBLE-SPAN VINYL OR ALUMINU SOFFIT PANEL SUPPORT

1410.4 Fiber-cement soffit panels. Fiber-cement soffit panels shall comply with Section 1410.2 and shall be a minimum of 1/4 inch (6.4 mm) in thickness and comply with the requirements of ASTM C1186, Type A, minimum Grade II, or ISO 8336, Category A, minimum Class 2. Panel joints shall occur over framing or over wood structural panel sheathing. Soffit panels shall be installed with spans and fasteners in accordance with the manufacturer's installation instructions. Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modifiedround head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire.

TABLE 1410.4.2.4 PRESCRIPTIVE ALTERNATE FOR WOOD STRUCTURAL PANEL SOFFIT[b, c, d, e]

Maximum Design Pressure (+ or - psf)	Minimum Panel Span Rating	Minimum Panel Performance Category	Nail Type and Size	Fastenera Spacing Along Edges and Intermediate Supports	
				Galvanized Steel	Stainless Steel
30	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter	6f	4
40	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter	6	4
50	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter	4	4
			8d common (21/2 x 0.131 x 0.281 head diameter	6	6
60	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter	4	3
			8d common (21/2 x 0.131 x 0.281 head diameter	6	4
70	24/16	7/16	8d common (21/2 x 0.131 x 0.281 head diameter	4	4
			10d box (3 x 0.128 x 0.312 head diameter)	6	4
80	24/16	7/16	8d common (21/2 x 0.131 x 0.281 head diameter	4	4
			10d box (3 x 0.128 x 0.312 head diameter)	6	4
90	32/16	15/32	8d common (21/2 x 0.131 x 0.281 head diameter	4	3
			10d box (3 x 0.128 x 0.312 head diameter)	6	4

a. Fasteners shall comply with Section 1410.6.

b. Maximum spacing of soffit framing members shall not exceed 24 inches.

c. Wood structural panels shall be of an exterior exposure grade.

d. Wood structural panels shall be installed with strength axis perpendicular to supports with a minimum of two continuous spans.

e. Wood structural panels shall be attached to soffit framing members with specific gravity of at least 0.42. Framing members shall be minimum 2x3 nominal with the larger dimension in the cross section aligning with the length of fasteners to provide sufficient embedment depths.

f. Spacing at intermediate supports is permitted to be 12 inches on center.

1410.5 Hardboard soffit panels. Hardboard soffit panels shall comply with Section 1410.2 and shall be not less than 7/16 inch (11.11 mm) in thickness and fastened to framing or nailing strips to meet the required design wind pressures. Where the design wind pressure is 30 and less, hardboard soffit panels are permitted to be attached to wood framing with 2 1/2-inch by 0.113-inch (64 mm by 2.9 mm) siding nails spaced not more than 6 inches (152 mm) on center at panel edges and 12 inches (305 mm) on center at intermediate supports. Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire.

1410.6 Wood structural panel soffit. Wood structural panel soffits shall comply with Section 1410.2 and shall have minimum panel performance category of 3/8. Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire. Alternatively, wood structural panel soffits are permitted to attached to wood framing in accordance with Table 1410.6.

1410.7 Aluminum Fascia. Aluminum fascia shall comply with Section 1410.2 and shall be a minimum of 0.019 inches and installed in accordance with manufacturer's installation instructions. Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or other approved corrosion-resistant fasteners. Aluminum fascia shall be attached to wood frame construction in accordance with Section 1410.7.1 or 1410.7.2.

1410.7.1 Fascia installation where the design wind pressure is 30 psf or less. Where the design wind pressure is 30 pounds per square foot (1.44kPA) or less, aluminum fascia shall be a attached with one finish nail (1 ¼ x 0.057 x 0.177 head diameter) in the return leg spaced a maximum of 24 inches (610 mm) on center, and the fascia shall be inserted under the drip edge with at least 1 inch (305 mm) of fascia material covered by the drip edge. Where the fascia can not be inserted under the drip edge, the top edge of the fascia shall be secured using one finish nail (1 ¼ x 0.057 x 0.177 head diameter) located not more than 1 inch below the drip edge and spaced a maximum of 24 inches on center.

1410.7.2 Fascia installation where the design wind pressure exceeds 30 psf. Where the design wind pressure is greater than 30 pounds per square foot (1.44kPA), aluminum fascia shall be attached with one finish nail (1 ¼ x 0.057 x 0.177 head diameter) in the return leg spaced a maximum of 16 inches on center and one finish nail located no more than 1 inch below the drip edge spaced a maximum of 16 inches on center. As an alternative, the top edge of the fascia is permitted to be secured using utility trim installed beneath the drip edge with snap locks punched into the fascia spaced no more than 6 inches on center.

Reason Statement: The purpose of this code change proposal is to improve the wind performance of soffits and fascia by adding structural design requirements and compliant installation options to the International Building Code (IBC). As part of the response to Hurricane Michael in Florida, the Federal Emergency Management Agency (FEMA) deployed a Mitigation Assessment Teams (MAT) composed of national and regional building science experts who assess building performance after a disaster. These experts then incorporate lessons learned to make recommendations on improving the resilience of new construction and repairs and retrofits of existing buildings.
The following MAT-related conclusion, recommendation and supporting observations are included in FEMA P-2077, Hurricane Michael in Florida MAT Report (https://www.fema.gov/sites/default/files/2020-07/mat-report_hurricane-michael_florida.pdf). **The Hurricane Michael in Florida MAT concluded (see FL-23) that "buildings throughout the impacted area were found to be vulnerable to wind-driven rain and water infiltration."** The MAT observed wind-driven rain and water infiltration at many buildings. These vulnerabilities can lead to extensive damage and disruption of normal building operations. The MAT Report also recommended (see FL-23d) that "**designers, contractors, and inspectors should place more emphasis on proper soffit installation**" and "**should adapt the guidance in Hurricane Irma in Florida Recovery Advisory 2**, *Soffit Installation in Florida* (in FEMA P-2023, 2018g), **Hurricane Michael in Florida Recovery Advisory 2**, *Best Practices for Minimizing Wind and Water Infiltration Damage* (in FEMA P-2077, 2019a), **and Technical Fact Sheet 7.5**, "Minimizing Water Intrusion through Roof Vents in High-Wind Regions" (in FEMA P-499, 2010f) **to non-residential applications to help prevent soffit blow-off**."

Observations of non-residential soffit failure that led to water infiltration include the University of Florida Institute of Food and Agricultural Sciences Bay County Extension Building (Panama City, FL) shown below (MAT Report Figure 5-16). Several vinyl soffit panels were also blown away from the wood frame roof overhang, thereby exposing the attic space to entrance of wind-driven rain. Interior water intrusion was exacerbated by loss of roof top equipment and leakage at hip closures which led to collapse of the gypsum ceiling.

Another non-residential soffit failure at roof overhang is documented at the Bay County Courthouse addition (MAT Report Figure 5-110, shown below) where repairs to interior damages caused by the soffit breach, roof membrane damage, and flashing deficiencies at the ridge and hips were estimated to cost $477,000.

In addition the Vinyl Siding Institute has noted in several analysis reports from Hurricanes over the past several years, including Irma and Isaias that this an issue that needs to be addressed due to failures in the field.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides some clarity on the required wind loads and material specifications for soffits. The code change proposal may decrease costs for wood structural panel soffits because it provides some prescriptive solutions as an alternative to design.

FS1-22

FS2-22

IBC: [BS] 1402.3.1 (New)

Proponents: Theresa Weston, representing Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Add new text as follows:

[BS] 1402.3.1 Veneer attachment. *Veneers* shall be attached as specified in Section 1404. For *veneers* not specified in Section 1404, attachments and associated support systems shall be designed as specified in Chapter 16 and installed in accordance with manufacturer's instructions.

Reason Statement: New claddings that do not directly fit into the wall covering materials currently specified in the code are being introduced to the market. Some of these new claddings are rainscreen systems which provide drainage and ventilation functionality in addition to other cladding functions. The attachment of such claddings need to be designed to resist loads and maintain their performance safely. This proposal provides the "roadmap" to the code requirements for the design of the attachment of these claddings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add new requirements to the code. Rather, it highlights the the appropriate compliance requirements already in the code for materials that are not directly specified in the code. Therefore, it does not increase or decrease the cost of construction.

FS2-22

FS3-22

IBC: [BS] 1404.6, [BS] 1404.6.1, [BS] 1404.6.2, [BS] 1404.10

Proponents: Phillip Samblanet, representing The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.6 Anchored masonry veneer. *Anchored masonry veneer* shall comply with the provisions of Sections 1404.6 through 1404.9 and Sections ~~12.1~~ 13.1 and ~~12.2~~ 13.2 of TMS 402.

[BS] 1404.6.1 Tolerances. *Anchored masonry veneers* in accordance with Chapter 14 are not required to meet the tolerances in Article 3.3 ~~F1G~~ of TMS 602.

Delete without substitution:

~~**[BS] 1404.6.2 Seismic requirements.** *Anchored masonry veneer* located in *Seismic Design Category* C, D, E or F shall conform to the requirements of Section 12.2.2.11 of TMS 402.~~

Revise as follows:

[BS] 1404.10 Adhered masonry veneer. *Adhered masonry veneer* shall comply with the applicable requirements in this section and Sections ~~12.1~~ 13.1 and ~~12.3~~ 13.2 of TMS 402.

Reason Statement: Chapter 12 (Veneer) in TMS 402-16 was moved to Chapter 13 in TMS 402-22. Similarly, the tolerances in TMS 602 were relocated. The changes proposed here reflect those revisions.
In addition, the basis for the Veneer provisions in TMS 402 were modified to be more rationally based. Seismic design requirements are now integrally incorporated into the veneer provisions of TMS 402. As such, IBC Section 1404.6.2 is not needed any longer as these seismic requirements are adopted by the general reference in IBC Section 1404.6.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply updates section references. As such, there is no impact on construction costs.

FS3-22

FS4-22

IBC: [BS] 1404.14

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.14 Vinyl siding and Insulated Vinyl Siding. *Vinyl siding* and *insulated vinyl siding* conforming to the requirements of this section and complying with ASTM D3679 and ASTM D7793, respectively, shall be permitted on *exterior walls* where the design wind pressure determined in accordance with Section 1609 does not exceed 30 pounds per square foot (1.44 kN/m^2). Where the design wind pressure exceeds 30 pounds per square foot (1.44 kN/m^2), tests or calculations indicating compliance with Chapter 16 shall be submitted. Vinyl siding and insulated vinyl siding shall be secured to the building so as to provide weather protection for the *exterior walls* of the building.

Reason Statement: This change compliments FS134 which was been fully approved last year by the IBC fire safety committee, the introduction of ASTM D7793 and insulated vinyl siding into the IBC. The installation of vinyl siding and insulated vinyl siding are identical relative to code requirements. This proposal brings in a simple change to require insulated vinyl siding to be installed in the same manner as vinyl siding.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change adds in installation requirements for when the product is specified without any technical changes.

FS4-22

FS5-22

IBC: [BS] 1404.14

Proponents: Matthew Dobson, representing Vinyl Siding Institute

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.14 Vinyl siding. Vinyl siding conforming to the requirements of this section and complying with ASTM D3679 shall be permitted on *exterior walls* where the design wind pressure determined in accordance with Section 1609 does not exceed 30 pounds per square foot (1.44 kN/m^2). Where the design wind pressure exceeds 30 pounds per square foot (1.44 kN/m^2), tests or calculations indicating compliance with Chapter 16 shall be submitted. ~~Vinyl siding shall be secured to the building so as to provide weather protection for the *exterior walls* of the building.~~

Reason Statement: This sentence is not necessary as it is redundant to specific provisions already provided including in this sections as well as the broader code and definition for exterior wall covering.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a cleanup change.

FS5-22

FS6-22

IBC: [BS] 1404.14.1, 1404.14.1.1 (New), 1404.14.1.1.1 (New), 1404.14.1.1.2 (New)

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.14.1 Application. The siding shall be applied over sheathing or materials listed in Section 2304.6. Siding shall be applied over a ~~to conform to the~~ *water-resistive barrier* in accordance with requirements in Section 1402.5. Siding and accessories shall be installed in accordance with the *approved* manufacturer's instructions.

Add new text as follows:

1404.14.1.1 Accessories. Accessories must be installed in accordance with the *approved* manufacturer's instructions.

1404.14.1.1.1 Starter Strip. Horizontal siding shall be installed with a starter strip at the initial course at any location.

1404.14.1.1.2 Utility Trim. Under windows, and at top of walls, utility trim shall be used with snap locks.

Reason Statement: This addition brings in critical installation elements for vinyl siding, insulated vinyl siding, and polypropylene siding that sometime ignored by installers. Including these provisions will help to ensure proper installation. The two critical applications are important to highlight as they are part of the wind performance system. In some instances, systems have been installed in high wind events incorrectly resulting in product performance failure. These are standard installation procedures for horizontal polymeric cladding.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These are standard installation practices that are not being followed in some cases but need to be followed for proper product performance.

FS6-22

FS7-22

IBC: 1404.14.2 (New), TABLE 1404.14.2 (New)

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Add new text as follows:

1404.14.2 Installation over foam plastic insulating sheathing. Where vinyl siding or insulated vinyl siding is installed over foam plastic insulating sheathing, the vinyl siding shall comply with Section 1404.14 and shall have a wind load design pressure rating in accordance with Table 1404.14.2.

Exceptions:

1. Where the foam plastic insulating sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing or other approved backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with Section 1404.14.1.
2. Where the vinyl siding manufacturer's product specifications provide an approved wind load design pressure rating for installation over foam plastic insulating sheathing, use of this wind load design pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.
3. Where the foam plastic insulating sheathing and its attachment has a design wind pressure resistance complying with Sections 2603.10 and 1609, the vinyl siding shall be installed in accordance with Section 1404.14.1.

TABLE 1404.14.2 REQUIRED MINIMUM WIND LOAD DESIGN PRESSURE RATING FOR VINYL SIDING INSTALLED OVER FOAM PLASTIC SHEATHING ALONE

ULTIMATE DESIGN WIND SPEED (MPH)	ADJUSTED MINIMUM DESIGN WIND PRESSURE (ASD) (PSF)[a, b]					
	Case 1: With interior gypsum wallboard[c]			Case 2: Without interior gypsum wallboard[c]		
	Exposure			Exposure		
	B	C	D	B	C	D
≤ 95	-30.0	-33.2	-39.4	-33.9	-47.4	-56.2
100	-30.0	-36.8	-43.6	-37.2	-52.5	-62.2
105	-30.0	-40.5	-48.1	-41.4	-57.9	-68.6
110	-31.8	-44.5	-52.8	-45.4	-63.5	-75.3
115	-35.5	-49.7	-59.0	-50.7	-71.0	-84.2
120	-37.4	-52.4	-62.1	-53.4	-74.8	-88.6
130	-44.9	-62.8	-74.5	-64.1	-89.7	-106
> 130	See Note d					

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m , 1 mile per hour = 0.447 m/s, 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation is permitted.

b. The table values are based on a maximum 30-foot mean roof height, and effective wind area of 10 square feet Wall Zone 5 (corner), and the ASD design component and cladding wind pressure determined in accordance with Section 1609 multiplied by the following adjustment factors: 1.87 (Case 1) and 2.67 (Case 2).

c. Gypsum wallboard, gypsum panel product or equivalent.

d. For the indicated wind speed condition and where foam sheathing is the only sheathing on the exterior of a frame wall with vinyl siding, the wall assembly shall be capable of resisting an impact without puncture at least equivalent to that of a wood frame wall with minimum 7/16 -inch
OSB sheathing as tested in accordance with ASTM E1886. The vinyl siding shall comply with an adjusted design wind pressure requirement in accordance with Note b, using an adjustment factor of 2.67.

Reason Statement: This proposal coordinates the IBC with provisions already in the IRC (Section R703.11.2) and in ASTM D3679 for specification of vinyl siding. These provisions are supported by collaborative research including wind pressure testing of assemblies and full-scale wind tunnel tests of whole buildings with various combinations of vinyl siding and foam sheathing (see Bibliography). For buildings meeting criteria for Type V construction (where vinyl siding is permissible in the IBC), this proposal provides needed wind load pressure rating requirements for vinyl siding installed on walls that also use foam sheathing as continuous insulation for energy code compliance.

Bibliography: Please refer to the following reports and presentation for technical substantiation of the proposal (and the current identical provisions in the 2015-2021 editions of the IRC):

1. https://ibhs.org/wp-content/uploads/wpmembers/files/Wind-Loads-Multi-Layer-Wall-Systems-Air-Permeable-Exterior-Cladding_IBHS.pdf (full-scale wind tunnel study; ACI/SEI paper by IBHS, ACC, VSI, and NAHB Research Center)

2. https://www.nrel.gov/docs/fy13osti/55204.pdf (DOE Building America report on tests by NAHB Research Center)

3. https://www.energy.gov/sites/prod/files/2013/12/f6/wind_pressure_perf.pdf (presentation of DOE research and testing project results)

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase cost for use of vinyl siding on Type V buildings by requiring use of a higher wind pressure rated vinyl siding when applied over foam sheathing. However, there is no cost increase for the common condition where foam sheathing is installed over a separate sheathing material (e.g., wood structural panel, gypsum sheathing, etc.) separately capable of resting the full design wind load (see Exception 1).

FS7-22

FS8-22

IBC: [BS] 1404.17, [BS] 2603.11, [BS] 2603.12, [BS] 2603.12.1, TABLE 2603.12.1, [BS] 2603.12.2, TABLE 2603.12.2, [BS] 2603.13, [BS] 2603.13.1, TABLE 2603.13.1, [BS] 2603.13.2, TABLE 2603.13.2

Proponents: Rob Brooks, representing DuPont (rob@rtbrooks.com)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.17 Fastening. Weather boarding and wall coverings shall be securely fastened with aluminum, copper, zinc, zinc-coated or other *approved* corrosion-resistant fasteners in accordance with the nailing schedule in Table 2304.10.2 or the *approved* manufacturer's instructions. Shingles and other weather coverings shall be attached with appropriate standard-shingle nails to furring strips securely nailed to studs, or with *approved* mechanically bonding nails, except where sheathing is of wood not less than 1-inch (25 mm) nominal thickness or of *wood structural panels* as specified in Table 2308.6.3(3). Fastening of claddings or furring through foam plastic insulating sheathing shall comply with Section 1404.17.1, 1404.17.2, or 1404.17.3 as applicable.

[BS] ~~2603.11~~ 1404.17.1 Cladding attachment over foam sheathing to masonry or concrete wall construction. Cladding shall be specified and installed in accordance with this Chapter ~~14~~ and the cladding manufacturer's installation instructions or an approved design. Foam sheathing shall be attached to masonry or concrete construction in accordance with the insulation manufacturer's installation instructions or an approved design. Furring and furring attachments through foam sheathing shall be designed to resist design *loads* determined in accordance with Chapter 16, including support of cladding weight as applicable. Fasteners used to attach cladding or furring through foam sheathing to masonry or concrete substrates shall be approved for application into masonry or concrete material and shall be installed in accordance with the fastener manufacturer's installation instructions.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing and connection to a masonry or concrete substrate, those requirements shall apply.
2. For *exterior insulation and finish systems*, refer to Section 1407.
3. For anchored masonry or stone *veneer* installed over foam sheathing, refer to Section 1404.

[BS] ~~2603.12~~ 1404.17.2 Cladding attachment over foam sheathing to cold-formed steel framing. Cladding shall be specified and installed in accordance with this Chapter ~~14~~ and the cladding manufacturer's approved installation instructions, including any limitations for use over foam plastic sheathing, or an approved design. Where used, furring and furring attachments shall be designed to resist design *loads* determined in accordance with Chapter 16. In addition, the cladding or furring attachments through foam sheathing to cold-formed steel framing shall meet or exceed the minimum fastening requirements of Sections 1404.17.2.1 ~~2603.12.1~~ and 1404.17.2.2 ~~2603.12.2~~, or an approved design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.
2. For *exterior insulation and finish systems*, refer to Section 1407.
3. For anchored masonry or stone *veneer* installed over foam sheathing, refer to Section 1404.

[BS] ~~2603.12.1~~ 1404.17.2.1 Direct attachment. Where cladding is installed directly over foam sheathing without the use of furring, cladding minimum fastening requirements to support the cladding weight shall be as specified in Table ~~2603.12.1~~ 1404.17.2.1.

TABLE ~~2603.12.1~~ 1404.17.2.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

CLADDING FASTENER THROUGH FOAM SHEATHING INTO:	CLADDING FASTENER TYPE AND MINIMUM SIZE[b]	CLADDING FASTENER VERTICAL SPACING (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING[c] (inches)							
			16″ o.c. fastener horizontal spacing				24″ o.c. fastener horizontal spacing			
			Cladding weight				Cladding weight			
			3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Cold-formed steel framing (minimum penetration of steel thickness plus 3 threads)	#8 screw into 33 mil steel or thicker	6	3.00	2.95	2.20	1.45	3.00	2.35	1.25	DR
		8	3.00	2.55	1.60	0.60	3.00	1.80	DR	DR
		12	3.00	1.80	DR	DR	3.00	0.65	DR	DR
	#10 screw into 33 mil steel	6	4.00	3.50	2.70	1.95	4.00	2.90	1.70	0.55
		8	4.00	3.10	2.05	1.00	4.00	2.25	0.70	DR
		12	4.00	2.25	0.70	DR	3.70	1.05	DR	DR
	#10 screw into 43 mil steel or thicker	6	4.00	4.00	4.00	3.60	4.00	4.00	3.45	2.70
		8	4.00	4.00	3.70	3.00	4.00	3.85	2.80	1.80
		12	4.00	3.85	2.80	1.80	4.00	3.05	1.50	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa, 1 pound per square inch = 0.00689 MPa.

DR = design required, o.c. = on center.

a. Cold-formed steel framing shall be minimum 33 ksi steel for 33 mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker.
b. Screws shall comply with the requirements of AISI S240.
c. Foam sheathing shall have a minimum compressive strength of 15 pounds per square inch in accordance with ASTM C587 or ASTM C1289.

[BS] ~~2603.12.2~~ 1404.17.2.2 Furred cladding attachment. Where steel or wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table ~~2603.12.2~~ 1404.17.2.2. Where placed horizontally, wood furring shall be *preservative-treated wood* in accordance with Section 2303.1.9 or *naturally durable wood* and fasteners shall be corrosion resistant in accordance Section 2304.10.6. Steel furring shall have a minimum G60 galvanized coating.

TABLE ~~2603.12.2~~ 1404.17.2.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE[b]	MINIMUM PENETRATION INTO WALL FRAMING (inches)	FASTENER SPACING IN FURRING (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING[d] (inches)							
					16″ o.c. furring[e]				24″ o.c. furring[e]			
					Cladding weight				Cladding weight			
					3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Minimum 33 mil steel furring or minimum 1x wood furring[c]	33 mil cold-formed steel stud	#8 screw	Steel thickness plus 3 threads	12	3.00	1.80	DR	DR	3.00	0.65	DR	DR
				16	3.00	1.00	DR	DR	2.85	DR	DR	DR
				24	2.85	DR	DR	DR	2.20	DR	DR	DR
		#10 screw	Steel thickness plus 3 threads	12	4.00	2.25	0.70	DR	3.70	1.05	DR	DR
				16	3.85	1.45	DR	DR	3.40	DR	DR	DR
				24	3.40	DR	DR	DR	2.70	DR	DR	DR
	43 mil or thicker cold-formed steel stud	#8 Screw	Steel thickness plus 3 threads	12	3.00	1.80	DR	DR	3.00	0.65	DR	DR
				16	3.00	1.00	DR	DR	2.85	DR	DR	DR
				24	2.85	DR	DR	DR	2.20	DR	DR	DR
		#10 screw	Steel thickness plus 3 threads	12	4.00	3.85	2.80	1.80	4.00	3.05	1.50	DR
				16	4.00	3.30	1.95	0.60	4.00	2.25	DR	DR
				24	4.00	2.25	DR	DR	4.00	0.65	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa, 1 pound per square inch = 0.00689 MPa.

DR = Design Required, o.c. = on center.

a. Wood furring shall be spruce-pine-fir or any softwood species with a specific gravity of 0.42 or greater. Steel furring shall be minimum 33 ksi steel. Coldformed steel studs shall be minimum 33 ksi steel for 33 mil and 43 mil thickness and 50 ksi steel for 54 mil steel or thicker.

b. Screws shall comply with the requirements of AISI S240.

c. Where the required cladding fastener penetration into wood material exceeds $^{3}/_{4}$ inch and is not more than $1^{1}/_{2}$ inches, a minimum 2-inch nominal wood furring or an approved design shall be used.

d. Foam sheathing shall have a minimum compressive strength of 15 pounds per square inch in accordance with ASTM C587 or ASTM C1289.

e. Furring shall be spaced not more than 24 inches on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

[BS] ~~2603.13~~ 1404.17.3 Cladding attachment over foam sheathing to wood framing. Cladding shall be specified and installed in accordance with this Chapter ~~14~~ and the cladding manufacturer's installation instructions. Where used, furring and furring attachments shall be designed to resist design *loads* determined in accordance with Chapter 16. In addition, the cladding or furring attachments through foam sheathing to framing shall meet or exceed the minimum fastening requirements of Section ~~2603.13.1~~ 1404.17.3.1 or ~~2603.13.2~~ 1404.17.3.2, or an approved design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.
2. For *exterior insulation and finish systems*, refer to Section 1407.
3. For anchored masonry or stone *veneer* installed over foam sheathing, refer to Section 1404.

[BS] ~~2603.13.1~~ 1404.17.3.1 Direct attachment. Where cladding is installed directly over foam sheathing without the use of furring, minimum fastening requirements to support the cladding weight shall be as specified in Table ~~2603.13.1~~ 1404.17.3.1.

TABLE ~~2603.13.1~~ 1404.17.3.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

CLADDING FASTENER THROUGH FOAM SHEATHING INTO:	CLADDING FASTENER TYPE AND MINIMUM SIZE[b]	CLADDING FASTENER VERTICAL SPACING (INCHES)	MAXIMUM THICKNESS OF FOAM SHEATHING[c] (INCHES)							
			16″ o.c. fastener horizontal spacing				24″ o.c. fastener horizontal spacing			
			Cladding weight:				Cladding weight:			
			3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Wood Framing (minimum 1 1/4- inch penetration)	0.113" diameter nail	6	2.00	1.45	0.75	DR	2.00	0.85	DR	DR
		8	2.00	1.00	DR	DR	2.00	0.55	DR	DR
		12	2.00	0.55	DR	DR	1.85	DR	DR	DR
	0.120" diameter nail	6	3.00	1.70	0.90	0.55	3.00	1.05	0.50	DR
		8	3.00	1.20	0.60	DR	3.00	0.70	DR	DR
		12	3.00	0.70	DR	DR	2.15	DR	DR	DR
	0.131" diameter nail	6	4.00	2.15	1.20	0.75	4.00	1.35	0.70	DR
		8	4.00	1.55	0.80	DR	4.00	0.90	DR	DR
		12	4.00	0.90	DR	DR	2.70	0.50	DR	DR
	0.162" diameter nail	6	4.00	3.55	2.05	1.40	4.00	2.25	1.25	0.80
		8	4.00	2.55	1.45	0.95	4.00	1.60	0.85	0.50
		12	4.00	1.60	0.85	0.50	4.00	0.95	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa.

DR = Design Required, o.c. = on center.

a. Wood framing shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.

b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

c. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C587 or ASTM C1289.

[BS] ~~2603.13.2~~ 1404.17.3.2 Furred cladding attachment. Where wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table ~~2603.13.2~~ 1404.17.3.2. Where placed horizontally, wood furring shall be *preservative-treated wood* in accordance with Section 2303.1.9 or *naturally durable wood* and fasteners shall be corrosion resistant in accordance with Section 2304.10.6 .

TABLE ~~2603.13.2~~ 1404.17.3.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a, b]

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE	MINIMUM PENETRATION INTO WALL FRAMING (INCHES)	FASTENER SPACING IN FURRING (INCHES)	MAXIMUM THICKNESS OF FOAM SHEATHING[d] (INCHES)							
					16″ o.c. furring[e]				24″ o.c. furring[e]			
					Siding weight:				Siding weight:			
					3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Minimum 1x Wood Furring[c]	Minimum 2x Wood Stud	0.131" diameter nail	$1^{1}/_{4}$	8	4.00	2.45	1.45	0.95	4.00	1.60	0.85	DR
				12	4.00	1.60	0.85	DR	4.00	0.95	DR	DR
				16	4.00	1.10	DR	DR	3.05	0.60	DR	DR
		0.162" diameter nail	$1^{1}/_{4}$	8	4.00	4.00	2.45	1.60	4.00	2.75	1.45	0.85
				12	4.00	2.75	1.45	0.85	4.00	1.65	0.75	DR
				16	4.00	1.90	0.95	DR	4.00	1.05	DR	DR
		No. 10 wood screw	1	12	4.00	2.30	1.20	0.70	4.00	1.40	0.60	DR
				16	4.00	1.65	0.75	DR	4.00	0.90	DR	DR
				24	4.00	0.90	DR	DR	2.85	DR	DR	DR
		$^{1}/_{4}$" lag screw	$1^{1}/_{2}$	12	4.00	2.65	1.50	0.90	4.00	1.65	0.80	DR
				16	4.00	1.95	0.95	0.50	4.00	1.10	DR	DR
				24	4.00	1.10	DR	DR	3.25	0.50	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa, 1 pound per square inch = 0.00689 MPa.

DR = Design Required, o.c. = on center.

a. Wood framing and furring shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.
b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
c. Where the required cladding fastener penetration into wood material exceeds $^{3}/_{4}$ inch and is not more than $1^{1}/_{2}$ inches, a minimum 2-inch nominal wood furring or an approved design shall be used.
d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C587 or ASTM C1289.
e. Furring shall be spaced not greater than 24 inches on center in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

Reason Statement: Fastening of cladding through foam sheathing is currently specified in Chapter 26, but it is optimally located in the cladding attachment provisions of Chapter 14. This proposal relocates the foam sheathing cladding attachment tables from Chapter 26 to Chapter 14. The following list provides the section number revisions:
2603.11 becomes 1404.17.1

2603.12 becomes 1404.17.2

2603.12.1 becomes 1404.17.2.1

2603.12.2 becomes 1404.17.2.2

2603.13 becomes 1404.17.3

2603.13.1 becomes 1404.17.3.1

2603.13.2 becomes 1404.17.3.2

No technical revisions are provided other than section number revisions and editorial reference to "this Chapter" instead of "Chapter 14".

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This is simply relocating text from Chapter 26 to Chapter 14 and will not increase nor decrease cost.

FS8-22

FS9-22

IBC: [BS] 1404.17

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.5 ~~1404.17~~ Fastening. Weather boarding and wall coverings shall be securely fastened with aluminum, copper, zinc, zinc-coated or other *approved* corrosion-resistant fasteners in accordance with the nailing schedule in Table 2304.10.2 or the *approved* manufacturer's instructions. Shingles and other weather coverings shall be attached with appropriate standard-shingle nails to furring strips securely nailed to studs, or with *approved* mechanically bonding nails, except where sheathing is of wood not less than 1-inch (25 mm) nominal thickness or of *wood structural panels* as specified in Table 2308.6.3(3).

Reason Statement: This proposal moves Section 1404.17 to Section 1404.5 without making technical changes. The fastening requirements for exterior wall coverings apply across multiple cladding types and should be located earlier in Section 1404, prior to addressing the specific claddings. This approach is consistent with the approach taken in the IRC and for other similar requirements in the IBC such as water-resistive barriers and flashing that apply to multiple exterior wall covering conditions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a formatting change with no change to requirements or cost.

FS9-22

FS10-22

IBC: [BS] 1404.17

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.17 Fastening. Weather boarding and wall coverings shall be securely fastened with aluminum, copper, zinc, zinc-coated or other *approved* corrosion-resistant fasteners in accordance with the nailing schedule in Table 2304.10.2 or the *approved* manufacturer's instructions. Shingles and other weather coverings shall be attached with appropriate standard-shingle nails to furring strips securely nailed to studs, or with *approved* mechanically bonding nails, except where sheathing is of wood not less than 1-inch (25 mm) nominal thickness or of *wood structural panels* as specified in Table 2308.6.3(3). <u>Fastening of claddings or furring through foam plastic insulating sheathing shall comply with Section 2603.11, 2603.12, or 2603.13 as applicable.</u>

Reason Statement: Fastening of cladding through foam sheathing is addressed in Chapter 26, far removed from the cladding attachment provisions in Chapter 14. This proposal adds a reference to fastening requirements in Chapter 26 for attachment of furring or cladding through a layer of foam sheathing so that it is not overlooked. In fact, those provisions must be coordinated with attachment requirements in Chapter 14.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change requirements and simply ensures that existing requirements will be properly applied and not overlooked.

FS10-22

FS11-22

IBC: [BS] 1404.18, [BS] 1404.18.1 (New), [BS] 1404.18.1.1 (New), [BS] 1404.18.1.1.1 (New), [BS] 1404.18.1.1.2 (New), [BS] 1404.18.2 (New)

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.18 Polypropylene siding. *Polypropylene siding* conforming to the requirements of this section and complying with Section 1403.12 shall be limited to *exterior walls* located in areas where the wind speed specified in Chapter 16 does not exceed 100 miles per hour (45 m/s) and the building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. ~~*Polypropylene siding* shall be installed in accordance with the manufacturer's instructions. *Polypropylene siding* shall be secured to the building so as to provide weather protection for the *exterior walls* of the building.~~

Add new text as follows:

[BS] 1404.18.1 Installation. Unless otherwise specified in the approved manufacturer's instructions, *Polypropylene siding* and accessories shall be installed over and attached to wood structural panel sheathing with minimum thickness of 7/16 inch (11.1 mm), or other nailable substrate.

[BS] 1404.18.1.1 Accessories. Accessories shall be installed in accordance with the approved manufacturer's instructions.

[BS] 1404.18.1.1.1 Starter Strip. Horizontal siding shall be installed with a starter strip at the initial course at any location.

[BS] 1404.18.1.1.2 Under Windows and Top of Walls. Where nail hem is removed such as under windows and at top of walls, nail slot punch or predrilled holes shall be constructed.

[BS] 1404.18.2 Fastener requirements. Unless otherwise specified in the approved manufacturer's instructions, nails shall be corrosion resistant, with a minimum 0.120-inch (3 mm) shank and minimum 0.313-inch (8 mm) head diameter. Nails shall be a minimum of 1 1/4 inches (32 mm) long or as necessary to penetrate sheathing or nailable substrate not less than 3/4 inch (19.1 mm). Where the nail fully penetrates the sheathing or nailable substrate, the end of the fastener shall extend not less than 1/4 inch (6.4 mm) beyond the opposite face of the sheathing or nailable substrate. Spacing of fasteners shall be installed in accordance with the approved manufacturer's instructions.

Reason Statement: This addition brings in critical installation elements for and polypropylene siding.
Two critical applications are starter strip and utility trim, are important to highlight as they are part of the wind performance system. In some instances, systems have been installed in high wind events incorrectly resulting in product performance failure. These are standard installation procedures for horizontal polymeric cladding.

In addition this proposal highlights the need for proper nail size, spacing uniqueness, and the need to for the installation over a proper nailable substrate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change brings in critical required installation practices for the product category.

FS11-22

FS12-22

IBC: TABLE 2603.13.1, TABLE 2603.13.2

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] TABLE 2603.13.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

CLADDING FASTENER THROUGH FOAM SHEATHING INTO:	CLADDING FASTENER TYPE AND MINIMUM SIZE[~~b~~ c]	CLADDING FASTENER VERTICAL SPACING (INCHES)	MAXIMUM THICKNESS OF FOAM SHEATHING[~~c~~ d] (INCHES)							
			16″ o.c. fastener horizontal spacing				24″ o.c. fastener horizontal spacing			
			Cladding weight:				Cladding weight:			
			3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Wood Framing (minimum $1^{1}/_{4}$- inch penetration) [b]	0.113" diameter nail	6	2.00	1.45	0.75	DR	2.00	0.85	DR	DR
		8	2.00	1.00	DR	DR	2.00	0.55	DR	DR
		12	2.00	0.55	DR	DR	1.85	DR	DR	DR
	0.120" diameter nail	6	3.00	1.70	0.90	0.55	3.00	1.05	0.50	DR
		8	3.00	1.20	0.60	DR	3.00	0.70	DR	DR
		12	3.00	0.70	DR	DR	2.15	DR	DR	DR
	0.131" diameter nail	6	4.00	2.15	1.20	0.75	4.00	1.35	0.70	DR
		8	4.00	1.55	0.80	DR	4.00	0.90	DR	DR
		12	4.00	0.90	DR	DR	2.70	0.50	DR	DR
	0.162" diameter nail	6	4.00	3.55	2.05	1.40	4.00	2.25	1.25	0.80
		8	4.00	2.55	1.45	0.95	4.00	1.60	0.85	0.50
		12	4.00	1.60	0.85	0.50	4.00	0.95	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa.

DR = Design Required, o.c. = on center.

a. Wood framing shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.

b. The thickness of wood structural panels complying with the specific gravity requirement of Note a shall be permitted to be included in satisfying the minimum penetration into framing.

~~b.~~ c. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

~~c.~~ d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C587 or ASTM C1289.

[BS] TABLE 2603.13.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a, b]

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE	MINIMUM PENETRATION INTO WALL FRAMING (INCHES)[c]	FASTENER SPACING IN FURRING (INCHES)	MAXIMUM THICKNESS OF FOAM SHEATHING[~~d~~ e] (INCHES)							
					16″ o.c. furring[~~e~~ f]				24″ o.c. furring[~~e~~ f]			
					Siding weight:				Siding weight:			
					3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Minimum 1x Wood Furring[~~c~~ d]	Minimum 2x Wood Stud	0.131" diameter nail	$1^1/_4$	8	4.00	2.45	1.45	0.95	4.00	1.60	0.85	DR
				12	4.00	1.60	0.85	DR	4.00	0.95	DR	DR
				16	4.00	1.10	DR	DR	3.05	0.60	DR	DR
		0.162" diameter nail	$1^1/_4$	8	4.00	4.00	2.45	1.60	4.00	2.75	1.45	0.85
				12	4.00	2.75	1.45	0.85	4.00	1.65	0.75	DR
				16	4.00	1.90	0.95	DR	4.00	1.05	DR	DR
		No. 10 wood screw	1	12	4.00	2.30	1.20	0.70	4.00	1.40	0.60	DR
				16	4.00	1.65	0.75	DR	4.00	0.90	DR	DR
				24	4.00	0.90	DR	DR	2.85	DR	DR	DR
		$^1/_4$" lag screw	$1^1/_2$	12	4.00	2.65	1.50	0.90	4.00	1.65	0.80	DR
				16	4.00	1.95	0.95	0.50	4.00	1.10	DR	DR
				24	4.00	1.10	DR	DR	3.25	0.50	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa, 1 pound per square inch = 0.00689 MPa.

DR = Design Required, o.c. = on center.

a. Wood framing and furring shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.

b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

c. The thickness of wood structural panels complying with the specific gravity requirements of Note a shall be permitted to be included in satisfying the minimum required penetration into framing.

~~c.~~ d. Where the required cladding fastener penetration into wood material exceeds $^3/_4$ inch and is not more than $1^1/_2$ inches, a minimum 2-inch nominal wood furring or an approved design shall be used.

~~d.~~ e. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C587 or ASTM C1289.

~~e.~~ f. Furring shall be spaced not greater than 24 inches on center in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

Reason Statement: This proposal adds a new footnote to Tables 2603.13.1 and 2603.13.2 to coordinate with changes made to identical tables in the 2021 IRC. Wood structural panels have fastener dowel bearing and shear capacities similar to that for wood framing and can be safely included in determining the embedment depth required for fasteners in accordance with Tables 2603.13.1 and 2603.13.2.

Cost Impact: The code change proposal will decrease the cost of construction
The impact will be a small decrease in cost due to slightly less cladding fastener length required for embedment in wood framing where wood structural panels are used and contribute to the fastener embedment. This will also improve constructability in marginal cases based on availability of fasteners of a suitable length to meet the required embedment.

FS12-22

IBC General Code Change Proposals

The following code change proposals are labeled as General code change proposals because they are proposals for changes to sections in chapters of the International Building Code that are designated as the responsibility of the IBC-General Code Development Committee (see page xii of the Introductory pages of this monograph). However the changes included in this Group B code development cycle are to sections of the code that have been prefaced with a [S] and [RB], meaning that they are the responsibility of a different IBC Code Development Committee—IBC-Structural Committee [S] and IRC Code Development Committee—IRC-Building.

The committees assigned for each code change proposal is indicated in a banner statement near the beginning of the proposal.

G1-22 Part I

PART I - IBC: SECTION 202; IFC: SECTION 202; IEBC: SECTION 202 (New)

PART 2: IRC: SECTION 202

Proponents: Tim Earl, representing The Gypsum Association (tearl@gbhinternational.com)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE, PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[BS] GYPSUM BOARD.
A type of gypsum panel product consisting of a noncombustible core primarily of gypsum with paper surfacing. ~~The generic name for a family of sheet products consisting of a noncombustible core primarily of gypsum with paper surfacing.~~

[BS] GYPSUM PANEL PRODUCT. The general name for a family of sheet products consisting essentially of gypsum complying with the standards specified in Table 2506.2 and Table 2507.2, and Chapter 35. ~~*Gypsum board*and*glass mat gypsum panels* are examples of *gypsum panel products*.~~

[BS] GYPSUM SHEATHING. *Gypsum panel products* specifically manufactured with enhanced water resistance for use as a substrate for exterior surface materials.

[BS] GYPSUM WALLBOARD. A *gypsum board* used primarily as an interior surfacing for building structures.

2021 International Fire Code

Revise as follows:

[BS] GYPSUM BOARD. A type of gypsum panel product consisting of a noncombustible core primarily of gypsum with paper surfacing. ~~Gypsum wallboard, gypsum sheathing, gypsum base for gypsum veneer plaster, exterior gypsum soffit board, predecorated gypsum board or water-resistant gypsum backing board complying with the standards listed in Tables 2506.2 and 2507.2 and Chapter 35 of the International Building Code.~~

Add new definition as follows:

GYPSUM PANEL PRODUCT. The general name for a family of sheet products consisting essentially of gypsum complying with the standards specified in Table 2506.2 and Table 2507.2, and Chapter 35 of the International Building Code.

2021 International Existing Building Code

Add new definition as follows:

GYPSUM BOARD. A type of gypsum panel product consisting of a noncombustible core primarily of gypsum with paper surfacing.

GYPSUM PANEL PRODUCT. The general name for a family of sheet products consisting essentially of gypsum complying with the standards specified in Table 2506.2 and Table 2507.2, and Chapter 35 of the International Building Code.

GYPSUM SHEATHING. Gypsum panel products specifically manufactured with enhanced water resistance for use as a substrate for exterior surface materials.

GYPSUM WALLBOARD. A gypsum board used primarily as an interior surfacing for building structures.

G1-22 Part I

G1-22 Part II

PART I - IBC: SECTION 202; IFC: SECTION 202; IEBC: SECTION 202 (New)

PART 2: IRC: SECTION 202

Proponents: Tim Earl, representing The Gypsum Association (tearl@gbhint.com)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE, PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

[RB] GYPSUM BOARD. ~~The generic name for a family of sheet products~~ A type of gypsum panel product consisting of a noncombustible core primarily of gypsum with paper surfacing. ~~Gypsum wallboard, gypsum sheathing, gypsum base for gypsum *veneer* plaster, exterior gypsum soffit board, predecorated gypsum board and water-resistant gypsum backing board complying with the standards listed in Section R702.3 and Part IX of this code are types of gypsum board.~~

[RB] GYPSUM PANEL PRODUCT. The general name for a family of sheet products consisting essentially of gypsum complying with the standards specified in Section R702.3 and Part IX of this code.

[RB] GYPSUM SHEATHING. Gypsum panel products specifically manufactured with enhanced water resistance for use as a substrate for exterior surface materials.

[RB] GYPSUM WALLBOARD. A gypsum board used primarily as interior surfacing for building structures.

Reason Statement: This clarifies the term already used in the code and more closely harmonizes the terms and definitions to what is being used by ASTM and the industry than what currently exists.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply clarifies the terms and harmonizes to what is being used by ASTM and the industry.

G1-22 Part II

G2-22

IBC: SECTION 202 (New)

Proponents: David Bonowitz, representing Self (dbonowitz@att.net)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

Add new definition as follows:

LIFE SAFETY COMPONENTS (for risk category). Components of *life safety systems*, *designated seismic systems*, *emergency power systems*, and emergency and egress lighting systems. This definition of *life safety components* is limited in application to the provisions of Section 1604.5.

Reason Statement:
This proposal defines a term already used in Section 1604.5.1. (If approved, the words "life safety components," currently used only in Sec 1604.5.1, would be italicized by staff.)

The term "life safety components" is similar to the term *life safety systems*, which was defined only in the 2021 IBC. But "life safety components" is also understood to include certain nonstructural components commonly considered "life safety systems" for purposes of seismic design, as cited in Section 1613 and as used without definition in ASCE 7. Those are identified by the IBC-defined term *designated seismic systems*.

Thus, a reasonable definition of *life safety components*, as already used in Section 1604.5.1 can be derived by combining these two groups of components. By adding *emergency power systems* (also already defined) and lighting, the proposed definition also draws from (and coordinates with) the scope of ASCE 41 (see below).

For reference:

ASCE 7 does not define "life safety systems," but for the design of protection for nonstructural components, Chapter 13 sets the component importance factor equal to 1.5 for any component "required to function for life-safety purposes after an earthquake, including fire protection sprinkler systems and egress stairways." The IBC term *designated seismic systems* covers these.

Similarly, ASCE 41 does not define "life safety systems," but its Tier 1 procedure includes a checklist section titled "Life Safety System," which includes the following items:

- Fire suppression piping: anchorage
- Flexible couplings (for fire suppression piping)
- Emergency power: anchorage of "equipment used to power or control Life Safety systems"
- Stair and smoke ducts
- Sprinkler ceiling clearance
- Emergency lighting (includes egress lighting)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal merely codifies the current understanding of a previously undefined term, using other terms already defined in the IBC.

G2-22

G3-22

IBC: SECTION 202

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

Revise as follows:

[BS] ROOF COVERING. A system designed to cover ~~The covering applied to~~ the *roof deck* and provide ~~for~~ weather resistance, fire classification or appearance. The system consists of a membrane or water-shedding layer and can include an *underlayment*, a thermal barrier, insulation or a *vapor retarder*.

Reason Statement: This code change proposal is intended to clarify the current definition of the term "roof covering" and better coordinate it with the defined term "roof assembly."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal re-words the definition for the term roof covering to use similar wording from the broader term roof assembly, which is also included in Section 202. There is no change to the technical content or intent of the definition. Approving this proposal will result in no change in construction or construction cost.

G3-22

G4-22 Part I

PART I - IBC: SECTION 202; IEBC: SECTION 202;
PART II - IRC: SECTION 202

Proponents: Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org); Justin Koscher, Polyisocyanurate Insulation Manufacturers Association, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE, PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[BS] ROOF REPLACEMENT. ~~The process of removing the existing *roof covering*, repairing any damaged substrate and installing a new *roof covering*.~~ An alteration that includes the removal of all existing layers of *roof assembly* materials down to the roof deck and installing replacement materials above the existing roof deck.

2021 International Existing Building Code

Revise as follows:

[BS] ROOF REPLACEMENT. ~~The process of removing the existing roof covering, repairing any damaged substrate and installing a new roof covering~~. An alteration that includes the removal of all existing layers of *roof assembly* materials down to the roof deck and installing replacement materials above the existing roof deck.

G4-22 Part I

G4-22 Part II

PART I - IBC: SECTION 202; IEBC: SECTION 202;

PART II - IRC: SECTION 202

Proponents: Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org); Justin Koscher, Polyisocyanurate Insulation Manufacturers Association, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE, PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

[RB] ROOF REPLACEMENT. ~~The process of removing the existing *roof covering*, repairing any damaged substrate and installing a new *roof covering*.~~ An alteration that includes the removal of all existing layers of *roof assembly* materials down to the roof deck and installing replacement materials above the existing roof deck. For the definition applicable in Chapter 11, see Section N1101.6.

Reason Statement: This proposal revises the definition for roof replacement to reflect the intent and the scope of the roof replacement activity that takes place, which includes removal of all existing materials installed above the roof deck, removing those materials down to the roof deck, and installing a new roof assembly above the roof deck. The definition more explicitly states that roof replacement is an alteration as indicated in Section C503 of the IECC. The revised language in the definition more appropriately aligns with the requirements in Chapter 15 (Section 1512) of the IBC. The term “roof assembly” is already defined in the IECC and in the IBC (for use in Chapter 15). Furthermore, PIMA submitted a code change proposal for the Group B development cycle to explicitly reflect that existing roof insulation that is in good repair may be reused as part of a roof replacement (Section 1512.4). Therefore, this proposal should not be interpreted as requiring the disposal of existing roof insulation that is in good repair. This proposal simply aligns the definition with the existing requirements for roof replacements, which are intended in part to ensure that the building and roof deck are in proper condition prior to the installation of new roofing materials.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will have no impact on the cost of construction. The proposal does not impose new requirements.

G4-22 Part II

G5-22 Part I

PART 1 - IBC: SECTION 202 (New); IFC: SECTION 202 (New)

PART 2 - IRC: SECTION 202 (New)

Proponents: Tim Earl, representing The Gypsum Association (tearl@gbhinternational.com)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE, PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

TYPE X. A type of gypsum panel product with special core additives to increase the fire resistance as specified by the applicable standards listed in Table 2506.2. (see the definition of 'Gypsum panel product')

2021 International Fire Code

Add new definition as follows:

TYPE X. A type of gypsum panel product with special core additives to increase the fire resistance as specified by the applicable standards listed in Table 2506.2. (see the definition of 'Gypsum panel product')

G5-22 Part I

G5-22 Part II

PART 1 - IBC: SECTION 202 (New); IFC: SECTION 202 (New)

PART 2 - IRC: SECTION 202 (New)

Proponents: Tim Earl, representing The Gypsum Association (tearl@gbhint.com)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE, PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Add new definition as follows:

TYPE X. A type of gypsum panel product with special core additives to increase the fire resistance as specified by the applicable standards specified in Section R702.3 and Part IX. (see the definition of 'Gypsum panel product')

Reason Statement: This clarifies the term already used in the code and harmonizes the terms and definitions to what is being used by ASTM and the industry.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simply adding a definition for a term already used in the code.

G5-22 Part II

G6-22

IBC: SECTION 202

Proponents: Dennis Richardson, representing self (dennisrichardsonpe@yahoo.com)

THIS CODE CHANGE WILL BE HEARD BY THE STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] WALL, LOAD-BEARING. Any wall meeting either of the following classifications:

1. Any metal or wood stud wall that <u>is required to</u> <u>support</u> ~~supports~~ more than 100 pounds per linear foot (1459 N/m) of vertical load in addition to its own weight.
2. Any *masonry,* concrete or *mass timber* wall that <u>is required to</u> <u>support</u> ~~supports~~ more than 200 pounds per linear foot (2919 N/m) of vertical *load* in addition to its own weight.

Reason Statement: The current code language has resulted in vastly different interpretations by some designers and code officials, costing thousands of dollars and creating substantial project delays depending when the issue is raised and how long it takes to resolve.

When light frame walls are balloon framed as in Detail A and roof and floor joists are parallel and close to the wall, the definition is clear and there is little disagreement. If the weight of the load imposed by the floor and roof sheathing (spanning perpendicular to the wall) is more than 100 pounds per lineal foot, neglecting the weight of the balloon framed wall, then the wall is considered load-bearing. If equal to or less than 100 pounds per lineal foot the wall is considered non-load bearing according to the definition. In Type III construction, Group R occupancy, where this configuration is common, load bearing or not is the difference between the wall being required to be 2 hour fire resistance rated in Table 601 for load bearing walls and not rated at all if the Fire Separation Distance, FSD, of the wall is 30 feet or more in Table 602.

When light frame walls are platform framed as in Details B or C there is disagreement between some. The same height of wall from foundation to top of parapet with the same 100 pound per linear foot or less imposed load from the roof and wall sheathing is now considered by some to be load bearing because the segment of platform framed wall above is considered to impose additional load on the segment of platform framed wall below. Since the wall segments are framed separately some choose to ignore the part of the definition that says to neglect the weight of the wall.

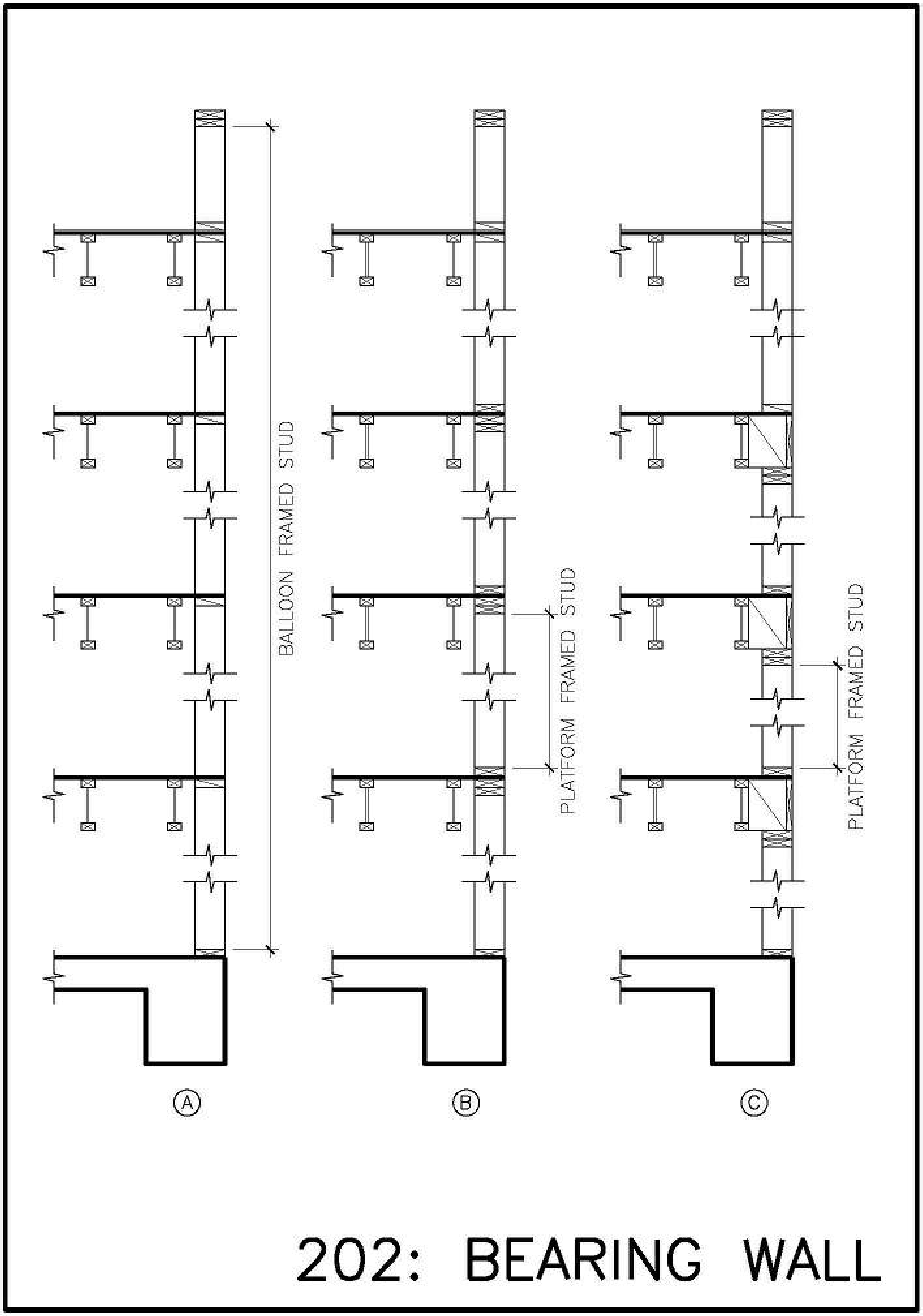
The key issue from an intent standpoint in the code is exterior and interior bearing walls that could result in a collapse of the structure if compromised by fire deserve greater protection depending on the height and number of stories of the building. Those who feel the platform framed walls in Details B or C are bearing walls state the wall segments above could fall if the segment below carrying their weight is compromised by fire or hit by a car.

In reality for the walls to have less than 100 pounds per linear foot of load applied from multiple floors of roof and wall sheathing spanning perpendicular to the wall line then the wall must be parallel and very close to the roof and floor framing. Light frame walls with finish materials tend to act as deep beams and will span a long distance under their own weight. The exterior walls are attached to the perpendicular walls and floor sheathing as required by the code. The concern that a compromised section of platform framed wall will somehow collapse under its own weight is not valid in this configuration and it is clear the light walls also will not cause the multiple floors that are designed to span parallel to the wall to fall either.

There is an alternate load path of the wall acting as a deep beam and/or floor joist spanning to the perpendicular bearing walls with their protection as required by table 601. Even though a segment of platform framed wall may carry the weight of the platform framed walls above when constructed, they are not required to carry the weight of segments above due to this alternate load path. Removing a segment of platform framed wall will not cause the other segments of wall, the floor or roof to collapse.

This code change proposes to insert the words “is required to” support more than 100 pounds per lineal foot into the definition in order to make the distinction clearer for light frame construction. Input on this code change has suggested the same language should also be added for item 2, masonry, concrete or mass timber walls to be consistent as the same confusion could occur with platform framed mass timber wall construction.

Other solutions to this interpretation problem result in a longer and more complex definition and may result in unintended consequences so three words “is required to” were chosen to try and keep this code change proposal as simple as possible.
See sketch A, B and C indicated below.



Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change clarifies language that is confusing but does not change the code.

G7-22

IBC: [BS] 403.2.2, [BS] 403.2.2.1, [BS] 403.2.2.2, [BS] 403.2.2.3, [BS] 403.2.2.4

Proponents: Gabriel Quintana, Northwest Wall and Ceiling Bureau (NWCB), representing Northwest Wall and Ceiling Bureau (NWCB) (gabe@nwcb.org)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

SECTION 403
HIGH-RISE BUILDINGS

Revise as follows:

[BS] 403.2.2 Structural integrity of interior exit stairways and elevator hoistway enclosures. For *high-rise buildings of Risk Category* III or IV in accordance with Section 1604.5, and for all buildings that are more than 420 feet (128 m) in *building height*, enclosures for *interior exit stairways* and elevator hoistway enclosures shall comply with Sections 403.2.2.1 through ~~403.2.2.4~~ 403.2.2.3.

Delete without substitution:

~~**[BS] 403.2.2.1 Wall assembly materials—soft body impact.** The panels making up the enclosures for *interior exit stairways* and elevator hoistway enclosures shall meet or exceed Soft Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.~~

Revise as follows:

[BS] ~~403.2.2.2~~ 403.2.2.1 Wall assembly materials~~—hard body impact~~. ~~The panels making up the enclosures for *interior exit stairways* and elevator hoistway enclosures that are not exposed to the interior of the enclosures for *interior exit stairways* or elevator hoistway enclosure~~ Where an interior exit stairway enclosure or an elevator hoistway enclosure is constructed as an interior wall of the building, the panels applied to the exterior of the enclosure shall be in accordance with one of the following:

1. The wall assembly shall incorporate not fewer than two layers of impact-resistant panels, each of which meets or exceeds Soft Body Impact Classification Level 2 and Hard Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.
2. The wall assembly shall incorporate not fewer than one layer of impact-resistant panels that meet or exceed Soft Body Impact Classification Level 2 and Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.
3. The wall assembly incorporates multiple layers of any material, tested in tandem, that meets or exceeds Soft Body Impact Classification Level 2 and Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.

[BS] ~~403.2.2.3~~ 403.2.2.2 Concrete and masonry walls. Concrete or masonry walls shall be deemed to satisfy the requirements of ~~Sections~~ Section 403.2.2.1 ~~and 403.2.2.2~~.

[BS] ~~403.2.2.4~~ 403.2.2.3 Other wall assemblies. Any other wall assembly that provides impact resistance equivalent to that required by Section~~s~~ 403.2.2.1 for Soft Body Impact Classification Level 2 and ~~403.2.2.2~~ for Hard Body Impact Classification Level 3, as measured by the test method described in ASTM C1629/C1629M, shall be permitted.

Reason Statement: The code proposal reorganizes and clarifies the sections. It makes it much clearer that both soft and hard body criteria must be met in all cases. It also clarifies which walls/side of the enclosure are to have these materials.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a simple reorganization and clarification of language.

G7-22

G8-22

IBC: [BS] 403.2.2.3

Proponents: Thom Zaremba, Roetzel & Andress, representing National Glass Association (tzaremba@ralaw.com); Nicholas Resetar, representing Glazing Industry Code Committee (GICC) (nresetar@ralaw.com)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

SECTION 403
HIGH-RISE BUILDINGS

Revise as follows:

[BS] 403.2.2.3 Concrete , ~~and~~ masonry and glass walls. Concrete or masonry walls shall be deemed to satisfy the requirements of Sections 403.2.2.1 and 403.2.2.2. Glass walls complying with the safety glazing impact requirements of CPSC 16 CFR 1201, Cat. II or ANSI Z97.1, Class A shall be deemed to satisfy the requirements of Sections 403.2.2.1 and 403.2.2.2.

Reason Statement: The proposed change is needed to avoid costly, time consuming and unnecessary testing of glass walls that are already tested and marked as meeting the impact safety glazing standards set out in CPSC 16 CFR 1201, Cat II, or ANSI Z97.1, Class A. Testing glass walls to either safety glazing standard will subject them to impact testing at 400 ft. lbs. of force. The tests specified in Sections 403.2.2.1 and 403.2.2.2 only subject test specimens to 200 ft. lbs. of force. Obviously, glass walls that pass the 400 ft.lb. tests of either CPSC 16 CFR 1201 Cat. II or ANSI Z97.1 Class A, will also pass the tests specified in Sections 403.2.2.1 or 403.2.2.2. Accordingly, just as concrete and masonry walls are deemed to comply with Sections 403.2.2.1 and 403.2.2.2, so should glass walls that meet the "safety glazing" test standards set out in the proposal.

Cost Impact: The code change proposal will decrease the cost of construction
When glass walls complying with Cat. II or Class A safety glazing standards are "deemed" to comply with the less stringent test requirements of Sections 403.2.2.1 and/or 403.2.2.2, the costs of testing glass walls to Sections 403.2.2.1 or 403.2.2.2 will be unnecessary, thus, decreasing the cost of construction.

G8-22

G9-22

IBC: 3301.2, 3302.2, 3303.5, SECTION 3307, [BS] 3307.1; IEBC: [BG] 1501.2, [BG] 1501.4, SECTION 1502, [BS] 1502.1

Proponents: Justin Spivey, representing Self (jspivey@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

Revise as follows:

3301.2 Storage and placement. Construction equipment and materials shall be stored and placed so as not to endanger the public, the workers or ~~adjoining~~ adjacent property for the duration of the construction project.

3302.2 Manner of removal. Waste materials shall be removed in a manner that prevents injury or damage to persons, ~~adjoining~~ adjacent properties and public rights-of-way.

3303.5 Water accumulation. Provision shall be made to prevent the accumulation of water or damage to any foundations on the premises or ~~the adjoining~~ on adjacent property.

SECTION 3307
PROTECTION OF ~~ADJOINING~~ ADJACENT PROPERTY

[BS] 3307.1 Protection required. ~~Adjoining~~ Adjacent public and private property shall be protected from damage during construction, remodeling and demolition work. Protection shall be provided for footings, foundations, party walls, chimneys, skylights and roofs. Provisions shall be made to control water runoff and erosion during construction or demolition activities. The person making or causing an excavation to be made shall provide written notice to the *owners* of ~~adjoining~~ adjacent buildings advising them that the excavation is to be made and that the ~~adjoining~~ adjacent buildings should be protected. Said notification shall be delivered not less than 10 days prior to the scheduled starting date of the excavation.

2021 International Existing Building Code

Revise as follows:

[BG] 1501.2 Storage and placement. Construction equipment and materials shall be stored and placed so as not to endanger the public, the workers or ~~adjoining~~ adjacent property for the duration of the construction project.

[BG] 1501.4 Manner of removal. Waste materials shall be removed in a manner that prevents injury or damage to persons, ~~adjoining~~ adjacent properties and public rights-of-way.

SECTION 1502
PROTECTION OF ~~ADJOINING~~ ADJACENT PROPERTY

[BS] 1502.1 Protection required. ~~Adjoining~~ Adjacent public and private property shall be protected from damage during construction and demolition work. Protection must be provided for footings, foundations, party walls, chimneys, skylights and roofs. Provisions shall be made to control water runoff and erosion during construction or demolition activities. The person making or causing an excavation to be made shall provide written notice to the owners of ~~adjoining~~ adjacent buildings advising them that the excavation is to be made and that the ~~adjoining~~ adjacent buildings should be protected. Said notification shall be delivered not less than 10 days prior to the scheduled starting date of the excavation.

Reason Statement: A distinction is needed between adjacent (Webster: close or near) and adjoining (Webster: touching or bounding at a point or line); adjoining is the more restrictive term as it requires contact. Especially in urban environments, *buildings* or non-building *structures* may separated by a public alley or otherwise close enough that demolition, excavation, or construction activities for one *building* or non-building *structure* may affect another without direct contact, i.e., adjacent but not adjoining. This and other related proposals being submitted in this cycle do not seek to address the numerous instances where adjacent and adjoining appear to be used interchangeably—most frequently in IBC Chapters 4, 7, 9, 10, and 23; instead, they seek to resolve inconsistent usage of adjacent and adjoining as a modifier of the words property, *structure*, *building*, and footing in IBC Chapters 18 and 33 and Appendix J and in IEBC Chapter 15.

Cost Impact: The code change proposal will increase the cost of construction
This proposal does not change the spirit of the provision, but changes the letter slightly. There is a chance the revised wording will curtail questionable or creative interpretations and thus increase initial cost, but to the extent it encourages proper protection of adjacent property, it will lower the risk of damage, reduce or eliminate the cost of repairs and/or litigation, and thereby decrease total cost.

G9-22

G10-22

IBC: 3302.1, 3302.2 (New); IEBC: [BG] 1501.3, 1501.4 (New)

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

Revise as follows:

3302.1 Alterations, repairs and additions. Required *exits*, ~~existing structural elements,~~ fire protection devices and sanitary safeguards shall be maintained at all times during *alterations*, *repairs* or *additions* to any building or structure.

Exceptions:

1. Where such required elements or devices are being altered or repaired, adequate substitute provisions shall be made.
2. Maintenance of such elements and devices is not required where the existing building is not occupied.

Add new text as follows:

3302.2 Structural stability during construction. The structure and its components shall be capable of supporting the imposed construction and environmental loads that will be encountered during construction. Where alteration of structural elements will temporarily reduce capacity during construction, the altered load path shall be evaluated to maintain structural stability. Where *approved* by the *building official* the duration of construction shall be permitted to be considered in evaluating element lateral forces.

2021 International Existing Building Code

Revise as follows:

[BG] 1501.3 Alterations, repairs and additions. Required exits, ~~existing structural elements,~~ fire protection devices and sanitary safeguards shall be maintained at all times during *alterations*, *repairs* or *additions* to any building or structure.

Exceptions:

1. Where such required elements or devices are being altered or repaired, adequate substitute provisions shall be made.
2. Maintenance of such elements and devices is not required where the *existing building* is not occupied.

Add new text as follows:

1501.4 Structural stability during construction. The structure and its components shall be capable of supporting the imposed construction and environmental loads that will be encountered during construction. Where alteration of structural elements will temporarily reduce capacity during construction, the altered load path shall be evaluated to maintain structural stability. Where *approved* by the *code official* the duration of construction shall be permitted to be considered in evaluating element lateral forces.

Reason Statement: Clarifies requirements for structural alterations based on 2018 SEAOC survey. Reference Survey Question 18, associated results, and discussion in the attached conference paper (Zepeda et al, 2019). Questions were raised as to whether alteration requirements apply to temporary conditions. Proposal intends to clarify how to evaluate temporary conditions during construction, when altering existing structural elements.
Revisions made by this proposal intend to clarify that structural stability during all stages of construction should be considered, but that reduced transient loads may be used where it can be demonstrated to the satisfaction of the building official that building code reliability objectives are met taking into account the limited duration of construction.

https://www.cdpaccess.com/proposal/8703/25651/files/download/3153/

Bibliography: Zepeda, D., Hagen, G., O'Connell, K., McLellan, R., Buckalew, J., and Sumer, A., "Existing Buildings and the "10% Rule": Survey Results, Opinions, and Recommendations." 2019 SEAOC Convention Proceedings (pp. 116-147), Sacramento, CA: Structural Engineers Association of California.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of this code change proposal is for clarification. As it does not change the intent of the code, it will not increase of decrease the cost of construction.

G11-22

IBC: [BS] 3307.1, [BS] 3307.2, [BS] 3307.2.2; IEBC: [BS] 1502.1, [BS] 1502.2, [BS] 1502.2.2

Proponents: Justin Spivey, representing Self (jspivey@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

Revise as follows:

[BS] 3307.1 Protection required. Adjoining public and private property shall be protected from damage during construction, remodeling and demolition work. Protection shall be provided for footings, foundations, party walls, chimneys, skylights and roofs. Provisions shall be made to control water runoff and erosion during construction or demolition activities. The person making or causing an excavation to be made shall provide written notice to the *owners* of adjoining ~~buildings~~ property advising them that the excavation is to be made and that the adjoining ~~buildings~~ property should be protected. Said notification shall be delivered not less than 10 days prior to the scheduled starting date of the excavation.

[BS] 3307.2 Excavation retention systems. Where a retention system is used to provide support of an excavation for protection of adjacent property or *structures*, the system shall conform to the requirements in Sections 3307.2.1 through 3307.2.3.

[BS] 3307.2.2 Excavation retention system monitoring. The retention system design shall include requirements for monitoring of the system and adjacent property or *structures* for horizontal and vertical movement.

2021 International Existing Building Code

Revise as follows:

[BS] 1502.1 Protection required. Adjoining public and private property shall be protected from damage during construction and demolition work. Protection must be provided for footings, foundations, party walls, chimneys, skylights and roofs. Provisions shall be made to control water runoff and erosion during construction or demolition activities. The person making or causing an excavation to be made shall provide written notice to the owners of adjoining ~~buildings~~ property advising them that the excavation is to be made and that the adjoining ~~buildings~~ property should be protected. Said notification shall be delivered not less than 10 days prior to the scheduled starting date of the excavation.

[BS] 1502.2 Excavation retention systems. Where a retention system is used to provide support of an excavation for protection of adjacent property or structures, the system shall conform to the requirements in Section 1502.2.1 through 1502.2.3.

[BS] 1502.2.2 Excavation retention system monitoring. The retention system design shall include requirements for monitoring of the system and adjacent property or structures for horizontal and vertical movement.

Reason Statement: This proposal seeks to resolve inconsistent use of property, *structure*, and *building* in IBC Section 3307 and similar IEBC Section 1502. Property is not defined in Chapter 2 but assumed to indicate a parcel of real property (land) on which one or more *structures* might be located, and some or all of those *structures* might be *buildings* (per IBC and IEBC Chapter 2, *buildings* are *structures* "utilized or intended for supporting or sheltering any occupancy"). Given that property is the least restrictive term, and encompasses both *buildings* and non-building *structures* along with the parcel of land they occupy, the term property should be used throughout to improve consistency among subsections. IBC Section 3307 and IEBC Section 1502 already cover adjacent property; this proposal just makes all of these provisions consistent.

Cost Impact: The code change proposal will increase the cost of construction
This proposal resolves inconsistent use of terminology and is editorial only. Although there is a small chance that the revised wording would cause additional protective measures to be implemented and thus increase initial cost, the protective measures would presumably be designed to substantially limit or preclude damage to adjacent property, reducing or eliminating the cost of repairs and/or litigation, and thereby decreasing total cost.

G11-22

G12-22

IBC: G109.1

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

APPENDIX G
FLOOD-RESISTANT CONSTRUCTION

SECTION G109
MANUFACTURED HOMES

Revise as follows:

G109.1 Elevation. All new and replacement manufactured homes to be placed or substantially improved in a *flood hazard area* shall be elevated such that the top of the foundation for ~~lowest floor of~~ the manufactured home is ~~elevated to~~ at or above the *design flood elevation*.

Reason Statement: As defined by the US Department of Housing and Urban Development, and IBC Appendix G, manufactured homes are built on permanent chassis and designed for use with or without a permanent foundation. Manufactured homes may be replaced from time to time. This code change applies the elevation requirement to the top of the foundation, rather than the floor of the home. This ensures that any future replacement home, regardless of the depth of the chassis and floor system, will be properly elevated. Note that when communities use the FEMA Flood Insurance Rate Maps to regulate flood hazard areas, the “design flood elevation” is equal to the “base flood elevation.”
The I-Codes require all other residential structures in flood hazard areas other than coastal high hazard areas (Zone V) and Coastal A Zones to have the lowest floors at or above the base flood elevation plus one foot, or the design flood elevation, whichever is higher (R322 or ASCE 24 Flood Design Class 2). In those flood hazard areas, this code change will achieve approximately the same result, depending on the depth of the chassis and floor system of individual homes. This is a reasonable way to equitably protect owners and occupants of manufactured homes. Also, Sec. R322.1.9 specifies the reference point for determining elevation is the bottom of the frame, which is essentially the same as the top of the foundation.

In coastal high hazard areas (Zone V) and Coastal A Zones, the I-Codes already require the “bottom of the lowest horizontal structural member of the lowest floor” to be at or above the base flood elevation plus one foot. In these flood hazard areas, this code change does not change that requirement because the top of the foundation is the same as the bottom of the chassis frame.

Ease of enforcement is an added benefit of this proposal because inspection of the foundation can determine compliance in advance of installation of a unit. Another benefit is when replacement units are installed on the same foundation there will be no need to factor in the depth of the chassis frame and floor system. For example, if the first installation has the walking surface of the floor at the required elevation but a replacement unit has a shallower frame/floor system, the foundation would have to be extended to make up the difference to ensure the walking surface of the replacement unit is at the required elevation.

Data on the relationship of elevation and damage by flooding that were compiled by FEMA and the US Army Corps of Engineers indicate that manufactured homes, on average, sustain considerably more damage as a percent of structure value than do conventional construction.

Cost Impact: The code change proposal will increase the cost of construction
The code change will increase the cost of foundations for manufactured homes installed in flood hazard areas other than Zone V and Coastal A Zone because the foundations will be approximately 12 to 18 inches taller, which adds approximately $1500 to the foundation cost. Most published information on the cost of adding additional height to foundations are developed based on total costs of conventional construction, not just the cost of the foundation. In 2018, Pinellas County, FL, collected cost estimates for the foundation and setting for a 28’ x 70’ unit. The County noted that in its jurisdiction, foundation piers that are 4 ft or taller must be designed by a registered professional engineer. The data indicate the cost of installation on a foundation that is 3 ft above grade was $8,500 and the cost for 4 ft above grade was $10,000. Assuming the installation or placement of the unit costs are the same, the cost to add one foot to the foundation is $1,500. It is reasonable to assume that the cost for an additional foot of foundation height is approximately the same, regardless of how tall the piers must be to meet the current requirement.

Analyses of flood damage as a function of elevation have been prepared by FEMA and the U.S. Army Corps of Engineers. The analyses show that adding just one additional foot of elevation results in significant damage avoided if floodwater rises higher than the floor. Having the top of the foundation at the base flood elevation means the floor will be at least one foot higher, which can avoid damage estimated to be between 10-40% of the unit value. Avoiding damage saves the unit owner in the long run. Also, flood insurance policies written by the National Flood Insurance Program may be reduced because the rating is based, in part, on the elevation of the top of the lowest floor.

G13-22

IBC: G112.1

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

APPENDIX G
FLOOD-RESISTANT CONSTRUCTION

SECTION G112
OTHER BUILDING WORK

Revise as follows:

G112.1 Garages and accessory structures. Garages and accessory structures shall be designed and constructed in accordance with ASCE 24~~.~~, subject to the limitations of this section:

1. In flood hazard areas other than coastal high hazard areas and Coastal A Zones, the floors of detached garages and detached accessory storage structures are permitted below the elevations specified in ASCE 24 provided such structures are used solely for parking or storage, are one story and not larger than 600 square feet (55.75 m^2).
2. In coastal high hazard areas and Coastal A Zones, the floors of detached garages and detached accessory storage structures are permitted below the elevations specified in ASCE 24 provided such structures are used solely for parking or storage, are one story and are not larger than 100 square feet (9.29 m^2). Such structures shall not be required to have breakaway walls or flood openings.

Reason Statement: The regulations of the National Flood Insurance Program require all structures to be elevated or dry floodproofed (nonresidential only). FEMA guidance issued in 1993 (NFIP Technical Bulletin 7) states that communities must use variances to authorize non-elevated detached accessory structures that are wet floodproofed. Wet floodproofing measures minimize flood damage by allowing certain areas to flood, relieving hydrostatic loads and using materials resistant to flood damage. FEMA expects to reissue Technical Bulletin 7 in early 2022.
In 2020, FEMA issued a policy and bulletin specifying requirements for communities to issue permits for non-elevated, wet floodproofed accessory structures rather than variances. Notably, the policy and bulletin establish size limits as a function of flood zone. In flood hazard areas identified as Zone A (all zones that start with "A"), the size limit is one-story two car garage (600 sq ft) and in areas identified as Zone V (start with "V"), the size limit is 100 sq ft. Detached accessory structures that are larger than these sizes must fully comply with the elevation or dry floodproofing requirements for buildings in flood hazard areas. Alternatively, communities may consider individual variances for those larger accessory structures (local floodplain management regulations have criteria for considering variances).

The proposal amends Section G112.1 in IBC Appendix G, Flood-Resistant Construction, to specify size limits applicable when the provisions of ASCE 24 are used to allow wet floodproofed accessory storage structures and detached garages in flood hazard areas. Note that enclosures under elevated buildings used solely for parking, storage and building access are enclosures, not garages.

The size limits specified by FEMA are:

· In flood hazard areas other than coastal high hazard areas, one-story and not larger than 600 sq ft (approximately a two-car garage). FEMA expects communities to require elevation or dry floodproofing if the structures are larger, or approve them by variance.

· In coastal high hazard areas (Zone V), not larger than 100 sq ft. Note that breakaway walls and flood openings, which are required by ASCE 24, are not required (not required by the FEMA policy). FEMA expects communities to require elevation if the structures are larger, or approve them by variance.

Bibliography: The Floodplain Management Agricultural Structures Policy and FEMA P-2140*, Floodplain Management Bulletin: Requirements for Agricultural Structures and Accessory Structures*, are available here: https://www.fema.gov/media-collection/floodplain-management-requirements-agricultural-and-accessory-structures

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal limits the size of detached accessory structures and detached garages that can be wet floodproofed. There will be a reduction in costs for accessory structures in Zone V because ASCE 24 requires breakaway walls and flood openings, but the FEMA policy does not specify breakaway walls or flood openings. For 100 sq ft structures (10 x 10) there will be a cost decrease by avoiding the installation of at least two flood openings. Engineered flood opening devices cost approximately $100-$150 each, not including the cost of installation (nonengineered

openings, such as typical air vent device disabled in the open position, cost less). Cost data for fabrication of breakaway walls is not available. FEMA Technical Bulletin 9 contains prescriptive solutions for breakaway walls that do not require certification of design. A 10 x 10 structure has 100 linear feet of wall, thus cost savings are attributable to not having to fabricate approximately 100 feet of breakaway wall.An increase in costs occurs only when property owners want accessory structures or detached garages in flood hazard areas that are larger than the specified limits because those larger structures must be installed on elevated foundations (or dry floodproofed in Zone A/AE), unless approved by individually considered variances to be wet floodproofed. However, it is reasonable to assume that the large the size, the more costly would be the losses resulting from flooding. Therefore, there are avoided damage costs due to elevating or dry floodproofing (Zone A) and limiting size (Zone V). Additional costs for those larger structures to be elevated depend on the type of foundation chosen. In the report “Natural Hazard Mitigation Saves,” the National Institute of Building Sciences estimates a cost of $33 per foot of elevation per pile and $325 per foot of elevation for stairs. Therefore, for a 1152 square foot accessory structure (24 ft by 48 ft) with 15 piles spaced 12 feet on center, the added cost of elevation would be $820 per foot of elevation. It is reasonable to assume the cost would be less when more typical pier foundation elements and anchoring are used.

Bibliography: Natural Hazard Mitigation Saves (2019), National Institute of Building Sciences. https://www.nibs.org/projects/natural-hazard-mitigation-saves-2019-report.

G13-22

G14-22

IBC: H106.3 (New), TABLE H116.1

Proponents: Jonathan Roberts, representing UL (jonathan.roberts@ul.com)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

APPENDIX H
SIGNS

SECTION H106
ELECTRICAL

Add new text as follows:

H106.3 Listing. Electric signs shall be listed and labeled in accordance with UL 48, and shall be installed in accordance with the manufacturer's installation instructions.

Revise as follows:

TABLE H116.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM D635—14	*Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position*	H107.1.1
NFPA 70—20	*National Electrical Code*	H106.1, H106.2
NFPA 701—19	*Methods of Fire Test for Flame Propagation of Textiles and Films*	H106.1.1
UL 48-11	*Electric Signs, with revisions through March 2021*	H106.1

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 48-11 Electric Signs with revisions through March 2021, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: NFPA 70 Section 600.3 requires electric signs to be listed and labeled. This proposal clarifies that electric signs as an assembly are to be listed and labeled to UL 48, and to be installed in accordance with the manufacturers installation instructions. Electric signs covered by UL 48 include all signs (regardless of voltage) that are electrically operated and/or electrically illuminated.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Electric signs are required by NFPA 70 to be listed and labeled. This clarifies the requirements for signs and therefore there is no additional cost.

G14-22

G15-22

IBC: J103.2, J104.2

Proponents: Justin Spivey, representing Self (jspivey@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

APPENDIX J
GRADING

SECTION J103
PERMITS REQUIRED

Revise as follows:

J103.2 Exemptions. A grading *permit* shall not be required for the following:

1. Grading in an isolated, self-contained area, provided that the public is not endangered and that such grading will not adversely affect ~~adjoining~~ adjacent properties.
2. Excavation for construction of a *structure* permitted under this code.
3. Cemetery graves.
4. Refuse disposal sites controlled by other regulations.
5. Excavations for wells, or trenches for utilities.
6. Mining, quarrying, excavating, processing or stockpiling rock, sand, gravel, aggregate or clay controlled by other regulations, provided that such operations do not affect the lateral support of, or significantly increase stresses in, soil on ~~adjoining~~ adjacent properties.
7. Exploratory excavations performed under the direction of a registered design professional.

Exemption from the *permit* requirements of this appendix shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

SECTION J104
PERMIT APPLICATION AND SUBMITTALS

Revise as follows:

J104.2 Site plan requirements. In addition to the provisions of Section 107, a grading plan shall show the existing grade and finished grade in contour intervals of sufficient clarity to indicate the nature and extent of the work and show in detail that it complies with the requirements of this code. The plans shall show the existing grade on ~~adjoining~~ adjacent properties in sufficient detail to identify how grade changes will conform to the requirements of this code.

Reason Statement: A distinction is needed between adjacent (Webster: close or near) and adjoining (Webster: touching or bounding at a point or line); adjoining is the more restrictive term as it requires contact. Especially in urban environments, *buildings* or non-building *structures* may separated by a public alley or otherwise close enough that demolition, excavation, or construction activities for one *building* or non-building *structure* may affect another without direct contact, i.e., adjacent but not adjoining. This and other related proposals being submitted in this cycle do not seek to address the numerous instances where adjacent and adjoining appear to be used interchangeably—most frequently in IBC Chapters 4, 7, 9, 10, and 23; instead, they seek to resolve inconsistent usage of adjacent and adjoining as a modifier of the words property, *structure*, *building*, and footing in IBC Chapters 18 and 33 and Appendix J and in IEBC Chapter 15.

Cost Impact: The code change proposal will increase the cost of construction
This proposal does not change the spirit of the provision, but changes the letter slightly. There is a chance the revised wording will curtail questionable or creative interpretations and thus increase initial cost, but to the extent it encourages proper protection of adjacent property, it will lower the risk of damage, reduce or eliminate the cost of repairs and/or litigation, and thereby decrease total cost.

G15-22

TENTATIVE ORDER OF DISCUSSION
2022 PROPOSED CHANGES TO THE
INTERNATIONAL BUILDING CODE - STRUCTURAL

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some S code change proposals may not be included on this list, as they are being heard by another committee.

Numbers Not Used

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S240-22 Part I
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S244-22

S1-22

IBC: 1502.3

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Delete without substitution:

~~**1502.3 Scuppers.** Where *scuppers* are used for secondary (emergency overflow) roof drainage, the quantity, size, location and inlet elevation of the *scuppers* shall be sized to prevent the depth of ponding water from exceeding that for which the roof was designed as determined by Section 1611.1. *Scuppers* shall not have an opening dimension of less than 4 inches (102 mm). The flow through the primary system shall not be considered when locating and sizing *scuppers*.~~

Reason Statement: IBC's Section 1502.3-Scuppers provides requirements for scuppers used as secondary (emergency overflow) roof drainage that are identical to those in IPC's Section 1106.5-Parapet Wall Scuppers and Section 1108-Secondary (Emergency) Roof Drains. IBC's Section 1502.1-General and Section 1502.2-Secondary (Emergency Overflow) Drains or Scuppers already provide pointers to the IPC. This proposal deletes the redundant requirement in IBC Section 1502.3-Scuppers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal eliminates redundant language. There is no change in technical requirements.

S1-22

S2-22

IBC: 1502.4

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1502.4 Gutters. Gutters and leaders placed on the outside of buildings, other than Group R-3, *private garages* and buildings of Type V construction, shall be of corrosion resistant metal with a thickness not less than 0.019 inch (0.483 mm) (No. 26 galvanized sheet), noncombustible material or not less than Schedule 40 plastic pipe.

Reason Statement: This code change proposal provides additional guidance to the code regarding specific materials commonly used to fabricate and install sheet metal gutters and downspouts/leaders. The reference to 0.019 inch (0.483 mm) (No. 26 galvanized sheet) is consistent with other areas of the chapter for describing light-gauge metal sheet.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease construction cost as it only adds an additional option and clarity.

S2-22

S3-22

IBC: 1502.5 (New)

Proponents: Emily Lorenz, representing International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com)

2021 International Building Code

Add new text as follows:

1502.5 Waterproofing weather-exposed areas. Balconies, decks, landings, exterior stairways, occupied roofs, and similar surfaces exposed to the weather and sealed underneath shall be waterproofed and sloped a minimum of 1/4 unit vertical in 12 units horizontal (2-percent slope) for drainage.

Reason Statement:
To ensure life-safety of users of balconies in cold climates, and to promote bulk water flow away from exterior walls or assemblies that adjoin balconies, so that ponding does not occur. Proper drainage on balconies, decks, etc., is an important performance requirement to aid in draining liquid water away from the building. In cold climates, any ponding that may occur could potentially freeze, causing a safety issue. Add the original code reference from 1997 UBC Chapter 14 under the roof drainage sections of IBC Chapter 15 (1502) and IRC Chapter 9 (R903.4). Section 1402.3 of the 1997 Uniform Building Code (UBC) stated:

1402.3 Waterproofing Weather-exposed Areas.

Balconies, landings, exterior stairways, occupied roofs, and similar surfaces exposed to the weather and sealed underneath shall be waterproofed and sloped a minimum of 1/4 unit vertical in 12 units horizontal (2% slope) for drainage.

Section 1402.3 of the 1997 Uniform Building Code (UBC) is what most waterproofing consultants considered the gold standard for ensuring that architects and builders constructed balcony and stairways with a minimum of 2% slope. The 2% slope requirement referenced in the Section 1402.3 of the 1997 UBC does not exist at any location within any version of IBC from 2000 through 2018. Decks were also listed as an area that should be waterproofed and sloped.

During the transition from the UBC to the IBC, this valuable and useful reference to require a minimum 2% surface slope for balconies, landings, and exterior stairways was omitted from the IBC and IRC. There are no referenced statements or definitions anywhere in the current codes on this issue.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This should be standard practice, thus will not impact the cost of construction.

S3-22

S4-22

IBC: 1503.2

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1503.2 Flashing. Flashing shall be installed according to the *roof covering* manufacturer's installation instructions in such a manner so as to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane.

Reason Statement: The code change proposal is intended to add clarity to the code by specifically indicating flashings are to be installed by the roof covering manufacturer's installation instructions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is a clarification of existing requirements; there are no changes to the code's technical requirements.

S4-22

S5-22

IBC: 1503.4

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1503.4 Attic and rafter ventilation. Ventilation of *attic* and enclosed rafter assemblies ~~Intake and exhaust vents~~ shall be provided in accordance with Section 1202.2 and the vent product manufacturer's installation instructions.

Exception: Unvented attic and unvented enclosed rafter assemblies shall be permitted in accordance with Section 1202.3.

Reason Statement: This code change proposal is intended to clarify the code's existing requirements requirements regarding attic and enclosed rafter ventilation. The words "... attic and enclosed rafter assemblies... are added to clarify the scoping of the requirement. An exception is added to direct users to Section 1202.3 to the code's provisions unvented attics and unvented enclosed rafters.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal has no cost impact. It simply clarifies the code's existing requirements.

S5-22

S6-22

IBC: 1504.1

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1504.1 Wind resistance of roofs. *Roof decks* and *roof coverings* shall be designed ~~for wind *loads*~~in accordance with~~ Chapter 16~~ and this Section~~s 1504.2, 1504.3 , 1504.4 and 1504.5~~ .

Reason Statement: This code change proposal is intended to clarify this section's intent. This code change proposal is not intended to change the code's technical requirements or stringency.
Currently, Section 1504.1 indicates roof decks and roof coverings "...shall be designed for *wind loads*..." While this is true for some of the roof covering types in this section, some other roof covering types are designed by classifications based on the maximum basic wind speed maps. For example, asphalt shingle roof coverings are designed for wind resistance based on classifications in Table 1504.2.

Also, the change striking "...Sections 1504.2, 1504.3, 1504. and 1504.5..." and replacing it with "...this Section." is intended to appropriately reference the requirements entire section. Over the years and code development cycles, this section has been added to without updating the subsection pointers in Section 1504.1. Changing this pointer to "...this Section." addresses this and also will address any future additions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is a clarification of the code's existing requirements; it does not change the code's technical requirements or stringency.

S6-22

S7-22

IBC: 1504.4.4 (New)

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Add new text as follows:

1504.4.4 Slate shingles. Slate shingles shall be tested in accordance with ASTM D3161. Slate packaging shall bear a label indicating compliance with ASTM D3161 and the required classification in Table 1504.2.

Reason Statement: This code change proposal is intended to provide building officials and users of the code guidance regarding the wind resistance of slate roof covings. Wind resistance of slate roof coverings is not currently addressed in the IBC. This code change adds wind resistance testing in accordance with ASTM D3161 and its classification designations similar to what is already provided for in the IBC for asphalt shingles and metal roof shingles. Existing Table 1504.2 is referenced providing the required wind resistance classification based on the maximum basic wind speed, V, or maximum allowable stress design wind speed, Vasd. Slate package labeling is required to facilitate classification identification and enforcement. Such package labeling would be slate supplier specific, but most likely would be in the form of of a pallet tag.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
While this code change proposal adds a requirement for wind resistance testing, it will not result in an increase in the cost of construction. Slate suppliers have indicating they already have ASTM D3161 testing in-place and classifications available.

S7-22

S8-22

IBC: SECTION 202 (New), SECTION 202, 1504.5, 1504.6, 1504.6.1, 1504.7, 1504.8, 1507.12.3

Proponents: Jonathan Roberts, representing UL (jonathan.roberts@ul.com)

2021 International Building Code

Add new definition as follows:

LOW-SLOPE. A roof slope two units vertical in 12 units horizontal (17-percent slope) or less.

Revise as follows:

[BF] STEEP~~-~~SLOPE. A roof slope greater than 2 units vertical in 12 units horizontal (17-percent slope)~~ or greater~~.

1504.5 Ballasted low-slope single-ply roof systems. Ballasted low-slope ~~(roof slope < 2:12)~~ single-ply roof system coverings installed in accordance with Section 1507.12 shall be designed in accordance with ANSI/SPRI RP-4.

1504.6 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roofsystems ~~having a slope less than 2 units vertical in 12 units horizontal (2:12)~~ on a *low slope* roof shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic design *wind speed*, V, shall be determined from Figures 1609.3(1) through 1609.3(12) as applicable.

1504.6.1 Gutter securement for low-slope roofs. Gutters that are used to secure the perimeter edge of the roof membrane on low-slope ~~(less than 2:12 slope)~~ built-up, modified bitumen, and single-ply roofs, shall be designed, constructed and installed to resist wind loads in accordance with Section 1609 and shall be tested in accordance with Test Methods G-1 and G-2 of SPRI GT-1.

1504.7 Physical properties. *Roof coverings* installed on low-slope roofs ~~(roof slope < 2:12)~~ in accordance with Section 1507 shall demonstrate physical integrity over the working life of the roof based on 2,000 hours of exposure to accelerated weathering tests conducted in accordance with ASTM G152, ASTM G154 or ASTM G155. Those *roof coverings* that are subject to cyclical flexural response due to wind *loads* shall not demonstrate any significant loss of tensile strength for unreinforced membranes or breaking strength for reinforced membranes when tested as herein required.

1504.8 Impact resistance. *Roof coverings* installed on low-slope roofs ~~(roof slope < 2:12)~~ in accordance with Section 1507 shall resist impact damage based on the results of tests conducted in accordance with ASTM D3746, ASTM D4272 or the “Resistance to Foot Traffic Test” in FM 4470.

1507.12.3 Ballasted low-slope roofs. Ballasted low-slope roofs ~~(roof slope < 2:12)~~ shall be installed in accordance with this section and Section 1504.5. Stone used as *ballast* shall comply with ASTM D448 or ASTM D7655.

Reason Statement: This proposal addresses an inconsistency in the code. Per referenced standard ANSI/SPRI/FM 4435-ES-1—17 a low slope roof is one with a slope of 2:12 or less (e.g. ≤2:12), but the references in section 1504 to low-slope are less than 2:12 (e.g. < 2:12). This proposal corrects these discrepancies and adds a definition of Low-Slope. The definition of steep slope has subsequently been revised to reference roof slopes greater than 2:12.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is just and editorial correction therefore no cost is associated with it.

S8-22

S9-22

IBC: SECTION 202, [BS] 1404.16, [BS] 1404.18, 1504.6, 1504.9; IBC: TABLE 1504.9; IBC: 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3), 1507.16.8, 1602.1, 1603.1, 1603.1.4, TABLE 1604.3, 1609.1.1, TABLE 1609.2, 1609.2.2, 1609.3, 1609.3.1, TABLE 1609.3.1, 1705.12, 2304.6.1, TABLE 2304.10.2, TABLE 2308.7.5, 2404.1, 2404.2, 2404.3.1, 2404.3.3, 2404.3.5, 2405.5.2

Proponents: Emily Guglielmo, representing NCSEA Wind Committee (eguglielmo@martinmartin.com); Don Scott, representing ASCE 7 Wind Load Subcommittee (dscott@pcs-structural.com); Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

[BS] BASIC WIND SPEED, *V*.
~~Basic design wind speeds.~~ The wind speed used for design, as determined in Chapter 16.

[BS] HURRICANE-PRONE REGIONS. Areas vulnerable to hurricanes defined as:

1. The US Atlantic Ocean and Gulf of Mexico coasts where the basic ~~design~~ wind speed, *V*, for Risk Category II buildings is greater than 115 mph (51.4 m/s);
2. Hawaii, Puerto Rico, Guam, Virgin Islands and American Samoa.

[BS] WINDBORNE DEBRIS REGION. Areas within *hurricane-prone regions* located:

1. Within 1 mile (1.61 km) of the mean high-water line where an Exposure D condition exists upwind at the waterline and the basic ~~design~~ wind speed, *V*, is 130 mph (58 m/s) or greater; or
2. In areas where the basic ~~design~~ wind speed , V, is 140 mph (63 m/s) or greater.

For *Risk Category* II buildings and structures and Risk Category III buildings and structures, except health care facilities, the windborne debris region shall be based on Figure 1609.3.(1). For *Risk Category* IV buildings and structures and *Risk Category* III health care facilities, the windborne debris region shall be based on Figure 1609.3(2).

[BS] 1404.16 Fiber-cement siding. *Fiber-cement siding* complying with Section 1403.10 shall be permitted on *exterior walls* of Type I, II, III, IV and V construction for wind pressure resistance or basic wind speed exposures as indicated by the manufacturer's listing and *label* and *approved* installation instructions. Where specified, the siding shall be installed over sheathing or materials listed in Section 2304.6 and shall be installed to conform to the *water-resistive barrier* requirements in Section 1402. Siding and accessories shall be installed in accordance with *approved* manufacturer's instructions. Unless otherwise specified in the *approved* manufacturer's instructions, nails used to fasten the siding to wood studs shall be corrosion-resistant round head smooth shank and shall be long enough to penetrate the studs not less than 1 inch (25 mm). For cold-formed steel *light-frame construction*, corrosion-resistant fasteners shall be used. Screw fasteners shall penetrate the cold-formed steel framing not fewer than three exposed full threads. Other fasteners shall be installed in accordance with the approved construction documents and manufacturer's instructions.

[BS] 1404.18 Polypropylene siding. *Polypropylene siding* conforming to the requirements of this section and complying with Section 1403.12 shall be limited to *exterior walls* located in areas where the basic wind speed, V, specified in Chapter 16 does not exceed 100 miles per hour (45 m/s) and the building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed , V, exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. *Polypropylene siding* shall be installed in accordance with the manufacturer's instructions. *Polypropylene siding* shall be secured to the building so as to provide weather protection for the *exterior walls* of the building.

1504.6 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roofsystems having a slope less than 2 units vertical in 12 units horizontal (2:12) shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic ~~design~~ *wind speed*, V, shall be determined from Figures 1609.3(1) through 1609.3(12) as applicable.

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9.

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Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC ~~DESIGN~~ WIND SPEED , V (MPH)																	
		Exposure B									Exposure C[d]								
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No. 6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for mean roof height and parapet height.
b. Basic ~~design~~ wind speed, *V*, and wind exposure shall be determined in accordance with Section 1609.
c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.
d. For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

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Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for ~~design~~ basic wind speeds, V, less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.
2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, V < 140 MPH	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic ~~Design~~ Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Clay and concrete tile	1507.3	For roof slopes from $2\frac{1}{2}$ units vertical in 12 units horizontal ($2\frac{1}{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: Starting at the eave, a 19-inch strip of underlayment shall be applied parallel with the eave. Starting at the eave, a 36-inch-wide strip of underlayment felt shall be applied, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic ~~Design~~ Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		
Photovoltaic shingles	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic ~~Design~~ Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

TABLE 1507.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, V < 140 MPH	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, $V \geq$ 140 MPH
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Clay and concrete tile	1507.3		
Photovoltaic shingles	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage. The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Metal roof shingles	1507.5		
Mineral-surfacedroll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

For SI: 1 inch = 25.4 mm; 1 mile per hour = 0.447 m/s.

1507.16.8 Wind resistance. *Photovoltaic shingles* shall comply with the classification requirements of Table 1504.2 for the appropriate maximum ~~nominal design~~ basic wind speed, V.

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
R	=	Rain load.
S	=	Snow load.
T	=	Cumulative effects of self-straining load forces and effects.
V_{asd}	=	Allowable stress design wind speed, miles per hour (mph) ~~(km/hr)~~ (m/s) where applicable.
V	=	Basic ~~design~~ wind speed , V, miles per hour (mph) ~~(km/hr)~~ (m/s) determined from Figures 1609.3(1) through 1609.3(12) or ASCE 7.
W	=	Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.

1603.1 General. *Construction documents* shall show the size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.9 shall be indicated on the *construction documents*.

Exception: *Construction documents* for buildings constructed in accordance with the *conventional light-frame construction* provisions of Section

Exception: *Construction documents* for buildings constructed in accordance with the *conventional light-frame construction* provisions of Section 2308 shall indicate the following structural design information:

1. Floor and roof dead and live loads.
2. Ground snow load, p_g.
3. Basic ~~design~~ wind speed, *V*, miles per hour (mph) ~~(km/hr)~~ (m/s) and allowable stress design wind speed, V_{asd}, as determined in accordance with Section 1609.3.1 and wind exposure.
4. *Seismic design category* and *site class*.
5. Flood design data, if located in *flood hazard areas* established in Section 1612.3.
6. Design load-bearing values of soils.
7. Rain load data.

1603.1.4 Wind design data. The following information related to wind *loads* shall be shown, regardless of whether wind *loads* govern the design of the lateral force-resisting system of the structure:

1. Basic ~~design~~ *wind speed*, *V*, miles per hour and *allowable stress design wind speed*, V_{asd}, as determined in accordance with Section 1609.3.1.
2. *Risk category*.
3. Wind exposure. Applicable wind direction if more than one wind exposure is utilized.
4. Applicable internal pressure coefficient.
5. Design wind pressures and their applicable zones with dimensions to be used for exterior component and cladding materials not specifically designed by the *registered design professional* responsible for the design of the structure, pounds per square foot (kN/m^2).

TABLE 1604.3 DEFLECTION LIMITS[a, b, c, h, i]

CONSTRUCTION	*L or* L_r	*S or W*[f]	*D + L*[d, g]
Roof members:[e]			
Supporting plaster or stucco ceiling	*l*/360	*l*/360	*l*/240
Supporting nonplaster ceiling	*l*/240	*l*/240	*l*/180
Not supporting ceiling	*l*/180	*l*/180	*l*/120
Floor members	*l*/360	—	*l*/240
Exterior walls:			
With plaster or stucco finishes	—	*l*/360	—
With other brittle finishes	—	*l*/240	—
With flexible finishes	—	*l*/120	—
Interior partitions:[b]			
With plaster or stucco finishes	*l*/360	—	—
With other brittle finishes	*l*/240	—	—
With flexible finishes	*l*/120	—	—
Farm buildings	—	—	*l*/180
Greenhouses	—	—	*l*/120

For SI: 1 foot = 304.8 mm.

a. For structural roofing and siding made of formed metal sheets, the total load deflection shall not exceed *l*/60. For secondary roof structural members supporting formed metal roofing, the live load deflection shall not exceed *l*/150. For secondary wall members supporting formed metal siding, the design wind load deflection shall not exceed *l*/90. For roofs, this exception only applies when the metal sheets have no roof covering.

b. Flexible, folding and portable partitions are not governed by the provisions of this section. The deflection criterion for interior partitions is based on the horizontal load defined in Section 1607.16 .

c. See Section 2403 for glass supports.

d. The deflection limit for the $D+(L+L_r)$ load combination only applies to the deflection due to the creep component of long-term dead load deflection plus the short-term live load deflection. For lumber, structural glued laminated timber, prefabricated wood I-joists and structural composite lumber members that are dry at time of installation and used under dry conditions in accordance with the ANSI/AWC NDS, the creep component of the long-term deflection shall be permitted to be estimated as the immediate dead load deflection resulting from 0.5*D*. For lumber and glued laminated timber members installed or used at all other moisture conditions or cross laminated timber and wood structural panels that are dry at time of installation and used under dry conditions in accordance with the ANSI/AWC NDS, the creep component of the long-term deflection is permitted to be estimated as the immediate dead load deflection resulting from *D*. The value of 0.5*D* shall not be used in combination with ANSI/AWC NDS provisions for long-term loading.

e. The preceding deflections do not ensure against ponding. Roofs that do not have sufficient slope or camber to ensure adequate drainage shall be investigated for ponding. See Chapter 8 of ASCE 7.

f. The wind load shall be permitted to be taken as 0.42 times the “component and cladding” loads or directly calculated using the 10-year mean return interval basic wind speed , V, for the purpose of determining deflection limits in Table 1604.3. Where framing members support glass, the deflection limit therein shall not exceed that specified in Section 1604.3.7

g. For steel structural members, the deflection due to creep component of long-term dead load shall be permitted to be taken as zero.

h. For aluminum structural members or aluminum panels used in skylights and sloped glazing framing, roofs or walls of sunroom additions or patio covers not supporting edge of glass or aluminum sandwich panels, the total load deflection shall not exceed *l*/60. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed *l*/175 for each glass lite or *l*/60 for the entire length of the member, whichever is more stringent. For aluminum sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed *1*/120.

i. *l* = Length of the member between supports. For cantilever members, l shall be taken as twice the length of the cantilever.

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic ~~design~~ *wind speed*, *V*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.

The wind speeds in Figures 1609.3(1) through 1609.3(12) are basic ~~design~~ wind speeds, V, and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 4 and 5 are used.

TABLE 1609.2 WINDBORNE DEBRIS PROTECTION FASTENING SCHEDULE FOR WOOD STRUCTURAL PANELS[a, b, c, d]

FASTENER TYPE	FASTENER SPACING (inches)		
	Panel Span ≤ 4 feet	4 feet < Panel Span ≤ 6 feet	6 feet < Panel ≤ Span 8 feet
No. 8 wood-screw-based anchor with 2-inch embedment length	16	10	8
No. 10 wood-screw-based anchor with 2-inch embedment length	16	12	9
$^{1}/_{4}$-inch diameter lag-screw-based anchor with 2-inch embedment length	16	16	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.448 N, 1 mile per hour = 0.447 m/s.

a. This table is based on a 140 mph basic wind speed~~s~~ , V, and a 45-foot mean roof height.

b. Fasteners shall be installed at opposing ends of the wood structural panel. Fasteners shall be located not less than 1 inch from the edge of the panel.

c. Anchors shall penetrate through the exterior wall covering with an embedment length of 2 inches minimum into the building frame. Fasteners shall be located not less than $2^{1}/_{2}$ inches from the edge of concrete block or concrete.

d. Where panels are attached to masonry or masonry/stucco, they shall be attached using vibration-resistant anchors having a minimum ultimate withdrawal capacity of 1,500 pounds.

1609.2.2 Application of ASTM E1996. The text of Section 6.2.2 of ASTM E1996 shall be substituted as follows:
6.2.2 Unless otherwise specified, select the wind zone based on the basic ~~design~~ *wind speed*, *V*, as follows:

6.2.2.1 *Wind Zone 1*—130 mph ≤ basic ~~design~~ *wind speed*, *V* < 140 mph.

6.2.2.2 *Wind Zone 2*—140 mph ≤ basic ~~design~~ *wind speed*, *V* < 150 mph at greater than one mile (1.6 km) from the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.3 *Wind Zone 3*—150 mph (67 m/s) ≤ basic ~~design~~ *wind speed*, *V* ≤ 160 mph (72 m/s), or 140 mph (63 m/s) ≤ basic ~~design~~ *wind speed*, *V* ≤ 160 mph (72 m/s) and within one mile (1.6 km) of the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.4 *Wind Zone 4*— basic ~~design~~ *wind speed*, *V* > 160 mph (72 m/s).

1609.3 Basic ~~design~~ wind speed. The basic ~~design~~ *wind speed*, *V*, in mph, for the determination of the wind *loads* shall be determined by Figures 1609.3(1) through 1609.3(12). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* II buildings and structures shall be obtained from Figures 1609.3(1), 1609.3(5) and 1609.3(6). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* III buildings and structures shall be obtained from Figures 1609.3(2), 1609.3(7) and 1609.3(8). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* IV buildings and structures shall be obtained from Figures 1609.3(3), 1609.3(9) and 1609.3(10). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* I buildings and structures shall be obtained from Figures 1609.3(4), 1609.3(11) and 1609.3(12). The basic ~~design~~ *wind speed*, *V*, for the special wind regions indicated near mountainous terrain and near gorges shall be in accordance with local jurisdiction requirements. The basic ~~design~~ wind speeds, *V*, determined by the local jurisdiction shall be in accordance with Chapter 26 of ASCE 7.
In nonhurricane-prone regions, when the basic ~~design~~ *wind speed*, *V*, is estimated from regional climatic data, the basic ~~design~~ *wind speed*, *V*, shall be determined in accordance with Chapter 26 of ASCE 7.

1609.3.1 Wind speed conversion. Where required, the basic ~~design~~ wind speed, V, of Figures 1609.3(1) through 1609.3(12) shall be converted to *allowable stress design* wind speeds, V_{asd}, using Table 1609.3.1 or Equation 16-17.

$$V_{asd} = V\sqrt{0.6} \qquad \textbf{(Equation 16-17)}$$

where:

V_{asd} = *Allowable stress design* wind speed applicable to methods specified in Exceptions 4 and 5 of Section 1609.1.1.

V = Basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3(12).

TABLE 1609.3.1 WIND SPEED CONVERSIONS[a, b, c]

V	100	110	120	130	140	150	160	170	180	190	200
V_{asd}	78	85	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.44 m/s.

a. Linear interpolation is permitted.

b. V_{asd} = allowable stress design wind speed applicable to methods specified in Exceptions 1 through 5 of Section 1609.1.1.

c. V = basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3(12).

1705.12 Special inspections for wind resistance. *Special inspections* for wind resistance specified in Sections 1705.12.1 through 1705.12.3, unless exempted by the exceptions to Section 1704.2, are required for buildings and structures constructed in the following areas:

1. In wind Exposure Category B, where <u>*basic wind speed*</u>, *V* is 150 miles per hour (67 m/sec) or greater.
2. In wind Exposure Category C or D, where <u>*basic wind speed*</u>, *V* is 140 mph (62.6 m/sec) or greater.

2304.6.1 Wood structural panel sheathing. Where *wood structural panel* sheathing is used as the exposed finish on the outside of *exterior walls*, it shall have an exterior exposure durability classification. Where *wood structural panel* sheathing is used elsewhere, but not as the exposed finish, it shall be of a type manufactured with exterior glue (Exposure 1 or Exterior). *Wood structural panel* sheathing, connections and framing spacing shall be in accordance with Table 2304.6.1 for the applicable <u>allowable stress design</u> wind speed and exposure category where used in enclosed buildings with a mean roof height not greater than 30 feet (9144 mm) and a topographic factor (K_{zt}) of 1.0.

TABLE 2304.10.2 FASTENING SCHEDULE

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[g]	SPACING AND LOCATION
Roof		
1. Blocking between ceiling joists, rafters or trusses to top plate or other framing below	4-8d box (2$^{1}/_{2}$″ x 0.113″); or 3-8d common (2$^{1}/_{2}$″ × 0.131″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″14 gage staples, $^{7}/_{16}$″ crown	Each end, toenail
Blocking between rafters or truss not at the wall top plate, to rafter or truss	2-8d common (2$^{1}/_{2}$″ × 0.131″) 2-3″ × 0.131″ nails 2-3″ 14 gage staples	Each end, toenail
	2-16 d common (3$^{1}/_{2}$″ × 0.162″) 3-3″ × 0.131″ nails 3-3″ 14 gage staples	End nail
Flat blocking to truss and web filler	16d common (3$^{1}/_{2}$″ × 0.162″) @ 6″ o.c. 3″ × 0.131″ nails @ 6″ o.c. 3″ × 14 gage staples @ 6″ o.c	Face nail
2. Ceiling joists to top plate	4-8d box (2$^{1}/_{2}$″ x 0.113″); or 3-8d common (2$^{1}/_{2}$″ × 0.131″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, $^{7}/_{16}$″ crown	Each joist, toenail
3. Ceiling joist not attached to parallel rafter, laps over partitions (no thrust) (see Section 2308.7.3.1, Table 2308.7.3.1)	3-16d common (3$^{1}/_{2}$″ × 0.162″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, $^{7}/_{16}$″ crown	Face nail
4. Ceiling joist attached to parallel rafter (heel joint) (see Section 2308.7.3.1, Table 2308.7.3.1)	Per Table 2308.7.3.1	Face nail
5. Collar tie to rafter	3-10d common (3″ × 0.148″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, $^{7}/_{16}$″ crown	Face nail
6. Rafter or roof truss to top plate (See Section 2308.7.5, Table 2308.7.5)	3-10 common (3″ × 0.148″); or 3-16d box (3$^{1}/_{2}$″ × 0.135″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131 nails; or 4-3″ 14 gage staples, $^{7}/_{16}$″ crown	2 toenails on one side and 1 toenail on opposite side of rafter or truss[c]
7. Roof rafters to ridge valley or hip rafters; or roof rafter to 2-inch ridge beam	2-16d common (3$^{1}/_{2}$″ × 0.162″); or 3-16d box (3$^{1}/_{2}$″ × 0.135″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, $^{7}/_{16}$″ crown	End nail
	3-10d common (3$^{1}/_{2}$″ × 0.148″); or 4-16d box (3$^{1}/_{2}$″ × 0.135″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, $^{7}/_{16}$″ crown	Toenail
Wall		
8. Stud to stud (not at braced wall panels)	16d common (3$^{1}/_{2}$″ × 0.162″);	24″ o.c. face nail
	10d box (3″ × 0.128″); or 3″ × 0.131″ nails; or 3-3″ 14 gage staples, $^{7}/_{16}$″ crown	16″ o.c. face nail
9. Stud to stud and abutting studs at intersecting wall	16d common (3$^{1}/_{2}$″ × 0.162″)	16″ o.c. face nail
	16d box (3$^{1}/_{2}$″ × 0.135″); or 3″ × 0.131″ nails; or 3-3″ 14 gage staples, $^{7}/_{16}$″ crown	12″ o.c. face nail

corners (at braced wall panels)

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION
10. Built-up header (2″ to 2″ header)	16d common (3$^1/_2$″ × 0.162″)	16″ o.c. each edge, face nail
	16d box (3$^1/_2$″ × 0.135″)	12″ o.c. each edge, face nail
11. Continuous header to stud	4-8d common (2$^1/_2$″ × 0.131″); or 4-10d box (3″ × 0.128″); or 5-8d box (2$^1/_2$″ x 0.113″)	Toenail
12. Top plate to top plate	16d common (3$^1/_2$″ × 0.162″)	16″ o.c. face nail
	10d box (3″ × 0.128″); or 3″ × 0.131″ nails; or 3″ 14 gage staples, $^7/_{16}$″ crown	12″ o.c. face nail
13. Top plate to top plate, at end joints	8-16d common (3$^1/_2$″ × 0.162″); or 12-16d box (3$^1/_2$″ x 0.135″); or 12-10d box (3″ × 0.128″); or 12-3″ × 0.131″ nails; or 12-3″ 14 gage staples, $^7/_{16}$″ crown	Each side of end joint, face nail (minimum 24" lap splice length each side of end joint)
14. Bottom plate to joist, rim joist, band joist or blocking (not at braced wall panels)	16d common (3$^1/_2$″ × 0.162″)	16″ o.c. face nail
	16d box (3$^1/_2$″ × 0.135″); or 3″ × 0.131″ nails; or 3″ 14 gage staples, $^7/_{16}$″ crown	12″ o.c. face nail
15. Bottom plate to joist, rim joist, band joist or blocking at braced wall panels	2-16d common (3$^1/_2$″ × 0.162″); or 3-16d box (3$^1/_2$″ × 0.135″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, $^7/_{16}$″ crown	16″ o.c. face nail
16. Stud to top or bottom plate	3-16d box (3$^1/_2$″ x 0.135″); or 4-8d common (2$^1/_2$″ × 0.131″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-8d box (2$^1/_2$″ x 0.113″); or 4-3″ 14 gage staples, $^7/_{16}$″ crown	Toenail
	2-16d common (3$^1/_2$″ × 0.162″); or 3-16d box (3$^1/_2$″ x 0.135″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, $^7/_{16}$″ crown	End nail
17. Top plates, laps at corners and intersections	2-16d common (3$^1/_2$″ × 0.162″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, $^7/_{16}$″ crown	Face nail
18. 1″ brace to each stud and plate	3-8d box (2$^1/_2$″ x 0.113″); or 2-8d common (2$^1/_2$″ × 0.131″); or 2-10d box (3″ × 0.128″); or 2-3″ × 0.131″ nails; or 2-3″ 14 gage staples, $^7/_{16}$″ crown	Face nail
19. 1″ × 6″ sheathing to each bearing	3-8d box (2$^1/_2$″ x 0.113″); or 2-8d common (2$^1/_2$″ × 0.131″); or 2-10d box (3″ × 0.128″); or 2-1$^3/_4$″ 16 gage staples, 1″ crown	Face nail
	3-8d common (2$^1/_2$″ × 0.131″); or 3-8d box (2$^1/_2$″ x 0.113″); or 3-10d box (3″ × 0.128″); or 3-1$^3/_4$″ 16 gage staples, 1″ crown	

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION	
20. 1″ × 8″ and wider sheathing to each bearing		Face nail	
	Wider than 1″ × 8″ 3-8d common ($2\frac{1}{2}$″ x 0.131″); or 4-8d box ($2\frac{1}{2}$″ × 0.113″); or 3-10d box (3″ × 0.128″); or 4-$1\frac{3}{4}$″ 16 gage staples, 1″ crown		
Floor			
21. Joist to sill, top plate, or girder	4-8d box ($2\frac{1}{2}$″ × 0.113″); or 3-8d common ($2\frac{1}{2}$″ × 0.131″); or floor 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, $\frac{7}{16}$″ crown	Toenail	
22. Rim joist, band joist, or blocking to top plate, sill or other framing below	8d box ($2\frac{1}{2}$″ × 0.113″)	4″ o.c., toenail	
	8d common ($2\frac{1}{2}$″ × 0.131″); or 10d box (3″ × 0.128″); or 3″ × 0.131″ nails; or 3″ 14 gage staples, $\frac{7}{16}$″ crown	6″ o.c., toenail	
23. 1″ × 6″ subfloor or less to each joist	3-8d box ($2\frac{1}{2}$″ × 0.113″); or 2-8d common ($2\frac{1}{2}$″ × 0.131″); or 3-10d box (3″ × 0.128″); or 2-$1\frac{3}{4}$″ 16 gage staples, 1″ crown	Face nail	
24. 2 subfloor to joist or girder	3-16d box ($3\frac{1}{2}$″ × 0.135″); or 2-16d common ($3\frac{1}{2}$″ × 0.162″)	Blind and face nail	
25. 2″ planks (plank & beam – floor & roof)	3-16d box ($3\frac{1}{2}$″ × 0.135″); or 2-16d common ($3\frac{1}{2}$″ × 0.162″)	Each bearing, face nail	
26. Built-up girders and beams, 2″ lumber layers	20d common (4″ × 0.192″)	32″ o.c., face nail at top and bottom staggered on opposite sides	
	10d box (3″ × 0.128″); or 3″ × 0.131″ nails; or 3″ 14 gage staples, $\frac{7}{16}$″ crown	24″ o.c. face nail at top and bottom staggered on opposite sides	
	And: 2-20d common (4″ × 0.192″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, $\frac{7}{16}$″ crown	Ends and at each splice, face nail	
27. Ledger strip supporting joists or rafters	3-16d common ($3\frac{1}{2}$″ × 0.162″); or 4-16d box ($3\frac{1}{2}$″ × 0.135″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, $\frac{7}{16}$″ crown	Each joist or rafter, face nail	
28. Joist to band joist or rim joist	3-16d common ($3\frac{1}{2}$″ × 0.162″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, $\frac{7}{16}$″ crown	End nail	
29. Bridging or blocking to joist, rafter or truss	2-8d common ($2\frac{1}{2}$″ × 0.131″); or 2-10d box (3″ × 0.128″); or 2-3″ × 0.131″ nails; or 2-3″ 14 gage staples, $\frac{7}{16}$″ crown	Each end, toenail	
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]			
		Edges (inches)	**Intermediate supports (inches)**
	6d common or deformed (2″ × 0.113″); or $2\frac{3}{8}$″ × 0.113″ nail (subfloor and wall)	6	12
	8d common or deformed ($2\frac{1}{2}$″ × 0.131″× 0.281″ head) (roof) or RSRS-01 ($2\frac{3}{8}$″ × 0.113″) nail (roof)[d]	6[e]	6[e]

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION	
30. $^{3}/_{8}$″ – $^{1}/_{2}$″	1$^{3}/_{4}$″ 16 gage staple, $^{7}/_{16}$″ crown (subfloor and wall)	4	8
	2$^{3}/_{8}$″ × 0.113″× 0.266″ head nail (roof)	3[f]	3[f]
1$^{3}/_{4}$″ 16 gage staple, $^{7}/_{16}$″ crown (roof)	3[f]	3[f]	
31. $^{19}/_{32}$″ – $^{3}/_{4}$″	8d common (2$^{1}/_{2}$″ × 0.131″); or deformed (2″ × 0.113″) (subfloor and wall)	6	12
	8d common or deformed (2$^{1}/_{2}$″ × 0.131″ × 0.281″ head) (roof) or RSRS-01 (2$^{3}/_{8}$″ × 0.113″) nail (roof)[d]	6[e]	6[e]
	2$^{3}/_{8}$″ × 0.113″× 0.266″ head nail; or 2″ 16 gage staple, $^{7}/_{16}$″ crown	4	8
32. $^{7}/_{8}$″ – 1$^{1}/_{4}$″	10d common (3″ × 0.148″); or deformed (2$^{1}/_{2}$″ × 0.131″ × 0.281″ head)	6	12
Other exterior wall sheathing			
33. $^{1}/_{2}$″ fiberboard sheathing[b]	1$^{1}/_{2}$″ × 0.120″, galvanized roofing nail ($^{7}/_{16}$″ head diameter); or 1$^{1}/_{4}$″ 16 gage staple with $^{7}/_{16}$″ or 1″ crown	3	6
34. $^{25}/_{32}$″ fiberboard sheathing[b]	1$^{3}/_{4}$″ × 0.120″ galvanized roofing nail ($^{7}/_{16}$″ diameter head); or 1$^{1}/_{2}$″ 16 gage staple with $^{7}/_{16}$″ or 1″ crown	3	6
Wood structural panels, combination subfloor underlayment to framing			
35. $^{3}/_{4}$″ and less	8d common (2$^{1}/_{2}$″ × 0.131″); or deformed (2″ × 0.113″); or deformed (2″ × 0.120″)	6	12
36. $^{7}/_{8}$″ – 1″	8d common (2$^{1}/_{2}$″ × 0.131″); or deformed (2$^{1}/_{2}$″ × 0.131″); or deformed (2$^{1}/_{2}$″ × 0.120″)	6	12
37. 1$^{1}/_{8}$″ – 1$^{1}/_{4}$″	10d common (3″ × 0.148″); or deformed (2$^{1}/_{2}$″ × 0.131″); or deformed (2$^{1}/_{2}$" × 0.120")	6	12
Panel siding to framing			
38. $^{1}/_{2}$″ or less	6d corrosion-resistant siding (1$^{7}/_{8}$″ × 0.106″); or 6d corrosion-resistant casing (2″ × 0.099″)	6	12
39. $^{5}/_{8}$″	8d corrosion-resistant siding (2$^{3}/_{8}$″ × 0.128″); or 8d corrosion-resistant casing (2$^{1}/_{2}$″ × 0.113″)	6	12
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]			
		Edges (inches)	**Intermediate supports (inches)**
Interior paneling			
40. $^{1}/_{4}$″	4d casing (1$^{1}/_{2}$″ × 0.080″); or 4d finish (1$^{1}/_{2}$″ × 0.072″)	6	12
41. $^{3}/_{8}$″	6d casing (2″ × 0.099″); or 6d finish (2″ × 0.092″) (Panel supports at 24 inches)	6	12

For SI: 1 inch = 25.4 mm.

a. Nails spaced at 6 inches at intermediate supports where spans are 48 inches or more. For nailing of wood structural panel and particleboard diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.

b. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).

c. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule and the ceiling joist is fastened to the top plate in accordance with this schedule, the number of toenails in the rafter shall be permitted to be reduced by one nail.

d. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

e. Tabulated fastener requirements apply where the ~~ultimate design~~ basic wind speed , V, is less than 140 mph. For wood structural panel roof sheathing attached to gable-end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ~~ultimate design~~ basic wind speed , V, is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C. Spacing exceeding 6 inches on center at intermediate supports shall be permitted where the fastening is designed per the AWC NDS.

f. Fastening is only permitted where the ~~ultimate design~~ basic wind speed, V, is less than or equal to 110 mph.

g. Nails and staples are carbon steel meeting the specifications of ASTM F1667. Connections using nails and staples of other materials, such as stainless steel, shall be designed by acceptable engineering practice or approved under Section 104.11.

TABLE 2308.7.5 REQUIRED RATING OF APPROVED UPLIFT CONNECTORS (pounds)[a, b, c, e, f, g, h]

~~NOMINAL~~ ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd} [i]	ROOF SPAN (feet)							OVERHANGS (pounds/feet)[d]
	12	20	24	28	32	36	40	
85	-72	-120	-145	-169	-193	-217	-241	-38.55
90	-91	-151	-181	-212	-242	-272	-302	-43.22
100	-131	-281	-262	-305	-349	-393	-436	-53.36
110	-175	-292	-351	-409	-467	-526	-584	-64.56

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = ~~1.61 km/hr~~

0.447 meters per second, 1 pound = 0.454 Kg, 1 pound/foot = 14.5939 N/m.

a. The uplift connection requirements are based on a 30-foot mean roof height located in Exposure B. For Exposure C or D and for other mean roof heights, multiply the loads by the following adjustment coefficients:

	Mean Roof Height (feet)									
EXPOSURE	15	20	25	30	35	40	45	50	55	60
B	1.00	1.00	1.00	1.00	1.05	1.09	1.12	1.16	1.19	1.22
C	1.21	1.29	1.35	1.40	1.45	1.49	1.53	1.56	1.59	1.62
D	1.47	1.55	1.61	1.66	1.70	1.74	1.78	1.81	1.84	1.87

b. The uplift connection requirements are based on the framing being spaced 24 inches on center. Multiply by 0.67 for framing spaced 16 inches on center and multiply by 0.5 for framing spaced 12 inches on center.

c. The uplift connection requirements include an allowance for 10 pounds of dead load.

d. The uplift connection requirements do not account for the effects of overhangs. The magnitude of the loads shall be increased by adding the overhang loads found in the table. The overhang loads are based on framing spaced 24 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.

e. The uplift connection requirements are based on wind loading on end zones as defined in Figure 28.5-1 of ASCE 7. Connection loads for connections located a distance of 20 percent of the least horizontal dimension of the building from the corner of the building are permitted to be reduced by multiplying the table connection value by 0.7 and multiplying the overhang load by 0.8.

f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 500-pound rated connector is used on the roof framing, a 400-pound rated connector is permitted at the next floor level down).

g. Interpolation is permitted for intermediate values of V_{asd} and roof spans.

h. The rated capacity of approved tie-down devices is permitted to include up to a 60-percent increase for wind effects where allowed by material specifications.

i. V_{asd} shall be determined in accordance with Section 1609.3.1.

2404.1 Vertical glass. Glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind *loads* due to basic ~~design~~ *wind speed*, *V*, in Section 1609 for components and cladding. Glass in glazed curtain walls, glazed storefronts and glazed partitions shall meet the seismic requirements of ASCE 7, Section 13.5.9. The load resistance of glass under uniform *load* shall be determined in accordance with ASTM E1300.
The design of vertical glazing shall be based on Equation 24-1.

$0.6F_{gw} \leq F_{ga}$ **(Equation 24-1)**

where:

F_{gw} = Wind *load* on the glass due to basic ~~*design*~~ *wind speed*, *V*, computed in accordance with Section 1609.

F_{ga} = Short duration *load* on the glass as determined in accordance with ASTM E1300.

2404.2 Sloped glass. Glass sloped more than 15 degrees (0.26 rad) from vertical in skylights, *sunrooms*, sloped roofs and other exterior applications shall be designed to resist the most critical combinations of loads determined by Equations 24-2, 24-3 and 24-4.

$F_g = 0.6W_o - D$ **(Equation 24-2)**

$F_g = 0.6W_i + D + 0.5\,S$ **(Equation 24-3)**

$F_g = 0.3\ W_i + D + S$ **(Equation 24-4)**

where:

D = Glass *dead load* psf (kN/m^2).

For glass sloped 30 degrees (0.52 rad) or less from horizontal,

= 13 t_g (For SI: 0.0245 t_g).

For glass sloped more than 30 degrees (0.52 rad) from horizontal,

= 13 t_g cos θ (For SI: 0.0245 t_g cos θ).

F_g = Total *load*, psf (kN/m^2) on glass.

S = Snow *load*, psf (kN/m^2) as determined in Section 1608.

t_g = Total glass thickness, inches (mm) of glass panes and plies.

W_i = Inward wind force, psf (kN/m^2) due to basic ~~design~~ *wind speed*, *V*, as calculated in Section 1609.

W_o = Outward wind force, psf (kN/m^2) due to basic ~~design~~ wind speed, *V*, as calculated in Section 1609.

θ = Angle of slope from horizontal.

Exception: The performance grade rating of *unit skylights* and *tubular daylighting devices* shall be determined in accordance with Section 2405.5.

The design of sloped glazing shall be based on Equation 24-5.

$F_g \leq F_{ga}$ **(Equation 24-5)**

where:

F_g = Total *load* on the glass as determined by Equations 24-2, 24-3 and 24-4.

F_{ga} = Short duration *load* resistance of the glass as determined in accordance with ASTM E1300 for Equations 24-2 and 24-3; or the long duration *load* resistance of the glass as determined in accordance with ASTM E1300 for Equation 24-4.

2404.3.1 Vertical wired glass. Wired glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind *loads* in Section 1609 for components and cladding according to the following equation:

$0.6F_{gw} < 0.5\ F_{ge}$ **(Equation 24-6)**

where:

F_{gw} = Wind *load* on the glass due to basic ~~*design*~~ *wind speed*, *V*, computed in accordance with Section 1609.

F_{ge} = Nonfactored *load* from ASTM E1300 using a thickness designation for monolithic glass that is not greater than the thickness of wired glass.

2404.3.3 Vertical patterned glass. Patterned glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind *loads* in Section 1609 for components and cladding according to Equation 24-9.

$F_{gw} < 1.0\ F_{ge}$ **(Equation 24-9)**

where:

F_{gw} = Wind *load* on the glass due to basic ~~design~~ *wind speed*, *V*, computed in accordance with Section 1609.

F_{ge} = Nonfactored *load* in accordance with ASTM E1300. The value for patterned glass shall be based on the thinnest part of the glass. Interpolation between nonfactored *load* charts in ASTM E1300 shall be permitted.

2404.3.5 Vertical sandblasted glass. Sandblasted glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors, and other exterior applications shall be designed to resist the wind *loads* in Section 1609 for components and cladding according to Equation 24-12.

$0.6F_{gw} < 0.5\ F_{ge}$ **(Equation 24-12)** where:

F_g = Wind *load* on the glass due to basic ~~design~~ *wind speed*, *V*, computed in accordance with Section 1609.

F_{ge} = Nonfactored *load* in accordance with ASTM E1300. The value for sandblasted glass is for moderate levels of sandblasting.

2405.5.2 Skylights rated for separate performance grades for positive and negative design pressure. The design of skylights rated for performance grade for both positive and negative design pressures shall be based on Equations 24-14 and 24-15.

$F_{gi} \leq PG_{Pos}$ **(Equation 24-14)**

$F_{go} \leq PG_{Neg}$ **(Equation 24-15)**

where:

PG_{Pos} = Performance grade rating of the skylight under positive design pressure;

PG_{Neg} = Performance grade rating of the skylight under negative design pressure; and
F_{gi} and F_{go} are determined in accordance with the following:

For

where:

W_o = Outward wind force, psf (kN/m^2) due to basic ~~design~~ wind speed, *V*, as calculated in Section 1609.

D = The dead weight of the glazing, psf (kN/m^2) as determined in Section 2404.2 for glass, or by the weight of the plastic, psf (kN/m^2) for plastic glazing.

F_{gi} = Maximum load on the skylight determined from Equations 24-3 and 24-4 in Section 2404.2.

F_{go}= Maximum load on the skylight determined from Equation 24-2.

For 0.6 $W_o < D$,

where:

W_o = The outward wind force, psf (kN/m^2) due to basic ~~design~~ wind speed, *V*, as calculated in Section 1609.

D = The dead weight of the glazing, psf (kN/m^2) as determined in Section 2404.2 for glass, or by the weight of the plastic for plastic glazing.

F_{gi} = Maximum load on the skylight determined from Equations 24-2 through 24-4 in Section 2404.2.

F_{go} = 0.

Staff Analysis: CC# S9-22 and CC# S62-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This is a clarifying proposal to clean up the wording in regard to the basic wind speed referenced in the many sections of the code. This proposal makes the wording consistent with ASCE 7 and other loading standards.
Also, modified the metric conversions used for wind speeds in that the maps are based on miles per hour and the conversion is to meters per second not kilometers per hour.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code change will not affect the cost of construction. It's just a cleanup with the language to make consistent with other documents.

S9-22

S10-22

IBC: 1504.7 (New), 1504.6, MCA (New), (New)

Proponents: Bob Zabcik, representing Metal Construction Association (bob@ztech-consulting.com); Andy Williams, representing National Frame Building Association (panelcladsolutions@gmail.com)

2021 International Building Code

Add new text as follows:

1504.7 Metal edge systems for metal roofs. Metal edge systems, excluding gutters, installed on metal roofs shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with ANSI/MCA FTS-1.

> **Exception:** Direct-fastened edge systems without cleats as defined in ANSI/MCA FTS-1 which are connected to cold-formed steel or aluminum cladding or framing are permitted to be designed for resistance to wind *loads* in accordance with the applicable referenced structural design standard in Section 2210.1 and 2002.1 as applicable.

Revise as follows:

1504.6 Edge systems for built-up, modified bitumen and single-ply low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roofsystems having a slope less than 2 units vertical in 12 units horizontal (2:12) shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic design *wind speed*, V, shall be determined from Figures 1609.3(1) through 1609.3(12) as applicable.

Add new text as follows:

MCA

Metal Construction Assocation
8735 W. Higgins Rd., Suite 300
Chicago, IL 60631

ANSI/MCA FTS-1-2019. Test Method for Wind Load Resistance of Flashings Used with Metal Roof System

Reason Statement: This proposal adds requirements for testing of edge metal systems on metal roofs, similar to those currently in place for low-slope built-up, modified bitumen and single-ply roof systems in Section 1504.6. It is being put forth by the Metal Construction Association (MCA) to address issues observed by the Roofing Industry Committee on Weather Issues (RICOWI) through their Windstorm Investigation Program (WIP). The test standard cited, ANSI/MCA FTS-1-2019, was developed by MCA through the Single Ply Roofing Institute's (SPRI) ANSI-accredited canvassing process. MCA is a sponsoring organization of RICOWI and began development of ANSI/MCA FTS-1 in 2016 to address this issue and the method was finalized and released in 2019. The standard may be found at <https://tinyurl.com/ytemy7u4> and a video of a test may be viewed at <https://tinyurl.com/y36heu49>.
The RICOWI WIP post-event field studies revealed instances where the edge metal system was torn from the perimeter of a building with a metal roof, exposing a longer leading edge of the incorporated roof panel and initiating a partial failure of the roof system, particularly near the corners and gable edges of the roof. Although the damage was very localized, it did allow water to enter the building and in some cases, the edge metal became a wind-borne debris threat. Most commonly, this occurred in two cases:

1) Where a multi-piece edge trim assembly incorporating cleats deformed enough to disengage the cleat.

2) Where the metal edge trim assembly was fastened to a non-metal substrate such as wood or masonry, leaving to question the appropriateness of the fastener used since it would often not be provided by the edge system manufacturer for non-metal substrates.

The exception in Section 1504.7 recognizes that neither of the two conditions listed applies to non-cleated, single-piece edge systems attached to structural metal roof or wall panels and framing, provided the fastening is appropriately designed in accordance with the relevant design standards. (i.e, the fastener and substrate material requirements and fastener spacing criteria of these standards are met.) These standards are AISI S100 for cold-formed steel and AA ADM for aluminum. See Figures 1 through 4 in the attachment or at <https://tinyurl.com/2p8msj2t>, which visually differentiate these conditions.

Additional text is also being added to the title of Section 1504.6 to provide delineation between the sections. However, this does not alter the requirements for built-up, modified bitumen and single-ply roof systems in any way.

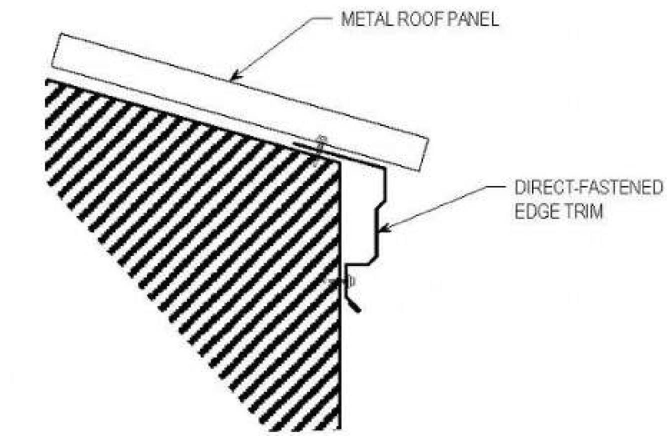


Figure 1: Direct-Fastened, Non-Cleated Eave Edge System

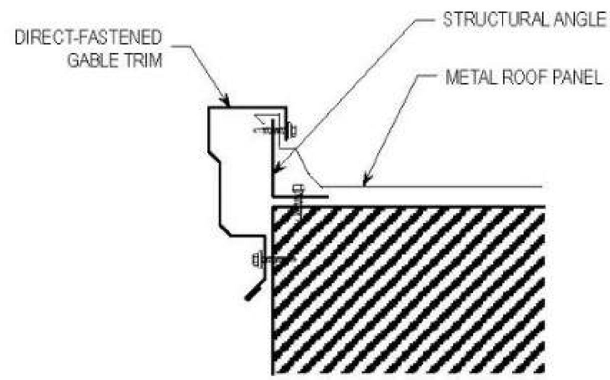


Figure 3: Direct-Fastened, Non-Cleated Gable Edge System

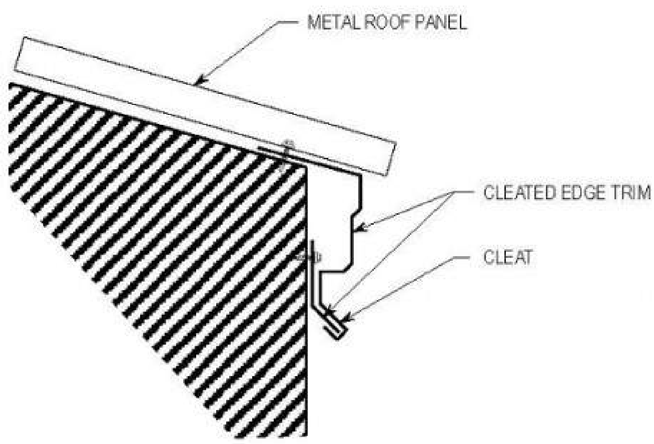


Figure 2: Cleated Eave Edge System

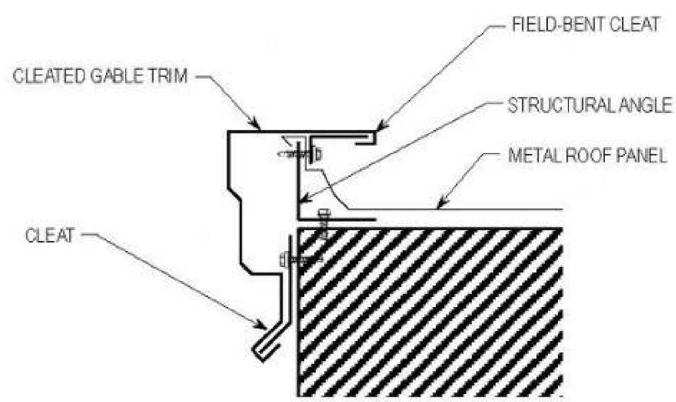


Figure 4: Cleated Gable Edge System

Cost Impact: The code change proposal will increase the cost of construction
This change would indirectly increase the cost of construction as the cost of the testing would presumably be passed to the consumer. However, the impact is tiny. The test cost is estimated to be $1,500/test and most manufacturers carry 2-5 styles of edge metal systems different enough to test separately. Thus, total cost is estimated to be $3,000 to $7,500. If this cost is accrued over the life of the product line, assumed to be 500 to 10,000 buildings, it results in a nominal increase of at most $15 per building. If a typical building includes 400 feet of trim valued at $5/lineal foot, this represents a nominal increase of 0.8% for the trim system. The cost of the edge metal is at most 1% of the total building cost, making the increase at most 0.008% over the entire building.

S10-22

S11-22

IBC: 1504.7

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Delete without substitution:

~~**1504.7 Physical properties.** *Roof coverings* installed on low-slope roofs (roof slope < 2:12) in accordance with Section 1507 shall demonstrate physical integrity over the working life of the roof based on 2,000 hours of exposure to accelerated weathering tests conducted in accordance with ASTM G152, ASTM G154 or ASTM G155. Those *roof coverings* that are subject to cyclical flexural response due to wind *loads* shall not demonstrate any significant loss of tensile strength for unreinforced membranes or breaking strength for reinforced membranes when tested as herein required.~~

Reason Statement: This code change proposal is intended to clarify the code's intent by removing Section 1504.7-Physical Properties, which requires accelerated weathering for roof coverings used on low-slope roofs (roof slope < 2:12) to demonstrate no significant loss of tensile strength or breaking strength. The code's requirement does not specifically define "significant loss" levels. As a result, this requirement is difficult to interpret and enforce.
Section 1506.2 already requires roofing products to confirm to the applicable product standards prescribed in the code. Section 1507-Requirements for Roof Coverings defines the specific standards the products and materials. Such product standards include accelerated aging and weathering testing, and specific pass/fail criteria deemed appropriate by the standard developer for the products. For example, the product standard for TPO single-ply roof membranes, ASTM D6878, "Standard Specification for Thermoplastic Polyolefin-based Sheet Roofing," includes not only accelerated weathering resistance testing with no resulting cracks or crazing, but also ozone resistance testing (no cracks) and retention of physical properties after heat aging (max. 1.5% weight loss and no cracking when bent over a mandrel). Such testing is more severe than that currently in Section 1504.7.

Removing Section 1504.7 and relying on the testing included in the product standards already included in Section 1507 will not decrease the performance levels of roof coverings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal has no cost impact. It does not lower or raise performance levels already incorporated in the code.

S11-22

S12-22

IBC: TABLE 1504.9

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, representing ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c, d]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC DESIGN WIND SPEED (MPH)																	
		Exposure B									Exposure C[e ~~d~~]								
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No. 6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for mean roof height and parapet height.

b. Basic design wind speed, *V*, and wind exposure shall be determined in accordance with Section 1609.

c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

d. The tabulated values apply only to conditions where the topographic factor (K_{zt}) determined in accordance with Chapter 26 of ASCE 7 is 1.0 or where K_{zt} is incorporated in the mapped basic design wind speed in section 1609.

e.~~d.~~ For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

Reason Statement: This proposal is needed because Table 1504.9 does not indicate that the tabulated values are based on the absence of topographic effects at the building site. Consequently, the tabulated values could be inappropriately interpreted as applying to sites where topographic effects exist (e.g., $K_{zt} > 1.0$). This could result in increased wind speed at roof height and result in a more severe condition for aggregate blow-off than considered in developing the table based on the assumption of $K_{zt} = 1.0$. This concern does not apply where topographic wind speed-up effects are incorporated into the wind map for Hawaii [2021 IBC Figures 1609.3(5) through 1609.3(12)].

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change technical content. It adds documentation about an existing limitation associated with Table 1504.9. There should be no change in cost of construction if this proposal is approved.

S12-22

S13-22

IBC: 1504.9

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, representing ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9. <u>Such parapets shall be provided on the perimeter of the roof at all exterior sides except where an adjacent wall extends above the roof to a height at least equivalent to that required for the parapet.</u>

Reason Statement: The additional sentence clarifies treatment of the Table 1504.9 requirements for the special circumstance in which a building roof has at least one side bounded by a wall.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Existing language implies a parapet is required on all roof sides. This change makes that implied requirement explicit and addresses potential confusion in interpretation of Section 1504.9. Because it improves understanding of existing provisions without creating new requirements, no change in cost of construction is associated with this proposal.

S13-22

S14-22

IBC: 1504.9

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, representing ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9. <u>For roofs with differing surface elevations due to slope or sections at different elevations, the minimum parapet height shall be provided for each roof surface elevation and at no point shall the parapet height be less than that required by Table 1504.9.</u>

Reason Statement: The additional sentence clarifies treatment of the Table 1504.9 requirements with respect to both roof slope and the special circumstance in which a building has roof sections at different elevations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The additional sentence in this proposal makes explicit what is already implied in Section 1504.9 without creating a new requirement. The improved understanding of existing provisions should not alter cost of construction if this proposal is approved.

S14-22

S15-22

IBC: TABLE 1504.9

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, representing ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC DESIGN WIND SPEED (MPH)																	
		Exposure B									Exposure C[d]								
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No. 6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for wind speed, mean roof height and parapet height. Extrapolation is not permitted.

b. Basic design wind speed, *V*, and wind exposure shall be determined in accordance with Section 1609.

c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

d. For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

Reason Statement: This proposal clarifies that interpolation is permissible for wind speed in addition to mean roof height and parapet height. It further clarifies that extrapolation beyond the limits of the table is not permitted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The modifications to the footnote provide additional explanatory information without making any technical change. No change in cost of construction is expected if this proposal is approved.

S15-22

S16-22

IBC: TABLE 1504.9

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, representing ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c, d]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC DESIGN WIND SPEED (MPH)																	
		Exposure B									Exposure C[e~~d~~]								
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No. 6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Parapet height is measured vertically from the top surface of the coping down to the surface of the *roof covering* in the field of the roof adjacent to the parapet and outbound of any cant strip.

b.~~a.~~ Interpolation shall be permitted for mean roof height and parapet height.

c.~~b.~~ Basic design wind speed, *V*, and wind exposure shall be determined in accordance with Section 1609.

d.~~c.~~ Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

e.~~d.~~ For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

Reason Statement: The proposal provides necessary direction for measurement of the parapet height.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The new footnote provides guidance for measurement of the parapet height. A few users may obtain lower parapet heights and a few may obtain higher heights if their measurement technique differs substantially from this provision, causing some to experience decreases in cost of construction and some to experience increases. The number of cases where a different height is obtained is likely to be very small, and there is no basis to believe a systematic bias exists between existing measurement techniques and the guidance provided in this proposal. Therefore, no general increase in cost of construction is anticipated.

S16-22

S17-22

IBC: 1504.9

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9.

> **Exception:** Aggregate ballasted single-ply roof coverings shall be designed and installed accordance with Section 1504.5.

Reason Statement: This code change proposal is intended to add clarity to the code by adding an exception to Section 1504.9 indicating aggregate ballasted single-ply membrane roofs are already addressed by the requirements in Section 1504.5. No changes are intended to the code's requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is simply a clarification of the code's existing requirements.

S17-22

S18-22

IBC: [BF] 1505.8, SECTION 202

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Building Code

Revise as follows:

[BF] 1505.8 Building-integrated photovoltaic (BIPV) ~~products~~ <u>systems</u>. *BIPV* ~~*products*~~ <u>systems</u> installed as the roof covering shall be tested, *listed* and *labeled* for fire classification in accordance with Section 1505.1.

[BS] BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) ~~PRODUCT~~ <u>SYSTEM</u>. A building ~~product~~ system that incorporates *photovoltaic modules* and functions as ~~a~~ <u>an integral part</u> ~~component~~ of the building envelope, <u>such as *roof assemblies* and *roof coverings*, *exterior wall envelopes* and *exterior wall coverings*, and *fenestration*</u>.

Reason Statement: The term “BIPV product” is used twice in the I-codes, both requiring fire classification for roofing applications (IBC Section 1505.8 and IRC Section R902.3). The term “BIPV system” is used eight times in the I-codes, addressing roof access, rapid shutdown systems, and fire classification for roofing applications (IFC Sections 1205.2 and 1205.2.3; IBC Sections 3111.3.2 and 3113.3; and IRC Sections R324.5, R324.5.2, R324.6 and R324.6.3). IBC Section 3111.3.2 directs BIPV systems to have a fire classification in accordance with Section 1505.8. The word “system” is defined by the dictionary as “a combination of things or parts forming a complex or unitary whole”, whereas the word “product” is defined as “the totality of goods or services that a company makes available; something produced”. “Product” infers a discrete piece, whereas “system” better describes a number of components that when installed function together for a specific purpose. This proposal also clarifies that these systems, when installed per the manufacturer’s installation instructions, become an integral part of the building envelope to provide a physical separator between internal and external environments.The types of BIPV systems that include “e*xterior wall envelopes* and *exterior wall coverings*, and *fenestration*” are added because FS150-21 in Group A added these types of BIPV systems to Chapter 14 of the IBC.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the term as it is used throughout the family of ICC codes.

S18-22

S19-22

IBC: 1507.1.1

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. <u>As an alternative, self-adhering polymer modified bitumen underlayment complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed shall be permitted.</u>

<u>2.</u>~~1.~~ As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.

<u>3.</u>~~2.~~ As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.

<u>4.</u>~~3.~~ Structural metal panels that do not require a substrate or underlayment.

Reason Statement: This proposal adds back into the IBC an exception permitting underlayment complying with ASTM D1970 that was removed during the previous code development cycle. Proposal S24-19 struck the existing exception and cited the mention of D1970 in 1507.1.1 as justification. Section 1507.1.1 states that D1970 underlayment must bear a label and refers to Tables 1507.1.1(1), 1507.1.1(2), and 1507.1.1(3). However, D1970 is not included in those tables, which is the reason this exception is necessary. In addition, the exception is needed to maintain some of the specific criteria for the use of this underlayment such as roof ventilation and climate exposure.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal corrects an error by reinserting a section that should not have been removed. By doing so, it expands available underlayment options for all roof covering types that use underlayment. The cost of construction impact will be project specific and might lead to decrease or increase. When considered across many projects, cost impact of approving this proposal is expected to be neutral.

S19-22

S20-22

IBC: 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3)

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety (testafford@charter.net)

2021 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.

~~1.~~ 2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane bearing a label indicating compliance to ~~complying with~~ ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering and design wind speed ~~for design wind speeds less than 120 mph (54 m/s)~~ shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table 1507.1.1(2) using the application requirements for where the maximum basic design wind speed is less than 130 mph. Underlayment shall be attached in accordance with Table 1507.1.1(3) for the applicable roof covering and design wind speed.

~~2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch (19.1 mm) into the roof sheathing.~~

3. Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V ≥ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or IV ~~ASTM D6757~~
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing	ASTM D226 Type II ~~ASTM D2626 Type I~~ ~~ASTM D6380 Class M mineral surfaced roll roofing~~
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or IV
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or IV ~~ASTM D6757~~

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V ≥ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.
Clay and concrete tile	1507.3	For roof slopes from $2^1/_2$ units vertical in 12 units horizontal ($2^1/_2$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: Starting at the eave, a 19-inch strip of underlayment shall be applied parallel with the eave. Starting at the eave, a 36-inch-wide strip of underlayment felt shall be applied, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	~~For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12),~~ underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. ~~For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches. End laps shall be 4 inches and shall be offset by 6 feet.~~
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		
Photovoltaic shingles	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

TABLE 1507.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V ≥ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1 inch diameter metal or plastic cap s ~~nails or cap staples with a nominal cap diameter of not less than 1 inch~~. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch ~~for ring shank cap nails and 0.091 inch for smooth shank cap nails~~. ~~Staples shall be not less than 21 gage (0.032 inch).~~ The cap nail shank ~~and cap staple legs~~ shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Clay and concrete tile	1507.3		
Photovoltaic shingles	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1 inch diameter metal or plastic cap s ~~nails or cap staples with a nominal cap diameter of not less than 1 inch~~. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch ~~for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage~~. The cap nail shank ~~and cap staple legs~~ shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Metal roof shingles	1507.5		
Mineral-surfacedroll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

For SI: 1 inch = 25.4 mm; 1 mile per hour = 0.447 m/s.

Reason Statement: This code change will align the IBC roof underlayment requirements in high wind regions with the 2021 IRC. For practical purposes, this code change simply requires an extra layer of 30# roofing felt (ASTM D 226 Type II, or ASTM D 4869 Types III or IV) for areas vulnerable to roof covering loss and subsequent water intrusion in the hurricane-prone regions. The fastening of the underlayment remains the same as required in the 2021 IBC except the use of staples as a fastening method has been removed. The effectiveness of staples in keeping the underlayment in place when subjected to hurricane-level wind loads has not been tested. Additionally, the trigger for the enhanced underlayment has been changed to where the design wind speed is 130 mph and greater for consistency with the 2021 IRC. This wind speed would capture areas impacted by Hurricane Michael where design wind speeds currently range from 130 mph to 140 mph. However, for special wind regions and Alaska, the trigger remains the same consistent with the IRC.

Water infiltration due to wind driven rain has been well documented from post-hurricane damage assessments where hurricane winds were strong enough to blow off the primary roof covering, but not strong enough to blow off roof sheathing. In such instances, significant property damage and extended occupant displacement routinely occur due to water intrusion. In many cases, the building will appear relatively undamaged from the exterior except for roof covering loss. However, a closer inspection would reveal significant interior and contents damage.

Water entry can occur where it is able to infiltrate through the roof, walls, vents, windows, and/or doors, or at interfaces between these items. Water intrusion can cause extensive damage to interior finishes, furnishings, and other contents, and can lead to ceiling collapse when attic insulation is saturated. When power is lost and/or a building cannot otherwise be dried out within 24–48 hours, additional issues such as mold can develop, potentially extending the period during which the property may not be available for use. Recent hurricanes have not been an exception.

Tests performed by IBHS at the Research Center have consistently shown that the secondary roof underlayment strategies recommended by the IBHS Fortified Commercial - Hurricane program consistently show significantly reduced water intrusion rates when one of these strategies was employed. Two of these strategies are already recognized by the code in Exceptions 1 and 2 to Section 1507.1.1. A 2011 hurricane demonstration clearly showed the benefit of sealing the

seams of the roof deck sheathing which is one of the strategies recognized in Exception 1 to Section 1507.1.1.

A summary of the results of the demonstration can be viewed at the following link:

http://ibhstest.wpengine.com/ibhsnews-releases/ibhs-hurricane-demonstration-illustrates-importance-of-sealed-roof-deck-3/.

The wind driven rain demonstration can be viewed at the following

https://disastersafety.org/thunderstorms/winddriven-rain-demo/.

A more recent study included an assessment of a new approach where the roof is covered with two layers of high-quality underlayment attached with cap nails. Based on the performance achieved with this system, it has now been added to the FORTIFIED program as a fifth option for achieving a sealed roof deck. This report is identified in the bibliography and has been included as an attachment to this code change. All of the underlayment strategies, including the two layers of felt underlayment reduced water entry into the attic space by 70% or more.

This proposal also adds one the most effective methods for preventing water intrusion back into the code. The use of fully adhered underlayment complying with ASTM D1970 has been recognized in the IBC going back to the mid-2000's. S24-19 deleted this exception permitting the use of ASTM D1970 underlayment on basis of it being redundant as it was listed in Section 1507.1.1. However, Section 1507.1.1 doesn't specifically permit this type of underlayment other than it is required to comply with the listed standard. A similar proposal for the IRC was proposed but a public comment added the exception for fully adhered underlayment back in. This proposal adds the exception for fully adhered underlayment complying with ASTM D 1970 back in the code consistent with the 2021 IRC.

Bibliography: Brown, T.M., Quarles, S.L., Giammanco, I.M., Brown, R., Insurance Institute for Business and Home Safety, "Building Vulnerability to Wind-Driven Rain Entry and Effectiveness of Mitigation Techniques." 14th International Conference on Wind Engineering (ICWE).

Cost Impact: The code change proposal will increase the cost of construction
If one of the methods in Exceptions 1 or 2 of Section 1507.1.1 are used, this proposal will not increase the cost of construction.

If the double layer of underlayment option is used, for areas where design wind speeds are greater than or equal to 130 mph in the Hurricane-Prone Region (140 mph elsewhere), the cost of the additional layer of underlayment will vary by region. However, for a 2000 square foot roof, the cost increase for the additional layer of underlayment will be between $100 to $200. For areas where the design wind speed is less than 140 mph but equal to or greater than 130 mph in the Hurricane-Prone region, additional fasteners will be required in addition to the additional layer of underlayment.

S20-22

S21-22

IBC: SECTION 202, SECTION 202 (New), 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3), 1507.16, 1507.16.1, 1507.16.2, 1507.16.3, 1507.16.4, 1507.16.5, 1507.16.6, 1507.16.7, 1507.16.8

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Building Code

Revise as follows:

[BS] ~~PHOTOVOLTAIC SHINGLES.~~ ~~A *roof covering* resembling shingles that incorporates *photovoltaic modules*.~~

Add new definition as follows:

<u>**BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) ROOF COVERING.** A *BIPV system* that also functions as a *roof covering*. Coverings include, but not limited to, shingles, tiles, and roof panels.</u>

Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and ~~*photovoltaic shingles*~~ <u>*BIPV roof coverings*</u> shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.
2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
~~Photovoltaic shingles~~ BIPV roof coverings	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Clay and concrete tile	1507.3	For roof slopes from $2^{1}/_{2}$ units vertical in 12 units horizontal ($2^{1}/_{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: Starting at the eave, a 19-inch strip of underlayment shall be applied parallel with the eave. Starting at the eave, a 36-inch-wide strip of underlayment felt shall be applied, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		
~~Photovoltaic shingles~~ BIPV roof coverings	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

TABLE 1507.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.
Clay and concrete tile	1507.3		
~~Photovoltaic shingles~~ BIPV roof coverings	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage. The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.
Metal roof shingles	1507.5		
Mineral-surfacedroll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

For SI: 1 inch = 25.4 mm; 1 mile per hour = 0.447 m/s.

1507.16 ~~Photovoltaic~~ BIPV shingles. The installation of ~~*photovoltaic*~~ *BIPV shingles* shall comply with the provisions of this section.

1507.16.1 Deck requirements. ~~*Photovoltaic*~~ *BIPV shingles* shall be applied to a solid or closely fitted deck, except where the shingles are specifically designed to be applied over spaced sheathing.

1507.16.2 Deck slope. ~~*Photovoltaic*~~ *BIPV shingles* shall be installed on roof slopes of not less than 2 units vertical in 12 units horizontal (2:12).

1507.16.3 Underlayment. *Underlayment* shall comply with Section 1507.1.1.

1507.16.4 Ice barrier. Where required, ice barriers shall comply with Section 1507.1.2.

Revise as follows:

1507.16.5 Fasteners. Fasteners for ~~*photovoltaic*~~ *BIPV shingles* shall be galvanized, stainless steel, aluminum or copper roofing nails, minimum 12-gage [0.105 inch (2.67 mm)] shank with a minimum $^{3}/_{8}$-inch-diameter (9.5 mm) head, of a length to penetrate through the roofing materials and not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing. Where the roof sheathing is less than $^{3}/_{4}$ inch (19.1 mm) thick, the nails shall penetrate through the sheathing. Fasteners shall comply with ASTM F1667.

1507.16.6 Material standards. ~~*Photovoltaic*~~ *BIPV shingles* shall be *listed* and labeled in accordance with UL 7103 or with both UL 61730-1 and UL 61730-2.

1507.16.7 Attachment. ~~*Photovoltaic*~~ *BIPV shingles* shall be attached in accordance with the manufacturer's installation instructions.

1507.16.8 Wind resistance. ~~*Photovoltaic*~~ *BIPV shingles* shall comply with the classification requirements of Table 1504.2 for the appropriate maximum nominal design wind speed.

Reason Statement: For the definitions, there are different forms of BIPV roof coverings, just as there are different forms of traditional roof coverings. The code defines roof coverings in general, and the different forms are described in Chapter 15 for their specific application. This change aligns with the change to the definition of BIPV Systems, which clarifies this type of photovoltaic solar energy system.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The

purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This provides clarity and consistency in terminology related to BIPV used as roof assemblies and roof coverings.

S21-22

S22-22 Part I

IBC: TABLE 1507.1.1(1), 1507.1.1, ASTM Chapter 35 (New)

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257
Metal roof panels	1507.4	Manufacturer's instructions ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 , ~~and~~ D6757 or ASTM D8257 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.

2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This code change proposal adds a new product standard for synthetic roof underlayment, ASTM D8257, "Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing," to Section 1507.1.1-Underlayment and Table 1507.1.1(1)-Underlayment Types.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds an additional option for roof underlayment. Synthetic underlayment products are priced competitively to the underlayment products already included in the Code.

S22-22 Part I

S22-22 Part II

IRC: R905.1.1, TABLE R905.1.1(1), ASTM Chapter 44 (New)

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757 and D8257 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type III or Type IV <u>ASTM D8257</u>
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing <u>ASTM D8257</u>	ASTM D226 Type II <u>ASTM D8257</u>
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type III or Type IV <u>ASTM D8257</u>
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type III or Type IV <u>ASTM D8257</u>
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type III or Type IV <u>ASTM D8257</u>
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type III or Type IV <u>ASTM D8257</u>
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type III or Type IV <u>ASTM D8257</u>
Metal panels	R905.10	Manufacturer's instructions <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type III or Type IV <u>ASTM D8257</u>
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757 <u>ASTM D8257</u>	ASTM D4869 Type III or Type IV <u>ASTM D8257</u>

For SI: 1 mile per hour = 0.447 m/s.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

<u>D8257/D8257M-20</u> <u>Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This code change proposal adds a new product standard for synthetic roof underlayment, ASTM D8257, "Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing," to Section R905.1.1-Underlayment and Table R905.1.1(1)-Underlayment Types.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds an additional option for roof underlayment. Synthetic underlayment products are priced competitively to the underlayment products already included in the Code

S22-22 Part II

S23-22

IBC: TABLE 1507.1.1(1), 1507.1.1

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M ~~mineral surfaced roll roofing~~	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M ~~mineral surfaced roll roofing~~
Metal roof panels <u>applied to a solid or closedly fitted deck</u>	1507.4	~~Manufacturer's instructions~~ <u>ASTM D226 Type I or II</u> <u>ASTM D4869, Type I, II, III or IV</u>	ASTM D226 Type II ASTM D4869 Type IV
Wood shakes <u>applied to a solid sheathing roof deck</u>	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869<u>,</u> ~~and~~ D6757<u>, D2626 Type I or D6380 Class M</u> shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.
2. As an alternative, two layers of underlayment complying with ASTM D226 Type II<u>,</u> ~~or~~ ASTM D4869 Type IV <u>or ASTM D6757</u> shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

Reason Statement: This code change proposal is a clarification and clean-up of Table 1507.1.1(1). Specifically:

- In Section 1507.1.1, ASTM D2626, Type I and ASTM D6380, Class M are added since these already occur in the table.
- In Section 1507.1.1, Exception 2, ASTM D6757 is added since it already appears in the table and is appropriate for a two layer application.
- In the table in the row for clay and concrete tile roof coverings, "mineral surface roof roofing" is deleted from the description of ASTM D6380, Class M as it is unnecessary. The Class M designation already identifies the product as being mineral granule-surfacing.
- In the table in the row for metal roof panel roof coverings, underlayment is only used over solid or closely fitted decks. Where a structural metal panel roof covering is applied over open framing without a roof deck, an underlayment is not applied. Also, "Manufacturer's instructions" is stuck from the cell for maximum basic wind design wind speed, V < 140 mph. This is replaced with ASTM designation underlayment standards similar to what is already appearing in the rows for Clay and Concrete Roof Tiles through Wood Shakes.
- In the table for the row for wood shake roof coverings, underlayment is only used over solid roof deck sheathing. Where a wood shake roof covering is applied over spaced sheathing, an underlayment is not applied to allow for downward venting/drying of the wood shakes. An interlayment is unused between courses of wood shakes per Section 1507.9.6

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply a clarification and clean-up of the table.

S23-22

S24-22 Part I

IBC: 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3), ASTM Chapter 35 (New)

Proponents: Gregory Keeler, representing Owens Corning (greg.keeler@owenscorning.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment in accordance with this section is required for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* and shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 , ~~and~~ D6757 , and D8257 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be ~~attached~~ fastened in accordance with Table 1507.1.1(3).

Exception~~s~~:

~~1.~~ ~~As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.~~

~~2.~~ ~~As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch (19.1 mm) into the roof sheathing.~~

~~3.~~ Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~ in the following manner: Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch (95.25mm) wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Clay and concrete tile	1507.3	For roof slopes from $2^1/_2$ units vertical in 12 units horizontal ($2^1/_2$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~ in the following manner: Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof panels	1507.4		
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		

<table>
<tr><th>ROOF COVERING</th><th>SECTION</th><th>MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH</th><th>MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH</th></tr>
<tr><td>Slate shingles</td><td>1507.7</td><td rowspan="3">Apply in accordance with the manufacturer’s installation instructions</td><td rowspan="3">Underlayment shall be one of the following:

1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.

2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer’s installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips.

3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer’s installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.</td></tr>
<tr><td>Wood shingles</td><td>1507.8</td></tr>
<tr><td>Wood shakes</td><td>1507.9</td></tr>
</table>

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Photovoltaic shingles	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~ in the following manner: Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

TABLE 1507.1.1(3) UNDERLAYMENT ~~ATTACHMENT~~ FASTENING

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	~~The~~ Mechanically fastened underlayment shall be ~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of maximum 12 inches horizontally and vertically between side laps with a 6-inch spacing at side and end laps. Mechnically fastened ~~U~~ underlayment shall be fastened ~~attached~~ using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	1507.3		
Photovoltaic shingles	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	~~The~~ Mechanically fastened underlayment shall be ~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of maximum 12 inches horizontally and vertically between side laps with a 6-inch spacing at side and end laps. Mechnically fastened ~~U~~ underlayment shall be fastened ~~attached~~ using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	1507.5		
Mineral-surfacedroll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

For SI: 1 inch = 25.4 mm; 1 mile per hour = 0.447 m/s.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The first language modification in this proposal is to stipulate that underlayment is required. I receive feedback regularly from contractors that while the existing language implies that underlayment is required, that requirement is not clearly stated. Additionally, this proposal adds the first ever consensus-based Standard that is applicable to synthetic/polymeric underlayments. The roofing industry has been in need of such a Standard for many years so that this category of products can be adequately evaluated for performance. This proposal also modifies the language that is applicable to installation of a 2-layer underlayment system in such a way that it reduces waste (the current language results in a strip of underlayment that is too narrow to be used in most cases), and so that the lapping and fastening requirements are applicable to any width of underlayment. Finally, this proposal also re-configures the expression of the options for enhanced underlayment systems in high wind areas.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds a new ASTM Standard for qualifying synthetic underlayments which have been in use for many years and clarifies and reorganizes existing requirements.

S24-22 Part I

S24-22 Part II

IRC: R905.1.1, TABLE R905.1.1(1), TABLE R905.1.1(2), TABLE R905.1.1(3), ASTM Chapter 44 (New)

Proponents: Gregory Keeler, representing Owens Corning (greg.keeler@owenscorning.com)

2021 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* in accordance with this section is required for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757, and D8257 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be ~~attached~~ fastened in accordance with Table R905.1.1(3).

~~Exceptions~~:

1. ~~As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.~~
2. ~~As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering~~

Exception: Structural metal panels that do not require a substrate or underlayment.

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757 <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>	ASTM D4869 Type III or ~~Type~~ IV <ins>ASTM D8257</ins> <ins>ASTM D1970</ins>

For SI: 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches.~~ Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~a~~ Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place . Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Clay and concrete tile	R905.3	For roof slopes from $2^{1}/_{2}$ units vertical in 12 units horizontal ($2^{1}/_{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~apply~~ Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place . Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	R905.4		
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Metal panels	R905.10	Apply in accordance with the manufacturer's installation instructions.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~apply~~ Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place . Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Photovoltaic shingles	R905.16	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~apply~~ Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place . Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(3) UNDERLAYMENT ~~APPLICATION~~ ATTACHMENT

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	~~The~~ Mechnically fastened underlayment shall be ~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	R905.3		
Photovoltaic shingles	R905.16		
Metal roof shingles	R905.4	Manufacturer's installation instructions.	~~The~~ Mechnically fastened underlayment shall be ~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering. **Exception:** Self-adhering polymer modified bitumen underlayment shall not be installed under wood shakes or wood shingles.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

Add new standard(s) as follows:

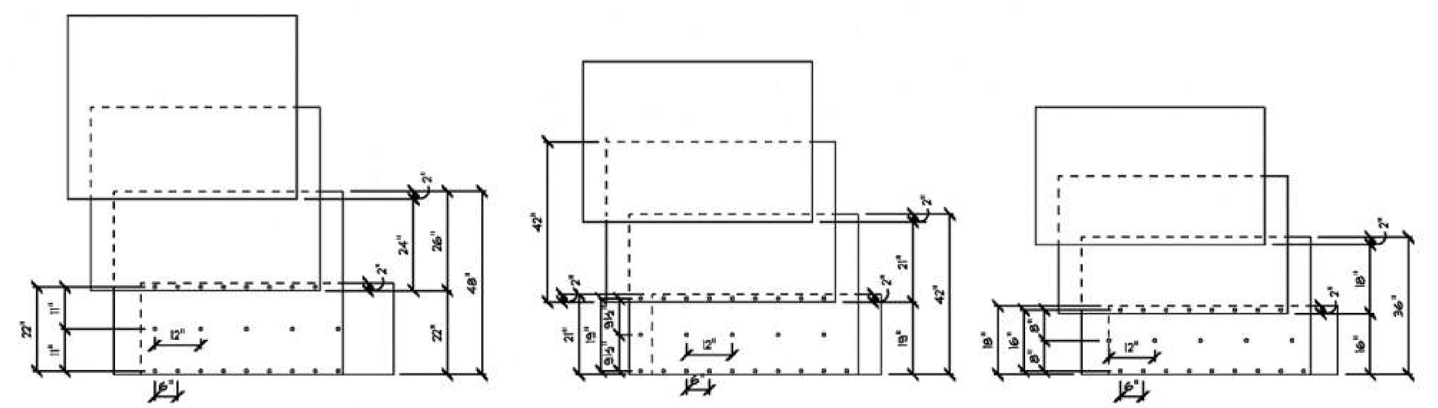
ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The first language modification in this proposal is to stipulate that underlayment is required. I receive feedback regularly from contractors that while the existing language implies that underlayment is required, that requirement is not clearly stated. Additionally, this proposal adds the first ever consensus-based Standard that is applicable to synthetic/polymeric underlayments. The roofing industry has been in need of such a Standard for many years so that this category of products can be adequately evaluated for performance. This proposal also modifies the language that is applicable to installation of a 2-layer underlayment system (See below Fig. clarifying the Underlayment Lapping and Fastening) in such a way that it reduces waste (the current language results in a strip of underlayment that is too narrow to be used in most cases), and so that the lapping and fastening requirements are applicable to any width of underlayment. Finally, this proposal also adds an exception in the charging paragraph for consistency with current IBC language, and also includes some cleanup items for clarity and consistency.



Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds a new ASTM Standard for qualifying synthetic underlayments which have been in use for many years and clarifies and reorganizes existing requirements.

S24-22 Part II

S25-22

IBC: 1507.1.3 (New); IEBC: [BS] 705.1

Proponents: Bill McHugh, representing Chicago Roofing Contractors Association (bill@mc-hugh.us)

2021 International Building Code

Add new text as follows:

1507.1.3 Flashing Heights for Low Sloped Roofs. For roofs with slope less than or equal to 2:12, vertical roof membrane flashings shall not be terminated less than 8" (203mm) above the top of the roof membrane surface.

2021 International Existing Building Code

Revise as follows:

[BS] 705.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the International Building Code. For roofs with slope less than or equal to 2:12, vertical roof membrane flashings shall not be terminated less than 8" (203mm) above the top of the roof membrane surface.

Exceptions:

1. *Roof replacement* or roof recover of existing low-slope roof coverings shall not be required to meet the minimum design slope requirement of $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 of the International Building Code for roofs that provide positive roof drainage.
2. Recovering or replacing an existing roof covering shall not be required to meet the requirement for secondary (emergency overflow) drains or scuppers in Section 1502 of the International Building Code for roofs that provide for positive roof drainage. For the purposes of this exception, existing secondary drainage or scupper systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or scuppers designed and installed in accordance with Section 1502 of the International Building Code.

Reason Statement: The purpose of this proposal is to put a minimum requirement in this section of the building and existing building code specifying a low sloped roof, less than or equal to 2:12 slope, (flat) for vertical roof membrane flashing heights. The IBC has been silent on this issue, causing all kinds of field interpretations from "do the best you can" to "isn't there an industry norm for 8" vertical height of flashings?".
The most important point of this proposal is that the 8" vertical roof membrane flashing height provides protection from wind driven rain and snow that can be forced up under low flashings, entering the building through vented or open flashing tops. The minimum roof membrane flashing height requirement results in a better built building for the owner and manager.

Many industry blogs and manufacturers, in addition to the National Roofing Contractors Association's Roofing Manuals, mention the 8" minimum roof membrane vertical flashing height termination. However, we still have "do the best you can" as a reply to the question, "How high should flashings be on flat roofs", by many in the industry.

The minimum 8" vertical roof membrane flashing termination heights allow for a variety of roofing systems to be installed now and in the future. The NRCA's Roofing and Waterproofing Manuals recommend 8" vertical flashing heights as well. However, many standard details do not show a height from the top of the roof surface to the top of the vertical roof membrane flashing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
While it can be said this proposal might increase or decrease the cost of construction, it can also be said that this will decrease the cost of construction. From research, it was found that the major roofing manufacturers specify a 8” flashing height in their installation instructions and flashing details. However, because this is not a building code minimum requirement, the flashing heights can be altered in the field. Codifying a minimum requirement serves the building owner for the building life cycle, by providing a minimum benchmark that is crystal clear in the code.

S25-22

S26-22

IBC: 1507.2.8

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Building Code

Revise as follows:

1507.2.8 Flashings. Flashing for asphalt shingles shall comply with this section. Flashing shall be applied in accordance with this section and the asphalt shingle manufacturer's ~~printed~~ instructions.

Reason Statement: Manufacturer's instructions are increasingly made available in media other than printed versions. This proposal removes the word "printed" from the only instance in IBC Chapter 15 where it is used in conjunction with "instructions." Removal of the word "printed" will permit alternative methods for providing instructions, including digital formats that support greater sustainability. The proposed change is important in light of events such as the COVID-19 pandemic, which brought attention to the need to deliver information using alternative methods.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal expands available options for delivering manufacturer's instructions, which allows manufacturers to select the option that best serves their customers. There is no basis to expect either a general increase or decrease in cost of construction if this proposal is approved.

S26-22

S27-22

IBC: 1507.2.8.2

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Building Code

Revise as follows:

1507.2.8.2 Valleys. Valley linings shall be installed in accordance with the manufacturer's instructions before applying shingles. Valley linings of the following types shall be permitted:

1. For open valleys (valley lining exposed) lined with metal, the valley lining shall be not less than 24 inches (610 mm) wide and of any of the corrosion-resistant metals in Table 1507.2.8.2.
2. For open valleys, valley lining of two plies of mineral-surfaced roll roofing complying with ASTM D3909 or ASTM D6380 shall be permitted. The bottom layer shall be 18 inches (457 mm) and the top layer not less than 36 inches (914 mm) wide.
3. For closed valleys (valleys covered with shingles), valley lining of one ply of smooth roll roofing complying with ASTM D6380, and not less than 36 inches (914 mm) wide or types as described in Item 1 or 2 above shall be permitted. Self-adhering polymer modified bitumen *underlayment* bearing a label indicating compliance with ASTM D1970 <u>and not less than 36 inches (914 mm) wide</u> shall be permitted in lieu of the lining material.

Reason Statement: Although implied, the minimum width of ASTM D1970 valley lining is not provided in the existing language of the IBC. This proposal establishes that ASTM D1970 underlayment used as closed valley lining must be at least 36" wide.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal defines an implied requirement to remove ambiguity. No change in cost of construction is expected if this proposal is approved.

S27-22

S28-22

IBC: 1507.4.3, TABLE 1507.4.3(1), TABLE 1507.4.3(2), 1507.5.5

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1507.4.3 Material standards. Metal-sheet *roof covering* systems that incorporate supporting structural members shall be designed in accordance with Chapter 22. Metal-sheet *roof coverings* installed over structural decking shall comply with Table 1507.4.3~~(1)~~. ~~The materials used for metal-sheet *roof coverings* shall be naturally corrosion resistant or provided with *corrosion resistance* in accordance with the standards and minimum thicknesses shown in Table 1507.4.3(2).~~

TABLE 1507.4.3~~(1)~~ METAL ROOF COVERINGS

ROOF COVERING TYPE	STANDARD APPLICATION RATE/THICKNESS
5% Aluminum alloy-coated steel	ASTM A875, GF60
Aluminum	ASTM B209, 0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.
Aluminum-coated steel	ASTM A463, T2 65
Aluminum-zinc alloy coated steel	ASTM A792 AZ 50
Cold-rolled copper	ASTM B370 minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz./sq. ft. for preformed metal shingle systems.
Copper	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A653 G-90 zinc-coated[a].
Hard lead	2 lbs./sq. ft.
Lead-coated copper	ASTM B101
Prepainted steel	ASTM A755
Soft lead	3 lbs./sq. ft.
Stainless steel	ASTM A240, 300 Series Alloys
Steel	ASTM A924
Terne and terne-coated stainless	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions.
Zinc	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).

For SI: 1 ounce per square foot = 0.305 kg/m^2, 1 pound per square foot = 4.882 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.

a. For Group U buildings, the minimum coating thickness for ASTM A653 galvanized steel roofing shall be G-60.

~~**TABLE 1507.4.3(2) MINIMUM CORROSION RESISTANCE**~~

55% ~~Aluminum-zinc alloy coated steel~~	~~ASTM A792 AZ 50~~
~~5% Aluminum alloy-coated steel~~	~~ASTM A875 GF60~~
~~Aluminum-coated steel~~	~~ASTM A463 T2 65~~
~~Galvanized steel~~	~~ASTM A653 G-90~~
~~Prepainted steel~~	~~ASTM A755 [a]~~

a. ~~Paint systems in accordance with ASTM A755 shall be applied over steel products with corrosion-resistant coatings complying with ASTM A463, ASTM A653, ASTM A792 or ASTM A875.~~

1507.5.5 Material standards. *Metal roof shingle roof coverings* shall comply with Table 1507.4.3~~(1)~~. ~~The materials used for metal-roof shingle *roof coverings* shall be naturally corrosion resistant or provided with *corrosion resistance* in accordance with the standards and minimum thicknesses specified in the standards listed in Table 1507.4.3(2).~~

Reason Statement: This code change is intended to clarify code's requirements regarding metal sheet stock used in fabricating metal roof panels and metal roof shingles.
This proposal combines existing Table 1507.4.3(1) and Table 1507.4.3(2) into a single new table, Table 1507.4.3. ASTM A792 AZ 50; ASTM G653 G90 and ASTM A755 currently occur in both tables. From existing Table 1507.4.3(2), ASTM A857 GF 60 and A463 T2 65 do not occur in Table 1507.4.3(1), so they these standards are being added to the new consolidated table.

From existing Table 1507.4.3(2), Footnote "a" is deleted. ASTM A463, ASTM A653, ASTM A792 and ASTM A875 are already incorporated into ASTM A755 and, therefore, these standards and this footnote are not necessary in the code.

There are no changes in code's technical requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply a clarification of existing provisions. There are no changes in code's technical requirements.

S28-22

S29-22

IBC: SECTION 202, 1507.4.3, TABLE 1507.4.3(1), [BS] 3301.2.1

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

[BS] ROOF COATING. A fluid-applied, adhered coating used for roof maintenance or *roof repair*, or as a component of a ~~*roof covering* system or~~ *roof assembly*.

~~**ROOF COVERING SYSTEM.** See " *Roof assembly* ."~~

1507.4.3 Material standards. Metal-sheet *roof coverings* ~~systems~~ that incorporate supporting structural members shall be designed in accordance with Chapter 22. Metal-sheet *roof coverings* installed over structural decking shall comply with Table 1507.4.3(1). The materials used for metal-sheet *roof coverings* shall be naturally corrosion resistant or provided with *corrosion resistance* in accordance with the standards and minimum thicknesses shown in Table 1507.4.3(2).

TABLE 1507.4.3(1) METAL ROOF COVERINGS

ROOF COVERING TYPE	STANDARD APPLICATION RATE/THICKNESS
Cold-rolled copper	ASTM B370 minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof coverings ~~systems~~: 12 oz./sq. ft. for preformed metal shingle systems.
Copper	16 oz./sq. ft. for metal-sheet roof-coverings ~~covering systems~~; 12 oz./sq. ft. for preformed metal shingle systems.

For SI: 1 ounce per square foot = 0.305 kg/m^2, 1 pound per square foot = 4.882 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.

a. For Group U buildings, the minimum coating thickness for ASTM A653 galvanized steel roofing shall be G-60.

[BS] 3301.2.1 Structural and construction loads. Structural roof components shall be capable of supporting the ~~roof-covering system~~ roof assembly and the material and equipment *loads* that will be encountered during installation of the system.

Reason Statement: This code change proposal is intended to clarify the code's intent by eliminating the term "roof covering system" in its four uses in the code and using the already defined term "roof assembly" instead. While the term "roof covering system" is defined in Chapter 2-Definitions, its definition provides a see-reference to the term and definition for roof assembly as follows:

ROOF COVERING SYSTEM: See "*Roof assembly*."

This change eliminates the need for the see-reference and is not intended to change the technical requirements of the code. The existing four uses of the current term are revised with this proposal.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of an existing definition. There is no change in the code's technical requirements.

S29-22

S30-22

IBC: 1507.8.1

Proponents: Chadwick Collins, representing Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Building Code

Revise as follows:

1507.8.1 Deck requirements. Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. <u>Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center or greater, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When wood shingles are installed over spaced sheathing and the underside of the shingles are exposed to the attic space, the attic shall be ventilated in accordance with Section 1202.2. The shingles shall not be backed with materials that prevent the free movement of air on the interior side of the spaced sheathing.</u>

Reason Statement: When shingles are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shingles and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process. Further, installation of components such as spray foam insulation also eliminates one surface for shingles to release heat gained through exposure. This slows the release of heat energy, requiring the shingle to hold on to heat load for longer durations, which leads to shorter service life cycles

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

S30-22

S31-22

IBC: 1507.8.6, 1507.9.7

Proponents: Chadwick Collins, representing Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Building Code

Revise as follows:

1507.8.6 Attachment. ~~Fasteners for wood shingles shall be corrosion resistant with a minimum penetration of 3/4 inch (19.1 mm) into the sheathing. For sheathing less than 1/2 inch (12.7 mm) in thickness, the fasteners shall extend through the sheathing. Each shingle shall be attached with not fewer than two fasteners.~~ Fasteners for untreated (naturally durable) wood shingles shall be box nails in accordance with Table 1507.8. Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized with a coating weight of ASTM A153 Class D (1.0 oz/ft^2). Alternatively, two 16-gage stainless steel Type 304 or 316 staples with crown widths 7/16 inch (11.1 mm) minimum, 3/4-inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shingles or pressure-impregnated-preservative treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of 3/4 inch (19.1 mm). For sheathing less than 3/4 inch in (19.1 mm) thickness, each fastener shall penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned in accordance with the manufacturer's installation instructions. Fastener packaging shall bear a label indicating the appropriate grade material or coating weight.

1507.9.7 Attachment. ~~Fasteners for wood shakes shall be corrosion resistant with a minimum penetration of 3/4 inch (19.1 mm) into the sheathing. For sheathing less than 1/2 inch (12.7 mm) in thickness, the fasteners shall extend through the sheathing. Each shake shall be attached with not fewer than two fasteners.~~ Fasteners for untreated (naturally durable) wood shingles shall be box nails in accordance with Table 1507.8. Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized with a coating weight of ASTM A153 Class D (1.0 oz/ft^2). Alternatively, two 16-gage stainless steel Type 304 or 316 staples with crown widths 7/16 inch (11.1 mm) minimum, 3/4-inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shingles or pressure-impregnated-preservative treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of 3/4 inch (19.1 mm). For sheathing less than 3/4 inch (19.1 mm) in thickness, each fastener shall penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned in accordance with the manufacturer's installation instructions. Fastener packaging shall bear a label indicating the appropriate grade material or coating weight.

Reason Statement: This proposal is an effort to harmonize language in this section with the information in Table 1507.8 and match language in the International Residential Code for this material in Chapter 9.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction as this update aligns this section with the requirements of currently found in Table 1507.8 and matches practices for this material as required in Chapter 9 of the International Residential Code since the 2015 edition and has been manufacturer's installation instructions requirements since 2010 (Cedar Shake & Shingle Bureau - New Construction Manual).

S31-22

S32-22

IBC: 1507.9.1

Proponents: Chadwick Collins, representing Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Building Code

Revise as follows:

1507.9.1 Deck requirements. Wood shakes shall only be used on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. <u>Where wood shakes are installed over spaced sheathing and the underside of the shakes are exposed to the attic space, the attic shall be ventilated in accordance with Section 1202.2. The shakes shall not be backed with materials that prevent the free movement of air on the interior side of the spaced sheathing.</u>

Reason Statement: When shakes are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shakes and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process. Further, installation of components such as spray foam insulation also eliminates one surface for shakes to release heat gained through exposure. This slows the release of heat energy, requiring the shakes to hold on to heat load for longer durations, which leads to shorter service life cycles

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

S32-22

S33-22

IBC: 1507.14.2

Proponents: Chadwick Collins, representing Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com)

2021 International Building Code

Revise as follows:

1507.14.2 Material standards. Liquid-applied roofing shall comply with ASTM C836, ASTM C957 ~~or~~ , ASTM D3468 , ASTM D6694, or ASTM D6947.

Reason Statement: In 2019, the successful proposal S32-19 removed these two reference standards as part of a larger edit with the reasoning statement that these products are specific intended for use in SPF roof system and their inclusion in 1507.13 (Sprayed Polyurethane Foam Roofing) as justification of that edit. Further, the new section 1509 included these two standards as acknowledgement that these products as roof coatings. Since, many Roof Coating Manufacturers Association (RCMA) members have indicated that these products are also installed as liquid-applied roofing systems, with the different installation instructions and in some cases, additional components such as reinforcements, to distinguish between their use as a roof coating and as a liquid-applied roofing system. This proposal is to reinstate those two material standards to eliminate any confusion if the referenced configurations are recognized and accepted by the building code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is adding two reference standards for products that can be configured for installation as a liquid-applied roofing system.

S33-22

S34-22

IBC: 1507.14, 1507.14.1, 1507.14.2, 1507.14.3 (New), 1507.14.4 (New)

Proponents: Chadwick Collins, representing Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com)

2021 International Building Code

1507.14 Liquid-applied roofing. The installation of liquid-applied roofing shall comply with the provisions of this section.

1507.14.1 Slope. Liquid-applied roofing shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope).

1507.14.2 Material standards. Liquid-applied roofing shall comply with ASTM C836, ASTM C957 or ASTM D3468.

Add new text as follows:

1507.14.3 Application. Liquid-applied roofing shall be installed in accordance with the manufacturer's installation instructions.

1507.14.4 Flashings. Flashings shall be applied in accordance section 1507.14 and the liquid-applied roofing manufacturer's installation instructions.

Reason Statement: This proposal provides clarity and direction that is missing from section 1507.14 regarding application and flashings that other sections within 1507 currently have for those respective materials. The manufacturer's installation instructions have the specifics for each specific product and should be the source material to consult for proper application and flashing guidance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal updates 1507.14 to mimic the format and content of sister subsections of 1507 to be consistent.

S34-22

S35-22 Part I

IBC: 1507.16.6, 1507.17.5

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1507.16.6 Material standards. *Photovoltaic shingles* shall be *listed* and labeled in accordance with UL 7103 ~~or with both UL 61730-1 and UL 61730-2~~.

1507.17.5 Material standards. BIPV roof panels shall be listed and labeled in accordance with UL 7103 ~~or with both UL 61730-1 and UL 61730-2~~.

S35-22 Part I

S35-22 Part II

IRC: R905.16.4, R905.17.5

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R905.16.4 Material standards. *Photovoltaic shingles* shall be *listed* and *labeled* in accordance with UL 7103 ~~or with both UL 61730-1 and UL 61730-2~~.

R905.17.5 Material standards. *BIPV roof panels* shall be *listed* and *labeled* in accordance with UL 7103 ~~or with both UL 61730-1 and UL 61730-2~~.

Reason Statement: The standard for all forms of BIPV roof coverings and roof assemblies is UL 7103, which covers all aspects of these products – fire classification, material performance, and wind resistance. UL 61730-1 and UL 61730-2, which primarily cover the related electrical requirements, are part of the requirements within UL 7103.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal properly references the standard for BIPV roofing systems.

S35-22 Part II

S36-22

IBC: 1507.16.9 (New), 1507.17.9 (New)

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Add new text as follows:

1507.16.9 Flashing. Flashing for *photovoltaic shingles* shall be installed in accordance with the *roof covering* manufacturer's installation instructions to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane.

1507.17.9 Flashing. Flashing for BIPV roof panels shall be installed in accordance with the *roof covering* manufacturer's installation instructions to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane.

Reason Statement: This code change proposal is intended to add guidance to building officials and users of the code by specifically indicating flashings for PV shingles and BIPV roof panels be installed according to the roof covering manufacturer's installation instructions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal adds clarity to the code; it does not change the codes existing technical requirements.

S36-22

S37-22

IBC: TABLE 1508.2, ASTM Chapter 35 (New)

Proponents: Greg Keeler, Owens Corning, representing Owens Corning (greg.keeler@owenscorning.com)

2021 International Building Code

Revise as follows:

TABLE 1508.2 MATERIAL STANDARDS FOR ROOF INSULATION

Cellular glass board	ASTM C552 or ASTM C1902
Composite boards	ASTM C1289, Type III, IV, V or VII
Expanded polystyrene	ASTM C578
Extruded polystyrene	ASTM C578
Fiber-reinforced gypsum board	ASTM C1278
Glass-faced gypsum board	ASTM C1177
High-density polyisocyanurate board	ASTM C1289, Type II, Class 4
Mineral fiber insulation board	ASTM C726
Perlite board	ASTM C728
Polyisocyanurate board	ASTM C1289, Type I or II
Wood fiberboard	ASTM C208, Type II

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

C1902-20 Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM C1902-20 Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Today, the scope of ASTM C552, “Standard Specification for Cellular Glass Thermal Insulation”, encompasses applications where the cellular glass is intended to be used on surfaces that operate between -450 F and 800 F. While useful in industrial and pipe applications, this temperature range is much broader than needed for typical building material applications and limits the flexibility in the manufacturing operation to modify the formulation or process to tailor the properties to the needs of the building materials market. Therefore, the new material specification of ASTM C1902, “Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications”, is being proposed that is better aligned to service the building materials market. This specification would be differentiated from the existing ASTM C552 specification in the following ways:

1. Narrow the scope of the service temperature range to that of typical building applications

a. From the industrial temperature of -450 F to 800 F to the building temperature range of -50 F to 200 F

2. Remove properties that are not pertinent to the building materials market

a. Hot-surface performance warpage – This test refers primarily to high-temperature insulations that are applicable to hot-side temperatures as high as 800°F to determine material warpage or cracking and is not relevant to buildings.

b. Stress corrosion – This test is for insulation in contact with austenitic stainless-steel piping to assess corrosion of a stressed component and is not relevant to buildings.

3. Add properties that are pertinent to the building materials market

a. Dimensional stability – This is a measurement of a material’s change in dimensions in response to various environmental exposure conditions, which can be important to building systems.

Cost Impact: The code change proposal will decrease the cost of construction
The current code language requires products to be over-engineered for the building application and does not address dimensional stability, a key characteristic for building insulation. This proposed change addresses dimensional stability, over-engineering, and enables the product density to be reduced to enable lower cost and improved thermal resistance of the cellular glass. The improved thermal resistance further enables reduced energy usage for the occupied building.

S37-22

S38-22

IBC: 1509.1, 1509.2, 1509.3 (New), 1509.4 (New)

Proponents: Chadwick Collins, representing Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com)

2021 International Building Code

1509.1 General. The installation of a *roof coating* on a *roof covering* shall comply with the requirements of Section 1505 and this section.

1509.2 Material standards. Roof coating materials shall comply with the standards in Table 1509.2.

Add new text as follows:

1509.3 Application. Roof coatings shall be installed in accordance with the manufacturer's installation instructions.

1509.4 Flashings. Roof coatings shall be applied to flashings in accordance with section 1509 and the roof coating manufacturer's installation instructions.

Reason Statement: This proposal provides clarity and direction that is missing from 1509 regarding application that is found with other materials in chapter 15. The manufacturer's installation instructions have the specifics for each coating type and to the various substrates that the product may be installed over which is the reason directing stakeholders to the source material for consultation is being proposed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal updates 1509 to mimic the format and content of other material sections in chapter 15.

S38-22

S39-22

IBC: SECTION 1510 (New), SECTION 202 (New), 1510.1 (New), 1510.2 (New), 1510.3 (New), 1510.4 (New), 1510.4.1 (New)

Proponents: Chadwick Collins, representing Protected Membrane Roofing Institute (ccollins@kellencompany.com)

2021 International Building Code

Add new text as follows:

SECTION 1510
PROTECTED MEMBRANE ROOF ASSEMBLIES

Add new definition as follows:

PROTECTED MEMBRANE ROOF ASSEMBLY. A roof assembly of interacting components designed to waterproof a building's top surface where insulation is installed above the roof membrane and outside of the air barrier.

Add new text as follows:

1510.1 General. A *protected membrane roof assembly* shall comply with the applicable requirements of this Chapter.

1510.2 Landscaped roofs and vegetative roofs. *Landscaped roofs* and *vegetative roofs* that include *protected membrane roof assemblies* shall comply with Sections 1505.10 and 1507.15.

1510.3 Foam plastics. Foam plastic insulation in *protected membrane roof assemblies* shall comply with the applicable requirements of Chapter 26.

1510.4 Installation. *Protected membrane roof assemblies* shall be installed in accordance with the manufacturer's installation instructions.

1510.4.1 Flashing. Flashing for *protected membrane roof assemblies* shall be installed in accordance with this Section and the manufacturers installation instructions.

Reason Statement: The current IBC presumes that foam plastic insulation in roofing assemblies is installed within the assembly and below the membrane. That installation is common with many roof covering types, including single-ply, EPDM, and other roofing materials. For example, section 1508.1 includes a reference to above-deck foam plastic insulation being installed below an approved roof covering.
There are many applications of low-slope systems where some or all of the above-deck insulation is installed above the roof covering membrane. These systems are known as Protected Membrane Roofs and are commonly used for vegetative and landscaped roofs.

The proposal adds a new Section to address this growing segment of the roofing market by establishing the minimum standards specific to this use. It also adds a definition for the assembly to clarify when this proposed section would apply. The new section includes basic provisions for installation, flashing, and foam plastic installation requirements. Additionally, it provides pointers to the appropriate provisions for vegetative and landscaped roofs. It should be noted that proposal F15-21 modified definitions for vegetative roofing and landscaped roofs by making careful distinctions between a vegetative roof system, and a landscaped roof- meaning a roof that has landscaping elements above but not part of the roof assembly. This proposal completes the work done last year by including protected membrane roofs in the IBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal would provide additional roofing options in the code, and help streamline product approval. The use of protected membrane roofing is not mandatory thus adds no new requirements.

S39-22

S40-22

IBC: [BF] 1510.2

Proponents: Phillip Smith, representing fm approvals (phillip.smith@fmglobal.com)

2021 International Building Code

Revise as follows:

[BF] 1510.2 Fire testing. *Radiant barriers* shall be permitted for use above decks where the *radiant barrier* is covered with an *approved roof covering* and the system consisting of the *radiant barrier* and the *roof covering* complies with the requirements of either FM ~~4450~~ 4470 or UL 1256.

Staff Analysis: The proposed referenced standard, FM 4470, is currently referenced in the International Building Code.

Reason Statement: all requirements of 4450 are included in 4470.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
All requirements of 4450 are included in 4470

S40-22

S41-22

IBC: SECTION 1511 (New), 1511.1 (New), 1511.2 (New), 3111.3.6 (New), ASTM Chapter 35 (New)

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Add new text as follows:

SECTION 1511
ROOFTOP-MOUNTED PHOTVOLTIAC PANEL SYSTEMS

1511.1 General. Rooftop-mounted *photovoltaic panel systems* shall be designed and installed in accordance with Section 3111.

1511.2 Roof penetration flashing. Flashing for rooftop-mounted *photovoltaic panel systems* shall be installed in accordance with the *roof covering* manufacturer's installation instructions to prevent moisture from entering through roof penetrations.

Exception: The application of flashing in accordance with ASTM E2766 is permitted.

3111.3.6 Roof penetrations. Roof penetrations shall be flashed in accordance with Chapter 15.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E2766-13(2019)	Standard Practice for Installation of Roof Mounted Photovoltaic Arrays on Steep-Slope Roofs

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E2766-13(2019) Standard Practice for Installation of Roof Mounted Photovoltaic Arrays on Steep-Slope Roofs, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This code change proposal proposal is intended to provide guidance to building officials and user of the code regarding flashing penetrations in rooftop-mounted PV panel systems. This proposal adds a new section to Chapter 15, Section 1511, specifically addressing rooftop-mounted PV panel systems. This new section first provides a pointer to IBC's existing requirements for PV systems, then adds specific direction regarding flashing roof penetrations. Flashing penetrations are required to be in accordance with the roof covering manufacturer's installation instructions or compliance with ASTM E2766 is permitted. ASTM E2766, "Standard Practice for Installation of Roof Mounted Photovoltaic Arrays on Steep-Slope Roofs," includes specific guidance on roof penetration flashings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds additional direction and guidance. It does not add additional requirements that will add to the cost of construction.

S41-22

S42-22

IBC: SECTION 1511 (New), 1511.1 (New), 1511.1.1 (New), 1511.1.2 (New), 1511.1.3 (New), 1511.1.4 (New)

Proponents: Bill McHugh, representing Chicago Roofing Contractors Association (bill@mc-hugh.us)

2021 International Building Code

Add new text as follows:

SECTION 1511
AIR BARRIERS

1511.1 General. A continuous air barrier shall be provided throughout the building thermal envelope. The continuous air barriers shall be located on the inside or outside of the building thermal envelope, located within the assemblies composing the building thermal envelope, or any combination thereof. Air Barrier construction shall comply with the *International Building Code*, *International Energy Conservation Code*, and shall comply with Sections 1511.1.1 through 1511.1.4.

Exception: Air barriers are not required in buildings located in *Climate Zone* 2B as referenced in the *International Energy Conservation Code*.

1511.1.1 Construction. The continuous air barrier shall be constructed to comply with the following:

1. The air barrier shall be continuous for all assemblies that are the thermal envelope of the building and across the joints and assemblies.
2. Air barrier joints and seams shall be sealed, including sealing transitions in places and changes in materials. The joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to resist positive and negative pressure from wind, stack effect and mechanical ventilation.
3. Penetrations of the air barrier shall be caulked, gasketed or otherwise sealed in a manner compatible with the construction materials and location. Sealing shall allow for expansion, contraction and mechanical vibration. Joints and seams associated with penetrations shall be sealed in the same manner or taped. Sealing materials shall be securely installed around the penetration so as not to dislodge, loosen or otherwise impair the penetrations' ability to resist positive and negative pressure from wind, stack effect and mechanical ventilation. Sealing of concealed fire sprinklers, where required, shall be in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.
4. Recessed lighting fixtures shall comply with Section C402.5.10. Where similar objects are installed that penetrate the air barrier, provisions shall be made to maintain the integrity of the air barrier.

1511.1.2 Continuous air barrier. A continuous air barrier for the opaque building envelope shall comply with the following:

1. Buildings or portions of buildings, including Group R and I occupancies, shall meet the provisions of Section C402.5.2.

   Exception: Buildings in *Climate Zones* 2B, 3C and 5C.

2. Buildings or portions of buildings other than Group R and I occupancies shall meet the provisions of Section C402.5.3.

   Exceptions:

   1. Buildings in *Climate Zones* 2B, 3B, 3C and 5C.
   2. Buildings larger than 5,000 square feet (464.5 m^2) floor area in *Climate Zones* 0B, 1, 2A, 4B and 4C.
   3. Buildings between 5,000 square feet (464.5 m^2) and 50,000 square feet (4645 m^2) floor area in *Climate Zones* 0A, 3A and 5B.

3. Buildings or portions of buildings that do not complete air barrier testing shall meet the provisions of Section C402.5.1.3 or C402.5.1.4 in addition to Section C402.5.1.5.

1511.1.3 Materials. Materials with an air permeability not greater than 0.004 cfm/ft^2 (0.02 L/s × m^2) under a pressure differential of 0.3 inch water gauge (75 Pa) when tested in accordance with ASTM E2178 shall comply with this section. Materials in Items 1 through 16 shall be deemed to comply with this section, provided that joints are sealed and materials are installed as air barriers in accordance with the manufacturer's instructions.

1. Plywood with a thickness of not less than $^3/_8$ inch (10 mm).
2. Oriented strand board having a thickness of not less than $^3/_8$ inch (10 mm).

3. Extruded polystyrene insulation board having a thickness of not less than $^1/_2$ inch (12.7 mm).
4. Foil-back polyisocyanurate insulation board having a thickness of not less than $^1/_2$ inch (12.7 mm).
5. Closed-cell spray foam having a minimum density of 1.5 pcf (2.4 kg/m^3) and having a thickness of not less than $1^1/_2$ inches (38 mm).
6. Open-cell spray foam with a density between 0.4 and 1.5 pcf (0.6 and 2.4 kg/m^3) and having a thickness of not less than $4^1/_2$ inches (113 mm).
7. Exterior or interior gypsum board having a thickness of not less than $^1/_2$ inch (12.7 mm).
8. Cement board having a thickness of not less than $^1/_2$ inch (12.7 mm).
9. Built-up roofing membrane.
10. Modified bituminous roof membrane.
11. Single-ply roof membrane.
12. A Portland cement/sand parge, or gypsum plaster having a thickness of not less than $^5/_8$ inch (15.9 mm).
13. Cast-in-place and precast concrete.
14. Fully grouted concrete block masonry.
15. Sheet steel or aluminum.
16. Solid or hollow masonry constructed of clay or shale masonry units.

1511.1.4 Assemblies. Assemblies of materials and components with an average air leakage not greater than 0.04 cfm/ft^2 (0.2 L/s × m^2) under a pressure differential of 0.3 inch of water gauge (w.g.)(75 Pa) when tested in accordance with ASTM E2357, ASTM E1677 , ASTM D8052 or ASTM E283 shall comply with this section. Assemblies listed in Items 1 through 3 shall be deemed to comply, provided that joints are sealed and the requirements of Section C402.5.1.1 of the International Energy Conservation Code are met.

1. Concrete masonry walls coated with either one application of block filler or two applications of a paint or sealer coating.
2. Masonry walls constructed of clay or shale masonry units with a nominal width of 4 inches (102 mm) or more.
3. A Portland cement/sand parge, stucco or plaster not less than $^1/_2$ inch (12.7 mm) in thickness

Staff Analysis: These provisions are duplicated from the 2021 International Energy Conservation Code.

Reason Statement: Air Barrier requirements appeared in The 2012 International Energy Conservation Code. While air barriers are required in great detail in the IECC, there is nowhere in the International Building Code that covers details for building these assembles. In the IBC, there are chapters for plastics, where insulation is regulated. Roofing materials are regulated in Chapter 15. After a search of the 2021 IBC, it was found that air barrier is mentioned once, in Chapter 12, and not in the context of an air barrier found in the IECC.
The building envelope covers the whole building, and all that's encompassed in the assemblies. There are thermal, moisture and fire requirements, penetrations and breaches made for joints, all that have to be accounted for in air barrier design. Having air barriers in the same code as the rest of the building requirements means consistency and better built buildings.

In order to build air barriers to protect the building elements - and their interaction with other requirements, the air barrier sections belong duplicated in the International Building Code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since air barriers are already required by the International Energy Conservation Code, this proposal will not increase the cost of construction, nor will it decrease. It is the hope that the air barrier will be built with all the other complexities of buildings referenced in the same code, the IBC.

S42-22

S43-22

IBC: [BG] 1511.7, 1511.7.6 (New), 1511.7.6.1 (New)

Proponents: Amanda Hickman, representing Single-Ply Roofing Industry (SPRI) (amanda@thehickmangroup.com)

2021 International Building Code

Revise as follows:

[BG] 1511.7 Other rooftop structures. *Rooftop structures* not regulated by Sections 1511.2 through 1511.6 shall comply with Sections 1511.7.1 through 1511.7.~~5~~ 6, as applicable.

Add new text as follows:

1511.7.6 Lightning Protection Systems. Lightning protection system components shall be installed in accordance with Section 1511.7.6.1. Lightning protection systems shall not be attached directly to metal edge systems, including gutters, where these roof assembly components are required to be tested to ANSI/SPRI/FM 4435-ES-1 or ANSI/SPRI GT-1 in accordance with Sections 1504.6 or 1504.6.1.

Exception: Where permitted by the manufacturer's installation instructions for the metal edge systems or gutters.

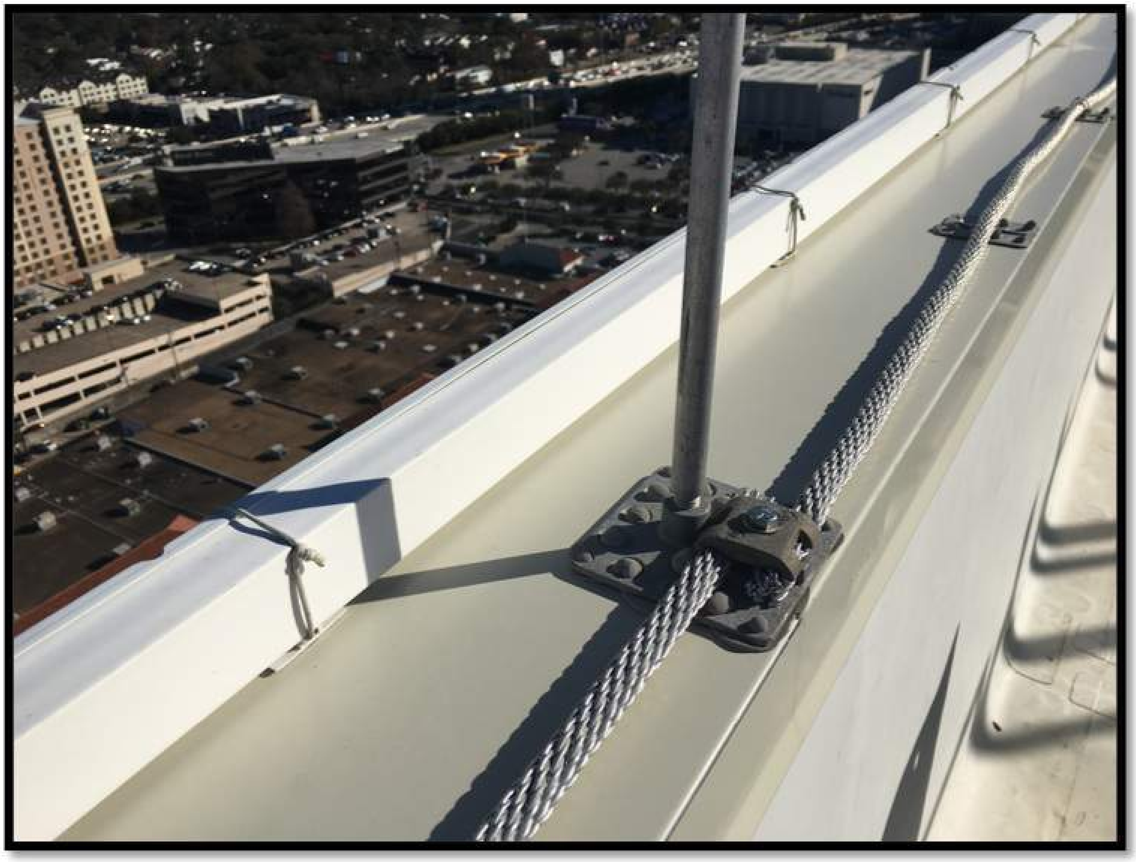
1511.7.6.1 Installation. Lightning protection system components directly attached to or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof plane.

Reason Statement: Progress was made during the Group A cycle to include Lightning Protection Systems (LPS) and their appropriate installation standards in the IBC (G176-21). However, these standards (NFPA 780 and UL 96A) are currently silent on the impact the attachment of LPS have on the roof.
In order to preserve the building envelope in a wind or weather event, it is critical to maintain the integrity of the roof components which are required by code to be tested and to ensure weatherproofing continuity.

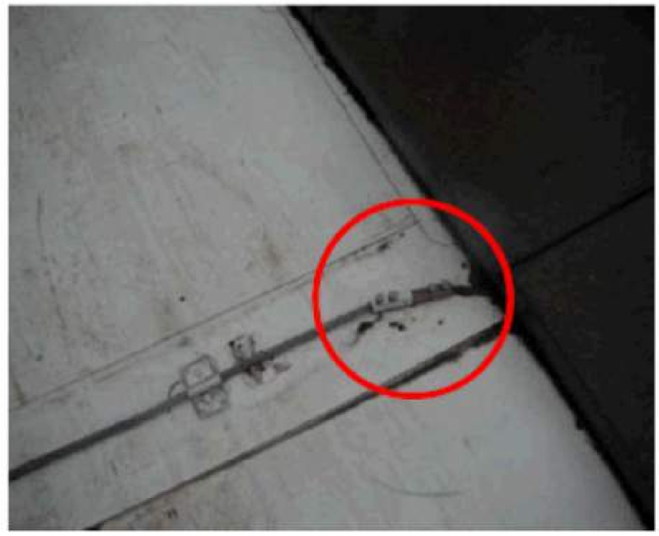
Even in moderate wind events, there have been documented failures of code compliant and tested roof assembly components where LPS were attached.

Roof assembly components such as coping and gutters are required by code to be tested to specific wind loads. LPS attachments to these roof component systems not only alter the wind load on of these tested components, but also alter their performance by restricting thermal movement causing galvanic reaction, leak point, etc.

This proposal clarifies that attachment of LPS to any part of the roof needs to be done in accordance with the installation instructions for the roof assembly, roof covering, metal edge systems, or gutter. Where LPS components attach to or penetrate the roof, they must be properly flashed. Reasonable and readily available methods and details exist to attach LPS systems independent of coping, fascia, gutter and roof assembly components and for flashing of existing LPS attachment methods where penetrations are required. This proposal clarifies that regardless of sequencing challenges which may exist in new or retrofit applications of LPS, the integrity of tested components and the envelope shall be maintained.



Due to the installation of the Lightning Protection System components there may be certain details which require additional hot air welded patches installed under cable splices, frayed cable, and specific connections that could abrade the membrane. Hot air welded patches will provide sufficient protection to the field membrane from abrasion. Pictures below show examples of areas where additional hot air welded patches would be required.



Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal just clarifies that LPS must be installed in accordance with the roofing component manufacturer's installation instructions. Flashing is already required for penetrations. There will, however, be a reduction in failure costs.

S43-22

S44-22

IBC: 1512.1

Proponents: Emily Lorenz, representing International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com)

2021 International Building Code

Revise as follows:

1512.1 General. Materials and methods of application used for recovering or replacing an existing *roof covering* shall comply with the requirements of Chapter 15.

Exceptions:

1. *Roof replacement* or *roof recover* of existing low-slope *roof coverings* shall not be required to meet the minimum design slope requirement of $^{1}/_{4}$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide *positive roof drainage* <u>and meet the requirements of Section 1608.3 and Section 1611.2.</u>
2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for *positive roof drainage*. For the purposes of this exception, existing secondary drainage or *scupper* systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or *scuppers* designed and installed in accordance with Section 1502.2.

Reason Statement: This additional language is necessary to ensure public life-safety. It emphasizes the IBC requirement that susceptible bays be analyzed for ponding instability during structural design/loads analyses that are required incidental to the recovering or replacement of existing *roof coverings,* which adds new live loads to existing roof structures. As the IBC has evolved through periodic updates, there have been fundamental changes in its requirements related to roof drainage, structural requirements for ponding instability, and, with climate change, significant increases in design rain loads (both rainfall intensity and duration). Annually, re-roofing projects comprise about three-quarters of U.S. low-sloped roofing projects. This additional language is needed to reduce the likelihood of catastrophic roof collapses that that occur from uncontrolled ponding and/or inadequate drainage that is directly related to new live loads imposed onto existing roof structures from re-roofing.
The following recent studies and case studies further support, in much greater detail, justification for the proposed additional language to Exception 1.

Fundamental Changes Related to Drainage

A 2012 study published by the American Society of Plumbing Engineers (ASPE) and the International Association of Plumbing and Mechanical Officials (IAPMO) concluded: "The research produced stunning results that verified that the sizing method for storm drainage systems, as required in the plumbing codes, is inaccurate." (Ballanco 2012) In summary, the roof drains design criteria the engineering/construction industry has been using for more than 70 years is flawed. Drainage assemblies' flow rates are based on the head of water over the drains and their geometry.

This research led to significant changes to the *IPC*. As of 2015, the IPC no longer publishes flow rates through drains. The IPC requires the designer to use "the published roof drain flow rate" for drainage design. The problem is that, at the time of this writing, there is only one drain manufacturer that publishes flow rates for their roof drains. The only published data on flow through drains is *FM Global Property Loss Prevention Data Sheets 1-54: Roof Loads for New Construction,* which essentially addresses only one type of drain. As a result of these code changes, the IIBEC-RCI Foundation recently published the second edition of *Roof Drainage* (IIBEC-RCI Foundation 2021), which provides an in-depth explanation of the new drainage design criteria and a guide for roof drainage designers. Accordingly, roof drainage systems that were designed per plumbing code requirement prior to IPC 2015 should be re-evaluated as part of roof recovering or replacement over an existing *roof covering.*

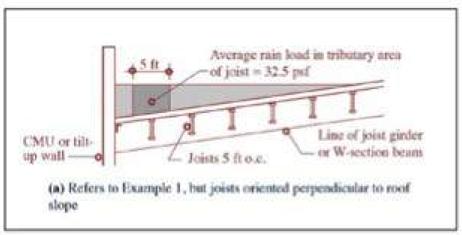
Structural Requirements for Ponding Instability

The second major change to codes involves structural requirements for ponding instability. Currently Section 1512.1 Exception 1 allows slopes less than ¼ inch per foot for re-roofing projects. By definition (2021 IBC Section 202), a *susceptible bay* is "a roof or portion thereof with a slope less than ¼ inch per foot." Sections 1608.3 and 1611.2 require that *susceptible b*ays be evaluated for ponding instability in accordance with Chapters 7 and 8 of ASCE 7. This proposed change allows a slope of less than ¼ inch per foot only if the roof is not susceptible to ponding instability.

ASCE 7-16 significantly revised its "Chapter 8: Rain Loads" (ASCE 2016). Historically, ASCE and the model codes required ponding instability to be investigated when the roof slope was less than ¼ inch per foot. Ponding instability is a serious life-safety and structural issue for roofs. We have also learned that *ponding instability* is not just an issue on roofs with slopes less than ¼-inch per foot, but can also an issue on many more roof configurations. In other words, the potential for roof collapse resulting from ponding instability is more widespread than originally thought, and there are a number of roofs constructed before the 2016 design standards were enacted that have never been analyzed for ponding instability.

The most significant change in the evaluation of ponding instability addressed in ASCE 7-16 is structural orientation. The load on the joists is much greater if the joists are oriented parallel to the wall to which the water drains than if the joists are perpendicular to the wall. Below is example of a collapse in Dallas where ponding instability and structural orientation was an issue. The build-up of water on the 1st and 2nd joists running parallel to the wall was much greater than if the joists had been perpendicular to the wall. This condition resulted in excessive rainwater load on the joists. **Figure 1** (left) shows the roof collapse, and **Figure 1** (right) shows the structural orientation.

Figure 2 is an excerpt from “Roof Drainage Design, Roof Collapses, and the Code” (Patterson and Mehta 2018) illustrating the distribution on a roof with joists running parallel to the drainage wall (Patterson and Mehta 2018). In most cases these joists were designed using a live load of 16 psf, so the rainwater live load is double the design live load.



In a paper by Coffman and Williamson (2019), they discuss ponding that can occur due to differences between “design slope” found in IBC Chapter 15 and “roof slope” used in ASCE 7. Their recommendation is “When design constraints necessitate a 1/4 in 12 design slope be used, the framing members should be cambered or investigated for ponding.”

Increases in Design Rain Loads

ASCE 7-16 also recognized another important roof drainage design issue in “Section 8.2 Roof Drainage.” There have been two rainfall rates used for the design of secondary drainage systems. Currently, the IPC requires a 1-hour, 100-year rainfall rate for designing the secondary drainage system, while the *National Standard Plumbing Code* requires a 15-minute, 100-year rainfall rate for designing the secondary drainage system. The original *IPC* also included the requirement to use a 15-minute, 100-year rainfall rate for designing the secondary drainage system, which was also in the *Standard Plumbing Code* before the IPC replaced it. ASCE 7-16 added the requirement that the secondary drainage system be designed based on the 15-minute, 100-year rainfall rate, which is contrary to the current *IPC* requirements. The *IPC* requirements are also in conflict in the current IBC, which is the reason why this change is important. The 15-minute, 100-year rainfall rate is double (two times) the 1-hour, 100-year rainfall rate. In other words, to comply with ASCE 7 and Section 1608.3 and Section 1611.2 of the IBC, the secondary drainage system must be designed using double the design rainfall rate required in the IPC.

As a result, the secondary drainage system design can be based on the IPC and not meet the requirements of ASCE and the IBC. Chapter 3, Sections 3.4 and 3.5 of *Roof Drainage* (IIBEC-RCI Foundation 2021) provides an in-depth discussion of the use and importance of the 15-minute, 100-year design standard for secondary drainage systems. Essentially, ASCE 7 has doubled the ”Rainwater Loads” on roofs.

In addition, Levine (2021) conducted a review of US rainfall intensity data reports and various plumbing codes from 1935 to the present. He found that “plumbing codes have remained relatively static, rarely contain current rainfall intensity data, and truly represent a minimum standard with regard to the design of roof drainage systems.”

Catastrophic Failures Due to Ponding

Ponding water on roofs, the accumulation of water on roofs, or *ponding instability* has the potential to cause serious structural/life safety issues, including roof collapses. There is a precedent for the ICC recognizing the significance of changes in design standards based upon new inputs, especially when related to life-safety issues. “Section 403.5 Bracing for unreinforced masonry parapets upon reroofing” and “Section 403.8 Roof diaphragms resisting wind loads in high-wind regions” in the IEBC require the correction of potentially hazardous conditions from seismic and wind forces. When reroofing a building in a high-wind region, an analysis of the structural diaphragms and correction of the deficiencies are required. IEBC Section 302.1, Dangerous Conditions, gives the building official “the authority to require the eliminate of conditions deemed *dangerous*.” IEBC Section 706.2, Addition or replacement of roofing or replacement of equipment, requires replacement or alteration to structural elements when the structural element’s design dead, live or snow load, including snow drift effects, is increased by 5 percent. In roof re-cover situations, the additional load from the re-cover roof is not the only increase in gravity loads, because the changes in the IBC and ASCE 7, as discussed previously, have doubled the gravity load from rainwater. These “Rain Loads” changes in ASCE 7 were made to address significant life-safety structural issues related to water accumulation on roofs. Michael O'Rourke, PhD, PE and Aaron Lewis, PE have published an excellent monograph regarding rain loads (O'Rourke and Lewis 2020).

Case Studies of Failures

Case Study 1: Roof Failure in Walhalla, South Carolina, on October 8, 2017 (**Figures 3-4**)

Background:

Construction Science and Engineering, Inc. of Westminster, SC, performed an investigation following the collapse of a roof structure in Walhalla, SC, in October of 2017. Research was limited due to the number of weather recording stations proximate to the subject building; however, a private weather station within 3 miles of the building reported 4.3 in. of rain on the day of the event.

Findings:

In the opinion of Construction Science and Engineering, Inc., the primary cause of the roof collapse was due to excessive and rapid water accumulation on the roof during the significant weather event on October 8, 2017. The reported 5 in. of rainwater reported by the adjacent resident was similar to the 4.3 in. of rainwater measured from the closest private weather station. Additionally, the measured 3.5 in. water depth at the rear of an adjacent building 3 days after the rain event corroborated the reported rain amounts.

A 20 psf unreduced roof design load is specified as the standard in the applicable building code. An accumulation of 5 in. of rainwater equates to approximately 26 psf load on a roof structure. This roof load represents approximately 30% higher load than the current code prescribed design load. Due to the installation of the granular cap sheet below the tile parapet cap, the weight of the water is believed to have initiated the steel truss collapse by pulling a portion of the masonry brick parapet wall onto the roof. This impact force would result in the damage observed at the subject property.

Per Figure 1106.1(3), 100-Year, 1-Hour Rainfall (Inches) Eastern United States provides the 100-year hourly rainfall rate is 4.0 inches for Walhalla, South Carolina.

Case Study 2:

Roof Failure in Kinston, North Carolina, on August 1, 2020 (**Figures 5-7**)

Background:

REI Engineers, Inc. of Greenville, NC, performed an investigation following the collapse of a roof structure in Kinston, NC, in August of 2020.

Findings:

In the opinion of REI Engineers, Inc., the primary cause of the roof collapse was due to excessive loading of the roof framing system. Examination of the roof storm drainage system showed the primary drainage scuppers to obstructed by debris. Additionally, no secondary (emergency) drainage was observed. The combined factors of failure of the primary drainage system and lack of an overflow drainage system most likely caused the excess amount of water to accumulate on the roof, as it was contained by the structure's parapet. This additional load exceeded the structural framing's ability and a failure of the framing occurred by collapse.

Bibliography: American Society of Civil Engineers (ASCE). 2016. *ASCE 7 -16*: *Minimum Design Loads Minimum Design Loads and Associated Criteria for Buildings and Other Structures*. Reston, VA: ASCE.
Ballanco, Julius. 2012. *Storm Drainage System Research Project: Flow Rate Through Roof Drains*. Rosemont, IL: American Society of Plumbing Engineers (ASPE) Research Foundation.

Coffman, Scott D., and Thomas Williamson. 2019. "Low-Slope Roofs: Design Solutions for Building Code-Permitted Low-Slope Applications that Cause Ponding Water."
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Patterson, Stephen L., and Madan Mehta. 2018. "Roof Drainage Design, Roof Collapses, and the Code" in *Proceedings of the 33rd RCI International Convention and Trade Show*, March 22-27, 2018: RCI.

Cost Impact: The code change proposal will increase the cost of construction
Most buildings that will be reroofed already meet IBC requirements, and there will be no increased costs resulting from the proposed additional language. Most residential and multi-family buildings' roofs (typically steep-slope) and commercial buildings' roofs that drain over the edge and buildings with rigid structures will not be affected.

There will be increased costs to buildings with flexible structural elements that are susceptible to *ponding instability,* which leads to roof structure overloading and catastrophic roof collapse. These buildings would fall into the "Dangerous Condition" category, as defined in IEBC Section 401.3 (however, it should be noted that the IEBC is typically a voluntary code is most jurisdictions, and accordingly, this issue needs to be fully discussed in the IBC).

For these "Dangerous Condition" buildings, additional cost would involve a structural engineering evaluation to determine that the building structure with new live loading is safe. In a majority of cases, it is presumed that structural engineering evaluation would be the extent of the additional costs, since building structures are typically designed with sufficient additional safety factors.In cases where a structural engineering evaluation indicates a building/roof structure is unsafe, there would be additional costs to strengthen, supplement, replace or otherwise alter the structure, as required to carry the additional loads. These costs would vary from building-to-building depending upon the extent of the discovered issues. In most cases, overflow drains or scuppers could be added or resized to limit the amount of water that would accumulate on the new roof. Overflow scuppers costs vary from $500 to $1,500 depending on their complexity.

Regardless, the costs to evaluate and/or modify a structure that has been found to be unsafe from additional loading caused by re-roofing, is necessary to protect public life-safety.

S44-22

S45-22

IBC: 1512.1

Proponents: Emily Lorenz, representing International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com)

2021 International Building Code

Revise as follows:

1512.1 General. Materials and methods of application used for recovering or replacing an existing *roof covering* shall comply with the requirements of Chapter 15.

Exceptions:

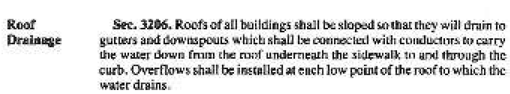
1. *Roof replacement* or *roof recover* of existing low-slope *roof coverings* shall not be required to meet the minimum design slope requirement of $^{1}/_{4}$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide *positive roof drainage*.
2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for *positive roof drainage* <u>and have been determined to resist all design loads</u>. For the purposes of this exception, existing secondary drainage or *scupper* systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or *scuppers* designed and installed in accordance with Section 1502.2.

Reason Statement: This amended language is necessary to ensure public life-safety. It clarifies specifically when the Exception 2 is applicable so as to prevent roof collapses/structural overload failures from uncontrolled ponding, incidental to new dead-loads imposed onto existing roof structures, inadequate/missing secondary drainage assemblies at existing roofs, or alteration of drainage assemblies during re-roofing projects. This amended language is also needed to ensure preservation of physical assets or operations covered by existing roofs that are subject to re-roofing. The IBC and its predecessor building codes have long called for scuppers (or other secondary drainage measures) within all roofs that incorporate parapet walls and within other low-slope roofs, to prevent roof-structure overload and collapse. If during a low-slope re-roofing project, an owner discovers that their as-constructed roof has defective or missing code-required emergency overflow or secondary-drainage assemblies, the existing roof was most likely not code-compliant at the time of its installation and was and remains a danger to public life-safety from catastrophic collapse.
The following recent studies further support, in much greater detail, justification for the proposed additional language to Exception 2.

Secondary Drainage Should Have Been Provided During Original Construction

Chapter 15, Section 1502.2 Secondary (emergency overflow) drains or scuppers requires that, "secondary (emergency overflow) drains or scuppers shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason." Generally, this provision only applies to low-sloped roofs with parapet walls. As the title suggests, the *secondary drainage system* is an *emergency* system that is required to prevent the roof structures from collapsing in the event of an unsafe buildup of water. The s*econdary (emergency overflow) drains or scuppers* are the safety valves for the roof structure.

Building codes have required that buildings have an *emergency overflow drainage system* since modern codes were introduced. Below is an excerpt from Chapter 32 Roof Construction and Covering from the first *Uniform Building Code* (1927) requiring that, "Overflows … (be) installed at each low point to which the water drains." (**Figure 1**)


Roof Drainage

Sec. 3206. Roofs of all buildings shall be sloped so that they will drain to gutters and downspouts which shall be connected with conductors to carry the water down from the roof underneath the sidewalk to and through the curb. Overflows shall be installed at each low point of the roof to which the water drains.

Doesn't Apply to Roofs Designed to Drain Over Edge

The provision for an *emergency overflow drainage system* does not apply to roofs that drain over the edge, which are the vast majority of buildings. These include most residential buildings, multi-family buildings, pre-engineered metal buildings, and buildings with low-slope roofs that drain over the edge into the gutters. The provision only applies to roofs where water can accumulate when the primary drains are blocked, i.e., buildings with parapet walls. A building with parapet walls and no *emergency overflow drainage system* did not meet building codes when they were built and do not meet the building codes today.

Exception: Buildings where the structure is sufficient to support the buildup of water do not require overflow. One example of this would be a concrete structure designed to be a future floor. In many cases, these roofs will support water that would build up to the top of the parapet wall. A typical parapet 2-foot wall would result in 2-feet of water buildup at the perimeter or 125 psf of Rain Load (**Figure 2**).

Exception: Buildings where the structure is sufficient to support the buildup of water do not require overflow. One example of this would be a concrete structure designed to be a future floor. In many cases, these roofs will support water that would build up to the top of the parapet wall. A typical parapet 2-foot wall would result in 2-feet of water buildup at the perimeter or 125 psf of Rain Load.

Secondary Drainage Essential to Structural Integrity

An *emergency overflow drainage system* is essential to the structural integrity of a building. It is the safety valve to prevent an unsafe water buildup on a roof in the case that the primary drainage system is blocked or if the rainfall rate exceeds the design rainfall rate for the primary drainage system. The head of water over an overflow drain or scupper is a critical component in the design calculus for roof structures. Both the IBC and ASCE-7 require that the roof structure be designed to support the weight (head) of water that accumulates over the *emergency overflow drainage system* assuming the primary drainage are blocked. **Figure 3** is an excerpt from Chapter 16, Section 1611.1 from the 2021 IBC describing the design requirements for "Rain Loads."

SECTION 1611
RAIN LOADS

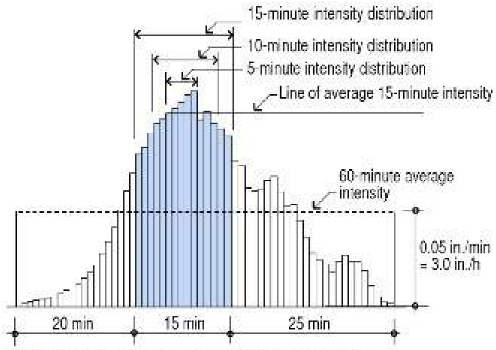
1611.1 Design rain loads. Each portion of a roof shall be designed to sustain the *load* of rainwater as per the requirements of Chapter 8 of ASCE 7. The design rainfall shall be based on the 100-year 15-minute duration event, or on other rainfall rates determined from approved local weather data. Alternatively, a design rainfall of twice the 100-year hourly rainfall rate indicated in Figures 1611.1(1) through 1611.1(5) shall be permitted.

Increases in Design Rain Loads

It is important to note that in the 2021 edition there was a significant change. Previously, the IBC and IPC required using the 1-hour, 100-year rainfall rate for the design of both the primary and secondary drainage systems. Section 1611.1 has changed the design rainfall rate to the 15-minute, 100-year rainfall rate. The requirement to use the 15-minute rainfall rate was made in ASCE 7-16 (ASCE 2016), so both ASCE and IBC require the 15-minute rainfall rate for designing overflow systems. The 15-minute rainfall rate is approximately double the 1-hour rainfall rate. **In other words, to comply with ASCE 7 and Section 1611.1. of the *IBC,* the secondary drainage system must be designed using double the design rainfall rate.** The result is that the new code requirement significantly increases the Rain Load on a building.

The change from the 1-hour to the 15-minute duration rainfall rate is well supported in the technical literature. Chapter 3, Section 3.4 and 3.5 of *Roof Drainage* (IIBEC-RCI Foundation 2021) provides an in-depth discussion of the use and importance of the 15-minute, 100-year design standard for secondary drainage systems. There is also strong precedence in the codes for using the 15-minute rainfall rate for secondary drains. Prior to the consolidation of codes, the *Standard Plumbing Code* required using the 15-minute rainfall rates. The National Standard Plumbing Code requires using the 15-minute rainfall rate. Also, the first IPC required using the 15-minute duration rainfall rate for secondary drain systems. This requirement was changed in the 2000 IPC.

From a structural design perspective, rainfall rates commonly exceed the 1-hour, 100-year rainfall rate for short durations. **Figure 4** is an excerpt from *Roof Drainage* (IIBEC-RCI Foundation 2021) showing a typical distribution of rainfall rates occurring over 1-hour. The area above the 3.0 in/h line illustrate the time when the Rain Load would exceed the design Rain Load using the 1-hour rainfall rate. The illustration also shows (in blue) the 15-minute rainfall rate, which is about double the 1-hour rainfall rate. The Rain Load from 15-minute duration rainfall rate is now recognized as the appropriate standard. These structural design changes were made because of the serious recurring problem of roof collapses.



(a) Rainfall intensity distribution over 60 minutes. Width of each rectangle is one minute.

Climate change is causing more frequent and more intense rain events to occur. A good example was Hurricane Harvey. The flooding in Houston resulting from Hurricane Harvey contributed to the collapse of several roofs. A common scenario was that the flood water filled the storm drainage systems preventing the primary drains from functioning properly. This flooding severely tested the *secondary emergency overflow drainage system*. Most passed the test, but several roofs did not.

Another major change in the IPC significantly affects the design of a *secondary emergency overflow drainage system.* A 2012 study (Ballanco 2012) published by the American Society of Plumbing Engineers and the International Association of Plumbing and Mechanical Officials in found that, "***The research produced stunning results that verified that the sizing method for storm drainage systems, as required in the plumbing codes, is inaccurate***." In other words, **the drainage design criteria we have been using for more than 70 years is wrong … stunning indeed**. The study showed that flow rates are based on the head of water over the drains and the drain geometry, which is the very data a structural engineer must use in determining "Rain Loads." So not only have we changed the rainfall rate for designing secondary emergency drainage systems, we have an entirely different standard for determining the head (weight) of water over the drains.

As stated previously, the requirement that the re-roof system includes an appropriate *emergency overflowdrainage system* has been in the National Codes since these codes addressed reroofing. Chapter 32 Re-Roofing was added to the Appendix of the *Uniform Building Code* in 1979. Chapter 32 Re-Roof required that the new roof *conform the applicable provisions of* Chapter 32 of this code. Section 3207 (c) required Overflow Drains and Scuppers. Below is an excerpt from the 1979 UBC addressing the applicable provision related to the requirement for Overflow Drains and Scuppers. There was a reason that for almost 40 years the codes required the reroofing system to have an appropriate *secondary emergency overflow drainage system* (**Figure 5**).

(c) **Overflow Drains and Scuppers.** Where roof drains are required, overflow drains having the same size as the roof drains shall be installed with the inlet flow line located 2 inches above the low point of the roof, or overflow scuppers having three times the size of the roof drains may be installed in adjacent parapet walls with the inlet flow line located 2 inches above the low point of the adjacent roof and having a minimum opening height of 4 inches.

Overflow drains shall be connected to drain lines independent from the roof drains.

Buildings are typically reroofed every 20 years or so. The IBC requires building permits for recovering the existing roof or for reroofing. This is typically the only time during the life of a building that the Building Official and the Code are involved with the roof. This is the appropriate time to make sure the building structure is safe and that the roof drainage system was constructed properly in accordance with the code. The omission of an appropriate *emergency overflow drainage system* is a design and/or construction defect that should be corrected. A building constructed without an appropriate *emergency overflow drainage system* does not meet the code now or in the past. It is critical that this provision be reinstated to ensure our buildings are safe.

Bibliography:

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Ballanco, Julius. 2012. *Storm Drainage System Research Project: Flow Rate Through Roof Drains.* Rosemont, IL: American Society of Plumbing Engineers (ASPE) Research Foundation.

Coffman, Scott D., and Thomas Williamson. 2019. "Low-Slope Roofs: Design Solutions for Building Code-Permitted Low-Slope Applications that

Cause Ponding Water.” *Civil + Structural Engineering*. Fayetteville, AR: Zweig Group.

Levine, Jeffrey. 2021. “Rainfall Intensity Changes Over Time: Have the Codes Kept Pace?,” *Interface*, 39 (10): International Institute of Building Enclosure Consultants.

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Patterson, Stephen, and Medan Mehta. 2021. *Roof Drainage.* Second Edition, Raleigh, NC: IIBEC-RCI Foundation.

Patterson, Stephen L., and Madan Mehta. 2018. “Roof Drainage Design, Roof Collapses, and the Code” in *Proceedings of the 33rd RCI International Convention and Trade Show*, March 22-27, 2018: RCI.

Cost Impact: The code change proposal will increase the cost of construction
Most buildings that will be re-roofed already meet IBC requirements, and there will be no increased costs resulting from the proposed additional language. Most residential and multi-family buildings’ roofs (typically steep-slope) and commercial buildings with roofs that drain over the edge and buildings with rigid structures will not be affected. The cost of adding parapet wall emergency through-wall scuppers or other secondary drainage measures at low-slope roofs that require such assemblies, should have been borne at the time of the existing low-slope roof’s original construction, based on requirements of earlier adopted building codes.

If found to missing, parapet wall through-wall scuppers or other secondary drainage measures are typically of nominal cost to retrofit into existing buildings/roofs. The costs to add or modify an emergency overflow drainage systemvaries. In many cases, all that is required is to add overflow drains or scuppers to control the volume of water that would accumulate on the roof. Overflow scupper costs vary from $500 to $1500 depending on their complexity and overflow drains vary from $1500 to $3000.

There will be increased costs to buildings with flexible structural elements that are susceptible to ponding instability,which leads to roof structure overloading and catastrophic roof collapse. These buildings would fall into the “Dangerous Condition” category, as defined in IEBC Section 302.1. For these “Dangerous Condition” buildings, additional cost would involve a structural engineering evaluation to determine that the building structure with new, added dead-loading is safe and additionally, that the new dead-loading will not alter the function of in-place secondary drainage systems. In most cases, it is presumed that structural engineering evaluation would be the extent of the additional costs, since building structures are typically designed with sufficient margin-of-safety factors.

In cases where a structural engineering evaluation indicates a building/roof structure is unsafe, there would be additional costs to strengthen, supplement, replace or otherwise alter the structure, as required to carry the additional loads. These costs would vary from building-to-building depending upon the extent of the discovered issues.

Regardless, the costs to evaluate and/or modify a structure that has been found to be unsafe from additional loading caused by re-roofing or from inadequate or missing secondary drainage systems, is necessary to protect public life-safety and property/operations below existing roofs.

S45-22

S46-22

IBC: SECTION 1512, 1512.1; IEBC: SECTION 705, [BS] 705.1

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

SECTION 1512
REROOFING

Revise as follows:

1512.1 General. Materials and methods of application used for recovering or replacing an existing *roof covering* shall comply with the requirements of Chapter 15.

Exceptions:

1. *Roof replacement* or *roof recover* of existing low-slope *roof coverings* shall not be required to meet the minimum design slope requirement of $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide *positive roof drainage*.
2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for *positive roof drainage*. For the purposes of this exception, existing secondary drainage or *scupper* systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or *scuppers* designed and installed in accordance with Section 1502.2.
3. For *roof replacement* with insulation above the *roof deck* where the required *R*-value cannot be provided because the additional thickness would restrict accessibility, reduce of the height of existing *guards* or result in thickness limitations that occur with the existing rooftop conditions, including low roof drains or secondary (emergency overflow) drains, low rooftop mechanical equipment, low door or glazing heights, low parapet heights, or proper roof flashing heights, the maximum thickness of insulation compatible with the available space and existing rooftop conditions shall be installed, as *approved* by the *building official*. In no case shall the R-value of the roof insulation be reduced or the U-factor of the *roof assembly* be increased as part of the *roof replacement*.

2021 International Existing Building Code

SECTION 705
REROOFING

Revise as follows:

[BS] 705.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the International Building Code.

Exceptions:

1. *Roof replacement* or roof recover of existing low-slope roof coverings shall not be required to meet the minimum design slope requirement of $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 of the International Building Code for roofs that provide positive roof drainage.
2. Recovering or replacing an existing roof covering shall not be required to meet the requirement for secondary (emergency overflow) drains or scuppers in Section 1502 of the International Building Code for roofs that provide for positive roof drainage. For the purposes of this exception, existing secondary drainage or scupper systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or scuppers designed and installed in accordance with Section 1502 of the International Building Code.
3. For *roof replacement* with insulation above the *roof deck* where the required *R*-value cannot be provided because the additional thickness would restrict accessibility, reduce of the height of existing *guards* or result in thickness limitations that occur with the existing rooftop conditions, including low roof drains or secondary (emergency overflow) drains, low rooftop mechanical equipment, low door or glazing heights, low parapet heights, or proper roof flashing heights, the maximum thickness of insulation compatible with the available space and existing rooftop conditions shall be installed, as *approved* by the *building official*. In no case shall the R-value of the roof insulation be reduced or the U-factor of the *roof assembly* be increased as part of the *roof replacement*.

Reason Statement: This proposed code change is intended to provide guidance to code officials and users in situations where a roof replacement's additional roof covering thickness can restrict accessibility, reduce guard heights or result in less than necessary clearances for existing rooftop conditions. In reroofing, problematic existing rooftop conditions include HVAC equipment, low door or glazing heights, parapet heights, and proper roof flashing heights. This provision requires the maximum thickness of insulation compatible with the available space and existing rooftop conditions to be installed. Also, the provision stipulates in no case shall the *R*-value of the roof insulation for the new roof covering be reduced or the *U*-factor of the *roof assembly* be increased from that of the existing building as part of the roof replacement. Implementation of this provision requires approval by the building official.

Cost Impact: The code change proposal will decrease the cost of construction
This code change proposal could provide cost savings compared to requiring strict, literal compliance with the code without code official approved alternatives. Since rooftop conditions vary on a building-to-building basis, the amount of the saving varies from minimal to significant -- exceeding the cost of roof replacement alone in some cases, such as those requiring accessibility changes, reworking guard heights and addressing specific rooftop conditions.

S46-22

S47-22

IBC: 1512.1, SPRI Chapter 35 (New); IEBC: [BS] 705.1, SPRI (New), (New)

Proponents: Amanda Hickman, representing Single-Ply Roofing Industry (SPRI) (amanda@thehickmangroup.com)

2021 International Building Code

Revise as follows:

1512.1 General. Materials and methods of application used for recovering or replacing an existing *roof covering* shall comply with the requirements of Chapter 15. The existing decking material shall be tested in accordance with ANSI/SPRI FX-1 or ANSI/SPRI IA-1

Exceptions:

1. *Roof replacement* or *roof recover* of existing low-slope *roof coverings* shall not be required to meet the minimum design slope requirement of $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide *positive roof drainage*.
2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for *positive roof drainage*. For the purposes of this exception, existing secondary drainage or *scupper* systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or *scuppers* designed and installed in accordance with Section 1502.2.

Add new standard(s) as follows:

SPRI

Single-Ply Roofing Institute
465 Waverly Oaks Road, Suite 421
Waltham, MA 02452

ANSI/SPRI FX-1 2021	Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners
ANSI/SPRI IA-1 2021	Standard Field Test Procedure for Verifying the Suitability of Roof Substrates and Adhesives

2021 International Existing Building Code

Revise as follows:

[BS] 705.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the International Building Code. The existing decking material shall be tested in accordance with ANSI/SPRI FX-1 or ANSI/SPRI IA-1.

Exceptions:

1. *Roof replacement* or roof recover of existing low-slope roof coverings shall not be required to meet the minimum design slope requirement of $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 of the International Building Code for roofs that provide positive roof drainage.
2. Recovering or replacing an existing roof covering shall not be required to meet the requirement for secondary (emergency overflow) drains or scuppers in Section 1502 of the International Building Code for roofs that provide for positive roof drainage. For the purposes of this exception, existing secondary drainage or scupper systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or scuppers designed and installed in accordance with Section 1502 of the International Building Code.

Add new text as follows:

SPRI

Single-Ply Roofing Institute
465 Waverly Oaks Road
Waltham, MA 02452
USA

ANSI/SPRI FX-1 2021. Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners

ANSI/SPRI IA-1 2021. Standard Field Test Procedure for Verifying the Suitability of Roof Substrates and Adhesives

Staff Analysis: A review of the standard proposed for inclusion in the code, SPRI ANSI/SPRI FX-1 2021 Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.
A review of the standard proposed for inclusion in the code, SPRI ANSI/SPRI IA-1 2021 Standard Field Test Procedure for Verifying the Suitability of Roof Substrates and Adhesives, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the

ICC website on or before March 16, 2022.

Reason Statement: It is critical that a roof system performs properly in a wind event. Currently the provisions on reroofing and roof replacement are silent on the need to determine and verify that the existing roof assembly, substrate and adhesive combination are suitable for a reroof or roof replacement. The addition of these two standards will ensure that existing roof decks are properly tested to meet the required minimum uplift loads in Chapter 16 of the IBC.
ANSI/SPRI FX-1 provides procedures used out at the jobsite to test the pullout resistance of roofing fasteners from substrate (decking materials).

ANSI/SPRI IA-1 specifies a field test procedure to verify the suitability of an existing roof substrate or roof assembly, and adhesive combination. This testing procedure encompasses various types of insulation adhesives and substrates.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Prior to a reroof or roof replacement, installers already perform some version of a field test to determine the suitability of the existing decking materials and verify the suitability of an existing roof substrate or roof assembly, and adhesive combination. The proposed test procedures provide a standardized method for appropriately administering these tests.

S47-22

S48-22 Part I

IBC: 1512.2; IEBC: [BS] 705.2

Proponents: Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org); Richard Justin Koscher, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof assembly* materials down to the *roof deck*.

> **Exception:** Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck*, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.

<u>Where the existing *roof assembly* contains insulation entirely above the roof deck, installation of roof insulation materials shall comply with Section C503.2.1 of the *International Energy Conservation Code.*</u>

2021 International Existing Building Code

Revise as follows:

[BS] 705.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of roof coverings down to the roof deck.

> **Exception:** Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 of the International Building Code.

<u>Where the existing *roof assembly* contains insulation entirely above the roof deck, installation of roof insulation materials shall comply with Section C503.2.1 of the *International Energy Conservation Code*.</u>

Staff Analysis: CC# S48-22 and CC# S49-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

S48-22 Part I

S48-22 Part II

IRC: R908.3

Proponents: Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org); Richard Justin Koscher, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org)

2021 International Residential Code

Revise as follows:

R908.3 Roof replacement. *Roof replacement* shall include the removal of existing layers of roof coverings down to the *roof deck.*

> **Exception:** Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck*, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905.

Where the existing *roof assembly* is part of the building thermal envelope, the *alteration* shall comply with Section R503.1.1 of the *International Energy Conservation Code*--Residential Provisions.

Staff Analysis: CC# S48-22 and CC# S49-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This proposal adds a reference within the IBC, IEBC and IRC provisions relating to roof replacements that points code users to the applicable IECC requirements for roof replacement projects or alterations to the roof assembly where the assembly is part of the building thermal envelope. This proposal adds an important connection between the building code and the energy code, and will improve compliance with the energy code requirements. The new language is intended to appear under the existing exception. Roof replacements are required to comply with the IECC requirements regardless of the reuse of existing materials such as an ice barrier membrane.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provide clarification of requirements related to roof replacements and creates no new requirements.

S48-22 Part II

S49-22 Part I

IBC: 1512.2; IEBC: [BS] 705.2

Proponents: Richard Justin Koscher, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org); Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof assembly* materials down to the *roof deck*.

> ~~**Exception**~~ **Exceptions:** ~~Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck*, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.~~
>
> 1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck*, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.
> 2. Where the existing *roof assembly* includes roof insulation above the *roof deck*, the existing roof insulation shall be permitted to be reused in accordance with Section 1508. Existing roof insulation that is damaged, deteriorated or water soaked shall not be reused.

2021 International Existing Building Code

Revise as follows:

[BS] 705.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of roof coverings down to the roof deck.

> ~~**Exceptions**~~ **Exceptions:** ~~Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 of the International Building Code.~~
>
> 1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 of the *International Building Code*.
> 2. Where the existing *roof assembly* includes roof insulation above the roof deck, the existing roof insulation shall be permitted to be reused in accordance with Section 1508 of the *International Building Code*. Existing roof insulation that is damaged, deteriorated or water soaked shall not be reused.

Staff Analysis: CC# S48-22 and CC# S49-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

S49-22 Part I

S49-22 Part II

IRC: R908.3

Proponents: Richard Justin Koscher, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org); Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org)

2021 International Residential Code

Revise as follows:

R908.3 Roof replacement. *Roof replacement* shall include the removal of existing layers of roof coverings down to the *roof deck*.

> ~~**Exceptions**~~ **Exceptions:** ~~Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck*, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905.~~
>
> 1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905.
> 2. Where the existing *roof assembly* includes roof insulation above the roof deck, the existing roof insulation shall be permitted to be reused in accordance with Section R906. Existing roof insulation that is damaged, deteriorated or water soaked shall not be reused.

Staff Analysis: CC# S48-22 and CC# S49-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This code change proposal recognizes that roof insulation boards that are in good repair may be appropriately reused as part of a roof replacement project. This code change proposal will reduce the amount of construction materials that are landfilled during a roof replacement project by clarifying the appropriate circumstances under which roof insulation boards may be reused. Additional layers of new insulation may be installed over existing layers of roof insulation in order to meet the requirements of the International Energy Conservation Code as well as to prepare an appropriate substrate for the installation of a new roof membrane.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal does not create any new requirements for roof replacement projects. Where existing roof insulation is reused, this code change proposal may reduce the cost of construction.

S49-22 Part II

S50-22

IBC: 1512.2

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof* ~~*assembly*~~ *covering* materials down to the *roof deck*.

> **Exception:** Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck*, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.

Reason Statement: This code change proposal is intended to clarify the code. Use of the term "roof assembly" here, as is defined in Chapter 2-Definitions, is confusing because it includes the roof deck. The requirement indicates the roof deck is intended to remain in-place.
Substituting the term "roof covering," which is also defined in Chapter 2-Definitions, clarifies the requirement's intent. A "roof covering" is those materials applied over the roof deck for weather resistance, fire classification or appearance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply a clarification of existing requirements. There is no change in technical requirements.

S50-22

S51-22

IBC: 1512.2

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety (testafford@charter.net)

2021 International Building Code

Revise as follows:

1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof assembly* materials down to the *roof deck*.

~~Exception~~ Exceptions:

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck* and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 where permitted by the roof covering manufacturer and self-adhered underlayment manufacturer.
2. Where the existing roof includes a self-adhered underlayment and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing self-adhered underlayment shall be permitted to remain in place and covered with an underlayment complying with Table 1507.1.1(1), Table 1507.1.1(2), and Table 1507.1.1(3).
3. Where the existing roof includes one layer of self-adhered underlayment and the existing layer cannot be removed without damaging the roof deck, a second layer of self-adhered underlayment is permitted to be installed over the existing self-adhered underlayment provided the following conditions are met:
   - 3.1. It is permitted by the roof covering manufacturer and self-adhered underlayment manufacturer,
   - 3.2. The existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, and
   - 3.3. The second layer of self-adhered underlayment is installed such that buildup of material at walls, valleys, roof edges, end laps, and side laps does not exceed two layers.

Reason Statement: The use of a self-adhered polymer modified bitumen membrane complying with ASTM D1970 is one of several underlayment options permitted for roof coverings in the IBC. ASTM D1970 self-adhered membranes were first recognized in the 2000 IBC and IRC as an underlayment and as an option for an ice barrier. After 20 years of code implementation, it remains approved by shingle manufacturers, underlayment manufacturers and building codes, and has been consistently observed to perform very well as a method for preventing water intrusion in the event the roof covering is lost or damage.
While the code requires materials and methods for roof replacement to comply with Chapter 15, it doesn't provide any specific requirements for what to do where a roof is being replaced and there is an existing self-adhered underlayment other than ice barrier membranes. Section 1512.2requires roof replacement to include the removal of all roof covering layers down to the roof deck. An exception permits one additional layer of an ice barrier membrane where the existing roof has an ice barrier membrane.

As currently written, the code would imply that a self-adhered membrane would have to be removed during a roof replacement. However, depending on the decking material, many self-adhered membranes can be difficult to remove. Some may not be able to be removed without damaging or removing the roof deck. Damaging the deck and/or removing the roof decking can be expensive and unnecessary.

This proposal is a collaboration between the Insurance Institute for Business and Home Safety (IBHS), the Asphalt Roofing Manufacturers Association (ARMA), and the National Roofing Contractors Association (NRCA). It provides specific requirements on acceptable methods for dealing with existing self-adhered membranes during a roof replacement. The underlayment methods in the 2021 IBC include specific methods for preventing water intrusion in the event the roof covering is damaged or lost in high wind regions. The changes proposed herein seek to maintain that level of protection during roof replacement.

ARMA provides guidance on the removal of self-adhered membrane in their Technical Bulletin, Self-Adhering Underlayment Removal Prior to Steep Slope Re-Roofing: *"Removal of self-adhering underlayment is always recommended in situations in which it can be removed without damaging the deck….If one layer of self-adhering underlayment is in place, and it is not possible to remove it without damaging the deck, installation of a second layer of underlayment over the existing membrane may be permissible: Check with the underlayment manufacturer's installation instructions and local building codes for details. Offset end and side laps in the new and existing underlayment to minimize thickness build-up and "feather in" the new underlayment by extending the new material a minimum of 8" up the slope onto the bare deck. This will reduce the likelihood of problems with drainage and aesthetics. If two or more layers of self-adhering underlayment are in place, all layers should be removed."*

In lieu of an additional layer of self-adhered underlayment, this proposal also permits felt underlayment to be installed in accordance with Tables 1507.1.1(1), 1507.1.1(2), and 1507.1.1(3).

This proposal also provides industry recommended clarifications regarding the installation of an additional layer of an ice barrier membrane.

Cost Impact: The code change proposal will decrease the cost of construction
For existing roofs with one layer of self-adhered membrane underlayment, this proposal would reduce the cost of construction by permitting the existing layer to remain in place.

S51-22

S52-22

IBC: 1512.2

Proponents: Gregory Keeler, representing Owens Corning (greg.keeler@owenscorning.com)

2021 International Building Code

Revise as follows:

1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof assembly* materials down to the *roof deck*.

~~Exception~~ Exceptions:

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck*, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ~~ice barrier~~ self-adhering modified bitumen membrane complying with ASTM D1970 in accordance with the new ice barrier membrane manufacturer's installation instructions and Section 1507.2.
2. Where the existing *roof assembly* includes a self-adhered underlayment that cannot be removed from the *roof deck*, the existing membrane shall be permitted to remain in place and covered with an additional layer of underlayment in accordance with Section 1507.1.1.

Reason Statement: It is increasingly common to encounter an existing self-adhered membrane on a roof deck on which the roofing is being replaced. In many cases, especially in high wind regions, the self-adhering underlayment is covering the entire deck. This modification adds additional language to deal with both ice dam and whole-roof self-adhered underlayment situations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Roofing contractors have been searching for guidance on how to handle these situations for years. This proposal simply codifies requirements that are consistent with how these situations have been handled historically.

S52-22

S53-22

IBC: 1512.2; IEBC: [BS] 705.2

Proponents: Bill McHugh, representing Chicago Roofing Contractors Association (bill@mc-hugh.us)

2021 International Building Code

Revise as follows:

1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof assembly* materials down to the *roof deck*.

~~**Exception**~~ **Exceptions:**

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck*, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.
2. *Roof replacement* of existing *low sloped roofs* shall comply with the roof insulation requirements for new construction unless the installation of additional insulation above the structural roof deck is infeasible due to the height of existing parapets, equipment curbs, skylight curbs, window sills, door thresholds, and similar elements with flashing into the roof system. In no case shall a *roof replacement* reduce the insulating value of the roof.

2021 International Existing Building Code

Revise as follows:

[BS] 705.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of roof coverings down to the roof deck.

~~**Exception**~~ **Exceptions:**

1. Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 of the International Building Code.
2. *Roof replacement* of existing *low sloped roofs* shall comply with the roof insulation requirements for new construction unless the installation of additional insulation above the structural roof deck is infeasible due to the height of existing parapets, equipment curbs, skylight curbs, window sills, door thresholds, and similar elements with flashing into the roof system. In no case shall a *roof replacement* reduce the insulating value of the roof.

Reason Statement: A major jurisdiction, the City of Chicago, in its adoption of the I-Codes, put this in Chapter 3 of the 2019 Chicago Building Rehabilitation Code, their version of the International Existing Building Code. The City of Chicago has this in its 2016 Chicago Roofing Memorandum. The State of Illinois and Minnesota both have similar language in their adoptions of the I-codes as well.
To be consistent with the IBC and IEBC format, a slight edit was made to the Chicago Rehabilitation Code to remove *roof recover'* from the proposal. That would be covered in a separate proposal.

This proposal provides the building official clear guidance for roof replacements on existing buildings where there are limitations to what can be done on the rooftop, with the structure itself, when a new roof is needed on an existing building.

The structure's characteristics, set during design, do not always provide vertical flashing heights above the roof membrane surface that can allow thicker materials below the membrane, additional deck materials, or insulation, when a new roof is needed, without rebuilding some number of elements on the rooftop.

Cost Impact: The code change proposal will decrease the cost of construction
By not rebuilding the rooftop, the building owner and manager does reduce costs to what the limitations of the building present.

S53-22

S55-22

IBC: 1512.2.1.1, ASTM Chapter 35 (New), SPRI Chapter 35 (New)

Proponents: Emily Lorenz, representing International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com)

2021 International Building Code

Revise as follows:

1512.2.1.1 Exceptions. A *roof recover* shall not be permitted where any of the following conditions occur:

1. Where the existing roof or *roof covering* is ~~water soaked~~ found to have moisture present by infrared testing in accordance with ASTM C1153, electrical impedance testing in accordance with ASTM D7954/D7954M, or nuclear testing in accordance with ANSI/SPRI/RCI NT-1 2012 and the existing roof or *roof covering* cannot be removed and restored on a spot basis. ~~or~~
2. Where the existing roof or *roof covering* has deteriorated to the point that the existing roof or *roof covering* is not adequate as a base for additional roofing.
~~2.~~ 3. Where the existing *roof covering* is slate, clay, cement or asbestos-cement tile.
~~3.~~ 4. Where the existing roof has two or more applications of any type of *roof covering*.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

C1153-10 (2015)	Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging
D7954/D7954M-15a	Standard Practice for Moisture Surveying of Roofing and Waterproofing Systems Using Non-Destructive Electrical Impedance Scanners

SPRI

Single-Ply Roofing Institute
465 Waverly Oaks Road, Suite 421
Waltham, MA 02452

ANSI/SPRI/RCI NT-1 2017	Detection And Location Of Latent Moisture in Building Roofing Systems by Nuclear Radioisotopic Thermalization

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM C1153-10 (2015) Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.
A review of the standard proposed for inclusion in the code, ASTM D7954/D7954M-15a Standard Practice for Moisture Surveying of Roofing and Waterproofing Systems Using Non-Destructive Electrical Impedance Scanner, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

A review of the standard proposed for inclusion in the code, SPRI ANSI/SPRI/RCI NT-1 2017 Detection And Location Of Latent Moisture in Building Roofing Systems by Nuclear Radioisotopic Thermalization, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement:
The term “water soaked” is not clearly defined. If a roof is recovered and the underlying, existing roof still contains moisture, the new system is in a compromised state from the start; specifically, accelerated roof deck and fastener decay, and loss of R-value and wind-uplift resistance. The referenced standards added to the exception provide protocols to test for the presence of moisture in existing systems. These methods are more accurate than a few small core cuts taken at random areas, where moisture/water damaged or laden material can be missed. These three-consensus based standard test methods are well established, easy to perform, and allow cost-effective testing of the entire roof surface area in a short amount of time. Performing these tests reduces the chance for missing areas of moisture- or water-damaged material in the existing roof or roof covering and related substrate materials. These standards provide a better definition of “water soaked” while allowing moisture- or water-damaged or laden materials, where discovered, to be removed and infilled with like material, thereby allowing a roof recover without unintended consequences.

Bibliography: ASTM International. 2015. *Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging.* ASTM C1153-10(2015), West Conshohocken, PA: ASTM International.

ASTM International. 2015. *Standard Practice for Moisture Surveying of Roofing and Waterproofing Systems Using Non-Destructive Electrical Impedance Scanners.* ASTM D7954/D7954M-15a, West Conshohocken, PA: ASTM International.
Single Ply Roofing Industry (SPRI). 2017. *Detection And Location Of Latent Moisture in Building Roofing Systems by Nuclear Radioisotopic Thermalization*. ANSI/SPRI/RCI NT-1, Waltham, MA: SPRI.

Cost Impact: The code change proposal will increase the cost of construction

The cost to apply the consensus-based testing standards is minimal. Generally, less than $0.04 per square foot. Furthermore, they can be performed quickly not adding delay to re-roofing projects. The cost of the equipment and training necessary to be proficient with these testing procedures is nominal, generally, less than $5000.

S55-22

S56-22

IBC: 1512.2.2.2 (New)

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Add new text as follows:

1512.2.2.2 Roof recover membrane layer removal. In a *roof recover*, the membrane or water-shedding layer shall be permitted to be removed and any existing thermal barrier, insulation or *vapor retarder* remain in-place and be reused in the new *roof covering* in accordance with the applicable portions of this section, the roof covering manufacturer's installation instructions and as approved by the *building official.*

> **Exception:** Membrane or water-shedding layer removal and reuse of any existing thermal barrier, insulation or *vapor retarder* remain in-place shall not be permitted in *roof recovering* where the existing roof has two or more applications of any type of *roof covering*.

Reason Statement: This code change proposal is intended to add clarity to the code's current requirements regarding roof recovering.
The code currently permits roof recovering in certain specific circumstances described in Section 1512.2.1 and Section 1512.3. This provision adds specific guidance to building officials and users of the code by addressing those situations where the topmost surface of the roof membrane or water shedding layer is deteriorated, irregular or otherwise unsuitable to receive a new roof covering layer as a roof recover. Removal of the roof membrane or water shedding layer removes some of the roof covering's dead load, allows for inspection of the underlying roof covering components and can allow for a smooth surface to apply the new roof re-cover roof covering.

The provision requires compliance with the requirements of other provisions of Section 1512-Reroofing and the roof covering manufacturer's installation instructions and requires approval of the building code official.

Cost Impact: The code change proposal will decrease the cost of construction
While this code change proposal is intended to add clarity to the already existing requirements for roof recovering, for those situations where it is interpreted membrane or water-shedding removal requires complete removal of the roof covering, this proposal would result in a cost savings. The savings would be the cost of roof tear-off and disposal labor, dumpster and disposal costs, and any associated overhead and profit. Roof tear-off labor output and costs vary on a project-to-project basis based on a number of factors, including the complexity of the roof area and building height.

S56-22

S57-22

IBC: 1512.2.2 (New); IEBC: 705.4 (New)

Proponents: Bill McHugh, representing The Chicago Roofing Contractors Association (bill@mc-hugh.us)

2021 International Building Code

Add new text as follows:

1512.2.2 Roof Membrane Peel and Replacement. Roof membrane peel and replacement shall be allowed where only an existing roof membrane is removed, exposing insulation or sheathing, and only a new weather resisting roof membrane is installed. Roof membrane peel and replacement shall be approved by the *building official.*

2021 International Existing Building Code

Add new text as follows:

705.4 Roof Membrane Peel and Replacement. Roof membrane peel and replacement shall be allowed where only an existing roof membrane is removed, exposing insulation or sheathing, and only a new weather resisting roof membrane is installed. Roof membrane peel and replacement shall be approved by the *building official.*

Reason Statement: The purpose of this proposal is to add a section on roof membrane replacement into the International Building Code and International Existing Building Code. This proposal mirrors what has been used in a major jurisdiction for over 6 years - in the Building Codes.
The Chicago Roofing Memorandum to the Chicago Municipal Code has had roof membrane peel and replacement allowed since 2016 as amendment. The I-Code based Chicago Building Rehabilitation Code has allowed roof membrane peel and replacement since 2019's adoption of the code.

In addition, the Illinois Adoption of the International Energy Conservation Code has had roof membrane peel and replacement since the 2018 adoption. At this writing, the Illinois Commercial Energy Conservation Advisory Council has approved using this definition in the 2021 Illinois Adoption.

The reason for the International Building Code is to reflect what a major jurisdiction has declared. In its adoption of the International Family of Codes, the City of Chicago put this requirement into the Chicago Rehabilitation Code, similar to the Existing Building Code and the reroofing section of the IBC's Chapter 15.

In addition, this proposal is more restrictive than the current Chicago Building Rehabilitation Code and 2016 Chicago Roofing Memorandum. The proposal adds that the building code official must approve the activity.

This is even more restrictive than currently exists in the International Building Code for the code defined, *Roof Recover* activity. *Roof recover* does NOT require building code official approval.

This activity, where an existing roof is removed, the substrate prepared, and a new roof membrane installed in accordance with the manufacturers installation instructions and the listing, (if required), is sometimes the preferred choice.

Cost Impact: The code change proposal will decrease the cost of construction
This roof membrane peel and replacement option will provide the building owner and manager another way to keep water out of the building if the rooftop conditions fit the definition. It would be the optimal cost, rather than a decreased cost, if it fits. If it is determined a roof replacement is needed, then the activity moves to that category instead of the roof membrane peel and replacement. Roof replacement is a more expensive option. However, roof recover vs. roof membrane peel and replacement can either be more or less expensive, depending on the configuration.

S57-22

S58-22 Part I

IBC: [A] 110.3.6, 1512.3; IEBC: [A] 109.3.5, [BS] 705.3

Proponents: Tim Earl, representing the Gypsum Association (tearl@gbhint.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 110.3.6 Lath~~, gypsum board~~ and gypsum panel product inspection. Lath~~, *gypsum board*~~ and *gypsum panel product* inspections shall be made after lathing~~, *gypsum board*~~ and *gypsum panel products*, interior and exterior, are in place, but before any plastering is applied or ~~*gypsum board* and~~ *gypsum panel product* joints and fasteners are taped and finished.

Exception: *Gypsum* ~~*board* and *gypsum*~~ *panel products* that are not part of a fire-resistance-rated assembly or a shear assembly.

1512.3 Roof recovering. Where the application of a new *roof covering* over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with *gypsum* *panel products* ~~*board*~~, mineral fiber, glass fiber or other *approved* materials securely fastened in place.

2021 International Existing Building Code

Revise as follows:

[A] 109.3.5 Lath or gypsum ~~board~~ panel product inspection. Lath and gypsum ~~board~~ panel inspections shall be made after lathing and gypsum ~~board~~ panel products, interior and exterior, is in place but before any plastering is applied or before gypsum ~~board~~ panel product joints and fasteners are taped and finished.

Exception: Gypsum ~~board~~ panels that ~~is~~ are not part of a fire-resistance-rated assembly or a shear assembly.

[BS] 705.3 Roof recovering. Where the application of a new roof covering over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum ~~board~~ panel products, mineral fiber, glass fiber or other *approved* materials securely fastened in place.

S58-22 Part I

S58-22 Part II

IRC: R109.1.5.1

Proponents: Tim Earl, representing the Gypsum Association (tearl@gbhint.com)

2021 International Residential Code

Revise as follows:

R109.1.5.1 Fire-resistance-rated construction inspection. Where fire-resistance-rated construction is required between *dwelling units* or due to location on property, the *building official* shall require an inspection of such construction after lathing or ~~gypsum board or~~ gypsum panel products are in place, but before any plaster is applied, or before ~~board or~~ panel joints and fasteners are taped and finished.

Reason Statement: Gypsum board is a type of gypsum panel product. These two sections erroneously use the term board instead of panel. Exterior products are often glass mat, which are panels but not boards, so panel is the appropriate term here.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple editorial cleanup with no impact on cost.

S58-22 Part II

S59-22 Part I

IBC: 1512.4; IEBC: [BS] 705.4

Proponents: Richard Justin Koscher, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org); Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1512.4 Reinstallation of materials. Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counterflashings shall not be reinstalled where rusted, damaged or deteriorated. Existing *ballast* that is damaged, cracked or broken shall not be reinstalled. Existing aggregate surfacing materials from built-up roofs shall not be reinstalled. <u>Existing roof insulation boards that are damaged, deteriorated or water soaked shall not be reused or reinstalled.</u>

2021 International Existing Building Code

Revise as follows:

[BS] 705.4 Reinstallation of materials. Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counterflashings shall not be reinstalled where rusted, damaged or deteriorated. Existing ballast that is damaged, cracked or broken shall not be reinstalled. Existing aggregate surfacing materials from built-up roofs shall not be reinstalled. <u>Existing roof insulation boards that are damaged, deteriorated or water soaked shall not be reused or reinstalled.</u>

S59-22 Part I

S59-22 Part II

IRC: R908.5

Proponents: Richard Justin Koscher, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org); Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org)

2021 International Residential Code

Revise as follows:

R908.5 Reinstallation of materials. Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Any existing flashings, edgings, outlets, vents or similar devices that are a part of the assembly shall be replaced where rusted, damaged or deteriorated. Aggregate surfacing materials shall not be reinstalled. Existing roof insulation boards that are damaged, deteriorated or water soaked shall not be reused or reinstalled.

Reason Statement: This code change proposal recognizes that roof insulation boards that are in good repair may be appropriately reused as part of a reroofing project. The new language is written in the negative (i.e., when reuse is not permissible) to match the existing provisions for the reinstallation of roofing materials. This code change proposal will reduce the amount of construction materials that are landfilled during a reroofing project by clarifying the appropriate circumstances under which roof insulation boards may be reused.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal does not impose any new requirements for reroofing projects. Therefore, the proposal will not increase or decrease the cost of construction. Where roof insulation is reused as part of a reroofing project, the provision may reduce the cost of construction by reducing the quantity of new roofing materials purchased to complete the project.

S59-22 Part II

S60-22

IBC: 1512.4, 1512.5 (New), 1512.5.1 (New), 1512.5; IEBC: [BS] 705.4, 705.5 (New), 705.5.1 (New), [BS] 705.5

Proponents: Joseph Cain, representing Solar Energy Industries Association (SEIA) (JoeCainPE@gmail.com)

2021 International Building Code

1512.4 Reinstallation of materials. Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counterflashings shall not be reinstalled where rusted, damaged or deteriorated. Existing *ballast* that is damaged, cracked or broken shall not be reinstalled. Existing aggregate surfacing materials from built-up roofs shall not be reinstalled.

Add new text as follows:

1512.5 Reinstallation of equipment. Existing installations of rooftop-mounted photovoltaic (PV) panel systems approved under previous code requirements are permitted to remain in use, in accordance with NFPA 70 and this code.

1512.5.1 Permit for reinstalled equipment. Existing rooftop-mounted photovoltaic (PV) panel systems shall be permitted for reinstallation after roof repair or replacement, provided all of the following are provided:

1. The installation of the original equipment was permitted and approved.
2. The permit is obtained by a qualified person for the removal and reinstallation of the equipment.
3. At the time of application for permit, the applicant shall provide at least one of the following:
   3.1 A copy of the original approved plans that includes the equipment.
   3.2 Where plans are unavailable, photographs of the existing rooftop-mounted PV panel system prior to removal.

Revise as follows:

~~1512.5~~ 1512.6 Flashings. Flashings shall be reconstructed in accordance with *approved* manufacturer's installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation.

2021 International Existing Building Code

[BS] 705.4 Reinstallation of materials. Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counterflashings shall not be reinstalled where rusted, damaged or deteriorated. Existing ballast that is damaged, cracked or broken shall not be reinstalled. Existing aggregate surfacing materials from built-up roofs shall not be reinstalled.

Add new text as follows:

705.5 Reinstallation of equipment. Existing installations of rooftop-mounted *photovoltaic (PV) panel systems* approved under previous code requirements are permitted to remain in use, in accordance with *NFPA 70* and the *International Building Code*.

705.5.1 Permit for reinstalled equipment. Existing rooftop-mounted *photovoltaic (PV) panel systems* shall be permitted for reinstallation after roof repair or replacement, provided all of the following are provided:

1. The installation of the original equipment was permitted and approved.
2. The permit is obtained by a qualified person for the removal and reinstallation of the equipment.
3. At the time of application for permit, the applicant shall provide at least one of the following:
   3.1. A copy of the original approved plans that includes the equipment.
   3.2 Where plans are unavailable, photographs of the existing rooftop-mounted *PV panel system* prior to removal.

Revise as follows:

[BS] ~~705.5~~ 705.6 Flashings. Flashings shall be reconstructed in accordance with *approved* manufacturer's installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation.

Reason Statement: The Sustainable Energy Action Committee (SEAC) has recognized that PV systems often continue to have useful life after the time that a roof covering or roof assembly is in need of repair or replacement. A guidance document has been prepared by SEAC to address this concern. Following is a link to the document, and an excerpt that is include on the SEAC web site.
https://sustainableenergyaction.org/resources/reinstallation-of-pv-system/

The growing number of re-roofing projects on buildings that have photovoltaic panel systems installed is prompting AHJs to search for sensible guidelines to ensure safety codes are followed. SEAC has developed the following permitting and inspection guidelines in an effort to support the inspection community and the growing number of re-roofing projects that involve an existing photovoltaic panel system.These guidelines pertain to the following activities:

1. Removing a previously installed, inspected, and approved photovoltaic panel system. Followed by…
2. Repairing or replacing the roof surface below the photovoltaic panel system. Followed by…
3. Reinstallation of the previously installed, inspected, and approved photovoltaic panel system.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal simply clarifies the ongoing use of approved equipment after roof repair or replacement, so does not impact the cost of construction.

S60-22

S62-22

IBC: CHAPTER 2, SECTION 202, SECTION 202 (New), CHAPTER 15, SECTION 1504, TABLE 1504.2, 1504.6, CHAPTER 16, SECTION 1602, 1602.1, SECTION 1609, 1609.1.1, 1609.3, FIGURE 1609.3(1), FIGURE 1609.3(2), FIGURE 1609.3(3), FIGURE 1609.3(4), FIGURE 1609.3(5), FIGURE 1609.3(6), FIGURE 1609.3(7), FIGURE 1609.3(8), FIGURE 1609.3(9), FIGURE 1609.3(10), FIGURE 1609.3(11), FIGURE 1609.3(12), 1609.3.1, TABLE 1609.3.1

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

CHAPTER 2
DEFINITIONS

SECTION 202
DEFINITIONS

Revise as follows:

[BS] WINDBORNE DEBRIS REGION. Areas within *hurricane-prone regions* located:

1. Within 1 mile (1.61 km) of the mean high-water line where an Exposure D condition exists upwind at the waterline and the basic ~~design~~ wind speed, *V*, is 130 mph (58 m/s) or greater; or
2. In areas where the basic ~~design~~ wind speed, *V*, is 140 mph (63 m/s) or greater.

For *Risk Category* II buildings and structures and Risk Category III buildings and structures, except health care facilities, the windborne debris region shall be based on Figure ~~1609.3.(1)~~ 1609.3.(2). For *Risk Category* III health care facilities, and *Risk Category* IV buildings and structures ~~and *Risk Category* III health care facilities~~, the windborne debris region shall be based on Figure ~~1609.3(2)~~ 1609.3(3) and Figure 1609.3 (4), respectively .

Add new definition as follows:

[BS] WIND DESIGN GEODATABASE. The ASCE database (version 2022-1.0) of geocoded wind speed design data. The ASCE Wind Design Geodatabase of geocoded wind speed design data is available at https://asce7hazardtool.online/.

CHAPTER 15
ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

SECTION 1504
PERFORMANCE REQUIREMENTS

Revise as follows:

TABLE 1504.2 CLASSIFICATION OF STEEP SLOPE ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161OR D7158

MAXIMUM BASIC WIND SPEED, *V*, FROM FIGURES 1609.3(1) ~~(8)~~ (4) OR ASCE 7(mph)	MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd}, FROM Table 1609.3.1 (mph)	ASTM D7158 [a] CLASSIFICATION	ASTM D3161 or UL 7103 CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

For SI: 1 foot = 304.8 mm; 1 mph = 0.447 m/s.

a. The standard calculations contained in ASTM D7158 assume Exposure Category B or C and building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

1504.6 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roofsystems having a slope less than 2 units vertical in 12 units horizontal (2:12) shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic ~~design~~ *wind speed*, V, shall be determined from Figures 1609.3(1) through ~~1609.3(12)~~ 1609.3(4) as applicable.

CHAPTER 16
STRUCTURAL DESIGN

SECTION 1602
NOTATIONS

Revise as follows:

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
R	=	Rain load.
S	=	Snow load.
T	=	Cumulative effects of self-straining load forces and effects.
V_{asd}	=	Allowable stress design wind speed, miles per hour (mph) (~~km/hr~~ m/s) where applicable.
V	=	Basic ~~design~~ wind speeds, miles per hour (mph) (~~km/hr~~ m/s) determined from Figures 1609.3(1) through 1609.3~~(12)~~ (4) or ASCE 7.
W	=	Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.

SECTION 1609
WIND LOADS

Revise as follows:

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic ~~design~~ *wind speed*, *V*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

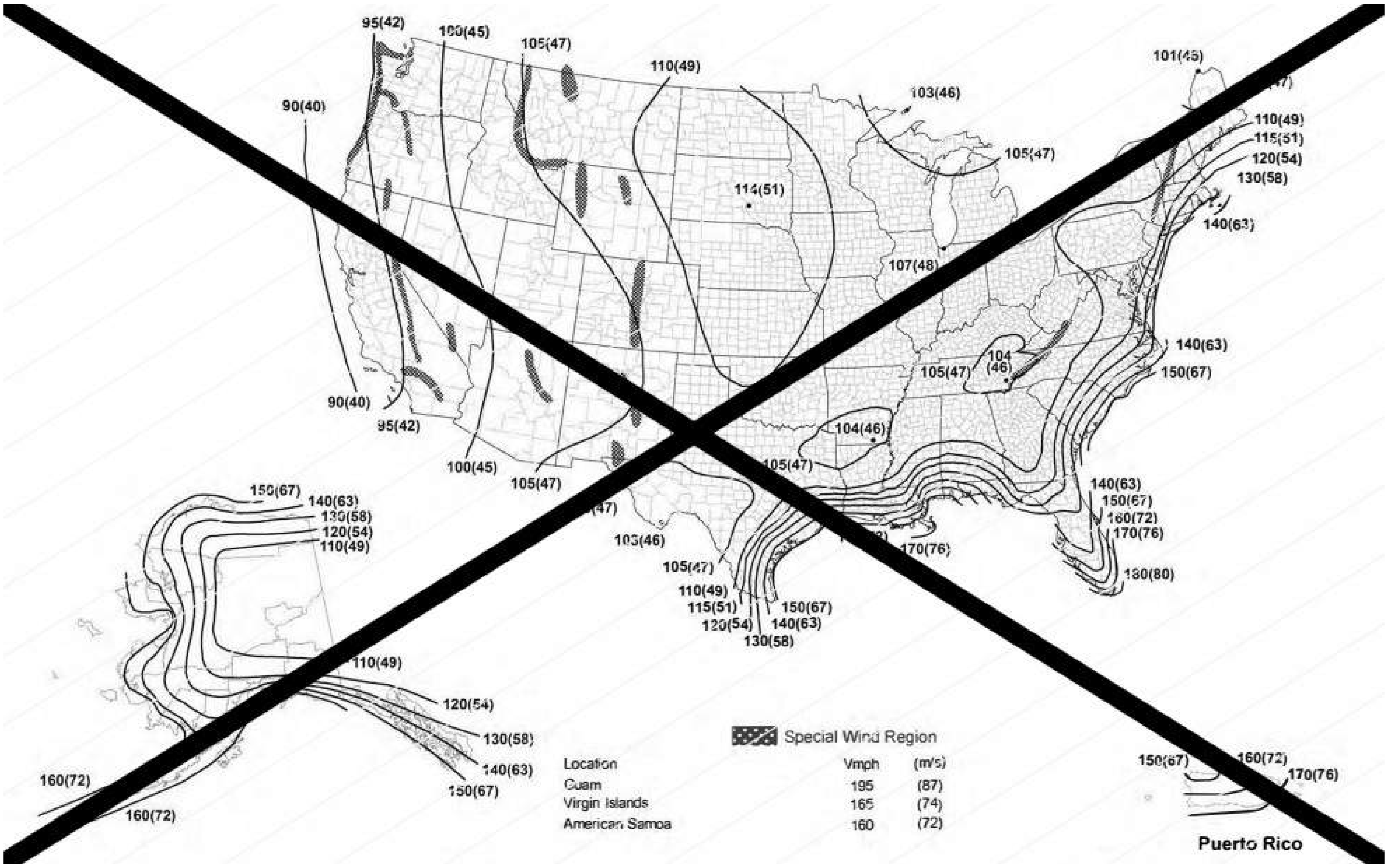
Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.

The wind speeds in Figures 1609.3(1) through ~~1609.3(12)~~ 1609.3(4) are basic ~~design~~ wind speeds, *V*, and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 4 and 5 are used.

1609.3 Basic design wind speed. The basic ~~design~~ *wind speed*, *V*, in mph, for the determination of the wind *loads* shall be determined by Figures 1609.3(1) through ~~1609.3(12)~~ 1609.3(4). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* I ~~II~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(1)~~, 1609.3(5) and 1609.3(6)~~. The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* II ~~III~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(2)~~, 1609.3(7) and 1609.3(8)~~. The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* III ~~IV~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(3)~~, 1609.3(9) and 1609.3(10)~~. The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* IV ~~I~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(4)~~, 1609.3(11) and 1609.3(12)~~. Basic *wind speeds* for Hawaii, US Virgin Islands, and Puerto Rico shall be determined by using the ASCE *Wind Design Geodatabase*. The ASCE *Wind Design Geodatabase* is available at https://asce7hazardtool.online, or an approved equivalent.

The basic ~~design~~ *wind speed*, *V*, for the special wind regions indicated near mountainous terrain and near gorges shall be in accordance with local jurisdiction requirements. The basic ~~design~~ wind speeds, *V*, determined by the local jurisdiction shall be in accordance with Chapter 26 of ASCE 7.In nonhurricane-prone regions, when the basic ~~design~~ *wind speed*, *V*, is estimated from regional climatic data, the basic design *wind speed*, *V*, shall be determined in accordance with Chapter 26 of ASCE 7.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100(45)
105(47)
110(49)
90(40)
103(46)
105(47)
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110(49)
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120(54)
130(58)
140(63)
114(51)
107(48)
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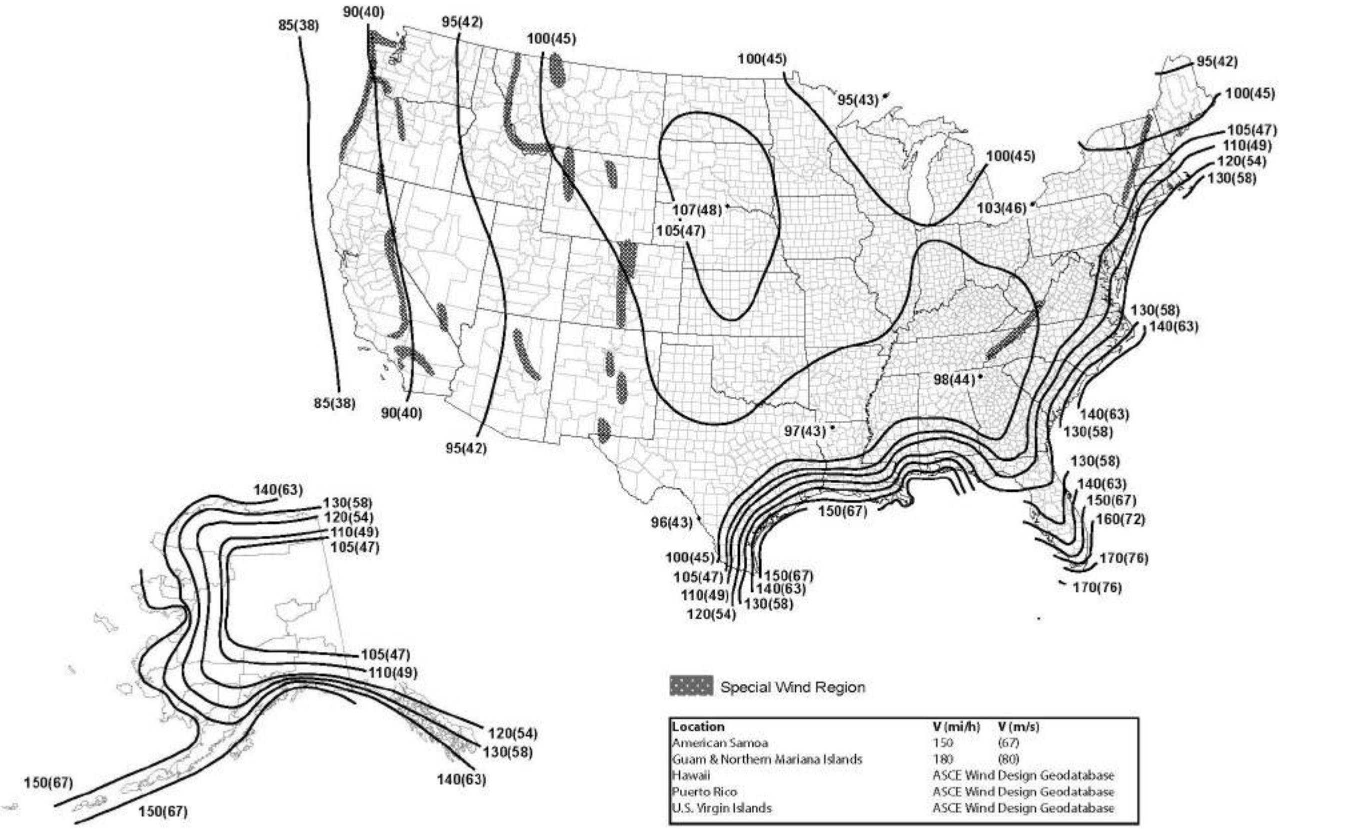
160(72)
170(76)
180(80)
110(49)
120(54)
130(58)
140(63)
150(67)
160(72)
160(72)
Special Wind Region
Location
Vmph
(m/s)
Guam
195
(87)
Virgin Islands
165
(74)
American Samoa
160
(72)
150(67)
160(72)
170(76)
Puerto Rico



~~**Notes:**~~

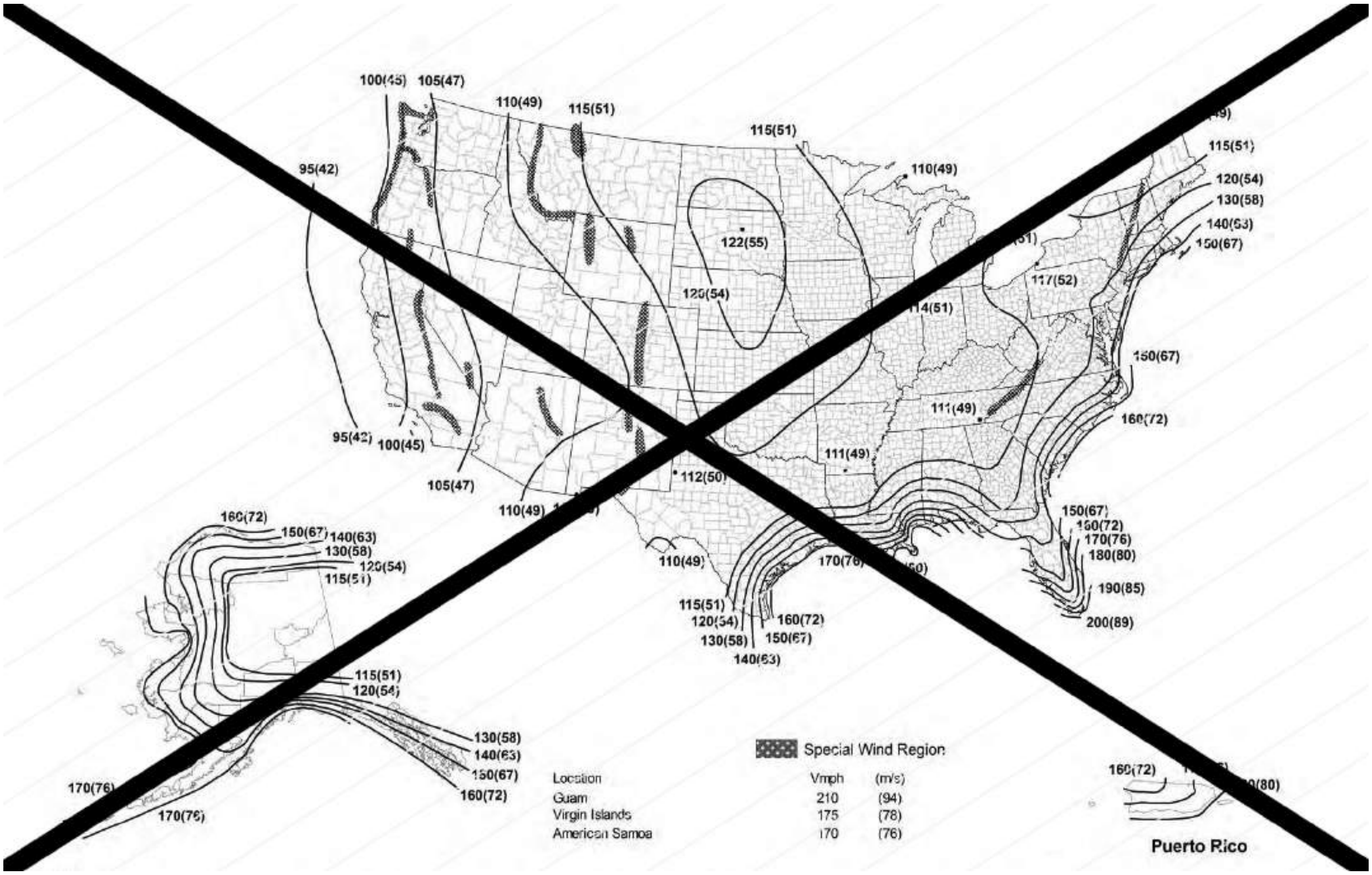
1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation.~~
3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.~~
4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.~~
5. ~~Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~
6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed~~

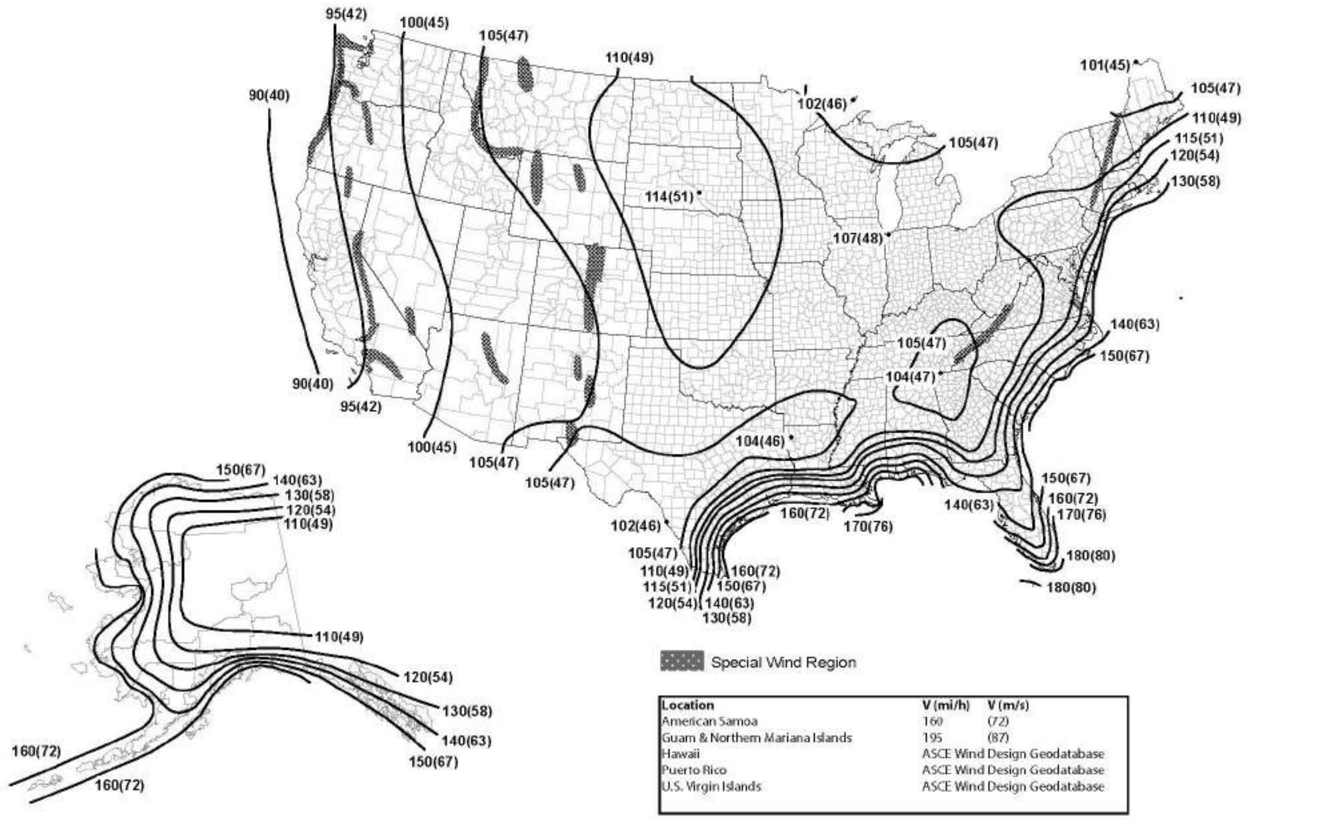
Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.
5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.
7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 300 years).

8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(1) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY I ~~II~~ BUILDINGS AND OTHER STRUCTURES


Special Wind Region
Location Vmph (m/s)
Guam 210 (94)
Virgin Islands 175 (78)
American Samoa 170 (76)
Puerto Rico



Notes:

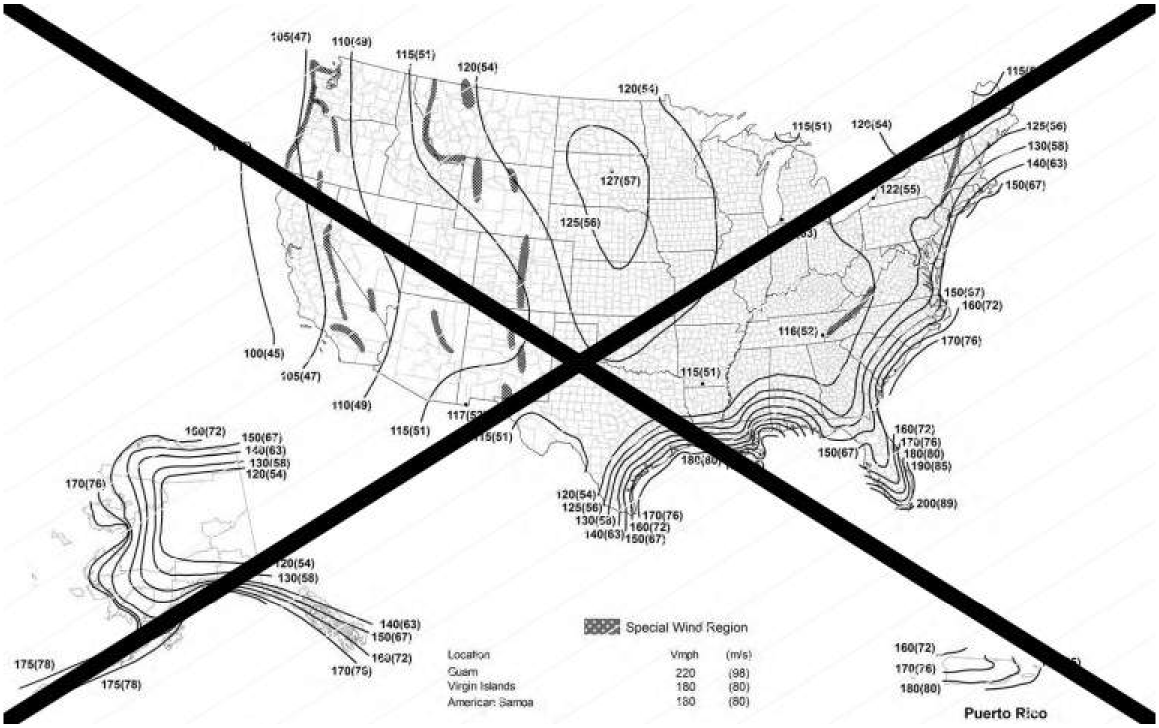
1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation.~~
3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.~~
4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.~~
5. ~~Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~
6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed~~

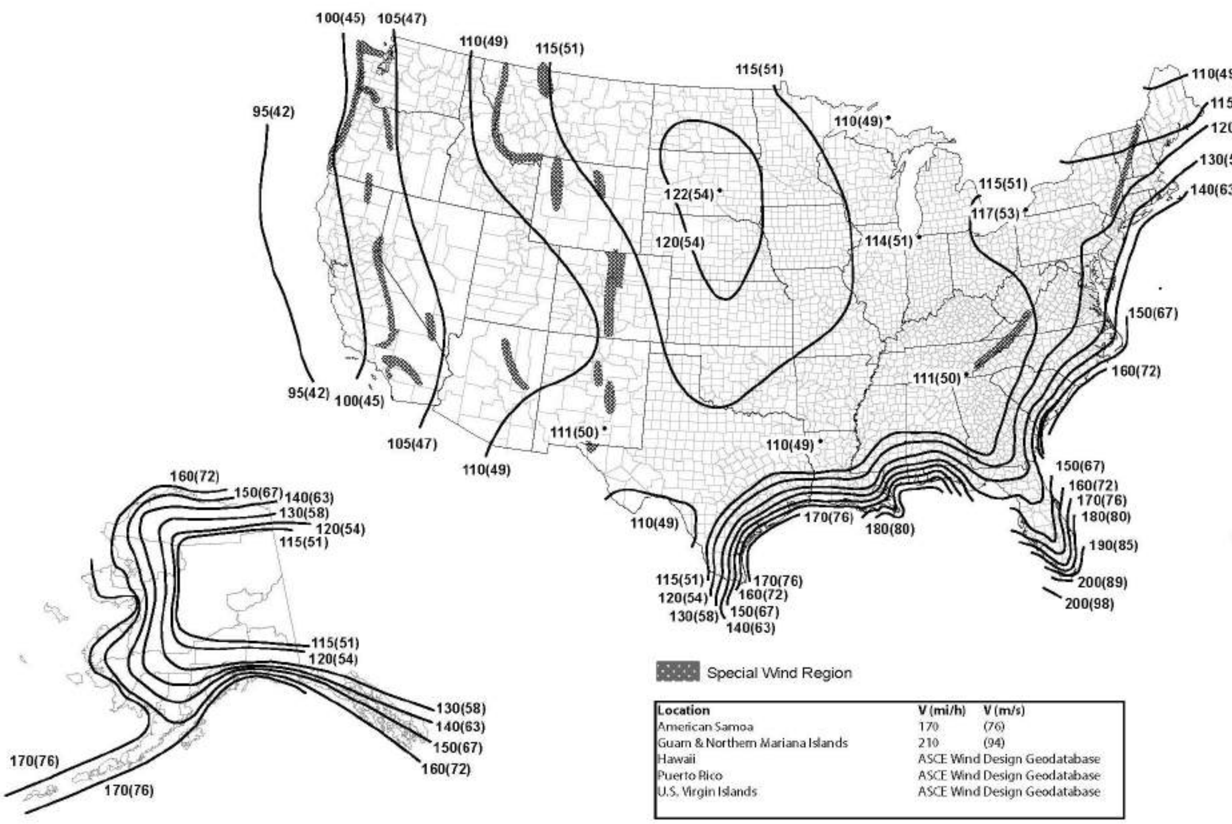
Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.
5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.
7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 700 years).

8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(2) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY II ~~III~~ BUILDINGS AND OTHER STRUCTURES


105(47)
110(49)
115(51)
120(54)
127(57)
125(56)
122(55)
116(52)
115(51)
100(45)
105(47)
110(49)
115(51)
150(67)
160(72)
170(76)
180(80)
190(85)
200(89)
130(58)
140(63)
175(78)
Special Wind Region
Location Vmph (m/s)
Guam 220 (98)
Virgin Islands 180 (80)
American Samoa 180 (80)
Puerto Rico


100(45)
105(47)
110(49)
115(51)
95(42)
122(54)
120(54)
110(49)
115(51)
117(53)
114(51)
111(50)
130(58)
140(63)
150(67)
160(72)
170(76)
180(80)
190(85)
200(89)
200(98)
Special Wind Region
Location V (mi/h) V (m/s)
American Samoa 170 (76)
Guam & Northern Mariana Islands 210 (94)
Hawaii ASCE Wind Design Geodatabase
Puerto Rico ASCE Wind Design Geodatabase
U.S. Virgin Islands ASCE Wind Design Geodatabase

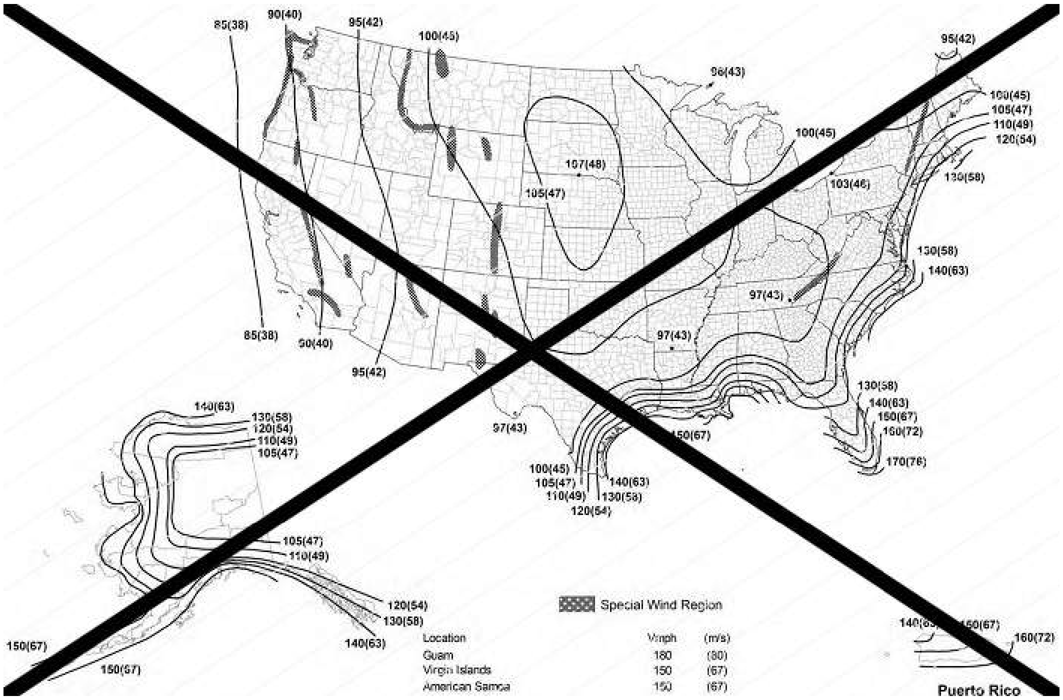
Notes:

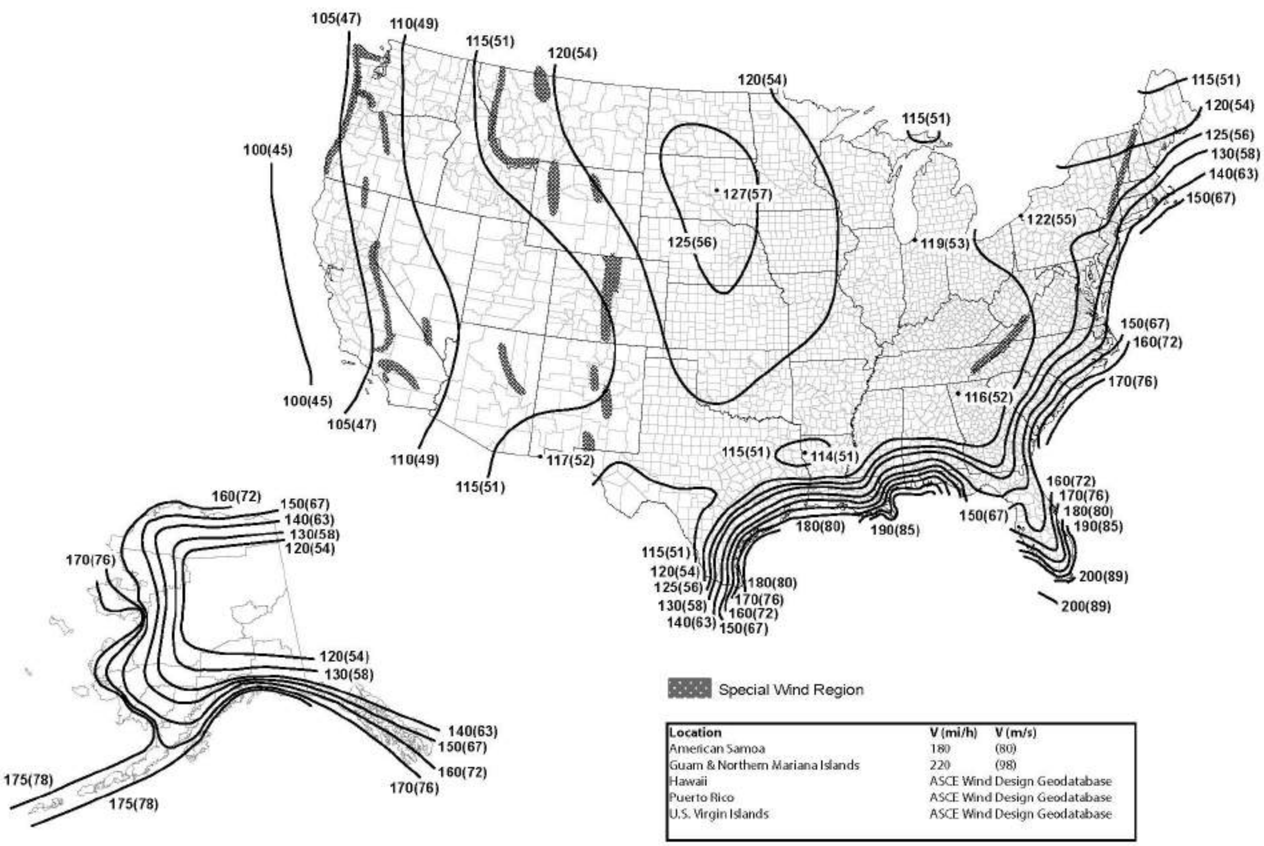
1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation.~~
3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.~~
4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.~~
5. ~~Wind speeds correspond to approximately a 1.6% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 3000 Years).~~
6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed~~

Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic windspeeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.
5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.
7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 1,700 years).
8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(3) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY III ~~IV~~ BUILDINGS AND OTHER STRUCTURES





Location	V (mi/h)	V (m/s)
American Samoa	180	(80)
Guam & Northern Mariana Islands	220	(98)
Hawaii	ASCE Wind Design Geodatabase	
Puerto Rico	ASCE Wind Design Geodatabase	
U.S. Virgin Islands	ASCE Wind Design Geodatabase	

~~**Notes:**~~

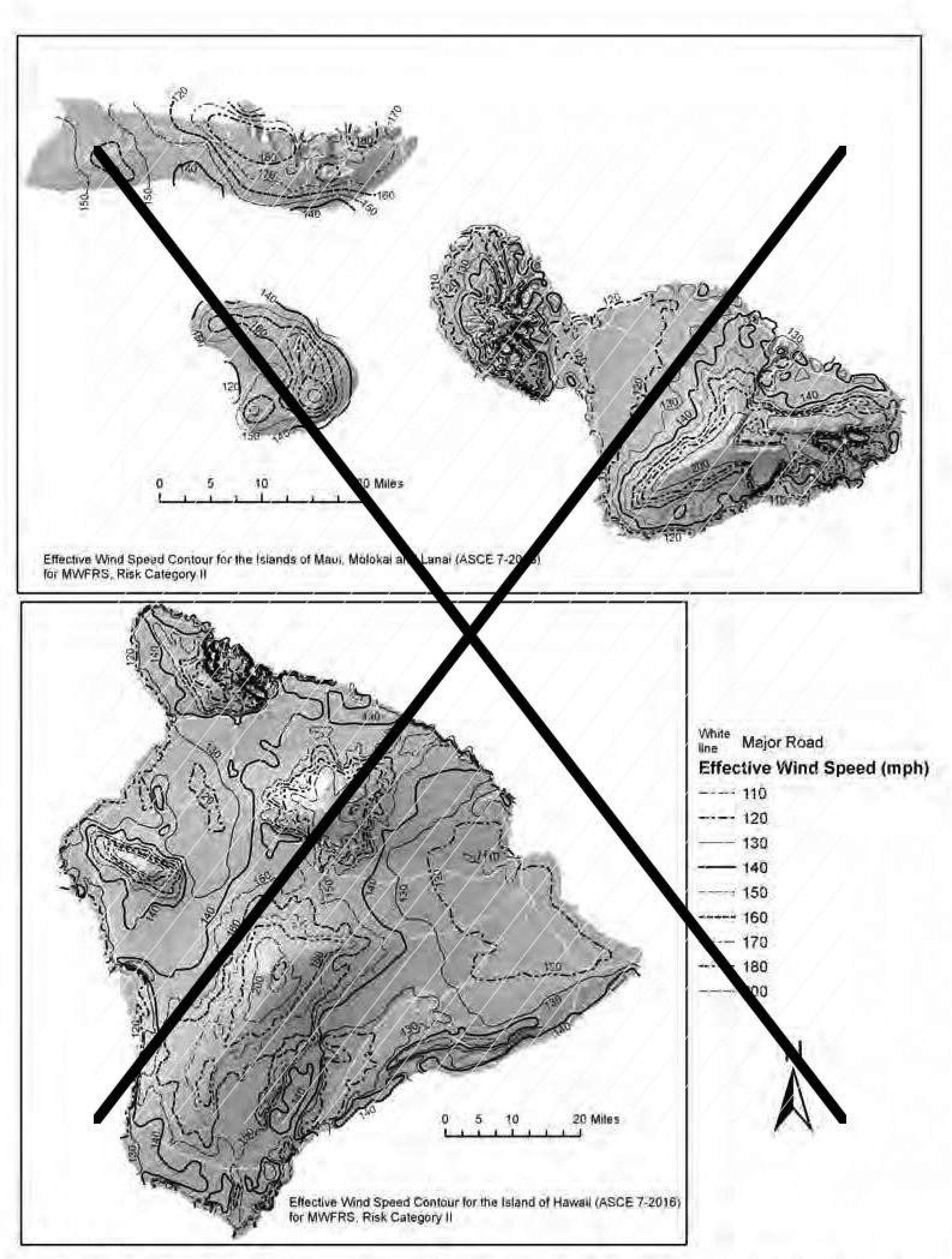
1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation.~~
3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.~~
4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.~~
5. ~~Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00333, MRI = 300 Years).~~
6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed.~~

Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.
5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.
7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 3,000 years).
8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(4) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY IV ~~I~~ BUILDINGS AND OTHER STRUCTURES

Delete without substitution:

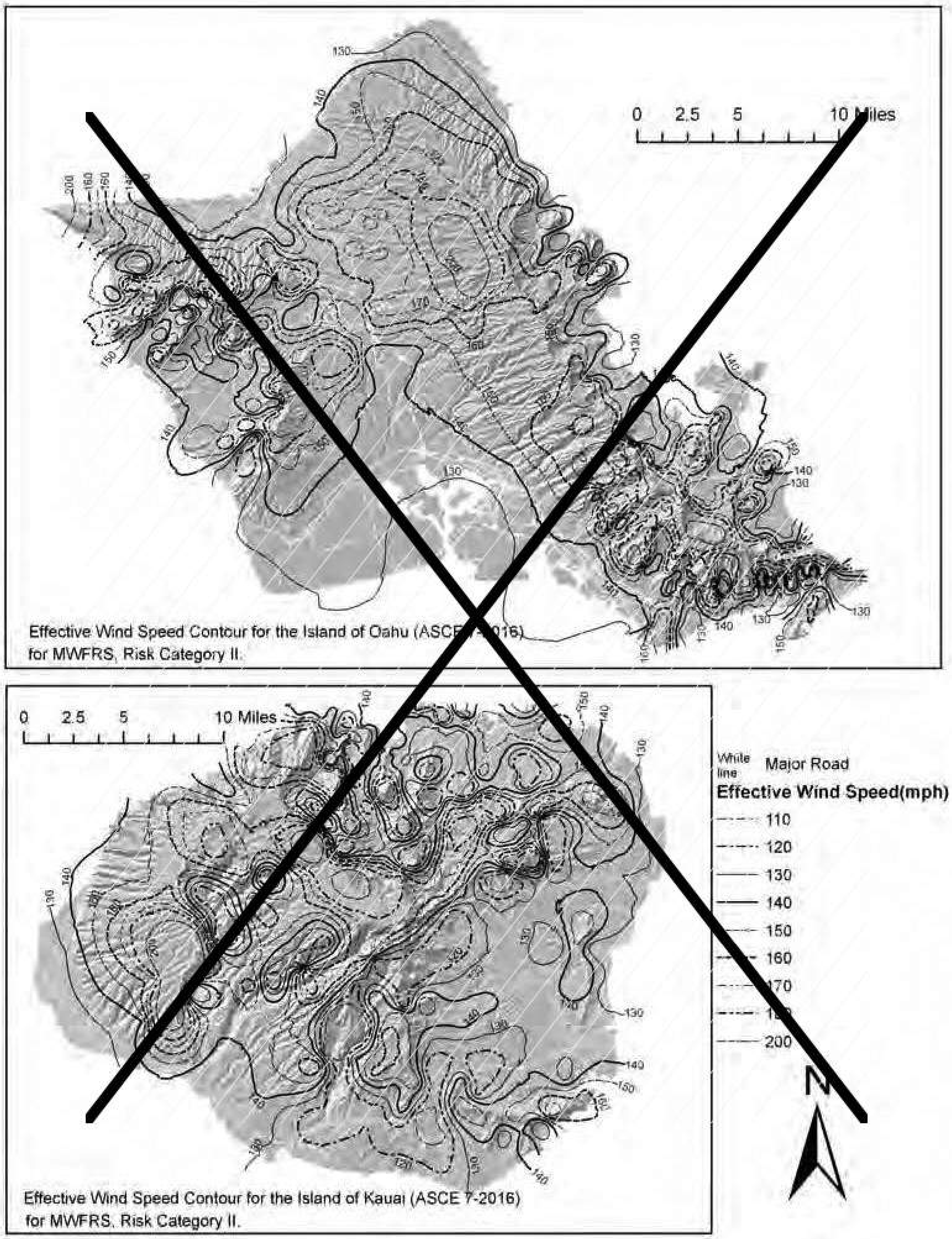


~~Notes:~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~

6. ~~Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(5) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES IN HAWAI~~



Effective Wind Speed Contour for the Island of Oahu (ASCE 7-2016) for MWFRS, Risk Category II.

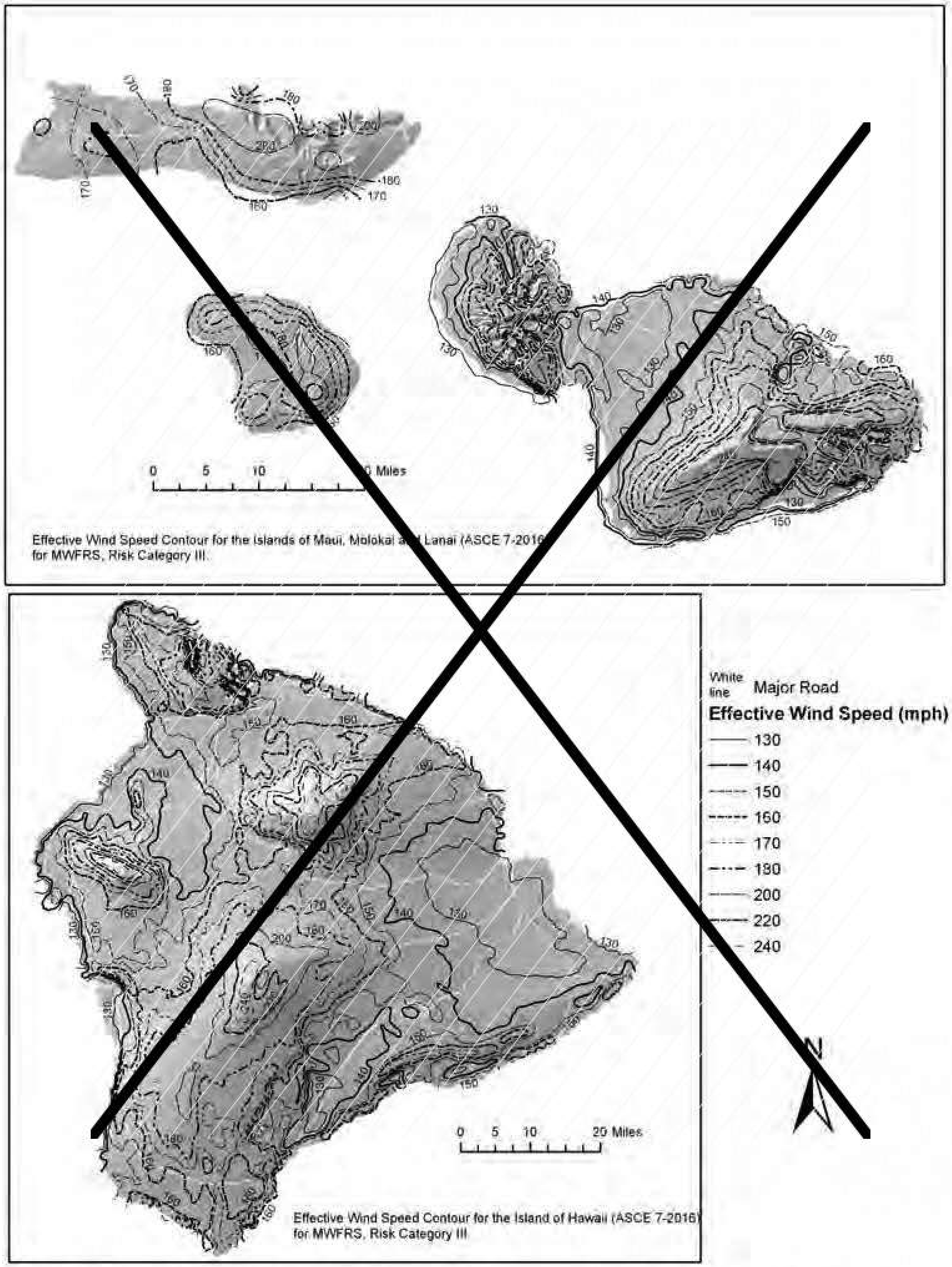
Effective Wind Speed Contour for the Island of Kauai (ASCE 7-2016) for MWFRS, Risk Category II.

~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~

6. ~~Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(6) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)~~



Effective Wind Speed Contour for the Islands of Maui, Molokai and Lanai (ASCE 7-2016) for MWFRS, Risk Category III.

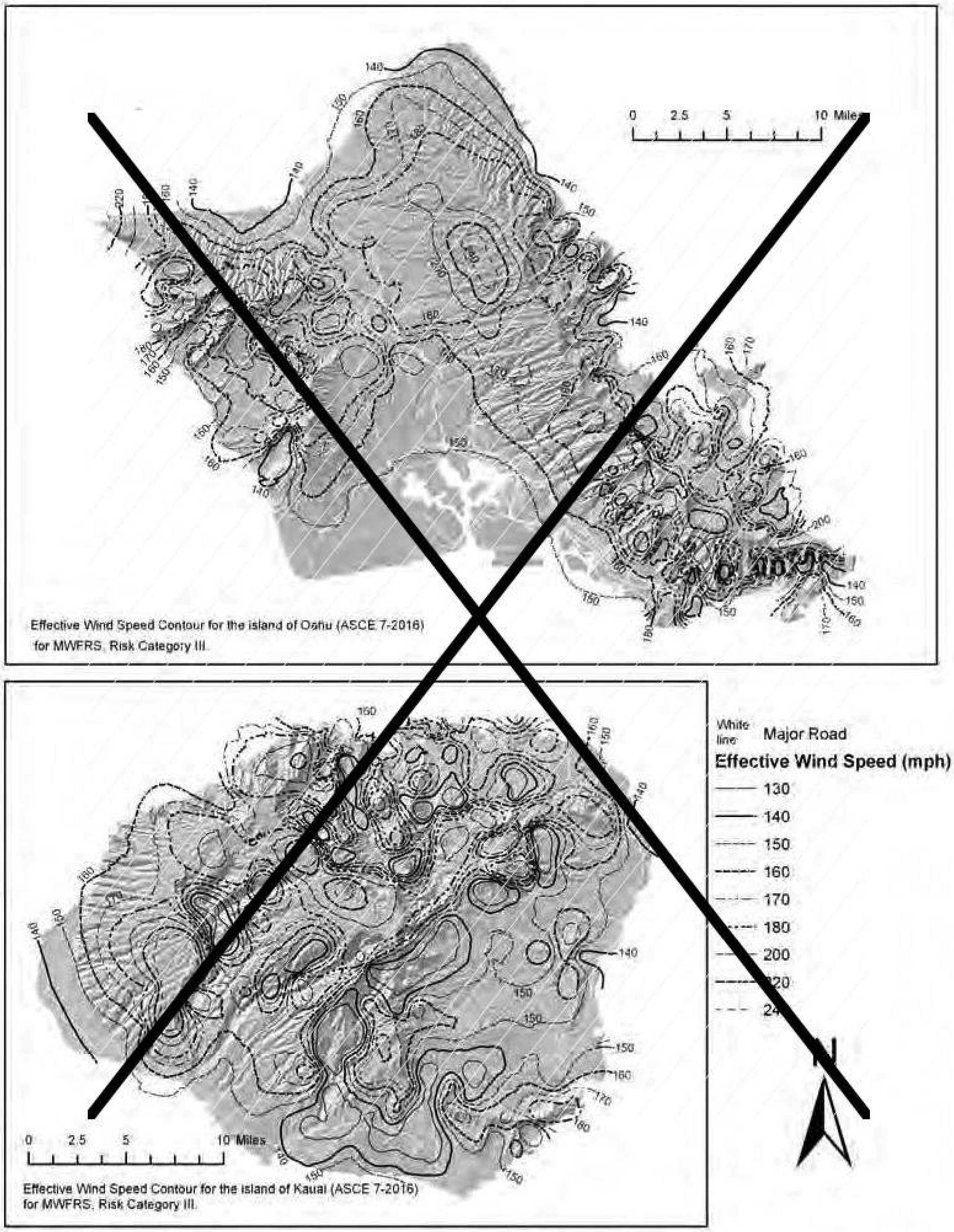
Effective Wind Speed Contour for the Island of Hawaii (ASCE 7-2016) for MWFRS, Risk Category III.

~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~

~~6. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(7) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY III BUILDINGS AND OTHER STRUCTURES IN HAWAII~~



Effective Wind Speed Contour for the island of Oahu (ASCE 7-2016) for MWFRS, Risk Category III.

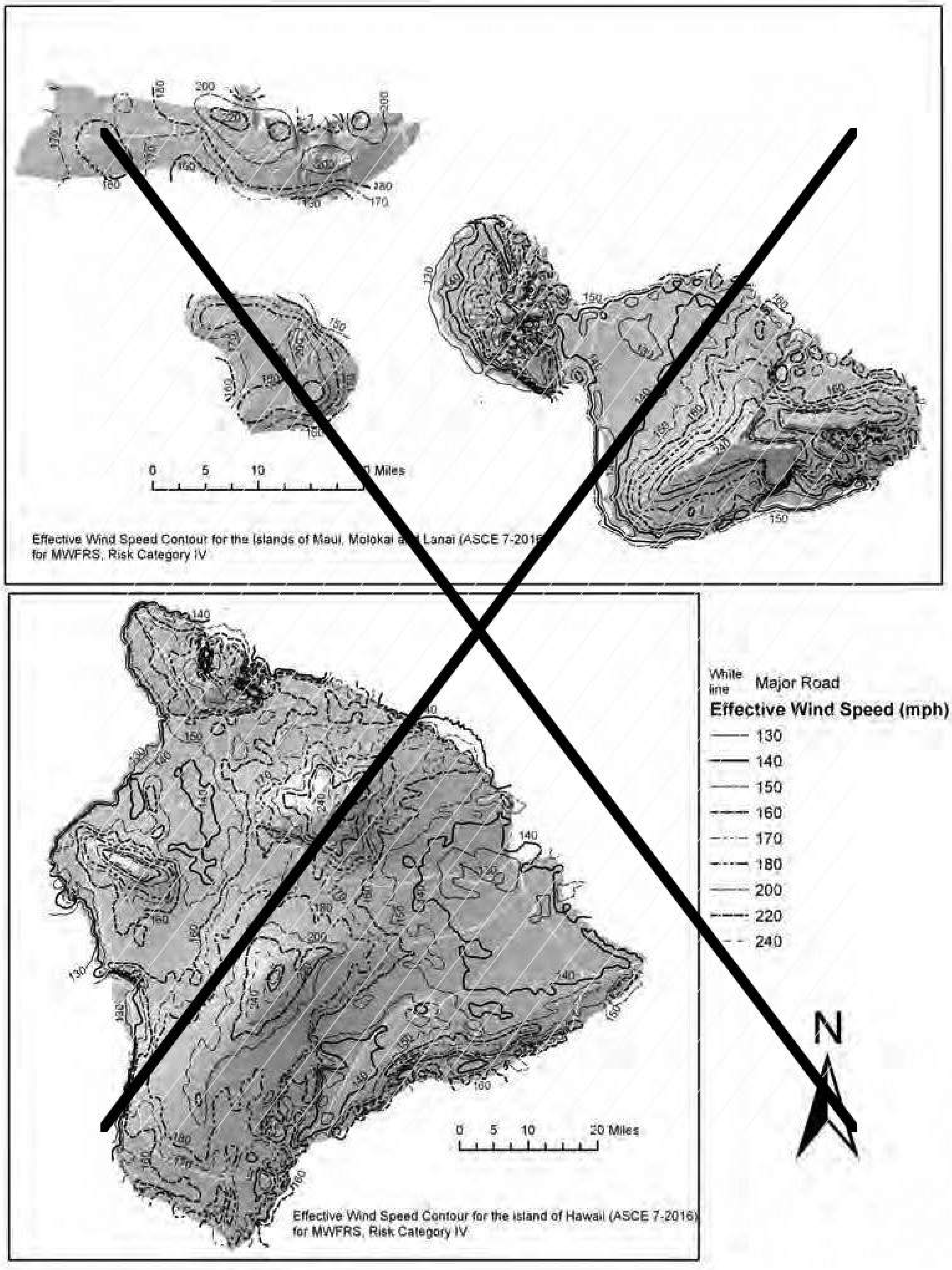
Effective Wind Speed Contour for the island of Kauai (ASCE 7-2016) for MWFRS, Risk Category III.

~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~

6. ~~Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(8) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY III BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)~~



Effective Wind Speed Contour for the Islands of Maui, Molokai and Lanai (ASCE 7-2016) for MWFRS, Risk Category IV

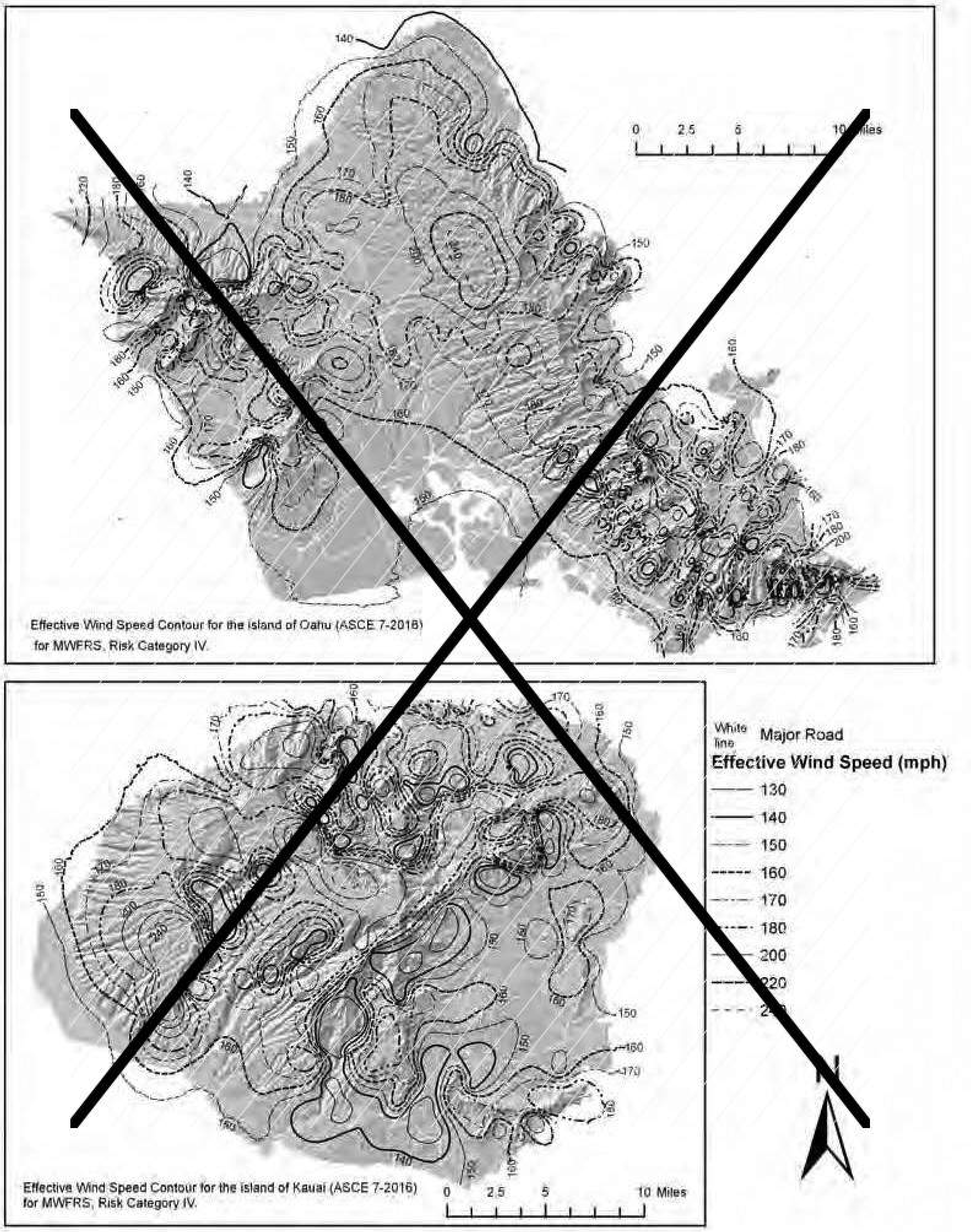
Effective Wind Speed Contour for the island of Hawaii (ASCE 7-2016) for MWFRS, Risk Category IV

~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~

6. ~~Wind speeds correspond to approximately a 1.7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(9) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY IV BUILDINGS AND OTHER STRUCTURES IN HAWAII~~

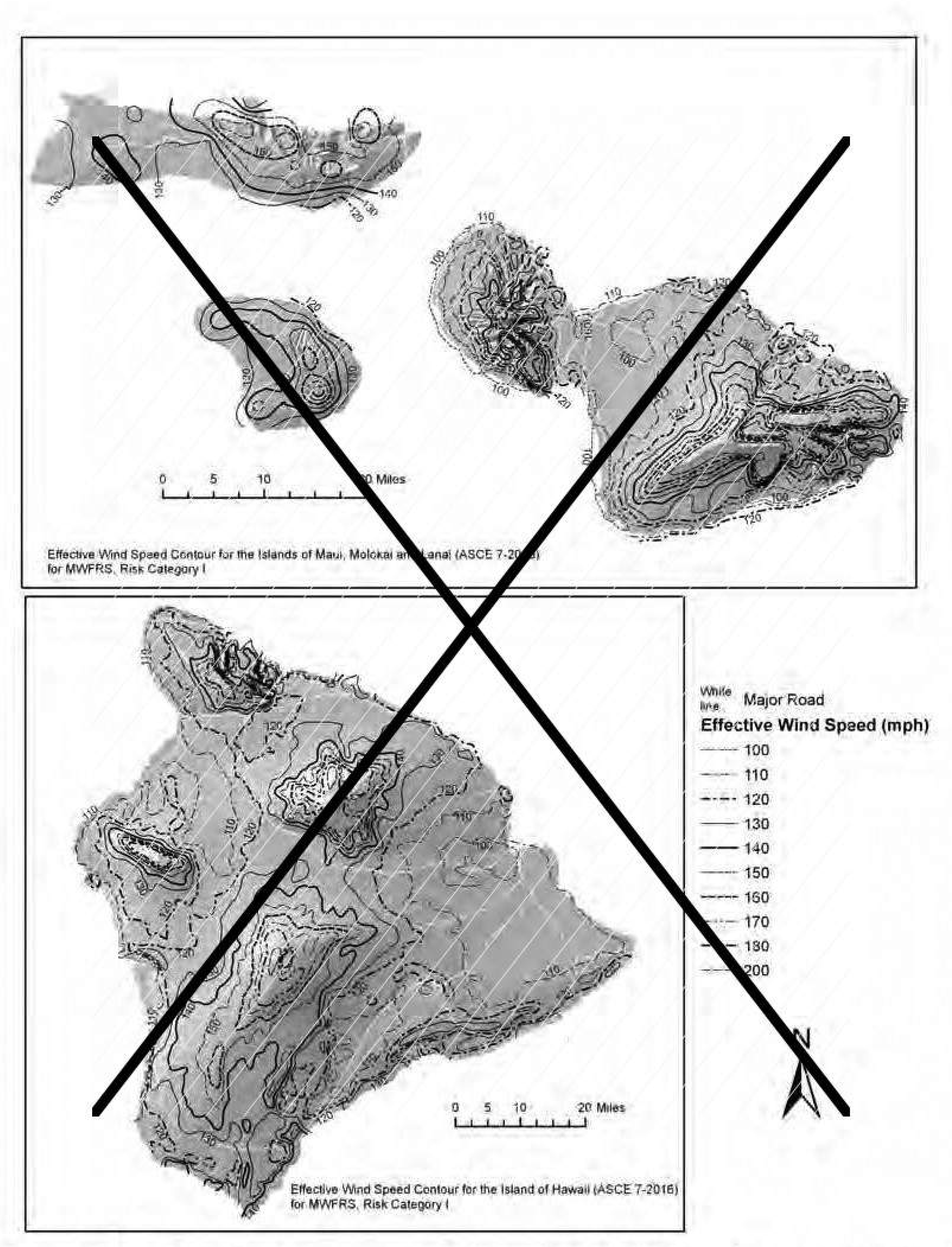


~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~

~~6. Wind speeds correspond to approximately a 1.7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(10) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY IV BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)~~

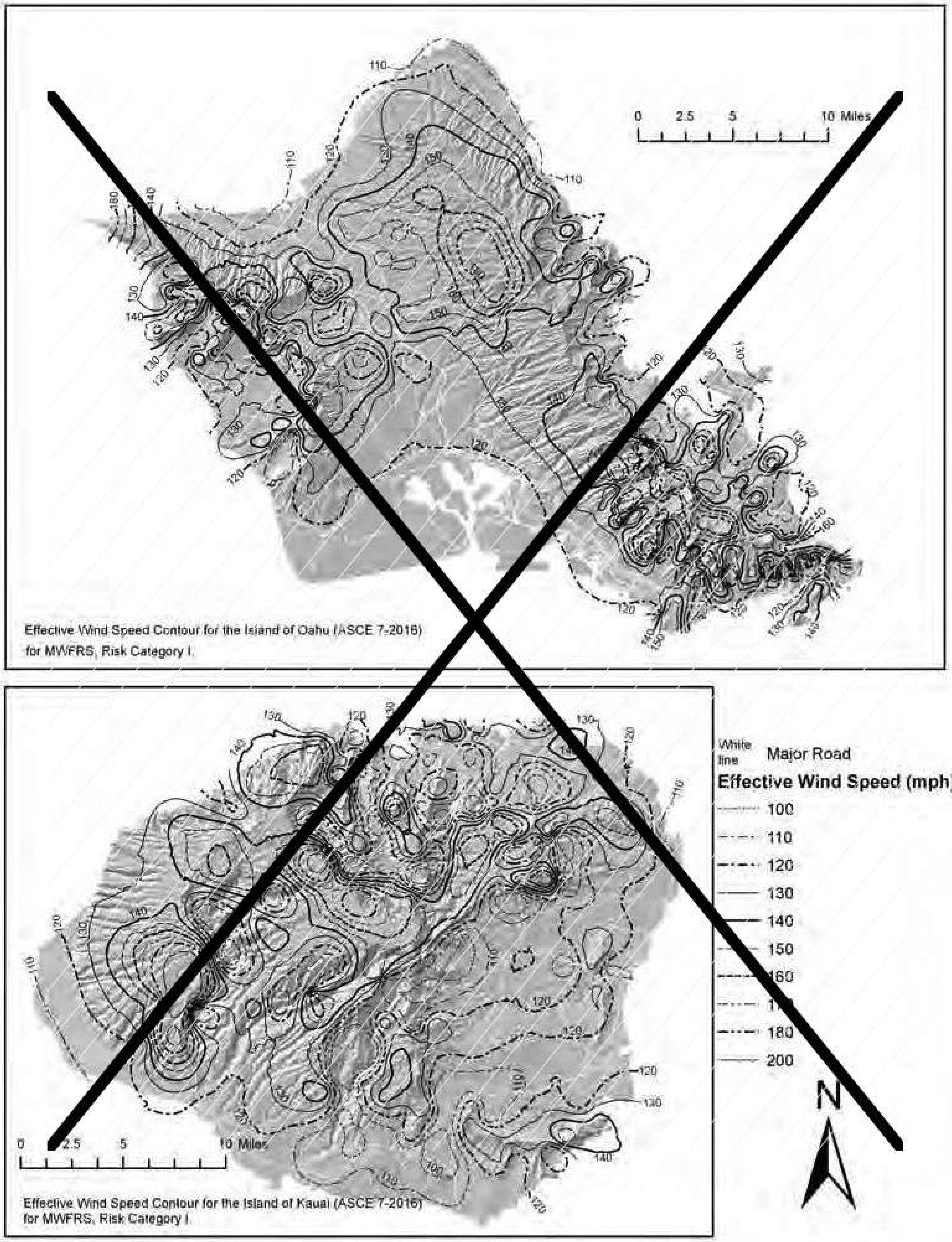


~~Notes:~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~

6. ~~Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(11) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY I BUILDINGS AND OTHER STRUCTURES IN HAWAII~~



Effective Wind Speed Contour for the Island of Oahu (ASCE 7-2016) for MWFRS, Risk Category I

Effective Wind Speed Contour for the Island of Kauai (ASCE 7-2016) for MWFRS, Risk Category I

~~Notes:~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~

~~6. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(12) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY I BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)~~

Revise as follows:

1609.3.1 Wind speed conversion. Where required, the basic ~~design~~ wind speeds of Figures 1609.3(1) through 1609.3~~(12)~~ (4) shall be converted to *allowable stress design* wind speeds, V_{asd}, using Table 1609.3.1 or Equation 16-17.

$$V_{asd} = V\sqrt{0.6} \quad \textbf{(Equation 16-17)}$$

where:

V_{asd} = *Allowable stress design* wind speed applicable to methods specified in Exceptions 4 and 5 of Section 1609.1.1.

V = Basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3~~(12)~~ (4).

TABLE 1609.3.1 WIND SPEED CONVERSIONS[a, b, c]

V	100	110	120	130	140	150	160	170	180	190	200
V_{asd}	78	85	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.44 m/s.

a. Linear interpolation is permitted.

b. V_{asd} = allowable stress design wind speed applicable to methods specified in Exceptions 1 through 5 of Section 1609.1.1.

c. V = basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3~~(12)~~ (4).

Staff Analysis: CC# S9-22 and CC# S62-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of *ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures* (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal includes technical updates as well as editorial corrections or re-organizations. Technical updates to the wind speed maps within ASCE/SEI 7-22 include new hurricane coastline wind speed contours from the Carolina's through Texas, as well as, new Special Wind Region definitions in Southern California and Northern Colorado. All of these updates are based upon recent wind studies conducted in these areas. These wind speeds for the contiguous United States and Alaska are available from the maps in ASCE 7-22, which are updated in Section 1609 of this proposal.

Along with the continental United States, the wind speeds for US Virgin Island and Puerto Rico were also updated based upon recent wind studies of these islands. The resulting wind speeds accounting for the steep terrain of these island created a very dense contour map that is not easily read by a map that is sized practically for inclusion into a printed standard. Therefore the the wind speeds for US Virgin Islands and Puerto Rico - along with wind speeds for Hawaii - are only included in the ASCE Wind Design Geodatabase and therefore are no longer represented with maps in ASCE/SEI 7-22. Consequently, Hawaii and Puerto Rico maps - as well as values for US Virgin Islands - are being removed from the IBC and replaced with a pointer to the ASCE Wind Design Geodatabase. The wind speeds within the updated Special Wind Regions also are available for the designer ASCE Wind Design Geodatabase. This database of geocoded wind speed design data is freely available and accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/, or from an approved equivalent.

A summary of the coordination changes is provided below.

Section 202 DEFINITIONS:

Windborne Debris Region: Corrections to this definition for correct term of "basic *wind speed*" deleting the outdated inclusion of "design" in the term. Also reorganized Risk Category order and correct pointers to the updated maps. No technical changes.

Wind Design Geodatabase: Adding a new definition for the database that contains the windspeeds from ASCE 7-22. The database is the 2022-1.0 version and is freely available at https://asce7hazardtool.online/.

Table 1504.2: Updates the pointer to the maps in 1609.3(1)-(4).

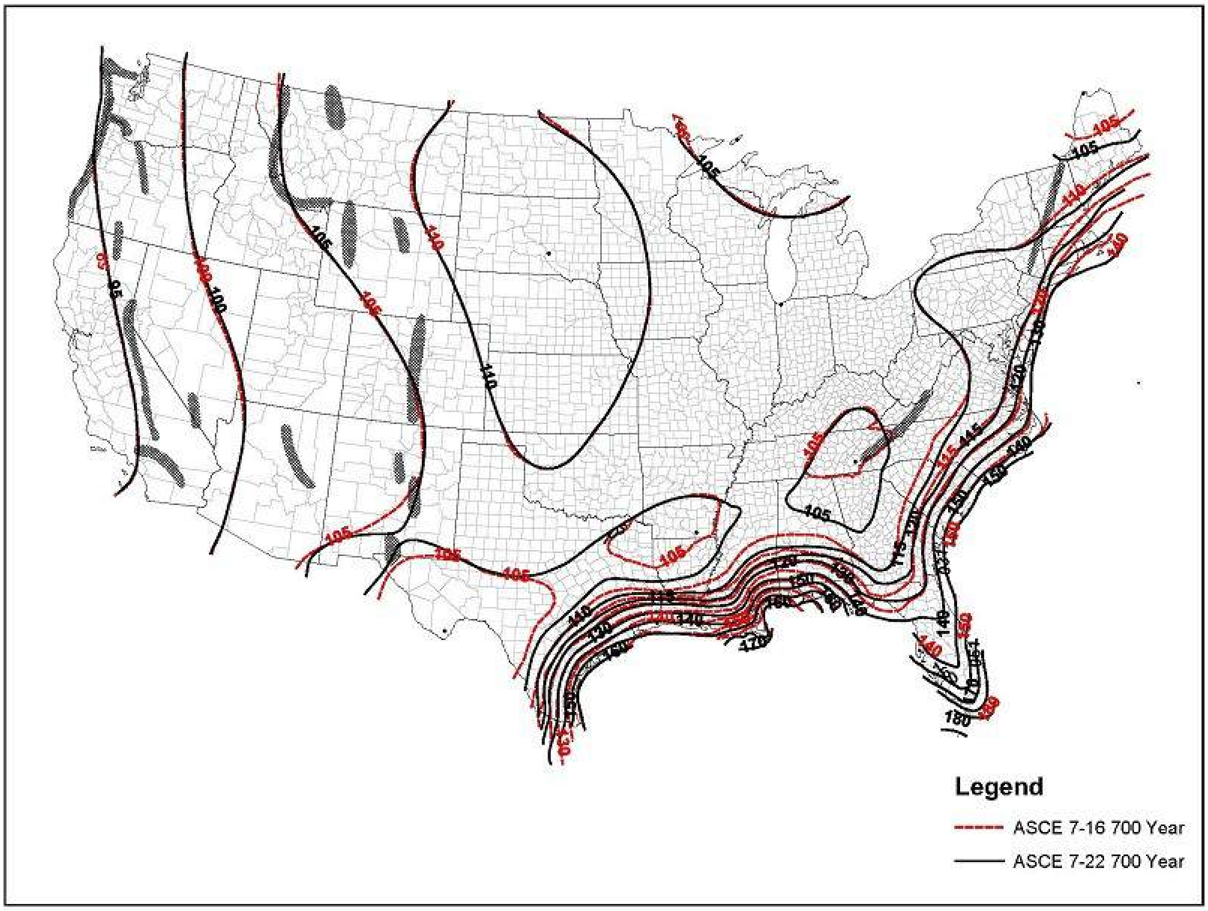
1504.6 Edge systems for low-slope roofs. Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.

1602.1 Notations: Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.

1609.1.1Determination of wind loads: Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.

1609.3 Basic design wind speed: This section updates all of the basic wind speed maps for the contiguous United States and Alaska, as well as the Notes, to match what is in ASCE/SEI 7-22. It also includes the updates to the pointers for the maps. Additionally, the order of the maps has been revised. The maps now begin with Risk Category I and progress to Risk Category IV. The pointer to the ASCE Wind Design Geodatabase is added for Hawaii, US Virgin Islands, and Puerto Rico, and because maps for these three areas are no longer produced in ASCE/SEI 7-22, the maps have been removed from the IBC and are not replaced.

1609.3.1 Wind speed conversion and **Table 1609.3.1:** Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.



Cost Impact: The code change proposal will increase the cost of construction
ASCE 7 is a national minimum design load standard. Therefore as the study of each hazard advances from one edition to the next, updates to the national maps will impact the nation differently. In this case, the wind speeds for ASCE 7-22 largely remain unchanged, therefore the is no impact to the cost of construction from the updated maps. However, in some areas the wind speeds decrease and in other areas the wind speeds increase. The proposed code change will modestly increase the cost of construction along in some areas along the hurricane coastline between the Carolinas and Texas where the windspeeds have increased.

Although the wind speeds do increase in some locations along the hurricane coastline, the higher wind speeds influence less than 3% of the United States. The wind speeds decrease in most areas along the hurricane coastline (as shown by the wind speed contours moving closer to the coastline), while in the Gulf Coast area of the Florida Panhandle the contours extend further inland, which indicates higher wind speeds for this area. And most of the rest of the continental United States the speeds do not change and therefore the cost of construction will be unchanged; see the Risk Category II map below that compared ASCE 7-22 to ASCE 7-16. ASCE 7 Wind speeds are available at the ASCE 7 Hazard Tool (https://asce7hazardtool.online/), which is free to all users, to view and compare various locations.

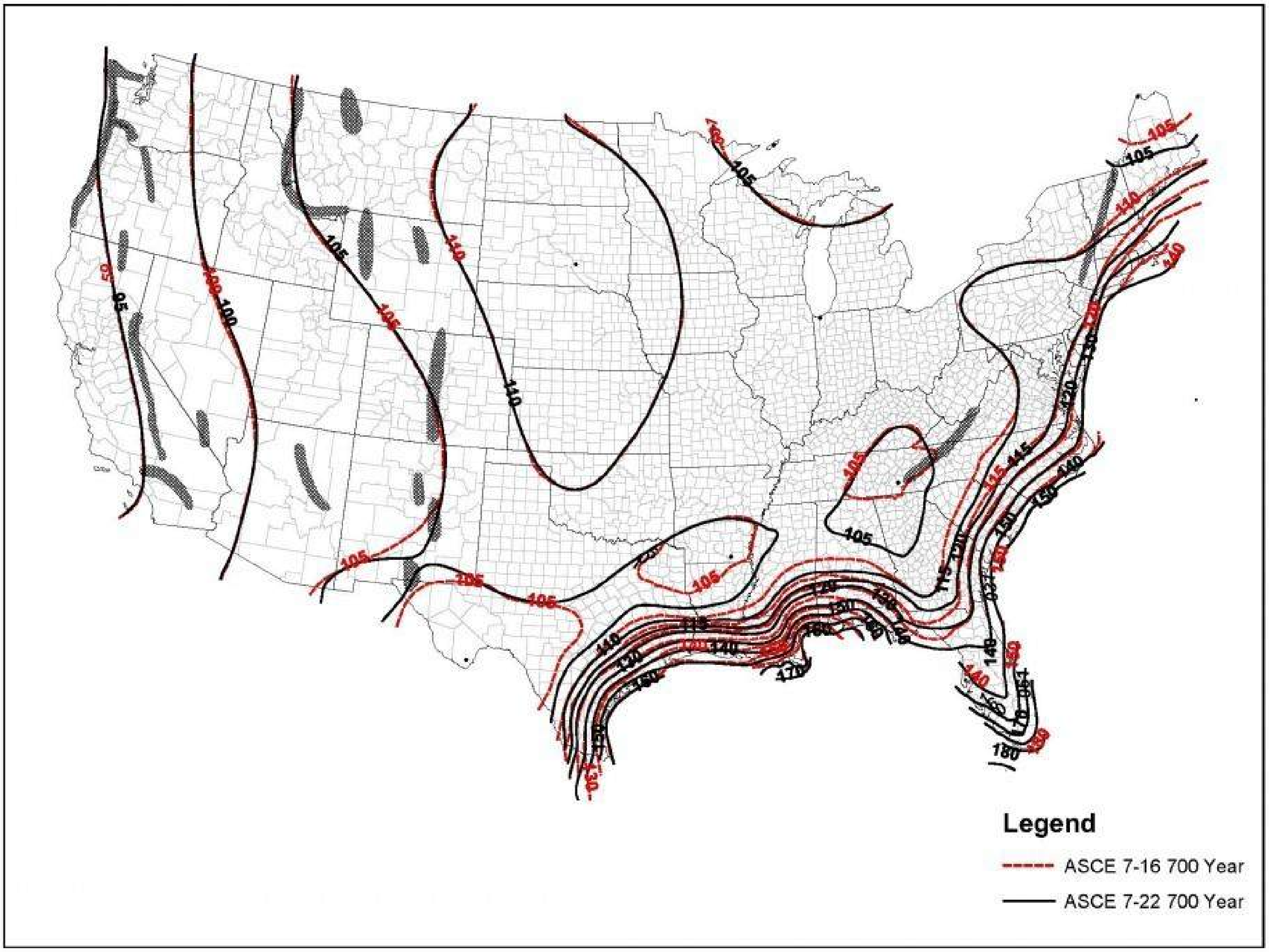


FIGURE: Comparison of ASCE/SEI 7-22 basic wind speeds for Risk Category II (700 Year MRI) to ASCE/SEI 7-16. (Courtesy ARA)

All of the other proposed changes are editorial and will not impact the cost of construction.

S62-22

S63-22

IBC: CHAPTER 2, SECTION 202, CHAPTER 16, SECTION 1602, 1602.1, SECTION 1603, 1603.1.4, SECTION 1605, 1605.1, SECTION 1607, 1607.14, 1607.14.3, SECTION 1609, 1609.5 (New), 1609.5, 1609.5.1, 1609.5.2, 1609.6.3 (New), 1609.5.3, 1609.6.3.2 (New), CHAPTER 23, SECTION 2308, 2308.2.3

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org); Marc Levitan, National Institute of Standards and Technology, representing NIST (marc.levitan@nist.gov); Pataya Scott, representing Federal Emergency Management Agency (pataya.scott@fema.dhs.gov)

2021 International Building Code

CHAPTER 2
DEFINITIONS

SECTION 202
DEFINITIONS

Revise as follows:

[BS] NOMINAL LOADS. The magnitudes of the *loads* specified in Chapter 16 (dead, live, soil, wind, tornado, snow, rain, *flood* and earthquake).

[BS] ESSENTIAL FACILITIES. Buildings and other structures that are intended to remain operational in the event of extreme environmental loading from *flood*, wind, tornadoes, snow or earthquakes.

[BS] RISK CATEGORY. A categorization of buildings and *other structures* for determination of *flood*, wind, tornado, snow, ice and earthquake *loads* based on the risk associated with unacceptable performance.

CHAPTER 16
STRUCTURAL DESIGN

SECTION 1602
NOTATIONS

Revise as follows:

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
R	=	Rain load.
S	=	Snow load.
T	=	Cumulative effects of self-straining load forces and effects.
V_{asd}	=	Allowable stress design wind speed, miles per hour (mph) (km/hr) where applicable.
V	=	Basic design wind speeds, miles per hour (mph) (km/hr) determined from Figures 1609.3(1) through 1609.3(12) or ASCE 7.
V_T	=	Tornado speed, miles per hour (mph) (m/s) determined from Chapter 32 of ASCE 7.
W	=	Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.

SECTION 1603
CONSTRUCTION DOCUMENTS

Revise as follows:

1603.1.4 Wind and tornado design data. The following information related to wind and tornado *loads* shall be shown, regardless of whether wind or tornado *loads* govern the design of the lateral force-resisting system of the structure:

1. Basic ~~design~~ *wind speed*, *V* (mph), tornado speed, V_T (mph), ~~miles per hour~~ and *allowable stress design wind speed*, V_{asd} (mph), as determined in accordance with Section 1609.3.1.
2. *Risk category*.
3. Effective plan area, A_e, for tornado design in accordance with Chapter 32 of ASCE 7.
4. ~~3.~~ 4. Wind exposure. Applicable wind direction if more than one wind exposure is utilized.
5. ~~4.~~ 5. Applicable internal pressure coefficients, and applicable tornado internal pressure coefficients.
6. ~~5.~~ 6. Design wind pressures and their applicable zones with dimensions to be used for exterior component and cladding materials not specifically designed by the *registered design professional* responsible for the design of the structure, pounds per square foot (kN/m^2). Where design for tornado loads is required, the design pressures shown shall be the maximum of wind or tornado pressures.

SECTION 1605
LOAD COMBINATIONS

Revise as follows:

1605.1 General. Buildings and *other structures* and portions thereof shall be designed to resist the strength load combinations specified in ASCE 7, Section 2.3, the a*llowable stress design* load combinations specified in ASCE 7, Section 2.4, or the alternative a*llowable stress design* load combinations of Section 1605.2.

Exceptions:

1. The modifications to load combinations of ASCE 7 Section 2.3, ASCE 7 Section 2.4, and Section 1605.2 specified in ASCE 7 Chapters 18 and 19 shall apply.
2. Where the allowable stress design load combinations of ASCE 7 Section 2.4 are used, flat roof snow *loads* of 30 pounds per square foot (1.44 kN/m^2) and *roof live loads* of 30 pounds per square foot (1.44 kN/m^2) or less need not be combined with seismic load. Where flat roof snow *loads* exceed 30 pounds per square foot (1.44 kN/m^2), 20 percent shall be combined with seismic loads.
3. Where the allowable stress design load combinations of ASCE 7 Section 2.4 are used, crane hook loads need not be combined with *roof live loads* or with more than three-fourths of the snow load or one-half of the wind loads.
4. Where tornado loads are required, the alternative *allowable stress design* load combinations of Section 1605.2 shall not apply when tornado loads govern the design.

SECTION 1607
LIVE LOADS

Revise as follows:

1607.14 Roof loads. The structural supports of roofs and *marquees* shall be designed to resist wind and, where applicable, tornado and snow and earthquake *loads*, in addition to the *dead load* of construction and the appropriate *live loads* as prescribed in this section, or as set forth in Table 1607.1. The *live loads* acting on a sloping surface shall be assumed to act vertically on the horizontal projection of that surface.

1607.14.3 Awnings and canopies. *Awnings* and canopies shall be designed for uniform *live loads* as required in Table 1607.1 as well as for snow *loads* and wind and tornado *loads* as specified in Sections 1608 and 1609.

SECTION 1609
WIND LOADS

Add new text as follows:

1609.5 Tornado Loads. The design and construction of *Risk Category* III and IV buildings and *other structures* located in the tornado-prone region as shown in Figure 1609.5 shall be in accordance with Chapter 32 of ASCE 7, except as modified by this code.

FIGURE 1609.5 TORNADO-PRONE REGION

Revise as follows:

~~1609.5~~ 1609.6 Roof systems. Roof systems shall be designed and constructed in accordance with Sections ~~1609.5.1~~ 1609.6.1 through ~~1609.5.3~~, 1609.6.3 as applicable.

~~1609.5.1~~ 1609.6.1 Roof deck. The *roof deck* shall be designed to withstand the greater of wind pressures or tornado pressures determined in accordance with ASCE 7.

~~1609.5.2~~ 1609.6.2 Roof coverings. *Roof coverings* shall comply with Section ~~1609.5.1~~ 1609.6.1.

> **Exception:** Rigid tile *roof coverings* that are air permeable and installed over a *roof deck* complying with Section ~~1609.5.1~~ 1609.6.1 are permitted to be designed in accordance with Section 1609.~~5~~ 6.3.

Asphalt shingles installed over a *roof deck* complying with Section ~~1609.5.1~~ 1609.6.1 shall comply with the wind-resistance requirements of Section 1504.2 .

Add new text as follows:

1609.6.3 Rigid Tile . Wind and tornado loads on rigid tiles shall comply with Sections 1609.6.3.1 or 1609.6.3.2, as applicable.

Revise as follows:

~~1609.5.3~~ 1609.6.3.1 ~~Rigid tile~~ Wind loads. Wind *loads* on rigid tile *roof coverings* shall be determined in accordance with the following equation:

$$M_a = q_h C_L b L L_a [1.0 - GC_p]$$ **(Equation 16-18**

For SI:

$$M_a = \frac{q_h C_L b L L_a [1.0 - GC_p]}{1{,}000}$$

where:

b = Exposed width, feet (mm) of the roof tile.

C_L = Lift coefficient. The lift coefficient for concrete and clay tile shall be 0.2 or shall be determined by test in accordance with Section 1504.3.1.

GC_p = Roof pressure coefficient for each applicable roof zone determined from Chapter 30 of ASCE 7. Roof coefficients shall not be adjusted for internal pressure.

L = Length, feet (mm) of the roof tile.

L_a = Moment arm, feet (mm) from the axis of rotation to the point of uplift on the roof tile. The point of uplift shall be taken at 0.76L from the head of the tile and the middle of the exposed width. For roof tiles with nails or screws (with or without a tail clip), the axis of rotation shall be taken as the head of the tile for direct deck application or as the top edge of the batten for battened applications. For roof tiles fastened only by a nail or screw along the side of the tile, the axis of rotation shall be determined by testing. For roof tiles installed with battens and fastened only by a clip near the tail of the tile, the moment arm shall be determined about the top edge of the batten with consideration given for the point of rotation of the tiles based on straight bond or broken bond and the tile profile.

M_a = Aerodynamic uplift moment, feet-pounds (N-mm) acting to raise the tail of the tile.

q_h = Wind velocity pressure, psf (kN/m^2) determined from Section 26.10.2 of ASCE 7.

Concrete and clay roof tiles complying with the following limitations shall be designed to withstand the aerodynamic uplift moment as determined by this section.

1. The roof tiles shall be either loose laid on battens, mechanically fastened, *mortar* set or adhesive set.
2. The roof tiles shall be installed on solid sheathing that has been designed as components and cladding.
3. An *underlayment* shall be installed in accordance with Chapter 15.
4. The tile shall be single lapped interlocking with a minimum head lap of not less than 2 inches (51 mm).
5. The length of the tile shall be between 1.0 and 1.75 feet (305 mm and 533 mm).
6. The exposed width of the tile shall be between 0.67 and 1.25 feet (204 mm and 381 mm).
7. The maximum thickness of the tail of the tile shall not exceed 1.3 inches (33 mm).
8. Roof tiles using *mortar* set or adhesive set systems shall have not less than two-thirds of the tile's area free of *mortar* or adhesive contact.

Add new text as follows:

1609.6.3.2 Tornado Loads. Tornado loads on rigid tile roof coverings shall be determined in accordance with Section 1609.6.3.1, replacing q_h with q_{hT} and (GC_p) with $K_{vT}(GC_p)$ in Equation 16-18, where:
q_{hT} = tornado velocity pressure, psf (kN/m^2) determined in accordance with Section 32.10 of ASCE 7.

K_{vT} = tornado pressure coefficient adjustment factor for vertical winds, determined in accordance with Section 32.14 of ASCE 7.

CHAPTER 23
WOOD

SECTION 2308
CONVENTIONAL LIGHT-FRAME CONSTRUCTION

Revise as follows:

2308.2.3 Allowable loads. *Loads* shall be in accordance with Chapter 16 and shall not exceed the following:

1. Average *dead loads* shall not exceed 15 psf (718 N/m^2) for combined roof and ceiling, *exterior walls*, floors and partitions.

   Exceptions:

   1. Subject to the limitations of Section 2308.6.10, stone or masonry *veneer* up to the less of 5 inches (127 mm) thick or 50 pounds per square foot (2395 N/m^2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2439) permitted for *gable* ends.
   2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code.

2. *Live loads* shall not exceed 40 psf (1916 N/m^2) for floors.

   Exception: *Live loads* for concrete slab-on-ground floors in *Risk Categories* I and II shall be not more than 125 psf.

3. Ground snow *loads* shall not exceed 50 psf (2395 N/m^2).
4. Tornado loads on the main wind force resisting system and all components and cladding shall not exceed the corresponding wind loads on these same elements

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal includes technical updates as well as editorial coordination. The specific changes to each section included in this proposal is outlined below, and a detailed summary of the technical updates are explained below that:

Section 202 Definitions: Updates to **Nominal Loads**, **Essential Facilities**, and **Risk Category** to include tornadoes.

Section 1602.1 Notations: Add new term V_T for tornado speeds.

Section 1603.1.4 Wind design data: Modifies section to include tornado speed and applicable internal pressures to be included on the construction drawings.

Section 1605.1 General: Adds new Exception 4 to exclude the use of the Alternative allowable stress design load combinations in Section 1605.2 when tornado loads govern the design.

Section 1607.14 Roof loads; Section 1607.14.3 Awnings and canopies: Modifies section to include tornado.

Section 1609.5 Tornado Loads: Added new section for charging language for tornado loads as well as a new **Figure 1609.5 Tornado Prone Region** to determine where tornado loads must be considered, per ASCE 7-22 Chapter 32.

Section 1609.5 Roof systems: This is to update the section number to 1609.6 after adding the new section 1609.5 for Tornado loads.

Section 1609.5.1 Roof deck: This updates to the new section number of 1609.6.1 and clarifies the requirement to be the greater of wind or tornado pressures for roof deck design.

Section 1609.5.2 Roof coverings: This updates the new section number 1609.6.2 as well as updates the pointers to the new section numbers.

Section 1609.5.3 Rigid Tile: This updates to the new section number of 1609.6.3 as well as adds new section **1609.6.3.1 Wind loads** and **1609.6.3.2 Tornado loads** to differentiate the requirements for wind and tornado. Also the new section 1609.6.3.2 for tornado loads clarifies the terms to be used in Equation 16-18 as well as adds pointers to ASCE 7 Chapter 32. [NOTE TO EVERYONE: cdpAccess would not permit me to strikeout the redundant "Section 1609.5.3 Rigid Tile" following the new section " Section 1609.6.3.1 Wind Loads" shown in the PDF of this proposal. My intention is to strike out "~~Section 1609.5.3 Rigid Tile~~" but cannot in cdpAccess at the time of this submittal.]

Section 2308.2.3 Allowable loads: This adds a requirement that allowable loads for conventional light-frame construction shall not be used on any portion of the design where tornado loads govern. This is written to specifically address only the portions of the design - specific to each element - where the loads are governed by tornado loads and does not intend to exclude the rest of the project that is not governed by tornado loads.

TECHNCIAL REASON STATEMENT:

Overview

Tornado hazards have not previously been considered in the design of conventional buildings, despite the fact that tornadoes and tornadic storms cause more fatalities than hurricanes and earthquakes combined (NIST 2014) and more catastrophe insured losses than hurricanes and tropical storms combined (Insurance Information Institute 2021). This gap is addressed for the first time in ASCE 7-22, which now includes requirements for tornado loads. The tornado hazard maps and load methodology are based on a decade of research and development led by the National Institute of Standards and Technology (NIST), in collaboration with ASCE, following the record 2011 tornado season (1,691 tornadoes causing 553 fatalities). ASCE 7-22 requirements for tornado loads apply to Risk Category III and IV buildings and other structures sited in the tornado-prone region, which is approximately equal to the area of the U.S. east of the Continental Divide.

The tornado loads specified in the new Chapter 32 provide reasonable consistency with the reliability delivered by the existing criteria in ASCE 7 Chapters 26 and 27 for the Main Wind Force Resisting System (MWFRS), using the same return periods as the basic wind speed maps in Chapter 26 for Risk Category III and IV facilities (1,700 and 3,000 years, respectively). At return periods of 300 and 700 years (used for wind speeds with Risk Category I and II structures), tornado speeds are generally so low that tornado loads will not control over Chapter 26 wind loads. Therefore, design for tornadoes is not required for Risk Category I and II buildings and other structures.

ASCE 7-22 tornado design speeds for Risk Category III and IV structures range from 60 to 138 mph, depending on geographic location, Risk Category, and effective plan area (which is a function of the building footprint size and shape). This approximately corresponds to the speeds for Enhanced Fujita Scale EF0- EF2 tornadoes, which are not the most intense tornadoes but they are the most common. During the period from 1995 to 2016, over 89% of all reported tornadoes were EF0-EF1, and 97% were in the range of EF0-EF2. Furthermore, most of the area impacted by a tornado does not experience the maximum winds speeds on which the tornado is rated. For example, in the 2011 EF-5 tornado that damaged or destroyed approximately 8,000 buildings in Joplin, Missouri, an estimated 72% of the area swept by the tornado experienced EF0-EF2 winds, while just 28% experienced EF3 and greater winds (NIST 2014). It should also be noted that while property losses per individual tornado increase dramatically with increasing EF number, the aggregate losses caused by all EF1 tornadoes are very similar in magnitude to aggregate losses for all EF2s, for all EF3s, for all EF4s, and for all EF5s (NIST 2014). This is due to the fact that there are so many more lower-intensity tornadoes; e.g., only 59 of the nearly 66,000 recorded tornadoes since 1950 have been rated as EF-5.

To make it very clear that the ASCE 7 tornado provisions are not intended to provide protection from the most violent tornadoes, a large User Note on the first page of the Tornado Load chapter advises readers as follows:

Options for protection of life and property from more intense tornadoes include construction of a storm shelter and/or design for longer-return-period *tornado speeds as provided in Appendix G, including performance-based design. A building or other structure designed for tornado loads determined exclusively in accordance with Chapter 32 cannot be designated as a storm shelter without meeting additional critical requirements provided in the applicable building code and ICC 500, the ICC/NSSA Standard for the Design and Construction of Storm Shelters. See Commentary Section C32.1.1 for an in-depth discussion on storm shelters.* (ASCE 7-22 Section 32.1.1)

The referenced commentary section explains that life safety protection against the most violent tornadoes requires a tornado shelter that meets the *ICC 500 Standard for Design and Construction of Storm Shelters* (ICC 2020), or a tornado safe room meeting FEMA P-361 guidelines (FEMA 2021; note that Safe Rooms must meet all ICC 500 requirements plus additional FEMA Funding Criteria). Tornado hazard criteria for ICC 500 and FEMA P-361 are much more stringent than ASCE 7, reflecting the purpose to provide 'near-absolute life safety protection' as described by FEMA (2021). For example, the tornado shelter design speed in the central US is 250 mph. This compares to ASCE 7 speeds of 78-124 mph for Risk Category III and 95-138 mph for Risk Category IV, where the lower and upper values in the ranges correspond to 1 ft^2 and 4 million ft^2 effective plan areas, respectively.

Tornado Hazards

Among the many reasons that building codes and standards have not previously required design for tornado hazards is the misperception that tornadoes are too rare. As seen in Figure 1, in recent decades there have been an average of 1,251 *reported* tornadoes per year. The apparent smaller numbers of tornadoes from the 1950s through the early 1990s is primarily due to reporting issues, before there were doppler radar networks, cell phones, and trained spotter networks. Even today, many tornadoes in areas of low population density go unreported, in a well-known effect called *population bias*. There are less tornadoes per square mile per year recorded in very rural areas compared to suburban and urban areas in the same region of the country. The average annual frequency of tornadoes per state is shown in Figure 2, with the majority of tornadoes occurring in the Central and Southeast states.

Although the peak months for tornado activity in the US are in the spring, tornadoes can and do occur year-round. The end of 2021 yielded a record-setting December. The "Quad-State Tornado Outbreak" on December 10-11 spawned 68 tornadoes across 10 states, including two that tracked for more than 100 miles. This outbreak caused 90 confirmed fatalities. "The total damages and economic losses resulting from the historic tornado outbreak that impacted multiple states from the South to the Midwest could amount to $18 billion, which would make it the costliest tornado outbreak in U.S. history," (AccuWeather 2021). The day after AccuWeather published that loss estimate, a derecho over the upper Midwest on December 15-16 caused another outbreak of 94 tornadoes. December yielded a total of 193 tornadoes across the Midwest and Southeast, including 42 EF-0, 96 EF-1, 42 EF-2, 6 EF-3, and 2 EF-4 tornadoes, with 5 more rated as unknown intensity (Figure 3).

While tornadoes have been recorded in all 50 states, the overwhelming majority occur east of the Continental Divide as seen in Figure 4. Even from this raw data, it is apparent why the tornado prone-region is east of the Rocky Mountains. The most intense tornadoes, shown in the darker colors, generally occur in the Central US, except near the Gulf Coast. Similarly, there are fewer intense tornadoes along the Atlantic Coast states. The coastal states have a large number of lower intensity tornadoes, many of them generated by hurricanes. In comparison, the Mountain and Western States experience relatively few tornadoes, and almost no strong (EF2-EF3) or violent (EF4-EF5) tornadoes.

Tornadoes can vary significantly in size. Path lengths range from as short as tens of yards to over a hundred miles. December's Quad-State Tornado tracked 166 miles across Arkansas, Missouri, Tennessee and Kentucky over the span of 4 hours. It was the 9th longest tornado on record (the longest being 219 miles). Path widths vary from around 10 yards to over a mile. The widest tornado on record occurred in El Reno, Oklahoma in 2013, with a maximum path width of 2.6 miles. The average path length for the December 2021 tornadoes was 8.8 miles, while the average maximum path width was 184 yards (Figure 3).

It is clear from the climatology that tornadoes are not rare events. For example, Oklahoma City has been struck by at least 141 tornadoes since 1940, for an average of nearly 2 per year (NWS 2022a). Another way to understand how frequent tornadoes actually are is to consider them from a building impacts perspective. Mining of event and episode narratives from NOAA's National Centers for Environmental Information (NCEI) Storm Events Database from 1993-2020 indicated at least 647 reports of schools being struck by tornadoes. Figure 5 shows the number of preK-12 schools per state that were struck by tornadoes. This average of more than 23 schools per year is a lower bound. The purpose of the Storm Events Database narratives is not to document school impacts per se, but rather summarize key features of storm and its overall impacts. Schools are often mentioned, but this is by no means a complete data source for school strikes. Review of other databases, post-storm reports, news searches, and other sources of information revealed many additional schools that were struck by tornadoes during this time period.

One recent example school impact: in a terrible way to ring in the new year, Veterans Memorial Middle School in Covington, Georgia was struck by an EF-1 tornado on December 31, 2021 (Figure 6). According to the National Weather Service, which conducted its assessment on New Year's Day, structural damage was observed at the school (NWS 2022b). "The tornado reached peak intensity of 90 mph as it hit Veterans Middle School removing significant amounts of siding and roofing from the gymnasium and sections of roof."

Tornado Load Provisions

The commentary chapter C32 of ASCE 7-22 provides descriptions and references supporting the development and application of the tornado load provisions. A brief summary is provided below.

Introduction. The tornado hazard maps and load methodology were developed over the course of a decade of R&D by the National Institute of Standards and Technology, working closely with Applied Research Associates, Inc. and ASCE. The ASCE 7 tornado load provisions were developed by the ASCE 7 Tornado Task Committee in cooperation with the ASCE 7 Wind Load and Load Combinations Subcommittees. Three workshops were held (two at ASCE headquarters, in September 2015 and May 2019) in support of the tornado hazard map development. A broad range of stakeholders were informed about the detailed plans for map development at the first two workshops and advised on the details of the final methodology and draft maps at the last workshop. Stakeholder feedback from all workshops was incorporated into the final tornado hazard maps and load methodology.

Incorporation of Tornado Loads in ASCE 7. Tornado load are treated completely separately from wind loads, hence their inclusion in a new chapter. While tornadoes are a type of windstorm, there are significantly different characteristics between tornadoes and other windstorms. For instance, tornadic winds have significant updrafts near the core; rapid atmospheric pressure changes can induce loads; and load combinations including tornado loads are not always the same as those including other wind loads (e.g., tornadoes are warm weather phenomena, so snow loads would not be included in combination with tornado loads). As a result of these considerations, tornado loads are treated separately from wind loads, not as a subset of wind loads. This is analogous to the separate treatment of flood loads and tsunami loads; both are hydrodynamic loads on buildings, but the nature of the hazard and the hazard-structure interaction is different enough that they are considered as completely separate loads.

Tornado Load Procedures. The tornado load procedures are based on the overall framework of the ASCE 7 wind load procedures. Tornado velocity pressure and design pressure/design load equations are similar to those found in Chapters 26-31 (exclusive of Chapter 28 Envelope Procedure, where the underlying methodology is incompatible with the tornado load approach). However, most of the terms used in the tornado load equations have some differences compared to their wind load counterparts, reflecting the unique characteristics of tornadic winds and wind-structure interaction in contrast to straight-line winds. Several wind load parameters are not used in the tornado load chapter, while Chapter 32 also introduces a few new and significantly revised parameters.

Tornado Hazard Maps. Critical to development of the entire tornado load methodology was creation of a new generation of tornado hazard maps. The R&D needed to create these maps broke new ground in a number of areas. For example, novel approaches to quantify the well-known problems of population bias (where more tornadoes are reported in areas having greater population) and to capture regional variation in tornado climate were developed and applied. Tornado wind speeds associated with the Enhanced Fujita (EF) Scale intensity ratings were derived through engineering analysis instead of relying on the original EF Scale methodology, which was based on expert elicitation. The tornado hazard maps take spatial effects into account (since larger buildings are more likely to be struck by a tornado, tornado wind speeds increase with increasing plan (i.e., footprint) area of the building). These efforts resulted in a set of state-of-the-art probabilistic tornado hazard maps prescribing tornado design wind speeds for a wide range of return periods and target building plan area sizes, enabling tornado-resistant design of conventional buildings and infrastructure, including essential facilities.

The mapped tornado speeds represent the maximum 3-s gust produced by the translating tornado at a height of 33 ft anywhere within the plan area of the target building. The design tornado speeds for Risk Category III and IV buildings (for 1,700- and 3,000-year return periods, respectively) typically range from EF0-EF2 intensity, depending on geographic location, Risk Category, and plan size and shape. For protection from more violent tornadoes, performance-based design is explicitly allowed, and commentary on additional design requirements for storm shelters is provided. An appendix is included with tornado speeds for longer return periods. At return periods of 300 and 700 years, tornado speeds are generally so low that tornado loads will not control over Ch. 26 wind loads, hence design for tornadoes is not required for Risk Category I and II buildings and other structures.

Tornado Velocity Pressure. While the effects of terrain and topography on tornado wind speed profiles are not yet well understood, a review of near-surface tornadic wind measurements from mobile research radar platforms plus numerical and experimental simulations consistently showed wind speed profiles with greater horizontal wind speeds closer to the ground than aloft. The tornado velocity pressure profile (K_{zTor}) used has a uniform value of 1.0 from the ground up to a height of 200 ft, with a slightly smaller value at greater heights. In comparison, wind loads are based on an assumed boundary layer profile, where wind speeds are slower near the ground due to the effects of surface roughness.

Tornado Design Pressures. Atmospheric pressure change (APC) was found to have significant contributions to the tornado loads, particularly for large buildings with low permeability. The internal pressure coefficient was modified to also include the effects of APC. Since APC-related loads are not directionally dependent, the directionality factor was removed from the velocity pressure equation and added to the external pressure term (only) in the design pressure/load equations. The directionality factor K_d was modified through analysis of tornado load simulations on building MWFRS and components and cladding (C&C) systems. The resulting tornado directionality factor K_{dT} has values slightly less than the corresponding wind K_d values, with the exception of roof zone 1' (in the field of the roof), which increased. External pressure and force coefficients for both the MWFRS and C&C remain unchanged, but a modifier (K_{vT}) was added to account for experimentally determinized increases to uplift loads on roofs caused by updrafts in the core of the tornado.

Reliability. A reliability analysis was conducted to evaluate the tornado load provisions for the purpose of identifying appropriate return periods for the tornado hazard maps. This effort was conducted by a working group composed of members from both the ASCE 7-22 Load Combinations and Wind Load Subcommittees. Monte Carlo analyses (adapted from the ASCE 7-16 wind speed map return period analysis) were used, in which significant uncertainties for system demands and capacity were identified and quantified in the form of random variables with defined probability distributions. The results of this series of risk-informed analyses showed that the tornadic load criteria of Chapter 32 provided reasonable consistency with the reliability delivered by the existing criteria in Chapters 26 and 27 for MWFRS; therefore confirming that the 1,700- and 3,000-year return periods used for Risk Category III and IV wind hazard maps (respectively) in Chapter 26 were also suitable return periods to use for the tornado hazard maps.

Load Combinations. In both the Strength and Allowable Stress Design (ASD) load combinations that maximize wind load effects, the wind load term W is replaced by the term (W or W_T), where W_T is the tornado load. Tornado loads do not appear in combinations that maximize other loads where wind is an arbitrary point-in-time load.

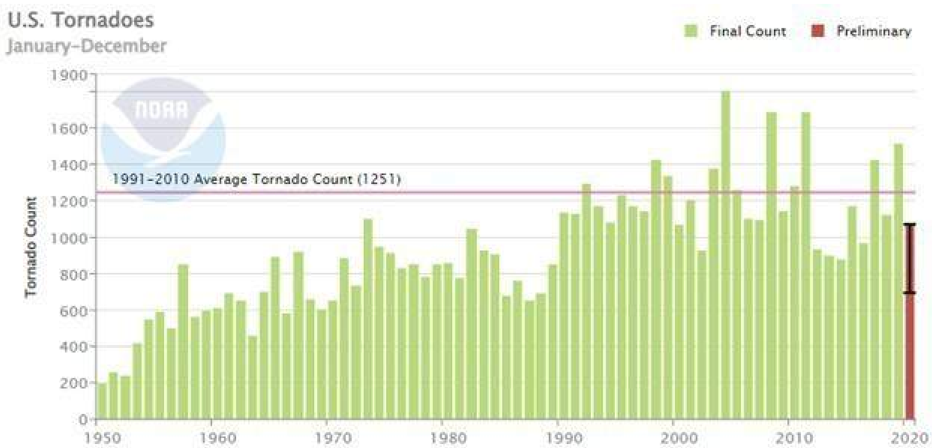


Figure 1. Number of *reported* tornadoes per year from 1950-2020 (NCEI 2022).

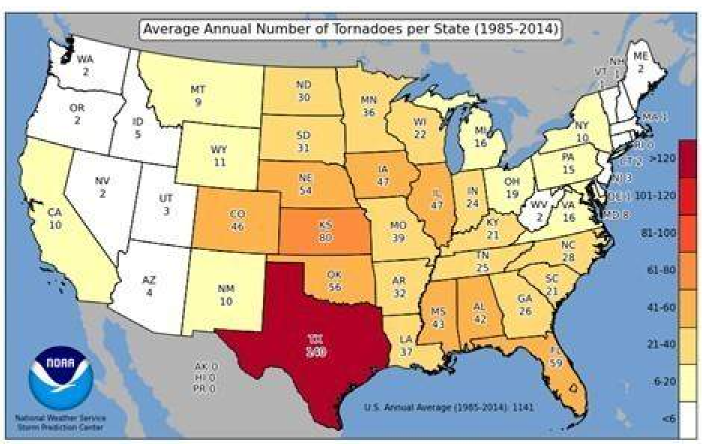


Figure 2. Average annual number of tornadoes per state (SPC 2022).

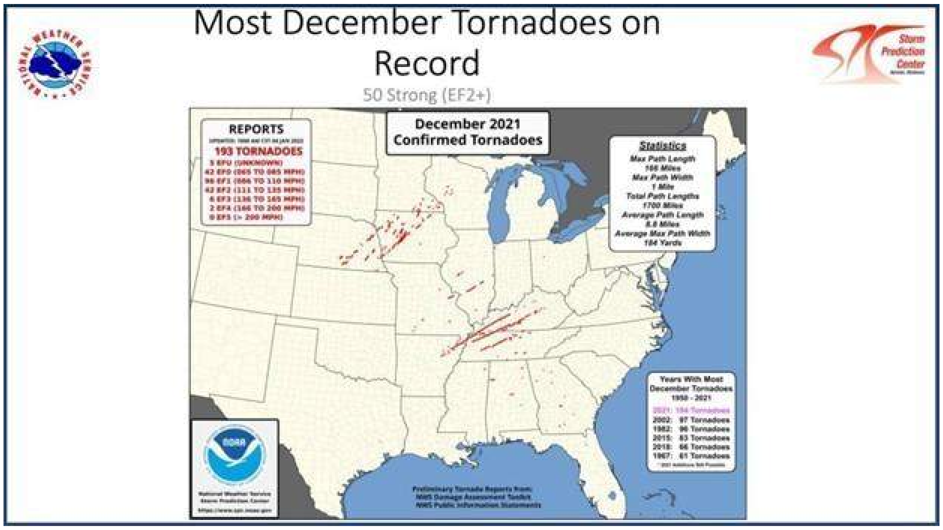


Figure 3. December 2021 produced a record 193 tornadoes across 17 states. (source: NOAA/NWS/Storm Prediction Center)

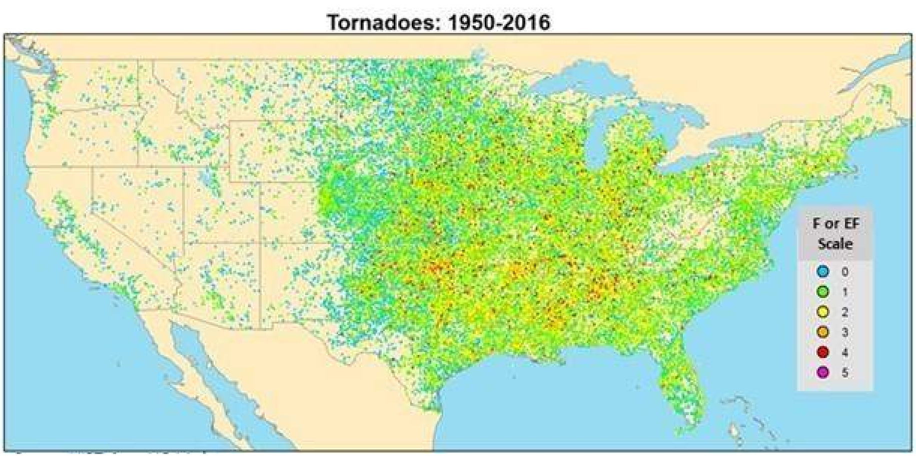


Figure 4. Map of tornado locations from 1950-2016 (source: NIST, using NOAA data).

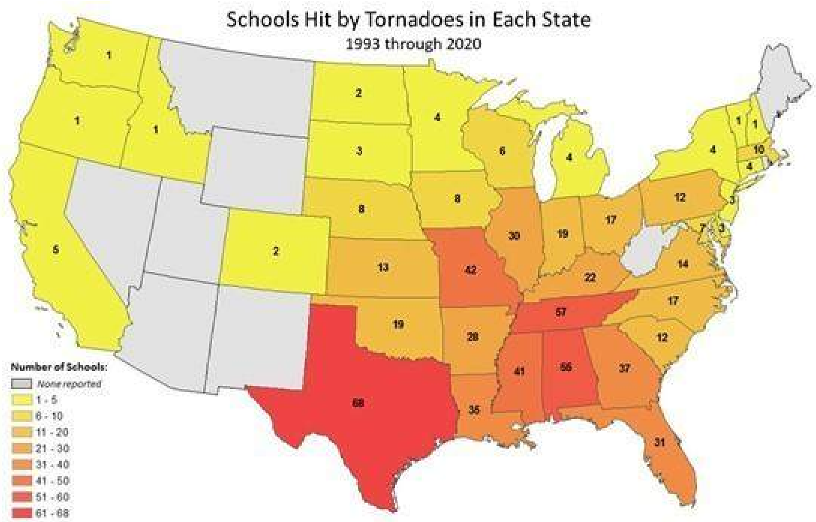


Figure 5. Lower bound for the number of schools struck by tornadoes, per state, for the 28-year period of 1993-2020 (source: NIST, using NOAA data).

Figure 6. EF-1 tornado in Covington, Georgia on New Year's Eve, 2021 (left); resulting damage to Veterans Memorial Middle School (right). (source: NWS)

References:

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National Institute of Standards and Technology (NIST). 2014. Final report: NIST technical investigation of the May 22, 2011, tornado in Joplin Missouri. NCSTAR 3, March. https://doi.org/10.6028/NIST.NCSTAR.3

National Weather Service (NWS). 2022a. Tornadoes in the Oklahoma City, Oklahoma Area Since 1890. https://www.weather.gov/oun/tornadodata-okc

NWS. 2022b. NWSChat - PUBLIC INFORMATION STATEMENT, NATIONAL WEATHER SERVICE PEACHTREE CITY GA, 258 PM EST SAT JAN 1. https://nwschat.weather.gov/p.php?pid=202201011958-KFFC-NOUS42-PNSFFC

Storm Prediction Center (SPC). 2022. Annual Averages: Tornadoes by State. National weather Service/ National Oceanic and Atmospheric Administration. https://www.spc.noaa.gov/wcm/

Cost Impact: The code change proposal will increase the cost of construction
This proposal may increase the cost of construction for Risk Category III and IV buildings and other structures located in the tornado-prone region where tornado loads govern the design.

The ASCE 7-22 tornado load provisions in Section 32.5.2 include provisions to help identify many of the situations where tornado loads will not control any aspects of the wind load design. If the tornado speed $V_T < 60$ mph, tornado loads will not control over wind loads, so design for tornado loads is not required. Additionally, if the tornado speed is less than a certain percentage of the basic (non-tornado) wind speed, V, tornado loads will not control. For structures located in wind Exposure Category B or C, design for tornado loads is not required where $V_T < 0.5V$ or $V_T < 0.6V$, respectively (in this context, Exposure B means that the structure is surrounded on all sides by urban, suburban or wooded terrain, otherwise it would be considered Exposure C). The exposure category does not change the tornado loads, while wind loads in Exposure B are less than in Exposure C. Therefore, a building located in Exposure B is more likely to have tornado loads control over wind loads compared to the same building in Exposure C.

Whether or not tornado loads will ultimately control any aspects of the wind load design for a particular structure is dependent on a large number of factors, including but not limited to:

1. tornado speed, which is a function of
   - geographic location
   - Risk Category
   - effective plan area, which depends on footprint size and shape
2. basic wind speed, which is a function of
   - geographic location
   - Risk Category
3. wind exposure category
4. building shape
5. roof geometry
6. roof height
7. enclosure classification
8. designation as an essential facility or not

Maps were created to show where design for tornado loads is not required, based on the tornado speed criteria in the previous paragraph. Examples for a medium size Risk Category III facility and a very large Risk Category IV facility are shown in Figures 7 and 8, for both Exposures B and C. At locations where the tornado speed is greater than the specified percentage of the basic wind speed, design for tornado loads is required but may still not control. This is because the net pressure loading patterns on a building are different for tornadic versus non-tornadic winds, due to the differences in wind and wind-structure interaction characteristics which are reflected by factors 4 through 8 above.

For a medium-sized Risk Category III building, the tornado speeds are less than 60 mph across much of the tornado prone region (Figure 7). Tornado loads are required only in the areas shaded with the warm colors, which spans roughly between north Texas, central Minnesota, and the central Carolinas. In contrast, tornado loads are required across most of the tornado-prone region for very large Risk Category IV facilities, except New England and small areas of south Florida and south Louisiana for Exposure C (Figure 8). In both figures, the darker reds indicate areas that tornado loads are more likely to exceed wind loads. In general, tornado loads are more likely to control at least some element(s) of the wind load design for buildings and other structures that have one or more of the following characteristics:

- are located in the central or southeast US, except near the coast (where hurricanes can dominate the extreme wind climate),
- are Risk Category IV,
- have large effective plan areas,
- are designated as Essential Facilities,
- are located in Exposure B,
- have low mean roof heights, and
- are classified as enclosed buildings for purposes of determining internal pressures.

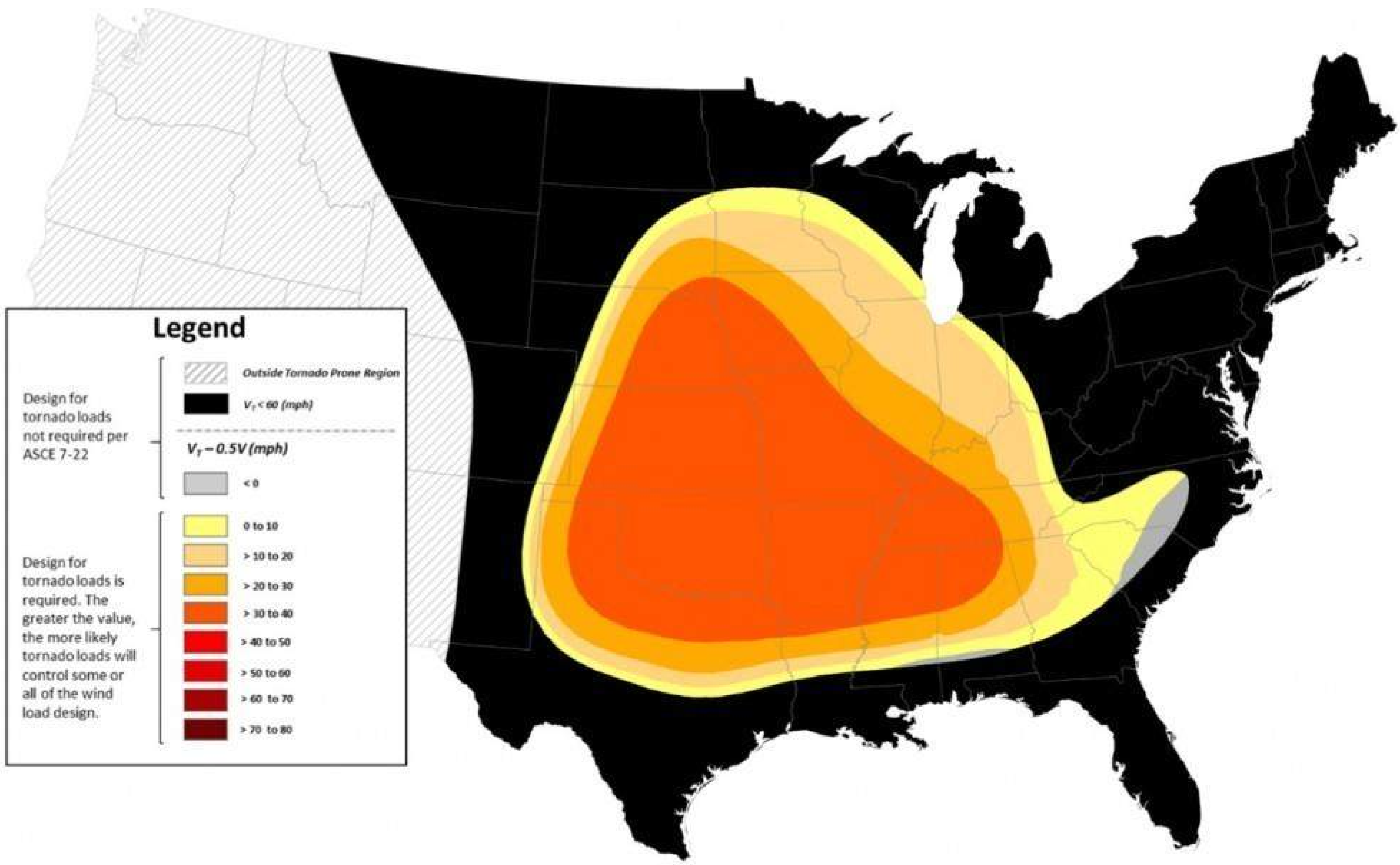
A case study was conducted to compare MWFRS and C&C pressures between ASCE 7-16 (non-tornado) and ASCE 7-22 tornado provisions in the Dallas / Fort Worth area of Texas, and also consider the cost impacts. The case study considered four building types, an elementary school, a high school, a fire station, and a large hospital facility. The schools were Risk Category III, while the fire station and hospital were Risk Category IV essential facilities. All were new construction (no additions or renovations).

The elementary school was assumed to have an effective plan area of 100,000 ft^2 while the high school was 500,000 ft^2. For the two-story schools, the basic wind speed V = 112 mph, while the tornado speeds for the elementary and high school were V_T = 90 and 102 mph, respectively. Even though the tornado speeds were less than the basic wind speeds, tornado loads exceeded wind loads for many elements of the design. The high school experienced greater increases in design pressures compared to the elementary school, given its greater tornado speed. The tornado loads were generally larger than the corresponding wind loads, with the most significant impacts occurring where the magnitude of MWFRS and C&C pressure coefficients are relatively small. Tornado suction pressures on the leeward wall and uplift pressures in the field of the roof were more than double the corresponding wind loads in some instances. This was primarily due to the increased tornado internal pressure coefficient and the new pressure coefficient adjustment factor for vertical winds, which increases the uplift on the roof. These surfaces have the smallest magnitude pressures to begin with, so increases of internal pressure and other coefficients have more relative effect. MWFRS loads on the windward walls of all schools also increased (again, due to internal pressures), but less than on the leeward walls. The net lateral loads on the buildings were not significantly impacted (internal pressure cancels out). MWFRS and C&C tornado pressures on roof edges and corners generally increased for the Exposure B cases, but were similar to or smaller than the corresponding wind design pressures when the schools were in Exposure C.

Although specific percentage changes to design pressures are dependent on many factors as discussed previously, the trend for the greatest relative impacts to occur on parts of the building or structure that have the smallest absolute values of wind loads holds true, as was the case for the fire station and hospital examples. The fire station and hospital were designed with effective plan areas of 15,000 ft^2 and 4 million ft^2 and heights of 20 ft and 80 ft (5-stories), respectively. The basic wind speed for Risk Category IV facilities in the DFW area is V = 115 mph. Tornado speeds for the fire station and hospital were V_T = 97 and 123 mph, respectively. The relative impacts on the fire station were generally somewhere between those for the elementary and high schools. The hospital, with its much greater tornado speed due to the large effective plan area, experienced greater relative pressure differences. For example, C&C tornado pressures (for effective wind area of 200 ft^2) exceeded corresponding wind pressures across the four different flat roof pressure zones by 81 to 126% for Exposure B, and 39 to 73% for Exposure C. The tornado design pressures for the hospital were similar in magnitude to wind pressures for a comparable facility located in the hurricane-prone region along the Texas coast.

A study of the cost impacts for the schools showed that the structural cost increases were very modest. On the elementary school with a building cost of $20M, the estimated cost increases were 0.24% and 0.14% for wind Exposure B and C, respectively. For the $200M high school, the cost increases were 0.13% and 0.08% for Exposures B and C. The study did not include cladding and appurtenance costs. It should be noted that Dallas-Ft. Worth location of this case study is part of the most highly impacted area of the country (as seen in Figures 7 and 8 below), having a combination of comparatively high tornado speeds and low basic wind speeds. The increases in design pressures and costs diminish rapidly outside of the parts of the central and southeast US that experience the most frequent and intense tornadoes and have the greatest tornado speeds, roughly approximated as the area between north Texas, west Iowa, and north Alabama.

Therefore, while tornado load design could increase loads and pressures for Risk Category III and IV structures in the tornado prone area, the impacts on cost of construction resulting in increases will most likely be small when compared to the overall project costs.



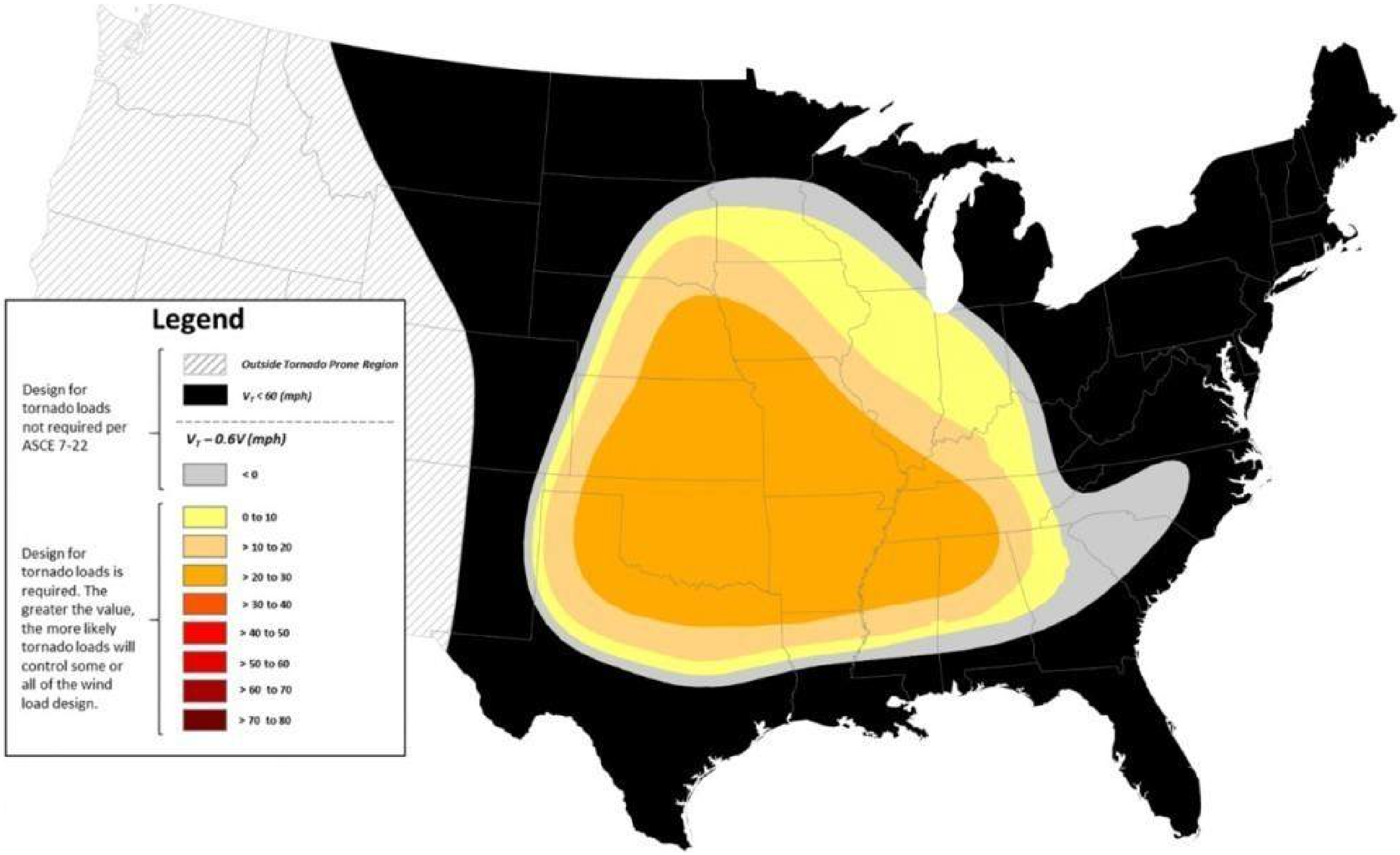
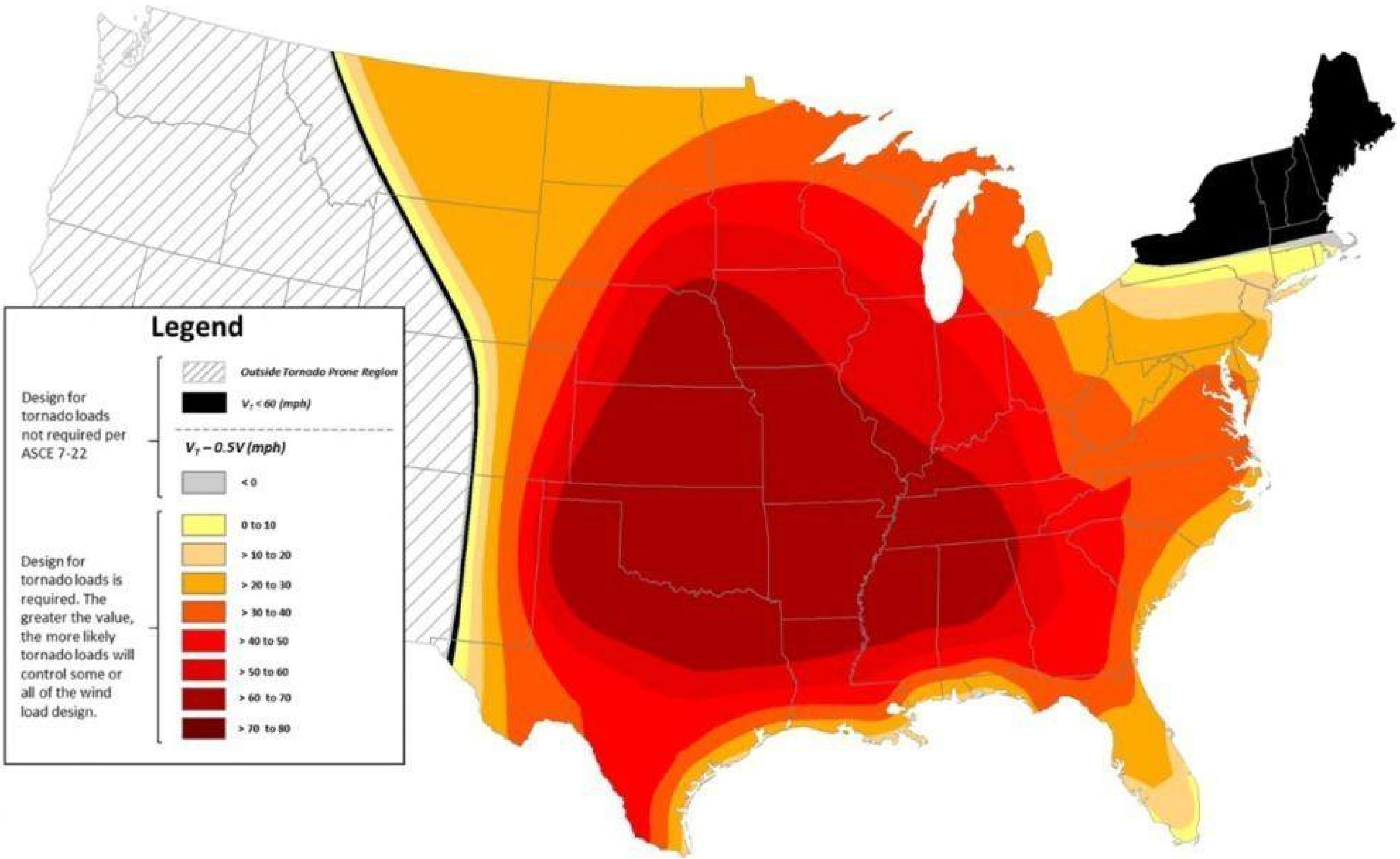


Figure 7. Locations where design for tornado loads is not required for a Risk Category III building or other structure having an effective plan area A_e = 100,000 ft^2, located in Exposure B (top) and Exposure C (bottom).



Legend
Outside Tornado Prone Region
V_T < 60 (mph)
Design for tornado loads not required per ASCE 7-22
$V_T - 0.5V$ (mph)
< 0
0 to 10
> 10 to 20
> 20 to 30
> 30 to 40
> 40 to 50
> 50 to 60
> 60 to 70
> 70 to 80
Design for tornado loads is required. The greater the value, the more likely tornado loads will control some or all of the wind load design.

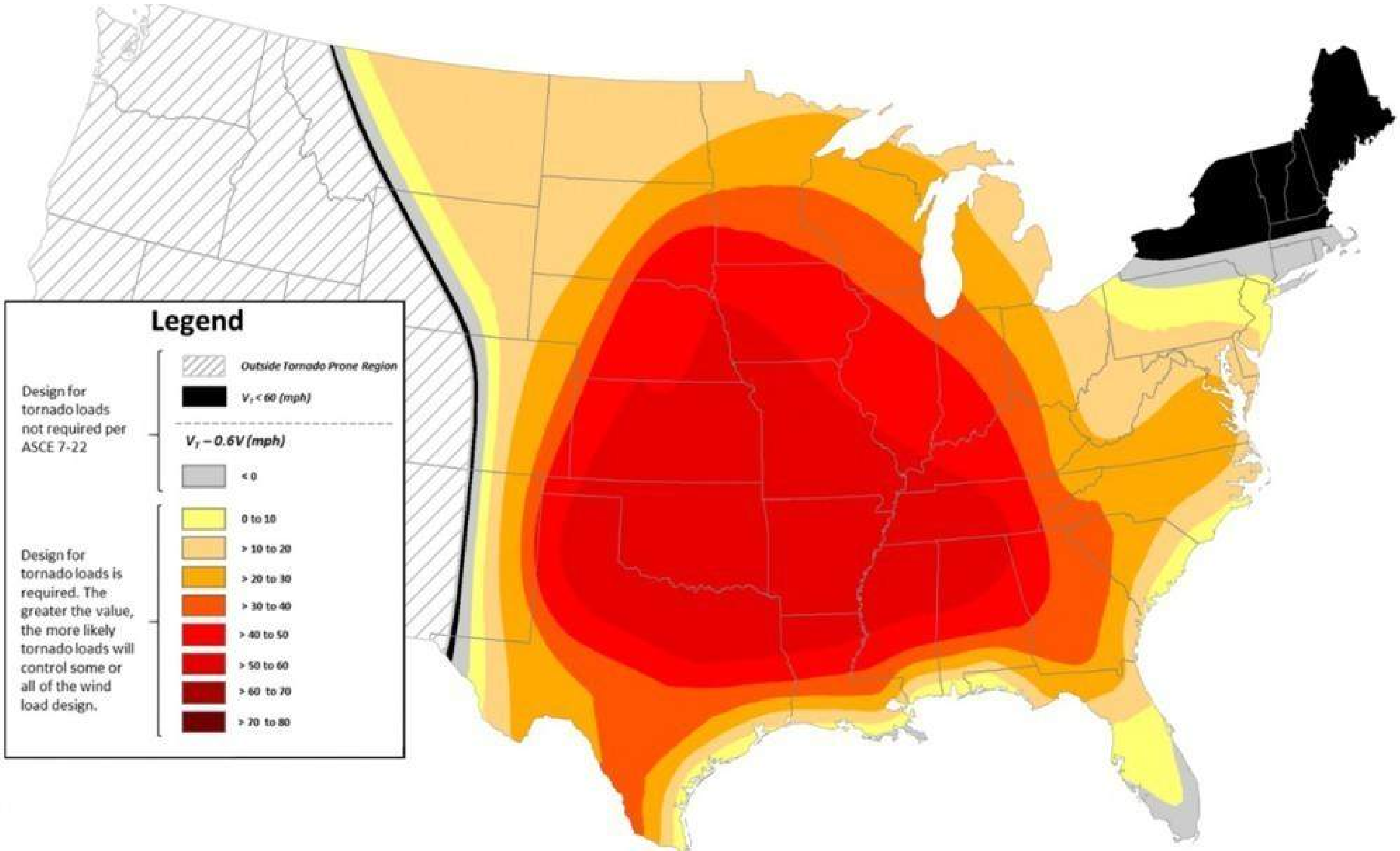


Figure 8. Locations where design for tornado loads is not required for a Risk Category IV building or other structure having an effective plan area A_e = 1,000,000 ft^2, located in Exposure B (top) and Exposure C (bottom).

S63-22

S64-22

IBC: CHAPTER 2, SECTION 202, SECTION 202 (New), CHAPTER 16, SECTION 1602, 1602.1, SECTION 1603, 1603.1.3, SECTION 1605, 1605.1, 1605.2, SECTION 1608, 1608.1, 1608.2, 1608.2.1 (New), TABLE 1608.2, FIGURE 1608.2(1), FIGURE 1608.2(2), (New)

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

CHAPTER 2
DEFINITIONS

SECTION 202
DEFINITIONS

Add new definition as follows:

GROUND SNOW LOAD GEODATABASE. The ASCE database (version 2022-1.0) of geocoded values of risk-targeted design ground snow load values.

GROUND SNOW LOAD, p_g. design ground snow loads

GROUND SNOW LOAD, $p_{g(asd)}$. Allowable stress design ground snow loads

CHAPTER 16
STRUCTURAL DESIGN

SECTION 1602
NOTATIONS

Revise as follows:

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
$p_{g(asd)}$	=	Allowable stress design ground snow load
p_g	=	Ground snow load determined from reliability-targeted (strength-based) maps in Figures 1608.2(1) through 1608.2(4)
R	=	Rain load.
S	=	Snow load.
T	=	Cumulative effects of self-straining load forces and effects.
V_{asd}	=	Allowable stress design wind speed, miles per hour (mph) (km/hr) where applicable.
V	=	Basic design wind speeds, miles per hour (mph) (km/hr) determined from Figures 1609.3(1) through 1609.3(12) or ASCE 7.
W	=	Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.

SECTION 1603
CONSTRUCTION DOCUMENTS

Revise as follows:

1603.1.3 Roof snow load data. The ground snow *load*, p_g, shall be indicated. In areas where the ground snow *load*, p_g, exceeds 10 pounds per square foot (psf) (0.479 kN/m^2), the following additional information shall also be provided, regardless of whether snow *loads* govern the design of the roof:

1. Flat-roof snow *load*, p_f.
2. Snow exposure factor, C_e.
3. ~~Snow *load* importance factor, I_s.~~ *Risk category*.
4. Thermal factor, C_t.
5. Slope factor(s), C_s.
6. Drift surcharge load(s), p_d, where the sum of p_d and p_f exceeds 20 psf (0.96 kN/m^2).
7. Width of snow drift(s), *w*.

SECTION 1605
LOAD COMBINATIONS

Revise as follows:

1605.1 General. Buildings and *other structures* and portions thereof shall be designed to resist the strength load combinations specified in ASCE 7, Section 2.3, the a*llowable stress design* load combinations specified in ASCE 7, Section 2.4, or the alternative a*llowable stress design* load combinations of Section 1605.2.

Exceptions:

1. The modifications to load combinations of ASCE 7 Section 2.3, ASCE 7 Section 2.4, and Section 1605.2 specified in ASCE 7 Chapters 18 and 19 shall apply.
2. Where the allowable stress design load combinations of ASCE 7 Section 2.4 are used, flat roof snow *loads* of ~~30~~ 45 pounds per square foot (~~1.44~~ 2.15 kN/m^2) and *roof live loads* of 30 pounds per square foot (1.44 kN/m^2) or less need not be combined with seismic load. Where flat roof snow *loads* exceed ~~30~~ 45 pounds per square foot (~~1.44~~ 2.15 kN/m^2), ~~20~~ 15 percent shall be combined with seismic loads.
3. Where the allowable stress design load combinations of ASCE 7 Section 2.4 are used, crane hook loads need not be combined with *roof live loads* or with more than three-fourths of the snow load or one-half of the wind loads.

1605.2 Alternative allowable stress design load combinations. In lieu of the load combinations in ASCE 7, Section 2.4, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following combinations. Where using these alternative allowable stress load combinations that include wind or seismic *loads*, allowable stresses are permitted to be increased or load combinations reduced where permitted by the material chapter of this code or the referenced standards. For load combinations that include the counteracting effects of dead and wind *loads*, only two-thirds of the minimum *dead load* likely to be in place during a design wind event shall be used. Where using these alternative load combinations to evaluate sliding, overturning and soil bearing at the soil-structure interface, the reduction of foundation overturning from Section 12.13.4 in ASCE 7 shall not be used. Where using these alternative basic *load* combinations for proportioning foundations for loadings, which include seismic *loads*, the vertical seismic *load effect*, E_v, in Equation 12.4-4 of ASCE 7 is permitted to be taken equal to zero. Where required by ASCE 7, Chapters 12, 13 and 15, the load combinations including overstrength of ASCE 7, Section 2.3.6 shall be used.

(Equation 16-1)

$D + L + (Lr \text{ or } \underline{0.7}\, S \text{ or } R)$

$D + L + 0.6W$ **(Equation 16- 2)**

(Equation 16-3)

$D + L + 0.6W + \underline{0.7}S/2$

(Equation 16-4)

$D + L + \underline{0.7}S + 0.6(W/2)$

(Equation 16-5)

$D + L + \underline{0.1}\, S + E/1.4$

$0.9D + E/1.4$ **(Equation 16-6)**

Exceptions:

1. Crane hook *loads* need not be combined with *roof live loads* or with more than three-fourths of the snow load or one-half of the wind load.
2. Flat roof snow *loads* of ~~30~~ 45 pounds per square foot (~~1.44~~ 2.15 kN/m^2) or less and *roof live loads* of 30 pounds per square foot (1.44 kN/m^2) or less need not be combined with seismic loads. Where flat roof snow loads exceed ~~30~~ 45 pounds per square foot (~~1.44~~ 2.15 kN/m^2), ~~20~~ 15 percent shall be combined with seismic loads.

SECTION 1608
SNOW LOADS

1608.1 General. Design snow *loads* shall be determined in accordance with Chapter 7 of ASCE 7, but the design roof *load* shall be not less than that determined by Section 1607.

Revise as follows:

1608.2 Ground snow loads. The ground snow *loads* to be used in determining the design snow *loads* for roofs shall be determined in accordance with the reliability-targeted (strength based) ground snow load values in Chapter 7 of ASCE 7 or Figures 1608.2(1) ~~and~~ through 1608.2(~~2~~ 4) for the contiguous United States and Table 1608.2 for Alaska. Site-specific case studies shall be determined in accordance with Chapter 7 of ASCE 7 and shall be approved by the *building official.* ~~made in areas designated "CS" in Figures 1608.2(1) and 1608.2(2). Ground snow *loads* for sites at elevations above the limits indicated in Figures 1608.2(1) and 1608.2(2) and for all sites within the CS areas shall be *approved.* Ground snow *load* determination for such sites shall be based on an extreme value statistical analysis of data available in the vicinity of the site using a value with a 2-percent annual probability of being exceeded (50-year mean recurrence interval).~~ Snow loads are zero for Hawaii, except in mountainous regions as *approved* by the *building official.*

Add new text as follows:

1608.2.1 Ground snow conversion . Where required, the ground snow loads, p_g, of Figures 1608.2(1) through 1608.2(4) shall be converted to allowable stress design ground snow loads, $p_{g(asd)}$, using Equation 16-17 .

$p_{g(asd)} = 0.7\, p_g$ **(Equation 16-17)**

where:

$p_{g(asd)}$= *Allowable stress design* ground snow load

p_g= Ground snow load determined from Figures 1608.2(1) through 1608.2(4)

Revise as follows:

TABLE 1608.2 GROUND SNOW LOADS, p_g , FOR ALASKAN LOCATIONS

City/Town ~~LOCATION~~	~~Pounds per square foot~~	Elevation (ft)	Ground Snow Load, P_g[1, 2, 4] (lb/ft^2)			
	-		Risk Category			
	-		I	II	III	IV
Adak	~~30~~	100	32	40	46	50
Anchorage/Eagle River[3]	~~50~~	500	64	80	92	100
Arctic Village		2,100	38	48	55	60
~~Angoon~~	~~70~~					
~~Barrow~~	~~25~~					
~~Barter Island~~	~~35~~					
Bethel	~~40~~	100	51	64	74	80
Bettles		700	102	128	147	160
~~Big Delta~~	~~50~~					
Cantwell		2,100	109	136	156	170
Cold Bay	~~25~~	100	45	56	64	70
Cordova	~~100~~	100	128	160	184	200
Deadhorse		100	32	40	46	50
Delta Junction		400	51	64	74	80
Dillingham		100	141	176	202	220
Emmonak		100	128	160	184	200
Fairbanks	~~60~~	1,200	77	96	110	120
Fort Yukon	~~60~~	400	64	80	92	100
Galena	~~60~~	200	77	96	110	120
Girdwood		200	179	224	258	280
Glennallen		1,400	58	72	83	90
~~Gulkana~~	~~70~~					
Haines		100	237	296	340	370
Holy Cross		100	154	192	221	240
Homer[3]	~~40~~	500	58	72	83	90
Iliamna		200	102	128	147	160
Juneau	~~60~~	100	90	112	129	140
Kaktovik		100	58	72	83	90
Kenai/Soldotna	~~70~~	200	83	104	120	130
Ketchikan		100	38	48	55	60
Kobuk		200	115	144	166	180
Kodiak	~~30~~	100	45	56	64	70
Kotzebue	~~60~~	100	77	96	110	120
McGrath	~~70~~	400	83	104	120	130
Nenana	~~80~~	400	96	120	138	150
Nikiski		200	102	128	147	160
Nome	~~70~~	100	90	112	129	140
Palmer/Wasilla	~~50~~	500	64	80	92	100
Petersburg	~~150~~	100	122	152	175	190
Point Hope		100	58	72	83	90
Saint Lawrence Island		100	122	152	175	190
Saint Paul Islands	~~40~~	100	51	64	74	80

City/Town ~~LOCATION~~	~~Pounds per square foot~~	Elevation (ft)	Ground Snow Load, P (lb/ft)			
	-		Risk Category			
	-		I	II	III	IV
Seward	~~50~~	100	77	96	110	120
~~Shemya~~	~~25~~					
Sitka	~~50~~	100	64	80	92	100
Talkeetna	~~120~~	400	154	192	221	240
Tok		1,700	45	56	64	70
Umiat		300	38	48	55	60
Unalakleet	~~50~~	100	45	56	64	70
Unalaska		100	96	120	138	150
Utqiagvik (Barrow)		100	32	40	46	50
Valdez	~~160~~	100	205	256	294	320
Wainwright		100	32	40	46	50
Whittier	~~300~~	100	346	432	497	540
Willow		300	102	128	147	160
~~Wrangell~~	~~60~~					
Yakutat	~~150~~	100	179	224	258	280

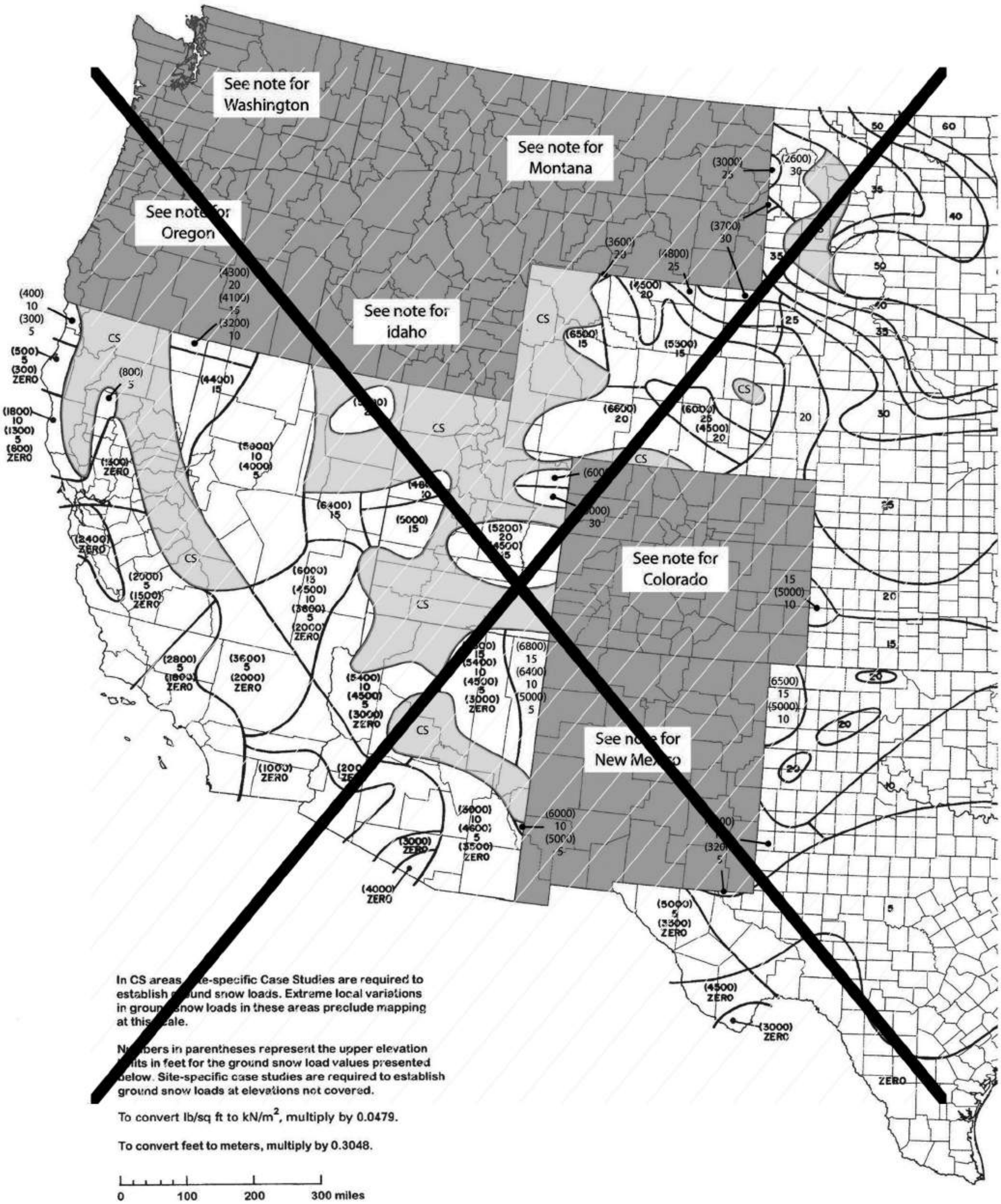
For SI: 1 pound per square foot = 0.0479 kN/m^2, 1 foot = 0.3048 m

a. Statutory requirements of the *building official* are not included in this state ground snow load table

b. For locations where there is substantial change in altitude over the city/town, the load applies at and below the cited elevation within the jurisdiction and up to 100 feet above the cited elevation unless otherwise noted.

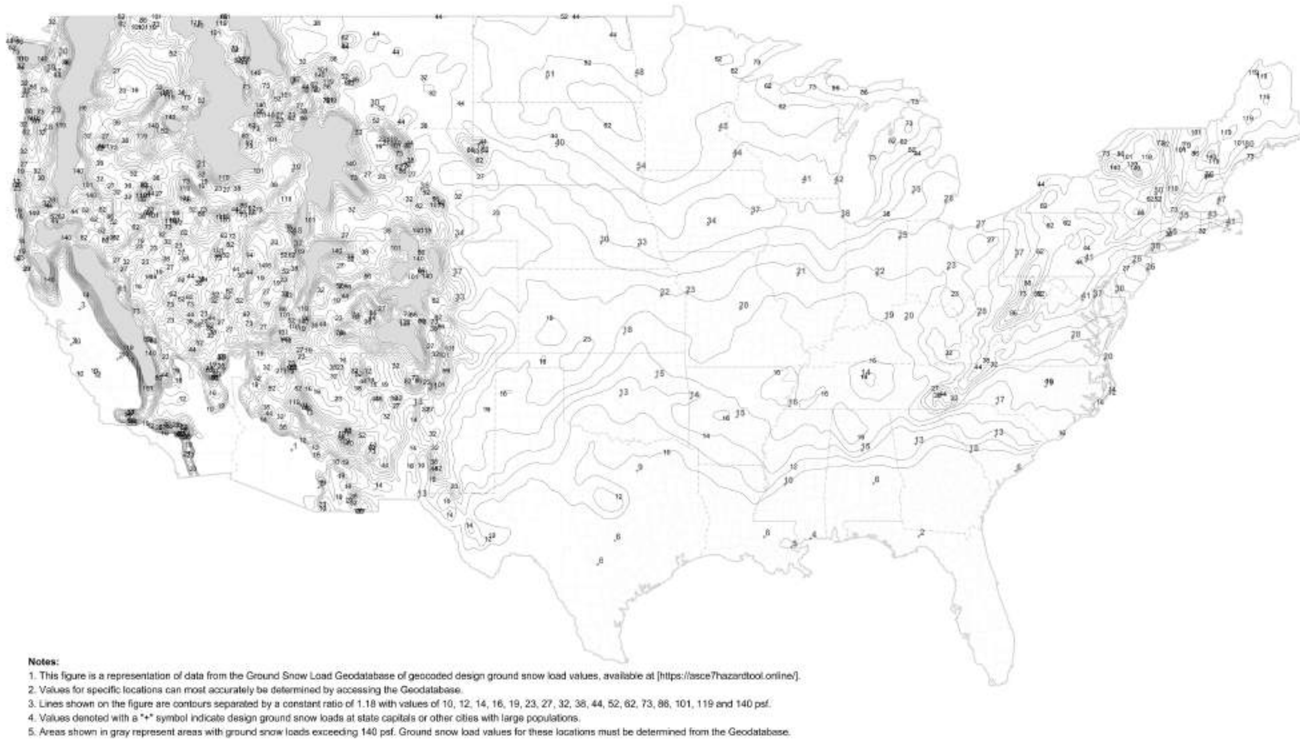
c. For locations in Anchorage/Eagle River and Homer above the cited elevation, the ground snow load shall be increased by 15% for every 100 feet above the cited elevation

Delete and substitute as follows:



~~NOTE:~~ ~~See ASCE 7 Table 7.2-2 for Colorado, Table 7.2-3 for Idaho, Table 7.2-4 for Montana, Table 7.2-5 for Washington, Table 7.2-6 for New Mexico and Table 7.2-7 for Oregon.~~

~~FIGURE 1608.2(1) GROUND SNOW LOADS, p_g , FOR THE UNITED STATES (psf)~~



NOTES:

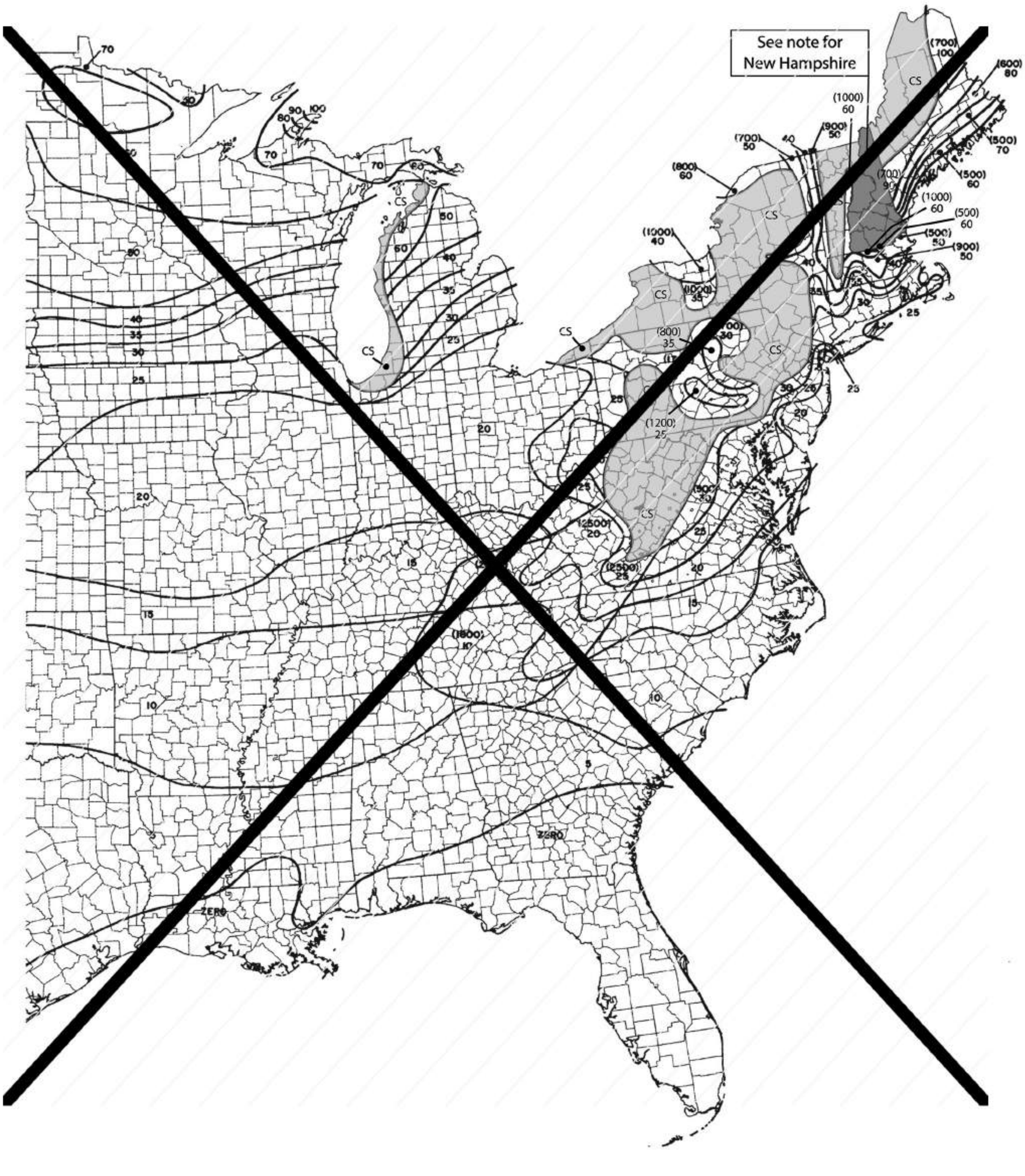
a. Location-specific ground snow load values are provided in the *Ground Snow Load Geodatabase* of geocoded design ground snow load values, which can be accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/ or an approved equivalent.

b. Lines shown on the figure are contours separated by a constant ratio 1.18 with values of 10, 12, 14, 16, 19, 23, 27, 32, 38, 44, 52, 62, 73, 86, 101, 119, and 140 psf.

c. Values denoted with a "+" symbol indicate design ground snow loads at state capitals or other high-population locations.

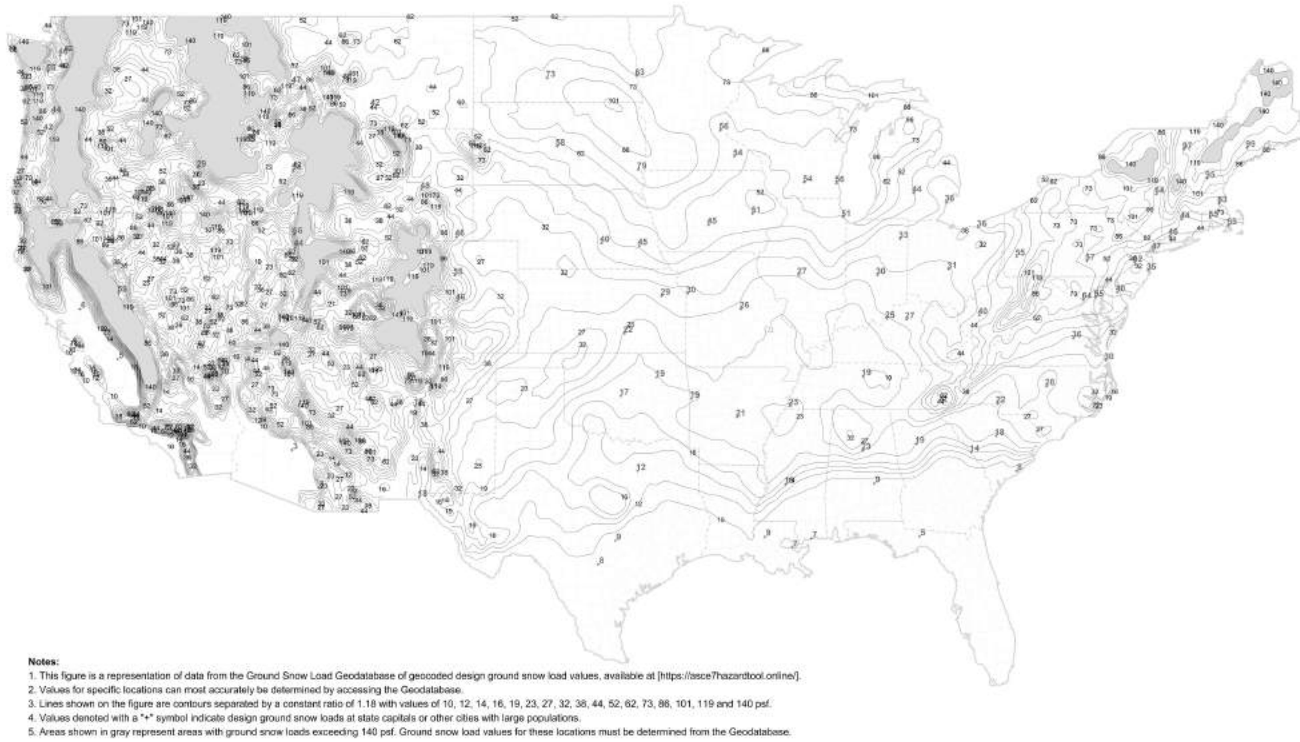
d. Areas shown in gray represent areas with ground snow loads exceeding 140 psf. Ground snow load values for these locations can be determined from the Geodatabase.

FIGURE 1608.2(1) Ground snow loads, p_g, for Risk Category I for the conterminous United States (lb/ft^2).



~~**Note:** See ASCE 7 Table 7.2-8 for New Hampshire.~~

~~**FIGURE 1608.2(2) GROUND SNOW LOADS, p_g, FOR THE UNITED STATES (psf)**~~



NOTES:

a. Location-specific ground snow load values are provided in the *Ground Snow Load Geodatabase* of geocoded design ground snow load values, which can be accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/ or an approved equivalent.

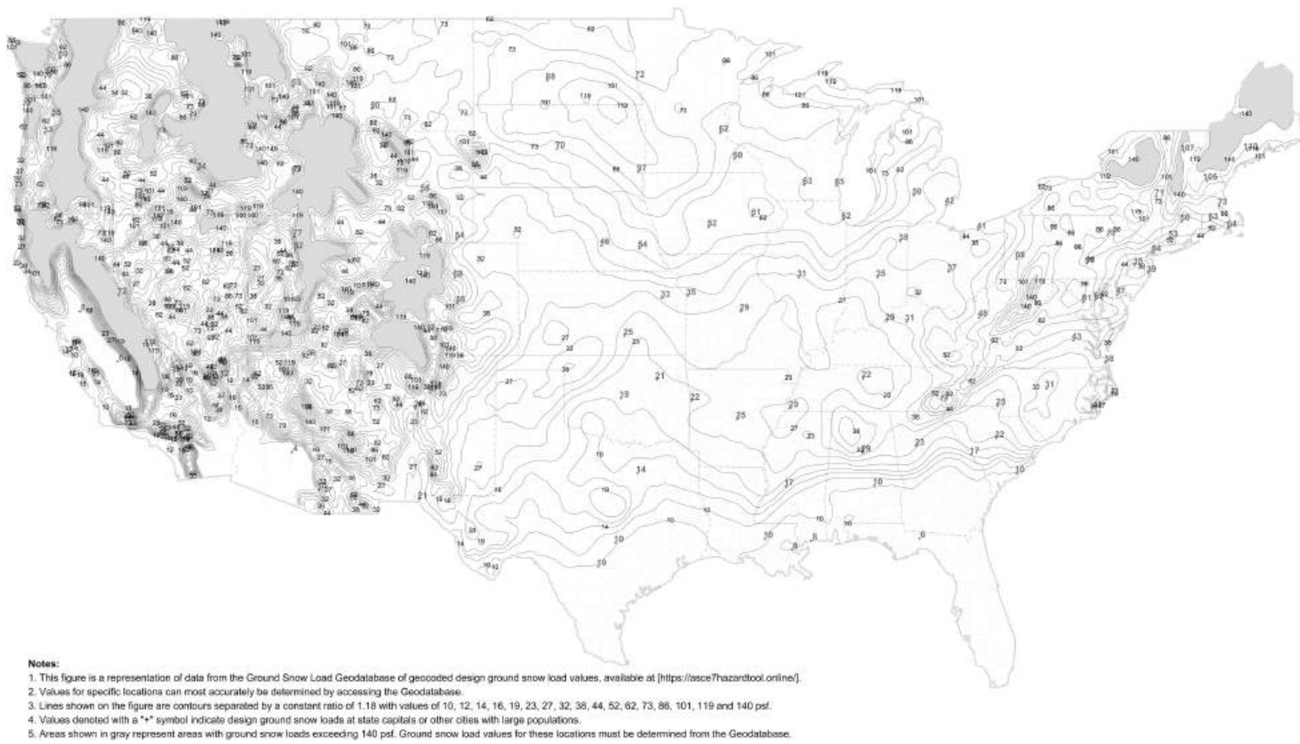
b. Lines shown on the figure are contours separated by a constant ratio 1.18 with values of 10, 12, 14, 16, 19, 23, 27, 32, 38, 44, 52, 62, 73, 86, 101, 119, and 140 psf.

c. Values denoted with a "+" symbol indicate design ground snow loads at state capitals or other high-population locations.

d. Areas shown in gray represent areas with ground snow loads exceeding 140 psf. Ground snow load values for these locations can be determined from the Geodatabase.

FIGURE 1608.2(2) Ground snow loads, p_g, for Risk Category II for the conterminous United States (lb/ft^2).

Add new text as follows:



NOTES:

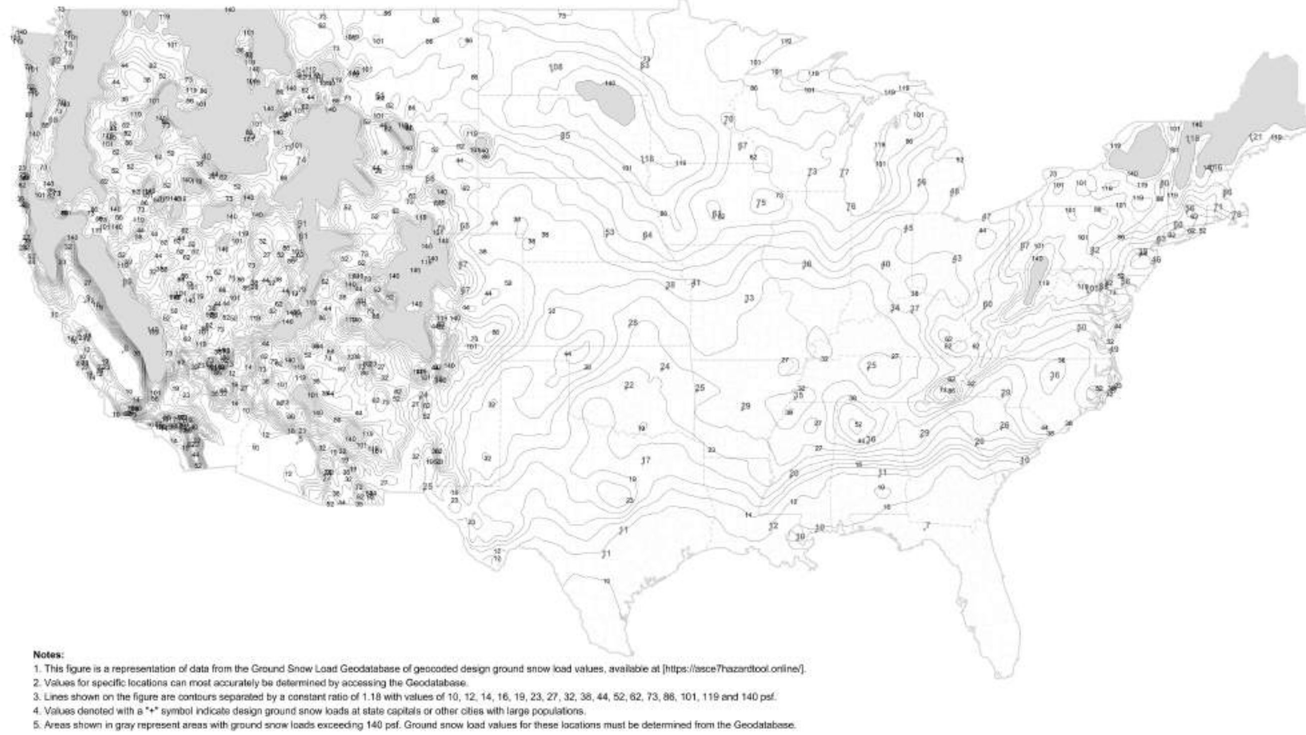
a. Location-specific ground snow load values are provided in the *Ground Snow Load Geodatabase* of geocoded design ground snow load values, which can be accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/ or an approved equivalent.

b. Lines shown on the figure are contours separated by a constant ratio 1.18 with values of 10, 12, 14, 16, 19, 23, 27, 32, 38, 44, 52, 62, 73, 86, 101, 119, and 140 psf.

c. Values denoted with a "+" symbol indicate design ground snow loads at state capitals or other high-population locations.

d. Areas shown in gray represent areas with ground snow loads exceeding 140 psf. Ground snow load values for these locations can be determined from the Geodatabase.

FIGURE 1608.2(3) Ground snow loads, p_g, for Risk Category III for the conterminous United States (lb/ft^2)



NOTES:

a. Location-specific ground snow load values are provided in the *Ground Snow Load Geodatabase* of geocoded design ground snow load values, which can be accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/ or an approved equivalent.

b. Lines shown on the figure are contours separated by a constant ratio 1.18 with values of 10, 12, 14, 16, 19, 23, 27, 32, 38, 44, 52, 62, 73, 86, 101, 119, and 140 psf.

c. Values denoted with a "+" symbol indicate design ground snow loads at state capitals or other high-population locations.

d. Areas shown in gray represent areas with ground snow loads exceeding 140 psf. Ground snow load values for these locations can be determined from the Geodatabase.

FIGURE 1608.2(4) Ground snow loads, p_g, for Risk Category IV for the conterminous United States (lb/ft^2)

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal includes technical updates as well as editorial corrections or re-organizations. Technical updates are explained further below, along with a rationale for developing the new ground snow load data.

A summary of the specific coordination changes is provided below.

Section 202 Definitions.

Add new definition of *Ground Snow Loads Geodatabase* as the location for the geocoded values of risk-targeted design ground snow load values. The database is uniquely identified by the version (2022-1.0).

Section 1603.1 General. Added a new term $p_{g(asd)}$ to provide a value of ground snow that can be correctly used with existing provisions is the IBC and IRC. **Section 1603.1.3 Roof snow load data.** This change removes the Snow load importance factor, I_s, which is no longer needed because the ground snow loads included are now risk-targeted maps.

Section 1605.1 General. This changes the current allowable stress design limits to the appropriate strength load (30psf/0.7 = approximately 45 psf) that will be calculated from the strength-based ground snow loads from the new maps. The use of 45 psf as a bound for when snow loads are considered in seismic weight is slightly conservative based on the calculated value. Because the reliability targeted loads are greater than the unfactored 50 year MRI loads in the current standard, 15% of the snow load is used (approximately equal to 20%/1.6).

Section 1605.2 Alternative allowable stress design load combinations.

This section was updated to match the revisions in the ASD load combinations in ASCE 7-22. The factor on snow load as the principal variable load for strength design changes from 1.6 to 1.0. Changes to the ASD combinations were chosen by first dividing the current factor by 1.5 and then rounding up to the nearest 0.05. We chose not to round down because that would assume that ASD standards have a reliability as uniform as a strength design standard, which has not been demonstrated. Also the allowable stress design load limit of 30 psf is changed to a strength-based design of 45 psf as described above.

Section 1608.2 Ground snow loads. This section is updated to point to the four new risk-targeted maps in **Figures 1608.2(1) through 1608.2(4)**. It also updates the **Table 1608.2** for risk-targeted ground snow loads for Alaskan cites.

Section 1608.2.1 Ground snow conversion. This is a new section (modeled after the approach used for wind loads) that introduces a new term for allowable stress design ground snow loads, pg(asd), in order to provide a value that can be used correctly with the existing provisions in the IBC and IRC that have developed tables or charts based on the allowable stress design ground snow loads.

Technical rationale

The previous editions of ASCE 7 included mapped values for ground snow load, p_g, (GSL) based on a statistical analysis using National Weather Service snowfall data from 1952 to 1992. This map was first included in the 1992 edition of ASCE 7 and was updated with additional information for the 1995 edition. It has remained essentially as it was in 1995 for each subsequent edition through 2016. Additionally, at the time that map was generated, the authors (researchers at the Cold Regions Research and Engineering Laboratory [CRREL] of the US Army Corps of Engineers) marked as Case Study or ‘CS’ several significant regions, encompassing large parts of eighteen states, where the statistical analysis had not been completed or the data were insufficient to perform the analysis. The CS regions place significant burden on structural engineers to do snow load hazard analysis, and very little guidance has been provided as to how to conduct such studies.

The new GSL in ASCE 7-22 are included in four updated national GSL datasets in electronic and map form. The electronic datasets are defined in the Ground Snow Loads Geodatabase (version 2022-1.0) in ASCE 7-22, and the maps in Chapter 7 are a representation of that data. The new snow loads are also based on nearly 30 years of additional snow load data since the previous study and updated procedures for estimating snow loads from depth-only measurements. The loads account for site-specific variability throughout the United States in both the magnitude and variation of the annual ground snow loads. Additionally, this approach incorporates advanced spatial mapping that has reduced the number and size of case study regions in mountainous areas significantly and eliminates discontinuities in design values across state boundaries (Bean et al. 2021).

A very small fraction of the locations defined in the Ground Snow Loads Geodatabase indicate that a case study must be completed to determine the ground snow load. These case-study regions are now limited and apply only to locations higher than any locally available snow measurement locations. Database ground snow load values are still provided to the user, with a warning that the estimated value lies outside the range of elevations of surrounding measurement locations. Information from local experts, from the Bean et al. (2021) report, or from Buska et al. (2020) can be used to determine values at these locations.

ASCE 7-22 also includes GSL maps for each Risk Category. Each of these maps (and associated datasets) is based on reliability calculations that target the reliability objectives of Chapter 1 of ASCE 7-22. The adoption of reliability-targeted design ground snow loads represents a significant change from ASCE/SEI 7-16 and prior editions, which previously used ground snow loads with a 50-year mean recurrence interval (MRI). Reliability-targeted loads are adopted to address the nonuniform reliability of roofs designed according to the 50-year snow load in different parts of the country, due to climatic differences. In some parts of the country, designing for the 1.6 load factor times the 50-year value does not meet the reliability targets of the standard (and, in some of these places, failures due to an underestimated ground snow load have been observed); in other places, designing for the 1.6 load factor times the 50-year value is unnecessarily conservative.

Given that the values of GSL have been provided as allowable stress loads up until this point, there are many provisions within the IBC and the IRC that rely on ASD values. Therefore a new section is proposed to provide a conversion from the strength-based values provided in the reliability-targeted ground snow loads maps to an ASD value. An additional, separate code change proposal will be submitted for clarifying where existing tables are for ASD values.

-

References

Bean, B., Maguire, M., Sun, Y, Wagstaff, J., Al-Rubaye, S., Wheeler, J., Jarman, S., and Rogers, M. (2021). “The 2020 National Snow Load Study.” Mathematics and Statistics Faculty Publications. Paper 276.

Buska, J., Greatorex, A., and Tobiasson, W. (2020). “Site-specific Case Studies for Determining Ground Snow Loads in the United States”. U.S. Army Corps of Engineers Engineer Research and Development Center. ERDC/CRREL SR-20-1.

Cost Impact: The code change proposal will increase the cost of construction
ASCE 7 is a national minimum design load standard. Therefore, as the study of each hazard advances from one edition to the next, updates to the national maps will impact the nation differently. In this case, the ground snow loads developed for ASCE 7-22 will result in some decreases in loads, but on average results in an increase in loads. The proposed code change will modestly increase the cost of construction in the areas were the snow loads have increased.

In order to estimate this impact, roof total loads that would be used in specifying roof secondary structural members, such as open-web roof joists, were calculated for approximately 80 locations throughout the portion of the conterminous US affected by snow loading. The box plot to the right shows the ratio of these Total Load results.

The average change in Total Load is a 5% increase. At most locations, the change is between a 5% reduction to a 15% increase. Regarding the effect of this average 5% increase, the increase in Total Load would generally equate to an increase in weight of these secondary members of +5% and a structural cost impact of about +2-3%. Extending this to the effects on the total in-place cost of the structure, we expect an estimated impact of +0.5-0.7%.

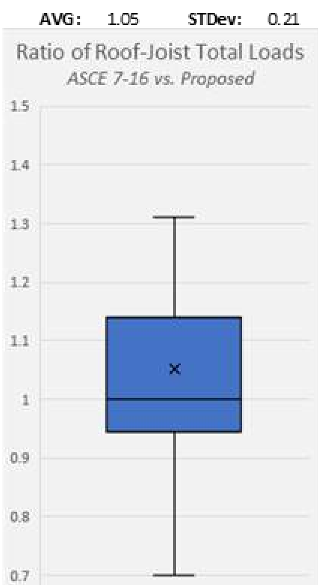


Figure 1. Box plot of ratio of roof-joist total loads of ASCE 7-16 vs. ASCE 7-22.

S64-22

S65-22

IBC: 1602.1, 1605.2

Proponents: John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com); Stephen Kerr, representing Self (skerr@jwa-se.com)

2021 International Building Code

Revise as follows:

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
R	=	Rain load.
S	=	Snow load.
T	=	Cumulative effects of self-straining load forces and effects.
V_{asd}	=	Allowable stress design wind speed, miles per hour (mph) (km/hr) where applicable.
V	=	Basic design wind speeds, miles per hour (mph) (km/hr) determined from Figures 1609.3(1) through 1609.3(12) or ASCE 7.
W	=	Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.
$\underline{W_T}$	=	Load due to tornado wind pressure in accordance with Chapter 32 of ASCE 7.

1605.2 Alternative allowable stress design load combinations. In lieu of the load combinations in ASCE 7, Section 2.4, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following combinations. Where using these alternative allowable stress load combinations that include wind or seismic *loads*, allowable stresses are permitted to be increased or load combinations reduced where permitted by the material chapter of this code or the referenced standards. For load combinations that include the counteracting effects of dead and wind *loads*, only two-thirds of the minimum *dead load* likely to be in place during a design wind event shall be used. Where using these alternative load combinations to evaluate sliding, overturning and soil bearing at the soil-structure interface, the reduction of foundation overturning from Section 12.13.4 in ASCE 7 shall not be used. Where using these alternative basic *load* combinations for proportioning foundations for loadings, which include seismic *loads*, the vertical seismic *load effect*, E_v, in Equation 12.4-4 of ASCE 7 is permitted to be taken equal to zero. Where required by ASCE 7, Chapters 12, 13 and 15, the load combinations including overstrength of ASCE 7, Section 2.3.6 shall be used.

$\cancel{D + L + (L_r \text{ or } S \text{ or } R)}$ ~~**(Equation 16-1)**~~

$D + L + (Lr \text{ or } \underline{0.7}S \text{ or } R)$ **(Equation 16-1)**

$\cancel{D + L + 0.6W}$ ~~**(Equation 16- 2)**~~

$D + L + 0.6W \underline{\text{ or } 0.6W_T}$ **(Equation 16-2)**

$\cancel{D + L + 0.6W + S/2}$ ~~**(Equation 16-3)**~~

$D + L + 0.6W \underline{\text{ or } 0.6W_T} + \underline{0.7}(S/2)$ **(Equation 16-3)**

$\cancel{D + L + S + 0.6(W/2)}$ ~~**(Equation 16-4)**~~

$D + L + \underline{0.7}S + 0.6(W/2) \underline{\text{ or } 0.6(W_T/2)}$ **(Equation 16-4)**

$\cancel{D + L + S + E/1.4}$ ~~**(Equation 16-5)**~~

$D + L + \underline{0.7}S + \underline{0.7}E\cancel{/1.4}$ **(Equation 16-5)**

$\cancel{0.9D + E/1.4}$ ~~**(Equation 16-6)**~~

$0.9D + \underline{0.7}S\cancel{/1.4}$ **(Equation 16-6)**

Exceptions:

1. Crane hook *loads* need not be combined with *roof live loads* or with more than three-fourths of the snow load or one-half of the wind load.

2. Flat roof snow *loads* of 30 pounds per square foot (1.44 kN/m^2) or less and *roof live loads* of 30 pounds per square foot (1.44 kN/m^2) or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 pounds per square foot (1.44 kN/m^2), 20 percent shall be combined with seismic loads.

Reason Statement: The Alternate allowable stress load combinations must change because the underlying basis for these loads in ASCE 7-22 has changed.
Snow loads have changed from being presented as ASD loads to LRFD loads. Thus, in ASD load combinations, S is replaced with 0.7S in ASD load combinations.

ASCE 7-22 has added Chapter 32 for design for Tornado Loads. These are presented at the LRFD level. In ASD Load Combinations these forces are presented as $0.6W_T$.

ASCE 7 presents seismic loads as 0.7 E in ASD load combinations. The IBC presents seismic loads as E/1.4 (0.71E) in ASD load combinations. The change for seismic loading to 0.7E in Equations 16-5 and 16-6 is for consistency between the two documents.

Cost Impact: The code change proposal will increase the cost of construction
The cost of structures designed for snow loading or seismic loading will neither increase or decrease. The cost of building structures for tornado loading may increase.The cost of structures designed for snow loading or seismic loading will neither increase or decrease. The cost of building structures for tornado loading may increase.

S65-22

S66-22

IBC: 1603.1

Proponents: John-Jozef Proczka, representing Self (John-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1603.1 General. *Construction documents* shall show the material, size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.9 shall be indicated on the *construction documents*.

> **Exception:** *Construction documents* for buildings constructed in accordance with the *conventional light-frame construction* provisions of Section 2308 shall indicate the following structural design information:
>
> 1. Floor and roof dead and live loads.
> 2. Ground snow load, p_g.
> 3. Basic design wind speed, V, miles per hour (mph) (km/hr) and allowable stress design wind speed, V_{asd}, as determined in accordance with Section 1609.3.1 and wind exposure.
> 4. *Seismic design category* and *site class*.
> 5. Flood design data, if located in *flood hazard areas* established in Section 1612.3.
> 6. Design load-bearing values of soils.
> 7. Rain load data.

Reason Statement: The code provisions of structural designs are very reliant on the type of material being used for structural members, but there is no global requirement to identify this material, even though a code compliant design would be impossible without such identification. This change would add a global requirement to identify the material of construction for the structural members.
Construction documents are defined to include specifications, so this change would not place a requirement to identify the material of construction directly on the drawings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is essentially an editorial reorganization to place the requirements that are already inherent in the code in an obvious location

S66-22

S67-22

IBC: 1603.1, 1603.1.1 (New)

Proponents: John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@grenierenge.com)

2021 International Building Code

Revise as follows:

1603.1 General. *Construction documents* shall show the size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through ~~1603.1.9~~ 1603.1.10 shall be indicated on the *construction documents*.

> **Exception:** *Construction documents* for buildings constructed in accordance with the *conventional light-frame construction* provisions of Section 2308 shall indicate the following structural design information:
>
> 1. Floor and roof dead and live loads.
> 2. Ground snow load, p_g.
> 3. Basic design wind speed, *V*, miles per hour (mph) (km/hr) and allowable stress design wind speed, V_{asd}, as determined in accordance with Section 1609.3.1 and wind exposure.
> 4. *Seismic design category* and *site class*.
> 5. Flood design data, if located in *flood hazard areas* established in Section 1612.3.
> 6. Design load-bearing values of soils.
> 7. Rain load data.

Add new text as follows:

1603.1.1 Design Dead Loads. The *dead load* as defined in section 1606 used in the design shall be indicated for all areas of the structure.

Reason Statement: 1. By requiring the design dead loads to be listed on the construction documents provides a building official a quick review of the project and can also act as a check list item for the Registered Design Professional in Responsible Charge, especially if there are different areas that have different dead loads.
2. Understanding what the original design dead loads were used for a structure is useful information whenever there are revisions, alterations or additions proposed to a structure in the future.

3. The current requirement of indicating the loads listed in sections 1603.1.1 thru 1603.1.9 and not requiring the Design Dead Load makes the list incomplete.

4. The Design Dead loads are currently required to be listed on the drawings for conventional light frame construction, which establishes a precedence.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This will be documentation information only and has no cost impact.

S67-22

S68-22

IBC: 1603.1.10 (New)

Proponents: John-Jozef Proczka, representing Self (John-jozef.proczka@phoenix.gov)

2021 International Building Code

Add new text as follows:

1603.1.10 **Material Specification.** Specifications for the materials to be used in the construction of the structural members shall be shown on the *construction documents* in accordance with the applicable material chapters and referenced standards.

Reason Statement: This change would add a global more readily seen requirement to identify the material properties of construction for the structural members, as already required by the structural referenced standards or material chapters of the IBC.
The code provisions of structural designs are very reliant on the type of material being used for structural members. The absence of material specification can cause insufficiently strong structures, especially when similar materials are or can be used, such as: differing steel grades, steel versus aluminum hollow sections, and differing wood species/grades. Material specification absence causes issues with correct communication between the designer, the contractor, and the inspector.

Construction documents are defined to include specifications, so this change would not place a requirement to identify the material of construction directly on the drawings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial reorganization to place the requirements that are already in the code in an obvious and globally applicable location.

S68-22

S69-22

IBC: 1604.4

Proponents: Ronald LaPlante, Division of State Architect, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (ron.laplante@dgs.ca.gov); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

1604.4 Analysis. *Load effects* on structural members and their connections shall be determined by methods of structural analysis that take into account equilibrium, general stability, geometric compatibility and both short- and long-term material properties.
Members that tend to accumulate residual deformations under repeated service *loads* shall have included in their analysis the effects of added deformations expected to occur during their service life.

Any system or method of construction to be used shall be based on a rational analysis in accordance with well-established principles of mechanics. Such analysis shall result in a system that provides a complete *load* path capable of transferring *loads* from their point of origin to the load-resisting elements. The total lateral force shall be distributed to the various vertical elements of the lateral force-resisting system in proportion to their rigidities, considering the rigidity of the horizontal bracing system or *diaphragm*. Rigid elements assumed not to be a part of the lateral force-resisting system are permitted to be incorporated into buildings provided that their effect on the action of the system is considered and provided for in the design. <u>Where a diaphragm is not permitted to be idealized as either flexible or rigid in accordance with ASCE 7 or for wood diaphragms in accordance with AWC SDPWS, it is permitted to perform an envelope analysis of the structure using a flexible and rigid diaphragm analysis separately and designing each component for the more severe load condition in lieu of a semirigid diaphragm analysis.</u> ~~A *diaphragm* is rigid for the purpose of distribution of *story* shear and torsional moment when the lateral deformation of the *diaphragm* is less than or equal to two times the average *story* drift.~~ Where required by ASCE 7, provisions shall be made for the increased forces induced on resisting elements of the structural system resulting from torsion due to eccentricity between the center of application of the lateral forces and the center of rigidity of the lateral force-resisting system. Every structure shall be designed to resist the effects caused by the forces specified in this chapter, including overturning, uplift and sliding. Where sliding is used to isolate the elements, the effects of friction between sliding elements shall be included as a force.

Reason Statement: ASCE 7 Section 12.3.1 requires that the structural analysis consider the relative stiffness of the diaphragms and the vertical elements of the seismic force-resisting system. This section also requires the structural analysis to explicitly consider the stiffness of the diaphragm with a semirigid diaphragm analysis unless the diaphragms meet certain conditions where they may be idealized as flexible or rigid. The current IBC language is in direct conflict with ASCE 7 as it permits a simple comparison of the diaphragm deflection relative to the vertical seismic force-resisting system average drift as whether a diaphragm is either rigid or flexible and this would never result in a semirigid diaphragm analysis. There are many conditions that occur in buildings where a semirigid diaphragm analysis is necessary to develop a more accurate distribution of forces in the structure. The proposed change will align the IBC with ASCE 7 while also permitting an envelope solution for buildings where a 3D analysis may not have been performed.
Furthermore, this change in necessary as the current IBC language provides no guidance on which loads are to be used to evaluate the lateral deformation of the diaphragm to compare it to the story drift to determine the rigid diaphragm condition. For example, for seismic design, diaphragms have different design loads than the vertical seismic force-resisting system when computing drift. ASCE 7 provides clarity on which design loads are to be used to compute these displacements, which the IBC is lacking.

The SDPWS provides specific requirements for when a diaphragm may be idealized as flexible or rigid and that direct reference has been added to clarify that for wood diaphragms, that standard may be used.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not, in general, increase or decrease the overall cost of construction, rather provide an alternate diaphragm analysis approach, that in some cases may cause less design effort and in other case more design effort. The exception can be used to limit the design effort and avoid a computer analysis.

S69-22

S70-21

IBC: TABLE 1604.5

Proponents: Homer Maiel, PE,CBO, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay) (hmaiel@gmail.com)

2021 International Building Code

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

Portions of table not shown remain unchanged.

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of the public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000.[a] Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code*; and Are sufficient to pose a threat to the public if released.[b]

RISK CATEGORY	NATURE OF OCCUPANCY
IV	Buildings and other structures designated as essential facilities, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code*; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression. <u>Storm shelters in accordance with Section 423.1</u>

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason Statement: This is simply cross refering a table to a section and a section to a table. In Section 423.1 there is mention of storm shelters to comply with Table 1604.5 as a Risk Cat. IV. However, table does not mention Section 423.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply an editorial clarification; make a section and a table to reference each other.

S70-21

S71-22

IBC: 1604.5

Proponents: Ali Fattah, representing City of San Diego Development Services Department (AFATTAH@SANDIEGO.GOV)

2021 International Building Code

Revise as follows:

1604.5 Risk category. Each building and structure shall be assigned a *risk category* in accordance with Table 1604.5. Where a referenced standard specifies an occupancy category, the *risk category* shall not be taken as lower than the occupancy category specified therein. Where a referenced standard specifies that the assignment of a *risk category* be in accordance with ASCE 7, Table 1.5-1, Table 1604.5 shall be used in lieu of ASCE 7, Table 1.5-1.

~~Exception~~ Exceptions:

1. The assignment of buildings and structures to Tsunami *Risk Categories* III and IV is permitted to be in accordance with Section 6.4 of ASCE 7.
2. Free standing parking garages shall be assigned to *Risk Category II.*

Reason Statement: The proposed code change is necessary to address an anomaly in the IBC whereby large parking structures that serve airports, shopping centers and other large buildings trigger a risk Category III designation when they have a floor area that exceeds 1,000,00 sq ft. The code change addresses the intent of the IBC as well as ASCE 7 whereby the codes are interested in providing more protection for buildings with a high concentration of occupants and certain large buildings that in total have 5,000 or more occupants. ASCE 7 intends to improve protection for "Buildings and other structures, the failure of which could pose a substantial risk to human life"
The occupant load for parking garages is determined based on an occupant load factor of 200 sq ft per occupant gross. There are circumstances where even when deducting drive aisles and the other items permitted to establish an occupant load based on net area the total occupant load can still exceed 5,000.The occupancy for parking garages is classified as a Group S-2 light hazard storage area and the occupant load density tends to be low due to the intermittent nature of the storage occupancy.

- It is hard to imagine that a large parking garage will have 5,000 occupants simultaneously entering or exiting a garage concurrent with the occurrence of a major earthquake.
- From experience large structures may experience partial damage or collapse but the entire structure should not collapse.

The Commentary to ASCE 7 states "Classification continues to reflect a progression of the anticipated seriousness of the consequence of failure from lowest risk to human life (Risk Category I) to the highest (Risk Category IV)." It is therefore reasonable to assign free standing parking structures to Risk Category II.

My jurisdiction recently review a 5 level 2.5 million sq ft parking plaza, a free standing open parking garage, that had to be structurally divided into two or more structures with independent means of egress and life safety systems. The garage will serve an enlarged replacement terminal at San Diego International Airport. Proponent has also heard from other jurisdictions that had similar projects.

The proposed code change shall be considered on it's own and is not reliant on the approval of other related code changes.

Cost Impact: The code change proposal will decrease the cost of construction
The proposed code change will have the effect of reducing earthquake loads on parking garages the are large and have a low concentration of occupant load.

The code change will also reduce the need to create separate structures and will allow more efficient designs where the distribution and sizing of exists is only dependent on the requirements in IBC Chapter 10. Additionally, the code change will permit the use of common life safety systems such as emergency power from a common generator or UPS system.

S71-22

S72-22

IBC: TABLE 1604.5

Proponents: Ali Fattah, representing City of San Diego Development Services Department (AFATTAH@SANDIEGO.GOV)

2021 International Building Code

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000.[a] Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]

RISK CATEGORY	NATURE OF OCCUPANCY
IV	Buildings and other structures designated as essential facilities, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load. <u>The floor area for vehicular drive aisles shall be permitted to be excluded in the determination of net floor area in parking garages.</u>

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason Statement: The proposed code change is necessary to clarify the determination of occupant load in parking garages when establishing the total occupant load in a building for purposes of assigning the Risk Category. Table1604.5 assigns risk categories based on the occupant load in an occupancy or the building. Parking garages are classified as occupancy Group S-2 and footnote (a) to the table permits the use of floor area net to determine the total occupant load used in assigning the Risk Category.

- The IBC defines floor area net as "[BE] FLOOR AREA, NET. The actual occupied area not including unoccupied accessory areas such as corridors , stairways , ramps , toilet rooms, mechanical rooms and closets."
- Aisle is also defined as "[BE] AISLE. An unenclosed exit access component that defines and provides a path of egress travel"

While occupants use drive aisles to access parked motor vehicles they are not commonly identified as AISLE based on the definition. The proposed code change modifies footnote (a) to clarify that floor area for drive aisles can be deducted when determining net floor area for the assignment of Risk Category. Unlike mechanical access parking garages, vehicular aisles are an integral part for the functioning the of the garage and occupants in the motor vehicle would not be located concurrently within the drive aisle. Additionally, drive aisles are not commonly associated with exit access aisles.

There can be situations where a public assembly such as a multiplex cinema or an amenity space for a residential community may be located above a parking structure serving that amenity space and other surrounding buildings. The occupant load in the parking garage itself which is accessory to the public assembly or other buildings may requiring the structure to be assigned to Risk Category III merely due to the size of the parking garage.The proposed code change should be considered to be editorial in nature.
The occupant load for parking garages is determined based on an occupant load factor of 200 sq ft per occupant gross. there are circumstances when even deducting drive aisles and the other items permitted to establish an occupant load based on net area the total occupant load can still exceed 5,000.The occupancy for parking garages is classified as a Group S-2 light hazard storage area and the occupant load density tends to be low due to the intermittent nature of the storage occupancy.

- It is hard to imagine that a large parking garage will have 5,000 occupants simultaneously entering or exiting a garage concurrent with the occurrence of a major earthquake.

- From experience large structures may experience partial damage or collapse but the entire structure should not collapse.

The Commentary to ASCE 7 states "Classification continues to reflect a progression of the anticipated seriousness of the consequence of failure from lowest risk to human life (Risk Category I) to the highest (Risk Category IV)." It is therefore reasonable to assign free standing parking structures to Risk Category II.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code change is editorial and can be considered to reduce the cost of construction in jurisdiction that do not permit the deduction of the floor area in drive aisle. Proponent feels the code change will neither increase nor decrease the cost of construction and merely adds a clarification to footnote (a).

S72-22

S73-22

IBC: TABLE 1604.5

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000.[a] Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]

RISK CATEGORY	NATURE OF OCCUPANCY
IV	Buildings and other structures designated as essential facilities, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression <u>of a community.</u>

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason Statement: Fire pumps for a single building's automatic sprinkler system or standpipes in structures outside of the primary structure they are serving are relatively common. This proposal clarifies that the intent of having risk category IV water pump structures does not extend to these ancillary structures serving only lower risk category structures. The intent is for maintaining water pressure for fire suppression for an entire community - not a single structure.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification of what is a risk category IV structure. This proposal may decrease cost if the existing provisions have been misinterpreted.

S73-22

S74-22

IBC: TABLE 1604.5

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. ~~Group I-2, Condition 1 occupancies with 50 or more care recipients.~~ ~~Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities.~~ Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000.[a] Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]

RISK CATEGORY	NATURE OF OCCUPANCY
IV	Buildings and other structures designated as essential facilities <u>and buildings where loss of function represents a substantial hazard to occupants</u>, including but not limited to: Group I-2 <u>occupancies</u>~~, Condition 2 occupancies having emergency surgery or emergency treatment facilities.~~ Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason Statement: This proposal improves consistency in the assignment of risk categories. It applies current thinking from IBC Chapters 3 and 4 to the risk category assignments in Table 1604.5. The logic of the proposal is as follows:

1. **Risk Category IV is the IBC's main tool to provide functional facilities** soon after a natural hazard event (earthquake, flood, snow, or wind). In terms of post-event functionality, there is a wide gap between RC II-III facilities (which have identical requirements for nonstructural systems) and RC IV facilities. The difference in expected recovery time can be on the order of weeks or months.
2. The performance gap between RC II-III and RC IV is most acute for occupancies that depend on functional nonstructural systems and special design provisions to serve vulnerable users.
3. Because these facilities are rare and specially designed, their services and occupants cannot be quickly relocated to other buildings.
4. Therefore, facilities with special design features and vulnerable users should be strong candidates for Risk Category IV.

Following this logic, this proposal expands the scope of RC IV from just "essential facilities" to include "buildings where loss of function represents a substantial hazard." **This "substantial hazard" can even be life threatening** where, for example, a 24-hour medical facility, residential care facility, public water or power utility, detention center with impeded egress, or critical supply chain facility is out of service for weeks. The code defines *essential facilities* as those that need to "remain operational" through and after an "extreme" earthquake, flood, wind, or snow event. The additional facilities described by the logic above and considered in this proposal might not require continuous operation, but **prolonged downtime – which can be expected from RC II design criteria – can give rise to a similar risk for vulnerable users**, if not on Day 1 after the event, then possibly by Day 3, 10, or 30.

This proposal addresses *medical care* facilities assigned to Group I-2. Many design professionals assume all hospitals, typically assigned to Group I-2, are already assigned to RC IV, but that is only true for facilities that provide emergency surgery or emergency treatment. (Even "in-patient stabilization," which is part of what defines Group I-2 Condition 2, does not currently qualify for RC IV.) Many Group I-2 facilities, which include hospitals, nursing homes, and detoxification facilities, are assigned to RC II or RC III, even though they provide **24-hour *medical care*** for patients who are ***incapable of self-preservation***, and even though they are already required to meet special design requirements for corridors, egress plans, etc. in Section 407. Under the current code, Group I-2 facilities with fewer than 50 patients are not even assigned to RC III.

Because of the specialized nature of the care provided, the vulnerability of the patients, and the special design features, none of which would be available in typical RC II buildings, no Group I-2 facility designed under the current code could reasonably be expected to provide or relocate its normal services in a timely fashion after a design-level storm or earthquake. Therefore, this proposal reassigns all Group I-2 facilities to RC IV.

Despite this reassignment, this proposal is measured in its scope. **It does NOT affect:**

- Medical care facilities for 5 or fewer residents. Per Section 308.3, Group I-2 applies only to larger facilities.
- Any *medical care* facility eligible for design under the IRC.
- Outpatient or *ambulatory care facilities* (even those subject to Section 422), including "urgent care" businesses, dialysis centers, dentists, optometrists, or similar clinics; these are typically Group B. (Ambulatory care facilities with emergency surgery or emergency treatment facilities are already assigned to RC IV.)
- Pharmacies or drug stores, typically Group M.
- Medical office buildings, typically Group B.Medical supply or equipment manufacturers, warehouses, or stores.**This proposal is consistent with current IBC principles.** This proposal extends the current scope of Risk Category IV, but it does so consistent with the purpose, philosophy, and normative goals the IBC already represents.

Even if you think of the IBC as strictly a "life safety" code, safety is more than mere survival, and safety can be at risk even after the rain, snow, or ground shaking has stopped. If building damage affects the safety of vulnerable users in the following days or weeks, it is consistent with even a safety-based code to manage those risks through design.

But the IBC's purpose is broader than just "life safety." Section 101.3 states that the purpose of the IBC is to provide a "reasonable level of safety, **health and general welfare**." So a focus on the health and welfare of vulnerable building users, even where their building provides immediate safety, is both "reasonable" and completely consistent with the purpose of the code.

With its definition of *essential facilities* and its use of Risk Category IV to ensure they "remain operational," the IBC is already more than a safety code. It is, in fact, already a basic "functional recovery" code; the only question is which building uses, and users, we decide should qualify for a designed recovery. Where RC II or RC III is not reliable enough, it is consistent with the purpose and scope of the IBC to assign more building uses to RC IV.

Not all of the IBC's tools are perfectly nuanced. Some involve bright lines and broad categories, and it is sometimes necessary to err on the conservative side. So even if a certain use is not quite as "essential" as a fire station, RC IV might still be a more appropriate choice than RC II or RC III, and in these cases, it is consistent with the code to assign buildings to the higher category. In time, design criteria should evolve to address more specific recovery objectives (FEMA, 2020; FEMA-NIST, 2021). But those nuanced provisions are *at least* a decade away. For now, however, RC IV is the most appropriate tool we have, and we ought to use it. Adapting existing practices to new objectives is entirely consistent with the history of code development.

IBC Chapters 3 and 4 define and provide special requirements to manage fire and egress risks for particular groups of users. Table 1604.5 is meant to do the same for rare natural hazard events. But while Chapters 3 and 4 consider dozens of specific building uses and conditions, Table 1604.5 has only four categories. Changing the scope of Risk Category IV to account for specific building uses that are not adequately served by RC II or RC III criteria is consistent with the detailed, use-specific approach of Chapters 3 and 4.

Table 1604.5 represents public policy about what we desire from our buildings. As such, it has changed over time, along with public expectations. As we consider new or increasing risks related to more frequent natural hazard events, urbanization, the pandemic, or aging populations, it is both appropriate and consistent with past practice for Table 1604.5 to evolve as well.

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Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction for the buildings newly assigned to RC IV. The largest increases will likely be in high seismic areas where assignment to RC IV makes the largest changes to structural and nonstructural design criteria. This does not mean, however, that every RC IV facility will have the same unit cost as a new state-of-the-art hospital. On the contrary, case studies of voluntary RC IV-like seismic design have found a **construction cost premium ranging typically from 0% to 2%** relative to normal RC II designs. (See proposal references by Almufti, Bade, Berkowitz, Mar, and SEFT.) This estimate stands to reason: Wind, snow, and earthquake loads can already vary significantly within a jurisdiction, but the building designs and unit costs don’t change wildly from one side of the county to the other. For example, the seismic design force in Berkeley is about 1.5 times that in downtown San Francisco; so with respect to the structure, any nursing home or grocery store you can build as RC II in Berkeley you can also build as RC IV in San Francisco with no change to the design. The same is likely true for snow design, for example, in Vail v. Boulder and for wind design in Galveston v. the west side of Houston. On the nonstructural side, a facility’s nonstructural systems might need more bracing or support when assigned to RC IV, but the number and size of the components themselves don’t suddenly look like a hospital just because the risk category has changed.

S74-22

S75-22

IBC: TABLE 1604.5

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3<u>, Condition 1</u> occupancies. Any other occupancy with an occupant load greater than 5,000.[a] Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]

RISK CATEGORY	NATURE OF OCCUPANCY
IV	Buildings and other structures designated as essential facilities <u>and buildings where loss of function represents a substantial hazard to occupants</u>, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. <u>Group I-3 occupancies other than Condition 1.</u> Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason Statement: This proposal improves consistency in the assignment of risk categories. It applies current thinking from IBC Chapters 3 and 4 to the risk category assignments in Table 1604.5. The logic of the proposal is as follows:

1. **Risk Category IV is the IBC's main tool to provide functional facilities** soon after a natural hazard event (earthquake, flood, snow, or wind). In terms of post-event functionality, there is a wide gap between RC II-III facilities (which have identical requirements for nonstructural systems) and RC IV facilities. The difference in expected recovery time can be on the order of weeks or months.
2. The performance gap between RC II-III and RC IV is most acute for occupancies that depend on functional nonstructural systems and special design provisions to serve vulnerable users.
3. Because these facilities are rare and specially designed, their services and occupants cannot be quickly relocated to other buildings.
4. Therefore, facilities with special design features and vulnerable users should be strong candidates for Risk Category IV.

Following this logic, this proposal expands the scope of RC IV from just "essential facilities" to include "buildings where loss of function represents a substantial hazard." **This "substantial hazard" can even be life threatening** where, for example, a 24-hour medical facility, residential care facility, public water or power utility, detention center with impeded egress, or critical supply chain facility is out of service for weeks. The code defines *essential facilities* as those that need to "remain operational" through and after an "extreme" earthquake, flood, wind, or snow event. The additional facilities described by the logic above and considered in this proposal might not require continuous operation, but **prolonged downtime – which can be expected from RC II design criteria – can give rise to a similar risk for vulnerable users**, if not on Day 1 after the event, then possibly by Day 3, 10, or 30.

This proposal addresses detention facilities with special security needs, where occupants depend on facility staff for safety and habitability. Group I-3 buildings, currently assigned to RC III, include jails, prisons, and similar facilities in which six or more people are held **"under restraint [and] generally *incapable of self-preservation*."** Group I-3 facilities are also subject to special design requirements in Section 408 for means of egress, fire safety, guard stations, glazing, door mechanisms, etc., making them **essentially unique within a community**. This proposal represents the best way to use current code tools to ensure that a new detention facility will actually be available to serve the community in the days and weeks after a major storm or earthquake.

Existing jails and prisons have a record of life-threatening failures after recent hurricanes (Omorogieva, 2018). So do other old buildings, but the risk to restrained occupants is obviously higher – so much so that it can violate constitutional rights and impose liability on local governments (Jones v. San Francisco, 1997; Omorogieva, 2018). Even if the structure remains safe from collapse – the objective of both RC II and RC III – the loss of power and damage to MEP, communications, and security systems can leave the facility non-functional and, for restrained occupants, uninhabitable to the point of violation (Jones v. San Francisco, 1997). The concern has prompted a current bill in the U.S. Senate seeking information on the preparedness and damage costs in federal correctional facilities after major disasters (S.4748, 2020). The IBC should ensure that new jails and prisons are not adding to the problem.

RC III design provisions for nonstructural systems are the same as for RC II. Most jails and prisons do have emergency plans, and IBC Section 408.4.2 does require emergency power for certain doors and locks. But those strategies are focused on short-term outages or emergency response; they typically do not consider the effects of a long-term outage due to inevitable storm or earthquake damage. Many emergency plans assume feasible evacuation. But pre-event evacuation is only possible for trackable storms, not for earthquakes. Evacuation also comes with high costs and security concerns, requires a facility to evacuate to, and makes no provision for return to a damaged building. Better design can, and should, help solve this problem.

This proposal reassigns four of the five Conditions under Group I-3 to RC IV. Except for Condition 1, which this proposal leaves in RC III, all Group I-3 facilities have **egress and free movement impeded by locks**, rendering the occupants incapable of self-preservation. Because of this restraint, the uniqueness of Group I-3 facilities, and the implications of long repair times, Risk Category IV is appropriate.

Despite this reassignment, this proposal is measured in its scope. **It does NOT affect:**

- Group I-3, Condition 1. These facilities do allow free movement for occupants and are even eligible for design as residential occupancies. (One might argue that these do not even need to be assigned to RC III, but a change to RC II is outside the scope of this proposal.)
- Facilities with fewer than 6 people under restraint. Per Section 308.4, Group I-3 applies only to larger facilities. This would exempt typical holding cells in small court facilities.
- Halfway houses assigned to Group I-1 or R-4. (The difference between “halfway houses,” listed in Sections 308.2 and 310.5, and “prerelease centers,” listed in Section 308.4, is unclear.)

This proposal is consistent with current IBC principles. This proposal extends the current scope of Risk Category IV, but it does so consistent with the purpose, philosophy, and normative goals the IBC already represents.

Even if you think of the IBC as strictly a “life safety” code, safety is more than mere survival, and safety can be at risk even after the rain, snow, or ground shaking has stopped. If building damage affects the safety of vulnerable users in the following days or weeks, it is consistent with even a safety-based code to manage those risks through design.

But the IBC’s purpose is broader than just “life safety.” Section 101.3 states that the purpose of the IBC is to provide a “reasonable level of safety, **health and general welfare**.” So a focus on the health and welfare of vulnerable building users, even where their building provides immediate safety, is both “reasonable” and completely consistent with the purpose of the code.

With its definition of *essential facilities* and its use of Risk Category IV to ensure they “remain operational,” the IBC is already more than a safety code. It is, in fact, already a basic “functional recovery” code; the only question is which building uses, and users, we decide should qualify for a designed recovery. Where RC II or RC III is not reliable enough, it is consistent with the purpose and scope of the IBC to assign more building uses to RC IV.

Not all of the IBC’s tools are perfectly nuanced. Some involve bright lines and broad categories, and it is sometimes necessary to err on the conservative side. So even if a certain use is not quite as “essential” as a fire station, RC IV might still be a more appropriate choice than RC II or RC III, and in these cases, it is consistent with the code to assign buildings to the higher category. In time, design criteria should evolve to address more specific recovery objectives (FEMA, 2020; FEMA-NIST, 2021). But those nuanced provisions are *at least* a decade away. For now, however, RC IV is the most appropriate tool we have, and we ought to use it. Adapting existing practices to new objectives is entirely consistent with the history of code development.

IBC Chapters 3 and 4 define and provide special requirements to manage fire and egress risks for particular groups of users. Table 1604.5 is meant to do the same for rare natural hazard events. But while Chapters 3 and 4 consider dozens of specific building uses and conditions, Table 1604.5 has only four categories. Changing the scope of Risk Category IV to account for specific building uses that are not adequately served by RC II or RC III criteria is consistent with the detailed, use-specific approach of Chapters 3 and 4.

Table 1604.5 represents public policy about what we desire from our buildings. As such, it has changed over time, along with public expectations. As we consider new or increasing risks related to more frequent natural hazard events, urbanization, the pandemic, or aging populations, it is both appropriate and consistent with past practice for Table 1604.5 to evolve as well.

Bibliography: Almufti, I. et al. (2016). “The resilience-based design of 181 Fremont Tower,” *Structure*, June.
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Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction for the buildings newly assigned to RC IV. The largest increases will likely be in high seismic areas where assignment to RC IV makes the largest changes to structural and nonstructural design criteria. This does not mean, however, that every RC IV facility will have the same unit cost as a new state-of-the-art hospital. On the contrary, case studies of voluntary RC IV-like seismic design have found a **construction cost premium ranging typically from 0% to 2%** relative to normal RC II designs. (See proposal references by Almufti, Bade, Berkowitz, Mar, and SEFT.) This estimate stands to reason: Wind, snow, and earthquake loads can already vary significantly within a jurisdiction, but the building designs and unit costs don’t change wildly from one side of the county to the other. For example, the seismic design force in Berkeley is about 1.5 times that in downtown San Francisco; so with respect to the structure, any nursing home or grocery store you can build as RC II in Berkeley you can also build as RC IV in San Francisco with no change to the design. The same is likely true for snow design, for example, in Vail v. Boulder and for wind design in Galveston v. the west side of Houston. On the nonstructural side, a facility’s nonstructural systems might need more bracing or support when assigned to RC IV, but the number and size of the components themselves don’t suddenly look like a hospital just because the risk category has changed.

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IBC: TABLE 1604.5

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000.[a] ~~Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public~~ <u>Public</u> utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]

RISK CATEGORY	NATURE OF OCCUPANCY
IV	Buildings and other structures designated as essential facilities <u>and buildings where loss of function represents a substantial hazard to occupants or users</u>, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. <u>Public utility facilities providing power generation, potable water treatment, or wastewater treatment.</u> Power-generating stations and other public utility facilities required as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason Statement: This proposal improves consistency in the assignment of risk categories. It applies current thinking from IBC Chapters 3 and 4 to the risk category assignments in Table 1604.5. The logic of the proposal is as follows:

1. **Risk Category IV is the IBC's main tool to provide functional facilities** soon after a natural hazard event (earthquake, flood, snow, or wind). In terms of post-event functionality, there is a wide gap between RC II-III facilities (which have identical requirements for nonstructural systems) and RC IV facilities. The difference in expected recovery time can be on the order of weeks or months.
2. The performance gap between RC II-III and RC IV is most acute for occupancies that depend on functional nonstructural systems and special design provisions to serve vulnerable users.
3. Because these facilities are rare and specially designed, their services and occupants cannot be quickly relocated to other buildings.
4. Therefore, facilities with special design features and vulnerable users should be strong candidates for Risk Category IV.

Following this logic, this proposal expands the scope of RC IV from just “essential facilities” to include “buildings where loss of function represents a substantial hazard.” **This “substantial hazard” can even be life threatening** where, for example, a 24-hour medical facility, residential care facility, public water or power utility, detention center with impeded egress, or critical supply chain facility is out of service for weeks. The code defines *essential facilities* as those that need to “remain operational” through and after an “extreme” earthquake, flood, wind, or snow event. The additional facilities described by the logic above and considered in this proposal might not require continuous operation, but **prolonged downtime – which can be expected from RC II design criteria – can give rise to a similar risk for vulnerable users**, if not on Day 1 after the event, then possibly by Day 3, 10, or 30.

This proposal addresses buildings that support the operations of public utilities. Under the current code, utility buildings that support power generation and water treatment are mostly assigned to RC III even though their value and function is closely linked to the performance of specialized nonstructural components. Only those that provide “emergency backup facilities” for other RC IV facilities are themselves assigned to RC IV.

Instead of drawing a line between normal operations and “emergency backup,” this proposal makes the distinction between public utilities (typically designated not by the code but by a state or local commission) and other utilities. If housing, schools, offices, shops, and all the other normal buildings assigned to RC II are to be unusable for prolonged periods after a major storm or earthquake, it should not be because of a failure at a public water or power utility. On the contrary, a policy that expects people to “shelter in place” for weeks or longer in damaged but occupiable buildings should, at the very least, supply those buildings with water and power within at most a few days.

Further, those who would argue that RC IV design for more buildings should be voluntary must acknowledge that no developer would do that voluntary work until reliable utility services are in place. Otherwise, the voluntary work would be wasted as long as a utility outage continues.

Therefore, this proposal makes the key distinction between public water and power utilities and other utilities as follows:

- It maintains the “emergency backup” utilities in RC IV, with no change to the current code.
- It moves public utility facilities for power generation, potable water, and wastewater from RC III to RC IV.
- It maintains the broad assignment of the remaining public utilities to RC III, essentially as in the current code. In some jurisdictions, these “other public utilities” (in the current code’s phrasing) might include communications or public transit facilities, but it is the fact that they are designated as public utilities that qualifies them for design consideration beyond RC II.

Despite this reassignment, this proposal is measured in its scope. **It does NOT affect** any non-public utility or any utility supply chain facility not already included in the current RC III provision.

(The current wording of Table 1604.5 regarding utilities is unclear in several ways, but clarifying or correcting it is outside the scope of this proposal. Examples of unclear wording include: Is it assumed that all power generation and water treatment facilities *are* public utilities? Is a solar installation that returns power to the grid considered “power generation”? Are power distribution facilities included with “power generating stations”? What “other” utility functions does the code expect to be assigned to RC III? Why would public utilities be considered *backup* for private facilities, rather than the primary service? And if there is no backup, shouldn’t the primary service be assigned to RC IV as well? How many public utilities serve only RC IV facilities, but not the broader community? Etc.)

This proposal is consistent with current IBC principles. This proposal extends the current scope of Risk Category IV, but it does so consistent with the purpose, philosophy, and normative goals the IBC already represents.

Even if you think of the IBC as strictly a “life safety” code, safety is more than mere survival, and safety can be at risk even after the rain, snow, or ground shaking has stopped. If building damage affects the safety of vulnerable users in the following days or weeks, it is consistent with even a safety-based code to manage those risks through design.

But the IBC’s purpose is broader than just “life safety.” Section 101.3 states that the purpose of the IBC is to provide a “reasonable level of safety, **health and general welfare**.” So a focus on the health and welfare of vulnerable building users, even where their building provides immediate safety, is both “reasonable” and completely consistent with the purpose of the code.

With its definition of *essential facilities* and its use of Risk Category IV to ensure they “remain operational,” the IBC is already more than a safety code. It is, in fact, already a basic “functional recovery” code; the only question is which building uses, and users, we decide should qualify for a designed recovery. Where RC II or RC III is not reliable enough, it is consistent with the purpose and scope of the IBC to assign more building uses to RC IV.

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IBC Chapters 3 and 4 define and provide special requirements to manage fire and egress risks for particular groups of users. Table 1604.5 is meant to do the same for rare natural hazard events. But while Chapters 3 and 4 consider dozens of specific building uses and conditions, Table 1604.5 has only four categories. Changing the scope of Risk Category IV to account for specific building uses that are not adequately served by RC II or RC III criteria is consistent with the detailed, use-specific approach of Chapters 3 and 4.

Table 1604.5 represents public policy about what we desire from our buildings. As such, it has changed over time, along with public expectations. As we consider new or increasing risks related to more frequent natural hazard events, urbanization, the pandemic, or aging populations, it is both appropriate and consistent with past practice for Table 1604.5 to evolve as well.

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This proposal will increase the cost of construction for the buildings newly assigned to RC IV. The largest increases will likely be in high seismic areas where assignment to RC IV makes the largest changes to structural and nonstructural design criteria. This does not mean, however, that every RC IV facility will have the same unit cost as a new state-of-the-art hospital. On the contrary, case studies of voluntary RC IV-like seismic design have found a **construction cost premium ranging typically from 0% to 2%** relative to normal RC II designs. (See proposal references by Almufti, Bade, Berkowitz, Mar, and SEFT.) This estimate stands to reason: Wind, snow, and earthquake loads can already vary significantly within a jurisdiction, but the building designs and unit costs don’t change wildly from one side of the county to the other. For example, the seismic design force in Berkeley is about 1.5 times that in downtown San Francisco; so with respect to the structure, any nursing home or grocery store you can build as RC II in Berkeley you can also build as RC IV in San Francisco with no change to the design. The same is likely true for snow design, for example, in Vail v. Boulder and for wind design in Galveston v. the west side of Houston. On the nonstructural side, a facility’s nonstructural systems might need more bracing or support when assigned to RC IV, but the number and size of the components themselves don’t suddenly look like a hospital just because the risk category has changed.

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IBC: TABLE 1604.5

Proponents: David Bonowitz, representing Self (dbonowitz@att.net)

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III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000.[a] Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]

RISK CATEGORY	NATURE OF OCCUPANCY
IV	Buildings and other structures designated as essential facilities <u>and buildings where loss of function represents a substantial hazard to occupants</u>, including but not limited to: <u>Group I-1 occupancies in which at least half of the Group I-1 care recipients qualify as Group I-1, Condition 2</u> Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

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Reason Statement: This proposal improves consistency in the assignment of risk categories. It applies current thinking from IBC Chapters 3 and 4 to the risk category assignments in Table 1604.5. The logic of the proposal is as follows:

1. **Risk Category IV is the IBC's main tool to provide functional facilities** soon after a natural hazard event (earthquake, flood, snow, or wind). In terms of post-event functionality, there is a wide gap between RC II-III facilities (which have identical requirements for nonstructural systems) and RC IV facilities. The difference in expected recovery time can be on the order of weeks or months.
2. The performance gap between RC II-III and RC IV is most acute for occupancies that depend on functional nonstructural systems and special design provisions to serve vulnerable users.
3. Because these facilities are rare and specially designed, their services and occupants cannot be quickly relocated to other buildings.
4. Therefore, facilities with special design features and vulnerable users should be strong candidates for Risk Category IV.

Following this logic, this proposal expands the scope of RC IV from just "essential facilities" to include "buildings where loss of function represents a substantial hazard." **This "substantial hazard" can even be life threatening** where, for example, a 24-hour medical facility, residential care facility, public water or power utility, detention center with impeded egress, or critical supply chain facility is out of service for weeks. The code defines *essential facilities* as those that need to "remain operational" through and after an "extreme" earthquake, flood, wind, or snow event. The additional facilities described by the logic above and considered in this proposal might not require continuous operation, but **prolonged downtime – which can be expected from RC II design criteria – can give rise to a similar risk for vulnerable users**, if not on Day 1 after the event, then possibly by Day 3, 10, or 30.

This proposal addresses custodial care facilities that provide housing for vulnerable residents. Group I-1 buildings, currently assigned to RC II, provide **24-hour supervised housing** for residents receiving ***custodial care***, a defined term meaning assistance with day-to-day tasks, including bathing, cooking, and taking medication. This proposal reassigns certain Group I-1, Condition 2 facilities to RC IV.

Condition 2 occupancies include assisted living facilities (this is the term used in Sections 308.2 and 420.7) and similar care facilities. Residents in these facilities require assistance with daily tasks as well as **assistance with emergency egress** in or after natural hazard events. These facilities are already required to meet special design requirements in IBC Section 420, and specifically Section 420.7, regarding sprinklers, alarms, refuge areas, and cooking facilities. These requirements are not met by normal market housing. Further, the staffs that provide supervision and assist residents with their daily tasks have facility-specific training and resources. Therefore, residents of these facilities cannot be simply relocated to market housing.

Because Group I-1 facilities can sometimes combine Condition 1 and Condition 2, the proposal assigns to RC IV only those that are majority Condition 2. Since Group I-1 includes only facilities with at least 17 residents, only facilities with at least 9 residents qualified as Condition 2 are covered by this proposal.

Despite this reassignment, this proposal is measured in its scope. **It does NOT affect:**

- Custodial care facilities for 16 or fewer residents. Per Section 308.2, Group I-1 applies only to larger facilities.
- Group I-1, Condition 1 facilities, whose residents are more capable of self-preservation than those in Condition 2. For example, alcohol and drug centers, halfway houses, and other care facilities are included in Group I-1 but are likely Condition 1.
- Group I-1 facilities that are majority Condition 1.
- Other small residential facilities assigned to Group R, even if subject to Section 420.
- Any residential or care facility eligible for design under the IRC.
- Daycare facilities (child or adult), typically in Group I-4.

This proposal is consistent with current IBC principles. This proposal extends the current scope of Risk Category IV, but it does so consistent with the purpose, philosophy, and normative goals the IBC already represents.

Even if you think of the IBC as strictly a "life safety" code, safety is more than mere survival, and safety can be at risk even after the rain, snow, or ground shaking has stopped. If building damage affects the safety of vulnerable users in the following days or weeks, it is consistent with even a safety-based code to manage those risks through design.

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TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000.[a] Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]

RISK CATEGORY	NATURE OF OCCUPANCY
IV	Buildings and other structures designated as essential facilities <u>and buildings where loss of function represents a substantial hazard to occupants or users</u>, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. <u>Group F-1 food processing establishments or commercial kitchens, not primarily associated with dining facilities, with *gross floor area* exceeding 30,000 square feet.</u> <u>Group M retail or wholesale stores with *gross floor area* exceeding 30,000 square feet in which at least half of the usable floor area is used for the sale of food or beverages.</u> Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason Statement: This proposal improves consistency in the assignment of risk categories. It applies current thinking from IBC Chapters 3 and 4 to the risk category assignments in Table 1604.5. The logic of the proposal is as follows:

1. **Risk Category IV is the IBC's main tool to provide functional facilities** soon after a natural hazard event (earthquake, flood, snow, or wind). In terms of post-event functionality, there is a wide gap between RC II-III facilities (which have identical requirements for nonstructural systems) and RC IV facilities. The difference in expected recovery time can be on the order of weeks or months.
2. The performance gap between RC II-III and RC IV is most acute for occupancies that depend on functional nonstructural systems and special design provisions to serve vulnerable users.
3. Because these facilities are rare and specially designed, their services and occupants cannot be quickly relocated to other buildings.
4. Therefore, facilities with special design features and vulnerable users should be strong candidates for Risk Category IV.

Following this logic, this proposal expands the scope of RC IV from just "essential facilities" to include "buildings where loss of function represents a substantial hazard." **This "substantial hazard" can even be life threatening** where, for example, a 24-hour medical facility, residential care facility, public water or power utility, detention center with impeded egress, or critical supply chain facility is out of service for weeks. The code defines *essential facilities* as those that need to "remain operational" through and after an "extreme" earthquake, flood, wind, or snow event. The additional facilities described by the logic above and considered in this proposal might not require continuous operation, but **prolonged downtime – which can be expected from RC II design criteria – can give rise to a similar risk for vulnerable users**, if not on Day 1 after the event, then possibly by Day 3, 10, or 30.

This proposal addresses large facilities that are essential to a stable food supply chain. “Food and Agriculture” has been designated a “critical infrastructure sector” by the federal government since 2003 and as such, is addressed in the National Infrastructure Protection Plan (NIPP). The mission of the sector is “to protect against a disruption anywhere in the food system that would pose a serious threat to public health, safety, welfare, or to the national economy,” and to achieve that mission, the NIPP relies explicitly on “the support and action of the private sector.” (FDA et al., 2015)

No doubt that reliance includes the government’s general adoption of ICC’s model codes. Indeed, while the NIPP lays out an extensive sector taxonomy including categories for “Processing, Packaging, and Production” and “Agricultural and Food Product Distribution,” it says almost nothing about the design of these critical facilities as buildings. For that, **the NIPP is relying on the IBC**, which labels these facilities as “food processing establishments,” “commercial kitchens,” and “retail or wholesale stores” – and currently assigns them all to Risk Category II, just like any other factory or shop.

More recently, as cities and states took actions against the COVID pandemic, nearly all immediately recognized grocery stores, food banks, and other establishments on the food supply chain as **“essential businesses”** (For example, SFDPH, 2020), and the federal government issued an advisory identifying grocery and food manufacturing employees as **“essential critical infrastructure workers”** (CISA, 2020). This recognition not only reflected an obvious need – one that arises after every natural hazard event as ell – but was also consistent with the NIPP’s emphasis on public health and the economy, not just building-specific safety.

Food processing facilities, commercial kitchens, and large grocery stores have mechanical, electrical, and plumbing systems unlike those in other RC II commercial buildings. Only Risk Category IV design provisions address the post-event functionality of these nonstructural systems.

For these reasons, this proposal considers certain Group F-1 and Group M uses currently assigned to RC II. The proposal reassigns the largest of these, with gross floor areas exceeding 30,000 square feet, to RC IV. The 30,000 square foot criterion is meant to **exempt minor processing facilities and small stores that are less likely to disrupt the local food supply chain if damaged**. In the larger facilities, the per-building costs of a Risk Category IV design (such as the seismic certification of designated equipment, discussed below) are also less significant. The 30,000 square foot criterion is based on an in-progress inventory of existing grocery stores in San Francisco, where buildings of this size are all standalone supermarkets serving large customer bases, as opposed to specialty stores within larger buildings. The proposed cutoff size is somewhat arbitrary, but no more so than that other arbitrary measures of size or occupant load used by the current code to assign occupancy or risk category. The exercise of assigning occupancies and risk categories has always involved drawing lines based on judgment, so this is no departure from past code development practices.

The two uses proposed for RC IV are:

- Large Group F-1 food processing establishments or commercial kitchens. Consistent with Section 306.2, this proposal includes only those facilities not associated with specific dining facilities. Also, Section 306.2 applies to these uses in buildings larger than just 2500 square feet, so the proposed 30,000 square foot criterion is far more selective.
- Large Group M supermarkets. As described above, the 30,000 square foot criterion is meant to capture only the type of store that serves a large area and could represent a large portion of the local food distribution system. Because many of these larger facilities sell a variety of items, the proposal includes only those where at least half the floor space is dedicated to food supply.

Despite this reassignment, this proposal is measured in its scope. **It does NOT affect:**

- Processing facilities or markets smaller than 30,000 square feet.
- Multi-purpose stores selling non-food items where less than half the area is for food.
- Facilities primarily associated with specific restaurants or dining establishments.
- Food warehouses, trucking facilities, or other distribution facilities along the food supply chain, even if associated with the RC IV processing facility or supermarket.

This proposal is consistent with current IBC principles. This proposal extends the current scope of Risk Category IV, but it does so consistent with the purpose, philosophy, and normative goals the IBC already represents.

Even if you think of the IBC as strictly a “life safety” code, safety is more than mere survival, and safety can be at risk even after the rain, snow, or ground shaking has stopped. If building damage affects the safety of vulnerable users in the following days or weeks, it is consistent with even a safety-based code to manage those risks through design.

But the IBC’s purpose is broader than just “life safety.” Section 101.3 states that the purpose of the IBC is to provide a “reasonable level of safety, **health and general welfare**.” So a focus on the health and welfare of vulnerable building users, even where their building provides immediate safety, is both “reasonable” and completely consistent with the purpose of the code.

With its definition of *essential facilities* and its use of Risk Category IV to ensure they “remain operational,” the IBC is already more than a safety code. It is, in fact, already a basic “functional recovery” code; the only question is which building uses, and users, we decide should qualify for a designed recovery. Where RC II or RC III is not reliable enough, it is consistent with the purpose and scope of the IBC to assign more building uses to RC IV.

Not all of the IBC's tools are perfectly nuanced. Some involve bright lines and broad categories, and it is sometimes necessary to err on the conservative side. So even if a certain use is not quite as "essential" as a fire station, RC IV might still be a more appropriate choice than RC II or RC III, and in these cases, it is consistent with the code to assign buildings to the higher category. In time, design criteria should evolve to address more specific recovery objectives (FEMA, 2020; FEMA-NIST, 2021). But those nuanced provisions are *at least* a decade away. For now, however, RC IV is the most appropriate tool we have, and we ought to use it. Adapting existing practices to new objectives is entirely consistent with the history of code development.

IBC Chapters 3 and 4 define and provide special requirements to manage fire and egress risks for particular groups of users. Table 1604.5 is meant to do the same for rare natural hazard events. But while Chapters 3 and 4 consider dozens of specific building uses and conditions, Table 1604.5 has only four categories. Changing the scope of Risk Category IV to account for specific building uses that are not adequately served by RC II or RC III criteria is consistent with the detailed, use-specific approach of Chapters 3 and 4.

Table 1604.5 represents public policy about what we desire from our buildings. As such, it has changed over time, along with public expectations. As we consider new or increasing risks related to more frequent natural hazard events, urbanization, the pandemic, or aging populations, it is both appropriate and consistent with past practice for Table 1604.5 to evolve as well.

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Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction for the buildings newly assigned to RC IV. The largest increases will likely be in high seismic areas where assignment to RC IV makes the largest changes to structural and nonstructural design criteria. This does not mean, however, that every RC IV facility will have the same unit cost as a new state-of-the-art hospital. On the contrary, case studies of voluntary RC IV-like seismic design have found a **construction cost premium ranging typically from 0% to 2%** relative to normal RC II designs. (See proposal references by Almufti, Bade, Berkowitz, Mar, and SEFT.) This estimate stands to reason: Wind, snow, and earthquake loads can already vary significantly within a jurisdiction, but the building designs and unit costs don't change wildly from one side of the county to the other. For example, the seismic design force in Berkeley is about 1.5 times that in downtown San Francisco; so with respect to the structure, any nursing home or grocery store you can build as RC II in Berkeley you can also build as RC IV in San Francisco with no change to the design. The same is likely true for snow design, for example, in Vail v. Boulder and for wind design in Galveston v. the west side of Houston. On the nonstructural side, a facility's nonstructural systems might need more bracing or support when assigned to RC IV, but the number and size of the components themselves don't suddenly look like a hospital just because the risk category has changed.

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IBC: 1604.5, TABLE 1604.5

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1604.5 Risk category. Each building and structure shall be assigned a *risk category* in accordance with Table 1604.5. Where a referenced standard specifies an occupancy category, the *risk category* shall not be taken as lower than the occupancy category specified therein. Where a referenced standard specifies that the assignment of a *risk category* be in accordance with ASCE 7, Table 1.5-1, Table 1604.5 shall be used in lieu of ASCE 7, Table 1.5-1.

> **Exception:** The assignment of buildings and structures to Tsunami *Risk Categories* III and IV is permitted to be in accordance with Section 6.4 of ASCE 7.

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities. *Ground-mounted photovoltaic (PV) panel systems.*
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000.[a] Power-generating stations with individual power units not smaller than 100 MW, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]

RISK CATEGORY	NATURE OF OCCUPANCY
IV	Buildings and other structures designated as essential facilities, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating ~~stations~~ and other public utility facilities <u>required for compliance</u> as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason Statement: IBC Section 1604.5 and IBC Table 1604.5 are presently silent for assignment of risk category for all types of photovoltaic (PV) installations. This is a serious gap that still exists in the IBC, even as many other PV provisions in the I-codes have matured over several cycles. The problem this proposal seeks to resolve is confusion and gross inconsistencies regarding the assignment of risk categories for PV projects. With zero guidance in the IBC, AHJs and other code-enforcing authorities are left to make up their own rules and their own policies, based on their own personal opinions and interpretations. While there is broad agreement on several of these topics, there are outlier cases where the most stringent AHJs create interpretations that increase the cost of construction arbitrarily. With a code that is silent, industry stakeholders and permit applicants have no recourse other than to attempt a negotiation at the building department counter with each AHJ or sometimes with each project.

As there are several primary types of structures used to support PV panels, it is a serious gap in the IBC to be entirely silent on assignment of risk category for these primary applications. Justification is provided here for each of the six categories in this proposal. Note these line items are based on the following definitions. The first definition has appeared in several cycles of the IBC.

PHOTOVOLTAIC (PV) PANEL SYSTEM. A system that incorporates discrete photovoltaic panels, that converts solar radiation into electricity, including rack support systems.

During Group A proceedings in 2021, Proposal G193-21 was approved As Submitted, creating two new definitions that are foundational to the assignment of risk category.

PHOTOVOLTAIC (PV) PANEL SYSTEM, GROUND-MOUNTED. An independent photovoltaic (PV) panel system without useable space underneath, installed directly on the ground.

PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED. An independent photovoltaic (PV) panel support structure designed with useable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of motor vehicles.

Justification by proposal line item is provided as follows:

1. *Ground-mounted PV panel systems*serving Group R-3 buildings shall be assigned as Risk Category I (one).

We hope all stakeholders can agree that a ground-mounted PV panel system installed in the back yard behind someone's home does not need to be anything other than Risk Category I (one), as it represents "a low hazard to human life in the event of failure."

2. *Ground-mounted PV panel systems*shall be assigned as Risk Category I (one).

Fundamentally, ground-mounted PV panel systems meet the description of Risk Category I, as they "represent a low hazard to human life in the event of failure."

Unfortunately, the Solar Energy Industries Association (SEIA) is aware of a broad range of interpretation by local authorities regarding proper assignment of Risk Category for ground-mounted PV panel systems. This is especially true -- and especially impactful -- for large-scale (often referred to as "utility scale") ground-mounted PV facilities. Given the same set of construction drawings, different building department staff can reach different conclusions, based on different rationale. Different building departments have reviewed projects that are fundamentally the same design, and determined it was Risk Category I, or Risk Category II, or Risk Category III. A few reviewers have even claimed the same design should be assigned as Risk Category IV. Owing to this broad range of opinions and beliefs, the solar industry cannot design a large-scale solar facility without first asking the building code official to make this determination, and the design features and associated cost of construction of a solar facility are therefore dependent on individual opinions and beliefs of reviewers. This is far too subjective.

This inconsistency in the assignment of risk category for ground-mounted PV systems is sometimes based on the Risk Category III description that reads: "Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV." Unfortunately, there is no definition in the IBC for "power generating stations," so it has no distinct meaning and no consistent interpretation. Is a ground-mounted PV system in the back yard of a residential property a "power generating station"?

With no definition found in the IBC, we can search ASCE 7-16 and find Section 15.5.4.1, which states: "Electrical power-generating facilities are power plants that generate electricity by steam turbines, combustion turbines, diesel generators, or similar turbo machinery." While ASCE 7-16 Table 1.5-1 does not use the term "power generating station" or "electrical power generating station," the description of Risk Category III includes "Buildings and other structures … with potential to cause a substantial economic impact and/or mass disruption of day-to-day civilian life in the event of failure." It is clear that the original intent of "power-generating stations" as Risk Category III structures was based on large power-generating units such as turbines and was never intended to apply to individual PV panel systems that had not yet scaled at the time this language was created.

ASCE 7-16 Commentary C1.5 states in part: "Risk Category III ... has also included structures associated with utilities required to protect the health and safety of a community, including power generating stations and water treatment and sewage treatment plants. ... Failures of power plants that supply electricity on the national grid can cause substantial economic losses and disruption to civilian life when their failures can trigger other plants to go offline in succession. The result can be massive and potentially extended power outage, shortage, or both that lead to huge economic losses because of idled industries and a serious disruption of civilian life because of inoperable subways, road traffic signals, and so forth."

IMPORTANT: It is extremely important to note there is a fundamental difference between the physical behavior of conventional turbine power plants and PV facilities. For example, if one reactor shuts down at a nuclear power plant, over 1 gigaWatt of power production can be lost at once. The physical behavior of ground-mounted PV facilities is not the same as turbine-based power generating stations. Where failures in PV facilities have been observed – except in the most extreme cases during hurricanes Irma and Maria -- they are typically localized failures that do not shut down the entire plant.

This behavior is described in future ASCE 7-22 Commentary Section C32.5.2.1, which states in part: "Large-scale photovoltaic facilities can cover hundreds of acres of land, yet they are composed of hundreds or thousands of small, structurally independent 'tables' of PV panels, each with their own independent foundation system. The PV panels on these independent nonbuilding structures are linked with electrical conductors to central inverters that convert DC power to AC power. Large-scale PV facilities can have dozens to hundreds of independent central inverters. If an electrical fault is detected, only the inverter associated with that fault is shut down, and the remainder of the facility remains operational. The entire PV facility will shut down only if the electrical substation is shut down, or if the system otherwise detects a loss of the AC signal from the grid. Substations and grids are outside the scope of ASCE 7.
While there is little data of tornado strikes on large-scale PV facilities, in two known cases the damage from a tornado strike was isolated to localized damage. These facilities typically remain operational with localized damage. For ground-mounted photovoltaic installations, the effective plan area A_e should be the size of the largest structurally independent nonbuilding structure supporting PV panels."
Further, PV panel systems are by their nature an intermittent power source. They convert sunlight to electricity, producing power during daylight hours only. Photovoltaic power systems do not cause substantial economic losses and disruption to civilian life when they stop producing power during night-time hours. We acknowledge that the addition of Energy Storage Systems (ESS) is changing this part of the conversation. However, the addition of ESS does not change the fact that where structural failures have occurred in ground-mounted PV panel systems (except as noted), those failures have been localized and did not trigger a complete shut-down of a power plant. Where electrical faults are detected, individual inverters can shut down portions of a power plant, without any disruption to civilian life. Therefore, they do not meet the IBC or ASCE 7 criteria for Risk Category III.

There are other considerations that have been brought up for discussion.

Some AHJs have expressed an opinion that ground-mounted PV systems can be assigned as Risk Category I only if they are enclosed by a fence. While most large-scale PV facilities are in fact enclosed within a fence, they are simply not facilities open to the public. They can be accessed only by authorized personnel, who are keenly aware of behavioral conditions during weather events. It is not rational to assign an increased risk category and associated increase in cost of construction to protect possible trespassers. In a different case, with small projects located at school sites, there could be provisions for keeping students and other unauthorized people away from PV systems, but this is independent of the assignment of risk category.

In another deviation from the norm, at least one AHJ requires an increase of risk category based on proximity to highways, schools, or residential developments, with an apparent rationale that a dislodged PV panel could become airborne and cause injury at some distance away from the PV facility after being carried by high winds. In this case, the concern of the AHJ is one failure mode only – panel dislodgement. It would be far more rational to refer to Failure Modes and Effects (FMEA) analysis to focus on the root cause of that one failure mode, and to then solve the problem directly. It is not rational to use a very indirect approach of arbitrarily increasing the risk category of the entire facility because of concern about one failure mode, thereby increasing the structural loads and increasing the cost of the PV facility – perhaps without even solving the problem.

It is true that dislodgement of PV panels has been observed in some cases. It is also true that dislodgement of PV panels has led to progressive failure, as observed in at least one catastrophic failure during a hurricane event. Focused work is underway today to address that identified risk. Attachment of PV panels to the superstructure is being considered by the recently formed ASCE Solar PV Structures Committee. Recommendations are expected to be published in the future Manual of Practice. This is a problem to be solved that is independent of assignment of risk category.

There are other factors that have been identified in forensic studies, which are usually conducted under Non-Disclosure Agreements (NDAs). Work is underway to gather data that can be anonymized and aggregated, in an effort of continual improvement. Some of this work is being funded under a grant by the U.S. Department of Energy. Members of the structural engineering community who are deeply involved in solar projects are engaged in these efforts.

There are other factors that can contribute to increased reliability and resilience of PV facilities. For example, better consideration of gust effect factor and topographic factors; and a growing knowledge base from boundary layer wind tunnel studies; as well as design, specification, installation, and maintenance of components. It is both more rational and more economical to focus directly on resolving specific issues. It is not rational to believe we can increase risk category and wind loads until problems are nonexistent.

For any situation where project owners or financiers desire enhanced performance beyond code-minimum provisions for safety, a performance factor could be developed to voluntarily increase structural loads, but this should be independent of code-prescribed assignment of risk categories or methods for determining minimum structural loads.

3. *Elevated PV support structures* other than those described in Items 4 and 6 shall be assigned as Risk Category II (two).

The newly defined term for elevated PV support structures will make it easier to clarity the assignment of risk category. Elevated PV support structures are often constructed on the ground surface over parking spaces. In this application, the elevated PV support structures are not using any space that is not already used as a parking lot, and they provide the added benefit of providing shade for vehicles. Elevated PV support structures can also be constructed on the ground surface to provide shade for other uses, such as picnic areas. In all of these cases other than described in Items 4 and 6, elevated PV support structures meet the criteria and intent for Risk Category II.

There are also some emerging agricultural uses, sometimes referred to as "agri-voltaics." As one example, elevated PV support structures have been built over cranberry bogs. Although there could be an exception for agricultural use, for simplicity this proposal is not seeking to treat agricultural uses differently than the more-common installations assigned as Risk Category II.

4. Rooftop-mounted *PV panel systems* and *elevated PV support structures* installed on top of buildings shall be assigned a *risk category*that is the same as the *risk category*of the building on which they are mounted.

This concept is widely accepted by industry and AHJs and should not be controversial. Where PV panel systems are mounted on building roofs, whether attached or unattached, they shall be assigned as the same risk category as the building on which they are mounted. Elevated PV support structures have been installed on top of buildings along with vegetative roof features, and on top of parking garages over parking spaces. In any of these cases, PV structures must be designed to at least the same risk category as the building on which they are installed.

5. *PV panel systems* and *elevated PV support structures paired* with *energy storage systems (ESS)*and serving as a dedicated, stand-alone source of backup power for Risk Category IV (four) buildings shall be assigned as Risk Category IV (four).

The intermittent nature of power generation makes PV panel systems and elevated PV support structures an extremely unlikely choice as an on-site, sole source of required emergency backup power for a Risk Category IV structure. We believe most essential services facilities are still using fuel-powered (usually diesel) generators and a stock of fuel for backup power. However, with increasing adoption of Energy Storage Systems (ESS), it is conceivable that PV paired with ESS could be a sole source of required backup power.

Where PV plus ESS is the only direct source of backup power for an essential services facility – with a transfer switch or other equipment enabling it to operate independently from the grid during a time of grid power outage – it shall be assigned as Risk Category IV. If PV plus ESS is not designed to operate in the event of grid power outage, then it need not be Risk Category IV. This assignment of risk category can also apply when power switching enables the use of either the PV + ESS or a generator interchangeably.

6. *Elevated PV support structures* dedicated to parking of emergency vehicles shall be assigned as Risk Category IV (four).

There could be cases where elevated PV support structures are installed on the same site as a Risk Category IV building, over surface parking spaces that are designated for emergency services vehicles. Whether or not those elevated PV support structures are serving as part of a backup power source (as in Item 5), the elevated PV support structures must be assigned as Risk Category IV.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Where ground-mounted PV panel systems are already designed and constructed as Risk Category I (one), this proposal will neither increase nor decrease the cost of construction. Where additional clarity is provided by this proposal, there could be projects where the cost of construction is decreased.

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S80-22

IBC: 1604.5.1

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com)

2021 International Building Code

Revise as follows:

1604.5.1 Multiple occupancies. Where a building or structure is occupied by two or more occupancies not included in the same *risk category*, it shall be assigned the classification of the highest *risk category* corresponding to the various occupancies. Where buildings or structures have two or more portions that are structurally separated, each portion shall be separately classified. Where a separated portion of a building or structure provides required access to, required egress from or shares life safety components with another portion having a higher *risk category*, <u>or provides required electrical, communications, mechanical, plumbing, or conveying support to another portion assigned to Risk Category IV,</u> both portions shall be assigned to the higher *risk category*.

> **Exception:** Where a *storm shelter* designed and constructed in accordance with ICC 500 is provided in a building, structure or portion thereof normally occupied for other purposes, the *risk category* for the normal occupancy of the building shall apply unless the *storm shelter* is a designated emergency shelter in accordance with Table 1604.5.

Reason Statement: This proposal ensures that a building assigned to Risk Category IV will have all the building systems and services it needs to actually perform like a RC IV building, without relying on another portion of the building designed only as RC II. It extends the application of a current provision (Section 1604.5.1) to buildings with RC IV uses.
Current IBC Section 1604.5.1 already says that a building with multiple uses can have multiple risk categories under certain conditions. The question is: If Portion A of a new building would be assigned to RC IV, when can Portion B be assigned to only RC II or III? The current provision says that can happen when all four of the following are true:

- Portion B is “structurally separated” from Portion A.
- Portion B does *not* provide required access to Portion A.
- Portion B does *not* provide required egress for Portion A.
- Portion B does not “share” any “life safety components” with Portion A. (“Share” is not defined. “Life safety components” is also not defined. It is probably broader than Life Safety Systems, a definition just added to the 2021 IBC.)

Those four conditions are meant to ensure that Portion A can perform adequately, independent of Portion B. But are they enough if Portion A is assigned to Risk Category IV? RC IV facilities need reliable power, HVAC, and functional recovery capacity that is not covered by the four conditions. Therefore, this proposal adds a fifth condition where Portion A is assigned to RC IV.

The phrase “electrical, communications, mechanical, plumbing, or conveying” refers to the requirements of IBC Chapters 27, 28, 29, and 30, respectively. The references are intended be generic, just like the current provision’s references to undefined “life safety components” and to egress, access, and structural separation. As with many IBC provisions, it’s appropriate to leave project specific details to the project team and the code official, in this case to determine which aspects of any of those systems is necessary for the RC IV function in question.

Cost Impact: The code change proposal will increase the cost of construction
The proposal could increase the cost of construction for mixed-use buildings that include RC IV uses, but only in cases that where interpretation of the current code would fail to give proper attention to RC IV performance.

S80-22

S81-22

IBC: 1604.5, 1604.5.1, 1604.5.2 (New)

Proponents: Joseph Cain, representing Solar Energy Industries Association (SEIA) (JoeCainPE@gmail.com)

2021 International Building Code

1604.5 Risk category. Each building and structure shall be assigned a *risk category* in accordance with Table 1604.5. Where a referenced standard specifies an occupancy category, the *risk category* shall not be taken as lower than the occupancy category specified therein. Where a referenced standard specifies that the assignment of a *risk category* be in accordance with ASCE 7, Table 1.5-1, Table 1604.5 shall be used in lieu of ASCE 7, Table 1.5-1.

> **Exception:** The assignment of buildings and structures to Tsunami *Risk Categories* III and IV is permitted to be in accordance with Section 6.4 of ASCE 7.

1604.5.1 Multiple occupancies. Where a building or structure is occupied by two or more occupancies not included in the same *risk category*, it shall be assigned the classification of the highest *risk category* corresponding to the various occupancies. Where buildings or structures have two or more portions that are structurally separated, each portion shall be separately classified. Where a separated portion of a building or structure provides required access to, required egress from or shares life safety components with another portion having a higher *risk category*, both portions shall be assigned to the higher *risk category*.

> **Exception:** Where a *storm shelter* designed and constructed in accordance with ICC 500 is provided in a building, structure or portion thereof normally occupied for other purposes, the *risk category* for the normal occupancy of the building shall apply unless the *storm shelter* is a designated emergency shelter in accordance with Table 1604.5.

Add new text as follows:

1604.5.2 Photovoltaic (PV) panel systems. *Photovoltaic (PV) panel systems* and *elevated PV support structures* shall be assigned a *risk category* as follows:

1. *Ground-mounted PV panel systems* serving Group R-3 buildings shall be assigned as *Risk Category* I.
2. *Ground-mounted PV panel systems* shall be assigned as *Risk Category* I.
3. *Elevated PV support structures* other than those described in Items 4 and 6 shall be assigned as *Risk Category* II.
4. Rooftop-mounted *PV panel systems* and *elevated PV support structures* installed on top of buildings shall be assigned a *risk category* that is the same as the *risk category* of the building on which they are mounted.
5. *PV panel systems* and *elevated PV support structures* paired with *energy storage systems (ESS)* and serving as a dedicated, stand-alone source of backup power for *Risk Category* IV buildings shall be assigned as *Risk Category* IV.
6. *Elevated PV support structures* dedicated to parking of emergency vehicles shall be assigned as *Risk Category* IV.

Reason Statement: IBC Section 1604.5 and IBC Table 1604.5 are presently silent for assignment of risk category for all types of photovoltaic (PV) installations. This is a serious gap that still exists in the IBC, even as many other PV provisions in the I-codes have matured over several cycles. The problem this proposal seeks to resolve is confusion and gross inconsistencies regarding the assignment of risk categories for PV projects. With zero guidance in the IBC, AHJs and other code-enforcing authorities are left to make up their own rules and their own policies, based on their own personal opinions and interpretations. While there is broad agreement on several of these topics, there are outlier cases where the most stringent AHJs create interpretations that increase the cost of construction arbitrarily. With a code that is silent, industry stakeholders and permit applicants have no recourse other than to attempt a negotiation at the building department counter with each AHJ or sometimes with each project.

As there are several primary types of structures used to support PV panels, it is a serious gap in the IBC to be entirely silent on assignment of risk category for these primary applications. Justification is provided here for each of the six categories in this proposal. Note these line items are based on the following definitions. The first definition has appeared in several cycles of the IBC.

PHOTOVOLTAIC (PV) PANEL SYSTEM. A system that incorporates discrete photovoltaic panels, that converts solar radiation into electricity, including rack support systems.

During Group A proceedings in 2021, Proposal G193-21 was approved As Submitted, creating two new definitions that are foundational to the assignment of risk category.

> **PHOTOVOLTAIC (PV) PANEL SYSTEM, GROUND-MOUNTED.** An independent photovoltaic (PV) panel system without useable space underneath, installed directly on the ground.

> **PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED.** An independent photovoltaic (PV) panel support structure designed with useable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of

motor vehicles.

Justification by proposal line item is provided as follows:

1. *Ground-mounted PV panel systems* serving Group R-3 buildings shall be assigned as Risk Category I (one).

We hope all stakeholders can agree that a ground-mounted PV panel system installed in the back yard behind someone's home does not need to be anything other than Risk Category I (one), as it represents “a low hazard to human life in the event of failure.”

2. *Ground-mounted PV panel systems* shall be assigned as Risk Category I (one).

Fundamentally, ground-mounted PV panel systems meet the description of Risk Category I, as they “represent a low hazard to human life in the event of failure.”

Unfortunately, the Solar Energy Industries Association (SEIA) is aware of a broad range of interpretation by local authorities regarding proper assignment of Risk Category for ground-mounted PV panel systems. This is especially true -- and especially impactful -- for large-scale (often referred to as "utility scale") ground-mounted PV facilities. Given the same set of construction drawings, different building department staff can reach different conclusions, based on different rationale. Different building departments have reviewed projects that are fundamentally the same design, and determined it was Risk Category I, or Risk Category II, or Risk Category III. A few reviewers have even claimed the same design should be assigned as Risk Category IV. Owing to this broad range of opinions and beliefs, the solar industry cannot design a large-scale solar facility without first asking the building code official to make this determination, and the design features and associated cost of construction of a solar facility are therefore dependent on individual opinions and beliefs of reviewers. This is far too subjective.

This inconsistency in the assignment of risk category for ground-mounted PV systems is sometimes based on the Risk Category III description that reads: "Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV." Unfortunately, there is no definition in the IBC for “power generating stations,” so it has no distinct meaning and no consistent interpretation. Is a ground-mounted PV system in the back yard of a residential property a “power generating station”?

With no definition found in the IBC, we can search ASCE 7-16 and find Section 15.5.4.1, which states: “Electrical power-generating facilities are power plants that generate electricity by steam turbines, combustion turbines, diesel generators, or similar turbo machinery.” While ASCE 7-16 Table 1.5-1 does not use the term “power generating station” or “electrical power generating station,” the description of Risk Category III includes “Buildings and other structures … with potential to cause a substantial economic impact and/or mass disruption of day-to-day civilian life in the event of failure.” It is clear that the original intent of “power-generating stations” as Risk Category III structures was based on large power-generating units such as turbines and was never intended to apply to individual PV panel systems that had not yet scaled at the time this language was created.

ASCE 7-16 Commentary C1.5 states in part: "Risk Category III ... has also included structures associated with utilities required to protect the health and safety of a community, including power generating stations and water treatment and sewage treatment plants. ... Failures of power plants that supply electricity on the national grid can cause substantial economic losses and disruption to civilian life when their failures can trigger other plants to go offline in succession. The result can be massive and potentially extended power outage, shortage, or both that lead to huge economic losses because of idled industries and a serious disruption of civilian life because of inoperable subways, road traffic signals, and so forth.”

IMPORTANT: It is extremely important to note there is a fundamental difference between the physical behavior of conventional turbine power plants and PV facilities. For example, if one reactor shuts down at a nuclear power plant, over 1 gigaWatt of power production can be lost at once. The physical behavior of ground-mounted PV facilities is not the same as turbine-based power generating stations. Where failures in PV facilities have been observed – except in the most extreme cases during hurricanes Irma and Maria -- they are typically localized failures that do not shut down the entire plant.

This behavior is described in future ASCE 7-22 Commentary Section C32.5.2.1, which states in part: “Large-scale photovoltaic facilities can cover hundreds of acres of land, yet they are composed of hundreds or thousands of small, structurally independent ‘tables’ of PV panels, each with their own independent foundation system. The PV panels on these independent nonbuilding structures are linked with electrical conductors to central inverters that convert DC power to AC power. Large-scale PV facilities can have dozens to hundreds of independent central inverters. If an electrical fault is detected, only the inverter associated with that fault is shut down, and the remainder of the facility remains operational. The entire PV facility will shut down only if the electrical substation is shut down, or if the system otherwise detects a loss of the AC signal from the grid. Substations and grids are outside the scope of ASCE 7.

While there is little data of tornado strikes on large-scale PV facilities, in two known cases the damage from a tornado strike was isolated to localized damage. These facilities typically remain operational with localized damage. For ground-mounted photovoltaic installations, the effective plan area A_e should be the size of the largest structurally independent nonbuilding structure supporting PV panels.”

Further, PV panel systems are by their nature an intermittent power source. They convert sunlight to electricity, producing power during daylight hours only. Photovoltaic power systems do not cause substantial economic losses and disruption to civilian life when they stop producing power during night-time hours. We acknowledge that the addition of Energy Storage Systems (ESS) is changing this part of the conversation. However, the addition of ESS does not change the fact that where structural failures have occurred in ground-mounted PV panel systems (except as noted), those failures have been localized and did not trigger a complete shut-down of a power plant. Where electrical faults are detected, individual inverters can shut down portions of a power plant, without any disruption to civilian life. Therefore, they do not meet the IBC or ASCE 7 criteria for Risk Category III.

There are other considerations that have been brought up for discussion.

Some AHJs have expressed an opinion that ground-mounted PV systems can be assigned as Risk Category I only if they are enclosed by a fence. While most large-scale PV facilities are in fact enclosed within a fence, they are simply not facilities open to the public. They can be accessed only by authorized personnel, who are keenly aware of behavioral conditions during weather events. It is not rational to assign an increased risk category and associated increase in cost of construction to protect possible trespassers. In a different case, with small projects located at school sites, there could be provisions for keeping students and other unauthorized people away from PV systems, but this is independent of the assignment of risk category.

In another deviation from the norm, at least one AHJ requires an increase of risk category based on proximity to highways, schools, or residential developments, with an apparent rationale that a dislodged PV panel could become airborne and cause injury at some distance away from the PV facility after being carried by high winds. In this case, the concern of the AHJ is one failure mode only – panel dislodgement. It would be far more rational to refer to Failure Modes and Effects (FMEA) analysis to focus on the root cause of that one failure mode, and to then solve the problem directly. It is not rational to use a very indirect approach of arbitrarily increasing the risk category of the entire facility because of concern about one failure mode, thereby increasing the structural loads and increasing the cost of the PV facility – perhaps without even solving the problem.

It is true that dislodgement of PV panels has been observed in some cases. It is also true that dislodgement of PV panels has led to progressive failure, as observed in at least one catastrophic failure during a hurricane event. Focused work is underway today to address that identified risk. Attachment of PV panels to the superstructure is being considered by the recently formed ASCE Solar PV Structures Committee. Recommendations are expected to be published in the future Manual of Practice. This is a problem to be solved that is independent of assignment of risk category.

There are other factors that have been identified in forensic studies, which are usually conducted under Non-Disclosure Agreements (NDAs). Work is underway to gather data that can be anonymized and aggregated, in an effort of continual improvement. Some of this work is being funded under a grant by the U.S. Department of Energy. Members of the structural engineering community who are deeply involved in solar projects are engaged in these efforts.

There are other factors that can contribute to increased reliability and resilience of PV facilities. For example, better consideration of gust effect factor and topographic factors; and a growing knowledge base from boundary layer wind tunnel studies; as well as design, specification, installation, and maintenance of components. It is both more rational and more economical to focus directly on resolving specific issues. It is not rational to believe we can increase risk category and wind loads until problems are nonexistent.

For any situation where project owners or financiers desire enhanced performance beyond code-minimum provisions for safety, a performance factor could be developed to voluntarily increase structural loads, but this should be independent of code-prescribed assignment of risk categories or methods for determining minimum structural loads.

3. *Elevated PV support structures* other than those described in Items 4 and 6 shall be assigned as Risk Category II (two).

The newly defined term for elevated PV support structures will make it easier to clarity the assignment of risk category. Elevated PV support structures are often constructed on the ground surface over parking spaces. In this application, the elevated PV support structures are not using any space that is not already used as a parking lot, and they provide the added benefit of providing shade for vehicles. Elevated PV support structures can also be constructed on the ground surface to provide shade for other uses, such as picnic areas. In all of these cases other than described in Items 4 and 6, elevated PV support structures meet the criteria and intent for Risk Category II.

There are also some emerging agricultural uses, sometimes referred to as “agri-voltaics.” As one example, elevated PV support structures have been built over cranberry bogs. Although there could be an exception for agricultural use, for simplicity this proposal is not seeking to treat agricultural uses differently than the more-common installations assigned as Risk Category II.

4. Rooftop-mounted *PV panel systems* and *elevated PV support structures* installed on top of buildings shall be assigned a *risk category* that is the same as the *risk category* of the building on which they are mounted.

This concept is widely accepted by industry and AHJs and should not be controversial. Where PV panel systems are mounted on building roofs, whether attached or unattached, they shall be assigned as the same risk category as the building on which they are mounted. Elevated PV support structures have been installed on top of buildings along with vegetative roof features, and on top of parking garages over parking spaces. In any of these cases, PV structures must be designed to at least the same risk category as the building on which they are installed.

5. *PV panel systems* and *elevated PV support structures paired* with *energy storage systems (ESS)* and serving as a dedicated, stand-alone source of backup power for Risk Category IV (four) buildings shall be assigned as Risk Category IV (four).

The intermittent nature of power generation makes PV panel systems and elevated PV support structures an extremely unlikely choice as an on-site, sole source of required emergency backup power for a Risk Category IV structure. We believe most essential services facilities are still using fuel-powered (usually diesel) generators and a stock of fuel for backup power. However, with increasing adoption of Energy Storage Systems (ESS), it is conceivable that PV paired with ESS could be a sole source of required backup power.

Where PV plus ESS is the only direct source of backup power for an essential services facility – with a transfer switch or other equipment enabling it to operate independently from the grid during a time of grid power outage – it shall be assigned as Risk Category IV. If PV plus ESS is not designed to operate in the event of grid power outage, then it need not be Risk Category IV. This assignment of risk category can also apply when power switching enables the use of either the PV + ESS or a generator interchangeably.

6. *Elevated PV support structures* dedicated to parking of emergency vehicles shall be assigned as Risk Category IV (four).

There could be cases where elevated PV support structures are installed on the same site as a Risk Category IV building, over surface parking spaces that are designated for emergency services vehicles. Whether or not those elevated PV support structures are serving as part of a backup power source (as in Item 5), the elevated PV support structures must be assigned as Risk Category IV.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds clarity for assignment of risk category. The proposal does not increase the cost of construction, and in some cases could decrease the cost of construction.

S81-22

S82-22

IBC: 1604.8.2

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1604.8.2 Structural walls. Walls that provide vertical load-bearing resistance or lateral shear resistance for a portion of the structure shall be anchored to the roof and to all floors and members that provide lateral support for the wall or that are supported by the wall. The connections shall be capable of resisting the horizontal forces that result from the application of the prescribed *loads*. The required earthquake out-of-plane *loads* are specified in Section 1.4.4 of ASCE 7 for walls of structures assigned to *Seismic Design Category* A and to Section 12.11 of ASCE 7 for walls of structures assigned to all other *seismic design categories*. Required anchors in masonry walls of hollow units or *cavity walls* shall be embedded in a reinforced grouted structural element of the wall. See Sections 1609 for wind design requirements and 1613 for earthquake design requirements.

Reason Statement: This proposal clarifies that where wind, lateral earth pressures, or other loads are the dominant lateral in-plane or out-of-plane loads on structural walls that those walls must be anchored to resist those forces. The StEER Hurricane Michael P-VAT report Figure 17 showed Jinks Middle School's gymnasium walls on two sides completely separating and collapsing from the roof they could have been properly anchored to. https://www.weather.gov/media/tae/events/20181010_Michael/StEER_PVAT.pdf

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of wall anchorage where design currently may have incorrectly been ignoring non-earthquake loading.

S82-22

S83-22

IBC: SECTION 1606, 1606.1, 1606.2, 1606.3, 1606.4, 1606.5, 1607.1

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

SECTION 1606
DEAD LOADS

Revise as follows:

1606.1 General. ~~*Dead loads* are those *loads* defined in Chapter 2 of this code. *Dead loads* shall be considered to be permanent loads.~~ Buildings, structures, and parts thereof shall be designed to resist the effects of *dead loads* in accordance with Chapter 3 of ASCE 7.

Delete without substitution:

~~**1606.2 Weights of materials of construction.** For purposes of design, the actual weights of materials of construction shall be used. In the absence of definite information, values used shall be subject to the approval of the *building official*.~~

~~**1606.3 Weight of fixed service equipment.** In determining dead loads for purposes of design, the weight of fixed service equipment, including the maximum weight of the contents of fixed service equipment, shall be included. The components of fixed service equipment that are variable, such as liquid contents and movable trays, shall not be used to counteract forces causing overturning, sliding, and uplift conditions in accordance with Section 1.3.6 of ASCE 7.~~

~~**Exceptions:**~~

1. ~~Where force effects are the result of the presence of the variable components, the components are permitted to be used to counter those load effects. In such cases, the structure shall be designed for force effects with the variable components present and with them absent.~~
2. ~~For the calculation of seismic force effects, the components of fixed service equipment that are variable, such as liquid contents and movable trays, need not exceed those expected during normal operation.~~

~~**1606.4 Photovoltaic panel systems.** The weight of *photovoltaic panel systems*, their support system, and ballast shall be considered as dead *load*.~~

~~**1606.5 Vegetative and landscaped roofs.** The weight of all landscaping and hardscaping materials for vegetative and landscaped roofs shall be considered as *dead load*. The weight shall be computed considering both fully saturated soil and drainage layer materials and fully dry soil and drainage layer materials to determine the most severe *load* effects on the structure.~~

Revise as follows:

1607.1 General. ~~*Live loads* are those loads defined in Chapter 2 of this code.~~ Buildings, structures, and parts thereof shall be designed to resist the effects of live loads.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
These changes are proposed to improve the coordination between the IBC and ASCE 7 by removing text in the IBC that is contained in ASCE 7. Reducing overlap between the IBC and ASCE 7, where appropriate, makes it easier to keep the documents coordinated. This overlap reduction has been successfully done in the past with overlap between the IBC and material design standards such as ACI 381, AISC 360, and TMS 402.Section 1606 Dead Load is deleted entirely and replaced with reference to the applicable chapter in ASCE 7. The information currently contained within Section 1606 is structural design information used by the design professional. The technical requirements in ASCE 7 are the same as the IBC and the wording is very similar, therefore this proposal does not change technical requirements, just where they are located and maintained. This is similar to material design information that is contained in referenced design standards and not within the IBC itself, such as in ACI 318 for concrete and AISC 360 for steel.

It is also noted that dead loads are not commonly reviewed by building officials during their review of the design shown on the construction documents as the weight of the construction and the weight of items considered as dead loads are not required to be listed out on the construction documents by Section 1603 (floor and roof dead loads for construction in accordance with the conventional light-frame construction provisions of Section 2308 are an exception).Removal of this information from the IBC is not likely to impact reviews performed by building officials.

This proposal revises the General section for live loads to include charging text similar to the other load sections in the IBC. Currently the General sub-section doesn't actually require buildings and structures to be designed for these loads. The proposal corrects this. The proposed text is based on current text for the other design loads, specifically wind, soil, rain, and earthquake.

This proposal also removes the text pointing to Chapter 2 for the definition of Live Load. This pointer is unnecessary as Chapter 2 adequately describes how definitions are applied, such pointers are not used elsewhere in the IBC, and defined terms are italicized throughout the IBC which by itself is a pointer to Chapter 2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change what loads are considered dead loads, it simply changes where the design information for dead loads is located.

S83-22

S84-22

IBC: SECTION 1606, 1606.1, SECTION 1607, 1607.1

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

SECTION 1606
DEAD LOADS

Revise as follows:

1606.1 General. ~~*Dead loads* are those *loads* defined in Chapter 2 of this code. *Dead loads* shall be considered to be permanent loads.~~ Buildings, structures, and parts thereof shall be designed to resist the effects of *dead loads*.

SECTION 1607
LIVE LOADS

Revise as follows:

1607.1 General. ~~*Live loads* are those loads defined in Chapter 2 of this code.~~ Buildings, structures, and parts thereof shall be designed to resist the effects of *live loads*.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal revises the General section for both dead loads and live loads to include charging text similar the other load sections in the IBC. Currently the "General" sub-section for both dead and live loads doesn't actually require buildings and structures to be designed for these loads. The proposal corrects this.

The proposed text is based on current text for the other design loads, specifically wind, soil, rain, and earthquake.

The proposal also removes the text pointing to Chapter 2 for the definitions of Dead Load and Live Load. This pointer is unnecessary as Chapter 2 adequately describes how definitions are applied, such pointers are not used elsewhere in the IBC, and defined terms are italized throughout the IBC which by itself is pointer to Chapter 2.

The sentence indicating dead loads are to be considered permanent loads is also deleted as it is unnecessary. The load combination provisions in Section 1605 and the symbol notations in Section 1602.1 no longer refer to permanent or transient conditions. It is also noted that the dead load chapter of ASCE 7 does not refer to dead loads as permanent loads.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Improving coordination with ASCE 7 and adding charging text is not expected to effect the cost of construction.

S84-22

S85-22

IBC: 1607.6, 1607.6.1 (New), TABLE 1607.1

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.6 Helipads. Landing areas designed for a design basis helicopter with maximum take-off weight of 3,000 pounds (13.35 kN) shall be identified with a 3,000-pound (13.34 kN) weight limitation. The landing area weight limitation shall be indicated by the numeral “3” (kips) located in the bottom right corner of the landing area as viewed from the primary approach path. The indication for the landing area weight limitation shall be a minimum 5 feet (1524 mm) in height. ~~Helipads shall be designed for the following *live loads*:~~

1. ~~A uniform *live load*, *L*, as specified in Items 1.1 and 1.2. This *load* shall not be reduced.~~

    1.1. ~~40 psf (1.92 kN/m^2) where the design basis helicopter has a maximum take-off weight of 3,000 pounds (13.35 kN) or less.~~

    1.2. ~~60 psf (2.87 kN/m^2) where the design basis helicopter has a maximum take-off weight greater than 3,000 pounds (13.35 kN).~~

2. ~~A single concentrated *live load*, *L*, of 3,000 pounds (13.35 kN) applied over an area of 4.5 inches by 4.5 inches (114 mm by 114 mm) and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated *load* is not required to act concurrently with other uniform or concentrated *live loads*.~~
3. ~~Two single concentrated *live loads*, *L*, 8 feet (2438 mm) apart applied on the landing pad (representing the helicopter’s two main landing gear, whether skid type or wheeled type), each having a magnitude of 0.75 times the maximum take-off weight of the helicopter, and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated loads shall be applied over an area of 8 inches by 8 inches (203 mm by 203 mm) and are not required to act concurrently with other uniform or concentrated *live loads*.~~

~~Landing areas designed for a design basis helicopter with maximum take-off weight of 3,000 pounds (13.35 kN) shall be identified with a 3,000-pound (13.34 kN) weight limitation. The landing area weight limitation shall be indicated by the numeral “3” (kips) located in the bottom right corner of the landing area as viewed from the primary approach path. The indication for the landing area weight limitation shall be a minimum 5 feet (1524 mm) in height.~~

Add new text as follows:

1607.6.1 Concentrated loads. Helipads shall be designed for the following concentrated *live loads*:

1. A single concentrated *live load*, *L*, of 3,000 pounds (13.35 kN) applied over an area of 4.5 inches by 4.5 inches (114 mm by 114 mm) and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated *load* is not required to act concurrently with other uniform or concentrated *live loads*.
2. Two single concentrated *live loads*, *L*, 8 feet (2438 mm) apart applied on the landing pad (representing the helicopter’s two main landing gear, whether skid type or wheeled type), each having a magnitude of 0.75 times the maximum take-off weight of the helicopter, and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated loads shall be applied over an area of 8 inches by 8 inches (203 mm by 203 mm) and are not required to act concurrently with other uniform or concentrated *live loads*.

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS
Portions of table not shown remain unchanged.

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
16.	Handrails, guards and grab bars		See Section 1607.9		—
17.	Helipads	Helicopter takeoff weight 3,000 lb (13.35 kN) or less	~~See Section 1607.6~~ 40	See Section 1607.6.1	Section 1607.6
		Helicopter takeoff weight more than 3,000 lb (13.35 kN)	60	See Section 1607.6.1	Section 1607.6

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.
b. Live load reduction is only permitted in accordance with Section 1607.12.1.2or Item 1 of Section 1607.12.2.
c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal reorganizes both the section on helipads and the live load table entry for helipads to coordinate with the organization in ASCE 7. The reorganization also more closely follows the typical IBC format for live loads by placing the live load value in the live load table itself where ever possible.

This proposal does not change the technical requirements for helipads.

Currently the entry in the live load table for helipads is simply a pointer as it states to See Section 1607.6. This proposal moves the uniform live loads into the Live Load Table as they can be concisely listed in the table by using two rows. The helipad concentrated loads remain in Section 1607 as they have accompanying text that would not fit concisely in the table.

Section 1607.6 is also logically reorganized by adding a subsection. This way the base text addressing the requirements for identification on the helipad are placed first and the concentrated loads are placed in their own subsection.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Reorganizing text and improving coordination with ASCE 7 is not expected to effect the cost of construction.

S85-22

S86-22

IBC: TABLE 1607.1

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS

Portions of table not shown remain unchanged.

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
3.	Armories and drill rooms		150[a]~~[b]~~	—	—
4.	Assembly areas	Fixed seats (fastened to floor)	60[a]	—	—
		~~Follow spot, projections and control rooms~~	~~50~~		
		Lobbies	100[a]		
		Movable seats	100[a]		
		Stage floors	150[a]~~[b]~~		
		Platforms (assembly)	100[a]		
		Bleachers, folding and telescopic seating and grandstands	100[a] (See Section 1607.19)		
		Stadiums and arenas with fixed seats (fastened to the floor)	60[a] (See Section 1607.19)		
		Other assembly areas	100[a]		
25.	Recreational uses	Bowling alleys, poolrooms and similar uses	75[a]	—	—
		Dance halls and ballrooms	100[a]		
		Gymnasiums	100[a]		
		Theater projection, control, and follow spot rooms	50		
		Ice skating rinks	250[b]		
		Roller skating rinks	100[a]		

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.

b. Live load reduction is only permitted in accordance with Section 1607.12.1.2 or Item 1 of Section 1607.12.2.

c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal makes changes to the Live Load table to coordinate with ASCE 7.1) The table entry for follow spot rooms, control rooms, and projection rooms in theaters is moved from Item 4 Assembly Areas to Item 25 Recreation Areas. This matches the location in the ASCE 7-22 Live Load table. These rooms are not areas that are typically open to the public or have large crowds gather. These are behind the scenes type areas and as such the entry is better located under Recreation Areas. The entry is also reworded in order to make it clear that the intent of these areas is within theaters. The rewording matches the ASCE 7-22 text.

2)The live load reduction footnote for two entries is changed to match the requirements in ASCE 7. For both "Armories and Drill Rooms" and "Stage Floors", the footnote is changed from Footnote B which allows live load reduction per certain sections, to Footnote A which does not allow live load reduction. Both of these changes coordinate with ASCE 7. The occupancy of these two areas is not similar to the occupancies upon which the live load reduction provisions are based and as such the live load reduction provisions should not apply.

Cost Impact: The code change proposal will increase the cost of construction
For designers that were using live load reduction per the IBC and not ASCE 7, this change could increase the size of structural members and as such the cost of construction. It is noted that in these types of areas floor deflection or vibration can control the design and in those cases the size of members and the cost of construction would be unchanged.

S87-22

IBC: TABLE 1607.1

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS

Portions of table not shown remain unchanged.

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
15.	Garages and vehicle floors	Passenger vehicle~~s only~~ garages	40[c]	See Section 1607.7	—
		Trucks and buses	See Section 1607.8		
		Fire trucks and emergency vehicles	See Section 1607.8		
		Forklifts and movable equipment	See Section 1607.8		

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.

b. Live load reduction is only permitted in accordance with Section 1607.12.1.2 or Item 1 of Section 1607.12.2.

c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

This proposal makes changes to the live load table to include uses already contained elsewhere in Chapter 16. These changes also coordinate with the ASCE 7 live load table. The IBC already contains provisions for vehicles and moveable equipment in Section 1607.8. These uses should be included in the live load table along with the passenger vehicle and heavy vehicle loads. There is no basis for only including some aspects of Section 1607.8 in the Live Load table.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This code change proposal does not change requirements and as such will not affect the cost of construction.

S87-22

S88-22

IBC: TABLE 1607.1

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
26.	Residential	One- and two-family dwellings:		—	Section 1607.22
		Uninhabitable attics without storage	10		
		Uninhabitable attics with storage	20		
		Habitable attics and sleeping areas	30		
		Canopies, including marquees	20		
		All other areas	40		
		Hotels and multifamily dwellings:			
		Private rooms and corridors serving them	40		
		Public rooms~~[a] and corridors serving them~~	100[a]		
		Corridors serving public rooms	100		
27.	Roofs	Ordinary flat, pitched, and curved roofs (that are not occupiable)	20	—	Section 1607.15.2
		Roof areas used for assembly purposes	100[a]	—	
		Roof areas used for occupancies other than assembly	Same as occupancy served	—	
		Vegetative and landscaped roofs:		—	
		Roof areas not intended for occupancy	20	—	
		Roof areas used for assembly purposes	100[a]	—	
		Roof areas used for ~~other~~ occupancies other than assembly	Same as occupancy served	—	
		Awnings and canopies:		—	
		Fabric construction supported by a skeleton structure	5[a]	—	
		All other construction, except one- and two-family dwellings	20	—	
		Primary roof members exposed to a work floor:			
		Single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs over manufacturing, storage warehouses, and repair garages	—	2,000	
		All other primary roof members	—	300	
		All roof surfaces subject to maintenance workers	—	300	

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.

b. Live load reduction is only permitted in accordance with Section 1607.12.1.2 or Item 1 of Section 1607.12.2.

c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal makes changes to two items in the live load table. In Item 26 for "Hotels and multifamily dwellings", the sub-item "public rooms and corridors serving them" is separated into two sub-items, "public rooms" and "corridors serving public rooms". This is done so that Footnote A,

which indicates that live load reduction is not permitted, is only applied to the public room sub-item. The public room is the assembly area, where live load reduction is not to be applied. Corridors, including corridors serving the public, are not assembly areas themselves and live load reduction is intended to be permitted as it is for corridors per Item 8 of the live load table. This change also aligns the IBC with the corresponding portion of the live load table in ASCE 7.

In Item 27, editorial changes are made so that consistent terminology is used. The revised text under "Vegetative and landscaped roofs" matches the phrasing used immediately above. These editorial changes are also consistent with ASCE 7.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent has always been not to allow live load reduction for the public room, however some designers may have be excluding live load reduction for the corridors serving them as well. For those designers the size of structural members could decrease and as such the cost of construction could decrease. Most likely the change has no affect on the cost of construction.

The change to the Roof item of the Live Load table is for clarification and will not affect the cost of construction.

S88-22

S89-22

IBC: TABLE 1607.1

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS

Portions of table not shown remain unchanged.

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
24.	Penal institutions	Cell blocks	40	—	—
		Corridors	100		
25.	Public Restrooms		Same as live load for area served but not required to exceed 60 psf	—	—

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.

b. Live load reduction is only permitted in accordance with Section 1607.12.1.2or Item 1 of Section 1607.12.2.

c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
A public restroom live load was added to the live load table in ASCE 7-22. This live load was contained in a table in the 7-16 commentary. This change coordinates the IBC live load table with ASCE 7-22.

The following text appears in the commentary to ASCE 7-22. "The public restroom uniform live load in Table 4.3-1 applies to restrooms for publicly accessible spaces. Public restrooms should be designed for the live load associated with the occupancy it serves, with an upper limit of 60 psf. The upper limit recognizes that the fixtures within restrooms limit the space available for a dense grouping of occupants."

Cost Impact: The code change proposal will increase the cost of construction
The impact of this change will vary depending on the live load that designers are currently using for these spaces. It is possible that designers are using a lower live load and therefore the size of structural members and the cost of construction could increase.

S89-22

S90-22

IBC: TABLE 1607.1

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS

Portions of table not shown remain unchanged.

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
25.	Recreational uses	Bowling alleys, poolrooms and similar uses	75[a]	—	—
		Dance halls and ballrooms	100[a]		
		Gymnasiums	100[a]		
		~~Ice skating rinks~~	~~250[b]~~		
		Roller skating rinks	100[a]		

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.
b. Live load reduction is only permitted in accordance with Section 1607.12.1.2 or Item 1 of Section 1607.12.2.
c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal improves the coordination between the live load table in the IBC and the table in ASCE 7-22.

The ASCE 7-16 live load table does not contain either Ice Skating Rinks or Roller Skating Rinks. These items are contained in a table in the commentary. During the development cycle for the 2022 edition, moving these items from the commentary into the standard was considered. Roller Skating Rinks were moved into the standard, however Ice Skating Rinks were not. A consensus was not reached on the basis for and the appropriateness of the 250 psf value for Ice Skating Rinks. Therefore Ice Skating Rinks were left in the commentary for now. Further discussion and research is expected to occur in the next ASCE 7 development cycle.

Removing the live load for Ice Skating Rinks in the IBC coordinates the IBC with ASCE 7. Designers and code officials still have the ASCE 7 commentary for guidance.

Further Background Information: In the 2006 & 2009 editions of the IBC, the live load table listed "Skating Rinks" with a live load of 100 psf. This item was removed from the 2012 IBC live load table. Code change proposal S88-12 resulted in the 2015 IBC live load table containing both Roller Skating Rinks, with a live load of 100 psf, and Ice Skating Rinks, with a live load of 250 psf. Both the S88-12 proposal and the ROH are attached. The only technical justification provided for the live load values in S88-12 is that they appear in the ASCE 7 commentary.

The ASCE 7 consensus process has established that further work is needed to establish an appropriate the live load value for ice skating rinks. Items to be researched and discussed further include what the load value includes (flooring types, thickness of ice, occupants, vehicles, etc.). As such it is appropriate for now that the Ice Skating Rink live load simply appear in the ASCE 7 commentary, not in the IBC live load table.

S88–12
Table 1607.1

Proponent: Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee (Huston@smithhustoninc.com)

Revise as follows:

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS[g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs)
24.Recreational uses:		
Ice Skating Rink	250[m]	See Section 1607.7.4
Roller Skating Rink	100[m]	

m. Live load reduction is not permitted unless specific exceptions of Section 1607.10 apply.

(Portions of Table and footnotes not shown remain unchanged)

Reason: : Uniformly distributed live load for rinks were in previous editions of the IBC. They were removed from the IBC 2009, as part of a larger CCP. The intent of this code change proposal is to once again list the recommended minimum uniform live load for rinks back into IBC. The proposed loads are consistent with the recommendations in ASCE7 commentary for minimum uniformly distributed live load.

Cost Impact: The code change proposal will not increase the cost of construction.

S88-12

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

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S88-12

Committee Action: **Approved as Submitted**

Committee Reason: This code change puts the uniformly distributed live loads for ice rinks and roller rinks back into the IBC.

Assembly Action: **None**

S89-12

Committee Action: **Approved as Submitted**

Committee Reason: This is a relatively minor clarification of the partition loading requirement that brings consistency with the live load value of 80 psf for corridors that is commonly applied to an entire floor.

Assembly Action: **None**

S90-12

PART I – IBC STRUCTURAL
Committee Action: **Approved as Submitted**

Committee Reason: This proposal clarifies the owner's responsibilities and recognizes that the owner's authorized agent can also be responsible. The use of these terms throughout makes the provisions easier to apply.

Assembly Action: **None**

PART II – IBC GENERAL
Committee Action: **Approved as Submitted**

Committee Reason: See reason for S90-12, Part I.

Assembly Action: **None**

PART III – IBC FIRE SAFETY
Committee Action: **Approved as Submitted**

Committee Reason: See reason for S90-12, Part I.

Assembly Action: **None**

PART IV – IBC MEANS OF EGRESS
Committee Action: **Approved as Submitted**

Committee Reason: See reason for S90-12, Part I.

Assembly Action: **None**

S91-12

Committee Action: **Disapproved**

Committee Reason: The proposed increase in gross vehicle weight was not supported. The proponent may have a point that the current 10,000 pound is not necessarily the correct threshold for heavy vehicle loads, but the justification for the proposed 12,000 pound threshold was insufficient.

Assembly Action: **None**

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Cost Impact: The code change proposal will not increase or decrease the cost of construction
The ice skating rink live load will still appear in the commentary of ASCE 7. While removing it from the IBC may require designers to spend more time considering the appropriate live load, it is not likely to affect the cost of construction.

S90-22

S91-22

IBC: TABLE 1607.1

Proponents: John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com)

2021 International Building Code

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0 , AND MINIMUM CONCENTRATED LIVE LOADS

Portions of table not shown remain unchanged.

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
25.	Recreational uses	Bowling alleys, poolrooms and similar uses	75[a]	—	—
		Dance halls and ballrooms	100[a]		
		Gymnasiums	100[a]		
		Ice skating rinks	~~250~~[b] 100		
		Roller skating rinks	100[a]		

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.

b. Live load reduction is only permitted in accordance with Section 1607.12.1.2or Item 1 of Section 1607.12.2.

c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Reason Statement: 1. NCSEA submitted a code change proposal for the 2015 IBC that added Ice Skating Rinks into Table 1607.1. At that time, we pointed to the ASCE 7 commentary and submitted using the 250 psf load cited there. We did not at that time delve into the ASCE commentary to see the origin of the 250 psf load, and we now feel that the 250 psf is overly conservative and not realistic.

2. We have currently researched and there is typically only 1” to 2” of actual ice used in a new rink (a maximum of 10 psf). The critical load for a rink is the Zamboni; with them weighing 11,000 pounds maximum. With a foot print of 16’ x 7’, will generate a footprint load of 98 psf.

3. We feel that a 100 psf Uniform load is more realistic and will account for the ice and piping associated with the rink, as well as the Zamboni and the players on the ice.

4. Our review of the New York Building Code and the National Building Code of Canadian, both list Ice Rinks at 100 psf.

Cost Impact: The code change proposal will decrease the cost of construction
Reducing the live load from 250 to 100 psf will decrease the size and the cost of the structural supports.

S91-22

S92-22

IBC: 1507.15, 1603.1.2, SECTION 1607, 1607.1, 1607.2, 1607.3, 1607.13, 1607.14.1, 1607.12, 1607.14, 1607.14.2, 1607.14.2.1, 1607.14.2.2, 1607.14.3, 1607.14.4, 1607.14.4.1, 1607.14.4.2, 1607.14.4.3, 1607.14.4.4, 1607.14.4.5, 1808.3, 3111.1, 3111.1.1, 3111.1.2

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1507.15 Vegetative roofs and landscaped roofs. *Vegetative roofs* and landscaped roofs shall comply with the requirements of this chapter, Section ~~1607.14.2.2~~ 1607.13.2 and the *International Fire Code*.

1603.1.2 Roof live load. The *roof live load* used in the design shall be indicated for roof areas ~~(Section 1607.14)~~.

SECTION 1607
LIVE LOADS

1607.1 General. *Live loads* are those loads defined in Chapter 2 of this code.

1607.2 Loads not specified. For occupancies or uses not designated in Section 1607, the *live load* shall be determined in accordance with a method *approved* by the *building official*.

Revise as follows:

1607.3 Uniform live loads. The *live loads* used in the design of buildings and *other structures* shall be the maximum loads expected by the intended use or occupancy but shall not be less than the minimum uniformly distributed *live loads* given in Table 1607.1. *Live loads* acting on a sloping surface shall be assumed to act vertically on the horizontal projection of that surface.

~~**1607.13**~~ **1607.3.1** ~~**Distribution of floor loads.**~~ **Partial loading of floors.** Where uniform floor *live loads* are involved in the design of structural members arranged so as to create continuity, the minimum applied loads shall be the full *dead loads* on all spans in combination with the floor *live loads* on spans selected to produce the greatest *load effect* at each location under consideration. ~~Floor~~ Uniform floor *live loads* applied to selected spans are permitted to be reduced in accordance with Section 1607.12 .

~~**1607.14.1**~~ **1607.3.2** ~~**Distribution of roof loads**~~ **Partial loading of roofs.** Where uniform roof *live loads* are reduced to less than 20 psf (0.96 kN/m^2) in accordance with Section ~~1607.14.2.1~~ 1607.13.1 and are applied to the design of structural members arranged so as to create continuity, the reduced roof *live load* shall be applied to adjacent spans or to alternate spans, whichever produces the most unfavorable *load effect*. ~~See Section 1607.14.2 for reductions in minimum roof *live loads* and Section 7.5 of ASCE 7 for partial snow loading.~~

1607.12 Reduction in uniform live loads. Except for uniform *live loads* at roofs, all other minimum uniformly distributed *live loads*, L_o, in Table 1607.1 are permitted to be reduced in accordance with Section 1607.12.1 or 1607.12.2. Uniform *live loads* at roofs are permitted to be reduced in accordance with Section ~~1607.14.2~~ 1607.13.

~~**1607.14 Roof loads.** The structural supports of roofs and *marquees* shall be designed to resist wind and, where applicable, snow and earthquake *loads*, in addition to the *dead load* of construction and the appropriate *live loads* as prescribed in this section, or as set forth in Table 1607.1. The *live loads* acting on a sloping surface shall be assumed to act vertically on the horizontal projection of that surface.~~

~~**1607.14.2**~~ **1607.13 Reduction in uniform roof live loads.** The minimum uniformly distributed *live loads* of roofs and *marquees*, L_o, in Table 1607.1 are permitted to be reduced in accordance with Section ~~1607.14.2.1~~ 1607.13.1.

~~**1607.14.2.1**~~ **1607.13.1 Ordinary roofs, awnings and canopies.** Ordinary flat, pitched and curved roofs, and *awnings* and canopies other than of fabric construction supported by a skeleton structure, are permitted to be designed for a reduced uniformly distributed *roof live load*, L_r, as specified in the following equations or other controlling combinations of *loads* as specified in Section 1605, whichever produces the greater *load effect*.
In structures such as *greenhouses*, where special scaffolding is used as a work surface for workers and materials during maintenance and repair operations, a lower roof *load* than specified in the following equations shall not be used unless *approved* by the *building official*. Such structures shall be designed for a minimum roof live *load* of 12 psf (0.58 kN/m^2).

$$L_r = L_o R_1 R_2$$ **(Equation 16-10)**

where: $12 \leq L_r \leq 20$

For SI: $L_r = L_o R_1 R_2$

where: $0.58 \leq L_r \leq 0.96$

L_o = Unreduced *roof live load* per square foot (m^2) of horizontal projection supported by the member (see Table 1607.1).

L_r = Reduced *roof live load* per square foot (m^2) of horizontal projection supported by the member.

The reduction factors R_1 and R_2 shall be determined as follows:

$$R_1 = 1 \text{ for } A_t \leq 200 \text{ square feet } (18.58 \text{ m}^2) \quad \textbf{(Equation 16-11)}$$

$$R_1 = 1.2 - 0.001A_t \text{ for } 200 \text{ square feet} < A_t < 600 \text{ square feet} \quad \textbf{(Equation 16-12)}$$

$$R_1 = 0.6 \text{ for } A_t \geq 600 \text{ square feet } (55.74 \text{ m}^2) \quad \textbf{(Equation 16-13)}$$

where:

A_t = Tributary area (span length multiplied by effective width) in square feet (m^2) supported by the member, and

$$R_2 = 1 \text{ for } F \leq 4 \quad \textbf{(Equation 16-14)}$$

$$R_2 = 1.2 - 0.05\,F \text{ for } 4 < F < 12 \quad \textbf{(Equation 16-15)}$$

$$R_2 = 0.6 \text{ for } F \geq 12 \quad \textbf{(Equation 16-16)}$$

where:

F = For a sloped roof, the number of inches of rise per foot (for SI: $F = 0.12 \times$ slope, with slope expressed as a percentage), or for an arch or dome, the rise-to-span ratio multiplied by 32.

Live Preview

1607.14.2.1 Ordinary roofs, awnings and canopies.

Ordinary flat, pitched and curved roofs, and *awnings* and canopies other than of fabric construction supported by a skeleton structure, are permitted to be designed for a reduced uniformly distributed *roof live load*, L_r, as specified in the following equations or other controlling combinations of *loads* as specified in Section 1605, whichever produces the greater *load effect*.

In structures such as *greenhouses*, where special scaffolding is used as a work surface for workers and materials during maintenance and repair operations, a lower roof *load* than specified in the following equations shall not be used unless *approved* by the *building official*. Such structures shall be designed for a minimum roof live *load* of 12 psf (0.58 kN/m^2).

$$L_r = L_o R_1 R_2 \quad \textbf{(Equation 16-10)}$$

where: $12 \leq L_r \leq 20$

For SI: $L_r = L_o R_1 R_2$

where: $0.58 \leq L_r \leq 0.96$

L_o = Unreduced *roof live load* per square foot (m^2) of horizontal projection supported by the member (see Table 1607.1).

L_r = Reduced *roof live load* per square foot (m^2) of horizontal projection supported by the member.

The reduction factors R_1 and R_2 shall be determined as follows:

$$R_1 = 1 \text{ for } A_t \leq 200 \text{ square feet } (18.58 \text{ m}^2) \quad \textbf{(Equation 16-11)}$$

$$R_1 = 1.2 - 0.001A_t \text{ for } 200 \text{ square feet} < A_t < 600 \text{ square feet} \quad \textbf{(Equation 16-12)}$$

$$R_1 = 0.6 \text{ for } A_t \geq 600 \text{ square feet } (55.74 \text{ m}^2) \quad \textbf{(Equation 16-13)}$$

where:

A_t = Tributary area (span length multiplied by effective width) in square feet (m^2) supported by the member, and

$$R_2 = 1 \text{ for } F \leq 4 \quad \textbf{(Equation 16-14)}$$

$$R_2 = 1.2 - 0.05\,F \text{ for } 4 < F < 12 \quad \textbf{(Equation 16-15)}$$

$$R_2 = 0.6 \text{ for } F \geq 12 \quad \textbf{(Equation 16-16)}$$

where:

F = For a sloped roof, the number of inches of rise per foot (for SI: $F = 0.12 \times$ slope, with slope expressed as a percentage), or for an arch or dome, the rise-to-span ratio multiplied by 32.

Original Codebook Text
1607.14.2.1 Ordinary roofs, awnings and canopies.
Ordinary flat, pitched and curved roofs, and *awnings* and canopies other than of fabric construction supported by a skeleton structure, are permitted to be designed for a reduced uniformly distributed *roof live load*, L_r, as specified in the following equations or other controlling combinations of *loads* as specified in Section 1605, whichever produces the greater *load effect*.

In structures such as *greenhouses*, where special scaffolding is used as a work surface for workers and materials during maintenance and repair operations, a lower roof *load* than specified in the following equations shall not be used unless *approved* by the *building official.* Such structures shall be designed for a minimum roof live *load* of 12 psf (0.58 kN/m^2).

$$L_r = L_o R_1 R_2$$ **(Equation 16-10)**

where: $12 \leq L_r \leq 20$

For SI: $L_r = L_o R_1 R_2$

where: $0.58 \leq L_r \leq 0.96$

L_o = Unreduced *roof live load* per square foot (m^2) of horizontal projection supported by the member (see Table 1607.1).

L_r = Reduced *roof live load* per square foot (m^2) of horizontal projection supported by the member.

The reduction factors R_1 and R_2 shall be determined as follows:

$$R_1 = 1 \text{ for } A_t \leq 200 \text{ square feet } (18.58 \text{ m}^2)$$ **(Equation 16-11)**

$$R_1 = 1.2 - 0.001A_t \text{ for } 200 \text{ square feet} < A_t < 600 \text{ square feet}$$ **(Equation 16-12)**

$$R_1 = 0.6 \text{ for } A_t \geq 600 \text{ square feet } (55.74 \text{ m}^2)$$ **(Equation 16-13)**

where:
A_t = Tributary area (span length multiplied by effective width) in square feet (m^2) supported by the member, and

$$R_2 = 1 \text{ for } F \leq 4$$ **(Equation 16-14)**

$$R_2 = 1.2 - 0.05 F \text{ for } 4 < F < 12$$ **(Equation 16-15)**

$$R_2 = 0.6 \text{ for } F \geq 12$$ **(Equation 16-16)**

where:

F = For a sloped roof, the number of inches of rise per foot (for SI: $F = 0.12 \times$ slope, with slope expressed as a percentage), or for an arch or dome, the rise-to-span ratio multiplied by 32.

SaveCancel Remove

~~1607.14.2.2~~ 1607.13.2 **Occupiable roofs.** Areas of roofs that are occupiable, such as *vegetative roofs*, landscaped roofs or for assembly or other similar purposes, and *marquees* are permitted to have their uniformly distributed *live loads* reduced in accordance with Section 1607.12 .

~~1607.14.3~~ 1607.14 **Awnings and canopies.** *Awnings* and canopies shall be designed for uniform *live loads* as required in Table 1607.1 as well as for snow *loads* and wind *loads* as specified in Sections 1608 and 1609.

~~1607.14.4~~ 1607.15 **Photovoltaic panel systems.** Roof structures that provide support for *photovoltaic panel systems* shall be designed in accordance with Sections ~~1607.14.4.1~~ 1607.15.1 through ~~1607.14.4.5~~ 1607.15.5 , as applicable.

~~1607.14.4.1~~ 1607.15.1 **Roof live load.** Roof structures that support *photovoltaic panel systems* shall be designed to resist each of the following conditions:

1. Applicable uniform and concentrated roof *loads* with the *photovoltaic panel system dead loads*.

   Exception: *Roof live loads* need not be applied to the area covered by *photovoltaic panels* where the clear space between the panels and the roof surface is 24 inches (610 mm) or less.

2. Applicable uniform and concentrated roof loads without the *photovoltaic panel system* present.

~~1607.14.4.2~~ 1607.15.2 **Photovoltaic panels or modules.** The structure of a roof that supports solar *photovoltaic panels* or modules shall be designed to accommodate the full solar *photovoltaic panels* or modules and ballast *dead load*, including concentrated *loads* from support frames in combination with the *loads* from Section ~~1607.14.4.1~~ 1607.15.1 and other applicable *loads*. Where applicable, snow drift *loads* created by the *photovoltaic panels* or modules shall be included.

~~1607.14.4.3~~ 1607.15.3 **Photovoltaic panels installed on open grid roof structures.** Structures with open grid framing and without a *roof deck* or sheathing supporting *photovoltaic panel systems* shall be designed to support the uniform and concentrated *roof live loads* specified in Section ~~1607.14.4.1~~ 1607.15.1, except that the uniform *roof live load* shall be permitted to be reduced to 12 psf (0.57 kN/m^2).

~~1607.14.4.4~~ 1607.15.4 **Ground-mounted photovoltaic (PV) panel systems or modules installed as an independent structure.** Ground-mounted photovoltaic (PV) panel systems that are independent structures and do not have accessible/occupied space underneath are not required to accommodate a roof photovoltaic *live load*. Other *loads* and combinations in accordance with Section 1605 shall be accommodated.

~~1607.14.4.5~~ 1607.15.5 **Ballasted photovoltaic panel systems.** Roof structures that provide support for ballasted *photovoltaic panel systems* shall be designed, or analyzed, in accordance with Section 1604.4; checked in accordance with Section 1604.3.6 for deflections; and checked in accordance with Section 1611 for ponding.

1808.3 Design loads. Foundations shall be designed for the most unfavorable effects due to the combinations of *loads* specified in Section 2.3 or 2.4 of ASCE 7 or the alternative allowable stress design load combinations of Section 1605.2. The *dead load* is permitted to include the weight of foundations and overlying fill. Reduced *live loads*, as specified in Sections 1607.12 and ~~1607.14~~ 1607.13, shall be permitted to be used in the design of foundations.

3111.1 General. Solar energy systems shall comply with the requirements of this section.

3111.1.1 Wind resistance. Rooftop-mounted photovoltaic (PV) panel systems and solar thermal collectors shall be designed in accordance with Section 1609.

Revise as follows:

3111.1.2 Roof live load. Roof structures that provide support for solar energy systems shall be designed in accordance with Section ~~1607.14.4~~ 1607.15.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

These changes are proposed to improve the coordination between the IBC and ASCE 7 by aligning the organization of 1) partial loading requirements and 2) roof live load provisions.

This proposal primarily relocates requirements in Section 1607 Live Loads so that they are provided in a more logical order and so that they align with ASCE 7. General requirements for the distribution of uniform floor live loads and uniform roof live loads, also known as partial loading or pattern loading, are moved forward in Section 1607 so that they appear immediately after the introduction of uniform live loads in Section 1607.3. These requirements are better suited to appear in the beginning of the Live Load section as they are general requirements. The placement as subsections under Section 1607.3 Uniform live loads is logical as they apply to uniform loads. This location also aligns with ASCE 7.

Minor changes to the text are also made in some locations for clarity and to coordinate with the ASCE 7 text.

In Section 1607.3, the sentence added at the end is moved from existing Section 1607.14 Roof Loads as that section is deleted in the proposal (see below for why). This sentence does not just apply to roofs, it also applies to sloped ramps, and therefore it is better suited in Section 1607.3 whose scope is not limited to roofs.

Section 1607.13 is relocated to 1607.3.1 as a sub-section to the Uniform Live Load section. It is also renamed to better describe the content. This section deals with selectively applying the uniform live load, or pattern loading, and therefore is more appropriately located directly after the uniform live load section.

Section 1607.14 Roof Loads is deleted except for one sentence that was moved to Section 1607.3 as described above. There is no need for a stand alone Roof Loads section as roof live loads are contained in Table 1607.1 just like all the other live loads. In addition, most of the text in 1607.14 references other loads, wind, snow, earthquake, and dead, which has no place in the Live Load section. These loads have their own sections in the IBC, and there is also a section (Load Combinations) that governs how to combine the different loads.

Section 1607.14.1 is also relocated as a sub-section to the Uniform Live Load section, as new Section 1607.3.2. This section deals with roof pattern live loading and is more appropriately located after the uniform live load section.

The remainder of the changes are section number changes that are the result of moving the two sections on load distribution, 1607.3 and 1607.14.1, and deleting the Roof Load section, 1607.14. The uniform roof live load reduction provision get their own section, Section 1607.13, awnings and canopies get Section 1607.14, and the photovoltaic panel systems get Section 1607.14.

Due to an issue with cdpAccess not formatting existing Section 1607.14.2.1 correctly, a Word file is attached to this proposal that correctly shows the new section number for this section and shows it in its new location.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal contains ASCE 7 alignment and coordination changes.

S92-22

S94-22

IBC: 1607.5

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.5 Partition loads. In office buildings and in other buildings where partition locations are subject to change, provisions for partition weight shall be made, whether or not partitions are shown on the construction documents~~, unless the specified *live load* is 80 psf (3.83 kN/m^2) or greater~~. The partition *load* shall be not less than a ~~uniformly distributed~~ *live load* of 15 psf (0.72 kN/m^2) and shall not be reduced per Section 1607.12.

Exception: A partition *live load* is not required where the minimum specified *live load* is 80 psf (3.83 kN/m^2) or greater.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

These changes are proposed to improve the coordination between the IBC and ASCE 7.

This proposal moves the exception that is embedded within the text and places it at the end of the section in the typical format for exceptions in the IBC. It also removes the words "uniformly distributed" as they are unnecessary. The indicated 15 psf live load is by nature of the units, a uniform load.

This proposal does not change the technical requirements of the section. The proposed clarification regarding live load reduction was added in the 2022 edition of ASCE 7. The following text is part of the reason statement contained in the ASCE 7 proposal:

"On November 7th, 2018, Dr. Ross Corotis and James R Harris met with the Dead and Live Load Subcommittee and confirmed that when partition loads were added to ASCE 7 they were not considered to be reducible. The current ASCE 7 language leaves room for interpretation, therefore the subcommittee felt that further clarification was needed. Dr. Ross Corotis is a co-author for various articles in structural engineering journals that eventually become the live load reduction theory that is currently found in ASCE 7. These articles include “Probability Model for Design Live Loads” and “Area-Dependent Processes for Structural Live Loads” in the Journal of the Structural Division, in October 1980 and May 1981 respectively, which are references in the Live Load Commentary. Neither of those studies provide any basis for reduction of partition loads. In office buildings and in other buildings where partition locations are subject to change, partitions are often moved around without consulting a structural engineer. Since a new tenant might cluster partitions differently than the last tenant, preparing for the worst-case load for the life of the building is recommended. "

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Improving coordination with ASCE 7 is not expected to effect the cost of construction.

S94-22

S95-22

IBC: 1607.6

Proponents: John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com); Erik Madsen, representing NCSEA (erik@madsenengineering.com)

2021 International Building Code

Revise as follows:

1607.6 Helipads. Helipads shall be designed for the following *live loads*:

1. A uniform *live load*, *L*, as specified in Items 1.1 and 1.2. This *load* shall not be reduced.

   1.1. 40 psf (1.92 kN/m^2) where the design basis helicopter has a maximum take-off weight of 3,000 pounds (13.35 kN) or less.

   1.2. 60 psf (2.87 kN/m^2) where the design basis helicopter has a maximum take-off weight greater than 3,000 pounds (13.35 kN).

2. A single concentrated *live load*, *L*, of 3,000 pounds (13.35 kN) applied over an area of 4.5 inches by 4.5 inches (114 mm by 114 mm) and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated *load* is not required to act concurrently with other uniform or concentrated *live loads*.
3. Two single concentrated *live loads*, *L*, 8 feet (2438 mm) apart applied on the landing pad (representing the helicopter's two main landing gear, whether skid type or wheeled type), each having a magnitude of 0.75 times the maximum take-off weight of the helicopter, and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated loads shall be applied over an area of 8 inches by 8 inches (203 mm by 203 mm) and are not required to act concurrently with other uniform or concentrated *live loads*.

~~Landing areas designed for a design basis helicopter with~~ Helipads shall be marked to indicate the maximum take-off weight~~ of 3,000 pounds (13.35 kN) shall be identified with a 3,000-pound (13.34 kN) weight limitation~~. The take-off ~~landing area~~ weight limitation shall be indicated in units of thousands of pounds and placed in a box that is ~~by the numeral "3" (kips)~~ located in the bottom right corner of the landing area as viewed from the primary approach path. The~~ indication for the landing area weight limitation~~box shall be a minimum 5 feet (1524 mm) in height.

Staff Analysis: CC# S95-22 and CC# S96-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: To extend the marking requirements to all helipads and not just helipads with a maximum take-off weight of 3,000 pounds.
In review of the current requirements and the commentary it is not clear as to why only helipads with a maximum take-off weight of 3,000 lbs are required to have markings identifying the weight limitations. Helipads for design weights greater than or less than 3,000 lbs should also have the weight limitations identified.

FAA Advisory Circular AC No. 150/5390-2C (2012) provides standards for the design of heliports serving helicopters with single rotors. Sections 215(b), 314(b), and 414(b) of the FAA Advisory Circular contain marking requirements for the touchdown and lift-off (TLOF) area for heliports. The proposed changes to the marking requirements are consistent with the FAA Advisory Circular.

For General Aviation identification symbols (Figure 2-23 AC No. 150/5390-2C) the symbol is a 5ft square "box". The term "box" is used within the Circular and applied to this proposal. Marking requirements within the box are not contained in current IBC language and based on current IBC commentary standard practice.

Bibliography: FAA Advisory Circular AC No. 150/5390-2C
(2012) https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5390-2

Cost Impact: The code change proposal will increase the cost of construction
The cost of construction will be marginally increase by this change. The additional cost for paint making the weight limitation, while most often already in practice, will be required for all helipads.

S95-22

S96-22

IBC: 1607.6

Proponents: John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com); Erik Madsen, representing NCSEA (erik@madsenengineering.com)

2021 International Building Code

Revise as follows:

1607.6 Helipads. Helipads shall be designed for the following *live loads*:

1. A uniform *live load*, *L*, as specified in Items 1.1 and 1.2. This *load* shall not be reduced.
   1.1. 40 psf (1.92 kN/m^2) where the design basis helicopter has a maximum take-off weight of 3,000 pounds (13.35 kN) or less.
   1.2. 60 psf (2.87 kN/m^2) where the design basis helicopter has a maximum take-off weight greater than 3,000 pounds (13.35 kN).
2. A single concentrated *live load*, *L*, of 3,000 pounds (13.35 kN) applied over an area of 4.5 inches by 4.5 inches (114 mm by 114 mm) and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated *load* is not required to act concurrently with other uniform or concentrated *live loads*.
3. Two single concentrated *live loads*, *L*, 8 feet (2438 mm) apart applied on the landing pad (representing the helicopter's two main landing gear, whether skid type or wheeled type), each having a magnitude of 0.75 times the maximum take-off weight of the helicopter, and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated loads shall be applied over an area of 8 inches by 8 inches (203 mm by 203 mm) and are not required to act concurrently with other uniform or concentrated *live loads*.

~~Landing areas designed for a design basis helicopter with maximum take-off weight of 3,000 pounds (13.35 kN) shall be identified with a 3,000-pound (13.34 kN) weight limitation. The landing area weight limitation shall be indicated by the numeral "3" (kips) located in the bottom right corner of the landing area as viewed from the primary approach path. The indication for the landing area weight limitation shall be a minimum 5 feet (1524 mm) in height.~~ Helipads shall be marked to indicate the maximum take-off weight in accordance with the standards and specifications required by the jurisdiction having authority for the design and construction of helipads in the same location of the structure.

Staff Analysis: CC# S95-22 and CC# S96-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: To provide uniform and consistent marking requirements for helipads.
FAA Advisory Circular AC No. 150/5390-2C (2012) provides standards for the design of heliports serving helicopters with single rotors. Section 215(b) of the circular states:"(b) TLOF weight limitations. If a TLOF has limited weight-carrying capability, mark it with the maximum takeoff weight of the design helicopter, in units of thousands of pounds, as shown in Figure 2–23. Do not use metric equivalents for this purpose. Center this marking in the upper section of a TLOF size/weight limitation box. If the TLOF does not have a weight limit, add a diagonal line, extending from the lower left hand corner to the upper right hand corner, to the upper section of the TLOF size/weight limitation box. See Figure 2–23."

The marking requirements from the FAA are more than just simply providing the Take-off design limit currently shown in the IBC. While the IBC commentary does make reference that the marking is a standard practice, to avoid any misleading or incomplete language within the IBC the specifics for the marking requirements are removed from the code.

It is recommended that the commentary include reference to the FAA Circular, similar to what was done for heavy vehicle loads and the reference to AASHTO in the commentary in section 1607.8.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Marking is already a requirement for helipads.

S96-22

S97-22

IBC: 1607.7

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.7 Passenger vehicle garages. Floors in garages ~~or~~ and portions of a building used for the storage of motor vehicles shall be designed for the uniformly distributed *live loads* indicated in Table 1607.1 or the following concentrated *load*:

1. For garages restricted to passenger vehicles accommodating not more than nine passengers, 3,000 pounds (13.35 kN) acting on an area of 4.5 inches by 4.5 inches (114 mm by 114 mm).
2. For mechanical parking structures without slab or deck that are used for storing passenger vehicles only, 2,250 pounds (10 kN) per wheel.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

This proposal makes a change to coordinate with the 2022 edition of ASCE 7. The proposal replaces "or" with "and" as the intent is to require **both** 1) garage floors and 2) portions of a building floor used for the storage of motor vehicles, to be designed for the indicated live loads.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Making the text more clear and improving coordination with ASCE 7 is not expected to effect the cost of construction.

S97-22

S98-22

IBC: 1607.8, 1607.8.1, 1607.8.2

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

1607.8 Heavy vehicle loads. Floors and other surfaces that are intended to support vehicle *loads* greater than a 10,000-pound (4536 kg) gross vehicle weight rating shall comply with Sections 1607.8.1 through 1607.8.5.

1607.8.1 Loads. Where any structure does not restrict access for vehicles that exceed a 10,000-pound (4536 kg) gross vehicle weight rating, those portions of the structure subject to such *loads* shall be designed using the vehicular *live loads*, including consideration of impact and fatigue, in accordance with the codes and specifications required by the jurisdiction having authority for the design and construction of the roadways and bridges in the same location of the structure.

Revise as follows:

1607.8.2 Fire truck and emergency vehicles. Where a structure or portions of a structure are accessed ~~and loaded~~ by fire department ~~access~~ vehicles and other similar emergency vehicles, those portions of the structure subject to such *loads* shall be designed for the greater of the following *loads*:

1. The actual operational *loads*, including outrigger reactions and contact areas of the vehicles as stipulated and *approved* by the *building official*.
2. The live loading specified in Section 1607.8.1.

Emergency vehicle loads need not be assumed to act concurrently with other uniform *live loads*.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal revises the text of Section 1607.8.2 to coordinate with ASCE 7. The 2022 edition of ASCE 7 has added live loads due to fire truck and emergency vehicles.

The proposed changes to the first paragraph also coordinate with the text of the preceding section, Section 1607.8.1 by using the phrases "those portions of" and "subject to such loads". The text, "and loaded", is deleted as it is unnecessary with the use of the "subject to such loads". It is noted that the "and loaded" text is also redundant as it is used, if a vehicle accesses a portion of the structure, it will also load that portion of the structure.

The additional text at the end of the section adds clarity for the application of the live loads. The operational loads of fire trucks and emergency vehicles are significant loads and do not need to be combined with other uniform live loads.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Reorganizing text and improving coordination with ASCE 7 is not expected to effect the cost of construction.

S98-22

S99-22

IBC: SECTION 106, [A] 106.1, [A] 106.2, [A] 106.3, 1607.8.5

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Delete without substitution:

~~SECTION 106~~

~~FLOOR AND ROOF DESIGN LOADS~~

~~**[A] 106.1 Live loads posted.** In commercial or industrial buildings, for each floor or portion thereof designed for *live loads* exceeding 50 psf (2.40 kN/m^2), such design *live loads* shall be conspicuously posted by the *owner* or the owner's authorized agent in that part of each *story* in which they apply, using durable signs. It shall be unlawful to remove or deface such notices.~~

~~**[A] 106.2 Issuance of certificate of occupancy.** A certificate of occupancy required by Section 111 shall not be issued until the floor load signs, required by Section 106.1, have been installed.~~

~~**[A] 106.3 Restrictions on loading.** It shall be unlawful to place, or cause or permit to be placed, on any floor or roof of a building, structure or portion thereof, a *load* greater than is permitted by this code.~~

Revise as follows:

1607.8.5 Posting. The maximum weight of vehicles allowed into or on a garage or other structure shall be posted <u>on a durable sign in a readily visible location at the vehicle entrance of the building or other approved location</u> ~~by the owner or the owner's authorized agent in accordance with Section 106.1.~~

Reason Statement: This proposal addresses the concerns expressed during testimony on a similar change last cycle. S52-19 attempted to move this signage requirement back to Chapter 16. This section was moved to the administrative provisions from structural by S48-07/08 The structural committee felt that this sign did not belong with the loading provisions in Chapter 16. There was testimony stating that the signage for live loads exceeding 50 pounds was an erroneous requirement. Signage requirements do not belong in the administrative provisions and none are found in any of the Administrative requirements in any of the other codes. Therefore, this proposal to delete the sign that was considered ineffective out of Chapter 1, and add a clarification of the requirements for the vehicle loading in Section 107.7.5 where it currently exists.
This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will decrease the cost of construction
Eliminates signage in some areas.

S99-22

S100-22

IBC: 1607.9.1

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.9.1 Handrails and guards. *Handrails* and *guards* shall be designed to resist a linear *load* of 50 pounds per linear foot (plf) (0.73 kN/m) in accordance with Section 4.5.1.1 of ASCE 7. Glass *handrail* assemblies and *guards* shall comply with Section 2407.

Exceptions:

1. For one- and two-family dwellings, only the single concentrated *load* required by Section 1607.9.1.1 shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are not accessible to the general public and that have an *occupant load* less than 50, the minimum *load* shall be 20 pounds per foot (0.29 kN/m).
3. <u>For roofs not intended for occupancy, only the single concentrated *load* required by Section 1607.9.1.1 shall be applied.</u>

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposals adds an exception to the requirement to design handrails and guards for the 50 plf load to coordinate with ASCE 7. The proposed exception was added to ASCE 7 for the 2022 edition.

Unoccupied rooftops are not factory, industrial, or storage occupancies and therefore do not currently qualify for what is in essence a reduced load; however, unoccupied roofs have, at most, a few maintenance workers on them at intermittent times and arguably pose less of a hazard then rails at one- and two-family dwellings and the other occupancies to which this exception currently applies. Unoccupied rooftop areas meet the two other requirements -- namely that they are areas not accessible to the public and serve an occupant load not greater than 50.

Note, the term "roofs not intended for occupancy" is proposed as it coordinates with the terminology used in the live load table.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal has the possibility of reducing design and construction costs where the new exception applies.

S100-22

S101-22

IBC: 1607.9, 1607.9.1.1, 1607.9.1

Proponents: John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com); Erik Madsen, representing NCSEA (erik@madsenengineering.com); Edwin Huston, representing NCSEA (huston@smithhustoninc.com)

2021 International Building Code

1607.9 Loads on handrails, guards, grab bars and seats. *Handrails* and *guards* shall be designed and constructed for the structural loading conditions set forth in Section 1607.9.1. Grab bars, shower seats and accessible benches shall be designed and constructed for the structural loading conditions set forth in Section 1607.9.2.

Revise as follows:

1607.9.1~~.1 Concentrated load~~Handrails and guards. *Handrails* and *guards* shall be designed to resist a concentrated *load* of 200 pounds (0.89 kN) in accordance with Section 4.5.1 of ASCE 7. Glass handrail assemblies and guards shall comply with Section 2407.

1607.9.1.1 ~~Handrails and guards~~ Uniform Load. *Handrails* and *guards* shall be designed to resist a linear *load* of 50 pounds per linear foot (plf) (0.73 kN/m) in accordance with Section 4.5.1.1 of ASCE 7. ~~Glass *handrail* assemblies and *guards* shall comply with Section 2407.~~ This load need not be assumed to act concurrently with the concentrated load specified in Section 1607.9.1

Exceptions:

1. For one- and two-family dwellings, only the single concentrated *load* required by Section 1607.9.1~~.1~~ shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are not accessible to the general public and that have an *occupant load* less than 50, the minimum *load* shall be 20 pounds per foot (0.29 kN/m).

Reason Statement: The purpose for the proposed changes are two fold.
First, the intent is to clarify that the uniform load and concentrated load need not be applied concurrently. While it is contained within the ASCE 7 language that the concentrated and uniform guard loads are not concurrent, there was seen as a need to reinforce this requirement in the language within the IBC.

Second, the text was modified to be consistent with section 4.5.1 of ASCE 7. The order of the loading requirements in IBC is changed to match the order within ASCE 7. The concentrated load will be presented first, with the uniform load, and the limitations on the uniform load, will be moved to the subsection. The technical design requirements are not being changed. The editorial modifications are being proposed to make the two loads more clearly defined.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed change is editorial and to provide consistency between the IBC and referenced standards.

S101-22

S102-22

IBC: 1607.9.1.2, 1607.9.1.2.1 (New)

Proponents: John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com); Erik Madsen, representing NCSEA (erik@madsenengineering.com)

2021 International Building Code

Revise as follows:

1607.9.1.2 Guard component loads. Balusters, panel fillers and guard infill components, including all rails , wires and cables except the handrail and the top rail, shall be designed to resist a horizontally applied concentrated load of 50 pounds (0.22 kN), distributed in accordance with Section 4.5.1.2 of ASCE 7.

Add new text as follows:

1607.9.1.2.1 Barrier Cable Systems. For wire or cable used as guard infill components of a pedestrian barrier / protection system, the wires or cables shall be tightened or stressed sufficient to prevent a sphere with a diameter equivalent to the opening limitations of Section 1015.4 from passing through the barrier when the component force is applied to the sphere. The 50 pound (0.22 kN) component force applied to an individual opening sphere may be divided by the number of wires or cables within a 12 inch (305 mm) width.

Reason Statement: The use of barrier cable systems for guards is widely used. The criteria for how to apply the component force to design or test the cable stressing however is not currently in the code or referenced standards.
The purpose of the proposed change is to address the unique aspect of cable rail systems in order to provide guidance for the amount of tension required on the infill cables to prevent splaying of the cables beyond the code opening limitation. Currently the 50 pound infill load per ASCE 7 Section 4.5.1.2 is applied on an area not to exceed 12 in. by 12 in., including openings. If the force is applied to a flat pate applied to the cables then the effect of cables splaying will not be captured. The new text clarifies that that the load for design and testing of a cable system should be applied to the individual sphere or cone and would be reduced by the number of cables in the test area.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of the code change is to capture the state of the practice for cable systems and properly designed systems already meet the proposed changes.

S102-22

S103-22

IBC: 1607.17, 1607.10, 1607.11

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

~~**1607.17**~~ **1607.10** **Fixed ladders.** Fixed ladders with rungs shall be designed to resist a single concentrated *load* of 300 pounds (1.33 kN) in accordance with Section 4.5.4 of ASCE 7. Where rails of fixed ladders extend above a floor or platform at the top of the ladder, each side rail extension shall be designed to resist a single concentrated *load* of 100 pounds (0.445 kN) in accordance with Section 4.5.4 of ASCE 7. Ship's ladders shall be designed to resist the *stair loads* given in Table 1607.1.

~~**1607.10**~~ **1607.11** **Vehicle barriers.** *Vehicle barriers* for passenger vehicles shall be designed to resist a concentrated *load* of 6,000 pounds (26.70 kN) in accordance with Section 4.5.3 of ASCE 7. Garages accommodating trucks and buses shall be designed in accordance with an *approved* method that contains provisions for traffic railings.

~~**1607.11**~~ **1607.12** **Impact loads.** The *live loads* specified in Sections 1607.3 through ~~1607.10~~ 1607.11 shall be assumed to include adequate allowance for ordinary impact conditions. Provisions shall be made in the structural design for uses and loads that involve unusual vibration and impact forces.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

This proposal moves the Fixed Ladders live load section in order to place it under the umbrella of the live loads considered to include allowance for ordinary impact conditions by the Impact Loads section. This change coordinates with how ASCE 7 treats fixed ladder live loads.

No technical changes are made to the live load values. Subsequent sections will need to be renumbered.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It is not likely that designers are increasing fixed ladder loads to account for impact, but if they are, this would decrease the cost of construction.

S103-22

S105-22

IBC: 1607.12.1.2, 1607.12.1.3

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.12.1.2 Heavy live loads. *Live loads* that exceed 100 psf (4.79 kN/m^2) shall not be reduced.

Exceptions:

1. The *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent, but the reduced *live load* shall be not less than *L* as calculated in Section 1607.12.1.
2. For uses other than storage, where *approved*, additional *live load* reductions shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.

1607.12.1.3 Passenger vehicle garages. The *live loads* shall not be reduced in passenger vehicle garages.

Exception: The *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent, but the reduced *live load* ~~be~~ shall be not less than *L* as calculated in Section 1607.12.1.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
The proposal adds the word "reduced" in front of live load in two places to coordinate the IBC text with the ASCE 7 text. The text should indicate the "reduced live load" as it is the reduced value from these two sections (limited to a maximum 20% reduction) that is required to be compared to "L" in Section 1607.12.1.The proposal also deletes an extraneous "be" in the exception.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Editorial changes for clarity.

S105-22

S106-22

IBC: 1607.12.2

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.12.2 Alternative uniform live load reduction. As an alternative to Section 1607.12.1 and subject to the limitations of Table 1607.1, uniformly distributed *live loads* are permitted to be reduced in accordance with the following provisions. Such reductions shall apply to slab systems, beams, girders, columns, piers, walls and foundations.

1. For *live loads* not exceeding 100 psf (4.79 kN/m^2), the design *live load* for structural members supporting 150 square feet (13.94 m^2) or more is permitted to be reduced in accordance with Equation 16-8.

   $R = 0.08(A - 150)$ (Equation 16-8)

   For SI: $R = 0.861(A - 13.94)$

   where:

   A = Area of floor supported by the member, square feet (m^2).

   R = Reduction in percent.

   Such reduction shall not exceed the smallest of:

   1.1 40 percent for members supporting one floor.

   1.2 60 percent for members supporting two or more floors.

   1.3 *R* as determined by the following equation:

   $R = 23.1(1 + D/L_o)$ (Equation 16-9)

   where:

   D = *Dead load* per square foot (m^2) of area supported.

   L_o = Unreduced *live load* per square foot (m^2) of area supported.

2. A reduction shall not be permitted where the *live load* exceeds 100 psf (4.79 kN/m^2) except that the design *live load* for members supporting two or more floors is permitted to be reduced by not greater than 20 percent.

   Exception: For uses other than storage, where *approved*, additional *live load* reductions shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.

3. A reduction shall not be permitted in passenger vehicle parking garages except that the *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent.

4. For one-way slabs, the area, *A*, for use in Equation 16-8 shall not exceed the product of the slab span and a width normal to the span of 0.5 times the slab span.

~~1. A reduction shall not be permitted where the *live load* exceeds 100 psf (4.79 kN/m²) except that the design *live load* for members supporting two or more floors is permitted to be reduced by not greater than 20 percent.~~

~~**Exception:** For uses other than storage, where *approved*, additional *live load* reductions shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.~~

~~2. A reduction shall not be permitted in passenger vehicle parking garages except that the *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent.~~

~~3. For *live loads* not exceeding 100 psf (4.79 kN/m²), the design *live load* for any structural member supporting 150 square feet (13.94 m²) or more is permitted to be reduced in accordance with Equation 16-8~~

4. ~~For one-way slabs, the area, *A*, for use in Equation 16-8 shall not exceed the product of the slab span and a width normal to the span of 0.5 times the slab span.~~

~~R = 0.08(A - 150)~~ **~~(Equation 16-8)~~**

~~For SI: *R* = 0.861(*A* – 13.94)~~

~~Such reduction shall not exceed the smallest of:~~

1. ~~40 percent for members supporting one floor.~~
2. ~~60 percent for members supporting two or more floors.~~
3. ~~*R* as determined by the following equation:~~

~~$R = 23.1(1 + D/L_o)$~~ **~~(Equation 16-9)~~**

~~where:~~

~~*A* = Area of floor supported by the member, square feet (m^2).~~

~~*D* = *Dead load* per square foot (m^2) of area supported.~~

~~L_o = Unreduced *live load* per square foot (m^2) of area supported.~~

~~*R* = Reduction in percent.~~

Reason Statement: This proposal reorganizes the alternative live load reduction provisions (Section 1607.12.2) into a more logical order that aligns with both the historical format of these provisions and the format of the basic live load reduction provisions (Section 1607.12.1). The current order places the actual live load reduction equation at the end of the section, after the qualifications and limitations. This places the proverbial cart before the horse.
Currently Section 1607.12.2 lists four numbered items, then presents the reduction equation, the equation limitations, and the symbol definitions. This organization has caused confusion as it appears the equation and related information is a part of Item 4.

The reorganization moves Item 3 to Item 1 as Item 1 is the general requirement and it directly references the reduction equation. The reduction equation, its limitations, and the symbol definitions are then incorporated into Item 1. Placing the equation into the first item is more logical and mirrors the layout of the basic live load reduction requirement in Section 1607.12.1. It also aligns with the historical format from ANSI A58.1, *Building Code Requirements for Minimum Design Loads in Buildings and Other Structures*, which listed the rate of live load reduction first, before any limitations.

The other existing items are then simply renumbered and reference back to the previously provided equation as necessary.

This proposal does not change the technical requirements of the section. There is a minor change as the word "any", in front of "structural member", was removed from Item 3 (now Item 1). The word "any" in this case is unnecessary, it also does appear in the corresponding location in Section 1607.12.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No technical changes are included in this proposal.

S106-22

S107-22

IBC: 1607.12.1, 1607.12.1.1, 1607.12.1.2, 1607.12.1.3, 1607.12.2

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

1607.12.1 Basic uniform live load reduction. Subject to the limitations of Sections 1607.12.1.1 through 1607.12.1.3 and Table 1607.1, members for which a value of $K_{LL}A_T$ is 400 square feet (37.16 m^2) or more are permitted to be designed for a reduced uniformly distributed *live load*, L, in accordance with the following equation:

(Equation 16-7)

$$L = L_o\left(0.25 + \frac{15}{\sqrt{K_{LL}A_T}}\right)$$

For SI:

$$L = L_o\left(0.25 + \frac{4.57}{\sqrt{K_{LL}A_T}}\right)$$

where:

L = Reduced design *live load* per square foot (m^2) of area supported by the member.

L_o = Unreduced design *live load* per square foot (m^2) of area supported by the member (see Table 1607.1).

K_{LL} = *Live load* element factor (see Table 1607.12.1).

A_T = Tributary area, in square feet (m^2).

L shall be not less than $0.50L_o$ for members supporting one floor and L shall be not less than $0.40L_o$ for members supporting two or more floors.

1607.12.1.1 One-way slabs. The tributary area, A_T, for use in Equation 16-7 for one-way slabs shall not exceed an area defined by the slab span times a width normal to the span of 1.5 times the slab span.

Revise as follows:

1607.12.1.2 Heavy live loads. *Live loads* that exceed 100 psf (4.79 kN/m^2) shall not be reduced.

Exception~~s~~:

1. The *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent, but the *live load* shall be not less than L as calculated in Section 1607.12.1.
2. ~~For uses other than storage, where *approved*, additional *live load* reductions shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.~~

1607.12.1.3 Passenger vehicle garages. The *live loads* shall not be reduced in passenger vehicle garages.

Exception: The *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent, but the *live load* be shall be not less than L as calculated in Section 1607.12.1.

Revise as follows:

1607.12.2 Alternative uniform live load reduction. As an alternative to Section 1607.12.1 and subject to the limitations of Table 1607.1, uniformly distributed *live loads* are permitted to be reduced in accordance with the following provisions. Such reductions shall apply to slab systems, beams, girders, columns, piers, walls and foundations.

1. A reduction shall not be permitted where the *live load* exceeds 100 psf (4.79 kN/m^2) except that the design *live load* for members supporting two or more floors is permitted to be reduced by not greater than 20 percent.

   ~~**Exception:** For uses other than storage, where *approved*, additional *live load* reductions shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.~~

2. A reduction shall not be permitted in passenger vehicle parking garages except that the *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent.
3. For *live loads* not exceeding 100 psf (4.79 kN/m^2), the design *live load* for any structural member supporting 150 square feet (13.94 m^2) or more is permitted to be reduced in accordance with Equation 16-8

4. For one-way slabs, the area, A, for use in Equation 16-8 shall not exceed the product of the slab span and a width normal to the span of 0.5 times the slab span.

$$R = 0.08(A - 150)$$ **(Equation 16-8)**

For SI: $R = 0.861(A - 13.94)$
Such reduction shall not exceed the smallest of:

1. 40 percent for members supporting one floor.
2. 60 percent for members supporting two or more floors.
3. R as determined by the following equation:

$$R = 23.1(1 + D/L_o)$$ **(Equation 16-9)**

where:

A = Area of floor supported by the member, square feet (m^2).

D = *Dead load* per square foot (m^2) of area supported.

L_o = Unreduced *live load* per square foot (m^2) of area supported.

R = Reduction in percent.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

These changes are proposed to 1) improve the coordination between the IBC and ASCE 7 and 2) remove a vague and unnecessary exception to the live load reduction provisions that applies to live loads that exceed 100 psf. The exception appears in two places and is proposed to be deleted in both places.

The exception is unnecessary as it is essentially a repeat of the alternative materials, design, and methods provision in Section 104.11. Section 104.11 already allows the building official to approve an alternative design and therefore this exception in Chapter 16 is redundant. If this exception contained additional requirements or further detail above what is contained in Section 104.11, such as specific information required be submitted to the building official, then the exception would have value. However the exception is nonspecific, simply requiring a registered design professional to use a "rational approach" and to show that the reductions are "warranted". This offers little guidance to the building official in their review of the registered design professionals submittal.

This exception is not contained in ASCE 7 and it does not appear that it was reviewed by ASCE 7 technical committees even though live loads and live load reduction provisions are contained and maintained in ASCE 7. Removing this exception will coordinate with ASCE 7.

This exception first appeared in the 2006 edition of the IBC for the basic live load reduction provisions and in the 2009 edition for the alternative live load provisions.

The reason statement in the ICC proposal that resulted in the inclusion of this exception, S24-04/05, essentially states that there are non-storage areas with live loads that exceed 100 psf, such as mechanical rooms, where there is not a good chance of the entire tributary area being loaded to the full design load. The merits of this position should be reviewed by the technical committees of ASCE 7. If there are uses with heavy live loads where a reduction should be permitted, those uses, and any appropriate limitations on the amount of live load reduction, should be specifically stated. This applies to both ASCE 7 and the IBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The alternative method is still available to the designer and as such no change in the cost of construction is expected.

S107-22

S108-22

IBC: 1607.12, 1607.12.2

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.12 Reduction in uniform live loads. Except for uniform *live loads* at roofs, all other minimum uniformly distributed *live loads*, L_o, in Table 1607.1 are permitted to be reduced in accordance with Section 1607.12.1 ~~or 1607.12.2~~. Uniform *live loads* at roofs are permitted to be reduced in accordance with Section 1607.14.2.

~~**1607.12.2 Alternative uniform live load reduction.** As an alternative to Section 1607.12.1 and subject to the limitations of Table 1607.1, uniformly distributed *live loads* are permitted to be reduced in accordance with the following provisions. Such reductions shall apply to slab systems, beams, girders, columns, piers, walls and foundations.~~

1. ~~A reduction shall not be permitted where the *live load* exceeds 100 psf (4.79 kN/m^2) except that the design *live load* for members supporting two or more floors is permitted to be reduced by not greater than 20 percent.~~

   ~~**Exception:** For uses other than storage, where *approved*, additional *live load* reductions shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.~~

2. ~~A reduction shall not be permitted in passenger vehicle parking garages except that the *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent.~~
3. ~~For *live loads* not exceeding 100 psf (4.79 kN/m^2), the design *live load* for any structural member supporting 150 square feet (13.94 m^2) or more is permitted to be reduced in accordance with Equation 16-8~~
4. ~~For one-way slabs, the area, *A*, for use in Equation 16-8 shall not exceed the product of the slab span and a width normal to the span of 0.5 times the slab span.~~

~~$R = 0.08(A - 150)$~~ ~~**(Equation 16-8)**~~

~~For SI: $R = 0.861(A - 13.94)$~~

~~Such reduction shall not exceed the smallest of:~~

1. ~~40 percent for members supporting one floor.~~
2. ~~60 percent for members supporting two or more floors.~~
3. ~~*R* as determined by the following equation:~~

~~$R = 23.1(1 + D/L_o)$~~ ~~**(Equation 16-9)**~~

~~where:~~

~~*A* = Area of floor supported by the member, square feet (m^2).~~

~~*D* = *Dead load* per square foot (m^2) of area supported.~~

~~L_o = Unreduced *live load* per square foot (m^2) of area supported.~~

~~*R* = Reduction in percent.~~

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

These changes are proposed to 1) improve the coordination between the IBC and ASCE 7 and 2) remove an outdated provision that has been superceded by a more rigorously supported provision.

The IBC contains two methods of live load reduction, referred to as the Basic Uniform Live Load Reduction (Basic) and the Alternative Live Load Reduction (Alternate). The Basic method corresponds to the method contained in ASCE 7, which dates back to the 1982 edition, when the standard was known as ANSI A58.1. The Alternate method corresponds to the method contained in ANSI A58.1 prior to the 1982 edition. It last appeared in the 1972 edition. The Alternate method is based on building survey data published in 1947, and analysis published in 1968 per the ANSI A58.1-72 commentary. The Basic method is the result of work published in the early 1980's by Chalk and Corotis, as well as Harris, Corotis, and Bova per the ASCE 7 commentary.

Prior to the first edition of the IBC in 2000, the legacy codes had started to transition from the older Alternate method to the newer Basic method. The BOCA National Building Code only contained the Basic method, the UBC contained both methods, and SBCCI's Standard Building Code still contained the Alternate method. The melding of the three legacy codes resulted in the 2000 IBC including both methods. Both methods have continued to appear in the IBC despite the newer Basic method being based on on more current and more extensive information.

This proposal removes the alternative live load reduction provisions from the IBC. There has been a long enough transition period provided by both the legacy model codes and the IBC. The Alternative method has been replaced by the more rigorously supported Basic method, and it is time for the IBC to reflect this, as was done long ago in ASCE 7/ANSI A58.1. The Basic method is based on more recent and more extensive data as well as statistical analysis of theoretical models.

Cost Impact: The code change proposal will increase the cost of construction
For designers that are still using the alternative live load reduction method, some designs can result in slightly lower live load reductions with the basic method. For these designs the slightly higher live load could result in an increased cost of construction.

S108-22

S109-22

IBC: 1607.14.2

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1607.14.2 Reduction in uniform roof live loads. The minimum uniformly distributed *live loads* of roofs and *canopies* ~~*marquees*~~, L_o, in Table 1607.1 are permitted to be reduced in accordance with Section 1607.14.2.1.

Reason Statement: *Marquees* are defined to be a specific kind of *canopy*, yet the the subsections of this section include all *canopies*. This is simply a clean up of incorrect wording.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Just clarifying wording of a section to line-up with its subsections

S109-22

S110-22

IBC: 1607.14.3

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Delete without substitution:

~~**1607.14.3 Awnings and canopies.** *Awnings* and canopies shall be designed for uniform *live loads* as required in Table 1607.1 as well as for snow *loads* and wind *loads* as specified in Sections 1608 and 1609.~~

Staff Analysis: CC# S110-22 and CC# S111-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
These changes are proposed to improve the coordination between the IBC and ASCE 7 by removing unnecessary pointers that do not appear in ASCE 7.

Awning and canopy live loads are listed in the live load table. Section 1607.14.3 is simply a pointer to the live load table and as such is unnecessary. Typically separate section are only provided when additional information regarding the live load is provided. This section does not further clarify the application or applicability of the live load for these items.

The reference to snow and wind loads in the live load section is also unnecessary. These loads are addressed in their own IBC sections. There is nothing in the wind and snow load sections that suggest that awnings and canopies are exempt from these loads.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change loads in the IBC.

S110-22

S111-22

IBC: 1607.14.3

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.14.3 Awnings and canopies. *Awnings* and canopies shall be designed for uniform *live loads* as required in Table 1607.1 ~~as well as for snow *loads* and wind *loads* as specified in Sections 1608 and 1609~~.

Staff Analysis: CC# S110-22 and CC# S111-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
The reference to snow and wind loads in the live load section is unnecessary. These loads are addressed in their own IBC sections. There is nothing in the wind and snow load sections that suggest that awnings and canopies are exempt from those loads.

Referencing environmental loads in the live load section for only some building components can also be confusing. What does it mean when environmental loads are not called out in the live load section for other building components?

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change design requirements and will have no affect on the cost of construction.

S111-22

S112-22

IBC: 1607.14.4.3

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Philip Oakes, representing National Association of State Fire Marshals

2021 International Building Code

Revise as follows:

1607.14.4.3 ~~Photovoltaic panels installed on~~ <u>Elevated PV support structures with</u> open grid ~~roof structures~~ <u>framing</u>. ~~Structures~~ <u>*Elevated PV support structures*</u> with open grid framing and without a *roof deck* or sheathing ~~supporting *photovoltaic panel systems*~~ shall be designed to support the uniform and concentrated *roof live loads* specified in Section 1607.14.4.1, except that the uniform *roof live load* shall be permitted to be reduced to 12 psf (0.57 kN/m^2).

Reason Statement: This provides alignment with a new definition for these types of structures, which was included in the Group A cycle in accordance with Proposal G193-21. Language that occurs in the newly defined term becomes redundant and can be struck from Section 1607.14.4.3 for clarity.
PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED. An independent photovoltaic (PV) panel support structure designed with useable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of motor vehicles.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides clarity, and alignment with the new definition for these types of structures.

S112-22

S113-22

IBC: 1607.14.4.4

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Building Code

Revise as follows:

1607.14.4.4 Ground-mounted photovoltaic (PV) panel systems or modules installed as an independent structure. Ground-mounted photovoltaic (PV) panel systems tha~~t are independent structures and do not have accessible/occupied space underneath~~ are not required to accommodate a roof ~~photovoltaic~~ *live load*. Other *loads* and combinations in accordance with Section 1605 shall be accommodated.

Reason Statement:
This is a further improvement on what was revised in Group A through the action on G1-21, Part I. The proposal G1-21, Part I was to address the need to revise “accessible” to “access”.

Note the following definition was created by Proposal G193-21 in Group A.“**PHOTOVOLTAIC (PV) PANEL SYSTEM, GROUND-MOUNTED.** An independent photovoltaic (PV) panel system without useable space underneath, installed directly on the ground.”

This provides alignment with a new definition for these types of structures, which was included in the Group A cycle in accordance with Proposal G193-21.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Bibliography: G1-21 Part I
Section 1607.14.4.4

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides clarity, and alignment with the definition of ground mounted PV panel systems and accessible.

S113-22

S114-22

IBC: 1607.15, 1607.15.1, 1607.15.2, 1607.15.3, 1607.15.4

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.15 Crane loads. The crane *live load* shall be the rated capacity of the crane. Design *loads* for the runway beams, including connections and support brackets, of moving bridge cranes and monorail cranes shall be in accordance with Section 4.9 of ASCE 7.~~include the maximum wheel *loads* of the crane and the vertical impact, lateral and longitudinal forces induced by the moving crane.~~

Delete without substitution:

~~**1607.15.1 Maximum wheel load.** The maximum wheel *loads* shall be the wheel *loads* produced by the weight of the bridge, as applicable, plus the sum of the rated capacity and the weight of the trolley with the trolley positioned on its runway at the location where the resulting *load effect* is maximum.~~

~~**1607.15.2 Vertical impact force.** The maximum wheel *loads* of the crane shall be increased by the following percentages to account for the effects of vertical impact or vibration:~~

~~Monorail cranes (powered)~~	~~25 percent~~
~~Cab-operated or remotely operated bridge cranes (powered)~~	~~25 percent~~
~~Pendant-operated bridge cranes (powered)~~	~~10 percent~~
~~Bridge cranes or monorail cranes with hand-geared bridge, trolley and hoist~~	~~0 percent~~

~~**1607.15.3 Lateral force.** The lateral force on crane runway beams with electrically powered trolleys shall be calculated as 20 percent of the sum of the rated capacity of the crane and the weight of the hoist and trolley. The lateral force shall be assumed to act horizontally at the traction surface of a runway beam, in either direction perpendicular to the beam, and shall be distributed with due regard to the lateral stiffness of the runway beam and supporting structure.~~

~~**1607.15.4 Longitudinal force.** The longitudinal force on crane runway beams, except for bridge cranes with hand-geared bridges, shall be calculated as 10 percent of the maximum wheel *loads* of the crane. The longitudinal force shall be assumed to act horizontally at the traction surface of a runway beam, in either direction parallel to the beam.~~

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal is the first of two proposals from ASCE 7 regarding crane live loads. Both proposals are intended to keep the IBC coordinated with ASCE 7, but each proposal accomplishes that coordination in different ways.The 2022 edition of ASCE 7 includes revisions to the Vertical Impact Force provisions for the crane wheel loads. These changes were made to align the vertical impact factor with crane service class for consistency with crane industry practice and with the CMAA (Crane Manufacturers Association of America) document referenced by the ASCE 7 commentary. The revisions consist of changes to the Vertical Impact Factor table and the inclusion of crane service class descriptions adapted from the CMAA document.

In order to keep the IBC coordinated with ASCE 7-22, as well as crane industry practice, changes are also needed to the IBC. However, the changes to ASCE 7 included the addition of a significant amount of text. As an alternative to also placing this text in the IBC, this proposal accomplishes the IBC-ASCE 7 coordination by having the IBC simply reference ASCE 7 for the majority of the crane load information. The base requirement that the crane live load is to be the rated capacity of the crane remains stated in the IBC. The information detailing the design loads for the runway beams is removed and replaced with the reference to ASCE 7.

The information removed from the IBC is structural design information used by the design professional. The information applies to a very limited use, that for runway beams supporting moving bridge cranes and monorail cranes. The reference to ASCE 7 for this design information is similar to material design information that is contained in referenced design standards and not within the IBC itself, such as in ACI 318 for concrete and AISC 360 for steel.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Relocating the crane load information from the IBC to ASCE 7 is not expected to affect the cost of construction. The revisions in ASCE 7 to categorize the crane wheel load impact factor based on the crane service class is also not expect to affect the cost of construction as the use of the crane service class is recognized in the crane industry.

S114-22

S115-22

IBC: 1607.15, 1607.15.1, 1607.15.2, 1607.15.2.1 (New), 1607.15.3, 1607.15.4

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

1607.15 Crane loads. The crane *live load* shall be the rated capacity of the crane. Design *loads* for the runway beams, including connections and support brackets, of moving bridge cranes and monorail cranes shall include the maximum wheel *loads* of the crane and the vertical impact, lateral and longitudinal forces induced by the moving crane.

1607.15.1 Maximum wheel load. The maximum wheel *loads* shall be the wheel *loads* produced by the weight of the bridge, as applicable, plus the sum of the rated capacity and the weight of the trolley with the trolley positioned on its runway at the location where the resulting *load effect* is maximum.

Revise as follows:

1607.15.2 Vertical impact force. The maximum wheel *loads* of the crane shall be increased by the following percentages to account for the effects of vertical impact or vibration:

Monorail cranes (powered)	25 percent
~~Cab-operated or remotely operated bridge cranes (powered)~~ Bridge crane service class D, E, or F	25 percent
~~Pendant-operated bridge cranes (powered)~~ Bridge crane service class, A, B, or C	10 percent
~~Bridge cranes or monorail cranes~~ Cranes with hand-geared bridge, trolley and hoist	0 percent

Add new text as follows:

1607.15.2.1 Bridge crane service class. For the purpose of determining the vertical impact force, one of the following bridge crane service class shall be assigned based on the actual service conditions including the frequency of use, variability in load lifted, and the operation speed.

1. Bridge Crane Service Class A (Standby or infrequent service). This service class shall include cranes used in installations such as powerhouses, public utilities, turbine rooms, motor rooms and transformer stations where precise handling of equipment at slow speeds is required and cranes are infrequently used or are idled for long periods. Full rated loads shall be handled for initial installation of equipment and for infrequent maintenance.
2. Bridge Crane Service Class B (Light service). This service class shall include cranes used in repair shops, light assembly operations, service buildings, light warehousing, etc. where service requirements are light and the speed is slow. Loads are permitted to vary, but full rated loads shall occur only occasionally, with two to five lifts per hour, averaging 10 feet per lift.
3. Bridge Crane Service Class C (Moderate service). This service class shall include cranes used in machine shops or paper mill machine rooms, etc. where service requirements are moderate. In this type of service, the crane shall handle loads which average 50 percent of the rated capacity with five to ten lifts per hour, averaging 15 feet, not over 50 percent of the lifts at rated capacity.
4. Bridge Crane Service Class D (Heavy service). This service class shall include cranes used in heavy machine shops, foundries, fabricating plants, steel warehouses, container yards, lumber mills, etc., and the standard duty bucket and magnet operations where heavy duty production is required. In this type of service, the crane shall handle loads approaching 50 percent of the rated capacity constantly during the working period. High speeds are used for this type of service with 10 to 20 lifts per hour averaging 15 feet, not over 65 percent of the lifts at rated capacity.
5. Bridge Crane Service Class E (Severe service). This service class shall include cranes capable of handling loads approaching rated capacity throughout its life. Applications include magnet, bucket, magnet/bucket combination cranes for scrap yards, cement mills, lumber mills, fertilizer plants, container handling, etc., with twenty or more lifts per hour at or near the rated capacity.
6. Bridge Crane Service Class F (Continuous severe service).This service class shall include cranes capable of handling loads approaching rated capacity continuously under severe service conditions throughout its life. Applications include custom designed specialty cranes essential to performing the critical work tasks affecting the total production facility. These cranes shall provide the highest reliability with special attention to ease of maintenance features.

1607.15.3 Lateral force. The lateral force on crane runway beams with electrically powered trolleys shall be calculated as 20 percent of the sum of the rated capacity of the crane and the weight of the hoist and trolley. The lateral force shall be assumed to act horizontally at the traction surface of a runway beam, in either direction perpendicular to the beam, and shall be distributed with due regard to the lateral stiffness of the runway beam and supporting structure.

1607.15.4 Longitudinal force. The longitudinal force on crane runway beams, except for bridge cranes with hand-geared bridges, shall be calculated as 10 percent of the maximum wheel *loads* of the crane. The longitudinal force shall be assumed to act horizontally at the traction surface of a runway beam, in either direction parallel to the beam.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal is the second of two proposals from ASCE 7 regarding crane live loads. Both proposals are intended to keep the IBC coordinated with ASCE 7, but each proposal accomplishes that coordination in different ways.The 2022 edition of ASCE 7 includes revisions to the Vertical Impact Force provisions for the crane wheel loads. These changes were made to align the vertical impact factor with crane service class for consistency with crane industry practice and with the CMAA (Crane Manufacturers Association of America) document referenced by the ASCE 7 commentary. The revisions consist of changes to the Vertical Impact Factor table and the inclusion of crane service class descriptions adapted from the CMAA document.

In order to keep the IBC coordinated with ASCE 7-22, as well as crane industry practice, changes are also needed to the IBC. This proposal accomplishes the IBC-ASCE 7 coordination by making the same revisions in the IBC as were made in ASCE 7. The following is part of the reason statement contained in the ASCE 7 proposal:

"The magnitude of potential impact forces is dependent on service class and hoisting and trolley travel speeds. The proposed changes align the vertical impact factor based on the crane service class that considers the overall use of the crane. MHI defines the crane service classes and uses it in the design of the various crane components (Note, MHI is correctly changed to CMAA in ASCE 7-22 proposal DL-CH04-28r01). Structural engineers currently use service class for fatigue loading and deflection criteria of members supporting the crane. An example is AISC Design Guide 7 / Industrial Buildings – Roofs to Anchor Rods, 2nd Edition, Part 2, Chapter 11, which describes the use of service class to address frequency of loading. Only two impact factors are used, 10% and 25%, to align with previous ASCE 7 editions, but all six crane service classes are listed and defined for consistency with the MHI/CMAA referenced document and crane industry practice.

As speeds are similar for remotely operated cranes and pendant-operated cranes, using different impact factors is illogical. The current higher factor for radio-controlled cranes of light to moderate service class imposes an un-necessary increase in costs for a crane system that has a higher level of operational safety. In recent years as improvements in remote controlled systems have become more available, existing pendant systems retrofitting to utilize remote control without any review or modifications to the structure has occurred without any known/reported problems with runway beam design/performance. New applications are utilizing both control systems with the pendant control acting as a back up to the remote control leading to confusion on which impact factor to use.

As crane service class is a requirement by crane manufacturers and used in other aspects of design, its use in setting the vertical impact factor is an improvement without any significant change in impact factor values."

The format of the service class information is modeled after the format used to describe wind load exposure categories and surface roughness categories in Section 1609.4.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Categorizing the crane wheel load impact factor based on the crane service class is not expected to affect the cost of construction as the use of the crane service class is recognized in the crane industry.

S115-22

S116-22

IBC: CHAPTER 1, SECTION 108, [A] 108.1, CHAPTER 2, SECTION 202, SECTION 202 (New), CHAPTER 16, SECTION 1608, 1608.1, SECTION 1609, 1609.1.1, SECTION 1612, 1612.2, SECTION 1613, 1613.1, SECTION 1614, 1614.1, SECTION 1615, 1615.1, CHAPTER 31, SECTION 3103, 3103.1, 3103.1.1 (New), 3103.1.1, 3103.1.2, 3103.5 (New), 3103.5.1 (New), TABLE 3103.5.1 (New), 3103.5.1.1 (New), 3103.5.1.2 (New), 3103.5.1.3 (New), 3103.5.1.4 (New), 3103.5.1.5 (New), 3103.5.1.6 (New), 3103.5.1.7 (New), 3103.5.1.8 (New), 3103.5.2 (New), TABLE 3103.5.2 (New), 3103.5.3 (New), 3103.5.4 (New), 3103.5.5 (New), 3103.6 (New), 3103.7 (New), 3103.7.1 (New), 3103.7.2 (New), 3103.7.3 (New), CHAPTER 35, ANSI Chapter 35 (New)

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org); Don Scott, representing ASCE 7 Wind Load Subcommittee (dscott@pcs-structural.com); John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com); Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Building Code

CHAPTER 1
SCOPE AND ADMINISTRATION

SECTION 108
TEMPORARY STRUCTURES AND USES

Revise as follows:

[A] 108.1 General. The *building official* is authorized to issue a *permit* for temporary structures and temporary uses. Such *permits* shall be limited as to time of service, but shall not be permitted for more than 180 days. The *building official* is authorized to grant extensions for demonstrated cause. Structures designed to comply with Section 3103.5 shall not be in service for a period of more than 1-year unless an extension of time is granted.

CHAPTER 2
DEFINITIONS

SECTION 202
DEFINITIONS

Add new definition as follows:

PUBLIC-OCCUPANCY TEMPORARY STRUCTURE. Any building or structure erected for a period of one year or less *that support public or private assemblies*, or that provide human shelter, protection, or safety. Public-occupancy temporary structures within the confines of another existing structure (such as convention booths) are exempted from Section 3103.5.

SERVICE LIFE. The period of time that a structure serves its intended purpose. For temporary structures, this shall be the cumulative time of service for sequential temporary events which may occur in multiple locations. For *public-occupancy temporary structures* this is assumed to be a minimum of 10 years.

TEMPORARY EVENT. A single use during the service life of a *public-occupancy temporary structure* at a given location which includes its installation, inspection, use and occupancy, and dismantling.

TEMPORARY STRUCTURE. Any building or structure erected for a period of 180 days or less to support *temporary events. Tempo*rary structures include a range of structure types (*public-occupancy temporary structures*, temporary *special event structures*, tents, umbrella and other membrane structures, *relocatable buildings, temporary bleachers, etc.)* for a range of purposes (storage, equipment protection, dining, workspace, assembly, etc.).

CHAPTER 16
STRUCTURAL DESIGN

SECTION 1608
SNOW LOADS

Revise as follows:

1608.1 General. Design snow *loads* shall be determined in accordance with Chapter 7 of ASCE 7, but the design roof *load* shall be not less than that determined by Section 1607.

Exception: *Temporary structures* complying with Section 3103.5.1.3.

SECTION 1609
WIND LOADS

Revise as follows:

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic design *wind speed*, *V*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.
7. *Temporary structures* complying with Section 3103.5.1.4.

The wind speeds in Figures 1609.3(1) through 1609.3(12) are basic design wind speeds, *V*, and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 4 and 5 are used.

SECTION 1612
FLOOD LOADS

Revise as follows:

1612.2 Design and construction. The design and construction of buildings and structures located in *flood hazard areas*, including *coastal high hazard areas* and *coastal A zones*, shall be in accordance with Chapter 5 of ASCE 7 and ASCE 24.

Exception: *Temporary structures* complying with Section 3103.5.1.5.

SECTION 1613
EARTHQUAKE LOADS

Revise as follows:

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable. The *seismic design category* for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

Exceptions:

1. Detached one- and two-family dwellings, assigned to *Seismic Design Category* A, B or C, or located where the mapped short-period spectral response acceleration, S_S, is less than 0.4 g.
2. The *seismic force-resisting system* of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. References within ASCE 7 to Chapter 14 shall not apply, except as specifically required herein.
6. *Temporary structures* complying with Section 3103.5.1.6.

SECTION 1614

ATMOSPHERIC ICE LOADS

Revise as follows:

1614.1 General. *Ice-sensitive structures* shall be designed for atmospheric ice *loads* in accordance with Chapter 10 of ASCE 7. *Public-occupancy temporary structures* shall comply with Section 3103.7.3.

Exception: *Temporary structures* complying with Section 3103.5.1.7.

SECTION 1615
TSUNAMI LOADS

Revise as follows:

1615.1 General. The design and construction of *Risk Category* III and IV buildings and structures located in the *Tsunami Design Zones* defined in the *Tsunami Design Geodatabase* shall be in accordance with Chapter 6 of ASCE 7, except as modified by this code.

Exception: *Temporary structures* complying with Section 3103.5.1.8.

CHAPTER 31
SPECIAL CONSTRUCTION

SECTION 3103
TEMPORARY STRUCTURES

Revise as follows:

3103.1 General. The provisions of Sections 3103.1 through ~~3103.4~~ 3103.7 shall apply to structures erected for a period of less than 180 days. Temporary *special event structures*, tents, umbrella structures and other membrane structures erected for a period of less than 180 days shall also comply with the *International Fire Code* . ~~Those~~ *Temporary structures* erected for a longer period of time and *public-occupancy temporary structures* shall comply with applicable sections of this code.

Exception: *Public-occupancy temporary structures* complying with Section 3103.1.1 shall be permitted to remain in service for 180 days or more but not more than 1 year when approved by the *Building Official.*

Add new text as follows:

3103.1.1 Extended period of service time. *Public-occupanc y temporary structures* shall be permitted to remain in service for 180 days or more without complying with requirements in this code for new buildings or structures when extensions for up to 1 year are granted by the *Building Official* in accordance with Section 108.1 and when the following conditions are satisfied:

1. Additional inspections as determined by the *Building Official* shall be performed to verify that site conditions and the approved installation comply with the conditions of approval at the time of final inspection.
2. The *Building Official* shall perform follow up inspections after initial occupancy at intervals not exceeding 180 days to verify the site conditions and the installation conform to the approved site conditions and installation requirements.
3. An examination shall be performed by a registered design professional to determine the adequacy of the *temporary structure* to resist the structural loads required in Section 3103.5.
4. Relocation of the *temporary structures* shall require a new approval by the *Building Official.*
5. The use or occupancy approved at the time of final inspection shall remain unchanged.

Revise as follows:

~~3103.1.1~~ 3103.1. 2 Conformance. Temporary structures and uses shall conform to the structural strength, fire safety, *means of egress*, accessibility, light, *ventilation* and sanitary requirements of this code as necessary to ensure public health, safety and general welfare.

~~3103.1.2~~ 3103.1.3 Permit required. Temporary structures that cover an area greater than 120 square feet (11.16 m^2), including connecting areas or spaces with a common *means of egress* or entrance that are used or intended to be used for the gathering together of 10 or more persons, shall not be erected, operated or maintained for any purpose without obtaining a *permit* from the *building official.*

Add new text as follows:

3103.5 Structural requirements. *Temporary structures* shall comply with Chapter 16 of this code. *Public-occupancy temporary structures* shall be designed and erected to comply with requirements of this Section.

3103.5.1 Structural loads. *Public-occupanc y temporary structures* shall be classified, based on the risk to human life, health, and welfare associated with damage or failure by nature of their occupancy or use, according to Table 1604.5 for the purposes of applying flood, wind, snow, earthquake, and ice provisions. Additionally, public assembly facilities that require more than 15 min to evacuate to a safe location and any structure whose failure or collapse would endanger the public assembled near the structure, such as speaker stands or other temporary structures for public gatherings shall be classified as Risk Category III.

TABLE 3103.5.1 REDUCTION FACTORS FOR GROUND SNOW LOADS FOR PUBLIC-OCCUPANCY TEMPORARY STRUCTURES

	Service Life	
Risk Category	≤ 10 yr	>10 yr
II	0.7	1.0
III	0.8	1.0
IV	1.0	1.0

3103.5.1.1 Dead. Dead loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1606.

3103.5.1.2 Live. Live loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1607.

> **Exception** : Where *approved*, *live loads* less than those prescribed by Table 1607.1 *Minimum Uniformly Distributed Live Loads*, L_0, *and Minimum Concentrated Live Loads* shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.

3103.5.1.3 Snow. Snow loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1608 and Chapter 7 of ASCE 7. The ground snow loads, p_g, in Section 1608 shall be modified according to Table 3103.5.1.
If the *public-occupancy temporary structure* is not subject to snow loads or not constructed and occupied during winter months when snow is to be expected, snow loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for snow loads if the period of time when the public-occupancy *temporary structure* is in service shifts to include winter months.

> **Exception:** Risk Category II *public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.2 shall be permitted to use a ground snow load reduction factor of 0.65 instead of the ground snow load reduction factors in Table 3105.1.

3103.5.1.4 Wind. Wind loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1609 and Chapters 26 to 30 of ASCE 7. The design wind load shall be modified according to Table 3103.5.2.

Exceptions

1. *Public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.1 shall be permitted to use a load reduction factor of 0.65 instead of the load reduction factors in Table 3103.5.2.
2. *Public-occupancy temporary structures* erected in a hurricane-prone region outside of hurricane season, the design wind speed shall be set at the following 3-second gust basic *wind speeds* depending on *Risk Category*:
   2.1. For *Risk Category* II use 115 mph,
   2.2. For Risk Category III use 120 mph, and
   2.3. For Risk Category IV use 125 mph.

3103.5.1.5 Flood. An Emergency Action Plan, in accordance with 3103.5.4, shall be submitted for *public-occupancy temporary structures* in a Flood Hazard Area when requested by the Building or Fire Official. *Public-occupancy temporary structures* need not be designed for flood loads specified in Section 1615 except when specifically designed as a dry floodproofed structure or designated to be occupied during a storm event per the approved Emergency Action Plan.

3103.5.1.6 Seismic. Seismic loads on *public-occupancy temporary structures* assigned to Seismic Design Categories C through F shall be determined in accordance with Section 1613. The resulting seismic loads are permitted to be taken as 75% of those determined by Section 1613. *Public-occupancy temporary structures* assigned to Seismic Design Categories A and B need not be designed for seismic loads.

3103.5.1.7 Ice. Ice loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1614, Chapter 10 of ASCE 7, with the largest maximum nominal thickness being 0.5 in, for all Risk Categories**.** When ice is expected during the occupancy of *public-occupancy temporary structures*, ice loads shall be determined for surfaces on which ice could accumulate in accordance with ASCE 7. If the *public-occupancy temporary structure* is not subject to ice loads or not constructed and occupied during winter months when ice is to be expected, ice loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for ice loads if the period of time when the temporary structure is in service shifts to include winter months.

3103.5.1.8 Tsunami. An Emergency Action Plan, in accordance with 3103.5.4, shall be submitted for *public-occupancy temporary structures* in a Tsunami Design Zone when requested by the Building or Fire Official. The *public-occupancy temporary structure* need not be designed for tsunami loads specified in Section 1615.

3103.5.2 Foundations. *Public-occupancy temporary structures* may be supported on the ground with temporary foundations when approved by the Building Official. Consideration shall be given for the impacts of differential settlement when foundations do not extend below the ground or foundations supported on compressible materials. The presumptive load-bearing value for *public-occupancy temporary structures* supported on a pavement, slab on grade or on other *Collapsible or Controlled Low Strength* substrates soils such as beach sand or grass shall be assumed not to exceed 1,000 psf unless determined through testing and evaluation by a registered design professional. The presumptive load-bearing values listed in Table 1806.2 shall be permitted to be used for other supporting soil conditions.

TABLE 3103.5.2 REDUCTION FACTORS FOR WIND LOADS FOR PUBLIC-OCCUPANCY TEMPORARY STRUCTURES

	Service Life	
Risk Category	≤ 10 yr	>10 yr
II	0.8	1.0
III	0.9	1.0
IV	1.0	1.0

3103.5.3 Installation and maintenance inspections. A qualified person shall inspect *public-occupancy temporary structures* that are assembled using transportable and reusable materials; components shall be inspected when purchased or acquired and at least once per year. The inspection shall evaluate individual components, and the fully assembled structure, to determine suitability for use based on the requirements in ESTA ANSI E1.21. Inspection records shall be kept and shall be made available for verification by the *Building Official*. Additionally, *public-occupancy temporary structures* shall be inspected at regular intervals when in service.

3103.5.4 Emergency Action plans. When required by the *Building Official*, Emergency Action Plans shall be submitted and approved. Emergency Action Plans shall include procedures to be implemented due to flood, wind, or snow hazards, or within the tsunami design zone. The action plans shall include provisions for evacuating, securing, or dismantling *public-occupancy temporary structures*, in whole or in part, and removal to prevent damage to surrounding buildings or structures.

3103.5.5 Durability and maintenance. Reusable components used in the erection and the installation of *public-occupancy temporary structures* shall be manufactured of durable materials necessary to withstand environmental conditions at the service location. Components damaged during transportation or installation and due to the effects of weathering shall be replaced or repaired.
A qualified person shall inspect *public-occupancy temporary structures*, including components, when purchased or acquired and at least once per year, based on the requirements in ANSI E1.21. Inspection records shall be kept and shall be made available for verification by the *building official.* Additionally, *public-occupancy temporary structures* shall be inspected at regular intervals when in service to ensure that the structure continues to perform as designed and initially erected.

3103.6 Serviceability. The effects of structural loads or conditions shall not adversely affect the serviceability or performance of the *public-occupancy temporary structure.*

3103.7 Controlled occupancy. *Public-occupancy temporary structures* that comply with Section 3103.5 for structural requirements do not require monitoring for controlled occupancy. *Public-occupancy temporary structures* that employ exceptions for reduced environmental loads shall employ controlled occupancy procedures as specified in this section and in accordance with ANSI ES1.7. An operations management plan conforming to ANSI E1.21 with an occupant evacuation plan shall be submitted to the *Building Official* for approval as a part of the permit documents.

3103.7.1 Wind. Wind speeds associated with the design wind loads shall be monitored before and during occupancy of the *public-occupancy temporary structure. T*he *public-occupancy temporary structure* shall be vacated in the event that the design wind speed is expected to be exceeded during its occupancy.

3103.7.2 Snow. Surfaces on which snow accumulates shall be monitored before and during occupancy of the *public-occupancy temporary structure* and any loads in excess of the design snow load shall be removed prior to its occupancy, or the *public-occupancy temporary structure* shall be vacated in the event that the design snow load is exceeded during its occupancy.

3103.7.3 Ice. Surfaces on which ice accumulates shall be monitored before and during occupancy of the *public-occupancy temporary structure* and any loads in excess of the design ice load *shall* be removed prior to its occupancy, or the *public-occupancy temporary structure* shall be vacated in the event that the design ice load is exceeded during its occupancy.

CHAPTER 35
REFERENCED STANDARDS

Add new standard(s) as follows:

ANSI

American National Standards Institute
25 West 43rd Street, Fourth Floor
New York, NY 10036

E1.21-2013	Entertainment Technology: Temporary Structures Used for Technical Production of Outdoor Entertainment Event
ES1.7-2021	Event Safety Requirements - Weather Preparednes

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI ES1.7-2021 Event Safety Requirements - Weather Preparedness, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

ANSI E1.21-2013 is already referenced in the IFC. This is simply a new occurrence of the reference in the I-Codes.

Reason Statement: There is a need for code provisions for minimum structural loads for temporary structures. In past code cycles, inappropriate references were attempted to be introduced to the International Building Code but failed due to lack of consensus within the industry. Following that failed attempt, committee members from the adopted structural loading standard ASCE/SEI 7 *Minimum Design Loads and Associated Criteria for Buildings and Other Structures* committed to work with building officials and industry stakeholders to develop provisions that align with the design basis for Chapter 16 and ASCE/SEI 7, as well as provide the appropriate level of risk and structural reliability to the public.
To meet the need for minimum loading provisions and deliver on their commitment, this code change proposal was developed by a diverse group of experts that have experience with the development of the ASCE/SEI 7 Standard, building officials from many jurisdictions from across the country that have experience with large events and temporary structures, and industry representatives from the US entertainment industry.

This proposal was developed by an ad hoc committee that met every month since mid-2020 and the included the following members:

- Don Scott; PCS Structural Solutions – ASCE 7 Wind Load Subcommittee
- Jennifer Goupil; ASCE/SEI Codes & Standards - ASCE 7 Main Committee
- Therese McAllister, PhD; NIST – ASCE 7 Load Combinations Subcommittee
- John Hooper; MKA – ASCE 7 Seismic Subcommittee
- John Duntemann; WJE – ASCE 7 Snow Subcommittee
- Andrew Stam; WJE – ASCE 7 Dead & Live Load Subcommittee
- Bryan Lanier; American Tower Corporation – ASCE 7 Ice Load Subcommittee
- Chris Cerino; STV – ASCE 7 Flood Load Subcommittee
- James (Greg) Soules, PhD; CBI – ASCE 7 Main Committee
- Ali Fattah; City of San Diego
- Constadino (Gus) Sirakis; City of New York

This proposal was developed in collaboration with industry stakeholders, many of whom reviewed the proposal and provided comments to the ad hoc committee; the following stakeholders were invited to collaborate, and many provided comments and input for this proposal:

- Richard Nix; Entertainment Services and Technology Assoc. (ESTA)
- Mike Nugent; ICC BCAC Chair
- Steve Kerr; National Council of Structural Engineers Associations (NCSEA)
- Kai Ki Mow; Seattle Department of Construction and Inspection
- Julius Carreon; City of Bellevue Washington
- Paul Armstrong; PCA Code Services
- Daniel Clark; Clark Reder Engineers
- William Gorlin; McLaren Engineers
- David Renn; City of Denver
- Jon Siu; Jon Siu Consulting
- Gary Ehrlich; National Association of Home Builders and ICC/PTF
- Edgar Surla; Southern Nevada Chapter of ICC

Due to the staggered nature of the ICC and ASCE 7 Standard code development processes, this IBC proposal is the first of two efforts to address the need for provisions for loads on temporary structures. The second effort includes development of a new Appendix to ASCE 7 to address temporary structures.

Following is the description and rationale for content of this code change proposal:

The International Codes regulate the construction of new buildings and temporary structures through the International Building Code (IBC) and regulate existing buildings through the International Existing Building Code (IEBC). A temporary structure is not an existing building because it is not permanent and is therefore regulated through Chapter 31 of the IBC.

Temporary Special Event Structures are regulated by the International Fire Code. However, they are a type of temporary structure and thus need to also meet the requirements of this proposed section.

Three new definitions are added for public-occupancy temporary structures, service life, and temporary event. Public-occupancy temporary structures are new buildings or structures that are used by the general public, or that support public events, where the public expects similar levels of reliability and safety as offered by permanent construction. Public-occupancy temporary structures are often assembled with re-useable components and designed for a particular purpose and defined period of time, which is defined as a temporary event when the period of time is less than one year. Public-occupancy temporary structures in service for a period that exceeds 1-year are required to comply with the IBC for new buildings. Temporary structures should not pose more risk to occupants than permanent structures, but because the code's design-level environmental loads are far less likely during a temporary event, this proposal makes adjustments to reduce the requirements for a consistent level of risk. The code change addresses the hazards in the built environment in IBC chapter 16 for public-occupancy temporary structures. The code change includes the ability to mitigate some hazards through Emergency Action Plans. Portions of temporary structures may be removed to reduce wind loads, for example.

The concept of controlled occupancy is also introduced to address cases where an environmental loading hazard cannot be reasonably mitigated and allows for actions based on a preapproved action plan that the Building Official may use to allow installations that cannot resist code prescribed loads. For example, hazard areas such as flood hazard areas and tsunami inundation zones are clearly mapped, and evacuation plans are adopted and include tsunami alert warning systems and temporary structures subject to high wind loads may be evacuated and have sections removed to reduce the wind load. The code change proposal recognizes that it may be desirable for a temporary structure to remain in service for more than 180 days, whether continuously occupied or not, and provides a process that the Building Official can follow to facilitate such an extended service period. However, after 1-year has passed, the structure is required to comply with requirements for new buildings or is removed from service by being disassembled.

DESIGN PHILOSOPHY:

Temporary structures that are occupied by the general public or that could cause injuries or loss of life by their failure require a design basis that is consistent with the risk and reliability criteria in ASCE 7. The basis of design for temporary structures needs to consider voluntary vs involuntary risk, service life, and reliability as well as the ability to reduce risk for the general public for severe weather events, as elaborated below. Therefore, temporary structures occupied by the general public are expected to have the same level of reliability (or failure rate) and performance as permanent structures.

While temporary structures are developed for use up to 180 days, many of these structures are used repeatedly at different locations. Thus, their actual service life may be on the order of 5 to 10 years. Such structures are consequently subjected to repeated assembly and dismantling with associated wear and tear. Therefore, service life for temporary structures is defined to provide a consistent basis of reliability relative to that of new buildings, and a service life of 10 years is assumed for determining structural load requirements in Section 3103.5.

Risk:

In a general sense, risk represents the potential consequences of exposure to a natural or man-made hazard in the presence of uncertainty. There are three components to risk – hazard, consequences and context – and risk-informed decisions should involve all three. The focus in structural engineering has been on the hazard (and its probability of exceedance) and structural performance in terms of failure given a hazard intensity over a structure's service life. Consequences and context are reflected indirectly through Risk Categories (or Importance Factors).

The concept of voluntary and involuntary risk assumed by the general public should be considered in the design of structures. Voluntary risk assumption occurs when people choose to undertake an activity with a known level of hazard and consequences, such as driving or flying to a destination. Involuntary risks occur when people are exposed to a hazard without understanding the potential consequences. The willingness of people to incur risk depends on whether the risk is incurred voluntarily or involuntarily (Slovic, 2000). Because people require shelter, building occupancy is an involuntary risk. The general public assumes that all structures, permanent and temporary, have been designed and constructed to provide the same level of structural safety and reliability. If a structure is designed to a lower level of safety or reliability, the general public has no means to identify or assess the difference in risk. This includes temporary structures that may not be accessible to the general public but could cause injuries or loss of life in the event of failure (e.g., special event structures such as towers, platforms, and stages). Analogies can be made to various modes of transportation, and their inherent risks; the general public is aware of differences in assumed risk and can choose a mode of transportation accordingly. In contrast, ASCE 37 was developed for temporary structures used in construction. The risk associated with these structures is generally limited to construction workers, who voluntarily accept a higher-risk environment and have training and skills for operating in a construction environment. Therefore, temporary structures that are used by or in close proximity to the general public need to have a level of reliability consistent with the other structures designed for involuntary risk.

Reliability:

Structural reliability requires the combined analysis of the probability of occurrence of the hazard and the probability that the loads caused by the hazard equal or exceed the structural resistance. Temporary structures that are used, occupied, or placed in close proximity to the general public should meet reliability targets that are consistent with those for permanent structures in ASCE, allowing for differences in service lives and other conditions of use.

ASCE 7 Table 1.3-1 presents the target reliabilities by Risk Category (RC) and failure mode (e.g., ductile vs brittle failures) for hazards other than earthquake, tsunami, or extraordinary events. The target reliabilities are presented in two formats: the mean annual failure rate and the probability of failure for a 50-yr service life, expressed in terms of reliability index, β. For example, a RC II structure with ductile, local failure modes has a target mean annual failure rate $P_F = 3.0 \times 10^{-5}$ and a 50-yr target reliability index of $\beta = 3.0$ (or $P_F = 1.43 \times 10^{-3}$ over 50 years).

WIND:

ASCE 7-16 wind hazard maps were updated to confirm the risk-based mean recurrence interval (MRI) for RC I to III and to establish a risk-based MRI for RC IV (McAllister, Wang, and Ellingwood 2018). The updated wind maps are based on a fully coupled reliability analysis that considered the hazard and structural resistance. The results for the recommended MRI for the target reliabilities are shown in Figure 3105.5.2.

Two exceptions are allowed for wind:

- An exception is allowed where controlled occupancy actions in Section 3103.7 are adopted, given that on-site management and weather forecasting capabilities allow sufficient time to reduce the risk to occupants by canceling events or reducing the wind loads through removal of wind surface area or dismantling sections of the temporary structure.

- An exception is allowed when public-occupancy temporary structures are erected in a hurricane-prone region outside of hurricane season. The wind load reduction is based on hurricane and non-hurricane wind speeds. ASCE 7 publishes wind speed maps that include both hurricane and non-hurricane winds for permanent structures. Pintar et al (2015) published maps of non-hurricane non-tornadic wind speeds for the contiguous United States.

A study by Dasguputa and Ghosh (2019) evaluated a wind speed factor of 0.78 used by the Unified Facilities Criteria for temporary structures for 5-yr and 25-yr service lives. This study selected the 50-yr target reliabilities and associated 50-yr wind speed exceedance probabilities to evaluate the wind speed load factor for occupied temporary structures based on ASCE 7-16 wind speed maps. The ASCE 7-16 wind maps for RC I, II, III and IV structures were developed for 15%, 7%, 3% and 1.6% probabilities of wind speed exceedance. To evaluate the 0.78 wind speed factor, wind speeds at 342 locations across the country were identified for specified mean recurrence intervals (MRI). The specified MRI were determined by computing the MRI that would provide the same probability of wind speed exceedance in 5 years and 25 years as that specified for a 50-yr service life in ASCE 7, as shown in Table C3105.1.1. However, the mean recurrence rates of wind speeds, and therefore the structural reliability, are quite different from the ASCE 7 target reliabilities, as shown in Example 1. Assuming that the structural resistance is similar, a comparison of the RC II mean annual frequency for wind speeds for a 50-yr service life (1.43×10^{-3}) to that of a 5-yr service life (1.43×10^{-2}) and a10-yr service life (7.14×10^{-2}) show service life reliability ratios of 10 and 5, respectively, which do not meet the ASCE 7 target reliability criteria.

Until further analyses can be conducted, a 10-yr service life and a wind speed factor of 0.9 is deemed to provide a reasonable level of reliability, given the ability to evacuate or modify temporary structures for strong wind events.

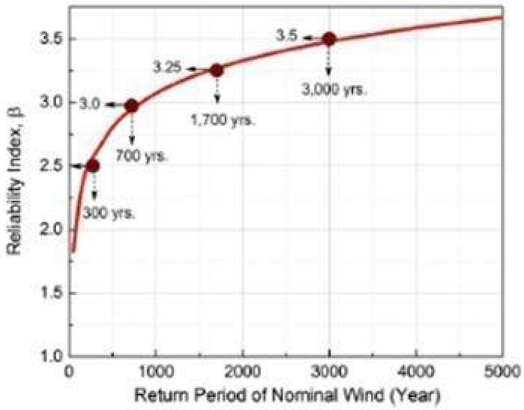


Fig. 3. Recommended mean return periods for wind maps in ASCE 7-16 ($K_{dn} = 0.85$; $\mu_{Kd} = 0.71$)

Figure C3105.5.1. ASCE 7 wind MRI versus reliability index (McAllister, Wang, and Ellingwood 2018).

Table C3105.5.1. Proposed wind speed factor for 5-yr and 25-yr service life for temporary structures by Dasguputa and Ghosh (2019) based on 50-yr service reliability criteria.

ASCE 7 MRIWind speed factor5 yr MRI25 yr MRII3000.7830150II7000.7870350III1,7000.78170850IV3,0000.783001,500

Example 1: Probability of exceedance over T yr service life for W

This example provides a comparison of probability of wind speed exceedance for service lives (T) from 5 to 25 years and Risk Category. The probability of wind exceedance is set to remain constant for each risk category; however, the mean annual frequency (P_a) can vary significantly between different values of T.

$P(W > w \text{ for } T) = 1-(1-P_a)^T = X\%$

- W – random wind speed (3-sec gust)
- w – wind speed (3-sec gust) for Mean Recurrence Interval (MRI)
- T is the service life (yr)
- P_a = 1/T is the mean annual frequency for this wind speed (1/yr)
- X is the probability of the wind speed exceedance for T

For a 50 yr service life (ASCE 7):

RC I P(W > 300 MRI in 50 yrs) = $1 - (1 - 0.0033)^{50} = 0.15$ = 15% $P_a = 3.3x10^{-3}$

RC II P(W > 700 MRI in 50 yrs) = $1 - (1 - 0.00143)^{50} = 0.069$ = 7% $P_a = 1.4x10^{-3}$

RC III P(W > 1700 MRI in 50 yrs) = $1 - (1 - 0.00059)^{50} = 0.029$ = 3% $P_a = 5.9x10^{-4}$

RC IV P(W > 3000 MRI in 50 yrs) = $1 - (1 - 0.00033)^{50} = 0.017$ = 1.7% $P_a = 3.3x10^{-4}$

For a 25 yr service life:

RC I P(W > 150 MRI in 25 yrs) = $1 - (1 - 0.0067)^{25} = 0.15$ = 15% $P_a = 6.7x10^{-3}$

RC II P(W > 350 MRI in 25 yrs) = $1 - (1 - 0.0029)^{25} = 0.069$ = 7% $P_a = 2.9x10^{-3}$

RC III P(W > 850 MRI in 25 yrs) = $1 - (1 - 0.0012)^{25} = 0.029$ = 3% $P_a = 1.2x10^{-3}$

RC IV P(W > 1500 MRI in 25 yrs) = $1 - (1 - 0.0007)^{25} = 0.017$ = 1.7% $P_a = 6.7x10^{-4}$

For a 10 yr service life:

RC I P(W > 60 MRI in 10 yrs) = $1 - (1 - 0.017)^{10} = 0.16$ = 16% $P_a = 1.7x10^{-2}$

RC II P(W > 140 MRI in 10 yrs) = $1 - (1 - 0.0714)^{10} = 0.069$ = 7% $P_a = 7.1x10^{-3}$

RC III P(W > 340 MRI in 10 yrs) = $1 - (1 - 0.00294)^{10} = 0.029$ = 3% $P_a = 2.9x10^{-3}$

RC IV P(W > 600 MRI in 10 yrs) = $1 - (1 - 0.00167)^{10} = 0.017$ = 1.7% $P_a = 1.7x10^{-3}$

For a 5 yr service life:

RC I P(W > 30 MRI in 5 yrs) = $1 - (1 - 0.0333)^{5} = 0.16$ = 16% $P_a = 3.3x10^{-2}$

RC II P(W > 70 MRI in 5 yrs) = $1 - (1 - 0.0143)^{5} = 0.069$ = 7% $P_a = 1.4x10^{-2}$

RC III P(W > 170 MRI in 5 yrs) = $1 - (1 - 0.0059)^{5} = 0.029$ = 3% $P_a = 5.9x10^{-3}$

RC IV P(W > 300 MRI in 5 yrs) = $1 - (1 - 0.0033)^{5} = 0.017$ = 1.7% $P_a = 3.3x10^{-3}$

References

Dasguputa, P. and S.K. Ghosh (2019) *An Evaluation of the Wind and Seismic Provisions of UFC 1-201-01 for Temporary Structures*, S.K. Ghosh Associates LLC**,** www.skghoshassociates.com

McAllister, T., N. Wang, and B. R. Ellingwood. 2018. *Risk-informed mean recurrence intervals for update wind maps in ASCE 7-16*, J. Struct. Eng. 144 (5). https://doi.org/10.1061/(ASCE)ST.1943-541X.0002011

Pintar, A.L., Simiu, E., Lombardo, F.T., Levitan, M. 2015. *Maps of Non-hurricane Non-tornadic Wind Speeds With Specified Mean Recurrence Intervals for the Contiguous United States Using a Two-dimensional Poisson Process Extreme Value Model and Local Regression*, NIST Special Publication 500-301, National Institute of Standards and Technology, Gaithersburg, MD https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.500-301.pdf

Slovic, P. (2000), *The perception of risk*. Earthscan Publications, Sterling, VA. https://www.researchgate.net/publication/232546133_The_perception_of_risk_Risk_society_and_policy_series

SEISMIC:

The requirement that the seismic loads on temporary structures assigned to Seismic Design Categories C through F are permitted to be taken as 75% of those required by Section 1613, while resulting in reduced seismic performance relative to permanent structures, is consistent with the reduction generally accepted for the evaluation/upgrade of existing buildings and would result in a similar seismic risk to the occupants. Due to the unique lack of warning associated with earthquakes, taking further reductions, even for temporary structures, results in unacceptable, involuntary risk to the occupants. Even for short time frames, the risk to the occupants should be similar, whether it's a temporary or permanent structure. Given the low seismic risk associated with Seismic Design Categories A and B locations, which results in low seismic demands, temporary structures are exempted from designing for seismic loads.

TSUNAMI:

Given that most tsunami-affected areas will have time to respond to a possible inundation, designing temporary structures for tsunami loads was deemed unnecessarily. Rather, temporary structures located in a Tsunami Design Zone will require an Emergency Action Plan that will provide details for evacuating the structure in the event of a tsunami warning.

SNOW:

When snowfall is expected during the service life of a temporary structure, snow loads are determined for surfaces on which snow can accumulate in accordance with Section 1608 and Chapter 7 of ASCE 7. In recognition of the relatively short service life of temporary structures, the ground snow load can be reduced to reflect the relatively low probability that the ASCE 7 ground snow loads will occur during the shorter service life of a temporary structure. The reduction factors of 0.7 and 0.8 in Table 3103.5.1 approximately correspond to 10-year and 20-year MRI for ground snow loads, respectively. If the service life of the temporary structure will not occur during winter months when snow is to be expected, snow loads need not be considered. Similar to wind, an exception is allowed where controlled occupancy actions in Section 3103.7 are adopted, given that on-site management and weather forecasting capabilities allow sufficient time to reduce the risk to occupants by canceling events or reducing the snow loads.

FLOOD:

Temporary structures within riverine and coastal flood zones should be evacuated at the time of loading, therefore the intent of this section is to have a defined plan to secure the structure and minimize the potential for the temporary structure to become floating debris for the surrounding environment. While local flash flooding can occur without advanced warning, the potential hazard area is much more wide-spread and not easily quantified for an enforceable Code provision as part of this cycle. For this reason, there are no requirements for temporary structures outside of a mapped flood zone.

ICE:

When ice can accumulate on a temporary structure during the service life of a temporary structure, ice loads are determined for surfaces on which ice can accumulate in accordance with Section 1614 and Chapter 10 of ASCE 7.

The 0.5-inch nominal ice thickness is based on consideration of the 10-yr and 25-yr mean recurrence interval values. Based on this, the use of a single nominal ice thickness for all locations with a Risk Category II nominal thickness greater than 0.5 inch is recommended. The gust wind speeds in Figure 10.5-1 are concurrent values, rather than extremes, so they should be used in determining wind-ice-loads for temporary ice-sensitive structures.

LOAD FACTORS/RELIABILITY:

The proposed code change is necessary to harmonize the IBC with the IFC since the latter addresses Temporary Special Event Structures and tents that are in service for up to 180 days. The recent pandemic has shown that temporary structures can be in service for more than 180 days and includes structures not regulated within the scope of the IFC.

Given the need to propose load and design criteria for publicly occupied temporary structures based on existing information and standards, the approach presented uses the load and Risk Category criteria in ASCE 7-22. Further analyses may be able to refine these criteria for the next edition of ASCE 7.

EMERGENCY ACTION PLANS:

The code change addresses all the natural hazards and associated environmental loads addressed in IBC chapter 16 and ASCE 7. However, some hazards are more frequent with a likelihood of occurrence during the in-service period or occupancy while others have a remote possibility of occurrence. Emergency Action plans are currently accepted by authorities having jurisdiction for wind loads to reduce the risk to public safety, given the reduced level of reliability relative to new buildings. Flood hazards may be seasonal for example during hurricane seasons or flash flooding is forecast in advance to allow for removal or tying down of installations. They provide the Building Official with the ability to permit a more cost effective alternative than full compliance.

DURABILITY AND MAINTENCE:

Temporary structures are designed to be assembled and disassembled and transported to many locations as components or as modules. Additionally, they may be in service during varying weather conditions. The components may be damaged during transportation or installation. Components may have been manufactured more than a decade prior to the latest use. As a consequence, and unlike a new structure that is typically constructed with new building materials and components that were not previously used, components for temporary structures need to be inspected regularly and suitability for re-use needs to be assessed. This is typically done by the installation crews, and this is similar to bleachers regulated by ICC 300 (Section 501.2). The qualified person is identified by the owner and approved by the Building Official.

Temporary structures are typically assembled utilizing transportable and reusable components that can get damaged in use or during transportation and in use and need to be verified prior to reuse. The most qualified personnel to address whether superficial corrosion is acceptable or whether bent members can be used will be the specifying engineer or the rigging supervisors or owner’s management team who tend to be most familiar with the components and the temporary structure’s system.

Cost Impact: The code change proposal will decrease the cost of construction
The proposed code change will reduce the cost of construction since it proposes reduction to the adopted loads in IBC Ch 16 and ASCE 7. The codes and standards that are in effect under the 2021 edition of the I Codes, with the exception of the International Fire Code regulations for Temporary Special Event Structures, do not provide structural loading criteria adjusted to lower loads for temporary structures that typically have a service life of a few days or weeks not to exceed 1 year.

S116-22

S117-22

IBC: SECTION 202, 1608.3, 1611.2

Proponents: Nathalie Boeholt, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Building Code

Delete without substitution:

~~**[BS] SUSCEPTIBLE BAY.** A roof or portion thereof with either of the following:~~

1. ~~A slope less than $^{1}/_{4}$ inch per foot (0.0208 rad).~~
2. ~~On which water is impounded, in whole or in part, and the secondary drainage system is functional but the primary drainage system is blocked.~~

~~A roof surface with a slope of $^{1}/_{4}$ inch per foot (0.0208 rad) or greater towards points of free drainage is not a susceptible bay.~~

Revise as follows:

1608.3 Ponding instability. ~~*Susceptible bays* of roofs shall be evaluated for ponding~~ Ponding instability on roofs shall be evaluated in accordance with ~~Chapters 7 and 8 of~~ ASCE 7.

1611.2 Ponding instability. ~~*Susceptible bays* of roofs shall be evaluated for ponding~~ Ponding instability on roofs shall be evaluated in accordance with ~~Chapters 7 and 8 of~~ ASCE 7.

Reason Statement: Section 1608.3 (Snow Loads-Ponding instability) and section 1611.2 (Rain Loads-Ponding instability) refer to the defined term “Susceptible Bay” for ponding instability evaluation. The referenced standard ASCE 7-22 has eliminated the defined term "Susceptible Bay" but still takes ponding into account for snow and rain loads. This proposal will help align the Building Code with the ASCE 7-22 standard by removing this term. This proposal also shortens the code language with a simple reference to ASCE 7.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is only an editorial change and does not change the technical requirements for ponding consideration. There will be no cost impact when approving this proposal.

S117-22

S118-22

IBC: 1609.2.1

Proponents: Amanda Hickman, representing Air Movement and Control Association International, Inc. (AMCA) (amanda@thehickmangroup.com)

2021 International Building Code

Revise as follows:

1609.2.1 Louvers. Louvers protecting ~~intake and exhaust ventilation ducts not assumed to be open~~ <u>the exterior wall envelope</u> that are located within 30 feet (9144 mm) of grade shall meet the requirements of AMCA 540.

Reason Statement:
The current language is clunky, confusing, and unclear. This proposal simplifies and clarifies the intent of the section.

There are many and differing interpretations of what the phrase “not assumed to be open” means.

Does it mean the louver is open?

That does not make sense as a louver is a device made up of many blades that are typically “open” to allow airflow into or out of a building for various reasons. Some louvers have adjustable blades that allow the blades to be “closed” to stop airflow. The phrase “not assumed to be open” is confusing as it is unknown if it pertains to if the louver blades are in the open or closed position.

Is that phrase referring to the ducts being open?

An open duct allows extra wind pressure into a room or system where a closed duct does not.

Another interpretation could be that “open” refers to if the face area of the louver that is or is not counted towards the total “open area” of a building’s envelope, which has great influence on if a building is classified as an “enclosed”, a “partially enclosed”, or an “open” building per ASCE 7 (which then has great influence on the ASCE 7 structural calculations of the building).

To better clarify the correct interpretation of this phrase is to replace it with a code defined term for what the louver is protecting: “the exterior wall envelope”.

Not all installations of louvers in the exterior wall envelope are ducted. However, the louver still needs to protect the building and maintain the continuity of the exterior wall envelope.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Non-ducted or non-intake/exhaust louvers meeting location requirements of IBC 1609.2 already need to be impact protected. Per IMC 401.5, intake louvers already need to be impact protected per IBC 1609. Per IMC 501.3.2, exhaust louvers already need to be impact protected per IBC 1609.

S118-22

S119-22 Part I

IBC: 1609.2.2, 1609.2.3

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Delete without substitution:

~~**1609.2.2 Application of ASTM E1996.** The text of Section 6.2.2 of ASTM E1996 shall be substituted as follows:~~
~~6.2.2 Unless otherwise specified, select the wind zone based on the basic design *wind speed*, *V*, as follows:~~

~~6.2.2.1 *Wind Zone 1*—130 mph ≤ basic design *wind speed*, *V* < 140 mph.~~

~~6.2.2.2 *Wind Zone 2*—140 mph ≤ basic design *wind speed*, *V* < 150 mph at greater than one mile (1.6 km) from the coastline. The coastline shall be measured from the mean high water mark.~~

~~6.2.2.3 *Wind Zone 3*—150 mph (67 m/s) ≤ basic design *wind speed*, *V* ≤ 160 mph (72 m/s), or 140 mph (63 m/s) ≤ basic design *wind speed*, *V* ≤ 160 mph (72 m/s) and within one mile (1.6 km) of the coastline. The coastline shall be measured from the mean high water mark.~~

~~6.2.2.4 *Wind Zone 4*— basic design *wind speed*, *V* > 160 mph (72 m/s).~~

Revise as follows:

~~**1609.2.3**~~ **1609.2.2 Garage doors.** Garage door glazed opening protection for windborne debris shall meet the requirements of an *approved* impact-resisting standard or ANSI/DASMA 115.

S119-22 Part I

S119-22 Part II

IRC: R301.2.1.2.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Delete without substitution:

~~**R301.2.1.2.1 Application of ASTM E1996.** The text of Section 2.2 of ASTM E1996 shall be substituted as follows:~~
~~2.2 ASCE Standard:~~

~~ASCE 7-10 American Society of Civil Engineers *Minimum Design Loads for Buildings and Other Structures*~~

~~The text of Section 6.2.2 of ASTM E1996 shall be substituted as follows:~~

~~6.2.2 Unless otherwise specified, select the wind zone based on the ultimate design wind speed, V_{ult}, as follows:~~

~~6.2.2.1 Wind Zone 1–130 mph ≤ ultimate design wind speed, V_{ult} < 140 mph.~~

~~6.2.2.2 Wind Zone 2–140 mph ≤ ultimate design wind speed, V_{ult} < 150 mph at greater than 1 mile (1.6 km) from the coastline. The coastline shall be measured from the mean high-water mark.~~

~~6.2.2.3 Wind Zone 3–150 mph (67 m/s) ≤ ultimate design wind speed, V_{ult} ≤ 170 mph (76 m/s), or 140 mph (54 m/s) ≤ ultimate design wind speed, V_{ult} ≤ 170 mph (76 m/s) and within 1 mile (1.6 km) of the coastline. The coastline shall be measured from the mean high-water mark.~~

~~6.2.2.4 Wind Zone 4–ultimate design wind speed, V_{ult} > 170 mph (76 m/s).~~

Reason Statement: This proposal removes the technical criteria that is redundant with the current reference standards ASTM E1996-20 and ASCE7- 22. ASTM E1996 has changed to ultimate design from strength design and reduced the wind zones from 4 to 3. The ‘correction’ as specified in IBC Section 1609.2.2 and IRC Section R301.2.1.2.1 is no longer needed with the current ASTM E1996-20 and ASCE 7-22.
ASCE 7-10 changed the basis of its wind speed maps from allowable stress-level wind speeds to strength design-level wind speeds. However, due to the timing of the ICC code development cycle leading to the 2012 IBC and IRC and of the ASTM cycle for updating E1996, there was not enough time to correlate and update the wind speeds associated with the E1996 wind zones. Section 1609.2.2 was introduced as a temporary measure to correlate the E1996 wind zones with ASCE 7-10.

In addition, Wind Zone 4 was modified to trigger at a higher wind speed as was specified in E1996 at the time. Wind Zone 4 was originally introduced to bring Miami-Dade County on board with accepting ASTM E1996 as equivalent to the TAS 102. The IBC and IRC raised the Wind Zone 4 trigger as the ASCE 7-10 wind maps would have otherwise resulted in Wind Zone 4 extending beyond Miami-Dade County.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Removing the IBC and IRC modification will not change any design or testing requirements as the wind zone definitions in E1996 largely match those in the modification. It may reduce confusion in southern Florida by removing reference to Wind Zone 4, which no longer exists in E1996.

S119-22 Part II

S121-22

IBC: SECTION 1609, 1609.5.3

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

SECTION 1609
WIND LOADS

Revise as follows:

1609.5.3 Rigid tile. Wind *loads* on rigid tile *roof coverings* shall be determined in accordance with the following equation:

$M_a = q_h \underline{K_d} C_L b L L_a [1.0 - \underline{(GC_p)}]$ **(Equation 16-18**

For SI:

$M_a = q_h \underline{K_d} C_L b L L_a [1.0 - \underline{(GC_p)}] / 1{,}000$

where:

b = Exposed width, feet (mm) of the roof tile.

C_L = Lift coefficient. The lift coefficient for concrete and clay tile shall be 0.2 or shall be determined by test in accordance with Section 1504.3.1.

$\underline{(GC_p)}$ = Roof pressure coefficient for each applicable roof zone determined from Chapter 30 of ASCE 7. Roof coefficients shall not be adjusted for internal pressure.

$\underline{K_d}$ = Wind directionality factor determined from Chapter 26 of ASCE 7.

L = Length, feet (mm) of the roof tile.

L_a = Moment arm, feet (mm) from the axis of rotation to the point of uplift on the roof tile. The point of uplift shall be taken at 0.76L from the head of the tile and the middle of the exposed width. For roof tiles with nails or screws (with or without a tail clip), the axis of rotation shall be taken as the head of the tile for direct deck application or as the top edge of the batten for battened applications. For roof tiles fastened only by a nail or screw along the side of the tile, the axis of rotation shall be determined by testing. For roof tiles installed with battens and fastened only by a clip near the tail of the tile, the moment arm shall be determined about the top edge of the batten with consideration given for the point of rotation of the tiles based on straight bond or broken bond and the tile profile.

M_a = Aerodynamic uplift moment, feet-pounds (N-mm) acting to raise the tail of the tile.

q_h = Wind velocity pressure, psf (kN/m^2) determined from Section 26.10.2 of ASCE 7.

Concrete and clay roof tiles complying with the following limitations shall be designed to withstand the aerodynamic uplift moment as determined by this section.

1. The roof tiles shall be either loose laid on battens, mechanically fastened, *mortar* set or adhesive set.
2. The roof tiles shall be installed on solid sheathing that has been designed as components and cladding.
3. An *underlayment* shall be installed in accordance with Chapter 15.
4. The tile shall be single lapped interlocking with a minimum head lap of not less than 2 inches (51 mm).
5. The length of the tile shall be between 1.0 and 1.75 feet (305 mm and 533 mm).
6. The exposed width of the tile shall be between 0.67 and 1.25 feet (204 mm and 381 mm).
7. The maximum thickness of the tail of the tile shall not exceed 1.3 inches (33 mm).
8. Roof tiles using *mortar* set or adhesive set systems shall have not less than two-thirds of the tile's area free of *mortar* or adhesive contact.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
A summary of the coordination changes is provided below.

1609.5.3 Rigid tile. This code change is needed because the Wind Directionality Factor (K_d) in ASCE 7 - 22 Standard *Minimum Design Loads and Associated Criteria for Buildings and Other Structures* was relocated from the Velocity Pressure Equation that determines q_h to the pressure equations that determine pressures on the components and cladding elements of the structure. Because K_d is no longer included in the calculation for q_h directly, it is added here. This is not a new addition for M_a equation, but only re-organization of the terms in the calculation. The parentheses are added around (*GCp*) to match with the formatting of the term in ASCE 7.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only coordinates the re-organization of the terms in the ASCE 7-22 equations for calculating the loads on rigid tiles. It does not change the values and therefore will have no effect on the cost of construction.

S121-22

S122-22

IBC: 1609.6 (New), 1612.2, 1613.4 (New), 3001.3, 3001.6 (New)

Proponents: Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov); Emily Guglielmo, representing NCSEA Wind Committee (eguglielmo@martinmartin.com); Kevin Brinkman, representing National Elevator Industry, Inc. (klbrinkman@neii.org); Robert Bachman, representing FEMA/ATC Seismic Code Support Committee (rebachmanse@aol.com)

2021 International Building Code

Add new text as follows:

1609.6 Elevators, Escalators, and other Conveying Systems. Elevators, escalators, and other conveying systems and their components exposed to outdoor environments shall satisfy the wind design requirements of ASCE 7.

Revise as follows:

1612.2 Design and construction. The design and construction of buildings and structures located in *flood hazard areas*, including *coastal high hazard areas* and *coastal A zones*, shall be in accordance with Chapter 5 of ASCE 7 and ASCE 24. Elevators, escalators, conveying systems and their components shall conform to ASCE 24 and ASME A17.1/CSA B44 as applicable.

Add new text as follows:

1613.4 Elevators, Escalators, and other Conveying Systems. Elevators, escalators, and other conveying systems and their components shall satisfy the seismic requirements of ASCE 7 and ASME A17.1/CSA B44 as applicable.

Revise as follows:

3001.3 Referenced standards. ~~Except as otherwise provided for in this code, t~~ The design, construction, installation, alteration, repair and maintenance of elevators and conveying systems and their components shall conform to the applicable standard specified in Table 3001.3 and Section 3001.6. ~~ASCE 24 for construction in *flood hazard areas* established in Section 1612.3.~~

Add new text as follows:

3001.6 Structural Design. All interior and exterior elevators, escalators, and other conveying systems and their components shall comply with all applicable design loading criteria in Chapter 16, including wind, flood, and seismic loads established in Sections 1609, 1612, and 1613.

Reason Statement: The proposed revisions to Chapter 30 are intended to clarify which design criteria and standards apply to elevators, escalators, conveying systems and their components and that the provisions are applicable to both interior and exterior systems. Additionally, since applicable standards are published by different organizations subject to different update cycles, this specifies that the provisions of all applicable standards shall apply to ensure the absence of a provision in one standard is not used to avoid the provision entirely. These revisions do not impose new technical requirements on the structural design of these systems.
Environmental provisions, both interior and exterior, are relevant to the design and construction of elevators, escalators, and conveying systems. However, Section 3001.3 currently points only to ASME, ALI, ANSI and ASCE 24 (flood provisions) standards, without reference to ASCE 7. The omission of ASCE 7 leaves Chapter 30 open to an interpretation that ASCE 7 does not apply or is overridden by the listed standards.

Wind

There have been many cases in south Florida where high wind loads were not considered in the design and installation of outdoors escalators and elevators. ASME A17.1 does not currently address wind provisions, leaving ASCE 7 as the next appropriate standard to reference. However, since ASCE 7 is not specified in Chapter 30, a common interpretation is that only ASME A17.1 should apply and ASCE 7 is not required. This leaves exterior structures vulnerable to damage and/or failure when exposed to high winds.

Seismic

ASME A17.1 and ASCE 7 both outline seismic requirements for elevators and conveying systems, but different update cycles mean these two standards are not always in sync. As such, seismic provisions in the current version of ASME A17.1 are based on ASCE 7-16 and still need to be updated to comply with changes in ASCE 7-22. There are significant differences in the requirements of ASCE 7-22 and ASCE 7-16 that the casual user may be unaware of. It is unknown if ASME A17.1 will be updated in time for incorporation into the 2024 IBC.

For individual structures, this proposal may reduce the nonstructural component seismic design forces constructed using lateral force-resisting system with higher ductility, which are commonly used in regions of high seismic risk while for structures using low or moderate ductility systems the seismic design forces may increase.

Flood

Reference to ASCE 24 specifically for elevators, escalators and conveying systems has been relocated to Section 1612. ASME A17.1 Section 8.12 specifically states that elevators must be in compliance with ASCE 24.

<u>Other</u>

Snow, ice, and other environmental loads are equally important to maintain structural stability and should be considered in design for exterior systems, where applicable. The general reference to Chapter 16 captures all other environmental loading conditions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification that more clearly defines when ASCE and ASME standards are required for different environmental loads and conditions. The added language in Chapter 16 further clarifies that a lack of reference to specific environmental loads in one standard does not mean the design is exempt from considering that environmental load.

S122-22

S123-22

IBC: SECTION 1610, 1610.1

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

SECTION 1610
SOIL LOADS AND HYDROSTATIC PRESSURE

Revise as follows:

1610.1 Lateral pressures. ~~Foundation walls and retaining walls~~ Structures below grade shall be designed to resist lateral soil *loads* from adjacent soil. Soil *loads* specified in Table 1610.1 shall be used as the minimum design lateral soil *loads* unless determined otherwise by a geotechnical investigation in accordance with Section 1803. Foundation walls and other walls in which horizontal movement is restricted at the top shall be designed for at-rest pressure. ~~Retaining walls~~ Walls that are free to move and rotate at the top , such as retaining walls, shall be permitted to be designed for active pressure.

Where applicable, lateral ~~Lateral~~ pressure from fixed or moving surcharge *loads* shall be added to the lateral soil *load*. Lateral pressure shall be increased if expansive soils are present at the site. Foundation walls shall be designed to support the weight of the full hydrostatic pressure of undrained backfill unless a drainage system is installed in accordance with Sections 1805.4.2 and 1805.4.3.

Exception: Foundation walls extending not more than 8 feet (2438 mm) below grade and laterally supported at the top by flexible *diaphragms* shall be permitted to be designed for active pressure.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal makes minor changes to coordinate with the 2022 edition of ASCE 7. The revised text is more clear and does not limit the use of the lateral soil loads to just foundation walls and retaining walls. The loads can be applied to all below grade structures as limited within the section.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The lateral soil loads are unchanged.

S123-22

S124-22

IBC: SECTION 1603, 1603.1.9, SECTION 1611, 1611.1, FIGURE 1611.1(1), FIGURE 1611.1(2), FIGURE 1611.1(3), FIGURE 1611.1(4), FIGURE 1611.1(5), 1611.2, 1611.3

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

SECTION 1603 CONSTRUCTION DOCUMENTS

Revise as follows:

1603.1.9 Roof rain load data. Design rainfall ~~Rain~~ intensity, *i* (in/hr) (cm/hr), shall be shown regardless of whether rain *loads* govern the design.

SECTION 1611 RAIN LOADS

Revise as follows:

1611.1 Design rain loads. Each portion of a roof shall be designed to sustain the *load* of rainwater as per the requirements of Chapter 8 of ASCE 7. Rain loads shall be based on the summation of the static head, d_s, hydraulic head, d_h, and ponding head, d_p, using Eqn. 16-19. The hydraulic head shall be based on hydraulic test data or hydraulic calculations assuming a flow rate corresponding to a rainfall intensity equal to or greater than the 15-min duration storm with return period given in Table 1611.1. Rainfall intensity shall be determined in inches per hour for 15 minute duration storms for Risk Category given in Table 1611.1. ~~The design rainfall shall be based on the 100-year 15-minute duration event, or on other rainfall rates determined from approved local weather data. Alternatively, a design rainfall of twice the 100-year hourly rainfall rate indicated in Figures 1611.1(1) through 1611.1(5) shall be permitted.~~ The ponding head shall be based on structural analysis as the depth of water due to deflections of the roof subjected to unfactored rain load and unfactored dead load.

$R = 5.2\,(d_s + d_h + d_p)$ **(Equation 16-19**

For SI: $R = 0.0098(d_s + d_h + d_p)$

where:

d_h = hydraulic head equal to the depth of water on the undeflected roof above the inlet of the secondary drainage system for structural loading (SDSL) required to achieve the design flow in in. (mm) ~~Additional depth of water on the undeflected roof above the inlet of secondary drainage system at its design flow (in other words, the hydraulic head), in inches (mm).~~

d_s = static head equal to the depth of water on the undeflected roof up to the inlet of the secondary drainage system for structural loading (SDSL) in in. (mm) ~~Depth of water on the undeflected roof up to the inlet of secondary drainage system when the primary drainage system is blocked (in other words, the static head), in inches (mm).~~

d_p = ponding head equal to the depth of water due to deflections of the roof subjected to unfactored rain load and unfactored dead load, in in. (mm)

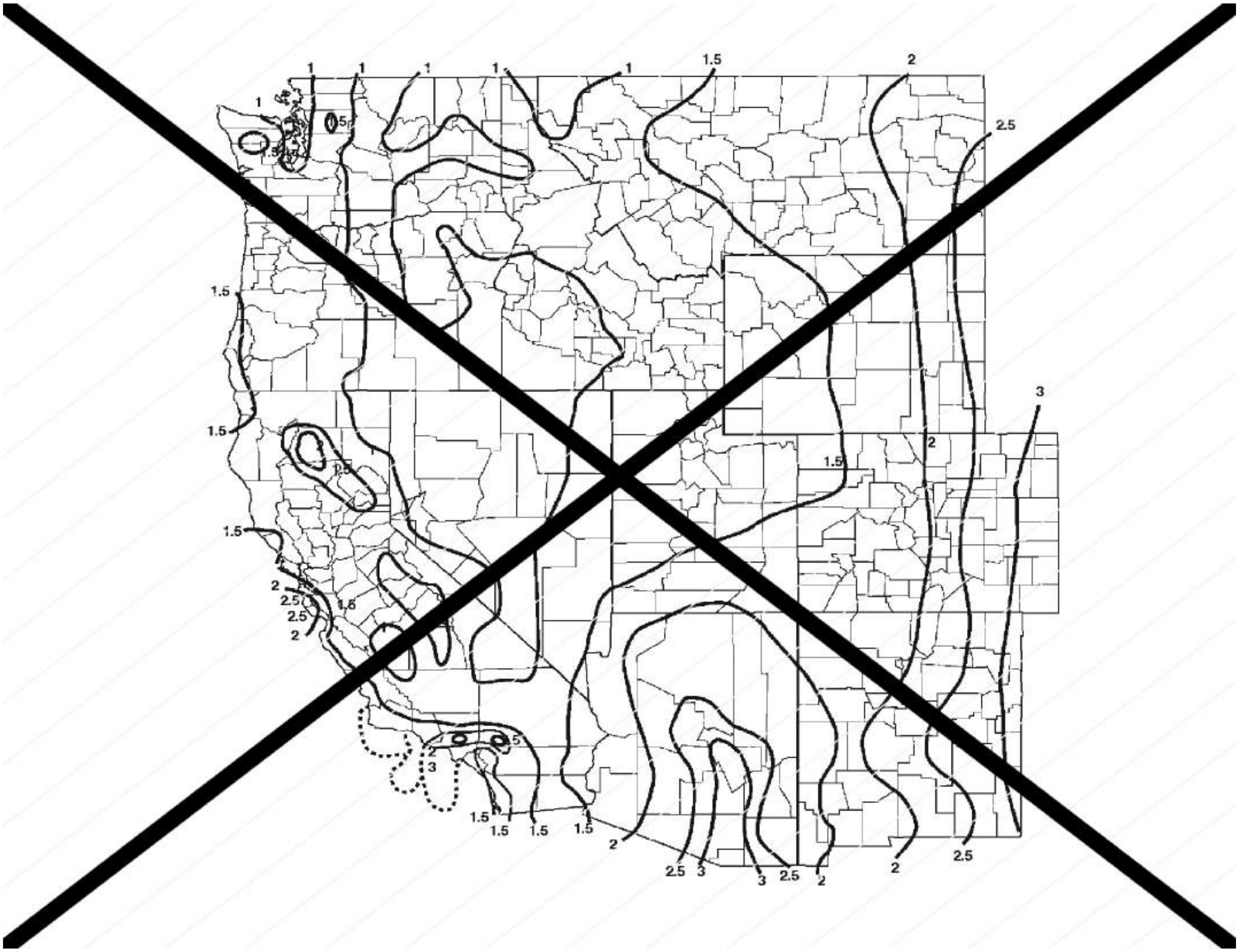
R = Rain load ~~on the undeflected roof~~, in psf (kN/m^2). ~~Where the phrase "undeflected roof" is used, deflections from *loads* (including *dead loads*) shall not be considered when determining the amount of rain on the roof.~~

SDSL is the roof drainage system through which water is drained from the roof when the drainage systems listed in ASCE 7 Section 8.2 (a) through (d) are blocked or not working.

Table 1611.1 Design Storm Return Period by Risk Category

Risk Category	Design Storm Return Period
I & II	100 Years
III	200 Years
IV	500 Years

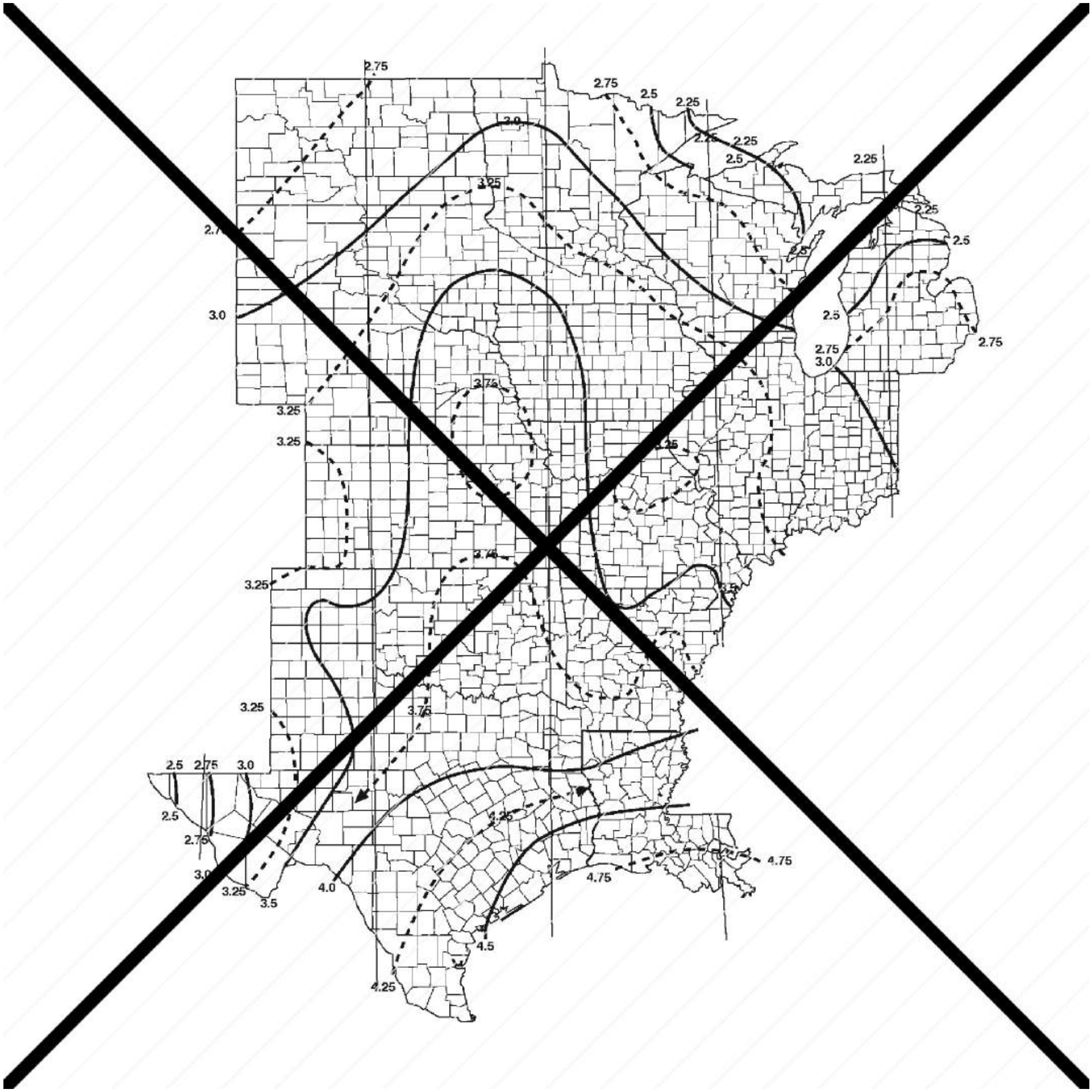
Delete without substitution:



~~For SI: 1 inch = 25.4 mm.~~

~~Source: National Weather Service, National Oceanic and Atmospheric Administration, Washington, DC.~~

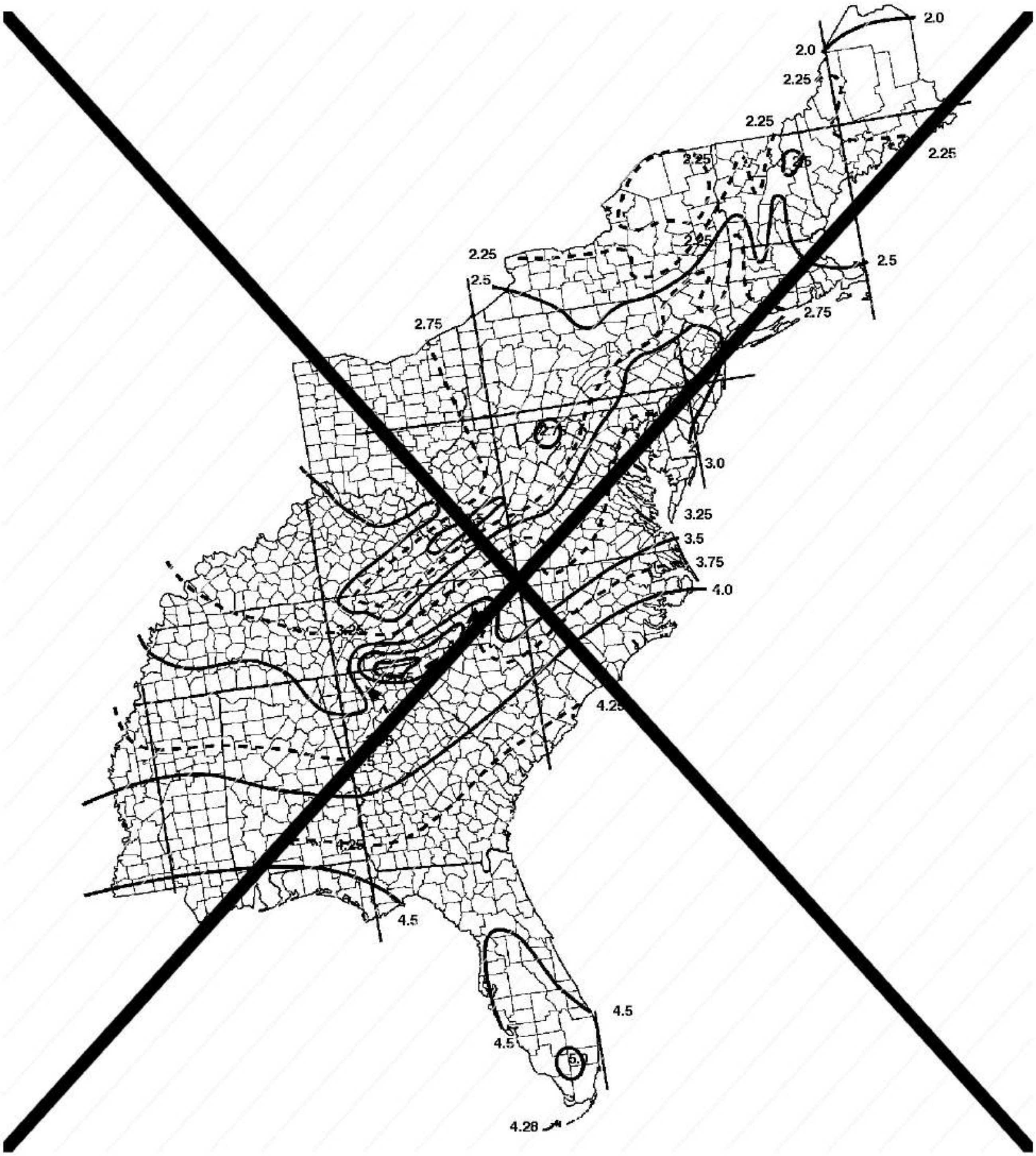
~~**FIGURE 1611.1(1) 100-YEAR, 1-HOUR RAINFALL (INCHES) WESTERN UNITED STATES**~~



~~For SI: 1 inch = 25.4 mm.~~

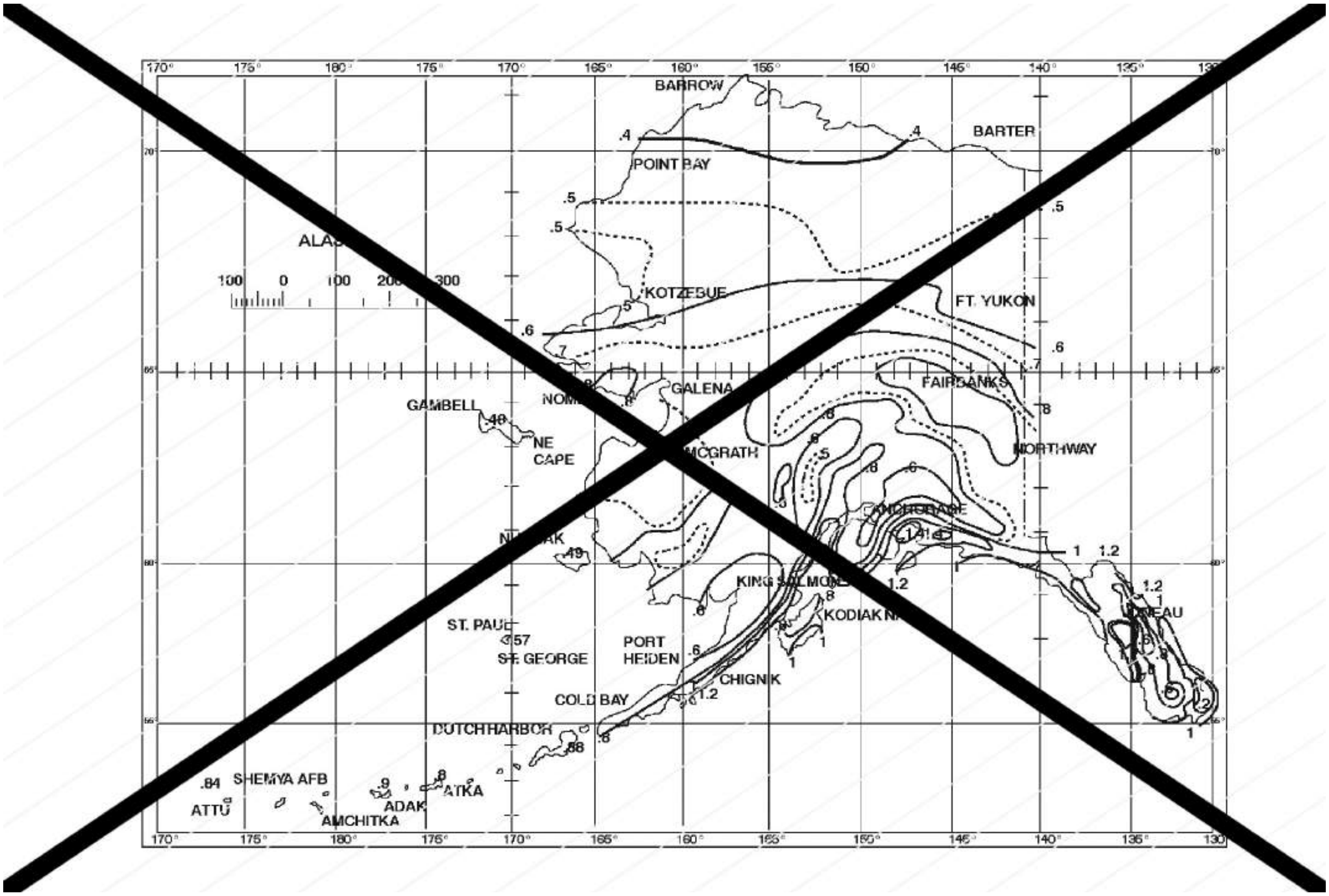
~~Source: National Weather Service, National Oceanic and Atmospheric Administration, Washington, DC.~~

~~**FIGURE 1611.1(2) 100-YEAR, 1-HOUR RAINFALL (INCHES) CENTRAL UNITED STATES**~~



~~For SI: 1 inch = 25.4 mm.~~
~~Source: National Weather Service, National Oceanic and Atmospheric Administration, Washington, DC.~~

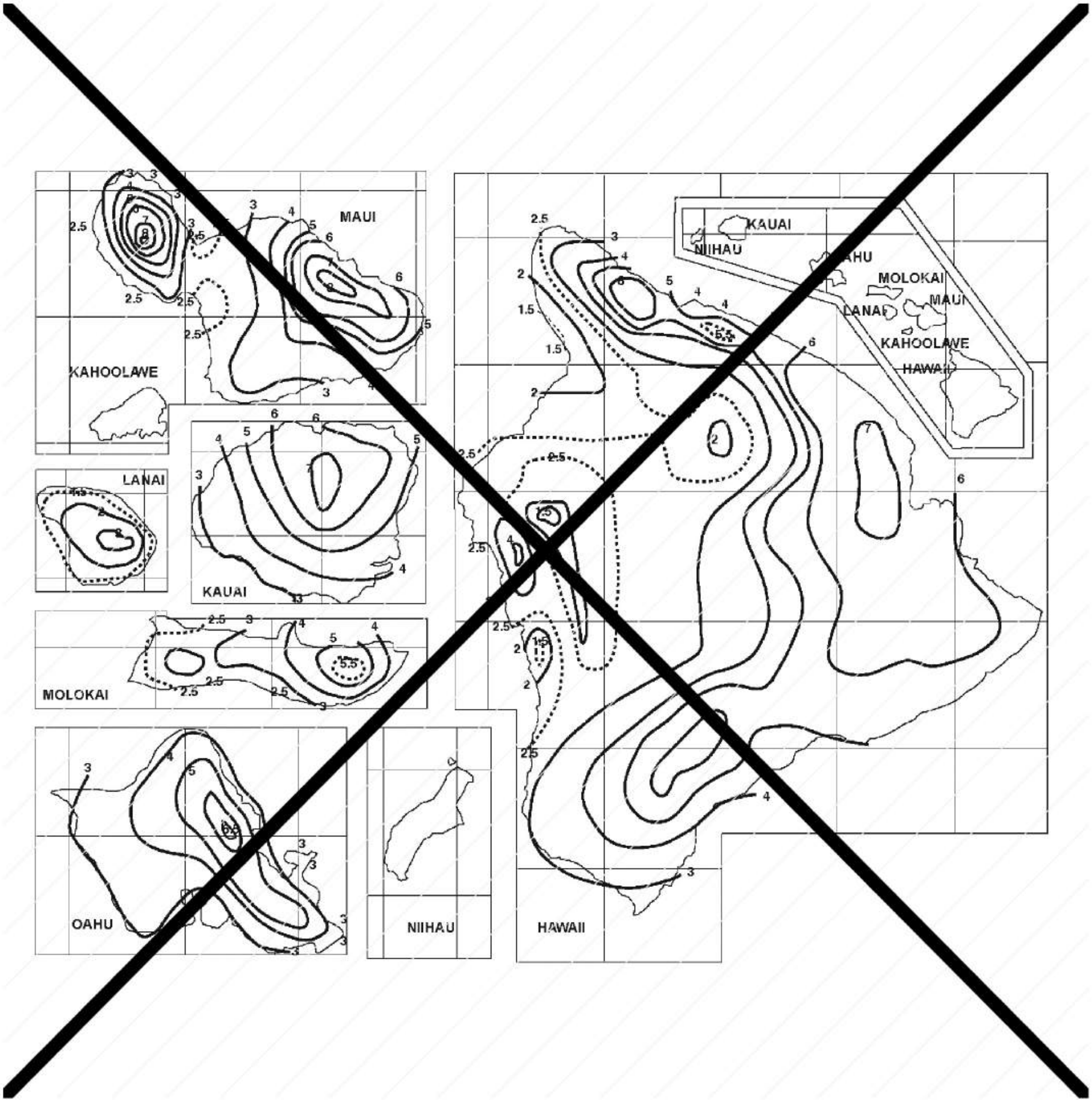
~~FIGURE 1611.1(3) 100-YEAR, 1-HOUR RAINFALL (INCHES) EASTERN UNITED STATES~~



~~For SI: 1 inch = 25.4 mm.~~

~~Source: National Weather Service, National Oceanic and Atmospheric Administration, Washington, DC.~~

~~FIGURE 1611.1(4) 100-YEAR, 1-HOUR RAINFALL (INCHES) ALASKA~~



~~For SI: 1 inch = 25.4 mm.~~
~~Source: National Weather Service, National Oceanic and Atmospheric Administration, Washington, DC.~~

~~FIGURE 1611.1(5) 100-YEAR, 1-HOUR RAINFALL (INCHES) HAWAII~~

1611.2 Ponding instability. *Susceptible bays* of roofs shall be evaluated for ponding instability in accordance with Chapters 7 and 8 of ASCE 7.

1611.3 Controlled drainage. Roofs equipped with hardware to control the rate of drainage shall be equipped with a secondary drainage system at a higher elevation that limits accumulation of water on the roof above that elevation. Such roofs shall be designed to sustain the *load* of rainwater that will accumulate on them to the elevation of the secondary drainage system plus the uniform *load* caused by water that rises above the inlet of the secondary drainage system at its design flow determined from Section 1611.1. Such roofs shall be checked for ponding instability in accordance with Section 1611.2.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from

the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal includes technical updates as well as editorial corrections or re-organizations.

A summary of the coordination changes made to each section is as follows.

Section 1611.1 Design rain loads. The primary change is the addition of the ponding head (d_p) directly into the rain load calculation. In ASCE 7-16 and previous editions, there was a requirement to perform a ponding analysis, yet limited guidance was provided on how to perform that analysis. The commentary references the methods in Appendix 2 of the AISC Specification (AISC 360), however these provisions are of limited scope and they are currently under ballot to be removed from the AISC Specification. The addition of the ponding head to rain load provides a more consistent approach to accommodate ponding. The addition SDSL pointer to ensure that the requirement that the inlet to the SDSL be vertically separated from the inlet to the primary drainage system by not less than 2 in. This requirement will allow activation of the SDSL to serve as a warning that the primary drainage system is blocked.

Table 1611.1 Design Storm Return Period by Risk Category – ASCE 7-22 incorporates risk category into the determination of rainfall intensity. Therefore, this change to design storm return period for determination of hydraulic head to be based on risk category. **Figures 1611.1(1) through 1611.1(5).** These figures were removed because they are outdated. Theses are 100-year hourly rainfall maps, which do not adequately provide the rainfall intensity required by a 15 minute storm. Furthermore, the rainfall is now required to be determined based upon risk category. ASCE 7 does not provide rainfall data or maps for determining the rainfall rate. The best source currently is the National Oceanic and Atmospheric Administration (NOAA's) National Weather Service Precipitation Frequency Data Server - Hydrometerorological Design Studies Center for precipitation intensity (inches per hour) based on the required mean recurrence interval (years).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change will not add load or increase costs. It is a change to how the load is calculated to align with ASCE 7-22. Past editions of ASCE 7 have included the requirement that ponding be considered in structural designs. This proposal formalizes aspects of the method in which the engineer must consider ponding, most notably by including the effects of ponding in the rain load. While rain load will increase because of this proposal, the effect on overall demands and construction cost is less clear since separate ponding investigation requirements have been removed. The impact on construction cost will largely be dependent on the methods previously used by individual engineers to perform their ponding investigation.

S124-22

S125-22 Part I

IBC: [A] 110.3.12.1, 1612.4

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE ADMIN CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 110.3.12.1 Flood hazard documentation. If located in a *flood hazard area*, documentation of the elevation of the*lowest floor* <u>or the elevation of dry floodproofing, if applicable,</u> as required in Section 1612.4 shall be submitted to the *building official* prior to the final inspection.

1612.4 Flood hazard documentation. The following documentation shall be prepared and sealed by a *registered design professional* and submitted to the *building official*:

1. For construction in *flood hazard areas* other than *coastal high hazard areas* or *coastal A zones*:
   - 1.1. The elevation of the *lowest floor*, including the basement, as required by the lowest floor elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.12.1.
   - 1.2. For fully enclosed areas below the *design flood elevation* where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, *construction documents* shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.
   - 1.3. For *dry floodproofed* nonresidential buildings, *construction documents* shall include a statement that the *dry floodproofing* is designed in accordance with ASCE 24 and shall include the flood emergency plan specified in Chapter 6 of ASCE 24.
   - <u>1.4. For dry floodproofed nonresidential buildings, the elevation to which the building is dry floodproofed as required for the final inspection in Section 110.3.12.1.</u>
2. For construction in *coastal high hazard areas* and *coastal A zones*:
   - 2.1. The elevation of the bottom of the lowest horizontal structural member as required by the *lowest floor* elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.12.1.
   - 2.2. *Construction documents* shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored to resist flotation, collapse and lateral movement due to the effects of wind and *flood loads* acting simultaneously on all building components, and other *load* requirements of Chapter 16.
   - 2.3. For breakaway walls designed to have a resistance of more than 20 psf (0.96 kN/m^2) determined using *allowable stress design*, *construction documents* shall include a statement that the breakaway wall is designed in accordance with ASCE 24.
   - 2.4 For breakaway walls where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

S125-22 Part I

S125-22 Part II

IEBC: [A] 109.3.10

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Existing Building Code

Revise as follows:

[A] 109.3.10 Flood hazard documentation. Where a building is located in a *flood hazard area*, documentation of the elevation of the lowest floor or the elevation of dry floodproofing, if applicable, as required in the International Building Code or the International Residential Code, as applicable, shall be submitted to the *code official* prior to the final inspection.

Reason Statement: When nonresidential buildings in flood hazard areas are proposed to be dry floodproofed, several aspects of design are critical, including the strength of walls and flood shields that are designed to be watertight (addressed in 1612.4 #1.3) and the required elevation of the dry floodproofing, which is specified in ASCE 24 Chapter 6.
The proposed change follows the pattern already established for documentation of lowest floor elevations prior to the final inspection. Because dry floodproofed buildings do not have elevated “lowest floors,” rather than survey floors, this change clarifies the elevation to which dry floodproofed buildings are protected is to be documented. Having this elevation determined and documented helps local officials confirm compliance with the design requirements. The NFIP regulations require communities to obtain the elevation to which structures are floodproofed [44 Code of Federal Regulations Sec. 60.3(b)(5)(ii)].

FEMA’s Mitigation Assessment Team reports prepared after some significant flood events document failures of dry floodproofing systems. Some failures are caused by floodwater rising higher than the protective measures, which indicates the value of documenting that construction of those measures does meet the requirements for compliance.

Many communities require permittees to use the FEMA Floodproofing Certificate for Non-Residential Structures (FEMA Form 086-0-34). That form is prepared for use to certify designs as part of documentation submitted with permit applications, as well as for use to certify the “floodproofed elevation.” The form also is used when certification of as-built conditions is required, including the elevation to which the building is dry floodproofed. The FEMA National Flood Insurance Program requires as-built certification as part of qualifying for NFIP flood insurance policy coverage for dry floodproofed nonresidential buildings.

Bibliography: FEMA Form 086-0-34, FEMA Floodproofing Certificate for Non-Residential Structures: https://www.fema.gov/media-library/assets/documents/2748

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal clarifies that the elevation to which dry floodproofed buildings are protected is to be documented, rather than documentation of the “lowest floors.” There is no change in cost because the cost to survey the elevation to which a building is dry floodproofed would be equal to the cost to survey a floor elevation relative to datum. Completion of the survey portion of the FEMA Nonresidential Floodproofing Certificate requires fewer inputs by the professional certifying the survey than are required to complete a FEMA Elevation Certificate.

S125-22 Part II

S126-22

IBC: 1612.4

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Building Code

Revise as follows:

1612.4 Flood hazard documentation. The following documentation shall be prepared and sealed by a *registered design professional* and submitted to the *building official*:

1. For construction in *flood hazard areas* other than *coastal high hazard areas* or *coastal A zones*:

   1.1. The elevation of the *lowest floor*, including the basement, as required by the lowest floor elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.12.1.

   1.2. For fully enclosed areas below the *design flood elevation* where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, *construction documents* shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

   1.3. For *dry floodproofed* nonresidential buildings, *construction documents* shall include a statement that the *dry floodproofing* is designed in accordance with ASCE 24 and shall include the flood emergency plan specified in Chapter 6 of ASCE 24.

2. For construction in *coastal high hazard areas* and *coastal A zones*:

   2.1. The elevation of the bottom of the lowest horizontal structural member as required by the *lowest floor* elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.12.1.

   2.2. *Construction documents* shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored to resist flotation, collapse and lateral movement due to the effects of wind and *flood loads* acting simultaneously on all building components, and other *load* requirements of Chapter 16.

   2.3. For breakaway walls designed to have a resistance of more than 20 psf (0.96 kN/m^2) determined using *allowable stress design* or a resistance to an ultimate load of more than 33 psf (1.58 kN/m^2), *construction documents* shall include a statement that the breakaway wall is designed in accordance with ASCE 24.

   2.4 For breakaway walls where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

Reason Statement: This code change does not change the loads used to design breakaway walls. It just shows how the loads expressed using allowable stress design are expressed as ultimate loads, which is used in ASCE 7 for seismic design and wind loads. One of the reasons for the lower load shown in the existing section is to avoid breakaway walls that might fail under wind loads. Showing the loads expressed as ultimate loads will make it easier to compare to calculated wind loads and seismic loads.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal shows how the loads expressed using allowable stress design are expressed as ultimate loads to better align with ASCE 7. There is no change to the technical content of the provisions. By showing how existing load values are expressed as ultimate loads, there will be no cost impact when approving this proposal.

S126-22

S127-22

IBC: CHAPTER 16, SECTION 1613, 1613.1, 1613.2, 1613.2.1, FIGURE 1613.2.1(1), FIGURE 1613.2.1(2), FIGURE 1613.2.1(3), FIGURE 1613.2.1(4), FIGURE 1613.2.1(5), FIGURE 1613.2.1(6), FIGURE 1613.2.1(7), FIGURE 1613.2.1(8), FIGURE 1613.2.1(9), FIGURE 1613.2.1(10), 1613.2.2, 1613.2.3, TABLE 1613.2.3(1), TABLE 1613.2.3(2), 1613.2.4, 1613.2.5, TABLE 1613.2.5(1), TABLE 1613.2.5(2), 1613.2.5.1, 1613.2.5.2, 1613.3

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

CHAPTER 16
STRUCTURAL DESIGN

SECTION 1613
EARTHQUAKE LOADS

Revise as follows:

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable. The *seismic design category* for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

Exceptions:

1. Detached one- and two-family dwellings, assigned to *Seismic Design Category* A, B or C~~, or located where the mapped short-period spectral response acceleration, S_s, is less than 0.4g~~.
2. The *seismic force-resisting system* of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. References within ASCE 7 to Chapter 14 shall not apply, except as specifically required herein.

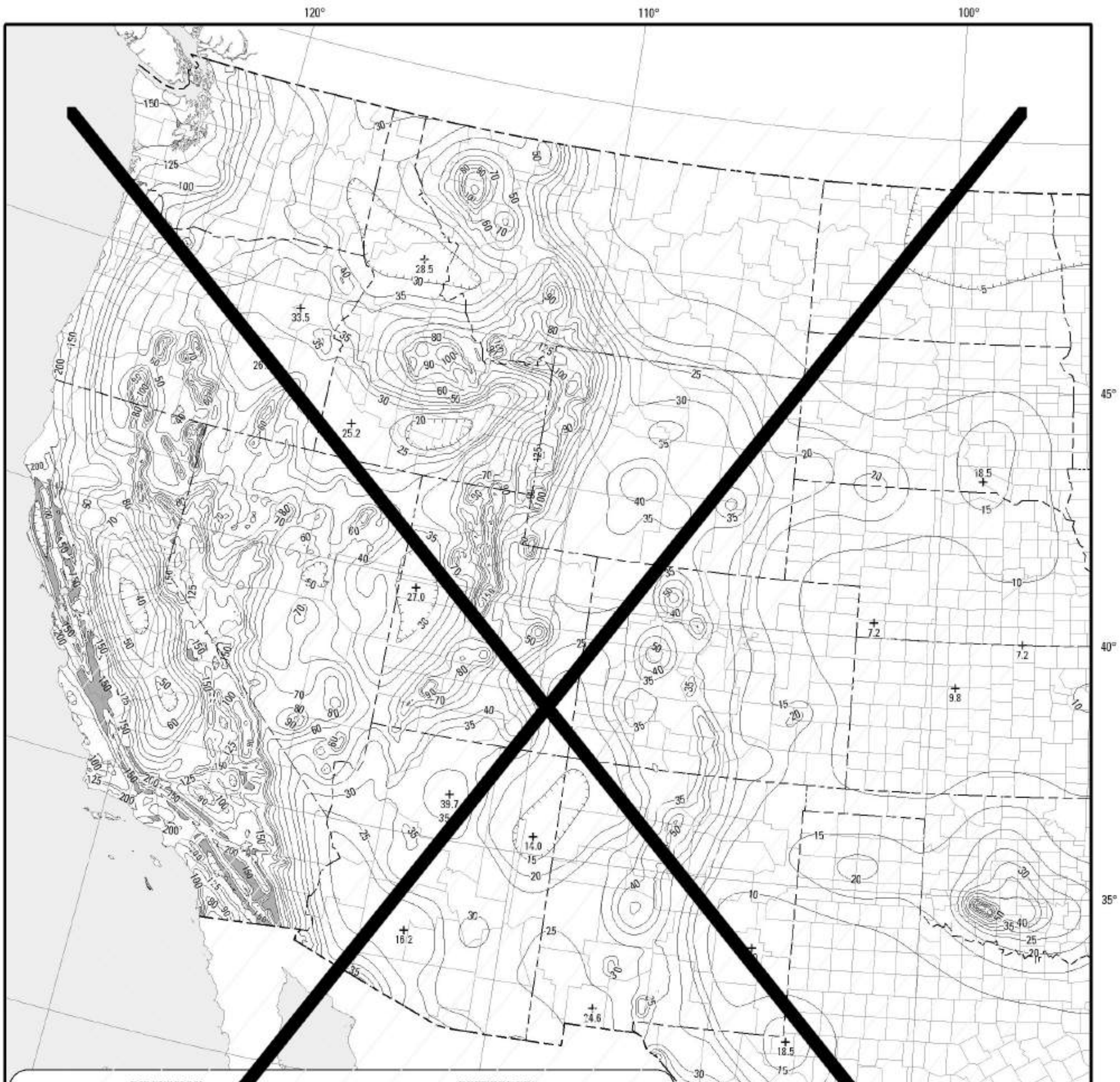
1613.2 Seismic ground motion values. Seismic ground motion values shall be determined in accordance with this section.

Delete and substitute as follows:

~~**1613.2.1 Mapped acceleration parameters.** The parameters S_S and S_1 shall be determined from the 0.2 and 1-second spectral response accelerations shown on Figures 1613.2.1(1) through 1613.2.1(10). Where S_1 is less than or equal to 0.04 and S_S is less than or equal to 0.15, the structure is permitted to be assigned *Seismic Design Category* A.~~

1613.2.1 Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters. Risk-Targeted Maximum Considered Earthquake (MCE_R) spectral response acceleration parameters S_1, S_{MS}, and S_{M1} shall be determined based on one of the following methods unless the authority having jurisdiction or geotechnical data determine that Site Class DE, E, or F soils are present at the site. Where Site Class DE, E, or F soils are present, the spectral response acceleration parameters shall be determined in accordance with ASCE 7.

1. Using Figures 1613.2.1(1) through 1613.2.1(10).
2. Determined in accordance with ASCE 7.



DISCUSSION

Maps prepared by United States Geological Survey (USGS) in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council (BSSC) and the American Society of Civil Engineers (ASCE). The basis is explained in commentaries prepared by BSSC and ASCE and in the references.

Ground motion values contoured on these maps incorporate:

- a target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility
- a factor of 1.1 to adjust from a geometric mean to the maximum response regardless of direction
- deterministic upper limits imposed near large, active faults, which are taken as 1.5 times the estimated median response to the characteristic earthquake for the governing fault (1.8 is used to represent the 84th percentile response), but not less than 150% g.

As such, the values are different from those on the uniform-hazard 2014 USGS National Seismic Hazard Maps posted at: http://earthquake.usgs.gov/hazards/products/.

Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (http://earthquake.usgs.gov/hazards/designmaps/ or http://content.seinstitute.org) be used to determine the mapped value for a specified location.

REFERENCES

American Society of Civil Engineers, 2010, Minimum Design Loads for Buildings and Other Structures: ASCE/SEI 7-10, ASCE Structural Engineering Institute, Reston, Virginia.

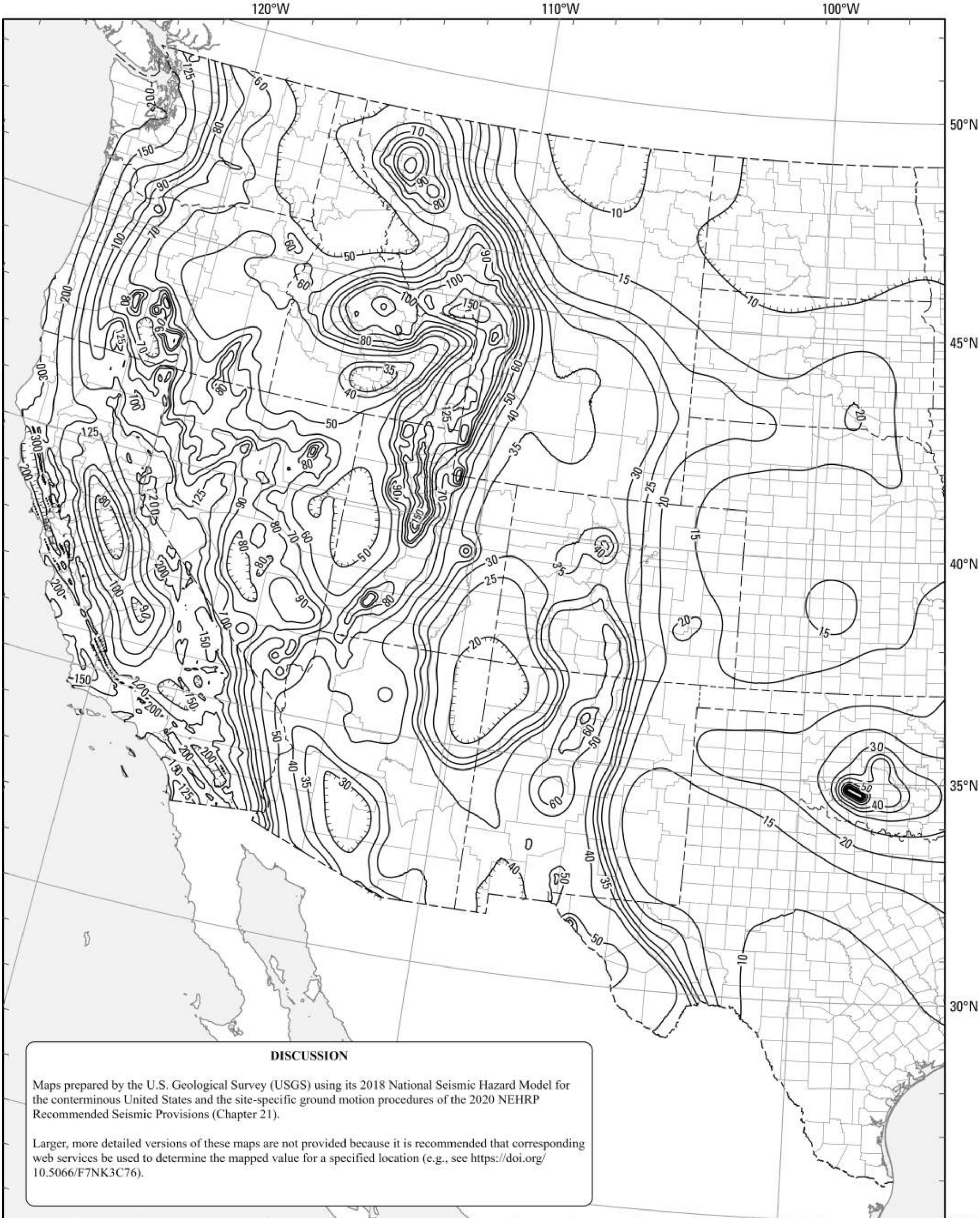
Building Seismic Safety Council, 2009, NEHRP Recommended Seismic Provisions for New Buildings and Other Structures: FEMA P-750/2009 Edition, Federal Emergency Management Agency, Washington, DC.

Huang, Yin-Nan, Whittaker, A.S., and Luco, Nicolas, 2008, Maximum spectral demands in the near-fault region, Earthquake Spectra, Volume 24, Issue 1, pp. 319-341.

Luco, N., Ellingwood, B.R., Hamburger, R.O., Hooper, J.D., Kimball, J.K., and Kircher, C.A., 2007, Risk-Targeted versus Current Seismic Design Maps for the Conterminous United States, Structural Engineers Association of California 2007 Convention Proceedings, pp. 163-175.

Petersen, M.D., Moschetti, M.P., Powers, P.M., Mueller, C.S., Haller, K.M., Frankel, A.D., Zeng, Y., Rezaeian, S., Harmsen, S.C., Boyd, O.L., Field, E.H., Chen, R., Rukstales, K.S., Luco, N., Wheeler, R.L., Williams, R.A., and Olsen, A.H., 2014, Documentation for the 2014 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 2014-1091, 224 p.

~~**FIGURE 1613.2.1(1) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)**~~



DISCUSSION

Maps prepared by the U.S. Geological Survey (USGS) using its 2018 National Seismic Hazard Model for the conterminous United States and the site-specific ground motion procedures of the 2020 NEHRP Recommended Seismic Provisions (Chapter 21).

Larger, more detailed versions of these maps are not provided because it is recommended that corresponding web services be used to determine the mapped value for a specified location (e.g., see https://doi.org/10.5066/F7NK3C76).

Notes:

Maps prepared by USGS in collaboration with the FEMA-funded Building Seismic Safety Council (BSSC) and ASCE. The basis is explained in commentaries prepared by BSSC and ASCE and in the references.
Ground motion values contoured on these maps incorporate:

a. A target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility,
b. A factor of 1.1 to adjust from a geometric mean to the maximum response regardless of direction, and
c. Deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the governing fault (1.8 is used to represent the 84th percentile response), but not less than 150% g.

As such, the values are different from those on the uniform-hazard 2014 USGS National Seismic Hazard Maps posted at https://doi.org/10.5066/F7HT2MHG.
Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (https://doi.org/10.5066/F7NK3C76) be used
to determine the mapped value for a specified location.

User Note: The USGS Seismic Design Geodatabase is available at the ASCE 7 Hazard Tool https://asce7hazardtool.online/ or an approved equivalent.

FIGURE 1613.2.1(1)
S_{MS} for the default site condition for the coterminous United States.

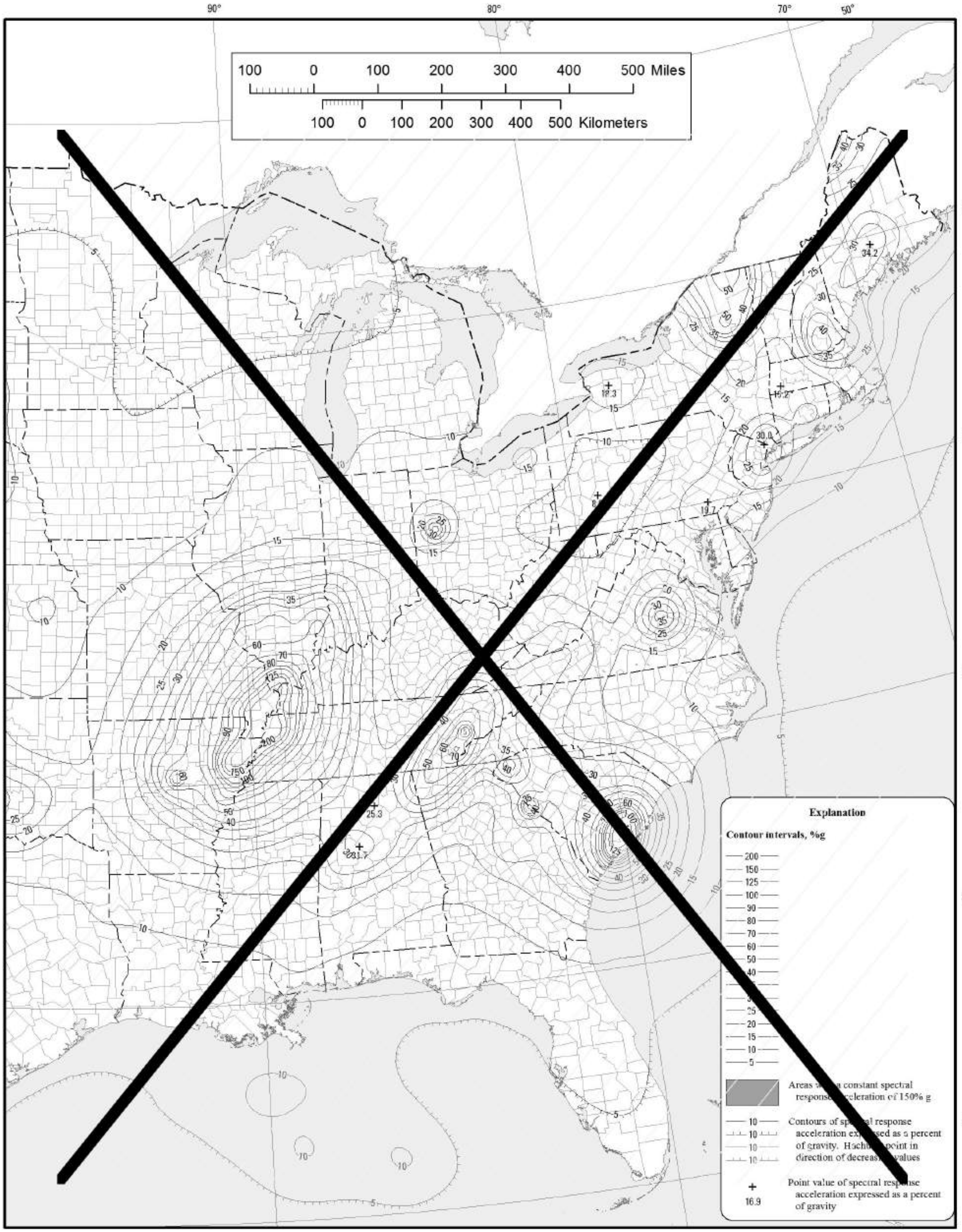


Figure 1613.3.1(1)-continued Risk-Targeted Maximum Considered Earthquake (MCE_R) Ground Motion for the Conterminous United States of 0.2-Second Spectral Response Acceleration (5% of Critical Damping)

~~FIGURE 1613.2.1(2) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

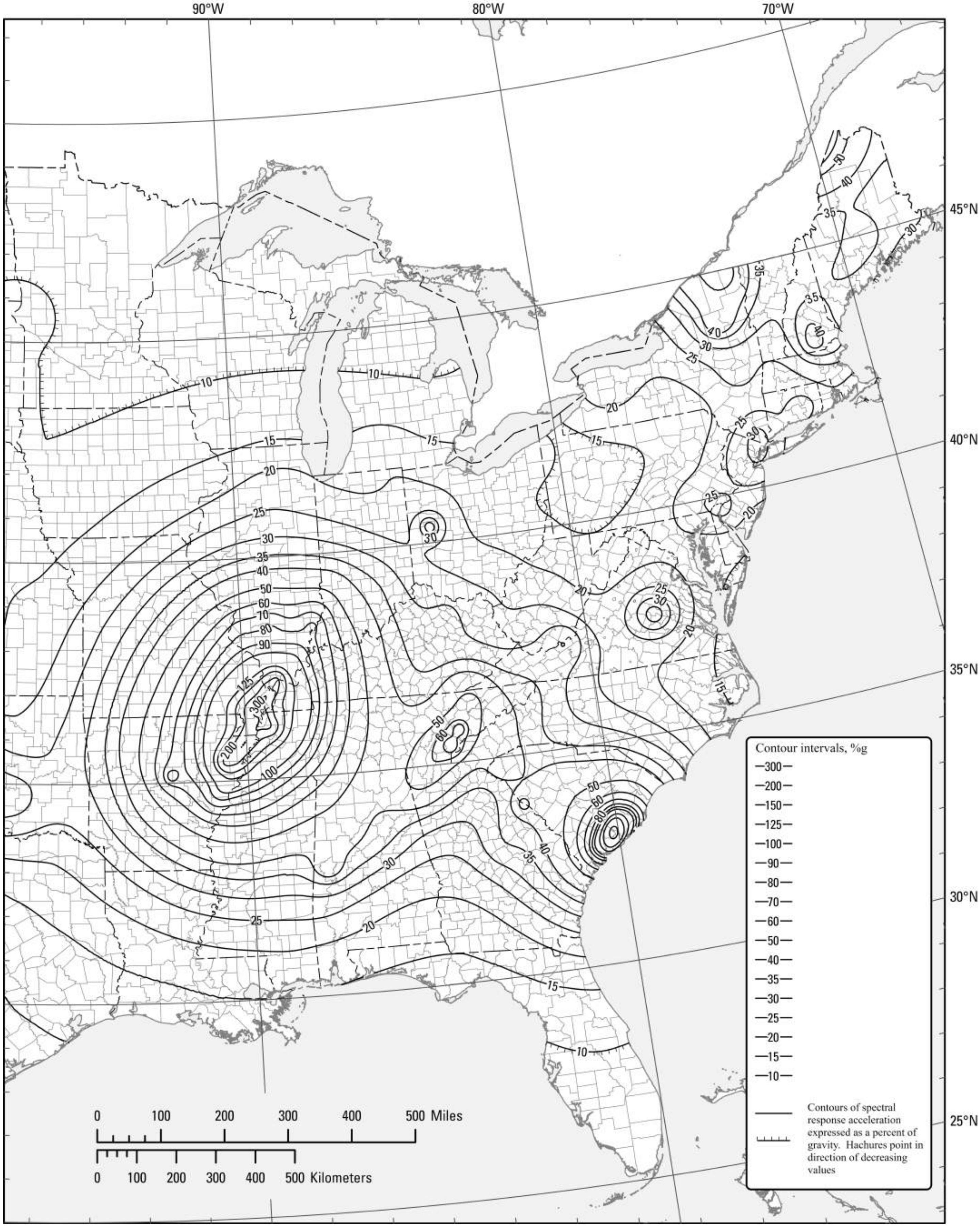
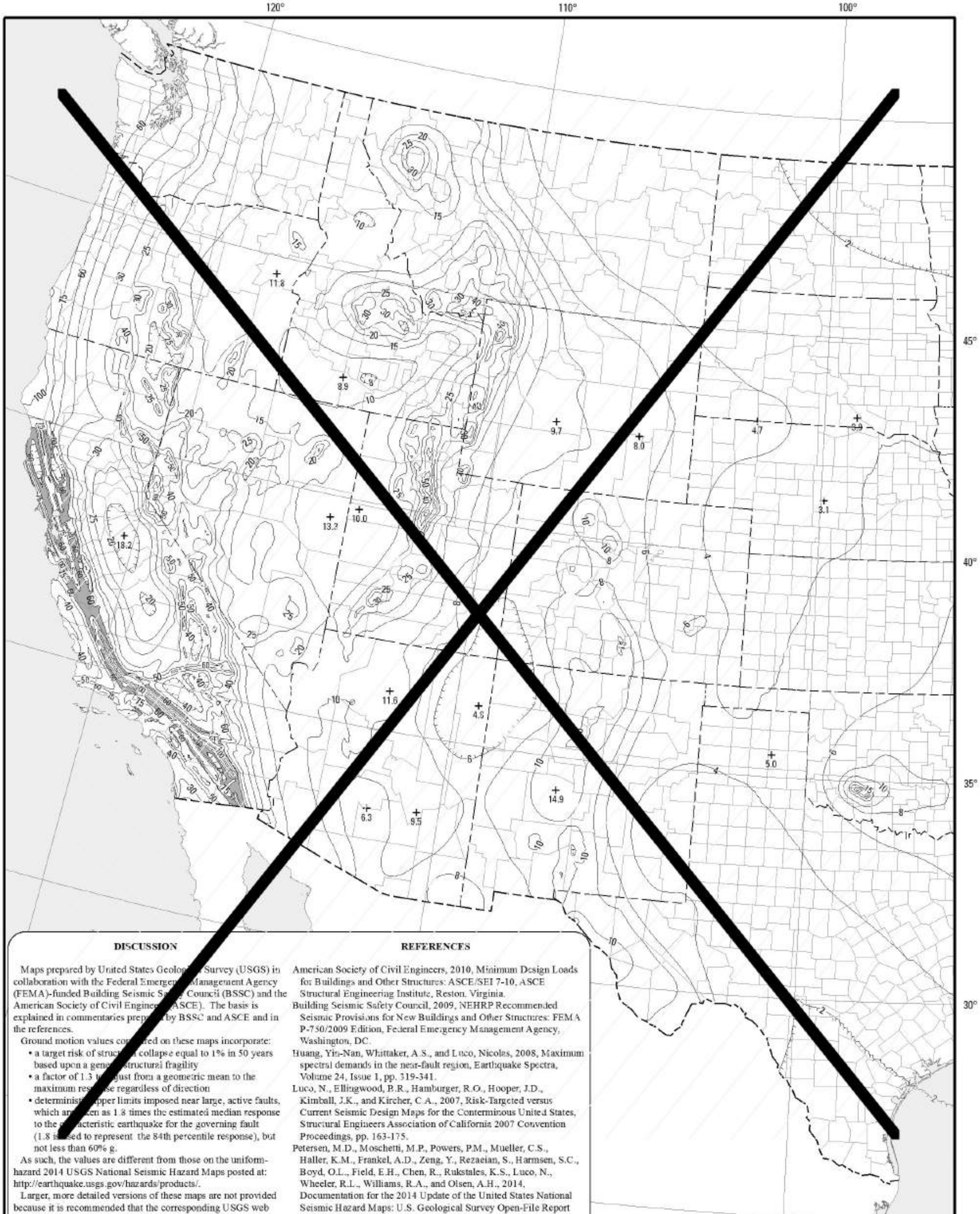


FIGURE 1613.2.1(2)
(Continued). S_{MS} for the default site conditions for the coterminous United States.



DISCUSSION

Maps prepared by United States Geological Survey (USGS) in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council (BSSC) and the American Society of Civil Engineers (ASCE). The basis is explained in commentaries prepared by BSSC and ASCE and in the references.

Ground motion values computed on these maps incorporate:

- a target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility
- a factor of 1.3 to adjust from a geometric mean to the maximum response regardless of direction
- deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the governing fault (1.8 is used to represent the 84th percentile response), but not less than 60% g.

As such, the values are different from those on the uniform-hazard 2014 USGS National Seismic Hazard Maps posted at: http://earthquake.usgs.gov/hazards/products/.

Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (http://earthquake.usgs.gov/hazards/designmaps/ or http://content.seinstitute.org) be used to determine the mapped value for a specified location.

REFERENCES

American Society of Civil Engineers, 2010, Minimum Design Loads for Buildings and Other Structures: ASCE/SEI 7-10, ASCE Structural Engineering Institute, Reston, Virginia.

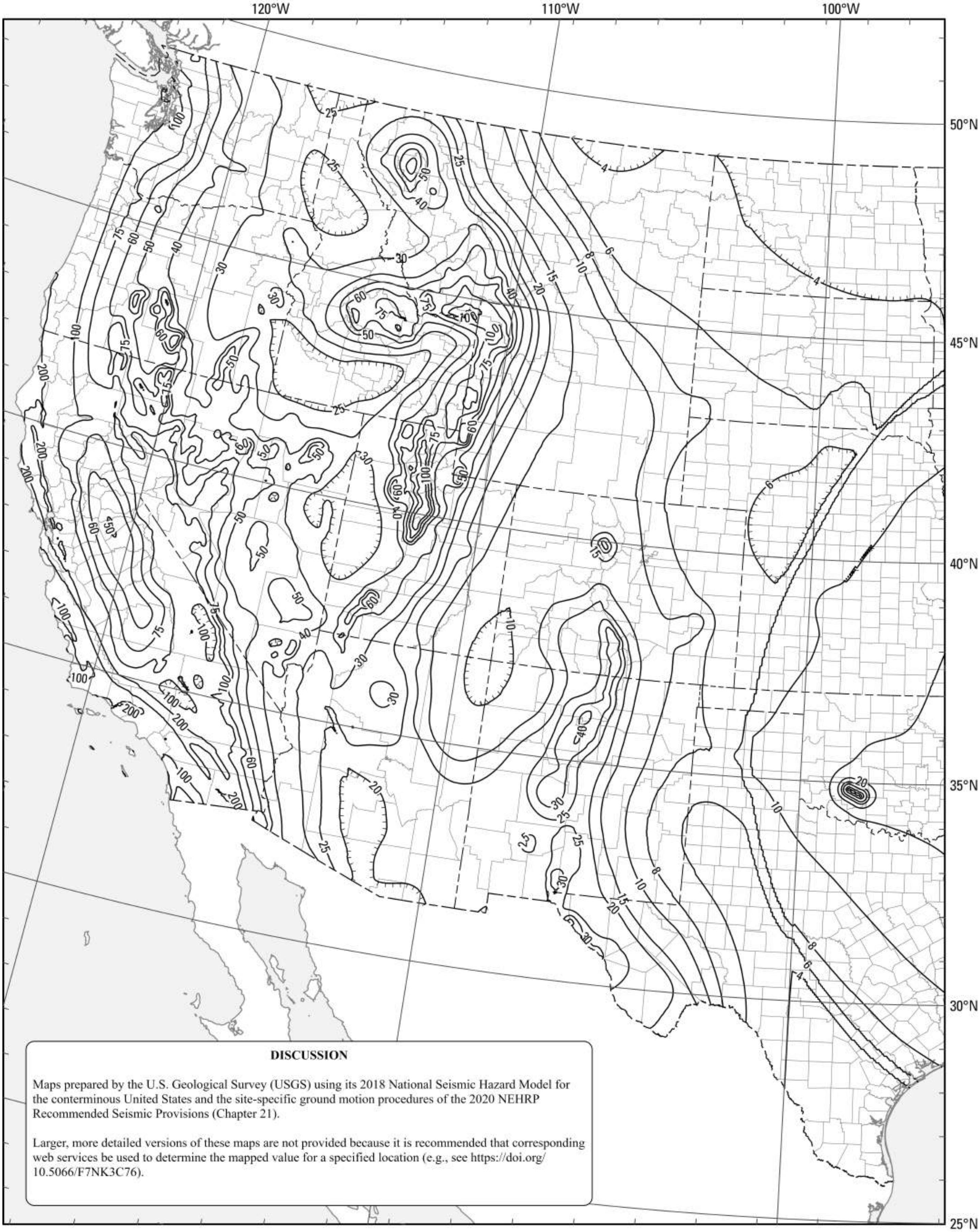
Building Seismic Safety Council, 2009, NEHRP Recommended Seismic Provisions for New Buildings and Other Structures: FEMA P-750/2009 Edition, Federal Emergency Management Agency, Washington, DC.

Huang, Yin-Nan, Whittaker, A.S., and Luco, Nicolas, 2008, Maximum spectral demands in the near-fault region, Earthquake Spectra, Volume 24, Issue 1, pp. 319-341.

Luco, N., Ellingwood, B.R., Hamburger, R.O., Hooper, J.D., Kimball, J.K., and Kircher, C.A., 2007, Risk-Targeted versus Current Seismic Design Maps for the Conterminous United States, Structural Engineers Association of California 2007 Convention Proceedings, pp. 163-175.

Petersen, M.D., Moschetti, M.P., Powers, P.M., Mueller, C.S., Haller, K.M., Frankel, A.D., Zeng, Y., Rezaeian, S., Harmsen, S.C., Boyd, O.L., Field, E.H., Chen, R., Rukstales, K.S., Luco, N., Wheeler, R.L., Williams, R.A., and Olsen, A.H., 2014, Documentation for the 2014 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 2014-1091, 224 p.

~~FIGURE 1613.2.1(3) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~



DISCUSSION

Maps prepared by the U.S. Geological Survey (USGS) using its 2018 National Seismic Hazard Model for the conterminous United States and the site-specific ground motion procedures of the 2020 NEHRP Recommended Seismic Provisions (Chapter 21).

Larger, more detailed versions of these maps are not provided because it is recommended that corresponding web services be used to determine the mapped value for a specified location (e.g., see https://doi.org/10.5066/F7NK3C76).

Notes:

Maps prepared by USGS in collaboration with the FEMA-funded BSSC and ASCE. The basis is explained in commentaries prepared by BSSC and ASCE and in the references.

Ground motion values contoured on these maps incorporate:

a. A target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility,

b. A factor of 1.3 to adjust from a geometric mean to the maximum response regardless of direction, and

c. Deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the governing fault (1.8 is used to represent the 84th percentile response), but not less than 60% g.

As such, the values are different from those on the uniform-hazard 2014 USGS National Seismic Hazard Maps posted at https://doi.org/10.5066/F7HT2MHG.

Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (https://doi.org/10.5066/F7NK3C76) be used
to determine the mapped value for a specified location.

User Note: The USGS Seismic Design Geodatabase is available at the ASCE 7 Hazard Tool https://asce7hazardtool.online/ or an approved equivalent.

FIGURE 1613.2.1(3)

S_{M1} for the default site conditions for the coterminous United States.

~~FIGURE 1613.2.1(4) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE COTERMINOUS UNITED STATES OF 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

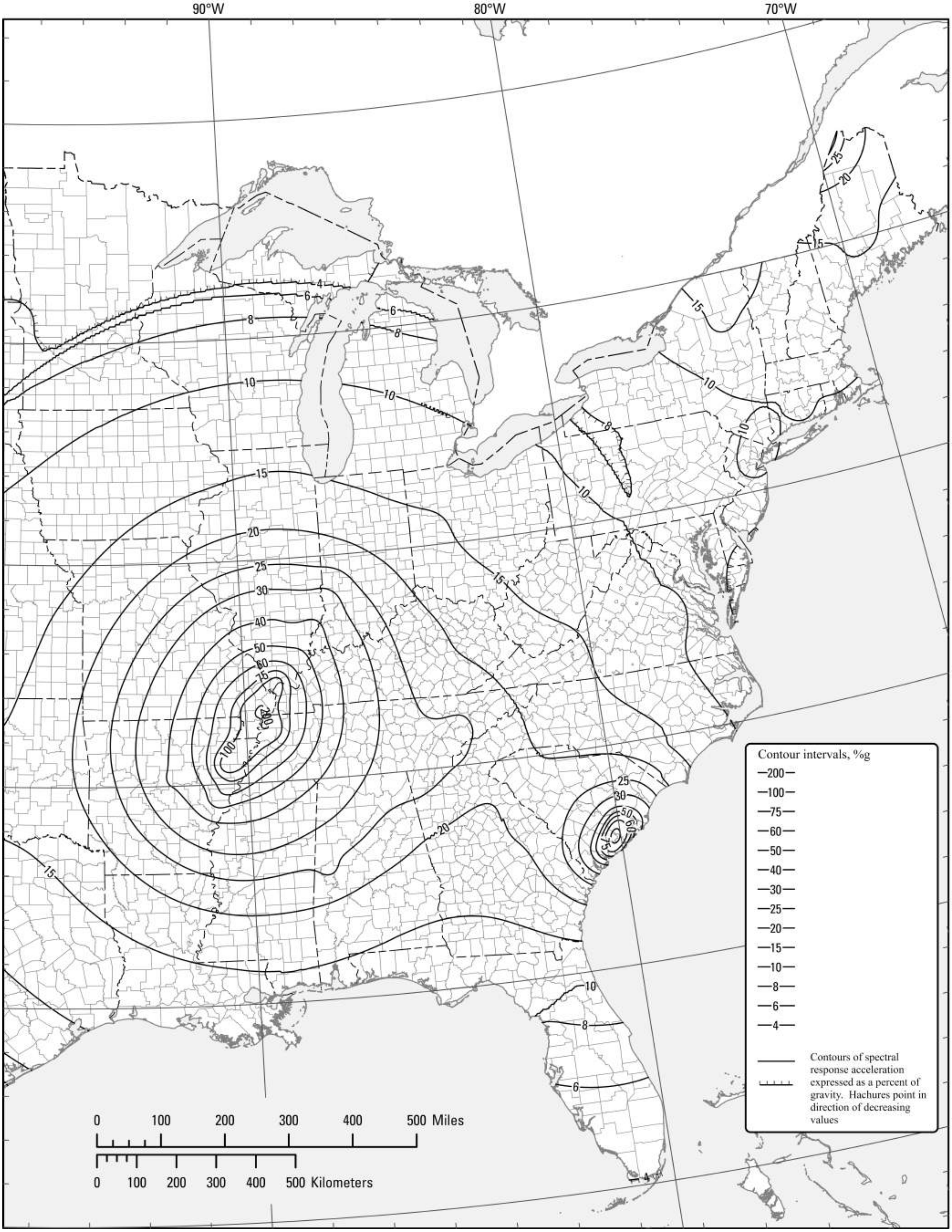
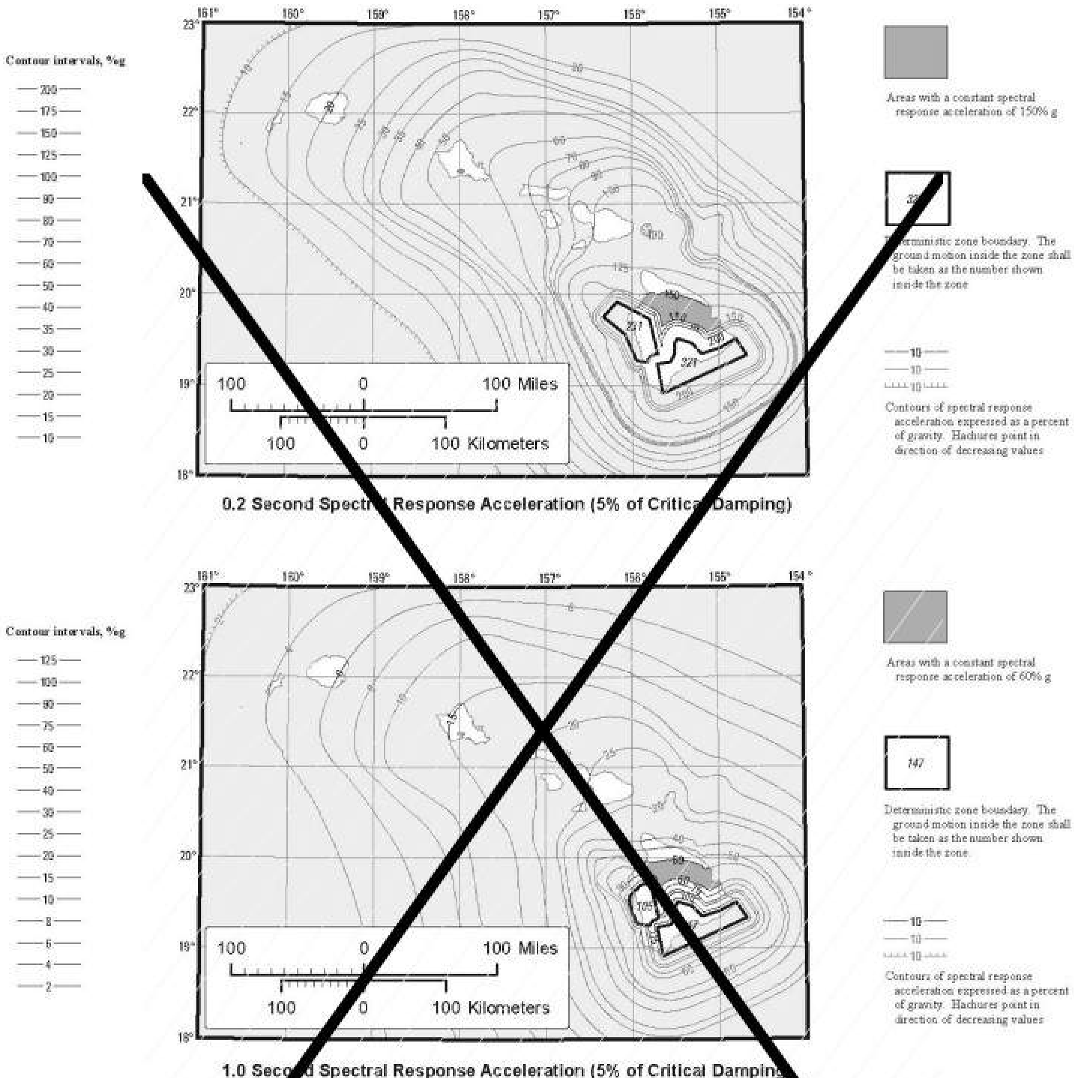


FIGURE 1613.2.1(4)
(Continued). S_{M1} for the default site conditions for the coterminous United States.



DISCUSSION

Maps prepared by United States Geological Survey (USGS) in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council (BSSC) and the American Society of Civil Engineers (ASCE). The basis is explained in commentaries prepared by BSSC and ASCE and in the references.

Ground motion values contoured on these maps incorporate:

- a target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility
- deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the fault (1.8 is used to represent the 84th percentile response), but not less than 150% and 60% g for 0.2 and 1.0 sec, respectively.

As such, the values are different from those on the uniform-hazard 1998 USGS National Seismic Hazard Maps for Hawaii posted at http://earthquake.usgs.gov/hazmaps.

Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (http://earthquake.usgs.gov/designmaps or http://content.seinstitute.org) be used to determine the mapped value for a specified location.

REFERENCES

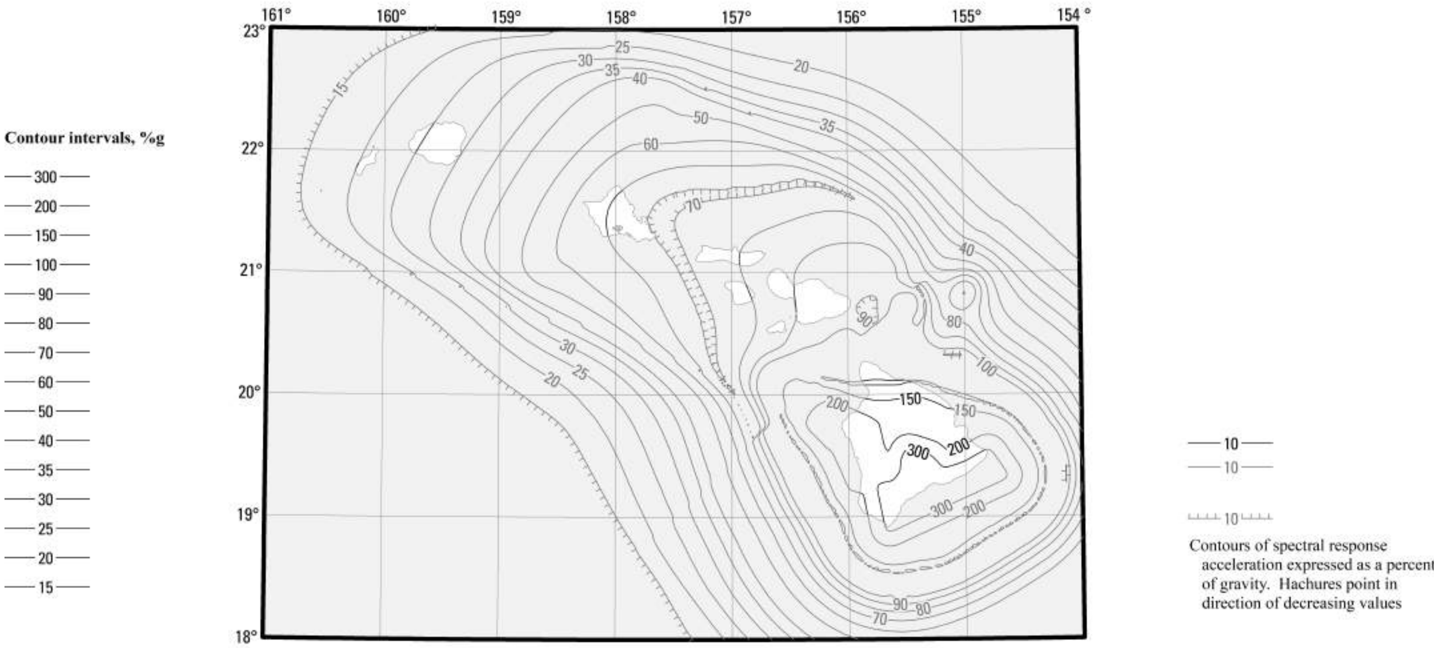
Building Seismic Safety Council, 2009, NEHRP Recommended Seismic Provisions for New Buildings and Other Structures: FEMA P-750/2009 Edition, Federal Emergency Management Agency, Washington, DC.

Huang, Yin-Nan, Whittaker, A.S., and Luco, Nicolas, 2008, Maximum spectral demands in the near-fault region, Earthquake Spectra, Volume 24, Issue 1, pp. 319-341.

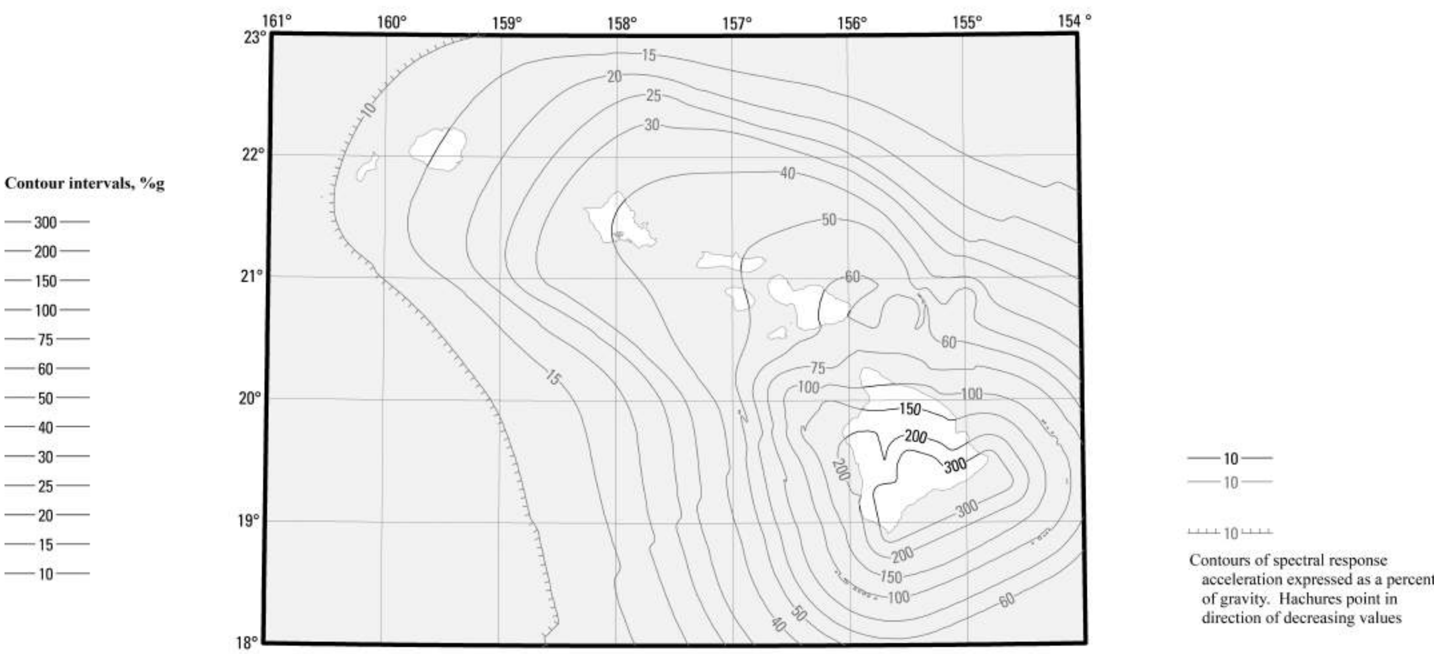
Klein, F., Frankel, A.D., Mueller, C.S., Wesson, R.L., and Okubo, P., 2001, Seismic hazard in Hawaii: high rate of large earthquakes and probabilistic ground-motion maps, Bulletin of the Seismological Society of America, Volume 91, pp. 479-498.

Luco, Nicolas, Ellingwood, B.R., Hamburger, R.O., Hooper, J.D., Kimball, J.K., and Kircher, C.A., 2007, Risk-Targeted versus Current Seismic Design Maps for the Conterminous United States, Structural Engineers Association of California 2007 Convention Proceedings, pp. 163-175.

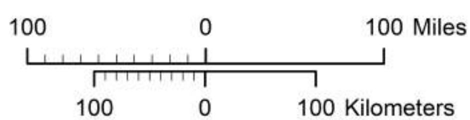
~~**FIGURE 1613.2.1(5) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR HAWAII OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)**~~



S_{MS}



S_{M1}



DISCUSSION

Maps prepared by the U.S. Geological Survey (USGS) using its 1998 National Seismic Hazard Model for Hawaii, the site-specific ground motion procedures of the 2020 NEHRP Recommended Seismic Provisions (Chapter 21), and the FEMA P-2078 procedures for developing multi-period response spectra of non-conterminous United States sites.

Larger, more detailed versions of these maps are not provided because it is recommended that corresponding web services be used to determine the mapped value for a specified location (e.g., see https://doi.org/10.5066/F7NK3C76).

Notes:

Maps prepared by USGS in collaboration with the FEMA-funded BSSC and ASCE. The basis is explained in commentaries prepared by BSSC and ASCE and in the references.

Ground motion values contoured on these maps incorporate:

a. A target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility, and

b. Deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the fault (1.8 is used to represent the 84th percentile response), but not less than 150% and 60% g for 0.2 and 1.0 s, respectively.

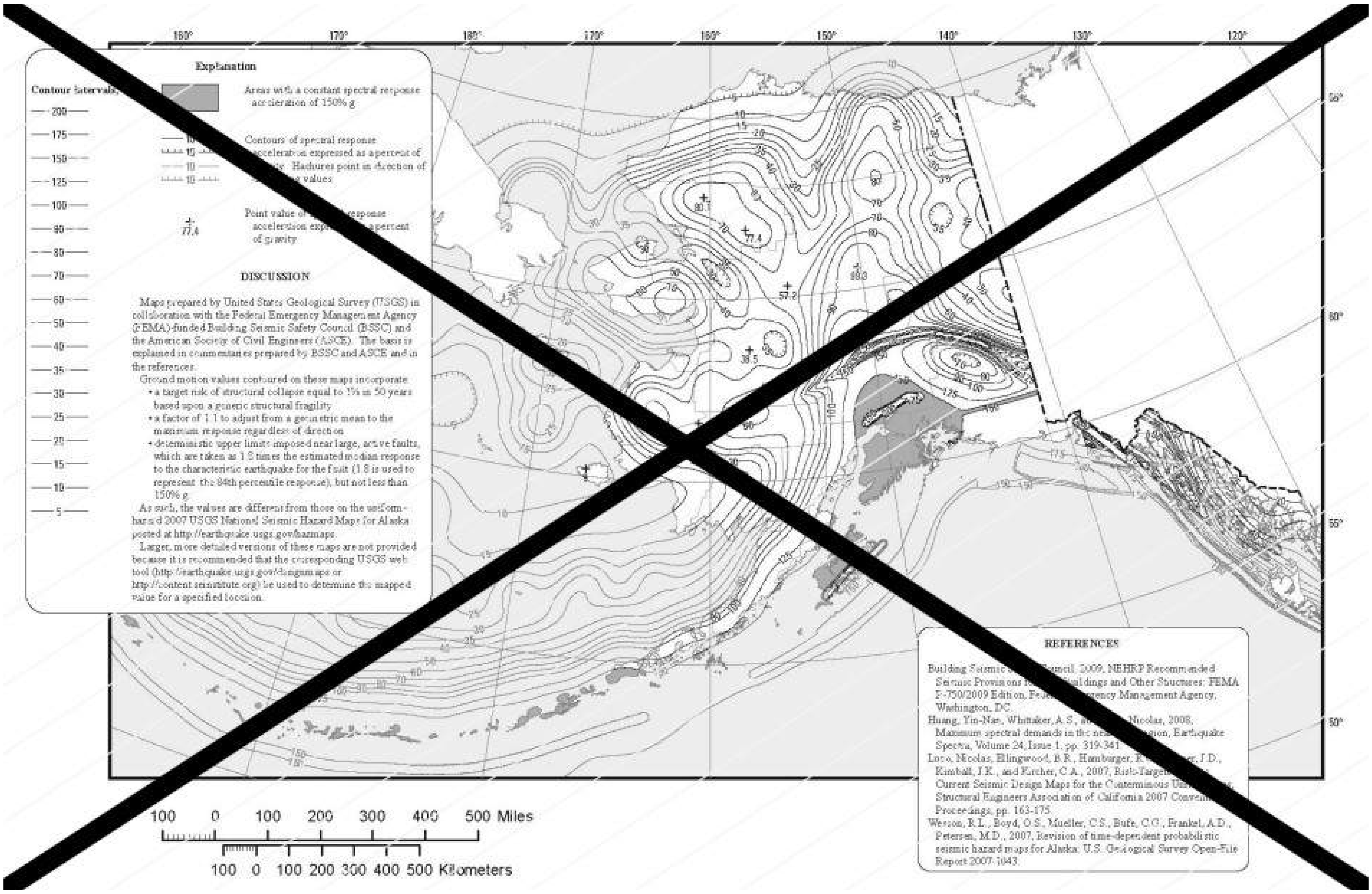
As such, the values are different from those on the uniform-hazard 1998 USGS National Seismic Hazard Maps for Hawaii posted at https://doi.org/10.5066/F7HT2MHG.

Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (https://doi.org/10.5066/F7NK3C76) be used
to determine the mapped value for a specified location.

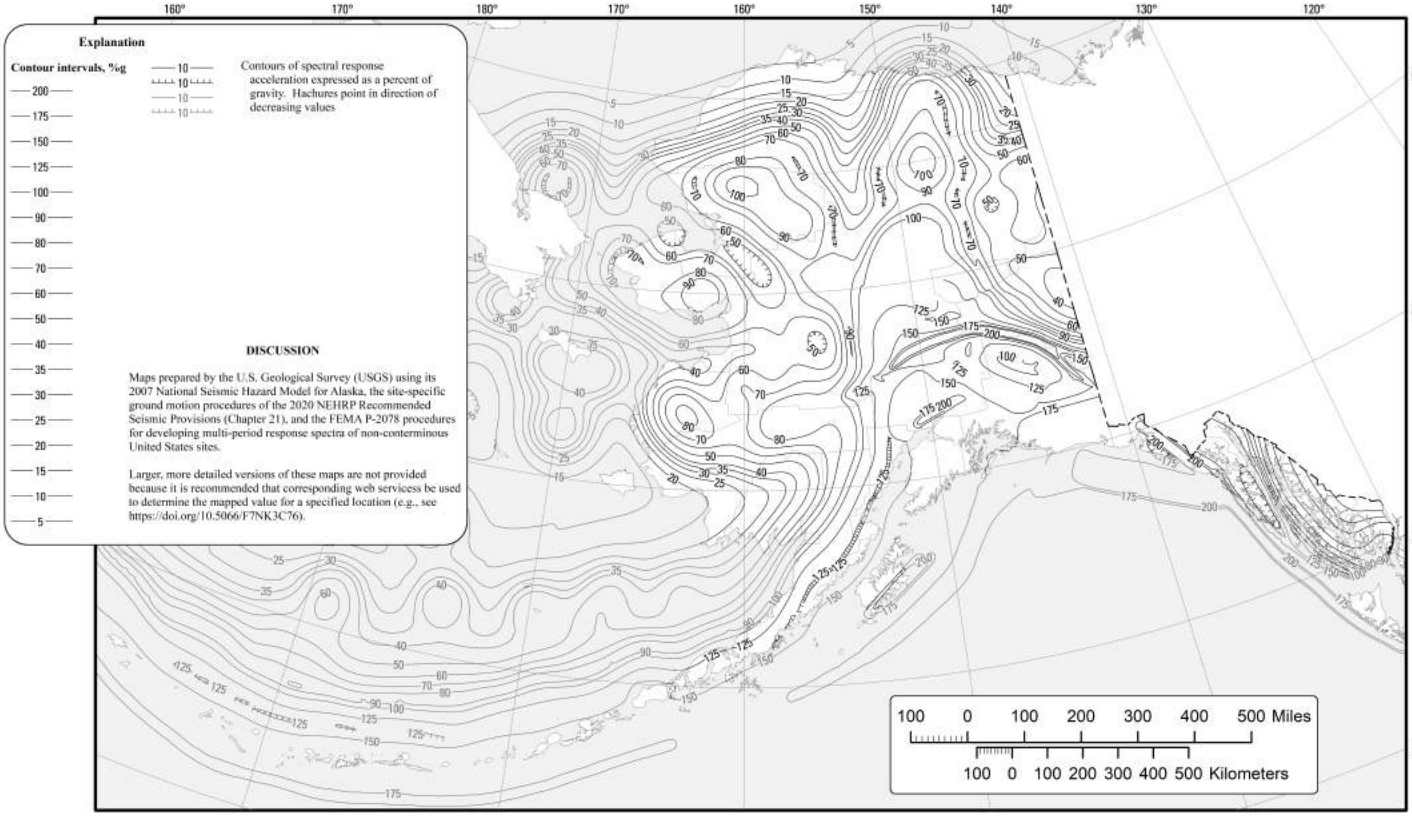
User Note: The USGS Seismic Design Geodatabase is available at the ASCE 7 Hazard Tool https://asce7hazardtool.online/ or an approved equivalent.

FIGURE 1613.2.1(5)

S_{MS} and S_{M1} for the default site conditions for Hawaii.



~~FIGURE 1613.2.1(6) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~



Notes:

Maps prepared by USGS in collaboration with the FEMA-funded BSSC and ASCE. The basis is explained in commentaries prepared by BSSC and ASCE and in the references. Ground motion values contoured on these maps incorporate:

a. A target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility,

b. A factor of 1.1 to adjust from a geometric mean to the maximum response regardless of direction, and

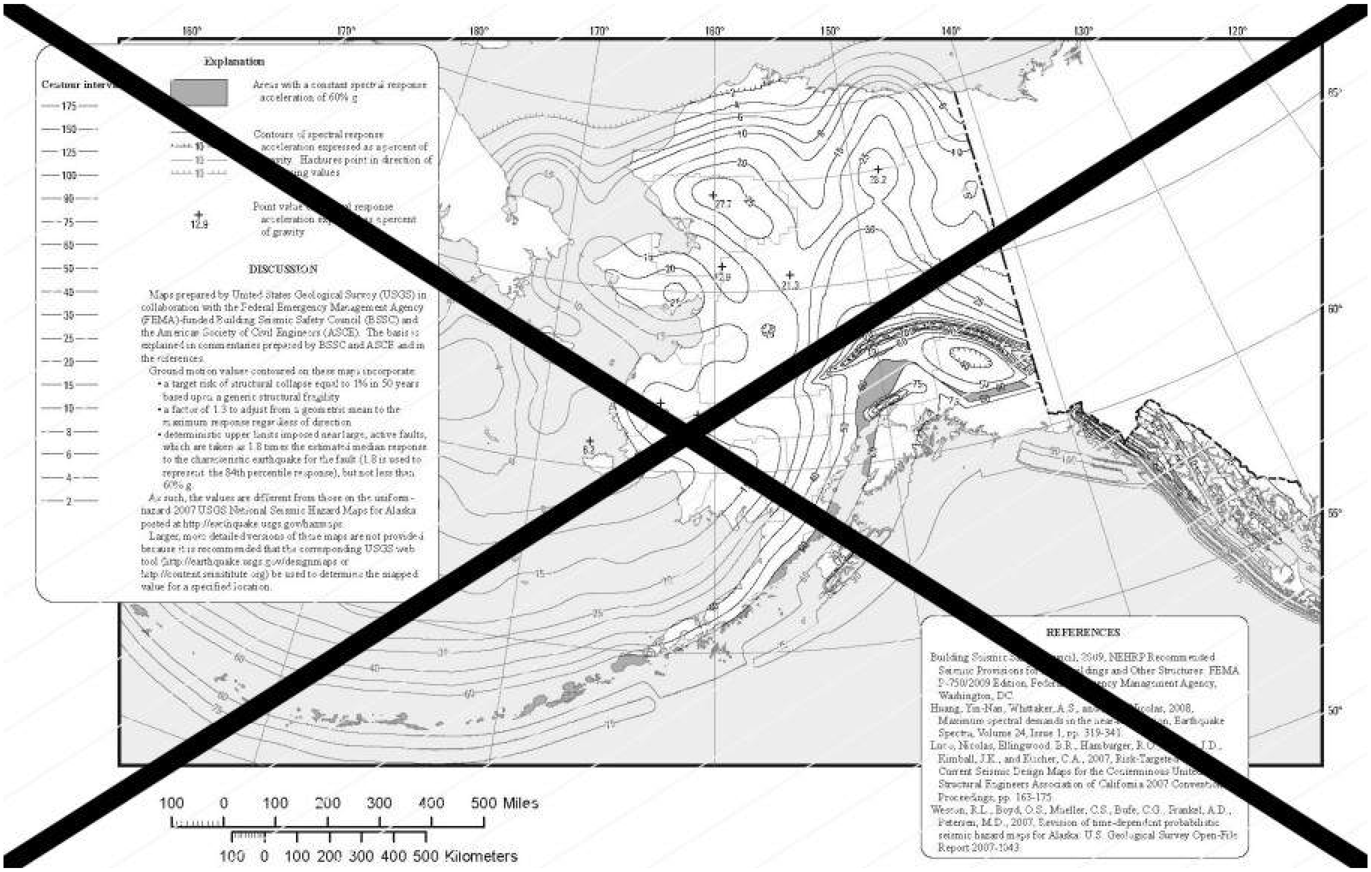
c. Deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the fault (1.8 is used to represent the 84th percentile response), but not less than 150% g.

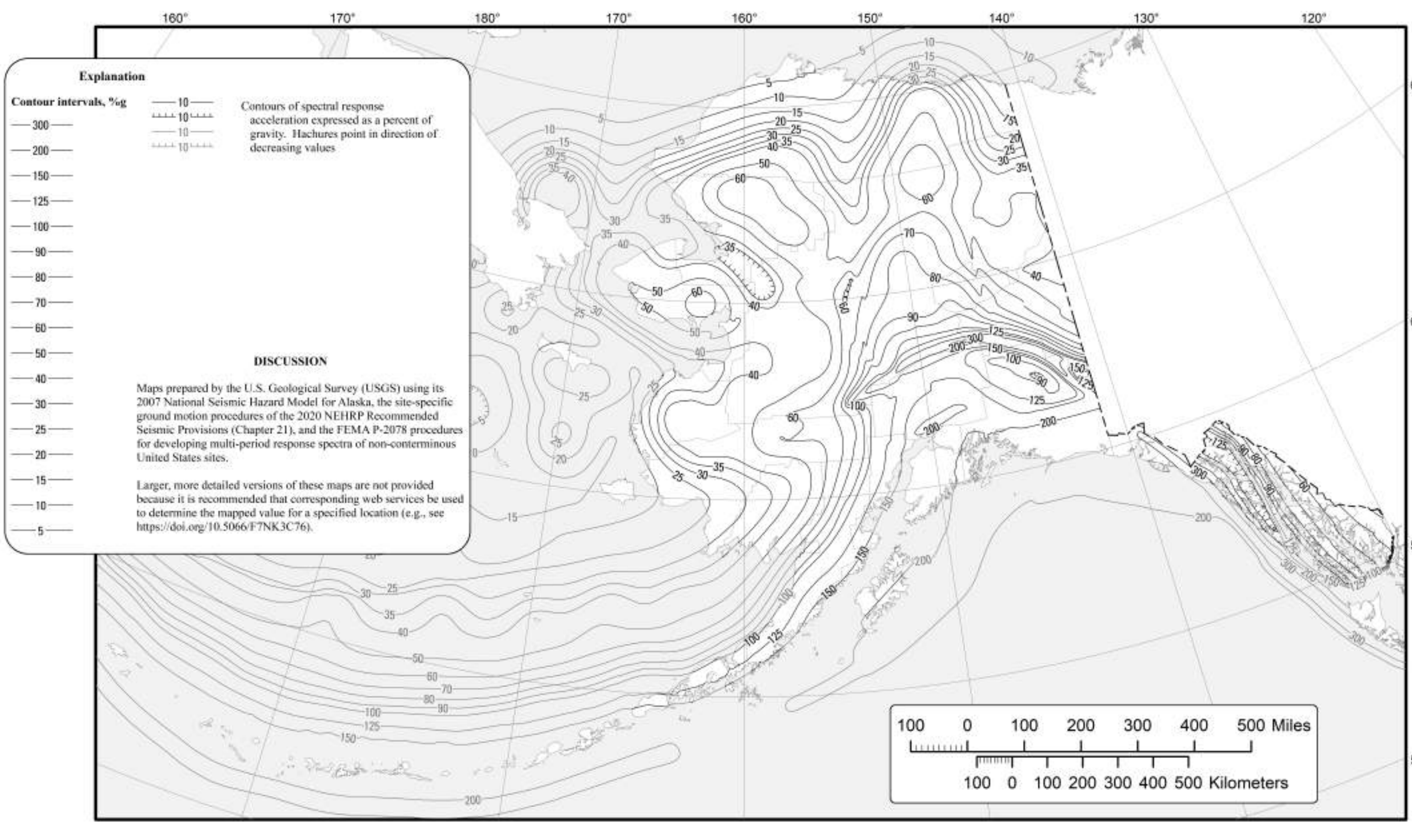
As such, the values are different from those on the uniform-hazard 2007 USGS National Seismic Hazard Maps for Alaska posted at https://doi.org/10.5066/F7HT2MHG.
Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (https://doi.org/10.5066/F7NK3C76) be used to determine the mapped value for a specified location.

User Note: The USGS Seismic Design Geodatabase is available at the ASCE 7 Hazard Tool https://asce7hazardtool.online/ or an approved equivalent.

FIGURE 1613.2.1(6)
S_{MS} for the default site conditions for Alaska.

Revise as follows:





Notes:

Maps prepared by USGS in collaboration with the FEMA-funded BSSC and ASCE. The basis is explained in commentaries prepared by BSSC and ASCE and in the references. Ground motion values contoured on these maps incorporate:

a. A target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility,

b. A factor of 1.3 to adjust from a geometric mean to the maximum response regardless of direction, and

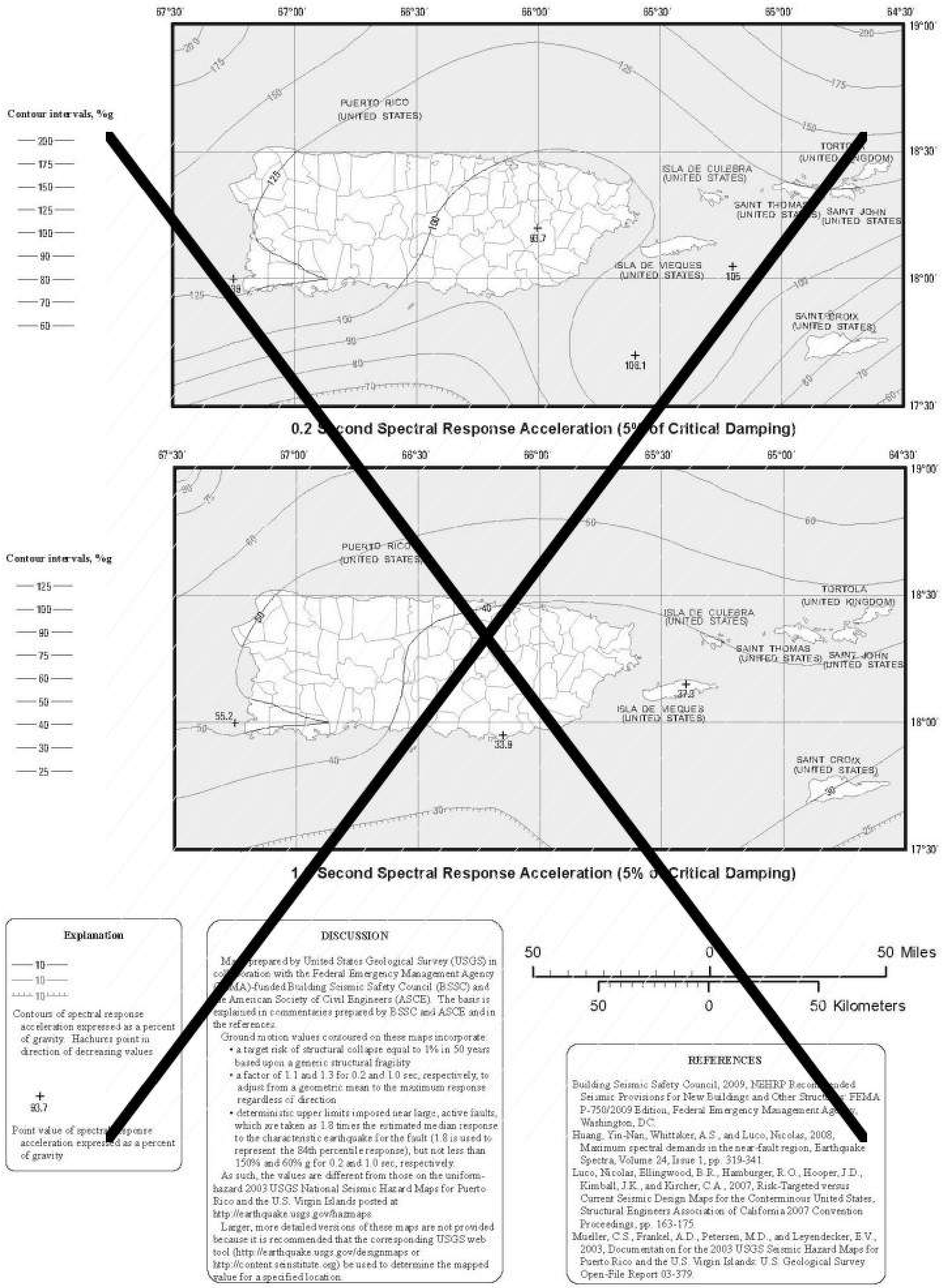
c. Deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the fault (1.8 is used to represent the 84th percentile response), but not less than 60% g.

As such, the values are different from those on the uniform-hazard 2007 USGS National Seismic Hazard Maps for Alaska posted at https://doi.org/10.5066/F7HT2MHG.
Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (https://doi.org/10.5066/F7NK3C76) be
used to determine the mapped value for a specified location.

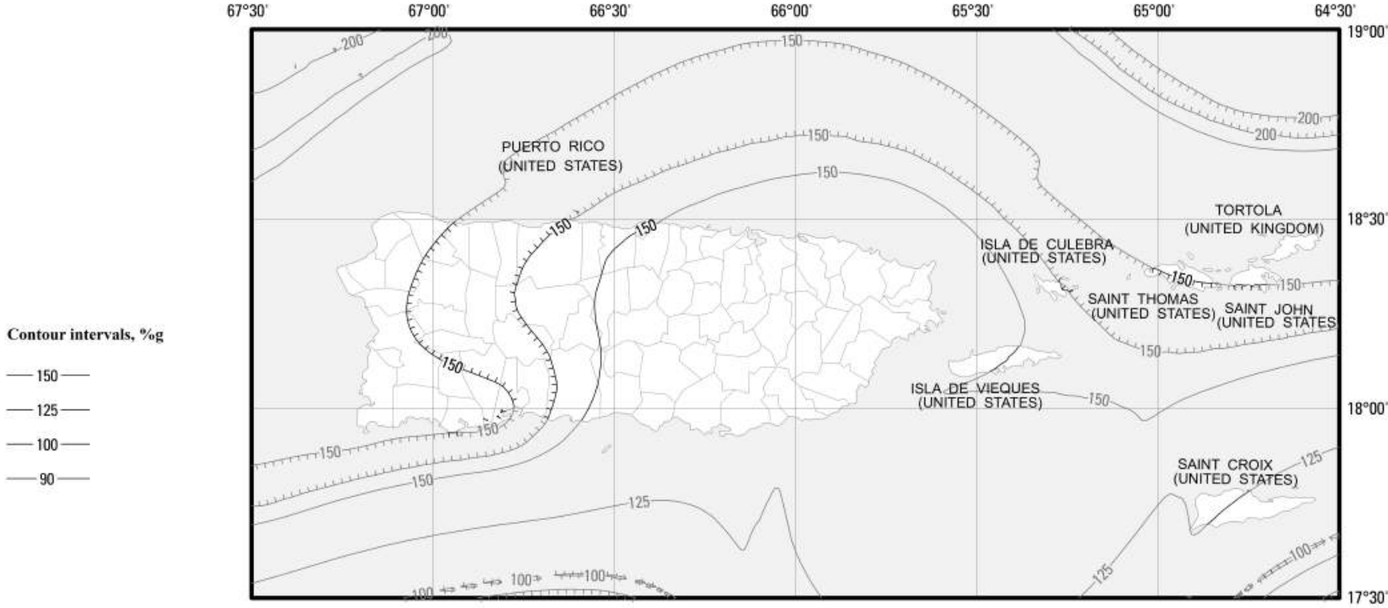
User Note: The USGS Seismic Design Geodatabase is available at the ASCE 7 Hazard Tool https://asce7hazardtool.online/ or an approved equivalent.

FIGURE 1613.2.1(7)
S_{M1} for the default site conditions for Alaska.

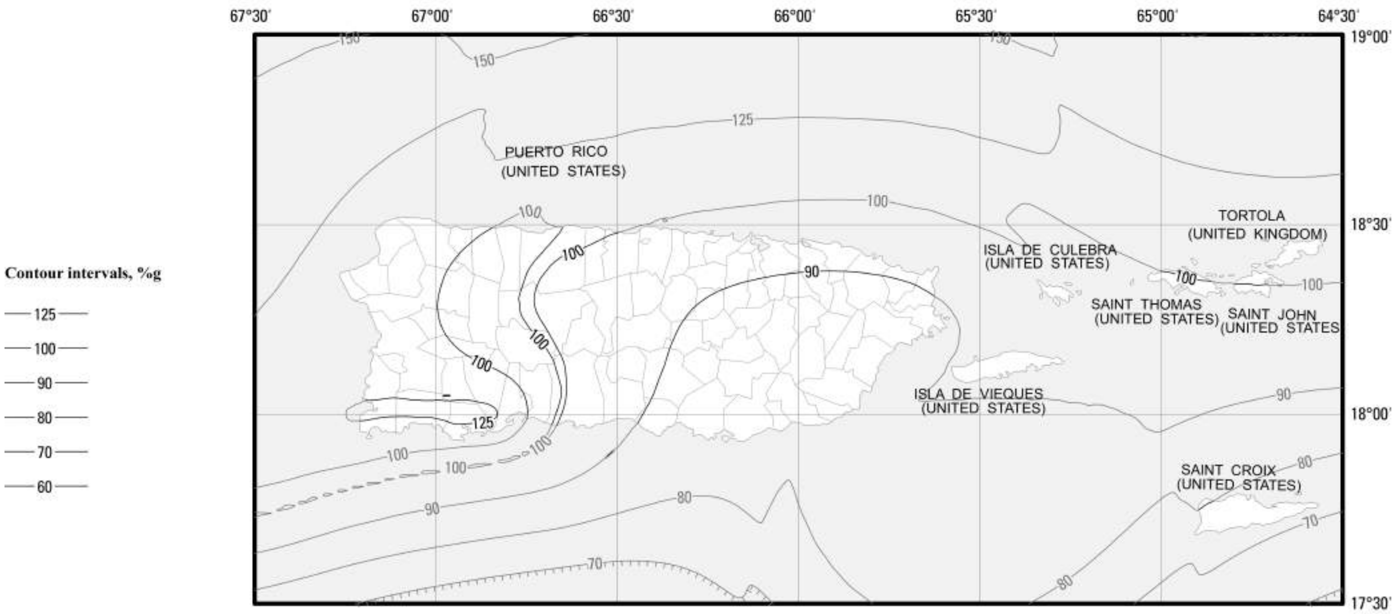
Delete and substitute as follows:



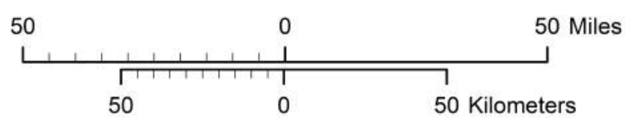
~~FIGURE 1613.2.1(8) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~



S_{MS}



S_{M1}



Explanation

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Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values

DISCUSSION

Maps prepared by the U.S. Geological Survey (USGS) using its 2003 National Seismic Hazard Model for Puerto Rico and the United States Virgin Islands, the site-specific ground motion procedures of the 2020 NEHRP Recommended Seismic Provisions (Chapter 21), and the FEMA P-2078 procedures for developing multi-period response spectra of non-conterminous United States sites.

Larger, more detailed versions of these maps are not provided because it is recommended that corresponding web servicess be used to determine the mapped value for a specified location (e.g., see https://doi.org/10.5066/F7NK3C76).

Notes:

Maps prepared by USGS in collaboration with the FEMA-funded BSSC and ASCE. The basis is explained in commentaries prepared by BSSC and

ASCE and in the references. Ground motion values contoured on these maps incorporate:

a. A target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility,

b. A factor of 1.1 and 1.3 for 0.2 and 1.0 s, respectively, to adjust from a geometric mean to the maximum response regardless of direction, and

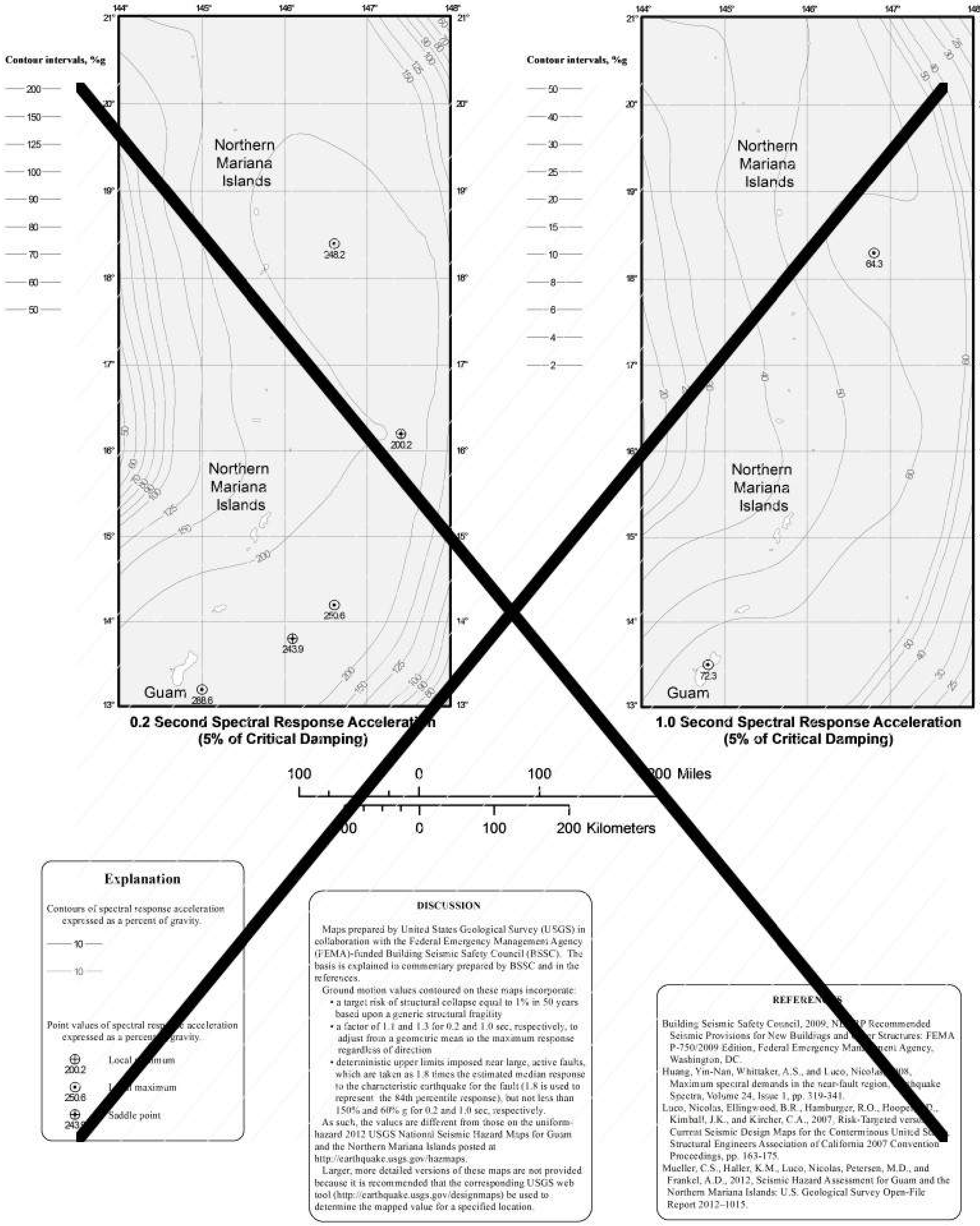
c. Deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the fault (1.8 is used to represent the 84th percentile response), but not less than 150% and 60% g for 0.2 and 1.0 s, respectively.

As such, the values are different from those on the uniform-hazard 2003 USGS National Seismic Hazard Maps for Puerto Rico and the US. Virgin Islands posted at
https://doi.org/10.5066/F7HT2MHG.
Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (https://doi.org/10.5066/F7NK3C76) be used to determine the mapped value for a specified location.

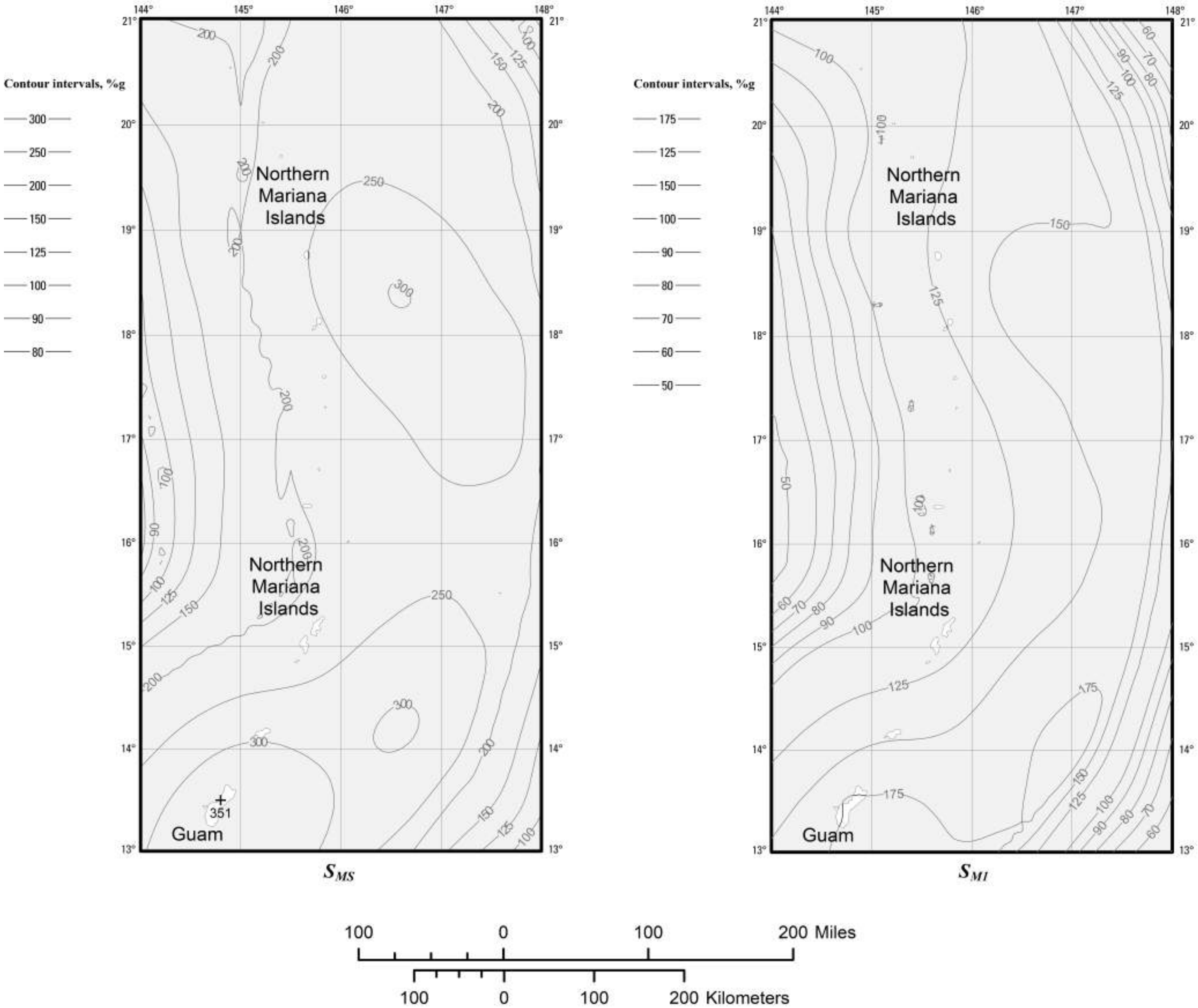
User Note: The USGS Seismic Design Geodatabase is available at the ASCE 7 Hazard Tool https://asce7hazardtool.online/ or an approved equivalent.

FIGURE 1613.2.1(8)

S_{MS} and S_{M1} for the default site conditions for Puerto Rico and the US Virgin Islands.



~~FIGURE 1613.2.1(9) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR GUAM AND THE NORTHERN MARIANA ISLANDS OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~



Explanation

Contours of spectral response acceleration expressed as a percent of gravity.

—10—

—10—

DISCUSSION

Maps prepared by the U.S. Geological Survey (USGS) using its 2012 National Seismic Hazard Model for Guam and the Northern Mariana Islands, the site-specific ground motion procedures of the 2020 NEHRP Recommended Seismic Provisions (Chapter 21), and the FEMA P-2078 procedures for developing multi-period response spectra of non-conterminous United States sites.

Larger, more detailed versions of these maps are not provided because it is recommended that corresponding web services be used to determine the mapped value for a specified location (e.g., see https://doi.org/10.5066/F7NK3C76).

<ins>Notes:</ins>

<ins>Maps prepared by USGS in collaboration with the FEMA-funded BSSC. The basis is explained in commentary prepared by BSSC and in the references.</ins>

<ins>Ground motion values contoured on these maps incorporate:</ins>

a. <ins>A target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility,</ins>

b. <ins>A factor of 1.1 and 1.3 for 0.2 and 1.0 s, respectively, to adjust from a geometric mean to the maximum response regardless of direction, and</ins>

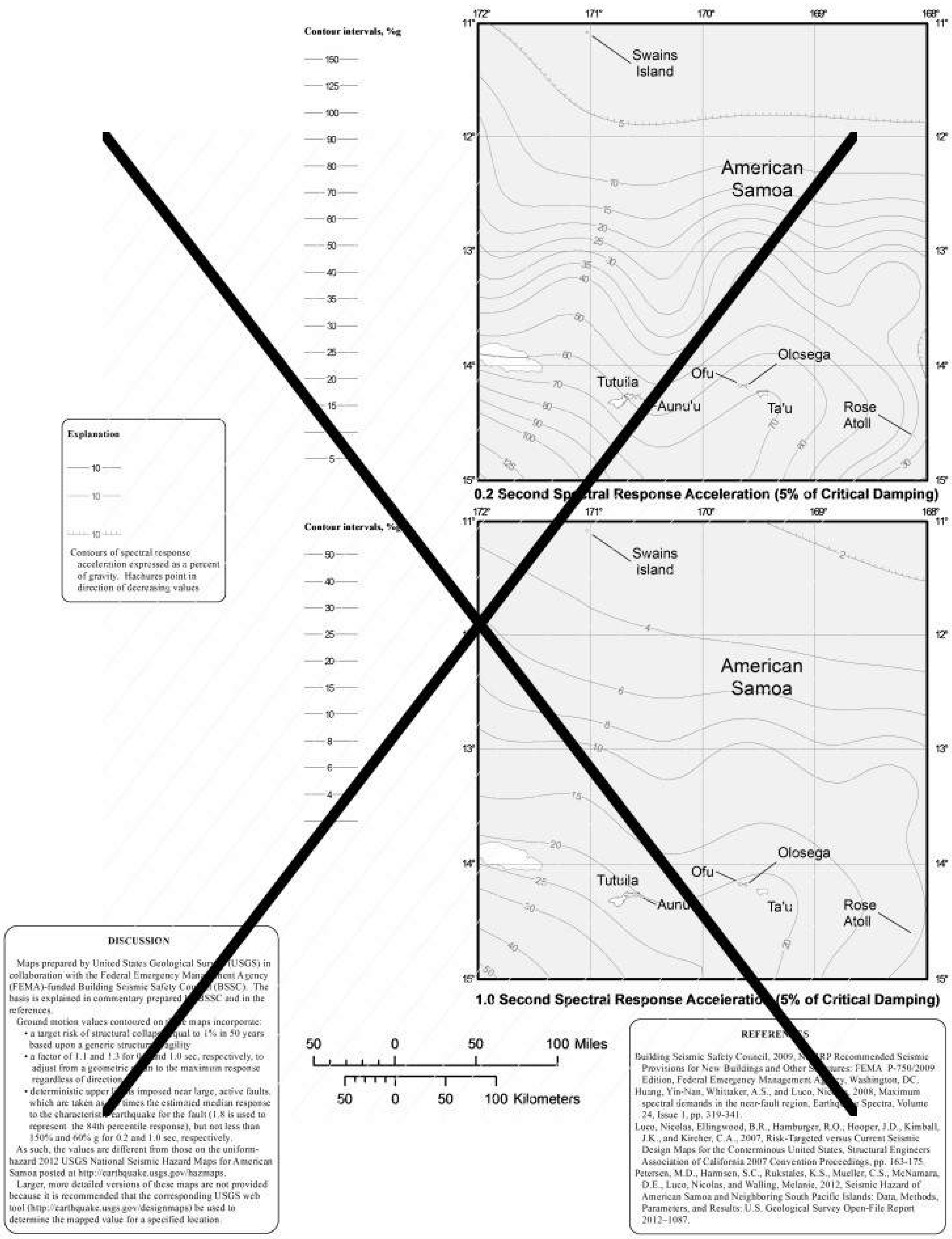
c. <ins>Deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the governing fault (1.8 is used to represent the 84th percentile response), but not less than 150% and 60% g for 0.2 and 1.0 s, respectively.</ins>

As such, the values are different from those on the uniform-hazard 2012 USGS National Seismic Hazard Maps for Guam and the Northern Mariana Islands posted at
https://doi.org/10.5066/F7HT2MHG.
Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (https://doi.org/10.5066/F7NK3C76) be
used to determine the mapped value for a specified location.

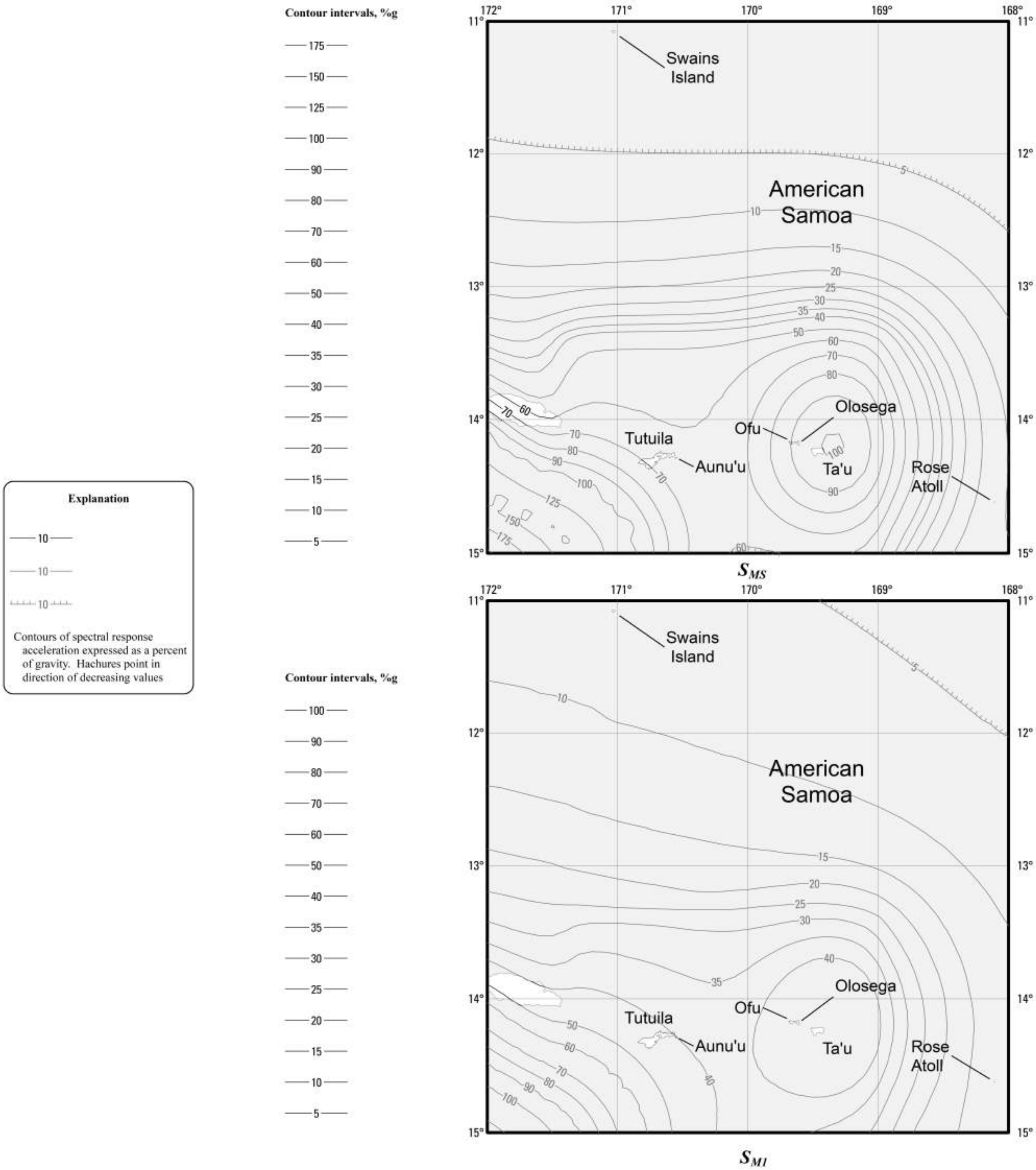
User Note: The USGS Seismic Design Geodatabase is available at the ASCE 7 Hazard Tool https://asce7hazardtool.online/ or an approved equivalent.

FIGURE 1613.2.1(9)

S_{MS} and S_{M1} for the default site conditions for Guam and the Northern Mariana Islands.



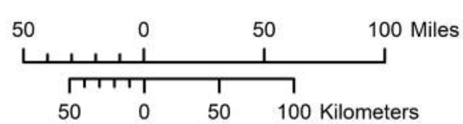
~~**FIGURE 1613.2.1(10) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR AMERICAN SAMOA OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)**~~



DISCUSSION

Maps prepared by the U.S. Geological Survey (USGS) using its 2012 National Seismic Hazard Model for American Samoa, the site-specific ground motion procedures of the 2020 NEHRP Recommended Seismic Provisions (Chapter 21), and the FEMA P-2078 procedures for developing multi-period response spectra of non-conterminous United States sites.

Larger, more detailed versions of these maps are not provided because it is recommended that corresponding web services be used to determine the mapped value for a specified location (e.g., see https://doi.org/10.5066/F7NK3C76).



Notes:

Maps prepared by USGS in collaboration with the FEMA-funded BSSC. The basis is explained in commentary prepared by BSSC and in the references. Ground motion values contoured on these maps incorporate:

a. A target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility,

b. A factor of 1.1 and 1.3 for 0.2 and 1.0 s, respectively, to adjust from a geometric mean to the maximum response regardless of direction, and

c. Deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the fault (1.8 is used to represent the 84th percentile response), but not less than 150% and 60% g for 0.2 and 1.0 s, respectively.

As such, the values are different from those on the uniform-hazard 2012 USGS National Seismic Hazard Maps for American Samoa posted at https://doi.org/10.5066/
F7HT2MHG.
Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (https://doi.org/10.5066/F7NK3C76) be used to determine the mapped value for a specified location.

User Note: The USGS Seismic Design Geodatabase is available at the ASCE 7 Hazard Tool https://asce7hazardtool.online/ or an approved equivalent.

FIGURE 1613.2.1(10)
S_{MS} and S_{M1} for the default site conditions for American Samoa.

Delete without substitution:

~~**1613.2.2 Site class definitions.** Based on the site soil properties, the site shall be classified as *Site Class* A, B, C, D, E or F in accordance with Chapter 20 of ASCE 7.~~
~~Where the soil properties are not known in sufficient detail to determine the site class, *Site Class* D, subjected to the requirements of Section 1613.2.3, shall be used unless the *building official* or geotechnical data determines that *Site Class* E or F soils are present at the site.~~

~~Where site investigations that are performed in accordance with Chapter 20 of ASCE 7 reveal rock conditions consistent with *Site Class* B, but site-specific velocity measurements are not made, the *site coefficients* F_a and F_v shall be taken at unity (1.0).~~

~~**1613.2.3 Site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters.** The maximum considered earthquake spectral response acceleration for short periods, S_{MS}, and at 1-second period, S_{M1}, adjusted for site class effects shall be determined by Equations 16-20 and 16-21, respectively:~~

$S_{MS} = F_a S_S$ ~~**(Equation 16-20)**~~

$S_{M1} = F_v S_1$ ~~**(Equation 16-21)**~~

~~but S_{MS} shall not be taken less than S_{M1} Except when determining the seismic design caregory in accordance with Section 1613.2.5.~~

~~where:~~

~~F_a = Site coefficient defined in Table 1613.2.3(1).~~

~~F_v = Site coefficient defined in Table 1613.2.3(2).~~

~~S_S = The mapped spectral accelerations for short periods as determined in Section 1613.2.1.~~

~~S_1 = The mapped spectral accelerations for a 1-second period as determined in Section 1613.2.1.~~

~~Where *Site Class* D is selected as the default site class per Section 1613.2.2, the value of F_a shall be not less than 1.2. Where the simplified design procedure of ASCE 7 Section 12.14 is used, the value of F_a shall be determined in accordance with ASCE 7 Section 12.14.8.1, and the values of F_v, S_{MS} and S_{M1} need not be determined.~~

~~TABLE 1613.2.3(1) VALUES OF SITE COEFFICIENT F_a~~ ~~[a]~~

~~SITE CLASS~~	~~MAPPED RISK TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) SPECTRAL RESPONSE ACCELERATION PARAMETER AT SHORT PERIOD~~					
	~~$S_s \le 0.25$~~	~~$S_s = 0.50$~~	~~$S_s = 0.75$~~	~~$S_s = 1.00$~~	~~$S_s = 1.25$~~	~~$S_s \ge 1.5$~~
~~A~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~
~~B~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~
~~C~~	~~1.3~~	~~1.3~~	~~1.2~~	~~1.2~~	~~1.2~~	~~1.2~~
~~D~~	~~1.6~~	~~1.4~~	~~1.2~~	~~1.1~~	~~1.0~~	~~1.0~~
~~E~~	~~2.4~~	~~1.7~~	~~1.3~~	~~Note b~~	~~Note b~~	~~Note b~~
~~F~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~

~~a. Use straight-line interpolation for intermediate values of mapped spectral response acceleration at short period, S_s.~~

~~b. Values shall be determined in accordance with Section 11.4.8 of ASCE 7.~~

~~TABLE 1613.2.3(2) VALUES OF SITE COEFFICIENT F_V[a]~~

~~SITE CLASS~~	~~MAPPED RISK TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) SPECTRAL RESPONSE ACCELERATION PARAMETER AT 1-SECOND PERIOD~~					
	~~$S_1 \le 0.1$~~	~~$S_1 = 0.2$~~	~~$S_1 = 0.3$~~	~~$S_1 = 0.4$~~	~~$S_1 = 0.5$~~	~~$S_1 \ge 0.6$~~
~~A~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~
~~B~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~
~~C~~	~~1.5~~	~~1.5~~	~~1.5~~	~~1.5~~	~~1.5~~	~~1.4~~
~~D~~	~~2.4~~	~~2.2[c]~~	~~2.0[c]~~	~~1.9[c]~~	~~1.8[c]~~	~~1.7[c]~~
~~E~~	~~4.2~~	~~3.3[c]~~	~~2.8[c]~~	~~2.4[c]~~	~~2.2[c]~~	~~2.0[c]~~
~~F~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~

~~a. Use straight-line interpolation for intermediate values of mapped spectral response acceleration at 1-second period, S_1.~~

~~b. Values shall be determined in accordance with Section 11.4.8 of ASCE 7.~~

~~c. See requirements for site-specific ground motions in Section 11.4.8 of ASCE 7.~~

Revise as follows:

1613.2.~~4~~ 2 Design spectral response acceleration parameters. Five-percent damped design spectral response acceleration at short periods, S_{DS}, and at 1-second period, S_{D1}, shall be determined from Equations 16-~~22~~ 20 and Equation 16-~~23~~ 21, respectively:

$$S_{DS} = \frac{2}{3}S_{MS}$$

(Equation 16-~~22~~ 20)

$$S_{D1} = \frac{2}{3}S_{M1}$$

(Equation 16-~~23~~ 21)

where:

S_{MS} = The maximum considered earthquake spectral response accelerations for short period as determined in Section 1613.2.~~3~~ 1.

S_{M1} = The maximum considered earthquake spectral response accelerations for 1-second period as determined in Section 1613.2.~~3~~ 1.

1613.2.~~5~~ 3 Determination of seismic design category. Structures classified as *Risk Category* I, II or III that are located where the mapped spectral response acceleration parameter at 1-second period, S_1, is greater than or equal to 0.75 shall be assigned to *Seismic Design Category* E. Structures classified as *Risk Category* IV that are located where the mapped spectral response acceleration parameter at 1-second period, S_1, is greater than or equal to 0.75 shall be assigned to *Seismic Design Category* F. It shall be permitted to use the values of S_{M1} obtained from Figures 1613.2.1 (1) through 1613.2.2 (10) in lieu of S_1 to determine *seismic design category*. Other structures shall be assigned to a *seismic design category* based on their *risk category* and the design spectral response acceleration parameters, S_{DS} and S_{D1}, determined in accordance with Section 1613.2.~~4~~ 2 or the site-specific procedures of ASCE 7. Each building and structure shall be assigned to the more severe *seismic design category* in accordance with Table 1613.2.~~5~~ 3(1) or 1613.2.~~5~~ 3(2), irrespective of the fundamental period of vibration of the structure, *T*.
User Note: It is recommended that the USGS web tool (https://doi.org/10.5066/F7NK3C76) be used to determine the mapped parameter values for a specified location, including S_1. The USGS mapped values from the USGS web tool are available from the ASCE 7 Hazard Tool https://asce7hazardtool.online/ or an approved equivalent.

TABLE 1613.2.~~5~~ 3(1) SEISMIC DESIGN CATEGORY BASED ON SHORT-PERIOD (0.2 second) RESPONSE ACCELERATION

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

TABLE 1613.2.~~5~~ 3(2) SEISMIC DESIGN CATEGORY BASED ON 1-SECOND PERIOD RESPONSE ACCELERATION

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \leq S_{D1} < 0.133g$	B	B	C
$0.133g \leq S_{D1} < 0.20g$	C	C	D
$0.20g \leq S_{D1}$	D	D	D

1613.2.~~5~~ 3.1 Alternative seismic design category determination. Where S_1 is less than 0.75, the *seismic design category* is permitted to be determined from Table 1613.2.~~5~~ 3(1) alone where all of the following apply:

1. In each of the two *orthogonal* directions, the approximate fundamental period of the structure, T_a, in each of the two *orthogonal* directions determined in accordance with Section 12.8.2.1 of ASCE 7, is less than 0.8 T_s determined in accordance with Section ~~11.8.6~~ 11.4.5.2 of ASCE 7.
2. In each of the two *orthogonal* directions, the fundamental period of the structure used to calculate the *story* drift is less than T_s.
3. Equation 12.8-2 of ASCE 7 is used to determine the seismic response coefficient, C_s.
4. The *diaphragms* are rigid or are permitted to be idealized as rigid in accordance with Section 12.3.1 of ASCE 7 or, for *diaphragms* permitted to be idealized as flexible in accordance with Section 12.3.1 of ASCE 7, the distances between vertical elements of the *seismic force-resisting system* do not exceed 40 feet (12 192 mm).

1613.2.~~5~~ 3.2 Simplified design procedure. Where the alternate simplified design procedure of ASCE 7 is used, the *seismic design category* shall be determined in accordance with ASCE 7.

1613.3 Ballasted photovoltaic panel systems. Ballasted, roof-mounted *photovoltaic panel systems* need not be rigidly attached to the roof or supporting structure. Ballasted non-penetrating systems shall be designed and installed only on roofs with slopes not more than one unit vertical in 12 units horizontal. Ballasted nonpenetrating systems shall be designed to resist sliding and uplift resulting from lateral and vertical forces as required by Section 1605, using a coefficient of friction determined by acceptable engineering principles. In structures assigned to *Seismic Design Category* C, D, E or F, ballasted nonpenetrating systems shall be designed to accommodate seismic displacement determined by nonlinear response-hi *story* or other *approved* analysis or shake-table testing, using input motions consistent with ASCE 7 lateral and vertical seismic forces for nonstructural components on roofs.

Staff Analysis: CC# S127-22 and CC# S128-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 *Minimum Design Loads and Associated Criteria for Buildings and Other Structures* (ASCE/SEI 7-22). The ASCE/SEI 7 maps introduces the use of multi-period response spectra (MPRS), to improve the accuracy of the frequency content of earthquake design ground motions and to enhance the reliability of the seismic design parameters derived from these ground motions. These improvements make better use of the available earth science, which has, in general, sufficiently advanced to accurately define spectral response for different site conditions over a broad range of periods. The result of the MPRS is to incorporate increased spectral demand for structures with mid-range fundamental periods on soft-soil sites where ground motion hazard is dominated by large magnitude events. Use of MPRS eliminates the need for site-specific hazard analysis, as required by ASCE 7-16.
In summary, the new maps that have been proposed for inclusion into Section 1613 for the spectral response acceleration parameters S_{MS} and $S_{M1}$for default site conditions are the same maps that are included in ASCE/SEI 7-22. These parameter maps replace the former S_s and S_1 maps because, in ASCE/SEI 7-22, site amplification is included directly in the derivation of values for S_{MS} and S_{M1} by the U.S. Geological Survey (USGS), using the 2018 National Seismic Hazard Model (NSHM) for the conterminous U.S. and the FEMA P-2078 procedures for the states and territories outside of the conterminous U.S.

These new maps have been developed for the default site class, which is the more critical spectral response of Site Class C, CD and D for design when soil properties are not known in sufficient detail to determine the site class. This is, in concept, consistent with ASCE 7-16 which effectively requires the more critical of Site Class C and D to be used for design when soil properties are not known in sufficient detail to determine the site class. For sites where Site Class DE, E, or F soils are present, the spectral response acceleration parameters need to be determined in accordance with ASCE/SEI 7.

Note that it shall be permitted to use the values of S_{M1} obtained from Figure 1613.2.1(1) through 1613.2.1(10) in lieu of S_1 to determine the seismic design category in Section 1613 (as this is conservative) and that these new S_{MS} and S_{M1}parameters are still sufficient to assign the building's seismic design category per newly renumbered Section 1613.2.3.

A summary of the coordination changes is provided below.

Section 1613.1 Scope – The second half of Exception 1 is deleted in this proposal because the short-period spectral response acceleration (S_s) maps are no longer needed. The exception for one- and two-family dwellings will be based solely on being assigned to *Seismic Design Category* A, B or C.

Section 1613.2.1 Mapped acceleration parameters

is being renamed to **Risk-Targeted Maximum Considered Earthquake (MCE_R) spectral response acceleration parameters** to be consistent with the information being provided in the updated S_{MS} and S_{M1} maps that are being reproduced from ASCE/SEI 7-22. Maps for the short-period spectral acceleration parameter S_s, and the 1-second spectral acceleration parameter, S_1, are no longer being generated.

Section 1613.2.3 Determination of seismic design category

has only minor renumbering changes due deletions of other sections. The resulting seismic design category for default site conditions are conservative if the site class is known to be A, B, BC, C, CD, or D. ASCE/SEI 7-22 can be used in these cases.

Given the above, **Section 1613.2.2 Site class definitions** and **Section 613.2.3 Site Coefficients and adjusted maximum considered earthquake spectral response acceleration parameters** are no longer needed and are deleted in this proposal.

Finally, **Tables 1613.2.3(1) and Table 1613.2.3(2)**, the F_a and F_v tables, are also deleted since these site amplification factors are no longer needed.

The remaining sections are renumbered to be consistent with these deletions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal coordinates the IBC with the referenced design load standard *ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures*. ASCE/SEI 7 will be updated to the 2022 edition from the 2016 edition as an Administrative Update to the 2024 I-Codes.

The code change proposal will slightly increase the cost of construction in some regions and slightly decrease it in other regions due to regional updates in the seismic hazard model. In aggregate, the cost of construction is not changed.

Specifically, any impact on construction cost, as reflected in design loads, will vary by site location, spectral response period and site class. For certain combinations of site location, spectral response period and site class, proposed design spectral acceleration parameter values (S_{DS} and S_{D1}) are larger than those of ASCE 7-16, while for other combinations of site location, spectral response period and site class, proposed values of S_{DS} and S_{D1} are smaller than those of ASCE 7-16. However, parameter values of S_{MS} and S_{M1} (which are used to determine design loads) included in ASCE 7-22 are generally within +/-15% of those of ASCE 7-16 for sites in the conterminous US assuming default site conditions.

S127-22

S128-22

IBC: 1613.1, 1613.2, 1613.2.1, FIGURE 1613.2.1(1), FIGURE 1613.2.1(2), FIGURE 1613.2.1(3), FIGURE 1613.2.1(5), FIGURE 1613.2.1(6), FIGURE 1613.2.1(7), FIGURE 1613.2.1(8), FIGURE 1613.2.1(9), FIGURE 1613.2.1(10), 1613.2.2, 1613.2.3, TABLE 1613.2.3(1), TABLE 1613.2.3(2), 1613.2.4, 1613.2.5, TABLE 1613.2.5(1), TABLE 1613.2.5(2), 1613.2.5.1, 1613.2.5.2, 1613.3, SECTION 202, 1810.3.9.4.2.1, 1603.1.5, J104.4, L101.1

Proponents: Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov); John Hooper, representing ATC/FEMA SCSC (jhooper@mka.com); Sanaz Rezaeian, representing USGS (srezaeian@usgs.gov); Nicolas Luco, representing U.S. Geological Survey

2021 International Building Code

Revise as follows:

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable. The *seismic design category* for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

Exceptions:

1. Detached one- and two-family dwellings, assigned to *Seismic Design Category* A, B or C. ~~, or located where the mapped short-period spectral response acceleration,~~ ~~S_S,~~ ~~is less than 0.4 g.~~
2. The *seismic force-resisting system* of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. References within ASCE 7 to Chapter 14 shall not apply, except as specifically required herein.

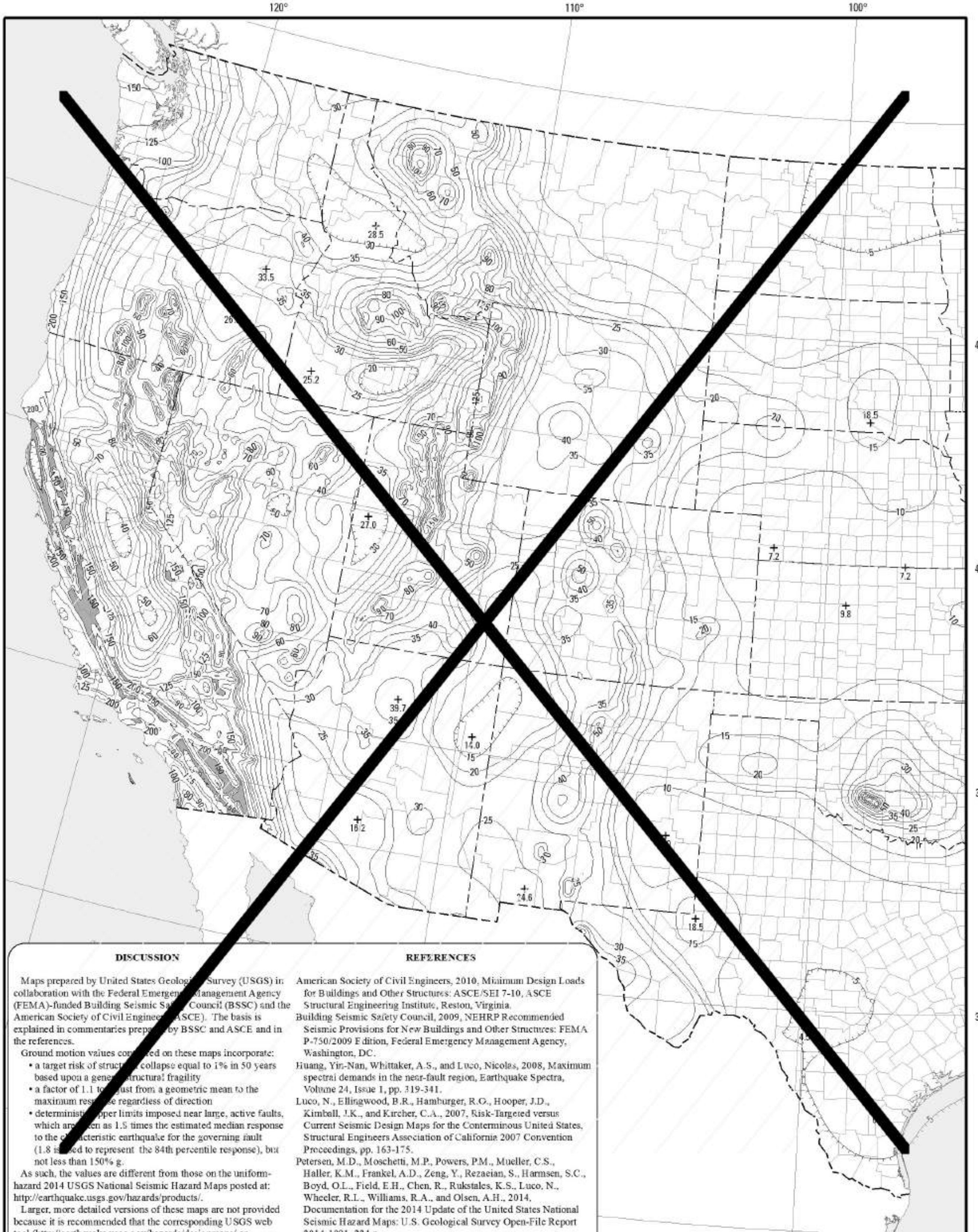
1613.2 Determination of *Seismic Design Category* ~~**Seismic ground motion values**~~**.** Structures shall be assigned to a *Seismic Design Category* based on one of the following methods unless the authority having jurisdiction or geotechnical data determines that *Site Class* DE, E or F soils are present at the site. Where S*ite Class* DE, E or F soils are present, the *Seismic Design Category* shall be determined in accordance with ASCE 7. Seismic ground motion values shall be determined in accordance with this section.

1. Using Figures 1613.2(1) through 1613.2(6) based on the structure *Risk Category*, or
2. Determined in accordance with ASCE 7.

Delete without substitution:

~~**1613.2.1 Mapped acceleration parameters.**~~ ~~The parameters S_S and S_1 shall be determined from the 0.2 and 1-second spectral response accelerations shown on Figures 1613.2.1(1) through 1613.2.1(10). Where S_1 is less than or equal to 0.04 and S_S is less than or equal to 0.15, the structure is permitted to be assigned *Seismic Design Category* A.~~

Delete and substitute as follows:



DISCUSSION

Maps prepared by United States Geolog... Survey (USGS) in collaboration with the Federal Emergen... Management Agency (FEMA)-funded Building Seismic Sa... Council (BSSC) and the American Society of Civil Enginee... (ASCE). The basis is explained in commentaries prep... by BSSC and ASCE and in the references.

Ground motion values co... ed on these maps incorporate:

- a target risk of struct... collapse equal to 1% in 50 years based upon a gene... structural fragility
- a factor of 1.1 to ...ust from a geometric mean to the maximum res...e regardless of direction
- determinist... pper limits imposed near large, active faults, which are ...en as 1.5 times the estimated median response to the c...cteristic earthquake for the governing fault (1.8 is ...ed to represent the 84th percentile response), but not less than 150% g.

As such, the values are different from those on the uniform-hazard 2014 USGS National Seismic Hazard Maps posted at: http://earthquake.usgs.gov/hazards/products/.

Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (http://earthquake.usgs.gov/hazards/designmaps/ or http://content.seinstitute.org) be used to determine the mapped value for a specified location.

REFERENCES

American Society of Civil Engineers, 2010, Minimum Design Loads for Buildings and Other Structures: ASCE/SEI 7-10, ASCE Structural Engineering Institute, Reston, Virginia.

Building Seismic Safety Council, 2009, NEHRP Recommended Seismic Provisions for New Buildings and Other Structures: FEMA P-750/2009 Edition, Federal Emergency Management Agency, Washington, DC.

Huang, Yin-Nan, Whittaker, A.S., and Luco, Nicolas, 2008, Maximum spectral demands in the near-fault region, Earthquake Spectra, Volume 24, Issue 1, pp. 319-341.

Luco, N., Ellingwood, B.R., Hamburger, R.O., Hooper, J.D., Kimball, J.K., and Kircher, C.A., 2007, Risk-Targeted versus Current Seismic Design Maps for the Conterminous United States, Structural Engineers Association of California 2007 Convention Proceedings, pp. 163-175.

Petersen, M.D., Moschetti, M.P., Powers, P.M., Mueller, C.S., Haller, K.M., Frankel, A.D., Zeng, Y., Rezaeian, S., Harmsen, S.C., Boyd, O.L., Field, E.H., Chen, R., Rukstales, K.S., Luco, N., Wheeler, R.L., Williams, R.A., and Olsen, A.H., 2014, Documentation for the 2014 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 2014-1091, 224 p.

~~FIGURE 1613.2.1(1) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

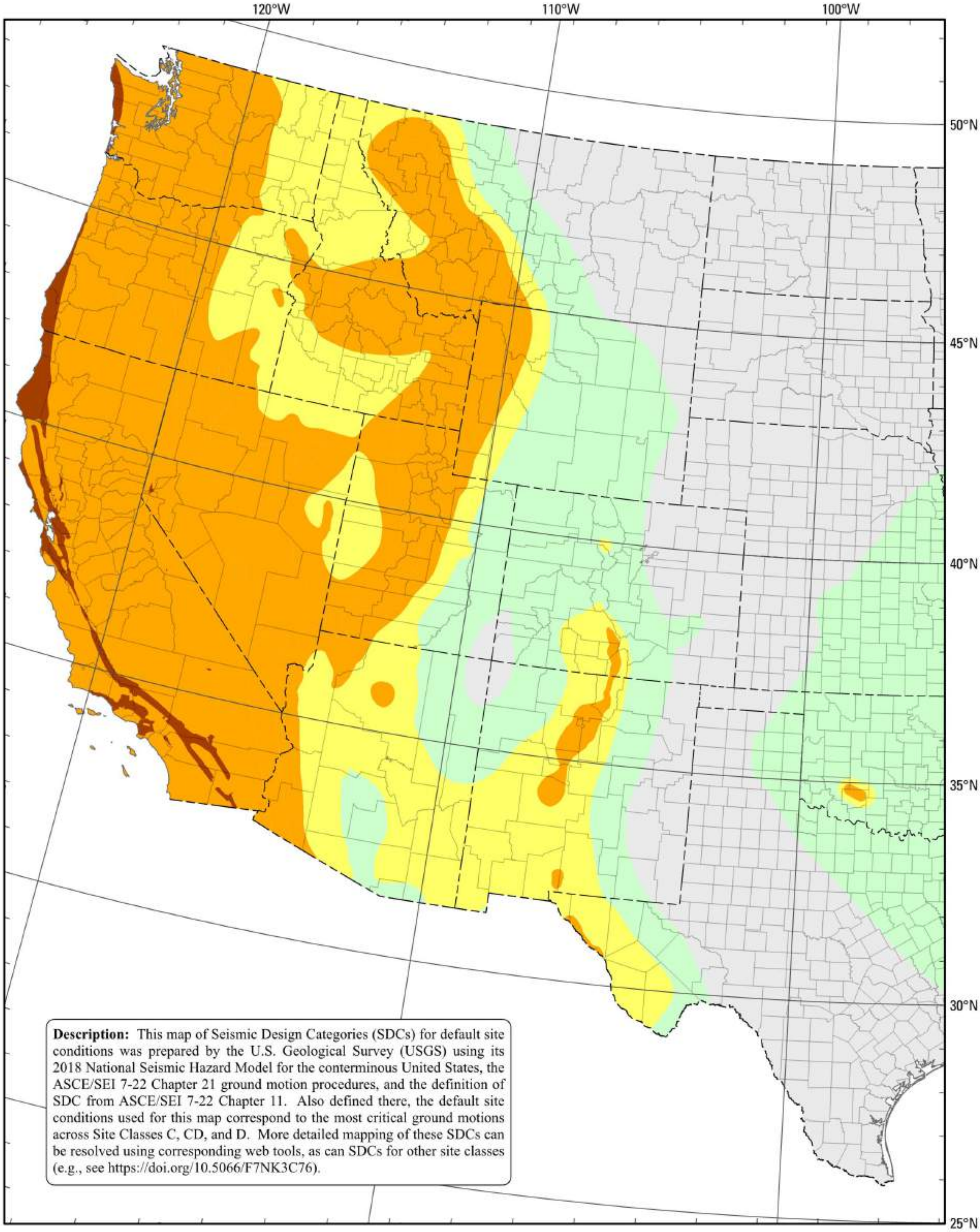


FIGURE 1613.2.1(1) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR THE CONTERMINOUS UNITED STATES RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)

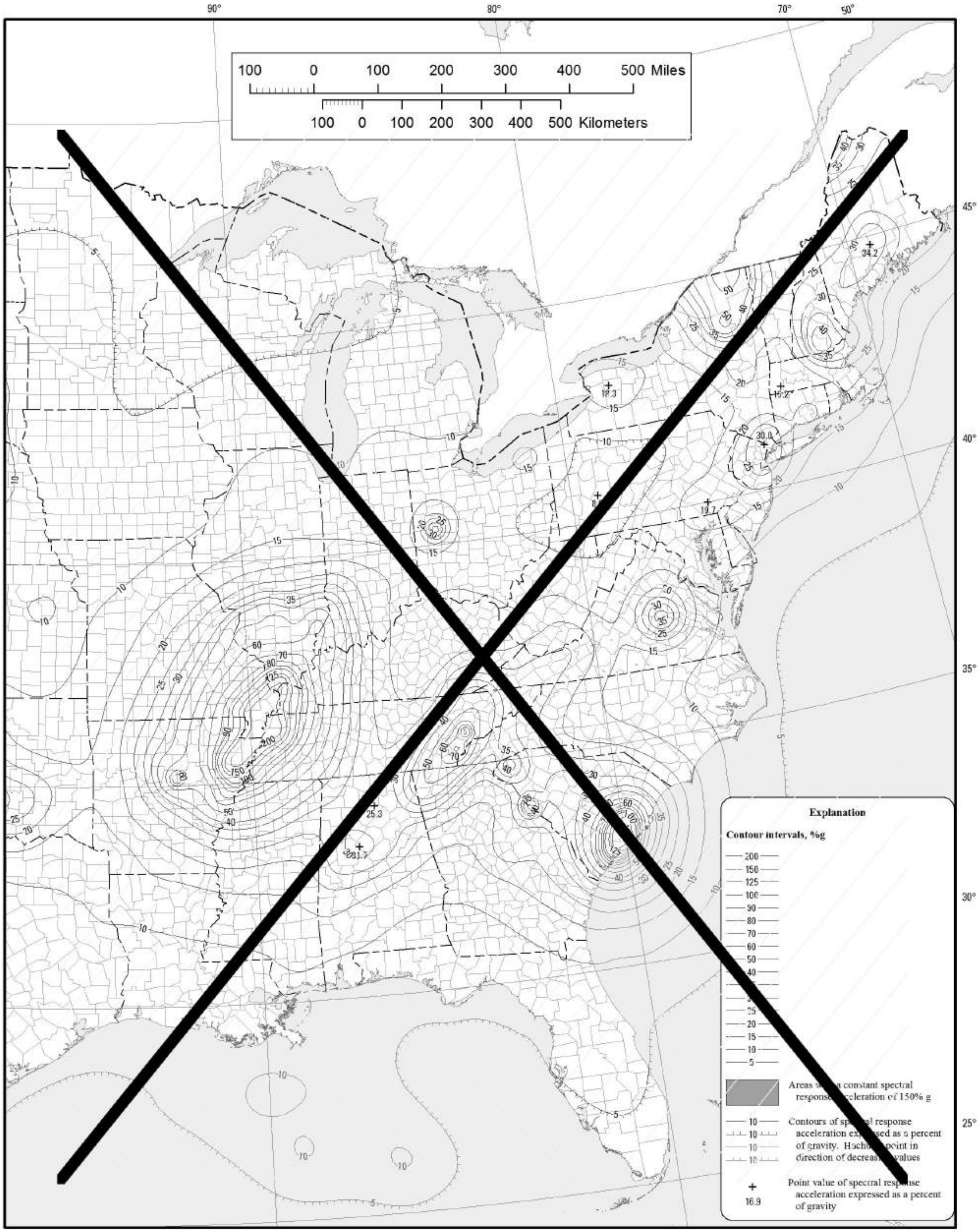


Figure 1613.3.1(1)-continued Risk-Targeted Maximum Considered Earthquake (MCE_R) Ground Motion for the Conterminous United States of 0.2-Second Spectral Response Acceleration (5% of Critical Damping)

~~FIGURE 1613.2.1(2) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

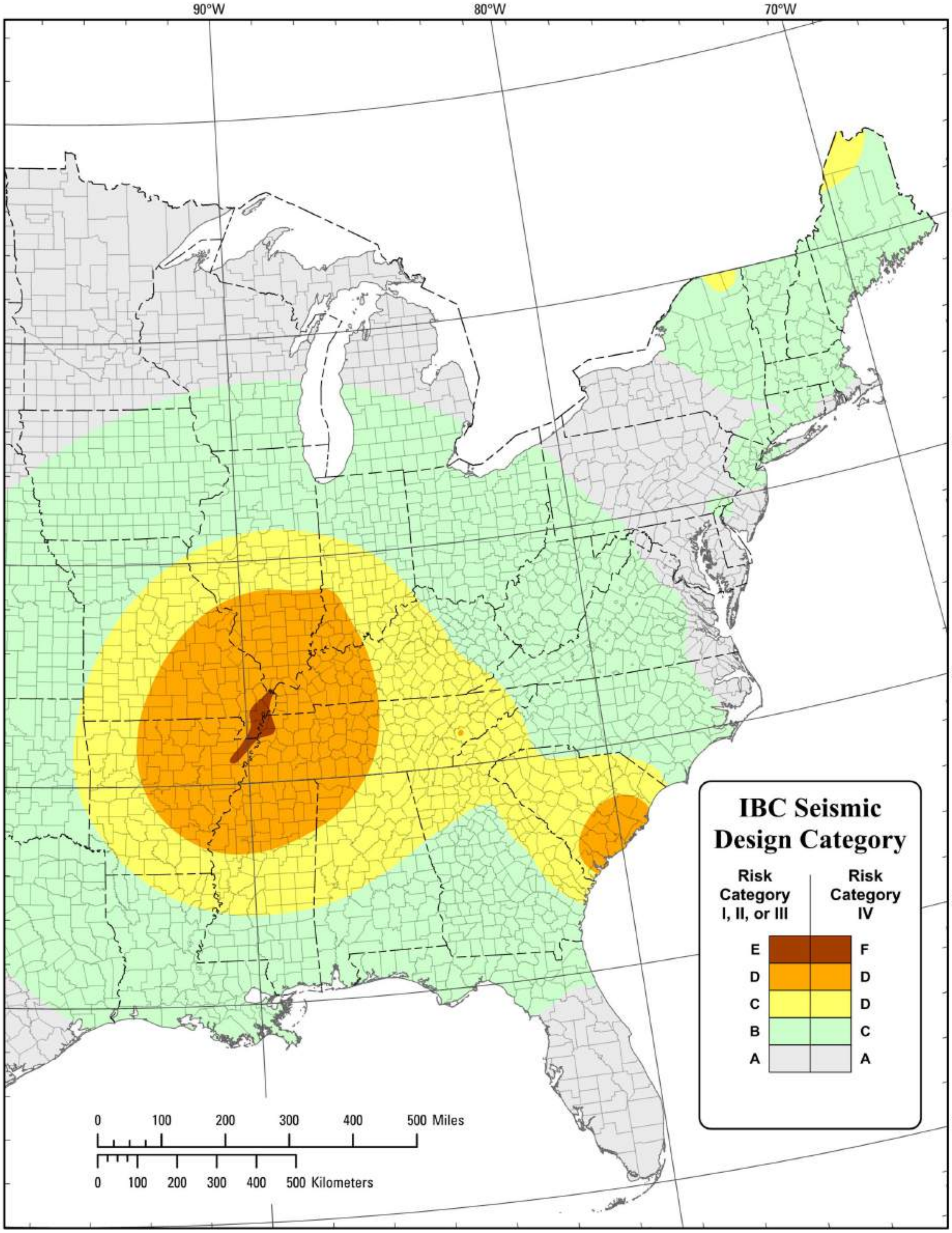
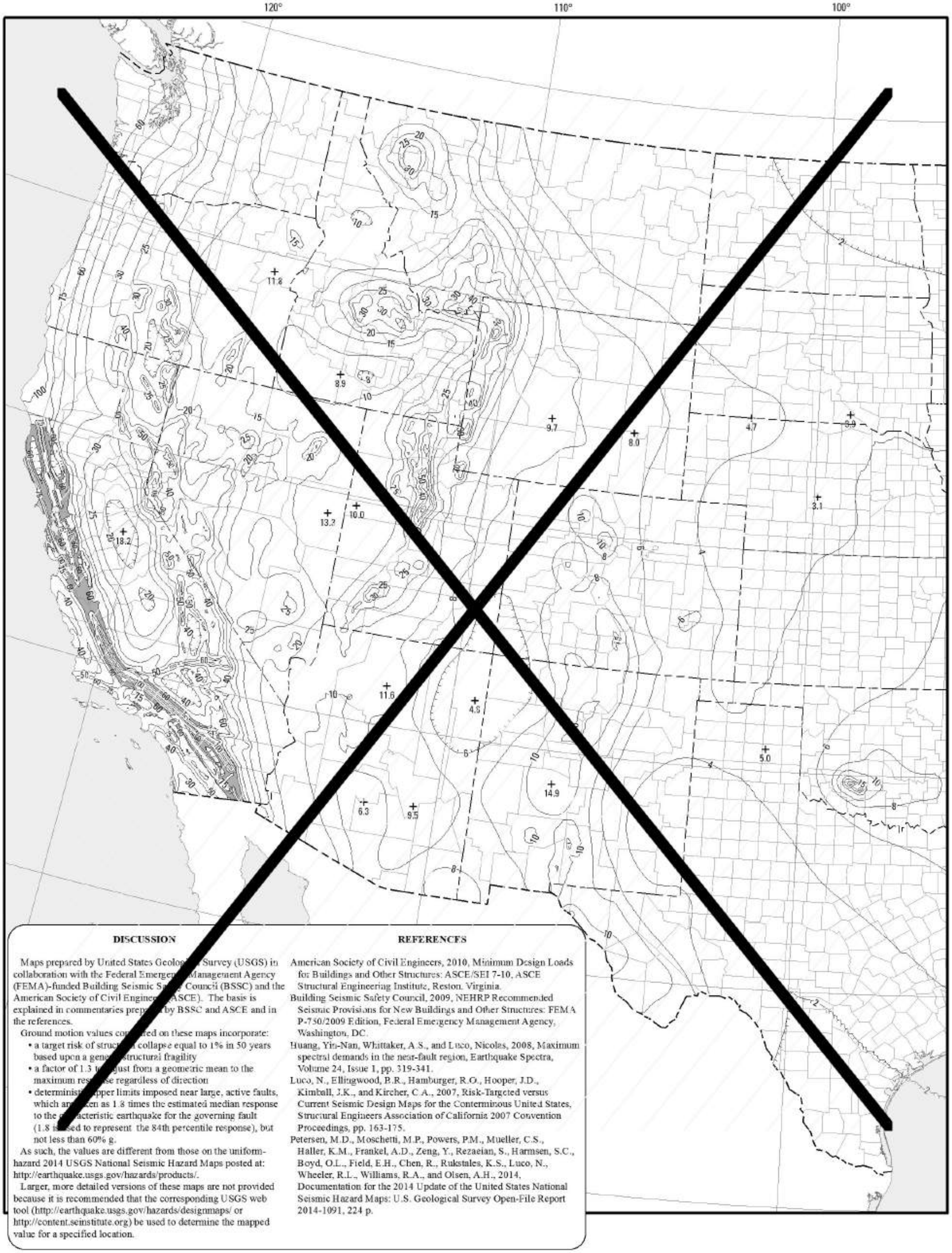
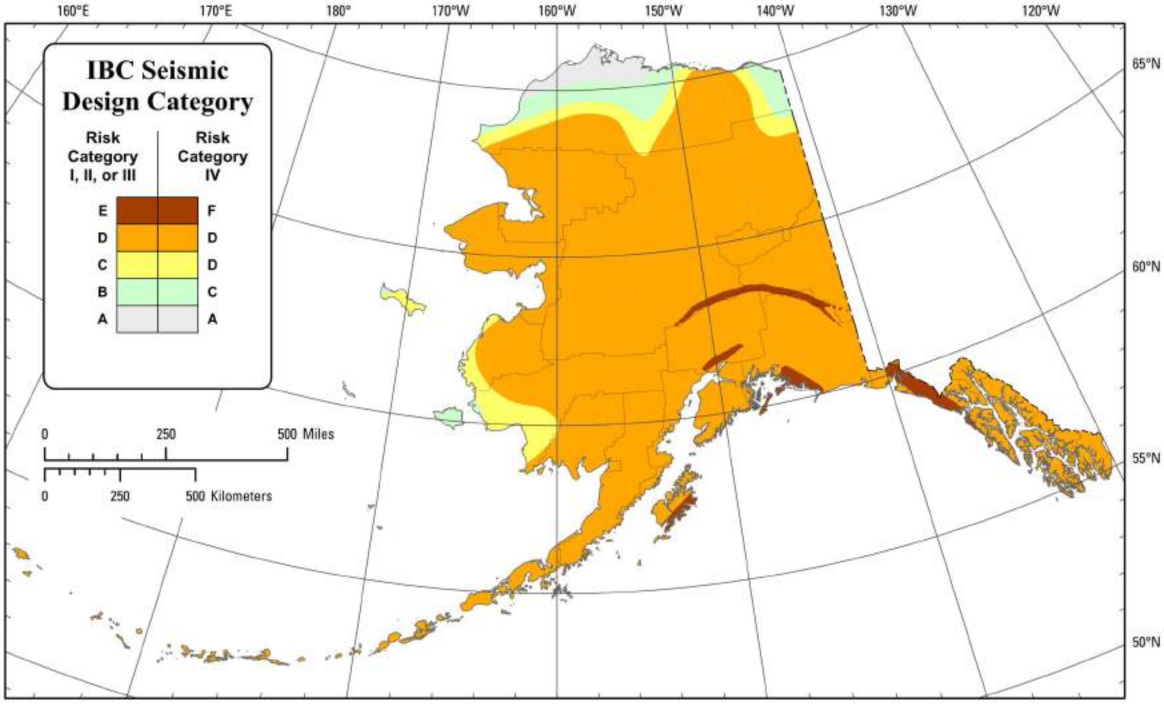


FIGURE 1613.2.1(1) CONTINUED
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR THE CONTERMINOUS UNITED STATES
RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)

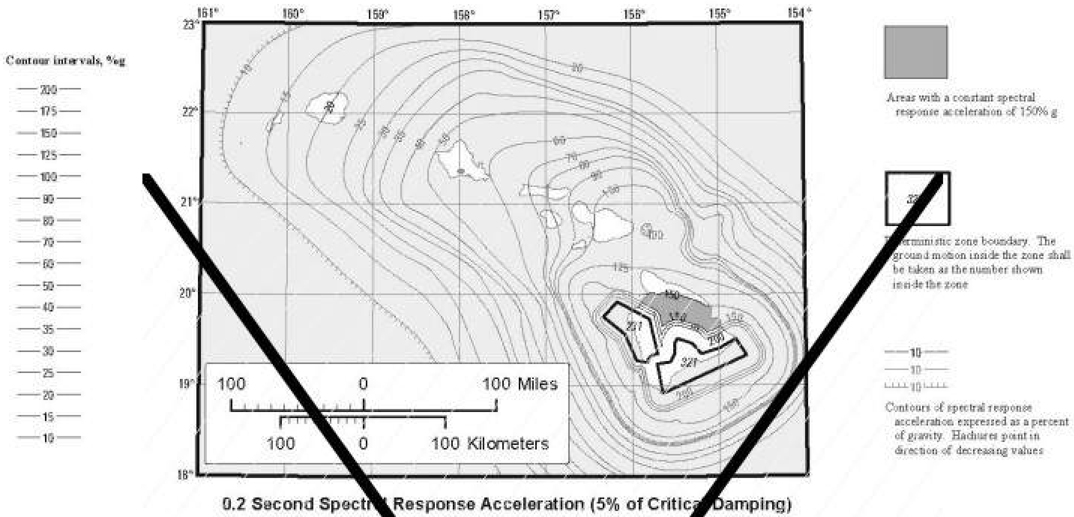


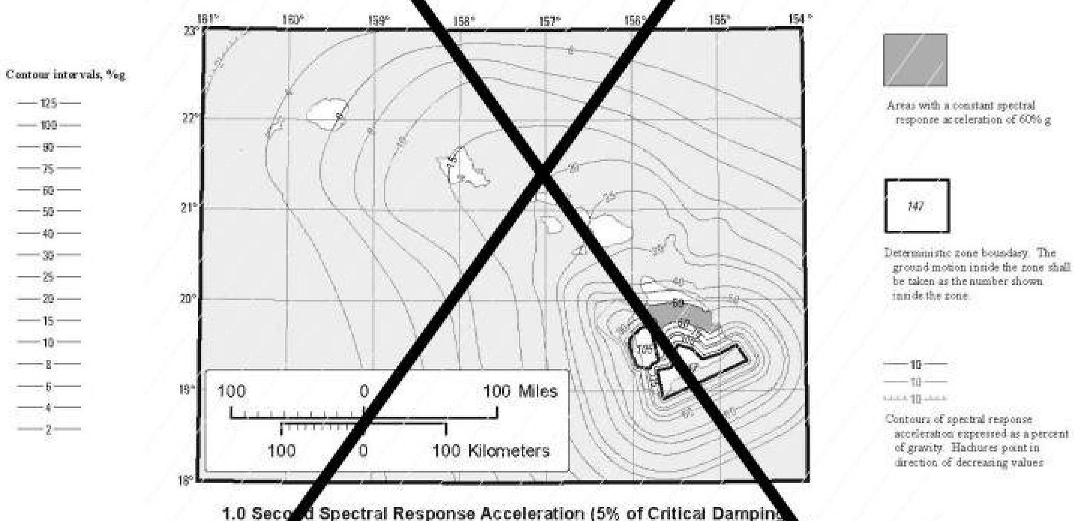
~~FIGURE 1613.2.1(3) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~



Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2007 National Seismic Hazard Model for Alaska, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the definition of SDC from ASCE/SEI 7-22 Chapter 11. Also defined there, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D. More detailed mapping of these SDCs can be resolved using corresponding web tools, as can SDCs for other site classes (e.g., see https://doi.org/10.5066/F7NK3C76).

FIGURE 1613.2.1(2)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR ALASKA
~~RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~





~~DISCUSSION~~

~~Maps prepared by United States Geological Survey (USGS) in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council (BSSC) and the American Society of Civil Engineers (ASCE). The basis is explained in commentaries prepared by BSSC and ASCE and in the references.~~

~~Ground motion values contoured on these maps incorporate:~~

- ~~a target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility~~
- ~~deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the fault (1.8 is used to represent the 84th percentile response), but not less than 150% and 60% g for 0.2 and 1.0 sec, respectively.~~

~~As such, the values are different from those on the uniform-hazard 1998 USGS National Seismic Hazard Maps for Hawaii posted at http://earthquake.usgs.gov/hazmaps.~~

~~Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (http://earthquake.usgs.gov/designmaps or http://content.seinstitute.org) be used to determine the mapped value for a specified location.~~

~~REFERENCES~~

~~Building Seismic Safety Council, 2009, NEHRP Recommended Seismic Provisions for New Buildings and Other Structures: FEMA P-750/2009 Edition, Federal Emergency Management Agency, Washington, DC.~~

~~Huang, Yin-Nan, Whittaker, A.S., and Luco, Nicolas, 2008, Maximum spectral demands in the near-fault region, Earthquake Spectra, Volume 24, Issue 1, pp. 319-341.~~

~~Klein, F., Frankel, A.D., Mueller, C.S., Wesson, R.L., and Okubo, P., 2001, Seismic hazard in Hawaii: high rate of large earthquakes and probabilistic ground-motion maps, Bulletin of the Seismological Society of America, Volume 91, pp. 479-498.~~

~~Luco, Nicolas, Ellingwood, B.R., Hamburger, R.O., Hooper, J.D., Kimball, J.K., and Kircher, C.A., 2007, Risk-Targeted versus Current Seismic Design Maps for the Conterminous United States, Structural Engineers Association of California 2007 Convention Proceedings, pp. 163-175.~~

~~**FIGURE 1613.2.1(5) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR HAWAII OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)**~~

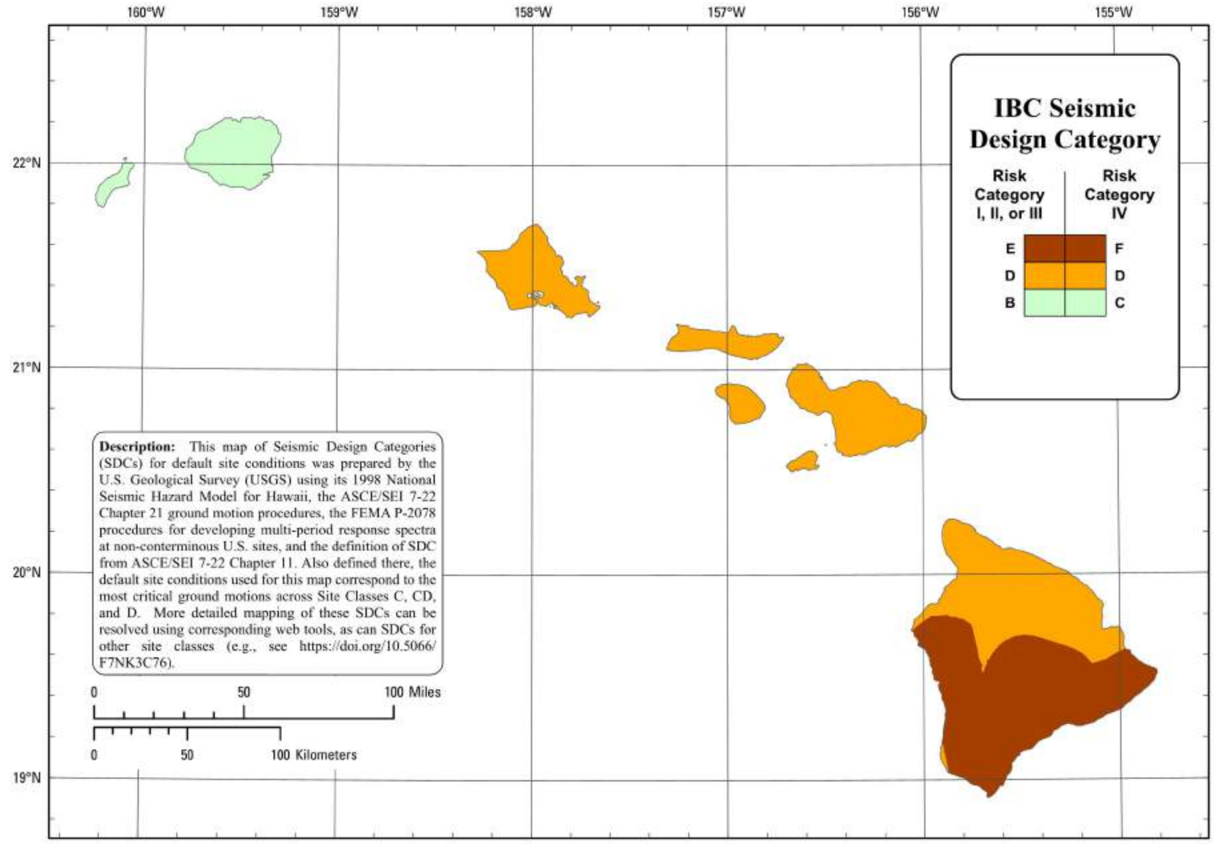
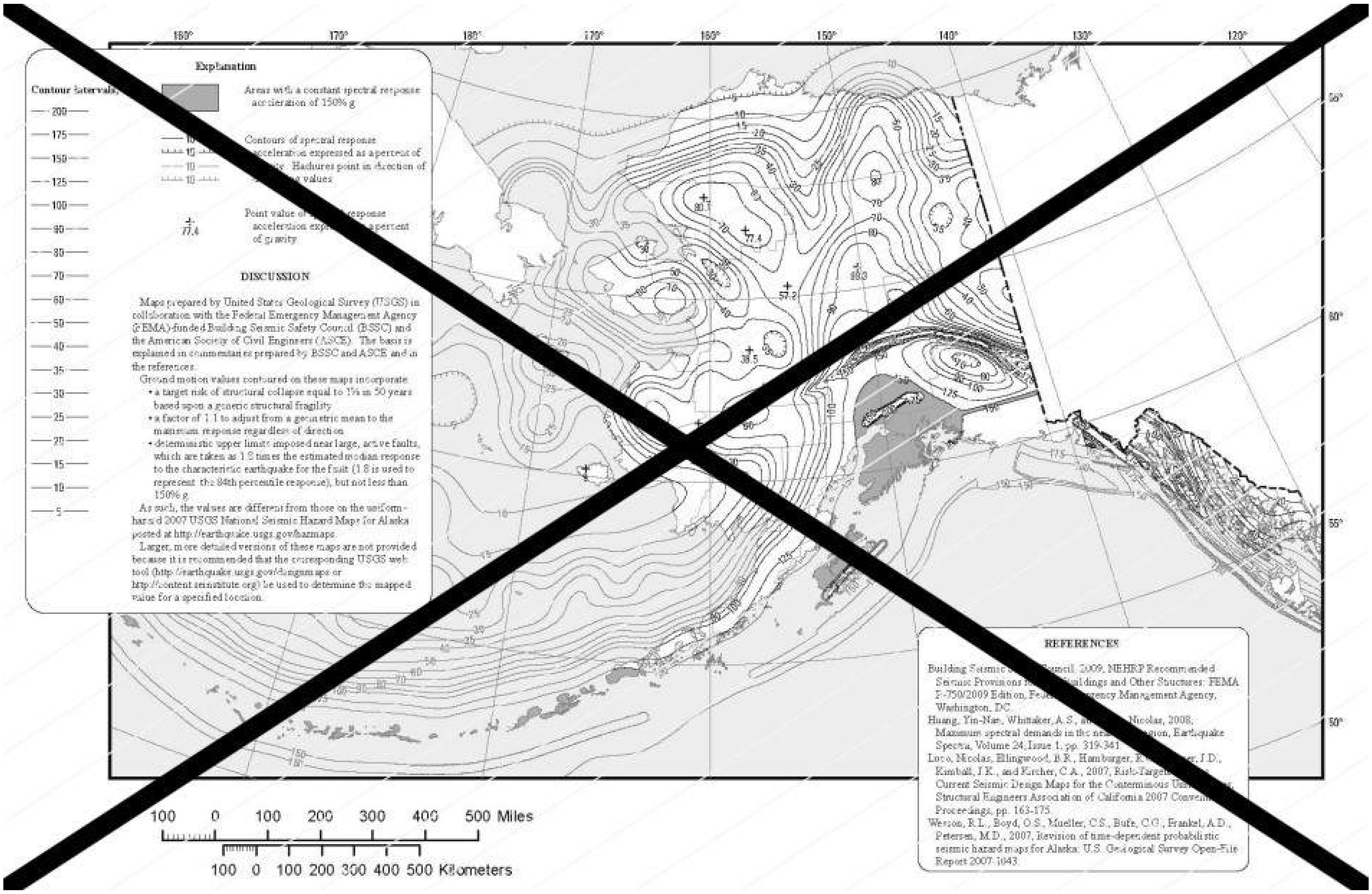


FIGURE1613.2.1(3)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR HAWAII
~~RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR HAWAII OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

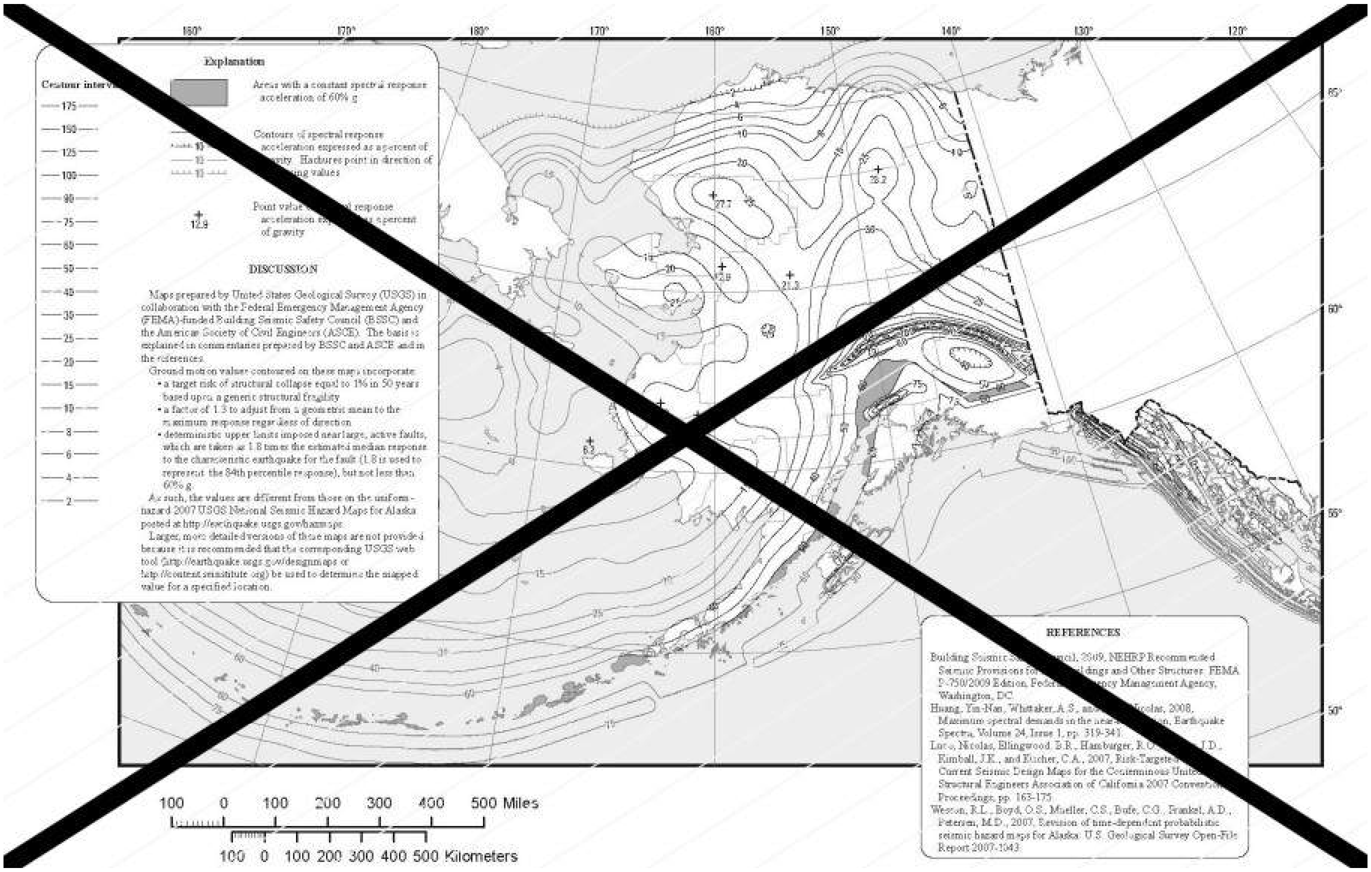


~~FIGURE 1613.2.1(6) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE~~$_R$~~) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2003 National Seismic Hazard Model for Puerto Rico and the U.S. Virgin Islands, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the definition of SDC from ASCE/SEI 7-22 Chapter 11. Also defined there, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

FIGURE 1613.2.1(4)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS
RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE$_R$) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF

02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)



~~FIGURE 1613.2.1(7) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 10-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

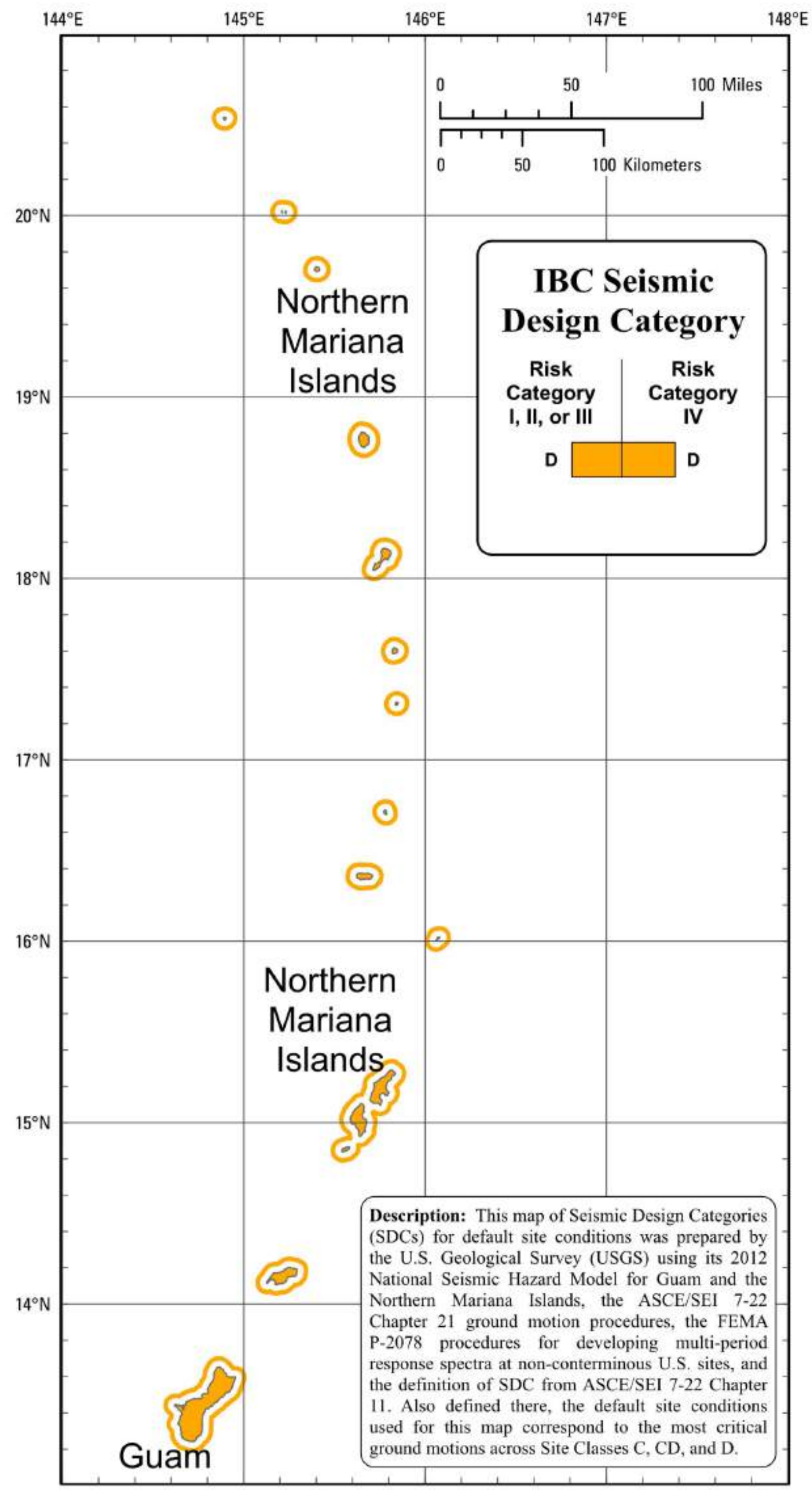
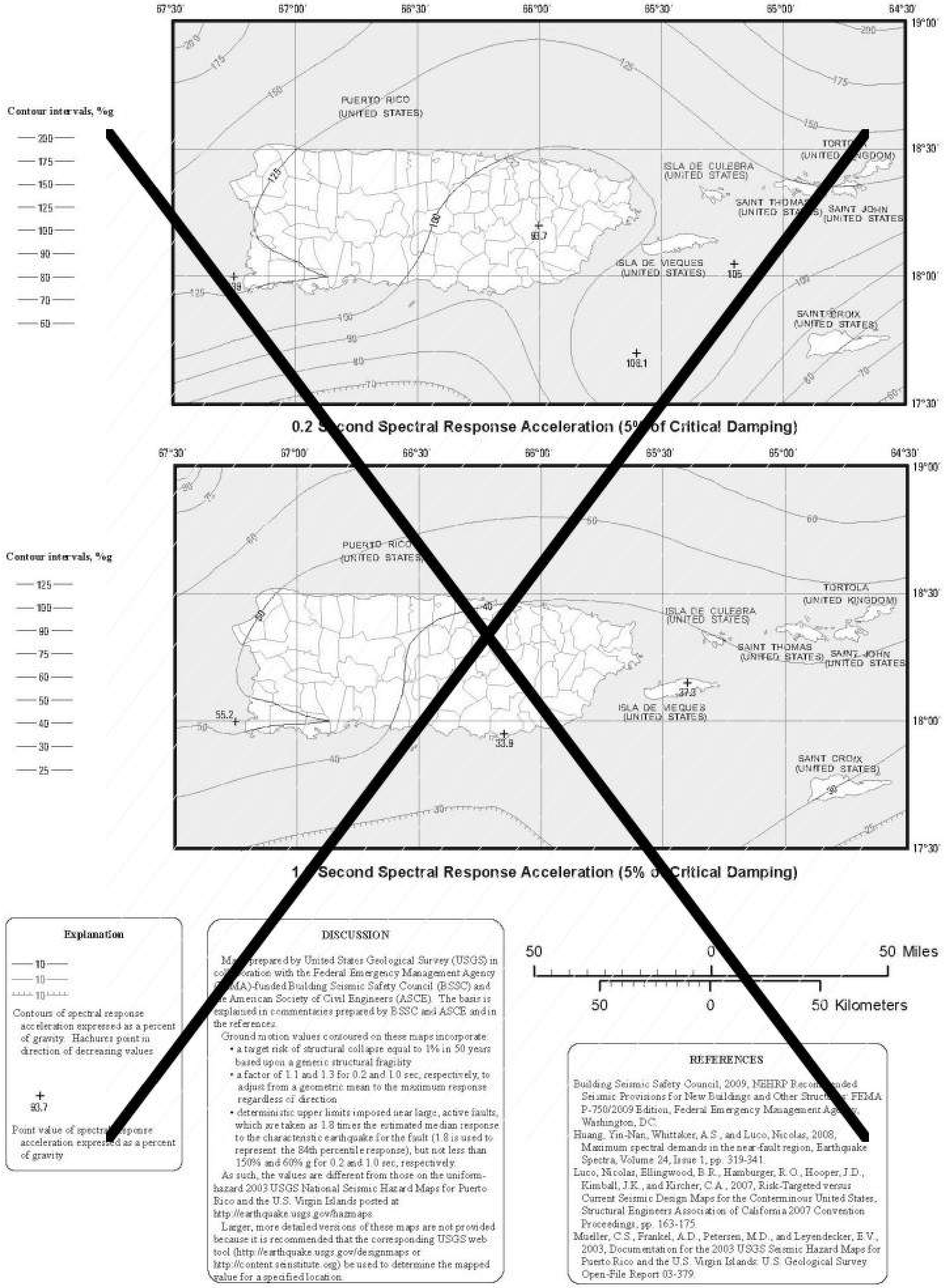


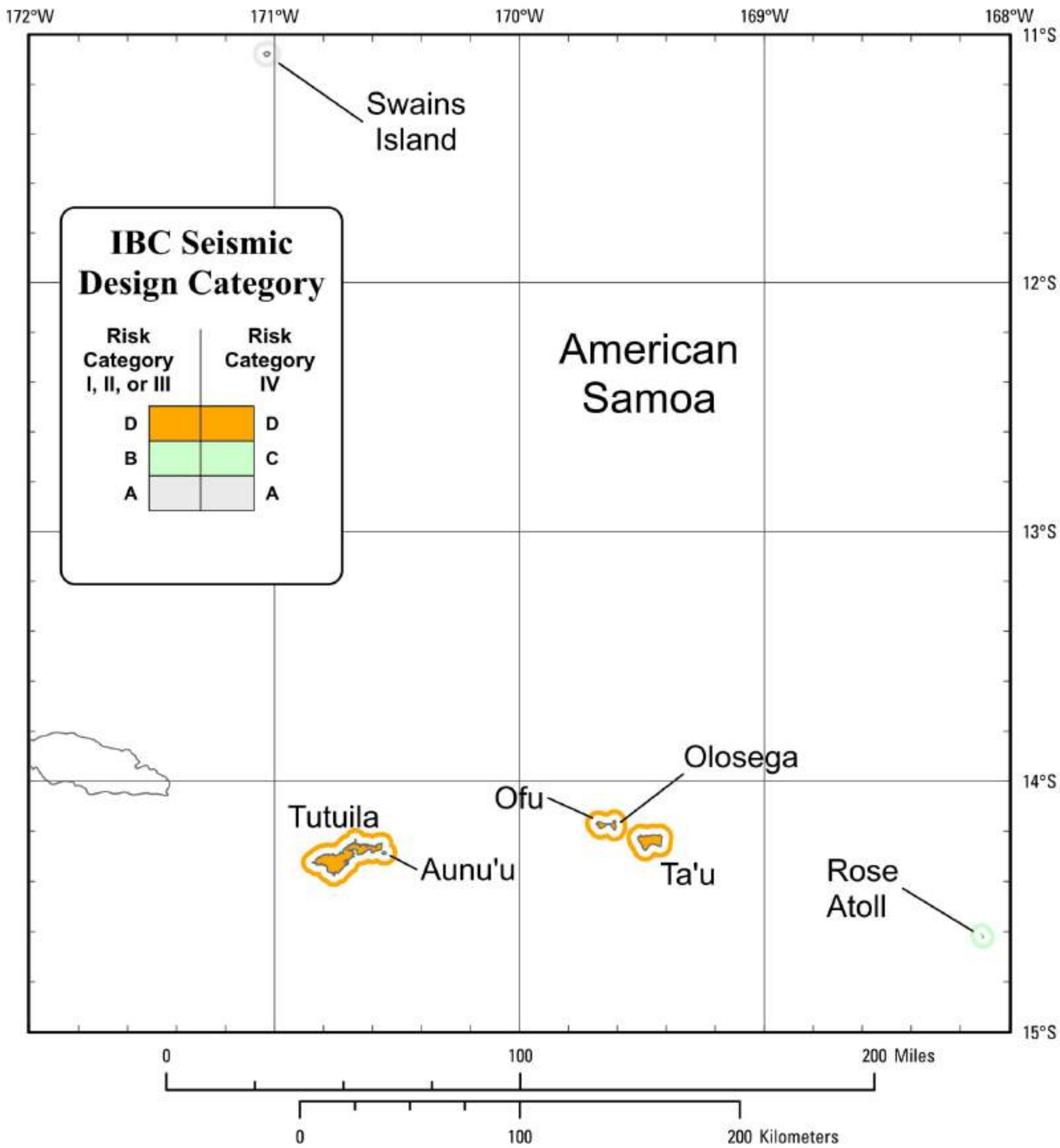
FIGURE 1613.2.1(5)

SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR GUAM AND THE NORTHERN MARIANA ISLANDS

RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 10-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)



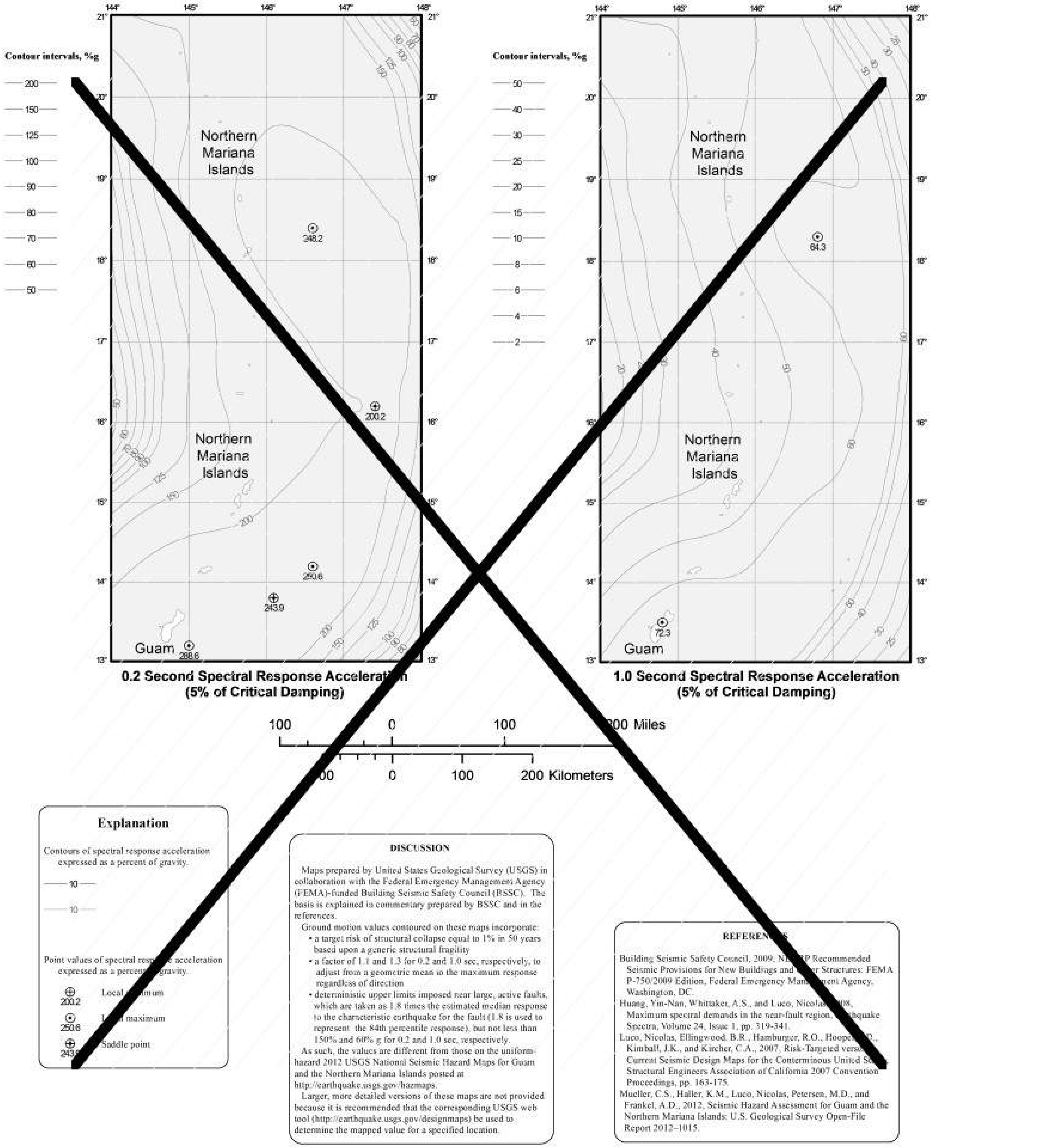
~~**FIGURE 1613.2.1(8) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)**~~



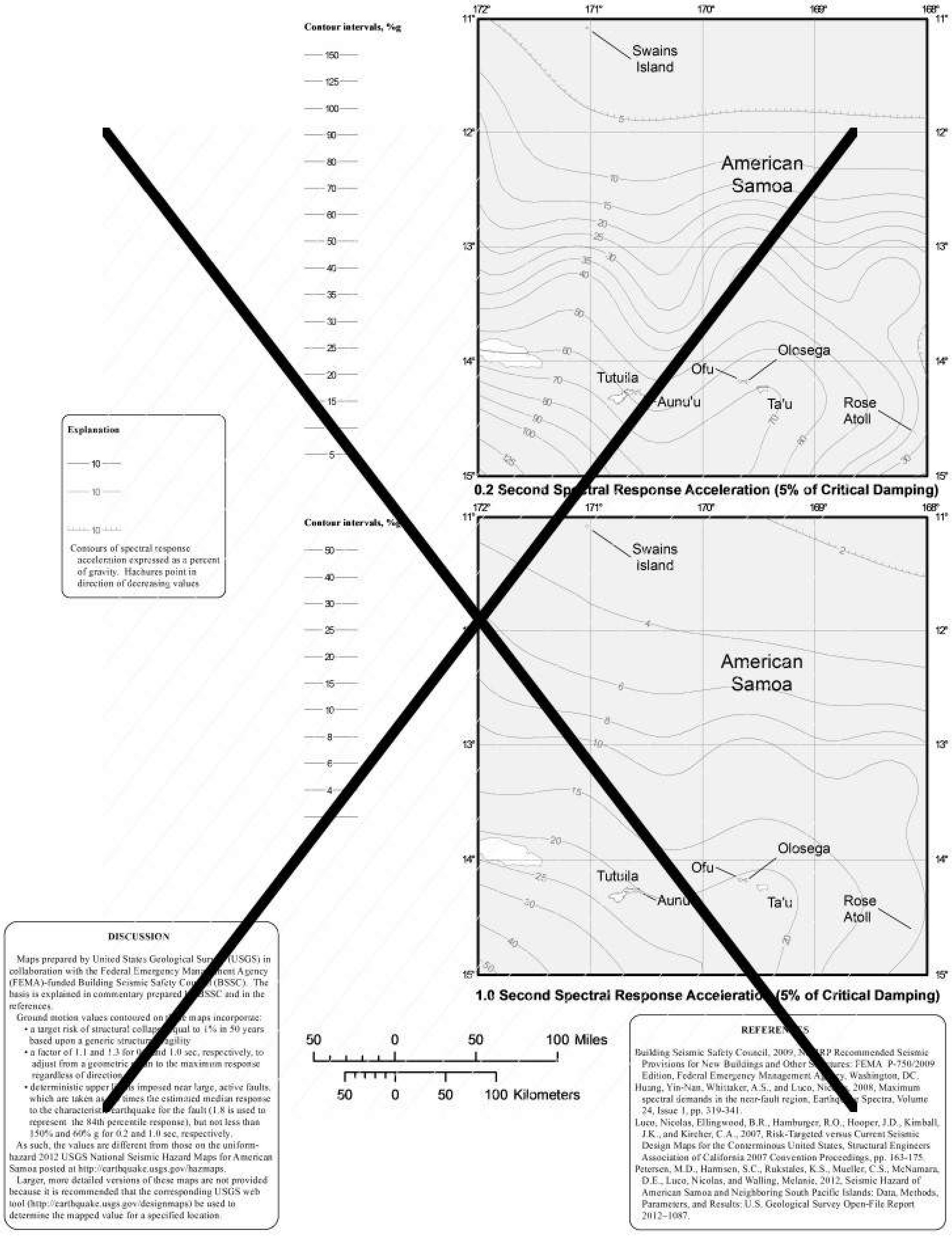
Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2012 National Seismic Hazard Model for American Samoa, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the definition of SDC from ASCE/SEI 7-22 Chapter 11. Also defined there, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

FIGURE 1613.2.1(6)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR AMERICAN SAMOA
RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)

Delete without substitution:



~~FIGURE 1613.2.1(9) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR GUAM AND THE NORTHERN MARIANA ISLANDS OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~



~~**FIGURE 1613.2.1(10) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR AMERICAN SAMOA OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)**~~

~~**1613.2.2 Site class definitions.** Based on the site soil properties, the site shall be classified as *Site Class* A, B, C, D, E or F in accordance with Chapter 20 of ASCE 7.~~
~~Where the soil properties are not known in sufficient detail to determine the site class, *Site Class* D, subjected to the requirements of Section 1613.2.3, shall be used unless the *building official* or geotechnical data determines that *Site Class* E or F soils are present at the site.~~

~~Where site investigations that are performed in accordance with Chapter 20 of ASCE 7 reveal rock conditions consistent with *Site Class* B, but site-specific velocity measurements are not made, the *site coefficients* F_a and F_v shall be taken at unity (1.0).~~

~~**1613.2.3 Site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters.** The maximum~~

~~considered earthquake spectral response acceleration for short periods,~~ ~~S_{MS},~~ ~~and at 1-second period,~~ ~~S_{M1},~~ ~~adjusted for site class effects shall be determined by Equations 16-20 and 16-21, respectively:~~

$S_{MS} = F_a S_S$ ~~**(Equation 16-20)**~~

$S_{M1} = F_v S_1$ ~~**(Equation 16-21)**~~

~~but~~ ~~S_{MS}~~ ~~shall not be taken less than~~ ~~S_{M1}~~ ~~Except when determining the seismic design caregory in accordance with Section 1613.2.5.~~

~~where:~~

~~F_a = Site coefficient defined in Table 1613.2.3(1).~~

~~F_v = Site coefficient defined in Table 1613.2.3(2).~~

~~S_S = The mapped spectral accelerations for short periods as determined in Section 1613.2.1.~~

~~S_1 = The mapped spectral accelerations for a 1-second period as determined in Section 1613.2.1.~~

~~Where *Site Class* D is selected as the default site class per Section 1613.2.2, the value of~~ ~~F_a~~ ~~shall be not less than 1.2. Where the simplified design procedure of ASCE 7 Section 12.14 is used, the value of~~ ~~F_a~~ ~~shall be determined in accordance with ASCE 7 Section 12.14.8.1, and the values of~~ ~~F_v,~~ ~~S_{MS}~~ ~~and~~ ~~S_{M1}~~ ~~need not be determined.~~

~~TABLE 1613.2.3(1) VALUES OF SITE COEFFICIENT F_a [a]~~

~~SITE CLASS~~	~~MAPPED RISK TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) SPECTRAL RESPONSE ACCELERATION PARAMETER AT SHORT PERIOD~~					
	~~$S_s \le 0.25$~~	~~$S_s = 0.50$~~	~~$S_s = 0.75$~~	~~$S_s = 1.00$~~	~~$S_s = 1.25$~~	~~$S_s \ge 1.5$~~
~~A~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~
~~B~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~
~~C~~	~~1.3~~	~~1.3~~	~~1.2~~	~~1.2~~	~~1.2~~	~~1.2~~
~~D~~	~~1.6~~	~~1.4~~	~~1.2~~	~~1.1~~	~~1.0~~	~~1.0~~
~~E~~	~~2.4~~	~~1.7~~	~~1.3~~	~~Note b~~	~~Note b~~	~~Note b~~
~~F~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~

~~a. Use straight-line interpolation for intermediate values of mapped spectral response acceleration at short period, S_s.~~

~~b. Values shall be determined in accordance with Section 11.4.8 of ASCE 7.~~

~~TABLE 1613.2.3(2) VALUES OF SITE COEFFICIENT F_V~~[a]

~~SITE CLASS~~	~~MAPPED RISK TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) SPECTRAL RESPONSE ACCELERATION PARAMETER AT 1-SECOND PERIOD~~					
	~~$S_1 \le 0.1$~~	~~$S_1 = 0.2$~~	~~$S_1 = 0.3$~~	~~$S_1 = 0.4$~~	~~$S_1 = 0.5$~~	~~$S_1 \ge 0.6$~~
~~A~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~
~~B~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~
~~C~~	~~1.5~~	~~1.5~~	~~1.5~~	~~1.5~~	~~1.5~~	~~1.4~~
~~D~~	~~2.4~~	~~2.2~~[c]	~~2.0~~[c]	~~1.9~~[c]	~~1.8~~[c]	~~1.7~~[c]
~~E~~	~~4.2~~	~~3.3~~[c]	~~2.8~~[c]	~~2.4~~[c]	~~2.2~~[c]	~~2.0~~[c]
~~F~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~	~~Note b~~

a. ~~Use straight-line interpolation for intermediate values of mapped spectral response acceleration at 1-second period, S_1.~~

b. ~~Values shall be determined in accordance with Section 11.4.8 of ASCE 7.~~

c. ~~See requirements for site-specific ground motions in Section 11.4.8 of ASCE 7.~~

~~1613.2.4 Design spectral response acceleration parameters.~~ ~~Five-percent damped design spectral response acceleration at short periods, S_{DS}, and at 1-second period, S_{D1}, shall be determined from Equations 16-22 and Equation 16-23, respectively:~~

$$S_{DS} = \frac{2}{3}S_{MS}$$ **~~(Equation 16-22)~~**

$$S_{D1} = \frac{2}{3}S_{M1}$$ **~~(Equation 16-23)~~**

~~where:~~

~~S_{MS} = The maximum considered earthquake spectral response accelerations for short period as determined in Section 1613.2.3.~~

~~S_{M1} = The maximum considered earthquake spectral response accelerations for 1-second period as determined in Section 1613.2.3.~~

~~1613.2.5 Determination of seismic design category.~~ ~~Structures classified as *Risk Category* I, II or III that are located where the mapped spectral response acceleration parameter at 1-second period, S_1, is greater than or equal to 0.75 shall be assigned to *Seismic Design Category* E. Structures classified as *Risk Category* IV that are located where the mapped spectral response acceleration parameter at 1-second period, S_1, is greater than or equal to 0.75 shall be assigned to *Seismic Design Category* F. Other structures shall be assigned to a *seismic design category* based on their *risk category* and the design spectral response acceleration parameters, S_{DS} and S_{D1}, determined in accordance with Section 1613.2.4 or the site-specific procedures of ASCE 7. Each building and structure shall be assigned to the more severe *seismic design category* in accordance with Table 1613.2.5(1) or 1613.2.5(2), irrespective of the fundamental period of vibration of the structure, T.~~

~~**TABLE 1613.2.5(1) SEISMIC DESIGN CATEGORY BASED ON SHORT-PERIOD (0.2 second) RESPONSE ACCELERATION**~~

~~**VALUE OF S_{DS}**~~	~~**RISK CATEGORY**~~		
	~~**I or II**~~	~~**III**~~	~~**IV**~~
~~S_{DS} < 0.167g~~	~~A~~	~~A~~	~~A~~
~~0.167g ≤ S_{DS} < 0.33g~~	~~B~~	~~B~~	~~C~~
~~0.33g ≤ S_{DS} < 0.50g~~	~~C~~	~~C~~	~~D~~
~~0.50g ≤ S_{DS}~~	~~D~~	~~D~~	~~D~~

~~**TABLE 1613.2.5(2) SEISMIC DESIGN CATEGORY BASED ON 1-SECOND PERIOD RESPONSE ACCELERATION**~~

~~VALUE OF S_{D1}~~	~~RISK CATEGORY~~		
	~~I or II~~	~~III~~	~~IV~~
~~S_{D1} < 0.067g~~	~~A~~	~~A~~	~~A~~
~~0.067g ≤ S_{D1} < 0.133g~~	~~B~~	~~B~~	~~C~~
~~0.133g ≤ S_{D1} < 0.20g~~	~~C~~	~~C~~	~~D~~
~~0.20g ≤ S_{D1}~~	~~D~~	~~D~~	~~D~~

~~**1613.2.5.1 Alternative seismic design category determination.** Where S_1 is less than 0.75, the *seismic design category* is permitted to be determined from Table 1613.2.5(1) alone where all of the following apply:~~

1. ~~In each of the two *orthogonal* directions, the approximate fundamental period of the structure, T_a, in each of the two *orthogonal* directions determined in accordance with Section 12.8.2.1 of ASCE 7, is less than 0.8 T_s determined in accordance with Section 11.8.6 of ASCE 7.~~
2. ~~In each of the two *orthogonal* directions, the fundamental period of the structure used to calculate the *story* drift is less than T_s.~~
3. ~~Equation 12.8-2 of ASCE 7 is used to determine the seismic response coefficient, C_s.~~
4. ~~The *diaphragms* are rigid or are permitted to be idealized as rigid in accordance with Section 12.3.1 of ASCE 7 or, for *diaphragms* permitted to be idealized as flexible in accordance with Section 12.3.1 of ASCE 7, the distances between vertical elements of the *seismic force-resisting system* do not exceed 40 feet (12 192 mm).~~

Revise as follows:

1613.3 ~~**1613.2.5.2**~~ **Simplified design procedure.** Where the alternate simplified design procedure of ASCE 7 is used, the *seismic design category* shall be determined in accordance with ASCE 7.

1613.4 ~~**1613.3**~~ **Ballasted photovoltaic panel systems.** Ballasted, roof-mounted *photovoltaic panel systems* need not be rigidly attached to the roof or supporting structure. Ballasted non-penetrating systems shall be designed and installed only on roofs with slopes not more than one unit vertical in 12 units horizontal. Ballasted nonpenetrating systems shall be designed to resist sliding and uplift resulting from lateral and vertical forces as required by Section 1605, using a coefficient of friction determined by acceptable engineering principles. In structures assigned to *Seismic Design Category* C, D, E or F, ballasted nonpenetrating systems shall be designed to accommodate seismic displacement determined by nonlinear response-hi *story* or other *approved* analysis or shake-table testing, using input motions consistent with ASCE 7 lateral and vertical seismic forces for nonstructural components on roofs.

Delete without substitution:

~~**[BS] RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS.** The most severe earthquake effects considered by this code, determined for the orientation that results in the largest maximum response to horizontal ground motions and with adjustment for targeted risk.~~

Revise as follows:

[BS] SITE CLASS. A classification assigned to a site based on the types of soils present and their engineering properties as defined in Chapter 20 of ASCE/SEI-7. ~~Section 1613.2.2.~~

Delete without substitution:

~~**[BS] SITE COEFFICIENTS.** The values of F_a and F_v indicated in Table 1613.2.3(1) and Table 1613.2.3(2), respectively.~~

Revise as follows:

1810.3.9.4.2.1 Site Classes A through DE. For *Site Class* A, B, BC, C, CD, D or ~~D~~ DE sites, transverse confinement reinforcement shall be provided in the element in accordance with Sections 18.7.5.2, 18.7.5.3 and 18.7.5.4 of ACI 318 within three times the least element dimension of the bottom of the pile cap. A transverse spiral reinforcement ratio of not less than one-half of that required in Table 18.10.6.4(g) of ACI 318 shall be permitted.

1603.1.5 Earthquake design data. The following information related to seismic *loads* shall be shown, regardless of whether seismic *loads* govern the design of the lateral force-resisting system of the structure:

1. *Risk category*.
2. Seismic importance factor, I_e.
3. ~~Mapped s~~ Spectral response acceleration parameters, S_S and S_1.

4. *Site class*.
5. Design spectral response acceleration parameters, S_{DS} and S_{D1}.
6. *Seismic design category*.
7. Basic seismic force-resisting system(s).
8. Design base shear(s).
9. Seismic response coefficient(s), *CS*.
10. Response modification coefficient(s), *R*.
11. Analysis procedure used.

J104.4 Liquefaction study. For sites with ~~mapped~~ maximum considered earthquake spectral response accelerations at short periods (S_s) greater than 0.5g as determined by Chapter 11 of ASCE 7 ~~Section 1613~~, a study of the liquefaction potential of the site shall be provided and the recommendations incorporated in the plans.

Exception: A liquefaction study is not required where the *building official* determines from established local data that the liquefaction potential is low.

L101.1 General. Every structure located where the 1-second spectral response acceleration, S_1, determined in accordance with Chapter 11 of ASCE 7 ~~Section 1613.2~~, is greater than 0.40 and either exceeds six stories in height with an aggregate floor area of 60,000 square feet (5574 m^2) or more, or exceeds 10 *stories* in height regardless of floor area, shall be equipped with not fewer than three approved recording accelerographs. The accelerographs shall be interconnected for common start and common timing.

Staff Analysis: CC# S127-22 and CC# S128-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This proposal simplifies IBC Section 1613 by providing Seismic Design Category (SDC) maps that users can reference to quickly determine a project's SDC based on default site conditions. These maps are intended to replace current ground motion response accelerations maps in the IBC and have been derived based on the new multi-period response spectra (MPRS) procedures of ASCE/SEI 7-22. This proposal is an alternative to a similar ASCE proposal that updates the seismic maps.
The SDC maps are one of two methods that will be provided in the IBC to determine SDC. Users are still allowed to determine the SDC following ASCE/SEI 7-22 provisions, where more refined information such as site-specific soils data can be considered.

The introduction of SDC maps within the IBC will address 2 primary issues:

1. SDC maps are intuitive and can be used directly by all disciplines and users.

2. Use of SDC maps will reduce the total number of maps that would otherwise be required to reflect updated ASCE/SEI 7-22 provisions.

Use by all Disciplines

SDC maps shifts determination of SDC per the ASCE/SEI 7-22 provisions from the user to USGS (map developer), for default site classes. These maps will allow building officials, non-structural engineers, component manufacturers, etc. to quickly identify a conservative SDC based on location alone.

The current process to determine the SDC under the 2021 IBC begins with users identifying S_s and S_1 from one of the 10 risk-targeted maximum considered earthquake (MCE_R) ground motion response acceleration maps. In combination with coefficients based on soil type, these parameters are then used to determine S_{MS} and S_{M1}, followed by S_{DS} and S_{D1}, and the user ultimately determines SDC based on the S_{DS} and S_{D1} values. This can in many instances be reduced to a one-step process if the SDC maps in this proposal are adopted.

Total Number of Maps

Should this proposal of six SDC maps not be adopted, the new MPRS procedures of ASCE/SEI 7-22 (as per the ASCE proposal) will result in more maps. Because site class coefficients (F_a and F_v) have been incorporated into the new MPRS procedures, S_1 and S_s maps are no longer relevant and F_a and F_v are no longer utilized or specified in ASCE 7. In lieu of the S_s and S_1 values previously provided by MCE_R maps, ground motion acceleration maps will now provide S_{DS} and S_{D1} values directly. Following are the number of maps that would be required per the USGS, depending on the site conditions made available for the user. This SDC map proposal will include a total of 6 maps, the least possible number of maps in Section 1613.

· 12 maps: S_{MS} and S_{M1} maps for default site conditions only

· 54 maps: SDC maps for all site classes

· 108 maps: S_{MS} and S_{M1} maps for all site classes

Technical Information

The SDC maps in Section 1613.2 have been derived based on the ASCE/SEI 7-22 procedures, so the results will be consistent between the SDC maps and ASCE/SEI 7-22 ground motion maps, for default site conditions. Both sets of maps are based on the 2018 U.S. Geological Survey (USGS) National Seismic Hazard Model (NSHM) for the conterminous U.S., the ground motion procedures (Chapter 21) of ASCE/SEI 7-22, and the definition of SDC (Chapter 11) in ASCE/SEI 7-22. The maps for the states and territories outside of the conterminous U.S. are based on the FEMA P-2078 procedures, referenced in ASCE/SEI 7-22. FEMA P-2078 procedures allow the multi-period response spectra (MPRS) to be approximated for Alaska, Hawaii, Guam and the Northern Mariana Islands, and American Samoa, where older USGS NSHMs did not provide the full spectrum and site classes for MPRS in these states and territories.

Incorporated into both the SDC maps in this proposal and the ASCE/SEI 7 maps is the use of multi-period response spectra (MPRS), introduced by ASCE/SEI 7-22 to improve the accuracy of the frequency content of earthquake design ground motions and to enhance the reliability of the seismic design parameters derived from these ground motions. These improvements make better use of the available earth science, which has, in general, sufficiently advanced to accurately define spectral response for different site conditions over a broad range of periods. The result of the MPRS is to incorporate increased spectral demand for structures with mid-range fundamental periods on soft-soil sites where ground motion hazard is dominated by large magnitude events. Use of MPRS eliminates the need for site-specific hazard analysis, as required by ASCE 7-16 on soil sites in areas of high seismicity. Internet tools such as those found on the ASCE and ATC websites will continue to be available to provide values of S_{DS}, S_{D1} and S_1 in a very simple way based on longitude/latitude or address to permit determination by AHJs and engineers for all structures where MPRS are not needed for design. It should be noted, all design values needed for design including seismic ground motion parameter are now available for free on the ASCE website.

For the conterminous U.S., the proposed updates to the IBC SDC maps, like the map updates already adopted by the 2020 NEHRP Provisions and ASCE/SEI 7-22, are based on (1) recommendations of the Project 17 collaboration between the Building Seismic Safety Council (BSSC) and the USGS (BSSC, 2019), and (2) the 2018 update of the USGS NSHM (Petersen et al., 2020) for the conterminous U.S. The Project 17 recommendations include modifications to (1) site-class effects, (2) spectral periods defining short-period and one-second ground-motion parameters, (3) deterministic caps on the otherwise probabilistic ground motions, and (4) maximum-direction scale factors. The updates in the 2018 USGS NSHM from the previous (2014) version (used in the 2018 and 2021 versions of the IBC include incorporation of (1) new NGA-East and other ground-motion models for the central and eastern U.S., (2) deep sedimentary basin effects in the Los Angeles, Seattle, San Francisco, and Salt Lake City regions, (3) earthquakes that occurred in 2013 through 2017, and (4) updated weights for the western U.S. ground-motion models.

Summary of Specific Changes

Section 1613.1 Scope – Exception 1 for one- and two-family dwellings will be based solely on being assigned to *Seismic Design Category* A, B or C.

Section 1613.2 Seismic ground motion values

is being renamed to **Determination of seismic design category**, consistent with the proposal to incorporate SDC maps. The SDC maps are based on default site conditions, as assigned by ASCE/SEI 7. Where Site Class DE, E, or F soils are present, the determination of seismic design category needs to be in accordance with ASCE/SEI 7-22. For all other site classifications, two options for assigning SDC are provided: (1) using the SDC maps for default site conditions or (2) going through procedures outlined in ASCE/SEI 7-22 for any site class. Use of the proposed SDC maps (option 1) will provide an upper bound assignment of SDC for all sites except for Site Class DE, E, or F soils; this is intended to provide quick and easy information for instances when further refinement of SDC assignment is not desired. For instances where further refinement is desired, the ASCE/SEI 7-22 provisions (option 2) are the appropriate tool.

The user is instructed to use the maps to determine SDC based on the structure's assigned Risk Category. It is important to note that for a given location, there is only one map provided; each map contains a dual scale in the legend, one portion assigning SDC for Risk Categories I, II and III, and the second portion assigning SDC for Risk Category IV.

It is noted that these SDC maps have been specifically developed for the IBC, as seen by the legend which indicates “IBC Seismic Design Category.” These are different and distinct from the IRC Seismic Design Category maps, which have been developed with rules and assumptions specific to dwellings that fall within the scope of the IRC.

Except for the renumbered **Section 1613.3 Simplified design procedure** (previously 1613.2.5.2), the remainder of Section 1613 is deleted by this proposal. The information in these sections is no longer current or necessary.

https://www.cdpaccess.com/proposal/8312/25387/files/download/2931/

Bibliography: BSSC, 2019. BSSC Project 17 Final Report, Development of the Next Generation of Seismic Design Value Maps for the 2020 NEHRP Provisions, National Institute of Building Sciences, Washington, D.C., December 2019.

Petersen et al., 2019. "*The 2018 update of the US National Seismic Hazard Model: Overview of model and implications*," Earthquake Spectra, Earthquake Engineering Research Institute, Oakland, CA, November 2019.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will slightly increase the cost of construction in some regions and slightly decrease it in other regions. In aggregate, the cost of construction is not changed. Specifically, any impact on construction cost, as reflected in design loads, will vary by site location, spectral response period and site class. For certain combinations of site location, spectral response periods and site class, proposed design spectral acceleration parameter values (S_{DS} and S_{D1}) are larger than those of ASCE 7-16, while for other combinations of site location, spectral response periods and site class, proposed values of S_{DS} and S_{D1} are smaller than those of ASCE 7-16. However, parameter values of S_{MS} and S_{M1} (which are used to determine design loads) included in ASCE 7-22 are generally within +/- 15% of those of ASCE 7-16 for sites in the conterminous US assuming default site conditions.

S128-22

S129-22

IBC: 1613.1

Proponents: John-Jozef Proczka, representing Self (John-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable. The *seismic design category* for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

Exceptions:

1. Detached one- and two-family dwellings, assigned to *Seismic Design Category* A, B or C, or located where the mapped short-period spectral response acceleration, S_S, is less than 0.4 g.
2. The *seismic force-resisting system* of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy <u>that are not adjacent to occupiable structures other than detached one- and two-family dwellings nor a *lot line* within a horizontal distance equal to the agricultural storage structure's height.</u>
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. References within ASCE 7 to Chapter 14 shall not apply, except as specifically required herein.

Reason Statement: Microbreweries that are also restaurants or other places of assembly with high occupant loads are becoming increasingly common. These types of businesses can have tall and heavy silos and tanks that can be considered agricultural storage - depending on what is stored, directly adjacent to them. These silos and tanks are also frequently installed adjacent to other occupiable businesses where they happen to be built next to the microbrewery or the microbrewery is built next to them.
The existing wording of the exception is intended to be applied to rural farming situations where the agricultural silos are near detached one-and two-family dwellings where the lives at risk associated with their failure is much lower than that associated with these structures in urban environments.

Note that this section does not invoke the definition of *agricultural building* but even that definition would not solve the problem.

Cost Impact: The code change proposal will increase the cost of construction
The cost of the design of agricultural storage structures that are adjacent to occupiable buildings will increase.

S129-22

S130-22

IBC: 1613.1, NEMA (New), (New)

Proponents: Bryan Holland, representing National Electrical Manufacturers Association (NEMA) (bryan.holland@nema.org); Megan Hayes, representing NEMA (megan.hayes@nema.org)

2021 International Building Code

Revise as follows:

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable. The *seismic design category* for a structure is permitted to be determined in accordance with Section 1613 or ASCE. Electrical equipment shall comply with the provisions of this section and NEMA EESCTG 1-2019 NEMA Seismic Guideline 1—General Requirements for Seismic Qualification of Electrical Equipment for Commercial Building Codes.

Exceptions:

1. Detached one- and two-family dwellings, assigned to *Seismic Design Category* A, B or C, or located where the mapped short-period spectral response acceleration, S_S, is less than 0.4 g.
2. The *seismic force-resisting system* of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. References within ASCE 7 to Chapter 14 shall not apply, except as specifically required herein.

Add new text as follows:

NEMA

National Electrical Manufactures Association
1300 17th Street North, Suite 900
Rosslyn, VA 22209

NEMA EESCTG 1-2019. NEMA Seismic Guideline 1—General Requirements for Seismic Qualification of Electrical Equipment for Commercial Building Codes

Staff Analysis: A review of the standard proposed for inclusion in the code, NEMA EESCTG 1-2019 NEMA Seismic Guideline 1—General Requirements for Seismic Qualification of Electrical Equipment for Commercial Building Codes, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The purpose of this guide is to define the general requirements for seismic qualification of electrical equipment to conform with model building code provisions for earthquake resistance. These provisions are intended to improve the performance of essential and non-essential electrical equipment and distribution systems subject to strong ground shaking and more specifically to acceleration sensitive electrical equipment rigidly attached to the building structure or foundation. The electrical equipment seismic qualification requirements contained within the guide establish seismic conformance to both IBC and ASCE/SEI 7 seismic design provisions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction. Compliance with the NEMA EESCTG 1-2019 Guide ensures the provisions of Section 1613 of the IBC and applicable Chapters of ASCE 7 are being met.

S130-22

S131-22

IBC: 1613.3

Proponents: Ronald LaPlante, Division of State Architect, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (ron.laplante@dgs.ca.gov); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

1613.3 Ballasted photovoltaic panel systems. Ballasted, roof-mounted *photovoltaic panel systems* shall comply with ASCE 7 Chapter 13, except the use of Exception Item 7 in Section 13.6.12 is permitted in structures assigned to Seismic Design Category C, D, or E. ~~need not be rigidly attached to the roof or supporting structure. Ballasted non-penetrating systems shall be designed and installed only on roofs with slopes not more than one unit vertical in 12 units horizontal. Ballasted nonpenetrating systems shall be designed to resist sliding and uplift resulting from lateral and vertical forces as required by Section 1605, using a coefficient of friction determined by acceptable engineering principles. In structures assigned to *Seismic Design Category* C, D, E or F, ballasted nonpenetrating systems shall be designed to accommodate seismic displacement determined by nonlinear response-hi *story* or other *approved* analysis or shake-table testing, using input motions consistent with ASCE 7 lateral and vertical seismic forces for nonstructural components on roofs.~~

Staff Analysis: CC# S131-22 and CC# S132-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: The provisions in IBC Section 1613.3 were added initially in the 2015 IBC to implement the recommendations contained in the Structural Engineers Association of California report titled "Structural Seismic Requirements and Commentary for Rooftop Solar Photovoltaic Arrays" (SEAOC PV1-2012) as there we no specific requirements for these systems in ASCE 7-10. The IBC provision were broadly written to permit the use of the methods outlined in SEAOC PV1 without any direct reference. The following edition of ASCE 7 contained specific provisions in ASCE 7-16 Section 13.6.12 for Rooftop Solar Panels that adopted the specific prescriptive method outlined in SEAOC PV1 for unattached ballasted solar arrays. These provisions were further developed in ASCE 7-22. Now that the ASCE 7 provisions have been developed, the IBC provisions in this section are no longer needed.

The IBC provisions require complex analysis to determine the seismic displacements for unattached arrays, whereas, the ASCE 7 provisions provide both a simple prescriptive calculation while also permitting a more complex analysis approach. Furthermore, there is lack of consistency in the industry on the array interconnection requirements and deformation compatibility requirements for unattached arrays which are not addresses in the IBC language, whereas, the ASCE 7 provisions provide specific requirements to address these issues.

This proposal strikes the majority of the IBC language and adds a direct reference to ASCE 7. This proposal also expands the Exception Item 7 in ASCE 7 Section 13.6.12 to also include Seismic Design Category (SDC) E. The ASCE 7 provisions limit the maximum roof slope supporting unattached arrays to a slope of 1 in 20 (3 degrees) since the SEAOC PV1 seismic displacement formula that ASCE 7 adopted is based on this same limitation. Exception Item 7 permits the roof slope supporting unattached arrays to be increased to a maximum slope of 1 in 12 (4.7 degrees) where justified by testing and analysis, which parallels the current IBC limits and requirements. However, the ASCE 7 exception is limited to Seismic Design Categories C and D only. The seismic displacement determination from nonlinear analysis and shake table testing are applicable to all levels of seismicity, and therefore, should be permitted in SDC E. Note that SDC F is not included in the proposal since the ASCE 7 provisions do not permit unattached arrays on Risk Category IV structures (SDC F in only applicable to Risk Category IV structures).

The ASCE 7 provision require an independent peer review when analysis, such as nonlinear time history analysis, are used to compute the seismic displacements for unattached systems on roof slopes steeper than 1 in 20 (3 degrees). This is consistent with the peer review requirements in ASCE 7 Chapter 16 when nonlinear response history analysis are utilized in the building design.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The code change proposal will not, in general, overall increase or decrease the cost of construction. On most projects it will result is less design effort to utilize the prescriptive requirements in ASCE 7 in lieu of the analysis method described in the IBC, and in some cases, may cause more design effort or fee when a peer review may be required on steeper roof slopes.

S131-22

S132-22

IBC: 1613.3

Proponents: Joseph Cain, representing Solar Energy Industries Association (SEIA) (JoeCainPE@gmail.com)

2021 International Building Code

Revise as follows:

1613.3 Ballasted photovoltaic panel systems. Ballasted, roof-mounted *photovoltaic (PV) panel systems* need not be rigidly attached to the roof or supporting structure. ~~Ballasted non-penetrating systems~~ Ballasted, unattached *PV panel systems* shall be designed and installed only on roofs with slopes not more than one unit vertical in 12 units horizontal. ~~Ballasted nonpenetrating systems~~ Ballasted, unattached *PV panel systems* shall be designed to resist sliding and uplift using design methods and associated criteria from ASCE 7. ~~resulting from lateral and vertical forces as required by Section 1605, using a coefficient of friction determined by acceptable engineering principles. In structures assigned to *Seismic Design Category* C, D, E or F, ballasted nonpenetrating systems shall be designed to accommodate seismic displacement determined by nonlinear response-hi *story* or other *approved* analysis or shake-table testing, using input motions consistent with ASCE 7 lateral and vertical seismic forces for nonstructural components on roofs.~~

Staff Analysis: CC# S131-22 and CC# S132-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: Ballasted, unattached PV systems are considered in ASCE 7-16 Section 13.6.12, which will have some updates in ASCE 7-22. As ASCE 7 language is now in effect, we believe there is general agreement that the language in IBC Section 1613.3 can be simplified. It is important to keep the language in IBC Section 1613.3 that indicates ballasted, unattached PV systems can only be installed on roof with slopes not more than 1:12.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will neither increase nor decrease the cost of construction, as it is just a simplification of language for IBC Section 1613.3 now that ASCE 7 language has matured.

S132-22

S133-22

IBC: 1613.4 (New)

Proponents: Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov); Robert Bachman, representing FEMA/ATC Seismic Code Support Committee (rebachmanse@aol.com)

2021 International Building Code

Add new text as follows:

1613.4 NFPA 13 sprinkler systems. NFPA 13 sprinkler systems, including their anchorage and bracing, shall comply with the seismic design force requirements of ASCE 7 Section 13.3.1.

Reason Statement: The seismic design force equations for nonstructural components provided in Chapter 13 of ASCE/SEI 7-22 have significantly changed since the ASCE 7-16 edition. Sprinkler systems are considered nonstructural components. The current version of NFPA 13 is based on ASCE 7-16 and does not satisfy the ASCE 7-22 seismic requirements and significant changes are required to bring them into compliance. NFPA has been advised that significant changes are needed and it is their intent to attempt to include in their next version scheduled for publication in 2022 or to publish a Tentative Interim Amendment (TIA) after the next edition is published. In the meantime, this proposed language will alert the user and the authority having jurisdiction that the seismic design requirements of ASCE 7-22 must also be satisfied in addition to those of NFPA 13. Hopefully by the time the 2024 IBC will be enforced, the next edition will have been updated to include the needed revisions to comply with ASCE 7-22 or a TIA will have been published so that the user and authority having jurisdiction will have a version of NFPA 13 which will satisfy ASCE 7-22 seismic design requirements.
The proposed change is only required if the edition of ASCE 7 is updated from ASCE 7-16 to ASCE 7-22, as per other code change proposals. Should the update to ASCE 7-22 not be adopted, it is recommended that this code change be disapproved.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not, in general, increase or decrease the overall cost of construction. However, for individual structures, this proposal may reduce the nonstructural component seismic design forces constructed using lateral force-resisting system with higher ductility, which are commonly used regions of high seismic risk while for structures using low or moderate ductility systems the seismic design forces may increase.

S133-22

S134-22

IBC: SECTION 1616 (New), 1616.1 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Add new text as follows:

SECTION 1616
FIRE LOADS

1616.1 General. Where the structural fire protection of structural elements is designed considering system-level behavior or realistic fire exposures, the design shall be in accordance with ASCE 7. Where the structural fire protection is designed per this section, all other provisions of Chapter 7 shall apply.

Reason Statement: American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI) has developed industry consensus on performance-based structural fire design within the ASCE/SEI 7 standard [1] as demonstrated in their freely-available ASCE/SEI Design Guide (Performance-Based Structural Fire Design: Exemplar Designs of Four Regionally Diverse Buildings using ASCE 7-16, Appendix E) [2]. For the first time in U.S. practice, this standard establishes the process that enables designers to upgrade structures (e.g., structural connections) to be intrinsically safer to fire effects (e.g., restrained thermal expansion/contraction and large deflections) in order to better protect building occupants and firefighters from structural collapse due to uncontrolled fire events. Also, ASCE/SEI 7 Appendix E works within the greater ASCE/SEI 7 context which is important to ensure that fire effects are analyzed in a similar fashion as other structural loads (e.g., wind and seismic). Notably, ASCE/SEI 7 Appendix E Section E.3 requires for a structural fire design to comply with the requirements of ASCE/SEI 7 Section 1.3.1.3, which details peer review requirements among other structural engineering aspects. Lastly, the standard is structured to formally integrate building officials into the design process in a similar manner as performance-based structural engineering is conducted for other design hazards (e.g., blast, seismic, and wind). In summary, this code change proposal adds the appropriate reference to the ASCE/SEI 7 standard for performance-based structural fire design. Importantly, ASCE/SEI 7 Appendix E Appendix E provides material-neutral and critical overarching requirements.
This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

https://www.cdpaccess.com/proposal/8203/24809/files/download/2858/
https://www.cdpaccess.com/proposal/8203/24809/files/download/2840/
https://www.cdpaccess.com/proposal/8203/24809/files/download/2839/

Bibliography: [1] ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures, Appendix E: Performance-Based Design Procedures for Fire Effects on Structures, American Society of Civil Engineers: Structural Engineering Institute, 2016
[2] ASCE/SEI Performance-Based Structural Fire Design: Exemplar Designs of Four Regionally Diverse Buildings using ASCE 7-16, Appendix E, American Society of Civil Engineers: Structural Engineering Institute and Charles Pankow Foundation, 2020 < https://ascelibrary.org/doi/book/10.1061/9780784482698 >.

The following attachment (free/open source) per Reference [1] and [2]: https://eshare.element.com/url/3udcsdjqruhpdnqk

Also, the following link where the Design Guide can be freely viewed or downloaded (simply click “PDF”): Performance-Based Structural Fire Design | Books (ascelibrary.org)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code change would have no direct impact on construction costs since alternative methods are already being conducted in practice and the performance-based structural fire design procedures in ASCE/SEI 7 represent current industry best practices.

S134-22

S135-22

IBC: 1701.1

Proponents: Gregory Robinson, representing National Council of Structural Engineers Associations (grobinson@lbyd.com)

2021 International Building Code

Revise as follows:

1701.1 Scope. The provisions of this chapter shall govern the quality, workmanship and requirements for materials covered. Materials of construction and tests shall conform to the applicable standards listed in this code. <u>Compliance with approved construction documents shall be verified through inspections set forth in Chapter 1, as well as tests, special inspections, structural observations, and submittals to the building official set forth in this chapter.</u>

Reason Statement: This proposal clarifies the purpose of special inspections and tests, etc., that are part of Chapter 17 and in addition to those required by Chapter 1. While this section indicates materials are to be tested, the chapter also includes special inspections, which are performed on construction work and are in addition to Chapter 1 inspections. Providing such clarity enables Owners and Building Officials to align expectations as to what is provided by the Building Official and what the Owner needs to hire for special inspections and materials testing, as well as structural observations. In addition, some components and systems, such as prefabricated assemblies, require a certificate of compliance per Section 1704.5.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction. This proposal clarifies code intent. These changes are not expected to affect cost of construction.

S135-22

S136-22

IBC: 1704.2.4

Proponents: Gregory Robinson, representing National Council of Structural Engineers Associations (grobinson@lbyd.com)

2021 International Building Code

Revise as follows:

1704.2.4 Report requirement. *Approved agencies* shall keep records of *special inspections* and tests. The *approved agency* shall submit all reports of *special inspections* and tests to the *building official* and to the *registered design professional in responsible charge* *at frequencies required by the approved construction documents or building official.* *All* r~~R~~eports shall describe the nature and extent of inspections and tests, the location within the structure where the inspections and tests were performed, and indicate that work inspected or tested was or was not completed in conformance to *approved construction documents*. Discrepancies shall be brought to the immediate attention of the contractor for correction. If they are not corrected, the discrepancies shall be brought to the attention of the *building official* and to the *registered design professional in responsible charge* prior to the completion of that phase of the work. A final report documenting required *special inspections* and tests, and correction of any discrepancies noted in the inspections or tests, shall be submitted at a point in time agreed upon prior to the start of work by the owner or the owner's authorized agent to the *building official*.

Reason Statement: This clarifies the nature of acceptable special inspection and test reports. The current code language lacks clarity regarding such reports. Many reports submitted are vague in nature and lacking key information about the inspection performed and where. This proposal addresses the need for more information on the reports to confirm that code required inspects and tests have been performed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies code intent. These changes are not expected to affect cost of construction.

S136-22

S137-22

IBC: 1704.3, 1704.3.1

Proponents: Gregory Robinson, representing National Council of Structural Engineers Associations (grobinson@lbyd.com)

2021 International Building Code

1704.3 Statement of special inspections. Where *special inspections* or tests are required by Section 1705, the *registered design professional in responsible charge* shall prepare a statement of *special inspections* in accordance with Section 1704.3.1 for submittal by the applicant in accordance with Section 1704.2.3.

> **Exception:** The statement of *special inspections* is permitted to be prepared by a qualified person *approved* by the *building official* for construction not designed by a *registered design professional*.

Revise as follows:

1704.3.1 Content of statement of special inspections. The statement of *special inspections* shall identify the following:

1. The materials, systems, components and work required to have *special inspections* or tests by the *building official* or by the *registered design professional* responsible for each portion of the work.
2. The type and extent of each *special inspection*.
3. The type and extent of each test.
4. Additional requirements for *special inspections* or tests for seismic or wind resistance as specified in Sections 1705.12, 1705.13 and 1705.14 .
5. For each type of *special inspection*, identification as to whether it will be continuous *special inspection*, periodic *special inspection* or performed in accordance with the notation used in the referenced standard where the inspections are defined.
6. <u>Deferred submittal items that may require a supplemental statement of special inspections to be prepared.</u>

Reason Statement: This proposal is complimentary to the proposed modifications to Section 107.3.4.1.1. The proposed language is intended to have the registered design professional in responsible charge, who is responsible for the overall preparation and submission of the statement of special inspections, to identify the deferred submittal items within the statement of special inspections that may require additional special inspections and tests, etc., so that the building official and owner know the associated special inspections and tests have not been provided, yet, but they may be expected as part of the deferred submittal. This proposal clarifies that some items have not been fully designed at the time of permit application. Item 1 of Section 1704.3.1 already indicates that the determination of which special inspections or tests are required for work related to deferred submittals by the design professional responsible for its design. The building official and owner, however, may not know that such work will have special inspections or tests that have not been identified in the statement of special inspections submitted at the time of application for permit. Substantial structural systems, components, and connections (e.g., precast concrete structural members and connections, as well as steel moment connections) are often deferred to the contractor to provide the most economical, locally-available solutions for the owner. If these special inspections or tests for work that is part of the deferred submittal are not provided by the registered professional responsible for its design, because they did not know they were responsible for it and thought the architect- or engineer-of-record would specify all special inspections and tests, it could jeopardize the life-safety of the building due to critical elements not undergoing special inspections or tests in accordance with the Code. Overall, this language clarifies that the work related to deferred submittals shall have special inspections or tests determined by the design professional responsible for its design.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction, although, by alerting the owner of forthcoming special inspections and tests that are in addition to those specified in the statement of special inspections submitted at time of application for permit, the associated costs are not unexpected. This proposal clarifies code intent. These changes are not expected to affect cost of construction.

S137-22

S138-22

IBC: 1704.3.1

Proponents: Gregory Robinson, representing National Council of Structural Engineers Associations (grobinson@lbyd.com)

2021 International Building Code

Revise as follows:

1704.3.1 Content of statement of special inspections. The statement of *special inspections* shall identify the following:

1. The materials, systems, components and work required to have *special inspections* or tests by the *building official* or by the *registered design professional* responsible for each portion of the work.
2. The type and extent of each *special inspection*.
3. The type and extent of each test.
4. Additional requirements for *special inspections* or tests for seismic or wind resistance as specified in Sections 1705.12, 1705.13 and 1705.14 .
5. For each type of *special inspection*, identification as to whether it will be continuous *special inspection*, periodic *special inspection* or performed in accordance with the notation used in the referenced standard where the inspections are defined.

<u>For deferred submittals, a list of special inspections, tests and structural observations for materials and work described within the deferred submittal shall be included with the deferred submittal.</u>

Reason Statement: The proposed language is intended to have the registered design professional(s) responsible for the design of the deferred submittal item(s) prepare a supplemental list of special inspections to identify the additional tests and special inspections, etc. for the deferred submittal items. This proposal clarifies that some items have not been fully designed at the time of permit application. Item 1 of Section 1704.3.1 already indicates that the determination of which special inspections or tests are required for work related to deferred submittals is by the design professional responsible for its design. The building official and owner, however, may not know that such work will have special inspections or tests that have not been identified in the statement of special inspections submitted at the time of application for permit. Substantial structural systems, components, and connections (e.g., precast concrete structural members and connections, as well as steel moment connections) are often deferred to the contractor to provide the most economical, locally-available solutions for the owner. If these special inspections or tests for work that is part of the deferred submittal are not provided by the registered professional responsible for its design, because they did not know they were responsible for it and thought the architect- or engineer-of-record would specify all special inspections and tests, it could jeopardize the life-safety of the building due to critical elements not undergoing special inspections or tests in accordance with the Code. Overall, this language clarifies that the work related to deferred submittals shall have special inspections or tests determined by the design professional responsible for its design.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction, although, by alerting the owner of forthcoming special inspections and tests that are in addition to those specified in the statement of special inspections submitted at time of application for permit, the associated costs are not unexpected. This proposal clarifies code intent. These changes are not expected to affect cost of construction.

S138-22

S139-22

IBC: 1704.6, 1704.6.1, 1704.7 (New)

Proponents: Gregory Robinson, representing National Council of Structural Engineers Associations (grobinson@lbyd.com)

2021 International Building Code

Revise as follows:

1704.6 Structural observations. Where required by the provisions of Section 1704.6.1, the owner or the owner's authorized agent shall employ a *registered design professional* to perform *structural observations* acceptable to the *registered design professional in responsible charge* of the structural design to be a structural observer performing *structural observations*. The structural observer shall visually observe the construction at representative locations of structural systems, details and load paths in accordance with the statement of *structural observations* in Section 1704.7 for general conformance to the approved construction documents. *Structural observation* does not include or waive the responsibility for the inspections in Section 110 or the *special inspections* in Section 1705 or other sections of this code. Prior to the commencement of construction work requiring structural observations, identification of the structural observer shall be communicated to the building official ~~observations, the structural observer shall submit to the *building official* a written statement identifying the frequency and extent of *structural observations*~~. At the conclusion of the work included in the permit, the structural observer shall submit to the *building official* a written statement that the structural observations ~~site visits~~ have been made in accordance with the statement of *structural observations* and identify any reported deficiencies that, to the best of the structural observer's knowledge, have not been resolved.

1704.6.1 Structural observations for structures. *Structural observations* shall be provided for those structures where one or more of the following conditions exist:

1. The structure is classified as *Risk Category III or* IV.
2. The structure is a *high-rise building*.
3. The structure is assigned to *Seismic Design Category* E, and is greater than two stories above the grade plane.
4. Such observation is required by the *registered design professional* responsible for the structural design.
5. Such observation is ~~specifically~~ required by the *building official*.

Add new text as follows:

1704.7 Statement of structural observations. Where structural observations are required by Section 1704.6, the *registered design professional* responsible for the structural design shall prepare a statement of structural observations for submittal to the building official as a condition for permit issuance. The statement of structural observations shall include the following:

1. The extent of *structural observations.*
2. The construction stages at which *structural observations* shall occur.
3. Documentation required, reporting of any identified structural discrepancies, and submittal requirements for observations.
4. Written statement by the structural observer at the conclusion of the work in accordance with Section 1704.6.

Reason Statement: The proposal requires that when applicable, a plan for structural observations, along with documentation requirements for those, is submitted simultaneously with the statement of special inspections as a comprehensive program and a condition for a permit. Previous similar proposals were rejected, in part, due to requiring information be provided when such information is typically unknown at the time, such as identification of the structural observer to be employed by the owner or owner's representative. The current proposal addresses this prior concern through requiring communication to the building official the identification of the structural observer prior to commencing construction requiring structural observations rather than prior to permit issuance. Previous recommendations to prior proposals also included adding a list of discrepancies to be documented. Rather than specifically identify discrepancies, which may inadvertently limit structural observations to the detriment of the project, the broad requirement to identify structural discrepancies is included in the structural observation documentation, along with submittal requirements of such, in the new Section 1704.7 proposal. Further modifications provided to clarify code intent regarding the nature of structural observations and competency of the structural observer.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No inspection tasks are added or eliminated, the overall program of construction quality assurance (tests, inspections, and observations) is clearly defined at time of permitting.

S139-22

S140-22

IBC: 1705.1, 1705.1.1, 1705.1.2 (New)

Proponents: Joseph Cain, representing Solar Energy Industries Association (SEIA) (JoeCainPE@gmail.com)

2021 International Building Code

1705.1 General. *Special inspections* and tests of elements and nonstructural components of buildings and structures shall meet the applicable requirements of this section.

1705.1.1 Special cases. *Special inspections* and tests shall be required for proposed work that is, in the opinion of the *building official*, unusual in its nature, such as, but not limited to, the following examples:

1. Construction materials and systems that are alternatives to materials and systems prescribed by this code.
2. Unusual design applications of materials described in this code.
3. Materials and systems required to be installed in accordance with additional manufacturer's instructions that prescribe requirements not contained in this code or in standards referenced by this code.

Add new text as follows:

1705.1.2 Ground-mounted photovoltaic (PV) panel systems. *Special inspections* and tests shall not be required for *ground-mounted photovoltaic (PV) panel systems* serving Group R-3 buildings. The *building official* shall be permitted to modify or exempt *special inspection* requirements for *deep foundation* elements for *ground-mounted PV panel systems.*

Reason Statement: A requirement for continuous Special Inspection for foundations for photovoltaic panel systems is overly restrictive.
For smaller installations -- such as residential ground-mounted photovoltaic panel systems -- continuous special inspection beyond the AHJ/County inspection adds project cost disproportionate to the risk to the project. Most AHJ/County Building Officials have agreed that special inspection is not necessary or reasonable for these small systems.

The first statement in proposed Section 1705.1.2 seeks to formalize the exemption that is commonly applied to small systems.

Large-scale (often called "utility scale") photovoltaic power plants often have tens of thousands of small piles. As project financing often involves third-party investors, existing measures of quality control are already in place. The developer and/or EPC (Engineer, Procure, Construct) contractor often use a rigorous design and testing process to optimize pile specifications, as part of value engineering. As part of their risk-management process, project financiers often use third-party Independent Engineers (IE's) to ensure quality controls are in place. Under current practice, it is extremely uncommon for local Building Officials to require Special Inspection for "deep" foundations for photovoltaic panel systems, regardless of the absence of an exception for these systems.

Large-scale photovoltaic power plants usually incorporate rigorous design and quality control steps, as follows:

1. Foundation elements designed by analysis, based on geotechnical investigation.

2. As thousands of small piles are used in a photovoltaic pow er plant, optimization of design usually includes preconstruction pile load testing conducted on site. Independent Engineers (IE's) often review test reports.

3. EPC contractor has their ow n internal quality control.

4. A representative sample of production piles (for example, 1 percent) are usually proof-tested during construction, to ensure adequate pile capacities are being achieved. Adjustments are made if necessary to meet the demand.

5. County/AHJ inspectors usually conduct periodic observation of pile installation. For large-scale power plants, these inspectors are often third-party inspectors.

6. IE's usually conduct site visits to observe installation methods and review inspection reports and production pile load test reports. A final report is prepared by the IE.

Owing to this rigorous program of quality control, continuous special inspection of "deep" foundations is highly redundant. A Special Inspector could be required to be on-site for one to three months watching piles being installed, even though the same piles are already being observed and monitored by the Developer, the EPC Contractor, the AHJ/County inspector, and the Independent Engineer.

The second statement in proposed Section 1705.1.2 seeks to allow the Building Official the flexibility allow modifications or exemptions to special inspection requirements, without taking away any such authority. For example, a Building Official could decide that an agreed-upon frequency of periodic special inspection, or might be satisfied with quality controls in place on behalf of the owner or EPC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction. In some cases, this proposal could decrease the cost of construction, where continuous special inspection is no longer a stated requirement for ground-mounted photovoltaic panel systems.

S140-22

S141-22

IBC: 1705.2.2 (New), AISC Chapter 35 (New)

Proponents: Jon-Paul Cardin, representing American Institute of Steel Construction (jcardin@steel.org)

2021 International Building Code

Add new text as follows:

1705.2.2 Structural Stainless Steel. *Special inspections* and nondestructive testing of structural stainless steel elements in buildings and portions thereof shall be in accordance with the quality assurance inspection requirements of AISC 370.

Add new standard(s) as follows:

AISC

American Institute of Steel
130 East Randolph Street, Suite 2000
Chicago, IL 60601-6219

ANSI/AISC 370-21 Specification for Structural Stainless Steel Buildings

Staff Analysis: A review of the standard proposed for inclusion in the code, AISC ANSI/AISC 370-21 Specification for Structural Stainless Steel Buildings, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: AISC 370 - Specification for Structural Stainless Steel Buildings is a new specification developed as a consensus document using ANSI-accredited procedures to provide a uniform practice in the design of structural stainless steel framed buildings. AISC 370 Chapter N addresses the minimum requirements for quality control, quality assurance, and nondestructive testing for structural stainless steel systems for buildings and other structures. The reference to this specification for the design, fabrication and erection of structural stainless steel is proposed to be added to Chapter 22 in another code change proposal. Reference to this standard in IBC Chapter 17 provides design professionals and building professionals with standardized methods for special inspection and nondestructive testing of these structures.
The AISC 370 Specification can be downloaded for free at www.aisc.org/publications/steel-standards/

Bibliography: AISC, “ANSI/AISC 370 - Specification for Structural Stainless Steel Buildings", American Institute of Steel Construction, Chicago, IL, 2021 edition.

Cost Impact: The code change proposal will increase the cost of construction
It is likely that the special inspection and nondestructive testing of structural stainless steel buildings and other structures was already being accomplished. However, if it was not being conducted, then these proposed provisions in the building code will ensure that they are accomplished in accordance with AISC 370.

S141-22

S142-22

IBC: 1705.2.5 (New), SECTION 202 (New), Table 1705.2.5 (New)

Proponents: Gregory Robinson, representing National Council of Structural Engineers Associations (grobinson@lbyd.com)

2021 International Building Code

Add new text as follows:

1705.2.5 Metal building systems. Special inspections of metal building systems shall be performed in accordance with Sections 1705.2.1, 1705.2.2, 1705.2.3, and 1705.2.4, and in accordance with Table 1705.2.5. The *approved agency* shall perform inspections of the erected *metal building system* to verify compliance with the *approved construction documents.*

Add new definition as follows:

METAL BUILDING SYSTEMS. Metal building systems are professionally engineered structures that typically include basic metal elements such as primary rigid frames, orthogonal braced frames, as well as secondary members such as wall girts and roof purlins, cladding, and rollover bracing, all designed to act as an integrated building system.

Add new text as follows:

Table 1705.2.5 SPECIAL INSPECTIONS OF METAL BUILDING SYSTEMS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Installation of rafter / beam flange braces and column flange braces.	---	X
2. Installation of purlins and girts, including specified lapping.	---	X
3. Purlin and girt restraint / bridging / bracing.	---	X
4. Installation of X-bracing, including proper tightening of X-bracing.	---	X

Staff Analysis: CC# S142-22 and CC# S197-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This proposal is complimentary to the proposed changes for metal building systems in Chapter 22. Metal building systems are generally highly optimized structures that are heavily dependent on bracing components to work per the design intent. The bracing components often consist of materials that aren't considered to be "structural steel," and therefore inspection of the completed installation of those critical components are often overlooked.

Metal building systems typically contain components that may be made of different types of metal, such as structural steel, cold-formed steel and cables. While the individual components are often covered by the various special inspections and tests found in Section 1705.2.1 through 1705.2.4, the systems used in metal building systems are often unique and not covered by other sections. In addition, metal building systems are generally highly-optimized structures that are heavily dependent on bracing components to work per the design intent. The bracing components often consist of materials that are not considered to be "structural steel," and therefore inspection of the completed installation of those critical components are often overlooked. Therefore, the proposed language is intended to add requirements for commonly-used systems not covered elsewhere.

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal may slightly increase the cost of construction, although the new special inspections will improve life-safety by reducing the incorrect construction of metal building systems.

S142-22

S143-22

IBC: TABLE 1705.3

Proponents: Stephen Skalko, representing Precast/Prestressed Concrete Institute (svskalko@svskalko-pe.com); Edith Smith, representing Precast/Presressed Concrete Institiute (esmith@pci.org)

2021 International Building Code

Revise as follows:

TABLE 1705.3 REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

Portions of table not shown remain unchanged.

TYPE		CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD[a]	IBC REFERENCE
2. Reinforcing bar welding:				AWS D1.4 ACI 318: ~~26.6.4~~ 26.13.3	—
a.	Verify weldability of reinforcing bars other than ASTM A706;	-	X		
b.	Inspect welding of reinforcement for special moment frames, boundary elements of special structural walls, and coupling beams.	X	-		
c.	Inspect welded reinforcement splices; and	X	-		
~~b~~ d.	Inspect single-pass fillet welds, maximum $^{5}/_{16}''$; and	-	X		
~~c.~~ e	Inspect all other welds.	~~X~~ -	X		

For SI: 1 inch = 25.4 mm.

Reason Statement: This proposed change coordinates the special inspection provisions for welding of reinforcing steel in the IBC with the provisions in Section 26.13.3 of ACI 318. New Item 2(b) adds the requirement for continuous inspection of welding of reinforcement in special moment frames, boundary elements of special structural walls, and coupling beams as required by ACI 318 Section 26.13.2(d). Because of the critical nature of welded reinforcement splices, new Item 2(c) is added to require continuous special inspection of all welded reinforcement splices. Existing Item 2(b) for periodic inspection of single pass fillet welds is renumbered as Item (d). And existing Item 2(c) for special inspection of all other welds is renumbered as Item 2(e) and revised to permit these welds to be performed as a periodic special inspection since the critical welds covered by new Items 2(b) and 2(c) have been re-introduced introduced into the table.

A review of the 2012 or any earlier edition of the IBC would show that the inspection requirements were essentially the same as what is now proposed (and as they are also in ACI 318-19). The requirements have been in their current form since the 2015 IBC, as the result of Code Change S148-12. That code change was said to be organizational; yet it turned out to be a very substantive change. This proposed change corrects the inconsistency.

Cost Impact: The code change proposal will decrease the cost of construction

The cost of precast concrete construction, where welding of reinforcing bars is not uncommon, should decrease modestly through the elimination of unnecessary continuous special inspection in many cases.

S143-22

S144-22

IBC: 1705.4, SECTION 2109

Proponents: Jason Thompson, representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

The primary section number and title shown as deleted (2109) includes the deletion of all sections and subsections within it. For clarity, the full text of these deletions is not shown.

2021 International Building Code

Revise as follows:

1705.4 Masonry construction. *Special inspections* and tests of masonry construction shall be performed in accordance with the quality assurance program requirements of TMS 402 and TMS 602.

Exception: *Special inspections* and tests shall not be required for:

1. Glass unit masonry or masonry veneer designed in accordance with Section 2110 or Chapter 14, ~~Empirically designed masonry, *glass unit masonry* or masonry *veneer* designed in accordance with Section 2109, Section 2110 or Chapter 14,~~ respectively, where they are part of a structure classified as *Risk Category* I, II or III.
2. Masonry foundation walls constructed in accordance with Table 1807.1.6.3(1), 1807.1.6.3(2), 1807.1.6.3(3) or 1807.1.6.3(4).
3. Masonry fireplaces, masonry heaters or masonry chimneys installed or constructed in accordance with Section 2111, 2112 or 2113, respectively.

Delete without substitution:

~~SECTION 2109~~

~~EMPIRICAL DESIGN OF ADOBE MASONRY~~

Reason Statement: The option for empirically designed masonry has been removed from the 2022 edition of TMS 402. As such, references to these provisions from the IBC are also being deleted - including all of Section 2109 of the IBC. Of note, the scope of Section 2109 is limited to empirically designed adobe masonry construction. Although there is a reference to the empirical design provisions of TMS 402 in Section 2109, there are questions as to whether the use of the empirical design provisions of TMS 402, which were developed for clay and concrete masonry construction, are appropriate and applicable to adobe masonry construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal simply deletes a historical design method that is no longer included in the referenced standard.

S144-22

S145-22

IBC: 1705.7, 1705.8, 1705.9

Proponents: Joseph Cain, representing Solar Energy Industries Association (SEIA) (JoeCainPE@gmail.com)

2021 International Building Code

Revise as follows:

1705.7 Driven deep foundations. *Special inspections* and tests shall be performed during installation of driven *deep foundation* elements as specified in Table 1705.7. The approved geotechnical report and the construction documents prepared by the *registered design professionals* shall be used to determine compliance.

Exceptions:

1. Driven *deep foundations* for *ground-mounted photovoltaic (PV) panel systems* serving Group R-3 buildings.
2. The *building official* shall be permitted to modify or exempt *special inspection* requirements for driven *deep foundations* for *ground-mounted photovoltaic panel systems*.

1705.8 Cast-in-place deep foundations. *Special inspections* and tests shall be performed during installation of cast-in-place *deep foundation* elements as specified in Table 1705.8. The *approved* geotechnical report and the *construction documents* prepared by the *registered design professionals* shall be used to determine compliance.

Exceptions:

1. Cast-in-place *deep foundations* for *ground-mounted photovoltaic (PV) panel systems* serving Group R-3 buildings.
2. The *building official* shall be permitted to modify or exempt *special inspection* requirements for cast-in-place *deep foundations* for *ground-mounted photovoltaic panel systems*.

1705.9 Helical pile foundations. *Continuous special inspections* shall be performed during installation of *helical pile* foundations. The information recorded shall include installation equipment used, pile dimensions, tip elevations, final depth, final installation torque and other pertinent installation data as required by the *registered design professional* in responsible charge. The *approved* geotechnical report and the *construction documents* prepared by the *registered design professional* shall be used to determine compliance.

Exceptions:

1. *Helical pile* foundations for *ground-mounted photovoltaic (PV) panel systems* serving Group R-3 buildings.
2. The *building official* shall be permitted to modify or exempt *special inspection* requirements for *helical pile foundations* for *ground-mounted photovoltaic panel systems*.

Reason Statement: A requirement for continuous Special Inspection for foundations for photovoltaic panel systems is overly restrictive.
For smaller installations -- such as residential ground-mounted photovoltaic panel systems -- continuous special inspection beyond the AHJ/County inspection adds project cost disproportionate to the risk to the project. Most AHJ/County Building Officials have agreed that special inspection is not necessary or reasonable for these small systems.

Proposed Exception 1 seeks to formalize the exemption that is commonly applied to small systems.

Large-scale (often called "utility scale") photovoltaic power plants often have tens of thousands of small piles. As project financing often involves third-party investors, existing measures of quality control are already in place. The developer and/or EPC (Engineer, Procure, Construct) contractor often use a rigorous design and testing process to optimize pile specifications, as part of value engineering. As part of their risk-management process, project financiers often use third-party Independent Engineers (IE's) to ensure quality controls are in place. Under current practice, it is extremely uncommon for local Building Officials to require Special Inspection for "deep" foundations for photovoltaic panel systems, regardless of the absence of an exception for these systems.

Large-scale photovoltaic power plants usually incorporate rigorous design and quality control steps, as follows:

1. Foundation elements designed by analysis, based on geotechnical investigation.

2. As thousands of small piles are used in a photovoltaic pow er plant, optimization of design usually includes preconstruction pile load testing conducted on site. Independent Engineers (IE's) often review test reports.

3. EPC contractor has their ow n internal quality control.

4. A representative sample of production piles (for example, 1 percent) are usually proof-tested during construction, to ensure adequate pile capacities are being achieved. Adjustments are made if necessary to meet the demand.

5. County/AHJ inspectors usually conduct periodic observation of pile installation. For large-scale power plants, these inspectors are often third-party inspectors.

6. IE's usually conduct site visits to observe installation methods and review inspection reports and production pile load test reports. A final report is prepared by the IE.

Owing to this rigorous program of quality control, continuous special inspection of "deep" foundations is highly redundant. A Special Inspector could be required to be on-site for one to three months watching piles being installed, even though the same piles are already being observed and monitored by the Developer, the EPC Contractor, the AHJ/County inspector, and the Independent Engineer.

Proposed Exception 2 seeks to allow the Building Official the flexibility allow modifications or exemptions to special inspection requirements, without taking away any such authority. For example, a Building Official could decide that an agreed-upon frequency of periodic special inspection, or might be satisfied with quality controls in place on behalf of the owner or EPC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction. In some cases, this proposal could decrease the cost of construction, where continuous special inspection is no longer a stated requirement for ground-mounted photovoltaic panel systems.

S145-22

S146-22

IBC: 1705.21 (New)

Proponents: Paul Armstrong, representing MBCEA

2021 International Building Code

Add new text as follows:

1705.21 Metal building assembly. Special inspections for new and altered metal building systems shall be as required by Section 1705.21.1 and Table 1705.21.

> **Exception:** Special inspections are not required if the metal building assembler has a Metal Building Assembler accreditation from an approved nationally recognized accrediting body.

1705.21 Required Verification and Inspection of Metal Buildings

Special Inspection and Verification	Continuous Inspection	Periodic Inspection
1.Inspection of properly installed primary structural components including verification of anchor bolt locations	---	X
2. Inspection of properly installed structural bolts and fasteners	---	X
3. Verify use of manufacturer's drawings and instructions and compliance with both	---	X
4. Primary and secondary steel members have not been modified without manufacturer approval	---	X
5. Framework properly plumbed and squared and then all bolts tightened	---	X
6. Secondary members are straight and true and in according to locations shown on manufacturer's drawings	---	X
7. Roof and wall sheets are properly aligned, lapped and fully fastened and are free from oil canning	---	X
8. Sheeting fasteners are properly installed and aligned with screws or rivets filling all drilled holes	---	X
9. Mastics properly installed at laps and at manufacturer's requirements.	---	X
10. Trims are properly installed, straight, true, cut and terminated	---	X
11. Insulation is properly installed and free from sags, rips, tears and snags	---	X

Reason Statement: The added special inspection requirements are necessary to address the problems with the installation of metal buildings. Structural failures have occurred due to a lack of understand how these buildings are designed and constructed. There is very little training for local jurisdictional inspection staff and it is recognized that the approved manufacturer's installation instructions/requirements are difficult to understand without very detailed checklists. End users and architects also struggle with compliance from Metal Building assemblers.

The added special inspection requirements will improve the performance of metal buildings by providing much better quality control. It will also add value to the end user of such buildings by ensuring the longevity of the built systems.

Cost Impact: The code change proposal will increase the cost of construction

There will be a slight increase in the cost of construction due to the special inspection costs.

S146-22

S147-22

IBC: 1709.5, WDMA Chapter 35 (New)

Proponents: Jeff Inks, representing Window & Door Manufacturers Association (jinks@wdma.com); Craig Drumheller, representing Window & Door Manufacturers Association (cdrumheller@wdma.com)

2021 International Building Code

Revise as follows:

1709.5 Exterior window and door assemblies. The design pressure rating of exterior windows and doors in buildings shall be determined in accordance with Section 1709.5.1 or 1709.5.2. For exterior windows and doors tested in accordance with Section 1709.5.1 or 1709.5.2, required design wind pressures determined from ASCE 7 shall be permitted to be converted to allowable stress design by multiplying by 0.6.

> **Exception:** Structural wind load design pressures for window or door assembiles other than the size tested in accordance with Section 1709.5.1 or 1709.5.2 shall be permitted to be different than the design value of the tested assembly, provided that such pressures are determined by accepted engineering analysis or validated by an additional test of the window or door assembly to the alternative allowable design pressure in accordance with Section 1709.5.2. Components of the alternate size assembly shall be the same as the tested or labeled assembly. Where engineering analysis is used, it shall be performed in accordance with the analysis procedures of AAMA 2502 <u>or WDMA I.S. 11</u>.

Add new standard(s) as follows:

WDMA

Window and Door Manufacturers Association
2025 M Street NW, Suite 800
Washington, DC 20006

<u>WDMA I.S. 11-2018</u> <u>Industry Standard for Voluntary Analytical Method for Design Pressure (DP) Ratings of Fenestration Products</u>

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, WDMA I.S. 11–2018 Industry Standard for Voluntary Analytical Method for Design Pressure (DP) Ratings of Fenestration Products, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The exception under 1709.5 Exterior window and door assemblies, allows for comparative analysis to be used for determining design pressures of different sized products within a given fenestration product line based on the testing and rating of a prototype unit/s for that product line. As required by the exception under 1709.5, comparative analysis determinations for this purpose must be in accordance with accepted engineering analysis and in accordance with AAMA 2502. *Comparative Analysis Procedure for Window and Door Products.* Comparative analysis alleviates the need for costly testing of all sizes within a product line that isn't necessary saving considerable construction costs and providing greater design flexibility, especially for specialty and custom products.
.

Consistent with AAMA 2502, WDMA I.S. 11 - *Industry Standard for Voluntary Analytical Method for Design Pressure (DP) Ratings of Fenestration Products* provides standardized accepted engineering analysis procedures for accurately determining design pressure ratings of window and door assemblies based on comparative analysis accordingly. WDMA I.S. 11 has been included as an accepted comparative analysis methodology for window and door assemblies in section 609.3.1 Comparative analysis of The *International Residential Code* (IRC) since the 2015 edition. Adding WDMA I.S. 11 as an additional comparative analysis option in the exception under section 1709.5 will allow even greater cost effective design flexibility and will also make the IBC consistent with the same requirements in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Including WDMA I.S. 11 does however provide an additional cost saving option for determining design pressures for window and door assemblies using comparative analysis in accordance with the provisions of 1709.5.

S147-22

S148-22

IBC: 1803.5.1, ASTM Chapter 35 (New)

Proponents: Lori Simpson, representing GeoCoalition (lsimpson@langan.com); Daniel Stevenson, representing GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1803.5.1 Classification. Soil materials shall be classified in accordance with ASTM D2487. Rock shall be classified in accordance with ASTM D5878.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D5878-19 Standard Guides for Using Rock-Mass Classification Systems for Engineering Purpose

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D5878-19 Standard Guides for Using Rock-Mass Classification Systems for Engineering Purpose, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Rock should be classified in accordance with a standard for consistency.

Bibliography: ASTM D5878 Standard Guides for Using Rock-Mass Classification Systems for Engineering Purposes

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No change to cost - this change is to make rock classification in accordance with a standard.

S148-22

S149-22

IBC: 1803.5.2

Proponents: Lori Simpson, representing GeoCoalition (lsimpson@langan.com); Daniel Stevenson, representing GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1803.5.2 Questionable soil and rock. Where the classification, strength, moisture sensitivity or compressibility of the soil or rock is in doubt or where a load-bearing value superior to that specified in this code is claimed, the *building official* shall be permitted to require that a geotechnical investigation be conducted.

Reason Statement:

1. Rock should be included as part of the evaluation of questionable material
2. "Moisture-sensitive" is also a questionable characteristic that the building official may consider when requiring a geotechnical investigation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
this change includes rock and adds "moisture sensitive" as a questionable characteristics, which will not change the cost of construction

S149-22

S150-22

IBC: 1803.5.3, ASTM Chapter 35 (New)

Proponents: Lori Simpson, representing GeoCoalition (lsimpson@langan.com); Daniel Stevenson, representing GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1803.5.3 Expansive or collapsible soil. In areas likely to have expansive or collapsible soil or weathered rock, the *building official* shall require soil tests to determine where such soils do exist. The presence of expansive or collapsible soil or weathered rock shall be determined using the procedures described in ASTM D4546.
Alternatively, for expansive soils, soils meeting all four of the following provisions shall be considered to be expansive, except that tests to show compliance with Items 1, 2 and 3 shall not be required if the test prescribed in Item 4 is conducted:

1. Plasticity index (PI) of 15 or greater, determined in accordance with ASTM D4318
2. More than 10 percent of the soil particles pass a No.200 sieve (75 µm), determined in accordance with ASTM D422.
3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D422.
4. Expansion index greater than 20, determined in accordance with ASTM D4829.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D4546-21 Standard Test Methods for One-Dimensional Swell or Collapse of Soils

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D4546-21 Standard Test Methods for One-Dimensional Swell or Collapse of Soils, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.
A review of the standard proposed for inclusion in the code, ASTM D6913/D6913M-17 Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement:
1. The title change is because the volume change can be either expansive or collapsible. Collapsible soil has not been previously addressed in the code.
2. The revised D4546 (Standard Test Method for One-dimensional Swell or Collapse of Soils) is the recognized standard that deals with expansive and collapsible soils. The proposed modification to this section brings the IBC into consistency with current ASTM standard procedures.
3. This section still allows for expansive soils to be identified using the tests indicated in the current code, by providing this option as an alternative to using D4546.

Bibliography:

1. ASTM D4546 Standard Test Methods for One-Dimensional Swell or Collapse of Soils
2. ASTM D6913 Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Changes use current ASTM standards and do not affect cost of construction.

S150-22

S151-22

IBC: 1803.5.3, ASTM Chapter 35 (New)

Proponents: Lori Simpson, representing GeoCoalition (lsimpson@langan.com); Daniel Stevenson, representing GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1803.5.3 Expansive soil. In areas likely to have expansive soil, the *building official* shall require soil tests to determine where such soils do exist. Soils meeting all four of the following provisions shall be considered to be expansive, except that tests to show compliance with Items 1, 2 and 3 shall not be required if the test prescribed in Item 4 is conducted:

1. Plasticity index (PI) of 15 or greater, determined in accordance with ASTM D4318
2. More than 10 percent of the soil particles pass a No.200 sieve (75 µm), determined in accordance with ASTM ~~D422~~ D6913.
3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM ~~D422~~ D6913.
4. Expansion index greater than 20, determined in accordance with ASTM D4829.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D6913/D6913M-17	Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D6913/D6913M-17 Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: ASTM has retired the older standard D422 and replaced it with D6913.

Bibliography: ASTM D6913 Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Updated to current ASTM standard and does not affect cost of construction.

S151-22

S152-22

IBC: 1803.5.4

Proponents: Lori Simpson, representing GeoCoalition (lsimpson@langan.com); Daniel Stevenson, representing GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1803.5.4 ~~Ground-water table~~ Groundwater. A ~~subsurface soil~~ geotechnical investigation shall be performed to determine ~~whether~~ if:

1. ~~the existing ground-water table~~ Groundwater is above or within 5 feet (1524 mm) below the elevation of the *lowest floor* level where such floor is located below the finished ground level adjacent to the foundation ; and
2. the groundwater depth will affect the design and construction of buildings and structures.

~~**Exception:** A subsurface soil investigation to determine the location of the ground-water table shall not be required where waterproofing is provided in accordance with Section 1805.~~

Reason Statement:

1. "Groundwater" is the more accepted term than "ground-water". ICC might want to review this editorially throughout the IBC code.
2. Knowing the location of groundwater levels are critical for designing and constructing underground structure elements, foundations, and earth retention systems.
3. "Geotechnical investigation" is the term being used throughout Section 1803.5, not "subsurface soil investigation".
4. The exception related to waterproofing is deleted because the inclusion of waterproofing does not eliminate the need to know the location of the groundwater for other purposes, such as hydrostatic pressures as referenced in 1805.2.
5. "Table" is removed from both title and text because there is often no singular "level" or "table"

Cost Impact: The code change proposal will not increase or decrease the cost of construction
this change proposal will not change the cost of construction because the hydrostatic pressure already needed to be accounted for.

S152-22

S153-22

IBC: 1803.5.6

Proponents: Lori Simpson, representing GeoCoalition (lsimpson@langan.com); Daniel Stevenson, representing GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1803.5.6 Rock strata. Where ~~subsurface explorations at the project site indicate variations in the structure of rock on which~~ foundations are to be constructed on or in rock, ~~a sufficient number of borings shall be drilled to sufficient depths to~~ the geotechnical investigation shall assess ~~the~~ variations in rock strata depth, competency, ~~of the rock~~ and ~~its~~ load-bearing capacity.

Reason Statement:

1. The proposed change clarifies the current code provision while preserving its intent.
2. "Geotechnical investigation" is the preferred term rather than "subsurface exploration."
3. There are methods other than borings to investigate depth of rock, including cone penetration testing, test pits, geophysics.
4. Delete "sufficient" as it is vague and therefore unenforceable.
5. The provision to assess rock depth variation was implied but not clearly stated.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change maintains the current intent of the code.

S153-22

S154-22 Part I

PART 1-IBC: 1805.1.2.1

PART 2 - IRC: R408.7

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE-BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1805.1.2.1 Flood hazard areas. For buildings and structures in *flood hazard areas* as established in Section 1612.3, the finished ground level of an under-floor space such as a crawl space shall be equal to or higher than the outside finished ground level on one side or more.

Exception: Under-floor spaces of Group R-3 buildings that meet the following requirements : ~~of FEMA TB 11.~~

1. The velocity of floodwater at the site does not exceed 5 feet per second.
2. The interior grade of the under-floor space is not more than 2 feet below the lowest adjacent exterior grade.
3. The height of the under-floor space, measured from the interior grade of the under-floor space to the top of the foundation wall is not more than 4 feet at any point.
4. There is an adequate drainage system that removes floodwater from the interior area of the under-floor space.

S154-22 Part I

S154-22 Part II

PART 2 - IRC: R408.7

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Revise as follows:

R408.7 Flood resistance. For buildings located in flood hazard areas as established in Table R301.2:

1. Walls enclosing the under-floor space shall be provided with flood openings in accordance with Section R322.2.2.
2. The finished ground level of the under-floor space shall be equal to or higher than the outside finished ground level on at least one side.

Exception: Under-floor spaces that meet the following requirements : ~~of FEMA TB 11-1.~~

1. The velocity of floodwater at the site does not exceed 5 feet per second.
2. The interior grade of the under-floor space is not more than 2 feet below the lowest adjacent exterior grade.
3. The height of the under-floor space, measured from the interior grade of the under-floor space to the top of the foundation wall is not more than 4 feet at any point.
4. There is an adequate drainage system that removes floodwater from the interior area of the under-floor space.

Reason Statement: The basic requirements of the National Flood Insurance Program prohibit areas of buildings that are below grade on all sides (except nonresidential buildings that are designed to be dry floodproofed). That limitation applies to crawlspaces that have the interior grade below the exterior grade on all sides. The exception in this section refers to NFIP Technical Bulletin 11, which outlines limitations to allow below-grade crawlspaces, specifically limitations on wall height and how far below grade the interior can extend. Importantly, TB 11 requires jurisdictions to adopt the specified requirements in the exception to allow for construction of such below-grade spaces.
The proposed replaces the reference to TB 11 with itemized lists that capture the limitations in TB 11. Not only does this eliminate the need for buildings and designers to find and interpret TB 11, it eliminates the need for communities to adopt the specific requirements.

If this code change proposal is successful, the codes will no longer refer to TB 11 and TB 11 should be removed from the list of referenced standards in both codes.

Bibliography: NFIP Technical Bulletin 11, Crawlspace Construction for Buildings Located in Special Flood Hazard Areas, Interim Guidance (2001), https://www.fema.gov/emergency-managers/risk-management/building-science/national-flood-insurance-technical-bulletins

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal replaces the reference to NFIP Technical Bulletin 11 with a list of requirements from NFIP Technical Bulletin 11. There is no change to the technical content of the provisions, rather the requirements are stated instead of referencing a publication. By listing existing requirements, there will be no cost impact when approving this proposal.

S154-22 Part II

S155-22

IBC: 1806.2

Proponents: Lori Simpson, representing GeoCoalition (lsimpson@langan.com); Daniel Stevenson, representing GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1806.2 Presumptive load-bearing values. The load-bearing values used in design for supporting soils and rock near the surface shall not exceed the values specified in Table 1806.2 unless data to substantiate the use of higher values are submitted and *approved*. Where the *building official* has reason to doubt the classification, strength or compressibility of the soil or rock, the requirements of Section 1803.5.2 shall be satisfied. Presumptive load-bearing values shall apply to materials with similar physical and engineering characteristics~~and dispositions~~. ~~Mud~~ Very soft to soft clay or silt (CL, CH, MH, ML), very loose to loose silt (ML), organic silt~~,~~ and organic clays (OL, OH), peat (Pt) ~~or unprepared~~ and undocumented fill shall not be assumed to have a presumptive load-bearing capacity unless data to substantiate the use of such a value are submitted.

> **Exception:** A presumptive load-bearing capacity shall be permitted to be used where the *building official* deems the load-bearing capacity ~~of mud, organic silt or unprepared fill~~ is adequate for the support of lightweight or temporary structures.

Reason Statement:

1. Rock is added because presumptive values are provided for rock in Table 1806.2.
2. A "disposition" is not a recognized geotechnical term.
3. Soils are classified in accordance with ASTM D2487, as specified in section 1803.5.1; therefore, soil classifications are shown to conform. "Mud" is not a recognized geotechnical "Class of Material".
4. "Undocumented" fill is a more appropriate term than "unprepared" because there is no record of how it was placed (i.e. it is "undocumented"); therefore, it is assumed that is was not adequately compacted.

Bibliography: ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This only changes terminology and does not affect cost of construction.

S155-22

S157-22

IBC: 1807.2.5 (New), 1807.2.5.1 (New), 1807.2.5.2 (New), 1807.2.5.3 (New)

Proponents: Peter Zvingilas, representing Region VI; John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com)

2021 International Building Code

Add new text as follows:

1807.2.5 Guards at retaining walls. *Guards* shall be provided in accordance with Sections 1807.2.5.1 through 1807.2.5.3.

1807.2.5.1 Guards. A *guard* shall be located along the top of a retaining wall located along open-sided walking surfaces that are located more than 30 inches (762 mm) measured vertically to the surface or grade below at the exposed face of the retaining wall. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions:

1. Where other barrier(s) are provided that is approved by the *building official*.
2. Where a retaining wall is located where it is not accessible to the public, as determine by the *building official*, a *guard* shall not be required.

1807.2.5.2 Height. Required *guards* at retaining walls shall comply with the height requirements of section 1015.3.

1807.2.5.3 Opening limitations. Required *guards* shall comply with the opening limitations of Section 1015.4.

Reason Statement: To add language to clarify where and how a guard is to be installed on top of a retaining wall that would pose a danger of a fall.

1. The code is currently silent on the requirement for guards on top of retaining walls. These conditions commonly occur on sites (not necessarily buildings that are addressed in Chapter 10) at public places (parks; schools; etc.) that need to have guards.

2. The exception #2 provides a method for conditions where a retaining wall is not accessible to the public and a guard would not be warranted and would be wasteful.

3. Section 1807.2.5.3 Opening Limitations, provides a method to allow the 21” sphere criteria to be used for certain non-public occupancies (industrial sites, etc.).

4. The 30” height requirement is consistent with section **1015.2**; and section **105.2 Work exempt from permit**, items #4 (retaining walls less than 4’ do not require a permit, however that is measured from the bottom of the footing so the grade difference would essentially be 30”), and item # 6 (which is where a sidewalk or driveway with over a 30” grade change would be required to be permitted).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of construction will not increase by this change. This change clarifies what is already being done in the industry.

S157-22

S158-22

IBC: 1807.3

Proponents: Andy Williams, representing National Frame Building Association (panelcladsolutions@gmail.com)

2021 International Building Code

Revise as follows:

1807.3 Embedded posts and poles. Designs to resist both axial and lateral *loads* employing posts or poles as columns embedded in earth or in concrete footings in earth shall be in accordance with Sections 1807.3.1 through 1807.3 <u>or in accordance with ASABE EP 486.3</u>.

Reason Statement: This proposal adds a reference for ASABE EP 486.3 to Section 1807.3 (Embedded posts and poles) where discussion of this type of foundation takes place. ASABE EP 486.3 is currently referenced in Table 2306.1 along with the other ASABE Engineering Practice (EP) standards recognized for use in post frame design. While the other EPs reference wood framing elements and issues used in post-frame construction, EP 486.3 is specifically designed to aid in the determination of soil strength for shallow post and pier foundation design.
Since the initial 2000 IBC, the National Frame Building Association (NFBA) has received a number of inquiries from building officials requesting why there is not reference to this design standard in Chapter 18 Soils and Foundations where it truly belongs. Addition of EP 486.3 to Section 1807.3 puts the foundation and soil design reference for post frame construction in the appropriate chapter and keeps the building official from having to link this already recognized reference standard in Table 2306.1 to foundation design based on the requirements of Chapter 18.

National Frame Building Association (NFBA) is a trade association that promotes the interests of the post-frame construction industry and its members including post-frame builders, suppliers, manufacturers, building material dealers, code and design professionals, and structural engineers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply moves an existing referenced standard from Chapter 23 to Chapter 18. No additional testing or costs should be associated with this move.

S158-22

S159-22

IBC: 1807.3.1

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1807.3.1 Limitations. The design procedures outlined in this section are subject to the following limitations:

1. The frictional resistance for structural walls and slabs on silts and clays shall be limited to one-half of the normal force imposed on the soil by the *dead load*~~weight of the footing or slab~~.
2. Posts embedded in earth shall not be used to provide lateral support for structural or nonstructural materials such as plaster, masonry or concrete unless bracing is provided that develops the limited deflection required.

Wood poles shall be treated in accordance with AWPA U1 for sawn timber posts (Commodity Specification A, Use Category 4B) and for round timber posts (Commodity Specification B, Use Category 4B).

Reason Statement: This change brings the wording of this section more in line with the wording of 1806.3.2. Additionally, this change clarifies that the physics of the situation depending on the dead load, and not on just the weight of the footing itself.

Cost Impact: The code change proposal will decrease the cost of construction
This change will allow the structure's dead load to be used instead of just the weight of the footing. This may allow for smaller foundations.

S159-22

S160-22

IBC: 1807.3.2.2

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1807.3.2.2 Constrained. The following formula shall be used to determine the depth of embedment required to resist lateral *loads* where lateral constraint is provided at the ground surface, such as by a rigid floor or pavement. Hot-mix asphaltic concrete shall not be considered a rigid pavement.

$$d = \sqrt{\frac{4.25Ph}{S_3 b}}$$ **(Equation 18-2)**

or alternatively

$$d = \sqrt{\frac{4.25M_g}{S_3 b}}$$ **(Equation 18-3)**

where:

M_g = Moment in the post at grade, in foot-pounds (kN-m).

S_3 = Allowable lateral soil-bearing pressure as set forth in Section 1806.2 based on a depth equal to the depth of embedment in pounds per square foot (kPa).

Reason Statement: This code change will answer the common question that arises when an embedded post or pole foundation is used with an adjacent hot-mix asphaltic concrete pavement surface.
Hot-mix asphaltic concrete does not undergo a chemical reaction to obtain its stiffness like portland cement does. Hot-mix asphaltic concrete's stiffness is entirely dependent on its temperature, as such it may behave like a rigid floor surface when it is very cold, but does not do so when it is hot. This transient stiffness nature makes it inappropriate to use as a rigid constraint to reduce a footing's embedment under lateral loads which may occur regardless of the temperature.

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of foundations that inappropriately assume that asphaltic concrete is capable of providing a rigid constraint.

S160-22

S161-22

IBC: 1808.2

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1808.2 Design for capacity and settlement. Foundations shall be so designed that the allowable vertical and lateral bearing ~~capacity~~ capacities of the soil are ~~is~~ not exceeded, the sliding resistance is not exceeded, and that differential settlement is minimized. Where geotechnical investigations are conducted, the allowable bearing capacities and sliding resistance of the soil shall not exceed the values in the geotechnical report. Foundations in areas with expansive soils shall be designed in accordance with the provisions of Section 1808.6 .

Reason Statement: There are two proposed changes:
1. Clarify that where geotechnical investigations are conducted that the soil capacity then needs to be in accordance with the values shown in the report from Section 1803.6. This would not allow the presumptive load-bearing values of the soil to be used where a registered design professional has determined the soil at the site is not sufficient to use those values. It should be noted that geotechnical reports rarely report smaller values than the presumptive values, but where they do it is inappropriate to use presumptive values.

2. Alter the wording such that recognition of vertical and lateral bearing capacities of the soil and lateral sliding resistance of the soil are all specifically invoked, where before they had to be assumed to be contained simply in "allowable bearing capacity".

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction on sites that have a geotechnical investigation and that investigation discovers that the soil at the site is worse than the presumptive load bearing values present in the code. This situation is rare.

S161-22

S162-22

IBC: 1808.8.6

Proponents: Kelly Cobeen, representing self (kcobeen@wje.com); Ronald LaPlante, Division of State Architect, representing Self (ron.laplante@dgs.ca.gov)

2021 International Building Code

Revise as follows:

1808.8.6 Seismic requirements. See Section 1905 for additional requirements for foundations of structures assigned to *Seismic Design Category* C, D, E or F.
For structures assigned to *Seismic Design Category* C, D, E or F, provisions of Section 18.13 of ACI 318 shall apply where not in conflict with the provisions of Sections 1808 through 1810.

~~**Exceptions**~~ **Exception**:

~~1.~~ Detached one- and two-family dwellings of *light-frame construction* and two stories or less above *grade plane* are not required to comply with the provisions of Section 18.13 of ACI 318.

~~2. Section 18.13.4.3(a) of ACI 318 shall not apply.~~

Reason Statement: This proposal updates IBC requirements to provide consistency with ACI 318-19.
This provision is made applicable to Seismic Design Categories C through F to be consistent with ACI 318.

Exception 2 is deleted because both ACI 318 and IBC now require closely spaced ties for three pile diameters below the pile cap.

Cost Impact: The code change proposal will decrease the cost of construction
The proposal will reduce the cost of construction a very small amount by reducing the extent of closely spaced ties.

S162-22

S163-22

IBC: 1809.6

Proponents: Justin Spivey, representing Self (jspivey@wje.com)

2021 International Building Code

Revise as follows:

1809.6 Location of footings. Footings on granular soil shall be so located that the line drawn between the lower edges of ~~adjoining~~ adjacent footings shall not have a slope steeper than 30 degrees (0.52 rad) with the horizontal, unless the material supporting the higher footing is braced or retained or otherwise laterally supported in an *approved* manner or a greater slope has been properly established by engineering analysis.

Reason Statement: A distinction is needed between adjacent (Webster: close or near) and adjoining (Webster: touching or bounding at a point or line); adjoining is the more restrictive term as it requires contact. Especially in urban environments, *buildings* or non-building *structures* may separated by a public alley or otherwise close enough that demolition, excavation, or construction activities for one *building* or non-building *structure* may affect another without direct contact, i.e., adjacent but not adjoining. This and other related proposals being submitted in this cycle do not seek to address the numerous instances where adjacent and adjoining appear to be used interchangeably—most frequently in IBC Chapters 4, 7, 9, 10, and 23; instead, they seek to resolve inconsistent usage of adjacent and adjoining as a modifier of the words property, *structure*, *building*, and footing in IBC Chapters 18 and 33 and Appendix J and in IEBC Chapter 15.

Cost Impact: The code change proposal will increase the cost of construction
This proposal does not change the spirit of the provision, but changes the letter slightly. There is a chance the revised wording will curtail questionable or creative interpretations and thus increase initial cost, but to the extent it encourages proper protection of adjacent property, it will lower the risk of damage, reduce or eliminate the cost of repairs and/or litigation, and thereby decrease total cost.

S163-22

S164-22

IBC: 1809.7, TABLE 1809.7, 1809.8, 1809.9

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1809.7 Prescriptive footings for light-frame construction. Where a specific design is not provided, concrete or masonry-unit footings supporting walls of *light-frame construction* shall be permitted to be designed in accordance with Table 1809.7. The *light-frame construction* supported by these footings shall comply with all of the following:

1. The light frame construction shall be designed in accordance with Section 2211.1.2, 2308, or 2309.
2. The light frame construction shall not exceed the limitations specified in Section 2308.2.
3. Floor and roof framing tributary width shall not exceed 16 feet (4877 mm), with an additional maximum roof overhang of 2 feet (610 mm).
4. The soil shall not be expansive and shall have a minimum allowable vertical bearing pressure of 1,500 psf (71.8 kN/m^2).

TABLE 1809.7 PRESCRIPTIVE FOOTINGS SUPPORTING WALLS OF LIGHT-FRAME CONSTRUCTION[a, b, c, d, e, f]

NUMBER OF FLOORS AND ROOFS SUPPORTED BY THE FOOTING~~[f]~~	WIDTH OF FOOTING (inches)	THICKNESS OF FOOTING (inches)
1	12	6
2	15	6
3	~~18~~ 23	8~~[g]~~

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Depth of footings shall be in accordance with Section 1809.4.

b. The ground under the floor shall be permitted to be excavated to the elevation of the top of the footing.

c. Interior stud-bearing walls shall be permitted to be supported by isolated footings. The footing width and length shall be twice the width shown in this table, and footings shall be spaced not more than 6 feet on center.

d. See Section 1905 for additional requirements for concrete footings of structures assigned to Seismic Design Category C, D, E or F.

e. For thickness of foundation walls, see Section 1807.1.6.

f. ~~Footings shall be permitted to support a roof in addition to the stipulated number of floors. Footings supporting roof only shall be as required for supporting one floor.~~ Footing projections shall not exceed the thickness of the footing.

~~g. Plain concrete footings for Group R-3 occupancies shall be permitted to be 6 inches thick.~~

1809.8 Plain concrete footings. The edge thickness of plain concrete footings supporting walls ~~of other than *light-frame construction*~~ shall be not less than 8 inches (203 mm) where placed on soil or rock.

~~Exception~~ Exceptions:

1. For plain concrete footings supporting Group R-3 occupancies, the edge thickness is permitted to be 6 inches (152 mm), provided that the footing does not extend beyond a distance greater than the thickness of the footing on either side of the supported wall.
2. The edge thickness of plain concrete footings shall be permitted to be designed in accordance with Section 1809.7.

1809.9 Masonry-unit footings. The design, materials and construction of masonry-unit footings shall comply with Sections 1809.9.1 and 1809.9.2, and the provisions of Chapter 21.

Exception: Where a specific design is not provided, masonry-unit footings shall be permitted to be designed in accordance with Section 1809.7 ~~supporting walls of *light-frame construction* shall be permitted to be designed in accordance with Table 1809.7~~.

Reason Statement: *Light-frame construction* is only defined by the repetitive nature of its structural elements and has no tie to loading.
This footing table is intended to only be applied to lightly loaded prescriptive construction, but the wording of the section currently allows any type of *light-frame construction*.

There are many buildings with very heavy foundation loads that meet the definition of *light-frame construction* and are not appropriate to place on the prescriptive foundations in Table 1809.7. This is also true with highly loaded shear walls. This proposal clarifies that the intent of these prescriptive provisions is tied with conventional-similar light-frame construction of Section 2308.

The limitations placed on these footings are taken from the limitations of *conventional light-frame construction* but also includes the tributary widths that are used in the IRC prescriptive footing tables. These limitations are necessary as AWC's WFCM and AISI's S230 allow higher snow load, wind load, and seismic design categories than are present in *conventional light-frame construction*. Additionally, no identified tributary width currently exists for the use of this table.

This table's ability to be used with a roof in addition to the number of floors being supported is removed as when calculating the foundations - it was found not to conform to code limits for soil bearing. The similar table that existed in the 2012 IRC and its previous versions limited the number of stories of the building – not the number of floors supported. This change reduces the table from being able to support a 4-story building to a 3-story building, which aligns with the 2012 IRC foundation table as well as the conventional light-frame construction limitations. The only additional change needed to make the table work was for the width that supports a three-story building and the change aligns with the 2012 IRC footing table.

Section 1808.6 would still be applicable to expansive soils, so this table should not apply to those soils. However, other questionable soil will require a geotechnical investigation where the allowable vertical foundation bearing pressure could be determined to be at least 1,500psf to use this table.

The changes to 1809.8 and 1809.9 are necessary to invoke the same limitations as the base section where masonry and plain concrete footings are used.

The restriction of the footing projection thickness is taken from IRC limitations of the same thing.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will increase the cost of construction
This proposal clarifies that the intent of the table is only to be applied to **lightly loaded** prescriptive construction, not for any type of *light-frame construction as stated in the 2021 IBC. Light-frame construction is* defined by the repetitive nature of its structural elements and has no tie to loading.

Clarifying the table limitations will ensure the table is not used for larger, more heavily-loaded light-frame structures that would overload the tabulated footing sizes, or in high-wind and high-seismic conditions where footings supporting the lateral force-resisting system need to be designed for such forces.

This code change proposal will increase the cost of construction by requiring non-prescriptive design of footings supporting structures that do not meet the clarified limitations.

S164-22

S165-22

IBC: 1809.14 (New), 1810.3.12

Proponents: Ronald LaPlante, Division of the State Architect, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (ron.laplante@dgs.ca.gov); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Add new text as follows:

1809.14 Grade beams. Grade beams shall comply with the provisions of ACI 318.

> **Exception:** Grade Beams not subject to differential settlement exceeding one-fourth of the thresholds specified in ASCE 7 Table 12.13-3 and designed to resist the seismic load effects including overstrength factor in accordance with Section 2.3.6 or 2.4.5 of ASCE 7 need not comply with ACI 318 Section 18.13.3.1.

Revise as follows:

1810.3.12 Grade beams. Grade beams shall comply with the provisions of ACI 318.

> **Exception:** Grade beams not subject to differential settlement exceeding one-fourth of the thresholds specified in ASCE 7 Table 12.13-3 and designed to resist the seismic load effects including overstrength factor in accordance with Section 2.3.6 or 2.4.5 of ASCE 7 need not comply with ACI 318 Section 18.13.3.1 .

Reason Statement: The exception in IBC Section 1810.3.12 for grade beams in deep foundation systems is being modified as follows: 1) Clarify that it is only the ductile detailing provisions in ACI 318 Section 18.13.3.1 are exempt when the grade beams are designed for the overstrength factor and that all the other provision of ACI 318 are still applicable, such as durability, reinforcing steel cover, etc. 2) Further limit the exception to only be permissible when differential settlements are less than one-fourth of those in ASCE 7-22 Table 12.13-3 since ASCE 7-22 Section 12.13.9 exempts foundation elements from complying with deformation ductility requirements when they are less than this limit. This is needed to be clarified for deep foundation since ASCE 7-22 Section 12.13.9.3.1 permits downdrag of pile design to be based on significant differential settlement. Differential settlement exceeding this limit (one-fourth of those in ASCE 7 Table 12.13-3) may impose moments and shears in the grade beam that exceed those computed with the seismic load effects including overstrength factor, in which case the ductile detailing requirements for grade beams in ACI Section 18.13.3.1 would be required.
IBC Section 1809.14 is a new section to add the same grade beam provisions contained in the Deep Foundation Section 1810 to the Shallow Foundations Section 1809. The same provisions are applicable to both deep and shallow grade beam foundations.

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal will not, in general, increase or decrease the overall cost of construction. These provisions provide alternatives and options for the designer to select the most economical approach to choose between ductile detailing (hoops and ties) or, perhaps, detail a larger foundation or more longitudinal reinforcement. For grade beams in deep foundations, this proposal limits the use of the exception to certain soil conditions which may have a slight cost impact.

S165-22

S166-22

IBC: 1810.2.2

Proponents: Daniel Stevenson, representing GeoCoalition; Lori Simpson, representing GeoCoalition (lsimpson@langan.com)

2021 International Building Code

Revise as follows:

1810.2.2 Stability. *Deep foundation* elements shall be braced to provide lateral stability in all directions. Three or more elements connected by a rigid cap shall be considered to be braced, provided that the elements are located in radial directions from the centroid of the group not less than 60 degrees (1 rad) apart. A two-element group in a rigid cap shall be considered to be braced along the axis connecting the two elements. Methods used to brace *deep foundation* elements shall be subject to the approval of the *building official*.
Deep foundation elements supporting walls shall be placed alternately in lines spaced not less than 1 foot (305 mm) apart and located symmetrically under the center of gravity of the wall load carried, unless effective measures are taken to provide for eccentricity and lateral forces, or the foundation elements are adequately braced to provide for lateral stability.

Exceptions:

1. Isolated cast-in-place *deep foundation* elements without lateral bracing shall be permitted where the least horizontal dimension is not less than 2 feet (610 mm), adequate lateral support in accordance with Section 1810.2.1 is provided for the entire height and analysis demonstrates that the element can support the required loads, including mislocations required by Section 1810.3.1.3, with neither harmful distortion nor instability in the structure~~the height does not exceed 12 times the least horizontal dimension~~.
2. A single row of *deep foundation* elements without lateral bracing is permitted for one- and two-family dwellings and lightweight construction not exceeding two *stories above grade plane* or 35 feet (10 668 mm) in *building height*, provided that the centers of the elements are located within the width of the supported wall.

Reason Statement:

- Element length (referred to in this code section as "height") alone is not an adequate indication of the need for deep foundation elements to be braced.
- Eliminating the 12 times the least horizontal dimension requirement will allow for greater economy by allowing for unbraced elements with greater lengths.
- Permitting elements to be unbraced based on length alone can result in unsafe conditions. Regardless of the element length, an analysis should be performed to determine if bracing is required. Research shows that shorter elements often have a greater need for bracing than longer elements. See attached white paper "Evaluating Lateral Bracing Code Requirements for Large Diameter Foundations", published by The Deep Foundations Institute (2021). The requirement to perform an analysis to determine if bracing is required will result in increased safety. Note the need for such an analysis is already implied by Section 1810.1.

https://www.cdpaccess.com/proposal/8661/25706/files/download/2945/

Cost Impact: The code change proposal will decrease the cost of construction
This code change proposal will decrease the cost of construction by not forcing the use of bracing where analysis shows that bracing is not required.

S166-22

S167-22

IBC: 1810.3.2.8

Proponents: Daniel Stevenson, representing GeoCoalition (dstevenson@berkelapg.com); Lori Simpson, representing GeoCoalition (lsimpson@langan.com)

2021 International Building Code

Revise as follows:

1810.3.2.8 Justification of higher allowable stresses. Use of allowable stresses ~~greater than those specified in Section~~ in table 1810.3.2.6 that must be justified in accordance with this section shall be permitted where supporting data justifying such higher stresses is ~~filed with~~ submitted to and *approved* by the *building official*. Such substantiating data shall include the following:

1. A geotechnical investigation in accordance with Section 1803.
2. Load tests in accordance with Section 1810.3.3.1.2, regardless of the load supported by the element.

The design and installation of the deep foundation elements shall be under the direct supervision of a *registered design professional* knowledgeable in the field of soil mechanics and deep foundations who shall submit a report to the *building official* stating that the elements as installed satisfy the design criteria.

Reason Statement:

- This section as currently written could override the allowable stresses in Table 1810.3.2.6 when a pile passes a load test.
- Table 1810.3.2.6 references Section 1810.3.2.8, and Table 1810.3.2.6 references Table 1810.3.2.6, thereby creating a circular reference. This proposal eliminates the circular reference.
- Several foundation types in Table 1810.3.2.6 have multiple allowable stresses for the same material type. For example, Table 1810.3.2.6 allows for an allowable compressive stress of 0.5Fy for steel piles when justified in accordance with 1810.3.2.8, and 0.35Fy otherwise. This proposal is intended to make this clear.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is intended to clarify the code.

S167-22

S168-22

IBC: 1810.3.3.2

Proponents: Daniel Stevenson, representing GeoCoalition; Lori Simpson, representing GeoCoalition (lsimpson@langan.com)

2021 International Building Code

Revise as follows:

1810.3.3.2 Allowable lateral load. Where required by the design, the lateral load capacity of a single *deep foundation* element or a group thereof shall be determined by an *approved* method of analysis or by lateral load tests to not less than twice the proposed design working *load*. The resulting allowable lateral *load* shall not be more than one-half of the *load* that produces a gross lateral movement of 1 inch (25 mm) at the lower of the top of the foundation element and the ground surface, unless it can be shown that the predicted lateral movement shall cause neither harmful distortion of, nor instability in, the structure, nor cause any element to be loaded beyond its capacity. When piles are used in groups, group effects shall be evaluated in accordance with Section 1810.2.5.

Reason Statement:

- In the second sentence, "allowable load" is revised to "allowable lateral load" to clarify that the subject is allowable lateral load, and not allowable axial load.
- When a load test is performed on a single foundation element, engineers may not realize that the results usually need to be adjusted for elements used in groups. A sentence was added to the end of this section to clarify that group effects still must be evaluated for foundation elements used in groups.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal only clarifies existing code requirements.

S168-22

S169-22

IBC: 1810.3.8

Proponents: Ronald LaPlante, Division of State Architect, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (ron.laplante@dgs.ca.gov); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

1810.3.8 Precast concrete piles. Precast concrete piles shall be designed and detailed in accordance with ACI 318.

Exceptions:

1. For precast prestressed piles in *Seismic Design Category* C, the minimum volumetric ratio of spirals or circular hoops required by Section 18.13.5.10.4 of ACI 318 shall not apply in cases where the design includes full consideration of load combinations specified in ASCE 7, Section 2.3.6 or Section 2.4.5 and the applicable overstrength factor, Ω_0. In such cases, minimum transverse reinforcement index shall be as specified in Section 13.4.5.6 of ACI 318.
2. For precast prestressed piles in *Seismic Design Categories* D through F and in Site Class A, B, BC, C, CD, D or DE sites, the minimum volumetric ratio of spirals or circular hoops required by Section 18.13.5.10.5(c) of ACI 318 shall not apply in cases where the design includes full consideration of load combinations specified in ASCE 7, Section 2.3.6 or Section 2.4.5 and the applicable overstrength factor, Ω_0. In such cases, minimum transverse reinforcement shall be as specified in Section 13.4.5.6 of ACI 318.

Reason Statement: Precast piles in Seismic Design Category D through F and in Site Class E or F sites may be subject to significant lateral deformations as a result of site soils that are either liquefiable or not considered competent to provide lateral support to the pile. Pile confinement reinforcement is required in these conditions to provide the necessary ductile performance where flexural yielding may occur because of these incompetent soils. The soil induced movements are capable of imposing moments and curvature on the piles that exceed those determined with the load combinations with overstrength factor. As a result, this proposal does not permit the use of exception #2 for Site Class E or F sites in Seismic Design Categories D through F. This proposal does not extend this restriction to exception #1 for sites in Seismic Design Category C due to the lower ground motion intensity at these sites. This change is consistent with IBC Section 1810.3.9.4.2.2 and ACI 318-19 Section 18.13.5.5 and Table 18.13.5.7.1 which require more ductile detailing in cast-in-place piles in Site Class E and F sites.

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal may result in a small increase in construction cost for precast piles in foundations on Site Class E and F by requiring more confinement ties.

S169-22

S170-22

IBC: 1810.3.9.2

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1810.3.9.2 Required reinforcement. Where subject to uplift or where the required moment strength determined using the load combinations of ASCE 7, Section 2.3 exceeds the design cracking moment determined in accordance with Section 1810.3.9.1 , cast-in-place deep foundations not enclosed by a structural steel pipe or tube shall be reinforced. <u>Where reinforcement is required it shall be in compliance with Chapter 20 of ACI 318.</u>

Reason Statement: This proposal will provide requirements for what form reinforcement must take when it is required. Currently there are no requirements, especially for seismic design category A and B and it leads to the question of what is meant by reinforcement. Can it be bamboo, aluminum, wood, steel? What ASTMs shall reinforcement conform to? Can it be prestressed? What is the required cover to protect the reinforcement from corrosion?
ACI 318 is not applicable to most deep foundations, but the basic form that reinforcement takes, as already robustly explored in ACI 318, should be applicable.

ACI 318 Chapter 20 contains:

- Required material properties (ASTMs)
- Design properties (modulus of elasticity, calculation of yield strength)
- Durability requirements (cover, prestressing encasement)

Cost Impact: The code change proposal will increase the cost of construction
This proposal will restrict the types of reinforcement that can be considered "reinforcement".

S170-22

S171-22

IBC: 1810.3.11.2

Proponents: Daniel Stevenson, representing GeoCoalition (dstevenson@berkelapg.com); Lori Simpson, representing GeoCoalition (lsimpson@langan.com)

2021 International Building Code

Revise as follows:

1810.3.11.2 Seismic Design Categories D through F. For structures assigned to *Seismic Design Category* D, E or F, *deep foundation* element resistance to uplift forces or rotational restraint shall be provided by anchorage into the pile cap, designed considering the combined effect of axial forces due to uplift and bending moments due to fixity to the pile cap. Anchorage shall develop not less than 25 percent of the strength of the element in tension. Anchorage into the pile cap shall comply with the following:

1. ~~In the case of~~ For elements required to resist uplift, the anchorage shall be capable of developing the least of the following:

   1.1. The nominal tensile strength of the longitudinal reinforcement in a concrete element.

   1.2. The nominal tensile strength of a steel element.

   1.3. The frictional force developed between the element and the soil multiplied by 1.3.

   Exception: The anchorage is permitted to be designed to resist the axial tension force resulting from the seismic load effects including overstrength factor in accordance with Section 2.3.6 or 2.4.5 of ASCE 7.

2. ~~In the case of~~ For elements required to provide rotational restraint, the anchorage shall be designed to resist the axial and shear forces, and moments resulting from the seismic *load effects* including overstrength factor in accordance with Section 2.3.6 or 2.4.5 of ASCE 7 or the anchorage shall be capable of developing the full axial, bending and shear nominal strength of the element.
3. The connection between the pile cap and the steel H-piles or unfilled steel pipe piles in structures assigned to *Seismic Design Category* D, E or F shall be designed for a tensile force of not less than 10 percent of the pile compression capacity.

   Exceptions:

   1. Connection tensile capacity need not exceed the strength required to resist seismic *load effects* including overstrength of ASCE 7 Section 12.4.3 or 12.14.3.2.
   2. Connections need not be provided where the foundation or supported structure does not rely on the tensile capacity of the piles for stability under the design seismic force.

Where the vertical lateral-force-resisting elements are columns, the pile cap flexural strengths shall exceed the column flexural strength. The connection between batter piles and pile caps shall be designed to resist the nominal strength of the pile acting as a short column. Batter piles and their connection shall be designed to resist forces and moments that result from the application of seismic *load effects* including overstrength factor in accordance with Section 2.3.6 or 2.4.5 of ASCE 7.

Reason Statement:

- The existing code language is confusing and can appear contradictory. For example, the requirements of "...not less than 25 percent of the strength of the element in tension", and then later "The nominal tensile strength..." appear contradictory if one does not realize that the more restrictive requirement is only for elements that are required to resist uplift forces. The revised phrases clarify that the more restrictive requirements in subsections 1 and 2 only apply to elements required to resist uplift forces or provide rotational restraint.
- ASCE section 12.13.6.5 is nearly identical to IBC 1810.3.11.2. ASCE 7 section 12.13.6.5 contains the sentence "For piles required to resist uplift or provide rotational restraint, anchorage into the pile cap shall comply with the following:". Changing the phrases "In the case of uplift" to "For piles required to resist uplift" and "In the case of rotational restraint" to "For piles required to provide rotational restraint" adds clarity creates more consistency between IBC and the referenced standard ASCE 7.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification of existing code requirements. However, it could potentially reduce the cost of construction in cases where the existing code language is misinterpreted.

S171-22

S172-22

IBC: 1810.4.5

Proponents: Daniel Stevenson, representing GeoCoalition (dstevenson@berkelapg.com); Lori Simpson, representing GeoCoalition (lsimpson@langan.com)

2021 International Building Code

Revise as follows:

1810.4.5 Vibratory driving. Vibratory drivers shall only be used to install *deep foundation* elements where the element load capacity is verified by load tests in accordance with Section 1810.3.3.1.2. ~~The installation of production elements shall be controlled according to power consumption, rate of penetration or other *approved* means that ensure element capacities equal or exceed those of the test elements.~~

Exceptions:

1. The pile installation is completed by driving with an impact hammer in accordance with Section 1810.3.3.1.1.
2. The pile is to be used only for lateral resistance.

The installation of production elements shall be controlled according to power consumption, rate of penetration or other *approved* means that ensure element capacities equal or exceed those of the test elements.

Reason Statement: The second sentence (The installation of...) has been moved to after the exception, to clarify that the exception only applies to the first sentence and not the second sentence. The requirements for the installation of production piles that are contained in the second sentence should still be applicable, even if an exception is used.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies existing code requirements.

S172-22

S173-22

IBC: 1901.2, SECTION 1907, 1907.1 (New), 1907.2 (New), 1907.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org)

2021 International Building Code

Revise as follows:

1901.2 Plain and reinforced concrete. Structural concrete shall be designed and constructed in accordance with the requirements of this chapter and ACI 318 as amended in Section 1905 of this code. ~~Except for the provisions of Sections 1904 and 1907, the design and construction of slabs on grade shall not be governed by this chapter unless they transmit vertical *loads* or lateral forces from other parts of the structure to the soil.~~

SECTION 1907
~~MINIMUM SLAB PROVISIONS~~ SLABS-ON-GROUND

Add new text as follows:

1907.1 General. Non-structural slabs-on-ground shall comply with Section 1904 and this Section. Structural slabs-on-ground shall comply with all applicable provisions of this Chapter. Slabs-on-ground shall be considered structural where designed to one of the following:

1. Transmit loads or resist lateral forces from other parts of the structure to the soil.
2. Transmit loads or resist lateral forces from other parts of the structure to foundations
3. Serve as tributary area for resisting uplift or overturning forces.

1907.2 Thickness. The thickness of concrete floor slabs supported directly on the ground shall be not less than 3½ inches (89 mm).

Revise as follows:

~~1907.1~~ 1907.3 ~~General~~ Vapor retarder. ~~The thickness of concrete floor slabs supported directly on the ground shall be not less than 3½ inches (89 mm).~~ A 6-mil (0.006 inch; 0.15 mm) polyethylene vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the base course or subgrade and the concrete floor slab, or other *approved* equivalent methods or materials shall be used to retard vapor transmission through the floor slab.

Exception: A vapor retarder is not required:

1. For detached structures accessory to occupancies in Group R-3, such as garages, utility buildings or other unheated facilities.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports attached to occupancies in Group R-3.
3. For buildings of other occupancies where migration of moisture through the slab from below will not be detrimental to the intended occupancy of the building.
4. For driveways, walks, patios and other flatwork that will not be enclosed at a later date.
5. Where *approved* based on local site conditions.

Reason Statement: This proposal:

1. Renames Section 1907 to “Slabs-on-Ground” as this section is not applicable to interim floor slabs or other slabs not on ground.

2. Moves all slab-on-ground requirements into one section by eliminating text in section 1901.2

3. Clarifies scenarios where slabs-on-ground are structural, adding language that addresses slabs on ground used as part of a diaphragm systems, transferring loads to micro-piles, etc. and as dead weight to resist overturning or uplift forces.

4. The proposal divided the existing text of 1907.1 into two sections. 1907.2 for the thickness of concrete floor slabs and 1907.3 for Vapor retarder.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a clarification of the requirements

S173-22

S174-22

IBC: 1901.2, 1901.2.1 (New), ACI Chapter 35 (New), ASTM Chapter 35 (New)

Proponents: Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org); Jerzy Zemajtis, representing NEx, An ACI Center of Excellence for Nonmetallic Building Materials (jerzy.zemajtis@nonmetallic.org); John Busel, representing American Composites Manufacturers Association (jbusel@acmanet.org); Scott Campbell, representing NRMCA (scampbell@nrmca.org); Doug Gremel, representing Owens Corning Infrastructure Solutions (douglas.gremel@owenscorning.com); Carl Larosche, representing ACI (clarosche@wje.com); William O'Donnell, representing DeSimone Consulting Engineers (william.odonnell@de-simone.com); Matthew D'Ambrosia, representing MJ2 Consulting (matt@mj2consulting.com); Keith Kesner, representing CVM (kkesner3006@gmail.com); antonio de luca, representing Thornton Tomasetti

2021 International Building Code

1901.2 Plain and reinforced concrete. Structural concrete shall be designed and constructed in accordance with the requirements of this chapter and ACI 318 as amended in Section 1905 of this code. Except for the provisions of Sections 1904 and 1907, the design and construction of slabs on grade shall not be governed by this chapter unless they transmit vertical *loads* or lateral forces from other parts of the structure to the soil.

Add new text as follows:

1901.2.1 Structural concrete with GFRP reinforcement. Cast-in-place structural concrete internally reinforced with glass fiber reinforced polymer (GFRP) reinforcement conforming to ASTM D7957 and designed in accordance with ACI CODE 440 shall be permitted only for structures assigned to Seismic Design Category A.

Add new standard(s) as follows:

ACI

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331-3439

CODE 440-22	Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars – Code Requirements

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D7957/D7957M-17	Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement

Staff Analysis: A review of the standard proposed for inclusion in the code, ACI CODE 440-22 Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars – Code Requirements, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.
A review of the standard proposed for inclusion in the code, ASTM D7957/D7957M-17 Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This proposal adds a new referenced standard: ACI CODE 440-22: *Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars – Code Requirements*.
The addition of this new standard allows the design and construction of cast-in-place reinforced concrete using non-metallic reinforcement bars. Currently the design and construct requirements contained in the standard are limited to use in Seismic Design Category A. ACI Committee 440 developed this standard to provide for public health and safety by establishing minimum requirements for strength, stability, serviceability, durability, and integrity of GFRP reinforced concrete structures.

The standard not only provides a means of establishing minimum requirements for the design and construction of GFRP reinforced concrete, but for acceptance of design and construction of GFRP reinforced concrete structures by the building officials or their designated representatives.

The standard applies to GFRP reinforced concrete structures designed and constructed under the requirements of the general building code.

GFRP reinforced concrete is especially beneficial for satisfying a demand for improved resistance to corrosion in highly corrosive environments, such as reinforced concrete exposed to salt water, salt air, or de-icing salts.

This standard establishes minimum requirements for GFRP reinforced concrete in a similar fashion as ACI 318 Building Code Requirements for Structural Concrete establishes minimum requirements for structural concrete reinforced with steel reinforcement. A separate standard is needed, as GFRP reinforcement behaves differently than steel reinforcement.

Currently GFRP is accepted for use to reinforce highway bridge decks. Acceptance is primarily in areas where deicing salts are used on the roads and cause severe corrosion to conventional steel reinforcement. This proposed change provides minimum requirements for other applications where GFRP reinforced concrete is being considered, such as marine and coastal structures, parking garages, water tanks, and structures supporting MRI machines. Design reasons to use GFRP bars in structures are: resistance to corrosion in the presence of chloride ions, lack of interference with electromagnetic fields, and low thermal conductivity.

Currently the standard prohibits the use concrete internally reinforced with GFRP for applications where fire resistance ratings are required. Chapter 6 of the International Building code cites applications for floors, roofs, walls, partitions and primary and secondary structural frames where a fire resistance ratings are not required.

The code requirements may be viewed at: https://www.concrete.org/publications/standards/upcomingstandards.aspx

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds alternative materials for the design and construction of reinforced structural concrete in Seismic Design Category A and does not preclude the use of conventional reinforced concrete. Thus there is no cost impact.

S174-22

S175-22

IBC: 1901.2, 1902.1, 1902.1.1, 1902.1.2, 1901.3, 1903.2, 1903.3, 1903.4, SECTION 1905, 1905.1, 1905.1.1, SECTION 202 (New), SECTION 202, 1905.1.2, 1905.1.3, 1905.1.4, 1905.3.1 (New), 1905.1.5, 1905.1.6, 1905.5.1 (New), 1905.1.7, 1905.6.1 (New), 1905.6.2 (New), 1905.1.8, 1905.7.1 (New), 1905.7.2 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov); Kerry Sutton, representing American Concrete Institute (kerry.sutton@concrete.org)

2021 International Building Code

Revise as follows:

1901.2 Plain and reinforced concrete. Structural concrete shall be designed and constructed in accordance with the requirements of this chapter and ACI 318 as ~~amended~~ supplemented in Section 1905 of this code. Except for the provisions of Sections 1904 and 1907, the design and construction of slabs on grade shall not be governed by this chapter unless they transmit vertical *loads* or lateral forces from other parts of the structure to the soil.

1902.1 General. Coordination of terminology used in ACI 318 and ASCE 7 shall be in accordance with Sections 1902.1.1 ~~and 1902.1.2~~.

1902.1.1 Design displacement . Design displacement shall be the Design Earthquake Displacement, δ_{DE}, defined in ASCE 7 Section 12.8.6.3. For diaphragms that can be idealized as rigid in accordance with ASCE 7 Section 12.3.1.2, δ_{di}, displacement due to diaphragm deformation corresponding to the design earthquake, is permitted to be taken as zero. ~~Design displacement at each level shall be the total lateral deflection at the level calculated for the design earthquake using the procedures defined in Section 12.8.6 of ASCE 7.~~

Delete without substitution:

~~**1902.1.2 Special structural wall.** Special structural walls made of cast-in-place or precast concrete shall comply with the requirements of Sections 18.2.4 through 18.2.8, 18.10 and 18.11 of ACI 318, as applicable, in addition to the requirements for *ordinary reinforced concrete structural walls* or *ordinary precast structural walls*, as applicable. Where ASCE 7 refers to a "special reinforced concrete shear wall," it shall be deemed to mean a "special structural wall."~~

Revise as follows:

1901.3 Anchoring to concrete. Anchoring to concrete shall be in accordance with ACI 318 as ~~amended~~ supplemented in Section 1905, and applies to cast-in (headed bolts, headed studs and hooked J- or L-bolts), post-installed expansion (torque-controlled and displacement-controlled), undercut, screw, and adhesive anchors.

Delete without substitution:

~~**1903.2 Special inspections**. *Where required, special inspections and tests shall be in accordance with Chapter 17.*~~

Revise as follows:

1903.2 ~~**1903.3**~~ **Glass fiber-reinforced concrete.** *Glass fiber-reinforced concrete (GFRC) and the materials used in such concrete shall be in accordance with the PCI ~~MNL~~ 128 s~~tandard~~.*

1903.3 ~~**1903.4**~~ **Flat wall insulating concrete form (ICF) systems.** Insulating concrete form material used for forming flat concrete walls shall conform to ASTM E2634.

SECTION 1905
SEISMIC REQUIREMENTS ~~MODIFICATIONS TO ACI 318~~

1905.1 General. In addition to the provisions of ACI 318, structural concrete shall comply with the requirements of Section 1905.
~~The text of ACI 318 shall be modified as indicated in Sections 1905.1.1 through 1905.1.8.~~

1905.2 ~~**1905.1.1**~~ **ACI 318, Section 23.** Modify existing definitions and add the following definitions to ACI 318, Section 2.3.

Add new definition as follows:

CAST-IN-PLACE CONCRETE EQUIVALENT DIAPHRAGM. A cast-in-place noncomposite topping slab diaphragm, as defined in Section 18.12.5, or a diaphragm constructed with precast concrete components that uses closure strips between precast components with detailing that meets the requirements of ACI 318 for the *Seismic Design Category* of the structure.

Revise as follows:

DETAILED PLAIN CONCRETE STRUCTURAL WALL. A wall complying with the requirements of Chapter 14, and Section 1905.5 of the *International Building Code* ~~including 14.6.2~~.

ORDINARY ~~STRUCTURAL~~ PLAIN CONCRETE STRUCTURAL WALL. A wall complying with the requirements of Chapter 14, *excluding 14.6.2.*

Add new definition as follows:

PRECAST CONCRETE DIAPHRAGM. A diaphragm constructed with precast concrete components, with or without a cast-in-place topping, that includes the use of discrete connectors or joint reinforcement to transmit diaphragm forces.

Delete without substitution:

~~**1905.1.2 ACI 318, Section 1821.** Modify ACI 318 Sections 18.2.1.2 and 18.2.1.6 to read as follows:~~

- ~~*18.2.1.2 – Structures assigned to Seismic Design Category* A shall satisfy requirements of Chapters 1 through 17 and 19 through 26; *Chapter 18 does not apply*. Structures assigned to *Seismic Design Category* B, C, D, E or F shall satisfy 18.2.1.3 through 18.2.1.7, as applicable. *Except for structural elements of plain concrete complying with Section 1905.1.7 of the International Building Code, structural elements of plain concrete are prohibited in structures assigned to Seismic Design Category C, D, E or F.*~~
- ~~18.2.1.6 – Structural systems designated as part of the *seismic force-resisting system* shall be restricted to those *permitted by ASCE 7.* Except for *Seismic Design Category* A, for which Chapter 18 does not apply, the following provisions shall be satisfied for each structural system designated as part of the *seismic force-resisting system*, regardless of the *seismic design category*:~~

~~(a) Ordinary moment frames shall satisfy 18.3.~~

~~(b) *Ordinary reinforced concrete structural walls and ordinary precast structural walls* need not satisfy any provisions in Chapter 18.~~

~~(c) Intermediate moment frames shall satisfy 18.4.~~

~~(d) Intermediate precast *structural* walls shall satisfy 18.5.~~

~~(e) Special moment frames shall satisfy 18.6 through 18.9.~~

~~(f) Special structural walls shall satisfy 18.10.~~

~~(g) Special structural walls constructed using precast concrete shall satisfy 18.11.~~

~~Special moment frames and special structural walls shall also satisfy 18.2.4 through 18.2.8.~~

Revise as follows:

1905.3 ~~1905.1.3~~ Intermediate precast structural walls ~~ACI 318, Section 185~~. Intermediate precast structural walls shall comply with Section 18.5 of ACI 318 and this section.
~~Modify ACI 318, Section 18.5 by adding new Section 18.5.2.2 and renumbering existing Sections 18.5.2.2 and 18.5.2.3 to become 18.5.2.3 and 18.5.2.4, respectively.~~

- ~~*18.5.2.2 – Connections that are designed to yield shall be capable of maintaining 80 percent of their design strength at the deformation induced by the design displacement or shall use Type 2 mechanical splices.*~~
- ~~18.5.2.3 – Elements of the connection that are not designed to yield shall develop at least 1.5 S_y.~~
- ~~18.5.2.4 – In structures assigned to SDC D, E or F, wall piers shall be designed in accordance with 18.10.8 or 18.14 in ACI 318.~~

Delete without substitution:

~~**1905.1.4 ACI 318, Section 1811.** Modify ACI 318, Section 18.11.2.1 to read as follows:~~

- ~~18.11.2.1 – Special structural walls constructed using precast concrete shall satisfy all the requirements of 18.10 *for cast-in-place special structural walls* in addition to 18.5.2.~~

Add new text as follows:

1905.3.1 Connections designed to yield. Connections that are designed to yield shall be capable of maintaining 80 percent of their design strength at the deformation induced by the design displacement or shall use Type 2 mechanical splices.

Revise as follows:

1905.4 ~~1905.1.5~~ Foundations designed to resist earthquake forces ~~ACI 318, Section 181311~~. *Foundations resisting earthquake-induced forces or transferring earthquake-induced forces between a structure and ground shall comply with the requirements of 18.13 and other applicable provisions of* ACI 318 *unless modified by Chapter 18 of the* International Building Code.
~~Modify ACI 318, Section 18.13.1.1 to read as follows:~~

- ~~18.13.1.1 – *Foundations resisting earthquake-induced forces or transferring earthquake-induced forces between a structure and ground*~~

~~*shall comply with the requirements of 18.13 and other applicable provisions of* ACI 318 *unless modified by Chapter 18 of the* International Building Code.~~

1905.5 ~~**1905.1.6**~~ **Detailed plain concrete structural walls** ~~**ACI 318, Section 146.**~~ Detailed plain concrete structural walls are walls conforming to the requirements of ordinary plain concrete structural walls and Section 1905.5.1 of the *International Building Code.*
~~Modify ACI 318, Section 14.6 by adding new Section 14.6.2 to read as follows:~~

- ~~*14.6.2 – Detailed plain concrete structural walls.*~~
- ~~*14.6.2.1 – Detailed plain concrete structural walls are walls conforming to the requirements of ordinary structural plain concrete walls and 14.6.2.2.*~~
- ~~*14.6.2.2 – Reinforcement shall be provided as follows:*~~

~~(a) Vertical reinforcement of at least 0.20 square inch (129 mm^2) in cross-sectional area shall be provided continuously from support to support at each corner, at each side of each opening and at the ends of walls. The continuous vertical bar required beside an opening is permitted to substitute for one of the two No. 5 bars required by 14.6.1.~~

~~*(b)Horizontal reinforcement at least 0.20 square inch (129 mm^2) in cross-sectional area shall be provided:*~~

~~*1.Continuously at structurally connected roof and floor levels and at the top of walls.*~~

~~*2.At the bottom of load-bearing walls or in the top of foundations where doweled to the wall.*~~

~~*3.At a maximum spacing of 120 inches (3048 mm).*~~

~~*Reinforcement at the top and bottom of openings, where used in determining the maximum spacing specified in Item 3 above, shall be continuous in the wall.*~~

Add new text as follows:

1905.5.1 Reinforcement. *Reinforcement shall be provided as follows:*
- Vertical reinforcement of at least 0.20 square inch (129 mm^2) in cross-sectional area shall be provided continuously from support to support at each corner, at each side of each opening, and at the ends of walls. The continuous vertical bar required beside an opening is permitted to substitute for one of the two No. 5 bars required by 14.6.1.
- *Horizontal reinforcement at least 0.20 square inch (129 mm^2) in cross-sectional area shall be provided:*
  1. *Continuously at structurally connected roof and floor levels and at the top of walls.*
  2. *At the bottom of load-bearing walls or in the top of foundations where doweled to the wall.*
  3. *At a maximum spacing of 120 inches (3048 mm).*

Reinforcement at the top and bottom of openings, where used in determining the maximum spacing specified in Item 3 above, shall be continuous in the wall.

Revise as follows:

1905.6 ~~**1905.1.7**~~ **Structural plain concrete** ~~**ACI 318, Section 1414.**~~ Structural plain concrete elements shall comply with this section in lieu of Section 14.1.4 of ACI 318. ~~Delete ACI 318, Section 14.1.4 and replace with the following:~~

- ~~*14.1.4 – Plain concrete in structures assigned to Seismic Design Category C, D, E or F.*~~
- ~~*14.1.4.1 – Structures assigned to Seismic Design Category C, D, E or F shall not have elements of structural plain concrete, except as follows:*~~
  - ~~*Structural plain concrete basement, foundation or other walls below the base as defined in ASCE 7 are permitted in detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls. In dwellings assigned to Seismic Design Category D or E, the height of the wall shall not exceed 8 feet (2438 mm), the thickness shall be not less than 7$^1/_2$ inches (190 mm), and the wall shall retain no more than 4 feet (1219 mm) of unbalanced fill. Walls shall have reinforcement in accordance with 14.6.1.*~~
  - ~~*Isolated footings of plain concrete supporting pedestals or columns are permitted, provided the projection of the footing beyond the face of the supported member does not exceed the footing thickness.*~~

    ~~***Exception:** In detached one- and two-family dwellings three stories or less in height, the projection of the footing beyond the face of the supported member is permitted to exceed the footing thickness.*~~
  - ~~*Plain concrete footings supporting walls are permitted, provided the footings have at least two continuous longitudinal reinforcing bars. Bars shall not be smaller than No. 4 and shall have a total area of not less than 0.002 times the gross cross-sectional area of the footing. For footings that exceed 8 inches (203 mm) in thickness, a minimum of one bar shall be provided at the top and bottom of the footing. Continuity of reinforcement shall be provided at corners and intersections.*~~

~~**Exceptions:**~~

~~*1.In Seismic Design Categories A, B and C, detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls are permitted to have plain concrete footings without longitudinal reinforcement.*~~

~~*2.For foundation systems consisting of a plain concrete footing and a plain concrete stemwall, a minimum of one bar shall be provided at the top of the stemwall and at the bottom of the footing.*~~

~~*3.Where a slab on ground is cast monolithically with the footing, one No. 5 bar is permitted to be located at either the top of the slab or bottom of the footing.*~~

Add new text as follows:

1905.6.1 **Seismic Design Categories A and B.** In structures assigned to Seismic Design Category A or B, detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls are permitted to have plain concrete footings without longitudinal reinforcement.

1905.6.2 **Seismic Design Categories C, D, E and F.** *Structures assigned to Seismic Design Category C, D, E or F shall not have elements of structural plain concrete, except as follows:*

- *Structural plain concrete basement, foundation or other walls below the base as defined in ASCE/SEI 7 are permitted in detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls. In dwellings assigned to Seismic Design Category D or E, the height of the wall shall not exceed 8 feet (2438 mm), the thickness shall be not less than $7^1/_2$ inches (190 mm), and the wall shall retain no more than 4 feet (1219 mm) of unbalanced fill. Walls shall have reinforcement in accordance with 14.6.1.*
- *Isolated footings of plain concrete supporting pedestals or columns are permitted, provided the projection of the footing beyond the face of the supported member does not exceed the footing thickness.*

  Exception: *In detached one- and two-family dwellings three stories or less in height, the projection of the footing beyond the face of the supported member is permitted to exceed the footing thickness.*
- *Plain concrete footings supporting walls are permitted, provided the footings have at least two continuous longitudinal reinforcing bars. Bars shall not be smaller than No. 4 and shall have a total area of not less than 0.002 times the gross cross-sectional area of the footing. For footings that exceed 8 inches (203 mm) in thickness, a minimum of one bar shall be provided at the top and bottom of the footing. Continuity of reinforcement shall be provided at corners and intersections.*

  Exceptions:

  1. *Where assigned to Seismic Design Category C, detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls are permitted to have plain concrete footings without longitudinal reinforcement.*
  2. *For foundation systems consisting of a plain concrete footing and a plain concrete stemwall, a minimum of one bar shall be provided at the top of the stemwall and at the bottom of the footing.*
  3. *Footings cast* monolithically *with a slab-on-ground shall have not fewer than one No. 4 bar at the top and bottom of the footing or one No. 5 bar or two No. 4 bars in the middle third of the footing depth.*

Revise as follows:

1905.7 ~~**1905.1.8**~~ **Design requirements for anchors** ~~**ACI 318, Section 1723.**~~ ~~Modify ACI 318 Sections 17.10.5.2, 17.10.5.3(d) and 17.10.6.2 to read as follows:~~

- ~~17.10.5.2 – *Where* the tensile component of the strength-level earthquake force applied to anchors exceeds 20 percent of the total factored anchor tensile force associated with the same load combination, anchors and their attachments shall be designed in accordance with 17.10.5.3. The anchor design tensile strength shall be determined in accordance with 17.10.5.4.~~

  ~~**Exception:** *Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 shall be deemed to satisfy Section 17.10.5.3(d).*~~
- ~~17.10.5.3(d) – *The* anchor or group *of anchors* shall be designed for the maximum tension obtained from design load combinations that include **E**, with **E** increased by Ω_0. The anchor design tensile strength shall *be calculated from 17.10.5.4.*~~
- ~~17.10.6.2 – *Where* the shear component of the strength-level earthquake force applied to anchors exceeds 20 percent of the total factored anchor shear force associated with the same load combination, anchors and their attachments shall be designed in accordance with 17.10.6.3. The anchor design shear strength for resisting earthquake forces shall be determined in accordance with 17.7.~~

  ~~**Exceptions:**~~

~~*1.For the calculation of the in-plane shear strength of anchor bolts attaching wood sill plates of bearing or nonbearing walls of light-frame wood structures to foundations or foundation stem walls, the in-plane shear strength in accordance with 17.7.2 and 17.7.3 need not be computed and 17.10.6.3 shall be deemed to be satisfied provided all of the following are met:*~~

~~*1.1.The allowable in-plane shear strength of the anchor is determined in accordance with ANSI/AWC NDS Table 12E for lateral design values parallel to grain.*~~

~~*1.2.The maximum anchor nominal diameter is $^5/_8$ inch (16 mm).*~~

~~*1.3.Anchor bolts are embedded into concrete a minimum of 7 inches (178 mm).*~~

~~*1.4.Anchor bolts are located a minimum of $1^3/_4$ inches (45 mm) from the edge of the concrete parallel to the length of the wood sill plate.*~~

~~*1.5.Anchor bolts are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the wood sill plate.*~~

~~*1.6.The sill plate is 2-inch (51 mm) or 3-inch (76 mm) nominal thickness.*~~

~~*2.For the calculation of the in-plane shear strength of anchor bolts attaching cold-formed steel track of bearing or nonbearing walls of light-frame construction to foundations or foundation stem walls, the in-plane shear strength in accordance with 17.7.2 and 17.7.3 need not be computed and 17.10.6.3 shall be deemed to be satisfied provided all of the following are met:*~~

~~*Allowable in-plane shear strength of exempt anchors, parallel to the edge of concrete, shall be permitted to be determined in accordance with AISI S100 Section J3.3.1.*~~

~~*2.1. The maximum anchor nominal diameter is $^5/_8$ inch (16 mm).*~~

~~*2.2. Anchors are embedded into concrete a minimum of 7 inches (178 mm).*~~

~~*2.3. Anchors are located a minimum of $1^3/_4$ inches (45 mm) from the edge of the concrete parallel to the length of the track.*~~

~~*2.4. Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the track.*~~

~~*2.5. The track is 33 to 68 mil (0.84 mm to 1.73 mm) designation thickness.*~~

~~*3.In light-frame construction bearing or nonbearing walls, shear strength of concrete anchors less than or equal to 1 inch [25 mm] in diameter attaching sill plate or track to foundation or foundation stem wall need not satisfy 17.10.6.3(a) through (c) when the design strength of the anchors is determined in accordance with 17.7.2.1(c).*~~

Add new text as follows:

1905.7.1 Anchors in tension. The following exception is permitted to ACI 318 Section 17.10.5.2:

Exception: Anchors designed to resist wall out-of-plane forces with *design strengths* equal to or greater than the force determined in accordance with ASCE/SEI 7 equation 12.11-1 or 12.14-1 shall be deemed to satisfy Section 17.10.5.3(d) of ACI 318.

1905.7.2 Anchors in shear. The following exceptions are permitted to ACI 318 Section 17.10.6.2:

Exceptions:

1. *For the calculation of the in-plane shear strength of anchor bolts attaching wood sill plates of bearing or nonbearing walls of light-frame wood structures to foundations or foundation stemwalls, the in-plane shear strength in accordance with 17.7.2 and 17.7.3 need not be computed and 17.10.6.3 of ACI 318 shall be deemed to be satisfied provided all of the following are met:*

   1.1. *The allowable in-plane shear strength of the anchor is determined in accordance with ANSI/AWC NDS Table 12E for lateral design values parallel to grain.*

   1.2. *The maximum anchor nominal diameter is $^5/_8$ inch (16 mm).*

   1.3. *Anchor bolts are embedded into concrete a minimum of 7 inches (178 mm).*

   1.4. *Anchor bolts are located a minimum of $1^3/_4$ inches (45 mm) from the edge of the concrete parallel to the length of the wood sill plate.*

   1.5. *Anchor bolts are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the wood sill plate.*

   1.6. *The sill plate is 2-inch (51 mm) or 3-inch (76 mm) nominal thickness.*

2. *For the calculation of the in-plane shear strength of anchor bolts attaching cold-formed steel track of bearing or nonbearing walls of light-frame construction to foundations or foundation stemwalls, the in-plane shear strength in accordance with 17.7.2 and 17.7.3 need not be computed and 17.10.6.3 shall be deemed to be satisfied provided all of the following are met:*

   Allowable in-plane shear strength of exempt anchors, parallel to the edge of concrete, shall be permitted to be determined in accordance with AISI S100 Section J3.3.1.

   2.1. *The maximum anchor nominal diameter is $^5/_8$ inch (16 mm).*

   2.2. *Anchors are embedded into concrete a minimum of 7 inches (178 mm).*

   2.3. *Anchors are located a minimum of 1$^3/_4$ inches (45 mm) from the edge of the concrete parallel to the length of the track.*

   2.4. *Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the track.*

   2.5. *The track is 33 to 68 mil (0.84 mm to 1.73 mm) designation thickness.*

3. *In light-frame construction bearing or nonbearing walls, shear strength of concrete anchors less than or equal to 1 inch [25 mm] in diameter attaching sill plate or track to foundation or foundation stemwalls need not satisfy 17.10.6.3(a) through (c) when the design strength of the anchors is determined in accordance with 17.7.2.1(c).*

Reason Statement: This proposal makes a conceptual change in Section 1905, without introducing any substantive change. The section is reformatted so that, instead of amending certain sections of ACI 318 19, it contains provisions that are supplemental to those of ACI 318-19. The new format is believed to be more user-friendly. As part of this format change existing provisions have been relocated to the following new subsections: 1905.3.1, 1905.5.1, 1905.6.1, 1905.7.1, and 1905.7.2.
1901.2, 1901.3 - The changes reflect the conceptual change in section 1905.

1902.1 - The two existing subsections are deleted as being unnecessary. The new Subsection 1902.1 .1 is added in view of the introduction of Design Earthquake displacement in ACE 7-22, which includes diaphragm displacement under the Design Earthquake. To avoid unnecessary calculations, the latter is permitted to be taken equal to zero for diaphragms that can be idealized as rigid.

1903.2 (old numbering) - This section is deleted because it is a repeat of Section 1901.6.

1903.2 - This is essentially the correction of an error. The 2021 IBC already refers to PCI 128-19 *Specification for Glass Fiber Reinforced Concrete Panels* in chapter 35. However, Section 1903.3, now 1903.2. still refers to the old PCI MNL 128, which was a recommended practice document, not a standard.

1905.1 - The language implements the conceptual change made to Section 1905

1905.2 - The two new definitions are introduced because they have been added to Chapter 14 of ASCE 7-22, which will not be adopted by the 2024 IBC.

1905.1 .2 (old numbering) - This is deleted as being unnecessary.

1905.3 - Deletions and additions implement the conceptual change made to Section 1905.

1905.1 .4 (old numbering) - This is deleted as being unnecessary.

1905.4 - Additions and deletions implement the conceptual change made to Section 1905

1905.5 - Additions and deletions implement the conceptual change made to Section 1905. The remaining text of 1905.5 is improved for ease of use.

1905.6 - In addition to reflecting the conceptual change mentioned above, changes have been made to correct a structural problem with the existing section. The section is applicable to SDC C, D, E, and F structures. Yet, there is an exception made for SDC A, B structures. This has now been straightened out.

1905.7 - In addition to implementing the conceptual change made to Section 1905, much unnecessary text is deleted to produce a much more streamlined section.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No substantive change has been made in the entire chapter.

S175-22

S176-22

IBC: 1901.5

Proponents: Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org)

2021 International Building Code

Delete without substitution:

~~**1901.5 Construction documents.** The *construction documents* for structural concrete construction shall include:~~

1. ~~The specified compressive strength of concrete at the stated ages or stages of construction for which each concrete element is designed.~~
2. ~~The specified strength or grade of reinforcement.~~
3. ~~The size and location of structural elements, reinforcement and anchors.~~
4. ~~Provision for dimensional changes resulting from creep, shrinkage and temperature.~~
5. ~~The magnitude and location of prestressing forces.~~
6. ~~Anchorage length of reinforcement and location and length of lap splices.~~
7. ~~Type and location of mechanical and welded splices of reinforcement.~~
8. ~~Details and location of contraction or isolation *joints* specified for plain concrete.~~
9. ~~Minimum concrete compressive strength at time of posttensioning.~~
10. ~~Stressing sequence for posttensioning tendons.~~
11. ~~For structures assigned to *Seismic Design Category* D, E or F, a statement if slab on grade is designed as a structural *diaphragm*.~~

Reason Statement: This proposal removes truncated list of items to be cited in construction documents, thereby removing inconsistencies between ACI 318 and the IBC. Further, this proposal eliminates the problems associated with maintaining lists in both the IBC and 318.
Since IBC Section [A] 102.4.1 Conflicts. States: “Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply,” the full list of items to appear in construction documents as required by ACI 318 is not applicable and only the truncated list in the IBC applies.

This section provides no benefit to the user, but simply creates conflicts and confusion. Except for the required related to fire performance of fireplaces in Section 2111 Masonry Fireplaces, there is no comparable list of requirements in Chapter 21 Masonry. The requirements for items to be included in the construction documents for masonry are only contained in the referenced standards: The Masonry Society 402—2016: Building Code for Masonry Structures and 602—2016: Specification for Masonry Structures, avoiding conflicts and confusion. Similarly, except for some specific information exclusive to steel joists and wood trusses ,the building code defers to the appropriate reference standards. The same should be applicable for structural concrete construction.

ACI recommends approval as submitted to avoid conflicts and confusion and to eliminate the problems of trying to maintain identical lists in multiple documents. Should a truncated list be beneficial for reference purposes, such a truncated list could be published in the commentary to the IBC, but not as code requirements that deviate form ACI 318.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to the design or construction requirements.

S176-22

S177-22

IBC: 1903.3, 1903.4 (New), 1903.4, ASTM Chapter 35 (New)

Proponents: Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org); Scott Campbell, representing NRMCA (scampbell@nrmca.org); John Busel, representing American Composites Manufacturers Association (jbusel@acmanet.org); Doug Gremel, representing Owens Corning Infrastructure Solutions (douglas.gremel@owenscorning.com); Jerzy Zemajtis, NEx, An ACI Center of Excellence for Nonmetallic Building Materials, representing NEx, An ACI Center of Excellence for Nonmetallic Building Materials (jerzy.zemajtis@nonmetallic.org)

2021 International Building Code

1903.3 Glass fiber-reinforced concrete. *Glass fiber-reinforced concrete (GFRC) and the materials used in such concrete shall be in accordance with the PCI MNL 128 standard.*

Add new text as follows:

1903.4 Glass fiber reinforced polymer bars. Glass fiber reinforced polymer (GFRP) bars used as concrete reinforcement shall conform to ASTM D7957.

Revise as follows:

~~**1903.4**~~ **1903.5 Flat wall insulating concrete form (ICF) systems.** Insulating concrete form material used for forming flat concrete walls shall conform to ASTM E2634.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D7957/D7957M-2017	Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D7957/D7957M-2017 Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This code change adds another type of reinforcement bars, glass fiber reinforced polymer bars. This makes the IBC more current and reflects technological advancements being integrated into standards. GFRP bars are particularly beneficial where a high degree of corrosion resistance is required.
This proposal is recommended so that new materials currently being used in concrete construction are clearly permitted in the International Building Code where qualified by compliance with an appropriate standard specification.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal allows an additional type of reinforcement bars for use in concrete.

S177-22

S178-22

IBC: [BS] 202, SECTION 202, SECTION 202 (New), TABLE 1903.5.1 (New), 1903.5.2 (New), 1903.5 (New), 1903.5.1 (New), 2103.1.2 (New), 2205.3 (New), 2205.3.1 (New), 2205.3.2 (New), TABLE 2205.3.3 (New), 2303.8 (New), 2403.6 (New), 2205.3.3 (New), ASTM Chapter 35 (New), ISO Chapter 35 (New)

Proponents: Webly Bowles, representing New Buildings Institute (webly@newbuildings.org); Kimberly Cheslak, NBI, representing NBI (kim@newbuildings.org); jim edelson, representing NBI (jim@newbuildings.org)

Add new definition as follows:

CONCRETE, LIGHTWEIGHT. *Concrete* containing lightweight aggregate and having an equilibrium density determined by ASTM C567.

2021 International Building Code

Revise as follows:

[BS] CONCRETE. Mixture of cementitious material, fine aggregate, coarse aggregate and water, with or without admixture.

Carbonate aggregate. Concrete made with aggregates consisting mainly of calcium or magnesium carbonate, such as limestone or dolomite, and containing 40 percent or less quartz, chert or flint.

Cellular. A lightweight insulating concrete made by mixing a preformed foam with Portland cement slurry and having a dry unit weight of approximately 30 pcf (480 kg/m^3).

Lightweight aggregate. Concrete made with aggregates of expanded clay, shale, slag or slate or sintered fly ash or any natural lightweight aggregate meeting ASTM C330 and possessing equivalent fire-resistance properties and weighing 85 to 115 pcf (1360 to 1840 kg/m^3).

Perlite. A lightweight insulating concrete having a dry unit weight of approximately 30 pcf (480 kg/m^3) made with perlite concrete aggregate. Perlite aggregate is produced from a volcanic rock which, when heated, expands to form a glass-like material of cellular structure.

Sand-lightweight. Concrete made with a combination of expanded clay, shale, slag, slate, sintered fly ash, or any natural lightweight aggregate meeting ASTM C330 and possessing equivalent fire-resistance properties and natural sand. Its unit weight is generally between 105 and 120 pcf (1680 and 1920 kg/m^3).

Siliceous aggregate. Concrete made with normal-weight aggregates consisting mainly of silica or compounds other than calcium or magnesium carbonate, which contains more than 40-percent quartz, chert or flint.

Vermiculite. A light weight insulating concrete made with *vermiculite* concrete aggregate which is laminated micaceous material produced by expanding the ore at high temperatures. When added to a Portland cement slurry the resulting concrete has a dry unit weight of approximately 30 pcf (480 kg/m^3).

2021 International Building Code

Add new definition as follows:

CARBON DIOXIDE EQUIVALENT (CO2e). A measure used to compare the impact of various greenhouse gases based on their global warming potential (GWP). CO2e approximates the time-integrated warming effect of a unit mass of a given greenhouse gas relative to that of carbon dioxide (CO2). GWP is an index for estimating the relative global warming contribution of atmospheric emissions of 1 kg of a particular greenhouse gas compared to emissions of 1 kg of CO2. The following GWP values are used based on a 100-year time horizon: 1 for CO2, 25 for methane (CH4), and 298 for nitrous oxide (N2O).

COMMUNITY RENEWABLE ENERGY FACILITY. A facility that produces energy harvested from *renewable energy resources* and is qualified as a community energy facility under applicable jurisdictional statutes and rules.

FINANCIAL RENEWABLE ENERGY POWER PURCHASE AGREEMENT (PPA). A financial arrangement between a renewable electricity generator and a purchaser wherein the purchaser pays or guarantees a price to the generator for the project's renewable generation. Also known as a "financial power purchase agreement" and "virtual power purchase agreement."

FLAT GLASS. A type of glass, initially produced in plane form. Common uses include, but are not limited to, windows, glass doors, and transparent walls. Flat glass is in contrast to container glass, glass fiber (insulation) and optical communication. Flat glass has a higher magnesium oxide and sodium oxide content than container glass and a lower silica, calcium oxide, and aluminum.

ON-SITE RENEWABLE ENERGY. Energy from *renewable energy resources* harvested at the building site.

PHYSICAL RENEWABLE ENERGY POWER PURCHASE AGREEMENT (PPA). A contract for the purchase of renewable electricity from a specific renewable electricity generator to a purchaser of renewable electricity.

PLATE GLASS. See “Flat glass”

RENEWABLE ENERGY RESOURCES. Energy from solar, wind, biomass or hydro, or extracted from hot fluid or steam heated within the earth.

SHEET GLASS. See “Flat glass”

Add new text as follows:

TABLE 1903.5.1
CO_2e LIMITS IN MIXTURE

Specified compressive strength f'c, psi	Maximum kg/m^3(SI)	High-early strength Maximum kg/m^3 (SI)	Lightweight concrete Maximum kg/m^3 (SI)
up to 2499	302	408	578
2500-3499	382	516	578
3500-4499	432	583	626
4500-5499	481	649	675
5500-6499	505	682	N/A
6500 and greater	518	680	N/A

1903.5.2 CO2e Limit Method - Project. Total CO2e ($CO2e_{proj}$) of all *concrete* placed at the building project shall not exceed the project limit ($CO2e_{allowed}$) determined using Table 1903.5.1 and Equation 1903.5.2

Equation 1903.5.2
$CO2e_{proj} < CO2E_{allowed}$

where: $CO2E_{proj} = \Sigma O2E_n v_n$ *and* $CO2E_{allowed} = \Sigma CO2E_{lim} v_n$
and

n = the total number of *concrete* mixtures for the project

$CO2E_n$ = the global warming potential for mixture n per mixture EPD, kg/m^3

$CO2E_{lim}$ = the global warming potential limit for mixture n per Table 1903.5.1, kg/m^3

v_n = the volume of mixture n *concrete* to be placed

1903.5 Embodied CO2e of concrete materials. *Concrete* products used in the building project shall be in accordance with Sections 1903.5.1 or 1903.5.2.

Exceptions:
1. Precast concrete.
2. *Masonry units* complying with Section 2103.1.2.
3. Projects where no *concrete* suppliers with product-specific environmental product declarations (EPD) for *concrete* are located within 100 miles of the project site, where Type III industry-wide EPDs and an inventory of CO2e values for all concrete mixes are provided to the AHJ.

1903.5.1 CO2e Limit Method - Mixture. The total CO2e of the *concrete* mixes used in the project shall not exceed the value given in Table 1903.5.1 based on the compressive strength of the product. CO2e content shall be documented by a product-specific Type III Environmental Product Declaration (EPD) for each product. EPDs used for compliance with this section shall be certified as complying with the goal and scope for the cradle-to-gate requirements in accordance with ISO 14025 and ISO 21930 and be available in a publicly accessible database.

2103.1.2 Embodied CO2e disclosure of masonry units. Product-specific Type III Environmental Product Declarations (EPD) shall be submitted for 75% of *masonry units*, by cost. EPDs used for compliance with this section shall be certified as complying with the goal and scope for the cradle-to-gate requirements in accordance with ISO Standards 14025 and 21930 and be available in a publicly accessible database.

2205.3 Embodied CO2e of steel products. Structural steel, hollow steel section, steel plate, and concrete reinforcing steel bar products used in the *building* shall comply with Section 2205.3.1, and one of either 2205.3.2 or 2205.3.3.

2205.3.1 EPD Disclosure. Product-specific Type III Environmental Product Declarations (EPD) shall be submitted for 75% of steel products, based on cost. EPDs used for compliance with this section shall be certified as complying with the goal and scope for the cradle-to-gate requirements in accordance with ISO Standards 14025 and 21930 and be available in a publicly accessible database.

2205.3.2 Steel Production. A minimum of 75% of steel products listed in this section, based on cost, shall be produced in a facility or facilities that comply with one of the following:

1. On the date of procurement is independently, or as part of an aggregation of facilities, a Green Power Partner in the United Stated Environmental Protection Agency (U.S. EPA) Green Power Partnership program, or an equivalent renewable power procurement registry as approved by the AHJ.

2. Not less than 50% of the energy sourced for production at the facility is a *renewable energy resource* as documented from one or more of the following:

   2.1. *On-site renewable energy* system

   2.2. Off-site renewable energy system owned by the production facility owner

   2.3. *Community renewable energy facility*

   2.4. *Physical Renewable Energy PPA*

   2.5. *Financial Renewable Energy PPA*

TABLE 2205.3.3
CO2e LIMIT PER STEEL PRODUCT

	Steel Product	Mill kg CO2e/kg[a]	Fabrication kg CO2e/kg[b]
Structural Steel	Structural Sections	0.99	1.22
Structural Steel	Hollow Structural Sections	1.71	1.99
Structural Steel	Plate	1.47	1.73
Concrete Reinforcing Bars		0.89	0.98

a. Applies when an EPD declares mill-only material (cradle to mill gate).

b. Applies when an EPD declares mill material plus U.S. industry average fabrication impacts (cradle to fabricator gate).

2303.8 Embodied CO2e disclosure of wood products. Environmental Product Declarations (EPD) shall be submitted for 75% of wood products and members, based on cost. Type III EPDs us ed for compliance with this section shall be certified as complying with the goal and scope for the cradle-to-gate requirements in accordance with ISO 14025 and ISO 21930 and be available in a publicly accessible database.

2403.6 Embodied CO2e disclosure of glass products. Type III Environmental Product Declarations (EPD)shall be submitted for 75% of *flat glass* products, based on cost. EPDs used for compliance with this section shall be certified as complying with the goal and scope for the cradle-to-gate requirements in accordance with ISO 14025 and ISO 21930 and be available in a publicly accessible database.

2205.3.3 Steel Product CO2e Limits. A minimum of 75% of steel products, based on cost, shall not exceed the total CO2e values in Table 2205.3.3 based on product type.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

C567/C567M-19 Standard Test Method for Determining Density of Structural Lightweight Concrete

ISO

International Organization for Standardization
Chemin de Blandonnet 8 CP 401 1214 Vernier
Geneva, Switzerland

ISO 14025:2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedure

ISO 21930:2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and service

Reason Statement: 1903.5 Embodied CO2e of concrete materials:

Language in this proposal builds on the success of the Marin County Low Carbon Concrete Code[1], setting achievable targets based on current U.S.-based EPDs. The CO2e limits are set on the 75th percentile of the concrete GWPs evaluated, meaning, 75% of the GWP values (not 75% of the EPDs) comply with the limits set. The values encourage the lowest 25% of the U.S. market's concrete to perform and report improved performance through EPDs. Several nationally available alternative manufacturing processes and materials provide opportunities to reduce concrete's embodied carbon. Alternative cements and supplementary cementitious materials, aggregate sourcing, chemical admixtures, and plant efficiency are a few of the opportunities for creating lower embodied carbon concrete.

Concrete is one of the top two materials in building construction and a primary contributor to embodied carbon in buildings. A recent case study analysis by RMI shows that simply by specifying concrete products with lower CO2e content, the embodied carbon of a commercial construction project can be reduced up to 33%.[2]

To build a building, construction professionals buy concrete (which contains cement used with water as a binder to adhere particles of sand and rock, known as aggregate) from a ready-mix supplier. Although each of concrete's constituent materials offer opportunities for reductions in embodied carbon, the high embodied carbon of concrete is primarily driven by the manufacture of one key ingredient—ordinary Portland cement. Portland cement is the most common cementitious binder used in concrete mixtures in the U.S., and the U.S. cement industry is one of the largest contributors to U.S.-borne emissions at 68.3 million metric tons (MMT) of CO2e per year.[3] The building construction industry's demand for concrete accounts for an estimated 51% of total Portland cement produced in the U.S.[4]

2103.1.2 Embodied CO2e disclosure of masonry units.

Language in this section recognizes the complete lack of data around masonry unit products. Recognized in the Clean Future Act as a product on the secondary list of materials, masonry units, are required to submit EPDs to increase the amount of data.[5]

2205.3 Embodied CO2e of steel products.

Language in this proposal recognizes the international dataset available to set targets across multiple steel products. Products with the most data have been targeted at (75%) of international values, eliminating the worst performing products. All structural steel products are required to submit EPDs to increase the amount of data for future updates to model code language. Steel is the second most widely used materials in building construction and a primary contributor to embodied carbon in buildings. The U.S. steel industry is responsible for 104.6 MMT of CO2 emissions annually, a contribution that makes up 2% of total U.S. emissions.[3] Steel destined for the built environment is responsible for 46 MMT of CO2 emissions annually, nearly half of the total annual emissions from the steel industry.[3] Many types of steel products made with different manufacturing techniques are found in buildings. Hot-rolled structural steel is the predominant structural framing material used in building construction, holding 46% of the market share for structural framing materials for nonresidential and multistory residential construction in 2017. [6] Steel reinforcing or "rebar," which is typically embedded in structural concrete, can also be a major use of steel and source of embodied carbon in buildings. A recent case study analysis by RMI shows that simply by specifying rebar products with lower CO2e content, the embodied carbon of a typical commercial construction project can be reduced up to 10%.[2]

2303.8 Embodied CO2e disclosure of wood products.

Language in this section recognizes the complete lack of data and inconsistent consensus on climate-smart wood products. Recognized in the Clean Future Act[5] as a product on the secondary list of materials, wood products regulated in Chapter 23 are required to submit EPDs to increase the amount of data for future updates to model code language. Jurisdictions can revise the percentage of materials subject to the requirements as necessary to meet their own needs.

2403.6 Embodied CO2e disclosure of glass products.

Language in this section recognizes the complete lack of data around flat glass products. Recognized in the Clean Future Act[5] as a product on the secondary list of materials, flat glass are required to submit EPDs to increase the amount of data for future updates to model code language.

Bibliography: [1] Marin County, Carbon Concrete Requirements, Chapter 19.07, November 2021, https://library.municode.com/ca/marin_county/codes/municipal_code?nodeId=TIT19MACOBUCO
[2] Matt Jungclaus, Rebecca Esau, Victor Olgyay, and Audrey Rempher, *Low-Cost, High-Value Opportunities to Reduce Embodied Carbon in Buildings,* RMI, 2021.

[3] *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2018,* US Environmental Protection Agency, 2020, https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf; and "Manufacturing Energy and Carbon Footprint," US Department of Energy, https://www.energy.gov/sites/prod/files/2018/10/f56/2014_mecs_cement_energy_footprint.pdf.

[4] *2019 U.S. Cement Industry Annual Yearbook,* Portland Cement Association, 2019, https://www.cement.org/morereports/2018-us-cement-industry-annual-yearbook.

[5] *GSA Green Building Advisory Committee Advice Letter: Policy Recommendations for Procurement of Low Embodied Energy and Carbon Materials by Federal Agencies,* U.S. General Services Administration, February 17 2021, https://www.gsa.gov/governmentwide-initiatives/federal-highperformance-green-buildings/policy/green-building-advisory-committee/advice-letters-and-resolutions

[6] *Structural Steel: An Industry Overview*, American Institute of Steel Construction, August 2018, https://www.aisc.org/globalassets/aisc/publications/white-papers/structural_steel_industry_overview_2018.pdf.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The impact of the embodied carbon considerations in code to project teams can be cost-neutral when the requirements are specified and administered efficiently. As described in the code, GWP limits for concrete mixes are set through an evaluation of national EPDs and their GWP values; data available for many regional concrete suppliers indicate that local markets can outperform the national average and is well-positioned to meet the code criteria. The optimizations needed to produce compliant concrete mixes can be achieved primarily by reducing cement in concrete mixes, through strategies like high performance aggregate selection or cement substitution. These interventions can be made without a cost impact if the criteria are effectively communicated to ready-mix suppliers. For projects necessitating a quicked concrete curing time, the code allows for a 130% GWP increase for high, early strength concrete because this concrete often requires additional cement. Low embodied carbon concrete does not require onerous changes to upstream industrial processes.

For steel products, the GWP limits were established using a percentage of the Type III industry-wide EPDs for each product, considering whether the product is directly from the mill or has been fabricated. The energy related to steel product manufacturing dominates the calculated embodied carbon of the final product. Therefore, products manufactured with electricity, over natural gas, and in regions with lower carbon energy grids, will have lower embodied carbon. International steel production's energy is sourced from more extensive coal and natural gas percentages than is found in the U.S., making American-made steel lower in carbon than most steel derived from Asian countries.

A recent case study analysis by RMI shows that simply by specifying concrete products with lower CO2e content, the embodied carbon of a commercial construction project can be reduced up to 33%. Similarly, specifying rebar with lower CO2e content can reduce the embodied carbon of a typical commercial construction project up to 10%. Both of these specifications were indicated to have a cost premium of less than 1%. Additional project-level research has shown a cost savings due to structural material efficiency as by right-sizing structural members, up to a 5% cost savings on structural materials has been achieved.

S178-22

S179-21

IBC: SECTION 1907, 1907.1

Proponents: Mark Domogala, Basement Systems Inc., representing Basement Systems Inc. (rd@basementsystems.com)

2021 International Building Code

SECTION 1907
MINIMUM SLAB PROVISIONS

Revise as follows:

1907.1 General. The thickness of concrete floor slabs supported directly on the ground shall be not less than $3^1/_2$ inches (89 mm). A 6-mil (0.006 inch; 0.15 mm) polyethylene vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the base course or subgrade and the concrete floor slab, or other *approved* equivalent methods or materials shall be used to retard vapor transmission through the floor slab.

~~Exception~~ <u>Exceptions</u>:

1. A vapor retarder is not required:
   1. For detached structures accessory to occupancies in Group R-3, such as garages, utility buildings or other unheated facilities.
   2. For unheated storage rooms having an area of less than 70 square feet (6.5 m2) and carports attached to occupancies in Group R-3.
   3. For buildings of other occupancies where migration of moisture through the slab from below will not be detrimental to the intended occupancy of the building.
   4. For driveways, walks, patios and other flatwork that will not be enclosed at a later date.
   5. Where *approved* based on local site conditions.
2. <u>Minimum thickness of concrete floor slabs supported directly on the ground having interior drainage systems. For installation of perimeter drain systems on the interior of a dwelling minimum floor thickness to be no less than 2-1/2" inches thick 6" to 8" away from interior walls.</u>

Reason Statement: To allow for interior drainage systems to be installed with an exception to the current 3-1/2" minimum thick concrete on slab requirement. The interior drainage system is to be installed in existing homes under the perimeter of basement floor. The floor would be restored to a minimum thickness of 2-1/2" of concrete.
The current language does not allow for water drainage strategies with revised minimum slab on ground thickness along the interior perimeter of foundation.

See attached file WaterGuard Cross Section Installation Illustration_11-05-2018-membrane.pdf

WaterGuard Installation Cross Section

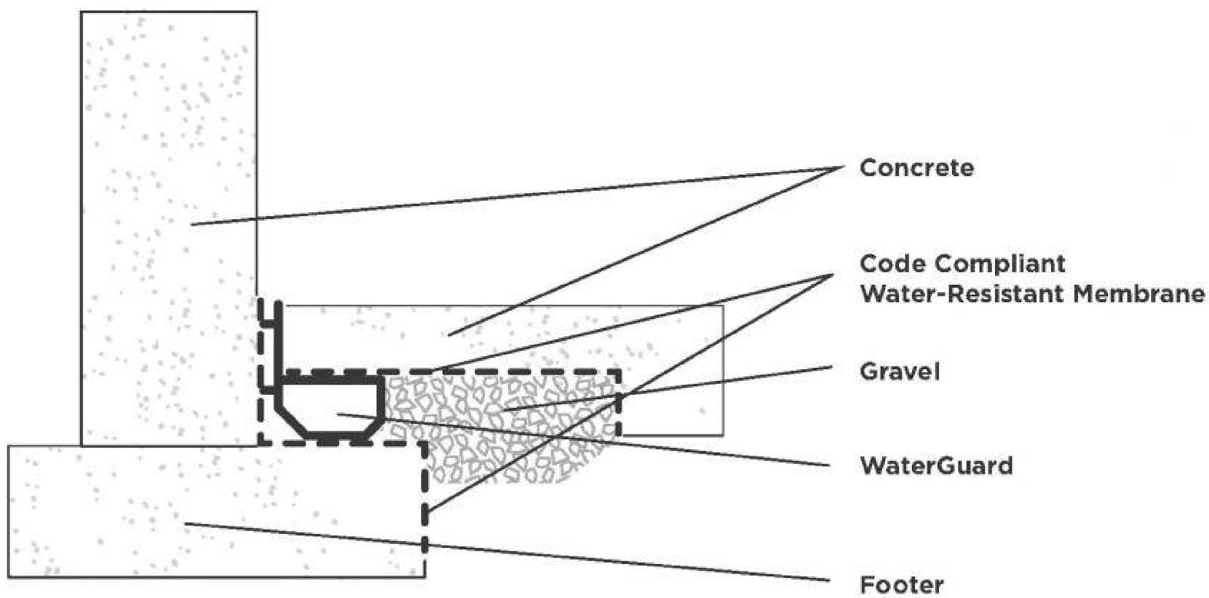


Figure 1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
As secondary strategy for draining ground water from around the foundation from the inside of a dwelling, the cost benefit and savings outweigh the cost and benefit of replacing or initially installing a footing drain system on the exterior of an existing dwelling. When exterior foundation footing drain systems fail, new footing drains need to be installed. For dwellings where exterior footing drains were not part of the original construction of the foundation system, exterior footing drains would need to be installed for the first time. Replacement of, or initial installation of, external footing drains require major outside excavation. In all cases several features of an existing dwelling often need to be altered or removed and then replaced to install new exterior footing drains since the dwellings is existing and not new construction. This disruption could range from plantings removals to removing stairs and porches, decks, sidewalks etc.... to gain access to the external foundation footing. This event poses major environmental disruption and is highly expensive depending on dwelling size. Cost on average is ~$26000. Dwelling size is driving cost factor.

An interior drainage system is the least invasive way to manage ground water that will eventually make its way into a below grade space. Cost impact for interior drainage takes into consideration minimal amount of labor and material cost and less invasive approach when compared to external excavation to install or replace footing drainage. Cost for internal drainage on average is $5,500 - $15,500.

An interior drainage system is the least invasive way to manage interior ground water infiltration and is more cost effective compared to external footing drain replacement.

5000 PSI prepackaged cement mix is used to restore the portion of the floor that is removed for installation. 2500 PSI is the minimum allowed for flooring.

The current language in IBC section 1907 and 1907.1 does not allow for secondary water removal strategies with revised minimum slab on ground thickness for installation along the interior perimeter of foundation.

Additional Exception Reason:

To allow for interior drainage systems to be installed with an exception to the 3-1/2" minimum thick concrete on slab current requirement. The interior drainage system is to be installed around perimeter of interior below grade space using the interior side top of the footing to install level for proper water drainage to a mechanical discharge system or drain to daylight.

S179-21

S180-22

IBC: 1907.1

Proponents: Joseph Summers, representing ICC Region VI (summersj@cityofgroton-ct.gov)

2021 International Building Code

Revise as follows:

1907.1 General. The thickness of concrete floor slabs supported directly on the ground shall be not less than $3^1/_2$ inches (89 mm). A 10-mil ~~6-mil~~ (~~0.006~~ 0.010 inch; ~~0.15~~ 0.254 mm) polyethylene vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the base course or subgrade and the concrete floor slab, or other *approved* equivalent methods or materials shall be used to retard vapor transmission through the floor slab.

Exception: A vapor retarder is not required:

1. For detached structures accessory to occupancies in Group R-3, such as garages, utility buildings or other unheated facilities.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports attached to occupancies in Group R-3.
3. For buildings of other occupancies where migration of moisture through the slab from below will not be detrimental to the intended occupancy of the building.
4. For driveways, walks, patios and other flatwork that will not be enclosed at a later date.
5. Where *approved* based on local site conditions.

Reason Statement: This change would be consistent with the vapor barrier requirements found in section R506.2.3 of the 2021 IRC and most commercial contractors do not use anything less than 10-mil under floor slabs.

Cost Impact: The code change proposal will increase the cost of construction
The use of 10-mil poly vs. 6-mil poly will increase the cost of a typical home < $200. 10-mil poly is approximately 30% more than 6-mil poly.

S180-22

S181-22

IBC: CHAPTER 21, SECTION 2102, 2102.1, 2107.2.1, 2109.2.1.2.4

Proponents: Phillip Samblanet, representing The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

2021 International Building Code

CHAPTER 21
MASONRY

SECTION 2102
NOTATIONS

Revise as follows:

2102.1 General. The following notations are used in the chapter:
NOTATIONS.

d_b	=	Diameter of reinforcement, inches (mm).
F_s	=	Allowable tensile or compressive stress in reinforcement, psi (MPa).
f_r	=	Modulus of rupture, psi (MPa).
f_s	=	Computed stress in reinforcement due to design loads, psi (MPa)
~~f'_{AAC}~~	~~=~~	~~Specified compressive strength of *AAC masonry*, the minimum compressive strength for a class of *AAC masonry* as specified in TMS 602 , psi (MPa).~~
~~f'_m~~	~~=~~	~~*Specified compressive strength of masonry* at age of 28 days, psi (MPa).~~
~~f'_{mi}~~	~~=~~	~~*Specified compressive strength of masonry* at the time of prestress transfer, psi (MPa).~~
~~K~~	~~=~~	~~The lesser of the masonry cover, clear spacing between adjacent reinforcement, or five times d_b, inches (mm).~~
L_s	=	Distance between supports, inches (mm).
l_d	=	Required development length or lap length of reinforcement, inches (mm).
P	=	The applied *load* at failure, pounds (N).
S_t	=	Thickness of the test specimen measured parallel to the direction of *load*, inches (mm).
S_w	=	Width of the test specimen measured parallel to the loading cylinder, inches (mm).

2107.2.1 Lap splices. The minimum length of lap splices for reinforcing bars in tension or compression, l_d, shall be:

$$l_d = 0.002 d_b f_s$$

For SI:

$$l_d = 0.29 d_b f_s$$

but not less than 12 inches (305 mm). The length of the lapped splice shall be not less than 40 bar diameters.

~~where :~~

~~d_b = Diameter of reinforcement, inches (mm).~~

~~f_s = Computed stress in reinforcement due to design loads, psi (MPa).~~

In regions of moment where the design tensile stresses in the reinforcement are greater than 80 percent of ~~the allowable steel tension stress,~~ F_s, the lap length of splices shall be increased not less than 50 percent of the minimum required length, but need not be greater than 72 d_b. Other equivalent means of stress transfer to accomplish the same 50 percent increase shall be permitted. Where epoxy coated bars are used, lap length shall be increased by 50 percent.

2109.2.1.2.4 Modulus of rupture determination. The modulus of rupture shall be determined by the equation:

$$f_r = 3\, PL_S / [2\, S_w\, (S_t^2)] \qquad \textbf{(Equation 21-2)}$$

~~where, for the purposes of this section only:~~

~~S_w = Width of the test specimen measured parallel to the loading cylinder, inches (mm).~~

~~f_r = Modulus of rupture, psi (MPa).~~

~~L_s = Distance between supports, inches (mm).~~

~~S_t = Thickness of the test specimen measured parallel to the direction of load, inches (mm).~~

~~P = The applied *load* at failure, pounds (N).~~

Reason Statement: In an effort to delete redundant and unneeded content to keep the provisions as short and direct as possible, a number of minor changes are being proposed. The Notation shown deleted in Section 2102 no longer appear in this Chapter, nor could the proponent find them in the IBC. They are used by referenced standards and are defined in those standards. But since they no longer appear to be used directly in the IBC, they should be deleted for clarity.
The term fs is defined in 2107.2, but not in this section, so it is proposed moving that notation to 2102.

Other terms are defined both in 2102, and in 2017.2 and in 2109. The redundant definitions are proposed to be deleted in 2107.2 and 2109.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change would simply delete unneeded or redundant notation. As such, there is no construction cost impact.

S181-22

S182-22

IBC: 2103.2.4, TMS Chapter 35 (New)

Proponents: Phillip Samblanet, representing The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

2021 International Building Code

Revise as follows:

2103.2.4 Mortar for adhered masonry veneer. *Mortar* for use with *adhered masonry veneer* shall conform to Section 13.3 of TMS 402.~~ASTM C270 for Type N or S, or shall comply with ANSI A118.4 for latex-modified Portland cement *mortar*.~~

Add new standard(s) as follows:

TMS

The Masonry Society
105 South Sunset Street, Suite Q
Longmont, CO 80501-6172

402-22	Building Code Requirements for Masonry Structures

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, TMS 402-22 Building Code Requirements for Masonry Structures, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Provisions for adhered veneer have been extensively discussed and updated in the 2022 TMS 402 to be more rationally based using a minimum mortar/unit bond strength value. This change updates the mortar requirements to comply with those provisions. Setting bed mortars are required by TMS 402/602-22 to be latex-modified mortars complying with ANSI A118.4 or A118.15 due to their increased bond strength. Setting bed mortars meeting ASTM C270 Type N or S are only permitted when testing is conducted on the specific mortar/unit combination to be used in construction.

Cost Impact: The code change proposal will increase the cost of construction
This change updates requirements for mortar for adhered masonry veneer. In most cases, because these mortars are currently used and required, there is no increase in the cost of construction. For some construction, there could be a minor increase in the cost of mortar used for these systems to achieve better performance.

S182-22

S183-22

IBC: 2107.2, 2107.2.1, 2107.3, 2108.2, 2108.3, TMS Chapter 35 (New)

Proponents: Phillip Samblanet, representing The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

2021 International Building Code

Revise as follows:

2107.2 TMS 402, Section ~~61611~~ 6.1.7.1, lap splices. As an alternative to Section ~~6.1.6.1.1~~ 6.1.7.1, it shall be permitted to design lap splices in accordance with Section 2107.2.1.

2107.2.1 Lap splices. The minimum length of lap splices for reinforcing bars in tension or compression, l_d, shall be:

$$l_d = 0.002 d_b f_s$$

For SI:

$$l_d = 0.29 d_b f_s$$

but not less than 12 inches (305 mm). The length of the lapped splice shall be not less than 40 bar diameters.
~~where :~~
~~d_b = Diameter of reinforcement, inches (mm).~~
~~f_s = Computed stress in reinforcement due to design loads, psi (MPa).~~

In regions of moment where the design tensile stresses in the reinforcement are greater than 80 percent of ~~the allowable steel tension stress,~~ F_s, the lap length of splices shall be increased not less than 50 percent of the minimum required length, but need not be greater than 72 d_b. Other equivalent means of stress transfer to accomplish the same 50 percent increase shall be permitted. Where epoxy coated bars are used, lap length shall be increased by 50 percent.

2107.3 TMS 402, Section ~~6161~~ 6.1.7, splices of reinforcement. Add to~~Modify~~ Section ~~6.1.6.1~~ 6.1.7 as follows:

- ~~6.1.6.1~~ 6.1.7– Splices of reinforcement. Lap splices, welded splices or mechanical splices are permitted in accordance with the provisions of this section. Welding shall conform to AWS D1.4. Welded splices shall be of ASTM A706 steel reinforcement. Reinforcement larger than No. 9 (M #29) shall be spliced using mechanical connections in accordance with Section ~~6.1.6.1.3~~ 6.1.7.2.

2108.2 TMS 402, Section ~~61511~~ 6.1.6, development. ~~Modify~~ Add a ~~the~~ second paragraph ~~of~~ Section 6.1.6.3.1~~6.1.5.1.1~~ as follows:
The required development length of reinforcement ~~shall be determined by Equation (6-1), but shall be not less than 12 inches (305 mm) and~~ need not be greater than 72 d_b.

2108.3 TMS 402, Section 61611, splices. ~~Modify~~ Add to Sections ~~6.1.6.1.2 and 6.1.6.1.3~~ 6.1.7.2.1 and 6.1.7.3.1 as follows:

- ~~6.1.6.1.2~~ 6.1.7.3.1 – ~~A welded splice shall have the bars butted and welded to develop not less than 125 percent of the yield strength, f_y, of the bar in tension or compression, as required. Welded splices shall be of ASTM A706 steel reinforcement.~~ Welded splices shall not be permitted in plastic hinge zones of intermediate or special reinforced walls.
- ~~6.1.6.1.3~~ 6.1.7.2.1 – Mechanical splices shall be classified as Type 1 or 2 in accordance with Section 18.2.7.1 of ACI 318. Type 1 mechanical splices shall not be used within a plastic hinge zone or within a beam-column joint of intermediate or special *reinforced masonry* shear walls. Type 2 mechanical splices are permitted in any location within a member.

Add new standard(s) as follows:

TMS

The Masonry Society
105 South Sunset Street, Suite Q
Longmont, CO 80501-6172

402-22 Building Code Requirements for Masonry Structures

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, TMS 402-22 Building Code Requirements for Masonry Structures, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The cited references have been moved. In addition, some of the requirements shown to be deleted are now included in TMS 402, and are thus no longer required in the IBC directly (as they would be redundant). No technical changes have been proposed in this change. The intent is just to update references and to remove redundancy.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply deletes redundant requirements and updates references. As such, there is no impact on construction costs.

S184-22

IBC: 2109.1.1, 2109.2

Proponents: Phillip Samblanet, representing The Masonry Society (psamblanet@masonrysociety.org)

2021 International Building Code

Revise as follows:

2109.1.1 Limitations. The use of empirical design of adobe masonry shall be limited as noted in Section A.1.2 of TMS 402-16. In buildings that exceed one or more of the limitations of Section A.1.2 of TMS 402 -16, masonry shall be designed in accordance with the engineered design provisions of Section 2101.2 or the foundation wall provisions of Section 1807.1.5.Section A.1.2.2 of TMS 402 -16 shall be modified as follows:

- A.1.2.2 – *Wind*. Empirical requirements shall not apply to the design or construction of masonry for buildings, parts of buildings, or other structures to be located in areas where V_{asd} as determined in accordance with Section 1609.3.1 of the *International Building Code* exceeds 110 mph.

2109.2 Adobe construction. *Adobe construction* shall comply with this section and shall be subject to the requirements of this code for Type V construction, Appendix A of TMS 402 -16, and this section.

Reason Statement: This change ties this section specifically to the 2016 edition of TMS 402 to maintain the reference to the noted Appendix. TMS 402 is being updated in 2022, and other IBC references should be updated to that more current edition. Those updates are considered with other proposed changes. Revisions to the 2022 standard include many enhancements and a few corrections that should be referenced in the 2024 I-Codes. Section 2109 is a hold over from the legacy codes, and it was tied to an empirical design method that was included in earlier issues of TMS 402 as Appendix A for some basic requirements for adobe masonry. However, that appendix is no longer supported by the Committee that develops TMS 402 for new buildings, and as such, if has been deleted from the 2022 edition. To maintain the adobe provisions, a specific reference to the 2016 edition is being added, otherwise, the references will be broken.

Reason empirical design provisions are not included in TMS 402-22 are many, but fundamentally, the Committee believes they are no longer appropriate with newer materials, construction methods, and building types. In the past, when buildings had fewer windows, smaller openings, more cross walls, and shorter walls, the provisions were used and worked reasonably. Because materials have changed, fewer multi-wythe walls are used, walls have become thinner, and cross walls that supported other walls are rarely used. For these and other reasons, the appendix is no longer supported.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change allows a standard currently referenced by the I-Code to continue to be used, while other portions of the I-Codes will be updated to the newer standard. For this section, there is no construction cost impact as the 2024 IBC requirements would be be consistent with those in the 2021 IBC.

S184-22

S185-22

IBC: 2109.1.1

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

2109.1.1 Limitations. The use of empirical design of adobe masonry shall be limited as noted in Section A.1.2 of TMS 402. In buildings that exceed one or more of the limitations of Section A.1.2 of TMS 402, masonry shall be designed in accordance with the engineered design provisions of Section 2101.2 or the foundation wall provisions of Section 1807.1.5.
Section ~~A.1.2.2~~ A.1.2.3 of TMS 402 shall be modified as follows:

- ~~A.1.2.2~~ A.1.2.3 – *Wind*. Empirical requirements shall not apply to the design or construction of masonry for buildings, parts of buildings, or other structures to be located in areas where V_{asd} as determined in accordance with Section 1609.3.1 of the *International Building Code* exceeds 110 mph.

Reason Statement: This code change proposal corrects what appears to be a longstanding typographical error. As the code currently stands the seismic section of TMS 402 Appendix A is eliminated and states wind limitations twice in A1.2.2 and A1.2.3.
There are those who assume this is not a typographical error, but an attempt to completely undo the TMS 402 seismic requirements of Appendix A in the IBC. This is not the case. TMS 402 is specific about what SDCs are allowed and in what capacities.

Cost Impact: The code change proposal will increase the cost of construction
Depending on one's current interpretation of the typographical error this will either have no impact or will restrict adobe masonry to only certain situations in certain SDCs.

S185-22

S186-22

IBC: 2110.1, TMS Chapter 35 (New)

Proponents: Phillip Samblanet, representing The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

2021 International Building Code

Revise as follows:

2110.1 General. *Glass unit masonry* construction shall comply with Chapter 14~~13~~ of TMS 402 and this section.

Add new standard(s) as follows:

TMS

The Masonry Society
105 South Sunset Street, Suite Q
Longmont, CO 80501-6172

402-22	Building Code Requirements for Masonry Structures

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, TMS 402-22 Building Code Requirements for Masonry Structures, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This is an editorial change to simply update the reference based on TMS 402-22.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply updates a refence citation. As such, there is no impact on construction costs.

S186-22

S187-22

IBC: CHAPTER 22, SECTION 2201, 2201.1, 2201.2 (New), 2201.3 (New), 2201.4 (New), 2201.5 (New), SECTION 2202, 2202.1, SECTION 2203, 2203.1, SECTION 2204, 2204.1, 2204.2, 2204.3, SECTION 2205, 2205.1, 2205.2, 2205.2.1, 2205.2.1.1, 2205.2.1.2, 2205.2.2, SECTION 2206, 2206.1, 2206.2, 2206.2.1, 2203 (New), 2203.1 (New), SECTION 2210, 2210.1, 2210.2, 2204.2.1 (New), 2204.2.2 (New), 2205 (New), 2205.1 (New), SECTION 2211, 2211.1, 2211.1.1, 2211.1.1.1, 2211.1.1.2, 2211.1.2, 2211.1.3, 2211.1.3.1, 2211.1.3.2, 2211.1.3.3, 2211.2, 2207 (New), 2210.1.1, 2210.1.1.1, 2210.1.1.2, 2210.1.1.3, SECTION 2207, 2207.1, 2207.1.1, 2207.2, 2207.3, 2207.4, 2207.5, SECTION 2209, 2209.1, 2209.2, 2209.3, SECTION 2208, 2208.1, AISC Chapter 35 (New), AISI Chapter 35 (New)

Proponents: Jon-Paul Cardin, representing American Iron and Steel Institute (jcardin@steel.org)

2021 International Building Code

CHAPTER 22
STEEL

SECTION 2201
GENERAL

2201.1 Scope. The provisions of this chapter govern the quality, design, fabrication and erection of steel construction.

Add new text as follows:

2201.2 Identification. Identification of steel members shall be in accordance with the applicable reference standards within this chapter. Other steel furnished for structural load-carrying purposes shall be identified for conformity to the ordered grade in accordance with the specified ASTM standard or other specification and the provisions of this chapter. Where the steel grade is not readily identifiable from marking and test records, the steel shall be tested to verify conformity to such standards.

2201.3 Protection. The protection of steel members shall be in accordance with the applicable reference standards within this chapter.

2201.4 Connections. The design and installation of steel connections shall be in accordance with the applicable reference standards within this chapter. For *special inspection* of welding or installation of high-strength bolts, see Section 1705.2.

2201.5 Anchor Rods. Anchor rods shall be set in accordance with the *approved construction documents*. The protrusion of the threaded ends through the connected material shall fully engage the threads of the nuts, but shall not be greater than the length of the threads on the bolts.

Delete without substitution:

~~SECTION 2202~~
~~IDENTIFICATION OF STEEL FOR STRUCTURAL PURPOSES~~

~~**2202.1 General.** Identification of *structural steel elements* shall be in accordance with AISC 360. Identification of cold-formed steel members shall be in accordance with AISI S100. Identification of cold-formed steel *light-frame construction* shall also comply with the requirements contained in AISI S240 or AISI S220, as applicable. Other steel furnished for structural load-carrying purposes shall be properly identified for conformity to the ordered grade in accordance with the specified ASTM standard or other specification and the provisions of this chapter. Where the steel grade is not readily identifiable from marking and test records, the steel shall be tested to verify conformity to such standards.~~

~~SECTION 2203~~
~~PROTECTION OF STEEL FOR STRUCTURAL PURPOSES~~

~~**2203.1 General.** Painting of *structural steel elements* shall be in accordance with AISC 360. Painting of open-web steel joists and joist girders shall be in accordance with SJI 100 and SJI 200. Individual structural members and assembled panels of *cold-formed steel construction* shall be protected against corrosion in accordance with the requirements contained in AISI S100. Protection of cold-formed steel *light-frame construction* shall be in accordance with AISI S240 or AISI S220, as applicable.~~

~~SECTION 2204~~
~~CONNECTIONS~~

~~**2204.1 Welding.** The details of design, workmanship and technique for welding and qualification of welding personnel shall be in accordance with the specifications listed in Sections 2205, 2206, 2207, 2208, 2210 and 2211. For *special inspection* of welding, see Section 1705.2.~~

~~**2204.2 Bolting.** The design, installation and inspection of bolts shall be in accordance with the requirements of Sections 2205, 2206, 2207, 2210 and 2211. For *special inspection* of the installation of high-strength bolts, see Section 1705.2.~~

~~**2204.3 Anchor rods.** Anchor rods shall be set in accordance with the *approved construction documents*. The protrusion of the threaded ends~~

~~through the connected material shall fully engage the threads of the nuts but shall not be greater than the length of the threads on the bolts.~~

Revise as follows:

SECTION ~~2205~~ <u>2202</u>
STRUCTURAL STEEL <u>AND COMPOSITE STRUCTURAL STEEL AND CONCRETE</u>

~~**2205.1**~~ <u>**2202.1**</u> **General.** The design, fabrication and erection of *structural steel elements* <u>and composite structural steel and concrete elements</u> in buildings, structures and portions thereof shall be in accordance with AISC 360.

~~**2205.2**~~ <u>**2202.2**</u> **Seismic design.** Where required, the seismic design, fabrication and erection of buildings, structures and portions thereof shall be in accordance with Section ~~2205.2.1~~ <u>2202.2.1</u> or ~~2205.2.2~~ <u>2202.2.2</u>, as applicable.

~~**2205.2.1**~~ <u>**2202.2.1**</u> **Structural steel seismic force-resisting systems** <u>**and composite structural steel and concrete seismic force-resisting systems**</u>**.** The design, detailing, fabrication and erection of structural steel *seismic force-resisting systems* <u>and composite structural steel and concrete *seismic force-resisting systems*</u> shall be in accordance with the provisions of Section ~~2205.2.1.1~~ <u>2202.2.1.1</u> or ~~2205.2.1.2~~ <u>2202.2.1.2</u>, as applicable.

~~**2205.2.1.1**~~ <u>**2202.2.1.1**</u> **Seismic Design Category B or C.** Structures assigned to *Seismic Design Category* B or C shall be of any construction permitted in Section ~~2205~~ <u>2202</u>. Where a response modification coefficient, *R*, in accordance with ASCE 7, Table 12.2-1, is used for the design of structures assigned to *Seismic Design Category* B or C, the structures shall be designed and detailed in accordance with the requirements of AISC 341. Beam-to-column moment connections in <u>structural steel</u> special moment frames and intermediate moment frames shall be prequalified in accordance with AISC 341, Section K1, qualified by testing in accordance with AISC 341, Section K2, or shall be prequalified in accordance with AISC 358.

Exception: The response modification coefficient, *R*, designated for "Steel systems not specifically detailed for seismic resistance, excluding cantilever column systems" in ASCE 7, Table 12.2-1, shall be permitted for <u>structural steel</u> systems designed and detailed in accordance with AISC 360, and need not be designed and detailed in accordance with AISC 341.

~~**2205.2.1.2**~~ <u>**2202.2.1.2**</u> **Seismic Design Category D, E or F.** Structures assigned to *Seismic Design Category* D, E or F shall be designed and detailed in accordance with AISC 341, except as permitted in ASCE 7, Table 15.4-1. Beam-to-column moment connections in <u>structural steel</u> special moment frames and intermediate moment frames shall be prequalified in accordance with AISC 341, Section K1, qualified by testing in accordance with AISC 341, Section K2, or shall be prequalified in accordance with AISC 358.

~~**2205.2.2**~~ <u>**2202.2.2**</u> **Structural steel elements.** The design, detailing, fabrication and erection of *structural steel elements* in *seismic force-resisting systems* other than those covered in Section ~~2205.2.1~~ <u>2202.2.1</u>, including struts, *collectors*, chords and foundation elements, shall be in accordance with AISC 341 where either of the following applies:

1. The structure is assigned to *Seismic Design Category* D, E or F, except as permitted in ASCE 7, Table 15.4-1.
2. A response modification coefficient, R, greater than 3 in accordance with ASCE 7, Table 12.2-1, is used for the design of the structure assigned to *Seismic Design Category* B or C.

Delete without substitution:

~~SECTION 2206~~
~~COMPOSITE STRUCTURAL STEEL AND CONCRETE STRUCTURES~~

~~**2206.1 General.** Systems of *structural steel elements* acting compositely with reinforced concrete shall be designed in accordance with AISC 360 and ACI 318, excluding ACI 318 Chapter 14.~~

~~**2206.2 Seismic design.** Where required, the seismic design, fabrication and erection of composite steel and concrete systems shall be in accordance with Section 2206.2.1.~~

~~**2206.2.1 Seismic requirements for composite structural steel and concrete construction.** Where a response modification coefficient, *R*, in accordance with ASCE 7, Table 12.2-1, is used for the design of systems of structural steel acting compositely with reinforced concrete, the structures shall be designed and detailed in accordance with the requirements of AISC 341.~~

Add new text as follows:

<u>2203</u>
<u>STRUCTURAL STAINLESS STEEL</u>

<u>**2203.1 General.** The design, fabrication, and erection of austenitic and duplex structural stainless steel shall be in accordance with AISC 370.</u>

Revise as follows:

SECTION ~~2210~~ 2204
COLD-FORMED STEEL

~~2210.1~~ 2204.1 General. The design of cold-formed carbon and low-alloy steel structural members not covered in Sections 2206 through 2209 of this chapter shall be in accordance with AISI S100. ~~The design of cold-formed stainless-steel structural members shall be in accordance with ASCE 8. Cold-formed steel *light-frame construction* shall comply with Section 2211.~~ The design of cold-formed steel diaphragms shall be in accordance with additional provisions of AISI S310 as applicable. Where required, the seismic design of cold-formed steel structures shall be in accordance with the additional provisions of Section ~~2210.2~~ 2204.2.

~~2210.2~~ 2204.2 Seismic design ~~requirements for cold-formed steel structures~~. The design and detailing of cold-formed steel seismic force-resisting systems shall be in accordance with Section 2204.2.1 and 2204.2.2 as applicable.~~Where a response modification coefficient, R, in accordance with ASCE 7, Table 12.2-1, is used for the design of cold-formed steel structures, the structures shall be designed and detailed in accordance with the requirements of AISI S100, ASCE 8, or, for cold-formed steel special bolted moment frames, AISI S400.~~

Add new text as follows:

2204.2.1 CFS Special Bolted Moment Frames. Where a response modification coefficient, R, in accordance with ASCE 7, Table 12.2-1, is used for the design of cold-formed steel special bolted moment frames, the structures shall be designed and detailed in accordance with the requirements of AISI S400.

2204.2.2 Cold-formed steel seismic force resisting systems. The response modification coefficient, R, designated for "Steel systems not specifically detailed for seismic resistance, excluding cantilever column systems" in ASCE 7, Table 12.2-1, shall be permitted for systems designed and detailed in accordance with AISI S100 and need not be designed and detailed in accordance with AISI S400.

2205
COLD-FORMED STAINLESS STEEL

2205.1 General. The design of cold-formed stainless steel structural members shall be in accordance with ASCE 8.

Revise as follows:

SECTION ~~2211~~ 2206
COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION

~~2211.1~~ 2206.1 Structural framing systems. For cold-formed steel *light-frame construction*, the design and installation of the following structural framing systems, including their members and connections, shall be in accordance with AISI S240, and Sections ~~2211.1.1~~ 2206.1.1 through ~~2211.1.3~~ 2206.1.3, as applicable:

1. Floor and roof systems.
2. Structural walls.
3. Shear walls, strap-braced walls and diaphragms that resist in-plane lateral loads.
4. Trusses.

~~2211.1.1~~ 2206.1.1 Seismic design ~~requirements for cold-formed steel structural systems~~. The design of cold-formed steel *light-frame construction* to resist seismic forces shall be in accordance with the provisions of Section ~~2211.1.1.1~~ 2206.1.1.1 or ~~2211.1.1.2~~ 2206.1.1.2, as applicable.

~~2211.1.1.1~~ 2206.1.1.1 Seismic Design Categories B and C. Where a response modification coefficient, *R*, in accordance with ASCE 7, Table 12.2-1 is used for the design of cold-formed steel *light-frame construction* assigned to *Seismic Design Category* B or C, the *seismic force-resisting system* shall be designed and detailed in accordance with the requirements of AISI S400.

> **Exception:** The response modification coefficient, *R*, designated for "Steel systems not specifically detailed for seismic resistance, excluding cantilever column systems" in ASCE 7, Table 12.2-1, shall be permitted for systems designed and detailed in accordance with AISI S240 and need not be designed and detailed in accordance with AISI S400

~~2211.1.1.2~~ 2206.1.1.2 Seismic Design Categories D through F. In cold-formed steel *light-frame construction* assigned to *Seismic Design Category* D, E or F, the *seismic force-resisting system* shall be designed and detailed in accordance with AISI S400.

~~2211.1.2~~ 2206.1.2 Prescriptive framing. Detached one- and two-family *dwellings* and *townhouses*, less than or equal to three *stories above grade plane*, shall be permitted to be constructed in accordance with AISI S230 subject to the limitations therein.

~~2211.1.3~~ 2206.1.3 Truss design. Cold-formed steel trusses shall comply with the additional provisions of Sections ~~2211.1.3.1~~ 2206.1.3.1. through ~~2211.1.3.3~~ 2206.1.3.3.

~~2211.1.3.1~~ 2206.1.3.1 **Truss design drawings.** The truss design drawings shall conform to the requirements of Section I1 of AISI S202 and shall be provided with the shipment of trusses delivered to the job site. The truss design drawings shall include the details of permanent *individual truss member* restraint/bracing in accordance with Section I1.6 of AISI S202 where these methods are utilized to provide restraint/bracing.

~~2211.1.3.2~~ 2206.1.3.2 **Trusses spanning 60 feet or greater.** The owner or the owner's authorized agent shall contract with a *registered design professional* for the design of the temporary installation restraint/bracing and the permanent *individual truss member* restraint/bracing for trusses with clear spans 60 feet (18 288 mm) or greater. *Special inspection* of trusses over 60 feet (18 288 mm) in length shall be in accordance with Section 1705.2.

~~2211.1.3.3~~ 2206.1.3.3 **Truss quality assurance.** Trusses not part of a manufacturing process that provides requirements for quality control done under the supervision of a third-party quality control agency in accordance with AISI S240 Chapter D shall be fabricated in compliance with Sections 1704.2.5 and 1705.2, as applicable.

~~2211.2~~ 2206.2 **Nonstructural framing systems ~~members~~.** For cold-formed steel *light-frame construction*, the design and installation of nonstructural members and connections shall be in accordance with AISI S220.

Add new text as follows:

2207
STEEL DECK

Revise as follows:

~~2210.1.1~~ 2207.1 **General ~~Steel decks~~.** The design and construction of cold-formed steel decks shall be in accordance with this section. The design of cold-formed steel diaphragms shall be in accordance with additional provisions of AISI S310 as applicable.

~~2210.1.1.1~~ 2207.1.1 **Noncomposite steel floor decks.** Noncomposite steel floor decks shall be permitted to be designed and constructed in accordance with ANSI/SDI-NC1.0.

~~2210.1.1.2~~ 2207.1.2 **Steel roof deck.** Steel *roof decks* shall be permitted to be designed and constructed in accordance with ANSI/SDI-RD1.0.

~~2210.1.1.3~~ 2207.1.3 **Composite slabs on steel decks.** Composite slabs of concrete and steel deck shall be permitted to be designed and constructed in accordance with SDI-C.

SECTION ~~2207~~ 2208
STEEL JOISTS

~~2207.1~~ 2208.1 **General.** The design, manufacture and use of open-web *steel joists* and joist girders shall be in accordance with either SJI 100 or SJI 200, as applicable.

~~2207.1.1~~ 2208.1.1 **Seismic design.** Where required, the seismic design of buildings shall be in accordance with the additional provisions of Section ~~2205.2~~ 2202.2 or ~~2211.1.1~~ 2206.1.1.

~~2207.2~~ 2208.2 **Design.** The *registered design professional* shall indicate on the *construction documents* the *steel joist* and *steel joist* girder designations from ~~the specifications listed in Section 2207.1~~ SJI 100 or SJI 200; and shall indicate the requirements for joist and joist girder design, layout, end supports, anchorage, bridging design that differs from ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~, bridging termination connections and bearing connection design to resist uplift and lateral *loads*. These documents shall indicate special requirements as follows:

1. Special *loads* including:

   1.1. Concentrated *loads*.

   1.2. Nonuniform *loads*.

   1.3. Net uplift *loads*.

   1.4. Axial *loads*.

   1.5. End moments.

   1.6. Connection forces.

2. Special considerations including:

    2.1. Profiles for joist and joist girder configurations that differ from those defined by ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~.

    2.2. Oversized or other nonstandard web openings.

    2.3. Extended ends.

3. Live and total *load* deflection criteria for joists and joist girder configurations that differ from those defined by ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~.

~~2207.3~~ 2208.3 Calculations. The *steel joist* and joist girder manufacturer shall design the *steel joists* and *steel joist* girders in accordance with ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~ to support the *load* requirements of Section ~~2207.2~~ 2208.2. The *registered design professional* shall be permitted to require submission of the *steel joist* and joist girder calculations as prepared by a *registered design professional* responsible for the product design. Where requested by the *registered design professional*, the *steel joist* manufacturer shall submit design calculations with a cover letter bearing the seal and signature of the joist manufacturer's *registered design professional.* In addition to the design calculations submitted under seal and signature, the following shall be included:

1. Bridging design that differs from ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~, such as cantilevered conditions and net uplift.
2. Connection design for:

    2.1. Connections that differ from ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~, such as flush-framed or framed connections.

    2.2. Field splices.

    2.3. Joist headers.

~~2207.4~~ 2208.4 Steel joist drawings. *Steel joist* placement plans shall be provided to show the *steel joist* products as specified on the *approved construction documents* and are to be utilized for field installation in accordance with specific project requirements as stated in Section ~~2207.2~~ 2208.2. *Steel joist* placement plans shall include, at a minimum, the following:

1. Listing of applicable *loads* as stated in Section ~~2207~~ 2208.2 and used in the design of the *steel joists* and joist girders as specified in the *approved construction documents*.
2. Profiles for joist and joist girder configurations that differ from those defined by ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~.
3. Connection requirements for:

    3.1. Joist supports.

    3.2. Joist girder supports.

    3.3. Field splices.

    3.4. Bridging attachments.

4. Live and total *load* deflection criteria for joists and joist girder configurations that differ from those defined by ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~.
5. Size, location and connections for bridging.
6. Joist headers.

Steel joist placement plans do not require the seal and signature of the joist manufacturer's *registered design professional*.

~~2207.5~~ 2208.5 Certification. At completion of manufacture, the *steel joist* manufacturer shall submit a *certificate of compliance* to the owner or the owner's authorized agent for submittal to the *building official* as specified in Section 1704.5 stating that work was performed in accordance with *approved construction documents* and with SJI 100 or SJI 200, as applicable ~~specifications listed in Section 2207.1~~.

SECTION 2209
STEEL STORAGE RACKS

Revise as follows:

2209.1 ~~Steel storage racks~~ General. The design, testing and utilization of steel *storage racks* made of cold-formed or hot-rolled steel structural members shall be in accordance with ~~RMI~~ ANSI/MH 16.1. The design testing, and utilization of steel cantilevered *storage racks* made of cold-formed or hot-rolled steel structural members shall be in accordance with ANSI/MH 16.3.~~Where required by ASCE 7, the seismic design of steel *storage racks* shall be in accordance with Section 15.5.3 of ASCE 7.~~

2209.2 ~~Steel cantilevered storage racks~~ Seismic design. ~~The design, testing and utilization of steel cantilevered *storage racks* made of cold-formed or hot-rolled steel structural members shall be in accordance with RMI ANSI/MH 16.3.~~ Where required by ASCE 7, the seismic design of steel *storage racks* and cantilevered steel *storage racks* shall be in accordance with Section 15.5.3 of ASCE 7.

2209.3 Certification. For ~~rack~~ steel storage racks ~~structures~~ that are 8 feet (2438 mm) in height or greater to the top *load* level and assigned to *Seismic Design Category* D, E, or F at completion of the *storage rack* installation, a *certificate of compliance* shall be submitted to the owner or the owner's authorized agent stating that the work was performed in accordance with approved construction documents.

SECTION ~~2208~~ 22010
STEEL CABLE STRUCTURES

~~2208.1~~ 2210.1 General. The design, fabrication and erection including related connections, and protective coatings of steel cables for buildings shall be in accordance with ASCE 19.

Add new standard(s) as follows:

AISC

American Institute of Steel
130 East Randolph Street, Suite 2000
Chicago, IL 60601-6219

ANSI/AISC 370-21	Specification for Structural Stainless Steel Buildings

AISI

American Iron and Steel Institute
25 Massachusetts Avenue, NW Suite 800
Washington, DC 20001

S310-20 w/S1-22	North American Standard for the Design of Steel Deck Diaphragms, 2020 Edition, with Supplement 1, 2022 Edition

Staff Analysis: A review of the standard proposed for inclusion in the code, AISC ANSI/AISC 370-21 Specification for Structural Stainless Steel Buildings, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.
A review of the standard proposed for inclusion in the code, AISI S310-20 w/S1-22 North American Standard for the Design of Steel Deck Diaphragms, 2020 Edition, with Supplement 1, 2022 Edition, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This code change proposal is intended to be an editorial reorganization of IBC Chapter 22 for the purpose of providing better flow, usability, and clarification of steel provisions in the building code. The steel provisions within Chapter 22 of the IBC have been pieced together as they have been developed over the life of the document. This process has resulted in provisions that are technically accurate, but can seem disorganization and confusing from the perspective of the user. The following reasoning is provided for the revisions proposed in each section of this document:
Section 2201: I am proposing to include existing sections on Identification (2202), Protection of Steel for Structural Purposes (2203), and Connections (2204) as subsections under General Section 2201. Each of the existing sections (2202, 2203, 2204) simply serve as pointers to the other product specific sections, and in turn reference standards, within Chapter 22. I have retained the concept of addressing these topics through the applicable reference standards and any additional provisions on each topic. This proposed revision simply consolidates the language to provide a more concise path under the General steel section.

Section 2202: I am proposing to combine the existing Structural Steel (Section 2205) and Composite Structural Steel and Concrete Structures (2206) sections into one section (2202). Both AISC 360 and AISC 341 (referenced in Sections 2205 and 2206) contain the provisions for both Structural Steel and Composite Structural Steel and Concrete as well as the necessary references to ACI 318. The proposal to combine the two sections simply eliminates unnecessary duplication while maintaining the necessary provisions.

Section 2203: This section introduces a new section on Structural Stainless Steel and the new AISC 370 - *Specification for Structural Stainless Steel Buildings*. I am proposing this section, and reference standard, in this proposal primarily for purposes of coordination with respect to section numbering. I am proposing to add these provisions to directly follow those of structural steel as a logical flow of the chapter. This standard was developed as a consensus document using ANSI-accredited procedures to provide a uniform practice in the design of structural stainless steel-framed buildings and other structures.

The AISC 370 Specification is available for free download at www.aisc.org/publications/steel-standards/

Section 2204: These proposed revisions are intended to clarify when to use AISI S100 – *North American Specification for the Design of Cold-*

Formed Steel Structural Members. The following cold-formed steel product design standards are developed based on the applicable provisions of AISI S100: AISI framing standards (AISI S220, S240, S400), Steel Deck Institute, Steel Joist Institute, Steel Rack Institute (for cold-formed racks). It is the intention that the product design standards are the primary resource for the design of these specific systems. In lieu of provisions within the product specific design standards, AISI S100 provisions are permitted to be used for the design of applicable cold-formed steel members or systems. The proposed language clarifies that the design standards referenced in the following product specific sections are to be used for the design of those members and systems.

Section 2204.2 also provides clarification regarding the design of cold-formed steel seismic force resisting systems not covered in the following sections.

Section 2205: This section splits the cold-formed stainless-steel provisions into its own section as it references a separate ASCE 8 Standard for the design. The ASCE 8 standard was previously referenced under the existing cold-formed steel section (2210).

Section 2206: This section on cold-formed steel light-framed construction remains essentially unchanged with some minor reference section renumbering.

Section 2207: This section follows the format of the rest of Chapter 22 by splitting out the steel deck provisions into its own section as the Steel Deck Institute develops a series of design standards specific to the design and detailing of steel deck members and systems. These provisions were previously referenced under the existing cold-formed steel section (2210).

Section 2208: This section on steel joists remains essentially unchanged with some minor reference section renumbering.

Section 2209: I have proposed minor reformatting revisions to this section on steel storage racks. To coordinate with the format of the other sections, I am proposing to have the subsections categorized as “general design provisions” and “seismic design provisions” as opposed to categorized by product. The technical content of the provisions remain unchanged.

Section 2210: This section on steel cable structures remains unchanged with just renumbering of the section.

This proposal is a coordinated effort with the American Institute for Steel Construction (AISC), Steel Joist Institute (SJI), Steel Deck Institute (SDI), Metal Building Manufacturers Association (MBMA), Rack Manufacturers Association (RMA), and the steel framing industry. There are concurrent code change proposals submitted on behalf of MBMA, to add Metal Building Systems, and SDI, to revise Section 2207, that have been coordinated with AISI and this proposal. Those proposals are intended to work jointly with, and do not conflict with, this proposal.

Bibliography: AISC, “ANSI/AISC 370 - Specification for Structural Stainless Steel Buildings", American Institute of Steel Construction, Chicago, IL, 2021 edition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is intended to be an editorial reorganization of existing provisions, and will not impact cost of construction.

S187-22

S188-22

IBC: 2205.2 (New)

Proponents: Jon-Paul Cardin, representing American Institute of Steel Construction (jcardin@steel.org)

2021 International Building Code

Add new text as follows:

2205.2 Delegated Connection Design. When the design of structural steel connections is delegated in the *construction documents* to a third party, the *registered design professional* shall be permitted to require submission of the calculations for the delegated connection designs. Those connection design calculations shall be prepared by a *registered design professional* in responsible charge for the delegated connection design. Where required by the *registered design professional*, the third party shall submit design calculations with a cover letter bearing the seal and signature of the *registered design professional* in responsible charge of the delegated connection designs.

Reason Statement: The intent of this proposal is to clarify the requirements for deferred submittals as they relate to delegated connection design in structural steel construction. The proposed language follows the requirements as listed in the AISC Code of Standard Practice (CoSP) for delegated connection design. The language also parallels the provisions in IBC Section 2207.3 (Steel Joist - Calculations) regarding design calculations prepared by a third party *registered design professional* in responsible charge for the delegated design. These provisions will provide clarity for structural steel construction regarding the accepted practice and requirements for delegated design of connections.

Bibliography: "Code of Standard Practice for Steel Buildings and Bridges", ANSI/AISC 303-16, American Institute of Steel Construction, 2016, Chicago, IL

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is based on the current practice in the structural steel design and construction industry. The proposal is intended to clarify already accepted requirements, and therefore will not increase the cost of construction.

S188-22

S189-22

IBC: 2207.2, 2207.4

Proponents: Jon-Paul Cardin, representing Steel Joist Institute (jcardin@steel.org)

2021 International Building Code

Revise as follows:

2207.2 Design. The *registered design professional* shall indicate on the *construction documents* the *steel joist* and *steel joist* girder designations from the specifications listed in Section 2207.1; and shall indicate the requirements for joist and joist girder design, layout, end supports, anchorage, bridging design that differs from the SJI specifications listed in Section 2207.1, bridging termination connections and bearing connection design to resist uplift and lateral *loads*. These documents shall indicate special requirements as follows:

1. Special *loads* including:
    - 1.1. Concentrated *loads*.
    - 1.2. Nonuniform *loads*.
    - 1.3. Net uplift *loads*.
    - 1.4. Axial *loads*.
    - 1.5. End moments.
    - 1.6. Connection forces.
2. Special considerations including:
    - 2.1. Profiles for joist and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.
    - 2.2. Oversized or other nonstandard web openings.
    - 2.3. Extended ends.
3. ~~Live and total *load* deflection~~ Deflection criteria for joists and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.

2207.4 Steel joist drawings. *Steel joist* placement plans shall be provided to show the *steel joist* products as specified on the *approved construction documents* and are to be utilized for field installation in accordance with specific project requirements as stated in Section 2207.2. *Steel joist* placement plans shall include, at a minimum, the following:

1. Listing of applicable *loads* as stated in Section 2207.2 and used in the design of the *steel joists* and joist girders as specified in the *approved construction documents*.
2. Profiles for joist and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.
3. Connection requirements for:
    - 3.1. Joist supports.
    - 3.2. Joist girder supports.
    - 3.3. Field splices.
    - 3.4. Bridging attachments.
4. ~~Live and total *load* deflection~~ Deflection criteria for joists and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.
5. Size, location and connections for bridging.
6. Joist headers.

Steel joist placement plans do not require the seal and signature of the joist manufacturer's *registered design professional*.

Reason Statement: This code change proposal is intended to correlate the language in the IBC with that used in the Steel Joist Institute (SJI) specifications with respect to deflection considerations. The SJI 100 and SJI 200 Specifications refer to the "deflection due to the design live load" for consideration of deflection criteria. Therefore, there is no SJI requirement or reference to provide total load criteria for steel joist deflection calculation. The 2021 IBC Section 2207 identifies that open-web steel joists shall be in accordance with SJI 100 or SJI 200, as applicable. The IBC states “Live and total load deflection criteria as defined by the SJI specifications” shall be provided, yet SJI has no total load deflection criteria requirement. The difference in language between the 2021 IBC and the SJI Specifications cause confusion for designers and building officials with respect to the loads used to calculate deflection of steel joist members. This code change will correlate the language in the IBC and the SJI Specifications and provide clarification, while also remaining clear that the designer shall list any deflection criteria they deem to be required.

Bibliography: SJI 100—20: 45th Edition Standard Specifications, Load Tables and Weight Tables for K-Series, LH-Series, DLH-Series and Joist Girders

SJI 200—15: 2nd Edition Standard Specifications, Weight Tables and Bridging Tables for CJ-Series Composite Steel Joists

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is simply clarifying requirements of current provisions.

S189-22

S190-22

IBC: SECTION 2209

Proponents: Paul Armstrong, representing MHI

2021 International Building Code

Revise as follows:

SECTION 2209
~~STEEL STORAGE RACKS~~ MATERIAL HANDLING STRUCTURES

Reason Statement: This is an editorial change only to revise the title of Section 2209 to more accurately reflect the variety of steel storage systems that are in use today. The term "Material Handling Structures" is more inclusive of all such systems and the industry's terminology.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a purely editorial proposal.

S190-22

S191-22

IBC: 2209.3 (New), MHI Chapter 35 (New)

Proponents: Paul Armstrong, representing MHI

2021 International Building Code

Add new text as follows:

2209.3 Industrial boltless steel shelving. The design, testing and utilization of industrial boltless steel shelving shall be in accordance with ANSI/MH 28.2. Where required by ASCE 7, the seismic design of industrial boltless steel shelving shall be in accordance with Chapter 15 of ASCE 7.

Add new standard(s) as follows:

MHI

Material Handling Institute
8720 Red Oak Blvd. Suite 201
Charlotte, NC 28217

ANSI/MH 28.2-2022 Design, Testing and Utilization of Industrial Boltless Steel Shelving

Staff Analysis: A review of the standard proposed for inclusion in the code, MHI ANSI/MH 28.2-2022 Design, Testing and Utilization of Industrial Boltless Steel Shelving, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The Storage Manufacturer's Association (SMA) of the Material Handling Industry (MHI) has developed a standard for the design, testing and utilization of industrial boltless steel shelving with the assistance of the FEMA Seismic Code Support committee. This is the industry standard for industrial boltless steel shelving systems already in use today.

Cost Impact: The code change proposal will decrease the cost of construction
The inclusion of this standard will provide a single industry accepted set of criteria for this type of material handling system. As a result, the cost of construction will reduce by complying with only one set of requirements.

S191-22

S192-21

IBC: 2209.4 (New), MHI Chapter 35 (New)

Proponents: Paul Armstrong, MHI, representing MHI (paul@7arms.com)

2021 International Building Code

Add new text as follows:

2209.4 Material handling stairs, ladders and guards. The design and installation of stairs, ladders and guarding serving material handling structures shall be in accordance with ANSI/MH 32.1.

Add new standard(s) as follows:

MHI

Material Handling Institute
8720 Red Oak Blvd. Suite 201
Charlotte, NC 28217

ANSI/MH 32.1-2018	Stairs, Ladders and Open-Edge Guards for Use with Material Handling Structures

Staff Analysis: A review of the standard proposed for inclusion in the code, MHI ANSI/MH 32.1-2018 Stairs, Ladders and Open-Edge Guards for Use with Material Handling Structures, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The Material Handling Industry (MHI) has two product groups, Rack Manufacturer's Institute (RMI) and Storage Manufacturer's Association (SMA), that have compared and compiled OSHA and Building Code that apply to employee access ways serving various materials handling types of structures. The RMI and SMA have developed this compiled information into an ANSI consensus Standard ANSI/MH 32.1. This will give consistency and consistent interpretations between employee safety regulations promulgated by OSHA and the adopted IBC in local and state jurisdictions.

Cost Impact: The code change proposal will decrease the cost of construction
In a number of projects across the U.S. local jurisdictions have interpreted that Chapter 10 Means of Egress criteria applies to employee only access ways serving material handling structures. This will allow for less costly access devices to be used that are in compliance with OSHA regulations.

S192-21

S193-22

IBC: 2209.4 (New), MHI Chapter 35 (New)

Proponents: Paul Armstrong, representing MHI

2021 International Building Code

Add new text as follows:

2209.4 Industrial steel work platforms. The design, testing and utilization of industrial steel work platforms shall be in accordance with ANSI/MH 28.3. Where required by ASCE 7, the seismic design of industrial steel work platforms shall be in accordance with Chapter 15 of ASCE 7.

Add new standard(s) as follows:

MHI

Material Handling Institute
8720 Red Oak Blvd. Suite 201
Charlotte, NC 28217

ANSI/MH 28.3-22 Design, Testing and Utilization of Industrial Steel Work Platforms

Staff Analysis: A review of the standard proposed for inclusion in the code, MHI ANSI/MH 28.3–22 Design, Testing and Utilization of Industrial Steel Work Platforms, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The Storage Manufacturer's Association (SMA) of the Material Handling Industry (MHI) has developed a standard for the design, testing and utilization of industrial steel work platforms with the assistance of the FEMA Seismic Code Support committee. This is the industry standard for industrial steel work platforms already used today.

Cost Impact: The code change proposal will decrease the cost of construction
The inclusion of this standard will provide a single industry accepted set of criteria for this type of material handling structure. As a result, the cost of construction will reduce by complying with only one set of requirements.

S193-22

S194-22

IBC: 2210.1.1, 2210.1.1.1, 2210.1.1.2, 2210.1.1.3, CHAPTER 35, SDI Chapter 35

Proponents: Thomas Sputo, Steel Deck Institute, representing Steel Deck Institute (tsputo50@gmail.com)

2021 International Building Code

Revise as follows:

2210.1.1 Steel decks. The design and construction of cold-formed steel floor and roof decks and composite slabs of concrete and steel deck shall be in accordance with ~~this section~~ SDI-SD.

Delete without substitution:

~~**2210.1.1.1 Noncomposite steel floor decks.** Noncomposite steel floor decks shall be permitted to be designed and constructed in accordance with ANSI/SDI-NC1.0.~~

~~**2210.1.1.2 Steel roof deck.** Steel *roof decks* shall be permitted to be designed and constructed in accordance with ANSI/SDI-RD1.0.~~

~~**2210.1.1.3 Composite slabs on steel decks.** Composite slabs of concrete and steel deck shall be permitted to be designed and constructed in accordance with SDI-C.~~

CHAPTER 35
REFERENCED STANDARDS

Delete and substitute as follows:

SDI

Steel Deck Institute
2661 Clearview Road #3
Allison Park, PA 15101

~~SDI NC—2017~~	~~Standard for Noncomposite Steel Floor Deck~~
SDI SD-2022	Standard for Steel Deck

Delete without substitution:

SDI

Steel Deck Institute
2661 Clearview Road #3
Allison Park, PA 15101

~~SDI RD—2017~~	~~Standard for Steel Roof Deck~~
~~SDI-C—2017~~	~~Standard for Composite Steel Floor Deck—Slabs~~

Staff Analysis: A review of the standard proposed for inclusion in the code, SDI SD-2022 Standard for Steel Deck, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The three previous SDI Steel Deck Standards (RD, NC, C) were combined into a single standard that covers both roof and floor deck applications (SD). This proposal removes the RD, NC, and C Standards and substitutes the new combined SD Standard. The new single Standard is easier to use than the three previous Standards. This proposal also removes the permissive language from the charging statement and makes the use of the SD Standard mandatory rather than permitted. The SD Standard was developed as a consensus standard under ANSI rules and is attached to this proposal.

Bibliography: ANSI/SDI SD-2022 *Standard for Steel Deck* (PDF attached to proposal).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The new SD Standard combines the content of the RD, NC, and C Standards into a single document with minimal technical changes. Because changes to the content were minimal, no changes to cost of construction are expected.

S194-22

S195-22

IBC: 2211.3 (New)

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Add new text as follows:

2211.3 Foam plastic insulating sheathing. Where foam plastic *insulating sheathing* is used as exterior sheathing or in addition to other exterior sheathing, it shall comply with Chapter 26 and Chapter 14. Screw fastener connections for cladding and furring attachment through foam plastic *insulating sheathing* to cold-formed steel framing shall comply with Section 2603.12.

Reason Statement: When applying foam plastic insulating sheathing as continuous insulation to cold-formed steel framing (typical for energy code compliance), it is necessary to consider fire safety requirements, vapor control requirements, and cladding attachment requirements in both Chapter 14 and Chapter 26. These are key "links" that are needed to ensure that a code-compliant application of foam plastic insulating sheathing is achieved for cold-formed steel wall assemblies. And, it will help users properly integrate foam sheathing on a cold-formed steel structure.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change cost and provides appropriate references for application of foam plastic insulating sheathing on cold-formed steel wall assemblies.

S195-22

S196-22

IBC: 2211.3 (New); IPC: 307.2, 307.3 (New), [BS] C101.5, [BS] C101.6; IMC: [BS] 302.5, [BS] 302.5.2, [BS] 302.5.3; IFGC: [BS] 302.6, [BS] 302.7

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Add new text as follows:

2211.3 Cutting, notching, and boring. The cutting, notching and boring of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members.

2021 International Plumbing Code

Revise as follows:

307.2 Cutting, notching and boring in wood framing. ~~or bored holes~~. A wood framing member shall not be cut, notched or bored in excess of limitations specified in the *International Building Code*.

Add new text as follows:

307.3 Cutting, notching and boring in cold-formed steel framing. The cutting, notching and boring of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members.

Delete without substitution:

~~**[BS] C101.5 Cutting, notching and boring holes in cold-formed steel framing.** Flanges and lips of load-bearing cold-formed steel framing members shall not be cut or notched. Holes in webs of load-bearing cold-formed steel framing members shall be permitted along the centerline of the web of the framing member and shall not exceed the dimensional limitations, penetration spacing or minimum hole edge distance as prescribed by the registered design professional. Cutting, notching and boring holes of steel floor/roof decking shall be as prescribed by the registered design professional.~~

~~**[BS] C101.6 Cutting, notching and boring holes in nonstructural cold-formed steel wall framing.** Flanges and lips of nonstructural cold-formed steel wall studs shall not be cut or notched. Holes in webs of nonstructural cold-formed steel wall studs shall be permitted along the centerline of the web of the framing member, shall not exceed $1^1/_2$ inches (38 mm) in width or 4 inches (102 mm) in length, and the holes shall not be spaced less than 24 inches (610 mm) center to center from another hole or less than 10 inches (254 mm) from the bearing end.~~

2021 International Mechanical Code

Revise as follows:

[BS] 302.5 Cutting, notching and boring in cold-formed steel framing. The cutting, notching and boring of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members. The cutting, notching and boring of steel framing members shall comply with Sections 302.5.1 through 302.5.3.

Delete without substitution:

~~**[BS] 302.5.2 Cutting, notching and boring holes in cold-formed steel framing.** Flanges and lips of load-bearing cold-formed steel framing members shall not be cut or notched. Holes in webs of load-bearing cold-formed steel framing members shall be permitted along the centerline of the web of the framing member and shall not exceed the dimensional limitations, penetration spacing or minimum hole edge distance as prescribed by the *registered design professional*. Cutting, notching and boring holes of steel floor/roof decking shall be as prescribed by the *registered design professional*.~~

~~**[BS] 302.5.3 Cutting, notching and boring holes in non-structural cold-formed steel wall framing.** Flanges and lips of nonstructural cold-formed steel wall studs shall not be cut or notched. Holes in webs of nonstructural cold-formed steel wall studs shall be permitted along the centerline of the web of the framing member, shall not exceed $1^1/_2$ inches (38 mm) in width or 4 inches (102 mm) in length, and shall not be spaced less than 24 inches (610 mm) center to center from another hole or less than 10 inches (254 mm) from the bearing end.~~

2021 International Fuel Gas Code

Revise as follows:

[BS] 302.6 Cutting, notching and boring ~~holes~~ in cold-formed steel framing. The cutting, notching and boring of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members. ~~Flanges and lips of load-bearing, cold-formed steel framing members shall not be cut or notched. Holes in webs of load-bearing, cold-formed steel framing members shall be permitted along the centerline of the web of the framing member and shall not exceed the dimensional limitations, penetration spacing or minimum~~

~~hole edge distance as prescribed by the *registered design professional*. Cutting, notching and boring holes of steel floor/roof decking shall be as prescribed by the *registered design professional*.~~

Delete without substitution:

~~**[BS] 302.7 Cutting, notching and boring holes in non-structural cold-formed steel wall framing.** Flanges and lips of nonstructural cold-formed steel wall studs shall be permitted along the centerline of the web of the framing member, shall not exceed 1$^{1}/_{2}$ inches (38 mm) in width or 4 inches (102 mm) in length, and the holes shall not be spaced less than 24 inches (610 mm) center to center from another hole or less than 10 inches (254 mm) from the bearing end.~~

Staff Analysis: CC# S196-22 and CC# S224-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This proposal sets uniform requirements for field modifications to cold-formed steel framing members (cutting, notching, and boring holes) in accordance with AISI standards.
Currently, the IFGC, IMC, and IPC all provide guidance on modification of cold-formed steel framing elements within the path of utilities. Although the guidance provided by each code is similar, they are not identical in wording or scope and are handled differently within each document.

Differences include but are not limited to:

- IFGC, IMC: The cutting and notching criteria is within the main body of the code.
- IFGC, IMC: Includes direction for wood, steel, cold-formed steel, and non-structural cold-formed steel materials.
- IPC: Points to the IBC for cutting and notching criteria but provides Appendix C as an alternate.
- IPC Appendix C:
  - Includes some, but not all, cutting and notching criteria and limitations found within the IFGC and IMC.
  - Does not address steel and cold-formed materials.

This will provide clear and consistent criteria across all trades on how to field modify framing members and when modification of such members requires input from a design professional.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a coordination of existing cutting, notching and boring provisions that are already used in practice but are not identical between codes or fully aligned with AISI standards.

S196-22

S197-22

IBC: SECTION 202 (New), SECTION 2212 (New), 2212.1 (New), 2212.1.1 (New), 2212.1.1.1 (New), 2212.1.1.2 (New), 2212.1.1.3 (New), 2212.1.1.4 (New), 2212.2 (New)

Proponents: W Lee Shoemaker, representing Metal Building Manufacturers Association (lshoemaker@mbma.com)

2021 International Building Code

Add new definition as follows:

METAL BUILDING SYSTEM. An integrated set of fabricated components and assemblies that form a complete or partial building shell that is designed by the manufacturer. This system typically includes but is not limited to primary framing comprised of built-up structural steel members, secondary members that are cold-formed steel or open-web steel joists, a metal panel roof system and exterior wall cladding. The system is manufactured in a manner that permits plant and/or field inspection prior to assembly or erection.

Add new text as follows:

SECTION 2212
Metal Building Systems

2212.1 General. The design, fabrication and erection of a metal building system shall be in accordance with the additional provisions of this section.

2212.1.1 Design. The design of metal building systems shall be in accordance with Sections 2212.1.1.1 through 2212.1.1.4, as applicable.

2212.1.1.1 Structural Steel. The design, fabrication and erection of structural steel shall be in accordance with Section 2205.

2212.1.1.2 Cold-Formed Steel. The design of cold-formed carbon and low-alloy steel structural members shall be in accordance with Section 2210.

2212.1.1.3 Steel Joists. The design of steel joists shall be in accordance with Section 2207.

2212.1.1.4 Steel Cable. The design, fabrication and erection including related connections of steel cables shall be in accordance with Section 2208.

2212.2 Seismic Design. Where required, the seismic design, fabrication and erection of the structural steel seismic force-resisting system shall be in accordance with Section 2205.2.1 or 2205.2.2, as applicable.

Staff Analysis: CC# S142-22 and CC# S197-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This addition to Chapter 22 and the accompanying new definition will clarify what the design requirements are for a metal building system. Metal building systems are significantly different from other forms of steel construction, especially regarding the shared design responsibilities between the metal building system manufacturer and registered design professional for the project. Furthermore, with clarification of the design requirements for the different parts of the metal building system, the special inspection requirements will be better defined. This might be viewed as an unnecessary clarification, but many construction documents are being used that list nonexistent "MBMA Standards" as the governing design requirements. This will be a real benefit to designers and building officials and lead to better construction documents and better construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This clarification of design requirements will not impact the cost of construction.

S197-22

S198-22

IBC: 2103.1

Proponents: Phillip Samblanet, representing The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

2021 International Building Code

Revise as follows:

2103.1 Masonry units. Concrete *masonry units*, clay or shale *masonry units*, stone *masonry units*, *glass unit masonry* and *AAC masonry* units shall comply with Article 2.3 of TMS 602. Architectural *cast stone* shall conform to ~~ASTM C1364 and~~ TMS 504. ~~Adhered manufactured stone masonry *veneer* units shall conform to ASTM C1670.~~

> **Exception:** *Structural clay tile* for nonstructural use in fireproofing of structural members and in wall furring shall not be required to meet the compressive strength specifications. The *fire-resistance rating* shall be determined in accordance with ASTM E119 or UL 263 and shall comply with the requirements of Table 705.5.

Reason Statement: In an effort to delete redundant provisions, the reference to ASTM C1364 is proposed for deletion because TMS 504 requires compliance with that standard. Likewise, TMS 602 now addresses adhered manufactured stone masonry veneer (it did not previously) making the last sentence redundant and unneeded as it is covered by the reference to TMS 602, Article 2.3.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply deletes redundant requirements. As such, there is no impact on construction costs.

S198-22

S199-22

IBC: 2301.2, 2304.11.3.1, 2304.11.4.1

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2301.2 ~~Nominal Sizes~~ Dimensions. For the purposes of this chapter, where dimensions of lumber are specified, they shall be deemed to be nominal dimensions unless specifically designated as actual dimensions (see Section 2304.2). <u>Where dimensions of *cross-laminated timber* thickness are specified, they shall be deemed to be actual dimensions.</u>

2304.11.3.1 Cross-laminated timber floors. *Cross-laminated timber* shall be not less than 4 inches (102 mm) in ~~actual~~ thickness. *Cross-laminated timber* shall be continuous from support to support and mechanically fastened to one another. *Cross-laminated timber* shall be permitted to be connected to walls without a shrinkage gap providing swelling or shrinking is considered in the design. Corbelling of masonry walls under the floor shall be permitted to be used.

2304.11.4.1 Cross-laminated timber roofs. *Cross-laminated timber* roofs shall be not less than 3 inches (76 mm) ~~nominal~~ in thickness and shall be continuous from support to support and mechanically fastened to one another.

Reason Statement: Clarify that cross-laminated timber (CLT) thickness is an actual dimension and describe CLT thickness consistently. In 2304.11.3.1 delete “actual”, and in 2304.11.4.1 delete “nominal”. With these changes CLT thickness will appear consistently with existing use in 2304.11.2.1 and 602.4.4.2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change implements consistent terminology for CLT thickness.

S199-22

S200-22

IBC: 2303.1, 2303.1.4

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2303.1 General. Structural sawn lumber; end-jointed lumber; *prefabricated wood I-joists*; *structural glued-laminated timber*; *cross-laminated timber*; *wood structural panels*; fiberboard sheathing (where used structurally); *hardboard* siding (where used structurally); *particleboard*; *preservative-treated wood*; structural log members; *structural composite lumber*; round timber poles and piles; *fire-retardant-treated wood*; hardwood plywood; wood trusses; joist hangers; nails; and staples shall conform to the applicable provisions of this section.

2303.1.4 ~~Structural glued cross~~ Cross-laminated timber. Cross-laminated timbers shall be manufactured and identified in accordance with ANSI/APA PRG 320.

Reason Statement: Adds cross-laminated timber to list of products in Section 2303.1 and updates name for consistency in Section 2303.1.4.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal updates general requirements to include cross-laminated timber.

S200-22

S201-22

IBC: 2303.2, 2303.2.1 (New), ASTM Chapter 35 (New)

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2021 International Building Code

Revise as follows:

2303.2 Fire-retardant-treated wood. *Fire-retardant-treated wood* is any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a *listed flame spread index* of 25 or less. ~~Additionally, the~~ The ASTM E84 or UL 723 test shall be continued for ~~a~~ an additional 20-minute period and the flame front shall not progress more than $10^1/_2$ feet (3200 mm) beyond the centerline of the burners at any time during the test.

Add new text as follows:

2303.2.1 Alternate fire testing. A wood product impregnated with chemicals by a pressure process or other means during manufacture, which, when tested to ASTM E2768, has a listed flame spread index of 25 or less and where the flame front does not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test, shall also be considered fire-retardant-treated wood.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E2768 -11(2018)	Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E2768 -11(2018) Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: ASTM E2768 was developed specifically intended for code use. It is a standardized version of ASTM E84 with the extension from 10 minutes to 30 minutes (meaning an additional 20 minutes) and it measures exactly what the extended ASTM E84 does, namely flame spread index and flame front progression beyond the centerline of the burners. This standard is already included in the IWUIC and the language proposed is consistent with the IWUIC language.
The change to the existing section is for language consistency (the exact same language is being proposed in the IRC). It is best to state that the test is continued for "an additional" 20 minutes.

Note that this change adds a new section without deleting any existing section. Thus, sections 2303.2.1 through 2303.2.9 will have to be renumbered as 2303.2.2 through 2303.2.10.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simple clarification/ ASTM E2768 is the same as the extended ASTM E84 test.

S201-22

S202-22

IBC: 2303.2.5, 2303.2.5.1, 2303.2.5.2

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2303.2.5 ~~Strength adjustments~~ Design values. Design values for ~~untreated lumber and *wood structural panels*,~~ *fire-retardant-treated wood*, including connection design values, shall be subject to all adjustments applicable to untreated wood as specified in this chapter and shall be further adjusted to account for the effects of the fire-retardant treatment. ~~Section 2303.1, shall be adjusted for *fire-retardant-treated wood*.~~ Adjustments to design values for the effects of the fire-retardant treatment shall be based on an *approved* method of investigation that takes into consideration ~~the effects of~~ the anticipated temperature and humidity to which the *fire-retardant-treated wood* will be subjected, the type of treatment and the redrying procedures. Adjustments to flexural design values for fire-retardant-treated plywood shall be determined in accordance with Section 2303.2.5.1. Adjustments to flexural, tension, compression and shear design values for fire-retardant-treated lumber shall be determined in accordance with Section 2303.2.5.2.

2303.2.5.1 ~~Wood structural panels~~ Fire-retardant-treated plywood. The effect of treatment and ~~the method of~~ redrying after treatment, and any treatment-based effects due to exposure to high temperatures and high humidities on the flexure properties of fire-retardant-treated softwood plywood shall be determined in accordance with ASTM D5516. The test data developed ~~by~~ in accordance with ASTM D5516 shall be used to develop treatment adjustment factors~~, maximum *loads* and spans, or both, for untreated plywood design values~~ in accordance with ASTM D6305. Each manufacturer shall publish the allowable maximum *loads* and spans for service as floor and roof sheathing for its treatment based on the adjusted design values and taking into account the climatological location.

2303.2.5.2 Fire-retardant-treated lumber. For each species of wood that is treated, the effect~~s~~ of ~~the~~ treatment~~, the method of~~ and redrying after treatment and any treatment-based effects due to exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated lumber shall be determined in accordance with ASTM D5664. The test data developed ~~by~~ in accordance with ASTM D5664 shall be used to develop ~~modification~~ treatment adjustment factors for use at or near room temperature and at elevated temperatures and humidity in accordance with ASTM D6841. Each manufacturer shall publish the ~~modification~~ treatment adjustment factors for service at maximum temperatures of not less than 80°F (27°C) and for roof framing. The roof framing modification factors shall take into consideration the climatological location.

Reason Statement: Section 2303.2.5 is revised to clarify that design values for fire-retardant-treated wood products are subject to all of the adjustments for untreated wood products and also must be adjusted to account for the effect of the fire-retardant treatment. This clarification aligns with ASTM D5664/D6841 for lumber and ASTM D5516/D6305 for plywood. In both cases, the fire-retardant treatment adjustment factors isolate the additional effect of the fire-retardant treatment, but do not address how the constituent untreated wood materials themselves need to be adjusted for typical application conditions. For this reason, design values for fire-retardant-treated wood products must be adjusted by factors that are applicable to untreated wood as well as the treatment adjustment factors.
A new sentence is added at the end of 2303.2.5 to reference 2303.2.5.1 and 2303.2.5.2 as strictly pertaining to fire-retardant-treated plywood and fire-retardant-treated lumber, respectively. These subsequent sections have also been revised accordingly, to reflect the fact that the standards referenced therein are specific to fire-retardant-treated plywood and fire-retardant-treated lumber, respectively.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change provides clarification of the requirements consistent with the intent of existing code provisions and referenced standards.

S202-22

S203-22

IBC: 2303.2.5, 2303.2.5.3 (New), ASTM Chapter 35 (New)

Proponents: Jason Smart, representing American Wood Council (jsmart@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2303.2.5 Strength adjustments. Design values for untreated lumber, and *wood structural panels*, as specified in Section 2303.1, shall be adjusted for *fire-retardant-treated wood*. Adjustments to design values shall be based on an *approved* method of investigation that takes into consideration the effects of the anticipated temperature and humidity to which the *fire-retardant-treated wood* will be subjected, the type of treatment and redrying procedures. Design values and treatment adjustment factors for fire-retardant-treated laminated veneer lumber shall be determined in accordance with 2303.2.5.3.

Add new text as follows:

2303.2.5.3 Fire-retardant-treated laminated veneer lumber. The effect of treatment and redrying after treatment and any treatment-based effects due to exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated laminated veneer lumber shall be determined in accordance with ASTM D8223. Each manufacturer shall publish reference design values and treatment-based design value adjustment factors in accordance with ASTM D8223, taking into account the climatological location.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8223-19 Standard Practice for Evaluation of Fire-Retardant Treated Laminated Veneer Lumber

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D8223-19 Practice for Evaluation of Fire-Retardant Treated Laminated Veneer Lumber, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This change adds provisions for fire-retardant-treated laminated veneer lumber design values and adjustments for treatment effects to be developed in accordance with the new ASTM standard D8223. The provision requiring that each manufacturer publish reference design values and treatment-based design value adjustment factors is consistent with similar existing provisions in 2303.2.5.1 and 2305.2.5.2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds provisions addressing development of design values and adjustments for fire-retardant-treated laminated veneer lumber (LVL) , which is currently not specifically addressed by the code. It does not affect when or where FRT LVL can be used as a building element.

S203-22

S204-22

IBC: 2303.2.5, 2303.2.5.3 (New), ASTM Chapter 35 (New)

Proponents: Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com); James Gogolski, representing Hoover Treated Wood Products, Inc. (jgogolski@frtw.com)

2021 International Building Code

Revise as follows:

2303.2.5 ~~Strength~~ Design value adjustments. Design values for untreated lumber, ~~and~~ *wood structural panels*, and structural composite lumber, as specified in Section 2303.1, shall be adjusted for *fire-retardant-treated wood*. Adjustments to design values shall be based on an *approved* method of investigation that takes into consideration the effects of the anticipated temperature and humidity to which the *fire-retardant-treated wood* will be subjected, the type of treatment and redrying procedures.

Add new text as follows:

2303.2.5.3 Structural composite lumber. The effect of treatment and redrying after treatment and any treatment-based effects due to exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated laminated veneer lumber shall be determined in accordance with ASTM D8223. Each manufacturer shall publish reference design values and treatment-based design value adjustment factors in accordance with ASTM D8223.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8223-19	Practice for Evaluation of Fire-Retardant Treated Laminated Veneer Lumber

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D8223-19 Practice for Evaluation of Fire-Retardant Treated Laminated Veneer Lumber, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This change adds provisions for fire-retardant-treated laminated veneer lumber design values and adjustments for treatment effects to be developed in accordance with the new ASTM standard D8223.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Currently in the IBC, strength adjustments for fire-retardant-treated (FRT) wood structural panels and FRT lumber are contained in Sections 2303.2.5.1 and 2303.2.5.2, respectively. This proposal will add a third section for determining the strength adjustments for FRT structural composite lumber using the new standard ASTM D8223-19: Practice for Evaluation of Fire-Retardant Treated Laminated Veneer Lumber.

Any potential increase in the cost of construction will be due to the difference between the costs of the raw materials (e.g., untreated LVL vs. untreated dimensional lumber), **NOT** because of the added fire-retardant treatment as the process and thus, cost, for fire-retardant-treating structural composite lumber and untreated dimensional lumber is identical.

S204-22

S205-22

IBC: 2303.3 (New)

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2021 International Building Code

Add new text as follows:

2303.3 Fire-retardant coated wood. The required flame spread index or smoke-developed index of an interior wood surface shall not be permitted to be achieved by the application on site of fire-retardant coatings, paints or solutions to surfaces. The application of factory-manufactured laminated products complying with Section 803.11 or the application of facings or veneers complying with Section 803.12 shall be acceptable methods of improving the flame spread index or smoke-developed index of such surfaces. Such factory-manufactured products shall not be considered fire-retardant-treated wood.

Reason Statement: The IBC implicitly does not allow the use of fire retardant coatings added on site in new construction. The reason for that not being permitted is that it is not possible to properly control the adequate application of a surface treatment by a person working on site, which means that there is no assurance that the application will result in the surface being appropriately fire safe. Section 2303.2.2 explicitly prohibits the use of paints, coatings, stains or surface treatments as means to obtain fire retardant treated wood.

2303.2.2 Other means during manufacture. For wood products impregnated with chemicals by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product. The use of paints, coating, stains or other surface treatments is not an approved method of protection as required in this section.

The language proposed mirrors exactly the language in Chapter 8 of the IBC, which distinguishes between laminated (or faced) products that are factory-produced and those that are applied on site. This also mirrors the requirements issued by ASTM when it developed practices ASTM E2404 and ASTM E2579. Sections 803.11 and 803.12 of the IBC explain how to assess the flame spread index and smoke developed index of wood substrates with added laminations, facings, or veneers, while making a clear distinction between those that are factory produced (803.11) and those that are applied on site (803.12). Neither section allows coatings to be used in new construction.

803.11 Laminated products factory produced with a wood substrate. Laminated products factory produced with a wood substrate shall comply with one of the following:
1. The laminated product shall meet the criteria of Section 803.1.1.1 when tested in accordance with NFPA 286 using the product-mounting system, including adhesive, as described in Section 5.8 of NFPA 286.
2. The laminated product shall have a Class A, B, or C flame spread index and smoke-developed index, based on the requirements of Table 803.13, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2579.

803.12 Facings or wood veneers intended to be applied on site over a wood substrate. Facings or veneers intended to be applied on site over a wood substrate shall comply with one of the following:
1. The facing or veneer shall meet the criteria of Section 803.1.1.1 when tested in accordance with NFPA 286 using the product mounting system, including adhesive, as described in Section 5.9 of NFPA 286.
2. The facing or veneer shall have a Class A, B or C flame spread index and smoke-developed index, based on the requirements of Table 803.13, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

The IFC does allow fire-retardant coatings to be used to bring the underlying surface up to code in section 803.4.

803.4 Fire-retardant coatings. The required flame spread or smoke-developed index of surfaces in existing buildings shall be allowed to be achieved by application of approved fire-retardant coatings, paints or solutions to surfaces having a flame spread index exceeding that allowed. Such applications shall comply with NFPA 703 and the required fire retardant properties shall be maintained or renewed in accordance with the manufacturer's instructions. The fire retardant paint, coating or solution shall have been assessed by testing over the same substrate to be used in the application.

What this proposal does is make it explicit what is now implicit, namely that coatings are not allowed to be used on-site to improve the flame spread index or smoke developed index of wood surfaces. However, it is permissible to ***bring to the site*** laminations, facings or veneers that have already been coated at a manufacturing facility.

(This proposal is intended to add a section and not to replace an existing section. Sections 2303.3 and subsequent ones would have to be renumbered.)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is clarification of an implicit code requirement.

S206-22

IBC: TABLE 2304.6.1

Proponents: Borjen Yeh, representing APA - The Engineered Wood Association (borjen.yeh@apawood.org)

2021 International Building Code

Revise as follows:

TABLE 2304.6.1 MAXIMUM ~~ALLOWABLE STRESS~~ BASICDESIGN WIND SPEED, V~~asd~~ PERMITTED FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES[a, b, c]

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		MAXIMUM ~~ALLOWABLE STRESS~~ BASIC DESIGN WIND SPEED, V~~asd~~ ~~d~~ (MPH)		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	Wind exposure category		
							B	C	D
6d common (2.0" × 0.113")	1.5	24/0	$^3/_8$	16	6	12	140 ~~110~~	115 ~~90~~	110 ~~85~~
		24/16	$^7/_{16}$	16	6	12	150 ~~110~~	125 ~~100~~	115 ~~90~~
						6	190 ~~150~~	160 ~~125~~	150 ~~110~~
8d common (2.5" × 0.131")	1.75	24/16	$^7/_{16}$	16	6	12	170 ~~130~~	140 ~~110~~	135 ~~105~~
						6	190 ~~150~~	160 ~~125~~	150 ~~110~~
				24	6	12	140 ~~110~~	115 ~~90~~	110 ~~85~~
						6	140 ~~110~~	115 ~~90~~	110 ~~85~~

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. Panel strength axis shall be parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.

b. The table is based on wind pressures acting toward and away from building surfaces in accordance with Section 30.~~7~~ 4 of ASCE 7. Lateral requirements shall be in accordance with Section 2305 or 2308.

c. Wood structural panels with span ratings of wall-16 or wall-24 shall be permitted as an alternative to panels with a 24/0 span rating. Plywood siding rated 16 on center or 24 on center shall be permitted as an alternative to panels with a 24/16 span rating. Wall-16 and plywood siding 16 on center shall be used with studs spaced not more than 16 inches on center.

~~d. V asd shall be determined in accordance with Section 1609.3.1.~~

Reason Statement: This proposal changes the table format from the allowable stress design wind speed (V_{asd}) to the basic design wind speed (V) for consistency with the rest of the IBC. This proposal evaluates the stud and panel capacities, nail withdrawal resistance, and nail-head pull-through capacities in the same manner as the existing table, resulting in comparable design requirements as the V values that are soft-converted from V_{asd} values in accordance with Section 1609.3.1. The tabulated V values are also consistent with those values already published in the 2021 IRC Table R602.3(3). For Footnote (b), Section 30.7 in the previous ASCE 7-10 should be Section 30.4 in ASCE 7-16. Since the revised table is in the format of basic design wind speed, the existing Footnote (d) is no longer required and should be deleted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal updates the table format, which results in comparable design requirements as the current table when the allowable stress design wind speed is soft-converted to the basic design wind speed in accordance with Section 1609.3.1.

S206-22

S207-22

IBC: TABLE 2304.6.1

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

2021 International Building Code

Revise as follows:

TABLE 2304.6.1 MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd} PERMITTED FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES[a, b, c]

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd}[d] (MPH)		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	Wind exposure category		
							B	C	D
6d common (2.0" × 0.113")	1.5	24/0	$^3/_8$	16	6	12[e]	110	90	85
		24/16	$^7/_{16}$	16	6	12[e]	110	100	90
						6[e]	150	125	110
8d common (2.5" × 0.131")	1.75	24/16	$^7/_{16}$	16	6	12[e]	130	110	105
						6[e]	150	125	110
				24	6	12[e]	110	90	85
						6[e]	110	90	85

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. Panel strength axis shall be parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.

b. The table is based on wind pressures acting toward and away from building surfaces in accordance with Section 30.7 of ASCE 7. Lateral requirements shall be in accordance with Section 2305 or 2308.

c. Wood structural panels with span ratings of wall-16 or wall-24 shall be permitted as an alternative to panels with a 24/0 span rating. Plywood siding rated 16 on center or 24 on center shall be permitted as an alternative to panels with a 24/16 span rating. Wall-16 and plywood siding 16 on center shall be used with studs spaced not more than 16 inches on center.

d. V_{asd} shall be determined in accordance with Section 1609.3.1.

e. Where the specific gravity of the wood species used for wall framing is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, nail spacing in the field of the panel shall be multiplied by 0.67. Where the specific gravity of the wood species used for wall framing is less than 0.35, fastening of the wall sheathing shall be designed in accordance with AWC NDS.

Reason Statement: This change recognizes the minimum specific gravity basis of 0.42 for the fastener spacing and provides a prescriptive option (i.e., multiply spacing by 0.67) for framing of species with lower specific gravity down to specific gravity equal to 0.35. Engineered design of the fastening is required when specific gravity of the species used for wall framing is less than 0.35.

Cost Impact: The code change proposal will increase the cost of construction
Increased cost of construction will occur where low specific gravity wood species are used. For wood species with specific gravity of 0.35, closer fastener spacing is required to provide equivalent withdrawal performance to the 0.42 specific gravity basis of the existing fastening schedule without requiring engineered design.

S207-22

S208-22

IBC: 2304.6.2 (New), TABLE 2308.5.11

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Add new text as follows:

2304.6.2 Foam plastic insulating sheathing. Where foam plastic *insulating sheathing* is used as exterior sheathing or in addition to other exterior sheathing, it shall comply with Chapter 14 and Chapter 26.

Revise as follows:

TABLE 2308.5.11 MINIMUM THICKNESS OF WALL SHEATHING

SHEATHING TYPE	MINIMUM THICKNESS	MAXIMUM WALL STUD SPACING
Diagonal wood boards	$^5/_8$ inch	24 inches on center
Structural fiberboard	$^1/_2$ inch	16 inches on center
Wood structural panel	In accordance with Tables 2308.6.3(2) and 2308.6.3(3)	—
M-S “Exterior Glue” and M-2 “Exterior Glue” particleboard	In accordance with Section 2306.3 and Table 2308.6.3(4)	—
Gypsum sheathing	$^1/_2$ inch	16 inches on center
Reinforced cement mortar	1 inch	24 inches on center
Hardboard panel siding	In accordance with Table 2308.6.3(5)	—
Foam plastic *insulating sheathing*[a]	In accordance with Sections 2304.6.2 and 2603.10	---

For SI: 1 inch = 25.4 mm.

a. Where foam plastic insulating sheathing is installed over or under one of the other sheathing materials listed in the table, compliance with Section 2603.10 with regard to foam sheathing thickness and maximum stud spacing is not required.

Reason Statement: Foam sheathing materials are commonly applied as exterior wall sheathing on conventional wood frame walls and should be included in Section 2304.6 and in Table 2308.5.11. It will help ensure that appropriate requirements are applied for use of foam plastic insulating sheathing on conventional wood frame construction.
Foam sheathing may be applied as the sole exterior sheathing material provided it has thickness and strength to resist required wind loads in accordance with Section 2603.10 for a given stud spacing. Foam sheathing also is commonly used as “over-“ or “under-“ sheathing together with one of the other sheathing materials listed in the table. For this latter condition of dual sheathing materials, footnote ‘a’ is added to the table because the other exterior sheathing materials resist 100 percent of the design wind load (in which case foam sheathing serves only as continuous insulation or perhaps also as the water-resistive barrier system). This proposal fills a gap in the prescriptive sheathing materials recognized in Chapter 23.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds no new requirements to the code, but clarifies the option and requirements for using foam sheathing with engineered and conventional wood frame construction.

S208-22

S209-22

IBC: TABLE 2304.8(2)

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

TABLE 2304.8(2) SHEATHING LUMBER, MINIMUM GRADE REQUIREMENTS: BOARD GRADE

SOLID FLOOR OR ROOF SHEATHING	SPACED ROOF SHEATHING	GRADING RULES
Utility	Standard	NLGA, PLIB/WCLIB, or WWPA
4 common or utility	3 common or standard	NLGA, PLIB/WCLIB, WWPA, ~~NSLB~~ or NELMA
No. 3	No. 2	SPIB
Merchantable	Construction common	RIS

Reason Statement: Update to reflect changes in PS20-20 and consolidation of West Coast Lumber Inspection Bureau (WCLIB) under Pacific Lumber Inspection Bureau (PLIB). Northern Softwood Lumber Bureau (NLSB) has been dissolved.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change updates applicable grading rules for consistency with PS20.

S209-22

S210-22

IBC: CHAPTER 23, SECTION 2304, TABLE 2304.8(3), TABLE 2304.8(5), 2308.2.3, TABLE 2308.4.1.1(1), TABLE 2308.7.2(3), TABLE 2308.7.2(4), TABLE 2308.7.2(5), TABLE 2308.7.2(6), TABLE 2308.7.3.1, CHAPTER 24, SECTION 2404, 2404.2

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

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CHAPTER 23
WOOD

SECTION 2304
GENERAL CONSTRUCTION REQUIREMENTS

Revise as follows:

TABLE 2304.8(3) ALLOWABLE SPANS AND LOADS FOR WOOD STRUCTURAL PANEL SHEATHING AND SINGLE-FLOOR GRADES CONTINUOUS OVER TWO OR MORE SPANS WITH STRENGTH AXIS PERPENDICULAR TO SUPPORTS[a]

SHEATHING GRADES		ROOF[b]				FLOOR[c]
Panel span rating roof/floor span	Panel thickness (inches)	Maximum span (inches)		Load[d] (psf)		Maximum span (inches)
		With edge support[e]	Without edge support	Total load	Live load	
16/0	$^{3}/_{8}$	16	16	40	30	0
20/0	$^{3}/_{8}$	20	20	40	30	0
24/0	$^{3}/_{8}$, $^{7}/_{16}$, $^{1}/_{2}$	24	20[f]	40	30	0
24/16	$^{7}/_{16}$, $^{1}/_{2}$	24	24	50	40	16
32/16	$^{15}/_{32}$, $^{1}/_{2}$, $^{5}/_{8}$	32	28	40	30	16[g]
40/20	$^{19}/_{32}$, $^{5}/_{8}$, $^{3}/_{4}$, $^{7}/_{8}$	40	32	40	30	20[g,h]
48/24	$^{23}/_{32}$, $^{3}/_{4}$, $^{7}/_{8}$	48	36	45	35	24
54/32	$^{7}/_{8}$, 1	54	40	45	35	32
60/32	$^{7}/_{8}$, $1^{1}/_{8}$	60	48	45	35	32
SINGLE FLOOR GRADES		**ROOF[b]**				**FLOOR[c]**
Panel span rating	**Panel thickness (inches)**	**Maximum span (inches)**		**Load [e] (psf)**		**Maximum span (inches)**
		With edge support[e]	**Without edge support**	**Total load**	**Live load**	
16 o.c.	$^{1}/_{2}$, $^{19}/_{32}$, $^{5}/_{8}$	24	24	50	40	16[g]
20 o.c.	$^{19}/_{32}$, $^{5}/_{8}$, $^{3}/_{4}$	32	32	40	30	20[g,h]
24 o.c.	$^{23}/_{32}$, $^{3}/_{4}$	48	36	35	25	24
32 o.c.	$^{7}/_{8}$, 1	48	40	50	40	32
48 o.c.	$1^{3}/_{32}$, $1^{1}/_{8}$	60	48	50	40	48

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kN/m^2.

a. Applies to panels 24 inches or wider.

b. Uniform load deflection limitations $^{1}/_{180}$ of span under live load plus dead load, $^{1}/_{240}$ under live load only.

c. Panel edges shall have approved tongue-and-groove joints or shall be supported with blocking unless $^{1}/_{4}$-inch minimum thickness underlayment or $1^{1}/_{2}$ inches of approved cellular or lightweight concrete is placed over the subfloor, or finish floor is $^{3}/_{4}$-inch wood strip. Allowable uniform load based on deflection of $^{1}/_{360}$ of span is 100 pounds per square foot except the span rating of 48 inches on center is based on a total load of 65 pounds per square foot.

d. Allowable load at maximum span. Where the total load includes snow, use allowable stress design snow loads.

e. Tongue-and-groove edges, panel edge clips (one midway between each support, except two equally spaced between supports 48 inches on center), lumber blocking or other. Only lumber blocking shall satisfy blocked diaphragm requirements. Where the total load includes snow, use allowable stress design snow loads.

f. For $^{1}/_{2}$-inch panel, maximum span shall be 24 inches.

g. Span is permitted to be 24 inches on center where $^{3}/_{4}$-inch wood strip flooring is installed at right angles to joist.

h. Span is permitted to be 24 inches on center for floors where $1^{1}/_{2}$ inches of cellular or lightweight concrete is applied over the panels.

TABLE 2304.8(5) ALLOWABLE LOAD (PSF) FOR WOOD STRUCTURAL PANEL ROOF SHEATHING CONTINUOUS OVER TWO OR MORE SPANS AND STRENGTH AXIS PARALLEL TO SUPPORTS (Plywood structural panels are five-ply, five-layer unless otherwise noted)[a]

PANEL GRADE	THICKNESS (inch)	MAXIMUM SPAN (inches)	LOAD AT MAXIMUM SPAN (psf)	
			Live	Total[c]
Structural I sheathing	7/16	24	20	30
	15/32	24	35[b]	45[b]
	1/2	24	40[b]	50[b]
	19/32, 5/8	24	70	80
	23/32, 3/4	24	90	100
Sheathing, other grades covered in DOC PS 1 or DOC PS 2	7/16	16	40	50
	15/32	24	20	25
	1/2	24	25	30
	19/32	24	40[b]	50[b]
	5/8	24	45[b]	55[b]
	23/32, 3/4	24	60[b]	65[b]

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kN/m^2.

a. Uniform load deflection limitations 1/180 of span under live load plus dead load, 1/240 under live load only. Edges shall be blocked with lumber or other approved type of edge supports.

b. For composite and four-ply plywood structural panel, load shall be reduced by 15 pounds per square foot.

c. Where the total load includes snow, use allowable stress design snow loads.

2308.2.3 Allowable loads. *Loads* shall be in accordance with Chapter 16 and shall not exceed the following:

1. Average *dead loads* shall not exceed 15 psf (718 N/m^2) for combined roof and ceiling, *exterior walls*, floors and partitions.

   Exceptions:

   1. Subject to the limitations of Section 2308.6.10, stone or masonry *veneer* up to the less of 5 inches (127 mm) thick or 50 pounds per square foot (2395 N/m^2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2439) permitted for *gable* ends.
   2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code.

2. *Live loads* shall not exceed 40 psf (1916 N/m^2) for floors.

   Exception: *Live loads* for concrete slab-on-ground floors in *Risk Categories* I and II shall be not more than 125 psf.

3. Ground snow *loads* shall not exceed 50 psf (2395 N/m^2).

Revise as follows:

TABLE 2308.4.1.1(1) HEADER AND GIRDER SPANS[a, b] FOR EXTERIOR BEARING WALLS (Maximum spans for Douglas fir-larch, hem-fir, Southern pine and spruce-pine-fir and required number of jack studs)

Portions of table not shown remain unchanged.

GIRDERS AND HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD, $p_{g(asd)}$ (psf)[e]																	
		30						50						70					
		Building width[c] (feet)																	
		12		24		36		12		24		36		12		24		36	
		Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]
Roof and ceiling	1-2 × 6	4-0	1	3-1	2	2-7	2	3-5	1	2-8	2	2-3	2	3-0	2	2-4	2	2-0	2
	1-2 × 8	5-1	2	3-11	2	3-3	2	4-4	2	3-4	2	2-10	2	3-10	2	3-0	2	2-6	3
	1-2 × 10	6-0	2	4-8	2	3-11	2	5-2	2	4-0	2	3-4	3	4-7	2	3-6	3	3-0	3
	1-2 × 12	7-1	2	5-5	2	4-7	3	6-1	2	4-8	3	3-11	3	5-5	2	4-2	3	3-6	3
	2-2 × 4	4-0	1	3-1	1	2-7	1	3-5	1	2-7	1	2-2	1	3-0	1	2-4	1	2-0	1
	2-2 × 6	6-0	1	4-7	1	3-10	1	5-1	1	3-11	1	3-3	2	4-6	1	3-6	2	2-11	2
	2-2 × 8	7-7	1	5-9	1	4-10	2	6-5	1	5-0	2	4-2	2	5-9	1	4-5	2	3-9	2
	2-2 × 10	9-0	1	6-10	2	5-9	2	7-8	2	5-11	2	4-11	2	6-9	2	5-3	2	4-5	2
	2-2 × 12	10-7	2	8-1	2	6-10	2	9-0	2	6-11	2	5-10	2	8-0	2	6-2	2	5-2	3
	3-2 × 8	9-5	1	7-3	1	6-1	1	8-1	1	6-3	1	5-3	2	7-2	1	5-6	2	4-8	2
	3-2 × 10	11-3	1	8-7	1	7-3	2	9-7	1	7-4	2	6-2	2	8-6	1	6-7	2	5-6	2
	3-2 × 12	13-2	1	10-1	2	8-6	2	11-3	2	8-8	2	7-4	2	10-0	2	7-9	2	6-6	2
	4-2 × 8	10-11	1	8-4	1	7-0	1	9-4	1	7-2	1	6-0	1	8-3	1	6-4	1	5-4	2
	4-2 × 10	12-11	1	9-11	1	8-4	1	11-1	1	8-6	1	7-2	2	9-10	1	7-7	2	6-4	2
	4-2 × 12	15-3	1	11-8	1	9-10	2	13-0	1	10-0	2	8-5	2	11-7	1	8-11	2	7-6	2
	1-2 × 6	3-3	1	2-7	2	2-2	2	3-0	2	2-4	2	2-0	2	2-9	2	2-2	2	1-10	2
	1-2 × 8	4-1	2	3-3	2	2-9	2	3-9	2	3-0	2	2-6	3	3-6	2	2-9	2	2-4	3
	1-2 × 10	4-11	2	3-10	2	3-3	3	4-6	2	3-6	3	3-0	3	4-1	2	3-3	3	2-9	3
	1-2 × 12	5-9	2	4-6	3	3-10	3	5-3	2	4-2	3	3-6	3	4-10	3	3-10	3	3-3	4
	2-2 × 4	3-3	1	2-6	1	2-2	1	3-0	1	2-4	1	2-0	1	2-8	1	2-2	1	1-10	1
	2-2 × 6	4-10	1	3-9	1	3-3	2	4-5	1	3-6	2	3-0	2	4-1	1	3-3	2	2-9	2
	2-2 × 8	6-1	1	4-10	2	4-1	2	5-7	2	4-5	2	3-9	2	5-2	2	4-1	2	3-6	2

GIRDERS AND HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD, p _ (psf)																	
		30						50						70					
		Building width (feet)																	
		12		24		36		12		24		36		12		24		36	
		Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ
Roof, ceiling and one center-bearing floor	2-2 × 10	7-3	2	5-8	2	4-10	2	6-8	2	5-3	2	4-5	2	6-1	2	4-10	2	4-1	2
	2-2 × 12	8-6	2	6-8	2	5-8	2	7-10	2	6-2	2	5-3	3	7-2	2	5-8	2	4-10	3
	3-2 × 8	7-8	1	6-0	1	5-1	2	7-0	1	5-6	2	4-8	2	6-5	1	5-1	2	4-4	2
	3-2 × 10	9-1	1	7-2	2	6-1	2	8-4	1	6-7	2	5-7	2	7-8	2	6-1	2	5-2	2
	3-2 × 12	10-8	2	8-5	2	7-2	2	9-10	2	7-8	2	6-7	2	9-0	2	7-1	2	6-1	2
	4-2 × 8	8-10	1	6-11	1	5-11	1	8-1	1	6-4	1	5-5	2	7-5	1	5-11	1	5-0	2
	4-2 × 10	10-6	1	8-3	2	7-0	2	9-8	1	7-7	2	6-5	2	8-10	1	7-0	2	6-0	2
	4-2 × 12	12-4	1	9-8	2	8-3	2	11-4	2	8-11	2	7-7	2	10-4	2	8-3	2	7-0	2
Roof, ceiling and one clear span floor	1-2 × 6	2-11	2	2-3	2	1-11	2	2-9	2	2-1	2	1-9	2	2-7	2	2-0	2	1-8	2
	1-2 × 8	3-9	2	2-10	2	2-5	3	3-6	2	2-8	2	2-3	3	3-3	2	2-6	3	2-2	3
	1-2 × 10	4-5	2	3-5	3	2-10	3	4-2	2	3-2	3	2-8	3	3-11	2	3-0	3	2-6	3
	1-2 × 12	5-2	2	4-0	3	3-4	3	4-10	3	3-9	3	3-2	4	4-7	3	3-6	3	3-0	4
	2-2 × 4	2-11	1	2-3	1	1-10	1	2-9	1	2-1	1	1-9	1	2-7	1	2-0	1	1-8	1
	2-2 × 6	4-4	1	3-4	2	2-10	2	4-1	1	3-2	2	2-8	2	3-10	1	3-0	2	2-6	2
	2-2 × 8	5-6	2	4-3	2	3-7	2	5-2	2	4-0	2	3-4	2	4-10	2	3-9	2	3-2	2
	2-2 × 10	6-7	2	5-0	2	4-2	2	6-1	2	4-9	2	4-0	2	5-9	2	4-5	2	3-9	3
	2-2 × 12	7-9	2	5-11	2	4-11	3	7-2	2	5-7	2	4-8	3	6-9	2	5-3	3	4-5	3
	3-2 × 8	6-11	1	5-3	2	4-5	2	6-5	1	5-0	2	4-2	2	6-1	1	4-8	2	4-0	2
	3-2 × 10	8-3	2	6-3	2	5-3	2	7-8	2	5-11	2	5-0	2	7-3	2	5-7	2	4-8	2
	3-2 × 12	9-8	2	7-5	2	6-2	2	9-0	2	7-0	2	5-10	2	8-6	2	6-7	2	5-6	3
	4-2 × 8	8-0	1	6-1	1	5-1	2	7-5	1	5-9	2	4-10	2	7-0	1	5-5	2	4-7	2
	4-2 × 10	9-6	1	7-3	2	6-1	2	8-10	1	6-10	2	5-9	2	8-4	1	6-5	2	5-5	2
	4-2 × 12	11-2	2	8-6	2	7-2	2	10-5	2	8-0	2	6-9	2	9-10	2	7-7	2	6-5	2

GIRDERS AND HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD, p _ (psf)																	
		30						50						70					
		Building width (feet)																	
		12		24		36		12		24		36		12		24		36	
		Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ
Roof, ceiling and two center-bearing floors	1-2 × 6	2-8	2	2-1	2	1-10	2	2-7	2	2-0	2	1-9	2	2-5	2	1-11	2	1-8	2
	1-2 × 8	3-5	2	2-8	2	2-4	3	3-3	2	2-7	2	2-2	3	3-1	2	2-5	3	2-1	3
	1-2 × 10	4-0	2	3-2	3	2-9	3	3-10	2	3-1	3	2-7	3	3-8	2	2-11	3	2-5	3
	1-2 × 12	4-9	3	3-9	3	3-2	4	4-6	3	3-7	3	3-1	4	4-3	3	3-5	3	2-11	4
	2-2 × 4	2-8	1	2-1	1	1-9	1	2-6	1	2-0	1	1-8	1	2-5	1	1-11	1	1-7	1
	2-2 × 6	4-0	1	3-2	2	2-8	2	3-9	1	3-0	2	2-7	2	3-7	1	2-10	2	2-5	2
	2-2 × 8	5-0	2	4-0	2	3-5	2	4-10	2	3-10	2	3-3	2	4-7	2	3-7	2	3-1	2
	2-2 × 10	6-0	2	4-9	2	4-0	2	5-8	2	4-6	2	3-10	3	5-5	2	4-3	2	3-8	3
	2-2 × 12	7-0	2	5-7	2	4-9	3	6-8	2	5-4	3	4-6	3	6-4	2	5-0	3	4-3	3
	3-2 × 8	6-4	1	5-0	2	4-3	2	6-0	1	4-9	2	4-1	2	5-8	2	4-6	2	3-10	2
	3-2 × 10	7-6	2	5-11	2	5-1	2	7-1	2	5-8	2	4-10	2	6-9	2	5-4	2	4-7	2
	3-2 × 12	8-10	2	7-0	2	5-11	2	8-5	2	6-8	2	5-8	3	8-0	2	6-4	2	5-4	3
	4-2 × 8	7-3	1	5-9	1	4-11	2	6-11	1	5-6	2	4-8	2	6-7	1	5-2	2	4-5	2
	4-2 × 10	8-8	1	6-10	2	5-10	2	8-3	2	6-6	2	5-7	2	7-10	2	6-2	2	5-3	2
	4-2 × 12	10-2	2	8-1	2	6-10	2	9-8	2	7-8	2	6-7	2	9-2	2	7-3	2	6-2	2
	1-2 × 6	2-3	2	1-9	2	1-5	2	2-3	2	1-9	2	1-5	3	2-2	2	1-8	2	1-5	3
	1-2 × 8	2-10	2	2-2	3	1-10	3	2-10	2	2-2	3	1-10	3	2-9	2	2-1	3	1-10	3
	1-2 × 10	3-4	2	2-7	3	2-2	3	3-4	3	2-7	3	2-2	4	3-3	3	2-6	3	2-2	4
	1-2 × 12	4-0	3	3-0	3	2-7	4	4-0	3	3-0	4	2-7	4	3-10	3	3-0	4	2-6	4
	2-2 × 4	2-3	1	1-8	1	1-4	1	2-3	1	1-8	1	1-4	1	2-2	1	1-8	1	1-4	2
	2-2 × 6	3-4	1	2-6	2	2-2	2	3-4	2	2-6	2	2-2	2	3-3	2	2-6	2	2-1	2
	2-2 × 8	4-3	2	3-3	2	2-8	2	4-3	2	3-3	2	2-8	2	4-1	2	3-2	2	2-8	3
	2-2 × 10	5-0	2	3-10	2	3-2	3	5-0	2	3-10	2	3-2	3	4-10	2	3-9	3	3-2	3
	2-2 × 12	5-11	2	4-6	3	3-9	3	5-11	2	4-6	3	3-9	3	5-8	2	4-5	3	3-9	3

Roof, ceiling and two clear span floors **GIRDERS AND HEADERS SUPPORTING**	**SIZE**	**GROUND SNOW LOAD, p _ (psf)**																	
		30						**50**						**70**					
		Building width (feet)																	
		12		**24**		**36**		**12**		**24**		**36**		**12**		**24**		**36**	
		Span	**NJ**	**Span**	**NJ**	**Span**	**NJ**	**Span**	**NJ**	**Span**	**NJ**	**Span**	**NJ**	**Span**	**NJ**	**Span**	**NJ**	**Span**	**NJ**
	3-2 × 8	5-3	1	4-0	2	3-5	2	5-3	2	4-0	2	3-5	2	5-1	2	3-11	2	3-4	2
	3-2 × 10	6-3	2	4-9	2	4-0	2	6-3	2	4-9	2	4-0	2	6-1	2	4-8	2	4-0	3
	3-2 × 12	7-5	2	5-8	2	4-9	3	7-5	2	5-8	2	4-9	3	7-2	2	5-6	3	4-8	3
	4-2 × 8	6-1	1	4-8	2	3-11	2	6-1	1	4-8	2	3-11	2	5-11	1	4-7	2	3-10	2
	4-2 × 10	7-3	2	5-6	2	4-8	2	7-3	2	5-6	2	4-8	2	7-0	2	5-5	2	4-7	2
	4-2 × 12	8-6	2	6-6	2	5-6	2	8-6	2	6-6	2	5-6	2	8-3	2	6-4	2	5-4	3

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.

b. Spans are based on minimum design properties for No. 2 grade lumber of Douglas fir-larch, hem-fir, Southern pine and spruce-pine fir.

c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.

d. NJ = Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.

e. Use 30 psf allowable stress design ground snow load for cases in which allowable stress design ground snow load is less than 30 psf and the roof live load is equal to or less than 20 psf.

f. Spans are calculated assuming the top of the header or girder is laterally braced by perpendicular framing. Where the top of the header or girder is not laterally braced (for example, cripple studs bearing on the header), tabulated spans for headers consisting of 2 × 8, 2 × 10, or 2 × 12 sizes shall be multiplied by 0.70 or the header or girder shall be designed.

TABLE 2308.7.2(3) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load, $\underline{p_{g(asd)}}$ = 30 psf, ceiling not attached to rafters, L/Δ = 180)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	Douglas Fir-Larch	SS	10-0	15-9	20-9	Note b	Note b	10-0	15-9	20-1	24-6	Note b
	Douglas Fir-Larch	#1	9-8	14-9	18-8	22-9	Note b	9-0	13-2	16-8	20-4	23-7
	Douglas Fir-Larch	#2	9-5	13-9	17-5	21-4	24-8	8-5	12-4	15-7	19-1	22-1
	Douglas Fir-Larch	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Hem-Fir	SS	9-6	14-10	19-7	25-0	Note b	9-6	14-10	19-7	24-1	Note b
	Hem-Fir	#1	9-3	14-4	18-2	22-2	25-9	8-9	12-10	16-3	19-10	23-0
	Hem-Fir	#2	8-10	13-7	17-2	21-0	24-4	8-4	12-2	15-4	18-9	21-9
	Hem-Fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Southern Pine	SS	9-10	15-6	20-5	Note b	Note b	9-10	15-6	20-5	25-4	Note b
	Southern Pine	#1	9-6	14-10	19-0	22-3	26-0	9-0	13-5	17-0	19-11	23-7
	Southern Pine	#2	8-7	12-11	16-4	19-5	22-10	7-8	11-7	14-8	17-4	20-5
	Southern Pine	#3	6-7	9-9	12-4	15-0	17-9	5-11	8-9	11-0	13-5	15-10
	Spruce-Pine-Fir	SS	9-3	14-7	19-2	24-6	Note b	9-3	14-7	18-8	22-9	Note b
	Spruce-Pine-Fir	#1	9-1	13-9	17-5	21-4	24-8	8-5	12-4	15-7	19-1	22-1
	Spruce-Pine-Fir	#2	9-1	13-9	17-5	21-4	24-8	8-5	12-4	15-7	19-1	22-1
	Spruce-Pine-Fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
16	Douglas Fir-Larch	SS	9-1	14-4	18-10	23-9	Note b	9-1	13-9	17-5	21-3	24-8
	Douglas Fir-Larch	#1	8-9	12-9	16-2	19-9	22-10	7-10	11-5	14-5	17-8	20-5
	Douglas Fir-Larch	#2	8-2	11-11	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Douglas Fir-Larch	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Hem-Fir	SS	8-7	13-6	17-10	22-9	Note b	8-7	13-6	17-1	20-10	24-2
	Hem-Fir	#1	8-5	12-5	15-9	19-3	22-3	7-7	11-1	14-1	17-2	19-11
	Hem-Fir	#2	8-0	11-9	14-11	18-2	21-1	7-2	10-6	13-4	16-3	18-10
	Hem-Fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Southern Pine	SS	8-11	14-1	18-6	23-8	Note b	8-11	14-1	18-5	21-11	25-11
	Southern Pine	#1	8-7	13-0	16-6	19-3	22-10	7-10	11-7	14-9	17-3	20-5
	Southern Pine	#2	7-6	11-2	14-2	16-10	19-10	6-8	10-0	12-8	15-1	17-9
	Southern Pine	#3	5-9	8-6	10-8	13-0	15-4	5-2	7-7	9-7	11-7	13-9
	Spruce-Pine-Fir	SS	8-5	13-3	17-5	22-1	25-7	8-5	12-9	16-2	19-9	22-10
	Spruce-Pine-Fir	#1	8-2	11-11	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-Pine-Fir	#2	8-2	11-11	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-Pine-Fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Douglas Fir-Larch	SS	8-7	13-6	17-9	21-8	25-2	8-7	12-6	15-10	19-5	22-6
	Douglas Fir-Larch	#1	7-11	11-8	14-9	18-0	20-11	7-1	10-5	13-2	16-1	18-8
	Douglas Fir-Larch	#2	7-5	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Douglas Fir-Larch	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Hem-Fir	SS	8-1	12-9	16-9	21-4	24-8	8-1	12-4	15-7	19-1	22-1
	Hem-Fir	#1	7-9	11-4	14-4	17-7	20-4	6-11	10-2	12-10	15-8	18-2
	Hem-Fir	#2	7-4	10-9	13-7	16-7	19-3	6-7	9-7	12-2	14-10	17-3

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
19.2			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
	Hem-Fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Southern Pine	SS	8-5	13-3	17-5	22-3	Note b	8-5	13-3	16-10	20-0	23-7
	Southern Pine	#1	8-0	11-10	15-1	17-7	20-11	7-1	10-7	13-5	15-9	18-8
	Southern Pine	#2	6-10	10-2	12-11	15-4	18-1	6-1	9-2	11-7	13-9	16-2
	Southern Pine	#3	5-3	7-9	9-9	11-10	14-0	4-8	6-11	8-9	10-7	12-6
	Spruce-Pine-Fir	SS	7-11	12-5	16-5	20-2	23-4	7-11	11-8	14-9	18-0	20-11
	Spruce-Pine-Fir	#1	7-5	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-Pine-Fir	#2	7-5	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-Pine-Fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
24	Douglas Fir-Larch	SS	7-11	12-6	15-10	19-5	22-6	7-8	11-3	14-2	17-4	20-1
	Douglas Fir-Larch	#1	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Douglas Fir-Larch	#2	6-8	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Douglas Fir-Larch	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
	Hem-Fir	SS	7-6	11-10	15-7	19-1	22-1	7-6	11-0	13-11	17-0	19-9
	Hem-Fir	#1	6-11	10-2	12-10	15-8	18-2	6-2	9-1	11-6	14-0	16-3
	Hem-Fir	#2	6-7	9-7	12-2	14-10	17-3	5-10	8-7	10-10	13-3	15-5
	Hem-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
	Southern Pine	SS	7-10	12-3	16-2	20-0	23-7	7-10	11-10	15-0	17-11	21-2
	Southern Pine	#1	7-1	10-7	13-5	15-9	18-8	6-4	9-6	12-0	14-1	16-8
	Southern Pine	#2	6-1	9-2	11-7	13-9	16-2	5-5	8-2	10-4	12-3	14-6
	Southern Pine	#3	4-8	6-11	8-9	10-7	12-6	4-2	6-2	7-10	9-6	11-2
	Spruce-Pine-Fir	SS	7-4	11-7	14-9	18-0	20-11	7-1	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#1	6-8	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-Pine-Fir	#2	6-8	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-Pine-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table 2308.7.2(7).

b. Span exceeds 26 feet in length.

TABLE 2308.7.2(4) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load, $\underline{p_{g(asd)}}$ = 50 psf, ceiling not attached to rafters, L/Δ = 180)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	Douglas Fir-Larch	SS	8-5	13-3	17-6	22-4	26-0	8-5	13-3	17-0	20-9	24-0
	Douglas Fir-larch	#1	8-2	12-0	15-3	18-7	21-7	7-7	11-2	14-1	17-3	20-0
	Douglas Fir-larch	#2	7-8	11-3	14-3	17-5	20-2	7-1	10-5	13-2	16-1	18-8
	Douglas Fir-larch	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Hem-Fir	SS	8-0	12-6	16-6	21-1	25-6	8-0	12-6	16-6	20-4	23-7
	Hem-Fir	#1	7-10	11-9	14-10	18-1	21-0	7-5	10-10	13-9	16-9	19-5
	Hem-Fir	#2	7-5	11-1	14-0	17-2	19-11	7-0	10-3	13-0	15-10	18-5
	Hem-Fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Southern Pine	SS	8-4	13-1	17-2	21-11	Note b	8-4	13-1	17-2	21-5	25-3
	Southern Pine	#1	8-0	12-3	15-6	18-2	21-7	7-7	11-4	14-5	16-10	20-0
	Southern Pine	#2	7-0	10-6	13-4	15-10	18-8	6-6	9-9	12-4	14-8	17-3
	Southern Pine	#3	5-5	8-0	10-1	12-3	14-6	5-0	7-5	9-4	11-4	13-5
	Spruce-Pine-Fir	SS	7-10	12-3	16-2	20-8	24-1	7-10	12-3	15-9	19-3	22-4
	Spruce-Pine-Fir	#1	7-8	11-3	14-3	17-5	20-2	7-1	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#2	7-8	11-3	14-3	17-5	20-2	7-1	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
16	Douglas Fir-Larch	SS	7-8	12-1	15-10	19-5	22-6	7-8	11-7	14-8	17-11	20-10
	Douglas Fir-Larch	#1	7-1	10-5	13-2	16-1	18-8	6-7	9-8	12-2	14-11	17-3
	Douglas Fir-Larch	#2	6-8	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Douglas Fir-Larch	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Hem-Fir	SS	7-3	11-5	15-0	19-1	22-1	7-3	11-5	14-5	17-8	20-5
	Hem-Fir	#1	6-11	10-2	12-10	15-8	18-2	6-5	9-5	11-11	14-6	16-10
	Hem-Fir	#2	6-7	9-7	12-2	14-10	17-3	6-1	8-11	11-3	13-9	15-11
	Hem-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Southern Pine	SS	7-6	11-10	15-7	19-11	23-7	7-6	11-10	15-7	18-6	21-10
	Southern Pine	#1	7-1	10-7	13-5	15-9	18-8	6-7	9-10	12-5	14-7	17-3
	Southern Pine	#2	6-1	9-2	11-7	13-9	16-2	5-8	8-5	10-9	12-9	15-0
	Southern Pine	#3	4-8	6-11	8-9	10-7	12-6	4-4	6-5	8-1	9-10	11-7
	Spruce-Pine-Fir	SS	7-1	11-2	14-8	18-0	20-11	7-1	10-9	13-8	15-11	19-4
	Spruce-Pine-Fir	#1	6-8	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-Pine-Fir	#2	6-8	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-Pine-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Douglas Fir-Larch	SS	7-3	11-4	14-6	17-8	20-6	7-3	10-7	13-5	16-5	19-0
	Douglas Fir-Larch	#1	6-6	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Douglas Fir-Larch	#2	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Douglas Fir-Larch	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Hem-Fir	SS	6-10	10-9	14-2	17-5	20-2	6-10	10-5	13-2	16-1	18-8
	Hem-Fir	#1	6-4	9-3	11-9	14-4	16-7	5-10	8-7	10-10	13-3	15-5

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
19.2			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
	Hem-Fir	#2	6-0	8-9	11-1	13-7	15-9	5-7	8-1	10-3	12-7	14-7
	Hem-Fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Southern Pine	SS	7-1	11-2	14-8	18-3	21-7	7-1	11-2	14-2	16-11	20-0
	Southern Pine	#1	6-6	9-8	12-3	14-4	17-1	6-0	9-0	11-4	13-4	15-9
	Southern Pine	#2	5-7	8-4	10-7	12-6	14-9	5-2	7-9	9-9	11-7	13-8
	Southern Pine	#3	4-3	6-4	8-0	9-8	11-5	4-0	5-10	7-4	8-11	10-7
	Spruce-Pine-Fir	SS	6-8	10-6	13-5	16-5	19-1	6-8	9-10	12-5	15-3	17-8
	Spruce-Pine-Fir	#1	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-Pine-Fir	#2	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-Pine-Fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
24	Douglas Fir-Larch	SS	6-8	10-3	13-0	15-10	18-4	6-6	9-6	12-0	14-8	17-0
	Douglas Fir-Larch	#1	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Douglas Fir-Larch	#2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Douglas Fir-Larch	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Hem-Fir	SS	6-4	9-11	12-9	15-7	18-0	6-4	9-4	11-9	14-5	16-8
	Hem-Fir	#1	5-8	8-3	10-6	12-10	14-10	5-3	7-8	9-9	11-10	13-9
	Hem-Fir	#2	5-4	7-10	9-11	12-1	14-1	4-11	7-3	9-2	11-3	13-0
	Hem-Fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Southern Pine	SS	6-7	10-4	13-8	16-4	19-3	6-7	10-0	12-8	15-2	17-10
	Southern Pine	#1	5-10	8-8	11-0	12-10	15-3	5-5	8-0	10-2	11-11	14-1
	Southern Pine	#2	5-0	7-5	9-5	11-3	13-2	4-7	6-11	8-9	10-5	12-3
	Southern Pine	#3	3-10	5-8	7-1	8-8	10-3	3-6	5-3	6-7	8-0	9-6
	Spruce-Pine-Fir	SS	6-2	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Spruce-Pine-Fir	#1	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-Pine-Fir	#2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-Pine-Fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table 2308.7.2(7).

b. Span exceeds 26 feet in length.

TABLE 2308.7.2(5) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load, $\underline{p_{g(asd)}}$ = 30 psf, ceiling attached to rafters, L/Δ = 240)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	Douglas Fir-Larch	SS	9-1	14-4	18-10	24-1	Note b	9-1	14-4	18-10	24-1	Note b
	Douglas Fir-Larch	#1	8-9	13-9	18-2	22-9	Note b	8-9	13-2	16-8	20-4	23-7
	Douglas Fir-Larch	#2	8-7	13-6	17-5	21-4	24-8	8-5	12-4	15-7	19-1	22-1
	Douglas Fir-Larch	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Hem-Fir	SS	8-7	13-6	17-10	22-9	Note b	8-7	13-6	17-10	22-9	Note b
	Hem-Fir	#1	8-5	13-3	17-5	22-2	25-9	8-5	12-10	16-3	19-10	23-0
	Hem-Fir	#2	8-0	12-7	16-7	21-0	24-4	8-0	12-2	15-4	18-9	21-9
	Hem-Fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Southern Pine	SS	8-11	14-1	18-6	23-8	Note b	8-11	14-1	18-6	23-8	Note b
	Southern Pine	#1	8-7	13-6	17-10	22-3	Note b	8-7	13-5	17-0	19-11	23-7
	Southern Pine	#2	8-3	12-11	16-4	19-5	22-10	7-8	11-7	14-8	17-4	20-5
	Southern Pine	#3	6-7	9-9	12-4	15-0	17-9	5-11	8-9	11-0	13-5	15-10
	Spruce-Pine-Fir	SS	8-5	13-3	17-5	22-3	Note b	8-5	13-3	17-5	22-3	Note b
	Spruce-Pine-Fir	#1	8-3	12-11	17-0	21-4	24-8	8-3	12-4	15-7	19-1	22-1
	Spruce-Pine-Fir	#2	8-3	12-11	17-0	21-4	24-8	8-3	12-4	15-7	19-1	22-1
	Spruce-Pine-Fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
16	Douglas Fir-Larch	SS	8-3	13-0	17-2	21-10	Note b	8-3	13-0	17-2	21-3	24-8
	Douglas Fir-Larch	#1	8-0	12-6	16-2	19-9	22-10	7-10	11-5	14-5	17-8	20-5
	Douglas Fir-Larch	#2	7-10	11-11	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Douglas Fir-Larch	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Hem-Fir	SS	7-10	12-3	16-2	20-8	25-1	7-10	12-3	16-2	20-8	24-2
	Hem-Fir	#1	7-8	12-0	15-9	19-3	22-3	7-7	11-1	14-1	17-2	19-11
	Hem-Fir	#2	7-3	11-5	14-11	18-2	21-1	7-2	10-6	13-4	16-3	18-10
	Hem-Fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Southern Pine	SS	8-1	12-9	16-10	21-6	Note b	8-1	12-9	16-10	21-6	25-11
	Southern Pine	#1	7-10	12-3	16-2	19-3	22-10	7-10	11-7	14-9	17-3	20-5
	Southern Pine	#2	7-6	11-2	14-2	16-10	19-10	6-8	10-0	12-8	15-1	17-9
	Southern Pine	#3	5-9	8-6	10-8	13-0	15-4	5-2	7-7	9-7	11-7	13-9
	Spruce-Pine-Fir	SS	7-8	12-0	15-10	20-2	24-7	7-8	12-0	15-10	19-9	22-10
	Spruce-Pine-Fir	#1	7-6	11-9	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-Pine-Fir	#2	7-6	11-9	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-Pine-Fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Douglas Fir-Larch	SS	7-9	12-3	16-1	20-7	25-0	7-9	12-3	15-10	19-5	22-6
	Douglas Fir-Larch	#1	7-6	11-8	14-9	18-0	20-11	7-1	10-5	13-2	16-1	18-8
	Douglas Fir-Larch	#2	7-4	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Douglas Fir-Larch	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Hem-Fir	SS	7-4	11-7	15-3	19-5	23-7	7-4	11-7	15-3	19-1	22-1
	Hem-Fir	#1	7-2	11-4	14-4	17-7	20-4	6-11	10-2	12-10	15-8	18-2
	Hem-Fir	#2	6-10	10-9	13-7	16-7	19-3	6-7	9-7	12-2	14-10	17-3

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
19.2			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
	Hem-Fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Southern Pine	SS	7-8	12-0	15-10	20-2	24-7	7-8	12-0	15-10	20-0	23-7
	Southern Pine	#1	7-4	11-7	15-1	17-7	20-11	7-1	10-7	13-5	15-9	18-8
	Southern Pine	#2	6-10	10-2	12-11	15-4	18-1	6-1	9-2	11-7	13-9	16-2
	Southern Pine	#3	5-3	7-9	9-9	11-10	14-0	4-8	6-11	8-9	10-7	12-6
	Spruce-Pine-Fir	SS	7-2	11-4	14-11	19-0	23-1	7-2	11-4	14-9	18-0	20-11
	Spruce-Pine-Fir	#1	7-0	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-Pine-Fir	#2	7-0	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-Pine-Fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
24	Douglas Fir-Larch	SS	7-3	11-4	15-0	19-1	22-6	7-3	11-3	14-2	17-4	20-1
	Douglas Fir-Larch	#1	7-0	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Douglas Fir-Larch	#2	6-8	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Douglas Fir-Larch	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
	Hem-Fir	SS	6-10	10-9	14-2	18-0	21-11	6-10	10-9	13-11	17-0	19-9
	Hem-Fir	#1	6-8	10-2	12-10	15-8	18-2	6-2	9-1	11-6	14-0	16-3
	Hem-Fir	#2	6-4	9-7	12-2	14-10	17-3	5-10	8-7	10-10	13-3	15-5
	Hem-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
	Southern Pine	SS	7-1	11-2	14-8	18-9	22-10	7-1	11-2	14-8	17-11	21-2
	Southern Pine	#1	6-10	10-7	13-5	15-9	18-8	6-4	9-6	12-0	14-1	16-8
	Southern Pine	#2	6-1	9-2	11-7	13-9	16-2	5-5	8-2	10-4	12-3	14-6
	Southern Pine	#3	4-8	6-11	8-9	10-7	12-6	4-2	6-2	7-10	9-6	11-2
	Spruce-Pine-Fir	SS	6-8	10-6	13-10	17-8	20-11	6-8	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#1	6-6	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-Pine-Fir	#2	6-6	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-Pine-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table 2308.7.2(7).

b. Span exceeds 26 feet in length.

TABLE 2308.7.2(6) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load, $\underline{p_{g(asd)}}$ = 50 psf, ceiling attached to rafters, L/Δ = 240)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	Douglas Fir-Larch	SS	7-8	12-1	15-11	20-3	24-8	7-8	12-1	15-11	20-3	24-0
	Douglas Fir-Larch	#1	7-5	11-7	15-3	18-7	21-7	7-5	11-2	14-1	17-3	20-0
	Douglas Fir-Larch	#2	7-3	11-3	14-3	17-5	20-2	7-1	10-5	13-2	16-1	18-8
	Douglas Fir-Larch	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Hem-Fir	SS	7-3	11-5	15-0	19-2	23-4	7-3	11-5	15-0	19-2	23-4
	Hem-Fir	#1	7-1	11-2	14-8	18-1	21-0	7-1	10-10	13-9	16-9	19-5
	Hem-Fir	#2	6-9	10-8	14-0	17-2	19-11	6-9	10-3	13-0	15-10	18-5
	Hem-Fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Southern Pine	SS	7-6	11-10	15-7	19-11	24-3	7-6	11-10	15-7	19-11	24-3
	Southern Pine	#1	7-3	11-5	15-0	18-2	21-7	7-3	11-4	14-5	16-10	20-0
	Southern Pine	#2	6-11	10-6	13-4	15-10	18-8	6-6	9-9	12-4	14-8	17-3
	Southern Pine	#3	5-5	8-0	10-1	12-3	14-6	5-0	7-5	9-4	11-4	13-5
	Spruce-Pine-Fir	SS	7-1	11-2	14-8	18-9	22-10	7-1	11-2	14-8	18-9	22-4
	Spruce-Pine-Fir	#1	6-11	10-11	14-3	17-5	20-2	6-11	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#2	6-11	10-11	14-3	17-5	20-2	6-11	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
16	Douglas Fir-Larch	SS	7-0	11-0	14-5	18-5	22-5	7-0	11-0	14-5	17-11	20-10
	Douglas Fir-Larch	#1	6-9	10-5	13-2	16-1	18-8	6-7	9-8	12-2	14-11	17-3
	Douglas Fir-Larch	#2	6-7	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Douglas Fir-Larch	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Hem-Fir	SS	6-7	10-4	13-8	17-5	21-2	6-7	10-4	13-8	17-5	20-5
	Hem-Fir	#1	6-5	10-2	12-10	15-8	18-2	6-5	9-5	11-11	14-6	16-10
	Hem-Fir	#2	6-2	9-7	12-2	14-10	17-3	6-1	8-11	11-3	13-9	15-11
	Hem-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Southern Pine	SS	6-10	10-9	14-2	18-1	22-0	6-10	10-9	14-2	18-1	21-10
	Southern Pine	#1	6-7	10-4	13-5	15-9	18-8	6-7	9-10	12-5	14-7	17-3
	Southern Pine	#2	6-1	9-2	11-7	13-9	16-2	5-8	8-5	10-9	12-9	15-0
	Southern Pine	#3	4-8	6-11	8-9	10-7	12-6	4-4	6-5	8-1	9-10	11-7
	Spruce-Pine-Fir	SS	6-5	10-2	13-4	17-0	20-9	6-5	10-2	13-4	16-8	19-4
	Spruce-Pine-Fir	#1	6-4	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-Pine-Fir	#2	6-4	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-Pine-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Douglas Fir-Larch	SS	6-7	10-4	13-7	17-4	20-6	6-7	10-4	13-5	16-5	19-0
	Douglas Fir-Larch	#1	6-4	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Douglas Fir-Larch	#2	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Douglas Fir-Larch	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Hem-Fir	SS	6-2	9-9	12-10	16-5	19-11	6-2	9-9	12-10	16-1	18-8
	Hem-Fir	#1	6-1	9-3	11-9	14-4	16-7	5-10	8-7	10-10	13-3	15-5

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	**2 × 6**	**2 × 8**	**2 × 10**	**2 × 12**	**2 × 4**	**2 × 6**	**2 × 8**	**2 × 10**	**2 × 12**
			Maximum rafter spans									
19.2			**(ft. - in.)**	**(ft. - in.)**	**(ft. - in.)**	**(ft. - in.)**	**(ft. - in.)**	**(ft. - in.)**	**(ft. - in.)**	**(ft. - in.)**	**(ft. - in.)**	**(ft. - in.)**
	Hem-Fir	#2	5-9	8-9	11-1	13-7	15-9	5-7	8-1	10-3	12-7	14-7
	Hem-Fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Southern Pine	SS	6-5	10-2	13-4	17-0	20-9	6-5	10-2	13-4	16-11	20-0
	Southern Pine	#1	6-2	9-8	12-3	14-4	17-1	6-0	9-0	11-4	13-4	15-9
	Southern Pine	#2	5-7	8-4	10-7	12-6	14-9	5-2	7-9	9-9	11-7	13-8
	Southern Pine	#3	4-3	6-4	8-0	9-8	11-5	4-0	5-10	7-4	8-11	10-7
	Spruce-Pine-Fir	SS	6-1	9-6	12-7	16-0	19-1	6-1	9-6	12-5	15-3	17-8
	Spruce-Pine-Fir	#1	5-11	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-Pine-Fir	#2	5-11	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-Pine-Fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
24	Douglas Fir-Larch	SS	6-1	9-7	12-7	15-10	18-4	6-1	9-6	12-0	14-8	17-0
	Douglas Fir-Larch	#1	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Douglas Fir-Larch	#2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Douglas Fir-Larch	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Hem-Fir	SS	5-9	9-1	11-11	15-2	18-0	5-9	9-1	11-9	14-5	15-11
	Hem-Fir	#1	5-8	8-3	10-6	12-10	14-10	5-3	7-8	9-9	11-10	13-9
	Hem-Fir	#2	5-4	7-10	9-11	12-1	14-1	4-11	7-3	9-2	11-3	13-0
	Hem-Fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Southern Pine	SS	6-0	9-5	12-5	15-10	19-3	6-0	9-5	12-5	15-2	17-10
	Southern Pine	#1	5-9	8-8	11-0	12-10	15-3	5-5	8-0	10-2	11-11	14-1
	Southern Pine	#2	5-0	7-5	9-5	11-3	13-2	4-7	6-11	8-9	10-5	12-3
	Southern Pine	#3	3-10	5-8	7-1	8-8	10-3	3-6	5-3	6-7	8-0	9-6
	Spruce-Pine-Fir	SS	5-8	8-10	11-8	14-8	17-1	5-8	8-10	11-2	13-7	15-9
	Spruce-Pine-Fir	#1	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-Pine-Fir	#2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-Pine-Fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table 2308.7.2(7).

TABLE 2308.7.3.1 RAFTER TIE CONNECTIONS[i]

RAFTER SLOPE	TIE SPACING (inches)	LIVE LOAD ONLY[g]			GROUND SNOW LOAD, $p_{g(asd)}$ (pounds per square foot)					
					30 pounds per square foot			50 pounds per square foot		
		Roof span (feet)								
		12	24	36	12	24	36	12	24	36
		Required number of 16d common ($3^1/_2$″ x 0.162″) nails per connection[a, b, c, d, e, f, h]								
3:12	12	3	5	8	3	6	9	5	9	13
	16	4	7	10	4	8	12	6	12	17
	19.2	4	8	12	5	10	14	7	14	21
	24	**5**	10	15	6	12	18	9	17	26
	32	7	13	20	8	16	24	12	23	34
	48	10	20	29	12	24	35	17	34	51
4:12	12	3	4	6	3	5	7	4	7	10
	16	3	5	8	3	6	9	5	9	13
	19.2	3	6	9	4	7	**11**	6	11	16
	24	4	8	11	5	9	13	7	13	19
	32	5	10	15	6	12	18	9	17	26
	48	8	15	22	9	18	26	13	26	38
5:12	12	3	3	5	3	4	6	3	6	8
	16	3	4	6	3	5	7	4	7	11
	19.2	3	5	7	3	6	9	5	9	13
	24	3	6	9	4	7	11	6	11	16
	32	4	8	12	5	10	14	7	14	21
	48	6	12	18	7	14	21	11	21	31
7:12	12	3	3	4	3	3	4	3	4	6
	16	3	3	5	3	4	5	3	5	8
	19.2	3	4	5	3	4	6	3	6	9
	24	3	5	7	3	5	8	4	8	11
	32	3	6	9	4	7	10	5	10	15
	48	5	9	13	5	10	15	8	15	22
9:12	12	3	3	3	3	3	3	3	3	5
	16	3	3	4	3	3	4	3	4	6
	19.2	3	3	4	3	4	5	3	5	7
	24	3	4	5	3	4	6	3	6	9
	32	3	5	7	3	6	8	4	8	12
	48	4	7	10	4	8	12	6	12	17
12:12	12	3	3	3	3	3	3	3	3	4
	16	3	3	3	3	3	3	3	3	5
	19.2	3	3	3	3	3	4	3	4	6
	24	3	3	4	3	3	5	3	5	7
	32	3	4	5	3	4	6	3	6	9
	48	3	5	8	3	6	9	5	9	13

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 47.8 N/m^2.

a. 10d common (3″ x 0.148″) nails shall be permitted to be substituted for 16d common ($3^1/_2$" × 0.162″) nails where the required number of nails is taken as 1.2 times the required number of 16d common nails, rounded up to the next full nail.

b. Rafter tie heel joint connections are not required where the ridge is supported by a load-bearing wall, header or ridge beam.

c. Where intermediate support of the rafter is provided by vertical struts or purlins to a load-bearing wall, the tabulated heel joint connection requirements are permitted to be reduced proportionally to the reduction in span.

d. Equivalent nailing patterns are required for ceiling joist to ceiling joist lap splices.

e. Connected members shall be of sufficient size to prevent splitting due to nailing.

f. For allowable stress design snow loads less than 30 pounds per square foot, the required number of nails is permitted to be reduced by multiplying by the ratio of actual snow load plus 10 divided by 40, but not less than the number required for no snow load.

g. Applies to roof live load of 20 psf or less.

h. Tabulated heel joint connection requirements assume that ceiling joists or rafter ties are located at the bottom of the attic space. Where ceiling joists or rafter ties are located higher in the attic, heel joint connection requirements shall be increased by the adjustment factors in Table 2308.7.3.1(1).

i. Tabulated requirements are based on 10 psf roof dead load in combination with the specified roof snow load and roof live load.

CHAPTER 24
GLASS AND GLAZING

SECTION 2404
WIND, SNOW, SEISMIC AND DEAD LOADS ON GLASS

Revise as follows:

2404.2 Sloped glass. Glass sloped more than 15 degrees (0.26 rad) from vertical in skylights, *sunrooms*, sloped roofs and other exterior applications shall be designed to resist the most critical combinations of loads determined by Equations 24-2, 24-3 and 24-4.

$F_g = 0.6W_o - D$ **(Equation 24-2)**

(Equation 24-3)

$F_g = 0.6W_i + D + \cancel{0.5}\ \underline{0.35}S$

(Equation 24-4)

$F_g = 0.3W_i + D + \underline{0.7}S$

where:

D = Glass *dead load* psf (kN/m^2).

For glass sloped 30 degrees (0.52 rad) or less from horizontal,

= 13 t_g (For SI: 0.0245 t_g).

For glass sloped more than 30 degrees (0.52 rad) from horizontal,

= 13 t_g cos θ (For SI: 0.0245 t_g cos θ).

F_g = Total *load*, psf (kN/m^2) on glass.

S = Snow *load*, psf (kN/m^2) as determined in Section 1608 from the reliability-targeted (strength-based) maps in Figures 1608.2(1) through 1608.2(4).

t_g = Total glass thickness, inches (mm) of glass panes and plies.

W_i = Inward wind force, psf (kN/m^2) due to basic design *wind speed*, *V*, as calculated in Section 1609.

W_o = Outward wind force, psf (kN/m^2) due to basic design wind speed, *V*, as calculated in Section 1609.

θ = Angle of slope from horizontal.

Exception: The performance grade rating of *unit skylights* and *tubular daylighting devices* shall be determined in accordance with Section 2405.5.

The design of sloped glazing shall be based on Equation 24-5.

$F_g \leq F_{ga}$ **(Equation 24-5)**

where:

F_g = Total *load* on the glass as determined by Equations 24-2, 24-3 and 24-4.

F_{ga} = Short duration *load* resistance of the glass as determined in accordance with ASTM E1300 for Equations 24-2 and 24-3; or the long duration *load* resistance of the glass as determined in accordance with ASTM E1300 for Equation 24-4.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal is a companion to the ASCE proposal to update the ground snow provisions in Section 1608.2 to the reliability-targeted (strength-based) maps.

This proposal includes coordination items for all existing allowable stress design tables to use the newly defined allowable stress design snow load, $p_{g(asd)}$, as described in the new Section 1602.1 and covered by Section 1608.2.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a coordination proposal intended to maintain the tables and equations using allowable stress design loads. Therefore, this change will not result in any cost impacts.

S210-22

S211-22

IBC: 2304.10.1

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org); Jason Smart, representing American Wood Council (jsmart@awc.org)

2021 International Building Code

Revise as follows:

2304.10.1 ~~Connection fire-resistance rating~~ Fire protection of connections. ~~*Fire-resistance* ratings for connections in~~ Connections used with fire-resistance-rated members and in fire-resistance-rated assemblies of Type IV-A, IV-B or IV-C construction shall be protected for the time associated with the *fire-resistance rating*. Protection time shall be determined by one of the following:

1. Testing in accordance with Section 703.2 where the connection is part of the *fire-resistance* test.
2. Engineering analysis that demonstrates that the temperature rise at any portion of the connection is limited to an average temperature rise of 250°F (139°C), and a maximum temperature rise of 325°F (181°C), for a time corresponding to the required *fire-resistance* rating of the structural element being connected. For the purposes of this analysis, the connection includes connectors, fasteners and portions of wood members included in the structural design of the connection.

Reason Statement: Revise title and description of section requirements to avoid using the term "fire-resistance rating" as it applies to connections. The provisions of Section 2304.10.1 are for determining fire protection of connections; there is no standardized test for establishing a fire-resistance rating of a connection in and of itself. This change clarifies the code intent that connections are required to be protected for the time associated with the fire-resistance rating, as required by Sections 704.2 and 704.3.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change clarifies the requirements for fire protection of connections.

S211-22

S212-22

IBC: 2304.10.1, AWC Chapter 35 (New)

Proponents: Jason Smart, representing American Wood Council (jsmart@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2304.10.1 Connection fire-resistance rating. *Fire-resistance* ratings for connections in Type IV-A, IV-B or IV-C construction shall be determined by one of the following:

1. Testing in accordance with Section 703.2 where the connection is part of the *fire-resistance* test.
2. Engineering analysis in accordance with the AWC FDS or other approved method that demonstrates that the temperature rise at any portion of the connection is limited to an average temperature rise of 250°F (139°C), and a maximum temperature rise of 325°F (181°C), for a time corresponding to the required *fire-resistance* rating of the structural element being connected. For the purposes of this analysis, the connection includes connectors, fasteners and portions of wood members included in the structural design of the connection.

Add new standard(s) as follows:

AWC

American Wood Council
222 Catoctin Circle SE, Suite 201
Leesburg, VA 20175

AWC FDS-2022	Fire Design Specification (FDS) for Wood Construction

Staff Analysis: A review of the standard proposed for inclusion in the code, AWC FDS-2022 Fire Design Specification (FDS) for Wood Construction, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: A reference is added in 2304.10.1(2) to the American Wood Council Fire Design Specification (FDS), which includes provisions for the design of fire protection for wood connections. The Fire Design Specification is available on AWC's website (https://awc.org/codes-standards/publications/fds-2021) and is being developed as an AWC standards in accordance with AWC's consensus standards development process. Completion is anticipated to occur prior to the Public Comment Hearing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal provides a reference to the AWC FDS, which contains provisions that provide an acceptable means by which the analysis in 2303.10.1(2) may be performed; however, it does not necessarily preclude the use of other analysis methods.

S212-22

S213-22

IBC: TABLE 2304.10.2

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

2021 International Building Code

Revise as follows:

TABLE 2304.10.2 FASTENING SCHEDULE

Portions of table not shown remain unchanged.

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[g]	SPACING AND LOCATION	
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]			
		Edges (inches)	**Intermediate supports (inches)**
30. $^{3}/_{8}'' - ^{1}/_{2}''$	6d common or deformed (2″ × 0.113″); or $2^{3}/_{8}''$ × 0.113″ nail (subfloor and wall)	6	12
	8d common or deformed ($2^{1}/_{2}''$ × 0.131″× 0.281″ head) nail (roof) ; or RSRS-01 ($2^{3}/_{8}''$ × 0.113″ × 0.281″ head) nail (roof)[d]	6[e]	6[e]
	$1^{3}/_{4}''$ 16 gage staple, $^{7}/_{16}''$ crown (subfloor and wall)	4	8
	$2^{3}/_{8}''$ × 0.113″× 0.266″ head nail (roof)	3[f]	3[f]
	$1^{3}/_{4}''$ 16 gage staple, $^{7}/_{16}''$ crown (roof)	3[f]	3[f]
31. $^{19}/_{32}'' - ^{3}/_{4}''$	8d common ($2^{1}/_{2}''$ × 0.131″); or deformed (2″ × 0.113″) (subfloor and wall)	6	12
	8d common or deformed ($2^{1}/_{2}''$ × 0.131″ × 0.281″ head) nail (roof) ; or RSRS-01 ($2^{3}/_{8}''$ × 0.113″ × 0.281″ head) nail (roof)[d]	6[e]	6[e]
	$2^{3}/_{8}''$ × 0.113″× 0.266″ head nail; or 2″ 16 gage staple, $^{7}/_{16}''$ crown	4	8

For SI: 1 inch = 25.4 mm.

a. Nails spaced at 6 inches at intermediate supports where spans are 48 inches or more. For nailing of wood structural panel and particleboard diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.

b. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).

c. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule and the ceiling joist is fastened to the top plate in accordance with this schedule, the number of toenails in the rafter shall be permitted to be reduced by one nail.

d. RSRS~~-01~~ is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

e. Tabulated fastener requirements apply where the ultimate design wind speed is less than 140 mph. For wood structural panel roof sheathing attached to gable-end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ultimate design wind speed is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C. Spacing exceeding 6 inches on center at intermediate supports shall be permitted where the fastening is designed per the AWC NDS. Where the specific gravity of the wood species used for roof framing is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, fastening of roof sheathing shall be with RSRS-03 (2-1/2″× 0.131″× 0.281″head) nails unless alternative fastening is designed in accordance with AWC NDS. Where the specific gravity of the wood species used for roof framing is less than 0.35, fastening of the roof sheathing shall be designed in accordance with AWC NDS.

f. Fastening is only permitted where the ultimate design wind speed is less than or equal to 110 mph and where fastening is to wood framing of a species with specific gravity greater than or equal to 0.42 in accordance with AWC NDS.

g. Nails and staples are carbon steel meeting the specifications of ASTM F1667. Connections using nails and staples of other materials, such as stainless steel, shall be designed by acceptable engineering practice or approved under Section 104.11.

Reason Statement: Fastening of roof sheathing to resist wind uplift forces per ASCE 7-16 and to agree with 2018 Wood Frame Construction Manual tables is based on wood framing of species with specific gravity equal to 0.42 (per proposal S173-19). For applications using species with lower specific gravity as wood roof framing (i.e., specific gravity less than 0.42 but equal to or greater than 0.35), the footnote is expanded to require use of the RSRS-03 nail unless alternative fastening is designed. The use of RSRS-03 nail (a standard ring shank nail) will maintain the same fastener spacing recommendations within the scope of applicability which is up to 140 mph wind speed. Engineered design of the fastening is required when specific gravity of the wood species used for roof framing is less than 0.35. Footnote f is revised to recognize the 0.42 specific gravity limit in addition to the existing wind speed limit of 110 mph for the prescribed nail and staple where used for roof sheathing fastening.

Cost Impact: The code change proposal will increase the cost of construction
Increased cost of construction will occur where low specific gravity wood species are used. For wood species with specific gravity of 0.35, the added ring shank nail option for resisting ASCE 7 wind uplift forces will provide equivalent withdrawal performance to the 0.42 specific gravity and smooth nail basis of the existing fastening schedule without requiring engineered design.

S214-22

IBC: TABLE 2304.10.2

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

2021 International Building Code

Revise as follows:

TABLE 2304.10.2 FASTENING SCHEDULE

Portions of table not shown remain unchanged.

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[g]	SPACING AND LOCATION	
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]			
		Edges (inches)	**Intermediate supports (inches)**
31. $^{19}/_{32}''$ – $^{3}/_{4}''$	8d common ($2^{1}/_{2}'' \times 0.131''$); or deformed ($2'' \times 0.113''$) (subfloor and wall)	6	12
	8d common or deformed ($2^{1}/_{2}'' \times 0.131'' \times 0.281''$ head) (roof) or RSRS-01 ($2^{3}/_{8}'' \times 0.113''$) nail (roof)[d]	6[e]	6[e]
	$2^{3}/_{8}'' \times 0.113'' \times 0.266''$ head nail; or 2″ 16 gage staple, $^{7}/_{16}''$ crown (subfloor and wall)	4	8

For SI: 1 inch = 25.4 mm.

a. Nails spaced at 6 inches at intermediate supports where spans are 48 inches or more. For nailing of wood structural panel and particleboard diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.

b. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).

c. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule and the ceiling joist is fastened to the top plate in accordance with this schedule, the number of toenails in the rafter shall be permitted to be reduced by one nail.

d. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

e. Tabulated fastener requirements apply where the ultimate design wind speed is less than 140 mph. For wood structural panel roof sheathing attached to gable-end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ultimate design wind speed is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C. Spacing exceeding 6 inches on center at intermediate supports shall be permitted where the fastening is designed per the AWC NDS.

f. Fastening is only permitted where the ultimate design wind speed is less than or equal to 110 mph.

g. Nails and staples are carbon steel meeting the specifications of ASTM F1667. Connections using nails and staples of other materials, such as stainless steel, shall be designed by acceptable engineering practice or approved under Section 104.11.

Reason Statement: Clarify applicability of 0.113" nail and staple fastener type to subfloor and wall applications consistent with similar usage of 0.113" nail and staples for thinner sheathing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is a clarification of existing requirements.

S214-22

S215-22

IBC: 2304.10.6, ASTM Chapter 35 (New)

Proponents: Rick Allen, representing ISANTA (rallen@isanta.org)

2021 International Building Code

Revise as follows:

2304.10.6 Fasteners and connectors in contact with preservative-treated and fire-retardant-treated wood. Fasteners, including nuts and washers, and connectors in contact with *preservative-treated* and *fire-retardant-treated wood* shall be in accordance with Sections 2304.10.6.1 through 2304.10.6.4. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A153 Class D or ASTM A641 Class 3S [1 oz/ft² (305 g/m²)]. Stainless steel driven fasteners shall be in accordance with the material requirements of ASTM F1667.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M-19 Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard currently in the IRC. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, ASTM A641/A641M-2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Rationale: Galvanized nails are made from wire. The wire may be uncoated or galvanized. Nails that are made from uncoated wire are hot-dip galvanized after forming to specification A153 Class D which provides a minimum average coating weight of 1 oz./ft². Nails that are made from galvanized wire are made from wire coated to specification A641 Class 3S which provides a minimum average coating weight of 1 oz/ft².
Although commercially available and used for many years, Class 3S was added to Specification A641 in 2019

Specification A641 Class 3S was added to ASTM F1667 in 2020.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
proposal will not add or reduce cost. proposal aligns with current industry practices

S215-22

S216-22

IBC: 2304.10.6 (New)

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Add new text as follows:

2304.10.6 Fastening of cladding through foam plastic insulating sheathing to wood members. Cladding and furring connections through foam plastic *insulating sheathing* to wood framing shall be in accordance with Section 2603.13.

Reason Statement: Fastening requirements for cladding and components attached to wood framing through a layer of foam sheathing must be addressed in accordance with Section 2603.13. These are relatively new requirements and are important for proper, code-compliant use of foam sheathing materials on wood construction. But, they are located in different places of the code and experience indicates that many users don't readily connect together these requirements. This proposal does not add any new requirement, it simply makes the code more transparent.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies requirements and adds no new requirement or cost.

S216-22

S217-21

IBC: 2304.11.1.1

Proponents: Jonathan Siu, Self, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov)

2021 International Building Code

Revise as follows:

2304.11.1.1 Columns. Minimum dimensions of columns shall be in accordance with Table 2304.11. Columns shall be ~~continuous or superimposed throughout all stories and~~ connected in an *approved* manner. <u>Columns shall be continuous or superimposed throughout all stories of Type IV-HT construction.</u> Girders and beams at column connections shall be closely fitted around columns and adjoining ends shall be cross tied to each other, or intertied by caps or ties, to transfer horizontal *loads* across joints. Wood bolsters shall not be placed on tops of columns unless the columns support roof *loads* only. Where traditional heavy timber detailing is used, connections shall be by means of reinforced concrete or metal caps with brackets, by properly designed steel or iron caps, with pintles and base plates, by timber splice plates affixed to the columns by metal connectors housed within the contact faces, or by other *approved* methods.

Reason Statement: 2021 IBC Section 2304.11.1.1 requires continuous column lines for all heavy timber construction types (IV-A, IV-B, IV-C, IV-HT). That is, columns must line up vertically, from foundation to roof—no transfers of column loads via slabs or beams to other columns are permitted. This puts unnecessary restrictions on the structural design of all mass timber buildings. This historical limitation on column load transfers intended for "traditional" heavy timber construction is not justified for the new Types IV-A, IV-B, or IV-C construction, nor should load transfer be restricted for podium construction in Section 510.
This proposal solves the problem by allowing column load transfers to occur in Types IV-A/B/C construction and in podium construction by specifying the restriction on column load transfers only applies to Type IV-HT construction ("traditional" heavy timber).

I believe this is an issue the ICC Ad-Hoc Committee on Tall Wood Buildings (TWB) overlooked in their deliberations when they wrote the new provisions for mass timber in the 2021 IBC. While the TWB discussed many fire/life safety and structural issues, they did not delve deeply into the structural detailing provisions existing in the code, so this issue was not identified.

Background:

IBC Section 2304.11 governs the sizes and some of the structural detailing requirements for heavy timber. All mass timber is required to comply with this section (see the definition for Mass Timber, and Section 602.4). Section 2304.11.1.1 deals with the detailing for columns. As written in the current code, the second sentence essentially requires heavy timber column lines to be continuous vertically, from foundation to roof:

- "Columns shall be <u>continuous or superimposed throughout all stories</u> and connected in an *approved* manner [emphasis mine]."

"Continuous or superimposed" means column loads cannot be transferred horizontally via beams of any material (fire-resistance rated or not) to other columns, or by a concrete transfer slab to columns or walls. In podium construction (Section 510.2), the continuity requirement plus a literal reading of "throughout all stories" dictates steel or concrete columns are required to be placed in the Type IA podium under every heavy timber column, and continue through the podium to the foundation.

The column continuity requirement has been in the codes for many decades, including the 1956 edition of the Seattle Building Code, which I presume was based on a legacy code. I did not research further back than that.

Discussion:

From a purely structural engineering standpoint, there is no reason for this restriction. Any transfer beam or slab would have to be designed for the loads in accordance with the structural provisions in the code. Transfer beams, girders, and slabs are common in all types of construction.

From a fire protection standpoint, an argument can be made for requiring column continuity for "traditional" heavy timber construction (Type IV-HT), where there is no requirement for fire-resistance ratings for connections. For example, if a transfer beam were supporting a column supporting multiple stories, the failure of a single unprotected transfer beam connection could trigger a multi-story collapse. While this proposal is not eliminating the requirement, it is noteworthy that no other type of construction has this requirement for column continuity. For example, steel transfer beams supporting columns are allowed in all types of construction, as long as the beams and connections are provided with the required fire-resistance rating. Unprotected steel transfer beams and connections are allowed in Types IIB, IIIB, and VB construction.

In Types IV-A, -B, and -C construction, the connections <u>are</u> required to have a fire-resistance rating (see AWC/NDS Section 16.1). For mass timber, wood char is allowed to account for some of the protection in Types IV-A and -B construction, and all of the protection in Type IV-C. Since the connections have a fire-resistance rating, there is not the same potential for failure described above for Type IV-HT. It does not make sense from a fire protection standpoint that loads cannot be transferred horizontally where there is rated construction. Steel and concrete beams are allowed to support columns, provided the beams, including their connections, are appropriately protected. There is no reason to treat fire-resistance-rated mass timber differently.

Some states, including the State of Washington, have adopted these provisions into their current codes. As these new types of construction are being explored by design professionals, they are posing questions to local building officials or requesting interpretations for issues that do not appear to have been covered in TWB discussions. This code change proposal is intended to address one of those questions by clarifying the application of the code through limiting the historical requirement for column continuity to “traditional” Type IV-HT construction, where it was originally intended to apply.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this is a clarification in the application of the code provisions, there is no increase or decrease in the cost of the construction.

S217-21

S218-22

IBC: 2305.1, 2305.1.2 (New)

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2305.1 General. Structures using wood~~-frame~~ *shear walls* or wood~~-frame~~ *diaphragms* to resist wind, and seismic ~~or other lateral~~ *loads* shall be designed and constructed in accordance with AWC SDPWS and the applicable provisions of Sections 2305, 2306 and 2307.

Add new text as follows:

2305.1.2 Permanent load duration. Permanent loads are associated with permanent load duration as defined by the ANSI/AWC NDS. For wood shear walls and wood diaphragms designed to resist loads of permanent load duration, the design unit shear capacities shall be taken as the AWC SDPWS nominal unit shear capacities, multiplied by 0.2 for use with *Allowable Stress Design* in Section 2306 and 0.3 for use with *Load and Resistance Factor Design* in Section 2307.

Reason Statement: Proposal revises Section 2305.1 to use “wood shear walls” and “wood diaphragms” instead of “wood-frame” shear walls and diaphragms to account for both wood-frame and cross-laminated timber shear walls and diaphragms in AWC SDPWS. Reference to the SDPWS is appropriate for design of wood shear walls and diaphragms to resist wind and seismic, but for resistance to permanent lateral loads, such as soil loads in foundation design, the nominal unit shear capacities in SDPWS need further reduction to account for long-term effects. Permanent loads are associated with permanent load duration as defined by ANSI/AWC NDS.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change clarifies applicability of SDPWS reference for wood shear walls and wood diaphragms and provides requirements for use of SDPWS values for permanent load applications.

S218-22

S219-22

IBC: TABLE 2308.6.3(1)

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

2021 International Building Code

Revise as follows:

TABLE 2308.6.3(1) BRACING METHODS

Portions of table not shown remain unchanged.

METHODS, MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA[a]	
			Fasteners	Spacing
GB Gypsum board (Double sided)	1/2″ or 5/8″ by not less than 4′ wide to studs at maximum of 24" o.c.		Section 2506.2 for exterior and interior sheathing: 5d ~~annual ringed~~ cooler nails (1 5/8″ × 0.086″) or 1 1/4″ screws (Type W or S) for 1/2″ gypsum board or 1 5/8″ screws (Type W or S) for 5/8″ gypsum board	For all braced wall panel locations: 7″ o.c. along panel edges (including top and bottom plates) and 7" o.c. in the field

For SI: 1 foot = 304.8 mm, 1 degree = 0.01745 rad.

a. Method LIB shall have gypsum board fastened to one or more side(s) with nails or screws

Reason Statement: The term "annual ringed" is incorrect an may have been intended to describe "annular ringed". However, "5d cooler nails" are commonly prescribed for gypsum board attachment and likely intended over "annular ringed" for consistency with nail descriptions in Table 2508.6 and Tables 721.1(1), 721.1(2), and 721.1(3). 5d cooler nails are also prescribed for gypsum board bracing at interior locations per Table R602.10.4 and R702.3.5.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is a clarification that leads to consistent nail description for this application.

S219-22

S220-22

IBC: 2306.1.3, 2306.1.4 (New)

Proponents: Jason Smart, representing American Wood Council (jsmart@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2306.1.3 Preservative-treated wood allowable stresses ~~stress adjustments~~. The allowable unit stresses for *preservative-treated wood* conforming to AWPA U1 and M4 need not be adjusted for treatment, but are subject to other adjustments. Load duration factors greater than 1.6 shall not be used in the structural design of *preservative-treated wood* members.
~~The allowable unit stresses for fire-retardant-treated wood, including fastener values, shall be developed from an approved method of investigation that considers the effects of anticipated temperature and humidity to which the fire-retardant-treated wood will be subjected, the type of treatment and the redrying process. Other adjustments are applicable except that the impact load duration shall not apply.~~

Add new text as follows:

2306.1.4 Fire-retardant-treated wood allowable stresses.. The allowable unit stresses for *fire-retardant-treated wood*, including connection design values, shall be developed in accordance with the provisions of Section 2303.2.5. Load duration factors greater than 1.6 shall not be used in the structural design of *fire-retardant-treated wood* members.

Reason Statement: Provisions pertaining to fire-retardant-treated wood are broken into a separate section from those pertaining to preservative-treated wood, due to the fact that they are handled differently. Adjustments for treatment are not necessary for preservative treated wood conforming with AWPA U1 and M4, whereas adjustments are necessary for fire-retardant-treated wood. The scope of existing Section 2306.1.3 is narrowed to address only preservative-treated wood.
A new Section 2306.1.4, referencing the applicable provisions in Section 2305.2.5, is created to address fire-retardant-treated wood.

A new sentence is added to both sections stating that load duration factors, as used in the NDS, shall not exceed 1.6. This clarifies the current prohibition on use of the impact load duration factor and provides consistency with AWC NDS provisions for both preservative-treated wood and fire-retardant-treated wood.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change provides clarification of the requirements consistent with the intent of existing code provisions and referenced standards.

S220-22

S222-22

IBC: SECTION 202 (New), 2308.2.7 (New), 2308.2

Proponents: Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov); J Daniel Dolan, representing Seismic Code Support Committee (jddolan@wsu.edu)

2021 International Building Code

Add new definition as follows:

[BS] CRIPPLE WALL CLEAR HEIGHT. The vertical height of a cripple wall from the top of the foundation to the underside of floor framing above.

Add new text as follows:

2308.2.7 Hillside light-frame construction. Design in accordance with Section 2308.1.1 shall be provided for the floor immediately above the *cripple walls* or post and beam systems and all structural elements and connections from this floor down to and including connections to the foundation and design of the foundation to transfer lateral loads from the framing above in buildings where all of the following apply:

1. The grade slope exceeds 1 unit vertical in 5 units horizontal where averaged across the full length of any side of the building, and
2. The tallest *cripple wall clear height* exceeds 7 feet (2134 mm), or where a post and beam system occurs at the building perimeter, the post and beam system tallest post clear height exceeds 7 feet (2134 m), and
3. Of the total plan area below the lowest framed floor, whether open or enclosed, less than 50 percent is *occupiable space* having interior wall finishes conforming to Section 2304.7 or Chapter 25 of this code.

Exception: Light-frame buildings in which the lowest framed floor is supported directly on concrete or masonry walls over the full length of all sides except the downhill side of the building are exempt from this provision.

Revise as follows:

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of *conventional light-frame construction*, subject to the limitations in Sections 2308.2.1 through ~~2308.2.6~~ 2308.2.7.

Reason Statement: This proposal provides correlation between the prescriptive provisions of IBC Section 2308 and the provisions of IRC Section R301.2.2.6 Item 8, added in the 2021 IRC with the intent of improving the seismic performance of wood-light-frame hillside buildings. A related modification has been made in ASCE/SEI 7-22 to provide additional guidance to engineers designing wood light-frame hillside buildings.
As part of work contributing to *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings Volume 1 - Prestandard* (FEMA P-1100, 2018), it was identified that for light-frame buildings on steep hillsides (Figure 1), adequate seismic performance does not occur when seismic design is based on typical seismic force distribution assumptions (tributary area, flexible diaphragm). Whether loading is in the cross-slope or out-of-hill direction (Figure 2), seismic forces follow the stiffest load path to the uphill foundation, rather than distributing uniformly to all the bracing walls in the way assumed in development of IBC Section 2308 seismic bracing provisions. For this reason, design using the IBC Section 2308 bracing provisions will not provide adequate seismic performance. This change proposal triggers an engineered lateral force design for the lower portion of hillside buildings by adding the hillside building configuration to the already existing list of Section 2308.2 limitations.

This building configuration was illustrated to be vulnerable in the 1994 Northridge, California Earthquake. The Earthquake Spectra Northridge Earthquake Reconnaissance Report (Volume 2, EERI, 1996) reported 117 significantly damaged hillside buildings of the bearing wall type and 40 of the post and beam (stilt) type. Fifteen dwellings were reported to have collapsed or were so near collapse that they were immediately demolished and another fifteen came close to collapsing. HUD (1994) also reported significant damage to hillside buildings. As examples of vulnerable hillside building performance, Figure 3 illustrates a building that pulled about six inches away from the uphill foundation, but did not collapse, and Figure 4 illustrates one of the buildings that collapsed in the 1994 earthquake.

Blaney et. Al. (2018) illustrates results from numerical studies used in development of FEMA P-1100. Figure 18 of this reference indicates that for a studied hillside building, the probability of collapse in the risk-adjusted maximum considered earthquake (MCE_R) was reduced by more than a factor of seven by changing from typical prescriptive bracing practice to an engineered methodology that considered the seismic response. More background on building past performance and the numerical studies are found in FEMA P-1100.

The Item 1 grade slope trigger is used to limit applicability of this provision to buildings that are on sites with a significant slope (Figure 5). Averaging the grade slope along the side of the building is intended to focus on the overall drop in grade elevation across the building and not trigger the irregularity based only on limited areas of higher grade slope. This is consistent with the numerical studies that form the basis of this proposal. For most buildings this criterion will be evaluated by looking at each of the four primary elevations. For large and more complex buildings, additional “sides” will need to be evaluated.

Item 2 adds a second trigger of downhill cripple wall height greater than 7’-0” (Figure 6) or downhill post clear height in post and pier building (Figure 7) based on the FEMA P-1100 numerical studies. The studies showed that for buildings with cripple walls greater than 7’-0” prescriptive design can lead to significantly diminished seismic performance. The reduction in performance was not as great with cripple walls of seven feet or less.

Item 3 adds a trigger where a significant portion of the underfloor area does not have interior finishes, as the strength and stiffness of seismic bracing are significantly diminished when interior finish materials are not present. Figure3 shows a dwelling where none of the underfloor area is enclosed. Figure 1 shows a dwelling where 100% of this underfloor area is enclosed. If this has interior finishes than Item 3 would not be applicable. If Figure 1 does not have interior finished then Item 3 would be applicable.

All three items must be applicable in order for dwelling to require engineered design. These triggers were observed to be the points at which damage and displacements at the uphill foundation were thought to significantly increase the likelihood of collapse.

The exception scopes out engineered design of hillside buildings that have full-height concrete or masonry walls (Figure 8) because this configuration was not part of the numerical studies that form the basis of this proposal. For a building with a simple rectangular floor plan, full height concrete or masonry walls would need to occur on three sides to qualify for the exception. For a more complex building plan configuration, additional concrete or masonry walls would be required to qualify for the exception. Buildings are permitted to have doors and windows in the concrete or masonry walls and still qualify for the exception. In all buildings the concrete or masonry walls will need to conform to applicable IBC provisions.

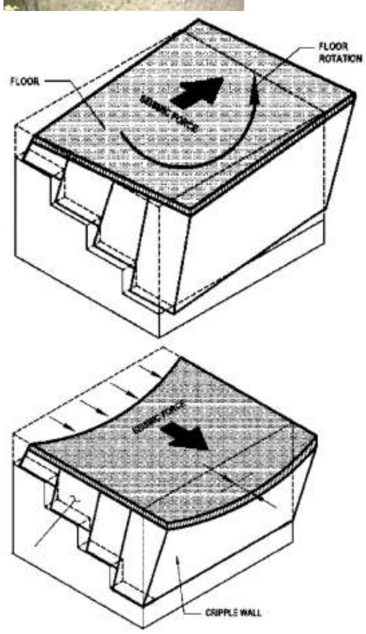


Figure 1 Hillside light-frame structure.   Figure 2. Hillside structure cross-slope and out-of-hill loading.

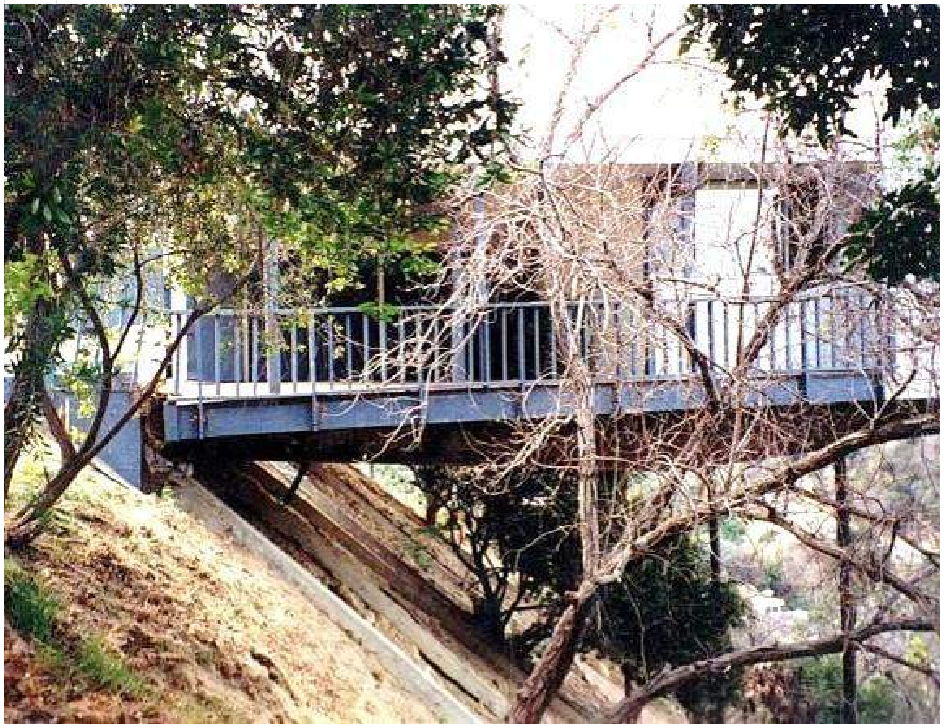


Figure 3. Hillside building pulled away from uphill foundation in the 1994 Northridge, California Earthquake (Credit: City of Los Angeles Department of Building and Safety). Red arrow shows location where floor framing has pulled six to eight inches away from the uphill foundation.

Figure 4. Hillside building collapse in the 1994 Northridge, California Earthquake (Credit: City of Los Angeles Department of Building and Safety).

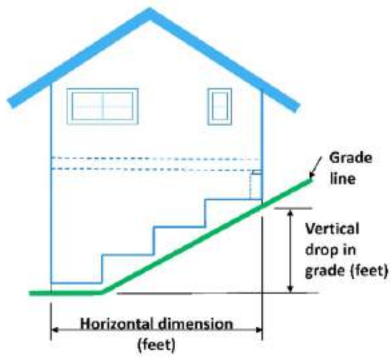


Figure 5. Grade slope triggering the hillside building engineered design exceeds 1 vertical in 5 horizontal across the full width of any side of the building.

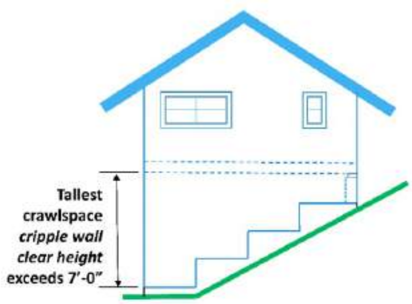


Figure 6. Downhill cripple wall height triggering the hillside building engineered design.

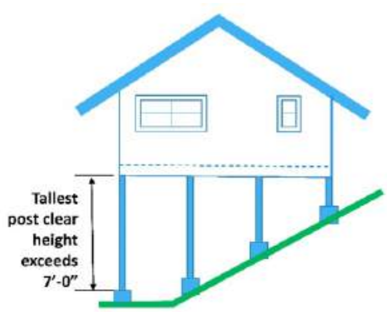


Figure 7. Downhill post height triggering the hillside building engineered design.

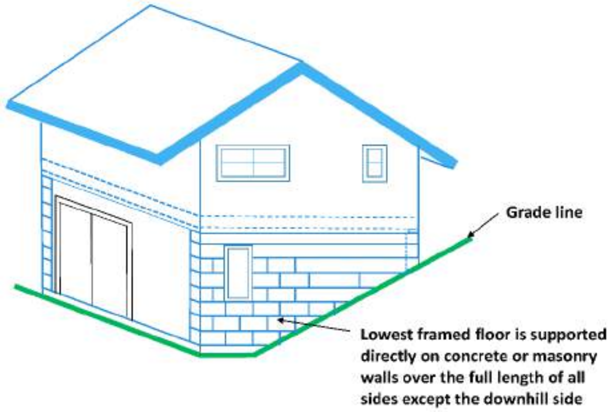


Figure 8. Concrete or masonry wall configuration that does not tripper the hillside building engineered design.

Cost Impact: The code change proposal will increase the cost of construction
This proposal is anticipated to increase the number of dwellings required to have an engineered lateral force design for moderately steep to very steep sites. In regions where these dwellings are believed to already be predominantly engineered, the cost impact is thought to be negligible. In other regions where these dwellings are not predominantly engineered, additional costs will be incurred for engineered design and more robust anchorage to the foundation.

S222-22

S223-22

IBC: 2308.1, 2308.1.1, 2308.1.2, 2308.2, 2308.3 (New), 2308.4 (New), 2308.5 (New), 2308.8, 2308.8.1, 2308.8.2

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

2308.1 General. The requirements of this section are intended for buildings of *conventional light-frame construction* not exceeding the height limitations of Section 2308.2.1. Other construction methods are permitted to be used, provided that a satisfactory design is submitted showing compliance with other provisions of this code. Interior nonload-bearing partitions, ceilings and curtain walls of *conventional light-frame construction* are not subject to the limitations of Section 2308.2. Detached one- and two-family dwellings and townhouses not more than three *stories above grade plane* in height with a separate *means of egress* and their accessory structures shall comply with the *International Residential Code* .

Delete without substitution:

~~**2308.1.1 Portions exceeding limitations of conventional light-frame construction.** Where portions of a building of otherwise *conventional light-frame construction* exceed the limits of Section 2308.2, those portions and the supporting load path shall be designed in accordance with accepted engineering practice and the provisions of this code. For the purposes of this section, the term "portions" shall mean parts of buildings containing volume and area such as a room or a series of rooms. The extent of such design need only demonstrate compliance of the nonconventional light-framed elements with other applicable provisions of this code and shall be compatible with the performance of the conventional light-framed system.~~

~~**2308.1.2 Connections and fasteners.** Connectors and fasteners used in conventional construction shall comply with the requirements of Section 2304.10.~~

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of *conventional light-frame construction*, subject to the limitations in Sections 2308.2.1 through 2308.2.6.

Add new text as follows:

2308.3 Portions or elements exceeding limitations of conventional light frame construction. Where a building of otherwise *conventional light-frame construction* contains portions or structural elements that exceed the limits of Section 2308.2, those portions or elements, and the supporting load path, shall be designed in accordance with accepted engineering practice and the provisions of this code. For the purposes of this section, the term "portions" shall mean parts of buildings containing volume and area such as a room or a series of rooms. The extent of such design need only demonstrate compliance of the nonconventional light-framed elements with other applicable provisions of this code and shall be compatible with the performance of the conventional light-framed system.

2308.4 Structural elements or systems not described herein. Where a building of otherwise conventional construction contains structural elements or systems not described in Section 2308, these elements or systems shall be designed in accordance with accepted engineering practice and the provisions of this code. The extent of such design need only demonstrate compliance of the nonconventional elements with other applicable provisions of this code and shall be compatible with the performance of the conventionally framed system.

2308.5 Connections and fasteners. Connectors and fasteners used in conventional construction shall comply with the requirements of Section 2304.10.

Delete without substitution:

~~**2308.8 Design of elements.** Combining of engineered elements or systems and conventionally specified elements or systems shall be permitted subject to the limits of Sections 2308.8.1 and 2308.8.2.~~

~~**2308.8.1 Elements exceeding limitations of conventional construction.** Where a building of otherwise conventional construction contains structural elements exceeding the limits of Section 2308.2, these elements and the supporting *load* path shall be designed in accordance with accepted engineering practice and the provisions of this code.~~

~~**2308.8.2 Structural elements or systems not described herein.** Where a building of otherwise conventional construction contains structural elements or systems not described in Section 2308, these elements or systems shall be designed in accordance with accepted engineering practice and the provisions of this code. The extent of such design need only demonstrate compliance of the nonconventional elements with other applicable provisions of this code and shall be compatible with the performance of the conventionally framed system.~~

Reason Statement: The purpose of this code change is to emphasize the limitations on story height for conventional construction and to editorially rearrange related sections so they make more sense.
Section 2308 contains prescriptive construction requirements for small wood-frame construction that is outside the scope of the IRC. Just like in the IRC, in order to keep things simple there needs to be limits on things like environmental loads, live and dead loads, number of stories, and sizes of certain building elements. Section 2308.2 provides these limitations. However, the section before that, 2308.1.1, allows "portions" of buildings that exceed these limits to be built as long as the portion is designed. The BCAC believes the intent is to permit exceeding the limits in certain cases, but not to permit exceeding the story height limits of Section 2308.2.1. So the first change adds the limitation in the very first section

that the story limitation of 2308.2.1 is the absolute minimum, just as the IRC does.

Looking at the organization of this section, 2308.1.1 describes what to do when “portions” exceed the limitations. Then 2308.2 describes all the limitations. Then much later in the section, 2308.8 describes what to do when “elements” exceed the limits for Conventional Construction.

It makes more sense to have the limitations at the beginning of the section, and then combine the sections on “portions” and “elements” that exceed the limitations right after that.

The section on “design of elements” seems unrelated enough that it should have its own section, also at the beginning of the Section. Finally, Section 2308.1.2 on Fasteners and Connectors seems like it should not be placed before the limitations of the entire section. It is proposed to move it after the sections on Limitations and design of portions and elements that exceed those limitations.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a clarification of current code requirements.

S223-22

S224-22

IBC: SECTION 2308.3 (New), 2308.3.1 (New), 2308.3.2 (New), 2308.3.2.1 (New), 2308.3.3 (New), 2308.3.4 (New), 2308.3.5 (New), 2308.4.2.4, 2308.5.9, 2308.5.10, 2308.7.4; IPC: 307.2, 307.3 (New), [BS] C101.1, [BS] C101.2, [BS] C101.3; IMC: [BS] 302.3, [BS] 302.3.1, [BS] 302.3.2, [BS] 302.3.3; IFGC: [BS] 302.3, [BS] 302.3.2, [BS] 302.3.3, [BS] 302.3.4

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Add new text as follows:

SECTION 2308.3 CUTTING, NOTCHING AND BORING

2308.3.1 Scope. The provisions of Section 2308.3 shall only apply to dimensional wood framing and shall not include engineered wood products, heavy timber, or pre-fabricated/manufactured wood assemblies.

2308.3.2 Floor joists, roof rafters, and ceiling joists. Notches on framing ends shall not exceed one-fourth the member depth. Notches in the top or bottom of the member shall not exceed one-sixth the depth and shall not be located in the middle third of the span. A notch not more than one-third of the depth is permitted in the top of a rafter or ceiling joist not further from the face of the support than the depth of the member. Holes bored in members shall not be within 2 inches (51 mm) of the top or bottom of the member and the diameter of any such hole shall not exceed one-third the depth of the member. Where the member is notched, the hole shall not be closer than 2 inches (51 mm) to the notch.

2308.3.2.1 Ceiling joists. Where ceiling joists also serve as floor joists, they shall be considered floor joists within this section.

2308.3.3 Wall studs. In *exterior walls* and bearing partitions, a wood stud shall not be cut or notched in excess of 25 percent of its depth. In nonbearing partitions that do not support *loads* other than the weight of the partition, a stud shall not be cut or notched in excess of 40 percent of its depth.

2308.3.4 Bored holes. The diameter of bored holes in wood studs shall not exceed 40 percent of the stud depth. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in nonbearing partitions. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in any wall where each stud is doubled, provided that not more than two such successive doubled studs are so bored. The edge of the bored hole shall not be closer than $^5/_8$ inch (15.9 mm) to the edge of the stud. Bored holes shall not be located at the same section of stud as a cut or notch.

2308.3.5 Limitations. In designated lateral-force resisting system assemblies designed in accordance with this code and greater than three-stories in height or in Seismic Design Categories C, D, E, and F, the cutting, notching and boring of wall studs shall be as prescribed by the registered design professional.
In structures designed in accordance with the International Residential Code, modification of wall studs shall comply with the International Residential Code.

Delete without substitution:

~~**2308.4.2.4 Notches and holes.** Notches on the ends of joists shall not exceed one-fourth the joist depth. Notches in the top or bottom of joists shall not exceed one-sixth the depth and shall not be located in the middle third of the span. Holes bored in joists shall not be within 2 inches (51 mm) of the top or bottom of the joist and the diameter of any such hole shall not exceed one-third the depth of the joist.~~

~~**2308.5.9 Cutting and notching.** In *exterior walls* and bearing partitions, a wood stud shall not be cut or notched in excess of 25 percent of its depth. In nonbearing partitions that do not support *loads* other than the weight of the partition, a stud shall not be cut or notched in excess of 40 percent of its depth.~~

~~**2308.5.10 Bored holes.** The diameter of bored holes in wood studs shall not exceed 40 percent of the stud depth. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in nonbearing partitions. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in any wall where each stud is doubled, provided that not more than two such successive doubled studs are so bored. The edge of the bored hole shall not be closer than~~ $^5/_8$ ~~inch (15.9 mm) to the edge of the stud. Bored holes shall not be located at the same section of stud as a cut or notch.~~

~~**2308.7.4 Notches and holes.** Notching at the ends of rafters or ceiling joists shall not exceed one-fourth the depth. Notches in the top or bottom of the rafter or ceiling joist shall not exceed one-sixth the depth and shall not be located in the middle one-third of the span, except that a notch not more than one-third of the depth is permitted in the top of the rafter or ceiling joist not further from the face of the support than the depth of the member. Holes bored in rafters or ceiling joists shall not be within 2 inches (51 mm) of the top and bottom and their diameter shall not exceed one-third the depth of the member.~~

2021 International Plumbing Code

Revise as follows:

307.2 Cutting, notching and boring of cold-formed steel framing. ~~or bored holes.~~ A cold-formed framing member shall not be cut, notched or bored in excess of limitations specified in the *International Building Code*.

Add new text as follows:

307.3 Cutting, notching and boring of wood framing. The cutting, notching and boring of structural wood framing members shall comply with Section 2308.3 of the *International Building Code.*

Delete without substitution:

~~**[BS] C101.1 Joist notching.** Notches on the ends of joists shall not exceed one-fourth the joist depth. Holes bored in joists shall not be within 2 inches (51 mm) of the top or bottom of the joist, and the diameter of any such hole shall not exceed one-third the depth of the joist. Notches in the top or bottom of joists shall not exceed one-sixth the depth and shall not be located in the middle third of the span.~~

~~**[BS] C101.2 Stud cutting and notching.** In exterior walls and bearing partitions, a wood stud shall not be cut or notched in excess of 25 percent of its depth. In nonbearing partitions that do not support loads other than the weight of the partition, a stud shall not be cut or notched in excess of 40 percent of its depth.~~

~~**[BS] C101.3 Bored holes.** The diameter of bored holes in wood studs shall not exceed 40 percent of the stud depth. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in nonbearing partitions. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in any wall where each stud is doubled, provided that not more than two such successive doubled studs are so bored. The edge of the bored hole shall be notcloser than $^5/_8$ inch (15.9 mm) to the edge of the stud. Bored holes shall not be located at the same section of stud as a cut or notch.~~

2021 International Mechanical Code

Revise as follows:

[BS] 302.3 Cutting, notching and boring in wood framing. The cutting, notching and boring of wood framing members shall comply with Section~~s~~ 2308.3 of the *International Building Code.* ~~302.3.1 through 302.3.4.~~

Delete without substitution:

~~**[BS] 302.3.1 Joist notching.** Notches on the ends of joists shall not exceed one-fourth the joist depth. Holes bored in joists shall not be within 2 inches (51 mm) of the top or bottom of the joist, and the diameter of any such hole shall not exceed one-third the depth of the joist. Notches in the top or bottom of joists shall not exceed one-sixth the depth and shall not be located in the middle third of the span.~~

~~**[BS] 302.3.2 Stud cutting and notching.** In exterior walls and bearing partitions, a wood stud shall not be cut or notched in excess of 25 percent of its depth. In nonbearing partitions that do not support loads other than the weight of the partition, a stud shall not be cut or notched in excess of 40 percent of its depth.~~

~~**[BS] 302.3.3 Bored holes.** The diameter of bored holes in wood studs shall not exceed 40 percent of the stud depth. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in nonbearing partitions. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in any wall where each stud is doubled, provided that not more than two such successive doubled studs are so bored. The edge of the bored hole shall be not closer than $^5/_8$ inch (15.9 mm) to the edge of the stud. Bored holes shall be not located at the same section of stud as a cut or notch.~~

2021 International Fuel Gas Code

Revise as follows:

[BS] 302.3 Cutting, notching and boring in wood members. The cutting, notching and boring of wood framing members shall comply with Section~~s~~ 2308.3 of the *International Building Code.* ~~302.3.1 through 302.3.4.~~

Delete without substitution:

~~**[BS] 302.3.2 Joist notching and boring.** Notching at the ends of joists shall not exceed one-fourth the joist depth. Holes bored in joists shall not be within 2 inches (51 mm) of the top and bottom of the joist and their diameters shall not exceed one-third the depth of the member. Notches in the top or bottom of the joist shall not exceed one-sixth the depth and shall not be located in the middle one-third of the span.~~

~~**[BS] 302.3.3 Stud cutting and notching.** In exterior walls and bearing partitions, any wood stud is permitted to be cut or notched to a depth not exceeding 25 percent of its width. Cutting or notching of studs to a depth not greater than 40 percent of the width of the stud is permitted in nonload-bearing partitions supporting no loads other than the weight of the partition.~~

~~**[BS] 302.3.4 Bored holes.** The diameter of bored holes in wood studs shall not exceed 40 percent of the stud depth. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in nonbearing partitions. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in any wall where each stud is doubled, provided that not more than two such successive doubled studs are so bored. The edge of the bored hole shall be not closer than $^5/_8$ inch (15.9 mm) to the edge of the stud. Bored holes shall not be located at the same section of~~

~~stud as a cut or notch.~~

Staff Analysis: CC# S196-22 and CC# S224-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: This proposal consolidates similar wood cutting, notching and boring criteria from the IFGC, IMC, IPC, and IBC into a single location in the IBC, and does not impose new requirements or restrict any practices currently allowed within the I-Codes. The proposed language draws from current language in the IPC, IMC, and IFGC and IBC provisions in the conventional light-framed section. The existing language was used to the greatest extent possible and relocated to minimize technical changes.
Within the IBC, existing wood framing notching, cutting and boring provisions have been relocated into a single new Section 2308.3. This reorganization into one location makes the IBC provisions easy to find and will provide clear and consistent criteria across all trades on how to field modify framing members and when modification of such members requires input from a design professional.

Structural framing members are frequently modified in the field by non-structural trades, to facilitate the installation of mechanical, electrical, plumbing, and other utilities. Especially in conventional light-framed wood construction, such modifications are rarely overseen by a design professional with knowledge of critical framing elements that should remain unmodified and the role they play within the structure.

It is unrealistic to expect field personnel to continually seek the guidance of a design professional for every framing member requiring modification. However, modifications of critical framing members have the potential to negatively impact the integrity of the structure and the utility systems that rely on that structure for support. The resulting structural deficiencies caused by field modifications to framing members may only be realized during significant high-wind, seismic, impact, or other loading events that, while within the normal structure design criteria, are outside every day operating conditions. At best, such deficiencies may be realized by local deformation of finish materials and at worst, by partial or full collapse of a structure.

Currently, the IFGC, IMC, IPC, and IBC all provide guidance on modification of structural framing elements within the path of utilities. Although the guidance provided by each code is similar, they are not identical in wording or scope and are handled differently within each document.

Differences include but are not limited to:

- IFGC, IMC: The cutting and notching criteria is within the main body of the code.
- IFGC, IMC: Includes direction for wood, steel, cold-formed steel, and non-structural cold-formed steel materials.
- IPC: Points to the IBC for cutting and notching criteria but provides Appendix C as an alternate. · IPC Appendix C
  - Includes some, but not all, cutting and notching criteria and limitations found within the IFGC and IMC.
  - Does not address steel and cold-formed materials.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal consolidates existing and slightly varied provisions from multiple locations into one location within the wood chapter of the International Building Code.

S224-22

S225-22

IBC: 2308.4.4.1, FIGURE 2308.4.4.1(1), 2308.7.6.1

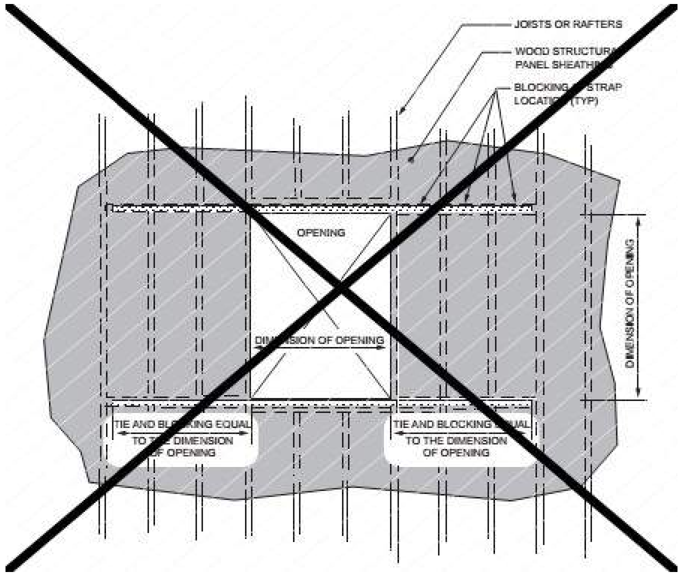
Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

2308.4.4.1 Openings in floor diaphragms in Seismic Design Categories B, C, D and E. Openings in horizontal *diaphragms* in *Seismic Design Categories* B, C, D and E with a dimension that is greater than 4 feet (1219 mm) perpendicular to the joists or rafters shall be constructed with metal ties and blocking in accordance with this section and Figure 2308.4.4.1(1). Metal ties shall be not less than 0.058 inch [1.47 mm (16 galvanized gage)] in thickness by $1^1/_2$ inches (38 mm) in width and shall have a yield stress not less than 33,000 psi (227 Mpa). Blocking shall extend not less than the dimension of the opening in the direction of the tie and blocking. Ties shall be attached to blocking in accordance with the manufacturer's instructions but with not less than eight 16d common nails on each side of the header-~~joist~~ trimmer intersection.

Delete and substitute as follows:



~~FIGURE 2308.4.4.1(1) OPENINGS IN FLOOR AND ROOF DIAPHRAGMS~~

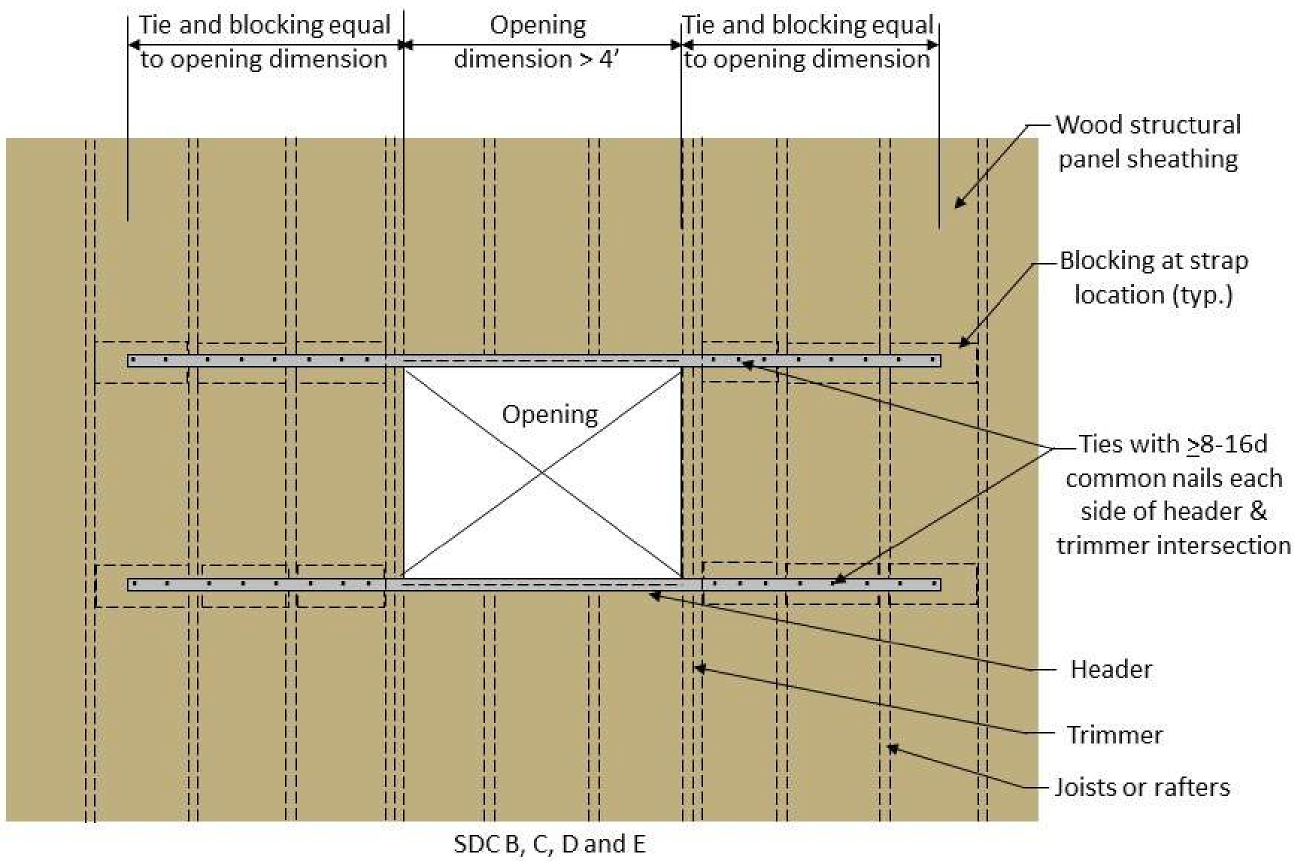


FIGURE 2308.4.4.1(1) OPENINGS IN FLOOR AND ROOF DIAPHRAGMS

Revise as follows:

2308.7.6.1 Openings in roof diaphragms in Seismic Design Categories B, C, D and E. In buildings classified as *Seismic Design Category* B, C, D or E. openings in horizontal *diaphragms* with a dimension that is greater than 4 feet (1219 mm) perpendicular to the joists or rafters shall be constructed with metal ties and blocking in accordance with this section and Figure 2308.4.4.1(1). Metal ties shall be not less than 0.058 inch [1.47 mm (16 galvanized gage)] in thickness by $1^1/_2$ inches (38 mm) in width and shall have a yield stress not less than 33,000 psi (227 Mpa). Blocking shall extend not less than the dimension of the opening in the direction of the tie and blocking. Ties shall be attached to blocking in accordance with the manufacturer's instructions but with not less than eight 16d common nails on each side of the header-~~joist~~ trimmer intersection.

Reason Statement: This proposal clarifies the current code text by adding "perpendicular to the joists or rafters", replaces joist by trimmer and revise Figure 2308.4.4.1(1). The purpose of this prescriptive solution is "to strengthen openings greater than 4 feet in dimension perpendicular to the joists and provide a general means for a load path in these specific cases in lieu of requiring an engineered design." The text of Sections 2308.4.4.1 and 2308.7.6.1 indicates that this provision applies when a floor diaphragm opening exceeds 4 feet. It details blocking and strapping perpendicular to the joists.

Sections 2308.4.4 and 2308.7.6.1 indicate that trimmers are to be doubled when the header span exceeds 4 feet, so the current Figure 2308.4.4.1(1) should be revised to show a double trimmer on each side of the opening. Since those trimmers are typically continuous, they act as collectors on either side of the opening parallel to the joists. Additional revisions to the figure as shown provide consistency with the code text. In summary, proposed changes to Figure 2308.4.4.1(1) include the following:

- Double trimmer shown on each side of the opening
- Remove vertical dimension of the opening
- Add opening dimension >4' perpendicular to joists
- Add nailing requirements as shown based on code text

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of the current code text.

S225-22

S227-22

IBC: 2308.7.5, TABLE 2308.7.5

Proponents: Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Building Code

Revise as follows:

2308.7.5 Wind uplift. The roof construction shall have rafter and truss ties to the wall below. Resultant uplift *loads* shall be transferred to the foundation using a continuous *load* path. The rafter or truss to wall connection shall comply with Tables 2304.10.2 and 2308.7.5.

> <u>**Exception:** The truss to wall connection shall be permitted to be determined from the uplift forces as specified on the *truss design drawings* or as shown on the *construction documents*.</u>

TABLE 2308.7.5 REQUIRED RATING OF APPROVED UPLIFT CONNECTORS (pounds)[a, b, c, e, f, g, h]

~~NOMINAL~~ BASIC DESIGN WIND SPEED, $V_{\cancel{asd}}$ [i]	ROOF SPAN (feet)							~~OVERHANGS (pounds/feet)[d]~~
	12	20	24	28	32	36	40	
EXPOSURE B								
~~85~~ 90	~~-72~~ 64	~~-120~~ 85	~~-145~~ 96	~~-169~~ 107	~~-193~~ 117	~~-217~~ 128	~~-241~~ 139	~~-38.55~~
~~90~~ 100	~~-91~~ 102	~~-151~~ 139	~~-181~~ 158	~~-212~~ 177	~~-242~~ 195	~~-272~~ 214	~~-302~~ 233	~~-43.22~~
~~100~~ 110	~~-131~~ 144	~~-281~~ 199	~~-262~~ 226	~~-305~~ 254	~~-349~~ 282	~~-393~~ 310	~~-436~~ 338	~~-53.36~~
~~110~~ 120	~~-175~~ 190	~~-292~~ 265	~~-351~~ 302	~~-409~~ 339	~~-467~~ 377	~~-526~~ 414	~~-584~~ 452	~~-64.56~~
130	-240	-335	-382	-431	-479	-528	-576	
140	-294	-411	-470	-530	-590	-650	-710	
EXPOSURE C								
90	-126	-175	-199	-223	-247	-272	-296	
100	-179	-250	-285	-320	-356	-391	-426	
110	-238	-332	-380	-428	-476	-525	-573	
120	-302	-424	-485	-547	-608	-669	-731	
130	-371	-521	-597	-674	-751	-828	-904	
140	-446	-628	-719	-812	-904	-997	-1090	
EXPOSURE D								
90	-166	-232	-265	-298	-311	-364	-396	
100	-229	-321	-367	-413	-459	-505	-551	
110	-298	-418	-478	-539	-601	-662	-723	
120	-373	-526	-603	-679	-756	-833	-910	
130	-455	-641	-734	-829	-924	-1020	-1114	
140	-544	-767	-878	-992	-1106	-1220	-1333	

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 1.61 km/hr, 1 pound = 0.454 Kg, 1 pound/foot = 14.5939 N/m.

a. The uplift connection requirements are based on a 33 ~~30~~ foot mean roof height ~~located in Exposure B. For Exposure C or D and for other mean roof heights, multiply the loads by the following adjustment coefficients:~~ .

	~~Mean Roof Height (feet)~~									
~~EXPOSURE~~	~~15~~	~~20~~	~~25~~	~~30~~	~~35~~	~~40~~	~~45~~	~~50~~	~~55~~	~~60~~
~~B~~	~~1.00~~	~~1.00~~	~~1.00~~	~~1.00~~	~~1.05~~	~~1.09~~	~~1.12~~	~~1.16~~	~~1.19~~	~~1.22~~
~~C~~	~~1.21~~	~~1.29~~	~~1.35~~	~~1.40~~	~~1.45~~	~~1.49~~	~~1.53~~	~~1.56~~	~~1.59~~	~~1.62~~
~~D~~	~~1.47~~	~~1.55~~	~~1.61~~	~~1.66~~	~~1.70~~	~~1.74~~	~~1.78~~	~~1.81~~	~~1.84~~	~~1.87~~

b. The uplift connection requirements are based on the framing being spaced 24 inches on center. Multiply by 0.67 for framing spaced 16 inches on center and multiply by 0.5 for framing spaced 12 inches on center.

c. The uplift connection requirements include an allowance for 10 pounds of dead load.

d. The uplift connection requirements ~~do not account for~~ include the effects of 24" overhangs. ~~The magnitude of the loads shall be increased by adding the overhang loads found in the table. The overhang loads are based on framing spaced 24 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.~~

e. The uplift connection requirements are based on wind loading on end zones as defined in Figure 28.3-1 of ASCE 7. Connection loads for connections located a distance of 20 percent of the least horizontal dimension of the building from the corner of the building are permitted to be reduced by multiplying the table connection value by 0.75 ~~and multiplying the overhang load by 0.8~~.

f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 500-pound rated connector is used on the roof framing, a 400-pound rated connector is permitted at the next floor level down).

g. Interpolation is permitted for intermediate values of $V_{\cancel{asd}}$ and roof spans.

h. The rated capacity of approved tie-down devices is permitted to include up to a 60-percent increase for wind effects where allowed by material specifications.

i. $V_{\cancel{asd}}$ shall be determined in accordance with Section 1609.3~~.1~~.

Reason Statement: The reason for this code change is to update the roof to wall connection loads to comply with the IBC referenced wind design standard, ASCE 7-16. The current loads are based on a very old version of ASCE 7. That can be seen by the use of the term V-asd. ASD wind loads have not been used since ASCE 7-10. The wind uplift loads need to be updated to the Ultimate Wind Speeds (now just called Basic Design Wind Speeds) used in ASCE 7-16 (and ASCE 7-22). That way the windspeeds will match the required Basic Design Windspeeds of Figures 1609.3(1) through 1609.3(12).
By adding a Basic Wind Speed down to 90 mph, there will be entries for the new lower Basic Wind Speed maps. Without these entries, users in those areas would have to use the entry for 85 mph V-asd, which converts to nearly 110 mph, meaning they would be overdesigning.

The new exception is added to allow the truss to wall connection to be designed using either the loads on the truss design drawings or the construction documents. That language is meant to be similar to Section R802.11.1, Truss uplift resistance, in the IRC.

This code change will not be affected if ASCE 7-22 is adopted as a referenced standard in the 2024 IBC.

Bibliography: American Wood Council
ANSI/AWC WFCM—2018: Wood Frame Construction Manual for One- and Two-Family Dwellings

ASCE/SEI American Society of Civil Engineers

ASCE 7—16 with Supplement 1: Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Cost Impact: The code change proposal will increase the cost of construction
Depending on the Basic Wind Speed, this code change can either increase or decrease the cost of construction.

In areas with higher Basic Wind Speed, there may be an increase in costs, as the listed wind loads were previously incorrect.

Comparing 110 mph Basic Windspeed to 90 mph ASD, the uplift loads are around 15% greater for common roof spans. That small of a difference frequently will not make a difference in the choice of connector for roof to wall connection.

However, for lower Basic Wind Speed areas, there will be a cost savings. The new table has the benefit of being able to use this table for lower windspeeds as shown in the new Basic Wind Speed Maps, which would not have been possible without these changes. Using the lowest listed V-asd, 85 mph, and then converting to Basic Wind Speeds using Section 1609.3.1, only Basic windspeeds above 110 could be used, because when converted that results in 85 mph V-asd. With the new tables Basic Wind Speeds between less than 110 down to 90 mph will have table entries, so they will have lower costs.

S227-22

S228-22

IBC: 2405.2, 2405.3, 2405.3.1 (New), 2405.3.2 (New), 2405.3.3 (New), 2405.3.4 (New)

Proponents: Jennifer Hatfield, representing Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com)

2021 International Building Code

Revise as follows:

2405.2 Allowable glazing materials and limitations. Sloped glazing shall be any of the following materials, subject to the listed limitations.

1. For monolithic glazing systems, the glazing material of the single light or layer shall be laminated glass with a minimum 30-mil (0.76 mm) polyvinyl butyral (or equivalent) interlayer, wired glass, light-transmitting plastic materials meeting the requirements of Section ~~2607~~ 2606, heat-strengthened glass or fully tempered glass.
2. For multiple-layer glazing systems, each light or layer shall consist of any of the glazing materials specified in Item 1.

Annealed glass is permitted to be used as specified in Exceptions 2 and 3 of Section 2405.3.

Laminated glass and plastic materials described in Items 1 and 2 shall not require the screening or height restrictions provided in Section 2405.3.

For additional requirements for plastic skylights, see Section 2610. Glass-block construction shall conform to the requirements of Section 2110.1.

2405.3 Screening. ~~Where used in monolithic glazing systems, annealed, heat-strengthened, fully tempered and wired glass shall have b~~ Broken glass retention screens , where required, ~~installed below the glazing material. The screens and their fastenings~~ shall be: capable of supporting twice the weight of the glazing; firmly and substantially fastened to the framing members; and installed within 4 inches (102 mm) of the glass. The screens shall be constructed of a noncombustible material not thinner than No. 12 B&S gage (0.0808 inch) with mesh not larger than 1 inch by 1 inch (25 mm by 25 mm). In a corrosive atmosphere, structurally equivalent noncorrosive screen materials shall be used. ~~Annealed, heat-strengthened, fully tempered and wired glass, where used in multiple-layer glazing systems as the bottom glass layer over the walking surface, shall be equipped with screening that conforms to the requirements for monolithic glazing systems.~~

~~**Exception:** In monolithic and multiple-layer sloped glazing systems, the following applies:~~

1. ~~Fully tempered glass installed without protective screens where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane, shall have the highest point of the glass 10 feet (3048 mm) or less above the walking surface.~~
2. ~~Screens are not required below any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.~~
3. ~~Any glazing material, including annealed glass, is permitted to be installed without screens in the sloped glazing systems of commercial or detached noncombustible *greenhouses* used exclusively for growing plants and not open to the public, provided that the height of the *greenhouse* at the ridge does not exceed 30 feet (9144 mm) above grade.~~
4. ~~Screens shall not be required in individual *dwelling units* in Groups R-2, R-3 and R-4 where fully tempered glass is used as single glazing or as both panes in an insulating glass unit, and the following conditions are met:~~

    ~~4.1. Each pane of the glass is 16 square feet (1.5 m^2) or less in area.~~

    ~~4.2. The highest point of the glass is 12 feet (3658 mm) or less above any walking surface or other accessible area.~~

    ~~4.3. The glass thickness is $^3/_{16}$ inch (4.8 mm) or less.~~

5. ~~Screens shall not be required for laminated glass with a 15-mil (0.38 mm) polyvinyl butyral (or equivalent) interlayer used in individual *dwelling units* in Groups R-2, R-3 and R-4 within the following limits:~~

    ~~5.1. Each pane of glass is 16 square feet (1.5 m^2) or less in area.~~

    ~~5.2. The highest point of the glass is 12 feet (3658 mm) or less above a walking surface or other accessible area.~~

Add new text as follows:

2405.3.1 Screens under monolithic glazing. Heat-strengthened glass and fully tempered glass shall have screens installed below the full area of the glazing material.

2405.3.2 Screens under multiple-layer glazing. Heat-strengthened glass, fully tempered glass and wired glass used as the bottom glass layer shall have screens installed below the full area of the glazing material.

2405.3.3 Screening in monolithic and multiple-layer sloped glazing systems. In monolithic and multiple-layer sloped glazing systems, the following applies:

1. Fully tempered glass shall be permitted to be installed without retention screens where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane, and having the highest point of the glass 10 feet (3048 mm) or less above the walking surface.
2. Retention screens are not required below any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.
3. Any glazing material, including annealed glass, is permitted to be installed without retention screens in the sloped glazing systems of commercial or detached noncombustible *greenhouses* used exclusively for growing plants and not open to the public, provided that the height of the *greenhouse* at the ridge does not exceed 30 feet (9144 mm) above grade.
4. Retention screens shall not be required in individual *dwelling units* in Groups R-2, R-3 and R-4 where fully tempered glass is used as single glazing or as both panes in an insulating glass unit, and all of the following conditions are met:
   - 4.1. Each pane of the glass is 16 square feet (1.5 m^2) or less in area.
   - 4.2. The highest point of the glass is 12 feet (3658 mm) or less above any walking surface or other accessible area.
   - 4.3. The glass thickness is $^3/_{16}$ inch (4.8 mm) or less.
5. Retention screens shall not be required for laminated glass with a 15-mil (0.38 mm) polyvinyl butyral (or equivalent) interlayer used in individual *dwelling units* in Groups R-2, R-3 and R-4 where both of the following conditions are met:
   - 5.1. Each pane of glass is 16 square feet (1.5 m^2) or less in area.
   - 5.2. The highest point of the glass is 12 feet (3658 mm) or less above a walking surface or other accessible area.

2405.3.4 Screens not required. For all other types of glazing complying with Section 2405.2, retention screens shall not be required.

Reason Statement: In section 2405.2, this proposal is correcting an inaccurate reference. The current reference to Section 2607 should be replaced with a reference to Section 2606. Section 2606 is where the general requirements and properties for light transmitting plastic are located, which is what item 1 of Section 2405.2 is speaking about. Section 2607, addressing light-transmitting plastic wall panels, is not germane to skylights and sloped glazing, as there are no performance requirements for plastic glazing materials listed in 2607. The performance requirements are in Section 2606.
In section 2405.3, this proposal is simply trying to make the language clearer on when screens are and are not required. There are no changes being made to what is or is not currently required when it comes to screening. The proposal is laying out the section with new subsections, in an attempt to make it easier for both the code user and enforcement, and eliminate interpretation issues that have occurred in the field.

In this proposed re-ordering of section 2405.3, it tells code users first what the screening requirements are, when used. Then in the following subsections, the proposal clearly lays out how screens must be installed for monolithic glazing and multiple layer glazing, followed by a subsection on the exceptions from screening for those types of sloped glazing systems when they meet certain criteria, and ending with a subsection for what types of glazing do not require screening.

Finally, this proposal provides a bit of clean-up and consistency of wording by ensuring in all places the term "retention screen" is used and making changes such as having "conditions are met" in both places instead of different wording.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal will have no effect on the cost of construction as the changes presented are not meant to alter the current requirements but simply meant to provide better clarity and more consistency.

S228-22

S229-22

IBC: 2406.1

Proponents: Thom Zaremba, Roetzel & Andress, representing National Glass Association (tzaremba@ralaw.com); Nicholas Resetar, representing Glazing Industry Code Committee (GICC) (nresetar@ralaw.com)

2021 International Building Code

Revise as follows:

2406.1 Human impact loads. <u>All glass panes in</u> ~~Individual~~ glazed areas, including glass mirrors, <u>single panes of glass and all panes in multi-pane glass assemblies</u> in hazardous locations as defined in Section 2406.4 shall comply with Sections 2406.1.1 through 2406.1.4.

Exception: Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.

Reason Statement: In recent months, the glass industry has received reports of multi-pane glass assemblies imported from outside the United States where the outermost panes are marked as safety glazing, but center pane(s) in these multi-pane assemblies, are annealed glass which breaks dangerously when broken by human impact. Nothing in either safety glazing standard - namely CPSC 16 CFR 1201 and ANSI Z97.1 - prohibits this since they establish acceptance criteria ONLY for individual glass panes, not for multi-panel glass assemblies. Accordingly, the adoption of this proposal is critical to ensure that multi-pane glass assemblies installed in hazardous locations are safe in the event of human impact and to ensure that potentially dangerous annealed panes of glass are not intermingled with safety glazing in multi-pane glass assemblies.

Cost Impact: The code change proposal will increase the cost of construction
For anyone incorporating non-safety annealed glass panes into multi-pane glass assemblies believing that such assemblies can properly be installed in hazardous locations, this proposal will increase the cost of construction. However, it is believed that most multi-pane glass assemblies manufactured in the United States do not follow the practice of incorporating non-safety annealed glass into multi-pane glass assemblies. Consequently, if this proposal is adopted, there should be very little, if any, actual increase in the cost of construction.

S229-22

S230-22

IBC: 2406.4.3

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

2021 International Building Code

Revise as follows:

2406.4.3 Glazing in windows. Glazing in an individual fixed or operable panel that meets all of the following conditions shall be considered to be a hazardous location:

1. The exposed area of an individual pane is greater than 9 square feet (0.84 m^2).
2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor.
3. The top edge of the glazing is greater than 36 inches (914 mm) above the floor.
4. One or more walking surface(s) are within 36 inches (914 mm), measured horizontally and in a straight line, of the plane of the glazing.

Exceptions:

1. Decorative glazing.
2. Where a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965 mm) above the walking surface. The rail shall be capable of withstanding a horizontal *load* of 50 pounds per linear foot (730 N/m) without contacting the glass and be not less than $1^1/_2$ inches (38 mm) in cross-sectional height.
3. Outboard panes in insulating glass units or multiple glazing where the bottom exposed edge of the glass is ~~25~~ 8 feet (~~7620~~ 2438 mm) or more above any grade, roof, walking surface or other horizontal or sloped (within 45 degrees of horizontal) (0.79 rad) surface adjacent to the glass exterior.

Staff Analysis: CC# S230-22 and CC# S231-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: According to the Commentary for IBC Section 2406.4.3, the purpose of safety glazing is to "provide protection where the glazed opening could be mistaken for a passageway or clear opening that someone might be able to walk through, fall into, or otherwise be accidentally forced into." For areas that meet all four criteria listed in Section 2406.4.3, safety glazing is required. The criteria are used to determine whether or not someone could be near the glass, fall into the glass, break the glass, and then fall through the glass.
The provision does have a few exceptions, including decorative glazing and locations where a horizontal rail is present that would act like a guard. These make sense, since the provision is intended to require safety glazing where someone could fall through the glass. The third and final exception, however, is for outboard panes of insulating glass units where the bottom edge of the glass is 25 feet or more above any grade, roof, walking surface, or other horizontal or sloped surface. With a minimum height of 25 feet, this third exception is overly restrictive. Again, the purpose of the safety glazing is to prevent someone from falling through the glass, but in the case of Exception 3, the height at which the exception kicks in is unnecessarily high. The proponent is not aware of any cases where passersby were hovering or flying 8 to 24 feet above any adjacent walking or working surface and managed to fall against and through an insulated glass unit (IGU).

This proposal lowers the height at which the exception can be used to just 8 feet. Even that seems quite high and is more onerous than the requirements for the safety glazing on the interiors of buildings. Nevertheless, it is a reasonable reduction and will effectively limit the area of safety glazing where safety glazing is required on the outboard panes of IGUs to just one story above the any adjacent walking or working surface instead of 25 feet. Further, since fully tempered glass can be vulnerable to breakage due to gradual growth of nickel-sulfide inclusions, it seems reasonable to avoid the use of fully-tempered glass unless necessary from a strength or impact perspective.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal lowers the height at which safety glazing can be omitted from the outboard pane of insulating glass units from 25 feet to 8 feet. So where safety glazing was previously required (e.g., anywhere from 8 to 25 feet above a walking or working surface), no safety glazing will be required in the outboard pane of glass in these areas. Since safety glazing is more expensive than annealed or heat-treated glass, this relaxation of the requirements will lower costs of insulating glass units in this range of height.

S230-22

S231-22

IBC: 2406.4.3

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

2021 International Building Code

Revise as follows:

2406.4.3 Glazing in windows. Glazing in an individual fixed or operable panel that meets all of the following conditions shall be considered to be a hazardous location:

1. The exposed area of an individual pane is greater than 9 square feet (0.84 m^2).
2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor, roof, or adjacent walking surface.
3. The top edge of the glazing is greater than 36 inches (914 mm) above the floor, roof, or adjacent walking surface.
4. One or more walking surface(s) are within 36 inches (914 mm), measured horizontally and in a straight line, of the plane of the glazing.

Exceptions:

1. Decorative glazing.
2. Where a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965 mm) above the walking surface. The rail shall be capable of withstanding a horizontal *load* of 50 pounds per linear foot (730 N/m) without contacting the glass and be not less than $1^1/_2$ inches (38 mm) in cross-sectional height.
3. For insulating glass units or windows with multiple layers of glazing, these requirements pertain only to the layer(s) on the accessible side(s) of the windows. ~~Outboard panes in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 18 inches (457 mm) or more above any adjacent exterior surface. above 25 feet (7620 mm) or more above any grade, roof, walking surface or other horizontal or sloped (within 45 degrees of horizontal) (0.79 rad) surface adjacent to the glass exterior.~~

Staff Analysis: CC# S230-22 and CC# S231-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: According to the Commentary for IBC Section 2406.4.3, the purpose of safety glazing is to "provide protection where the glazed opening could be mistaken for a passageway or clear opening that someone might be able to walk through, fall into, or otherwise be accidentally forced into." For areas that meet all four criteria listed in Section 2406.4.3, safety glazing is required. The criteria are used to determine whether or not someone could be near the glass, fall into the glass, break the glass, and then fall through the glass. The provision also provides three exceptions, but the third exception is complicated, and its intent is not particularly clear.
Rightly or wrongly, engineers and architects are fairly commonly interpreting Exception 3 as triggering the need for safety glazing on the exterior surfaces of the building. This does not appear to be the intent, but the provision is worded so confusingly that we have seen ground-floor, second-floor, and even third-floor windows being specified with or replaced with safety glazing on the exterior surface due to the poor wording of Exception 3. Of course, it makes zero sense to have a more stringent requirement for safety glazing on the exterior surfaces of the building (i.e., up to 25 feet above a roof or walking surface) than on the interior (only where the glass is less than 18 inches above the walking surface). It also makes zero sense to require safety glazing on the exterior when the window is an IGU but not when the glass is single-pane. So something needs to be done. The question is what.

This proposal attempts to fix the existing format and make the requirement blind to whether a fall out of a building, a fall into a building, or a fall through a window that does not result in a person entering or leaving a building (e.g., an interior window with floor walking surface on both sides) is the concern. It recognizes that we probably do want to prevent situations where people on the exterior of the building (whether on a roof or adjacent walking surface) could fall through a window and INTO a building. This seems to be a dramatically less common occurrence than people falling through windows and OUT of a building, but it does appear to be a concern where windows are located at the roof level (e.g., a clerestory) or along a walkway that may be higher than the immediately adjacent floor in the building and a fall into a building could result in serious injury (beyond cuts) from the glass. However, because the existing provision is -- and has always been -- blind to the fall distance, the provision would presumably also need to address the concern of people falling into a building where the interior and exterior walking surfaces are coplanar.

So in this proposal, we suggest adding the words ", roof, or adjacent walking surface" to Conditions 2 and 3, and we are proposing to simplify Exception 3 to explain that for IGUs and window with multiple layers of glass, only the layer(s) on the sides of the window that can be impacted need to be safety glass. Note that the term "accessible" is already used in Exception 2.

So this proposal makes the requirements equal, whether the person could fall OUT through a window; THROUGH a window, but not out of the building; or IN through a window.

Note that another reasonable interpretation could be to assess the possibility of people falling INTO a building as exceedingly rare and not the intent of the original wording at all. Thus we could leave Conditions 2 and 3 alone and just reword Exception 3. Perhaps something along the lines of "**Exception 3. For windows with insulating glass units and windows with multiple layers of glass, these requirements only apply to the layer(s) of glass exposed to potential impact from the floor side(s).**" That, combined with the reason statement of this proposal, should be sufficient to make it clear that there is no intent to address the exceedingly rare occurrence of people falling through windows INTO buildings. To avoid cluttering up the hearing with multiple versions of this proposal, I will propose this secondary option as a Floor Mod.

Cost Impact: The code change proposal will increase the cost of construction
Although the most rational interpretation is that the intent of the current provision is to prevent people falling OUT through a window, Exception 3 is worded so poorly that designers are interpreting it as requiring safety glazing to prevent people from falling INTO a building. Since the consequences of that interpretation are so severe (i.e., glass whose bottom is up to 25 feet high) is being required to be safety glazing, this proposal will result in reduced costs where that interpretation is being taken. Conversely, this proposal will result in increased costs where the interpretation is that the current intent is to prevent people from falling THROUGH windows but only when the fall begins on the inside of the building (and they either end up on the outside of the building or they end up on the interior because they fell through an interior window), and that safety glazing is NOT required for any circumstance when people can fall INTO a building.

In the end, depending on the project, the application, and the interpretation, this proposal may either increase or decrease the cost of construction, and it is not possible to quantify this at all because it depends on all three variables. The best we can do is clean up the language so that the intent is clear (and, in this case, consistent as to whether the concern is people falling out of a building through a window, falling through an interior window but not leaving the building, or falling into a building through a window).

S231-22

S232-22

IBC: 2406.5

Proponents: Thom Zaremba, Roetzel & Andress, representing National Glass Association (tzaremba@ralaw.com); Nicholas Resetar, representing Glazing Industry Code Committee (GICC) (nresetar@ralaw.com)

2021 International Building Code

Revise as follows:

2406.5 Fire department access panels. Fire department glass access panels shall be of tempered glass. For multi-panel glass assemblies ~~insulating glass units~~, all panes shall be tempered glass.

Staff Analysis: CC# S232-22 and CC# S233-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: If adopted, this proposal will make no technical changes to the requirements of Section 2406.1. The proposal is, simply, to make the language of this section of Chapter 24 consistent with another glass industry proposal to update the language of Section 2406.1 to include multi-pane glass assemblies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is entirely editorial and makes no technical changes to the requirements of Section 2406.1. Consequently, there will be no increase or decrease in the cost of construction.

S232-22

S233-21

IBC: 2406.5

Proponents: Jeffrey S Grove, P.E. FSFPE, Jensen Hughes, representing Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

Delete without substitution:

~~**2406.5 Fire department access panels.** Fire department glass access panels shall be of tempered glass. For insulating glass units, all panes shall be tempered glass.~~

Staff Analysis: CC# S232-22 and CC# S233-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: IBC section 403.4.7 permits fixed windows to be used for post-fire smoke purge in high rise buildings if they can be cleared by firefighters. At first glance, section 2406 is intended to coordinate with 403.4.7.
However, section 2406 was added to the 1993 BOCA code in response to concerns presented at the initial code hearing regarding a code change proposal associated with safety glazing. While the term "access panels" did not appear in the 1993 BOCA code (nor does it occur in the current IBC), the language is similar to the requirement for smoke control in high rise buildings that was in the 1990 edition of the BOCA code.

The 1990 edition of the BOCA code required "tempered glass panels or operable windows" for smoke control in high rise buildings. While the requirement for smoke control in high rise buildings was deleted beginning with the 1993 edition of the BOCA code, the language in what is now 2406.5 was added in 1993 to coordinate with the language of the deleted requirement. Given that 2406.3 was added in response to floor action, it was not coordinated with changes made to chapter 4.

The requirement for post fire smoke removal in high rise buildings was reintroduced into the IBC in the 2009 edition (see 403.4.7). The code change proposal that added what is now section 403.4.7 (G64-07/08) stated that tempered glazing could be used. However, the language in G53-07/08 for tempered glazing was removed by the IFC Code Development Committee (see G64-07/06), with the stated reason that "this modification is a clearer statement of the desired performance characteristic of fixed windows."

Research conducted by the U.S. General Services Administration evaluated the ability of firefighters to remove glazing using standard forcible entry tools (axe, hooligan bar, or pike pole). Laminated and untreated glazing was evaluated. Firefighters were able to clear all types of glazing evaluated within 64 seconds or less. (Stone, H. "Forcible Entry Demonstrations – Air-blast Resistant Window Systems," Prepared for General Services Administration, July 10, 2003.)

In brief, it was not the intent of the 1993 edition of the BOCA code to require tempered glazing for fixed windows that were used for smoke control. Additionally, it was not the intent when the requirement for post fire smoke removal was reintroduced in the 2009 edition of the IBC to require tempered glass.

Cost Impact: The code change proposal will decrease the cost of construction
By providing other means of smoke removal from a building, these provisions are no longer necessary.

S233-21

S234-22

IBC: 2409.1

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

2409.1 Glass walkways. Glass installed as a part of a floor/ceiling assembly as a walking surface and constructed with laminated glass shall comply with ASTM E2751 or with the *load* requirements specified in Chapter 16 <u>under the provisions of Section 104.11</u>. Such assemblies shall comply with the *fire-resistance rating* and marking requirements of this code where applicable.

Reason Statement: ASTM E2751 provides an obvious and robust method of compliance. However "or with the load requirements specified in Chapter 16" does not. Structural design has two primary sides: load and resistance. The current option completely leaves resistance requirements unknown and unspecified.
It is obvious that this type of glass walkway scenario would need engineered design to appropriate load resistance standards, but without invoking Section 104.11 it leaves this "option" confusingly specified, such that 104.11 may not be applicable.

Deleting "or with the load requirements specified in Chapter 16" is one possible solution to this problem, but then designs besides ASTM E2751 would need code modifications to overcome impracticality arguments.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal just clarifies that the alternative material, design, and method of construction provisions are applicable where ASTM E2751 is not followed.

S234-22

S235-22

IBC: 2407.1.1

Proponents: Thom Zaremba, Roetzel & Andress, representing National Glass Association (tzaremba@ralaw.com); Nicholas Resetar, representing Glazing Industry Code Committee (GICC) (nresetar@ralaw.com)

2021 International Building Code

Revise as follows:

2407.1.1 Loads. Glass *handrails* and guards and their support systems shall be designed to withstand the *loads* specified in Section 1607.9 . Glass *handrails* and *guards* shall be designed using a factor of safety of four. Calculated stresses for the loads specified in Section 1607.9 shall be less than or equal to 3,000 psi (20.7 MPa) for heat strengthened glass and less than or equal to 6,000 psi (41.4 MPa) for fully tempered glass.

Reason Statement: An often asked question is: "How do you determine whether a glass handrail or guard is designed using a safety factor of four?" This code change proposal is intended to provide guidance to those designing glass handrails or guards to a factor of safety of four.
First, the maximum stress carrying capabilities of the two types of glass that may be used in the design of glass handrails and guards - namely heat strengthened glass and fully tempered glass - must be known. These values are well known and published by the glass industry. (See bibliography). Heat strengthened glass is able to bear stresses of 12,000 psi while fully tempered glass is able to bear stresses of 24,000 psi.
Second, the professional designing the glass handrail or guard must calculate the stresses applicable to the loads specified in Section 1607.9.
Finally, to determine whether the glass handrail or guard will have a safety factor of four, the maximum published stresses for the type of glass being used, either heat strengthened glass or fully tempered glass, must be divided by 4. Those values - namely, 3,000 psi for heat strengthened glass and 6,000 psi for fully tempered glass - must, in turn, be less than or equal to the calculated stresses for the loads specified in Section 1607.9. If they are, the glass handrail or guard will be designed with a safety factor of four since the calculated stresses for the loads required by Section 1607.9 will be 1/4 or less of the stress carrying capability of the type of glass being used in the design.

Bibliography: National Glass Association - NGA Technical Paper FM 05-12 (2018) formerly FGMD 05-1212 (2018).
http://www.glassdynamicsllc.com/temperedglass.html

https://www.scientificamerican.com/article/how-is-tempered-glass-mad/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change will not change the cost of construction. It simply clarifies the glass stress values to be used and compared to the calculated stresses applicable to the loads specified in Section 1607.9 in order to determine whether a glass handrail or guard will achieve a factor of safety of four.

S235-22

S236-22

IBC: 2407.1.1

Proponents: Stephen Kerr, representing Self (skerr@jwa-se.com)

2021 International Building Code

Revise as follows:

2407.1.1 Loads. Glass *handrails* and guards and their support systems shall be designed to withstand the *loads* specified in Section 1607.9 . Glass elements in *handrails* and *guards* shall be designed using a factor of safety of four.

Reason Statement: In guard and handrail applications glass is often used in conjunction with other materials as part of a system. Section 2407.1.1 describes "Glass handrails and guards **and their support systems** shall be designed to withstand the loads specified in Section 1607.9." The purpose of this proposal is to emphasize that it is only the glass that needs to be designed for the safety factor of four. The non-glass support systems that are part of the glass guard should consider the factors of safety for the individual materials (concrete, aluminum, masonry, steel or wood) which are designed in accordance with Chapters 19-24.

IBC Commentary Figure 2407.1 shows several materials as part of the glass guards. The commentary discusses that "Nominally identical glass panels inherently have a wide variation in strength. The safety factor of four is used in the design to minimize the likelihood that breakage will occur below the design loads." This requirement remains unchanged with this proposal. The other elements of a glass handrail or guard system: the top rail or handrail where used in Section 2407.1.2, posts, base shoes or anchors should not be required to have the design factor of safety equal to four, rather factor of safeties based on the material reliability.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of this proposal is editorial. General practice for glass guard systems it to limit the safety factor of four to the glass and not the other materials.

S236-22

S239-22

IBC: TABLE 2508.1, 2508.2, GA Chapter 35 (New)

Proponents: Tim Earl, representing the Gypsum Association (tearl@gbhint.com)

2021 International Building Code

Revise as follows:

TABLE 2508.1 INSTALLATION OF GYPSUM CONSTRUCTION

MATERIAL	STANDARD
Gypsum board and gypsum panel products	GA 216; ASTM C840
Gypsum sheathing and gypsum panel products	ASTM C1280; GA-253
Gypsum veneer base	ASTM C844
Interior lathing and furring	ASTM C841
Steel framing for gypsum board and gypsum panel products	ASTM C754; C1007

2508.2 Limitations. *Gypsum wallboard* or *gypsum plaster* shall not be used in any exterior surface where such gypsum construction will be exposed directly to the weather. *Gypsum wallboard* shall not be used where there will be direct exposure to water or continuous high humidity conditions. *Gypsum sheathing* shall be installed on exterior surfaces in accordance with ASTM C1280 or GA-253.

Add new standard(s) as follows:

GA

Gypsum Association
962 Wayne Avenue, Suite 620
Silver Spring, MD 20910

GA-253-2021 Application of Gypsum Sheathing

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, GA-253-2021 Application of Gypsum Sheathing, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This change will align the IBC with the IRC by adding this GA specification as an alternate to the ASTM standard. In practice there is no difference between the two documents. GA 253 is already referenced in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply adds a reference to an equivalent standard that is already referenced in the IRC.

S239-22

S240-22 Part I

IBC: 2510.6

Proponents: Theresa Weston, representing Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

2510.6 Water-resistive barriers. *Water-resistive barriers* shall be installed as required in Section 1403.2 and, where applied over ~~wood-based~~ exterior sheathing, shall comply with Section 2510.6.1 or 2510.6.2.

S240-22 Part I

S240-22 Part II

IRC: R703.7.3

Proponents: Theresa Weston, representing Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

2021 International Residential Code

Revise as follows:

R703.7.3 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section R703.2 and, where applied over ~~wood-based~~ exterior sheathing, shall comply with Section R703.7.3.1 or R703.7.3.2.

Reason Statement: While drainage is part of the general Weather Protection provisions in 1402.2 (unless a wall system demonstrates compliance under 1402.2 Exception 2), a means of achieving drainage in stucco systems is only explicit for systems over wood-based sheathing. There are other exterior sheathing materials that are sensitive to, and can be deteriorated by water. The provisions for explicit drainage have been included for stucco over wood-based sheathing for many years. While initially these provisions initially addressed stucco cracking due water-absorption by wood-based sheathing. The understanding of the purpose of two layer systems evolved over the years to focus on the drainage that two layer systems provide.[1] The code began including drainage for stucco systems over wood-based sheathing in 2006 and explicitly required drainage between the two layers of water-resistive barrier in 2012. The water management provisions were subsequently expanded to respond to regional climatic challenges. This proposal expands explicit drainage to stucco systems applied over any exterior sheathing. Documented stucco moisture issues have been reported and are not confined to wood-based sheathing systems. The protections provided by these requirements should be afforded to all sheathed construction.

Bibliography: 1) Theresa A. Weston, “Stucco Systems: A Review of Reported Data and Code and Standard Development”, *Proceedings of the 4th Residential Design & Construction Conference*, State College, PA, February 2018
2) Fine Homebuilding Editors, "Home-Building Cyclopedia, Water-Resistive Barriers" https://www.finehomebuilding.com/project-guides/insulation/water-resistive-barriers

3) Brian Pontolilo, "Rainscreen products for Stucco Installations", Green Building Advisor, July 5, 2019, https://www.greenbuildingadvisor.com/article/what-to-install-behind-stucco

4) Dave Barrett, "The Renewal of Trust in Residential Construction, Commission of Inquiry into the Quality of Condominium Construction in British Columbia", June 1998.

Cost Impact: The code change proposal will increase the cost of construction
The proposal will not increase the cost of construction for assemblies with wood-based sheathing, as there are no technical changes for these assemblies. However, the proposal will increase the cost of construction for stucco assemblies containing non-wood-based exterior sheathings. For dry climates the cost will be for adding a second layer of water-resistive barrier to the assembly. Housewrap, which is a representative water-resistive barrier, is estimated to cost $0.17 per square foot.[2] For moist and marine climates, there are a variety of systems which could be used to satisfy the requirements, with estimated costs ranging from $0.30 to $1.90 per square foot.[3] This first cost increase is balanced against potential future costs for remediation if moisture damage occurs. It has been reported that stucco remediation can cost up to 288% of the original cost of the stucco construction.[4]

S240-22 Part II

S241-22 Part I

IBC: 2510.6, 2510.6.1

Proponents: Theresa Weston, representing Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

2510.6 Water-resistive barriers. *Water-resistive barriers* shall be installed as required in Section 1403.2 and, where applied over wood-based sheathing, shall comply with Section 2510.6.1 or 2510.6.2.

Revise as follows:

2510.6.1 Dry climates. One of the following shall apply for dry (B) climate zones:

1. The water-resistive barrier shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of water-resistive barrier complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing, installed in accordance with Section 1404.4 and intended to drain to the water-resistive barrier, is directed between the layers.
2. The *water-resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of *water-resistive barrier* complying with ASTM E2556, Type II. The *water-resistive barrier* shall be separated from the stucco by a layer of foam plastic insulating sheathing or other nonwater absorbing layer~~, or a drainage space.~~ <u>A means of drainage, as prescribed in 1402.2, shall be provided to the exterior side of the water-resistive barrier.</u>

S241-22 Part I

S241-22 Part II

IRC: R703.7.3, R703.7.3.1

Proponents: Theresa Weston, representing Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

2021 International Residential Code

Revise as follows:

R703.7.3 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section R703.2 and, where applied over wood-based sheathing, shall comply with Section R703.7.3.1 or R703.7.3.2.

> **Exception:** Where the *water-resistive barrier* that is applied over wood-based sheathing has a water resistance equal to or greater than that of 60-minute Grade D paper and is separated from the stucco by an intervening, substantially nonwater-absorbing layer or designed drainage space.

R703.7.3.1 Dry climates . In Dry (B) climate zones indicated in Figure N1101.7, *water-resistive barriers* shall comply with one of the following:

1. The *water-resistive barrier* shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of a *water-resistive barrier* complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane. Flashing installed in accordance with Section R703.4 and intended to drain to the *water-resistive barrier* shall be directed between the layers.
2. The *water-resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of a *water-resistive barrier* complying with ASTM E2556, Type II. The *water-resistive barrier* shall be separated from the stucco by a layer of foam plastic *insulating sheathing* or other non-water-absorbing layer~~, or a designed drainage space~~. A means of drainage, as prescribed in R703.1.1, shall be provided to the exterior side of the water-resistive barrier

Reason Statement: This is a clarification of the Dry Climate Option 2 to emphasize that a means of drainage (as required in 1402.2) is included in the design of the water-resistive barrier system. It is consistent with interpretation of 1402.2 included in ICC-ES AC11 Acceptance Criteria for Cementitious Exterior Wall Coatings:

> "Details shall be submitted of a drainage system based on drainage performance testing. The applicant must submit a testing proposal to ICC-ES prior to testing. Precedent for a testing procedure can be found in the ICC-ES Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (AC235), Section 4.10."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal modifies the existing compliance option to describe how the requirements from other code sections are applied when using this option. The proposal improves the alignment between existing code requirements and industry practices.

S241-22 Part II

S242-21

IBC: 2510.6.1

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Myself (joe@buildingscience.com)

2021 International Building Code

Revise as follows:

2510.6.1 Dry climates. One of the following shall apply for dry (B) climate zones:

1. The water-resistive barrier shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of water-resistive barrier complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing, installed in accordance with Section 1404.4 and intended to drain to the water-resistive barrier, is directed between the layers.
2. The *water-resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of *water-resistive barrier* complying with ASTM E2556, ~~Type II~~ Type I. The *water-resistive barrier* shall be separated from the stucco by a layer of foam plastic insulating sheathing or other nonwater absorbing layer, or a drainage space.

Reason Statement: The text in 2. is inconstant with the text in 1. In 1 the two layers of water-resistive barrier need to comply with ASTM E2556, Type I. In 2 there are also two layers….the outer layer is “a layer of foam plastic insulating sheathing or other nonwater absorbing layer, or a drainage space”. The outer layer as defined provides equivalent performance to a single layer of water-resistive barrier complying with ASTM E2556, Type I. The inner layer can therefore also be a layer of water-resistive barrier complying with ASTM E2556, Type I to provide equivalency between 1. and 2. Requiring the water-resistive barrier to comply with ASTM E2556, Type II limits the choice of materials such as fluid applied water-resistive barriers and sheathing integral water-resistive barriers.

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal decreases the cost of construction as Type 1 is less in cost than Type 2.

S242-21

S243-22 Part I

IBC: 2510.6.2

Proponents: Mark Fowler, representing Stucco Manufacturers Association (mark@markfowler.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

2510.6.2 Moist or marine climates. In moist (A) or marine (C) climate zones, *water-resistive barrier* shall comply with one of the following:

1. In addition to complying with Item 1 or 2 of Section 2510.6.1, a space or drainage material not less than $^{3}/_{16}$ inch (4.8 mm) in depth shall be applied to the exterior side of the *water-resistive barrier*.
2. In addition to complying with Item 2 of Section 2510.6.1, drainage on the exterior side of the *water-resistive barrier* shall have a minimum drainage efficiency of 90 percent as measured in accordance with ASTM E2273 or Annex A2 of ASTM E2925.

<u>**Exception:** In Climate Zone 3C, compliance with Section 2510.6.1 shall be permitted</u>

S243-22 Part I

S243-22 Part II

IRC: R703.7.3.2

Proponents: Mark Fowler, representing Stucco Manufacturers Association (mark@markfowler.org)

2021 International Residential Code

Add new text as follows:

R703.7.3.2 Moist or marine climates. In the Moist (A) or Marine (C) climate zones indicated in Figure N1101.7, *water-resistive barriers* shall comply with one of the following:

1. In addition to complying with Section R703.7.3.1, a space or drainage material not less than $^{3}/_{16}$ inch (5 mm) in depth shall be added to the exterior side of the *water-resistive barrier*.
2. In addition to complying with Section R703.7.3.1, Item 2, drainage on the exterior of the *water-resistive barrier* shall have a drainage efficiency of not less than 90 percent, as measured in accordance with ASTM E2273 or Annex A2 of ASTM E2925.

Exception: In Climate Zone 3C, compliance with Section R703.7.3.1 shall be permitted

Reason Statement: Two layers Grade D paper has proven effective since it was introduced into the code back in 1982. the Climate Zone 3C is below the low wind-driven rain region (<16 " annually) and aligns more reasonably with drier climates. It will preserve the stucco markets in Santa Barbara, San Jose and other coastal cities that are large stucco proven markets using two layers Grade D paper over wood-based sheathings.

Bibliography: Mark Fowler
Executive Director of the Stucco Manufacturers Assoc. , Author of the Plaster and Drywall Systems Manual, Northwest wall and Ceiling Bureau Stucco Resource Guide, over 100 technical papers on Cement plaster and organizational member of ASTM C 1063 and C 926 , as well as ACI 524. past chairman of the California State Apprenticeship committee for Plaster Tenders and on the committee for plastering.

Licensed lath and Plastering contractor (CSLB C35 1983) and registered in the Industry Expert Program by the state.

Editorial Director for Walls and Ceilings Magazine, the oldest trade magazine in the US for wall and ceiling trades

Project Manager at Soltner Group Architects in Seattle, WA. Specialized in Building Envelope failures for the Northwest

The SMA proposal has the support of its membership , that include SMA manufacturers, contractors and dealers.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will go back to what can help keep stucco affordable to moderate priced homes. The addition of rain screen should be an optional upgrade and not forced on the public to benefit special interest. This proposal returns that section with proven stucco performance back to pre 2021 code mandates.

S243-22 Part II

S244-21

IBC: [BS] 2606.5

Proponents: John-Jozef Proczka, City of Phoenix, representing self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

[BS] 2606.5 Structural requirements. Light-transmitting plastic materials in their assembly shall be of adequate strength and durability to withstand the *loads* indicated in Chapter 16 Technical data shall be submitted to establish stresses, maximum unsupported spans and such other information for the various thicknesses and forms used as deemed necessary by the *building official* under the provisions of Section 104.11.

Reason Statement: The provisions in the code for alternative materials, design, or methods of construction in Section 104.11 are appropriate to deal with the structural requirements of light-transmitting plastic. By including vague structural requirements in the code for light-transmitting plastic the applicability of the alternative material, design, or method of construction provisions is called into question. This proposal would clarify that the provisions of Section 104.11 apply.
The entire removal of Section 2606.5 would also be appropriate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
just clarification of what is already present

S244-21

ICCPC Code Change Proposals

The following code change proposals are labeled as Performance code change proposals because they are proposals for changes to sections in chapters of the International Code Council Performance Code that are designated as the responsibility of the ICCPC Development Committee (see page xii of the Introductory pages of this monograph). However the changes included in this Group B code development cycle are to sections of the code that have been prefaced with a [S], meaning that they are the responsibility of a different IBC Code Development Committee—IBC-Structural Committee [S].

The committee assigned for each code change proposal is indicated in a banner statement near the beginning of the proposal.

PC1-22

ICCPC: [BS] 501.3, [BS] 501.3.4

Proponents: David Collins, representing Self (dcollins@preview-group.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org); Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 501.3 Performance requirements. Minimum design loads and forces shall be equal to, or greater than the design loads and forces determined in accordance with ASCE 7 unless substantiated by other approved methods outlined in this code.

[BS] 501.3.4 Expected loads. Structures, or portions thereof, shall be designed and constructed taking into account expected loads, and combination of loads, associated with the event(s) magnitude(s) that would affect their performance, including, but not limited to:

1. Dead loads.
2. Live loads.
3. Impact loads.
4. Explosion loads.
5. Soil and hydrostatic pressure loads.
6. Flood loads (mean return period).

   6.1 Small: 100 years

   6.2 Medium: 500 years

   6.3 Large: Determined on a site-specific basis

   6.4 Very Large: Determined on a site-specific basis

7. Wind loads (mean return period).

   7.1 Small: 300 years

   7.2 Medium: 700 years

   7.3 Large: 1700 years

   7.4 Very Large: 3000 years

8. Windborne debris loads.
9. Snow loads (mean return period).

   9.1 Small: 25 years

   9.2 Medium: 50 years

   9.3 Large: 100 years

   9.4 Very Large: 500 years

   Snow loads shall Include but not be limited to consideration for drifting, unbalanced loads, impact loads and ice damming.

10. Rain loads. See Table 501.3.4.

11. Earthquake loads.

    11.1 Small: 43 years (mean return period)

    11.2 Medium: 72 years (mean return period)

    11.3 Large: Two-thirds of the intensity of very large loads

    11.4 Very large: The Risk-Targeted Maximum Considered Earthquake defined in Chapter 21 of ASCE 7.

12. Ice loads, atmospheric icing (mean return period).

    12.1 Small: 25 years

    12.2 Medium: 50 years

    12.3 Large: 100 years

    12.4 Very Large: 200 years

13. Hail loads.
14. Thermal loads.
15. Loads due to Coastal Storm Surges and Tsunamis.

Reason Statement: In 1998, the president of the AIA established a Blue Ribbon Panel to examine the future of the architectural profession and its relationship to codes and standards as part of AIA's public policies.
We stand for protecting communities from the impact of climate change. Global warming and man-made hazards pose an increasing threat to the safety of the public and the vitality of our nation. Rising sea levels and devastating natural disasters result in unacceptable losses of life and property. Resilient and adaptable buildings are a community's fires line of defense against disasters and changing conditions of life and property. This is why we advocate for robust building codes and policies that make our communities more resilient.

A key finding of the Blue Ribbon Panel was the need to direct the architect's practices toward higher performing buildings, while meeting and exceeding the standards adopted in our communities. AIA's 2019 and 2020 Codes and Standards Committee began that effort by reviewing the ICC's Performance Building Code that has remained largely unchanged since its initial publication in 2003.

This effort has led to the development of a series of changes intended to improve the usefulness of the International Code Council Performance Code for Buildings and Facilities (ICCPC). Many of these changes are proposed to clarify and coordinate the ICCPC with the family of I-Codes that have been advanced since the initial effort to create this performance based code. Some findings are best addressed in the guide for the use of the ICCPC. AIA has already reached out to the ICC staff to facilitate that effort following the completion of these code change.

A significant part of the proposed changes in Group A consolidate various requirements on the same subject that are currently located in different parts of the code for no apparent reason. Doing so left some things unsaid in one part that are stated in another without reference. Design and evaluation of performance designs and the disparate elements of a building aren't done independently, but are a part of a comprehensive examination of the involved systems and materials associated with the design. In the Group A hearings we submitted Code Changes PC1, PC10, PC11, PC12, PC13, PC14, PC15, PC16, PC17 and PC18 that were all approved.

In addition, ICC's Board of Directors has authorized a study currently being performed by Bryan Meachum, Ph.D., P.E. (CT&MA), CEng. (UK), EUR ING, FIFireE, FSFPE, to evaluate the future of the ICCPC. To date the results appear encouraging. To that end we have prepared a series of changes that take the next step in Group B changes to improve the code for all to use.

This change is proposed to continue the effort to make the Performance Code better.

As a baseline calculation for structural design using the ASCE 7 is the focus of the IBC and should be referenced here as well. In Section 501.3.4, expected loads are listed and should be modified as follows: Section 501.3.4 of the ICCPC addresses expected loads that a structure may be subjected to. Item 9 specifies snow loads. By this change the snow loads are expanded to include snow drifting, unbalanced snow loads, impact loads from falling or sliding snow or ice, loads from ice damming, etc. More damage is caused by those items than from the basic snow load itself. Also Item 15 is being added to include loads due to coastal storm surges and tsunamis, which are not currently addressed in the ICCPC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Any design for structural loads should consider these specific aspects of snow loads. Inclusion of coastal storm or tsunami exposure should be included as well. No additional cost would be incurred by providing the additional direction.

PC1-22

PC2-22

ICCPC: [BS] 501.3.5

Proponents: Robert Pekelnicky, representing FEMA Seismic Code Support Committee (rpekelnicky@degenkolb.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 501.3.5 ~~Safety factors~~ Target Reliabilities. The design of buildings and structures shall consider appropriate factors of safety to provide ~~adequate performance from~~ the target reliabilities stipulated in Chapter 1 of ASCE 7 considering:

1. Effects of uncertainties resulting from construction activities.
2. Variation in the properties of materials and the characteristics of the site.
3. Accuracy limitations inherent in the methods used to predict the stability of the building.
4. Self-straining forces arising from differential settlements of foundations and from restrained dimensional changes due to temperature, moisture, shrinkage, creep and similar effects.
5. Uncertainties in the determination of the expected loads.

Reason Statement: The current provision does not specify a quantitative factor of safety, instead providing an unenforceable statement on “adequate performance.” Furthermore, the term factor of safety is out of date with current strength design which uses different load and resistance factors to adjust the demand and capacity to achieve a specific reliability of not failing. By referencing the target reliabilities in Chapter 1 of ASCE 7, this creates a quantitative mechanism to affirm a performance-based design is providing the minimum performance of the IBC and the structural engineering standards referenced therein.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this change is simply providing quantitative metrics to establish the same performance as the prescriptive standards referenced in IBC, there should be no cost impact of the change. Correlating these aspects of the two codes may actually reduce cost due to misunderstanding or misapplication of the codes.

PC2-22

PC3-22

ICCPC: [BS] 501.3.5

Proponents: Robert Pekelnicky, representing FEMA Seismic Code Support Committee (rpekelnicky@degenkolb.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 501.3.5 Safety factors. The design of buildings and structures shall consider appropriate factors of safety to provide adequate performance from:

1. Effects of uncertainties resulting from construction activities.
2. Variation in the properties of materials and the characteristics of the site.
3. Accuracy and limitations inherent in the methods used to predict the stability of the building , load effects and capacities of members and their connections.
4. Self-straining forces arising from differential settlements of foundations and from restrained dimensional changes due to temperature, moisture, shrinkage, creep and similar effects.
5. Uncertainties in the determination of the expected loads.
6. The level of quality control and quality assurance in construction.

Reason Statement: The proposal lists two addition places where variability occurs that the IBC referenced structural standards consider when developing their load and resistance factors or safety factors to achieve the intended performance. The level of quality control is taken into account in several ways in the standards, by specifying a maximum construction tolerances, quality assurance and quality control provisions, and as a consideration in determining the resistance factors. Since the performance standard is intended to operate without the need for additional standards, it is important that the design professional executing a performance-based design think about how design and construction quality assurance may impact the reliability of their design.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this change is simply identifying sources of variability that are considered by the prescriptive standards, consideration of these items in a performance-based design should not result in an increase in construction cost.

PC3-22

PC4-22

ICCPC: [BS] 902.1, [BS] 902.3.1, [BS] 902.3.2, [BS] 902.3.3, [BS] 902.3.4

Proponents: David Collins, representing Self (dcollins@preview-group.com); Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 902.1 Objective. To safeguard people from injury and ~~property~~ to protect the building, facilities, equipment, processes materials, and contents from damage that could result from external moisture entering the building.

[BS] 902.3.1 Water penetration. Roofs and exterior walls shall prevent the ~~penetration of water that could cause damage to building elements~~ unwanted penetration and accumulation of moisture or water that causes damage to the building, facilities, equipment, processes, materials, or contents and shall provide a means for any unwanted penetration of water or moisture to dissipate.

.

[BS] 902.3.2 Building elements in contact with the ground. Walls, floors and structural support elements in contact with the ground shall not absorb or transmit moisture in quantities that could cause damage to the building ~~elements~~ facilities, equipment, processes, materials, or contents.

[BS] 902.3.3 Concealed spaces and cavities. Concealed spaces and cavities in buildings or facilities shall be constructed in a way that prevents ~~external moisture from causing degradation of building elements~~ unwanted penetration and accumulation of moisture or water that causes damage to the building, facilities, equipment, processes, materials, or contents and shall provide a means for any unwanted penetration of water or moisture to dissipate without causing damage.

[BS] 902.3.4 Moisture during construction. Excess moisture present at the completion of construction shall be capable of being dissipated without permanent damage to building elements.

Reason Statement: To expand the required safeguards to the equipment, processes, materials, and contents of the building because these elements of the building are interconnected with the building itself and the performance of the building.

Bibliography: U.S. Environmental Protection Agency (2013). "Moisture Control Guidance for Building Design, Construction and Maintenance." EPA 402-F-13053. Accessed January 4, 2022. https://www.epa.gov/sites/default/files/2014-08/documents/moisture-control.pdf.

Cost Impact: The code change proposal will increase the cost of construction
The broad nature of the existing content in this section could be interpreted to not include some features of the building. The more precise language proposed here addresses building features that may not have been included previously under the original requirement and thus may have a modest cost increase.

Whether or not this requirement influences the cost of construction, the application of this requirement should influence operation and maintenance costs once the building is occupied. By establishing a scope to include not only the building but also the facilities to deliberately prevent damage to it and equipment, processes, materials, or contents within them, will not be an additional cost of business within the facilities due to external moisture. According to the U.S. EPA, unwanted external moisture can cause any number of problems and costs, when not prevented. EPA's *Moisture Control Guidance for Building Design, Construction and Maintenance* provides information regarding health impacts from dampness in buildings, the damage moisture can cause to the building, and guidance to avoid them.

PC4-22

PC5-22

ICCPC: [BS] 903.1

Proponents: David Collins, representing Self (dcollins@preview-group.com); Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 903.1 Objective. To safeguard people against illness or injury <u>and to protect the building, facilities, equipment, processes, materials, and contents from damage</u> that could result from accumulation of internal moisture, and to protect an occupancy from damage caused by free<u> -flowing</u> water from another occupancy in the same building <u>or facility.   Each occupancy shall be evaluated as to the types of illness or injury they need to be protected from and the level of contaminants that will be allowed</u>.

Reason Statement: This change will expand the required safeguards to the equipment, processes, materials, and contents of the building because these elements of the building are interconnected with the building itself and the performance of the building. Each occupancy group has its own type of occupant. I-2 Occupancy Groups have very different occupants than, say, a typical B Occupancy Group. Therefore, the use of the space should determine the types of illnesses or injuries that the occupants should be protected from, as some may be more serious than others based on the occupant group.

Bibliography: National Institute for Occupational Safety and Health (2013). "Indoor Environmental Quality: Dampness and Mold in Buildings." Accessed January 4, 2022. https://www.cdc.gov/niosh/topics/indoorenv/mold.html.

Cost Impact: The code change proposal will increase the cost of construction
The broad nature of the existing content in this section could be interpreted to <u>not</u> include some features of the building. The more precise language proposed here addresses building features that may not have been included previously under the original requirement and thus may have a modest cost increase. Whether or not this requirement influences the cost of construction, the application of this requirement should influence operation, maintenance, and health insurance costs once the building is occupied.

The National Institute for Occupational Health and Safety (NIOSH) states in its "Dampness and Mold Assessment Tool for Schools and General Buildings":

The health of those who live, attend school, or work in damp buildings has been a growing concern through the years due to a broad range of reported building-related symptoms and illnesses. Research has found that people who spend time in damp buildings are more likely to report health problems such as these:

- Respiratory symptoms (such as in nose, throat, lungs)
- Development or worsening of asthma
- Hypersensitivity pneumonitis (a rare lung disease caused by an immune system response to repeated inhalation of sensitizing substances such as bacteria, fungi, organic dusts, and chemicals)
- Respiratory infections
- Allergic rhinitis (often called “hay fever”)
- Bronchitis
- Eczema

Not only are building occupants affected by moisture and dampness, but the durability of the building structure itself can be seriously affected by moisture within the building. The IBC, IMC, IECC, and other I-Codes recognize the potential cost impact of poor designs for moisture management can have, the ICCPC should do no less.

PC5-22

PC6-22

ICCPC: [BS] 903.2

Proponents: Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 903.2 Functional statement. Buildings shall be constructed to avoid the likelihood of:

1. Fungal growths or the accumulation of contaminants on linings and other building elements<u> caused by the use of water, including condensation from chilled lines</u>.
2. Free water overflow penetrating to an adjoining occupancy.
3. Damage to building elements being caused by the use of water<u>, including condensation from chilled lines</u>.

Reason Statement: The previous section, Section 902, addresses external moisture, and if performance is achieved, then no water from external sources will enter the building, thus preventing fungal growth. However, Section 903, which addresses internal moisture, is concerned with issues created by free water from within the building. Since "free water" is not defined, it could be interpreted to mean water that is leaking from sources within the building, such as plumbing piping, fixtures, and equipment. However, water can be also be created by condensation without a single leak within the building. Water from condensation can create as much damage as a leak.

Cost Impact: The code change proposal will increase the cost of construction
This requirement would require some additional insulation around piping that would create surface temperatures at or below the dew point. Designers would obviously include insulation around chilled supply lines, but some waste lines may not be considered. The cost of insulation to protect these additional lines would be negligible compared to the overall cost of a construction project. The added insulation, which is a relatively low cost material, is much less expensive than retrofitting insulation and repair or replacement of damaged materials.

PC6-22

TENTATIVE ORDER OF DISCUSSION
2022 PROPOSED CHANGES TO THE
INTERNATIONAL EXISTING BUILDING CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some EB code change proposals may not be included on this list, as they are being heard by another committee.

Numbers Not Used
EB49-22
EB115-22

EB1-22
EB5-22
EB7-22
EB8-22
EB11-22
EB12-22
EB20-22
EB21-22
EB22-22
EB23-22
EB24-22
EB25-22
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EB28-22
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EB94-22
EB95-22
EB96-22
EB97-22
EB98-22
EB99-22
EB100-22
EB101-22
EB102-22
EB103-22 Part I
EB106-22
EB107-22
EB108-22
EB109-22
EB110-22
EB111-22
EB116-22

EB1-22

IEBC: [A] 104.2.1, [A] 115.5, SECTION 202; IBC: [A] 116.5; IFC: [A] 114.6; IPMC: 111.9

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

2021 International Existing Building Code

Revise as follows:

[A] 104.2.1 Determination of substantially improved or substantially damaged existing buildings and structures in flood hazard areas. For applications for reconstruction, ~~rehabilitation,~~ repair, *alteration*, *addition* or other improvement of *existing buildings* or structures located in *flood hazard areas*, the building official shall determine where the proposed work constitutes *substantial improvement* or *repair* of *substantial damage*. Where the building official determines that the proposed work constitutes *substantial improvement* or *repair* of *substantial damage*, and where required by this code, the building official shall require the building to meet the requirements of Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

[A] 115.5 Restoration or abatement. The structure or equipment determined to be *unsafe* by the *code official* is permitted to be restored to a safe condition. The owner, the owner's authorized agent, operator or occupant of a structure, premises or equipment deemed *unsafe* by the *code official* shall abate or cause to be abated or corrected such *unsafe* conditions either by *repair*, ~~rehabilitation~~ alteration, demolition or other *approved* corrective action. To the extent that *repairs*, *alterations* or *additions* are made, or a *change of occupancy* occurs during the restoration of the structure, such *repairs*, *alterations*, *additions* or *change of occupancy* shall comply with the requirements of this code.

Delete without substitution:

~~**REHABILITATION.** Any work, as described by the categories of work defined herein, undertaken in an *existing building*.~~

2021 International Building Code

Revise as follows:

[A] 116.5 Restoration or abatement. Where the structure or equipment determined to be unsafe by the *building official* is restored to a safe condition, the owner, the owner's authorized agent, operator or occupant of a structure, premises or equipment deemed unsafe by the *building official* shall abate or cause to be abated or corrected such unsafe conditions either by repair, ~~rehabilitation~~ alteration, demolition or other approved corrective action. To the extent that repairs, *alterations* or *additions* are made or a *change of occupancy* occurs during the restoration of the structure, such *repairs*, *alterations*, *additions* and *change of occupancy* shall comply with the requirements of the *International Existing Building Code* .

2021 International Fire Code

Revise as follows:

[A] 114.6 Restoration or abatement. The structure or equipment determined to be unsafe by the *fire code official* is permitted to be restored to a safe condition. The *owner*, the *owner 's* authorized agent, operator or occupant of a structure, premises or equipment deemed unsafe by the *fire code official* shall abate or cause to be abated or corrected such unsafe conditions either by repair, ~~rehabilitation~~ alteration, demolition or other *approved* corrective action. To the extent that repairs, *alterations* or additions are made or a change of occupancy occurs during the restoration of the structure, such repairs, *alterations*, additions or change of occupancy shall comply with the requirements of Section105.1.5 and the *International Existing Building Code*.

2021 International Property Maintenance Code

Revise as follows:

111.9 Restoration or abatement. The structure or equipment determined to be unsafe by the code official is permitted to be restored to a safe condition. The *owner*, *owner*'s authorized agent, *operator* or *occupant* of a structure, *premises* or equipment deemed unsafe by the *code official* shall abate or cause to be abated or corrected such unsafe conditions either by repair, ~~rehabilitation~~ alteration, demolition or other *approved* corrective action. To the extent that repairs, alterations, or additions are made or a change of occupancy occurs during the restoration of the structure, such repairs, alterations, additions, or change of occupancy shall comply with the requirements of the *International Existing Building Code*.

Reason Statement: This is an editorial change dealing with the term "rehabilitation".
Although one of the IEBC provisions affected by the change (i.e., dealing with restoration or abatement in the administrative portion of the code) is mirrored in the IBC, the IFC, and the IPMC, the only code where the term *rehabilitation* is actually defined is the IEBC. As such, it is important to understand how the IEBC treats various terms.

- The term *repair* is defined in Chapter 2 of the IEBC as "The reconstruction, replacement, or renewal of any part of an *existing building* for the purposes of its maintenance or to correct damage."

- The term *addition* is defined in Chapter 2 of the IEBC as "An extension or increase in floor area, number of stories, or height of a building or structure."
- The term *alteration* is defined in Chapter 2 of the IEBC as "Any construction or renovation to an *existing structure* other than a *repair* or an *addition*."

The IEBC goes to some effort to keep the possible categories of actions regarding modification of existing buildings simple: actions are either *repairs*, *additions*, or *alterations*. Period.

The term *rehabilitation*, on the other hand, is defined in Chapter 2 as "Any work, as described by the categories defined herein, undertaken in an *existing building*." Put another way, it means <u>any</u> permitted work to an existing building. Yet there are only three sections of the IEBC that actually use the term: Sections 104.2.1, 115.5, and 405.2.4.

The issues with the use of the word *rehabilitation* in Section 405.2.4 are structural in nature and are dealt with in a separate, independent proposal that does not rely on the outcome of this proposal.

This proposal only deals with Sections 104.2.1 and 115.5 in the IEBC.

- Section 104.2.1 talks about determining whether work on a building constitutes either *substantial improvement* or *repair* of *substantial damage*, so initially it might seem to make sense to include the word "rehabilitation" in this provision. A closer look, however, makes it clear that the term rehabilitation is superfluous in this provision. This section already specifically lists *repairs*, *alterations*, and *additions* as well as a catch-all "other improvement". Furthermore, the term *rehabilitation* is <u>not</u> included in definitions of either *substantial improvement* or *repair* of *substantial damage*, So *rehabilitation* is an extraneous term that is not needed in this section.
- Section 115.5 deals with restoration or abatement of *unsafe* conditions. At first blush, use of the term *rehabilitation* might almost seem to make sense here, but again a closer look makes it clear that the term is superfluous. The sentence that contains the term *rehabilitation* mentions *repairs*, demolition, and a catch-all "other approved *corrective* action". Rather than having two catch-all terms, it would be better to replace *rehabilitation* with a more specific term that makes more sense in the context of making a change: *alteration*. As a reminder, *alteration* is defined as "Any construction or renovation to an *existing structure* other than a *repair* or an *addition*." So the word *alteration* is more fitting in this section than *rehabilitation*.

Given that the term *rehabilitation* is specifically, and somewhat illogically. defined in the IEBC as an all-inclusive term covering all possible actions on a building, given that the definition is counter to the ordinarily accepted meaning of "rehabilitation," and given that the term is barely used in the IEBC (and in a superfluous, duplicative, and arguably confusing manner), it makes sense to delete the term from the definitions in Section 202 of the IEBC.

Since Section 115.5 in the IEBC is mirrored exactly in the IBC (Section 116.5), in the IFC (Section 114.6), and in the IPMC (Section 111.9), it makes sense to make the same changes to these sections (i.e., replace *rehabilitation* with the term *alteration*) to maintain consistency between the various codes and because an alteration is what you are doing if you are not repairing.

Although the term "rehabilitation" occurs in a few other locations in those four other codes, it was never defined in those codes, and it makes more sense to use the ordinarily accepted meaning of "rehabilitation" in these instances (e.g.., returning something to a good condition -- Cambridge Dictionary), so deletion of the definition from the IEBC makes more sense here as well..

Note that the IMC, the IPC, the IFGC, and the ISPSC contain their own similar but not identical set of provisions and generally use the term "rehabilitate" in its ordinarily accepted meaning; however, those provisions are not identical to the IEBC provisions, so are not proposed for modification herein.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change that merely removes the word "rehabilitation" from the IEBC because that word is superfluous and its intent and meaning are already captured in the other portions of the provisions proposed for modification. Since four other codes copy the wording in the IEBC about how to deal with unsafe conditions, these codes are also proposed for modification to match what is being proposed in the IEBC.

Deletion or replacement of the word will have zero impact on the scope of these codes or how they address unsafe conditions; consequently, this proposal has zero impact on the cost of construction.

EB1-22

EB2-22

IEBC: SECTION 202; IBC: SECTION 202

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] DANGEROUS. Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous:

1. The building or structure has collapsed, has partially collapsed, has moved off its foundation or lacks the necessary support of the ground.
2. There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance or ornamentation of the building or structure under permanent, routine or frequent loads; under actual loads already in effect; or under snow, wind, rain, flood, earthquake aftershock, or other environmental loads when such loads are imminent.

2021 International Building Code

Revise as follows:

[BS] DANGEROUS. Any building, structure or portion thereof that meets any of the conditions described below shall be deemed *dangerous*:

1. The building or structure has collapsed, has partially collapsed, has moved off its foundation or lacks the necessary support of the ground.
2. There exists a significant risk of collapse, detachment or dislodgment of any portion, member, appurtenance or ornamentation of the building or structure under permanent, routine, or frequent *loads;* under actual loads already in effect; or under snow, wind, rain, *flood,* earthquake aftershock, or other environmental loads when such *loads* are imminent.

Reason Statement: This is a change that was suggested back in 2019 during the development of the existing language; however, it was never formally proposed to the Structural Committee. Since the current language was adopted, a question has been raised about whether earthquake loads should be considered "imminent" if, say, a region of the country is "due" for an earthquake. That is not the intent of this definition. Earthquakes that occur with recurrence intervals of hundreds to thousands of years (e.g., design-level events) are not and should not be considered "imminent". We lack the technology to predict when such large, essentially random events are likely to occur. We do know, however, that after a large earthquake, aftershocks are likely to occur, with the vast majority of aftershocks happening within hours to a few days of the initial earthquake. These are the earthquakes that can and should be considered "imminent". If a significant earthquake occurs, the aftershocks that are likely to occur soon thereafter are rightly considered "imminent." So if a building is damaged due to an earthquake, the building should be considered "dangerous" if there is a significant risk of collapse due to an earthquake aftershock that may occur in the coming hours to days.

This proposal clarifies the intent regarding earthquakes that should be considered, and brings the language regarding earthquakes into alignment with the other loads that are intended to be "imminent". Examples include snow loads when a winter storm is approaching, wind loads from an approaching storm, rain loads due to an approaching rainstorm, and flood loads when a flood is expected due to an approaching rainstorm or hurricane,

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial clarification of the intent; the proposal is not intended to change the existing scope of the term "dangerous".

EB2-22

EB3-22

IEBC: SECTION 202

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] DISPROPORTIONATE EARTHQUAKE DAMAGE. A condition of earthquake-related damage where both of the following occur:

1. The 0.3-second spectral acceleration at the building site for the earthquake in question, as estimated by the most recent algorithm of the United States Geological Survey for the point closest to the site or as determined from seismograph records from the site or from locations closer to the site than the algorithm-provided data points, ~~for the earthquake in question~~ is less than 40 percent of the mapped acceleration parameter S_S.
2. The vertical elements of the lateral force-resisting system have suffered damage such that the lateral load-carrying capacity of any story in any horizontal direction has been reduced by more than 10 percent from its predamage condition.

Reason Statement: Now that this upgrade trigger has been in the code for a cycle, it has been tested during recent earthquakes. A number of issues have been identified, including the following:

1. The United States Geological Survey (USGS) publishes spectral acceleration estimates that are generated by the USGS as well as estimates that are generated by regional entities that are not required to adhere to the most recent and up-to-date USGS algorithm.
2. The USGS algorithm is modified over time, and some of the regional entities that publish the estimates of spectral acceleration do not in fact use the most recent and up-to-date algorithm provided by the USGS.
3. The estimates of spectral acceleration for a given earthquake change over time as more and more data becomes available and is processed and aggregated.
4. In some cases, the data aggregated by the USGS may not include all seismographs that are close to the building site. For example, some buildings have seismographs on site, but the data from those seismographs may be owned by the property owner and is often not available to the USGS. In these cases, the USGS-based estimates (which combine both quantitative data from seismographs and qualitative/subjective results from Did You Feel It? surveys of lay people) may be dramatically different than what was actually recorded at or very close to the site.
5. The USGS has indicated that interpolation between their published grid points introduces additional uncertainties and is therefore not recommended. They recommend instead to use the data point closest to the site.

This proposal attempts to address Issues 1, 2, 4, and 5 by clarifying that it is the algorithm that is provided by the USGS that should be used, clarifying that the most recent version of the algorithm should be used, clarifying that the grid point closest to the site that should be used, and requiring that data from actual seismographs get preference when the seismographs are closer than the nearest USGS data grid point.

These are all commonsense changes that will improve the accuracy of determining whether or not a specific building has experienced disproportionate earthquake damage.

Note that Issue 3 is not addressed here, as we hope it is clear to all building officials and engineers that the most up-to-date estimates should be used as opposed to superseded results.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will alter the cost to comply with the disproportionate earthquake damage trigger. In some cases, this proposal may increase the cost of construction (e.g., where using less accurate estimates from a superseded algorithm -- or ignoring data from an on-site seismograph -- would have indicated that the earthquake had greater damage potential at the site than it actually had). This proposal could also decrease the cost of construction (e.g., where using less accurate estimates from a superseded algorithm -- or ignoring data from an on-site seismograph -- would have indicated that the earthquake had less damage potential at the site than it actually had). And it may result in larger or smaller construction costs on a building-by-building basis for the same earthquake, depending on the shaking that actually occurred at the site versus the estimates mandated by the currently existing language. For many if not most buildings, however, it won't make a difference at all, which is why the cost option "will not increase or decrease" is selected above.

EB3-22

EB4-22

IEBC: SECTION 202

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] DISPROPORTIONATE EARTHQUAKE DAMAGE. A condition of earthquake-related damage where both of the following occur:

1. The 0.3-second spectral acceleration at the building site as estimated by the United States Geological Survey for the earthquake in question is less than 40 percent of the mapped acceleration parameter S_S.
2. The vertical elements of the lateral force-resisting system have suffered damage such that the lateral load-carrying capacity of any story in any horizontal direction has been reduced by more than ~~10~~ 15 percent from its ~~predamage~~ pre-earthquake condition.

Reason Statement: Now that this upgrade trigger has been in the code for a cycle, it has been tested during recent earthquakes, and it needs improvement.
This proposal does two things:

1. It limits damage that counts towards the trigger to that damage actually caused by the earthquake in question. This change is required since the provision is meant to define damage that is "disproportionate" relative to the intensity of the earthquake shaking just experienced. Damage from other causes should not be considered in a trigger that is solely to address disproportionate damage. Damage from things like differential settlement, corrosion of steel, wood decay, vehicle impact, fire, or other environmental loads that are not earthquake-related should play no part in determining whether earthquake damage was disproportionate compared to expectations.
2. It increases the triggering damage threshold to 15 percent. A 10-percent threshold is far too low to have engineering significance. As a reminder, the IEBC considers 10-percent changes in seismic demand-to-capacity ratio to be negligible for additions or alterations (which are deliberate actions, and the effects of which are relatively easy to calculate), as seen in Exception 1 to Section 502.5 (additions), Exceptions 1 and 2 to Section 503.4 (alterations), the exception to Section 805.3, and Exception 2 to Section 1103.2. In all of these cases, an increase in demand-to-capacity of 10 percent is not considered significant. Since we design and expect nearly all structures to experience architectural and structural damage during a design-level earthquake, a 10-percent damage threshold for earthquakes that are 40 percent of the design-level earthquake is not appropriate and is too low. A 15-percent trigger is proposed, since it is about half of the similar threshold for *substantial structural damage*.

For these reasons, I request that damage that is not related to earthquake be excluded from the disproportionate damage trigger, and that the trigger be increased to a threshold substantially greater than 10 percent.

Cost Impact: The code change proposal will decrease the cost of construction
Making the trigger more targeted and increasing the threshold will result in fewer building for which upgrade is mandated and therefore smaller repair costs after earthquakes.

EB4-22

EB5-22

IEBC: SECTION 202 (New)

Proponents: Mike Jackson, representing Association for Preservation Technology (arch419@aol.com)

2021 International Existing Building Code

Add new definition as follows:

DISTINCT HAZARD. Any clear and evident condition that exists as an immediate danger to the safety of the occupants of a building or the adjacent public right of way. Conditions that do not meet the requirements of current regular codes and ordinances do not, of themselves, constitute a distinct hazard.

Reason Statement: This code change proposal defines distinct hazard in order to facilitate application of the existing code provision 1203.2, where a distinct fire hazard 'as defined herein' is a condition of the use of an approved automatic fire-extinguishing system as an alternative to non-conforming construction requirements. There is no definition presently in the IEBC.
This is one of a series of 6 proposals intended to facilitate use of the code for historic building projects.

Bibliography: APT Building Codes and Historic Preservation
Webliography https://www.apti.org/assets/Committees/technicalcommittees/CodesandStandards/2019/Building%20Codes%20and%20Historic%20Preservation%20–%20Webliography.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This should have no impact and potentially reduce cost as it is simply trying to clarify a term used within the IEBC and IFC which is often subject to wide interpretation.

EB5-22

EB6-22

IEBC: SECTION 202

Proponents: Zeno Martin, representing representing myself (zmartin@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] SUBSTANTIAL STRUCTURAL DAMAGE. A condition where any of the following apply:

1. The vertical elements of the lateral force-resisting system have suffered damage such that the lateral load-carrying capacity of any story in any horizontal direction has been reduced by more than 33 percent from its predamage condition. <u>Removal of structurally undamaged components for the purposes of implementing repair shall not be considered damage that reduces load carrying capacity.</u>
2. The capacity of any vertical component carrying gravity load, or any group of such components, that has a tributary area more than 30 percent of the total area of the structure's floor(s) and roof(s) has been reduced more than 20 percent from its predamage condition, and the remaining capacity of such affected elements, with respect to all dead and live loads, is less than 75 percent of that required by the *International Building Code* for new buildings of similar structure, purpose and location. <u>Removal of structurally undamaged components for the purposes of implementing repair shall not be considered damage that reduces load carrying capacity.</u>
3. The capacity of any structural component carrying snow load, or any group of such components, that supports more than 30 percent of the roof area of similar construction has been reduced more than 20 percent from its predamage condition, and the remaining capacity with respect to dead, live and snow loads is less than 75 percent of that required by the *International Building Code* for new buildings of similar structure, purpose and location. <u>Removal of structurally undamaged components for the purposes of implementing repair shall not be considered damage that reduces load carrying capacity.</u>

Reason Statement: Remediation contractors are sometimes excessive in removal of existing materials in their initial effort to mitigate and/or initiate repair. In addition, sometimes undamaged elements must be removed in order to access damaged components. The definition as written is open to interpretation where excessive or voluntary demolition done only for the purpose of making repairs leads to the conclusion that capacity has been reduced and should be considered in the calculation as to whether substantial structural damage has occurred. This can lead to the perception that a contractor's repair work exceeds the substantial structural damage threshold.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will reduce the cost of repairs by clarifying that related work does not itself create damage for which further expensive evaluation and possible upgrade are triggered.

EB6-22

EB7-22

IEBC: 301.3

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Existing Building Code

Revise as follows:

301.3 Alteration, addition or change of occupancy. The *alteration*, *addition* or *change of occupancy* of all *existing buildings* shall comply with one of the methods listed in Section 301.3.1, 301.3.2 or 301.3.3 as selected by the applicant. Section 301.3.1 shall be applicable unless the applicant selects a different method. Sections 301.3.1 through 301.3.3 shall not be applied in combination with each other.

> **Exception:** Subject to the approval of the *code official*, *alterations* complying with the laws in existence at the time the building or the affected portion of the building was built shall be considered in compliance with the provisions of this code. New structural members added as part of the *alteration* shall comply with the *International Building Code*. This exception shall not apply to the following:
>
> 1. *Alterations* for accessibility required by Section 306.
> 2. *Alterations* that constitute *substantial improvement* in *flood hazard areas*, which shall comply with Sections 503.2, 701.3 or 1301.3.3.
> 3. Structural provisions of Section 304, Chapter 5 or to the structural provisions of Sections 706, 805 and 906.

Reason Statement: Applicants for building permits associated with existing buildings very frequently do not selected a method of compliance as required by this section of the code. This has the odd result of a building permit not being issued simply because an administrative provision intended to make it easier to get a building permit is now a source of noncompliance with the code.
This change is intended to save a round of building code compliance examination by giving the building official a default method to use for examination of the construction documents for code compliance where no method is selected by the applicant. Without a default method or a selected method, a first round of compliance examination is not meaningful.

This change will result in building permits being obtained quicker and does not take away the power from the applicant to select their own method of compliance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change will cause building permits to be issued sooner, in some situations. Since it facilitates a faster construction process it may reduce or maintain construction costs.

EB7-22

EB8-22

IEBC: 301.4 (New), 1201.1 (New), 1201.1, 1201.6 (New), SECTION 607, 607.1, 607.2, SECTION 507, 507.1, 507.2, [BS] 507.3, [BS] 507.4

Proponents: Mike Jackson, representing Association for Preservation Technology (arch419@aol.com)

2021 International Existing Building Code

Add new text as follows:

301.4 Historic buildings. Historic buildings as defined in Section 202 shall comply with Chapter 12.

1201.1 Intent. The intent of this chapter is to preserve the integrity and character-defining features of historic buildings while maintaining a reasonable degree of protection of life, health and safety for its occupants.

Revise as follows:

~~1201.1~~ 1201.2 Scope . Historic buildings shall comply with Chapter 3 and the provisions of this chapter for repair, alteration, relocation and change of occupancy regardless of compliance path, except as limited by this chapter.
~~This chapter is intended to provide means for the preservation of *historic buildings*. *Historic buildings* shall comply with the provisions of this chapter relating to their *repair*, *alteration*, relocation and *change of occupancy*.~~

Add new text as follows:

1201.6 Accessibility . Accessibility of historic structures shall comply with Section 306, as applicable.

Delete without substitution:

~~SECTION 607~~
~~HISTORIC BUILDINGS~~

~~**607.1 Scope.** *Historic building* provisions shall apply to buildings classified as historic as defined in Chapter 2.~~

~~**607.2 Application.** Except as specifically provided for in Chapter 12, *historic buildings* shall comply with applicable provisions of this code for the type of work being performed.~~

SECTION 507
HISTORIC BUILDINGS

Revise as follows:

507.1 Historic buildings. Historic buildings as defined by Section 202 of this code shall comply with Chapter 12. ~~The provisions of this code that require improvements relative to a building's existing condition or, in the case of *repairs*, that require improvements relative to a building's predamage condition, shall not be mandatory for *historic buildings* unless specifically required by this section.~~

Delete without substitution:

~~**507.2 Life safety hazards.** The provisions of this code shall apply to *historic buildings* judged by the *code official* to constitute a distinct life safety hazard.~~

~~**[BS] 507.3 Flood hazard areas.** Within *flood hazard areas* established in accordance with Section 1612.3 of the International Building Code, or Section R322 of the International Residential Code, as applicable, where the work proposed constitutes *substantial improvement,* the building shall be brought into compliance with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.~~

~~**Exception:** *Historic buildings* meeting any of the following criteria need not be brought into compliance:~~

1. ~~Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.~~
2. ~~Determined by the Secretary of the US Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.~~
3. ~~Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.~~

~~**[BS] 507.4 Structural.** *Historic buildings* shall comply with the applicable structural provisions in this chapter.~~

~~**Exceptions:**~~

1. ~~The *code official* shall be authorized to accept existing floors and existing live loads and to approve operational controls that limit the live load on any floor.~~

2. ~~*Repair* of *substantial structural damage* is not required to comply with Sections 405.2.3, and 405.2.4. *Substantial structural damage* shall be repaired in accordance with Section 405.2.1.~~

Reason Statement: This code change proposal more clearly defines the scope of provisions related to historic buildings for the code official, the design professional and all who refer to it. It is a user-friendly change to eliminate confusion when applying the IEBC to historic buildings.
The proposal directs all historic buildings, regardless of compliance path being used, to Chapter 12. It relocates most historic building provisions found in other chapters to Chapter 12 (the single exception is for accessibility). It clarifies which provisions of Chapter 12 Historic Buildings are available to each compliance path, and increases consistency by clarifying that the allowances of Sections 1203 and 1204 are available to both the Work Area and Prescriptive compliance methods.

The new scoping statement in Section 1201.2 clarifies that buildings must comply with the IEBC for the type of work being undertaken, except as addressed in this chapter.

Deletion of Section 607 is included in this proposal as part of the effort to consolidate the historic building provisions into Chapter 12 for the benefit of the user.

This is one of a series of 6 proposals intended to facilitate use of the code for historic building projects.

The tables below explain each of the 6 proposals what each of the 6 proposals are focused upon and the intended layout of Chapter 12 if all the proposals should be approved.

HISTORIC BUILDING, CHAPTER 12 PROPOSED CODE CHANGES

#	Working Title	Proposal #	Summary	Rationale
1	Scoping	7939	All historic buildings directed to Chapter 12 regardless of compliance path (some limitations) Adds consideration of preservation as an intent Clarifies path for accessibility	Code useability and clarity (Ch. 12 previously improperly used beyond Work Area Method)
2	Historic Building Allowances	7917	Combines existing provisions currently separated for Alteration and Change of Occupancy Adds definition of 'character-defining features". Clarifies content of historic building report	Sections were inconsistent; concept of less stringency for Alterations incorrect and outdated. 'Character-defining' is an accepted state/federal preservation term and will permit removal of inconstant language in many provisions.
3	Special Occupancy - Museums	8166	Clarifies that allowance is 3000 sf/floor.	For specialized museums, consistency with other code provisions that indicate "per floor" for smaller buildings.
4	Historic Tolerances	7970	Permits minor dimensional and rating non-compliant conditions to be retained. Adds definition of Tolerance	Permission to maintain existing historic conditions when alteration would achieve no significant loss or gain in safety relieves projects of unnecessary costs and permits retention of historic materials.
5	Small Building Equivalencies	8167	Provides accepted and specific fire safety equivalencies for small (ex., Main Street) buildings	Codify commonly accepted solutions, including those derived from Performance Compliance.
6	Distinct Hazard	8165	Adds definition	Code useability and consistency. Term currently undefined

PROPOSED 2024 LAYOUT IF ALL PROPOSALS SHOULD PASS

PROPOSED 2024 IEBC, CH 12	DESCRIPTION	CODE CHANGE #	SOURCE (21 IEBC)
DEFINITIONS			
Distinct Hazard	New	6	
Character-Defining Feature	New	2	
SECTION 1201 GENERAL			
1201.1 Intent	New	1	New
1201.2 Scope	Edit	1	1201.1
1201.3 Historic Building Report	Edit	2	1201.2
1201.4 Special occupancy exceptions—museums	Edit	3	1201.3
1201.5 Flood hazard areas	NC		1201.4
1201.6 Unsafe Conditions	NC		1201.5
1201.6 Tolerances	New	4	
1201.7 Accessibility	New	1	
SECTION 1202 REPAIRS			
1202.1 General	NC		
1202.2 Replacement	NC		
SECTION 1203 ALTERATIONS & CHANGE OF OCCUPANCY	Rename		
1203.1 Scope	Clarify	2	1203.1
1203.2 Automatic fire extinguishing system	Rename/edit	2	1203.2, 1203.12 (deleted)
1203.3 Means of egress	Edit/combine	2	1203.3, 1204.6
1203.4 Transoms	Edit/combine/renumber	2	1203.4, 1204.8
1203.5 Interior finishes	Edit/combine	2	1203.5
1203.6 Flame Spread Index	Edit/combine/renumber	2	1204.9
1203.7 Stairway enclosure	Edit/combine/renumber	2	1204.11
1203.8 One-hour fire-resistant assemblies	Edit/combine/renumber	2	1203.7, 1204.4, 1204.10
1203.9 Occupancy Separation	Edit/combine/renumber	2	
1203.10 Glazing in fire-resistance-rated systems	Edit/combine/renumber	2	1203.8
1203.11 Stairways	Edit/combine/renumber	2	1204.11
1203.12 Guards and handrails	Edit/combine/renumber	2	1203.9, 1203.10
1203.13 Exit signs	Edit/combine/renumber	2	1203.11, 1204.12
1203.14 Door swing	Edit/combine/renumber	2	1204.7
1203.15 Roof covering	Edit/combine/renumber	2	1204.5
1203.16 Building area	Relocated	2	1204.2
1203.17 Exterior ratings	Relocated	2	1204.3
1203.18 Natural light	Relocated	2	1204.14
SECTION 1204 AUTOMATIC SPRINKLER SYSTEM EQUIVALENCIES			
1204.1 Sprinkler system alternatives	New	5	
1204.1.1 Group A-2, M or R-2 Occupancies	New	5	
1204.1.2 Other than Group A-2, M or R-2 Occupancies	New	5	
1204.4 Automatic sprinkler system type	New	5	
SECTION 1205 STRUCTURAL			
1205.1 General	NC		
1205.2 Dangerous conditions	NC		
1205.3 Exit stair live load	Relocate	2	1204.13
1205.4.Structural evaluation	Relocate	2	Portion of 1201.2
SECTION 1206. RELOCATED BUILDINGS			
1206.1 Relocated Buildings	NC		

Bibliography: APT Building Codes and Historic Preservation
Webliography https://www.apti.org/assets/Committees/technicalcommittees/CodesandStandards/2019/Building%20Codes%20and%20Historic%20Preservation%20–%20Webliography.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will permit more consistent and effective regulation of historic buildings with a consistent path to compliance permitting allowances found in Chapter 12. As a result, the clarifications will reduce the amount of time, and thus the cost, required of code officials, engineers,

architects and contractors.

By permitting the allowances of Chapter 12 to be available to Prescriptive and the Work Area methods, in some cases the cost of construction will be reduced.

EB8-22

EB9-22

IEBC: 302.6 (New)

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new text as follows:

302.6 Risk category. Where needed to determine the appropriate application of this code, the risk category of an existing building shall be determined in accordance with Section 1604.5 of the *International Building Code*.

Reason Statement: This proposal adds a clarification regarding risk category assignment that parallels the current code's provision in Sec 302.5 regarding use and occupancy. It adds a reference, in new Sec 302.6, to IBC 1604.5 (and 1604.5.1 as a subsection).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal merely makes explicit what is already believed to be the common practice, parallel to a similar provision regarding occupancy.

EB9-22

EB10-22

IEBC: 302.6 (New), 302.6.1 (New), 302.6.2 (New)

Proponents: David Bonowitz, representing Self (dbonowitz@att.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new text as follows:

302.6 Risk category. Where needed to determine the appropriate application of this code, the risk category of an existing building shall be determined in accordance with Section 1604.5 of the *International Building Code* and Sections 302.6.1 and 302.6.2.

302.6.1 Risk category for project areas. For any portion of an existing building affected by work within the scope of this code, the risk category shall be determined based on the intended use of the affected portion, not based on the existing building's current *risk category*.

302.6.2 Current risk category. For portions of existing buildings not covered by Section 302.6.1, the *risk category* shall be taken as the *risk category* of the original building or of the most recent permitted change of *risk category*. Where the building was assigned to an occupancy category or assigned an importance factor for environmental loads based on use or occupancy, the current *risk category* shall be taken as the nearest equivalent to the assigned category or factor. Otherwise, the current *risk category* shall be taken as Risk Category II.

Reason Statement: This proposal clarifies how existing buildings are assigned to risk categories, in two steps.

- First, new Section 302.6 adds a simple pointer to IBC Section 1604.5. This parallels current Section 302.5 regarding use and occupancy. This part of the proposal is straightforward.
- Second, the proposal recognizes the complexities of choosing risk categories for existing buildings that might pre-date the very concept of risk categories (or occupancy categories, as they were once called).

Thinking this through, it becomes clear that the area affected by an intended existing building project might properly be assigned to a different risk category than the rest of the existing building. Therefore, proposed sections 302.6.1 and 302.6.2 provide guidance for each part of the building. IBC Section 1604.5.1 (referenced from proposed Section 302.6 as part of IBC Section 1604.5) can then be used to reconcile the differences and determine an overall risk category for the building and the project.

This is important because while IEBC Sections 506.1 and Chapter 10 already require any area with a change of use to meet basic requirements for the new use, structural work is not triggered unless the risk category changes (see Sections 506.5, 1006.2, and 1006.3). And whether the risk category changes depends on how the current risk category of the existing building – which might have serious structural deficiencies – is determined.

Proposed Section 302.6.1 covers areas affected by the proposed project – an alteration, addition, repair, or change of use. From the general principle that new work in existing buildings should itself comply with provisions for new construction (Sections 302.4, 306.6, 503.1, etc.) it is clear that the area affected by any proposed project should be assigned to the risk category appropriate to the intended use of that area, as if the intended work were new construction. (Note that the term *work area* is not used, because work area is defined only in terms of reconfigured spaces, so existing building projects that affect only vertical components or distributed systems, while substantial, might have no clear *work area*.)

Proposed Section 302.6.2 covers the rest of the existing building. Assigning an existing building to a risk category seems like it should be easy, but it can get complicated. The proposed section applies the following logic:

- If the building is young enough to have been assigned a risk category (RC) similar to those in the current IBC, it should keep that RC unless there was a defined change of occupancy that also involved a change of RC. That is, the original RC stays with the building even if the code changes over time. This is similar to the allowance in IEBC 101.4.2 regarding legal occupancy. The point is that a building does not immediately become non-compliant just because the code evolves, since that is something over which the owner has no control.
- If the building is too old for "risk category" but was assigned an "occupancy category," the appropriate RC is just the corresponding category, even if the older OC rules do not quite match the current RC rules. Similarly, even before legacy codes used occupancy categories, the UBC, for example, assigned importance factors to wind and seismic loads. The point here is that RC should be understood as just a different term for the same idea, so the grandfathering of an original RC should apply to an original OC or *I* factor as well.
- Finally, if the building was never assigned a clear RC or Importance factor – typically because it pre-dates those ideas, which came into the legacy codes in the 1970s – then even if it contains uses that would be assigned to RC III or RC IV today, it was built under the same rules as any other building at the time. That is, **a hospital, school, or fire station from the 1950s was structurally designed with the same provisions as a 1950s office building or shopping center**. Therefore, for purposes of implementing the current IEBC, all those 1950s buildings should be assessed by the same terms now, so "where needed" (as proposed Section 302.6 says), such an un-assigned building should be assigned to RC II despite its current use.

To understand this, consider the intent of the current IEBC when a RC III or RC IV use is added, extended, or enhanced by an addition, alteration, or change of occupancy.

- If a RC III use is added to, created within, or altered within an existing RC III building, should the existing structure be subject to structural improvement just because of the use? No, because the risk category has not changed.
- If a RC III use is added to, created within, or altered within an existing RC II building, should the existing structure be subject to structural improvement just because of the use? Yes, as current Sections 506.5 and 1006 already require.
- If a RC III use is added to, created within, or altered within an existing building that functions as a RC III facility *but is just as deficient as a RC II building of the same age*, should the existing structure be subject to structural improvement just because of the use? Yes, for the same reason that an actual RC II building would be. But under the current code, there would be no retrofit. Therefore, proposed Section 302.6.2 assigns the existing building to RC II, and the triggers in Sections 506.5 and 1006 might apply.

Proposed Section 302.6.2 thus prevents the ill-advised use of a deficient structure for RC III or RC IV purposes where higher performance is expected and must be provided. This is consistent with other provisions already codified in the IEBC for specific cases. The idea of not extending an existing deficiency to affect new work is consistent with current IEBC Section 1101.2 (which applies only to additions, and only within the Work Area method). It is also similar to current Section 304.3.1, which requires the assumption of “ordinary” systems where there is no evidence (typically due to a building’s age) of more modern (“intermediate” or “special”) detailing.

Cost Impact: The code change proposal will increase the cost of construction
This proposal SHOULD neither increase nor decrease the cost of construction, assuming that code officials and designers are already addressing this lack of guidance in the current IEBC with the rational rules provided here. However, to the extent that people are currently taking advantage of this loophole to expand RC III or RC IV uses in buildings that are deficient but nominally assigned to those same RC’s, it will increase the cost of certain projects.

EB10-22

EB11-22

IEBC: 302.5 (New), 302.5.1 (New)

Proponents: Bruce Swiecicki, representing National Propane Gas Association (bswiecicki@npga.org)

2021 International Existing Building Code

Add new text as follows:

302.5 Building envelope modifications. Where the building envelope is modified in one or more of the following ways and the building has one or more gas appliances installed, a review of the combustion air supply and venting capability shall be conducted:

1. The building is modified under a weatherization program.
2. A building permit is issued for a building addition or exterior building modification.
3. Three or more window assemblies are replaced.
4. Three or more storm windows are installed over existing windows.
5. One or more exterior door and frame assemblies are replaced.
6. A building air barrier is installed or replaced.

302.5.1 Review of combustion air and venting of gas appliances. Where a building envelope is modified as described in Section 302.5, existing gas appliance installations shall be inspected to verify compliance with the provisions of Section 304 of the International Fuel Gas Code. Where the appliance installation does not comply with Section 304 of the International Fuel Gas Code, the installation shall be brought into compliance with Section 304 of the International Fuel Gas Code.

Reason Statement: This new section provides requirements to address a problem that may be present when existing buildings are retrofit for energy conservation or other purposes. Specifically, changes to a building's envelope may result in insufficient air for complete combustion of fuel gas, and can cause chimneys and vents that were operating properly to operate improperly, possibly leading to the introduction of the products of combustion into the building. These conditions may result in a greater production of carbon monoxide.
Those who modify buildings should be made aware of this safety concern to prevent unsafe conditions resulting from building modifications and this proposal is the appropriate location in the IEBC to do just that.

Locating this new section within Chapter 3 ensures that it will apply to all compliance methods.

Cost Impact: The code change proposal will increase the cost of construction
This proposal would increase the cost of construction because it would require verification through either an analysis or through testing that the fuel gas appliances installed in the building would be able to function properly after the building envelope was modified.

EB11-22

EB12-22

IEBC: SECTION 202 (New), SECTION 303, 303.1, 303.1.1 (New), 303.2 (New), 303.2.1 (New), 303.2.2 (New), 303.2, 303.2.1, 303.2.2

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Marc Levitan, representing ICC 500 Storm Shelter Standard Development Committee (icc500@iccsafe.org)

2021 International Existing Building Code

Add new definition as follows:

STORM SHELTER. A building, structure or portions thereof, constructed in accordance with ICC 500, designated for use during hurricanes, tornadoes or other severe windstorms.

SECTION 303
STORM SHELTERS

Revise as follows:

303.1 ~~Storm shelters~~ General. This section applies to the design and construction of storm shelters ~~constructed as rooms or spaces within *existing buildings*~~ for the purpose of providing protection during ~~storms that produce high winds, such as~~ tornados , ~~and~~ hurricanes and other severe windstorms. Section 303.2 provides requirements for the evaluation, maintenance and repair of existing storm shelters. Section 303.3 specifies where storm shelters are required for additions to existing buildings. ~~Such structures shall be designated to be hurricane shelters, tornado shelters, or combined hurricane and tornado shelters. Such structures shall be constructed in accordance with this code and ICC 500.~~

Add new text as follows:

303.1.1 Construction. Storm shelters shall be constructed in accordance with Section 423 of the International Building Code and ICC 500 and shall be designated as hurricane shelters, tornado shelters, or combined hurricane and tornado shelters.

Exception: Storm shelters added to critical emergency operations facilities or Group E occupancies are not required to comply with the travel distance in Section 423.4.2 or 423.5.2 of the International Building Code.

303.2 Evaluation, maintenance and repairs. Community storm shelters shall be evaluated, maintained and repaired in accordance with this section and ICC 500.

303.2.1 Evaluation. Community storm shelters shall be evaluated annually, and when requested by the authority having jurisdiction, in accordance with ICC 500.

303.2.2 Maintenance and Repairs. Community storm shelters shall be maintained in an operable condition. All structural and operational element shall be repaired or replaced in accordance with ICC 500 where damaged or found to be inoperable.

Revise as follows:

303.3 ~~303.2~~ Addition to a Group E occupancy. Where an *addition* is added to an existing Group E occupancy located in an area where the shelter design wind speed for tornados is 250 mph (402.3 km/h) in accordance with Figure 304.2(1) of ICC 500 and the occupant load in the *addition* is 50 or more, the *addition* shall have a storm shelter constructed in accordance with ICC 500.

Exceptions:

1. Group E day care *facilities*.
2. Group E occupancies accessory to places of religious worship.
3. *Additions* meeting the requirements for shelter design in ICC 500.

303.3.1 ~~303.2.1~~ ~~Required~~ Design occupant capacity. The required design occupant capacity of the storm shelter shall include all buildings on the site, and shall be the total occupant load of the classrooms, vocational rooms and offices in the Group E occupancy.

Exceptions:

1. Where an addition is being added on an existing Group E site, and where the addition is not of sufficient size to accommodate the required design occupant capacity of the storm shelter for all of the buildings on-site, the storm shelter shall at a minimum accommodate the required capacity for the addition.
2. Where approved by the code official, the required design occupant capacity of the shelter shall be permitted to be reduced by the design occupant capacity of any existing storm shelters on the site.

<u>303.4</u> ~~303.2.2~~ Occupancy classification. The occupancy classification for storm shelters shall be determined in accordance with Section 423.3 of the *International Building Code*.

Reason Statement: The intent of this proposal is to coordinate with the changes to the storm shelter requirements in IBC (G94-21 AS, G95-21 AM, G96-21 AM and G97-21 AM) and the latest edition of the storm shelter standard (ICC 500).Section 303.1 – The first sentence in the charging paragraph is proposed to match the phrase for the types of storms used in the ICC 500. The 2nd and 3rd sentences are the pointers for the sections on maintenance and additions. The deleted sentence is moved to a new section 303.1.1 for clarity and to allow for the exception for travel distance (added to shelters for critical emergency operations facilities by G95-21 AM, and in the current text for Educational facilities). In an existing site, the storm shelter may be part of a new building on the site and could not always meet the maximum exterior travel distances. It is important to get the shelter, and the extra travel time involved can be addressed in the operations plans.
Section 303.2 –The 2020 edition of ICC 500, which was incorporated by reference in the 2021 I-Codes, contains new provisions for the evaluation, maintenance, and repair of community storm shelters. The storm shelter owner or their authorized agent is required to have the shelter evaluated annually, and when requested by the authority having jurisdiction, to identify whether shelter envelope walls or roofs are damaged or whether any impact-protective systems (including doors, windows and shutters) are damaged or are not operational. Any shelter envelope wall, roof or impact-protective system found to be damaged or not operational is required to be repaired or replaced in accordance with Section 113 of ICC 500-2020. The ICC 500 provisions read as follows:

SECTION 113
EVALUATION, MAINTENANCE AND REPAIRS

113.1 General. Community shelters shall be evaluated and maintained in accordance with Sections 113.2 through 113.4.

113.2 Evaluation. The owner or owner's authorized agent shall evaluate the storm shelter annually and when requested by the authority having jurisdiction. The evaluation of the storm shelter shall include the following:

1. The storm shelter envelope shall be evaluated through visual observation to assess whether the walls and roofs are intact and undamaged.
2. Impact-protective systems shall be evaluated for compliance with the manufacturer's operational and maintenance requirements.113.3 Maintenance and repairs. Storm shelters shall be maintained in an operable condition at all times. All structural and operational elements shall be repaired or replaced where damaged or found to be inoperable.

113.3.1 Damaged or missing components. Storm shelters shall be maintained so that walls and roofs are intact and undamaged. Any damage to the storm shelter or its impact-protective systems that impair its functionality shall be repaired or replaced. Damaged or missing components shall be replaced with components that are specified within the tested or listed assembly.

113.3.2 Replacement assemblies and systems. Where it is necessary to replace certified or listed impact-protective systems, replacements shall comply with applicable ICC 500 requirements and shall be tested and installed as required by this standard for new installations or construction.

113.4 Recordkeeping. A record of the evaluations shall be maintained by the owner or owner's authorized agent. A record of the evaluations and any other tests, repairs or replacements and other operations and maintenance shall be kept on the premises or other approved location and consist of all changes to the original storm shelter envelope or impact-protective systems. Records shall include the date and person conducting the evaluations and maintenance or repairs. The proposed IEBC storm shelter provisions trigger evaluations of community storm shelters to verify that they can continue protecting occupants from extreme wind events. Door assemblies in multi-use storm shelters are especially vulnerable to disrepair when used frequently for their 'normal use' functions (e.g., gym, classroom, auditorium). Observations of existing storm shelter door assemblies have revealed the following common maintenance issues that can result in operational failure during an extreme wind event: debris in floor latch points preventing full connection, rust, and malfunctioning hardware. The new ICC 500 provision is specific to community storm shelters. Residential storm shelters are excluded so as not to burden homeowners who choose to incorporate a small residential storm shelter into their home or provide one in their yard.

Section 303.3 – Adding 'design' matches the terms used in the 2020 ICC 500 and the approved changes to 2024 IBC(G94-21 AM) and 2024 IPMC (PM11-20).

This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC 500 Committee, Standard for the Design and Construction of Storm Shelters.

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The ICC 500 (Standard for the Design and Construction of Storm Shelters) development committee has held several virtual meetings during the to develop the 2020 edition. In addition, there were numerous virtual Working Group meetings. All meetings included members of the committee as well as interested parties. The committee has now moved to continuous maintenance. Related documents and reports are posted on the ICC 500 website at https://www.iccsafe.org/products-and-services/standards-development/is-stm/ .

Cost Impact: The code change proposal will increase the cost of construction
The cost increase would be for the time and labor of the owner (or their agent) to conduct the annual visual inspection and/or hire an engineer or architect if needed for a more detailed evaluation. There would also be a cost to repair a damaged roof or wall or to replace a damaged component for an impact-protective system or the entire system if deemed necessary, but this is essential to the continued safe use of the shelter.

EB12-22

EB13-22

IEBC: 304.1 (New)

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new text as follows:

304.1 Loads. The loads on structural members shall be in accordance with Chapter 16 of the *International Building Code* except as modified by this code.

Reason Statement: This change will clarify what is already understood, but never specifically stated: that the loads on structures affected by changes to existing buildings and existing structures are those that are obtained from the IBC.
This code does frequently modify those loads and that will continue to be the case and remain unchanged.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal remedies a gap in the basic application of structural design to existing buildings by stating what is already the case: loads on structures undergoing changes are obtained from the IBC except for where the IEBC modifies those loads. As this is a clarifying statement to reduce confusion about how the existing code provisions are to be applied, there will be no cost difference in either the design or construction phases of projects.

EB13-22

EB14-22

IEBC: 304.1 (New)

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new text as follows:

304.1 General. Structural design loads, evaluation, and design procedures shall be in accordance with Chapter 16 of the International Building Code except as otherwise required or permitted by this code.

Reason Statement: The IEBC defines a number of structural loads, including live loads, snow loads, wind loads, and earthquake loads, typically with reference to IBC Chapter 16, and modifies them as deemed appropriate. Several other structural loads are not defined, including dead loads, soil loads and hydrostatic pressure, rain loads, atmospheric ice loads, etc. As these loads are not explicitly referenced, it is not clear if the existing structures should be evaluated for these loads, and which design loads, and evaluation and design procedures should be used.
Revisions made by this proposal intend to clarify that structural design loads, evaluation procedures, and design procedures of the IBC apply by default, except as explicitly modified by the IEBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of this code change proposal is for clarification. As it does not change the intent of the code, it will not increase of decrease the cost of construction.

EB14-22

EB15-22

IEBC: [BS] 304.3, [BS] 304.3.1, [BS] TABLE 304.3.1, [BS] 304.3.2, [BS] TABLE 304.3.2, [BS] 405.2.3.1, [BS] 405.2.3.3, [BS] 502.5, [BS] 503.4, [BS] 503.5, [BS] 503.6, [BS] 503.7, [BS] 503.8, [BS] 503.9, [BS] 503.10, [BS] 503.11, 506.5.3, 506.5.4, [BS] 706.3.1, [BS] 805.3, [BS] 906.2, [BS] 906.3, [BS] 906.4, [BS] 906.5, [BS] 906.6, [BS] 906.7, [BS] 1006.3, [BS] 1006.4, [BS] 1103.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 304.3 Seismic evaluation and design procedures. Where required, seismic evaluation or design shall ~~be based on~~ comply with the procedures and criteria in this section, regardless of which compliance method is used. The scope of the required evaluation or design shall be as indicated in applicable provisions of Chapters 4 through 12.

[BS] 304.3.1 ~~Compliance with full~~ Full seismic ~~forces~~ criteria. ~~Where compliance requires the use of full seismic forces, the criteria shall be in accordance with one of the following~~ Where required, seismic evaluation or design shall comply with one of the following:

1. ~~One-hundred percent of the values in~~ Section 1613 of the *International Building Code*. Where the existing seismic force-resisting system is a type that can be designated as “Ordinary,” values of R, Ω_0 and C_d used for analysis in accordance with Chapter 16 of the International Building Code shall be those specified for structural systems classified as “Ordinary” in accordance with Table 12.2-1 of ASCE 7, unless it can be demonstrated that the structural system will provide performance equivalent to that of a “Detailed,” “Intermediate” or “Special” system.
2. ASCE 41, using a Tier 3 procedure and the two-level performance objective in Table 304.3.1 for the applicable *risk category*.

[BS] TABLE 304.3.1 PERFORMANCE OBJECTIVES FOR USE IN ASCE 41 FOR COMPLIANCE WITH FULL SEISMIC ~~FORCES~~ CRITERIA

RISK CATEGORY (Based on IBC Table 1604.5)	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-1N EARTHQUAKE HAZARD LEVEL	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-2N EARTHQUAKE HAZARD LEVEL
I	Life Safety (S-3)	Collapse Prevention (S-5)
II	Life Safety (S-3)	Collapse Prevention (S-5)
III	Damage Control (S-2)	Limited Safety (S-4)
IV	Immediate Occupancy (S-1)	Life Safety (S-3)

[BS] 304.3.2 ~~Compliance with reduced~~ Reduced seismic ~~forces~~ criteria. ~~Where seismic evaluation and design is permitted to use reduced seismic forces, the criteria used shall be in accordance with one of the following~~ Where required, seismic evaluation or design shall comply with one of the following:

1. ~~The~~ Section 1613 of the *International Building Code* using 75 percent of the prescribed forces. Values of R, Ω_0 and C_d used for analysis shall be as specified in Section 304.3.1 of this code.
2. Applicable chapters of Appendix A of this code, for structures ~~Structures~~ or portions of structures ~~that comply with the requirements of the applicable chapter in Appendix A as~~ specified in Items 2.1 through 2.4 ~~and~~ subject to the limitations of the respective chapter ~~Appendix A chapters shall be deemed to comply with this section~~.

    2.1. Chapter A1 for ~~The seismic evaluation and design of~~ unreinforced masonry bearing wall buildings ~~in~~ assigned to *Risk Category* I or II ~~are permitted to be based on the procedures specified in Appendix Chapter A1~~.

    2.2. Chapter A2 for ~~Seismic evaluation and design of~~ the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms ~~in~~ assigned to *Risk Category* I or II ~~are permitted to be based on the procedures specified in Chapter A2~~.

    2.3. Chapter A3 for ~~Seismic evaluation and design of~~ cripple walls and sill plate anchorage in residential buildings of light-frame wood construction ~~in~~ assigned to *Risk Category* I or II ~~are permitted to be based on the procedures specified in Chapter A3~~.

    2.4. Chapter A4 for ~~Seismic evaluation and design of~~ soft, weak or open-front wall conditions in multiple-unit residential buildings of wood construction ~~in~~ assigned to *Risk Category* I or II ~~are permitted to be based on the procedures specified in Chapter A4~~.

3. ASCE 41, using the performance objective in Table 304.3.2 for the applicable *risk category*.

[BS] TABLE 304.3.2 PERFORMANCE OBJECTIVES FOR USE IN ASCE 41 FOR COMPLIANCE WITH REDUCED SEISMIC ~~FORCES~~ CRITERIA

RISK CATEGORY (Based on IBC Table 1604.5)	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-1E EARTHQUAKE HAZARD LEVEL	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-2E EARTHQUAKE HAZARD LEVEL
I	Life Safety (S-3). See Note a	Collapse Prevention (S-5)
II	Life Safety (S-3). See Note a	Collapse Prevention (S-5)
III	Damage Control (S-2). See Note a	Limited Safety (S-4). See Note b
IV	Immediate Occupancy (S-1)	Life Safety (S-3). See Note c

a. For Risk Categories I, II and III, the Tier 1 and Tier 2 procedures need not be considered for the BSE-1E earthquake hazard level.

b. For Risk Category III, the Tier 1 screening checklists shall be based on the Collapse Prevention, except that checklist statements using the Quick Check provisions shall be based on *MS*-factors that are the average of the values for Collapse Prevention and Life Safety.

c. For Risk Category IV, the Tier 1 screening checklists shall be based on Collapse Prevention, except that checklist statements using the Quick Check provisions shall be based on *MS*-factors for Life Safety.

[BS] 405.2.3.1 Evaluation. The building shall be evaluated by a registered design professional, and the evaluation findings shall be submitted to the *code official*. The evaluation shall establish whether the lateral force-resisting system of the damaged building, if repaired to its predamage state, would comply with the provisions of the *International Building Code* for load combinations that include wind ~~or earthquake~~ effects~~, except that the seismic forces shall be the reduced seismic forces~~ and with Section 304.3.2 of this code.

[BS] 405.2.3.3 Extent of repair for noncompliant buildings. If the evaluation does not establish that the lateral force-resisting system of the building in its predamage condition complies with the provisions of Section 405.2.3.1, then the ~~building~~ lateral force-resisting system shall be retrofitted to comply with the provisions of this section. The wind loads for the *repair* and *retrofit* shall be those required by the building code in effect at the time of original construction, unless the damage was caused by wind, in which case the wind loads shall be in accordance with the *International Building Code*. The seismic retrofit shall comply with Section 304.3.2 of this code, but the earthquake loads ~~for this *retrofit* design~~ shall not be less than those required by the building code in effect at the time of original construction~~, but not less than the reduced seismic forces~~.

[BS] 502.5 Existing structural elements carrying lateral load. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the lateral force-resisting system of the *existing structure* and its *addition* acting together as a single structure shall ~~be shown to meet the requirements of~~ comply with Section~~s~~ 1609 ~~and 1613~~ of the International Building Code ~~using full seismic forces~~ and with Section 304.3.1 of this code.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Section~~s~~ 1609 ~~and 1613~~ of the International Building Code and Section 304.3.1 of this code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.
2. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 503.4 Existing structural elements carrying lateral load. Except as permitted by Section 503.13, where the *alteration* increases design lateral loads, results in a prohibited structural irregularity as defined in ASCE 7, or decreases the capacity of any existing lateral load-carrying structural element, the ~~structure~~ lateral force-resisting system of the altered building or structure shall meet the requirements of Section~~s~~ 1609 ~~and 1613~~ of the International Building Code and Section 304.3.2 of this code. ~~Reduced seismic forces shall be permitted.~~

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Section~~s~~ 1609 ~~and 1613~~ of the *International Building Code* and Section 304.3.1 or Section 304.3.2 of this code. ~~Reduced seismic forces shall be permitted.~~ For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.

2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 400 pounds (181.4 kg) and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, “roof” shall mean the roof level above a particular story.

[BS] 503.5 Seismic Design Category F. Where the *work area* exceeds 50 percent of the building area, and where the building is assigned to Seismic Design Category F, the ~~structure~~ lateral force-resisting system of the altered building shall meet the requirements of Section~~s~~ 1609 ~~and 1613~~ of the International Building Code and Section 304.3.2 of this code. ~~Reduced seismic forces shall be permitted.~~

[BS] 503.6 Bracing for unreinforced masonry parapets on reroofing. Where the intended *alteration* requires a permit for reroofing and involves removal of roofing materials from more than 25 percent of the roof area of a building assigned to Seismic Design Category D, E or F that has parapets constructed of unreinforced masonry, the work shall include evaluation of the existing condition or installation of parapet bracing to resist out-of-plane seismic forces to comply with Section 304.3.2. ~~, unless an evaluation demonstrates compliance of such items. Reduced seismic forces shall be permitted.~~

[BS] 503.7 Anchorage for concrete and reinforced masonry walls. Where the *work area* exceeds 50 percent of the building area, the building is assigned to Seismic Design Category C, D, E or F and the building’s structural system includes concrete or reinforced masonry walls with a flexible roof diaphragm, the *alteration* work shall include evaluation of the existing condition or installation of wall anchors at the roof line to comply with Section 304.3.2. ~~, unless an evaluation demonstrates compliance of existing wall anchorage. Use of reduced seismic forces shall be permitted.~~

[BS] 503.8 Anchorage for unreinforced masonry walls in major alterations. Where the *work area* exceeds 50 percent of the building area, the building is assigned to Seismic Design Category C, D, E or F and the building’s structural system includes unreinforced masonry bearing walls, the *alteration* work shall include evaluation of the existing condition or installation of wall anchors at the floor and roof lines to comply with Section 304.3.2. ~~, unless an evaluation demonstrates compliance of existing wall anchorage. Reduced seismic forces shall be permitted.~~

[BS] 503.9 Bracing for unreinforced masonry parapets in major alterations. Where the *work area* exceeds 50 percent of the building area, and where the building is assigned to Seismic Design Category C, D, E or F, and the building has parapets constructed of unreinforced masonry , the alteration work shall include evaluation of the existing condition or installation of parapet ~~shall have~~ bracing ~~installed as needed~~ to resist out-of-plane seismic forces to comply with Section 304.3.2. ~~, unless an evaluation demonstrates compliance of such items. Reduced seismic forces shall be permitted.~~

[BS] 503.10 Anchorage of unreinforced masonry partitions in major alterations. Where the *work area* exceeds 50 percent of the building area, ~~and where~~ the building is assigned to Seismic Design Category C, D, E or F, and the building has unreinforced masonry partitions ~~and~~ or nonstructural walls , the alteration work shall include evaluation of the existing condition or removal, anchoring, or alteration of any such partitions or walls within the *work area* and adjacent to egress paths from the *work area* , to comply with Section 304.3.2. ~~shall be anchored, removed or altered to resist out-of-plane seismic forces, unless an evaluation demonstrates compliance of such items. Use of reduced seismic forces shall be permitted.~~

[BS] 503.11 Substantial structural alteration. Where the *work area* exceeds 50 percent of the building area and where work involves a *substantial structural alteration*, the lateral load-resisting system of the altered building shall satisfy the requirements of Section~~s~~ 1609 ~~and 1613~~ of the International Building Code and Section 304.3.2 of this code. ~~Reduced seismic forces shall be permitted.~~

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes that are altered based on the conventional light-frame construction methods of the *International Building Code* or in compliance with the provisions of the *International Residential Code*.
2. Where the intended *alteration* involves only the lowest story of a building, only the lateral load-resisting components in and below that story need comply with this section.

506.5.3 Seismic loads (seismic force-resisting system). Where a *change of occupancy* results in a building being assigned to a higher *risk category*, or where the change is from a Group S or Group U occupancy to any occupancy other than Group S or Group U, the lateral force-resisting system of the building shall ~~satisfy the requirements of Section 1613 of the International Building Code~~ comply with Section 304.3.1 for the new *risk category* ~~using full seismic forces~~.

Exceptions:

1. Where the area of the new occupancy is less than 10 percent of the building area, the occupancy is not changing from a Group S or Group U occupancy, and the new occupancy is not assigned to *Risk Category* IV, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.
2. Where a *change of use* results in a building being reclassified from *Risk Category* I or II to Risk Category III and the seismic coefficient, S_{DS}, is less than 0.33, compliance with this section is not required.
3. Unreinforced masonry bearing wall buildings assigned to *Risk Category* III and to Seismic Design Category A or B, shall be permitted to use Appendix Chapter A1 of this code.
4. Where the change is from a Group S or Group U occupancy and there is no change of risk category, ~~use of reduced seismic forces~~ compliance with Section 304.3.2 shall be permitted.

506.5.4 Access to Risk Category IV. Any structure that provides operational access to an adjacent structure assigned to *Risk Category* IV as the result of a *change of occupancy* shall itself ~~satisfy the requirements of~~ comply with Sections 1608~~,~~ and 1609 ~~and 1613~~ of the International Building Code and Section 304.3.1 of this code. ~~For compliance with Section 1613, International Building Code-level seismic forces shall be used.~~ Where operational access to the *Risk Category* IV structure is less than 10 feet (3048 mm) from either an interior lot line or from another structure, access protection from potential falling debris shall be provided.

[BS] 706.3.1 Bracing for unreinforced masonry bearing wall parapets. Where a permit is issued for reroofing for more than 25 percent of the roof area of a building assigned to Seismic Design Category D, E or F that has parapets constructed of unreinforced masonry, the work shall include evaluation of the existing condition or installation of parapet bracing to comply with Section 304.3.2. ~~unless an evaluation demonstrates compliance of such items. Reduced seismic forces shall be permitted.~~

[BS] 805.3 Existing structural elements resisting lateral loads. Except as permitted by Section 805.4, where the *alteration* increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the ~~structure~~ lateral force-resisting system of the altered building or structure shall meet the requirements of Section~~s~~ 1609 ~~and 1613~~ of the International Building Code and Section 304.3.2 of this code. ~~Reduced seismic forces shall be permitted.~~

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is not more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Section~~s~~ 1609 ~~and 1613~~ of the International Building Code and Section 304.3.1 or Section 304.3.2 of this code. ~~Reduced seismic forces shall be permitted.~~ For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

[BS] 906.2 Existing structural elements resisting lateral loads. Where work involves a *substantial structural alteration*, the lateral load-resisting system of the altered building shall be shown to satisfy the requirements of Section~~s~~ 1609 ~~and 1613~~ of the International Building Code and Section 304.3.2 of this code. ~~Reduced seismic forces shall be permitted.~~

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes that are altered based on the conventional light-frame construction methods of the *International Building Code* or in compliance with the provisions of the *International Residential Code*.
2. Where the intended alteration involves only the lowest story of a building, only the lateral load resisting components in and below that story need comply with this section.

[BS] 906.3 Seismic Design Category F. Where the building is assigned to Seismic Design Category F, the ~~structure~~ lateral force-resisting system of the altered building shall meet the requirements of Section~~s~~ 1609 ~~and 1613~~ of the International Building Code and Section 304.3.2 of this code. ~~Reduced seismic forces shall be permitted.~~

[BS] 906.4 Anchorage for concrete and masonry buildings. For any building assigned to Seismic Design Category D, E or F with a structural system that includes concrete or reinforced masonry walls with a flexible roof diaphragm, the *alteration* work shall include evaluation of the existing condition or installation of wall anchors at the roof line of all subject buildings and at the floor lines of unreinforced masonry buildings to comply with Section 304.3.2. ~~unless an evaluation demonstrates compliance of existing wall anchorage. Reduced seismic forces shall be permitted.~~

[BS] 906.5 Anchorage for unreinforced masonry walls. For any building assigned to Seismic Design Category C, D, E or F with a structural system that includes unreinforced masonry bearing walls, the *alteration* work shall include evaluation of the existing condition or installation of wall anchors at the roof line to comply with Section 304.3.2. ~~, unless an evaluation demonstrates compliance of existing wall anchorage. Reduced seismic forces shall be permitted.~~

[BS] 906.6 Bracing for unreinforced masonry parapets. Parapets constructed of unreinforced masonry in buildings assigned to Seismic Design Category C, D, E or F shall have their existing condition evaluated or shall have bracing installed to comply with Section 304.3.2. ~~as needed to resist the reduced *International Building Code*-level seismic forces in accordance with Section 304.3, unless an evaluation demonstrates compliance of~~

~~such items. Use of reduced seismic forces shall be permitted.~~

[BS] 906.7 Anchorage of unreinforced masonry partitions. Where the building is assigned to Seismic Design Category C, D, E or F, unreinforced masonry partitions and nonstructural walls within the *work area* and adjacent to egress paths from the *work area* shall have their existing conditions evaluated or shall be anchored, removed, or altered to resist out-of-plane seismic forces, to comply with Section 304.3.2. ~~unless an evaluation demonstrates compliance of such items. Use of reduced seismic forces shall be permitted.~~

[BS] 1006.3 Seismic loads. Where a *change of occupancy* results in a building being assigned to a higher *risk category*, or where the change is from a Group S or Group U occupancy to any occupancy other than Group S or Group U, the lateral force-resisting system of the building shall comply with Section 304.3.1 ~~satisfy the requirements of Section 1613 of the International Building Code~~ for the new *risk category* ~~using full seismic forces~~.

Exceptions:

1. Where a *change of use* results in a building being reclassified from *Risk Category* I or II to *Risk Category* III and the seismic coefficient, S_{DS}, is less than 0.33, compliance with this section is not required.
2. Where the area of the new occupancy is less than 10 percent of the building area, the occupancy is not changing from a Group S or Group U occupancy, and the new occupancy is not assigned to *Risk Category* IV, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.
3. Unreinforced masonry bearing wall buildings assigned to *Risk Category* III and to Seismic Design Category A or B shall be permitted to use Appendix Chapter A1 of this code.
4. Where the change is from a Group S or Group U occupancy and there is no change of *risk category*, ~~use of reduced seismic forces~~ compliance with Section 304.3.2 shall be permitted.

[BS] 1006.4 Access to Risk Category IV. Any structure that provides operational access to an adjacent structure assigned to *Risk Category* IV as the result of a change of occupancy shall itself ~~satisfy the requirements of~~ comply with Sections 1608~~,~~ and 1609 ~~and 1613~~ of the International Building Code and Section 304.3.1 of this code. ~~For compliance with Section 1613 of the *International Building Code*, the full seismic forces shall be used.~~ Where operational access to *Risk Category* IV is less than 10 feet (3048 mm) from either an interior lot line or from another structure, access protection from potential falling debris shall be provided.

[BS] 1103.2 Lateral force-resisting system. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the lateral force-resisting system of the *existing structure* and its *addition* acting together as a single structure shall ~~meet the requirements of~~ comply with Section~~s~~ 1609 ~~and 1613~~ of the *International Building Code* ~~using full seismic forces~~ and Section 304.3.1 of this code.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Section~~s~~ 1609 ~~and 1613~~ of the *International Building Code* and Section 304.3.1 of this code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

Reason Statement: This proposal clarifies the way the IEBC references seismic criteria. It makes important and practical clarifications consistent with the intent of the current code, but it is 100% clarification and simplification, with no substantive effect.
The proposal makes four types of changes, as needed, to various provisions that cite the seismic criteria in Section 304:

- Instead of referring vaguely to "full seismic forces" or "reduced seismic forces" – and relying on the user to know where to find those in Chapter 3 – it revises the many triggering provisions to point directly to Sections 304.3.1 or 304.3.2, respectively.
- It clarifies the scope of work within the triggering provisions by referring to the "lateral force-resisting system" instead of the generic "structure" or "building." Otherwise, the references to IBC Section 1613 would invoke provisions for seismic bracing and anchorage of nonstructural components, which is not intended except in select cases.
- It removes potential confusion associated with references to IBC Section 1613. Instead, it references Section 304.3, which gives IBC Section 1613 as one of several options for seismic criteria.
- It makes revisions to Section 304.3 consistent with the other three changes. In particular, it changes the subsection titles from "forces" to the more complete and correct "criteria," since the required criteria address more than just design forces.

In addition, the proposal makes various editorial revisions to improve readability and provide more consistent wording. The edit to Section 506.5.4

also corrects the old wording that should have been changed in a past cycle but was apparently missed.

The proposal makes matching changes to the Prescriptive and Work Area methods.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is 100% simplification and clarification of intent. It clarifies references to the applicable seismic criteria already provided in Chapter 3, it clarifies the current understanding that those criteria typically apply only to the lateral force-resisting system (not to the structure generally), and it clarifies how the code already allows evaluation as a means of compliance. Thus the substantive effect of the current code is unchanged.

EB15-22

EB16-22

IEBC: [BS] 304.3.1, [BS] 304.3.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 304.3.1 Compliance with full seismic forces. Where compliance requires the use of full seismic forces, the criteria shall be in accordance with one of the following <u>methodologies, which shall not be applied in combination with each other</u>:

1. One-hundred percent of the values in the *International Building Code*. Where the existing seismic force-resisting system is a type that can be designated as “Ordinary,” values of R, Ω_0 and C_d used for analysis in accordance with Chapter 16 of the International Building Code shall be those specified for structural systems classified as “Ordinary” in accordance with Table 12.2-1 of ASCE 7, unless it can be demonstrated that the structural system will provide performance equivalent to that of a “Detailed,” “Intermediate” or “Special” system.
2. ASCE 41, using a Tier 3 procedure and <u>both levels of</u> the two-level performance objective in Table 304.3.1 for the applicable *risk category*.

[BS] 304.3.2 Compliance with reduced seismic forces. Where seismic evaluation and design is permitted to use reduced seismic forces, the criteria used shall be in accordance with one of the following <u>methodologies, which shall not be applied in combination with each other</u>:

1. The *International Building Code* using 75 percent of the prescribed forces. Values of R, Ω_0 and C_d used for analysis shall be as specified in Section 304.3.1 of this code.
2. Structures or portions of structures that comply with the requirements of the applicable chapter in Appendix A as specified in Items 2.1 through 2.4 and subject to the limitations of the respective Appendix A chapters shall be deemed to comply with this section.

   2.1. The seismic evaluation and design of unreinforced masonry bearing wall buildings in *Risk Category* I or II are permitted to be based on the procedures specified in Appendix Chapter A1.

   2.2. Seismic evaluation and design of the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms in *Risk Category* I or II are permitted to be based on the procedures specified in Chapter A2.

   2.3. Seismic evaluation and design of cripple walls and sill plate anchorage in residential buildings of light-frame wood construction in *Risk Category* I or II are permitted to be based on the procedures specified in Chapter A3.

   2.4. Seismic evaluation and design of soft, weak or open-front wall conditions in multiple-unit residential buildings of wood construction in *Risk Category* I or II are permitted to be based on the procedures specified in Chapter A4.
3. ASCE 41, using the performance objective in Table 304.3.2 for the applicable *risk category*.

Reason Statement: This proposal makes two clarifications to the application of seismic structural criteria, both of which merely reflect the current intent of the code. There is no substantive change.
In both Section 304.3.1 and 304.3.2, the provision clarifies that the listed options are not to be used in combination with each other. This proposal responds to reports of opportunistic or uninformed use of ASCE 41 force levels with IBC Section 1613 (ASCE 7) analysis procedures and acceptability criteria. The phrase “shall not be applied in combination with each other” is borrowed from IEBC Section 301.3.

In Section 304.3.1, the use of ASCE 41 is clarified by noting that both columns of Table 304.3.1 must be applied. This proposal responds to questions about whether the two columns are interchangeable and to reports of projects complying with only half of the two-part objective. A similar clarification is not needed in Section 304.3.2 because for “reduced” seismic criteria, ASCE 41 usually requires application of only half of the two-part objective, as indicated in Table 304.3.2 footnote a.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is entirely a clarification of the current intent of the code, with no substantive effect.

EB16-22

EB17-22

IEBC: [BS] 304.3.2, ICC Chapter 16 (New)

Proponents: Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); J Daniel Dolan, representing Seismic Code Support Committee (jddolan@wsu.edu); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 304.3.2 Compliance with reduced seismic forces. Where seismic evaluation and design is permitted to use reduced seismic forces, the criteria used shall be in accordance with one of the following:

1. The *International Building Code* using 75 percent of the prescribed forces. Values of R, Ω_0 and C_d used for analysis shall be as specified in Section 304.3.1 of this code.
2. Structures or portions of structures that comply with the requirements of the applicable chapter in Appendix A as specified in Items 2.1 through 2.4 and subject to the limitations of the respective Appendix A chapters shall be deemed to comply with this section.

    2.1. The seismic evaluation and design of unreinforced masonry bearing wall buildings in *Risk Category* I or II are permitted to be based on the procedures specified in Appendix Chapter A1.

    2.2. Seismic evaluation and design of the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms in *Risk Category* I or II are permitted to be based on the procedures specified in Chapter A2.

    2.3. Seismic evaluation and design of cripple walls and sill plate anchorage in residential buildings of light-frame wood construction in *Risk Category* I or II are permitted to be based on the procedures specified in Chapter A3.

    2.4. Seismic evaluation and design of soft, weak or open-front wall conditions in multiple-unit residential buildings of wood construction in *Risk Category* I or II are permitted to be based on the procedures specified in Chapter A4.

3. <u>Seismic evaluation and retrofit of seismic vulnerabilities in one- and two-family dwellings or townhouses of wood light-frame construction in Risk Categories I and II shall be permitted to be assessed and retrofitted in accordance with the procedures of ICC-1300, subject to its eligibility requirements.</u>

~~3~~ <u>4.</u> ASCE 41, using the performance objective in Table 304.3.2 for the applicable *risk category*.

Add new standard(s) as follows:

ICC

International Code Council, Inc.
500 New Jersey Avenue NW 6th Floor
Washington, DC 20001

<u>1300-2023</u> <u>Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ICC 1300-2023 Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The recently published document *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings Volume 1 - Prestandard* (FEMA P-1100, 2018) is in the process of being converted to Standard ICC-1300 by the ICC Residential Assessment and Seismic Retrofit Standard Committee. The FEMA prestandard and the ICC standard have used state of the art analysis tools and performance-based methods to develop seismic retrofit provisions for cripple wall, living-space-over-garage, and hillside dwellings as well as residential brick masonry chimneys.
This proposal recognizes this seismic retrofit standard as providing seismic performance that is equivalent to the other methodologies listed in Section 304.3.2.

Bibliography: *ICC-1300, Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings,* Under development (ICC, 2022)

Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings Volume 1 - Prestandard (FEMA P-1100, 2018)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase or decrease the cost of construction. It only provides a new alternative method for voluntary retrofit.

EB18-22

IEBC: 304.4 (New), ICC Chapter 16 (New)

Proponents: Kelly Cobeen, representing ICC Residential Seismic Assessment and Retrofit Standard Consensus Committee (IS-RSARC) (kcobeen@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new text as follows:

304.4 Seismic Retrofit of One- and Two-Family Dwellings and Townhouses. Voluntary seismic retrofit of detached one- and two-family dwellings and townhouses shall be permitted to be in accordance with ICC-1300.

Add new standard(s) as follows:

ICC

International Code Council, Inc.
500 New Jersey Avenue NW 6th Floor
Washington, DC 20001

1300-2023	Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings

Staff Analysis: A review of the standard proposed for inclusion in the code, ICC 1300-2023 Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This proposal adds to IEBC Section 304 "Structural Design Loads and Evaluation and Design Procedures" a new Section 304.4 to reference new standard ICC 1300-202X, *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings*. Section 304.4 recognizes the standard and authorizes its use for owners, contractors, registered design professionals, and building officials where seismic retrofits may be desired. The new standard is also added to Chapter 16, Reference Standards. It is the general intent that voluntary seismic retrofit per ICC 1300 be permitted without triggering other requirements of the IEBC or the IRC, but discretion is left to the building official. A companion proposal provides a similar adoption of ICC 1300 into the IRC.
ICC 1300-202X is an optional design and construction standard that allows, under certain circumstances, one- and two-family dwelling units and townhouses to be assessed and retrofitted to provide a higher level of seismic resistance than structures built to legacy codes or prior to building codes being in effect. Damage assessments from earthquakes and application of modern seismic design standards and modeling techniques have shown hillside homes, crawl space homes, homes with living areas over garages, and brick masonry chimneys to be vulnerable to significant earthquake damage. Prestandard FEMA P-1100, *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings,* developed by the Applied Technology Council, was used as the basis of the new ICC 1300 standard. Also included is the evaluation and retrofit of masonry chimneys.

As an ANSI accredited standards developing organization, the Code Council is developing New ICC 1300-202X. The Residential Seismic Assessment and Retrofit Standard Consensus Committee (IS-RSARC) has the primary responsibility for the development of minimum requirements to safeguard the public health, safety, general welfare by providing a methodology for the identification, evaluation and retrofit of specific known vulnerabilities for one- and two-family wood light-frame dwellings up to 2 stories in height located in Seismic Design Categories B through E. This includes the use of the best available seismic numerical modeling tools and engineering practices to assist in development of assessment methods and to identify retrofit criteria to best achieve targeted performance objectives. Use of the provisions is anticipated to improve earthquake performance but is not necessarily intended to prevent earthquake damage. IS-RSARC was appointed by the ICC Board of Directors in June 2020 and has primary responsibility for the development as an American National Standard. All standards development is subject to ICC's ANSI Approved Consensus Procedures. The development of the standard is currently ongoing. The first public ballot version is included with this proposal; the final version is anticipated to be available in late 2022, as required by ICC.

Bibliography: ICC-1300, Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings, Under development (ICC, 2022)

Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings (FEMA P-1100), Federal Emergency Management Agency, Washington, D.C, 2018.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code proposal does not increase nor decrease cost of construction, as the standard and the charging language is voluntary.

EB18-22

EB19-22

IEBC: 304.4 (New), [BS] 502.4, [BS] 502.5, 304.5 (New), [BS] 503.3, [BS] 503.4, [BS] 503.5, [BS] 503.6, [BS] 503.7, [BS] 503.8, [BS] 503.9, [BS] 503.10, [BS] 503.11, [BS] 503.12, [BS] 503.13, 304.6 (New), 506.5, 506.5.1, 506.5.2, 506.5.3, 506.5.4, SECTION 706, [BS] 706.1, [BS] 706.2, [BS] 706.3, [BS] 706.3.1, [BS] 706.3.2, SECTION 805, [BS] 805.1, [BS] 805.2, [BS] 805.3, [BS] 805.4, SECTION 906, [BS] 906.1, [BS] 906.2, [BS] 906.3, [BS] 906.4, [BS] 906.5, [BS] 906.6, [BS] 906.7, SECTION 1006, [BS] 1006.1, [BS] 1006.2, [BS] 1006.3, [BS] 1006.4, [BS] 1103.1, [BS] 1103.2, [BS] 1301.4.1

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new text as follows:

304.4 Structural requirements for additions.. Additions shall comply with Sections 304.4.1 and 304.4.2

Revise as follows:

[BS] ~~502.4~~ 304.4.1 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose vertical load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 304.5.1 ~~503.3~~. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 304.4.2 ~~502.5~~.

Exception: Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] ~~502.5~~ 304.4.2 Existing structural elements carrying lateral load. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 1613 of the International Building Code using full seismic forces.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.
2. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

Add new text as follows:

304.5 Structural requirements for alterations.. Buildings undergoing alterations shall comply with Sections 304.5.1 through 304.5.10. Voluntary lateral force resisting system alterations shall comply with Section 304.5.11.

Revise as follows:

[BS] ~~503.3~~ 304.5.1 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable design dead, live and snow loads including snow drift effects required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.

[BS] ~~503.4~~ 304.5.2 Existing structural elements carrying lateral load. Except as permitted by Section 304.5.11 ~~503.13~~, where the *alteration* increases design lateral loads, results in a prohibited structural irregularity as defined in ASCE 7, or decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.
2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 400 pounds (181.4 kg) and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, "roof" shall mean the roof level above a particular story.

[BS] ~~503.5~~ 304.5.3 Seismic Design Category F. Where the *work area* exceeds 50 percent of the building area, and where the building is assigned to Seismic Design Category F, the structure of the altered building shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

[BS] ~~503.6~~ 304.5.4 Bracing for unreinforced masonry parapets on reroofing. Where the intended *alteration* requires a permit for reroofing and involves removal of roofing materials from more than 25 percent of the roof area of a building assigned to Seismic Design Category D, E or F that has parapets constructed of unreinforced masonry, the work shall include installation of parapet bracing to resist out-of-plane seismic forces, unless an evaluation demonstrates compliance of such items. Reduced seismic forces shall be permitted.

[BS] ~~503.7~~ 304.5.5 Anchorage for concrete and reinforced masonry walls. Where the *work area* exceeds 50 percent of the building area, the building is assigned to Seismic Design Category C, D, E or F and the building's structural system includes concrete or reinforced masonry walls with a flexible roof diaphragm, the *alteration* work shall include installation of wall anchors at the roof line, unless an evaluation demonstrates compliance of existing wall anchorage. Use of reduced seismic forces shall be permitted.

[BS] ~~503.8~~ 304.5.6 Anchorage for unreinforced masonry walls in major alterations. Where the *work area* exceeds 50 percent of the building area, the building is assigned to Seismic Design Category C, D, E or F and the building's structural system includes unreinforced masonry bearing walls, the *alteration* work shall include installation of wall anchors at the floor and roof lines, unless an evaluation demonstrates compliance of existing wall anchorage. Reduced seismic forces shall be permitted.

[BS] ~~503.9~~ 304.5.7 Bracing for unreinforced masonry parapets in major alterations. Where the *work area* exceeds 50 percent of the building area, and where the building is assigned to Seismic Design Category C, D, E or F, parapets constructed of unreinforced masonry shall have bracing installed as needed to resist out-of-plane seismic forces, unless an evaluation demonstrates compliance of such items. Reduced seismic forces shall be permitted.

[BS] ~~503.10~~ 304.5.8 Anchorage of unreinforced masonry partitions in major alterations. Where the *work area* exceeds 50 percent of the building area, and where the building is assigned to Seismic Design Category C, D, E or F, unreinforced masonry partitions and nonstructural walls within the *work area* and adjacent to egress paths from the *work area* shall be anchored, removed or altered to resist out-of-plane seismic forces, unless an evaluation demonstrates compliance of such items. Use of reduced seismic forces shall be permitted.

[BS] ~~503.11~~ 304.5.9 Substantial structural alteration. Where the *work area* exceeds 50 percent of the building area and where work involves a *substantial structural alteration*, the lateral load-resisting system of the altered building shall satisfy the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes that are altered based on the conventional light-frame construction methods of the *International Building Code* or in compliance with the provisions of the *International Residential Code*.

2. Where the intended *alteration* involves only the lowest story of a building, only the lateral load-resisting components in and below that story need comply with this section.

[BS] ~~503.12~~ 304.5.10 Roof diaphragms resisting wind loads in high-wind regions. Where the intended *alteration* requires a permit for reroofing and involves removal of roofing materials from more than 50 percent of the roof diaphragm of a building or section of a building located where the ultimate design wind speed is greater than 130 mph (58 m/s) in accordance with Figure 1609.3(1) of the International Building Code, roof diaphragms, connections of the roof diaphragm to roof framing members, and roof-to-wall connections shall be evaluated for the wind loads specified in Section 1609 of the International Building Code, including wind uplift. If the diaphragms and connections in their current condition are not capable of resisting 75 percent of those wind loads, they shall be replaced or strengthened in accordance with the loads specified in Section 1609 of the International Building Code.

Exception: Buildings that have been demonstrated to comply with the wind load provisions in ASCE 7—88 or later editions.

[BS] ~~503.13~~ 304.5.11 Voluntary lateral force-resisting system alterations. Structural *alterations* that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be required to meet the requirements of Section 1609 or 1613 of the International Building Code, provided that all of the following apply:

1. The capacity of existing structural systems to resist forces is not reduced.
2. New structural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.
3. New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.
4. The *alterations* do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

Add new text as follows:

304.6 Structural requirements for changes of occupancy. Any building undergoing a *change of occupancy* shall comply with the requirements of Sections 304.6.1 through 304.6.4

Delete without substitution:

~~**506.5 Structural.** Any building undergoing a *change of occupancy* shall satisfy the requirements of this section.~~

Revise as follows:

~~506.5.1~~ 304.6.1 Live loads. Structural elements carrying tributary live loads from an area with a *change of occupancy* shall satisfy the requirements of Section 1607 of the International Building Code. Design live loads for areas of new occupancy shall be based on Section 1607 of the International Building Code. Design live loads for other areas shall be permitted to use previously *approved* design live loads.

Exception: Structural elements whose demand-capacity ratio considering the *change of occupancy* is not more than 5 percent greater than the demand-capacity ratio based on previously *approved* live loads need not comply with this section.

~~506.5.2~~ 304.6.2 Snow and wind loads. Where a *change of occupancy* results in a structure being assigned to a higher *risk category*, the structure shall satisfy the requirements of Sections 1608 and 1609 of the International Building Code for the new *risk category*.

Exception: Where the area of the new occupancy is less than 10 percent of the building area, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.

~~506.5.3~~ 304.6.3 Seismic loads (seismic force-resisting system). Where a *change of occupancy* results in a building being assigned to a higher *risk category* , or where the change is from a Group S or Group U occupancy to any occupancy other than Group S or Group U, the building shall satisfy the requirements of Section 1613 of the International Building Code for the new *risk category* using full seismic forces.

Exceptions:

1. Where the area of the new occupancy is less than 10 percent of the building area, the occupancy is not changing from a Group S or Group U occupancy, and the new occupancy is not assigned to *Risk Category* IV, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.
2. Where a *change of use* results in a building being reclassified from *Risk Category* I or II to Risk Category III and the seismic coefficient, S_{DS}, is less than 0.33, compliance with this section is not required.
3. Unreinforced masonry bearing wall buildings assigned to *Risk Category* III and to Seismic Design Category A or B, shall be permitted to use Appendix Chapter A1 of this code.
4. Where the change is from a Group S or Group U occupancy and there is no change of risk category, use of reduced seismic forces shall be permitted.

~~506.5.4~~ 304.6.4 **Access to Risk Category IV.** Any structure that provides operational access to an adjacent structure assigned to *Risk Category* IV as the result of a *change of occupancy* shall itself satisfy the requirements of Sections 1608, 1609 and 1613 of the International Building Code. For compliance with Section 1613, International Building Code-level seismic forces shall be used. Where operational access to the *Risk Category* IV structure is less than 10 feet (3048 mm) from either an interior lot line or from another structure, access protection from potential falling debris shall be provided.

Delete without substitution:

~~SECTION 706~~
~~STRUCTURAL~~

~~**[BS] 706.1 General.** Where *alteration* work includes replacement of equipment that is supported by the building or where a reroofing permit is required, the provisions of this section shall apply.~~

~~**[BS] 706.2 Addition or replacement of roofing or replacement of equipment.** Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures.~~

~~**Exceptions:**~~

1. ~~Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.~~
2. ~~Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.~~

~~**[BS] 706.3 Additional requirements for reroof permits.** The requirements of this section shall apply to *alteration* work requiring reroof permits.~~

~~**[BS] 706.3.1 Bracing for unreinforced masonry bearing wall parapets.** Where a permit is issued for reroofing for more than 25 percent of the roof area of a building assigned to Seismic Design Category D, E or F that has parapets constructed of unreinforced masonry, the work shall include installation of parapet bracing unless an evaluation demonstrates compliance of such items. Reduced seismic forces shall be permitted.~~

~~**[BS] 706.3.2 Roof diaphragms resisting wind loads in high-wind regions.** Where roofing materials are removed from more than 50 percent of the roof diaphragm or section of a building located where the ultimate design wind speed, V_{ult}, determined in accordance with Figure 1609.3(1) of the International Building Code, is greater than 130 mph (58 m/s), roof diaphragms, connections of the roof diaphragm to roof framing members, and roof-to-wall connections shall be evaluated for the wind loads specified in the *International Building Code*, including wind uplift. If the diaphragms and connections in their current condition are not capable of resisting 75 percent of those wind loads, they shall be replaced or strengthened in accordance with the loads specified in the *International Building Code*.~~

~~**Exception:** Buildings that have been demonstrated to comply with the wind load provisions in ASCE 7—88 or later editions.~~

~~SECTION 805~~
~~STRUCTURAL~~

~~**[BS] 805.1 General.** Structural elements and systems within buildings undergoing Level 2 *alterations* shall comply with this section.~~

~~**[BS] 805.2 Existing structural elements carrying gravity loads.** Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable design dead, live and snow loads, including snow drift effects, required by the *International Building Code* for new structures.~~

~~**Exceptions:**~~

1. ~~Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.~~
2. ~~Buildings in which the increased dead load is attributable to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.~~

~~**[BS] 805.3 Existing structural elements resisting lateral loads.** Except as permitted by Section 805.4, where the *alteration* increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609~~

~~and 1613 of the International Building Code. Reduced seismic forces shall be permitted.~~

> ~~**Exception:** Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is not more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.~~

~~**[BS] 805.4 Voluntary lateral force-resisting system alterations.** Structural *alterations* that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be required to meet the requirements of Section 1609 or Section 1613 of the International Building Code, provided that the following conditions are met:~~

1. ~~The capacity of existing structural systems to resist forces is not reduced.~~
2. ~~New structural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.~~
3. ~~New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.~~
4. ~~The *alterations* do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.~~

~~SECTION 906~~
~~STRUCTURAL~~

~~**[BS] 906.1 General.** Where buildings are undergoing Level 3 *alterations*, the provisions of this section shall apply.~~

~~**[BS] 906.2 Existing structural elements resisting lateral loads.** Where work involves a *substantial structural alteration* , the lateral load-resisting system of the altered building shall be shown to satisfy the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.~~

~~**Exceptions:**~~

1. ~~Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes that are altered based on the conventional light-frame construction methods of the *International Building Code* or in compliance with the provisions of the *International Residential Code.*~~
2. ~~Where the intended alteration involves only the lowest story of a building, only the lateral load resisting components in and below that story need comply with this section.~~

~~**[BS] 906.3 Seismic Design Category F.** Where the building is assigned to Seismic Design Category F, the structure of the altered building shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.~~

~~**[BS] 906.4 Anchorage for concrete and masonry buildings.** For any building assigned to Seismic Design Category D, E or F with a structural system that includes concrete or reinforced masonry walls with a flexible roof diaphragm, the *alteration* work shall include installation of wall anchors at the roof line of all subject buildings and at the floor lines of unreinforced masonry buildings unless an evaluation demonstrates compliance of existing wall anchorage. Reduced seismic forces shall be permitted.~~

~~**[BS] 906.5 Anchorage for unreinforced masonry walls.** For any building assigned to Seismic Design Category C, D, E or F with a structural system that includes unreinforced masonry bearing walls, the *alteration* work shall include installation of wall anchors at the roof line, unless an evaluation demonstrates compliance of existing wall anchorage. Reduced seismic forces shall be permitted.~~

~~**[BS] 906.6 Bracing for unreinforced masonry parapets.** Parapets constructed of unreinforced masonry in buildings assigned to Seismic Design Category C, D, E or F shall have bracing installed as needed to resist the reduced *International Building Code* level seismic forces in accordance with Section 304.3, unless an evaluation demonstrates compliance of such items. Use of reduced seismic forces shall be permitted.~~

~~**[BS] 906.7 Anchorage of unreinforced masonry partitions.** Where the building is assigned to Seismic Design Category C, D, E or F, unreinforced masonry partitions and nonstructural walls within the *work area* and adjacent to egress paths from the *work area* shall be anchored, removed, or altered to resist out-of-plane seismic forces, unless an evaluation demonstrates compliance of such items. Use of reduced seismic forces shall be permitted.~~

~~SECTION 1006~~
~~STRUCTURAL~~

~~**[BS] 1006.1 Live loads.** Structural elements carrying tributary live loads from an area with a *change of occupancy* shall satisfy the requirements of~~

~~Section 1607 of the International Building Code. Design live loads for areas of new occupancy shall be based on Section 1607 of the *International Building Code*. Design live loads for other areas shall be permitted to use previously *approved* design live loads.~~

~~**Exception:** Structural elements whose demand-capacity ratio considering the *change of occupancy* is not more than 5 percent greater than the demand-capacity ratio based on previously *approved* live loads.~~

~~**[BS] 1006.2 Snow and wind loads.** Where a *change of occupancy* results in a structure being assigned to a higher *risk category*, the structure shall satisfy the requirements of Sections 1608 and 1609 of the International Building Code for the new risk category.~~

~~**Exception:** Where the area of the new occupancy is less than 10 percent of the building area. The cumulative effect of occupancy changes over time shall be considered.~~

~~**[BS] 1006.3 Seismic loads.** Where a *change of occupancy* results in a building being assigned to a higher *risk category*, or where the change is from a Group S or Group U occupancy to any occupancy other than Group S or Group U, the building shall satisfy the requirements of Section 1613 of the International Building Code for the new *risk category* using full seismic forces.~~

~~**Exceptions:**~~

1. ~~Where a *change of use* results in a building being reclassified from *Risk Category* I or II to *Risk Category* III and the seismic coefficient,~~ S_{DS}, ~~is less than 0.33, compliance with this section is not required.~~
2. ~~Where the area of the new occupancy is less than 10 percent of the building area, the occupancy is not changing from a Group S or Group U occupancy, and the new occupancy is not assigned to *Risk Category* IV, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.~~
3. ~~Unreinforced masonry bearing wall buildings assigned to *Risk Category* III and to Seismic Design Category A or B shall be permitted to use Appendix Chapter A1 of this code.~~
4. ~~Where the change is from a Group S or Group U occupancy and there is no change of *risk category*, use of reduced seismic forces shall be permitted.~~

~~**[BS] 1006.4 Access to Risk Category IV.** Any structure that provides operational access to an adjacent structure assigned to *Risk Category* IV as the result of a change of occupancy shall itself satisfy the requirements of Sections 1608, 1609 and 1613 of the International Building Code. For compliance with Section 1613 of the *International Building Code*, the full seismic forces shall be used. Where operational access to *Risk Category* IV is less than 10 feet (3048 mm) from either an interior lot line or from another structure, access protection from potential falling debris shall be provided.~~

~~**[BS] 1103.1 Additional gravity loads.** Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 805.2. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 1103.3.~~

~~**Exception:** Buildings of Group R occupancy with not more than five dwelling units or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.~~

~~**[BS] 1103.2 Lateral force-resisting system.** Where the *addition* is structurally independent of the *existing structure* , existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure* , the *existing structure* and its *addition* acting together as a single structure shall meet the requirements of Sections 1609 and 1613 of the *International Building Code* using full seismic forces.~~

~~**Exceptions:**~~

1. ~~Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.~~
2. ~~Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.~~

~~**[BS] 1301.4.1 Structural analysis.** The owner shall have a structural analysis of the *existing building* made to determine adequacy of structural~~

~~systems for the proposed *alteration, addition* or *change of occupancy*. The analysis shall demonstrate that the building with the work completed is capable of resisting the loads specified in Chapter 16 of the International Building Code.~~

Reason Statement: This proposal places all the structural requirements into Chapter 3, such that the same structural provisions are always applicable, regardless of which method of compliance is used.
The structural changes that have taken place recently to the IEBC show that this reorganization is the intent of the code, as the structural provisions have already been changed to not depend on the method of compliance used – except for the performance method.

Currently, the structural provisions of the IEBC are essentially the same in the prescriptive compliance method and work area compliance method. The wording primarily varies as the work area must be described in the prescriptive method as it is not scoped out as it is for the work area method in Chapter 6.

The provisions are still appropriately scoped to the amount of work being done. This consolidation will make it clear how the IEBC regulates the structural portion of existing structures and helps eliminate small differences from method to method that aren't intended. This will help in future cycles to keep the requirements consistent.

The approach is to renumber the sections from the prescriptive method and delete the equivalent sections in the work area method.

As already stated, it is intended to address the structural aspect of existing buildings consistently for all three methods. This is why Section 1301.4.1 is proposed to be deleted. The core purpose of the performance method is focused on providing a non-structural fire and life safety scoring method. That method is intended to provide additional flexibility to existing buildings that may struggle to meet current requirements of the IBC or the prescriptive or work area methods. It is felt appropriate to no longer require full compliance with the IBC for structural integrity and to instead afford the same flexibility provided to the other methods in this code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change will primarily relocate and consolidate existing structural provisions into one globally applicable spot within Chapter 3. This will likely make the code more straightforward to apply. In addition, the application of these requirements versus full compliance with the IBC as required currently by Chapter 13 would possibly decrease the cost of compliance.

EB19-22

EB20-22

IEBC: 306.3, 306.3.1, 306.2

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2021 International Existing Building Code

Revise as follows:

306.2 ~~306.3~~ General ~~Maintenance and repair of facilities~~. A *facility* that is constructed or altered to be accessible shall be maintained accessible during occupancy. Required accessible means of egress shall be maintained during construction, demolition, remodeling or *alterations* and *additions* to any occupied building.

> **Exception:** Existing means of egress need not be maintained where *approved* temporary means of egress and accessible means of egress systems and *facilities* are provided.

306.2.1~~306.3.1~~ Prohibited reduction in accessibility. An *alteration* that decreases or has the effect of decreasing accessibility of a building, *facility* or element, thereof, below the requirements for new construction at the time of the *alteration* is prohibited. The number of accessible elements need not exceed that required for new construction at the time of *alteration*.

306.3 ~~306.2~~ Design. Buildings and *facilities* shall be designed and constructed to be accessible in accordance with this code and the *alteration* and *existing building* provisions in ICC A117.1, as applicable.

Reason Statement: In the last code cycle there were three proposals that modified Section 306.3, EB21, EB22, and EB23. However, when combining all three proposals together, the title for the section "Maintenance and repair," which was changed from "Maintenance of facilities," no longer fits all of the content and subsections that were added.
For example, the second sentence of the section discusses construction, demolition, remodeling or alterations and additions, and the new subsection discusses limitations on alterations specifically. This does not match the title of maintenance and repair.

This proposal moves the topic up to just after scope and renames the section to "General." This is more in-line with how other sections of code address sections that generally provide provisions on the main section topic. For example, see Section 1203 Fire Safety of the 2021 IEBC

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal rearranges the text to better layout the section to start with more general provisions and place the more specific maintenance requirement as a subsection therefore is not intended to change the cost of construction.

EB20-22

EB21-22

IEBC: 306.5

Proponents: David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC (david.renn@denvergov.org)

2021 International Existing Building Code

Revise as follows:

306.5 Change of occupancy. Where an *existing*~~*Existing*~~ *building*~~s that undergo~~ undergoes a *change of occupancy*~~change of group or occupancy~~ that includes *alterations*, such *alterations* shall comply with Section 306.7.

> ~~**Exception:** Type B dwelling or sleeping units required by Section 1108 of the International Building Code are not required to be provided in *existing buildings* and *facilities* undergoing a *change of occupancy* in conjunction with *alterations* where the *work area* is 50 percent or less of the aggregate area of the building.~~

Reason Statement: The current language of this section requires buildings with a change of occupancy to comply with Section 306.7, which only includes requirements for alterations. A change of occupancy, by definition, is not an alteration, so it is unclear what is intended by this section.
A change of occupancy cannot comply with an alteration requirement unless there is also an alteration associated with the change of occupancy. Essentially, this section is moot as currently written since compliance with 306.7 is only applicable to alterations associated with the change of occupancy and is not applicable to the change of occupancy itself. Furthermore, alterations associated with a change of occupancy would have to comply with 306.7 whether there is a change of occupancy or not.
This proposal makes it clear that only alterations must comply with 306.7, not the change of occupancy. This is needed since some read the current language to imply that a change of occupancy should be treated as an alteration with an associated work area, which is incorrect and doesn't match the definition of work area that only includes reconfigured spaces. The exception to this section is proposed to be deleted since it only applies to a change of occupancy in conjunction with an alteration, and this is already covered by the alteration requirements in Section 306.7.4.

Please support this proposal to bring clarify to accessibility requirements (or lack thereof) for a change of occupancy.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not change the cost of construction as it is simply a clarification of the accessibility requirements (or lack thereof) for a change of occupancy.

EB21-22

EB22-22

IEBC: 306.5

Proponents: China Clarke, representing NYS DOS Division of Building Standards and Codes (china.clarke@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

2021 International Existing Building Code

Revise as follows:

306.5 Change of occupancy. *Existing buildings* that undergo a *change of occupancy* ~~change of group or occupancy~~ shall comply with Section 306.7.

> **Exception:** Type B dwelling or sleeping units required by Section 1108 of the International Building Code are not required to be provided in *existing buildings* and *facilities* undergoing a *change of occupancy* in conjunction with *alterations* where the *work area* is 50 percent or less of the aggregate area of the building.

Reason Statement: In the last code cycle, all references to “group” were removed from the IEBC definition of "change of occupancy", the definition was revised, and a definition for “change of use” was added (Code Change No: ADM 3-19 Part I). In light of those changes, the language of Section 306.5 of the 2021 IEBC no longer makes sense. The current use of the words “group or” in Section 305.4 implies that a “change of group” is something other than, or in addition to, a “change of occupancy,” but it is not. We propose to simplify the language of Section 306.5 of the IEBC by removing “group or” and italicizing “change of occupancy”.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is merely using the defined term "change of occupancy" and eliminates the term "Group" that is no longer used. The application of this section has not changed simply correlated more appropriately with a defined term.

EB22-22

EB23-22

IEBC: 306.6, 306.7, 306.7.3, 306.7.4, 306.7.10, 306.7.10.1, 306.7.10.2, 306.7.10.3

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Existing Building Code

Revise as follows:

306.6 Additions. Where additions contain dwelling and sleeping units, the accessibility requirements shall apply only to the quantity of the dwelling or sleeping units in the addition. Provisions for new construction shall apply to *additions*. An *addition* that affects the accessibility to, or contains an area of, a *primary function* shall comply with the requirements in Section 306.7.1.

306.7 Alterations. A *facility* that is altered shall comply with the applicable provisions in Chapter 11 of the International Building Code,ICC A117.1 and the provisions of Sections 306.7.1 through 306.7.16, unless *technically infeasible*. Where compliance with this section is *technically infeasible*, the *alteration* shall provide access to the maximum extent technically feasible.

1. The altered element or space is not required to be on an accessible route, unless required by Section .
2. Accessible means of egress required by Chapter 10 of the International Building Code are not required to be provided in existing *facilities*.
3. The *alteration* to Type A individually owned dwelling units within a Group R-2 occupancy shall be permitted to meet the provision for a Type B dwelling unit.
4. Type B dwelling or sleeping units required by Section 1107 of the International Building Code are not required to be provided in *existing buildings* and *facilities* undergoing *alterations* where the *work area* is 50 percent or less of the aggregate area of the building.

306.7.3 Alteration of Type A units. The *alteration* to Type A individually owned dwelling units within a Group R-2 occupancy shall be permitted to meet the provision for a Type B dwelling unit.

306.7.4 Type B units. Type B dwelling or sleeping units required by Section 1108 of the International Building Code are not required to be provided in *existing buildings* and *facilities* undergoing *alterations* where the *work area* is 50 percent or less of the aggregate area of the building.

Revise as follows:

306.7.10 Determination of number of units. Where Chapter 11 of the *International Building Code* requires Accessible, Type A or Type B units and where such units are being altered or added within an existing building, the number of Accessible, Type A and Type B units shall be determined in accordance with Sections 306.7.10.1 through 306.7.10.3.

306.7.10.1 Accessible dwelling or sleeping units. Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling or sleeping units are being altered or added within an existing building, the requirements of Section 1108 of the International Building Code for Accessible units apply only to the quantity of ~~spaces~~ dwelling or sleeping units being altered or added.

306.7.10.2 Type A dwelling or sleeping units. Where more than 20 Group R-2 dwelling or sleeping units are being altered or added within an existing building within an existing building, the requirements of Section 1108 of the International Building Code for Type A units apply only to the quantity of the ~~spaces~~ dwelling or sleeping units being altered or added.

306.7.10.3 Type B dwelling or sleeping units. ~~Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being added, the requirements of Section 1108 of the International Building Code for Type B units apply only to the quantity of the spaces being added.~~ Where Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being altered or added within an existing building and where the *work area* is greater than 50 percent of the aggregate area of the building, the requirements of Section 1108 of the International Building Code for Type B units apply only to the quantity of the ~~spaces~~ dwelling or sleeping units being altered or added.

Reason Statement: The intent of this proposal is to clarify where 'adding' units is for additions or for within existing buildings. With the current text change of occupancy for all or part of a building that converts from another use to apartments or hotel rooms could be interpreted as adding units, or an alteration.
The added sentence to Section 306.6 would clarify that only the dwelling units in the addition are considered for application of accessibility, not where the addition would now push the entire buildings to over 20 units (Type A) or 4 or more (Type B). This is consistent with FHA.

The text in the first sentence of Section 306.7.10.3 appears to addresses additions for Type B units in a section that is under alterations (306.7). The modification to Section 306.6 will address physical additions. Section 306.7.10.3 will address alterations and added units within existing buildings. This will also provide similar terminology for all three types – Accessible, Type A and Type B. This requirement exceed FHA.The current text for Accessible and Type A units is not clear if this is talking about additions; or units being added within an existing building where they did not exist before. The revised text in Sections 306.7.10, 306.7.10.1 and 306.7.10.2 would clarify that this section is for alterations, including a change of occupancy of part or all of a building.
This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or

portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is merely trying to clear up the applicability of when Accessible units, Type A units and Type B units must be added. Clarification between additions to existing buildings and an addition of new units or alterations to existing units in the existing building is provided. This avoids counting units in the existing buildings inappropriately which will avoid requiring more Accessible Units, Type A units and Type Units than is required. The proposal is not intended as a technical change.

EB23-22

EB24-22

IEBC: 306.6.1 (New), 306.6.1.1 (New)

Proponents: Daniel Nichols, MTA Construction and Development, representing MTA Construction and Development (dnichols@mnr.org)

2021 International Existing Building Code

Add new text as follows:

306.6.1 Accessible Means of Egress. At least one accessible means of egress from the addition shall be provided where required by Section 1009.1 of the International Building Code. A second accessible means of egress shall be provided where an additional means of egress is required due to the addition.

306.6.1.1 Additions for Elevators. Where an addition is being constructed to accommodate the installation of an elevator or elevators to improve accessibility, an accessible means of egress in accordance with Section 1009.1 of the International Building Code is not required when all of the following conditions are provided:

1. Two-way communication is provided at all elevator landings that are part of the addition in accordance with Section 1009.8 of the International Building Code.
2. Each elevator landing is on floor level with access to an exit or a stairway with a minimum width of 36 inches (914 mm).
3. The elevator does not serve a required accessible floor or occupied roof more than four stories above or below the level of exit discharge.

Reason Statement: In the 2015 Group A Code Development Cycle, code change proposal E34-15 was submitted to modify the requirements of Section 1009.1 regarding accessible means of egress in existing buildings. The proposal was modified at the committee action hearings and removed exception 1 that read "Accessible means of egress are not required to in existing buildings"
The proposal was submitted to address potential confusion with the removal of Chapter 34 in the IBC and making the IEBC the clearinghouse for all existing buildings undergoing work. Here is the reason statement from E34-15:

"This blanket exception should be removed from the IBC for two reasons. First, with the change to Chapter 34 of the IBC during the last code change cycle, all existing building requirements are now located in the IEBC. Exception 2 to IEBC Section 410.6 and exception 2 to IEBC Section 705.1 already contain this language, so it is simply redundant to be placed in the IBC. Second, the exception has been misused as a reason for eliminating existing accessible means of egress. Buildings which have been constructed since the adoption of the accessible means of egress provisions in the IBC (and some legacy codes) should be required to maintain these accessible means of egress elements and sections within the IEBC support that concept. By making a blanket statement in the IBC that they are simply not required because the building is "existing" can be construed as meaning that the accessible means of egress are no longer needed. This confusion should be removed from the IBC and allow the IEBC to note how this is supposed to be addressed in existing buildings."

This removal of the exception was approved (as modified by the committee), approved on the consent agenda, and the exception no longer exists since the 2018 IBC.

In the same Code Development Cycle, a reorganization of the IEBC placed all accessibility requirements in one location so there is consistent application regardless of compliance method.

Whereas we agree with the intent of these changes to minimize confusion for code users, it did create a technical change to the application of accessible means of egress requirements as in apples to additions. IEBC Section 306.6 states that "Provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, a primary function shall comply with the requirements in Section 306.7.1." Unlike the alteration section (IEBC 306.7.2) the has an exception that states "Accessible means of egress required by Chapter 10 of the International Building Code are not required to be provided in existing facilities," there is no such exception for additions.

This creates a disconnect between relative levels of safety provided by an accessible means of egress in alterations versus additions. If an elevator is placed through existing floor systems in an existing building undergoing an Alteration Level 3 rehabilitation, no accessible means of egress is required. However, the extension of the building footprint to place an elevator or an enclosed ramp outside the existing exterior walls is considered an addition and requires accessible means of egress.

The proposed language addresses two items regarding additions. The first proposed Section, 306.6.1, quantifies the number of accessible means of egress that needs to be provided. The baseline is one and is consistent with 1009.1. The second means of egress is based on if an additional means of egress is being added due to the addition, rather than relying on the new construction table. This is because an addition may already have sufficient exiting due to the addition.

The second section, 306.6.1.1, specifically addresses additions due to elevator installation. The allows for the use of existing exit and exit access stairways that meet minimum requirements, requires the same two-way communication system as found in 1009.1 for consideration of new exit and exit access stairways, and retains the limit of numbers of floors above or below the level of exit discharge prior to needing an elevator with emergency power. The intent here is to utilize existing stairways that can be used for rescue assistance but require the two-way communication as an increased level of safety than was found in the previous versions of the IBC.

Cost Impact: The code change proposal will decrease the cost of construction
The decrease in construction is mainly due to limiting addition work to 1 AMOE, unless stairways are being added for other code requirements like addressing increased occupant loads. Providing two accessible means of egress in an exiting building that is undergoing an addition is costly for materials, as well as the potential need for land purchases in urban areas for the additional building footprint or tenant revenue cuts due to leasable area losses. For an average cost of installing a new two-stop elevator in an existing below-grade rail station (excavation for one story below grade, EMR, landings, comms, and all other ASME A17.1 requirements) at $16M, the accompanying stairway cost is a average of $2.24M without consideration of excavation for below-grade application or built in area of refuge or enlarged landings. Even though the pricing is based on current public work values in the metropolitan NYC area, the addition of a stairway which was never previously required is an increase of 14% of construction costs.

For the additions for elevators sub-section, the decrease in construction is the same as recognizing the allowance to put in elective elevators without an approximately 14% increase in cost for an additional stairway. Additionally, the potential increase in construction costs due to the required two-way communication system is minimized due to the two-way communication system that is already required by ASME A17.1 and the accessible two-way system required in IBC Section 3001.2. The value of the head-end and monitoring connections are already required by these requirements.

EB24-22

EB25-22

IEBC: 306.7.1

Proponents: Lee Kranz, representing Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Existing Building Code

Revise as follows:

306.7.1 Alterations affecting an area containing a primary function. Where an *alteration* affects the accessibility to, or contains an area of *primary function*, the route to the *primary function* area shall be accessible. ~~The accessible route to the *primary function* area shall include toilet *facilities* and drinking fountains serving the area of *primary function*.~~ Toilet facilities and drinking fountains serving the area of primary function, including the route from the area of primary function to these facilities, shall be accessible.

Exceptions:

1. The cumulative costs of providing the accessible route of travel, toilet facilities and drinking fountains are not required to exceed 20 percent of the costs of the *alterations* affecting the area of *primary function*.
2. This provision does not apply to *alterations* limited solely to windows, hardware, operating controls, electrical outlets and signs.
3. This provision does not apply to *alterations* limited solely to mechanical systems, electrical systems, installation or *alteration* of fire protection systems and abatement of hazardous materials.
4. This provision does not apply to *alterations* undertaken for the primary purpose of increasing the accessibility of a *facility*.
5. This provision does not apply to altered areas limited to Type B dwelling and sleeping units.

Reason Statement: The current language in Section 306.7.1 related to the need to provide an accessible route of travel, accessible toilet facilities and drinking fountains for primary function areas being altered has been the source of confusion for many since it was added to the code. We believe that the current language, which attempts to combine a mandate to improve the accessible route to primary function areas, which is already addressed in the first sentence of this section, with improvements to existing restrooms and drinking fountains, is the source of this confusion. Is the current language intended to require just the path of travel to these facilities or improvements to them as well? This proposal clarifies the language in favor of the latter interpretation.
Separating these two distinct aspects of barrier-free access helps the reader to understand the intent of this provision which is: 1) provide an accessible route to the primary function area, and 2) make accessibility improvements to existing restrooms and drinking fountains serving the area of primary function. By removing the current language and replacing it with a separate and distinct sentence addressing the need to update restrooms and drinking fountains we are eliminating the ambiguity of the current code which will improve consistent enforcement.

Exception number one has also been modified to make it clear that the cumulative cost of these improvements are not required to exceed 20% of the construction budget. The current language can be interpreted to look at just the cost of the route of travel, which would not include the cost of upgrading toilet facilities or drinking fountains but ICC trainers teach that all improvements to accessibility are intended to be counted toward the 20% exception.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is intended to simply reflect what was intended that both the path and the facilities be accessible therefore will not change the cost of construction.

EB25-22

EB26-22

IEBC: 306.7.1

Proponents: Lee Kranz, representing Washington Association of Building Officials Technical Code Development Committee; Gene Boecker, representing self (geneb@codeconsultants.com); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Existing Building Code

Revise as follows:

306.7.1 Alterations affecting an area containing a primary function. Where an *alteration* affects the accessibility to, or contains an area of *primary function*, the route to the *primary function* area shall be accessible. The accessible route to the *primary function* area shall include toilet *facilities* and drinking fountains serving the area of *primary function*. Priority shall be given to the improvements affecting the *accessible route* to the *primary function* area.

Exceptions:

1. The costs of providing the accessible route are not required to exceed 20 percent of the costs of the *alterations* affecting the area of *primary function.*
2. This provision does not apply to *alterations* limited solely to windows, hardware, operating controls, electrical outlets and signs.
3. This provision does not apply to *alterations* limited solely to mechanical systems, electrical systems, installation or *alteration* of fire protection systems and abatement of hazardous materials.
4. This provision does not apply to *alterations* undertaken for the primary purpose of increasing the accessibility of a *facility*.
5. This provision does not apply to altered areas limited to Type B dwelling and sleeping units.

Reason Statement: The provisions of Section 306.7.1 are confusing and are not enforced in a consistent manner. Unless you've had ICC training on the topic, most people are not be able to discern what the intent of this section is or how it should be applied. This proposal is intended to provide guidance for building officials and designers to clearly state that the priority shall be given to the improvements affecting the *accessible route* to the *primary function* area over making other improvements such as updating restrooms and drinking fountains to become accessible. There is broad consensus that providing an accessible route to the primary function area is the most important aspect of this code section. It approved, this code change will create more consistent enforcement and accomplish the goal of allowing non-ambulatory occupants to access the areas of primary function being altered.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change will not affect the cost of construction. This proposal clarifies that the intent of this section is to give priority to improvements to the accessible route to the area of primary function over other improvements. The maximum 20% cost limitations will still apply.

EB26-22

EB27-22

IEBC: 306.7.7

Proponents: Andrew Cid, representing BARRIER FREE SOLUTIONS FOR THE DEAF AND HARD OF HEARING

2021 International Existing Building Code

Revise as follows:

306.7.7 Elevators. Altered elements of existing elevators shall comply with ASME A17.1. Where the elevator emergency communication system is altered or replaced, that system shall comply with Section 3001.2 of the *International Building Code*. Such elements shall also be altered in elevators programmed to respond to the same hall call control as the altered elevator.

Reason Statement: The proposed revision is in recognition that an alteration or modification to elevator emergency communication equipment in an existing elevator would be required to comply with the appropriate provisions of the International Building Code. The applicable provisions associated with elevators are noted in Chapter 30 (see code changes G177-21 AMPC1 and G178-21 AS). It is recognized that existing elevators that are modified or altered can include many elements associated with the elevator system such as control panels and emergency communication capabilities. The proposed revision for the reference to 3001.2 of the 2021 edition of the IBC (proposed 3001.6 of the 2024 edition) is to highlight that there are specific requirements related to emergency communication system that are required in the IBC. This is also to highlight that the current emergency communication requirements found in the ASME A17.1 are different and do not contain the updated and enhanced communication capabilities. This particular reference to the 3001.2 of the IBC is to establish a point of consistency between the various ICC documents as the IBC currently contains the specific requirements for emergency elevator communication that have been accepted by the ICC membership since the 2018 edition of the IBC. The elevator industry has started to incorporate the emergency communication provisions as referenced in the IBC as they have introduced new products in the marketplace in Las Vegas and Washington State plus several others related to emergency communication systems for new construction per 3001.2. It is recognized that this technology can be incorporated into existing elevators as they are modernized or updated as it is now time to move forward and incorporate this life safety feature into existing buildings.

Cost Impact: The code change proposal will increase the cost of construction
There will be a minimal cost increase in the cost of alterations of elevators.

EB27-22

EB28-22

IEBC: 306.7.8

Proponents: Ardel Jala, Seattle Department of Construction & Inspections, representing Washington Association of Building Officials Technical Code Development Committee (ardel.jala@seattle.gov); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Existing Building Code

Add new text as follows:

306.7.8 Limited-use/Limited-application Elevators. Limited-use/Limited-application elevators installed in accordance with ASME A17.1 shall be permitted as a component of an accessible route.

Reason Statement: A Limited-use/Limited-application (LULA) elevator is a type of elevator often proposed as part of an accessible route in existing buildings. Technical requirements for LULAs can be found in ASME A17.1/CSA B44 Safety Code for Elevators and Escalators. In comparison to a commercial elevator; LULAs have smaller car sizes, smaller capacity, slower speeds and shorter rise. In comparison to a platform lift, a LULA provides greater capacity and faster speed. A LULA is more expensive than a platform lift but can cost less than a commercial elevator.
Neither the IBC or IEBC currently provide guidance on where and when a LULA is accepted. Jurisdictions must look to other codes and guidelines to determine where a LULA is permitted. The Guide to the ADA Accessibility Standards explains criteria for elevators and platform lifts. Section 206.6 Required Compliance states: "In facilities not required to have an accessible route between stories or to mezzanines, a limited-use/limited-application (LULA) elevator is permitted. LULAs also are allowed as an alternative to platform lifts and private residence elevators." See: https://www.access-board.gov/ada/guides/chapter-4-elevators-and-platform-lifts/

Platform lifts are permitted as a component of an accessible route in an existing building or facility per IEBC Section 306.7.8. This proposal makes it clear that a LULA, given it is at least equivalent to a platform lift in function, should be allowed where and when a platform lift is allowed in an existing building or facility.

It has been argued that a LULA should be prohibited because it does not meet accessibility requirements. However ICC A117.1 Section 408 provides accessibility requirements for LULAs. Section 408 has requirements for the LULA elevator landing, door and car requirements. There are commercially available LULAs that meet the accessibility requirements of Section 408.

It has also been argued that a LULA is prohibited because it does not meet stretcher requirements. This proposal would not permit a LULA in an existing building where a stretcher sized elevator is required. Where there are multiple code provisions that apply, they all must be satisfied and the most restrictive applies when there is a conflict.

This proposal is appropriate to include in the IEBC and does not extend to new construction. This proposal is an extension of the flexibility that already exists in the IEBC for platform lifts.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal permits use of a LULA where the IEBC already permits use of a platform lift. Use of a LULA over a platform lift is a voluntary increase over the base code requirement.

EB28-22

EB29-22

IEBC: 306.7.8

Proponents: Lee Kranz, Self, representing Washington Association of Building Officials Technical Code Development Committee (lknewcastle@gmail.com); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Existing Building Code

Revise as follows:

306.7.8 Platform lifts. Vertical and inclined platform (wheelchair) lifts installed in accordance with ASME A18.1 shall be permitted as a component of an accessible route.

Reason Statement: This code change is for clarification purposes only. The IEBC Commentary indicates that the term 'platform lift' is intended to include both vertical and inclined lifts so it should be stated that way in the code to eliminate the need for further research. Because ASME A18.1 covers three types of lifts (vertical and inclined lifts, and stairway chair lifts), the proposed language in Section 306.7.8 adds clarity for the reader as to what types of conveyances are allowed by this section of the code. It also reduces potential confusion whether IBC Section 1003.3.4 allows platform lifts to project into the required width of the stair while in operation, because this section is more specific than 1003.3.4, following the principle in Section 102.1 that more specific provisions govern over more general provisions. If approved, the proposed language will give building officials confidence that inclined lifts are permitted to be used as conveyances even though they protrude over the required width of the stair.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is merely clarify the two types of lifts so further review of the standard is not necessary. Both types of lifts are already permitted so there are no substantive changes proposed so therefor no changes to the cost of construction are anticipated.

EB29-22

EB30-22

IEBC: 306.7.8

Proponents: Lee Kranz, representing Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Existing Building Code

Revise as follows:

306.7.8 Platform lifts. Platform (wheelchair) lifts installed in accordance with ASME A18.1 shall be permitted as a component of an accessible route. <u>Except as otherwise permitted by the International Building Code, wheelchair lifts in the stored position shall not encroach into the stairway width or obstruct access to handrails.</u>

Reason Statement: Installing wheelchair lifts on existing stairways creates inclusion opportunities for those who would not otherwise be permitted to access rooms and areas on upper or lower floors. Unfortunately, they also have the potential to create conflicts for safe means of egress in existing buildings. This proposal intends to make it clear that wheelchair lifts, while permitted to be installed and used on existing stairways, are not allowed to be stored on the stairway width or create an obstruction for using handrails.

Some of the lifts we've seen extend as much as 16 inches out onto the stairway walking surface while in the stored position,. This would require occupants to let go of the handrail, go around the lift and then re-grasp the handrail once they get to the other side of the stored lift. This is dangerous and not permitted by IBC Section 1014.4 which states "Handrail gripping surfaces shall be continuous, without interruption by newel posts **or other obstructions**." Approval of this code change will create consistency with IBC Section 1014.4. E73-21 was approved for inclusion in the 2024 IBC and will require handrails to be located within 6 inches of the edge of the stairway walking surface. If a wheelchair lift were allowed to be stored on the stairway, the potential reach could be as much as 22" which is not in compliance with this new provision (Section 1014.3) for the handrail reach limitation. We are aware of Exception #3 in Section 1011.2 of the 2021 International Building Code which specifically allows inclined platform lifts and stairway chair lifts in Group R-3 and individual dwelling units of Group R-2 to extend beyond the edge of the stairway so a reference has been added in our proposal to address this exemption. There is precedent for this language found in Section 302.4 of the 2021 IEBC.

Restricting the storage of wheelchair lifts on stairways will ensure safe use of stairways by maintaining continuity of the walking path and ergonomic use of handrails.

Cost Impact: The code change proposal will increase the cost of construction
If approved, this code change will restrict the storage of wheelchair lifts on stairways so additional costs to design and construct alternate ways of storing the lift will most likely occur.

EB30-22

EB31-22

IEBC: 306.7.13, 306.7.14 (New)

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, representing self (geneb@codeconsultants.com); Gina Hilberry, representing United Cerebral Palsy (gina@cohenhilberry.com); Laurel Wright, representing Chair - A117.1 Adult Changing Table SubCommittee (lwwright8481@icloud.com)

2021 International Existing Building Code

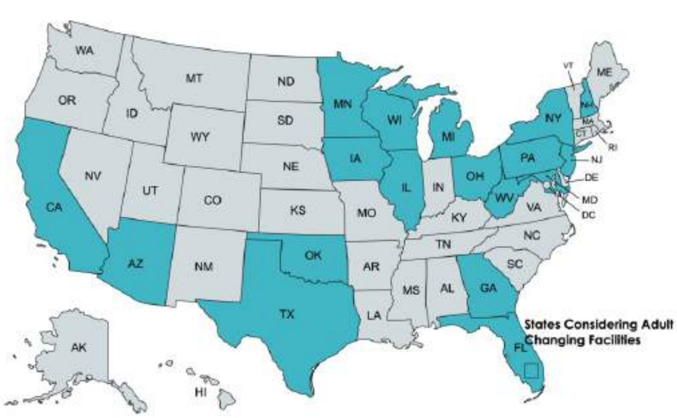
306.7.13 Additional toilet and bathing facilities. In assembly and mercantile occupancies, where additional toilet fixtures are added, not fewer than one accessible family or assisted-use toilet room shall be provided where required by Section 1110.2.1 of the International Building Code. In recreational *facilities*, where additional bathing rooms are being added, not fewer than one family or assisted-use bathing room shall be provided where required by Section 1110.2.1 of the International Building Code.

Add new text as follows:

306.7.14 Adult changing stations. Where additional toilet facilities are being added, in occupancies where adult changing stations are required by Section 1110.4.1 of the *International Building Code*, not fewer than one accessible family or assisted-use toilet room with an adult changing station shall be provided in accordance with Section 1110.4 of the *International Building Code*.The adult changing station shall be permitted to be located in an family or assisted-use toilet room or bathing room required by Sections 306.7.11, 306.7.12 or 306.7.13.

Reason Statement: The requirement for adult changing stations in large assembly, mercantile, college lecture halls and highway rest stops was added in the 2024 IBC by Code changes P37-21 Part 2(AMPC1), E141-21(AMPC1), E142-21 (AMPC1 & 2). In addition to the changing table, the room is required to have an accessible toilet and lavatory. This proposal is consistent with where family assisted use toilet rooms are required in the IEBC by Section 306.7.13. The last sentence makes it clear that both requirements can be met by the same toilet room.
An adult changing station contains a changing table large enough to accommodate an adult-sized person that is located in proximity to sanitary facilities, such as lavatories and trash disposal. Without such facilities, severely disabled people who cannot use toilets because of their disability suffer from severe isolation because they and their caregivers must return home to be changed. This lack of access has a profound impact not only on the person with a disability, but on their caregivers who are often their immediate family members. Normal activities outside the home such as shopping, entertainment, and travel must be curtailed because of a lack of safe and sanitary places to change. On occasion, caregivers report they have no option other than to change the adults for whom they care on restroom floors. Aside from the obvious sanitation concerns which is far from minimal, this practice raises serious questions about how we as a community afford people with significant disabilities a measure of human dignity and protect their right to privacy.

The ICC A117.1 is currently looking at proposals to the ICC A117.1 that will include the technical requirements for these tables. In order to address this problem, the ICC A117 committee established a task group to develop requirements for adult changing stations. The committee is expected to complete its work in March, 2021 - in time for consideration by the full committee for inclusion in the next edition of the standard which we expect to be available in time to be referenced by the 2024 IBC. The task group is comprised of committee members and interested parties - many of whom are parents of adult disabled children or who are caring for their parents. While these accommodations are not typically provided in any other type of occupancy, eleven airports, soon to be twelve, in the United States already voluntarily provide adult changing tables. Advocates for adult changing stations have had minimal success outside the code development process through state legislation, such as in California, Georgia, Canada, and the European Union. However, we believe that the building code is a far more appropriate vehicle for solving what amounts to a problem in the built environment and, we are convinced that a patchwork of state and local requirements is inefficient and presents unnecessary compliance challenges to building owners and managers.



Because there were two modifications to E142-21, a draft of the 2024 IBC for this section is included below.

1110.4 Adult Changing Stations. Where provided, adult changing stations shall be accessible. Where required, adult changing stations shall be accessible and shall comply with sections 1110.4.1 through 1110.4.4.

1110.4.1 Where required. At least one adult changing station shall be provided in all the following locations:

1. In assembly and mercantile occupancies, where family or assisted-use toilet or bathing rooms are quired to comply with Section 1110.2.1.

2. In Group B occupancies providing educational facilities for students above the 12th grade, where an aggregate of twelve of more male and female water closets are required to serve the classrooms and lecture halls.

3. In Group E occupancies, where a room or space used for assembly purposes requires an aggregate of six or more male and female water closets for that room or space.

4. In highway rest stops and highway service plazas.

1110.4.2 Room. Adult changing stations shall be located in toilet rooms that include only one water closet and only one lavatory. Fixtures located in such rooms shall be included in determining the number of fixtures provided in an occupancy. The occupants shall have access to the required adult changing station at all times that the associated occupancy is occupied.

Exception: Adult changing stations shall be permitted to be located in family or assisted toilet rooms required in Section 1110.2.1.

1110.4.3 Prohibited location. The accessible route from separate-sex toilet or bathing rooms to an accessible adult changing station shall not require travel through security checkpoints.

1110.4.4 Travel distance. The adult changing station shall be located on an accessible route such that a person is no more than two stories above or below the story with the adult changing station and the path of travel to such facility shall not exceed 2000 feet.

Cost Impact: The code change proposal will increase the cost of construction
There will be the cost of a changing table and the increase in room size. We have made every attempt to minimize costs by piggy backing on the existing requirements for family or assisted-use toilet rooms.

EB31-22

EB32-22

IEBC: SECTION 308, 308.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); John Williams, representing Committee on Healthcare (ahc@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

2021 International Existing Building Code

SECTION 308
CARBON MONOXIDE DETECTION

Revise as follows:

308.1 Carbon monoxide detection. Where an *addition*, *alteration*, *change of occupancy* or relocation of a building is made to an existing building ~~Group I-1, I-2, I-4 and R occupancies and classrooms of Group E occupancies~~, the *existing building* shall be provided with carbon monoxide detection in accordance with the International Fire Code or Section R315 of the *International Residential Code*.

Exceptions:

1. Work involving the exterior surfaces of buildings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of porches or decks.
2. Installation, alteration or *repairs* of plumbing or mechanical systems, other than fuel-burning appliances.
3. Work classified as Level 1 *Alterations* in accordance with Chapter 7.
4. Carbon monoxide detection is not required in each sleeping unit where carbon monoxide detection, which transmits an alarm signal to an approved location, is provided in each space containing a carbon monoxide source.

Reason Statement: The change to the first paragraph in Section 308.1 to make this section consistent with the actions taken on Group A on F102-21 and F116-21 which broadened the requirements for CO detection to all occupancies that present a CO hazard.

Regarding the addition of Exception 4, the revised text in F102-21 and F116-21 expands the CO source to include stoves and fireplaces, not just fuel fired appliances. The Healthcare committee identified that this would require CO detectors in every sleeping unit in hospitals and nursing homes that had a CO source in the building, such as a gas stove or a fireplace, no matter how far away the sleeping rooms were from the CO source. The 2024 IBC/IFC exceptions for CO detectors in the room where the source is located is only for furnaces.
This is also a concern for other occupancies, such as jails, dorms or hotels. Since these locations are outside the scope of the Healthcare committee, the Healthcare committee worked with BCAC and FCAC to expand this proposal. The committees will work together next cycle to address this concern in the IBC/IFC.

Since the 2024 IBC/IFC is not yet available, the following 2024 draft is provided to show the concern. F102 -21 had an extensive public comment. The revisions to the current text would read as follows:

CARBON MONOXIDE SOURCE . A piece of commonly used equipment or permanently installed appliance, fireplace or process that produces or emits carbon monoxide gas.

915.1.1 Where required. Carbon monoxide detection shall be installed ~~provided in Group I-1, I-2 and I-4, and R occupancies~~ in the locations specified in Section 915.2 where any of the following conditions ~~in Sections 915.1.2 through 915.1.6~~ exist.

1. In buildings that contain a CO source.

2. In buildings that contain or are supplied by a CO producing forced-air furnace

3. In buildings with attached *private garages*

4. In buildings that have a CO producing vehicle that is used within the building.

915.2 Locations . ~~Where required by Section 915.1.1, carbon~~ Carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.6 ~~915.2.3.~~

915.2.2 Sleeping units. Carbon monoxide detection shall be installed in *sleeping units*.

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a ~~fuel-burning appliance~~ CO source and is not served by a carbon monoxide producing forced-air furnace.

915.2.4 CO producing forced-air furnace. Carbon monoxide detection, complying with Item 2 of Section 915.1.1 shall be installed in all enclosed rooms and spaces served by a fuel-burning, forced-air furnace.

Exceptions:

1. Where carbon monoxide detector is provided in the first room or space served by each main duct leaving the furnace, and the carbon monoxide alarm signals are transmitted to an approved locations.

2. Dwelling units that comply with Section 915.2.1.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (FCAC) and the Committee on Healthcare (CHC)..

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/icc-committee-on-healthcare/.

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Cost Impact: The code change proposal will increase the cost of construction
This proposal is merely providing consistency with F102-21 and F116-21 which will in fact increase costs since it now requires CO detection more broadly across more occupancies types based upon the presence of CO sources. Without consistency with the revisions in the IBC and IFC will create confusion and difficulty in enforcement. The exception will help to reduce costs as it will allow the CO source for occupancies that have sleeping units to detect for CO at the source rather than in each sleeping unit or in each corridor in the area of sleeping units.

EB32-22

EB33-22

IEBC: 309.2.1 (New)

Proponents: Philip Oakes, representing National Association of State Fire Marshals (admin@firemarshals.org)

2021 International Existing Building Code

Add new text as follows:

309.2.1 Automatic sprinkler systems. Combustible exterior wall covering or combustible exterior wall envelopes shall not be added to an existing high-rise building that is not protected throughout with an automatic sprinkler system

Exceptions:

1. Where such material is located on a single story and is less than 15 percent of the wall area on any side of the building.
2. Water-resistive barriers installed in accordance with Section 1402.5 of the International Building Code.

Reason Statement: The proposal limits adding a combustible exterior wall covering to an existing high-rise building if the building is not protected with an automatic sprinkler system. It is understood that the IFC requires some existing high-rise buildings to be protected with an automatic sprinkler system. However, where such a requirement has not been enforced or in those instances in which the IFC does not require sprinkler protection in existing buildings, either the wall covering being added should be non-combustible or the building should be protected with an automatic sprinkler protection.

While a good fire test, it is recognized that the NFPA 285 fire test has some limitations. If the combustible exterior wall assembly contributes to fire spread in a high-rise building, the fire service will be challenged to address the fire scenario. Sprinkler protection within the building reduces the likelihood that a combustible exterior wall assembly will become involved in the fire as the result of an interior fire event.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not require a building to be retro-fitted with interior fire sprinklers if exterior wall coverings or envelopes are contemplated, it will simply limit the type of materials to non-combustible types should an interior sprinkler system not be present.

EB33-22

EB34-22

IEBC: SECTION 202 (New), SECTION 310 (New), 310.1 (New), ASTM Chapter 16 (New), UL Chapter 16 (New)

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Existing Building Code

Add new definition as follows:

ACCESSORY DWELLING UNIT. An additional, subordinate dwelling unit on the same lot, that is entirely within a dwelling unit, attached to a dwelling unit, or in a detached structure.

Add new text as follows:

SECTION 310
ACCESSORY DWELLING UNITS

310.1 General. Where an *accessory dwelling unit* or second dwelling unit is added to an existing dwelling, the dwelling units shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code. Such separation shall be provided regardless of whether a lot line exists between dwelling units. Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

Exceptions:

1. A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904 of the International Residential Code.
2. Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than 1/2-inch (15.9 m) Type X gypsum board, an attic draft stop constructed as specified in International Residential Code Section R302.12.1 is provided above and along the wall assembly separating the dwellings and the structural framing supporting the ceiling is protected by not less than 1/2-inch (12.7 m) gypsum board or equivalent.
3. A fire-resistance rated separation is not required where one of the dwelling units is an accessory dwelling unit and the other is an owner-occupied dwelling unit.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

E119-2018B	Standard Test Methods for Fire Tests of Building Construction and Materials

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

723-2018	Test for Surface Burning Characteristics of Building Materials

Staff Analysis: ASTM E119 and UL723 are already referenced in the IBC. This is simply a new occurrence of the references in the I-Codes

Reason Statement: In Group A, Code Change Z1-21 added a new definition of Accessory Dwelling Unit, or ADU, with the apparent intent of formally recognizing what has become an increasingly common practice of adding additional dwelling unit(s) to a property or building that was originally intended and limited to function as a single family dwelling unit. The proliferation of ADUs in many jurisdictions as a means of increasing available housing has had an undiscussed consequence of often creating buildings that essentially constitute illegal two-family dwellings / duplexes, in that such buildings do not met adopted IRC provisions for a two-family dwelling.
The trend essentially allows construction of a single-family dwelling, issuance of a certificate of occupancy, then subdividing the floorplan to provide an additional dwelling unit, completely circumventing the fire safety considerations in the IRC, particularly the requirement for a fire-rated separation. There is no logic behind requiring a building permitted as a two-family dwelling to provide a suitable fire barrier between units, but not requiring that separation for a building permitted as a one-family dwelling that immediately or thereafter adds an ADU. This proposal will return parity between the fire separation requirements for two-family dwellings and dwellings with an ADU.

An exception is provided for ADUs in owner occupied housing because, like lodging houses, these situations at least provide some level of on-site oversight of the ADU.To those who might argue that "owner occupied" is not something that's enforceable under the IRC, IEBC or otherwise, note that the concept of using this as a limitation is already baked into other portions of the IRC for lodging houses (se R101.2, Exception 2 and R320.1).

The intent here is to simply duplicate that precedent for ADUs.A similar change has been submitted to the IRC, and the intent of this proposal to the IEBC is to prevent the IEBC from becoming a loophole to escape the IRC requirement.

Cost Impact: The code change proposal will decrease the cost of construction
The IRC currently requires all two-family dwellings to have a fire separation between dwelling units, and there is currently no differentiation that applies to dwelling units with an added ADU. This proposal provides a limited reduction in the code requirements by allowing an ADU to be unseparated when the primary dwelling unit is owner-occupied, thereby reducing the cost of construction for such cases.

EB34-22

EB35-22

IEBC: 401.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Existing Building Code

Revise as follows:

401.2 Compliance. The work shall not make the building less complying than it was before the *repair* was undertaken. <u>Work on nondamaged components that is necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to requirements for alterations.</u>

Reason Statement: This proposal restores a useful provision from the 2015 IEBC Prescriptive and Work Area methods that was lost when repair provisions were consolidated into what is now Chapter 4.
The provision in question was not intentionally deleted when that consolidation was made by EB10-15, whose reason statement does not mention it at all. Rather, it was inadvertently dropped when the EB10-15 proponents selected the Work Area method as the basis for the new Repairs chapter, because that method was more complete in general. The loss of this useful provision came to light only in 2019 when the 2018 IEBC started to be adopted and used.

The clarification that work needed to facilitate repairs should not be considered an alteration project is added to Section 401.2. This provision was previously in 2015 IEBC Sections 404.1 and 502.3, excerpted below for reference. The wording proposed here is essentially identical.

For reference, here is the text of 2015 IEBC Sections 404.1 and 502.3:
404.1 General. Buildings and structures, and parts thereof, shall be repaired in compliance with Sections 401.2 and 404. **Work on nondamaged components that is necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to the requirements for alterations in this chapter.** Routine maintenance required by Section 401.2 [sic], ordinary repairs exempt from permit in accordance with Section 105.2, and abatement of wear due to normal service conditions shall not be subject to the requirements for repairs in this section.

502.3 Related work. Work on nondamaged components that is necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to the provisions of Chapter 7, 8, 9, 10, or 11.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal should not change the cost of any construction because it merely reflects a common understanding that was in the IEBC until it was inadvertently removed in 2018. If anything, the proposal could reduce the cost of some repairs if code officials are interpreting the current code differently.

EB35-22

EB36-22

IEBC: 401.4 (New)

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Existing Building Code

Add new text as follows:

401.4 Demolition and replacement. Where a building is effectively demolished by damage or where the intended method of repair is demolition and replacement, the replaced building, including its remaining or replaced foundation, shall comply with requirements for new construction in the *International Building Code* or the *International Residential Code*, as applicable. Where a portion of a building is effectively demolished by damage or where the intended method of repair is partial demolition and replacement, the replaced portion shall comply with requirements for *additions* in this code or the *International Residential Code*, as applicable.

Reason Statement: This proposal addresses a question raised, but not resolved, in the last cycle with proposal EB41-19: If a repair is essentially a replacement of the whole building (or a whole building wing), shouldn't the replacement be considered a new building? Answer: Yes, it should. And more to the point: The IEBC makes a number of allowances, including the use of "like materials" for repairs, but those allowances should not apply if the project is essentially new construction.
Currently, the code relies on building officials to manage these hopefully rare cases, but that results in inconsistency from jurisdiction to jurisdiction and even from building to building or event to event.

- Some jurisdictions apply a "50 percent replacement cost" threshold adapted from legacy codes, but requiring the building official to calculate replacement costs and account for changing real estate markets was explicitly rejected for the IEBC some years ago (though it is still used in flood hazard areas as *substantial damage* in coordination with the National Flood Insurance Program).
- EB41-19 tried to define a triggering loss level as damage "to the foundation," but that left too many loopholes (e.g. where a nominal portion of the superstructure – just a few feet of framing, or even just a sill plate – remains).
- EB41-19 also suggested treating this situation as a Level 3 alteration, but that would not have invoked "new construction" requirements and would have left open questions about how to define the work area.
- Other proposals have been floated for definitions of "complete damage" that explicitly rely on code official judgment, or for adapting the current IEBC definition of *substantial structural damage* or similar measures of the affected area, but none proved satisfactory.

This proposal offers a uniform approach consistent with current IEBC principles. Nearly all agree that where the entire building is destroyed by a damaging event (fire, flood, earthquake, etc.), the replacement structure should be designed and built as new construction. More difficult questions arise in two cases, both of which are addressed with this proposal:

- The damage itself is not complete, but the owner chooses to demolish and rebuild from scratch (possibly hoping to take advantage of the IEBC's allowances for like repairs).
- The damage or demolished portion can be demolished and replaced while leaving substantial other portions to be repaired.

To address the first case, the proposal clarifies that the same rules should apply whether the loss was caused directly by the damage or whether the demolition was at the owner's discretion.

To address the second case, the proposal takes advantage of current code provisions for additions, which already cover similar issues. First, it avoids quibbling over how much loss/demolition is enough to trigger the "like new" requirement. Beyond that benefit, thinking of the replacement portion as an addition is a convenient way to allow the code to address:

- Criteria for the replaced portion, since additions themselves are already required to satisfy the code as new construction.
- Whether the replaced portion and the remaining portion are structurally independent, including cases of vertical combinations of lateral systems (as in podium construction).
- Whether the two portions share access, egress, life safety systems, etc.
- Whether any part of the remaining portion needs to be evaluated, altered, or upgraded to accommodate the replaced portion.

Replacing the foundation is expensive. Why must it also be replaced? Nothing in the proposal prevents an adequate foundation in good condition from being re-used with the approval of the code official. But new superstructure framing, as required, generally needs an equally compliant foundation. Plus, any attempt to write a provision that would allow foundation re-use would inevitably end up having to parse obviously deficient conditions. Again, better to set an enforceable rule, as proposed, and rely on the judgment of design professionals and code officials for case-by-case variances.

Cost Impact: The code change proposal will increase the cost of construction
Since the current code is not clear about how to address cases of repairs that are as extensive as new construction, whether the proposal will

increase the cost of construction will vary depending on how a given jurisdiction is enforcing the incomplete code. Where a jurisdiction is making the same common sense interpretation as this proposal, there will be no cost increase. Where a jurisdiction is allowing any number of obsolete or deficient conditions to be rebuilt under the name of "repair," the proposal could represent a cost increase. At least with this proposal, owners will know the requirements that will apply if they choose to demolish and rebuild, as opposed to repairing what remains of a heavily damaged building.

EB36-22

EB37-22

IEBC: 401.1

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Existing Building Code

Revise as follows:

401.1 Scope. *Repairs* shall comply with the requirements of this chapter. *Repairs* to *historic buildings* need only comply with Chapter 12. <u>Maintenance within the scope of the *International Property Maintenance Code* and repairs exempt from permit in accordance with Section 105.2 shall not be subject to the requirements of this chapter.</u>

Reason Statement:
This proposal restores a useful provision from the 2015 IEBC Prescriptive and Work Area methods that was lost when repair provisions were consolidated into what is now Chapter 4.

The provision in question was not intentionally deleted when that consolidation was made by EB10-15, whose reason statement does not mention it at all. Rather, it was inadvertently dropped when the EB10-15 proponents selected the Work Area method as the basis for the new Repairs chapter, because that method was more complete in general. The loss of this useful provision came to light only in 2019 when the 2018 IEBC started to be adopted and used.

The proposal adds back the prior clarification that exempts maintenance and minor repairs from Chapter 4. The proposed wording comes from 2015 IEBC Section 404.1, excerpted below for reference.

It's true that even repairs (or other work) exempt from permitting still must comply with the code generally -- for example, may not create a dangerous condition or use prohibited materials. Still, It makes sense that these minor repairs (e.g. painting, papering, replacing lamps; see Sec 105.2) should not be subject to Chapter 4, since there is no way to track them without a permit application. If necessary, the proposed reference to Section 105.2 could be omitted by floor modification, even though it is no different from the 2015 and prior codes.

For reference, here is the text of 2015 IEBC Section 404.1:

404.1 General. Buildings and structures, and parts thereof, shall be repaired in compliance with Sections 401.2 and 404. Work on nondamaged components that is necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to the requirements for alterations in this chapter. **Routine maintenance required by Section 401.2 [sic], ordinary repairs exempt from permit in accordance with Section 105.2, and abatement of wear due to normal service conditions shall not be subject to the requirements for repairs in this section.**

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal merely reflects the common interpretation of the current code, one that was explicit in the IEBC through the 2015 edition and removed inadvertently in 2018. If anything, the proposal could decrease the cost of some repairs where building officials are interpreting the current code differently.

EB37-22

EB38-22

IEBC: [BS] 405.1

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 405.1 General. Structural damage ~~*repairs*~~ shall be repaired in compliance with this section and Section 401.2.

Reason Statement: This proposal restores a useful provision from the 2015 IEBC Prescriptive and Work Area methods that was lost when repair provisions were consolidated into what is now Chapter 4.
The provision in question was not intentionally deleted when that consolidation was made by EB10-15, whose reason statement does not mention it at all. Rather, it was inadvertently dropped when the EB10-15 proponents selected the Work Area method as the basis for the new Repairs chapter, because that method was more complete in general. The loss of this useful provision came to light only in 2019 when the 2018 IEBC started to be adopted and used.

The wording of Section 405.1 is restored to the wording from 2015 IEBC Section 404.1, excerpted below for reference. This subtle change clarifies that structural damage must actually be repaired. Without it, one could argue that Sections 405.1, 405.2, and 405.2.1 merely *allow* restoring of the pre-damage condition but do not actually require repair unless there’s *substantial structural damage*. 2015 Section 404.1 applied generally, but we are proposing this change only to the structural section where the potential confusion is most likely.

For reference, here is the text of 2015 IEBC Section 404.1:

404.1 General. Buildings and structures, and parts thereof, **shall be repaired** in compliance with Sections 401.2 and 404. Work on nondamaged components that is necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to the requirements for alterations in this chapter. Routine maintenance required by Section 401.2 [sic], ordinary repairs exempt from permit in accordance with Section 105.2, and abatement of wear due to normal service conditions shall not be subject to the requirements for repairs in this section.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal merely clarifies the existing provision, reflecting the most common interpretation, which was explicit in the IEBC until an inadvertent change in the 2018 edition, which has only been enforced in most jurisdictions for at most two years.

EB38-22

EB39-22

IEBC: [BS] 405.1, 405.1.1 (New), ACI (New), (New)

Proponents: Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org); Scott Campbell, representing NRMCA (scampbell@nrmca.org); Peter Barlow, representing Contech Services, Inc. (petebarlow@protonmail.com); Gene Stevens, , representing J.R. Harris & Company (gene.stevens@jrharrisandco.com); Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com); David Whitmore, Vector Corrosion Technologies, representing Vector Corrosion Technologies (davidw@vector-corrosion.com); Matt Miltenberger, VCS Inc., representing VCS Inc. (mattm@vcservices.com); Bill Horne, NDT Corporation, representing NDT Corporation (BHorne@ndtcorporation.com); Dave Tepke, representing SKA Consulting Engineers, Inc. (dgtepke@skaeng.com); Jason Coleman, representing International Concrete Repair Institute (jcoleman@wje.com); Dave Fuller, representing International Concrete Repair Institute, (ICRI) (davef@icri.org); Justin Long, representing Baltimore-Washington ICRI (justinl@skaengineers.com); Mark DeStefano, representing ICRI (markd@destefanoengineering.com); Bryan Heery, representing ICRI (bryanh@everclearenterprises.com); Matthew Hansen, representing Euclid Chemical Company (mhansen@euclidchemical.com); Jim Baker, representing Myself (jim@wmbakerco.com); Doug Qualey, representing Arizona ICRI (dqualey@euclidchemical.com); Mark Meighan, representing ICRI Delaware Valley (mmeighan@crlpa.com); Jeff Jezzard, Vector Construction, representing Vector Construction (jeffj@vector-construction.com); Elena Bradway, representing Aquafin Inc (elena@aquafin.net); Michael Payne, representing Pittsburgh ICRI (mike.payne@becsmd.com); John Catlett, representing BOMA International (catlettcodeconsulting@gmail.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

[BS] 405.1 General. Structural *repairs* shall be in compliance with this section and Section 401.2.

Add new text as follows:

405.1.1 Structural Concrete.. Repair of structural concrete in accordance with ACI 562 Section 1.7 is deemed to comply with Section 405.1, except where Section 405.2.2, 405.2.3 or 405.2.4.1 requires compliance with Section 304.3.

Add new standard(s) as follows:

ACI

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331-3439

ACI 562-21. Assessment, Repair, and Rehabilitation of Existing Concrete Structures - Code Requirements

Staff Analysis: A review of the standard proposed for inclusion in the code, ACI 562-21 Assessment, Repair and Rehabilitation of Existing Concrete Structures- Code Requirements, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Concept – This code change proposal adds ACI CODE 562: *Code Requirements for Assessment, Repair, and Rehabilitation of Existing Concrete Structures*, to establish minimum requirements for the evaluation, design, and construction of repairs, and rehabilitation of concrete structural elements in buildings for various levels of desired performance as deemed appropriate for the project. In addition to improved life safety, the requirements clearly define objectives and anticipated project performance for the code official, owners, designers, contractors, and installers. While the proposed language is mandatory, alternative means and methods remain permitted in accordance with Section 104.11 "Alternative materials, design and methods of construction, and equipment." This addition to the IEBC is also especially important as it includes references to standard specifications for materials used to repair concrete elements that are not addressed elsewhere in the family of International Code Council Codes. Consistent with the language in ACI CODE 562, and the proposed language clearly communicates that use of 562 is not permitted where either the disproportionate earthquake damage (Section 405.2.2), substantial structural damage (Section 405.2.3) or lateral force resisting elements (Section 405.2.4.1) provisions triggered strengthening. Such work would more appropriately be done using ASCE-41 or other similar resources.

Background – In 2006, the repair industry approached ACI asking for a concrete repair and rehabilitation code that would improve the overall quality of concrete repairs by establishing minimum requirements while establishing clear responsibilities between owners, designers, and contractors to improve public safety. Further, although ACI has made available many guides, manuals, reports and standards on concrete repairs for voluntary use, studies show that the current failure rate of repairs to structural concrete is inconsistent with ACI 562 Committee's views regarding a reasonable level of life safety. The studies [See Hyperlink 1] show that 50 percent of repairs to structural concrete fail within 10 years and 20 percent fail within 5 years. This code provides building code officials with a reference by which to evaluate repairs and rehabilitation of concrete structures.

Scope – ACI 318 provides specific requirements for structural concrete in the International Building Code, similarly, ACI CODE 562 complements the IEBC by providing specific direction on how to evaluate, design and conduct concrete repairs and how to handle the unique construction problems associated with repairs to concrete elements. This standard provides more in-depth requirements needed by most entities addressing the repair of concrete structural elements than is provided in the IEBC. Further, the standard provides the requirements that bridge the inconsistencies and gaps in acceptable criteria that occur from the two following situations that a designer must solve: 1) repairing a structure according to the original building code used at the time it was built using today's construction methods and materials; or 2) repairing a structure built according to an older building code but repaired according to a more recent building code. ACI CODE 562 includes specifications and requirements for products commonly used for repairs, but not addressed elsewhere in the building codes, including but not limited to fiber-reinforced polymers and polymer concrete.

Benefits – There are many benefits that ACI CODE 562 provides for the designer, owner, contractor, materials providers, building code official and the public. A few of these benefits are:

· **Life Safety**: Provides a level of expectation of life safety to the public in buildings where repairs or rehabilitation is performed on concrete structural elements.

· **Improved Infrastructure**: Many concrete structures are in need of repair and it is crucial that repairs as remedial action for deficiencies in structural elements must be done properly and not simply be cosmetic repairs. This requires minimum levels of evaluation, design, and repair. While not unique to Pittsburgh or parking structures, there is a common theme about the need to properly rehabilitate and repair existing concrete structures.

· **Uniform Requirements**: Provides clearly defined, uniform requirements aimed at extending the service life of existing structures.

· **Quality Repairs**: Provides minimum requirements for efficiency, safety, and quality of concrete repair.

· **Clear Responsibilities**: Establishes clear responsibilities between owners, designers, and contractors.

· **Clear Path for Approval**: Provides building code officials with a means to evaluate rehabilitation designs.

· **Affordable Repairs**: Where appropriate, while helping to ensure an acceptable level of risk, permits specific repair requirements that often result in less costly repairs compared to repairs required to meet requirements for new building construction.

· **Flexibility**: Permits flexibility in evaluation, design, construction and repair materials to provide economies while establishing expected performance for the service-life of the rehabilitation or repairs.

· **Sustainability** - Improve owner, developer, and public confidence regarding effective repairs, upgrades, and reuse of existing buildings in lieu of demolition and replacement (energy, disposal, new materials and construction costs), by appropriately extending the life of existing buildings.

· **Consistent Language**: Several jurisdictions have adopted or are considering adoption of ACI CODE 562. These include but are not limited to Florida, Hawaii, Massachusetts, North Carolina, Ohio, and South Carolina. Inclusion of language in the model building code for existing buildings will improve consistency of language and location of the requirements within the codes of the authorities having jurisdiction adopting ACI CODE 562 by reference.

Resources – Also, there many resources that complement ACI 562. Two ACI documents are provided in the bibliography.

These resources are readily available to provide greater understanding of assessment, repair and rehabilitation of concrete structural elements. ACI MNL-3 provides case studies demonstrating the ease of use of ACI 562. Numerous technical notes, reports, guides, and specifications that provide background information and technical support are available through other organizations, such as American Society of Civil Engineers, British Research Establishment, Concrete Society, International Concrete Repair Institute, National Association of Corrosion Engineers, Post-Tensioning Institute, Society for Protective Coatings, and US Army Corps of Engineers. Many of these organizations' publications related to concrete repair can be found in the Concrete Repair Manual.

Adoptions –

· *2020 Florida Building Code, Existing Buildings, 7th Edition* Section 301.3.4.

· *2018 Hawaii State Building* Code Item (53) Section 3401.6.· *2017 Ohio Building Code with Aug 2018 Updates & Errata 02-08-19* Section 3401.6.

· *2018 North Carolina Existing Building Code* Section 606.1.1.

· City of Los Angeles *California Design Guide Volume 1 City of Los Angeles Mandatory Earthquake Hazard Reduction in Non-Ductile Concrete Buildings (NDC),* including Section 4.1 Retrofit Design Process.

· New York City Department of Buildings cites ACI 562 in *BUILDINGS BULLETIN 2017-015.*

· Design and construction specifications for the City of Austin, Texas Section 410S

Recommendation – ACI, a professional technical society, has developed ACI CODE 562 in response to industry needs and to help assure acceptable minimum levels of life safety, health, and welfare for the public. For this reason and the other benefits identified in this reason statement, ACI recommends this code change proposal for committee approval as submitted.

Hyperlink 1: Studies: https://projects.bre.co.uk/conrepnet/pdf/newsletter3.pdf

Bibliography: ACI 563-18, Specifications for Repair of Structural Concrete in Buildings
MNL-3(16) Guide to the Code for Assessment, Repair, and Rehabilitation of Existing Concrete Structures, ACI and ICRI 2016.

Cost Impact: The code change proposal will decrease the cost of construction
Generally, the use of ACI CODE 562 will reduce the cost of repair, by allowing a level of repair amicable to both the owner and the building code official, while maintaining an acceptable level of safety for occupants. Without this option, often there is a demand to conduct repairs that meet the requirements of the most recent adopted building code for new construction. This standard increases the options available for repair and provides the acceptance criteria necessary to permit these options. A case study that illustrates this point: "ACI CODE 562 has been referenced in expert reports for litigation cases, resulting in significantly reduced financial settlements. Denver-based J. R. Harris & Company recently used the code as a standard in several litigation reports assessing damages in existing concrete structures. As an approved consensus standard, according to American National Standards Institute (ANSI) procedures, ACI CODE 562-13 has been accepted as the source standard to use for damage assessment and repair on individual projects by Greenwood Village and Pikes Peak Regional Building Departments in Colorado. Based on this acceptance, the consulting engineer was able to cite the code in their recommendation for structural remediation and determination of damages. In one case involving rehabilitation work on four buildings with faulty construction, J.R. Harris was able to reduce the repair costs from $12 million to $3 million, with a repair plan based on the lesser of the demand-capacity ratio based on either the original or current building code per ACI 562."

EB39-22

EB40-22

IEBC: 405.2.1 (New)

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new text as follows:

405.2.1 Repair of water damage. The removal and replacement of water-damaged finishes as part of a *repair* need not be considered damage that reduces the lateral load-carrying capacity of a structure.

Reason Statement: After a structural fire, gypsum board and other architectural finishes are often removed to address staining and to reduce or eliminate the potential for mold growth. Oftentimes, architectural finishes are removed wholesale due to the concern that the potential for mold growth is a significant liability. It is also often easier for a restoration contractor to simply remove all of the architectural finishes during the emergency cleanup rather than removing just the water-damaged portions. In many older structures, however, gypsum board sheathing is used to resist lateral loads. During the time between removal and replacement of these gypsum board finishes, the loss of lateral load-carrying capacity can appear to be total in the affected areas. Since these finishes are being removed to address water staining and to mitigate the potential for mold, it makes sense to exclude the transitory removal and replacement of these elements in any calculation of loss of lateral load-carrying capacity. This proposal adds this commonsense interpretation into the provisions of the IEBC between Section 405.2 and what is currently 405.2.1. This would cause Section 405.2.1 to become 405.2.2, Section 405.2.2 to become 405.2.3, etc.
Note that this proposal does not eliminate structural damage to gypsum board from being considered in a loss-of-lateral-load-carrying-capacity calculation (e.g., damage from an earthquake); it only addresses elements that are removed and replaced due to water damage.

Cost Impact: The code change proposal will decrease the cost of construction
This change will reduce the cost of repairs to water-damaged structures that rely on architectural finishes such as gypsum board for their lateral force resisting system. Previously, the proper treatment of finishes that are removed due to water damage, water staining, and/or mold has been unclear in the calculation of loss of lateral load-carrying capacity when the structure relies on those finishes for lateral bracing. This proposal would make it clear that water damage to those components need not be considered in the calculation of loss of lateral load-carrying capacity. With a reduced repair scope for these structures, the cost of repair will necessarily be reduced.

EB40-22

EB41-22

IEBC: [BS] 405.2.3.1, [BS] 405.2.3.3, [BS] 405.2.4

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 405.2.3.1 Evaluation. The building shall be evaluated by a registered design professional, and the evaluation findings shall be submitted to the *code official*. The evaluation shall establish whether the damaged building including its foundation, if repaired to its predamage state, would comply with the provisions of the *International Building Code* for load combinations that include wind or earthquake effects, except that the seismic forces shall be the reduced seismic forces.

[BS] 405.2.3.3 Extent of repair for noncompliant buildings. If the evaluation does not establish that the building in its predamage condition complies with the provisions of Section 405.2.3.1, then the building shall be retrofitted to comply with the provisions of this section. The portion of the foundation supporting damaged elements shall be shown to comply with or altered to comply with the provisions of this section. The wind loads for the *repair* and *retrofit* shall be those required by the building code in effect at the time of original construction, unless the damage was caused by wind, in which case the wind loads shall be in accordance with the *International Building Code*. The seismic loads for this *retrofit* design shall be those required by the building code in effect at the time of original construction, but not less than the reduced seismic forces.

[BS] 405.2.4 Substantial structural damage to gravity load-carrying components. Gravity load-carrying components that have sustained *substantial structural damage* shall be rehabilitated to comply with the applicable provisions for dead, live and snow loads in the *International Building Code*. The portion of the foundation supporting damaged elements shall be shown to comply with or altered to comply with the provisions of this section. Undamaged gravity load-carrying components that receive dead, live or snow loads from rehabilitated components shall also be rehabilitated if required to comply with the design loads of the *rehabilitation* design.

Reason Statement: Where structures have been extensively damaged and require repair, the building codes are silent on questions regarding reuse of existing foundations. Just as structural integrity of the superstructure depends on the original design and condition prior to being damaged, so does the structural integrity of the foundation depend on the same.
This proposal requires the affected portion of the foundation system to be included in the scope of the structural evaluation of the building. Just like the superstructure, if the foundation is found to be compliant and undamaged, no upgrades or repairs are required.

It provides a false sense of security in the structural integrity of the building to require the repaired superstructure to conform to current building code requirements if the foundation is unable to transfer the structure reactions at the soil-structure interface.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is for clarification.

EB41-22

EB42-22

IEBC: [BS] 405.2.4

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 405.2.4 Substantial structural damage to gravity load-carrying components. Gravity load-carrying components that have sustained *substantial structural damage* shall be ~~rehabilitated~~ retrofitted to comply with the applicable provisions for dead, live and snow loads in the *International Building Code*. Undamaged gravity load-carrying components that receive dead, live or snow loads from ~~rehabilitated~~ retrofitted components shall also be ~~rehabilitated~~ retrofitted if required to comply with ~~the~~ these design loads ~~of the *rehabilitation* design~~.

Reason Statement: This is an editorial change intended to replace the use of the all-encompassing terms *rehabilitation* and "rehabilitated" with the more specific terms "retrofit" and "retrofitted" to be consistent with the other sub-sections in Section 405.2.
The term *repair* is defined in Chapter 2 as "The reconstruction, replacement or renewal of any part of an *existing building* for the purpose of its maintenance or to correct damage." The term *addition* is defined as "An extension or increase in floor area, number of stories, or height of a building or structure." And *alteration* is defined as "any construction or renovation to an *existing structure* other than a *repair* or *addition*."

The IEBC goes to some effort to keep the possible categories of actions regarding modification of existing buildings simple: actions are either repairs, additions, or alterations.

Rehabilitation, on the other hand, is defined in Chapter 2 as "Any work, as described by the categories of work defined herein, undertaken in an *existing building*" -- or basically any permitted work done to an existing building. Yet there are only three sections of the IEBC that actually use this term; Sections 104.2.1, 115.5, and 405.2.4.

This proposal only deals with Section 405.2.4. In Section 405.2.4, the word *rehabilitation* (or the related word "rehabilitated") is used as a synonym for "retrofit" or "retrofitted". The other code upgrade triggers in this section use the word "retrofit" and eschew the word "rehabilitation". For example, Section 405.2.3 requires that buildings that exceed this component of substantial structural damage trigger be "repaired and retrofitted", and it contains two exceptions that eliminate the need to "retrofit" in certain circumstances. Similarly, Sections 405.2.3.3 and 405.2.5 also contain the word "retrofitted" and do not use the term "rehabilitation" or "rehabilitate". Even Section 405.2.4.1 and its associated exceptions (which are themselves subparts of Section 405.2.4) only use the word "retrofit" and do not use the term "rehabilitation"..

It is thus clear that the terms *rehabilitation* and "rehabilitated" in Section 405.2.4 are being used as synonyms for "retrofit" or "retrofitted" (or "strengthened") and not in the all-encompassing (and consequently less meaningful) manner of the definition of *rehabilitation*. To provide more consistent wording in all of the structural upgrade trigger provisions in Section 405.2, this proposal replaces the few instances of "rehabilitation" and "rehabilitated" in this section with the more specific terms "retrofit" and "retrofitted."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is strictly an editorial change that does not change the scope or reach of the IEBC. Rather, it is intended to replace a general and less specific term with a more specific term that is used in adjacent subsections and even in subsections of the provision in question..

EB42-22

EB43-22

IEBC: SECTION 406, 406.1, 406.1.1 (New), 406.1.1, 406.1.2, 406.1.3, 406.1.4, 406.1.5

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Existing Building Code

SECTION 406
ELECTRICAL

Revise as follows:

406.1 ~~Material~~ General. Repairs to existing ~~Existing~~ electrical wiring and equipment ~~undergoing *repair*~~ shall be ~~allowed to be repaired or replaced with like material~~ in accordance with NFPA 70.

Add new text as follows:

406.1.1 Reconditioned Electrical Equipment. Reconditioned electrical equipment shall comply with NFPA 70. Electrical equipment prohibited from being reconditioned by the applicable sections of NFPA 70 shall not be reconditioned.

Delete without substitution:

~~**406.1.1 Receptacles.** Replacement of electrical receptacles shall comply with the applicable requirements of Section 406.4(D) of NFPA 70.~~

~~**406.1.2 Plug fuses.** Plug fuses of the Edison-base type shall be used for replacements only where there is no evidence of over fusing or tampering per applicable requirements of Section 240.51(B) of NFPA 70.~~

~~**406.1.3 Nongrounding-type receptacles.** For replacement of nongrounding-type receptacles with grounding-type receptacles and for branch circuits that do not have an equipment grounding conductor in the branch circuitry, the grounding conductor of a grounding-type receptacle outlet shall be permitted to be grounded to any accessible point on the grounding electrode system or to any accessible point on the grounding electrode conductor in accordance with Section 250.130(C) of NFPA 70.~~

Revise as follows:

~~**406.1.4**~~ **406.1.2 Health care facilities.** Portions of electrical systems being repaired in Group I-2, ambulatory care *facilities* and outpatient clinics shall comply with NFPA 99 requirements for *repairs*.

Delete without substitution:

~~**406.1.5 Grounding of appliances.** Frames of electric ranges, wall-mounted ovens, counter-mounted cooking units, clothes dryers and outlet or junction boxes that are part of the existing branch circuit for these appliances shall be permitted to be grounded to the grounded circuit conductor in accordance with Section 250.140 of NFPA 70.~~

Reason Statement: The 2020 National Electrical Code (NEC) was revised to include requirements for reconditioned electrical equipment. Numerous sections were added to identify whether a specific piece of electrical equipment was suitable to be reconditioned. Not all electrical equipment is suitable to be reconditioned, rebuilt or remanufactured due to its design features or critical role in electrical safety. For example, a molded case circuit breaker by design is not able to be opened and reconditioned. Molded case circuit breakers that are subjected to flood or fire damage can't be reconditioned and must be replaced. The 2020 NEC includes requirements for specific equipment that cannot be reconditioned, such as molded case circuit breakers.
This proposal is intended to update the requirements in the IEBC to match that of the current edition of NFPA 70 the NEC. Section 406.1 was modified to include a reference to NFPA 70 for reconditioning. A new section 406.1.1 was added to clarify what equipment can be reconditioned and to identify the requirements that reconditioned electrical equipment be specifically marked in accordance with Section 110.21(A)(2) of NFPA 70.

The existing Sections 406.1.1, 406.1.2, 406.1.3 and 406.1.5 were deleted since these sections were repeats of requirements found in NFPA 70. There are differences between the requirements as written in the 2020 NEC and the existing sections in the IEBC. The requirements found in the sections are best left in NFPA 70. Additionally, the existing Section 406.1.4 was renumbered to 406.1.2 and left since this section references NFPA 99 for health care facilities.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will provide direction to the appropriate existing requirements for repair and reconditioning of electrical systems. The current provisions were not aligned with NFPA 70. These revisions simply makes the requirements consistent for enforcement and will not increase costs.

EB43-22

EB44-22

IEBC: 502.1, 503.1

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

2021 International Existing Building Code

Revise as follows:

502.1 General. *Additions* to any building or structure shall comply with the requirements of the *International Building Code* for new construction. *Alterations* to the *existing building* or structure shall be made to ensure that the *existing building* or structure together with the *addition* are not less complying with the provisions of the *International Building Code* than the *existing building* or structure was prior to the *addition* , unless explicitly permitted elsewhere in this section. An *existing building* together with its *additions* shall comply with the height and area provisions of Chapter 5 of the International Building Code.

503.1 General. *Alterations* to any building or structure shall comply with the requirements of the *International Building Code* for new construction. *Alterations* shall be such that the *existing building* or structure is not less complying with the provisions of the *International Building Code* than the *existing building* or structure was prior to the *alteration,* unless explicitly permitted elsewhere in this section.
.

Reason Statement: Clarifies requirements for structural alterations based on 2018 SEAOC survey. Reference Survey Question 4, associated results, and discussion in the attached conference paper (Zepeda et al, 2019). Code is not clear on how to evaluate whether the building is considered "less complying."
Revisions made by this proposal intend to clarify that the triggers for requiring structural upgrades are as defined in these sections for additions and alterations, with applicable exceptions, and that this statement is not the a trigger in itself.

https://www.cdpaccess.com/proposal/8703/25651/files/download/3153/

Bibliography: Zepeda, D., Hagen, G., O'Connell, K., McLellan, R., Buckalew, J., and Sumer, A., "Existing Buildings and the "10% Rule": Survey Results, Opinions, and Recommendations." 2019 SEAOC Convention Proceedings (pp. 116-147), Sacramento, CA: Structural Engineers Association of California.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of this code change proposal is for clarification. As it does not change the intent of the code, it will not increase of decrease the cost of construction.

EB44-22

EB45-22

IEBC: 502.1, 1102.2, 1102.3, 1301.2.3

Proponents: Daniel Nichols, representing MTA Construction and Development (dnichols@mnr.org)

2021 International Existing Building Code

Revise as follows:

502.1 General. *Additions* to any building or structure shall comply with the requirements of the *International Building Code* for new construction. *Alterations* to the *existing building* or structure shall be made to ensure that the *existing building* or structure together with the *addition* are not less complying with the provisions of the *International Building Code* than the *existing building* or structure was prior to the *addition*. An *existing building* together with its *additions* shall comply with the height and area provisions of Chapter 5 of the International Building Code.

> **Exception:** Where an addition is an exit or exit access stairway or to provide an accessible route, the addition shall not be considered an area increase for compliance with this section.

1102.2 Area limitations. An *addition* shall not increase the area of an *existing building* beyond that permitted under the applicable provisions of Chapter 5 of the International Building Code for new buildings unless fire separation as required by the *International Building Code* is provided.

> ~~**Exception**~~ **Exceptions:**
>
> 1. In-filling of floor openings and nonoccupiable appendages such as elevator and exit stairway shafts shall be permitted beyond that permitted by the International Building Code.
> 2. Where an addition is an exit or exit access stairway or to provide an accessible route, the addition shall not be considered an area increase for compliance with this section.

1102.3 Fire protection systems. Existing fire areas increased by the *addition* shall comply with Chapter 9 of the International Building Code.

> **Exception:** Where an addition is an exit or exit access stairway or to provide an accessible route, the addition shall not be considered an area increase for compliance with this section.

1301.2.3 Additions. *Additions* to *existing buildings* shall comply with the requirements of the *International Building Code* or the *International Residential Code* for new construction. The combined height and area of the *existing building* and the new *addition* shall not exceed the height and area allowed by Chapter 5 of the International Building Code. Where a fire wall that complies with Section 706 of the International Building Code is provided between the *addition* and the *existing building*, the *addition* shall be considered a separate building.

> **Exception:** Where an addition is an exit or exit access stairway or to provide an accessible route, the addition shall not be considered an area increase for compliance with this section.

Reason Statement: Due to constraints within an existing building footprint, many buildings that wish to add vertical circulation methods to provide accessibility to upper or lower levels need to create an "addition" to the existing building. In doing so, the addition of an elevator shaft attached to the exterior wall, the placement of a covered ramp, or the addition of an exterior stairway with a roof will usually trigger an evaluation of building areas and fire protection systems within existing fire areas. The general addition areas of these locations can be in the 100-300 sf per story for a single cab elevator, or run of a covered ramp.. Because of the definition of a building area and fire areas being modified over the past few IBC and IFC development cycles (see projection requirements for "area, building" and "fire area" in IBC Section 202 , these specialized additions are now considered the same as an addition looking to increase occupiable floor area.
Regarding building area- Width the limited space that an elevator, stairway, or ramp takes in regards to building area, the increase in nonconformance is minimal. The most nonconforming situation that could be realized is no greater than 10% (existing 3 story nonsprinklered group R Type 5B). However, the addition of an elevator doesn't completely increase the occupiable or usable floor area of a story in the same way fire flows and fire suppression methods have been evaluated to determine building area sizing for over a century. This was also previously supported by the "125% increase" that was found in the base "rehab" codes regarding area increases for additions.

Fundamentally, the addition of a stairway or ramp is always a benefit from upper levels for egress purposes. The placement of a covering to protect against the weather (or excavation if you are underground) should not be the trigger for an evaluation of the building area and all fire protection systems. Additionally, these types of additions also require an accessible means of egress to be provided which greatly increases the safety and (sometimes) requires additional fire separations or automatic sprinklers to meet AMOE requirements.

Since this code change proposal is an exception to building area and fire area requirements, a change has been placed in all three compliance method sections to ensure consistency of accessibility upgrades. It was felt it is not appropriate for code users to place in the all-accessibility section IEBC Section 306, but would take direction from the committee if so desired.

Cost Impact: The code change proposal will decrease the cost of construction
The removal of building area and fire area consideration from accessible route upgrades will decrease the cost of construction. Currently in the

metropolitan NYC area, the installation in an existing rail station of a two stop elevator from street level to one level below grade (excavation, elevator installation, space reconfiguration, EMR placement, MEP work, and com work) is an average of $16M. To continue to outfit an existing rail station with an automatic sprinkler system is an additional $2.234M for the first 5,000 sf of fire area. As an example of the savings, this code change proposal will decrease the cost of elevator projects by a minimum of 13.9% and does not include greater coverage areas, smoke detection requirements, and upgrades to construction due to building area increases.

EB45-22

EB46-22

IEBC: 502.1, CHAPTER 11, SECTION 1101, 1101.1, 1101.2, 1101.3, 1101.4, 1101.5 (New), 1301.2.3

Proponents: Stephen Thomas, representing Self (sthomas@coloradocode.net)

2021 International Existing Building Code

Revise as follows:

502.1 General. *Additions* to any building or structure shall comply with the requirements of the *International Building Code* for new construction. *Alterations* to the *existing building* or structure shall be made to ensure that the *existing building* or structure together with the *addition* are not less complying with the provisions of the *International Building Code* than the *existing building* or structure was prior to the *addition*. An *existing building* together with its *additions* shall comply with the height and area provisions of Chapter 5 of the International Building Code.
<u>Where a new occupiable roof is added to a building or structure, the occupiable roof shall comply with the provisions of the International Building Code.</u>

CHAPTER 11
ADDITIONS

SECTION 1101
GENERAL

1101.1 Scope. An *addition* to a building or structure shall comply with the International Codes as adopted for new construction without requiring the *existing building* or structure to comply with any requirements of those codes or of these provisions, except as required by this chapter. Where an *addition* impacts the *existing building* or structure, that portion shall comply with this code.

1101.2 Creation or extension of nonconformity. An *addition* shall not create or extend any nonconformity in the *existing building* to which the *addition* is being made with regard to accessibility, structural strength, fire safety, means of egress or the capacity of mechanical, plumbing or electrical systems.

1101.3 Other work. Any *repair* or *alteration* work within an *existing building* to which an *addition* is being made shall comply with the applicable requirements for the work as classified in Chapter 6.

1101.4 Enhanced classroom acoustics. In Group E occupancies, enhanced classroom acoustics shall be provided in all classrooms in the *addition* with a volume of 20,000 cubic feet (565 m^3) or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

Add new text as follows:

<u>**1101.5 Occupiable Roofs.** Where a new occupiable roof is added to a building or structure, the occupiable roof shall comply with the provisions of the International Building Code.</u>

Revise as follows:

1301.2.3 Additions. *Additions* to *existing buildings* shall comply with the requirements of the *International Building Code* or the *International Residential Code* for new construction. The combined height and area of the *existing building* and the new *addition* shall not exceed the height and area allowed by Chapter 5 of the International Building Code. Where a fire wall that complies with Section 706 of the International Building Code is provided between the *addition* and the *existing building*, the *addition* shall be considered a separate building. <u>Where a new occupiable roof is added to a building or structure, the occupiable roof shall comply with the provisions of the International Building Code.</u>

Reason Statement: The purpose of this proposed language is to provide guidance to the use of the code as to what is required when an occupiable roof is added to a building. The proposal would confirm that the occupiable roof will need to comply with the provisions of the International Building Code. This could include the means of egress, accessibility and live load requirements. Many roofs are not designed to support the loads imposed when an occupiable roof is added to a building. This would require that the structure be upgraded to support the additional loads, that a means of egress is provided in accordance with Chapter 10 of the IBC and that an accessible route be provided if one is required by Chapter 11 of the IBC, to just name a few requirements.
The new language has been added to each of the three different options for compliance. The definition of an addition is "An extension or increase in floor area, number of stories, or height of a building or structure". I would argue that the new occupiable roof is an increase in the floor area. It is not an increase in building area, but is increasing the floor area for the purpose egress and accessibility.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of this proposal is to clarify that a new occupiable roof must comply with the provisions of the building code. The requirements are essentially already in the code, but this change clarifies the requirement.

EB47-22

IEBC: 502.1.1 (New), 1101.3 (New)

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new text as follows:

502.1.1 **Risk category assignment.** Where the addition and the existing building have different occupancies, the risk category of each existing and added occupancy shall be determined in accordance with Section 1604.5.1 of the *International Building Code*. Where application of that section results in a higher risk category for the existing building, such a change shall be considered a change of occupancy and shall comply with Section 506 of this code. Where application of that section results in a higher risk category for the addition, the addition and any systems in the existing building required to serve the addition shall comply with the requirements of the *International Building Code* for new construction for the higher risk category.

1101.3 **Risk category assignment.** Where the addition and the existing building have different occupancies, the risk category of each existing and added occupancy shall be determined in accordance with Section 1604.5.1 of the *International Building Code*. Where application of that section results in a higher risk category for the existing building, such a change shall be considered a change of occupancy and shall comply with Section 506 of this code. Where application of that section results in a higher risk category for the addition, the addition and any systems in the existing building required to serve the addition shall comply with the requirements of the *International Building Code* for new construction for the higher risk category.

Reason Statement: This proposal clarifies how risk category should be assigned where the addition and the existing building have different uses. It creates identical provisions in the Prescriptive and Work Area methods.
IBC Section 1604.5.1 already covers conditions like this for new buildings. Generally, IEBC users would use IBC Section 1604.5 to find the risk category where any IEBC provision calls for it, but there is no general IEBC provision that explicitly points there. The case of additions, where the IEBC already requires the addition to be designed and built as new construction, is of particular interest, so this proposal provides a common sense interpretation.

As background and precedent, it is worth noting the other cases where the current codes address mismatched uses:

- IEBC Section 302.5 points to IBC Chapter 3 to assign occupancies, and Chapter 3 points in turn to Section 508 for buildings with mixed occupancies.
- IEBC Section 304.3 points to IBC Section 1604.5 to assign risk categories, and Section 1604.5.1 addresses mixed use buildings, requiring each portion of a new building to be assigned to the highest risk category of any portion on which it is structurally or functionally dependent. This proposal creates new IEBC sections to make that reference more direct and explicit for the case of additions.
- IEBC Section 1101.2 prohibits deficiencies in existing buildings from being extended into additions. (We are separately proposing a similar provision for the Prescriptive method.)
- IEBC Sections 506.5.4 and 1006.4 address operational access to RC IV facilities that might be affected by a change of occupancy project, but there is no similar provision for additions. This proposal would address that situation in a different way, by acknowledging that a dependent addition to a RC IV building must itself be assigned to RC IV, and that a RC IV addition changes the occupancy of a dependent non-RC IV existing building.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal merely provides a more explicit interpretation of the current code for the special case of additions.

EB47-22

EB48-22

IEBC: 502.1.1 (New), 1101.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Existing Building Code

Add new text as follows:

502.1.1 Creation or extension of nonconformity. An *addition* shall not create or extend any nonconformity in the *existing building* to which the *addition* is being made with regard to accessibility, structural strength, supports and attachments for nonstructural components, fire safety, means of egress or the capacity of mechanical, plumbing or electrical systems.

> **Exception:** Nonconforming supports and attachments for nonstructural components that serve the addition from within the *existing building* need not be altered to comply with *International Building Code* Section 1613 unless the components are part of the addition's *life safety system* or are required to serve an *addition* assigned to Risk Category IV.

Revise as follows:

1101.2 Creation or extension of nonconformity. An *addition* shall not create or extend any nonconformity in the *existing building* to which the *addition* is being made with regard to accessibility, structural strength, supports and attachments for nonstructural components, fire safety, means of egress or the capacity of mechanical, plumbing or electrical systems.

> **Exception:** Nonconforming supports and attachments for nonstructural components that serve the addition from within the *existing building* need not be altered to comply with *International Building Code* Section 1613 unless the components are part of the addition's *life safety system* or are required to serve an *addition* assigned to Risk Category IV.

Reason Statement: This proposal clarifies the current intent of the IEBC for cases where an addition relies on the existing building for certain systems or services – or vice versa.
The code already requires that any addition should itself be designed and built as new construction. This proposal ensures that the new addition is provided with suitable support from the existing building, consistent with the code's current intent. Examples:

- An addition might get its hot water from mechanical systems in the existing building, or might rely on a stair tower in the existing building for egress. In these cases, the addition is new and ought to have mechanical systems and egress capacity that are like new as well.
- A horizontal addition will include an elevator and new HVAC equipment meant to serve both the addition and the existing building. If the existing building is assigned to Risk Category IV, then the new systems should meet requirements for RC IV buildings even if the addition itself contains only RC II uses.

We believe this is the current intent of the code, and the Work Area method Sec 1101.2 already captures this intent for critical systems -- accessibility, structural strength, fire safety, egress, and MEP systems. Section 1101.2 sensibly requires that if the addition must be built as new construction, we wouldn't allow it to be built with deficient systems as a standalone structure, so why would we allow it to be served with deficient systems just because they're in an adjacent existing building?

But the current provision is not quite clear about bracing (especially seismic) of nonstructural components. Some might read "structural strength" to include "supports and attachments for nonstructural components" since the latter are covered in IBC Chapter 16. Some might consider the current reference to MEP systems to include their bracing and support. Nevertheless, the code is not as clear as it could be regarding this issue, so this proposal clarifies it.

Why the new exception? Despite what we believe is a laudable intent, we also recognize that the reason these items get overlooked is that it can be expensive to expose, evaluate, and retrofit nonstructural systems (even those already included in the list under fire safety, egress, and MEP). So the proposal adds an exception that effectively requires retrofit only for those systems serving RC IV additions where post-earthquake functionality is inherent in the design assumptions. Similarly, *life safety systems* must be functional in the addition, so they are not eligible for the exception either. The exception refers to IBC Section 1613 because that would be the default criteria if the exception were not provided, as indicated by Section 1101.1 (not shown) or by Section 502.1 (not shown) for the Prescriptive method.

Thus, depending on how one interprets the current code, this proposal is either an extension of the requirement in current Section 1101.2, or a relaxation of it through an exception. Either way, we submit that this proposal finds the right balance and should be in both the Work Area and Prescriptive methods. Therefore, in addition to revising Sec 1101.2, this proposal copies it into the Prescriptive method, where it will clarify the similar but implicit requirement in the first sentence of Section 502.1.

Finally, it's worth observing that if you don't want to retrofit existing systems, there's an easy way out. Just design your addition to be structurally and functionally separate from the existing building, as IBC Section 1605.4.1 and IEBC Section 1101.2 both allow. Thus, neither the current code nor this proposal actually mandates any upgrade to the existing building for an independent addition. But *without* this proposal, the incentive is to save money on the addition by relying on deficient systems in the existing building, or by having it serve the RC IV existing building while being designed itself as RC II. This proposal removes those perverse incentives.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal should not increase the cost of construction because it merely clarifies the intent of the current code, especially Section 1101.2, which prohibits the creation or extension of a deficient building system within an existing building when an addition is made. In some cases, depending on how the current code is interpreted, the proposed new Exception might actually reduce the cost of an addition.

EB48-22

EB50-22

IEBC: SECTION 202 (New), [BS] 502.3, [BS] 1103.3, [BS] 1301.3.3

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new definition as follows:

LOWEST FLOOR. The lowest floor of the lowest enclosed area, including basement, but excluding any unfinished or flood-resistant enclosure, usable solely for vehicle parking, building access or limited storage provided that such enclosure is not built so as to render the structure in violation of Section 1612 of the International Building Code or Section R322 of the International Residential Code, as applicable.

Revise as follows:

[BS] 502.3 Flood hazard areas. For buildings and structures in *flood hazard* areas established in Section 1612.3 of the International Building Code, or Section R322 of the International Residential Code, as applicable, any *addition* that constitutes *substantial improvement* of the *existing structure* shall comply with the flood design requirements for new construction, and all aspects of the *existing structure* shall be brought into compliance with the requirements for new construction for flood design.
For buildings and structures in *flood hazard areas* established in Section 1612.3 of the International Building Code, or Section R322 of the International Residential Code, as applicable, any *additions* that do not constitute *substantial improvement* of the *existing structure* are not required to comply with the flood design requirements for new construction provided that both of the following apply:

1. The addition shall not create or extend a nonconformity of the existing building or structure with the flood resistant construction requirements than the existing building or structure was prior to the addition
2. The lowest floor of the addition shall be at or above the lower of the lowest floor of the existing building or structure or the lowest floor elevation required in Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

[BS] 1103.3 Flood hazard areas. *Additions* and *foundations* in *flood hazard areas* shall comply with the following requirements:

1. For horizontal *additions* that are structurally interconnected to the *existing building*:
   - 1.1. If the *addition* and all other proposed work, when combined, constitute *substantial improvement*, the *existing building* and the *addition* shall comply with Section 1612 of the *International Building Code*, or Section R322 of the International Residential Code, as applicable.
   - 1.2. If the *addition* constitutes *substantial improvement*, the *existing building* and the *addition* shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.
   - 1.3 If the addition does not constitute substantial improvement the existing structure is not required to comply with the flood design requirements for new construction provided that both of the following apply.
     - 1.3.1 The addition shall not create or extend any nonconformity of the existing building with the flood resistant construction requirements.
     - 1.3.2 The lowest floor of the addition shall be at or above the lower of the lowest floor of the existing building or the lowest floor elevation required in Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.
2. For horizontal *additions* that are not structurally interconnected to the *existing building*:
   - 2.1. The *addition* shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.
   - 2.2. If the *addition* and all other proposed work, when combined, constitute *substantial improvement*, the *existing building* and the *addition* shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.
3. For vertical *additions* and all other proposed work that, when combined, constitute *substantial improvement*, the *existing building* shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

4. For a raised or extended foundation, if the foundation work and all other proposed work, when combined, constitute *substantial improvement*, the *existing building* shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.
5. For a new foundation or replacement foundation, the foundation shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

[BS] 1301.3.3 Compliance with flood hazard provisions. In *flood hazard areas*, buildings that are evaluated in accordance with this section shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable, if the work covered by this section constitutes *substantial improvement*. <u>If the work covered by this section is a structurally connected horizontal addition that does not constitute substantial improvement, the building is not required to comply with the flood design requirements for new construction provided that both of the following apply.</u>

1. <u>The addition shall not create or extend any nonconformity of the existing building with the flood resistant construction requirements.</u>
2. <u>The lowest floor of the addition shall be at or above the lower of the lowest floor of the existing building or the lowest floor elevation required in Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.</u>

Reason Statement: The IEBC, like the National Flood Insurance Program (NFIP), includes requirements for alterations and additions (improvements) to existing buildings in flood hazard areas. The trigger for compliance is in the definition for “substantial improvement.” The definition for “substantial damage” specifies the trigger when floodplain buildings are damaged. The trigger is sometimes referred to as the “50% rule” because compliance is required when the cost of proposed improvements or required repairs equals or exceeds 50 percent of the market value of the existing building before the work is done or before damage occurred. FEMA guidance, like IEBC Section 1103.3, distinguishes compliance of additions from compliance of the existing (or base) building.
The IEBC Sec. 502.1 already states that alterations must be made to ensure the existing buildings together with an addition, is “not less complying with” the requirements of the code than the existing building was before the addition. IBC Sec. 1101.2 echoes that limitation, by stating that an addition “shall not create or extend any nonconformity.” Buildings in flood hazard areas that were built before communities adopted regulations usually are nonconforming. Therefore, the basic premise that additions must not make nonconforming buildings more nonconforming includes consideration of the flood resistant requirements of the IBC and IRC.

The proposed amendments reinforce what is already a requirement of the code. The amendments make it clear that additions, even if not substantial improvement (i.e., cost less than 50% of the market value), must not make a nonconforming building more nonconforming. The way to ensure this is to have specific requirements for “non-substantial” additions stating those additions must not be lower than the lowest floors of the existing buildings because being lower would render the buildings more nonconforming. Similarly, non-substantial additions to conforming (or compliant) buildings must not make those buildings nonconforming. The proposal accounts for additions to buildings that are elevated higher than the requirements of the code by specifying additions to those buildings must be at least as high as the elevations required in IBC Section 1612 or IRC Section R322, as applicable.

Another scenario that is addressed by this proposal is when owners of buildings elevated on columns or pilings decide to enclose the area under the elevated buildings. Enclosing an area meets the definition of addition because it creates an “extension or increase in floor area.” Even when enclosing the area underneath is not a “substantial improvement” based on cost, the work is only allowed when the walls and the use of the proposed enclosure comply with the requirements for enclosures. Otherwise, the enclosure would either create noncompliance or extend nonconformance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal clarifies the application of the existing IEBC requirement that work on an existing building must not make a nonconforming building more nonconforming. The proposal is consistent with the existing requirement that additions must not create or extend any nonconformity. There is no change to the technical content of the provisions. By clarifying the existing requirement as it applies to additions to buildings in flood hazard areas, there will be no cost impact when approving this proposal.

EB50-22

EB51-22

IEBC: [BS] 502.3, [BS] 1103.3

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 502.3 Flood hazard areas. For buildings and structures in *flood hazard* areas established in Section 1612.3 of the International Building Code, or Section R322 of the International Residential Code, as applicable, any *addition* that constitutes *substantial improvement* of the *existing structure* shall comply with the flood design requirements for new construction, and all aspects of the *existing structure* shall be brought into compliance with the requirements for new construction for flood design. <u>For new foundations, foundations raised or extended in the vertical, and replacement foundations, the foundations shall be in compliance with the requirements for new construction for flood design.</u>
For buildings and structures in *flood hazard areas* established in Section 1612.3 of the International Building Code, or Section R322 of the International Residential Code, as applicable, any *additions* that do not constitute *substantial improvement* of the *existing structure* are not required to comply with the flood design requirements for new construction.

[BS] 1103.3 Flood hazard areas. *Additions* and *foundations* in *flood hazard areas* shall comply with the following requirements:

1. For horizontal *additions* that are structurally interconnected to the *existing building*:

   1.1. If the *addition* and all other proposed work, when combined, constitute *substantial improvement*, the *existing building* and the *addition* shall comply with Section 1612 of the *International Building Code*, or Section R322 of the International Residential Code, as applicable.

   1.2. If the *addition* constitutes *substantial improvement*, the *existing building* and the *addition* shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

2. For horizontal *additions* that are not structurally interconnected to the *existing building*:

   2.1. The *addition* shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

   2.2. If the *addition* and all other proposed work, when combined, constitute *substantial improvement*, the *existing building* and the *addition* shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

3. For vertical *additions* and all other proposed work that, when combined, constitute *substantial improvement*, the *existing building* shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

~~4. For a raised or extended foundation, if the foundation work and all other proposed work, when combined, constitute *substantial improvement*, the *existing building* shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.~~

<u>4</u>~~5~~. For a new foundation<u>,</u> ~~or~~ replacement foundation, <u>or a foundation raised or extended in the vertical,</u> the foundation shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Reason Statement: Whether an existing building will have a new foundation, replacement foundation, or a foundation that is raised or extended in the vertical, the construction process is generally the same: the building must be detached from the existing foundation and jacked up to allow the foundation work to proceed. Then, after the foundation work is complete, the building is lowered and structurally attached to the foundation. The costs to detach the building, jack it up, and lower and attach it to the foundation, do not change significantly based on how tall the new foundation will be.
The existing provisions in Section 502.3 and Section 1103.3 allow a building in a flood hazard area to remain below the required elevation (and possibly on an incompatible foundation type) if the work is determined to not constitute substantial improvement (a defined term). If a foundation is already being raised or extended in the vertical, it should be raised to the same elevation required for new construction in flood hazard areas. The I-Codes define “addition” to include an increase in height, which is why foundation work is included in IEBC Sec. 1103.3 and why the proposed change amends a section in Chapter 5 Additions.

When owners of buildings in flood hazard areas have already decided to invest in this type of extensive work, having the final foundation be resistant to identified flood conditions and flood loads is appropriate to protect that investment, as well as the investment in and safety of the building itself. The incremental cost of adding additional height to a foundation that is already being replaced or raised or extended in the vertical is offset by the benefits of lower risk of flood damage and lower NFIP flood insurance policy premiums which are, in part, a function of elevation.

Cost Impact: The code change proposal will increase the cost of construction
A change in cost would only occur for buildings in flood hazard areas that are already having their foundations raised or extended in the vertical, and then only if those foundations need to be higher to meet the elevations specified in ASCE 24 (which requires at least base flood elevation plus one foot). The code change proposal requires foundations that are raised or extended in the vertical to comply with flood resistant requirements, regardless of whether the cost of the work triggers the substantial improvement requirement. This type of project involves extensive work, with the majority of costs associated with the work elements other than the foundation construction. Because an owner proposing to raise, extend, or replace a foundation is already willing to incur those costs for foundations at lower heights, any additional costs are only those for added height to reach the elevation required by the Code. The per-foot cost of additional height is a function of the additional height and of the type of foundation, which typically are columns or perimeter walls.

FEMA manages a number of mitigation grant programs that fund elevation-in-place projects in flood hazard areas. Using cost sheets for two FEMA funded projects to elevate homes on concrete columns and CMU skirting (one smaller footprint but higher elevation, the other larger footprint but lower elevation), the foundation-only costs per additional foot of height average 2.3% of the total elevation projects. In a 2018 review of the per-foot cost for adding height to the foundation of a 2000 square foot light framed construction building (dwelling), FEMA estimated the cost per additional foot was $2144 (concrete perimeter wall with interior piers) and $1,850 (CMU perimeter wall with interior piers).

Offsetting benefits of having raised or extended foundations fully comply include long-term damage avoided. Also, flood insurance policies written by the National Flood Insurance Program may be reduced because the rating is based, in part, on the elevation of the top of the lowest floor.

EB51-22

EB52-22

IEBC: [BS] 502.4, [BS] 503.3, [BS] 706.2, [BS] 805.2, [BS] 1103.1

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 502.4 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in ~~design dead, live or snow load, including snow drift effects,~~ load effects due to the controlling gravity load combination of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose vertical load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 503.3. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 502.5.

Exception: Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 503.3 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in ~~design dead, live or snow load, including snow drift effects,~~ load effects due to the controlling gravity load combination of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable ~~design dead, live and snow loads including snow drift effects~~ gravity loads required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.

[BS] 706.2 Addition or replacement of roofing or replacement of equipment. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in ~~design dead, live or snow load, including snow drift effects,~~ load effects due to the controlling gravity load combination of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.

[BS] 805.2 Existing structural elements carrying gravity loads. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in ~~design dead, live or snow load, including snow drift effects,~~ load effects due to the controlling gravity load combination of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable ~~design dead, live and snow loads, including snow drift effects,~~ gravity loads required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Buildings in which the increased dead load is attributable to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.

[BS] 1103.1 Additional gravity loads. Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in ~~design dead, live or snow load, including snow drift effects,~~ load effects due to the controlling gravity load combination of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 805.2. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 1103.3.

Exception: Buildings of Group R occupancy with not more than five dwelling units or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

Reason Statement: The revision clarifies that the load combination is considered for the 5% increase, not individual loads. In addition, it requires “load effects” instead of “loads” so that more than just the magnitude of load is considered, but location as well, so that the effect of the applied loads such as moment and shear are considered.
Review of documentation from the 2015-2018 code revision cycle indicates that the changes adopted in this cycle were made in a good-faith effort to harmonize the various chapters of the IEBC on the topic of the “5 percent rule,” and the resulting language borrowed features from each provision. There is no indication in the records that the proposed intent was to substantially deviate from the prior application of the “5 percent rule,” but was rather to provide more clarity and consistency. However, the revisions have had several undesirable effects:

1. As currently phrased, the “5 percent rule” now applies not only to overall combined gravity loads, but also to any one component of the load, including “dead, live or snow load, including snow drift effects.” This change has the effect of imposing a much stricter limit on what additions or alternations can be undertaken without demonstrating compliance with the requirements for new structures, particularly for structures that carry significant live and/or snow loads. The 5% limit applied to dead load only for wood or steel structures can be very small, requiring new structural evaluations whereas considering the longstanding criteria of 5% of total load would not.

2. The specific gravity loads enumerated in the definition, “dead, live or snow load, including snow drift effects,” are not comprehensive. While less common, other forms of gravity load such as sliding snow, ice, rain, earth, and fluids may also be relevant. As written, the definition requires no evaluation for increases of any amount to these loads. This proposal is to revert to the more general language of the 2015 IEBC (and prior editions), which leaves it to the engineer to determine what gravity loads are applicable.

Additionally, an unresolved oversight in both the original and revised language of the “5 percent rule” is that it refers only to the magnitude of the applied loads. This has several drawbacks:

1. Changes to the distribution or locations of the applied loads are not addressed, which may have impacts on internal member forces (e.g., an RTU moved closer to the center of a roof beam, increasing flexure; or closer to the end, increasing shear.)

2. For some inelastic structures, changes to the character (but not the magnitude) of loads may have significant strength implications but show up only on the capacity side (e.g., wood structures supporting sustained vs. transient loading, and epoxy anchors in sustained tension.)

“Load effects” is deemed to best capture the original intent and most desirable application of the “5 percent rule.” Load effects are defined in the IBC as “forces and deformation produced in structural members by the applied loads.” While deformations have not traditionally been considered in the “5 percent rule,” we must acknowledge that internal member forces cannot develop without said deformations, so their presence is implicit. Increases in load generally affect deflections in the same proportions as they affect moments, so computation of deflections is not required. However, by including deformation in the definition of load effects, the engineer will need to consider cases where long-term deformation is a concern. For example, a change in load type on a wood structure from a short-term load (such as live load) to a sustained load (dead load) or a connection with epoxy anchors that will creep over time. Therefore, “load effects” desirably captures and incorporates these behaviors into a definition that remains tied to loading, and that does not unnecessarily undermine the simplicity of the rule by forcing practitioners to calculate stresses or assess changes in demand-to-capacity ratios.

The “5 percent rule” has long been applied by engineers to the combined design loads acting on a structure. This is consistent with similar past and present “5 percent rule” provisions that apply to member stresses or demand-to-capacity ratios (e.g., IEBC 2021 506.5.1). Changes to individual portions of the design loading are not as relevant or as descriptive as changes to the whole, and it is 5 percent changes to the whole that have long been held to constitute a significant change worthy of more detailed evaluation.

List of design loads “design dead, live, or snow loads, including snow drift effects” is revised to “load effects due to the controlling gravity load combination.”

The list of each type of load is deleted because the list is not all-inconclusive.

The list is deleted and replaced with gravity load combination so that it is clear that the total load is being checked, not individual load cases.

“Load effects” are checked rather than just “loads” so that locations of load are considered.

In sections 503.3 and 805.2, the requirement for elements with decreased capacity to be checked is revised to “gravity loads” of the IBC for a new structure rather than the list of “dead, live, or snow, including snow drift effects”, which is not all-inclusive. This is consistent with the requirement in the same sections for elements that exceed the 5% check to be “replaced or altered as needed to carry the gravity loads” per the IBC.

Administrative corrections are made in sections 502.4 to correct the reference to section 503.3 and to section 1103.1 to correct the reference to section 1103.2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These code change proposals are for clarification. If the existing 2021 code language for these sections is misinterpreted, there could be associated increased costs.

EB52-22

EB53-22

IEBC: [BS] 502.4, [BS] 503.3, [BS] 706.2, [BS] 805.2, [BS] 1103.1

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 502.4 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in the most critical gravity load combination ~~design dead, live or snow load, including snow drift effects,~~ of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose vertical load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 503.3. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 502.5.

Exception: Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 503.3 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in the most critical gravity load combination ~~design dead, live or snow load, including snow drift effects,~~ of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable design dead, live and snow loads including snow drift effects required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.

[BS] 706.2 Addition or replacement of roofing or replacement of equipment. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in the most critical gravity load combination ~~design dead, live or snow load, including snow drift effects,~~ of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.

[BS] 805.2 Existing structural elements carrying gravity loads. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in the most critical gravity load combination ~~design dead, live or snow load, including snow drift effects,~~ of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable design dead, live and snow loads, including snow drift effects, required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

2. Buildings in which the increased dead load is attributable to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.

[BS] 1103.1 Additional gravity loads. Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in the most critical gravity load combination ~~design dead, live or snow load, including snow drift effects,~~ of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 805.2. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 1103.3.

Exception: Buildings of Group R occupancy with not more than five dwelling units or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

Reason Statement: This proposal intends only to clarify the existing provisions that were made a bit harder to follow in the 2018 IEBC when the structural provisions were made more uniform across the different IEBC compliance methods in code change proposals EB15-16 and EB18-16. The 2015 IEBC states "...an increase in design gravity load..." and this change returns to this type of approach and extends the approach to the critical gravity load combination. This design methodology using the critical load combination is used by the "Wind Design Manual Based on the 2018 IBC and ASCE/SEI 7-16 Examples for Wind Forces on Buildings and Solar Photovoltaic Systems" that is jointly published by SEAOC, NCSEA, and ICC. This controlling load combination methodology is also the most widely used form of showing compliance in the structural design industry, yet currently is not code compliant.
The current wording tried to clarify what was meant by gravity load, but only included some of the many possible sources of gravity load and missed critical ones such as rain, ice, and fluid loads. Additionally, the current wording introduced an unfortunate "or" when listing the gravity load types. This caused an increased dead load of 1.1psf on a 20psf dead load roof to need to meet the current IBC, when that roof may have been designed to support heavy snow loads that dwarf its dead load which undoes the purpose of this 5% rule. This heavily influenced the placement of photovoltaic panels on existing light roofs as their new dead load is almost always an increase in the roof dead load of more than 5% but is not more than 5% of the controlling load combination due to the offset roof live load where snow loads are low, unless those panels are ballasted.

This change is still imperfect as many of the load combinations of the IBC include both lateral loads and gravity loads being applied simultaneously, but this imperfection is necessary so long as different IEBC sections for gravity and lateral loads are maintained with different thresholds. A more precise approach could be to identify exactly what load combinations are considered gravity and which are considered lateral, but this would greatly increase the complexity of the IEBC.

This proposal also removes the unnecessary wording about snow drifts. Those drifts are simply part of the snow load. Going into detail about how snow loads are to be applied gives the impression that details about other types of loads are OK to be ignored - such as live load reductions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of the code section does not change as part of this proposal so there should not be an increase in the cost of construction. However, if the code section was being interpreted to apply to small increases in dead load only the cost of construction could decrease and if the code section was being interpreted to not apply to rain, fluid, and ice loads the cost could increase.

EB53-22

EB54-22

IEBC: [BS] 502.4, [BS] 503.3, [BS] 706.2, [BS] 805.2, [BS] 1103.1

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 502.4 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be <u>analyzed and then if necessary</u> replaced or altered ~~as needed~~ to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose vertical load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 503.3. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 502.5.

Exception: Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 503.3 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be <u>analyzed and then if necessary</u> replaced or altered ~~as needed~~ to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable design dead, live and snow loads including snow drift effects required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.

[BS] 706.2 Addition or replacement of roofing or replacement of equipment. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be <u>analyzed and then if necessary</u> replaced or altered ~~as needed~~ to carry the gravity loads required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.

[BS] 805.2 Existing structural elements carrying gravity loads. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be <u>analyzed and then if necessary</u> replaced or altered ~~as needed~~ to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable design dead, live and snow loads, including snow drift effects, required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

2. Buildings in which the increased dead load is attributable to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering.

[BS] 1103.1 Additional gravity loads. Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be analyzed and then if necessary replaced or altered ~~as needed~~ to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 805.2. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 1103.3.

Exception: Buildings of Group R occupancy with not more than five dwelling units or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

Reason Statement: This proposal does two things:
1. It clarifies that an analysis of the existing structural members only needs to take place after the loading has passed the 5% threshold.

2. It clarifies that analysis methods of the existing structural members should follow the IBC, specifically section 1604.4 to capture the principles of engineering mechanics.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will likely decrease the cost of construction by placing the structural analysis requirements of existing members after the 5% rule. If existing structural analysis methods used do not meet the IBC analysis requirements then this proposal could increase the cost of construction.

EB54-22

EB55-22

IEBC: [BS] 502.4, [BS] 502.5, [BS] 1103.1, [BS] 1103.2

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 502.4 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose vertical load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 503.3. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 502.5.

Exception: Horizontal additions to buildings ~~Buildings~~ of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 502.5 Existing structural elements carrying lateral load. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 1613 of the International Building Code using full seismic forces.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.
2. Horizontal additions to buildings ~~Buildings~~ of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 1103.1 Additional gravity loads. Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 805.2. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 1103.3.

Exception: Horizontal additions to buildings ~~Buildings~~ of Group R occupancy with not more than five dwelling units or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 1103.2 Lateral force-resisting system. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall meet the requirements of Sections 1609 and 1613 of the *International Building Code* using full seismic forces.

Exceptions:

1. Horizontal additions to buildings ~~Buildings~~ of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

2. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code.* For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

Reason Statement: This proposal limits the use of exceptions for small Group R occupancies to horizontal additions only. Vertical additions and the increased loads they impose on the existing supporting structure are beyond the scope of both the IRC or the light-frame construction methods (2308) section of the IBC. Neither the IRC or IBC 2308 include prescriptive direction on how to evaluate or alter existing elements for the increased loads, which leads the user back to the IEBC for guidance.
Prescriptive provisions in both IBC 2308 and the IRC are written for use with new construction. Under a vertical addition, the existing structure is required to support increased gravity loads from the material dead load of the addition and from live loads imposed by use of the addition. Shear loads on shear walls/braced wall lines will increase:

1) Under wind loading due to the larger surface area presented by the taller structure height

2) Under seismic loading due to the increased mass from the material dead load of the addition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of the proposal is to direct the user to the appropriate code when considering vertical additions.

EB55-22

EB56-22

IEBC: 502.5 (New), 1101.4 (New)

Proponents: John Williams, representing Committee on Healthcare (ahc@iccsafe.org)

2021 International Existing Building Code

Add new text as follows:

502.5 Smoke Barriers in Group I-1, Condition 2. Where an addition to an existing Group I-1, Condition 2 building adds sleeping areas that result in more than 50 care recipients on a story, smoke barriers shall be provided to subdivide such story into not fewer than two smoke compartments in accordance with Section 420.6 of the International Building Code.

> **Exception:** Where the existing building is divided into smoke compartments, and the addition does not result in any individual smoke compartment exceeding the size and travel distance requirements in Section 420.6 of the International Building Code, additional smoke barriers are not required.

1101.4 Smoke Barriers in Group I-1, Condition 2. Where an addition to an existing Group I-1, Condition 2 building adds sleeping areas that result in more than 50 care recipients on a story, smoke barriers shall be provided to subdivide such story into not fewer than two smoke compartments in accordance with Section 420.6 of the International Building Code.

> **Exception:** Where the existing building is divided into smoke compartments, and the addition does not result in any individual smoke compartment exceeding the size and travel distance requirements in Section 420.6 of the International Building Code, additional smoke barriers are not required.

Reason Statement: The intent of this proposal is to clarify what is required where an existing Group I-1, Condition 2 has an addition. It is not reasonable for a small addition to trigger a major renovation to create smoke compartments (IBC Section 420.6).
This code change adds clarification for when smoke compartments are required to be added to existing Group I-1, Condition 2 buildings when being expanded with an addition. Many Group I-1 occupancy buildings, built prior to 2015, were not required to have smoke compartments. This code change triggers requirements to add smoke barriers to those buildings once a story reaches a certain size; sleeping rooms for 50 care recipients. The trigger for 50 care recipients is consistent with Section 420.6 of the *IBC* for new Group I-1 Conditions 2. This requirement does not address additions of other uses. Either the number of care recipients is not be increased in the facility, or the addition is large enough that new construction requirements would apply.

The exception clarifies that this only applies to buildings that do not already have smoke compartmentalization, and only if those additions expand the compartment size beyond the thresholds set by Section 420.6 of the *International Building Code*.

This proposal is submitted by the Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/icc-committee-on-healthcare/.

Cost Impact: The code change proposal will increase the cost of construction
This proposal would potentially require smoke compartments to be constructed where the addition to an existing Group I-1, Condition 2 would result in more than 50 care recipients on a story. The exception provides some relief where existing smoke compartments still comply including the addition. Overall this section triggers the need for smoke compartments in existing buildings that was not required in the 2021 IEBC.

EB56-22

EB57-22

IEBC: [BS] 502.5, [BS] 503.4, [BS] 805.3, [BS] 1103.2

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 502.5 Existing structural elements carrying lateral load. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 1613 of the International Building Code using full seismic forces. <u>Altered existing elements shall not be required to meet detailing requirements of the International Building Code.</u>

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.
2. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 503.4 Existing structural elements carrying lateral load. Except as permitted by Section 503.13, where the *alteration* increases design lateral loads, results in a prohibited structural irregularity as defined in ASCE 7, or decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. <u>Altered existing elements shall not be required to meet detailing requirements of the International Building Code.</u>

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.
2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 400 pounds (181.4 kg) and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, “roof” shall mean the roof level above a particular story.

[BS] 805.3 Existing structural elements resisting lateral loads. Except as permitted by Section 805.4, where the *alteration* increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. <u>Altered existing elements shall not be required to meet detailing requirements of the International Building Code.</u>

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is not more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

[BS] 1103.2 Lateral force-resisting system. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall meet the requirements of Sections 1609 and 1613 of the *International Building Code* using full seismic forces. Altered existing elements shall not be required to meet detailing requirements of the International Building Code.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

Reason Statement: Clarifies requirements for structural alterations based on 2018 SEAOC survey. Reference Survey Question 15, associated results, and discussion in the attached conference paper (Zepeda et al, 2019). Code is not clear about detailing requirements for altered existing structural elements as opposed to newly added structural elements.
Revisions made by this proposal intend to clarify that only **materials** are required to meet IBC requirements where existing structural elements are altered, whereas both **materials and detailing** must meet IBC requirements newly added structural elements.

https://www.cdpaccess.com/proposal/8703/25651/files/download/3153/

Bibliography: Zepeda, D., Hagen, G., O'Connell, K., McLellan, R., Buckalew, J., and Sumer, A., "Existing Buildings and the "10% Rule": Survey Results, Opinions, and Recommendations." 2019 SEAOC Convention Proceedings (pp. 116-147), Sacramento, CA: Structural Engineers Association of California.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of this code change proposal is for clarification. As it does not change the intent of the code, it will not increase of decrease the cost of construction.

EB57-22

EB58-22

IEBC: [BS] 502.5, [BS] 503.4, [BS] 805.3, [BS] 1103.2

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

2021 International Existing Building Code

Revise as follows:

[BS] 502.5 Existing structural elements carrying lateral load. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 1613 of the International Building Code using full seismic forces.

Exceptions:

1. Any existing lateral load-carrying structural element whose governing demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.
2. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 503.4 Existing structural elements carrying lateral load. Except as permitted by Section 503.13, where the *alteration* increases design lateral loads, results in a prohibited structural irregularity as defined in ASCE 7, or decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exceptions:

1. Any existing lateral load-carrying structural element whose governing demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.
2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 400 pounds (181.4 kg) and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, “roof” shall mean the roof level above a particular story.

[BS] 805.3 Existing structural elements resisting lateral loads. Except as permitted by Section 805.4, where the *alteration* increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exception: Any existing lateral load-carrying structural element whose governing demand-capacity ratio with the *alteration* considered is not more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

[BS] 1103.2 Lateral force-resisting system. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall meet the requirements of Sections 1609 and 1613 of the *International Building Code* using full seismic forces.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

2. Any existing lateral load-carrying structural element whose governing demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

Reason Statement: Clarifies requirements for structural alterations based on 2018 SEAOC survey. Reference Survey Questions 8, associated results, and discussion in the attached conference paper (Zepeda et al, 2019). Limiting changes in demand-capacity ratios of every action of every element (whereby element may be interpreted by some as coupled walls or beam-column systems) in 3D computer models can lead to unintended retrofit requirements at times where changes in relative demand do not directly affect performance. For example, a 10% change in small shear demands in a steel column controlled by flexure should not be the target of these provisions.
Revisions made by this proposal intend to clarify that the 10% threshold should apply to the controlling (governing) action.

https://www.cdpaccess.com/proposal/8703/25651/files/download/3153/

Bibliography: Zepeda, D., Hagen, G., O'Connell, K., McLellan, R., Buckalew, J., and Sumer, A., "Existing Buildings and the "10% Rule": Survey Results, Opinions, and Recommendations." 2019 SEAOC Convention Proceedings (pp. 116-147), Sacramento, CA: Structural Engineers Association of California.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of this code change proposal is for clarification. As it does not change the intent of the code, it will not increase of decrease the cost of construction.

EB58-22

EB59-22

IEBC: [BS] 502.5, [BS] 503.4, [BS] 805.3, [BS] 1103.2

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 502.5 Existing structural elements carrying lateral load. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 1613 of the International Building Code using full seismic forces.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction. For the purpose of evaluating cumulative effects, original construction shall be permitted to alternatively refer to a time at which the structure was demonstrated to be in conformance by evaluation or upgrade to meet new building performance objectives which are substantially equivalent to that required by the International Building Code, at the time of the upgrade.
2. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 503.4 Existing structural elements carrying lateral load. Except as permitted by Section 503.13, where the *alteration* increases design lateral loads, results in a prohibited structural irregularity as defined in ASCE 7, or decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction. For the purpose of evaluating cumulative effects, original construction shall be permitted to alternatively refer to a time at which the structure was demonstrated to be in conformance by evaluation or upgrade to meet new building performance objectives which are substantially equivalent to that required by the International Building Code, at the time of the upgrade.
2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 400 pounds (181.4 kg) and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, “roof” shall mean the roof level above a particular story.

[BS] 805.3 Existing structural elements resisting lateral loads. Except as permitted by Section 805.4, where the *alteration* increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is not more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction. For the purpose of evaluating cumulative effects, original construction shall be permitted to alternatively refer to a time at which the structure was demonstrated to be in conformance by evaluation or upgrade to meet new building performance objectives which are substantially equivalent to that required by the International Building Code, at the time of the upgrade.

[BS] 1103.2 Lateral force-resisting system. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall meet the requirements of Sections 1609 and 1613 of the *International Building Code* using full seismic forces.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction. For the purpose of evaluating cumulative effects, original construction shall be permitted to alternatively refer to a time at which the structure was demonstrated to be in conformance by evaluation or upgrade to meet new building performance objectives which are substantially equivalent to that required by the International Building Code, at the time of the upgrade.

Reason Statement: Clarifies requirements for structural alterations based on 2018 SEAOC survey. Reference Survey Questions 11 and 12, associated results, and discussion in the attached conference paper (Zepeda et al, 2019). Questions were raised over whether buildings that were determined to meet new building code performance objectives of a more recent building code either by evaluation or full retrofit could have the “clock restart” on cumulative alterations.
Revisions made by this proposal intend to clarify that the time of completion of a full evaluation or retrofit to new building code requirements may be considered the time of original construction for the purposes of the cumulative effects of additions and alterations.

https://www.cdpaccess.com/proposal/8703/25651/files/download/3153/

Bibliography: Zepeda, D., Hagen, G., O'Connell, K., McLellan, R., Buckalew, J., and Sumer, A., "Existing Buildings and the "10% Rule": Survey Results, Opinions, and Recommendations." 2019 SEAOC Convention Proceedings (pp. 116-147), Sacramento, CA: Structural Engineers Association of California.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of this code change proposal is for clarification. As it does not change the intent of the code, it will not increase of decrease the cost of construction.

EB59-22

EB60-22

IEBC: [BS] 502.5, [BS] 503.4, [BS] 805.3, [BS] 1103.2

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 502.5 Existing structural elements carrying lateral load. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 1613 of the International Building Code using full seismic forces.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction. <u>A nonlinear analysis shall be permitted to be used to evaluate the change in demand-capacity ratio using the same analysis procedure with and without the alteration considered.</u>
2. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 503.4 Existing structural elements carrying lateral load. Except as permitted by Section 503.13, where the *alteration* increases design lateral loads, results in a prohibited structural irregularity as defined in ASCE 7, or decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction. <u>A nonlinear analysis shall be permitted to be used to evaluate change in demand-capacity ratio using the same analysis procedure with and without the alteration considered.</u>
2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 400 pounds (181.4 kg) and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, "roof" shall mean the roof level above a particular story.

[BS] 805.3 Existing structural elements resisting lateral loads. Except as permitted by Section 805.4, where the *alteration* increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is not more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction. <u>A nonlinear analysis shall be permitted to be used to evaluate change in demand-capacity ratio using the same analysis procedure with and without the alteration considered.</u>

[BS] 1103.2 Lateral force-resisting system. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall meet the requirements of Sections 1609 and 1613 of the *International Building Code* using full seismic forces.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction. <u>A nonlinear analysis shall be permitted to be used to evaluate change in demand-capacity ratio using the same analysis procedure with and without the alteration considered.</u>

Reason Statement: Clarifies requirements for structural alterations based on 2018 SEAOC survey. Reference Survey Question 19, associated results, and discussion in the attached conference paper (Zepeda et al, 2019). Questions were raised as to whether nonlinear analysis could be used to justify 10% exception of structural alterations.
Revisions made by this proposal intend to clarify that nonlinear analysis may be used in conjunction with the permitted 10% exception for additions and alterations.

https://www.cdpaccess.com/proposal/8703/25651/files/download/3153/

Bibliography: Zepeda, D., Hagen, G., O'Connell, K., McLellan, R., Buckalew, J., and Sumer, A., "Existing Buildings and the "10% Rule": Survey Results, Opinions, and Recommendations." 2019 SEAOC Convention Proceedings (pp. 116-147), Sacramento, CA: Structural Engineers Association of California.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of this code change proposal is for clarification. As it does not change the intent of the code, it will not increase of decrease the cost of construction.

EB60-22

EB61-22

IEBC: [BS] 502.5, [BS] 503.4, [BS] 805.3, [BS] 1103.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov); Robert Pekelnicky, representing FEMA Seismic Code Support Committee (rpekelnicky@degenkolb.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 502.5 Existing structural elements carrying lateral load. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 1613 of the International Building Code using full seismic forces.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

   When calculating demand-capacity ratios for wind, the date of original construction shall be permitted to be taken as the date of completion of a prior retrofit in compliance with Section 1609 of the *International Building Code* or the codes or standards in effect at the time of the retrofit. When calculating demand-capacity ratios for earthquake, the date of original construction shall be permitted to be taken as the date of completion of a prior retrofit in compliance with Section 304.3.1 or the codes or standards in effect at the time of the retrofit.
2. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

[BS] 503.4 Existing structural elements carrying lateral load. Except as permitted by Section 503.13, where the *alteration* increases design lateral loads, results in a prohibited structural irregularity as defined in ASCE 7, or decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.

   When calculating demand-capacity ratios for wind, the date of original construction shall be permitted to be taken as the date of completion of a prior retrofit in compliance with Section 1609 of the *International Building Code* or the codes or standards in effect at the time of the retrofit. When calculating demand-capacity ratios for earthquake, the date of original construction shall be permitted to be taken as the date of completion of a prior retrofit in compliance with Section 304.3.1 or Section 304.3.2 item 1 or item 3 or the codes or standards in effect at the time of the retrofit.
2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 400 pounds (181.4 kg) and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, “roof” shall mean the roof level above a particular story.

[BS] 805.3 Existing structural elements resisting lateral loads. Except as permitted by Section 805.4, where the *alteration* increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is not more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction. When calculating demand-capacity ratios for wind, the date of original construction shall be permitted to be taken as the date of completion of a prior retrofit in compliance with Section 1609 of the *International Building Code* or the codes or standards in effect at the time of the retrofit. When calculating demand-capacity ratios for earthquake, the date of original construction shall be permitted to be taken as the date of completion of a prior retrofit in compliance with Section 304.3.1 or Section 304.3.2 item 1 or item 3 or the codes or standards in effect at the time of the retrofit.

[BS] 1103.2 Lateral force-resisting system. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall meet the requirements of Sections 1609 and 1613 of the *International Building Code* using full seismic forces.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

   When calculating demand-capacity ratios for wind, the date of original construction shall be permitted to be taken as the date of completion of a prior retrofit in compliance with Section 1609 of the *International Building Code* or the codes or standards in effect at the time of the retrofit. When calculating demand-capacity ratios for earthquake, the date of original construction shall be permitted to be taken as the date of completion of a prior retrofit in compliance with Section 304.3.1 or the codes or standards in effect at the time of the retrofit.

Reason Statement: This proposal clarifies the meaning of "original construction" used to assess "cumulative effects" in the current "10% rule" exceptions for additions and alterations. The clarification rationally resets the baseline for assessing these cumulative effects when a qualifying retrofit is done.
The proposal ensures that lateral (wind and seismic) upgrades are not triggered too easily for buildings that should not need them because they have already been retrofitted. In clarifying this exception, the proposal makes no change in the intent of the exception overall. Further, since this is a rational interpretation of a point on which the current code is incomplete, it should not change the effect of the triggering provision or the exception.

The proposal makes matching edits to the Prescriptive and Work Area methods.

For each project type (addition or alteration), the qualifying prior retrofit matches the criteria applicable to the overall provision -- "full" seismic criteria for additions, and "reduced" criteria for alterations. However, in the case of alterations, only a full-building retrofit should be deemed to qualify, so a retrofit by Appendix A (Section 304.3.2 item 2) is not allowed.

Since prior retrofits would not typically be done to current standards in Section 304.3, all of the proposed changes also allow the qualifying retrofit to be one based on the corresponding criteria from the time of the retrofit.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal should have no impact on project cost because it merely clarifies a common-sense interpretation of the existing provisions. Where the current provision is misunderstood or misapplied, the proposal could actually result in lower project costs.

EB61-22

EB62-22

IEBC: [BS] 503.3, [BS] 706.2, [BS] 805.2

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 503.3 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable design dead, live and snow loads including snow drift effects required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering~~.~~ provided that the R-value of the additional material does not exceed 5 where the ground snow load, determined in accordance with Section 1608 of the *International Building Code*, is 20 psf or greater.

[BS] 706.2 Addition or replacement of roofing or replacement of equipment. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering~~.~~ provided that the R-value of the additional material does not exceed 5 where the ground snow load, determined in accordance with Section 1608 of the *International Building Code*, is 20 psf or greater.

[BS] 805.2 Existing structural elements carrying gravity loads. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *International Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable design dead, live and snow loads, including snow drift effects, required by the *International Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Buildings in which the increased dead load is attributable to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m^2) or less over an existing single layer of roof covering~~.~~ provided that the R-value of the additional material does not exceed 5 where the ground snow load, determined in accordance with Section 1608 of the *International Building Code*, is 20 psf or greater.

Reason Statement: This proposal prevents the over insulation of roofs in higher snow zones without an engineering evaluation while at the same time enables the roofing industry to properly install and additional layer of roofing over an existing single layer of roofing.In some instances, to properly install an additional second layer of roofing over an existing single layer, a layer of protective surface over the existing layer is required. Typically, cover board or sprayed foam insulation is installed over an existing roof surface before the second layer of roof covering is installed.

Normally, the R-value for the protection board or sprayed foam insulation and the EPDM roofing is just under 3.Recent research by Michael O'Rourke, Phd of Rensselaer Polytechnic Institute and the ASCE 7 Snow Loads Committee has concluded higher Thermal Factors, Ct, used to derive the roof snow load in relation to an increase in roof R-values. The higher Thermal Factors have recently been published in tables 7.3-2 & 7.3-3 of ASCE 7. The higher thermal factor values indicate that a roof R-value of 50 could result in a 20% increase in roof snow load. 9.5 inches of extruded poly styrene roof insulation and one layer of EDPM roofing weights just below the 3 psf limit specified in this exception while at the same time increasing the roof R-value by approximately 50.

A 20 psf ground snow load or greater area was considered as it represents a transition zone to higher northern ground snow loads where hundreds of roofs were damaged or collapsed as observed with the Northeast Winters of 2011 & 2015 and the Spokane Wa / Cour'd Alene Idaho winter of 2009. In all three events, an Artic Trough resulted in prolonged periods of sub-freezing weather which resulted in cumulations of snow on roofs due to successive events within that period. An increase in roof snow load of these Older and lighter framed roofs due over insulating, without a proper evaluation, put these buildings at greater risk to damage or collapse.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal is for clarification and will not add cost.

EB62-22

EB63-22

IEBC: [BS] 503.4, [BS] 805.3

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 503.4 Existing structural elements carrying lateral load. Except as permitted by Section 503.13, where the *alteration* increases design lateral loads, results in a prohibited structural irregularity as defined in ASCE 7, or decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code.* Reduced seismic forces shall be permitted. <u>The same loads shall be considered in the evaluation of both the altered and unaltered structures.</u> For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.
2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 400 pounds (181.4 kg) and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, “roof” shall mean the roof level above a particular story.

[BS] 805.3 Existing structural elements resisting lateral loads. Except as permitted by Section 805.4, where the *alteration* increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is not more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. <u>The same loads shall be considered in the evaluation of both the altered and unaltered structures.</u> For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

Reason Statement: Misinterpretation of this exception can lead to unconservative determinations on weather existing structural elements carrying lateral load need to meet the requirements of the *International Building Code* or not. This proposal clearly states when considering the 10% exception, there must be consistency in the seismic loads used for comparing the unaltered and altered structures. In other words, if reduced seismic loads are used to evaluate the unaltered structure, reduced seismic loads must also be used to evaluate the altered structure. If full seismic loads are used to evaluate the unaltered structure, full seismic loads must also be used to evaluate the altered structure.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact associated with this proposal as it is intended for clarification of the intent of this code provision.

EB63-22

EB64-22

IEBC: SECTION 202 (New), [BS] 503.4, [BS] 805.3

Proponents: Ali Fattah, representing City of San Diego Development Services Department (AFATTAH@SANDIEGO.GOV)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new definition as follows:

PHOTOVOLTAIC PANEL SYSTEM. A system that incorporates discrete photovoltaic panels, that converts solar radiation into electricity, including rack support systems.

Revise as follows:

[BS] 503.4 Existing structural elements carrying lateral load. Except as permitted by Section 503.13, where the *alteration* increases design lateral loads, results in a prohibited structural irregularity as defined in ASCE 7, or decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *International Building Code*. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.
2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 400 pounds (181.4 kg) and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, “roof” shall mean the roof level above a particular story.
3. The installation of rooftop *photovoltaic panel systems* where the additional roof dead load due to the system, including ballast where applicable, does not exceed 5 psf and 10% of the dead load of the existing roof.

[BS] 805.3 Existing structural elements resisting lateral loads. Except as permitted by Section 805.4, where the *alteration* increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Exception:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is not more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.
2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 400 pounds (181.4 kg) and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, “roof” shall mean the roof level above a particular story.
3. The installation of rooftop *photovoltaic panel systems* where the additional roof dead load due to the system, including ballast where applicable, does not exceed 5 psf and 10% of the dead load of the existing roof.

Reason Statement: The IEBC includes a needed exception to exempt existing buildings undergoing alterations from compliance with more current seismic requirements in IBC chapter 16. The existing exception uses demand/capacity ratios (DCR) to identify a threshold below which the alteration is not deemed to be significant enough to require an evaluation and possible upgrade of the existing lateral force resisting system. Demand equates to the load applied to the lateral force resisting system and capacity equates the strength of the lateral force resisting system to resist the lateral load. Demand can be impacted by an increase in gravity load, alternations that redirect load to existing elements in addition to the loads they

resist prior to the alteration, for example force transfer around and due to a large floor/roof opening. The capacity of existing lateral force resisting elements can be impacted by alterations that cut into the elements such as for example reducing the length of a shearwall.
Roof top solar photovoltaic systems, and especially those with ballast, may increase the demand capacity ratio of lateral force resisting systems due to the location of the installation relative to the existing lines of resistance below the roof. For example a building that includes lateral force resisting systems at the interior of the building in addition to those at the exterior may cause an in creased demand-capacity ratio DCR at the interior shearwalls due additional tributary loads. As a consequence and without the proposed code change the installation of a rooftop solar system would require that a structural engineer identify the existing lateral force resisting system (possibly without the benefit of having existing plans), determine its capacity and determine the demand and thus demonstrate that the DCR increase is not increased by more than 10%. This requirement imposes a significant burden on buildings constructed with light framed wood construction due to the localized impact of the alteration since unlike other buildings they do not incorporate heavier concrete or steel floors and roofs or heavier concrete or masonry exterior walls. Heavier walls and roofs will allow the roof top installations to easily satisfy the DCR limit.

Earthquake loads are impacted by gravity loads and the addition of roof-top solar and ballast will contribute additional dead load to the overall building structure. Gravity load effects tend to be localized where lateral load effects envisioned by Sections 503.4 and 805.3 tend to be more global; lateral load effects due to earthquake tend to be based on a percentage of the gravity load. Sections 503.3 and 503.4 and Sections 805.2 and 805.3 need to be satisfied and a higher gravity load threshold set in the proposed exception to Sections 503.4 and 805.3 should not be construed to nullify the lower dead load effects. There is no published data demonstrating that alterations involving the installation of rooftop solar photovoltaics caused a life-safety hazard due to a seismic event. It would be difficult to explain to a building owner that the installation of a rooftop solar system necessitates $2,000 or more in engineering costs to demonstrate that the DCR has not been exceeded. ASCE 7 as well as the IBC recognize that roof top solar voltaic systems are unique and allow seismic force resistance through friction and allow discounting of the roof live load under the rack-mounted assemblies.

This proposed code change offers a similar and reasonable accommodation to light weight components that are hand carried on to a roof and which can occupy a portion of the roof. The proposed exception is necessary since photovoltaic panel system and it's associated ballast are not considered mechanical equipment which are addressed in Section 503.4 and 805.3 exception 2. Note that exception 2 is added to Section 805.3 to be consistent with what was approved for Section 503.4 in EB54-21. Exception 2 was inadvertently not added to Section 805.3 during the 2019 code cycle, so an editorial edit is also being proposed to align the work area method with the prescriptive method in Chapter 5. The structural provisions are intended to be consistent between the prescriptive and work area method.

A definition for photovoltaic panel system adopted into the IBC is proposed to be added as a part of the proposed code change for clarity. Proponent submitted the proposed code change as EB56-19 concurrent with EB54-19 with the latter approved by the Structural Committee and adopted as exception 2 to Section 503.4. The committee did not approve EB 56-19 due to confusion with the goal in code change EB55-19 that addressed gravity load impacts.

Cost Impact: The code change proposal will decrease the cost of construction
The proposed code change will eliminate the need to develop detailed structural plans to demonstrate the capacity of the existing lateral force resisting system as well as constructing lateral force resisting system upgrades when installing photovoltaic panel systems. This will reduce the cost of construction by reducing the need for extensive engineering analysis.

EB64-22

EB65-22

IEBC: [BS] 503.5, [BS] 906.3

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 503.5 Seismic Design Category F. Where the *work area* exceeds 50 percent of the building area, and where the building is assigned to Seismic Design Category F, the structure of the altered building shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. <u>Supports and attachments for nonstructural components serving any portion of the building with a use included in Risk Category IV shall comply with Section 1613 of the *International Building Code* or shall comply with ASCE 41 using an objective of Position Retention nonstructural performance with the BSE-1E earthquake hazard level.</u>

[BS] 906.3 Seismic Design Category F. Where the building is assigned to Seismic Design Category F, the structure of the altered building shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. <u>Supports and attachments for nonstructural components serving any portion of the building with a use included in Risk Category IV shall comply with Section 1613 of the *International Building Code* or shall comply with ASCE 41 using an objective of Position Retention nonstructural performance with the BSE-1E earthquake hazard level.</u>

Reason Statement: This proposal protects essential nonstructural systems and components in existing Risk Category IV buildings.
The fire stations, emergency operations centers, hospital emergency departments, and other facilities assigned to RC IV are especially reliant on the performance of nonstructural systems. Yet the current code, even in the rare cases where it triggers seismic upgrade, does not even require bracing of existing nonstructural components (let alone ruggedness to ensure functionality).

This proposal provides a basic level of protection, limited to the most crucial and cost-beneficial situations where structural retrofit is already triggered. It applies only to major (Level 3) alterations to buildings already assigned to RC IV *and* located in areas with very high seismicity (SDC F), where the code already requires a seismic structural evaluation and possibly a retrofit. This proposal would supplement the triggered structural work by including the nonstructural systems that keep the RC IV areas functional. In addition, consider its limited scope:

- Common alterations (Level 1 or Level 2) are exempt.
- RC IV buildings in areas of low, moderate, and even some high seismicity are exempt.
- Existing nonstructural systems that are not needed to serve the RC IV uses are exempt.
- Even where not exempt, reduced seismic design criteria are allowed, as is typical in the IEBC for alteration projects.
- By allowing reduced criteria, the proposal waives any retroactive certification or testing of the existing components themselves.

As is normal in the IEBC, “reduced” seismic criteria, represented by the specified ASCE 41 objective, are allowed for alteration triggers. (The code-based criteria are not reduced because there’s no simple way to do that except to say “pretend it’s a RC II building,” which would be confusing. So Section 1613 is allowed for those not yet familiar with ASCE 41, the national standard for seismic evaluation and retrofit, while those who practice in SDC F areas are most likely to be familiar already with ASCE 41.)

This proposal fills a gap in the code related to the expected performance of RC IV facilities, but it is consistent with other requirements related to the performance of these buildings. For reference and as precedents, consider:

- Current IEBC requirements for operational access to RC IV facilities affected by a change of occupancy (502.6 and 1103.3)
- ICC 500 requirements for storm shelter “critical support systems,” which requires an existing building to protect mechanical and plumbing systems that support a storm shelter addition.
- IBC 1604.5.1 requirements for assigning risk category in buildings with multiple occupancies. Even if a portion of a building has no RC IV use itself, and even if it is structurally separated from any RC IV uses, it is still assigned to RC IV if it provides access, egress, or life safety systems to the RC IV portion.
- Damage to the new Olive View hospital in the Northridge earthquake. The structure did fine. Nonstructural failures shut down the hospital.
- Too many articles, white papers, and reports to name, all arguing that we need to take nonstructural systems more seriously.

The proposal makes matching edits to the Prescriptive and Work Area methods.

Notes on phrasing:

- “occupancy included in the risk category” is the phrasing already in Sec 1605.4.1.

- The proposal applies to nonstructural systems that “serve” RC IV uses within the building. This is similar to the “work area” concept, but it does not use that terminology because distributed nonstructural systems (HVAC, elevators) can be critical to the work area without actually being within it. Thus, the triggered scope might extend beyond the defined “work area” even if it does not involve the whole building.

Cost Impact: The code change proposal will increase the cost of construction
The proposal will increase costs only for RC IV facilities in very high seismic areas undergoing major alterations, and therefore already subject to structural retrofit. In addition, its scope and criteria are limited to minimize cost increases, as explained in the Reason Statement, and the proposal affects only nonstructural components that are deficient relative to the reduced criteria.

EB65-22

EB66-22

IEBC: [BS] 503.11, [BS] 906.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 503.11 Substantial structural alteration. Where the *work area* exceeds 50 percent of the building area and where the work involves a *substantial structural alteration*, the lateral load-resisting system of the altered building shall satisfy the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. Where the building is assigned to Seismic Design Category D or F, supports and attachments for nonstructural components required to serve any portion of the building with a use included in Risk Category IV shall comply with Section 1613 of the *International Building Code* or shall comply with ASCE 41 using an objective of Position Retention nonstructural performance with the BSE-1E earthquake hazard level.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes that are altered based on the conventional light-frame construction methods of the *International Building Code* or in compliance with the provisions of the *International Residential Code*.
2. Where the intended *alteration* involves only the lowest story of a building, ~~only the~~ structural components of the lateral load-resisting system above ~~components in and below~~ that story need not comply with this section.

[BS] 906.2 Existing structural elements resisting lateral loads. Where the work involves a *substantial structural alteration*, the lateral load-resisting system of the altered building shall be shown to satisfy the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. Where the building is assigned to Seismic Design Category D or F, supports and attachments for nonstructural components required to serve any portion of the building with a use included in Risk Category IV shall comply with Section 1613 of the *International Building Code* or shall comply with ASCE 41 using an objective of Position Retention nonstructural performance with the BSE-1E earthquake hazard level.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes that are altered based on the conventional light-frame construction methods of the *International Building Code* or in compliance with the provisions of the *International Residential Code*.
2. Where the intended alteration involves only the lowest story of a building, ~~only the~~ structural components of the lateral load resisting system above ~~components in and below~~ that story need not comply with this section.

Reason Statement:
This proposal protects essential nonstructural systems and components in existing Risk Category IV buildings.
The fire stations, emergency operations centers, hospital emergency departments, and other facilities assigned to RC IV are especially reliant on the performance of nonstructural systems. Yet the current code, even in the rare cases where it triggers seismic upgrade, does not even require bracing of existing nonstructural components (let alone ruggedness to ensure functionality).

This proposal provides a basic level of protection, limited to the most crucial and cost-beneficial situations where structural retrofit is already triggered. It applies only to major (Level 3) alterations to buildings already assigned to RC IV and located in areas with moderate or high seismicity (SDC D or F), where the code already requires a seismic structural evaluation and possibly a retrofit. This proposal would supplement the triggered structural work by including the nonstructural systems that keep the RC IV areas functional. In addition, consider its limited scope:

- Common alterations (Level 1 or Level 2) are exempt.
- Nonstructural alteration projects are exempt, as the proposal applies only where there is an intended substantial structural alteration.
- RC IV buildings in areas of low seismicity are exempt.
- Existing nonstructural systems that are not needed to serve the RC IV uses are exempt.
- Even where not exempt, reduced seismic design criteria are allowed, as is typical in the IEBC for alteration projects.
- By allowing reduced criteria, the proposal waives any retroactive certification or testing of the existing components themselves.

As is normal in the IEBC, “reduced” seismic criteria, represented by the specified ASCE 41 objective, are allowed for alteration triggers. (The code-based criteria are not reduced because there’s no simple way to do that except to say “pretend it’s a RC II building,” which would be confusing. So Section 1613 is allowed for those not yet familiar with ASCE 41, the national standard for seismic evaluation and retrofit, while those who practice in SDC D-F areas are most likely to be familiar already with ASCE 41.)

This proposal fills a gap in the code related to the expected performance of RC IV facilities, but it is consistent with other requirements related to the performance of these buildings. For reference and as precedents, consider:

- Current IEBC requirements for operational access to RC IV facilities affected by a change of occupancy (502.6 and 1103.3)
- ICC 500 requirements for storm shelter “critical support systems,” which requires an existing building to protect mechanical and plumbing systems that support a storm shelter addition.
- IBC 1604.5.1 requirements for assigning risk category in buildings with multiple occupancies. Even if a portion of a building has no RC IV use itself, and even if it is structurally separated from any RC IV uses, it is still assigned to RC IV if it provides access, egress, or life safety systems to the RC IV portion.
- Damage to the new Olive View hospital in the Northridge earthquake. The structure did fine. Nonstructural failures shut down the hospital.
- Too many articles, white papers, and reports to name, all arguing that we need to take nonstructural systems more seriously.

In addition to its main purpose, the proposal makes a necessary edit to one of the exceptions to clarify that it applies only to the structural part of the trigger. This exception cannot apply to the proposed nonstructural trigger, since nonstructural systems are commonly located on the roof or in a mechanical room separate from the work area.

The proposal makes matching edits to the Prescriptive and Work Area methods. Notes on phrasing:

- “occupancy included in the risk category” is the phrasing already in Sec 1605.4.1.
- The proposal applies to nonstructural systems required to “serve” RC IV uses within the building. This is similar to the “work area” concept, but it does not use that terminology because distributed nonstructural systems (HVAC, elevators) can be critical to the work area without actually being within it. Thus, the triggered scope might extend beyond the defined “work area” even if it does not involve the whole building.

Cost Impact: The code change proposal will increase the cost of construction
The proposal will increase costs for RC IV facilities in moderate and high seismic areas undergoing major alterations AND substantial structural alterations. In addition, its scope and criteria are limited to minimize cost increases, as explained in the Reason Statement, and the proposal affects only nonstructural components that are deficient relative to the reduced criteria.

EB66-22

EB67-22

IEBC: [BS] 503.12, [BS] 706.3.2, [BS] C201.1

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net); Don Scott, representing ASCE 7 Wind Load Subcommittee (dscott@pcs-structural.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 503.12 Roof diaphragms resisting wind loads in high-wind regions. Where the intended *alteration* requires a permit for reroofing and involves removal of roofing materials from more than 50 percent of the roof diaphragm of a building or section of a building located where the ~~ultimate design~~ basic wind speed ,V, is greater than 130 mph (58 m/s) in accordance with Figure 1609.3(1) of the International Building Code for Risk Category II, roof diaphragms, connections of the roof diaphragm to roof framing members, and roof-to-wall connections shall be evaluated for the wind loads specified in Section 1609 of the International Building Code, including wind uplift. If the diaphragms and connections in their current condition are not capable of resisting 75 percent of those wind loads, they shall be replaced or strengthened in accordance with the loads specified in Section 1609 of the International Building Code.

Exception: Buildings that have been demonstrated to comply with the wind load provisions in ASCE 7—88 or later editions.

[BS] 706.3.2 Roof diaphragms resisting wind loads in high-wind regions. Where roofing materials are removed from more than 50 percent of the roof diaphragm or section of a building located where the ~~ultimate design~~ basic wind speed, ~~V_{ult},~~ V, is greater than 130 mph (58 m/s)~~determined~~ in accordance with Figure 1609.3(1) of the International Building Code for Risk Category II, ~~is greater than 130 mph (58 m/s),~~ roof diaphragms, connections of the roof diaphragm to roof framing members, and roof-to-wall connections shall be evaluated for the wind loads specified in the *International Building Code*, including wind uplift. If the diaphragms and connections in their current condition are not capable of resisting 75 percent of those wind loads, they shall be replaced or strengthened in accordance with the loads specified in the *International Building Code.*

Exception: Buildings that have been demonstrated to comply with the wind load provisions in ASCE 7—88 or later editions.

[BS] C201.1 Purpose. This chapter provides prescriptive methods for partial structural retrofit of an *existing building* to increase its resistance to wind loads. It is intended for voluntary use where the ~~ultimate design~~ basic wind speed, ~~V_{ult},~~ V , is greater than 130 mph (58 m/s) ~~determined~~ in accordance with Figure 1609.3(1) of the International Building Code for Risk Category II,~~exceeds 130 mph (58 m/s)~~ and for reference by mitigation programs. The provisions of this chapter do not necessarily satisfy requirements for new construction. Unless specifically cited, the provisions of this chapter do not necessarily satisfy requirements for structural improvements triggered by *addition, alteration, repair, change of occupancy*, building relocation or other circumstances.

Reason Statement: Editorial changes to align the wind speed description consistent with ASCE 7 and the *International Building Code.*

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal is editorial.

EB67-22

EB68-22

IEBC: [BS] 503.13, [BS] 805.4

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 503.13 Voluntary lateral force-resisting system alterations. Structural *alterations* that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be subject to the structural requirements of Section 503 r~~equired to meet the requirements of Section 1609 or 1613 of the International Building Code~~, provided that all of the following apply:

1. With the alteration complete, the ~~The~~ capacity of existing structural systems to resist forces is not reduced.
2. New structural elements are detailed and connected to existing or new structural elements as required by the selected design criteria ~~*International Building Code* for new construction~~.
3. Supports and attachments for ~~New or relocated~~ nonstructural elements removed and reinstalled to facilitate the work comply with ~~are detailed and connected to existing or new structural elements as required by~~ the *International Building Code* for new construction.
4. The *alterations* do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

[BS] 805.4 Voluntary lateral force-resisting system alterations. Structural *alterations* that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be subject to the structural requirements of this chapter or Chapter 7 ~~required to meet the requirements of Section 1609 or Section 1613 of the International Building Code~~, provided that the following conditions are met:

1. With the alteration complete, the ~~The~~ capacity of existing structural systems to resist forces is not reduced.
2. New structural elements are detailed and connected to existing or new structural elements as required by the selected design criteria ~~*International Building Code* for new construction~~.
3. Supports and attachments for ~~New or relocated~~ nonstructural elements removed and reinstalled to facilitate the work comply with ~~are detailed and connected to existing or new structural elements as required by~~ the *International Building Code* for new construction.
4. The *alterations* do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

Reason Statement: This proposal makes clarifying edits and recognizes that voluntary retrofit criteria need not be (and usually is not) the same as IBC Section 1609 or Section 1613 criteria for new construction.
In the main provision, the proposal replaces obsolete wording. The current wording suggests that IEBC alteration provisions would normally require a building to "meet the requirements of Section 1609 or 1613 of the [IBC]," but that is not the case. Typically, the IEBC does not trigger any lateral system upgrade for alteration projects, and where it does, it allows alternative criteria in Section 304.3. Therefore, what's really being waived is not compliance with the IBC, but compliance with the various triggers in the alteration section (or chapter, for the Work Area method).

In Item 1, the proposal clarifies that existing capacity can be reduced by removing certain elements, as long as that capacity is replaced by new retrofit elements.

In Item 2, the proposal recognizes that selected retrofit criteria can be different from the code for new construction. In particular, retrofit criteria such as ASCE 41 recognize that connections of retrofit elements need only develop the strength of critical load path elements, which might be less than what the IBC might require for new construction.

In item 3, the scope is clarified to apply to nonstructural elements that are removed and reinstalled to facilitate the structural retrofit. Components provided new or relocated for other reasons are outside the scope of this provision, which is meant for work "intended exclusively to improve the [LFRS]."

The proposal makes matching requirements to the Prescriptive and Work Area methods.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal merely clarifies what is already the current understanding of these sections. Also, these sections apply only to voluntary work.

EB68-22

EB69-22

IEBC: [BS] 503.13, [BS] 805.4

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 503.13 Voluntary lateral force-resisting system alterations. Structural *alterations* that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be required to meet the requirements of Section 1609 or 1613 of the International Building Code, provided that all of the following apply:

1. The capacity of existing structural systems to resist forces is not reduced.
2. New structural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.
3. New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.
4. The *alterations* do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

    <u>**Exception:** Where alterations create a structural irregularity or make an existing structural irregularity more severe, the irregularity is permitted provided the altered building complies with Section 304.3.2 Item 3 and Table 304.3.2 using ASCE 41 Tier 3 procedures.</u>

[BS] 805.4 Voluntary lateral force-resisting system alterations. Structural *alterations* that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be required to meet the requirements of Section 1609 or Section 1613 of the International Building Code, provided that the following conditions are met:

1. The capacity of existing structural systems to resist forces is not reduced.
2. New structural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.
3. New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.
4. The *alterations* do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

    <u>**Exception:** Where alterations create a structural irregularity or make an existing structural irregularity more severe, the irregularity is permitted provided the altered building complies with Section 304.3.2 Item 3 and Table 304.3.2 using ASCE 41 Tier 3 procedures.</u>

Reason Statement: Clarifies requirements for structural alterations based on 2018 SEAOC survey. Reference the attached conference paper (Zepeda et al, 2019). During discussions regarding the responses to Question 4, questions were raised as to why introduction of irregularities that would be permitted in accordance with ASCE 7 would prohibit structural alterations if ASCE 41 were used to explicitly evaluated such irregularities. Revisions made by this proposal intend to clarify that it is permitted to make existing structural irregularities more severe, and introduce new structural irregularities as part of voluntary seismic improvements, provided the altered building complies with ASCE 41 BPOE performance objectives under a full Tier 3 evaluation.

https://www.cdpaccess.com/proposal/8703/25651/files/download/3153/

Bibliography: Zepeda, D., Hagen, G., O'Connell, K., McLellan, R., Buckalew, J., and Sumer, A., "Existing Buildings and the "10% Rule": Survey Results, Opinions, and Recommendations." 2019 SEAOC Convention Proceedings (pp. 116-147), Sacramento, CA: Structural Engineers Association of California.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of this code change proposal is for clarification. As it does not change the intent of the code, it will not increase of decrease the cost of construction.

EB69-22

EB70-22

IEBC: [BS] 503.13, [BS] 805.4

Proponents: Nathalie Boeholt, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 503.13 Voluntary lateral force-resisting system alterations. Structural *alterations* that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be required to meet the requirements of Section 1609 or 1613 of the International Building Code, provided that all of the following apply:

1. The capacity of existing structural systems to resist forces is not reduced.
2. New structural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.

   <u>**Exception**: New lateral force-resisting systems designed in accordance with the International Building Code are permitted to be of a type designated as "Ordinary" or "Intermediate" where ASCE 7 Table 12.2-1 states these types of systems are not permitted.</u>

3. New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.
4. The *alterations* do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

[BS] 805.4 Voluntary lateral force-resisting system alterations. Structural *alterations* that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be required to meet the requirements of Section 1609 or Section 1613 of the International Building Code, provided that the following conditions are met:

1. The capacity of existing structural systems to resist forces is not reduced.
2. New structural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.

   <u>**Exception**: New lateral force-resisting systems designed in accordance with the International Building Code are permitted to be of a type designated as "Ordinary" or "Intermediate" where ASCE 7 Table 12.2-1 states these types of systems are not permitted.</u>

3. New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by the *International Building Code* for new construction.
4. The *alterations* do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

Reason Statement: Sections 503.13 and 805.4 indicate that voluntary lateral force-resisting system alterations are not required to meet the requirements of Section 1609 or 1613 of the International Building Code, provided that 4 conditions are met. Condition #2 requires that new structural elements are detailed and connected as required by the International Building Code for new construction. This has led to some confusion amongst the design and the plan review communities when it comes to selecting the lateral force-resisting systems from ASCE 7 Table 12.2-1. It is unclear what portions of the International Building Code are not required to be met and what portions shall be met.
Very often, existing buildings needing seismic upgrades are older and have lateral force-resisting systems such as ordinary reinforced concrete or masonry walls or unreinforced masonry walls. These systems, typically designed with older codes, are often under-reinforced per today's codes or not reinforced at all. In an earthquake, they will behave very rigidly which can lead to early failure and possibly early collapse. This has been witnessed in past earthquakes, such as the Nisqually Earthquake of 2001 in the Seattle area, where many unreinforced masonry walls cracked and crumbled. When a seismic upgrade is proposed, it is important to provide new systems that will match the existing building's rigidity as much as possible to prevent excessive displacements which can lead to the failure of the more rigid and older systems. If a very flexible system such as a special steel moment frame is proposed, it will be able to deform quite a bit more than the existing older system which can lead to more deformation than the existing building can handle. The purpose of this proposal is to avoid situations like these and help building officials enforce more adequate seismic upgrades by allowing systems that are not normally allowed in new construction.

For example, in Seismic Design Category D, if 4-story concentrically braced frames of a height exceeding 35 feet are proposed for a voluntary seismic upgrade in an existing unreinforced masonry wall building and must be detailed and connected for new construction, per condition #2, then an engineer may deduce that only the "Special" type is allowed per ASCE 7 Table 12.2-1. The code required design and detailing of an "Ordinary" and "Special" concentrically braced frame for new construction are very different. It is agreed that the lateral force-resisting system detailing shall be per current codes for that system, but the term "new construction" is confusing and leads to think that the new system shall meet all the requirements of ASCE 7 Table 12.2-1. With the proposed exception, a more rigid "Ordinary" concentrically braced frame that is not normally allowed in Seismic Design Category D, would be allowed in this example, and would provide better deformation compatibility with the existing building. These "Ordinary" braced frames would be more adequate at providing overall increased seismic resistance because they are a more rigid system than "Special" braced frames, they would "attract" more load and therefore be more efficient at "taking" load away from the existing unreinforced masonry walls.

This proposal will make it clear that new lateral systems are permitted to be of any type, even of a type that normally would not be allowed in new construction, based on the seismic design category and height, as long as all the other conditions of sections 503.13 and 805.4 are met. The original intent of this code section remains the same, the proposed design shall not weaken the existing lateral resistance of the building or affect the behavior of the building in a severe way. In addition, this proposal will help with cost reduction and most importantly performance since less ductile "Ordinary" or "Intermediate" systems may be closer to matching an existing building's deformation limits.

Cost Impact: The code change proposal will decrease the cost of construction
This code change proposal will reduce the cost of construction for the following reasons. Clarifying that a new lateral force-resisting system can be of a type designated as "Ordinary" or "Intermediate" instead of "Intermediate" or "Special" in a voluntary seismic upgrade will prevent the specification of more expensive systems (i.e. "Special"). A "Special" lateral force-resisting system is more expensive because it requires additional material, additional fabrication (including special welding), additional special inspections and added time and complexity during construction. All these costs add up.

EB70-22

EB71-22

IEBC: SECTION 202 (New), 503.15, 804.11

Proponents: John Williams, representing Committee on Healthcare (ahc@iccsafe.org)

2021 International Existing Building Code

Add new definition as follows:

AMBULATORY CARE FACILITY. Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less than 24-hour basis to persons who are rendered incapable of self-preservation by the services provided or staff has accepted responsibility for care recipients already incapable.

Revise as follows:

503.15 Refuge areas. Where *alterations* affect the configuration of an area utilized as a refuge area, the capacity of the refuge area shall not be reduced below the required capacity of the refuge area for horizontal exits in accordance with Section 1026.4 of the *International Building Code*. Where the horizontal exit also forms a smoke compartment, the capacity of the refuge area for Group I-1, I-2 and I-3 occupancies and ~~Group B~~ ambulatory care *facilities* shall not be reduced below that required in Sections 407.5.3, 408.6.2, 420.6.1 and 422.3.2 of the *International Building Code,* as applicable.

804.11 Refuge areas. Where *alterations* affect the configuration of an area utilized as a refuge area, the capacity of the refuge area shall not be reduced below the required capacity of the refuge area for horizontal exits in accordance with Section 1026.4 of the *International Building Code*. Where the horizontal exit also forms a smoke compartment, the capacity of the refuge area for Group I-1, I-2 and I-3 occupancies and ~~Group B~~ ambulatory care *facilities* shall not be reduced below that required in Sections 407.5.3, 408.6.2, 420.6.1 and 422.3.2 of the *International Building Code*, as applicable.

Reason Statement: The definition proposed is the same definition used in the IBC. It is hoped that this definition can be scoped to the General committee so they will remain consistent.
The 'Group B' as part of 'ambulatory care' was utilized when this subject was originally added in the the I-codes. Removing this is no change to technical criteria, and would make these sections consistent with Sections 406.1.4, 408.3, 501.3, 707.1, 806.3, and 808.1.

This proposal is submitted by the Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/icc-committee-on-healthcare/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is merely making the same revisions as made to the IBC. The use of the term "Group B" is not necessary and does not change the application of the code. The use of the definition is provided to assist in code application and will not change the cost of compliance. It is the same definition as used in the IBC.

EB71-22

EB72-22

IEBC: 503.16 (New), 503.16.1 (New), 902.2 (New), 902.2.1 (New)

Proponents: John Williams, representing Committee on Healthcare (ahc@iccsafe.org)

2021 International Existing Building Code

Add new text as follows:

503.16 Conditions for I-1 Occupancies. Group I-1 Occupancies that are being altered and where the work area is greater than 50 percent of the aggregate building area, shall be classified as Condition 1 or Condition 2 in accordance with Section 308.2 of the International Building Code.

503.16.1 Smoke Barriers in Group I-1, Condition 2. In Group I-1, Condition 2 occupancies where the work area is on a story used for sleeping rooms for more than 30 care recipients, the story shall be divided into not less than two compartments by smoke barrier walls in accordance with Section 420.6 of the International Building Code.

902.2 Conditions for I-1 Occupancies. Group I-1 Occupancies shall be classified as Condition 1 or Condition 2 in accordance with Section 308.2 of the International Building Code.

902.2.1 Smoke Barriers in Group I-1, Condition 2. In Group I-1, Condition 2 occupancies where the work area is on a story used for sleeping rooms for more than 30 care recipients, the story shall be divided into not less than two compartments by smoke barrier walls in accordance with Section 420.6 of the International Building Code.

Reason Statement: The intent of this proposal is to specify where an existing Group I-1 would need to subdivide into smoke compartments similar to Section 420.6 in the IBC.
Prior to changes to the 2015 I-Codes, many Assisted Living communities were already operating as I-1 Occupancies, without having a Condition 1 or Condition 2 declaration. A clear requirement is needed for when these buildings would need to declare a Condition and meet the current code requirements for Smoke Barriers and Sprinklers. This code change sets the threshold at a Level 3 Alteration (greater than 50% of the aggregate building area), because that level of work equates to a larger expenditure level, and it matches the requirements already in Section 904 requiring upgraded fire protection for I-2 occupancies.
Many Assisted Living and Memory care communities operate on very slim budgets. These communities should be able to operate as they currently are, and make certain cosmetic renovations to their building without triggering the current code requirements of a Condition 1 or Condition 2, Group I-1 Occupancy. However, once they reach the Level 3 alteration threshold (renovation of 50% of building) they must declare a condition, and if they choose Condition 2, they must add smoke barriers in the work area. The requirement to add sprinklers in the work area is already contained in Section 904.1.4 of the IEBC.

This proposal is submitted by the Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/icc-committee-on-healthcare/.

Cost Impact: The code change proposal will increase the cost of construction
This proposal would required the addition of a smoke barrier in Group I-1 undergoing a Level 3 alteration. The 2021 IEBC does not require that existing Group I-1 occupancies must upgrade to providing smoke compartments when alterations are undertaken.

EB72-22

EB73-22

IEBC: 503.16 (New), 902.3 (New)

Proponents: John Williams, representing Committee on Healthcare (ahc@iccsafe.org)

2021 International Existing Building Code

Add new text as follows:

503.16 Ambulatory care facilities. Where a work area exceeds 50 percent of the building area the and work area includes an existing ambulatory care facility, the following shall be provided:

1. A smoke compartment in accordance with Section 422.3 of the International Building Code where the alteration results in an ambulatory care facility greater than 10,000 square feet on one story.
2. Separation from adjacent spaces in accordance with Section 422.2 of the International Building Code, where any such facility has the potential for four or more care recipients are to be incapable of self-preservation at any time.

902.3 Ambulatory care facilities.. Where a Level 3 work area includes an existing ambulatory care facility, the following shall be provided:

1. A smoke compartment in accordance with Section 422.3 of the International Building Code where the alteration results in an ambulatory care facility greater than 10,000 square feet on one story.
2. Separation from adjacent spaces in accordance with Section 422.2 of the International Building Code, where any such facility has the potential for four or more care recipients are to be incapable of self-preservation at any time.

Reason Statement: This code change intends to address ambulatory care facilities in building where a substantial renovation is occurring. Ambulatory care presents a substantially different set of risks from a normal group B occupancy. To ensure that existing facilities in existing building address some of these unique risk, we are proposing that when there is a 50%/level 3 alteration of a building, and that alteration includes an existing ambulatory care facility, that users of the code are prompted to review two key aspects of the building code. The thresholds to add these requirements are the same as the building code requirement (10,000 square feet to add smoke compartment and 4 people incapable to add separation). Practically, existing care facilities that are certified through Medicare will already have these requirements. A subset of existing facilities will not, and since the special requirements in Chapter 4 of the building code did not exist prior to the 2009 version, these will require upgrade. The CHC considered several different thresholds to require upgrades. For Group I-2 facilities, smoke compartmentation is required at Level 2 alterations. Ambulatory care facilities are often located in multi-tenant buildings where other tenants could be impacted, so we are suggesting these requirements be triggered by a higher threshold.
This proposal is submitted by the Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/icc-committee-on-healthcare/.

Cost Impact: The code change proposal will increase the cost of construction
While many existing facilities will already have separation and smoke compartmentation, some will require adding these features which will increase the cost of compliance for some facilities that must upgrade or add smoke barrier separations. .

EB73-22

EB74-22

IEBC: 505.2, 702.4

Proponents: Jennifer Hatfield, representing Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com); Craig Drumheller, representing WDMA (cdrumheller@wdma.com)

2021 International Existing Building Code

Revise as follows:

505.2 Window <u>fall prevention</u> ~~opening control devices~~ on replacement windows. In Group R-2 or R-3 buildings containing dwelling units, and one- and two-family dwellings and townhouses regulated by the *International Residential Code*, window opening control devices or <u>other window</u> fall prevention devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:

1. The window is operable.
2. One of the following applies:
    2.1. The window replacement includes replacement of the sash and frame.
    2.2. The window replacement includes the sash only where the existing frame remains.
3. One of the following applies:
    3.1. In Group R-2 or R-3 buildings containing dwelling units, the bottom of the clear opening of the window opening is at a height less than 36 inches (915 mm) above the finished floor.
    3.2. In one- and two-family dwellings and townhouses regulated by the *International Residential Code*, the bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.
4. The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere when the window is in its largest opened position.
5. The vertical distance from the bottom of the clear opening of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

Exception: Operable windows where the bottom of the clear opening of the window opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F2006.

702.4 Window <u>fall prevention</u> ~~opening control devices~~ on replacement windows. In Group R-2 or R-3 buildings containing dwelling units and one- and two-family dwellings and townhouses regulated by the International Residential Code, window opening control devices <u>or other fall prevention devices</u> complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:

1. The window is operable.
2. One of the following applies:
    2.1. The window replacement includes replacement of the sash and frame.
    2.2. The window replacement includes the sash only where the existing frame remains.
3. One of the following applies:
    3.1. In Group R-2 or R-3 buildings containing dwelling units, the bottom of the clear opening of the window opening is at a height less than 36 inches (915 mm) above the finished floor.
    3.2. In one- and two-family dwellings and townhouses regulated by the *International Residential Code*, the bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.
4. The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere when the window is in its largest opened position.
5. The vertical distance from the bottom of the clear opening of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

Exception: Operable windows where the bottom of the clear opening of the window opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F2006.

Reason Statement: These sections are about fall prevention and window opening control devices (WOCDs) are one of several options in addressing fall prevention. This proposal changes the titles of sections 505.2 and 702.4 to properly reflect that these sections are addressing fall prevention in replacement windows and not just specifically WOCDs.
Then within the body of each section the proposal clarifies that window opening control devices or other types of window fall prevention devices complying with ASTM F2090 must be installed during replacement when all the following existing code language applies.

This proposal will not change the current requirements but simply provides clarity and a more proper title to these sections. It also provides for consistency between the two sections as currently section 702.4 does not include "or other fall prevention devices" whereas section 505.2 does.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal will have no effect on the cost of construction as the changes presented are not meant to alter the current requirements but simply meant to provide better clarity that other methods of fall prevention are available. This will lead to more consistent enforcement.

EB74-22

EB75-22

IEBC: 506.5.3, [BS] 1006.3

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

506.5.3 Seismic loads (seismic force-resisting system). Where a *change of occupancy* results in a building being assigned to a higher *risk category* , or where the change is from a Group S or Group U occupancy to any occupancy other than Group S or Group U, the building shall satisfy the <u>structural</u> requirements of Section 1613 of the International Building Code for the new *risk category* using full seismic forces. <u>Where a change of occupancy results in a building being assigned to Risk Category IV and Seismic Design Category D or F, nonstructural components serving any portion of the building changed to Risk Category IV shall comply with the requirements of Section 1613 of the *International Building Code* or shall comply with ASCE 41 using an objective of Operational nonstructural performance with the BSE-1N earthquake hazard level.</u>

Exceptions:

1. Where the area of the new occupancy is less than 10 percent of the building area, the occupancy is not changing from a Group S or Group U occupancy, and the new occupancy is not assigned to *Risk Category* IV, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.
2. Where a *change of use* results in a building being reclassified from *Risk Category* I or II to Risk Category III and the seismic coefficient, S_{DS}, is less than 0.33, compliance with this section is not required.
3. Unreinforced masonry bearing wall buildings assigned to *Risk Category* III and to Seismic Design Category A or B, shall be permitted to use Appendix Chapter A1 of this code.
4. Where the change is from a Group S or Group U occupancy and there is no change of risk category, use of reduced seismic forces shall be permitted.

[BS] 1006.3 Seismic loads. Where a *change of occupancy* results in a building being assigned to a higher *risk category*, or where the change is from a Group S or Group U occupancy to any occupancy other than Group S or Group U, the building shall satisfy the <u>structural</u> requirements of Section 1613 of the International Building Code for the new *risk category* using full seismic forces. <u>Where a change of occupancy results in a building being assigned to Risk Category IV and Seismic Design Category D or F, nonstructural components serving any portion of the building changed to Risk Category IV shall comply with the requirements of Section 1613 of the *International Building Code* or shall comply with ASCE 41 using an objective of Operational nonstructural performance with the BSE-1N earthquake hazard level.</u>

Exceptions:

1. Where a *change of use* results in a building being reclassified from *Risk Category* I or II to *Risk Category* III and the seismic coefficient, S_{DS}, is less than 0.33, compliance with this section is not required.
2. Where the area of the new occupancy is less than 10 percent of the building area, the occupancy is not changing from a Group S or Group U occupancy, and the new occupancy is not assigned to *Risk Category* IV, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.
3. Unreinforced masonry bearing wall buildings assigned to *Risk Category* III and to Seismic Design Category A or B shall be permitted to use Appendix Chapter A1 of this code.
4. Where the change is from a Group S or Group U occupancy and there is no change of *risk category*, use of reduced seismic forces shall be permitted.

Reason Statement:
This proposal protects essential nonstructural systems and components in existing buildings being changed to Risk Category IV.

Fire stations, emergency operations centers, hospital emergency departments, and other facilities assigned to RC IV are especially reliant on the performance of nonstructural systems. Yet the current code, even where it triggers seismic upgrade for a change of risk category, does not require any consideration of existing nonstructural components.

This proposal provides a level of protection consistent with the tough philosophy of the IEBC for change of occupancy projects. Still, it is limited to the most crucial and cost-beneficial situations where structural retrofit is already triggered. It applies only where a change of use would create a RC IV space within an existing non-RC IV building, where the code already requires a seismic structural evaluation and possibly a retrofit. This proposal would supplement the triggered structural work by including the nonstructural systems that would make the new RC IV areas functional. In addition, consider its limited scope:

- Change of occupancy to RC III is exempt.
- RC IV buildings in areas of low seismicity are exempt. (Application to moderate and high seismicity is consistent with the IEBC's current philosophy for change of occupancy, and we believe application to all of SDC D and SDC F is appropriate to avoid a perverse incentive in the code. That said, the proposal could be made less onerous in some areas by limiting it to SDC F or to the higher seismicity parts of SDC D, say Sds > 0.5g.)
- Existing nonstructural systems that are not needed to serve the new RC IV areas are exempt.

As is normal in the IEBC, “full” seismic criteria, represented by the specified ASCE 41 objective, are applicable for change of risk category triggers. (Again, we believe this is appropriate to avoid a perverse incentive in the code. That said, the proposal could be made less onerous by relaxing the ASCE 41 objective to Position Retention with the BSE-1N hazard, which would exempt many components and remove the need for backup power and retroactive component certification if it is the design intent to use existing, possibly nonconforming, nonstructural systems to serve the new RC IV areas.)

This proposal fills a gap in the code related to the expected performance of RC IV facilities, but it is consistent with other requirements related to the performance of these buildings. For reference and as precedents, consider:

- Current IEBC requirements for operational access to RC IV facilities affected by a change of occupancy (502.6 and 1103.3)
- ICC 500 requirements for storm shelter “critical support systems,” which requires an existing building to protect mechanical and plumbing systems that support a storm shelter addition.
- IBC 1604.5.1 requirements for assigning risk category in buildings with multiple occupancies. Even if a portion of a building has no RC IV use itself, and even if it is structurally separated from any RC IV uses, it is still assigned to RC IV if it provides access, egress, or life safety systems to the RC IV portion.
- Damage to the new Olive View hospital in the Northridge earthquake. The structure did fine. Nonstructural failures shut down the hospital.
- Too many articles, white papers, and reports to name, all arguing that we need to take nonstructural systems more seriously.

The proposal makes matching edits to the Prescriptive and Work Area methods.

A notes on phrasing: The proposal applies to nonstructural systems that “serve” the new RC IV areas. This is similar to the “work area” concept, but it does not use that terminology because distributed nonstructural systems (HVAC, elevators) can be critical to the work area without actually being within it. Thus, the triggered scope might extend beyond the defined “work area” even if it does not involve the whole building.

Finally, the proposal adds the word "structural" within the current text of each revised section to clarify that the current provision applies only to structural elements (per Section 304.3). We have made a note to staff that if a separate proposal modifying the way these and other provisions reference Section 304.3 is approved, that other proposal should take precedence, and addition of the word "structural" as shown here should be ignored.

Cost Impact: The code change proposal will increase the cost of construction
And the increase will be proper, since the code should discourage the use of deficient nonstructural systems for new RC IV areas. It is consistent with the IEBC's philosophy regarding change of occupancy and change of risk category projects. That said, the proposal will increase costs only for buildings changing to RC IV in areas of significant seismicity, which are already subject to structural retrofit.

EB75-22

EB76-22

IEBC: 506.5.5 (New), 1006.5 (New)

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new text as follows:

506.5.5 Tsunami loads.. Where a change of occupancy results in a structure being assigned to a higher Tsunami Risk Category, the structure shall satisfy the requirements of Section 1615 of the *International Building Code* for the new Tsunami Risk Category.

> **Exception:** Where the area of the new occupancy is less than 10 percent of the building area, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.

1006.5 Tsunami loads.. Where a change of occupancy results in a structure being assigned to a higher Tsunami Risk Category, the structure shall satisfy the requirements of Section 1615 of the *International Building Code* for the new Tsunami Risk Category.

> **Exception:** Where the building area of the new occupancy is less than 10 percent of the building area, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.

Reason Statement: Requires that structures with a change of occupancy resulting in an elevated Tsunami Risk Category shall conform to the building code for tsunami design as for a new building. If not modified to achieve code conformance, a structure can be maintained or renovated within the preexisting Risk Category.
The vulnerability of an existing structure should not be elevated by an increased occupant load or a change of occupancy that would elevate the Tsunami Risk Category of the structure, when it does not conform to the building code for tsunami design.

The intent to limit development of higher risk category structures in tsunami design zones, unless appropriately designed for the hazards, is extended to existing structures where a change of occupancy is being considered.

This simply follows the same rationale, almost verbatim, as that for snow and wind design in Sections 506.5.2 and 1006.2; and also, seismic design in Sections 506.5.3 and 1006.3.

With a changing climate, increasingly there is a need to reduce coastal flood vulnerability wherever possible. Without this change, allowing an increase in Tsunami Risk Category in a tsunami design zone would be a development step in the wrong direction.

The alteration or change of occupancy of a structure is still permitted for a non-conforming structure provided that there is no increase in Tsunami Risk Category. A substantial improvement or substantial structural alteration is still permitted without consideration of tsunami design, provided that there is no increase in Tsunami Risk Category. Unless modified by a local jurisdiction tsunami design only applies to Risk Category III and IV buildings anyway.

Cost Impact: The code change proposal will increase the cost of construction
Additional construction should be anticipated if the existing building does not satisfy the requirements of Section 1615 of the International Building Code.

EB76-22

EB77-22

IEBC: 506.5.5 (New), 1006.5 (New)

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Add new text as follows:

506.5.5 Flood loads.. Where a change of occupancy results in a structure being assigned to a higher Flood Design Class, the structure shall satisfy the requirements of Section 1612 of the *International Building Code* for the Flood Design Class.

> **Exception:** Where the area of the new occupancy is less than 10 percent of the building area, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.

1006.5 Flood loads.. Where a change of occupancy results in a structure being assigned to a higher Flood Design Class, the structure shall satisfy the requirements of Section 1612 of the *International Building Code* for the Flood Design Class.

> **Exception:** Where the area of the new occupancy is less than 10 percent of the building area, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.

Reason Statement: Requires that structures with a change of occupancy resulting in an elevated Flood Design Class shall conform to the building code for flood design as for a new building. If not modified to achieve code conformance, a structure can be maintained or renovated within the preexisting Flood Design Class.
The vulnerability of an existing structure should not be elevated by an increased occupant load or a change of occupancy that would elevate the Flood Design Class of the structure, when it does not conform to the building code for flood design.

The intent is to limit development of higher flood design class structures in flood or tsunami design zones, unless appropriately designed for the hazards, is extended to existing structures where a change of occupancy is being considered.

This simply follows the same rationale, almost verbatim, as that for snow and wind design in Sections 506.5.2 and 1006.2; and also, seismic design in Sections 506.5.3 and 1006.3.

With a changing climate, increasingly there is a need to reduce coastal flood and other flood vulnerability wherever possible. Without this change, allowing an increase in Flood Design Class would be a development step in the wrong direction.

The alteration or change of occupancy of a structure is still permitted for a non-conforming structure provided that there is no increase in Flood Design Class and the renovation is below the substantial improvement threshold for flood design.

Cost Impact: The code change proposal will increase the cost of construction
Additional construction cost should be anticipated if the existing structure does not satisfy the requirements of section 1612 of the International Building Code.

EB77-22

EB78-22

IEBC: 601.1

Proponents: Michael Fillion, representing National Council of Structural Engineers Associations (mrf.structure@verizon.net)

2021 International Existing Building Code

Revise as follows:

601.1 Scope. The provisions of this chapter shall be used in conjunction with Chapters 7 through 12 and shall apply to the *alteration*, *addition* and *change of occupancy* of *existing structures*, including historic ~~and moved~~ structures, as referenced in Section 301.3.2. The work performed on an *existing building* shall be classified in accordance with this chapter.

Reason Statement: Moved structures are no longer addressed in the work area method as noted in Section 301.4. Therefore, this term should be deleted from this section.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is for clarification as moved buildings are no longer addressed by the work area method and keeping the term within Section 601.1 is confusing.

EB78-22

EB79-22

IEBC: 702.4, 702.5

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Existing Building Code

Revise as follows:

702.4 Window opening control devices on replacement windows. In Group R-2 or R-3 buildings containing dwelling units and one- and two-family dwellings and townhouses regulated by the International Residential Code, window opening control devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:

1. The window is operable.
2. One of the following applies:
   - 2.1. The window replacement includes replacement of the sash and frame.
   - 2.2. The window replacement includes the sash only where the existing frame remains.
2. The window replacement includes replacement of the sash and the frame.
3. One of the following applies:
   - 3.1. In Group R-2 or R-3 buildings containing dwelling units, the bottom of the clear opening of the window opening is at a height less than 36 inches (915 mm) above the finished floor.
   - 3.2. In one- and two-family dwellings and townhouses regulated by the *International Residential Code*, the bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.
4. The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere when the window is in its largest opened position.
5. The vertical distance from the bottom of the clear opening of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

~~Exception~~ Exceptions:

1. Operable windows where the bottom of the clear opening of the window opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F2006.
2. Operable windows with openings that are provided with window fall prevention devices that comply with F2090.

702.5 Replacement window for emergency escape and rescue openings. Where windows are required to provide *emergency escape and rescue openings* in Group R-2 and R-3 occupancies and one- and two-family dwellings and townhouses regulated by the *International Residential Code*, replacement windows shall be exempt from the requirements of Section 1031.3of the International Building Code and Section R310.2of the International Residential Code, provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. Where the replacement window is part of a *change of occupancy* it shall comply with Section 1011.5.6.

Reason Statement: The proposed language is included in the requirements for replacement windows in IEBC. The requirements for the work area method and the prescriptive method should be the same for replacement EEROs.
702.4 – ASTM F2090 address both opening control devices and fall prevention devices. This is already stated in IEBC Section 505.2 and IRC Appendix AJ102.4.4. If this is approved, the titles of these sections should also be revised.
702.5 – This would be consistent with IEBC Section 505.3 and IRC Section 310.5 for replacement windows. This phase is also included in existing emergency escape and rescue opening with a change of occupancy in IEBC 506.4, 1011.5.6 and IRC 310.7.1.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are not changes to construction requirements. These revisions are focused upon making the work area method and prescriptive method verbiage match one another.

EB79-22

EB80-22

IEBC: 803.2.2, 803.2.5

Proponents: Chad Sievers, representing Deparment of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

2021 International Existing Building Code

Revise as follows:

803.2.2 Groups A, B, E, F-1, H, I-1, I-3, I-4, M, R-1, R-2, R-4, S-1 and S-2. In buildings with occupancies in Groups A, B, E, F-1, H, I-1, I-3, I-4, M, R-1, R-2, R-4, S-1 and S-2, *work areas* that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with automatic sprinkler protection where both of the following conditions occur:

1. The *work area* is required to be provided with automatic sprinkler protection in accordance with the *International Building Code* as applicable to new construction.
2. The *work area* exceeds 50 percent of the floor area.

Exception: If the building does not have an existing ~~sufficient municipal~~ water supply present at ~~for~~ the floor of the proposed work area with sufficient pressure and flow for the design of a fire sprinkler system ~~available to the floor~~ and without installation of a new fire pump, the *work areas* shall be protected by an automatic smoke detection system throughout all occupiable spaces other than sleeping units or individual dwelling units that activates the occupant notification system in accordance with Sections 907.4, 907.5 and 907.6 of the International Building Code.

803.2.5 Other required automatic sprinkler systems. In buildings and areas listed in Table 903.2.11.6 of the *International Building Code*, *work areas* that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with an automatic sprinkler system under the following conditions

1. The *work area* is required to be provided with an automatic sprinkler system in accordance with the International Building Code applicable to new construction; and
2. The building has an existing ~~sufficient municipal~~ water supply present at ~~for~~ the floor of the proposed work area with sufficient presssure and flow for the design of an automatic sprinkler system ~~available to the floor~~ and without installation of a new fire pump.

Reason Statement: There is confusion surrounding the language of the exception to this section. Some interpret that "sufficient municipal supply available to the floor" means the water main is in the ROW with adequate pressures and flow, and available to tap into with new piping to the building and work area. As supported by the ICC IEBC Interpretation No. 12-04 (see attached), it was never intended for a new water service/supply pipe or vertical/riser pipes to be installed which originated outside the floor of the work area as a requirement for "sufficient municipal supply" to satisfy this code section. The newly proposed language makes it clear that the existing sufficient water supply is to exist and be available to the floor where the work area is located without the installation of new supply piping, fire pump, or riser piping. Commentary to this code section states "One exception to these requirements states that if the building does not have a sufficient municipal water supply for a sprinkler system at the floor where the work area is located, then sprinklers are not required; however, that same exception does require an automatic smoke detection system throughout the work area. The smoke detection coverage is required throughout all occupiable spaces other than areas already required to install smoke alarms." While useful in understanding this code section, in many cases the Commentary is not available or enforceable. This proposal brings the stated intention of in the Commentary into the actual Code language. This code change should eliminate the need for code users to reference the Code Interpretation. New York State has made a similar change to the code and request for technical assistance on this topic has been eliminated.

CHAPTER 6
ALTERATIONS - LEVEL 2

SECTION 604.2.2
IEBC Interpretation No. 12-04
2003 Edition
Issued: 04-07-05

604.2.2 Groups A, E, F-1, H, I, M, R-1, R-2, R-4, S-1, and S-2. In buildings with occupancies in Groups A, E, F-1, H, I, M, R-1, R-2, R-4, S-1, and S-2, work areas that include exits or corridors shared by more than one tenant or that serve an occupant load greater than 30 shall be provided with automatic sprinkler protection where all of the following conditions occur:

1. The work area is required to be provided with automatic sprinkler protection in accordance with the *International Building Code* as applicable to new construction;
2. The work area exceeds 50 percent of the floor area; and
3. The building has sufficient municipal water supply for design of a fire sprinkler system available to the floor without installation of a new fire pump.

Exception: Work areas in Group R occupancies three stories or less in height.

● ● ● ● ● ● ● ● ● ● ●

GIVEN: Assume Level 2 alterations to an existing building that is not classified as a high-rise building. The building is not a Group R occupancy. All the listed conditions, including Items 1 and 2, are applicable. The municipal water supply for the building is sufficient for design of a fire sprinkler system to the floor containing the work area, without requiring the installation of a new fire pump.

Q1: Is a fire sprinkler system required to be provided to the work area if a new water service pipe is required to be installed between the municipal water supply and the building?

A1: No. Section 604.2.2, condition 3 indicates that "the building has sufficient...". Therefore it was not intended that new water service pipes be installed from the water main to the building.

Q2: Is a fire sprinkler system required to be provided to the work area if a new water distribution pipe (or riser) is required to be installed between the water service pipe and the work area?

A2: No. Sprinkler system will not be required if a new riser must be constructed to bring water from lower floors.

STAFF COMMENTARY: For both of these answers, please note that the language in Section 604.2.2 is distinctly different from that found in Section 704.1.1 (Level 3 Alterations, high-rise buildings), where sprinklers will be required if the municipal water main at the site has sufficient municipal water supply.

One of the main resource documents upon which the IEBC was based is the Nationally Applicable Recommended Rehabilitation Provisions (NARRP). The origin of many of the IEBC Sections can be traced to similar provisions in the NARRP. The NARRP does not require sprinkler systems in work areas for the level of construction called "Alterations" (this is approximately the same level as IEBC Level 2 Alterations and is found in NARRP Chapter 5). Section 606.1 of NARRP for the level called "Reconstruction" (approximately similar to Level 3 Alterations of IEBC), requires sprinkler system, but provides an exception if "...an automatic water supply for sprinkler protection is not available at that floor, the building official shall be permitted to accept alternative protection". A review of this history indicates the intent of the IEBC drafting committee to require sprinkler system in Level 2 Alterations only if sufficient municipal water supply is available at the floor under discussion.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply a clarification of the language as already interpreted by ICC and the commentary, so no change in the construction cost is anticipated.

EB80-22

EB81-22

IEBC: 803.2.6, NFPA Chapter 16

Proponents: Jeffrey Hugo, representing NFSA (hugo@nfsa.org)

2021 International Existing Building Code

Revise as follows:

803.2.6 Supervision. Automatic ~~Fire~~ sprinkler systems required by this section shall be electrically supervised in accordance with the International Building Code. ~~by one of the following methods:~~

1. ~~*Approved* central station system in accordance with NFPA 72.~~
2. ~~*Approved* proprietary system in accordance with NFPA 72.~~
3. ~~*Approved* remote station system of the jurisdiction in accordance with NFPA 72.~~
4. ~~Where *approved* by the *code official*, *approved* local alarm service that will cause the sounding of an alarm in accordance with NFPA 72.~~

~~**Exception:** Supervision is not required for the following:~~

1. ~~Underground key or hub gate valves in roadway boxes.~~
2. ~~Halogenated extinguishing systems.~~
3. ~~Carbon dioxide extinguishing systems.~~
4. ~~Dry- and wet-chemical extinguishing systems.~~
5. ~~Automatic sprinkler systems installed in accordance with NFPA 13R where a common supply main is used to supply both domestic and automatic sprinkler systems and a separate shutoff valve for the automatic sprinkler system is not provided.~~

Delete without substitution:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

~~NFPA 13R—19~~	~~Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height~~

Reason Statement: This proposal eliminates the conflict of having Level 2 and Level 3 alterations that require sprinkler systems with different supervision requirements. Correlating to the IBC for supervision provides a consistent and clearer installation of both sprinkler and alarm systems. Where automatic sprinkler systems are required by the IEBC, it refers the user to the IBC for installation and design to the appropriate sprinkler standard, i.e. NFPA 13, NFPA 13R, or NFPA 13D. With this reference to the IBC, sprinkler systems are required to be supervised per IBC, Section 903.4.1. However, the sprinkler system installation per IEBC, Section 803.2.6 has different supervision requirements and references than the IBC. The current 2024 IBC, Section 903.4.1 (see F73-21, Public Comment 1) list of exceptions is more robust than the current IEBC. Furthermore, the current IEBC, Section 803.2.6 exceptions 2,3, and 4 are not automatic sprinkler systems and those exceptions should not exist in the sprinkler section.
Reference to NFPA 13R is deleted to correlate with the removal of the reference in Section 803.2.6.

F73-21

Proposed Change as Submitted

Proponents: Chase Browning, representing Medford Fire Department

2021 International Fire Code

Revise as follows:

903.4.2 Alarms. For *automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2 , ~~A~~ an *approved* audible device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system.* Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a fire alarm system is installed, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

2021 International Building Code

Revise as follows:

[F] 903.4.2 Alarms. For *automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2, ~~A~~ an approved audible device, located on the exterior of the building in an approved location, shall be connected to each *automatic sprinkler system.* Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a fire alarm system is installed, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Reason: It is appropriate to provide an audible alarm for NFPA 13 and NFPA 13R systems, however, NFPA 13D (903.3.1.3) does not require such a device.

Cost Impact: The code change proposal will decrease the cost of construction
Not including the exterior bell will reduce costs.

F73-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that an exception already exists in the section charging text and all the other sections are subsections to that charging text. Additionally, it was noted that NFPA 13D systems are allowed for some structures that are not single family dwellings, which could be historic resources, and not having a bell that is going to tell you that there's a water flow going on inside is potentially going to damage those structures beyond repair. (Vote: 8-7)

F73-21

Individual Consideration Agenda

Public Comment 1:

IFC: 903.4 (New), 903.4, 903.4.1, 903.4.2, 903.4.3; IBC: 903.4 (New), [F] 903.4, [F] 903.4.1, [F] 903.4.2, [F] 903.4.3

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com); Chase Browning, representing Medford Fire Department requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

903.4 Sprinkler system supervision and alarms . *Automatic sprinkler system* supervision and alarms shall comply with Sections 903.4.1 through 903.4.3.

~~**903.4**~~ **903.4.1 Electronic supervision** ~~**Sprinkler system supervision and alarms**~~ **.** Valves controlling the water supply for *automatic sprinkler* *systems*, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all sprinkler systems shall be electrically supervised by a *listed* fire alarm control unit.

Exceptions:

1. *Automatic sprinkler systems* protecting one- and two-family *dwellings*.
2. Limited area sprinkler systems in accordance with Section 903.3.8, provided that backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position unless supplying an occupancy required to be equipped with a fire alarm system, in which case the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.
3. *Automatic sprinkler systems* installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the *automatic sprinkler system*, and a separate shutoff valve for the *automatic sprinkler system* is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. Underground key or hub gate valves in roadway boxes.

~~903.4.1~~ 903.4.2 Monitoring . Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an *approved* supervising station or, where *approved* by the *fire code official*, shall sound an audible signal at a constantly attended location.

~~**Exception:** Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.~~

~~903.4.2~~ 903.4.3 Alarms . An *approved* audible and visual sprinkler waterflow alarm device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a water flow switch is required by Section 903.4.1 to be electrically supervised, such sprinkler waterflow alarm devices shall be powered by a fire alarm control unit or, where provided, a fire alarm system. Where a fire alarm system is provided ~~installed~~, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Exception: *Automatic sprinkler systems* protecting one- and two-family dwellings.

903.3.9 ~~903.4.3~~ High-rise building floor ~~Floor~~ control valves . *Approved* supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.

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903.4 Sprinkler system supervision and alarms .
Automatic sprinkler system supervision and alarms shall comply with Sections 903.4.1 through 903.4.3.

[F] ~~903.4~~ 903.4.1 Electronic supervision ~~Sprinkler system supervision and alarms~~ . Valves controlling the water supply for *automatic sprinkler systems*, pumps, tanks, water levels and temperatures, critical air pressures, and waterflow switches on all sprinkler systems shall be electrically supervised by a *listed* fire alarm control unit.

Exceptions:

1. *Automatic sprinkler systems* protecting one- and two-family *dwellings*.
2. Limited area sprinkler systems in accordance with Section 903.3.8, provided that backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position unless supplying an occupancy required to be equipped with a fire alarm system, in which case the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.
3. *Automatic sprinkler systems* installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the *automatic sprinkler system*, and a separate shutoff valve for the *automatic sprinkler system* is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. Underground key or hub gate valves in roadway boxes.

[F] ~~903.4.1~~ 903.4.2 **Monitoring .** Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an *approved* supervising station or, where *approved* by the fire code official, shall sound an audible signal at a *constantly attended location*.

~~**Exception:** Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.~~

[F] ~~903.4.2~~ 903.4.3 **Alarms .** An *approved* audible and visual sprinkler waterflow alarm device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a water flow switch is required by Section 903.4.1 to be electrically supervised, such sprinkler waterflow alarm devices shall be powered by a fire alarm control unit or, where provided, a fire alarm system. Where a fire alarm system is provided ~~installed~~, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Exception: *Automatic sprinkler systems* protecting one- and two-family dwellings.

[F] ~~903.4.3~~ 903.3.9 **High-rise building floor ~~Floor~~ control valves .** *Approved* supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.

Commenter's Reason: Discussion at the committee hearing and the 8:7 vote clearly demonstrated varying interpretations of how Section 903.4 should be applied and that the section needs a more comprehensive rewrite to fix the existing issues. This public comment does the following to address all points of concern:

1. Creates a scoping section. Some interpret the existing exceptions in 903.4 as applying to the subsections under Section 903.4, while others do not. The revision clarifies scoping and that the exceptions in 903.4 of the 2021 edition only apply to that section, and not the subsections that followed.
2. Moves/merges the exception currently under 903.4.1 (monitoring) into the retitled section above (electronic supervision). The exception primarily relates to the need for electronic supervision, not monitoring by a supervising station or constantly attended location. Thereby, it was misplaced. Further, the current exception #2 in 903.4 exempted ALL limited area systems from any electronic supervision, so one could have argued that the exception under "monitoring" never applied. Merging the exceptions fixes that conflict in a way that clarifies logical application of the current code provisions.
3. Incorporates the committee recommendation on F74 but with improved text vs. the floor amendment that was accepted by the committee. The intent of F74 is to add visual alarm devices where audible devices are currently required. As modified by the committee, F74 also clarified that water flow switches required to be electrically supervised have to be be powered by a fire alarm control unit or a fire alarm system. If this public comment is approved, it is intended to replace the committee action on F74 since this will be the last action on this section in the 2024 edition cycle.
4. Section 903.4.3 is being relocated to Section 903.3 (installation). The requirement is more appropriately co-located with installation provisions because it is requiring floor control valves.
5. The original F73 proposed exception for one- and two-family dwellings is being added to Section 903.4.3. There was general agreement at the hearing that one- and two-family dwellings should not require exterior water flow alarms, but some felt that the original proposal was unnecessary (per the scoping misinterpretation issue discussed in #1 above). Others did not support extending an outdoor water flow alarm exception to all 13D installations, as originally proposed, so this public comment only applies the exception to one- and two-family dwellings.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
Outside alarm will now clearly not be required for one- and two-family dwelling sprinkler systems. Remainder of the proposal is cleanup of existing text and new provisions added by F74.

Public Comment# 2879

Public Comment 2:

Proponents: Dan Nichols, representing ICC Code Correlation Committee (ccc@iccsafe.org)

Commenter's Reason: The Code Correlation Committee (CCC) is not taking a position on this code change. The CCC submitted this public comment in order to bring a correlation issue to the attention of the full voting membership for the Public Comment Hearings and the Online Governmental Consensus Vote to allow the voting membership to coordinate actions on Code Changes F73-21 and F74-21. If the final actions on F73-21 is AMPC and F74-21 is AM, the resulting text will not be correlated.
The Code Correlation Committee is a standing committee of the International Code Council whose objectives, procedures and organization are set forth in Council Policy CP#44-13. The objective of the Code Correlation Committee is to maintain technical and editorial consistency among the International Codes and to assist staff in the evaluation and processing of code change proposals and comments that are exclusively editorial.

Cost Impact: The code change proposal will decrease the cost of construction
When fire sprinkler supervision requirements change or are different from other model codes, it adds construction and maintenance cost. The proposal correlates the supervision requirement across the IEBC, IBC, and IEBC. Removal of the standard is merely correlative to the revisions to Section 803.2.6

EB81-22

EB82-22

IEBC: 803.4, 803.4.1, 803.4.1.1, 803.4.1.5, 803.4.2, 803.4.3 (New)

Proponents: Michael O'Brian, representing Brighton Area Fire Authority (mobrian@brightonareafire.com)

2021 International Existing Building Code

Revise as follows:

803.4 Fire alarm and detection. An *approved* fire alarm system shall be installed in accordance with Sections 803.4.1 through ~~803.4.2~~ 803.4.3. Where automatic sprinkler protection is provided in accordance with Section 803.2 and is connected to the building fire alarm system, automatic heat detection shall not be required.
~~An *approved* automatic fire detection system shall be installed in accordance with the provisions of this code and NFPA 72. Devices, combinations of devices, appliances, and equipment shall be *approved*. The automatic fire detectors shall be smoke detectors, except that an *approved* alternative type of detector shall be installed in spaces such as boiler rooms, where products of combustion are present during normal operation in sufficient quantity to actuate a smoke detector.~~

803.4.1 Occupancy requirements. A fire alarm system shall be installed in accordance with Sections 803.4.1.1 through 803.4.1.6. Existing alarm-notification appliances shall be automatically activated throughout the building. Where the building is not equipped with a fire alarm system, alarm-notification appliances within the *work area* shall be provided and automatically activated.

Exceptions:

1. Occupancies with an existing, previously *approved* fire alarm system.
2. Where selective notification is permitted, alarm-notification appliances shall be automatically activated in the areas selected.

Revise as follows:

803.4.1.1 Group E. A fire alarm system shall be installed in *work areas* of Group E occupancies as required by Chapter 11 of the *International Fire Code* ~~for existing~~ Group E occupancies.

803.4.1.5 Group R-1. A fire alarm system shall be installed in Group R-1 occupancies as required by Chapter 11 of the *International Fire Code* for ~~existing~~ Group R-1 occupancies.

803.4.2 Supplemental fire alarm system requirements. Where the *work area* on any floor exceeds 50 percent of that floor area, Section 803.4.1 shall apply throughout the floor.

Exception: Alarm-initiating and notification appliances shall not be required to be installed in tenant spaces outside of the *work area*.

Add new text as follows:

803.4.3 Installation. Where a fire alarm system is required to be installed in accordance with Sections 803.4.1 or 803.4.2 the *fire alarm system* shall be installed in accordance with the provisions of this code, Section 907 of the *International Building Code* and NFPA 72

Reason Statement: This proposed change is based on clarifying the requirements for a Fire Alarm and detection system in a level 2 alteration as well as clarifying that a Group E and Group R-1 are per Chapter 11 of the IFC.
The first paragraph is modified as the language does not appear to be consistent with the installation requirements found in the IFC/IBC. The language was re-worded and a new section 803.4.3 Installation is proposed to be added.

This section is intended to clarify that it installed per the provisions of 907 and NFPA 72. Section 907 contains specific installation requirements for systems that are beyond when systems are required. It is not the intention of this new language to require compliance with 907.2 “where required for new systems” in a level 2 alteration.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is intended to clarify that the requirements for fire alarm installations are not required to be installed as would be required for new construction since these requirements are found in the alteration section and focus on existing buildings. This is simply a clarification of the intent of application and will not increase the cost of construction.

EB82-22

EB83-22

IEBC: 804.4, 804.4.1, 804.4.1.1, TABLE 804.4.1.1(1), TABLE 804.4.1.1(2)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Existing Building Code

804.4 Number of exits. The number of exits shall be in accordance with Sections 804.4.1 through 804.4.3.

Revise as follows:

804.4.1 Minimum number. Every story or occupied roof utilized for human occupancy on which there is a *work area* that includes exits or corridors shared by more than one tenant within the *work area* shall be provided with the minimum number of exits based on the occupancy and the occupant load in accordance with the *International Building Code*. In addition, the exits shall comply with Sections 804.4.1.1 and 804.4.1.2.

804.4.1.1 Single-exit buildings. A single exit or access to a single exit shall be permitted from spaces, any story or any ~~occupied~~ occupiable roof where one of the following conditions exists:

1. The occupant load, number of dwelling units and exit access travel distance do not exceed the values in Table 804.4.1.1(1) or Table 804.4.1.1(2).
2. In Group R-1 or R-2, buildings without an *approved* automatic sprinkler system, individual single-story or multiple-story dwelling or sleeping units shall be permitted to have a single exit or access to a single exit from the dwelling or sleeping unit provided one of the following criteria are met:
   - 2.1. The occupant load is not greater than 10 and the exit access travel distance within the unit does not exceed 75 feet (22 860 mm).
   - 2.2. The building is not more than three stories in height; all third-story space is part of dwelling with an exit access doorway on the second story; and the portion of the exit access travel distance from the door to any habitable room within any such unit to the unit entrance doors does not exceed 50 feet (15 240 mm).
3. In buildings of Group R-2 occupancy of any number of stories with not more than four dwelling units per floor served by an interior exit stairway; with a smokeproof enclosure in accordance with Sections 909.20 and 1023.12 of the International Building Code or an exterior stairway as an exit; and where the portion of the exit access travel distance from the dwelling unit entrance door to the exit is not greater than 20 feet (6096 mm).

TABLE 804.4.1.1(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE ~~(feet)~~
Basement, first, ~~or~~ second or third story above grade plane and occupiable roofs over the first or second floor above grade plane	R-2[a, b, c]	4 dwelling units	~~50~~ 125 feet
~~Third~~ Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2, equipped without an approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 of the International Fire Code and provided with emergency escape and rescue openings in accordance with Section 1031 of the International Building Code.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2) of the International Building Code.

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not access through and serving individual units, use Table 804.4.1.1(2).

TABLE 804.4.1.1(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane or occupable roofs over the first story above grade plane	B[b], F-2[b], ~~S-2[a]~~	~~35~~ 49	75
	S-2 [a,b]	35	75
Second story above grade plane	B, F-2, S-2[a]	35	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or on the roof of such buildings shall have a maximum exit access travel distance of 100 feet.

Reason Statement: This proposal has two reasons.

1. Coordination with IBC Section 1006.3.4 and E21-21 that added occupiable roofs to the single exit tables.

2. The current requirements in Table 804.4.1.1(1) is less that what is permitted for new construction for travel distance and could be read to not allow for a single exit from a 3rd floor. The current requirements for B and F-2 are less than permitted for new construction.

This has been approved for the 2024 IBC through the Approval of E21-21. Proposal E21-21 was approved as submitted and can be found at the following link. https://www.iccsafe.org/wp-content/uploads/IBC-Egress-2021-Group-A.pdf The committee reason statement is below:

Committee Reason:

This proposal was approved as an occupied roof is not a story, so the number of exits from the occupied roof needs to be clarified. The location of the occupied roof allowance in Table 1006.3.4(2) is appropriate as the occupied roof over the 1st floor is the same vertical travel as from the basement level. This is a good correlation with the occupied roof requirements in the code. (Vote: 10-4)

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a correlation revisions made to the IBC in Group A (2021). Without this correlation the IEBC requirements would be more restrictive than new thus increasing the cost of construction in existing buildings.

EB83-22

EB84-22

IEBC: SECTION 202 (New), 804.4.1.1, 902.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Existing Building Code

Add new definition as follows:

OCCUPIABLE ROOF. An exterior space on a roof that is designed for human occupancy, other than maintenance or repair, and which is equipped with a means of egress system meeting the requirements of this code.

Revise as follows:

804.4.1.1 Single-exit buildings. A single exit or access to a single exit shall be permitted from spaces, any story or any ~~occupied~~ occupiable roof where one of the following conditions exists:

1. The occupant load, number of dwelling units and exit access travel distance do not exceed the values in Table 804.4.1.1(1) or Table 804.4.1.1(2).
2. In Group R-1 or R-2, buildings without an *approved* automatic sprinkler system, individual single-story or multiple-story dwelling or sleeping units shall be permitted to have a single exit or access to a single exit from the dwelling or sleeping unit provided one of the following criteria are met:

   2.1. The occupant load is not greater than 10 and the exit access travel distance within the unit does not exceed 75 feet (22 860 mm).

   2.2. The building is not more than three stories in height; all third-story space is part of dwelling with an exit access doorway on the second story; and the portion of the exit access travel distance from the door to any habitable room within any such unit to the unit entrance doors does not exceed 50 feet (15 240 mm).
3. In buildings of Group R-2 occupancy of any number of stories with not more than four dwelling units per floor served by an interior exit stairway; with a smokeproof enclosure in accordance with Sections 909.20 and 1023.12 of the International Building Code or an exterior stairway as an exit; and where the portion of the exit access travel distance from the dwelling unit entrance door to the exit is not greater than 20 feet (6096 mm).

902.1 High-rise buildings. Any building having occupied floors or occupiable roof more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall comply with the requirements of Sections 902.1.1 and 902.1.2.

Reason Statement: This revision is for coordination with G12-21 and G20-21.
Over the last several cycles, code provisions have been added to address issues related to occupied/occupiable, vegetative and landscaped roofs. In some cases, the terms have been used interchangeably, in others applying to specific types of roof systems. With the increasing number of provisions, a definition is needed. A proposal last cycle (G7-19) attempted to add a definition for occupiable roof but was disapproved for several reasons including the fact it did not correlate with the fact the code uses “occupied roof” in some sections and “occupiable roof” in others.This code proposal both adds a definition for “occupiable roof”and. changes terminology throughout the code to be consistent with use of “occupiable roof” rather than “occupied roof”. The definition is intended to parallel the existing code definition for occupiable space:

[BG] OCCUPIABLE SPACE. A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code.

The proposed definition is different in a few key ways: The laundry list of uses is left out, and the one clarification made that access for maintenance of rooftop mechanical equipment or other maintenance does not trigger assembly live load requirements or other provisions related to occupiable roofs. The references to light and ventilation are left out as occupiable roofs are exterior spaces. No mechanical ventilation is necessary, and the code does not require lighting for exterior spaces other than portions of the means of egress.

The change to 804.4.1.1 is using the defined term.

The change to 902.1 coordinates with the change to the definition for ‘high-rise building’ approved in G12-21.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change is for consistency with the action taken on G12-21 and G20-21. Without consistency with the IBC proposals the IEBC would be more difficult and unclear to apply and enforce making compliance more complicated and expensive.

EB84-22

EB85-22

IEBC: 804.4, 804.4.1

Proponents: Daniel Nichols, representing MTA Construction and Development (dnichols@mnr.org)

2021 International Existing Building Code

Revise as follows:

804.4 Number of exits. The number of exits or access to exits shall be in accordance with Sections 804.4.1 through 804.4.3.

804.4.1 Minimum number. Every story utilized for human occupancy on which there is a *work area* that includes exits , access to exits, or corridors shared by more than one tenant within the *work area* shall be provided with the minimum number of exits or access to exits based on the occupancy and the occupant load in accordance with the *International Building Code*. In addition, the exits shall comply with Sections 804.4.1.1 and 804.4.1.2.

Reason Statement: When utilizing the Alterations – Level 2 work area method, IEBC Section 804.4.1 requires that any work to a wok area that effects any exits or corridors shared by more than one tenant shall be provided with the minimum number of exits. With the recent changes to the IBC expanding the use of exit access stairways, it creates a double-edged sword for existing buildings:

1. For “newer” existing buildings constructed under the more recent editions of the IBC, any Alt. 2 rehab work on a multi-tenant story that effects a corridor with no longer be permitted to utilize the “exit access stairway” allowance that was allowed when first built since the language specifically states “minimum number of exits” without exception

2. In a more general sense, a code user that goes to the IBC looking for the minimum number of exits per story will start at IBC Section 1006.3.3 and Table 1006.3.3. Both the section and the table state “Exits, or access to exits per story.” This gives the IEBC code user little direction if they are limited to just exits, IBC compliant exits, or can use any access to exits? The latter can be very concerning since there is not any limitation to sizing, separation, or travel distances referenced anywhere for this type of application.

The purpose of IEBC 804.4.1.3 is to provide qualifiers to allow for a subset of IBC compliant exit access stairways to be permitted. The 2 sections referenced ensure that the exit access travel distance and the number of stories traveled are both considered in the determination of exit access stairways counting toward the number of “exits” within IEBC Section 804.4

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is to align the methodology of "number of exits" with current requirements within the IBC.

EB85-22

EB86-22

IEBC: 804.5.2

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com)

2021 International Existing Building Code

Revise as follows:

804.5.2 Door swing. In the *work area* and in the egress path from any *work area* to the exit discharge, all egress doors serving an occupant load ~~greater than~~ of 50 or more shall swing in the direction of exit travel.

Reason Statement: This proposal is to make this section consistent with IBC Section 1010.1.2.1 for door swing which includes 50 occupants versus 51. See IBC section below.
1010.1.2.1 Direction of swing.

Side-hinged swinging doors, pivoted doors and balanced doors shall swing in the direction of egress travel where serving a room or area containing an occupant load of 50 or more persons or a Group H occupancy.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is simply to make the provisions for door swing consistent with the IBC and should not have an affect on the cost of construction or enforcement.

EB86-22

EB87-22

IEBC: 804.11 (New), 804.12 (New), 804.10, 804.10.1, 804.10.2, 804.12, 804.12.1, 804.12.2, 804.11

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Existing Building Code

Add new text as follows:

804.11 Stairways. An existing stairway shall not be required to comply with the requirements of Section 1011 of the *International Building Code* where the existing space and construction does not allow a reduction in pitch or slope.

804.12 Escalators. Where provided in below-grade transportation stations, existing and new escalators shall be permitted to have a clear width of less than 32 inches (815 mm).

Revise as follows:

~~**804.10**~~ **804.13 Handrails.** The requirements of Sections ~~804.10.1~~ 804.13.1 and ~~804.10.2~~ 804.13.2 shall apply to handrails from the *work area* floor to, and including, the level of exit discharge.

~~**804.10.1**~~ **804.13.1 Minimum requirement.** Every required exit stairway that is part of the means of egress for any *work area* and that has three or more risers and is not provided with not fewer than one handrail, or in which the existing handrails are judged to be in danger of collapsing, shall be provided with handrails for the full length of the stairway on not fewer than one side. Exit stairways with a required egress width of more than 66 inches (1676 mm) shall have handrails on both sides.

~~**804.10.2**~~ **804.13.2 Design.** Handrails required in accordance with Section ~~804.10.1~~ 804.13.1 shall be designed and installed in accordance with the provisions of the *International Building Code*.

> **Exception:** Handrails otherwise required to comply with Section 1011.11 of the *International Building Code* shall not be required to comply with the requirements of Section 1014.6 of the *International Building Code* regarding full extension of the handrails where such extensions would be hazardous because of plan configuration.

~~**804.12**~~ **804.14 Guards.** The requirements of Sections ~~804.12.1~~ 804.14.1 and ~~804.12.2~~ 804.14.2 shall apply to guards from the *work area* floor to, and including, the level of exit discharge but shall be confined to the egress path of any *work area*.

~~**804.12.1**~~ **804.14.1 Minimum requirement.** Every open portion of a stairway, landing, or balcony that is more than 30 inches (762 mm) above the floor or grade below and is not provided with guards, or those portions in which existing guards are judged to be in danger of collapsing, shall be provided with guards.

~~**804.12.2**~~ **804.14.2 Design.** Guards required in accordance with Section ~~804.12.1~~ 804.14.1 shall be designed and installed in accordance with the *International Building Code*.

~~**804.11**~~ **804.4 Refuge areas.** Where *alterations* affect the configuration of an area utilized as a refuge area, the capacity of the refuge area shall not be reduced below the required capacity of the refuge area for horizontal exits in accordance with Section 1026.4 of the *International Building Code*. Where the horizontal exit also forms a smoke compartment, the capacity of the refuge area for Group I-1, I-2 and I-3 occupancies and Group B ambulatory care *facilities* shall not be reduced below that required in Sections 407.5.3, 408.6.2, 420.6.1 and 422.3.2 of the *International Building Code*, as applicable.

Reason Statement: The intent of this proposal is to put in the same allowances in the prescriptive method and work area method for 1) existing stairways being replaced, 2) handrail extensions and 3) escalators to below-grade transportation systems. The prescriptive method contains these allowances in Section 503.1 for alterations.
503.1 General. Alterations to any building or structure shall comply with the requirements of the International Building Code for new construction. Alterations shall be such that the existing building or structure is not less complying with the provisions of the International Building Code than the existing building or structure was prior to the alteration.
Exceptions:
1. An existing stairway shall not be required to comply with the requirements of Section 1011 of the International Building Code where the existing space and construction does not allow a reduction in pitch or slope.
2. Handrails otherwise required to comply with Section 1011.11 of the International Building Code shall not be required to comply with the requirements of Section 1014.6 of the International Building Code regarding full extension of the handrails where such extensions would be hazardous because of plan configuration.3. Where provided in below-grade transportation stations, existing and new escalators shall be permitted to have a clear width of less than 32 inches (815 mm).

While the purpose of this change is for correlation between IEBC options, the BCAC was informed that there were an issue in the current section on escalators regarding coordination with the ADA (503.1). There is a proposal submitted by Marsha Mazz addressing this issue. If this proposal is successful, the text here should be coordinated.The reordering in Section 804 allows for the requirements for stairways, escalators, handrails and guards to be located together and refuge areas to be moved behind Group I-2. The end result would be as follows.

SECTION 804

MEANS OF EGRESS

804.1 Scope.

804.2 General.

804.3 Group I-2.

804.4 ~~804.11~~ Refuge areas.

804.5 ~~804.4~~ Number of exits.

804.6 ~~804.5~~ Egress doorways.

804.7 ~~804.6~~ Openings in corridor walls.

804.8 ~~804.7~~ Dead-end corridors.

804.9 ~~804.8~~ Means-of-egress lighting.

804.10 ~~804.9~~ Exit signs.

804.11 Stairways.

804.12 Escalators.

804.13 ~~804.10~~ Handrails.

804.14 ~~804.12~~ Guards.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal merely correlates the stairway and handrail allowances and requirements for the prescriptive method with the work area method. Otherwise without this allowance when applying the work area method stairways and handrails would be required to strictly comply with the IBC whereas the prescriptive method may not require such compliance. Therefore the intent is provide the same allowanced which may either reduce or not change the cost of compliance for the work area method.

EB87-22

EB88-22

IEBC: 904.1.8 (New)

Proponents: Michael O'Brian, representing Brighton Area Fire Authority (mobrian@brightonareafire.com)

2021 International Existing Building Code

Add new text as follows:

904.1.8 Supervision and Alarms. Where an automatic sprinkler system is required by Sections 904.1.1 through 904.1.7 such systems shall be provided with supervision and alarms in accordance with Section 903.4 of the *International Building Code*.

Reason Statement: This change is intended to clarify that buildings undergoing a level 3 alterations, their automatic sprinkler systems are required to be supervised in accordance with IBC 903. From time to time, AHJ's will find where sprinkler systems were not supervised electronically and this section would clarify on those level 3 alterations, the system would be electronically supervised.
In Group A this section in the IBC/IFC underwent a major revision and clarification for supervision of valves and alarm devices on automatic sprinkler systems.

Cost Impact: The code change proposal will increase the cost of construction
This change, although intended to clarify the existing requirement, could add costs to construction if the existing automatic sprinkler system is not supervised electronically. IBC 903 does include uniform provisions for where valves and sprinklers system do not need to be electronically supervised.

EB88-22

EB89-22

IEBC: 904.2, 904.2.1, 904.2.2, 904.2.3 (New)

Proponents: Michael O'Brian, representing Brighton Area Fire Authority (mobrian@brightonareafire.com)

2021 International Existing Building Code

904.2 Fire alarm and detection systems. Fire alarm and detection shall be provided in accordance with Section 907 of the International Building Code as required for new construction.

904.2.1 Manual fire alarm systems. Where required by the *International Building Code*, a manual fire alarm system shall be provided throughout the *work area*. Alarm notification appliances shall be provided on such floors and shall be automatically activated as required by the *International Building Code*.

Exceptions:

1. Alarm-initiating and notification appliances shall not be required to be installed in tenant spaces outside of the *work area*.
2. Visual alarm notification appliances are not required, except where an existing alarm system is upgraded or replaced or where a new fire alarm system is installed.

904.2.2 Automatic fire detection. Where required by the *International Building Code* for new buildings, automatic fire detection systems shall be provided throughout the *work area*.

Add new text as follows:

904.2.3 Emergency voice/alarm communication systems. Where required by the *International Building Code* for new buildings emergency voice/alarm communication systems shall be installed throughout the fire area containing the work area.

Reason Statement: This proposed code change, is intended to include requirements for voice evacuation, fire alarm systems in Group E occupancies and Group A occupancies with 1,000 or more occupants. The proposed language indicates that the system would be provided within the fire area which includes the work area undergoing a level 3 alteration. This language is consistent with the IBC/IFC requirements for these occupancies. When these use groups undergo a level 3 alteration, this is the time for these systems to be upgraded to provide the specific level of safety for those occupancies.

Cost Impact: The code change proposal will increase the cost of construction
Section 907 of the IBC would already require these systems. This proposal would require the installation within the fire area containing the work area. That could be an entire building in some cases and could increase installation costs beyond what would have been anticipated by the limitation to work areas as noted in Sections 904.2.1 and 904.2.2.

EB89-22

EB90-22

IEBC: 905.5 (New)

Proponents: Eirene Knott, representing Self (eirene.knott@brrarch.com)

2021 International Existing Building Code

Add new text as follows:

905.5 Exit and Exit Access Doorway Configuration. Exits, exit access doorways, and exit access stairways and ramps serving spaces, including individual building stories, shall be separated in accordance with the *International Building Code*.

Reason Statement: The IEBC has multiple references to the IBC when it comes to the means of egress for an existing building. When a building is undergoing an Alteration at a Level 3, a significant amount of work is being done. At this point, there should be some requirement to separate at least two of the required exits. Otherwise, there is currently no direction within the IEBC on separating exits, only that the number must be provided per the IBC. This code change is to provide direction on when two or more exits are required for a Alteration Level 3, that at least two of those exits be separated as per new construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This should not have any cost impact to a project as the number of required exits is not changing.

EB90-22

EB91-22

IEBC: SECTION 908 (New), 908.1 (New), 908.1.1 (New), 908.1.2 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

2021 International Existing Building Code

Add new text as follows:

SECTION 908
EMERGENCY RESPONDER COMMUNICATIONS ENHANCEMENT SYSTEM COVERAGE

908.1 Emergency Responder Communication Enhancement System Coverage. The existing building shall undergo an evaluation of the emergency responder communication signal strength and coverage area within the entire building in accordance with 908.1.1 and 908.1.2.

> **Exception:** Where it is determined by the fire code official that the emergency responder communication enhancement system (ERCES) is not needed.

908.1.1 Evaluation. The evaluation shall determine the current signal strength and coverage capabilities of the public safety communication systems utilized by the jurisdiction, measured at the exterior of the building.

908.1.2 Compliance. The evaluation report shall be submitted for approval by the fire code official and the frequency license holder. Where the coverage area, signal strength or DAQ does not comply with Section 510 of the International Fire Code, the existing building shall be provided with emergency responder communication enhancement system coverage. The fire code official is authorized to establish the timeframe for such installation or modification.

Reason Statement: Any building undergoing a Level 3 Alteration is likely to have a change in the ERCES coverage areas, signal strength and DAQ within that existing building. This proposal does not require an ERCES installation, The proposal simply adds a requirement for this building to undergo an evaluation of the public communication system coverage to ensure the altered building still complies with the IFC Section 510.
The exception in this proposal aligns with the current language in the IFC (510.1 Exception 2).

This proposal is submitted by the ICC Building Code Action Committee (BCAC) and ICC Fire Code Action Committee (FCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal will increase the cost of construction as there is a cost associated with the ERCES evaluation being required. Fees are typically $1K for the evaluation. The ERCES contractor would typically credit the evaluation fee against the purchase or upgrade of an ERCES system. There would be a cost associated with enhancing or installing a new ERCES system within a building that will vary based upon the characteristics of the building including size, location, type of construction and other factors.

EB91-22

EB92-22

IEBC: 1001.2.1, 1001.2.2, 1001.2.2.1

Proponents: China Clarke, representing NYS DOS Division of Building Standards and Codes (china.clarke@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

2021 International Existing Building Code

Revise as follows:

1001.2.1 Change of use. Any work undertaken in connection with ~~a change in use~~ *change of use* ~~that does not involve a *change of occupancy* classification or a change to another group within an occupancy classification~~ shall conform to the applicable requirements for the work as classified in Chapter 6 and to the requirements of Sections 1002 through 1010.

Exception: As modified in Section 1204 for *historic buildings*.

1001.2.2 Change of occupancy classification ~~or group~~. Where a building undergoes a change of occupancy classification ~~the occupancy classification of a building changes~~, the provisions of Sections 1002 through 1011 shall apply. ~~This includes a change of occupancy classification and a change to another group within an occupancy classification.~~

1001.2.2.1 Partial change of occupancy. Where a portion of an *existing building* undergoes a change of occupancyclassification ~~the occupancy classification or group of a portion of an *existing building* is changed~~, Section 1011 shall apply.

Reason Statement: In the last code cycle, all references to “group” were removed from the IEBC definition of "change of occupancy", the definition was revised, and a definition for “change of use” was added (Code Change No: ADM 3-19 Part I). In light of those changes, the references to "group" in Sections 1001.2.1, 1001.2.2, and 1001.2.2.1 of the 2021 IEBC no longer make sense. We propose cleaning up the language by removing references to “change of group” and by modifying the language to include the defined terms “Change of Occupancy” and “Change of Use.”

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is simply aligning with the definitions for “change of occupancy” and “change of use” and is not intended to increase the cost of construction.

EB92-22

EB93-22

IEBC: 1001.2, 1004.1, 1011.1, 1011.2, 1011.2.1, 1011.2.2

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com)

2021 International Existing Building Code

Revise as follows:

1001.2 Certificate of occupancy. A *change of occupancy* or a *change of occupancy* within a space where there is a different fire protection system threshold requirement in Chapter 9 of the current *International Building Code* than exists in the current building or space shall not be made to any structure without the approval of the *code official*. A certificate of occupancy shall be issued where it has been determined that the requirements for the *change of occupancy* have been met.

1004.1 General. Fire protection requirements ~~of~~ in Section 1011 shall apply where either of the following occur:

1. ~~a~~ A building , or portion~~s~~ thereof , ~~undergo~~ undergoes a *change of occupancy* . ~~classification or where~~
2. ~~there is a~~ A building, or portion thereof, undergoes a *change of occupancy* ~~within a space where~~ and there is a different fire protection system threshold requirement in Chapter 9 of the current *International Building Code* than exists in the current building or portion thereof.

1011.1 General. The provisions of this section shall apply to buildings or portions thereof undergoing a *change of occupancy* classification. This includes a *change of occupancy* classification within a group as well as a *change of occupancy* classification from one group to a different group . The provisions of this section shall also apply ~~or~~ where there is a *change of occupancy* within a ~~space where~~ building or portion thereof and there is a different fire protection system threshold requirement in Chapter 9 of the current *International Building Code* than exists in the current building or space. Such buildings shall also comply with Sections 1002 through 1010 of this code.

1011.2 Fire protection systems. Fire protection systems shall be provided in accordance with Sections 1011.2.1 and 1011.2.2.

1011.2.1 Fire sprinkler system. Where a *change in occupancy* classification occurs or where there is a *change of occupancy* within a space where there is a different fire protection system threshold requirement in Chapter 9 of the current *International Building Code* than exists in the current building or space that requires an automatic fire sprinkler system to be provided based on the new occupancy in accordance with Chapter 9 of the *International Building Code*. The installation of the automatic sprinkler system shall be required within the area of the *change of occupancy* and areas of the building not separated horizontally and vertically from the change of occupancy by one of the following:

1. Nonrated permanent partition and horizontal assemblies.
2. Fire partition.
3. Smoke partition.
4. Smoke barrier.
5. Fire barrier.
6. Fire wall.

Exceptions:

1. An automatic sprinkler system shall not be required in a one- or two-family dwelling constructed in accordance with the *International Residential Code*.
2. Automatic sprinkler system shall not be required in a townhouse constructed in accordance with the *International Residential Code*.
3. The townhouse shall be separated from adjoining units in accordance with Section R302.2 of the *International Residential Code*.

1011.2.2 Fire alarm and detection system. Where a change in occupancy classification occurs or where there is a *change of occupancy* within a space where there is a different fire protection system threshold requirement in Chapter 9 of the current *International Building Code* than exists in the current building or space that requires a fire alarm and detection system to be provided based on the new occupancy in accordance with Chapter 9 of the *International Building Code*, such system shall be provided throughout the area where the *change of occupancy* occurs. Existing alarm notification appliances shall be automatically activated throughout the building. Where the building is not equipped with a fire alarm system, alarm notification appliances shall be provided throughout the area where the *change of occupancy* occurs in accordance with Section 907 of the *International Building Code* as required for new construction.

Reason Statement: The definition of change of occupancy was revised last cycle to specify that a change in the use or occupancy of a building, or portion thereof, shall be treated as a Change of Occupancy if the current IBC requires a greater degree of protection than exists in the building. This proposal intends to correlate other sections of the IEBC with the new definition and to clarify how this concept is to be applied.
The intent of the IEBC is to compare the current fire safety requirements in the building with the fire safety requirements applicable to the proposed

occupancy in the current IBC. However, this comparison has been erroneously made to compare the thresholds for each occupancy in the IBC. Consider a Group R-1 being converted to a Group R-2. The existing building is not sprinklered. The intent of the IEBC, and the clarification offered by this code change, is that the features of the existing building are compared to the requirements in the current IBC for the proposed occupancy. Unfortunately, it has occurred that the sprinkler thresholds for each occupancy in the current IBC are compared, and since the thresholds are the same, it has been determined that sprinklers are not required. This is not the intent of the IEBC or the code change that approved last cycle.

This proposal intends to clarify that the fire safety features of the existing building are to be compared to the current requirements in the IBC. The building needs to comply with the requirements in the current IBC for fire safety features.

This would specifically mean that if a nonsprinklered Group R-1 is changed to Group R-2, sprinklers would now be required in accordance with the IBC. In other words, even though those two occupancies have the same sprinkler threshold in the IBC, that is not what is compared. The existing building is compared to the current threshold for sprinklers in the IBC.

The same process would be followed for a Group M being changed to Group S-1. Even though the sprinkler threshold for both occupancies requires sprinklers where a fire area exceeds 12,000 square feet is not relevant. The question is - does the building comply with the sprinkler requirements in the current code for the proposed occupancy?

An extreme example is an existing Group I-3 being changed to a Group H-2. The fire sprinkler threshold for both occupancies is “sprinklers installed in all”. If the existing Group I-3 did not have sprinklers, would you require sprinklers for a change of occupancy to Group H-2? Of course! The existing building does not comply with the requirements in the current IBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is merely clarifying that the intent is that the current conditions of the existing building experiencing any change in occupancy be compared with the fire protection triggers in Chapter 9 of the current IBC. This may require the installation of a new system such as an automatic sprinkler system but that was the intent of the current language when it was placed in the code. Therefore it was not intended to change of the cost of construction.

EB93-22

EB94-22

IEBC: 1002.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Existing Building Code

Revise as follows:

1002.1 Compliance with the building code. Where an *existing building* or part of an *existing building* undergoes a *change of occupancy* to one of the special use or occupancy categories as described in Chapter 4 in the *International Building Code*, the building shall comply with all of the requirements of Chapter 4 of the *International Building Code* applicable to the special use or occupancy.

> **Exception:** Where construction of a new occupiable roof on an existing building results in a high rise building classification, compliance with Section 403 of the *International Building Code* shall not be required. The construction of the occupiable roof shall comply with Section 1011.

Reason Statement: The intent of this proposal is to add an exception for converting portion of roof to an occupiable roof for buildings where the highest floor is below 75' but the roof is about 75'. This will have no impact on existing high-rise buildings.
The exception exempts buildings that were not considered high-rises without the occupied roof from the high-rise package as long as the building is sprinklered, has occupant notification and (if provided) an EVAC system. This is not an exemption from the limitations for occupiable roof so this added occupied roof is not an additional story. The items that would be very difficult or impossible for an existing building to comply with include :

- Moving the stairways to meet separation requirements
- Changing the structural integrity of the stairways
- Adding a secondary water supply.
- Adding a fire command center

In urban environments the opportunity for people to get outside by using the roof in very important for occupant health and well-being.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will decrease the cost of construction
To require compliance with the high-rise provisions in Section 403 of the IBC simply due to the later addition of an occupiable roof would be very expensive. This proposal prevents the need for costly and complex upgrades that would be required.

EB94-22

EB95-22

IEBC: 1002.3

Proponents: John Williams, representing Committee on Healthcare (ahc@iccsafe.org)

2021 International Existing Building Code

Revise as follows:

1002.3 Change of occupancy in health care. Where a *change of occupancy* occurs to a Group I-2 or I-1 *facility*, the *work area* with the *change of occupancy* shall comply with the International Building Code.

~~Exception~~ Exceptions:

1. A change in use or occupancy in the following cases shall not be required to meet the International Building Code:
   - 1.1. Group I-2, Condition 2 to Group I-2, Condition 1.
   - 1.2. Group I-2 to ambulatory health care.
   - 1.3. Group I-2 to Group I-1.
   - 1.4. Group I-1, Condition 2 to Group I-1, Condition 1.
2. In a Group I-1 occupancy, where a change of use is not in conjunction with a Level 3 alteration, a smoke barrier in accordance with Section 420.6 of the IBC is not required to be added.

Reason Statement: The intent of this proposal is to clarify what is required where an existing Group I-1 has partial change of use within the facility. It is not reasonable for a small change of use to trigger a major renovation to create smoke compartments. This is consistent with the Healthcare committee proposal for alterations in these facilities.
Prior to changes to the 2015 I-Codes, many Assisted Living communities were already operating as I-1 Occupancies, without having a Condition 1 or Condition 2 declaration. A clear requirement is needed for when these buildings would need to declare a Condition and meet the current code requirements for Smoke Barriers and Sprinklers. This code change sets the threshold at a Level 3 Alteration (greater than 50% of the aggregate building area), because that level of work equates to a larger expenditure level, and it matches the requirements already in Section 904 requiring upgraded fire protection for Group I-1 occupancies.

Many Assisted Living and Memory care communities operate on very slim budgets. These communities should be able to operate as they currently are, and make certain cosmetic renovations to their building without triggering the current code requirements of a Condition 1 or Condition 2, Group I-1 Occupancy. However, once they reach the Level 3 alteration threshold (renovation of 50% of building) they must declare a condition, and if they choose Condition 2, they must add smoke barriers in the work area. The requirement to add sprinklers in the work area is already contained in Section 904.1.4 of the IEBC.

This proposal is submitted by the Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/icc-committee-on-healthcare/.

Cost Impact: The code change proposal will increase the cost of construction
This proposal clarifies where compliance with the special use requirements for Group I-1 occupancies in accordance with the IBC apply. Such upgrades are required where there is a level 3 alteration in conjunction with a change in use. This then does allow minor changes (up through alteration level 2) to occur without full compliance. Where the exception cannot be met it may require installation of a smoke barrier thus increasing the cost of construction.

EB95-22

EB96-22

IEBC: 1011.2.1

Proponents: Jeffrey Grove, representing Jensen Hughes (jgrove@jensenhughes.com)

2021 International Existing Building Code

Revise as follows:

1011.2.1 Fire sprinkler system. ~~Where a change in occupancy classification occurs or where there is a *change of occupancy* within a space where there is a different fire protection system threshold requirement in Chapter 9 of the International Building Code that requires an automatic fire sprinkler system to be provided based on the new occupancy in accordance with Chapter 9 of the International Building Code.~~ The installation of an automatic sprinkler system shall be required where there is a *change of occupancy classification* and Chapter 9 of the *International Building Code* requires an automatic fire sprinkler system based on the new occupancy or where there is a change of occupancy within the space where there is a different fire protection system threshold requirement in Chapter 9 of the *International Building Code*
.The installation of the automatic sprinkler system shall be required within the area of the *change of occupancy* and areas of the building not separated horizontally and vertically from the change of occupancy by a nonrated permanent partition and horizontal assemblies, fire partition, smoke partition, smoke barrier, fire barrier, or fire wall. ~~one of the following:~~

1. ~~Nonrated permanent partition and horizontal assemblies.~~
2. ~~Fire partition.~~
3. ~~Smoke partition.~~
4. ~~Smoke barrier.~~
5. ~~Fire barrier.~~
6. ~~Fire wall.~~

Exceptions:

1. An automatic sprinkler system shall not be required in a one- or two-family dwelling constructed in accordance with the International Residential Code.
2. Automatic sprinkler system shall not be required in a townhouse constructed in accordance with the International Residential Code.
3. The townhouse shall be separated from adjoining units in accordance with Section R302.2 of the *International Residential Code*.

Reason Statement: This section was revised from the 2018 IEBC. In the 2021 IEBC, the section begins with a subordinate clause fragment. A revision is necessary to provide proper sentence structure and a complete thought. This is intended to clarify the intent and is not intended to be a substantive change.
Alternatively a simpler solution to addressing this issue could be as follows:

Revise as follows:

1011.2.1 Fire sprinkler system. Where a change in occupancy classification occurs or where there is a change of occupancy within a space where there is a different fire protection system threshold requirement in Chapter 9 of the International Building Code that requires an automatic fire sprinkler system to be provided based on the new occupancy in accordance with Chapter 9 of the International Building Code, ~~. The~~ the installation of the automatic sprinkler system shall be required within the area of the change of occupancy and areas of the building not separated horizontally and vertically from the change of occupancy by one of the following:

1. Nonrated permanent partition and horizontal assemblies.
2. Fire partition.
3. Smoke partition.
4. Smoke barrier.
5. Fire barrier.
6. Fire wall.

Exceptions:

1. An automatic sprinkler system shall not be required in a one- or two-family dwelling constructed in accordance with the International Residential Code.
2. Automatic sprinkler system shall not be required in a townhouse constructed in accordance with the International Residential Code.

3. The townhouse shall be separated from adjoining units in accordance with Section R302.2 of the International Residential Code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact as it is an editorial change to fix the sentence structure to provide the proper regulatory language intended.

EB96-22

EB97-22

IEBC: 1011.2.1, 1011.2.1.1 (New), 1011.2.1.1.1 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

2021 International Existing Building Code

1011.2.1 Fire sprinkler system. Where a change in occupancy classification occurs or where there is a *change of occupancy* within a space where there is a different fire protection system threshold requirement in Chapter 9 of the International Building Code that requires an automatic fire sprinkler system to be provided based on the new occupancy in accordance with Chapter 9 of the International Building Code. The installation of the automatic sprinkler system shall be required within the area of the *change of occupancy* and areas of the building not separated horizontally and vertically from the change of occupancy by one of the following:

1. Nonrated permanent partition and horizontal assemblies.
2. Fire partition.
3. Smoke partition.
4. Smoke barrier.
5. Fire barrier.
6. Fire wall.

Exceptions:

1. An automatic sprinkler system shall not be required in a one- or two-family dwelling constructed in accordance with the International Residential Code.
2. Automatic sprinkler system shall not be required in a townhouse constructed in accordance with the International Residential Code.
3. The townhouse shall be separated from adjoining units in accordance with Section R302.2 of the *International Residential Code*.

Add new text as follows:

1011.2.1.1 Nonrequired automatic sprinkler systems.. The code official is authorized to permit the removal of existing automatic sprinkler system where all of the following conditions exist:

1. The system is not required for new construction.
2. Portions of the system that are obvious to the public are removed.
3. The system was not installed as part of any special construction features, including fire-resistance-rated assemblies and smoke-resistive assemblies, conditions of occupancy, means of egress conditions, fire code deficiencies, approved modifications or approved alternative materials, design and methods of construction, and equipment applying to the building.

1011.2.1.1.1 Approval. Plans, investigation and evaluation reports, and other data shall be submitted documenting compliance Section 1011.2.1.1 for review and approval in support of a determination authorizing the removal of the automatic sprinkler system by the code official.

Reason Statement: E103-19 was approved as modified. It was disapproved in the final action due because Section 1011.2.1.1.1 did not reference all three items in Section 1011.2.1.1. The concerns raised have been addressed in the revisions.

A change of occupancy could be to an occupancy that did not require a sprinkler system. If the system was old, outdated or needed extensive reconfiguration, costs could be high. The new Section 1011.2.1.1 allows for non required systems to be removed. To be removed the designer/building owner would have to demonstrate to the code official that the building did not need the sprinklers for occupancy, fire areas or type of construction limitations, and that none of the trade off's for items such as travel distance or corridor rating were in effect in the building. The system would have to be removed totally – including the system in the ceiling, standpipes and the connections for the fire department outside of the building.
This proposal is submitted by the ICC Building Code Action Committee (BCAC) and ICC Fire Code Action Committee (FCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This section is essentially providing the allowance to remove a system that is not required and may be providing a false sense of security. Any costs will simply be associated with the removal process. Once removed it will reduce maintenance and repair costs.

EB97-22

EB98-22

IEBC: 1011.5.1, 1011.5.2, 804.12, 804.12.1, 804.12.2

Proponents: John Williams, representing Committee on Healthcare (ahc@iccsafe.org)

2021 International Existing Building Code

Revise as follows:

1011.5.1 Means of egress for change to a higher-hazard category. Where a change of occupancy classification is made to a higher-hazard category (lower number) as shown in Table 1011.5, the means of egress shall comply with the requirements of Chapter 10 of the International Building Code.

Exceptions:

1. Stairways shall be enclosed in compliance with the applicable provisions of Section 903.1.
2. Existing stairways including handrails and guards complying with the requirements of Chapter 9 shall be permitted for continued use subject to approval of the *code official*.
3. Any stairway replacing an existing stairway within a space where the pitch or slope cannot be reduced because of existing construction shall not be required to comply with the maximum riser height and minimum tread depth requirements.
4. Existing corridor walls constructed on both sides of wood lath and plaster in good condition or $^{1}/_{2}$-inch-thick (12.7 mm) gypsum wallboard shall be permitted. Such walls shall either terminate at the underside of a ceiling of equivalent construction or extend to the underside of the floor or roof next above.
5. Existing corridor doorways, transoms and other corridor openings shall comply with the requirements in Sections 804.6.1, 804.6.2 and 804.6.3.
6. Existing dead-end corridors shall comply with the requirements in Section 804.7.
7. An operable window complying with Section 1011.5.6 shall be accepted as an *emergency escape and rescue opening*.
8. In Group I-1 and I-2 facilities, required guards enclosing the occupiable roof areas shall be permitted to be greater than 48 inches (1219 mm) above the surface of the occupiable roof where the occupants, because of clinical needs, require restraint or containment as part of a function of a psychiatric or cognitive treatment area.

1011.5.2 Means of egress for change of use to an equal or lower-hazard category. Where a change of occupancy classification is made to an equal or lesser-hazard category (higher number) as shown in Table 1011.5, existing elements of the means of egress shall comply with the requirements of Section 905 for the new occupancy classification. Newly constructed or configured means of egress shall comply with the requirements of Chapter 10 of the International Building Code.

~~Exception~~ Exceptions:

1. Any stairway replacing an existing stairway within a space where the pitch or slope cannot be reduced because of existing construction shall not be required to comply with the maximum riser height and minimum tread depth requirements.
2. In Group I-1 and I-2 facilities, required guards enclosing the occupiable roof areas shall be permitted to be greater than 48 inches (1219 mm) above the surface of the occupiable roof where the occupants, because of clinical needs, require restraint or containment as part of a function of a psychiatric or cognitive treatment area.

804.12 Guards. The requirements of Sections 804.12.1 and 804.12.2 shall apply to guards from the *work area* floor to, and including, the level of exit discharge but shall be confined to the egress path of any *work area*.

804.12.1 Minimum requirement. Every open portion of a stairway, landing, or balcony that is more than 30 inches (762 mm) above the floor or grade below and is not provided with guards, or those portions in which existing guards are judged to be in danger of collapsing, shall be provided with guards.

Revise as follows:

804.12.2 Design. Guards required in accordance with Section 804.12.1 shall be designed and installed in accordance with the *International Building Code*.

Exception: In Group I-1 and I-2 facilities, required guards enclosing the occupiable roof areas shall be permitted to be greater than 48 inches (1219 mm) above the surface of the occupiable roof where the occupants, because of clinical needs, require restraint or containment as part of a function of a psychiatric or cognitive treatment area.

Reason Statement: The intent of this proposal is to allow higher guards for patient safety around outdoor patient garden/exercise areas on the roof.
The Healthcare committee understands the guard height limitation for low rise buildings was to allow for fire department access to the roof. However, we feel that the limitations proposed are reasonable.

Access to fresh air and getting outside is incredibly important for older adults who live in Group I-1&I-2 care facilities. These care recipients spend up to 90% of their time indoors and if the only choice of outdoor space requires staff or volunteers to take them downstairs, via an elevator, to get outside, some care recipients never get the opportunity to be outside. If a garden space or other outdoor area can be created on a roof adjacent to sleeping areas, this can make getting outside much easier.

Unfortunately, while we want care recipients to get outside, we also need to keep them safe. We know that exit seeking behavior is prevalent and a 48” barrier is not enough to protect from elopement or self harm.

Outdoor areas are important for patient mental health and wellness. Hospitals and nursing homes in a urban environment often don't have property that would allow for outdoor patient areas. The 'clinical needs' language is an attempt to balance care recipient wellness with safety. These types of facilities have extensive fire and safety evacuation plans and staff that is trained in assisting care recipients and guest for evacuation/defend-in-place during an emergency. Fire departments perform regular inspections of these buildings, to they would be very familiar with the layouts. In addition, these facilities have exceptionally good records for a small number of fire events.

There was a similar change in Group A, G105-21 that had an original intention of allowing for guards to exceed the height limitation required by IBC Section 503.1.4.1. The modification to broaden this allowance for “walls, parapets, rooftop structures (some of which are exempted in Exception 1), and wind screens” on roofs above the reach of fire departments (>75’) was appropriate. However, there is still the issue with existing buildings that want to expand or add an occupied roof with the result being –

· If any structure or guard is above 48” high, this is now being considered an additional story so they could violate height limitations for the type of construction.

· If the building is less than 75’ in height, you cannot have guards high enough to discourage people from jumping off the roof.

There is a suggestion for Sections 804.12.2, 1011.5.1 and 1011.5.2 for Group I-1 and I-2 where high guards are needed for patient safety. The language for the limitation of 'clinical needs' is the same as IBC Section 101.2.14 for Controlled Egress Doors.

Below are two pictures of a roof garden on a memory care facility. There are glass between the columns.

This proposal is submitted by the Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/icc-committee-on-healthcare/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an optional allowance for certain facilities so will provide design flexibility. It will cost more if such barriers are constructed but that is an option for the building owner.

EB98-22

EB99-22

IEBC: 1011.6.1

Proponents: Jeffrey Grove, representing Jensen Hughes (jgrove@jensenhughes.com)

2021 International Existing Building Code

Revise as follows:

1011.6.1 Height and area for change to a higher-hazard category. Where a change of occupancy classification is made to a higher-hazard category as shown in Table 1011.6, heights and areas of buildings and structures shall comply with the requirements of Chapter 5 of the *International Building Code* for the new occupancy classification.

~~Exception~~ Exceptions:

1. For high-rise buildings constructed in compliance with a previously issued permit, the type of construction reduction specified in Section 403.2.1 of the *International Building Code* is permitted. This shall include the reduction for columns. The high-rise building is required to be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of the *International Building Code*.
2. Buildings that were constructed in compliance with a previously issued permit that have floor assemblies with a 1-1/2 hour fire resistance rating shall not be required to comply with Chapter 5 of the *International Building Code* where all of the following apply:

    2.1. Chapter 5 of the *International Building Code* requires Type IB construction.

    2.2. The building does not include Group H occupancies.

    2.3. The building is protected throughout with an automatic sprinkler system in accordance Section 903.3.1.1 of the *International Building Code*.

Reason Statement: In general, the IEBC is written such that the extent to which an existing building is required to comply with the requirements of the IBC is proportional to the extent to which the existing building is being changed. The IEBC requires compliance with IBC chapter 5 (which may require upgrading the fire resistance ratings of existing building elements) when there is a change of occupancy classification to a higher hazard. See IEBC section 1011.6.1.
The legacy BOCA code had a construction classification (type 2A) that consisted of 2 hour rated columns, 1-1/2 hour rated floors and a one hour rated roof. This construction type was permitted for buildings up to 8 stories in height.

Many existing office buildings are converted to residential use as part of adaptive reuse projects. Per IEBC section 1011.6.1, a change in occupancy classification to a higher hazard category (like B to R-1 or R-2) would require upgrading these existing floor assemblies from a 90 minute rating to a 2 hour fire resistance rating. Upgrading 90 minute rated floor assemblies to a 2 hour fire resistance rating would be disproportionate to the risk associated with change from business to residential use in a building 8 stories in height or less. In general, the occupant load of residential occupancies is less than the occupant load of business occupancies.

Although IBC section 403.2.1 permits reduction from type IB to type IIA construction in some high rise buildings, not all legacy BOCA type 2A buildings are high rises.

This new exception is proposed to be limited to fully sprinklered buildings and to buildings that do not include type H occupancies. Additionally, we do not propose applying this exception to buildings that are required by IBC chapter 5 to have type IA construction.

Cost Impact: The code change proposal will decrease the cost of construction
This code change would reduce the cost of construction such that this specific type of existing construction would not require fire resistance upgrades.

EB99-22

EB100-22

IEBC: 1011.7.1

Proponents: China Clarke, representing NYS DOS Division of Building Standards and Codes; Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

2021 International Existing Building Code

Revise as follows:

1011.7.1 Exterior wall rating for change of occupancy classification to a higher-hazard category. Where a change of occupancy classification is made to a higher hazard category as shown in Table 1011.7, exterior walls shall have fire resistance, ~~and~~ exterior opening areas, and opening protectives as required by the *International Building Code*.

> **Exception:** A 2-hour fire-resistance rating shall be allowed where the building does not exceed three stories in height and is classified as one of the following groups: A-2 and A-3 with an occupant load of less than 300, B, F, M or S.

Reason Statement: The exterior walls of buildings, or portions thereof, undergoing a change of occupancy classification to a higher-hazard category, are required to comply with the provisions of Section 1011.7.1. The provisions require that users comply with the "fire resistance" and the "exterior opening protectives" of the IBC. In instances where existing exterior walls have existing openings that are, either not allowed or their area exceeds the maximum area allowed by section 705.8 of the IBC, the existing language may be interpreted as allowing those openings to remain unchanged. We propose to clarify the intent of the section by adding language that directs the user to be aware of the maximum allowable area of those openings also.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is intended to make sure exterior openings including opening protectives comply with the IBC. Without this revision it is unclear whether this is the intent of the section. It was not intended to make a technical change.

EB100-22

EB101-22

IEBC: 1011.8.2

Proponents: Jeffrey Hugo, representing NFSA (hugo@nfsa.org)

2021 International Existing Building Code

Revise as follows:

1011.8.2 Stairways. Where a change of occupancy classification is made to a higher-hazard category as shown in Table 1011.5, interior stairways shall be enclosed as required by the *International Building Code*.

Exceptions:

1. In other than Group I occupancies, an enclosure shall not be required for openings serving only one adjacent floor and that are not connected with corridors or stairways serving other floors.
2. Unenclosed existing stairways need not be enclosed in a continuous vertical shaft if each story is separated from other stories by 1-hour fire-resistance-rated construction or *approved* wired glass set in steel frames and all exit corridors are sprinklered in accordance with the *International Building Code*. The openings between the corridor and the ~~occupant~~ tenant space shall have not fewer than one sprinkler ~~head~~ above the openings on the tenant side. ~~The sprinkler system shall be permitted to be supplied from the domestic water-supply systems, provided that the system is of adequate pressure, capacity and sizing for the combined domestic and sprinkler requirements.~~
3. Existing penetrations of stairway enclosures shall be accepted if they are protected in accordance with the *International Building Code*.

Reason Statement: The requirement for installation of automatic sprinkler systems in the IEBC goes back to the IBC, which therein references the installation standards, such as NFPA 13, NFPA 13R, etc. This change provides the same and constant IEBC path back to the IBC for new sprinkler installations. The allowance for the connection to domestic water systems, adequate pressure, and sizing of limited area systems is handled better through the IBC, Where this exception is used, a limited area sprinkler system per IBC, Section 903.3.8, has prescriptive rules for classification, water connections, supervision, and calculations.

Cost Impact: The code change proposal will decrease the cost of construction
This change decreases the cost of construction by referencing a known installation standard.

EB101-22

EB102-22

IEBC: CHAPTER 12, 1201.1

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

2021 International Existing Building Code

Revise as follows:

CHAPTER 12
HISTORIC BUILDINGS <u>AND STRUCTURES</u>

1201.1 Scope. This chapter is intended to provide means for the preservation of *historic buildings* <u>and structures</u>. *Historic buildings* <u>and structures</u> shall comply with the provisions of this chapter relating to their *repair*, *alteration*, relocation and *change of occupancy*.

Reason Statement: For far too long, the title and charging language of this chapter have given historic structures a feeling of inadequacy and inferiority. The time to stop this outrage is now! Please join with me as we validate the existence, importance, and significance of historic structures everywhere!
In all seriousness, historic structures are specifically mentioned in Sections 1202.1, 1203.10.2, 1204.3, 1204.12, and 1206.1; however, the title and the charging language of this chapter do not mention historic structures. This proposal corrects that oversight.

While I could propose adding "and structures" to every provision within this chapter, that would not be appropriate in some cases and may create confusion, since many of the provisions deal with occupancy, and structures are effectively defined as being unoccupied (as compared to the definition of *building*, which specifically mentions occupancy). To keep things simple, for this code cycle, in this specific proposal, I am only addressing the lack of charging language in Section 1201.1, Scope, and the title of the chapter (which is an editorial change).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal merely corrects the lack of charging language in Section 1201.1. The chapter clearly addresses historic structures in several different sections, but the charging language that would allow the user to access those provisions is missing.

As such, this proposal merely corrects an oversight and provides a path to get to the relevant provisions. No change in scope or requirements is intended or provided. Consequently, this proposal has no cost implications.

EB102-22

EB103-22 Part I

IEBC: SECTION 202 (New), CHAPTER 12

Proponents: Mike Jackson, representing Association for Preservation Technology (arch419@aol.com)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE INTERNATIONAL EXISTING BUILDING CODE COMMITTEE AND PART II WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Existing Building Code

Add new definition as follows:

CHARACTER-DEFINING FEATURE. Those visual aspects and physical elements that comprise the appearance of an historic building and that are significant to the historical, architectural and cultural values, including the overall shape of the historic building or property, its materials, craftsmanship, decorative details, interior spaces and features, as well as the various aspects of its site and environment.

CHAPTER 12
HISTORIC BUILDINGS

SECTION 1201
GENERAL

1201.1 Scope. This chapter is intended to provide means for the preservation of *historic buildings* . *Historic buildings* shall comply with the provisions of this chapter relating to their *repair*, *alteration*, relocation and *change of occupancy*.

1201.3 Special occupancy exceptions—museums. Where a building in Group R-3 is used for Group A, B or M purposes such as museum tours, exhibits and other public assembly activities, or for museums less than 3,000 square feet (279 m^2), the *code official* is authorized to determine that the occupancy is Group B where life safety conditions can be demonstrated in accordance with Section 1201.2. Adequate means of egress in such buildings, including, but not limited to, a means of maintaining doors in an open position to permit egress, a limit on building occupancy to an occupant load permitted by the means of egress capacity, a limit on occupancy of certain areas or floors, or supervision by a person knowledgeable in the emergency exiting procedures, shall be provided.

[BS] 1201.4 Flood hazard areas. In *flood hazard areas*, if all proposed work, including *repairs*, work required because of a *change of occupancy*, and *alterations*, constitutes *substantial improvement*, then the *existing building* shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Exception: If a *historic building* will continue to be a *historic building* after the proposed work is completed, then the proposed work is not considered a *substantial improvement*. For the purposes of this exception, a *historic building* is any of the following:

1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.
2. Determined by the Secretary of the US Department of Interior to contribute to the historical significance of a registered historic district or a district preliminarily determined to qualify as a historic district.
3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

1201.5 Unsafe conditions. Conditions determined by the *code official* to be *unsafe* shall be remedied. Work shall not be required beyond what is required to remedy the *unsafe* conditions.

SECTION 1202
REPAIRS

1202.1 General. Repairs to any portion of a *historic building* or structure shall be permitted with original or like materials and original methods of construction, subject to the provisions of this chapter. Hazardous materials, such as asbestos and lead-based paint, shall not be used where the code for new construction would not permit their use in buildings of similar occupancy, purpose and location.

1202.2 Replacement. Replacement of existing or missing features using original materials shall be permitted. Partial replacement for *repairs* that match the original in configuration, height and size shall be permitted.
Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Chapter 24 of the International Building Code.

Exception: Glass block walls, louvered windows and jalousies repaired with like materials.

Revise as follows:

SECTION 1203
~~FIRE~~ GENERAL SAFETY

1203.1 Scope. *Historic buildings* using the prescriptive or work area compliance methods undergoing *alterations*, *changes of occupancy* or that are moved shall comply with Section 1203.

1203.2 ~~General~~ Automatic fire extinguishing system. Every *historic building* that does not conform to the construction requirements specified in the *International Building Code* or this code for the occupancy or use and that constitutes a distinct fire hazard as defined herein shall be provided with an *approved* automatic fire-extinguishing system or as approved ~~as determined appropriate~~ by the *code official*. However, an automatic fire-extinguishing system shall not be used to substitute for, or act as an alternative to, the required number of exits from any *facility*.

1203.3 Means of egress. Existing door openings and corridor and stairway widths ~~less than those specified elsewhere in this code may~~ shall be *approved*, provided that, in the opinion of the *code official*, there is sufficient width and height for a person to pass through the opening or traverse the means of egress. The capacity of the means of egress shall be adequate for the occupant load, or as approved by operational controls to limit occupancy. ~~Where *approved* by the *code official*, the front or main exit doors need not swing in the direction of the path of exit travel, provided that other *approved* means of egress having sufficient capacity to serve the total occupant load are provided.~~

1203.4 Transoms. In corridor walls required by these provisions to be fire-resistance rated ~~buildings with automatic sprinkler systems of Group R-1, R-2 or R-3,~~ existing transoms in corridors and other fire-resistance-rated walls may be maintained if fixed in the closed position. Buildings with an automatic sprinkler system shall have a ~~A~~ sprinkler ~~shall be~~ installed on each side of the transom. In non-sprinklered buildings, transoms shall be protected with fixed wired glass or other approved glazing set in a steel frame and installed on one side of the transom.

1203.5 Interior finishes. ~~The existing~~ Existing character defining interior finishes shall be accepted . ~~where it is demonstrated that they are the historic finishes~~.

~~1204.9~~ 1203.6 ~~Interior finishes~~ Flame Spread Index.. Where interior finish materials are required to comply with the fire test requirements of Section 803.1 of the *International Building Code*, existing nonconforming materials shall be permitted to be surfaced with an *approved* fire-retardant coating to achieve the required classification. Compliance with this section shall be demonstrated by testing the fire-retardant coating on the same material and achieving the required fire classification. Where the same material is not available, it shall be permitted to test on a similar material.

> **Exception:** Existing nonconforming materials need not be surfaced with an *approved* fire-retardant coating where the building is equipped throughout with an automatic sprinkler system installed in accordance with the *International Building Code* and the nonconforming materials are character defining features. ~~can be substantiated as being historic in character~~.

~~1203.6~~ 1203.7 Stairway enclosure. In buildings of three stories or less, exit enclosure construction shall limit the spread of smoke by the use of tight-fitting doors and solid elements. Such elements are not required to have a fire-resistance rating.

~~1203.7~~ 1203.8 One-hour fire-resistant assemblies. Where 1-hour fire-resistance-rated construction is required by these provisions, it need not be provided, regardless of construction or occupancy, where the existing wall and ceiling finish is wood or metal lath and plaster.

~~1204.4~~ 1203.9 Occupancy separation. Required occupancy separations of 1 hour may be omitted where the building is provided with an *approved* automatic sprinkler system throughout.

~~1203.8~~ 1203.10 Glazing in fire-resistance-rated systems. Historic glazing materials are permitted in interior walls required to have a 1-hour fire-resistance rating where the opening is provided with *approved* smoke seals and the area affected is provided with an automatic sprinkler system. In non-sprinklered buildings, glazing shall be protected with fixed wired glass or other approved glazing set in a steel frame and installed on one side of the glazing.

~~1203.9~~ 1203.11 Stairways~~Stairway railings~~. ~~Grand~~ Existing stairway geometry and configuration ~~stairways~~ shall be accepted ~~without complying with the handrail and guard requirements~~ provided they are not structurally dangerous. ~~Existing handrails and guards at all stairways shall be permitted to remain, provided they are not structurally *dangerous*.~~

~~1203.10~~ 1203.12 Guards and handrails. ~~Guards shall comply with Sections 1203.10.1 and 1203.10.2.~~
Existing character-defining guards and handrails shall be permitted to remain provided they are not structurally dangerous. The spacing between existing intermediate railings or openings shall be accepted. Missing elements or members of a guard shall be permitted to be replaced to match existing members.

> **Exception:** Where an existing stairway is replaced with construction of materials, dimensions and aesthetic features, the handrail shall be permitted to be omitted where there is documentation that a handrail did not originally exist..

Delete without substitution:

~~1203.10.1 Height.~~ ~~Existing guards shall comply with the requirements of Section 404.~~

~~1203.10.2 Guard openings.~~ ~~The spacing between existing intermediate railings or openings in existing ornamental patterns shall be accepted.~~

~~Missing elements or members of a guard may be replaced in a manner that will preserve the historic appearance of the building or structure.~~

Revise as follows:

~~**1203.11**~~ **1203.13 Exit signs.** Where exit sign or egress path marking location would damage the character-defininning features ~~historic character~~ of the building, alternative exit signs and locations are permitted with approval of the *code official.* Alternative signs shall identify the exits and egress path.

Delete without substitution:

~~**1203.12 Automatic fire-extinguishing systems.** Every *historic building* that cannot be made to conform to the construction requirements specified in the *International Building Code* for the occupancy or use and that constitutes a distinct fire hazard shall be deemed to be in compliance if provided with an *approved* automatic fire-extinguishing system.~~

~~**Exception:** Where the *code official* approves an alternative life-safety system.~~

Revise as follows:

~~**1204.7**~~ **1203.14 Door swing.** Where *approved* by the *code official*, existing front doors need not swing in the direction of exit travel, provided that other *approved* exits having sufficient capacity to serve the total occupant load are provided.

~~**1204.5**~~ **1203.15 Roof covering.** Regardless of occupancy or use group, roof-covering materials not less than Class C, where tested in accordance with ASTM E108 or UL 790, shall be permitted where a fire-retardant roof covering is required.

~~**1204.2**~~ **1203.16 Building area.** The allowable floor area for *historic buildings* undergoing a *change of occupancy* shall be permitted to exceed by 20 percent the allowable areas specified in Chapter 5 of the International Building Code.

~~**1204.3**~~ **1203.17** ~~**Location on property**~~ **Exterior ratings.** Historic structures undergoing a *change of use* to a higher-hazard category in accordance with Section 1011.7 may use alternative methods to comply with the fire-resistance and exterior opening protective requirements. Such alternatives shall comply with Section 1201.2.

~~**1204.14**~~ **1203.18 Natural light.** Where it is determined by the *code official* that compliance with the natural light requirements of Section 1010.1 will lead to loss of historic character or historic materials in the building, the existing level of natural lighting shall be considered to be acceptable.

Delete without substitution:

~~SECTION 1204~~
~~CHANGE OF OCCUPANCY~~

~~**1204.1 General.** *Historic buildings* undergoing a *change of occupancy* shall comply with the applicable provisions of Chapter 10, except as specifically permitted in this chapter. Where Chapter 10 requires compliance with specific requirements of Chapter 7, Chapter 8 or Chapter 9 and where those requirements are subject to the exceptions in Section 1202, the same exceptions shall apply to this section.~~

~~**1204.6 Means of egress.** Existing door openings and corridor and stairway widths less than those that would be acceptable for nonhistoric buildings under these provisions shall be *approved*, provided that, in the opinion of the *code official*, there is sufficient width and height for a person to pass through the opening or traverse the exit and that the capacity of the exit system is adequate for the occupant load, or where other operational controls to limit occupancy are *approved* by the *code official.*~~

~~**1204.8 Transoms.** In corridor walls required by these provisions to be fire-resistance rated, existing transoms may be maintained if fixed in the closed position, and fixed wired glass set in a steel frame or other *approved* glazing shall be installed on one side of the transom.~~

~~**Exception:** Transoms conforming to Section 1203.4 shall be accepted.~~

~~**1204.10 One-hour fire-resistant assemblies.** Where 1-hour fire-resistance-rated construction is required by these provisions, it need not be provided, regardless of construction or occupancy, where the existing wall and ceiling finish is wood lath and plaster.~~

~~**1204.11 Stairways and guards.** Existing stairways shall comply with the requirements of these provisions. The *code official* shall grant alternatives for stairways and guards if alternative stairways are found to be acceptable or are judged to meet the intent of these provisions. Existing stairways shall comply with Section 1203.~~

~~**Exception:** For buildings less than 3,000 square feet (279 m^2), existing conditions are permitted to remain at all stairways and guards.~~

~~**1204.12 Exit signs.** The *code official* may accept alternative exit sign locations where the location of such signs would damage the historic character of the building or structure. Such signs shall identify the exits and exit path.~~

SECTION 1205
STRUCTURAL

[BS] 1205.1 General. *Historic buildings* shall comply with the applicable structural provisions for the work as classified in Chapter 4 or 5.

Exceptions:

1. The *code official* shall be authorized to accept existing floors and existing live loads and to approve operational controls that limit the live load on any floor.
2. *Repair* of *substantial structural damage* is not required to comply with Sections 405.2.3 and 405.2.4. *Substantial structural damage* shall be repaired in accordance with Section 405.2.1.

[BS] 1205.2 Dangerous conditions. Conditions determined by the *code official* to be *dangerous* shall be remedied. Work shall not be required beyond what is required to remedy the *dangerous* condition.

Revise as follows:

[BS] ~~1204.13~~ 1205.3 Exit stair live load. Existing historic stairways in buildings changed to a Group R-1 or R-2 occupancy shall be accepted where it can be shown that the stairway can support a 75-pounds-per-square-foot (366 kg/m^2) live load.

SECTION 1206
RELOCATED BUILDINGS

1206.1 Relocated buildings. Foundations of relocated *historic buildings* and structures shall comply with the *International Building Code*. Relocated *historic buildings* shall otherwise be considered a *historic building* for the purposes of this code. Relocated *historic buildings* and structures shall be sited so that exterior wall and opening requirements comply with the *International Building Code* or with the compliance alternatives of this code.

EB103-22 Part I

EB103-22 Part II

IEBC: SECTION 202 (New), [BS] 1201.2, 1205.4 (New)

Proponents: Mike Jackson, representing Association for Preservation Technology (arch419@aol.com)

2021 International Existing Building Code

Add new definition as follows:

CHARACTER-DEFINING FEATURE. Those visual aspects and physical elements that comprise the appearance of an historic building and that are significant to the historical, architectural and cultural values, including the overall shape of the historic building or property, its materials, craftsmanship, decorative details, interior spaces and features, as well as the various aspects of its site and environment.

Revise as follows:

[BS] 1201.2 Historic building report ~~Report~~. ~~A *historic building* undergoing *alteration* or *change of occupancy* shall be investigated and evaluated. If it is intended that the building meet the requirements of this chapter, a written report~~ A historic building report shall be prepared and filed with the *code official* by a *registered design professional* where such a report is necessary in the opinion of the *code official*. Such report shall be in accordance with Chapter 1 and shall include the following: ~~identify each required safety feature that is in compliance with this chapter and where compliance with other chapters of these provisions would be damaging to the contributing historic features.~~

1. Documentation that the building meets the definition of historic building.
2. Identification, description and photograph of provisions of character-defining features able to be preserved using the provisions of this Section.
3. For each character-defining feature to be retained using the provisions of this Section, identification of the historic building provision permitting its preservation.
4. For each character-defining feature where preservation cannot occur using the historic building provisions in this Section, description of how the intent of these provisions will be met. The code official is authorized to accept any reasonably equivalent alternative.

~~For buildings assigned to Seismic Design Category D, E or F, a structural evaluation describing, at a minimum, the vertical and horizontal elements of the lateral force-resisting system and any strengths or weaknesses therein shall be prepared. Additionally, the report shall describe each feature that is not in compliance with these provisions and shall demonstrate how the intent of these provisions is complied with in providing an equivalent level of safety.~~

Add new text as follows:

1205.4 Structural evaluation. For buildings assigned to Seismic Design Category D, E, or F, a structural evaluation describing, at a minimum, the vertical and horizontal elements of the lateral force-resisting system and any strengths or weaknesses therein shall be prepared in accordance with Section 1201.2.

Reason Statement: This code change proposal consolidates the allowances permitted for Fire Safety (Alterations) and Change of Occupancy to a single set of allowances, rectifying the current situation where allowances in the two sections are inconsistent in language and stringency. Editing and slight reorganization have occurred to more clearly establish when these allowances can be used.
As no substantive changes have been made in the combining of these sections, few provisions retain their applicability for Change of Occupancy only.

This is a user-friendly change that clarifies the application of these provisions for the code official, the design professional and other code users.

This is one of a series of 6 proposals intended to facilitate use of the code for historic building projects.

The Table below explains the origins of the reorganized and revised Section 1203.

Cross reference – Section 1203 and 1204 Revisions

2024 SECTION - Proposed Section 1203 1203 General Safety	2021 Section	Change	Sections of origin in 1203 AND 1204
1203.1 Scope	1203.1	Clarify	1203.1
1203.2 Automatic fire extinguishing system	1203.2 (1203.12 deleted)	Rename/edit	1203.2, 1203.12 (deleted)
1203.3 Means of egress	1203.3	Edit/combine	1203.3, 1204.6
1203.4 Transoms	1203.4	Edit/combine/renumber	1203.4, 1204.8
1203.5 Interior finishes	1203.5	Edit/combine	1203.5
1203.6 Flame Spread Index	1204.9	Edit/combine/renumber	1204.9
1203.7 Stairway enclosure	1203.6	Edit/combine/renumber	1204.11
1203.8 One-hour fire-resistant assemblies	1203.7	Edit/combine/renumber	1203.7, 1204.4, 1204.10
1203.9 Occupancy Separation	1204.4		
1203.10 Glazing in fire-resistance-rated systems	1203.8	Edit/combine/renumber	1203.8
1203.11 Stairways	1203.9	Edit/combine/renumber	1204.11
1203.12 Guards and handrails	1203.10 (1203.10.1 and 1203.10.2 deleted)	Edit/combine/renumber	1203.9, 1203.10
1203.13 Exit signs	1203.11	Edit/combine/renumber	1203.11, 1204.12
1203.14 Door swing	1204.7	Edit/combine/renumber	1204.7
1203.15 Roof covering	1204.5	Edit/combine/renumber	1204.5
1203.16 Building area	1204.2	Edit/combine/renumber	1204.2
1203.17 Exterior ratings	1204.3	Relocated	1204.3
1203.18 Natural light	1204.14	Relocated	1204.14

Bibliography: APT Building Codes and Historic Preservation
Webliography https://www.apti.org/assets/Committees/technicalcommittees/CodesandStandards/2019/Building%20Codes%20and%20Historic%20Preservation%20–%20Webliography.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will permit more consistent and effective regulation of historic buildings. As a result, the clarifications will reduce the amount of time, and thus the cost, required of code officials, engineers, architects and contractors.

By permitting the allowances to be available to Alterations and Changes of Occupancy, in some cases the cost of construction will be reduced.

EB103-22 Part II

EB104-22

IEBC: [BS] 1201.2

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 1201.2 Report. A *historic building* <u>or structure</u> undergoing *alteration* or *change of occupancy* shall be investigated and evaluated<u>, and</u> . ~~If it is intended that the building meet the requirements of this chapter,~~ a written report shall be prepared and filed with the *code official* by a *registered design professional* where ~~such a report is necessary in the opinion of~~ <u>required by</u> the *code official*. ~~Such~~ <u>The</u> report ~~shall be in accordance with Chapter 1 and~~ shall identify <u>all unsafe conditions as defined in Section 115</u> ~~each required safety feature that is in compliance with this chapter and where compliance with other chapters of these provisions would be damaging to the contributing historic features~~. For buildings assigned to Seismic Design Category D, E or F, a <u>description of</u> ~~structural evaluation describing, at a minimum,~~ the vertical and horizontal elements of the lateral force-resisting system and ~~any~~ strengths or weaknesses therein shall be <u>included</u> ~~prepared~~. Additionally, the report shall describe <u>the components of the building or structure that provide a level of safety substantially below that required of existing non-historic buildings and structures.</u> ~~each feature that is not in compliance with these provisions and shall demonstrate how the intent of these provisions is complied with in providing an equivalent level of safety.~~

Reason Statement: The provisions in Section 1201.2 that govern the investigation, evaluation, and report are unclear at best. The Commentary is similarly vague and provides no substantive guidance regarding the intent of this provision.
The section contains a general reference to Chapter 1 (i.e., "in accordance with Chapter 1), but the only provisions in Chapter 1 that refer to such a report are in Section 115, which deals with unsafe conditions. Section 115 does not deal with "required safety features that are in compliance with this chapter" (whether the phrase "this chapter" refers to Chapter 1 or Chapter 12 is also unclear) and does not deal with "compliance with other chapters of these provisions".

It makes little sense to refer the user generally to Chapter 1 regarding a report if the only mention of a such a report in Chapter 1 is in Section 115, so a more direct pointer is proposed.

Further, the term "required safety feature" is undefined and unclear, and a vague requirement to assess compliance with all of the chapters makes little sense, when only alterations and changes of occupancy are covered by Section 1201.2.

The requirement to "describe each feature that is not in compliance with these provisions and demonstrate how the intent of these provisions is complied with in providing an equivalent level of safety" is also unclear and largely unenforceable.

This proposal simplifies and improves the language in Section 1201.2 by providing a direct pointer to Section 115 and eliminating vague and unenforceable language. If this proposal is accepted, the section will read as follows:

A *historic building* or structure undergoing *alteration* or *change of occupancy* shall be investigated and evaluated, and a written report shall be prepared and filed with the *code official* by a *registered design professional* where required by the *code official*. The report shall identify all unsafe conditions as defined in Section 115. For buildings assigned to Seismic Design Category D, E or F, a description of the vertical and horizontal elements of the lateral force-resisting system and strengths or weaknesses therein shall be included. Additionally, the report shall describe the components of the building or structure that provide a level of safety substantially below that required of existing non-historic buildings and structures.

While I would prefer to be able to say that this revised language matches the intent of the existing provision, I honestly cannot say that because the existing provision is extremely vague and unclear. What I can say is that this revised language is both reasonable and fair; it addresses unsafe conditions; and if an assessment of the level of safety provided by existing components must be provided, it requires comparison to that required of existing buildings (as opposed to that required of new buildings).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It is impossible to tell for sure whether this proposal will result in an increase or a decrease in the cost of construction because the existing language is so vague. Streamlining the provision and making it enforceable will arguably reduce the amount of time spent trying to intuit the meaning of the section, so that should reduce costs. Making the provision clear and enforceable may result in increased enforcement, so that could arguably increase the cost of construction.

In any event, the total change in the cost of construction is likely negligible as this provision only applies to alterations and changes of occupancy in historic buildings, and, even then, only where required by the building official. It's a very small subset of projects in a small subset of buildings.

EB105-22

IEBC: [BS] 1201.2

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 1201.2 Report. A *historic building* undergoing *alteration* or *change of occupancy* shall be investigated and evaluated. If it is intended that the building meet the requirements of this chapter, a written report shall be prepared and filed with the *code official* by a *registered design professional* where such a report is necessary in the opinion of the *code official*. Such report shall be in accordance with Chapter 1 and shall identify each required safety feature that is in compliance with this chapter and where compliance with other chapters of these provisions would be damaging to the contributing historic features. For buildings assigned to Seismic Design Category D, E or F, a structural evaluation describing, at a minimum, the vertical and horizontal elements of the lateral force-resisting system and any strengths or weaknesses therein shall be prepared. Additionally, the report shall describe each feature that is not in compliance with these provisions and shall demonstrate how the intent of these provisions is complied with in providing an equivalent level of safety.

> **Exception:** An investigation, evaluation, and report shall not be required where the *alteration* is scoped by Section 602 as a Level 1 *alteration* and does not make the building or structure less complying with the provisions of the *International Building Code*.

Reason Statement: The requirements for a report for historic structures are not particularly clear. What is a "required safety feature" and where are these defined? What are "other chapters of these provisions" and why would it be necessary to comply with all of them when only a Level 1 alteration is being proposed?
Further, and more importantly, there is no need for a report for a historic building or structure for a minor alteration that will not make the building or structure less complying with the building code than it was prior to the alteration. These are historic buildings, and typically they do not meet the requirements of the code for new construction. Itemization of all the ways that a building does not meet the current code for new construction and figuring out all the ways to upgrade the building or structure and then determining whether such upgrades would damage the contributing historic features can be a fairly onerous task.

According to the IEBC, Level 1 alterations include such minor things as replacement of roofing or like-for-like replacement of a piece of broken equipment. For historic buildings and structures that have necessarily existed for many decades or even several centuries, any Level 1 alteration that does not make the building less compliant with current code is not changing the status quo and should not trigger a costly report with all of these requirements.

This proposal makes it clear that Level 1 alterations that do not make the building or structure less compliant do not trigger the need for a report. Alterations more extensive than Level 1, alterations that would make the building less compliant with respect to code, and changes of occupancy would still be covered by this section. But Level 1 alterations that do not make any noncompliances with the current code for new construction worse should be exempted from this requirement.

Note that Building Officials still retain the authority to order remedy of dangerous conditions per Section 1205.2, order inspections per Section 109.2, order abatement of unsafe conditions per Section 115, and order emergency measures per Section 116. This proposal will not alter those powers.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal relaxes the requirements for a report for historic buildings and structures that are undergoing Level 1 alterations that do not make the building less compliant with the building code for new construction. As a report to determine all the ways that an existing historic building or structure does not meet the current building code for new construction can be a fairly onerous task, exemption of the requirement for a report will reduce the cost of these minor alterations where the alterations do no harm and do not make any noncompliances worse.

EB105-22

EB106-22

IEBC: 1201.3

Proponents: Mike Jackson, representing Association for Preservation Technology (arch419@aol.com)

2021 International Existing Building Code

Revise as follows:

1201.3 Special occupancy exceptions—museums. Where a building in Group R-3 is used for Group A, B or M purposes such as museum tours, exhibits and other public assembly activities, or for museums less than 3,000 square feet (279 m^2) per floor, the occupancy shall be classified as Group B where life safety conditions are approved by the code official in accordance with Section 1201.2. ~~the *code official* is authorized to determine that the occupancy is Group B where life safety conditions can be demonstrated in accordance with Section 1201.2.~~ Adequate means of egress in such buildings, including, but not limited to, a means of maintaining doors in an ~~open~~ unlocked position to permit egress, a limit on building occupancy to an occupant load permitted by the means of egress capacity, a limit on occupancy of certain areas or floors, or supervision by a person knowledgeable in the emergency exiting procedures, shall be provided.

Reason Statement: This code change proposal addresses the size of museums permitted to use the special provision applicable to small historic museums. It is assumed that the original intent was to specify building size *by floor*, similar to other provisions for historic buildings, including accessibility, and how the existing provision is often interpreted. This code change proposal does not alter the requirements of the existing provision. This clarification will benefit the nation's smallest museums, which are among the nation's most significant historic structures. Limitations related to means of egress, number of occupants, and supervision remain unchanged.

This is one of a series of 6 proposals intended to facilitate use of the code for historic building projects.

Bibliography: APT Building Codes and Historic Preservation Webliography https://www.apti.org/assets/Committees/technicalcommittees/CodesandStandards/2019/Building%20Codes%20and%20Historic%20Preservation%20–%20Webliography.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal has no construction cost impact but will support the ongoing operations of museums. This proposal extends the allowance to larger museum of 3000 sq ft per floor versus 3000 sq feet total. This will allow more museums to safely operate thus making no change or reducing the cost of compliance.

EB106-22

EB107-22

IEBC: 1201.5 (New)

Proponents: Mike Jackson, representing Association for Preservation Technology (arch419@aol.com)

2021 International Existing Building Code

Add new text as follows:

1201.5 Tolerances. The code official is authorized to accept a tolerance where there are practical physical impediments to achieving a required dimension or performance rating, or where compliance with that provision would threaten, degrade or destroy a character-defining feature. The approved solution shall be as close as possible to the required dimension or rating. Tolerances shall be documented in the report as required by Section 1201.2.

Reason Statement: This code change proposal addresses the barrier to building rehabilitation created by requiring exact compliance with standards for new construction. For existing conditions that would be physically impractical to change, determined by the code official to insignificantly diminish an historic building's safety or performance, or would threaten, damage or destroy historic building elements. The proposal identifies that accepted solutions should be as close as possible to the required ratings or performance standards.
This is one of a series of 6 proposals intended to facilitate use of the code for historic building projects.

Bibliography: APT Building Codes and Historic Preservation
Webliography https://www.apti.org/assets/Committees/technicalcommittees/CodesandStandards/2019/Building%20Codes%20and%20Historic%20Preservation%20–%20Webliography.pdf

Cost Impact: The code change proposal will decrease the cost of construction
By eliminating requirements to alter conditions with no significant benefit, this code change proposal will have significant cost savings. Under the identified conditions, it eliminates the need to pursue burdensome variances that are costly in time and money for the code official and design professional. By removing the burden of requirements determined to have no significant benefit, these historic rehabilitation projects will be more financially viable. This is an important step in eliminating barriers to rehabilitation and building vacancy.

EB107-22

EB108-22

IEBC: 1203.2, 1203.12

Proponents: John Swanson, representing NFSA (swanson@nfsa.org)

2021 International Existing Building Code

Revise as follows:

1203.2 General. Every *historic building* that does not conform to the construction requirements specified in this code for the occupancy or use and that constitutes a distinct fire hazard as defined herein shall be provided with an *approved* automatic sprinkler ~~fire-extinguishing~~ system as determined appropriate by the *code official*. However, an automatic sprinkler ~~fire-extinguishing~~ system shall not be used to substitute for, or act as an alternative to, the required number of exits from any *facility*.

1203.12 Automatic sprinkler ~~fire-extinguishing~~ systems. Every *historic building* that cannot be made to conform to the construction requirements specified in the *International Building Code* for the occupancy or use and that constitutes a distinct fire hazard shall be deemed to be in compliance if provided with an *approved* automatic sprinkler ~~fire-extinguishing~~ system.

Exception: Where the *code official* approves an alternative life-safety system.

Staff Analysis: Note that Proposal EB108-22 and EB109-22 are identical proposals.

Reason Statement: The intent of this code change proposal is to coordinate terminology between the IBC, IFC and IEBC when referring to "automatic sprinkler system" since this term is used and defined in the International Building Code and International Fire Code. The term "automatic fire-extinguishing system" is typically used for fire protection systems covered in IBC Section 904.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no technical changes to this code section. This proposal is being made to correlate across the I-Codes the term "automatic sprinkler system" as intended.

EB108-22

EB109-22

IEBC: 1203.2, 1203.12

Proponents: Stephen Thomas, representing Colorado Chapter ICC (sthomas@coloradocode.net)

2021 International Existing Building Code

Revise as follows:

1203.2 General. Every *historic building* that does not conform to the construction requirements specified in this code for the occupancy or use and that constitutes a distinct fire hazard as defined herein shall be provided with an *approved* automatic ~~fire-extinguishing~~ sprinkler system as determined appropriate by the *code official*. However, an automatic ~~fire-extinguishing~~ sprinkler system shall not be used to substitute for, or act as an alternative to, the required number of exits from any *facility*.

1203.12 Automatic ~~fire-extinguishing~~ sprinkler systems. Every *historic building* that cannot be made to conform to the construction requirements specified in the *International Building Code* for the occupancy or use and that constitutes a distinct fire hazard shall be deemed to be in compliance if provided with an *approved* automatic ~~fire-extinguishing~~ sprinkler system.

Exception: Where the *code official* approves an alternative life-safety system.

Staff Analysis: Note that Proposal EB108-22 and EB109-22 are identical proposals.

Reason Statement: The intent of this proposal is to provide language that is consistent with the building code regarding automatic sprinkler systems. Code Change Proposal IBC 3-09 CCC made similar revisions to clarify the use of sprinklers versus a fire-extinguishing system and fire suppression system. The change was submitted by the National Fire Sprinkler Association. They had the same reasoning to promote consistency throughout the code. We believe this proposal also provides consistency between the IBC and the IEBC regarding this language.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is just a clarification and provides consistency with the language in the codes for automatic sprinkler systems.

EB109-22

EB110-22

IEBC: 1203.3

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Existing Building Code

Revise as follows:

1203.3 Means of egress. ~~Existing door openings and corridor and stairway widths less than those specified elsewhere in this code may be *approved*, provided that,~~ Where in the opinion of the *code official*, there is sufficient width and height for a person to pass through the opening or traverse the means of egress , existing door openings and corridor and stairway widths are not required to meet the widths required by the *International Building Code* or this code. Where *approved* by the *code official*, the front or main exit doors need not swing in the direction of the path of exit travel, provided that other *approved* means of egress having sufficient capacity to serve the total occupant load are provided.

Reason Statement: There was change EB111-19 that had an editorial correction. This addresses non mandatory language and also addresses the fact that this is likely intending to refer also to the IBC. This proposal also addresses the grammar concern that caused this proposal to disapproved last cycle.
This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is merely provided to appropriately revise the language to be more mandatory and clearly provide the correct reference to the IBC as intended. This was a follow-up to a similar proposal EB111-19 and is not intended to change the intent of the section to allow reduced door widths in historic buildings therefore the cost of compliance will not change.

EB110-22

EB111-22

IEBC: SECTION 1205 (New), 1205.1 (New), 1205.1.1 (New), 1205.1.2 (New), 1205.2 (New)

Proponents: Mike Jackson, representing Association for Preservation Technology (arch419@aol.com)

2021 International Existing Building Code

Add new text as follows:

SECTION 1205
AUTOMATIC SPRINKLER SYSTEM EQUIVALENCIES

1205.1 Sprinkler system alternatives.. The following alternatives shall be permitted in lieu of full compliance with the Prescriptive Compliance Method or Work Area Method when undergoing alterations or a change of occupancy.

1205.1.1 Group A-2. M or R-2 Occupancies.. Group A-2, M, or R-2 occupancies, can be rehabilitated without an automatic sprinkler system provided the following conditions are met:

1. Building is less than 4 stories in height above grade plane and less than 3000 sqft per floor
2. Group A-2 and M occupancies shall be located on the first floor. Group R-2 shall be located on upper floors.
3. Type IIIB construction.
4. Two exits per story.
5. Vertical openings have 2-hour fire-resistance rating.
6. Fire-resistance rated separations in accordance with the *International Building Code.*
7. Compliance with Section 907 of the *International Building Code* and Item 4 of Section 1205.1.2.

1205.1.2 Other than Group A-2, M or R-2 Occupancies.. In other than A-2, M, R-2 occupancies, where an automatic sprinkler system is required a fire alarm system compliant with Section 907 of the *International Building Code* shall be accepted in lieu of the automatic sprinkler system provided that:

1. Buildings are less than 4 stories in height above grade plane and less than 3000 sqft per floor
2. The required number of exits are provided.
3. Carbon monoxide detection is in accordance with Section 915 of the *International Building Code.*
4. The fire alarm system contains the following components and capabilities:
   - 4.1 Manual pull stations
   - 4.2 Full coverage smoke detection in accordance with NFPA 72.
   - 4.3 Occupant notification in accordance with Section 907.5 of the *International Building Code.*
   - 4.4 Emergency lighting in accordance with Section 1008 of the *International Building Code.*

1205.2 Automatic sprinkler system type.. Where an automatic sprinkler system is not required but will be used as an alternative to other provisions of this code, the following systems are acceptable:

1. Buildings four stories above grade plane or less: NFPA 13R
2. Buidlings five stories above grade plane or greater, NFPA 13
3. Free standing buildings or with property line separation, two stories above grade plane or less and and limited to 1500 sqft per floor: NFPA 13D
4. An alternative life-safety system as approved by the code official.

Reason Statement: This code change proposal adds a sub-Section to address and describe fire safety equivalencies in small historic buildings. It specifies the highest level of a fire alarm system, and other mandatory conditions, that would be acceptable in lieu of an automatic fire extinguishing suppression system for small, mixed-use historic buildings, as is typically located in downtown areas and referred to as ‘main street’ buildings. It describes other small historic buildings where the highest level of a fire alarm system is acceptable in lieu of an automatic fire extinguishing suppression system and the conditions that must be met. It also specifies the type of automatic fire extinguishing suppression system that is acceptable when used as an alternative to other code provisions.
The basis of this code change proposal originates with projects using the Performance Compliance method, where an automatic fire extinguishing suppression system is not required for smaller historic building projects when that method’s other stringent requirements are met.

This code change proposal brings together, expands and clarifies this part of fire safety, providing specific guidance to the code official, the design professional and other code users.

This is one of a series of 6 proposals intended to facilitate use of the code for historic building projects.

Bibliography: APT Building Codes and Historic Preservation Webliography https://www.apti.org/assets/Committees/technicalcommittees/CodesandStandards/2019/Building%20Codes%20and%20Historic%20Preservation%20–%20Webliography.pdf

Cost Impact: The code change proposal will decrease the cost of construction
This code change will provide great cost savings for small historic rehabilitation projects where no water exists or where the cost of providing water and installing a fire extinguishing suppression system render a project infeasible. The code change also eliminates the need to pursue burdensome variances that are costly in time and money for the code official, design professional, and owner.

EB111-22

EB112-22

IEBC: [BS] 1205.1

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 1205.1 General. *Historic buildings* shall comply with the applicable structural provisions for the work as classified in Chapter 4 or 5.

Exceptions:

1. The *code official* shall be authorized to accept existing floors and existing live loads and to approve operational controls that limit the live load on any floor.
2. Repair of damage that was caused by or related to snow load effects is not required to comply with Sections 402.2.1.1 or 405.2.5.
3. Repair of *disproportionate earthquake damage* is not required to comply with Section 405.2.2. *Disproportionate earthquake damage* shall be repaired in accordance with Section 405.2.1.

~~2.~~ 4. *Repair* of *substantial structural damage* is not required to comply with Sections 405.2.3 and 405.2.4. *Substantial structural damage* shall be repaired in accordance with Section 405.2.1.

Staff Analysis: Code Change proposals EB112-22 and EB113-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: During the development of the 2018 IEBC, proposal EB41-16 was modified by public comment to further clarify that historic buildings are exempt from the then-existing structural upgrade triggers in Chapter 4 that apply to non-historic buildings. The public comment was accepted at the public comment hearings, and was then approved by the voting membership of the ICC.

However, at the same time that the proposal to clarify that historic buildings are exempted from the then-existing structural upgrade triggers, two new triggers -- the disproportionate earthquake damage trigger (now Section 405.2.2) and the snow-load damage trigger (now Section 405.2.5 and Section 405.2.1.1) -- were added to the IEBC, thus unintentionally contravening both the intent of the IEBC and that of the voting membership with respect to historic buildings. This proposal corrects that oversight by referring users to Section 405.2.1 for nearly all repairs, regardless of the level of damage.

As was discussed during the public comment hearing (and even in the committee action hearing prior to that), the intent is to make repair of historic buildings as least onerous as possible. Exemption of historic buildings from upgrade triggers had been in the code for several code cycles; however, the 2018 IEBC made it more clear, except for these two new upgrade triggers. This proposal brings the Exceptions portion of 1205.1 into alignment with the other exceptions and removes an unintended conflict. Note that building officials still retain the ability to order remedy of dangerous conditions; the intent of this proposal (and the prior proposals that came before) is to prevent upgrade triggers from mandating structural interventions that end up destroying the character-defining features of the structures that this chapter is intended to preserve.

Note that a separate proposal by this author attempts to simplify and improve this section; if the other proposal is accepted, this proposal will become moot and will be withdrawn.

Cost Impact: The code change proposal will decrease the cost of construction
Because this proposal adds exceptions to the existing requirements, this proposal has the potential to decrease the cost of construction for the repairs of historic buildings that experience disproportionate earthquake damage or snow-related damage. The costs associated with repairs to historic buildings that do not experience disproportionate earthquake damage or snow-related damage will remain unchanged, as will the cost to repair non-historic buildings.

EB112-22

EB113-22

IEBC: [BS] 1205.1

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 1205.1 General. *Historic buildings* shall comply with the applicable structural provisions for the work as classified in Chapter 4 or 5.

Exceptions:

1. The *code official* shall be authorized to accept existing floors and existing live loads and to approve operational controls that limit the live load on any floor.
2. ~~*Repair* of *substantial structural damage* is not required to comply with Sections 405.2.3 and 405.2.4. *Substantial structural damage* shall be repaired in accordance with Section 405.2.1.~~ <u>Regardless of the level of damage, *repairs* need only comply with Section 405.2.1. *Repairs* need not comply with Section 405.2.1.1 or Sections 405.2.2 through 405.2.6.</u>

Staff Analysis: Code Change proposals EB112-22 and EB113-22 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: During the development of the 2018 IEBC, proposal EB41-16 was modified by public comment to further clarify that historic buildings are exempt from the then-existing structural upgrade triggers in Chapter 4 that apply to non-historic buildings. The public comment was accepted at the public comment hearings, and was then approved by the voting membership of the ICC.
However, at the same time that the proposal to clarify that historic buildings are exempted from the then-existing structural upgrade triggers, two new triggers -- the disproportionate earthquake damage trigger (now Section 405.2.2) and the snow-load damage trigger (now Section 405.2.5 and Section 405.2.1.1) -- were added to the IEBC, thus unintentionally contravening both the intent of the IEBC and that of the voting membership with respect to historic buildings. This proposal corrects that oversight by simplifying the entire section, referring users to Section 405.2.1 for nearly all repairs, regardless of the level of damage.

As was discussed during the public comment hearing (and even in the committee action hearing prior to that), the intent is to make repair of historic buildings as least onerous as possible. Exemption of historic buildings from upgrade triggers had been in the code for several code cycles; however, the 2018 IEBC made it more clear, except for these two new upgrade triggers. This proposal brings the Exceptions portion of 1205.1 into alignment with the other exceptions and removes an unintended conflict. <u>Note that building officials still retain the ability to order remedy of dangerous conditions; the intent of this proposal (and the prior proposals that came before) is to prevent upgrade triggers from mandating structural interventions that end up destroying the character-defining features of the structures that this chapter is intended to preserve.</u>

This proposal does one other thing: it also exempts qualified historic structures from the flood hazard upgrade trigger associated with substantial damage. This is for the same reason that the historic structures are exempted from the other upgrade triggers -- namely that mandatory upgrade triggers often result in the removal or destruction of the character-defining features that make the structure historic. In editions of the IEBC prior to 2018, Chapter 12 contained fairly clear exceptions to any upgrades; however, it also contained a circular reference to the requirements in then-Chapter 5, which garbled the message. The changes in the 2018 IEBC removed much of the circular references and made the exceptions clear, except that the flood load trigger was NOT excepted. Whether this was by accident or on purpose is not clear; however, the same logic that necessitates the exemption of the other upgrade triggers also necessitates exemption of the flood load trigger for historic structures.

By addressing all of the structural upgrade triggers in a single exception, the intent of Chapter 12 with respect to upgrade triggers is made both clear and streamlined.

Note that a separate proposal by this author attempts to match the existing language in Exception 2; however, that language becomes clunky when all of the various upgrade triggers have to be specifically mentioned. If this proposal is accepted (which is the preferred solution), the other proposal becomes moot and will be withdrawn.

Cost Impact: The code change proposal will decrease the cost of construction
Because this proposal makes the existing exception to the upgrade triggers broader, this proposal has the potential to decrease the cost of construction for the repairs of historic buildings that experience disproportionate earthquake damage or damage from snow-load-related effects, or that might otherwise trigger flood upgrades as a result of substantial damage. The costs associated with repairs to historic buildings that do not experience disproportionate earthquake damage or snow-load-related damage or *substantial damage* will remain unchanged, as will the cost to repair non-historic buildings.

EB114-22

IEBC: [BS] 1205.1

Proponents: Gwenyth Searer, representing myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Revise as follows:

[BS] 1205.1 General. *Historic buildings* shall comply with the applicable structural provisions for the work as classified in Chapter 4 or 5.

Exceptions:

1. The *code official* shall be authorized to accept existing floor~~s~~ and roof framing and ~~existing~~ previously approved live loads and to approve operational controls that limit the live load on any floor or roof.
2. *Repair* of *substantial structural damage* is not required to comply with Sections 405.2.3 and 405.2.4. *Substantial structural damage* shall be repaired in accordance with Section 405.2.1.

Reason Statement: This is a largely editorial change, though it does expressly authorize actions by the code official that have previously been understood to be permitted but were not explicitly mentioned.

The current provision mentions "existing live load", which could be misinterpreted as the live load that is currently present on a given floor, but the intent is to allow the previously approved design live load to be continued, even if it is less than the design live load required for new construction. Further, the current provision does not discuss roofs, which in many historic buildings were not designed for the roof design live loads currently required for new construction. In these cases, it may make sense to create operational controls for maintenance and reroofing activities. For example, operational controls could consist of limiting the number of workers on the roof or limiting the amounts of debris and construction materials that are permitted to be placed on the roof structure during maintenance and reroofing activities. The intent is to permit the code official to allow activities that have historically been permitted, and to allow reasonable operational controls that will enable a historic structure to remain in service without requiring upgrades that may either destroy the character-defining features of the historic structure or that may make maintenance and use of a historic structure cost prohibitive and eventually result in a loss of that historic resource.

Cost Impact: The code change proposal will decrease the cost of construction
Although this proposal is intended largely as an editorial change to clarify that the Building Official has the ability to accept previously approved live loads, it also specifically allows the Building Official to accept operational controls for roofs in addition to interior spaces. Consequently, although this change is in the spirit of the original intent, the proposal specifically allows more leeway and judgment on the part of the Building Official with respect to allowing continued use of historic structures, and thus has at least some potential to reduce the cost of repairs and maintenance of these structures.

EB114-22

EB116-22

IEBC: APPENDIX E (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); John Williams, representing Committee on Healthcare (ahc@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

2021 International Existing Building Code

Add new text as follows:

User notes. **About this appendix:** The primary purpose for Appendix E is to provide guidance for designers, engineers, architects, fire and building code officials to allow temporary emergency uses of existing buildings or temporary structures with respect to the minimum code requirements. This appendix is intended to serve as that template or checklist for use during an emergency that references the relevant code requirement of concerns.

APPENDIX E
TEMPORARY EMERGENCY STRUCTURES AND EMERGENCY USES

SECTION E101
GENERAL

E101.1 Scope. The provisions of this appendix shall apply to the use, construction, installation, alteration, relocation and location of existing buildings or temporary structures and any service utilities or systems that serve such existing buildings or temporary structures during or based on the response to the emergency."

E101.1.1 Objectives. The objective of this Appendix is to provide flexibility for the code official to permit the temporary uses of existing buildings or temporary structures during an emergency to address unusual circumstances that temporarily overwhelms response capabilities of an entity while maintaining the level of safety intended by the code.

E101.1.2 Temporary use. Where temporary uses during emergencies exceed 180 days, judgement shall be used by the code official to allow for temporary uses and conditions to continue for the duration of the emergency based on the needs of the emergency. The code official is authorized to grant extensions for demonstrated cause.

SECTION E102
DEFINITIONS

Add new definition as follows:

EMERGENCY. Any event declared by local, state, or federal entities that temporarily overwhelms response capabilities, and that require the temporary suspension or modification of regulations, codes, or standards to facilitate response to such an event.

TEMPORARY STRUCTURES. That which is built, constructed or erected for a period of less than 180 days.

TEMPORARY USE. An activity or practice that is established at a designated location for a period of less than 180 days. Uses include, but are not limited to, those functional designations listed within the occupancy group descriptions in Section 302.1 of the International Building Code.

Add new text as follows:

SECTION E103
SUBMITTAL DOCUMENTS

E103.1 General. Submittal documents shall be of sufficient clarity to indicate the location, nature and extent of the work or use proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the code official.

SECTION E104
CONFORMANCE

E104.1 Conformance. Temporary use of existing buildings and temporary structures shall conform to the structural strength, fire safety, means of egress, accessibility, light, ventilation, and sanitary requirements of this code as necessary to provide a reasonable level of safety, health, and general welfare as determined by the code official. Tents and other membrane structures shall comply with Sections 3102 and 3103 of the *International Building Code.*

E104.2 Changes over time. As an emergency evolves, submittal documents shall be submitted to demonstrate that the temporary uses of the existing buildings or temporary structures are in compliance with the requirements of the *International Building Code.*

SECTION E105
PERMITS

E105.1 Emergency permits. In an emergency situation, where temporary structures are erected or an existing building undergoes a temporary change of use or occupancy, the *permit* application shall be submitted as soon as practicable to the *code official*. Permits shall be required in accordance with Sections 105.1.1 through 105.1.3.

105.1.1 Temporary structures, other than tents and membrane structures. Temporary structures, other than tents and other membrane structures, that occupy an area greater than 120 square feet (11.16 m^2), shall not be constructed, erected, or relocated for any purpose without obtaining a permit from the code official.

E105.1.2 Tents and membrane structures. Tents and membrane structures shall be permitted in accordance with the *International Fire Code.*

E105.1.3 Existing buildings. An existing buildings shall not repurposed for a purpose it was not designed for without obtaining a permit from the code official for the change of use or occupancy.

SECTION E106
GENERAL STANDARDS FOR EMERGENCY STRUCTURES

E106.1 Scope. The provisions of Sections E106.2 through E106.7 shall apply to all existing structure being repurposed or temporary structures constructed, erected or relocated to support the response to an emergency.

E106.2 Intent. The intent of this section is to provide a base level of safety in a structure built or repurposed for emergency use.

E106.3 Change of use or occupancy. Existing buildings used in a way that was not originally intended by occupancy class or use shall be allowed without formally changing the occupancy class. The previous occupancy class shall be restored upon the conclusion of the emergency. Where the temporary live load of the floor is more than that required by Section 1607 of the International Building Code for the original use, the area designated for the temporary live load shall be posted with placards for the approved live load.

E106.4 Fire Safety Provisions. Determination of the fire safety requirements by the code official shall be in accordance with Section E106.4.1 through E106.4.5 in order to make determinations of safe conditions rather than strict adherence to the provisions of the International Fire Code.

E106.4.1 Fire safety and evacuation plans. Fire safety and evacuation plans shall be provided in accordance with Section 403 and 404 of the *International Fire Code.* Submittal documents shall be updated where there are any physical changes to the layout of the structure.

E106.4.2 Training and practice drills. Training of staff and practice drills shall comply with Section 405 and 406 of the *International Fire Code.* Structures in place for longer than 30 days shall conduct evacuation drill in accordance with Section 405.3 of the International Fire Code based on the temporary use.

E106.4.3 Fire Protection. An evaluation shall be performed to decide on fire protection needed utilizing NFPA 550.

E106.4.4 Emergency Access. Emergency vehicle access roads shall be approved by the fire code official.

E106.4.5 Fire Watch. A fire watch in accordance with Section 403.11.1 of the *International Fire Code* shall be permitted to be provided in lieu of other fire protection systems.

E106.5 Means of Egress. Means of egress shall comply with Section 1011.5 in addition to Sections E106.5.1 through E106.5.3.

> **Exception:** In Group I-2 occupancies, in areas where corridors are used for movement of care recipients in beds, the clear width of ramps and corridors shall be not less than 48 inches (1219 mm).

E106.5.1 Exit Discharge. Exit discharge shall provide access to a public way, or to a safe dispersal area in accordance with Section 1028.5 of the *International Building Code*

E106.5.2 Means of Egress Lighting. The means of egress shall be illuminated when the space is occupied.

> **Exception:** Sleeping areas.

E106.5.3 Exit Signs. Exit signs shall be provided where the means of egress is not readily identifiable. Exit signs shall be permitted to be illuminated by the lighting provided in the structure.

E106.6 Accessibility. A facility that is constructed to be accessible shall be maintained accessible during occupancy.

E106.7 Temporary connection. The code official shall have the authority to authorize the temporary connection of the building or system to the utility, the source of energy, fuel, or power, or the water system or sewer system in accordance with Section 111. Water closets and lavatories shall be either permanent plumbing fixtures installed within the structure, or temporary water closets or lavatories, such as chemical toilets or other means approved by the code official.

E106.7.1 Portable heating and cooling equipment. Portable heating and cooling equipment shall be used in accordance with their listing, and manufacturer's instructions.

SECTION E107
USE OF SPECIFIC STANDARDS

E107.1 Increased occupant load. Allowing for additional occupants in existing building shall comply with Section E107.1.1 through E107.1.3.

E107.1.1 Authorization. The code official is authorized to allow for an increase in the number of occupants or a change of use in a building or portion of a building during an emergency.

E107.1.2 Maintenance of the means of egress. The existing a means of egress shall be maintained.

E107.1.3 Sleeping areas. Where a space is used for sleeping purposes, the space shall be equipped with smoke alarms in accordance with Sections 907.2.6.2 and 907.2.11 if the International Fire Codeor be provided with a fire watch in accordance with Section 403.11.1 of the *International Fire Code.* Carbon monoxide detectors shall be installed in accordance with Section 915 of the *International Fire Code* where the structure uses any fossil fuel or wood burning appliances.

E107.2 Temporary healthcare facilities. Temporary health care facilities shall comply with Section E107.2.1 and E107.2.2.

E107.2.1 General. Temporary health care facilities shall be erected, maintained and operated to minimize the possibility of a fire emergency requiring the evacuation of occupants.

E107.2.2 Membrane structures under projections. Membrane structures of less than 100 square feet (9.3 m2) shall be permitted tobe placed under projections of a permanent building provided the permanent building is protected with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

E107.3 Use of tiny houses or manufactured homes. Tiny houses or manufactured homes used for temporary housing shall comply with Section E107.3.1 through E107.3.5.

E107.3.1 Fire separation distances. Tiny houses or manufactured homes shall be separated by not less than 5 feet (1524 mm) between structures.

E107.3.2 Fire breaks. Tiny houses and manufactured homesshall not be located in groups of more than 20 units. Fire breaks of at least 20 feet (6096 mm) shall be provided between each group.

E107.3.3 Smoke alarms. Tiny houses and manufactured homes used for sleeping purposes shall be equipped with a smoke alarm complying with Section 907.2.11. of the *International Fire Code.* Smoke detectors are not required to be hard wired.

E107.3.4 Carbon monoxide detectors. Carbon monoxide detectors shall be installed in accordance with Section 915, where the tiny house or manufactured homes uses any fossil fuel or wood burning appliances.

E107.3.5 Structures located in a wildland urban interface zone. Tiny houses and manufactured homes that a relocated in a wildland urban interface area shall be provided with defensible space in accordance with the Section 603 of the International Wildland Urban Interface Code.

E107.4 Tents and membrane structures used as sleeping accommodations. Tents or membrane structures used as sleeping accommodations shall comply with the same requirements as tiny houses in Section E107.3.1 through E107.3.5 and Chapter 31 of the International Fire Code.

SECTION E108
REFERENCED STANDARDS

E108.1 General. See Table E108.1for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix referenced in the standard.

TABLE E108.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTION REFERENCED HEREIN
NFPA 550-2017	Guide to the Fire Safety Concepts Tree	E106.5.3

Staff Analysis: The standard proposed for inclusion in the code, NFPA 550-17, Guide to the Fire Safety Concepts Tree, was reviewed during Group A with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28). The result of the review can be found here https://www.iccsafe.org/wp-content/uploads/2021-PROPOSED-NEW-STANDARDS-ANALYSES.pdf

Reason Statement: This appendix was originally submitted to IBC as G201-21. Since this proposal extensively dealt with temporary use of existing buildings during an emergency, it was felt it was better suited to IEBC. We believe we have addressed concerns that we learned about during the testimony on the previous proposal and have addressed them in this proposal.
The intent of this appendix is to provide guidance when there are emergencies that exceed the emergencies that the community has planned for. Response must be immediate, so there is not time for the typical plan review and inspection. Existing buildings will be used for occupancies other than they were intended, and temporary structures may need to be erected or brought in to address immediate needs. Recent examples were the housing needs due to mass evacuations during the west coast fires and how hard Covid hit many community health care systems. The user note for this Appendix emphasizes that this is a guidance document for emergencies that exceed pre-planned emergency responses.

The code officials are the people with the experience and knowledge base to identify what can be done and still maintain public health and safety.

This idea is emphasized in Section E101.1.2 and the definition of emergency for this appendix, as well as the modification to the title.

The following revisions were incorporated based on the input received during the hearing:

· The user note states this is a guidance appendix. The idea is used in IFC appendix E and G.

· The title was modified for clarity.

· E101.1.2 – better code language

· Definition for emergency – better code language

· E104.1 was modified to mirror Section 3103.1. This is already permitted by the code. E104.1 has an added sentence clarify that tents and other membrane structures are required to comply with Section 3102 and 3103. These sections also incorporate Chapter 16.

· E104.2 – re-evaluation is not always dependent on additional resources – it could be people being able to return or moving to family.

· E106.1 – This change clarifies that this appendix is applicable to what is happening due to the emergency – not other construction that happens to be occurring at the same time that is not related.

· E106.3 – this modification allows for temporary uses with heavier loading – such as storage of emergency supplies in an office building – where the safe limits are addressed. The change to E104.1 and E106.3 are to address concerns raised by structural engineers about loads.

E106.5 – An exception was created to clarify that in I-2 Occupancies, corridors can be 48” wide in existing buildings. This is consistent with IEBC Section 804.3 for Level 2 Alterations.

· E107.1 – the modification removed ‘temporary waives for’. The criteria was not related to waivers.

· E107.2.2 – better code language

· E107.3 – use defined term for manufactured homes.

· E107.4 – change ‘tiny homes’ to ‘tiny houses’ for consistent terminology

· E107.5 and NFPA 1660 have been removed as they apply to previously anticipated emergencies. This appendix will only address where these plans are exceeded.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (FCAC) and the Committee on Healthcare (CHC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual

Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/icc-committee-on-healthcare/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This appendix is intended to provide a tool to jurisdictions and is not applicable unless adopted. Currently, no formal code requirements provide guidance on how to address. This will provide a framework to make enforcement more consistent and aligned with the requirements of the ICC codes. It was not intended to make compliance more expensive but instead to provide a resource for these emergency situations. These options mirror established ICC codes sections and standards.

EB116-22

TENTATIVE ORDER OF DISCUSSION
2022 PROPOSED CHANGES TO THE
INTERNATIONAL RESIDENTIAL CODE –BUILDING

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some RB code change proposals may not be included on this list, as they are being heard by another committee.

Numbers Not Used
RB21-22
RB33-22
RB50-22
RB119-22
RB128-22
RB211-22
RB301-22
RB303-22

    - ADM3-22 Part II
    - ADM4-22 Part II
- RB1-22
- RB2-22 Part I
- RB3-22
- RB4-22
- RB5-22
    - ADM7-22 Part II
- RB6-22
- RB7-22
- RB8-22
- RB9-22
- RB10-22
    - ADM13-22 Part II
    - ADM17-22 Part II
- RB11-22
    - ADM15-22 Part II
    - ADM24-22 Part II
    - ADM 34-22 Part II
- RB12-22
    - ADM16-22 Part II
- RB13-22
    - ADM36-22 Part II
    - ADM38-22 Part II
    - ADM37-22 Part II
- RB14-22
- RB15-22
- RB16-22
    - ADM41-22 Part II
    - ADM43-22 Part II
- RB17-22
    - S58-22 Part II
    - ADM45-22 Part II
- RB18-22
    - ADM48-22 Part II
- RB19-22
- RB20-22
- RB22-22
- RB23-22
    - G1-22 Part II
    - G5-22 Part II
- RB24-22
- RB25-22
    - ADM1-22 Part II
- RB26-22
- RB27-22
- RB28-22
- RB29-22
    - G4-22 Part II
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RB1-22

IRC: R101.2, R102.7.1, R105.3.1.1, R105.1, R110.2, CHAPTER 44(New)

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, relocation, enlargement, *addition* to, replacement, *repair*, equipment, use and occupancy, *change of occupancy*, location, removal and demolition of detached one- and two-family dwellings and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures* not more than three stories above *grade plane* in height.

Exception: The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904:

1. Live/work units located in townhouses and complying with the requirements of Section 508.5 of the International Building Code.
2. Owner-occupied *lodging houses* with five or fewer guestrooms.
3. A care facility with five or fewer persons receiving custodial care within a *dwelling unit*.
4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
5. A care facility for five or fewer persons receiving care that are within a single-family dwelling.

Delete without substitution:

~~**R102.7.1 Additions, alterations or repairs.** *Additions*, *alterations* or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with the requirements of this code, unless otherwise stated. *Additions*, *alterations,* repairs and relocations shall not cause an existing structure to become less compliant with the provisions of this code than the existing building or structure was prior to the *addition*, *alteration* or *repair*. An existing building together with its *additions* shall comply with the height limits of this code. Where the *alteration* causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the *International Existing Building Code* shall apply.~~

Revise as follows:

R105.3.1.1 Determination of substantially improved or substantially damaged existing buildings in flood hazard areas. For applications for reconstruction, rehabilitation, *addition, alteration*, *repair* or other improvement of existing buildings or structures located in a flood hazard area as established by Table R301.2, the *building official* shall examine or cause to be examined the *construction documents* and shall make a determination with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamaged condition. If the *building official* finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the proposed work is a substantial improvement or *repair* of substantial damage and the building official shall require existing portions of the entire building or structure to ~~meet the requirements of Section R322~~ comply with the requirements of Chapter 44 applicable in flood hazard areas.
For the purpose of this determination, a substantial improvement shall mean any *repair*, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the improvement or *repair* is started. Where the building or structure has sustained substantial damage, repairs necessary to restore the building or structure to its predamaged condition shall be considered substantial improvements regardless of the actual repair work performed. The term shall not include either of the following:

1. Improvements to a building or structure that are required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to ensure safe living conditions.
2. Any *alteration* of a *historic building* or structure, provided that the *alteration* will not preclude the continued designation as a *historic building* or structure. For the purposes of this exclusion, a *historic building* shall be any of the following:
   2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.
   2.2. Determined by the Secretary of the US Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.
   2.3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

R105.1 Required. Any *owner* or owner's authorized agent who intends to construct, enlarge, add to, alter, *repair*, move, relocate, demolish or change the occupancy of a building or structure, or to erect, install, enlarge, alter, *repair*, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be performed, shall first make application to the *building official* and obtain the required *permit*.

Delete without substitution:

~~**R110.2 Change in use.** Changes in the character or use of an existing structure shall not be made except as specified in Sections 506 and 507 of the International Existing Building Code.~~

Add new text as follows:

CHAPTER 44
EXISTING BUILDINGS

SECTION R4401
GENERAL

R4401.1 Applicability. Work on any existing building within the scope of this code shall comply with this chapter.

R4401.2 Compliance. In addition to the provisions of this chapter, work on existing buildings shall comply with applicable provisions in other chapters of this code that reference addition, alteration, repair, change of occupancy, or relocation of an existing building, including alteration or repair of specific systems or components. Provisions in other chapters include, but are not limited to, the following:

1. Emergency escape and rescue openings: Sections R310.5, R310.6, and R310.7.
2. Automatic fire sprinkler systems: Sections R313.1 and R313.2.
3. Smoke alarms: Section R314.2.2.
4. Carbon monoxide alarms: Sections R315.2.2 and R315.5.
5. Foundations: Section R408.3.
6. Wood trusses: Sections R502.11.3 and R802.10.4.
7. Roof assemblies: R908.1 through R908.6
8. Energy efficiency: Sections N1101.5, N1101.13, and N1109 through N1113.
9. Mechanical: Sections M1202, M1411.2, M1601.5, M1801.3, and M2301.1.
10. Fuel gas: Various subsections in Sections G2412, G2417, G2425, and G2427.
11. Plumbing: Sections P2502, P2503.1, P2603.1, P2910.12, P2911.1, P2912.1, P2913.1, P3008.2, P3010, and P3011.
12. Electrical: Sections E3401.4 and E3403.2.

R4401.3 Work on existing buildings. For work on an existing building, the new work itself, whether intended by the owner or required by this code, shall conform to the requirements for a new building, unless otherwise stated. Portions of the building outside the intended scope of work are not required to comply with the requirements of this code for new construction, unless otherwise stated. Work on an existing building shall not cause the existing building to become less compliant with the provisions of this code for new construction than the existing building was prior to the work.

R4401.4 Historic buildings in flood hazard areas. Where the building official has determined in accordance with Section R105.3.1.1 that alteration of a historic building or structure located in a flood hazard area constitutes substantial improvement or repair of substantial damage, the historic building or structure is not required to meet the requirements of Section R322 provided the alteration or repair will not preclude the continued designation as a historic building or structure.

R4401.5 Design criteria. Work within the scope of this chapter shall comply with design criteria provided in Chapter 3 unless otherwise stated.

SECTION R4402
ADDITIONS

R4402.1 Height limits. An existing building together with its additions shall comply with the height limits of this code.

R4402.2 Flood hazard areas. Where the building official has determined in accordance with Section R105.3.1.1 that an addition to an existing building located in a flood hazard area established by Table R301.2 constitutes a substantial improvement, the entire building shall be brought into compliance with the requirements of Section R322.

SECTION R4403

ALTERATIONS

R4403.1 Flood hazard areas. Where the building official has determined in accordance with Section R105.3.1.1 that alteration of an existing building located in a flood hazard area established by Table R301.2 constitutes a substantial improvement, the entire building shall be brought into compliance with the requirements of Section R322.

SECTION R4404
REPAIRS

R4404.1 Flood hazard areas. Where the building official has determined in accordance with Section R105.3.1.1 that an existing building located in a flood hazard area established by Table R301.2 has sustained substantial damage, the entire building shall be brought into compliance with the requirements of Section R322.

SECTION R4405
CHANGE OF OCCUPANCY

R4405.1 Change of use or occupancy. Where the use or occupancy is changed to one not within the scope of this code, the provisions of the *International Existing Building Code* shall apply.

R4405.2 Change in use. Changes in the character or use of an existing building shall not be made except as specified in Sections 506 and 507 of the *International Existing Building Code.*

SECTION R4406
RELOCATED BUILDINGS

R4406.1 Flood hazard areas. Where the building official has determined in accordance with Section R105.3.1.1 that the relocation of an existing building into or within a flood hazard area established by Table R301.2 constitutes a substantial improvement, the entire building shall be brought into compliance with the requirements of Section R322.

Staff Analysis: The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

Reason Statement: This proposal does two things to improve the IRC's usability and adaptability for existing buildings:

- It creates a new IRC chapter for Existing Buildings: Chapter 44.
- It moves current non-administrative Existing Building provisions out of Chapter 1 and into the new Chapter 44.

The proposal is 100% reorganization and clarification of terminology, to improve the IRC's consistency and completeness. It makes no substantive changes to the IRC at all. The section-by-section portion of this reason statement, below, explains how each of the proposed changes retains the IRC's current scope and intent.
Because the proposal is all reorganization and terminology, it will have no direct effect on construction cost. But it will still benefit IRC users because the reorganization **will make it easier to introduce basic cost-reducing allowances** for existing buildings into the IRC with separate proposals.

Existing Building projects are already within the IRC's scope per Section R101.2, which already says the IRC applies to alterations, repairs, etc. Therefore, the IRC needs to be usable and adaptable as a code for existing buildings, or an "EB code." The need for the IRC to be a functional EB code became even more important in 2018, when the IEBC added an exception to its own scope provision (101.2) allowing almost all existing dwellings and townhouses to use the IRC instead, no matter how old, nonconforming, or deficient, and no matter what code they were built with.

So there should be no debate about the fact that the IRC intends, and needs, to regulate EB projects. The problem is that the IRC has no clear, user-friendly place to put its EB provisions. It already has dozens of EB provisions for various disciplines and systems – from smoke alarms to trusses, from plumbing to energy efficiency – but they're scattered among its chapters, often combined in the same subsection with rules for new construction.

Thus, when new proposals are made for existing dwellings and townhouses – as they were with RB163-19 in the last cycle – they have no place to go, and just get tacked onto Section R102.7.1. Section R102.7.1 is a substantive EB provision with triggers and criteria. It is not an administrative provision, and it does not belong in Chapter 1. Similarly, Section R110.2 is a substantive (not administrative) provision, but it was tacked on to the normal Admin provision about legal occupancy because there was nowhere else to put it. So as new ideas about existing dwellings and townhouses come forward – including cost-saving allowances common to EB codes – are we going to keep dumping them improperly into Chapter 1?

Let's make the IRC a better EB code. In order to function as an EB code, the IRC needs more attention to three things:

- Established EB terminology
- Usability, so users don't have to hunt for provisions that might apply to their specific EB project type
- Basic concepts of an EB code, such as allowances for existing non-conforming conditions.

This proposal deals with only the first two. The third idea is outside the scope of this proposal because it would make substantive changes to the IRC, but in order to bring in these key concepts, we need to take the first two steps, which is what this proposal does.

To implement established EB terminology and improve usability for EB projects, this proposal makes the following changes and additions:

R101.2: These edits ensure that the IRC scope covers the five basic EB project types, like the IEBC: addition, alteration, repair, change of occupancy, and relocation. These terms also match the proposed section titles in the new Chapter 44. It's possible that "movement" (not defined) already covers relocation (also not defined), and "enlargement" (not defined) already covers additions (defined), but we add the IEBC terms for completeness and consistency; they change the IRC's terminology, but not its scope, since all would agree that the IRC already intends to cover these project types. Current R101.2 does not mention "change of occupancy" (defined) but that project type is also clearly within the intended scope of the IRC because R102.7.1, R105.1, and R110.2 all refer to it, and Chapter 2 defines it. (A note about terminology: Even though this section already uses "use and occupancy," the code defines "change of occupancy" to include a change in use. Otherwise, the current IRC is inconsistent. For example: current Section R102.7.1 refers to "use or occupancy;" R105.1 requires a permit to "change the occupancy;" R110.1 is titled "Use and change of occupancy" and uses "change of occupancy" as a defined term; R110.2 is titled "Change in use" and refers to "changes in the character or use;" R310.5 and R310.7.1 use "change of occupancy." Therefore, we propose that the best term to use is the one already defined in the code, especially since that current definition already encompasses a change of use.)

R102.7.1: This is the IRC's current catch-all provision for existing buildings. It does not belong in Chapter 1, however, so the proposal moves it to the new Chapter 44 and splits it to improve usability for specific project types. There is no substantive change.

R105.1: These edits ensure that the IRC permitting requirements cover at least the same scope as Section R101.2 (and IEBC Section 105.1). As in R101.2, the proposal supplements the terms "enlarge" and "move" with "add to" and "relocate" for completeness and consistency with the new Chapter 44.

R105.3.1.1: For purposes of this proposal, the administrative parts of this provision will remain in Chapter 1, and the only change needed is to replace the reference to Section R322 with a pointer to the new Chapter 44, where applicable compliance requirements are provided. There is no change to the substance of the current provision. (Note: The second paragraph of current R105.3.1.1 -- which this proposal does not change at all -- contains the definition of "substantial improvement" used by provisions for flood hazard areas. It also includes the carve-out for historic buildings, parts of which are being copied to proposed new section R4401.4 in coordination with the FEMA Flood program.)

R110.2: This substantive provision does not belong in Chapter 1. The proposal moves it to the new Chapter 44's section for Change of Occupancy. With respect to the wording, the IRC is inconsistent, but "change of occupancy" is the term already used in IEBC Section 506, which this IRC section references.

Part IX – Existing Buildings. CHAPTER 44 EXISTING BUILDINGS: This is the new proposed chapter where the EB provisions currently in Chapter 1 will be placed and organized for better usability. The section titles match the project type terminology from the IEBC and the proposed edits to IRC Section R101.2. (There is no full section proposed for historic buildings because in the current IRC, but see the proposed new section R4401.4.)

R4401.1: This is a general introductory provision, modeled on IEBC Chapter 5. It makes no substantive change to the IRC. The "scope of this code" is provided in Section R101.2.

R4401.2: This new section acknowledges and coordinates with the various EB provisions currently found throughout the IRC. We feel this is the best way to achieve that coordination during the present code cycle. The first sentence is just a reminder that the IRC has other EB provisions. The second sentence is a usability provision with pointers to current EB provisions. (We believe we have pointed to all the relevant EB provisions, but note the use of the phrase "include, but are not limited to." In general, we are pointing to triggering provisions, not to simple mentions of material standards or criteria that might apply to both new construction and to EB projects.)

There are alternatives to this set of pointers, but also good reasons why we did not propose them.

- One approach is to omit the second sentence and the pointers completely. This would be consistent with the current IRC, which does not provide any way-finding help to users with EB projects, but we felt that IRC users would benefit from this usability provision.
- Another option is to actually move the listed provisions into Chapter 44, but we felt that would be unnecessarily disruptive within the current cycle. In future cycles, developers of the various chapters might see the benefit of presenting their EB provisions in Chapter 44. Also, for at least the energy efficiency and fuel gas provisions, moving them to Chapter 44 would interfere in the coordination of the IRC with the IECC and IFGC, from which those EB provisions are copied.

R4401.3: This new provision replaces current Section R102.7.1. There is no substantive change to the thrust of the provision, which still limits triggered work beyond the intended project, imposing only a basic "no less complying" requirement. Some edits have been made for logic and clarity:

- The title "Additions, alterations or repairs" has been changed to the more generic "work," which includes the two other project types covered in Chapter 44 – change of occupancy and relocation – both of which are already mentioned in R102.7.1 but not in its title. The term "work" is consistent with the IEBC definition of "work area" and is already used with the same meaning in IRC flood provisions (R105.3.1.1) and other administrative provisions (e.g. R105.2 Work exempt from permit).

- A key concept of current R102.7.1 (and other EB codes) is that the "intended" work typically has its own work area that can be separated from the rest of the building. Current R102.7.1 refers to the "rest of the building" with the phrase "existing structure," which is confusing in this context because even the intended alteration, repair, etc. is part of the existing structure. Therefore, the proposed provision refers to the new work "itself" and borrows the concept of "intended work" from the definition of *work area* in the IEBC and in IRC Appendix J. The intended work is the scope of work before any additional scope is triggered by an EB provision like the flood provisions below.
- Consistent with the IRC's definition of *existing building*, "structure" has been changed to "building."
- For readability and logic, plural nouns have been changed to singular.
- The phrase "for new construction" is added in two places for logic. The distinction is necessary in a code that covers both new construction and existing buildings.

R4401.4: In coordination with the FEMA Flood program, this proposal copies this substantive provision from current Section R105.3.1.1 into Chapter 44. In format, the new section matches the other flood provisions being added to Chapter 44. There is no substantive change, since the new section matches what's already in Chapter 1 (it also matches similar provisions in IEBC Sections 507.3 and 1201.4).

R4401.5: This is a general reference to Chapter 3 that matches the IRC's current intent about design criteria for existing building projects. It makes no substantive change to the IRC. The term "design criteria" does not change the IRC's allowance of prescriptive criteria; the term is used simply to match the section title and terminology already in Chapter 3.

R4402.1: This is the "additions" sentence from Section R102.7.1, relocated.

R4402.2: This is the "additions" trigger, scope, and criteria relocated from Section R105.3.1.1. Note that IEBC Section 1103.3 provides a longer set of conditions for additions in flood hazard areas, but copying that section here would be a substantive change to the IRC, so it's not part of this proposal. However, by creating Chapter 44 as shown, **the proposal will make it easier to bring in those cost-saving allowances** with separate proposals.

R4403.1: This is the "alterations" trigger, scope, and criteria relocated from Section R105.3.1.1. The IEBC offers cost-saving allowances for alterations that are not yet in the IRC. They are not part of this proposal because adding them would be a substantive change, but again, **this proposal will make it easier to bring those cost-saving allowances** in with a separate proposal.

R4404.1: This is the "repairs" trigger, scope, and criteria relocated from Section R105.3.1.1. As with alterations, **this proposal will make it easier to bring in cost-saving allowances** like those in the IEBC.

R4405.1: This is the "change of use or occupancy" sentence from Section R102.7.1, relocated and edited. The edit removes a confusing reference to alteration, which is not the same as a change of occupancy and cannot by itself change the occupancy or use. It is a clarification, not a substantive change to the current IRC.

R4405.2: This is Section R110.2, relocated and slightly edited. The edit is a change from "structure" to "building" for consistency with the IRC's current definitions. There is no substantive change.

R4406.1: This is the implied meaning of the "other improvement" trigger, scope, and criteria from Section R105.3.1.1, applied to relocation projects. Note that IEBC Section 1402.6 provides a similar but more specific trigger for a building moved into a flood hazard area, but copying that here would be a substantive change to the IRC. If that provisions id desirable, **this proposal makes it clearer how to add it to the IRC**.

Finally, separate from this Reason Statement, we have provided notes to Staff about how to coordinate this proposal with other expected proposals that might cover existing buildings in general or would revise the current IRC sections addressed here.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is entirely reorganization of current IRC provisions, with a few clarifications of terminology. The Reason Statement for each relocated, revised, and new section explains how the proposal merely maintains the current IRC.

RB1-22

RB2-22 Part I

PART 1 - IRC: R101.2, R102.7.1, R301.1.3, R301.1.5 (New), R301.1.5.1 (New), R301.1.5.2 (New), R301.1.5.3 (New), R322.1.11 (New), R322.1.12 (New), AJ102.6

PART 2 - IEBC: [A] 101.2, [A] 101.4, 302.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE AND PART 2 WILL BE HEARD BY THE ADMINISTRATIVE BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, *change of occupancy*, location, removal and demolition of detached one- and two-family dwellings and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures* not more than three stories above *grade plane* in height.

> **Exception:** The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904:
>
> 1. Live/work units located in townhouses and complying with the requirements of Section 508.5 of the International Building Code.
> 2. Owner-occupied *lodging houses* with five or fewer guestrooms.
> 3. A care facility with five or fewer persons receiving custodial care within a *dwelling unit*.
> 4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
> 5. A care facility for five or fewer persons receiving care that are within a single-family dwelling.

R102.7.1 ~~Additions, alterations or repairs~~ Work on existing buildings. *Additions*, *alterations* or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with the requirements of this code, unless otherwise stated. *Additions*, *alterations,* repairs and relocations shall not cause an existing structure to become less compliant with the provisions of this code than the existing building or structure was prior to the *addition*, *alteration* ~~or~~ , *repair* , or relocation. An existing building together with its *additions* shall comply with the height limits of this code. Where ~~the *alteration* causes~~ the use or occupancy is to be changed to one not within the scope of this code, the provisions of the *International Existing Building Code* shall apply. Work on historic buildings shall be permitted to comply with Chapter 12 of the *International Existing Building Code*.

R301.1.3 Engineered design. Where a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the *International Building Code* or, for existing buildings, the *International Existing Building Code* is permitted for buildings and structures, and parts thereof, included in the scope of this code.

Add new text as follows:

R301.1.5 Application to existing buildings. The criteria of this section shall apply to work on existing buildings, except as allowed by Sections R301.1.5.1 through R301.1.5.3.

R301.1.5.1 Existing Materials. Materials already in use in a building in compliance with requirements or approvals in effect at the time of their erection or installation shall be permitted to remain in use unless determined by the building official to be *unsafe*.

R301.1.5.2 New and replacement materials. Except as otherwise required or permitted by this code, materials permitted by this code for new construction shall be used. Like materials shall be permitted for repairs and alterations, provided that *unsafe* conditions are not created. Hazardous materials shall not be used where this code would not permit their use in buildings of similar occupancy, purpose, and location.

R301.1.5.3 New structural members and connections. New structural members and connections shall comply with the detailing provisions of this code for new buildings of similar structure, purpose, and location.
Exception: Where alternative criteria are specifically permitted.

R322.1.11 Additions to existing buildings. Additions to existing buildings in flood hazard areas shall be permitted to comply with the provisions of Section 1103.3 of the *International Existing Building Code.*

R322.1.12 Foundation alteration in existing buildings. Raised, extended, or replaced foundations for existing buildings in flood hazard areas shall be permitted to comply with the provisions of Section 1103.3 of the *International Existing Building Code*.

Revise as follows:

AJ102.6 Equivalent alternatives. ~~Work performed in accordance with the *International Existing Building Code* shall be deemed to comply with the provisions of this appendix.~~ These provisions are not intended to prevent the use of any alternative material, alternative design or alternative method of construction not specifically prescribed herein, provided that any alternative has been deemed to be equivalent and its use authorized by the *building official*.

Staff Analysis: The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

RB2-22 Part I

RB2-22 Part II

PART 1 - IRC: R101.2, R102.7.1, R301.1.3, R301.1.5 (New), R301.1.5.1 (New), R301.1.5.2 (New), R301.1.5.3 (New), R322.1.11 (New), R322.1.12 (New), AJ102.6

PART 2 - IEBC: [A] 101.2, [A] 101.4, 302.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE AND PART 2 WILL BE HEARD BY THE ADMINSTRATIVE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Existing Building Code

Revise as follows:

[A] 101.2 Scope. The provisions of this code shall apply to the *repair*, *alteration*, *change of occupancy*, *addition* to and relocation of *existing buildings* , unless otherwise stated.

> ~~**Exception:**~~ Detached one- and two-family dwelling and townhouses not more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height, shall comply with ~~this code or~~ the *International Residential Code.*

[A] 101.4 Applicability. This code shall apply to the *repair*, *alteration*, *change of occupancy*, *addition* and relocation of *existing buildings*~~, regardless of occupancy~~ within its scope, subject to the criteria of Sections 101.4.1 and 101.4.2.

302.2 Additional codes. *Alterations, repairs, additions* and *changes of occupancy* to, or relocation of, *existing buildings* and structures shall comply with the provisions for *alterations, repairs, additions* and *changes of occupancy* or relocation, respectively, in this code and the *International Energy Conservation Code*, *International Fire Code*, *International Fuel Gas Code*, *International Mechanical Code*, *International Plumbing Code*, *International Private Sewage Disposal Code*, *International Property Maintenance Code*, ~~*International Residential Code*~~ and NFPA 70. Where provisions of the other codes conflict with provisions of this code, the provisions of this code shall take precedence.

Staff Analysis: The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

Reason Statement: This proposal directs most existing dwellings and townhouses to use the IRC instead of the IEBC. It also ensures that owners of these buildings will lose no advantages by using the IRC. By directing these buildings to the IRC, the proposal **will improve the usability of both codes – and reduce costs** – for owners, streamline the work of designers and builders, make approvals clearer and easier for code officials, simplify adoption for local jurisdictions, and eliminate potential conflicts and omissions for code developers.
Here's the problem. Say you're looking to make a significant alteration to a house. Should you use the IRC or the IEBC? Well, it's an existing building project, so probably the IEBC? But IEBC Section 101.2 allows you to use the IRC, which is probably better for houses, no? In fact, IRC Section R101.2 says the IRC already covers alterations so probably you should have started there in the first place? But if that's true, then why does the exception to IEBC 101.2 make it sound like you have a choice? Maybe you need to check both codes and see which one will cost you less? Does the fact that your building is old and has a lot of non-conforming conditions figure into this at all? Should it?

So while well-intended, the exception to IEBC Section 101.2, which was added in 2018 to allow the IRC as an alternative, actually raises a lot of questions, can cause confusion, and can even raise project costs.

Let's make this easier. The IRC already says it can cover the same existing building projects as the IEBC. So why not just send the dwellings and townhouses to the IRC and keep the IEBC for other buildings? That is what the simple proposed change to IEBC Section 101.2 would do. This simple change would:

- Remove a confusing and mostly pointless "option," thereby simplifying project planning for owners. In most cases, using the IRC will reduce an owner's project cost, so a clearer path to the IRC is to the owner's benefit.
- Relieve designers and builders from having to check five methods – three in the IEBC, plus the IRC, plus IRC Appendix J – to make sure they're picking the best one for their client.
- Help plan checkers by setting one basic compliance path for any given building.
- Allow jurisdictions to adopt both the IRC and IEBC without having to develop their own amendments to sort out the "options." (Of course, any jurisdiction that currently adopts Appendix J or amends the model code to specify one compliance path or another can continue to do so.)
- Facilitate future code development and remove duplication from the codes. Currently, any new proposal for existing dwellings or townhouses needs to propose language in at least three places – the IRC, the IEBC Prescriptive method, and the IRC Work Area method. Frequently, proponents forget to include one or another, unintentionally leaving the codes out of sync.

When the exception was added to the 2018 IEBC Section 101.2, the proponents argued that the IRC should be a complete, standalone code for buildings within its scope. This proposal now moves them closer to that goal.

There is one hitch, however, which is why this proposal also needs to make a few changes to the IRC. Currently, given the option, we can expect the owners of most existing dwellings and townhouses to use the IRC. But there are a few cases in which the IEBC does offer advantages over the IRC. The proposal therefore adds IEBC material to the IRC or points back to the IEBC to ensure there's no loss of advantage. The changes (detailed below) address four topics:

- Historic buildings. Since the IRC has no provisions for historic buildings (except for a highly specialized flood provision), the IEBC's allowances should apply.
- Design criteria for engineered design. Current IRC Section 301.1.3 points primarily to the IBC, so this proposal adds a reference to the IEBC to ensure those criteria remain available.
- Existing building materials. The IEBC makes sensible allowances for existing non-conforming materials, and if the IRC wants to be a functional code for existing buildings, it should have these allowances too.
- Additions and foundation alteration in flood hazard areas. The IRC triggers flood upgrades but does not provide the exceptions currently in the IEBC Work Area method.

Aren't there more allowances and waivers for existing buildings in the IEBC? Yes, there are, but we made an exhaustive review and (with a 12-page table) showed that all of them are moot in terms of providing an advantage over the IRC. Most of the IEBC's allowances and exemptions are for cases where the IEBC triggers upgrades outside the intended work area. Since the IRC rarely triggers upgrades in the first place, there's no need for the IEBC's allowances and exemptions. A few others (for example, the IRC does not explicitly allow a "blowout-design" water closet as the IEBC does) are expected to be within the easy discretion of the code official. So the four changes we make with this proposal should give current IEBC users all of the same advantages when they use the IRC instead.

The proposal makes the following specific changes:

In the IEBC:

101.2: The proposal edits this section to change the use of the IRC from an option to a requirement. For a given building, this simple change makes clear which code is to be used for existing building projects – the IEBC or the IRC. For a dwelling, townhouse, or accessory building within the scope of the exception, this is just a stronger version of the hope and expectation of the proponents who added this exception to the 2018 IEBC. For any other building, this edit changes nothing.

As shown, the proposal removes the word "Exception." We were advised by ICC staff and BCAC that if the second sentence no longer presents an option to the user, it cannot be an "exception" by ICC rules. Therefore, the first sentence gets an "unless" clause at the end, and the second sentence becomes a direction to go to the IRC.

101.4: This edit is consistent with the revision to Section 101.2. The phrase "regardless of occupancy" pre-dates the exception to Section 101.2 and should have been removed when the exception was added to the 2018 IEBC. The replacement phrase, "within its scope," refers to Section 101.2.

302.2: This proposal clearly directs any given existing building to either the IEBC or the IRC. Once that's done, there is no need to require IEBC users to also comply with the IRC. (Indeed, because of the last sentence regarding conflicts, the reference to the IRC probably should have been removed when the exception was added to 2018 IEBC Section 101.2.) The IRC does not have a similar provision listing other codes, so no parallel proposal is needed for the IRC.

In the IRC:

R101.2: The only edit here is to add the "change of occupancy" project type to the list already in this section. This ensures that the IRC scope covers all five IEBC project types – addition (i.e. enlargement), alteration, repair, relocation (i.e. movement) and, now, change of occupancy. Current R101.2 already lists "use and occupancy," so it's possible that the current IRC already intends to cover *change* of occupancy, but the edit is recommended in any case for completeness and consistency. There is no doubt that the IRC does intend to cover change of occupancy, since that project type is already defined in IRC Chapter 2 and mentioned in Sections R102.7.1, R105.1, and R110.2. (A note about terminology: Even though this section already uses "use and occupancy," the code defines "change of occupancy" to include a change in use. Otherwise, the current IRC is inconsistent. For example: current Section R102.7.1 refers to "use or occupancy;" R105.1 requires a permit to "change the occupancy;" R110.1 is titled "Use and change of occupancy" and uses "change of occupancy" as a defined term; R110.2 is titled "Change in use" and refers to "changes in the character or use;" R310.5 and R310.7.1 use "change of occupancy." Therefore, we propose that the best term to use is the one already defined in the code, especially since that current definition already encompasses a change of use.)

R102.7.1 regarding historic buildings: The main change to this section is the addition of the final sentence, which ensures that historic buildings assigned to the IRC by this proposal will not lose any of the advantages they might have had by using the IEBC instead. In a future cycle, it might be advisable to copy applicable provisions from IEBC Chapter 12 into the IRC, but it's not clear where they would go, since we would not want to add a whole page of substantive provisions to Chapter 1. Therefore, this is the best solution for this cycle. Reference back to the IEBC has precedent in the IRC. For example, see IRC Section R110.2, which sends the user back to IEBC Sections 506 and 507.

R102.7.1 miscellaneous edits: This proposal makes three other small edits to IRC Section R102.7.1:

- It changes the title of the section to match its content, which already mentions “relocation” and “change of occupancy” as potential projects. The term “work” is consistent with the IEBC definition of “work area” and is already used with the same meaning in IRC flood provisions (R105.3.1.1) and other Admin provisions (e.g. R105.2 Work exempt from permit).
- It adds “relocation” to the end of the second sentence, to match the start of the same sentence.
- It corrects a confusion about project types. An alteration alone does not change a building’s occupancy. An alteration and a change of occupancy are different project types.

R301.1.3: Adding the reference to the IEBC structural criteria ensures that when engineered design is required, the IRC user has access to the structural design criteria allowed by the IEBC, which include reduced seismic loads and ASCE 41. One could argue that this change is not needed because the current provision already relies on “accepted engineering practice,” but since the IBC is specifically listed as a design basis for new construction, it is appropriate to list the IEBC as well.

R301.1.5: Proposed new section R301.1.5 and its subsections ensure that the IRC user has access to these basic allowances from IEBC Section 302, which allow for existing materials and accommodate combinations of existing and new materials. The IEBC text has been modified only slightly to suit the IRC, replacing “code official” with “building official;” replacing “IBC” or “code for new construction” with “this code;” and changing “design criteria” to just “criteria.”

R301.1.5.1: This provision is basic to the IEBC and to any code that intends to function as a code for existing buildings. It is consistent with, but more explicit than, the “unless otherwise stated” clause of IRC Section R102.7.1. (Note: This provision refers to the term *unsafe*, which is defined in the IEBC. By IRC Section 201.3, the IRC incorporates the IEBC’s definitions by reference, so it does not need to be added to the IRC with this proposal.)

R301.1.5.2: This provision allows repairs and alterations to match the existing building conditions, with reasonable limits. (Note: The exception to IEBC Section 402.1 allows glass block, louvers, and jalousies to be repaired with like materials. But that exception is not really necessary, since this more general provision goes even further, allowing like materials for both repairs and alterations.)

R301.1.5.3: This provision addresses the question of how to repair, replace, or improve isolated structural members within a structural system. It is approved wording from the IEBC and is consistent with the basic IRC provision in Section R102.7.1 that requires new elements to be as they would be for new construction without requiring the rest of the building – or in this case, the rest of the structural system – to satisfy those same criteria. The exception goes even further, accommodating standards like ASCE 41, which would sometimes allow even the new members to be sized and detailed differently.

R322.1.11 and R322.1.12: These added provisions ensure that the IRC user has access to the more nuanced provisions for additions and foundation alterations in the IEBC Work Area method.

AJ102.6: This edit removes the allowance in Appendix J (an optional appendix) to use the IEBC. Since this proposal would send buildings from the IEBC to the IRC, this allowance in Appendix J is a circular reference, so it needs to be removed.

Finally, we have provided a note to ICC staff about how to coordinate this proposal with other proposals that might relocate certain IRC sections addressed here.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Currently, IEBC Section 101.2 allows the user to use either the IEBC or the IRC for an existing dwelling or townhouse. Depending on the nature of the project, there are cases where the IEBC is probably cheaper (because it has nuanced provisions and allowances for existing materials) and there are other cases where the IRC is probably cheaper (because it has essentially no structural upgrade triggers outside flood hazard areas). This proposal would eliminate the option and require the IRC -- but it also adds provisions to the IRC that preserve any of the cost-saving advantages of the IEBC. Therefore, any project that would currently opt to use the IEBC will have **no change in construction cost** by using the IRC. But any project that would currently opt to use the IRC **will have a lower cost** because it will now have access to both the IRC advantages and the IEBC advantages. In no case would construction cost increase. Beyond construction cost, as noted in the Reason Statement, this proposal is expected to **reduce overall project and regulation costs by simplifying the compliance path** and removing the need for amendments to sort out the current options.

RB2-22 Part II

RB3-22

IRC: SECTION 202 (New), SECTION 202, R101.2, R101.2.1 (New), R101.2.2 (New), R102.7.2 (New), R311.1, R403.1.4.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Add new definition as follows:

ACCESSORY BUILDING. A secondary building detached from, and located on the same lot as a one- or two-family dwelling featuring a roof assembly and more than 50 percent enclosed exterior walls. Examples include garages, storage buildings, workshops, boat houses, treehouses, and similar structures.

Revise as follows:

[RB] ACCESSORY STRUCTURE. A structure that is accessory to and incidental to that of the *dwelling(s)* and that is located on the same *lot* and is not an *accessory building*. Examples of accessory structures are carports, fencing, decks, gazebos, arbors, retaining walls, barbeque pits, detached chimneys, playground equipment, yard art, docks, piers, etc..

[RB] BUILDING. Any one- or two-family dwelling or *townhouse*, or portion thereof, used or intended to be used for human habitation, for living, sleeping, cooking or eating purposes, or any combination thereof, or any *accessory building* or *accessory structure*. For the definition applicable in Chapter 11, see Section N1101.6.

[RB] STRUCTURE. That which is built or constructed.

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress , ~~and~~ their *accessory buildings* and *accessory structures* not more than three stories above *grade plane* in height.

Exception: The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904:

1. Live/work units located in townhouses and complying with the requirements of Section 508.5 of the International Building Code.
2. Owner-occupied *lodging houses* with five or fewer guestrooms.
3. A care facility with five or fewer persons receiving custodial care within a *dwelling unit*.
4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
5. A care facility for five or fewer persons receiving care that are within a single-family dwelling.

Add new text as follows:

R101.2.1 Accessory buildings. *Accessory buildings* with any dimension greater than 12 feet (3658 mm) shall meet the provisions of this code.

R101.2.2 Accessory structures. The following *accessory structures* shall meet the provisions of this code:

1. Decks, see Chapter 3 and Section R507.
2. Gazebos.
3. Retaining walls, see Section R404.4.
4. Detached masonry chimneys located less than 10 feet (3048 m) from other buildings or lot lines.
5. Swimming pools and spas, see Section R327.
6. Detached carports, see Section R309.2.

Exception: Portable, lightweight carports not exceeding 400 square feet (37 m^2) or 12 feet (3658 mm) mean roof height.

R102.7 Existing structures. The legal occupancy of any structure existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically covered in this code, the *International Property Maintenance Code* or the *International Fire Code* , or as is deemed necessary by the *building official* for the general safety and welfare of the occupants and the public.

R102.7.1 Additions, alterations or repairs. *Additions*, *alterations* or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with the requirements of this code, unless otherwise stated. *Additions*, *alterations,* repairs and relocations shall not cause an existing structure to become less compliant with the provisions of this code than the existing building or structure was prior to the *addition*, *alteration* or *repair*. An existing building together with its *additions* shall comply with the height limits of this code. Where the *alteration* causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the *International Existing Building Code* shall apply.

Add new text as follows:

R102.7.2 Change of occupancy. Prior to a *change of occupancy* for a *building, structure, accessory building* or *accessory structure*, the *owner* or the owner's authorized agent, shall first make application to the *building official* and obtain the required permits.

Revise as follows:

R311.1 Means of egress. *Dwellings* , *accessory buildings* larger than 400 square feet (37m^2), and *accessory buildings* larger than one-story in height shall be provided with a means of egress in accordance with this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the *structure* ~~*dwelling*~~ to the required egress door without requiring travel through a garage. The required egress door shall open directly into a *public way* or to a *yard* or court that opens to a *public way*.

Exception: The means of egress in an *accessory building* that does not include a *dwelling unit* shall be permitted to be through a garage.

R403.1.4.1 Frost protection. Except where otherwise protected from frost, foundation walls, piers and other permanent supports of buildings and structures shall be protected from frost by one or more of the following methods:

1. Extended below the frost line specified in Table R301.2.
2. Constructed in accordance with Section R403.3.
3. Constructed in accordance with ASCE 32.
4. Erected on solid rock.

Footings shall not bear on frozen soil unless the frozen condition is permanent.

Exceptions:

1. Protection of free-standing *accessory buildings or accessory structures* with an area of 600 square feet (56 m^2) or less, of *light-frame construction*, with an eave height of 10 feet (3048 mm) or less shall not be required.
2. Protection of free-standing *accessory buildings or accessory structures* with an area of 400 square feet (37 m^2) or less, of other than *light-frame construction*, with an eave height of 10 feet (3048 mm) or less shall not be required.
3. Decks not supported by a dwelling need not be provided with footings that extend below the frost line.

Staff Analysis: The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

Reason Statement: The ICC Building Code Action Committee was requested to review the existing code language pertaining to the means of egress criteria applicable to accessory buildings and accessory structures. While accessory buildings and accessory structures are often considered as subordinate, secondary, and incidental to the main building on a lot, design professionals are increasingly tasked with designing oversized garages, barns, workshops, and similar spaces whose size may be comparable to the main dwelling. The proposed language is modeled on amendments adopted and promulgated by the State of North Carolina in their 2018 Residential Code with some refinement / reformatting for clarity.

The additional language to Chapter 1:

· Establishes that any *accessory building* with a dimension larger than 12 feet (3658 mm) is subject to the same design criteria as a *building*. Those with smaller dimensions (effectively 144 ft^2 or less) would not be subject to the IRC, but solely to local zoning ordinances or by-laws.

· Provides guidance for the design of *accessory structures*.

· Further clarifies that a prospective *change of use* for any type of building or structure on a lot is subject to review and permitting by the Authority Having Jurisdiction.

The revisions to Chapter 2 definitions:

· Create a distinction between an *accessory building* and an *accessory structure* with examples provided for clarity.

· Eliminates the undefined language in the existing definition of an *accessory structure* regarding what constitutes "incidental" and reframes it as secondary.

· Makes an editorial addition to the definition of a *building* for consistency with the other definitions.

The revisions to Chapter 3:

· Clarify that *accessory buildings* exceeding certain area and height dimensions shall comply with the means of egress requirements expected in a *building*.

o 400 square feet (37 m^2) facilitates a 20’-0” by 20’-0” detached two-car garage without triggering additional means of egress requirements.

o The single-story requirement coincides with concerns regarding the need for *Emergency Escape and Rescue Openings* (EERO) per R310.1 which apply to *basements*, *habitable attics*, and sleeping rooms.

§ Accessory buildings rarely include a basement.

§ Per the Chapter 2 definition, a habitable attic may be finished or unfinished, therefore an *accessory building* with a fixed stair to an attic / loft area would be required to provide an EERO.

§ If a carriage house or similar *accessory building* features a *dwelling unit* or sleeping room, it would require an EERO.

· Acknowledge via an Exception that if an *accessory building* does not include a *dwelling unit,* it is reasonable to allow the path of egress travel to go through a garage.

The additional language to Chapter 4:

· Insofar as free-standing accessory structures already have two exceptions pertaining to footing frost protection, the language is adjusted to include both accessory building and accessory structures in recognition of the new / revised definitions.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction associated with the design of larger accessory buildings. In scenarios where a code interpretation may previously have allowed an accessory building to not meet the design criteria of Chapter 3 (including EERO and Means of Egress), henceforth said accessory buildings would be so required.

RB3-22

RB4-22

IRC: R101.2

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures* not more than three stories above *grade plane* in height.

Exception: The following uses shall be permitted~~ to be constructed in accordance with this code~~ where located within a dwelling unit that is provided with an automatic sprinkler system complying with Section P2904:

1. Live/work units ~~located in townhouses and ~~complying with the requirements of Section 508.5 of the International Building Code.
2. Owner-occupied *lodging houses* with five or fewer guestrooms.
3. A care facility with five or fewer persons receiving custodial care~~ within a *dwelling unit*~~.
4. A care facility with five or fewer persons receiving medical care ~~within a *dwelling unit*~~.
5. A day care facility for five or fewer persons receiving care that are ~~within a single-family dwelling~~.

Staff Analysis: The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

Reason Statement: The intent of this proposal is to clarify the permitted uses of the scope within dwelling units and constructed in accordance with the IRC, by removing repeated and redundant language in each of the exceptions (“within a dwelling unit”) and placing that in the main body of the exception.
The revisions are editorial and for clarification with no technical changes included.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed changes are only editorial. This clarification of scope for IRC has no technical changes.

RB4-22

RB5-22

IRC: R101.2

Proponents: Stephen Thomas, representing Colorado Chapter ICC (sthomas@coloradocode.net)

2021 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures* not more than three stories above *grade plane* in height.

> **Exception:** The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904:
>
> 1. Live/work units located in townhouses and complying with the requirements of Section 508.5 of the International Building Code.
> 2. Owner-occupied *lodging houses* with five or fewer guestrooms.
> 3. A care facility with five or fewer persons receiving custodial care within a *dwelling unit*.
> 4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
> 5. A <u>day</u> care facility for five or fewer ~~persons~~ <u>children</u> receiving care ~~that are~~ within a ~~single-family~~ dwelling <u>unit</u>.

Staff Analysis: The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

Reason Statement: This proposal is designed to provide consistent language between the IBC and the IRC regarding small day care facilities. IBC Section 305.2.3 permits a day care facility within a dwelling unit to comply with the IRC where there ae five or fewer children receiving day care. However, there is no scoping in the IRC for this type of use. The cross references were added in the 2018 IBC but we missed the day care provision and just made a general comment for persons receiving care. We no longer need that language since we are addressing each type of care that the IBC permits to comply with the IRC in the different uses in the exception.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is a clarification and does not change any technical provisions.

RB5-22

RB6-22

IRC: R101.3

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

R101.3 Purpose. The purpose of this code is to establish minimum requirements to provide a reasonable level of safety, health and general welfare through affordability, structural strength, means of egress, stability, sanitation, light and ventilation, energy conservation~~ and safety to life~~ providing a reasonable level of life safety and property protection from fire and other hazards and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

Reason Statement: The purpose of this proposal is for consistency in language for the sections related to the purpose of the codes throughout the ICC family of codes. This would be consistent with IFC, IBC, IEBC, ISPSC, and IZC – which were passed with ADM10-19.
The change in the title reflects the language in the first sentence. The IRC code development committee objected to the proposal last cycle because it included “explosions”; which has been removed. The revision is for consistency with “providing a reasonable level of life safety and property protection”.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is for coordination across codes for the purpose statements and does not change any technical requirements.

RB6-22

RB7-22

IRC: R102.7.1, R102.7.2 (New), SECTION 202, SECTION 202 (New), CHAPTER 44 (New), APPENDIX AJ

Proponents: Sue Coffman, representing Washington Association of Building Officials Technical Code Development Committee (sue.coffman@cityoftacoma.org); Hoyt Jeter, representing WABO TCD (hjeter@cityoftacoma.org); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Revise as follows:

R102.7.1 Additions~~, alterations or repairs~~ or relocations. *Additions~~, alterations~~* ~~or repairs~~ to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with the requirements of this code, unless otherwise stated. *Additions~~, alterations,~~* ~~repairs~~ and relocations shall not cause an existing structure to become less compliant with the provisions of this code than the existing building or structure was prior to the *addition~~, alteration~~* ~~or *repair*~~ or relocation. An existing building together with its *additions* shall comply with the height limits of this code. ~~Where the *alteration* causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the *International Existing Building Code* shall apply.~~

Add new text as follows:

R102.7.2 Repairs, renovations, alterations, or reconstructions. Repairs, renovations, alterations, or reconstructions shall conform to the requirements of the provisions of Chapter 44. Where the renovation, alteration, or reconstruction causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the *International Existing Building Code* shall apply.

Revise as follows:

[RB] ALTERATION. Any construction, reconfiguration, retrofit or renovation to an existing structure other than *repair* or *addition* that requires a *permit*. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves ~~an~~ a reconfiguration or extension, *addition*, installation, or change to the equipment or arrangement, type or purpose of the original installation that requires a *permit*. For the definition applicable in Chapter 11, see Section N1101.6.

Add new definition as follows:

CATEGORIES OF WORK. The nature and extent of construction work undertaken in an existing building, which include repair, renovation, alteration, and reconstruction.

DANGEROUS. Where the stresses in any member; the condition of the building, or any of its components or elements or attachments; or other condition that results in an overload exceeding 150 percent of the stress allowed for the member or material in this code.

MATERIALS AND METHODS REQUIREMENTS. Those requirements in this code that specify material standards; details of installation and connection; joints, penetrations; and continuity of any element, component or system in the building. The required quantity, fire resistance, flame spread, acoustic or thermal performance, or other performance attribute is specifically excluded from materials and methods requirements.

RECONSTRUCTION. The reconfiguration of a space that affects an exit, a renovation or alteration where the work area is not permitted to be occupied because existing means-of-egress and fire protection systems, or their equivalent, are not in place or continuously maintained; or there are extensive alterations.

REHABILITATION. Any repair, renovation, alteration or reconstruction work undertaken in an existing building.

RENOVATION. The change, strengthening or addition of load-bearing elements; or the refinishing, replacement, bracing, strengthening, upgrading or extensive repair of existing materials, elements, components, equipment or fixtures. Renovation does not involve reconfiguration of spaces. Interior and exterior painting are considered refinishing for the purposes of this definition, and are not renovation.

Revise as follows:

[RB] REPAIR. The r~~econstruction, replacement~~ patching, restoration, minor replacement, or renewal of ~~any part~~ materials, elements, components, equipment, or fixtures of an existing building for the purpose of ~~its maintenance~~ maintaining those materials, elements, components, equipment, or fixtures in good or sound condition, or to correct damage.
For the definition applicable in Chapter 11, see Section N1101.6.

Add new definition as follows:

WORK AREA. That portion of a building affected by any renovation, alteration or reconstruction work as initially intended by the owner and indicated as such in the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed, and portions of the building where work not initially intended by the owner is specifically required by the provisions for the renovation, alteration or reconstruction.

Add new text as follows:

CHAPTER 44
EXISTING BUILDINGS AND STRUCTURES

SECTION R4401
SCOPE

R4401.1 General. The specific provisions in this chapter shall apply to the repair, renovation, alteration, and reconstruction of existing buildings and structures. These standards shall apply where construction does not fully comply with construction standards in this code for new construction.

SECTION R4402
CATEGORIES OF WORK

R4402.1 General. Work in existing buildings and structures shall be categorized as repair, renovation, alteration, and reconstruction, and comply with the requirements in this chapter.
Work of more than one category shall be part of a single work project and related work permitted within a 12-month period shall be considered a single work project. Where a project includes one category of work in one building area and another category of work in a separate and unrelated area of the building, each project area shall comply with the requirements of the respective category of work. Where a project with more than one category of work is performed in the same area or in related areas of the building, the project shall comply with the requirements of the more stringent category of work.

SECTION R4403
COMPLIANCE

R4403.1 General. Regardless of the category of work being performed, the work shall not cause the structure to become unsafe or adversely affect the performance of the building; shall not cause an existing mechanical or plumbing system to become unsafe, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the building any less compliant with this code or to any previously approved alternative arrangements than it was before the work was undertaken.

R4403.2 Requirements by category of work. Repairs shall conform with the requirements in Section R4405. Renovations shall conform to the requirements of Section R4406. Alterations shall conform to the requirements of Section 4407 and the requirements for renovations. Reconstructions shall conform to the requirements of Section R4408 and the requirements of alterations and renovations.

R4403.3 Smoke alarms. Regardless of the category of work, smoke alarms shall be provided where required by Section R314.2.2.

R4403.4 Replacement windows. Regardless of the category of work, where an existing window, including the sash and glazed portion, or safety glazing is replaced, the replacement window or safety glazing shall comply with the requirements of Sections R4403.4.1 through R4403.4.3, as applicable.

R4403.4.1 Energy efficiency. Replacement windows shall comply with the requirements of Chapter 11.

R4403.4.2 Safety glazing. Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Section R308.

R4403.4.3 Replacement windows for emergency escape and rescue openings. Replacement windows for emergency escape and rescue openings shall comply with Section R310.5.

4403.4.4 Window control devices. Window opening control devices and fall prevention devices shall be installed compliant with the requirements in R312.2 where all of the following apply to the replacement window:

1. The window is operable.
2. One of the following applies:
   2.1 The window replacement includes replacement of the sash and the frame.
   2.2. The window replacement includes the sash only when the existing frame remains.
3. The bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.
4. The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere where the window is in its largest opened position.
5. The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

R4403.5 Flood hazard areas. Work performed in existing buildings located in a flood hazard area as established by Table R301.2(1) shall be subject to the provisions of Section R105.3.1.1.

R4403.6 Features exceeding code requirements. Elements, components and systems of existing buildings with features that exceed the requirements of this code for new construction, and are not otherwise required as part of approved alternative arrangements or deemed by the building official to be required to balance other building elements not complying with this code for new construction, shall not be prevented by these provisions from being modified as long as they remain in compliance with the applicable requirements for new construction.

SECTION R4404
EVALUATION OF AN EXISTING BUILDING

R4404.1 General. The building official shall have authority to require an existing building to be investigated and evaluated by a registered design professional in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions, and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:

1. Available documentation of the existing building.
   - 1.1. Field surveys.
   - 1.2. Tests (nondestructive and destructive).
   - 1.3. Laboratory analysis.

Exception: Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing and extensive reconstruction shall not be required to be evaluated.

SECTION R4405
REPAIRS

R4405.1 Materials and methods. Except as otherwise required herein, repairs shall be done using like materials or methods permitted by this code for new construction.

R4405.1.1 Hazardous materials. Hazardous materials no longer permitted, such as asbestos and lead-based paint, shall not be used.

R4405.1.2 Plumbing materials and supplies. The following plumbing materials and supplies shall not be used:

1. All-purpose solvent cement, unless listed for the specific application.
2. Flexible traps and tailpieces, unless listed for the specific application.
3. Solder having more than 0.2-percent lead in the repair of potable water systems.

R4405.2 Water closets. Where any water closet is replaced with a newly manufactured water closet, the replacement water closet shall comply with the requirements of Section P2903.2.

R4405.3 Electrical. Repair or replacement of existing electrical wiring and equipment undergoing repair with like material shall be permitted.

Exceptions:
1. Replacement of electrical receptacles shall comply with the requirements of Chapters 34 through 43.
2. Plug fuses of the Edison-base type shall be used for replacements only where there is not evidence of overfusing or tampering in accordance with the applicable requirements of Chapters 34 through 43.
3. For replacement of nongrounding-type receptacles with grounding-type receptacles and for branch circuits that do not have an equipment grounding conductor in the branch circuity, the grounding conductor of a grounding-type receptacle outlet shall be permitted to be grounded to any accessible point on the grounding electrode system, or to any accessible point on the grounding electrode conductor, as allowed and described in Chapters 34 through 43.

R4405.4 Structural. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.

SECTION R4406
RENOVATIONS

R4406.1 Materials and methods. Except as otherwise required herein, renovations shall comply with the materials and methods requirements of this code for new construction.

R4406.2 Door and window dimensions. Minor reductions in the clear opening dimensions of replacement doors and windows that result from the use of different materials shall be allowed, whether or not they are permitted by this code.

R4406.3 Interior finish. Wood paneling and textile wall coverings used as an interior finish shall comply with the flame spread requirements of Section R302.9.

R4406.4 Structural. Unreinforced masonry buildings located in Seismic Design Category D2 or E shall have parapet bracing and wall anchors installed at the roofline whenever a reroofing permit is issued. Such parapet bracing and wall anchors shall be of an approved design.

SECTION R4407
ALTERATIONS

R4407.1 Newly constructed elements. Newly constructed elements, components and systems shall comply with the requirements of this code for new construction.

Exceptions:

1. Added openable windows are not required to comply with the light and ventilation requirements of Section R303.
2. Newly installed electrical equipment shall comply with the requirements of Section 4508.5

R4407.2 Nonconformities. Alterations shall not increase the extent of noncompliance with the requirements of Section 4408 or create nonconformity to those requirements that did not previously exist.

R4407.3 Extensive alterations. Where the total area of all of the work areas included in an *alteration* exceeds 50 percent of the area of the dwelling unit, the work shall be considered to be a reconstruction and shall comply with the requirements of Section 4408.

Exception: Work areas in which the alteration work is exclusively plumbing, mechanical or electrical shall not be included in the computation of the total area of all work areas.

R4407.4 Structural. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the alteration and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code for new construction.

R4407.5 Electrical equipment and wiring. Electrical equipment and wiring in alterations shall comply with Sections R4407.5.1 through R4407.5.5.

R4407.5.1 Materials and methods. Newly installed electrical equipment and wiring relating to work done in any work area shall comply with the materials and methods requirements of Chapters 34 through 43.

Exception: Electrical equipment and wiring in newly installed partitions and ceilings shall comply with the applicable requirements of Chapters 34 through 43.

R4407.5.2 Electrical service. Service to the dwelling unit shall not be less than 100 ampere, three-wire capacity and service equipment shall be dead front having no live parts exposed that could allow accidental contact. Type “S” fuses shall be installed where fused equipment is used.

Exception: Existing service of 60 ampere, three-wire capacity, and feeders of 30 ampere or larger two- or three-wire capacity shall be accepted if adequate for the electrical load being served.

R4407.5.3 Additional electrical requirements. Where the work area includes any of the following areas within a dwelling unit, the requirements of Sections R4407.5.3.1 through R4407.5.3.5 shall apply.

R4407.5.3.1 Enclosed areas. Enclosed areas other than closets, kitchens, basements, garages, hallways, laundry areas and bathrooms shall have not less than two duplex receptacle outlets, or one duplex receptacle outlet and one ceiling- or wall-type lighting outlet.

R4407.5.3.2 Kitchen and laundry areas. Kitchen areas shall have not less than two duplex receptacle outlets. Laundry areas shall have not less than one duplex receptacle outlet located near the laundry equipment and installed on an independent circuit.

R4407.5.3.3 Ground-fault circuit interruption. Ground-fault circuit interruption shall be provided on newly installed receptacle outlets where required by Chapters 34 through 43.

R4407.5.3.4 Lighting outlets. Not less than one lighting outlet shall be provided in every bathroom, hallway, stairway, attached garage and detached garage with electric power to illuminate outdoor entrances and exits, and in utility rooms and basements where these spaces are used for storage or contain equipment requiring service.

R4407.5.3.5 Clearance. Clearance for electrical service equipment shall be provided in accordance with Chapters 34 through 43.

R4407.6 Ventilation. Reconfigured spaces intended for occupancy and spaces converted to habitable or occupiable space in any work area shall be provided with *ventilation* in accordance with Section R303.

R4407.7 Ceiling height. Habitable spaces created in existing basements shall have ceiling heights of not less than 6 foot 8 inches (2032mm), except that the ceiling height at obstructions shall be not less than 6 foot 4 inches (1930 mm) from the basement or attic floor. Existing finished ceiling heights in nonhabitable basements shall not be reduced.

R4407.8 Stairs. Except as noted otherwise herein, stairs shall comply with the requirements of Section R311.

R4407.8.1 Stair width. Existing basement stairs and handrails not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing handrails.

R4407.8.2 Stair headroom. Headroom height on existing basement stairs being altered or modified shall not be reduced below the existing stairway finished headroom. Existing basement stairs not otherwise being altered shall be permitted to maintain the current finished headroom.

R4407.8.3 Stair landing. Landings serving existing basement stairs being altered or modified shall not be reduced below the existing stairway landing depth and width. Existing basement stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.

SECTION R4408
RECONSTRUCTION

R4408.1 Materials and methods. Except as otherwise required herein, reconstruction shall be done using materials or methods permitted by this code for new construction.

R4408.2 Stairways. Stairways within the work area shall be provided with illumination in accordance with Section R303.6.

R4408.3 Handrails. Every required exit stairway that has four or more risers, is part of the means of egress for any work area, and does not have handrails, or in which the existing handrails are judged to be in danger of collapsing, shall be provided with handrails designed and installed in accordance with Section R311 for the full length of the run of steps on not less than one side.

R4408.4 Guards. Every open portion of a stair, landing or balcony that is more than 30 inches (762 mm) above the floor or grade below, is part of the egress path for any work area, and does not have guards, or in which the existing guards are judged to be in danger of collapsing, shall be provided with guards designed and installed in accordance with Section R312.

R4408.5 Wall and ceiling finish. The interior finish of walls and ceilings in any work area shall comply with the requirements of Section R302.9. Existing interior finish materials that do not comply with those requirements shall be removed or shall be treated with an approved fire-retardant coating in accordance with the manufacturer's instructions to secure compliance with the requirements of this section.

R4408.6 Separation walls. Where the work area is in an attached dwelling unit, walls separating dwelling units that are not continuous from the foundation to the underside of the roof sheathing shall be constructed to provide a continuous fire separation using construction materials consistent with the existing wall or complying with the requirements for new structures. Performance of work shall be required only on the side of the wall of the dwelling unit that is part of the work area.

Revise as follows:

~~APPENDIX AJ~~
~~EXISTING BUILDINGS AND STRUCTURES~~
(Delete all of Appendix J)

Reason Statement: This proposed code change deletes Appendix Chapter J of the 2021 IRC and moves most of its provisions into the body of the IRC code as a new chapter 44. Definitions from the appendix chapter are also moved into the body of the code as new definitions, or modified if the definitions already existed in the body of the code.
While there are provisions for existing buildings in the IRC, they are scattered throughout different sections of the code and it is sometimes not clear when certain sections apply. There is also a need for clarity surrounding code standards for existing IRC buildings to provide an understanding of when the International Existing Building Code applies vs individual sections within the body of the code.

This proposal consolidates standards for alterations, renovations, reconstructions and repairs into a single chapter, which is referenced in a new section in Chapter R102.7.1. By moving code requirements for existing buildings into a separate chapter within the body of the code, there are distinct requirements that can be specifically applied to the variations options for modifying an existing IRC building, including repairs, renovations, alterations, and reconstructions. This is also contrasted with additions, to which only new code standards apply and the proposed code specifically addresses additions along with renovations in this section.

In addition to a need for consolidation and clarity of code requirements in the IRC, more reasonable standards are also needed for residential buildings that were built decades ago that potentially have windows, ceiling heights and stairs that don't comply with new code standards.

With many of these spaces potentially already being used for decades as habitable spaces by the homeowner who may not be familiar with building code requirements, the risk of allowing these spaces to be converted to legal habitable space is small. The ability to apply reasonable code standards with a reasonable level of safety gives the homeowner effective use these existing buildings without requiring major reconstruction such as raising the house above the foundation, or other expensive construction techniques that may not add any substantial level of safety to the use of the building.

These proposed provisions also increase the sustainability of our IRC building code because they allows reasonable re-use of buildings. The ability to add additional bedrooms or other habitable spaces to existing buildings enables the homeowner to maximize the use of their home within the same building footprint. This provides additional value to the home without the high cost of new construction.

Although the existing building standards in Appendix J are available as an option for any jurisdiction to adopt, it is a burden to many jurisdictions who have to petition their state building code councils or governing bodies to individually adopt it for their individual jurisdiction. Appendix chapters are therefore infrequently used and most jurisdictions, especially those without a lot capacity for code development, stick to the standard provisions of the state codes and do not adopt optional provisions such as Appendix J. There is a need for the model codes to take the leap and incorporate these requirements into the body of the code, which will therefore be adopted by the states and available to all jurisdictions.

Cost Impact: The code change proposal will decrease the cost of construction
More reasonable standards to allow for existing spaces to be compliant with code requirements will not require extensive costly alterations.

RB7-22

RB8-22

IRC: R102.7.1, R110.2

Proponents: Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Revise as follows:

R102.7.1 Additions, alterations, <u>change of use,</u> or repairs. *Additions*, *alterations* or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with the requirements of this code, unless otherwise stated. *Additions*, *alterations,* repairs and relocations shall not cause an existing structure to become less compliant with the provisions of this code than the existing building or structure was prior to the *addition*, *alteration* or *repair*. ~~An existing building together with its *additions* shall comply with the height limits of this code. Where the *alteration* causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the *International Existing Building Code* shall apply.~~ <u>Where additions, alterations, or changes of use to an existing structure result in a use or occupancy, height, or means of egress outside the scope of this code, the building shall comply with the International Existing Building Code.</u>

Delete without substitution:

~~**R110.2 Change in use.** Changes in the character or use of an existing structure shall not be made except as specified in Sections 506 and 507 of the International Existing Building Code.~~

Reason Statement: The current code language for existing buildings only addresses two of the three items defining what buildings are within the scope of the IRC--height and use. It does not deal with independent means of egress. This proposal more comprehensively addresses all the changes that can take a building out of the scope of the IRC, and directly points the user to the IEBC for those buildings. This proposal also removes a conflict in the code.
In order to be within the scope of the IRC, buildings must comply with three conditions (R101.2):

- Use. The buildings must be one- or two-family dwellings, or townhouses. In addition to residential use, five special uses are allowed in these buildings.
- Height. Buildings must be three stories or less.
- Egress. The units must have separate (independent) means of egress. They are not allowed to share a stairway or an egress balcony.

The current provisions in the code address additions that make the height of the building non-compliant with the IRC (R102.7.1, third sentence), and alterations to the use or occupancy that make the use non-compliant with the code (R102.7.1, last sentence). However, the current text does not address changes of use that are proposed without any construction, and while they are rare, there are circumstances where alterations or additions to the building could combine means of egress for two or more of the units.

Regarding the means of egress, in Seattle, we saw at least one project that because of topography and lot configuration, was originally designed with an elevated egress balcony, shared by all the townhouse-style units, leading to the right of way. In order to keep the project within the scope of the IRC, the site was redesigned so that independent means of egress was provided from each unit, but the shared, elevated (no-longer-egress) balcony remained. Alterations to the site could make this balcony the only means of egress again, which would then take the building out of the scope of the IRC. This proposal clarifies that if such a change is made, the IEBC would govern code compliance.

We have proposed to add "change of use" to the section title and the text in order to cover the cases where there may be a desire to change the use of a space without doing any construction. "Alterations" will not cover that case, since the definition refers to "construction, retrofit, or renovation." "Retrofit" is only defined in two appendices in the IEBC, and in ANSI/APSP/ICC-7 (suction entrapment standard), but those definitions imply some sort of construction is occurring. Similarly, "renovation" is only defined in IRC Appendix J and the IZC, where the definitions also imply some sort of construction.

This proposal also changes the viewpoint of the provision. Rather than saying, "In order to stay in the IRC, here's what you do," it takes the approach of, "If you go outside of scope of the IRC, go instead to the IEBC." This is more direct than saying "the provisions of the IEBC shall apply."

We are proposing to delete Section R110.2 for three reasons:

1. Section R110.2 conflicts with the existing language in the last sentence in Section R102.7.1. R110.2 currently points the user to two provisions within the Prescriptive Method--Change of Use (IEBC 506) and Historic Buildings (IEBC 507). The current reference to the IEBC in R102.7.1 is more flexible, allowing use of all three methods (Prescriptive, Work Area, or Performance) at the owner's or designer's discretion. The generic reference to the IEBC in the revised R102.7.1 will also cover any historic building provisions.
2. Aside from being buried in an obscure location, this provision does not belong in a section for Certificates of Occupancy. It more appropriately belongs in the section dealing with existing buildings.
3. Section R110.2 only deals with changes of use/occupancy. As noted above, there are other provisions in the scope of the IRC that are addressed by this proposal.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification of the existing provisions, sending users to the governing code. This will not result in a change in the cost of construction under the IRC, since it only addresses alterations and additions that take the building out of the scope of the IRC.

RB8-22

RB9-22

IRC: 102.7.2 (New), ICC Chapter 44 (New)

Proponents: Dennis Richardson, representing self (dennisrichardsonpe@yahoo.com)

2021 International Residential Code

Add new text as follows:

102.7.2 Rebuilding from WUI fire. When a fire incident spreads outside of a wildland-urban interface area into an area that is not regulated by the International Wildland-Urban Interface Code, rebuilding of new replacement buildings shall comply with this code and the International Wildland-Urban Interface Code as applicable in the area where the fire spread from.

Add new standard(s) as follows:

ICC

International Code Council, Inc.
500 New Jersey Avenue NW 6th Floor
Washington, DC 20001

IWUIC-2024	International Wildland-Urban Interface Code

Staff Analysis: A review of the standard proposed for inclusion in the code, ICC IWUIC-2024 International Wildland-Urban Interface Code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Numerous recent fires in CA have shown that destructive WUI fires are not limited to WUI areas. A misattributed quote "The definition of insanity is doing the same thing over and over again and expecting different results" is applicable to WUI fires. For example: in Santa Rosa, CA, the Tubbs fire traveled over 15 miles in one night before jumping a freeway and burning thousands of homes in Coffey Park as well as other neighborhoods. Nearly all of those homes are now rebuilt to non-WUI standards in Coffey Park which is located outside of the official WUI area.

Coffey Park is a flat urban area located west of a canyon regulated by the WUI provisions. Diablo winds from the east to west appear regularly in the fall and can serve to push embers from the WUI area into the non WUI urban area. By the time that happens there is little fire resource to protect those non WUI areas. When portions or entire neighborhoods burn down, these homes can be reasonably be expected to exposed to a similar hazard again some day in the future. The WUI provisions are more effective if all of the homes in a group comply with this code. Clearly homes burned down in mass from a WUI fire should be rebuilt to the WUI standards. Waiting for the wheels of government to reclassify areas after a conflagration does not result in WUI hardened structures being built as replacements.

Bibliography: NFPA Journal - Build Burn Repeat, Jan Feb 2018

Cost Impact: The code change proposal will increase the cost of construction
I am the design professional for a homeowner in Coffey Park, Santa Rosa, who wanted to rebuild and have a chance of surviving the next conflagration. Experience has shown it is very difficult and costly to design a single home that can survive such a conflagration when surrounded in close proximity by homes that do not meet any of the International Wildland-Urban Interface provisions. Though more costly, it is more effective for a neighborhood to require the WUI provisions throughout the rebuilt neighborhood as a form of herd immunity from blowing embers rather than trying to make single homes have the ability to withstand a future conflagration when surrounded by non WUI constructed homes in close proximity. If the code requires the WUI provisions for all of the rebuilds, most insurance policies offer coverage for rebuilding under more stringent code requirements.

RB9-22

RB10-22

IRC: SECTION R103, R103.1, R103.2, R103.3

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

SECTION R103
~~DEPARTMENT OF BUILDING SAFETY~~ CODE COMPLIANCE AGENCY

R103.1 Creation of ~~enforcement~~ agency. The ~~department of building safety~~ [INSERT NAME OF DEPARTMENT] is hereby created and the official in charge thereof shall be known as the *building official*. The function of the agency shall be the implementation, administration and enforcement of the provisions of this code.

R103.2 Appointment. The *building official* shall be appointed by the chief appointing authority of the *jurisdiction*.

R103.3 Deputies. In accordance with the prescribed procedures of this *jurisdiction* and with the concurrence of the appointing authority, the *building official* shall have the authority to appoint a deputy *building official*, ~~the~~ other related technical officers, inspectors, ~~plan examiners~~ and other employees. Such employees shall have powers as delegated by the *building official*.

Reason Statement: The purpose of this proposal is consistency through the family of codes for Enforcement Agency. During the 2018-2019 code development cycle, ADM 16-19 Parts 1 and III was approved for inclusion of this language in the IBC, IFC, IEBC, IPC, IMC, IFGC, IPMC, ISPSC, IPSDC, IGCC and IWUIC. BCAC is proposing this change again to the IRC to complete uniformity and consistency of language among all codes. A survey of several departments across the country showed that jurisdictions choose many different names. ADM 16-19 proposed to change the name of this section to "Code Compliance Agency" and add a fill in the blank for the adopting agency to choose a name specific to their jurisdiction. In addition to these changes, all three sub-sections were modified to use language that is common in a majority of the codes. Specifically, a sentence was added to the section "Creation of the Agency" to state the function of the agency. In the section titled "Appointment," the term "chief appointing authority of the" was inserted before "jurisdiction." This was intended to be more specific and in line with the language in the section titled "Deputies," which uses the phrase "appointing authority." This language was not intended to name a specific individual or group of individuals. It was intended to identify anyone within the jurisdiction who has the authority to make appointments or staffing decisions. This could be anyone from an elected official or a person or group of people who have been designated to make staffing decisions. The 2019 IRC committee also felt there was potential conflict with state and local laws. We believe it is incumbent on the jurisdiction adopting codes to make any modifications necessary to resolve conflicts that are specific for their locality.

The BCAC is working from the philosophy that ICC is a family of codes, so administrative requirements should be consistent across codes. Most administrative and enforcement matters are the same for any code. Those matters unique for a specific code remain unchanged. This is one of a series of proposals relating to technical, editorial and organizational changes proposed for the Administrative chapters (Chapter 1) in all of the I-Codes.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change that provides consistency between I-codes. This may be a reduction in the administrative costs for the building department by increasing options.

RB10-22

RB11-22

IRC: R104.2

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Residential Code

Add new text as follows:

R104.2.1 Listed compliance. Listings required by this code shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the building official upon request.

Reason Statement: When the code requires something to be listed, the test standard used or the listing evaluation must be germane to the code provision that is requiring the listing. Additionally, the installation must be in accordance with the manufacturer's instructions and copies of the listing standard and manufacturer's instructions must be made available to the building official.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This only clarifies that when something is required to be listed, the test standard used or the listing evaluation must be germane to the code provision that is requiring the listing. As with any listing, the installation must be in accordance with the manufacturer's instructions and the building official must have access to the listing standard and manufacturer's instructions.

RB11-22

RB12-22

IRC: R104.11

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Residential Code

Revise as follows:

R104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. The *building official* shall have the authority to approve an alternative material, design or method of construction upon application of the *owner* or the owner's authorized agent. The *building official* shall first find that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code, ~~and that~~
2. The ~~the~~ material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code ~~in~~ as it pertains to the following:
   2.1. Quality. ~~quality,~~

   2.2. Strength. ~~strength,~~

   2.3. Effectiveness. ~~effectiveness,~~

   2.4. Fire ~~fire~~ resistance . ~~,~~

   2.5. Durability. ~~durability, and~~

   2.6. Safety. ~~safety~~

Compliance with the specific performance-based provisions of the International Codes shall be an alternative to the specific requirements of this code. Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons why the alternative was not *approved*.

Reason Statement: This section can be written more clearly as to the various criteria that must be met in order to be approved as an alternate material, design or method of construction. This will make it easier for the building official to make the necessary evaluation and decision. Should the alternate not be approved, it will also make it easier for the building official to cite the reasons for disapproval. There are no changes to the various requirements that the building official or fire code official must consider. During the last code cycle, this change was approved in the IBC and was well received by the committee and membership who agreed that it made it easier to read.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no changes to the requirements in this section.

RB12-22

RB13-22

IRC: R104.11.2

Proponents: Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

2021 International Residential Code

Add new text as follows:

R104.11.2 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from an approved agency accredited to evaluate or certify products. The alternative material, design or method of construction and product evaluated shall be within the scope of accreditation and the criteria used for the evaluation shall be referenced within the report.

Reason Statement: It is sometimes difficult to determine the legitimacy of a research report. Agency accreditation is an excellent way to determine the legitimacy and reliability of research reports issued by such agencies. This is similar to R109.2 which authorizes the building official to accept reports from approved agencies, provided such agencies satisfy the requirement as to qualifications and reliability. The IBC, IEBC, IFC, IFGC, IMC, IPC, IPMC, IPSDC have provisions for the use of valid research reports as an aid to alternate approval. This will be valuable when the building official reviews a research report.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This new section does not require that a research report be submitted when requesting an alternate, only that when one is submitted to support a request for an alternate, the issuing agency be accredited to evaluate or certify products and that the alternative material, design or method of construction and product evaluated be within the scope of accreditation and the criteria used for the evaluation be referenced within the report.

RB13-22

RB14-22

IRC: R105.2, SECTION 202, TABLE R301.2.1.5.1, R302.1, TABLE R302.1(2), R301.2.2.6, R302.5, R302.5.1, R302.5.2, R302.6, TABLE R302.6, R302.3, R310.6, R311.1, R311.2, R314.3, R320.2, R324.6.2.1, R324.6.3, R801.3, R1006.2

Proponents: Glenn Mathewson, representing Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R105.2 Work exempt from permit. Exemption from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this *jurisdiction*. *Permits* shall not be required for the following:

Building:

1. Other than *storm shelters*, one-*story* detached *accessory structures,* provided that the floor area does not exceed 200 square feet (18.58 m^2).
2. Fences not over 7 feet (2134 mm) high.
3. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge.
4. Water tanks supported directly upon *grade* if the capacity does not exceed 5,000 gallons (18 927 L) and the ratio of height to diameter or width does not exceed 2 to 1.
5. Sidewalks and driveways.
6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Prefabricated swimming pools that are less than 24 inches (610 mm) deep.
8. Swings and other playground equipment.
9. Window awnings supported by an exterior wall that do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.
10. Decks not exceeding 200 square feet (18.58 m^2) in area, that are not more than 30 inches (762 mm) above *grade* at any point, are not attached to a *dwelling* <u>or *townhouse*</u> and do not serve the exit door required by Section R311.4.

Electrical:

1. *Listed* cord-and-plug connected temporary decorative lighting.
2. Reinstallation of attachment plug receptacles but not the outlets therefor.
3. Replacement of branch circuit overcurrent devices of the required capacity in the same location.
4. Electrical wiring, devices, *appliances,* apparatus or *equipment* operating at less than 25 volts and not capable of supplying more than 50 watts of energy.
5. Minor repair work, including the replacement of lamps or the connection of *approved* portable electrical equipment to *approved* permanently installed receptacles.

Gas:

1. Portable heating, cooking or clothes drying *appliances*.
2. Replacement of any minor part that does not alter approval of *equipment* or make such *equipment* unsafe.
3. Portable-fuel-cell *appliances* that are not connected to a fixed piping system and are not interconnected to a power grid.

Mechanical:

1. Portable heating *appliances*.
2. Portable ventilation *appliances*.
3. Portable cooling units.

4. Steam, hot- or chilled-water piping within any heating or cooling *equipment* regulated by this code.
5. Replacement of any minor part that does not alter approval of *equipment* or make such *equipment* unsafe.
6. Portable evaporative coolers.
7. Self-contained refrigeration systems containing 10 pounds (4.54 kg) or less of refrigerant or that are actuated by motors of 1 horsepower (746 W) or less.
8. Portable-fuel-cell *appliances* that are not connected to a fixed piping system and are not interconnected to a power grid.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe; provided, however, that if any concealed trap, drainpipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a*permit* shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures, and the removal and reinstallation of water closets, provided such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

[RB] ACCESSORY STRUCTURE. A structure that is accessory to and incidental to that of the *dwelling(s)* or *townhouse(s)* and that is located on the same *lot*.

TABLE R301.2.1.5.1 ULTIMATE DESIGN WIND SPEED MODIFICATION FOR TOPOGRAPHIC WIND EFFECT[a, b]

ULTIMATE DESIGN WIND SPEED FROM FIGURE R301.2(2) (mph)	AVERAGE SLOPE OF THE TOP HALF OF HILL, RIDGE OR ESCARPMENT (percent)						
	0.10	**0.125**	**0.15**	**0.175**	**0.20**	**0.23**	**0.25**
	Required ultimate design wind speed-up, modified for topographic wind speed-up (mph)						
95	114	119	123	127	131	137	140
100	120	125	129	134	138	144	147
105	126	131	135	141	145	151	154
110	132	137	142	147	152	158	162
115	138	143	148	154	159	165	169
120	144	149	155	160	166	172	176
130	156	162	168	174	179	NA	NA
140	168	174	181	NA	NA	NA	NA
150	180	NA	NA	NA	NA	NA	NA

For SI: 1 mile per hour = 0.447 m/s, 1 foot = 304.8 mm.

NA = Not Applicable.

a. Table applies to a feature height of 500 feet or less and dwellings and *townhouses* sited a distance equal or greater than half the feature height.

b. Where the ultimate design wind speed as modified by Table R301.2.1.5.1 equals or exceeds 140 miles per hour, the building shall be considered as "wind design required" in accordance with Section R301.2.1.1.

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings*, *townhouses*, and accessory buildings shall comply with Table R302.1(1); or *dwellings* and *townhouses* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2).

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling unit* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

TABLE R302.1(2) EXTERIOR WALLS—DWELLINGS AND TOWNHOUSES WITH FIRE SPRINKLERS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet[a]
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[b, c]	2 feet[a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	NA	< 3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. For residential subdivisions where all dwellings and/or *townhouses* are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the fire separation distance for exterior walls not fire-resistance rated and for fire-resistance-rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

c. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where gable vent openings are not installed.

R301.2.2.6 Irregular buildings. The seismic provisions of this code shall not be used for structures, or portions thereof, located in *Seismic Design Categories* C, D_0, D_1 and D_2 and considered to be irregular in accordance with this section. A building or portion of a building shall be considered to be irregular where one or more of the conditions defined in Items 1 through 8 occur. Irregular structures, or irregular portions of structures, shall be designed in accordance with accepted engineering practice to the extent the irregular features affect the performance of the remaining structural system. Where the forces associated with the irregularity are resisted by a structural system designed in accordance with accepted engineering practice, the remainder of the building shall be permitted to be designed using the provisions of this code.

1. ***Shear wall* or braced wall offsets out of plane.** Conditions where exterior *shear wall* lines or *braced wall panels* are not in one plane vertically from the foundation to the uppermost story in which they are required.

   Exception: For wood *light-frame construction*, floors with cantilevers or setbacks not exceeding four times the nominal depth of the wood floor joists are permitted to support *braced wall panels* that are out of plane with *braced wall panels* below provided that all of the following are satisfied:

   1. Floor joists are nominal 2 inches by 10 inches (51 mm by 254 mm) or larger and spaced not more than 16 inches (406 mm) on center.
   2. The ratio of the back span to the cantilever is not less than 2 to 1.
   3. Floor joists at ends of *braced wall panels* are doubled.
   4. For wood-frame construction, a continuous rim joist is connected to ends of cantilever joists. Where spliced, the rim joists shall be spliced using a galvanized metal tie not less than 0.058 inch (1.5 mm) (16 gage) and $1^1/_2$ inches (38 mm) wide fastened with six 16d nails on each side of the splice; or a block of the same size as the rim joist and of sufficient length to fit securely between the joist space at which the splice occurs, fastened with eight 16d nails on each side of the splice.
   5. Gravity loads carried at the end of cantilevered joists are limited to uniform wall and roof loads and the reactions from headers having a span of 8 feet (2438 mm) or less.

2. **Lateral support of roofs and floors.** Conditions where a section of floor or roof is not laterally supported by *shear walls* or *braced wall lines* on all edges.

   Exception: Portions of floors that do not support *shear walls*, *braced wall panels* above, or roofs shall be permitted to extend not more than 6 feet (1829 mm) beyond a *shear wall* or *braced wall line*.

3. ***Shear wall* or braced wall offsets in plane.** Conditions where the end of a *braced wall panel* occurs over an opening in the wall below and extends more than 1 foot (305 mm) horizontally past the edge of the opening. This provision is applicable to *shear walls* and *braced wall panels* offset in plane and to *braced wall panels* offset out of plane in accordance with the exception to Item 1.

   Exception: For wood light-frame wall construction, one end of a *braced wall panel* shall be permitted to extend more than 1 foot (305 mm) over an opening not more than 8 feet (2438 mm) in width in the wall below provided that the opening includes a header in accordance with all of the following:

   1. The building width, loading condition and framing member species limitations of Table R602.7(1) shall apply.
   2. The header is composed of:

      2.1. Not less than one 2 × 12 or two 2 × 10 for an opening not more than 4 feet (1219 mm) wide.

      2.2. Not less than two 2 × 12 or three 2 × 10 for an opening not more than 6 feet (1829 mm) in width.

      2.3. Not less than three 2 × 12 or four 2 × 10 for an opening not more than 8 feet (2438 mm) in width.

   3. The entire length of the *braced wall panel* does not occur over an opening in the wall below.

4. **Floor and roof opening.** Conditions where an opening in a floor or roof exceeds the lesser of 12 feet (3658 mm) or 50 percent of the least floor or roof dimension.
5. **Floor level offset.** Conditions where portions of a floor level are vertically offset.

   Exceptions:

   1. Framing supported directly by continuous foundations at the perimeter of the building.
   2. For wood *light-frame construction*, floors shall be permitted to be vertically offset where the floor framing is lapped or tied together as required by Section R502.6.1.

6. **Perpendicular *shear wall* and wall bracing.** Conditions where *shear walls* and *braced wall lines* do not occur in two perpendicular directions.

7. **Wall bracing in stories containing masonry or concrete construction.** Conditions where stories above *grade plane* are partially or completely braced by wood wall framing in accordance with Section R602 or cold-formed steel wall framing in accordance with Section R603 include masonry or concrete construction. Where this irregularity applies, the entire story shall be designed in accordance with accepted engineering practice.

    Exceptions: Fireplaces, chimneys and masonry veneer in accordance with this code.
8. **Hillside *light-frame construction*.** Conditions in which all of the following apply:

    8.1. The grade slope exceeds 1 unit vertical in 5 units horizontal where averaged across the full length of any side of the *building* ~~dwelling~~.

    8.2. The tallest cripple wall clear height exceeds 7 feet (2134 mm), or where a post and beam system occurs at the *building* ~~dwelling~~ perimeter, the post and beam system tallest post clear height exceeds 7 feet (2134 mm).

    8.3. Of the total plan area below the lowest framed floor, whether open or enclosed, less than 50 percent is living space having interior wall finishes conforming to Section R702.

    Where Item 8 is applicable, design in accordance with accepted engineering practice shall be provided for the floor immediately above the cripple walls or post and beam system and all structural elements and connections from this diaphragm down to and including connections to the foundation and design of the foundation to transfer lateral loads from the framing above.

    Exception: Light-frame construction in which the lowest framed floor is supported directly on concrete or masonry walls over the full length of all sides except the downhill side of the *building* ~~dwelling~~ need not be considered an irregular *building* ~~dwelling~~ under Item 8.

R302.5 Dwelling unit-garage opening and penetration protection. Openings and penetrations through the walls or ceilings separating the *dwelling* unit from the garage shall be in accordance with Sections R302.5.1 through R302.5.3.

R302.5.1 Opening protection. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and *dwelling unit* ~~residence~~ shall be equipped with solid wood doors not less than $1^3/_8$ inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than $1^3/_8$ inches (35 mm) thick, or 20-minute fire-rated doors. Doors shall be self-latching and equipped with a self-closing or automatic-closing device.

R302.5.2 Duct penetration. Ducts in the garage and ducts penetrating the walls or ceilings separating the *dwelling* unit from the garage shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel or other *approved* material and shall not have openings into the garage.

R302.6 Dwelling unit-garage fire separation. The garage shall be separated as required by Table R302.6. Openings in garage walls shall comply with Section R302.5. Attachment of gypsum board shall comply with Table R702.3.5. The wall separation provisions of Table R302.6 shall not apply to garage walls that are perpendicular to the adjacent *dwelling unit* wall.

TABLE R302.6 DWELLING UNIT-GARAGE SEPARATION

SEPARATION	MATERIAL
From the *dwelling unit* ~~residence~~ and attics	Not less than $^1/_2$-inch gypsum board or equivalent applied to the garage side
From habitable rooms above the garage	Not less than $^5/_8$-inch Type X gypsum board or equivalent
Structure(s) supporting floor/ceiling assemblies used for separation required by this section	Not less than $^1/_2$-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than $^1/_2$-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

R302.3 Two-family dwellings. *Dwelling units* in two-family dwellings shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

Exceptions:

1. A fire-resistance rating of $^1/_2$ hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.
2. Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than $^5/_8$-inch (15.9 mm) Type X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the ~~*dwellings*~~ *dwelling units* and the structural framing supporting the ceiling is protected by not less than $^1/_2$-inch (12.7 mm) gypsum board or equivalent.

R310.6 Dwelling additions. Where *dwelling unit additions* contain sleeping rooms, an *emergency escape and rescue opening* shall be provided in each new sleeping room. Where *dwelling unit additions* have *basements*, an *emergency escape and rescue opening* shall be provided in the new *basement*.

Exceptions:

1. An *emergency escape and rescue opening* is not required in a new *basement* that contains a sleeping room with an *emergency escape and rescue opening*.
2. An *emergency escape and rescue opening* is not required in a new *basement* where there is an *emergency escape and rescue opening* in an existing *basement* that is *accessed* from the new *basement*.
3. An operable window complying with Section 310.7.1 shall be acceptable as an *emergency escape and rescue opening*.

R311.1 Means of egress. ~~*Dwellings*~~ *Dwelling units* shall be provided with a means of egress in accordance with this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the *dwelling unit* to the required egress door without requiring travel through a garage. The required egress door shall open directly into a *public way* or to a *yard* or court that opens to a *public way*.

R311.2 Egress door. Not less than one egress door shall be provided for each *dwelling unit*. The egress door shall be side-hinged, and shall provide a clear width of not less than 32 inches (813 mm) where measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The clear height of the door opening shall be not less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the *dwelling unit* without the use of a key or special knowledge or effort.

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional story of the *dwelling unit*, including *basements* and *habitable attics* and not including crawl spaces and uninhabitable *attics*. In ~~*dwellings* or~~ *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.
4. Not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by this section.

5. In the hallway and in the room open to the hallway in *dwelling units* where the ceiling height of a room open to a hallway serving bedrooms exceeds that of the hallway by 24 inches (610 mm) or more.

R320.2 Live/work units. In *live/work units,* the nonresidential portion shall be accessible in accordance with Sections 508.5.9 and 508.5.11 of the *International Building Code*. In a <u>*building*</u> ~~structure~~ where there are four or more *live/work units,* the <u>residential</u> ~~dwelling~~ portion of the *live/work unit* shall comply with Section 1108.6.2.1 of the *International Building Code*.

R324.6.2.1 Alternative setback at ridge. Where an automatic sprinkler system is installed within the dwelling <u>or *townhouse*</u> in accordance with NFPA 13D or Section P2904, setbacks at ridges shall comply with one of the following:

1. For photovoltaic arrays occupying not more than 66 percent of the plan view total roof area, not less than an 18-inch (457 mm) clear setback is required on both sides of a horizontal ridge.
2. For photovoltaic arrays occupying more than 66 percent of the plan view total roof area, not less than a 36-inch (914 mm) clear setback is required on both sides of a horizontal ridge.

R324.6.3 Emergency escape and rescue openings. Panels and modules installed on dwellings <u>and *townhouses*</u> shall not be placed on the portion of a roof that is below an *emergency escape and rescue opening.* A pathway not less than 36 inches (914 mm) wide shall be provided to the *emergency escape and rescue opening*.

Exception: BIPV systems *listed* in accordance with Section 690.12(B)(2) of NFPA 70, where the removal or cutting away of portions of the BIPV system during fire-fighting operations has been determined to not expose a fire fighter to electrical shock hazards.

R801.3 Roof drainage. In areas where *expansive soils* or *collapsible soils* are known to exist, all *dwellings* <u>and *townhouses*</u> shall have a controlled method of water disposal from roofs that will collect and discharge roof drainage to the ground surface not less than 5 feet (1524 mm) from foundation walls or to an *approved* drainage system.

R1006.2 Exterior air intake. The exterior air intake shall be capable of supplying all *combustion air* from the exterior of the *dwelling* <u>*unit*</u> or from spaces within the *dwelling* <u>*unit*</u> ventilated with outdoor air such as nonmechanically ventilated crawl or attic spaces. The exterior air intake shall not be located within the garage or *basement* of the dwelling <u>unit</u>. The exterior air intake, for other than *listed* factory-built fireplaces, shall not be located at an elevation higher than the firebox. The exterior air intake shall be covered with a corrosion-resistant screen of $^1/_4$-inch (6.4 mm) mesh.

Reason Statement: This proposal does not intend to change any currently interpreted applications of any of these provisions. The goal is to use proper and defined terminology appropriately. Currently the IRC distinguishes two different "buildings". A "dwelling" and a "townhouse". Within a dwelling are "dwelling units". Within a townhouse are "townhouse units", which are also, by definition, dwelling units. The code uses the term "residence" in a few places, which leads a mind to wonder... "is that significant? Am I supposed to interpret 'residence' to be something unique?" This proposal was careful to include "townhouse" alongside existing uses of the term "dwelling" where the provision is in reference to the building as a whole. Other times, the existing term "dwelling" was changed to "dwelling unit" when a provision in reference to something specific to each "unit" within a dwelling or townhouse.

NOTE: dwellings and townhouse remain distinctly separate in the braced wall seismic provisions where design category C is regulated differently between the two buildings. This was not oversight.

The term "building" is defined, and thus chosen over "structure" when directly discussing dwellings or townhouses. Provisions related to other structures, such as decks, remain as "structures" in sections not included in this proposal.

If this proposal overlooked sections where this clarification is necessary, identification of those sections is welcomed by the proponent so they can be included in a public comment to further fine tune this goal.

The code must use the proper terms, especially when they are defined. "PRESENT THE INTENT" -spread the word...

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The clarifications in this proposal are most commonly already interpreted in this manner. The proposals simply changes the words to match the intent that is already in application.

RB14-22

RB15-22

IRC: R105.3.1.1, R322.3.1, AJ102.5

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Revise as follows:

R104.2.1~~R105.3.1.1~~ Determination of substantially improved or substantially damaged existing buildings in flood hazard areas. For applications for reconstruction, rehabilitation, *addition, alteration*, *repair* or other improvement of existing buildings or structures located in a flood hazard area as established by Table R301.2, the *building official* shall examine or cause to be examined the *construction documents* and shall make a determination with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamaged condition. If the *building official* finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the proposed work is a substantial improvement or *repair* of substantial damage and the building official shall require existing portions of the entire building or structure to meet the requirements of Section R322.
For the purpose of this determination, a substantial improvement shall mean any *repair*, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the improvement or *repair* is started. Where the building or structure has sustained substantial damage, repairs necessary to restore the building or structure to its predamaged condition shall be considered substantial improvements regardless of the actual repair work performed. The term shall not include either of the following:

1. Improvements to a building or structure that are required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to ensure safe living conditions.
2. Any *alteration* of a *historic building* or structure, provided that the *alteration* will not preclude the continued designation as a *historic building* or structure. For the purposes of this exclusion, a *historic building* shall be any of the following:

   2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.

   2.2. Determined by the Secretary of the US Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.

   2.3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

R322.3.1 Location and site preparation. 1. New buildings and buildings that are determined to be substantially improved pursuant to Section R104.2.1 ~~R105.3.1.1~~ shall be located landward of the reach of mean high tide.
2. For any alteration of sand dunes and mangrove stands, the building official shall require submission of an engineering analysis that demonstrates that the proposed alteration will not increase the potential for flood damage.

AJ102.5 Flood hazard areas. Work performed in existing buildings located in a flood hazard area as established by Table R301.2 shall be subject to the provisions of Section R104.2.1~~R105.3.1.1~~.

Reason Statement: The provision directs the building official to determine whether work proposed for existing dwellings constitutes substantial improvement and whether repairs of damage building constitute substantial damage. The proposal simply moves the provision out of Section R105 Permits to Section R104 Duties and Powers of the Building Official. The determination requirement is in the Duties and Powers sections of the IBC and IEBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal relocates a provision regarding substantial improvement determinations from one section to another section to better align with the organization of the same provision in the IBC and IEBC. There is no change to the technical content of the provisions. By only relocating the existing requirement, there will be no cost impact when approving this proposal.

RB15-22

RB16-22

IRC: SECTION 202 (New), R105.3.1.1

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Add new definition as follows:

SUBSTANTIAL DAMAGE. Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

SUBSTANTIAL IMPROVEMENT. Any *repair*, reconstruction, rehabilitation, *alteration*, *addition* or other improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the improvement or repair is started. If the structure has sustained *substantial damage*, any repairs are considered substantial improvement regardless of the actual *repair* work performed.
The term does not, however, include either:

1. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the *building official* and that are the minimum necessary to assure safe living conditions.
2. Any *alteration* of a historic structure provided that the *alteration* will not preclude the structure's continued designation as a historic structure.For the purposes of this exclusion, a historic building shall be any of the following:
   2.1 Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.
   2.2 Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.
   2.3 Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

Revise as follows:

R105.3.1.1 Determination of substantially improved or substantially damaged existing buildings in flood hazard areas. For applications for reconstruction, rehabilitation, *addition, alteration*, *repair* or other improvement of existing buildings or structures located in a flood hazard area as established by Table R301.2, the *building official* shall examine or cause to be examined the *construction documents* and shall make a determination with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamaged condition. If the *building official* finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the proposed work is a substantial improvement or *repair* of substantial damage and the building official shall require existing portions of the entire building or structure to meet the requirements of Section R322.
~~For the purpose of this determination, a substantial improvement shall mean any *repair*, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the improvement or *repair* is started. Where the building or structure has sustained substantial damage, repairs necessary to restore the building or structure to its predamaged condition shall be considered substantial improvements regardless of the actual repair work performed. The term shall not include either of the following:~~

1. ~~Improvements to a building or structure that are required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to ensure safe living conditions.~~
2. ~~Any *alteration* of a *historic building* or structure, provided that the *alteration* will not preclude the continued designation as a *historic building* or structure. For the purposes of this exclusion, a *historic building* shall be any of the following:~~
   ~~2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.~~
   ~~2.2. Determined by the Secretary of the US Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.~~
   ~~2.3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.~~

Reason Statement: This proposal does not change the requirement to determine whether work proposed on existing dwellings in flood hazard areas constitutes substantial improvement or repair of substantial damage. As currently written, the terms are defined in this Chapter 1 section, rather than in Section R202 Definitions. The proposal is to add definitions to Section R202 and remove the definition text from R104.3.1.1. This brings the IRC into alignment with the IBC and IEBC. Defining the terms is beneficial for those jurisdictions that do not adopt Chapter 1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The code change proposal relocates the definitions from the second paragraph of Section R105.3.1.1 to Chapter 2 Definitions. There is no change to the technical content of the provisions. By only relocating existing definitions, there will be no cost impact when approving this proposal.

RB16-22

RB17-22

IRC: R109.1.4, R109.1.4.1 (New), R109.1.4.1.1 (New), R109.1.4.2 (New), R109.1.4.3 (New), R109.1.4.4 (New), R109.1.4.5 (New)

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Delete and substitute as follows:

~~**R109.1.4 Frame and masonry inspection.** Inspection of framing and masonry construction shall be made after the roof, masonry, framing, firestopping, draftstopping and bracing are in place and after the plumbing, mechanical and electrical rough inspections are *approved*.~~

R109.1.4 Building Inspections. Inspection of the structure shall include the elements in Section R109.1.4.1 through R109.1.4.5. The building official shall determine the timing and sequencing of when inspections occur and what elements are inspected at each inspection.

Add new text as follows:

R109.1.4.1 Foundation inspection. Foundation inspections shall be made after trenches are excavated and forms erected and shall at a minimum include the following building components:

1. Stem-wall
2. Monolithic slab-on-grade
3. Piling/pile caps
4. Footers/grade beams

R109.1.4.1.1 Flood hazard areas. In flood hazard areas, upon placement of the lowest floor, including basement, and prior to further vertical construction, the elevation certification shall be submitted to the authority having jurisdiction.

R109.1.4.2 Framing inspection. Framing inspections shall be made after the roof, all framing, fire blocking and bracing is in place, all concealing wiring, all pipes, chimneys, ducts and vents are complete and shall at a minimum include the following building components:

1. Window/door framing
2. Vertical cells/columns
3. Lintel/tie beams
4. Framing/trusses/bracing/connectors
5. Draft stopping/fire blocking
6. Curtain wall framing
7. Energy insulation
8. Accessibility
9. Verify rough opening dimensions are within tolerances

R109.1.4.3 Sheathing inspection. Sheathing inspection shall be made either as part of a dry-in inspection or done separately at the request of the contractor after all roof and wall sheathing and fasteners are complete and shall at a minimum include the following building components:

1. Roof sheathing
2. Wall sheathing
3. Sheathing fasteners
4. Roof/wall dry
5. Water-resistive barrier/flashing

R109.1.4.4 Exterior wall coverings. Exterior wall coverings shall at a minimum include the following building components in progress inspections:

1. Exterior wall coverings and veneers
2. Soffit coverings

R109.1.4.5 Roofing inspection. Roofing inspections shall at a minimum include the following building components:

1. Dry-in
2. Insulation
3. Roof coverings
4. Flashing

Reason Statement: Code should provide more detailed steps on inspection areas, other than inspecting framing and masonry. This proposal contains the provision from the Florida Building Code has been used at least in part for several cycles and would be helpful to include in the IRC.

Cost Impact: The code change proposal will increase the cost of construction
With additional specified inspections, this could add permitting costs from the AHJ, although many AHJs may already be conducting these inspections currently.

RB17-22

RB18-22

IRC: SECTION 202 (New), SECTION R316 (New), R316.1 (New), R316.1.1 (New), R316.2 (New), R316.2.1 (New), R316.2.2 (New), R316.3 (New), R316.4 (New), R316.5 (New), R316.6 (New), R316.7 (New), R316.7.1 (New), R316.7.2 (New), R316.7.3 (New), R316.7.4 (New), R316.7.5 (New), R316.8 (New), NFPA Chapter 44 (New), UL Chapter 44 (New)

Proponents: Rick Trieste, representing Consolidated Edison Company of New York (triester@coned.com)

2021 International Residential Code

Add new definition as follows:

FUEL GAS ALARM. A single- or multiple-station alarm device intended to detect fuel gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components and an alarm notification appliance in a single unit.

FUEL GAS DETECTOR. A device with an integral sensor to detect fuel gas and transmit an alarm signal to a connected alarm control unit.

HOUSEHOLD FUEL GAS DETECTION SYSTEM. A system or portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fuel gas detectors and to initiate the appropriate response to those signals.

Add new text as follows:

SECTION R316
FUEL GAS DETECTION DEVICES

R316.1 General. Fuel gas detection devices shall comply with Sections R316.

R316.1.1 Listings. Fuel gas alarms shall be listed in accordance with UL 1484. Combination carbon monoxide and fuel gas alarms shall be listed in accordance with UL 2034 and UL 1484.

R316.2 Where required. Fuel gas alarms shall be provided in accordance with Sections R316.2.1 and R316.2.2.

R316.2.1 New construction. For new construction, fuel gas alarms shall be provided in dwelling units as follows:

1. In the same room as a permanently installed fuel-gas- burning appliance.
2. In the garage when the gas meter is located in the garage.

R316.2.2 Alterations, repairs and additions. Where alterations, repairs or additions requiring a permit occur, the individual dwelling unit shall be equipped with fuel gas alarms located as required for new dwellings.

R316.3 Location. Fuel gas alarms in dwelling units shall be located on the wall, ceiling, or other location as specified in the manufacturer's published instructions and located as follows:

1. For natural gas, the gas alarm shall be installed on the ceiling or on the wall with the top of the alarm within 12 inches (305 mm) of the ceiling.
2. For propane, the entire gas alarm shall be installed on the wall within 12 inches (305 mm) of the floor.

R316.4 Combination alarms. Combination carbon monoxide and fuel gas alarms shall be permitted to be used in lieu of fuel gas alarms.

R316.5 Power source. Fuel gas alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and where primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

Exception: Fuel gas alarms shall be permitted to be battery operated where installed in buildings without commercial power.

R316.6 Fuel gas alarm maintenance and replacement. Fuel gas alarms shall be maintained and replaced in accordance with manufacturer's recommendations.

R316.7 Household fuel gas detection systems. Household fuel gas detection systems shall be permitted to be used in lieu of fuel gas alarms and shall comply with Sections R316.7.1 through R316.7.5.

R316.7.1 Installation. The installation of household fuel gas detection systems shall comply with NFPA 715.

R316.7.2 Listings. Fuel gas detectors shall be listed in accordance with UL 2075. Combination carbon monoxide and fuel gas detectors shall be listed in accordance with UL 2075.

R316.7.3 Location. Fuel gas detectors shall be installed in the locations specified in Section R316.3.

R316.7.4 Permanent fixture. Where a household fuel gas detection system is installed, it shall become a permanent fixture of the occupancy and owned by the homeowner.

R316.7.5 Combination detectors. Combination carbon monoxide and fuel gas detectors shall be listed in accordance with UL 2075.

R316.8 Maintenance. Fuel gas alarms, fuel gas detectors and household fuel gas detection systems shall be maintained in accordance with NFPA 715 and manufacturer's instructions.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

715-2020	Standard for the Installation of Fuel Gases Detection and Warning Equipment

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

1484-2016	Standard for Residential Gas Detectors
2034-2017	Standard for Single and Multiple Station Carbon Monoxide Alarms

Staff Analysis: UL 2034-2017 Standard for Single and Multiple Station Carbon Monoxide Alarms is already referenced in the IBC. This is simply a new occurrence of the reference in the I-Codes
A review of the standards proposed for inclusion in the code, NFPA 715-2020 Standard for the Installation of Fuel Gases Detection and Warning Equipment and UL 1484-2016 Standard for Residential Gas Detectors, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This Proposal seeks to protect dwelling occupants from fires caused by natural gas or propane explosions or leaks. The proposal is needed because according to a 2018 NFPA report, Natural Gas and Propane Fires, Explosions and Leaks Estimates and Incidents - Marty Ahrens and Ben Evarts October 2018, between 2012 and 2016 an estimated average of 4,200 U.S. home structure fires per year started with the ignition of natural gas that caused an average of 40 deaths per year. Also, the report concludes these incidents have generally been increasing since 2007.The requirements in this proposal are based on the new NFPA 715 standard, Installation for Fuel Gas Detection and Warning Equipment, that is being developed. The new NFPA 715 will be published in the fall of 2022. The Fire Protection Research Foundation (FPRF) recently completed a report, Combustible Gas Dispersion in Residential Occupancies and Detector Location Analysis, that studied combustible gas leaks and dispersion in residential buildings, as well as an analysis of combustible gas detector placement. The FPRF report provides the necessary technical basis to justify the requirements in NFPA 715.
Further, the National Transportation Safety Board (NTSB) began advocating for the application of natural gas detectors in NTSB-PAR-76-2 following an incident at 305 E 46th St, NYC (Con Ed). They again advocated for their adoption in NTSB-PAR-96-1 following an incident at 1339 Allen St, Allentown PA (UGI). They again advocated for the adoption in NTSB/PAR-19/01 following an incident at 8701 Arliss St, Silver Springs MD (Washington Gas). Most recently the NTSB stated in their 2021-2022 NTSB Most Wanted List of Safety Improvements to "Require methane-detection systems in residential occupancies with gas service" to improve the safety of natural gas distribution.
Lastly, Con Edison has undertaken a program to install about 375,000 natural gas detectors in homes served with natural gas and these detectors are Company owned and report gas leaks over a wireless network to the Company where emergency responders are then dispatched. The Company has about 90,000 battery operated with a 10% lower explosive limit (LEL) units already installed and has received over 800 alarms. This program has demonstrated the safety benefit and reliability of the current technology.

Cost Impact: The code change proposal will increase the cost of construction
The net effect of the code change proposal will increase the cost of construction. The estimated total installation cost of a combustible gas alarm is approximately $150.00. Below is a breakdown of the cost estimation.

Contractor purchase price of fire alarm equipment: $50.00

Conduit, wire, J-box and labor (labor at $75 p/h): $75.00

25% Contractor Overhead/Profit: $25.00

______

Estimated total installation cost: $150.00

RB18-22

RB19-22

IRC: SECTION 202

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Residential Code

[RB] ATTIC. The unfinished space between the ceiling assembly and the *roof assembly*.

Revise as follows:

[RB] ATTIC, HABITABLE. A finished or unfinished *habitable space* ~~within an *attic*~~ between the ceiling assembly and the roof assembly.

Reason Statement: "Attic" is defined to be ONLY an unfinished space. So a "habitable attic" cannot rely on the definition of attic to specify part of its parameters since a "habitable attic" can be finished. It technically doesn't qualify as an attic under the current base definition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Editorial clarification of current intent with no intended technical change.

RB19-22

RB20-22

IRC: SECTION 202, R902.3

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

[RB] BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) ~~PRODUCT~~ SYSTEM. A building ~~product~~ system that incorporates *photovoltaic modules* and functions as ~~a~~ an integral part ~~component~~ of the building envelope, such as *roof assemblies* and *roof coverings*, *exterior wall envelopes* and *exterior wall coverings*, and *fenestration*.

R902.3 Building-integrated photovoltaic (BIPV) ~~product~~ systems. *Building-integrated photovoltaic* (BIPV) ~~*products*~~ *systems* installed as the roof covering shall be tested, *listed* and *labeled* for fire classification in accordance with UL 7103. Class A, B or C BIPV products shall be installed where the edge of the roof is less than 3 feet (914 mm) from a *lot line*.

Reason Statement: The term “BIPV product” is used twice in the I-codes, both requiring fire classification for roofing applications (IBC Section 1505.8 and IRC Section R902.3). The term “BIPV system” is used four times in the I-codes, addressing roof access, rapid shutdown systems, and fire classification for roofing applications (IBC Sections 1205.2, 1205.2.3, 3111.3.2, 3113.3). IRC Section R324.5.2 directs BIPV systems to have a fire classification in accordance with Section R902.3.
The word “system” is defined by the dictionary as “a combination of things or parts forming a complex or unitary whole”, whereas the word “product” is defined as “the totality of goods or services that a company makes available; something produced”. “Product” infers a discrete piece, whereas “system” better describes a number of components that when installed function together for a specific purpose. This proposal also clarifies that these systems, when installed per the manufacturer’s installation instructions, become an integral part of the building envelope to provide a physical separator between internal and external environments.

The types of BIPV systems that include “*exterior wall envelopes* and *exterior wall coverings*, and *fenestration*” are added because FS150-21 in Group A added these types of BIPV systems to Chapter 14 of the IBC, and there is another proposal for this cycle to add these types of systems to Chapter 7 of the IRC.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal clarifies the term as it is used in the codes.

RB20-22

RB21-22 Part I

PART 1 -IRC: SECTION 202;

PART 2 - IBC: SECTION 202

Proponents: THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE AND PART 2 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[BS] DECORATIVE ~~GLASS~~ GLAZING. A carved, leaded or *Dalle glass* or glazing material whose purpose is decorative or artistic, not functional; whose coloring, texture or other design qualities or components cannot be removed without destroying the glazing material and whose surface, or assembly into which it is incorporated, is divided into segments.

Staff Analysis: The IBC definition was added to the proposal as a modification by the CCC committee. See CCC Item IRC9-22.

RB21-22 Part I

RB21-22 Part II

PART 1 -IRC: SECTION 202;

PART 2 - IBC: SECTION 202

Proponents: THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE AND PART 2 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

[RB] DECORATIVE <u>GLAZING</u> ~~GLASS~~. A carved, leaded or Dalle glass or glazing material with a purpose that is decorative or artistic, not functional; with coloring, texture or other design qualities or components that cannot be removed without destroying the glazing material; and with a surface, or assembly into which it is incorporated, that is divided into segments.

Staff Analysis: The IBC definition was added to the proposal as a modification by the CCC committee. See CCC Item IRC9-22.

Reason Statement: Nowhere in the IRC does it refer to “decorative glass”. This subject only comes up in Section R308 and R609.3 and it refers to “decorative glazing” or “decorative glazed openings”. This proposal simply aligns the defined term with the term used in the body of the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change the intent or application of the code as it has been customarily interpreted, therefore it has no impact on the cost of construction.

RB21-22 Part II

RB22-22

IRC: SECTION 202

Proponents: Timothy Pate, representing Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Residential Code

Revise as follows:

[RB] EXTERIOR WALL.
An above-*grade* wall that defines the exterior boundaries of a building. Includes between-floor spandrels, peripheral edges of floors, roof and *basement* knee walls, dormer walls, gable end walls, gable end roof trusses, walls enclosing a mansard roof and *basement walls* with an average below-*grade* wall area that is less than 50 percent of the total opaque and nonopaque area of that enclosing side.
For the definition applicable in Chapter 11, see Section N1101.6.

Reason Statement: This propsosal is to add gable end wall trusses to this definition which will clarify that these will be considered as part of the exterior walls. This is important since when determining fire ratings due to FSD the rating would need to incude these gable roof trusses. The proposal is also to delete the RE in front of Exterior Wall and replace that with RB - This would need to be done by ICC Staff since CDP Access does not allow this to be done.

Cost Impact: The code change proposal will increase the cost of construction
This change will only increase the cost of construciton in jurisdications that have not interpretated the code to include these gable end wall trusses to be fire rated when the FSD requires the rating

RB22-22

RB23-22

IRC: SECTION 202

Proponents: Kristen Owen, representing Myself (kowen4568@gmail.com)

2021 International Residential Code

[RB] FIRE-RETARDANT-TREATED WOOD. Wood products that, when impregnated with chemicals by a pressure process or other means during manufacture, exhibit reduced surface burning characteristics and resist propagation of fire.

Revise as follows:

~~**Other means during manufacture.** A process where the wood raw material is treated with a fire-retardant formulation while undergoing creation as a finished product.~~

~~**Pressure process.** A process for treating wood using an initial vacuum followed by the introduction of pressure above atmospheric.~~

Reason Statement: The definition for fire-retardant-treated wood in the IRC needs to be consistent with the definition in the 2021 IBC. See G10-19(AMPC2).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
By matching the IBC definition to the IRC definition, there is no cost impact.

RB23-22

RB24-22

IRC: SECTION 202 (New)

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

Add new definition as follows:

LANDING (for stairs and ramps). The minimum required area for a walking surface at the top and bottom of a stair flight or ramp run.

LANDINGS (for doors). The minimum required area of approach on each side of a door.

Reason Statement: The term landing is prolific throughout the model IRC, family of ICC model codes, accessibility codes and standards. Those of us that navigate the codes and standards everyday have different views of what a landing actually is and often use the explanation, I know it when I see it. This code proposal for the definition of a landing is directed at the heart of the term and to provide a simple precise meaning. The reality is a landing is the minimum level area of a walking surface, floor area, that is required at the tops and bottoms of stair flights and ramp runs. They are also the minimum area on both sides of a door/doorway. The walking surface or floor area can be larger than the minimum area required for a landing and when you have connecting stair flights or ramp runs, the minimum areas can overlap, and they can also overlap with a door. However, the landing is required for each door, stair flight and ramp run, and the minimum required is the landing. To be more precise and to encompass the 2 different areas within the code that center around landings being required, we listed landings with 2 term qualifiers (Stairs & Ramps) and (Doors), we see the same split definition currently within the code for the definition of a Riser, (stair) & (plumbing).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a definition and is not adding or subtracting any technical requirements within the code which the author believes will increase or decrease cost.

RB24-22

RB25-22

IRC: SECTION R202 (NEW)

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2021 International Residential Code

Add new definition as follows:

LANDING. The required area of approach used to directly access an adjacent door, stair, or ramp.

Reason Statement: Landings are required throughout the code at doors, stairs and ramps but are not clearly understood in many cases as a walking surface. Egress from doors, stairs, and ramps may often be into a yard, a lawn, driveway or landscaped path. This definition purposefully allows the size, shape, and surface requirements of the landing to regulated by the code as suits the location.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The definition will not affect the cost of construction but may result in changes to the interpretation of existing requirements that will.

RB25-22

RB26-22

IRC: SECTION 202

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

[RB] PAN FLASHING. Corrosion-resistant flashing at the base of an opening that is integrated into the building exterior wall to direct water to the <u>*water-resistive barrier* surface or to the</u> exterior and is premanufactured, fabricated, formed or applied at the job site.

Reason Statement: It is very common to direct pan flashing drainage to the WRB surface for subsequent drainage to the exterior of a wall assembly. The current definition recognizes only drainage directly to the exterior and could be interpreted as preventing many common pan flashing drainage details that work and are being successfully used. This proposal also addresses a conflict with text in Section R703.4.1 which allows flashing (including pan flashing) to extend to the surface of the WRB.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal corrects a definition to include common and cost-effective pan flashing drainage details.

RB26-22

RB27-22

IRC: 202(New), R324.7

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Add new definition as follows:

PHOTOVOLTAIC (PV) PANEL SYSTEM, GROUND-MOUNTED. An independent photovoltaic (PV) panel system without useable space underneath, installed directly on the ground.

Revise as follows:

R324.7 Ground-mounted photovoltaic (PV) panel systems. Ground-mounted photovoltaic (PV) panel systems shall be designed and installed in accordance with Section R301.

Reason Statement: The newly proposed definition is identical to the definition created in the IBC by Proposal G193-21. The existing language in IRC Section R324.7 is edited to match the newly defined term.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It aligns with the IBC, and provides clarity of terms.

RB27-22

RB28-22

IRC: SECTION 202 (New), TABLE R702.7(3)

Proponents: Theresa A Weston, The Holt Weston Consultancy, representing Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

2021 International Residential Code

Add new definition as follows:

RAINSCREEN SYSTEM. An assembly applied to the exterior side of an exterior wall which consists of, at minimum, an outer layer, an inner layer, and a cavity between them sufficient for the passive removal of liquid water and water vapor.

Revise as follows:

TABLE R702.7(3) CLASS III VAPOR RETARDERS

CLIMATE ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
Marine 4	Vented cladding over wood structural panels.
	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 2.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 3.75 over 2 × 6 wall.
5	Vented cladding over wood structural panels.
	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 7.5 over 2 × 6 wall.
6	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 7.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 11.25 over 2 × 6 wall.
7	Continuous insulation with *R*-value ≥ 10 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 15 over 2 × 6 wall.
8	Continuous insulation with *R*-value ≥ 12.5 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 20 over 2 × 6 wall.

a. Vented cladding shall include vinyl, polypropylene, or horizontal aluminum siding, brick veneer with a clear airspace as specified in Table R703.8.4(1), rainscreen systems and other approved vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of Chapter 11.

Reason Statement: This proposal defines the term *rainscreen system* and includes *rainscreen systems* in the list of vented claddings that permit the use of Class III vapor retarders in wall assemblies in climate zones in which interior vapor retarders are required.
The use of *rainscreen systems* in construction is common and growing. *Rainsreen systems* involve many different types of materials from concrete and brick to metal and plastic, yet the term is not universally defined. The concept of cladding and substrate layers separated by a cavity that allows water to drain and air flow to accelerate drying is the most basic understanding of how a *rainscreen system* works.

This proposal correlates with a proposal approved in Group A to the IBC Chapter 14.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an option to an existing descriptive list of options, thereby increasing choice but not adding any new requirements.

RB28-22

RB29-22

IRC: SECTION 202

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Revise as follows:

[RB] ROOF COVERING. A system designed to ~~The~~ cover~~ing applied to~~ the *roof deck* and provide ~~for~~ weather resistance, fire classification or appearance. The system consists of a membrane or water-shedding layer and can include an *underlayment*, a thermal barrier, insulation or a vapor retarder.

Reason Statement: This code change proposal is intended to clarify the current definition of the term "roof covering" and better coordinate it with the defined term "roof assembly."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal re-words the definition for the term roof covering to use similar wording from the broader term roof assembly, which is also included in Section 202. There is no change to the technical content or intent of the definition. Approving this proposal will result in no change in construction or construction cost.

RB29-22

RB30-22

IRC: SECTION 202

Proponents: Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); J Daniel Dolan, representing Seismic Code Support Committee (jddolan@wsu.edu); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Revise as follows:

[RB] SEISMIC DESIGN CATEGORY (SDC). A classification assigned to a structure based on its occupancy ~~category~~ and the severity of the design earthquake ground motion at the site.

Reason Statement: This proposal removes the archaic term “occupancy category,” which is no longer used by the I-Codes or ASCE 7, leaving the generic term “occupancy.” The new IBC/ASCE 7 term “Risk Category” has not been introduced because this would add an additional undefined term. A word search has indicated that this is the only location where the term "occupancy category" still remains in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is editorial and intended to maintain correct terminology.

RB30-22

RB31-22

IRC: SECTION 202

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

[RB] SOLAR ENERGY SYSTEM. A system that converts solar radiation to usable energy, including *photovoltaic panel systems*, *BIPV systems* and *solar thermal systems*.

Reason Statement: BIPV systems are solar energy systems, but do not always utilize a rack support system. The definition of photovoltaic panel systems includes a rack support system.

[RB] PHOTOVOLTAIC PANEL SYSTEM. A system that incorporates discrete photovoltaic panels that convert solar radiation into electricity, including rack support systems.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This provides clarity and consistency in terminology used for various solar energy systems.

RB31-22

RB32-22

IRC: CHAPTER 3

Proponents: Timothy Pate, representing City and County of Broomfield (tpate@broomfield.org)

2021 International Residential Code

CHAPTER 3
BUILDING PLANNING

Revise as follows:

SECTION 301
DESIGN CRITERIA

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

SECTION R303 ~~R316~~
FOAM PLASTIC

SECTION R304 ~~R317~~
PROTECTION OF WOOD AND WOOD-BASED PRODUCTS AGAINST DECAY

SECTION R305 ~~R318~~
PROTECTION AGAINST SUBTERRANEAN TERMITES

SECTION R306 ~~R322~~
FLOOD-RESISTANT CONSTRUCTION

SECTION R307 ~~R323~~
STORM SHELTERS

SECTION R308 ~~R319~~
SITE ADDRESS

SECTION R309 ~~R313~~
AUTOMATIC FIRE SPRINKLER SYSTEMS

SECTION R310 ~~R314~~
SMOKE ALARMS

SECTION R311 ~~R315~~
CARBON MONOXIDE ALARMS

SECTION R312 ~~R304~~
MINIMUM ROOM AREAS

SECTION R313 ~~R305~~
CEILING HEIGHT

SECTION R314 ~~R325~~
MEZZANINES

SECTION <u>R315</u> ~~R326~~
HABITABLE ATTICS

SECTION <u>R316</u> ~~R309~~
GARAGES AND CARPORTS

SECTION <u>R317</u> ~~R311~~
MEANS OF EGRESS

SECTION <u>R318</u> ~~R310~~
EMERGENCY ESCAPE AND RESCUE OPENINGS

SECTION <u>R319</u> ~~R312~~
GUARDS AND WINDOW FALL PROTECTION

SECTION R320
ACCESSIBILITY

SECTION R321
ELEVATORS AND PLATFORM LIFTS

Revise as follows:

SECTION <u>R322</u> ~~R308~~
GLAZING

SECTION <u>R323</u> ~~R303~~
LIGHT, VENTILATION AND HEATING

SECTION <u>R324</u> ~~R306~~
SANITATION

SECTION <u>R325</u> ~~R307~~
TOILET, BATH AND SHOWER SPACES

SECTION <u>R326</u> ~~R327~~
SWIMMING POOLS, SPAS AND HOT TUBS

SECTION <u>R327</u> ~~R324~~
SOLAR ENERGY SYSTEMS

SECTION R328
ENERGY STORAGE SYSTEMS

SECTION R329
STATIONARY ENGINE GENERATORS

SECTION R330
STATIONARY FUEL CELL POWER SYSTEMS

Reason Statement: There are no technical changes to the text - this is a reorganization to improve usability of the code. Over the years there have been numbers 'adds' to IRC Chapter 3 without a general look at grouping or organization. The biggest stretch are the room area (R304) and height (R305) being multiple sections away from mezzanines (R325) and habitable attics (R326). The intent of this proposal is to reorganize the requirements into areas for the following:

- Structural (proposed R301-307)

- Fire (proposed R308 -311)
- Rooms and spaces (proposed R312-316)
- Means of egress (proposed R317-R319)
- Accessibility/Elevators (proposed R320-R321)
- MEP (proposed R322-R326)
- Energy (proposed R327-R330)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is only to reorganize the sections in Chapter 3 for ease of use. There are no technical changes.

RB32-22

RB33-22

IRC: TABLE R301.2

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, representing Self (sorlowski@sbcc.codes)

2021 International Residential Code

Revise as follows:

TABLE R301.2 CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

GROUND SNOW LOAD[o]	WIND DESIGN				SEISMIC DESIGN CATEGORY[f]	SUBJECT TO DAMAGE FROM			ICE BARRIER UNDERLAYMENT REQUIRED[h]	FLOOD HAZARDS[g]	AIR FREEZIN INDEX[i]
	Speed[d] (mph)	Topographic effects[k]	Special wind region[l]	Windborne debris zone[m]		Weathering[a]	Frost line depth[b]	Termite[c]			
—	—	—	—	—	—	—	—	—	—	—	—
MANUAL J DESIGN CRITERIA[n]											
Elevation			Altitude correction factor[e]	Coincident wet bulb	Indoor winter design dry-bulb temperature	Indoor winter design dry-bulb temperature			Outdoor winter design dry-bulb temperture		**Heating**
—			—	—	—	—			—		
Latitude			Daily range	Summer design gains	Indoor summer design relative humidity	Indoor summer design dry-bulb temperature			Outdoor summer design dry-bulb temperature		Cooling
—			—	—	—	—			—		

For SI: 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.

a. Where weathering requires a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code, the frost line depth strength required for weathering shall govern. The weathering column shall be filled in with the weathering index, "negligible," "moderate" or "severe" for concrete as determined from Figure R301.2(1). The grade of masonry units shall be determined from ASTM C34, ASTM C55, ASTM C62, ASTM C73, ASTM C90, ASTM C129, ASTM C145, ASTM C216 or ASTM C652.

b. Where the frost line depth requires deeper footings than indicated in Figure R403.1(1), the frost line depth strength required for weathering shall govern. The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.

c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.

d. The jurisdiction shall fill in this part of the table with the wind speed from the ~~basic wind speed~~ ultimate design wind speeds map ~~[~~Figure R301.2(2). Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.

e. The jurisdiction shall fill in this section of the table to establish the design criteria using Table 10A from ACCA Manual J or established criteria determined by the jurisdiction.

f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.

g. The jurisdiction shall fill in this part of the table with: the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas); and the title and date of the currently effective Flood Insurance Study or other flood hazard study and maps adopted by the authority having jurisdiction, as amended.

h. In accordance with Sections R905.1.2, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall fill in this part of the table with "NO."

i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99 percent) value on the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°F)."

j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°F)."

k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall indicate "NO" in this part of the table.

l. In accordance with Figure R301.2(2), where there is local historical data documenting unusual wind conditions, the jurisdiction shall fill in this part of the table with "YES" and identify any specific requirements. Otherwise, the jurisdiction shall indicate "NO" in this part of the table.

m. In accordance with Section R301.2.1.2 the jurisdiction shall indicate the wind-borne debris wind zone(s). Otherwise, the jurisdiction shall indicate "NO" in this part of the table.

n. The jurisdiction shall fill in these sections of the table to establish the design criteria using Table 1a or 1b from ACCA Manual J or established criteria determined by the jurisdiction.

o. The jurisdiction shall fill in this section of the table using the Ground Snow Loads in Figures R301.2(3) and R301.2(4).

Reason Statement: During the development of the 2015 IRC, Proposal RB39-13 was submitted to align the wind design provisions of the residential code with changes that were previously approved in the 2012 International Building Code and ASCE7-10. The change was submitted to remove all references to the term "basic wind speed" and update the IRC using the term "ultimate design wind speed". The proposal was approved as submitted and further revised during the public comment hearing, where additional public comment were approved to clean up additional references to the outdate terminology, not included in the original proposal. This proposal addresses one last clean up necessary in Footnote D of Table R301.2 which still uses the outdated term "basic wind speed" and replaces it with the correct term "ultimate design wind speed" as shown in Figure R301.2(2).

Bibliography: See RB39-13, Complete Revision History to the 2015 I-Codes: Successful Changes with Public Comments. First Printing: September 2014

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is editorial in nature and does not introduce any new requirements to the IRC.

RB33-22

RB34-22

IRC: TABLE R301.2, FIGURE R301.2(3), FIGURE R301.2(4), R301.2.3

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Residential Code

Revise as follows:

TABLE R301.2 CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

GROUND SNOW LOAD, $p_{g(asd)}$[o]	WIND DESIGN				SEISMIC DESIGN CATEGORY[f]	SUBJECT TO DAMAGE FROM			ICE BARRIER UNDERLAYMENT REQUIRED[h]	FLOOD HAZARDS[g]	AIR FREEZIN INDEX[i]
	Speed[d] (mph)	Topographic effects[k]	Special wind region[l]	Windborne debris zone[m]		Weathering[a]	Frost line depth[b]	Termite[c]			
—	—	—	—	—	—	—	—	—	—	—	—
MANUAL J DESIGN CRITERIA[n]											
Elevation			Altitude correction factor[e]	Coincident wet bulb	Indoor winter design dry-bulb temperature	Indoor winter design dry-bulb temperature			Outdoor winter design dry-bulb temperture		**Heating**
—			—	—	—	—			—		
Latitude			Daily range	Summer design gains	Indoor summer design relative humidity	Indoor summer design dry-bulb temperature			Outdoor summer design dry-bulb temperature		Cooling
—			—	—	—	—			—		

For SI: 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.

a. Where weathering requires a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code, the frost line depth strength required for weathering shall govern. The weathering column shall be filled in with the weathering index, “negligible,” “moderate” or “severe” for concrete as determined from Figure R301.2(1). The grade of masonry units shall be determined from ASTM C34, ASTM C55, ASTM C62, ASTM C73, ASTM C90, ASTM C129, ASTM C145, ASTM C216 or ASTM C652.

b. Where the frost line depth requires deeper footings than indicated in Figure R403.1(1), the frost line depth strength required for weathering shall govern. The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.

c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.

d. The jurisdiction shall fill in this part of the table with the wind speed from the basic wind speed map [Figure R301.2(2). Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.

e. The jurisdiction shall fill in this section of the table to establish the design criteria using Table 10A from ACCA Manual J or established criteria determined by the jurisdiction.

f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.

g. The jurisdiction shall fill in this part of the table with: the date of the jurisdiction’s entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas); and the title and date of the currently effective Flood Insurance Study or other flood hazard study and maps adopted by the authority having jurisdiction, as amended.

h. In accordance with Sections R905.1.2, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with “YES.” Otherwise, the jurisdiction shall fill in this part of the table with “NO.”

i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99 percent) value on the National Climatic Data Center data table “Air Freezing Index-USA Method (Base 32°F).”

j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table “Air Freezing Index-USA Method (Base 32°F).”

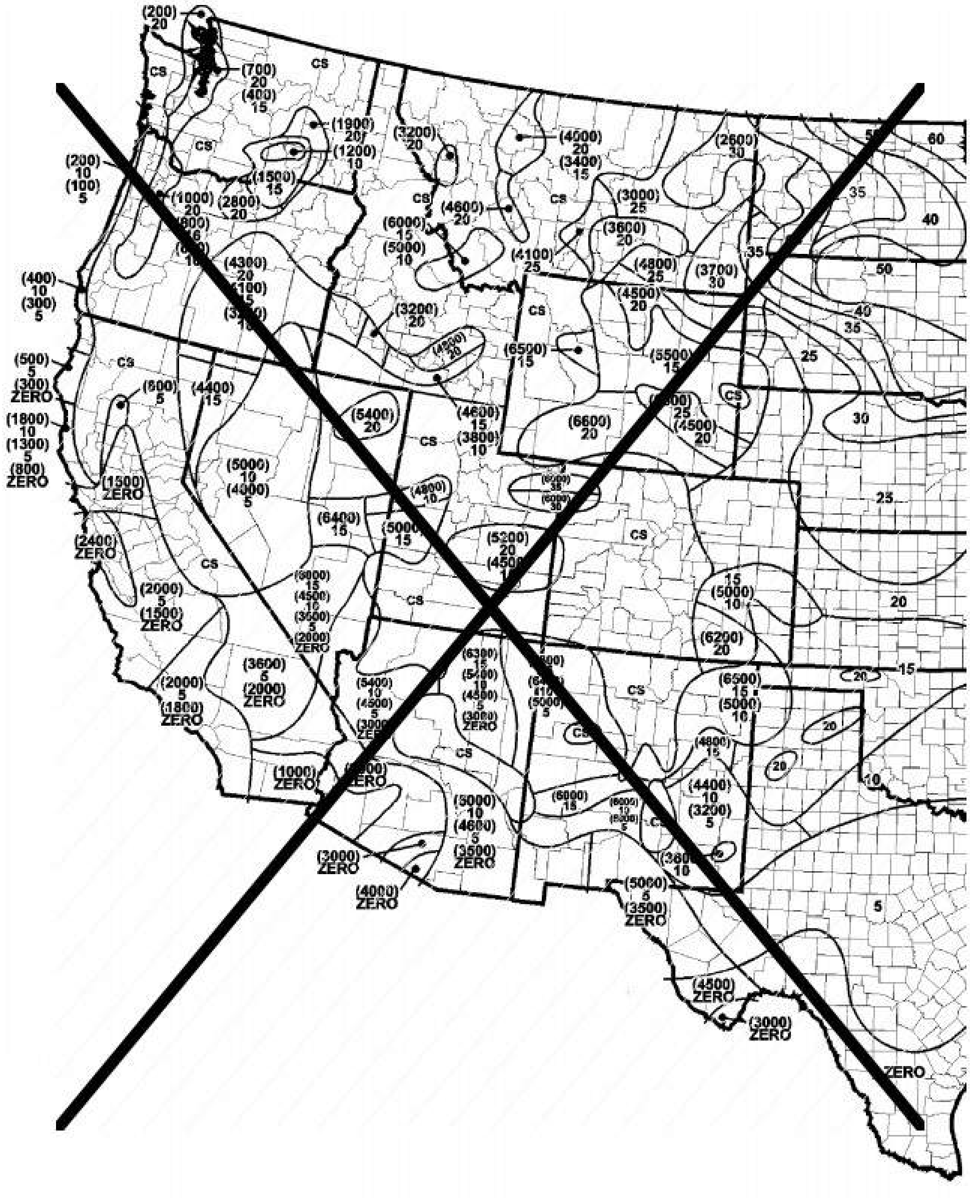
k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with “YES.” Otherwise, the jurisdiction shall indicate “NO” in this part of the table.

l. In accordance with Figure R301.2(2), where there is local historical data documenting unusual wind conditions, the jurisdiction shall fill in this part of the table with “YES” and identify any specific requirements. Otherwise, the jurisdiction shall indicate “NO” in this part of the table.

m. In accordance with Section R301.2.1.2 the jurisdiction shall indicate the wind-borne debris wind zone(s). Otherwise, the jurisdiction shall indicate “NO” in this part of the table.

n. The jurisdiction shall fill in these sections of the table to establish the design criteria using Table 1a or 1b from ACCA Manual J or established criteria determined by the jurisdiction.

o. The jurisdiction shall fill in this section of the table using the *allowable stress design* Ground Snow Loads, $\underline{p_{g(asd)}}$, in Figures R301.2(3) ~~and R301.2(4)~~.



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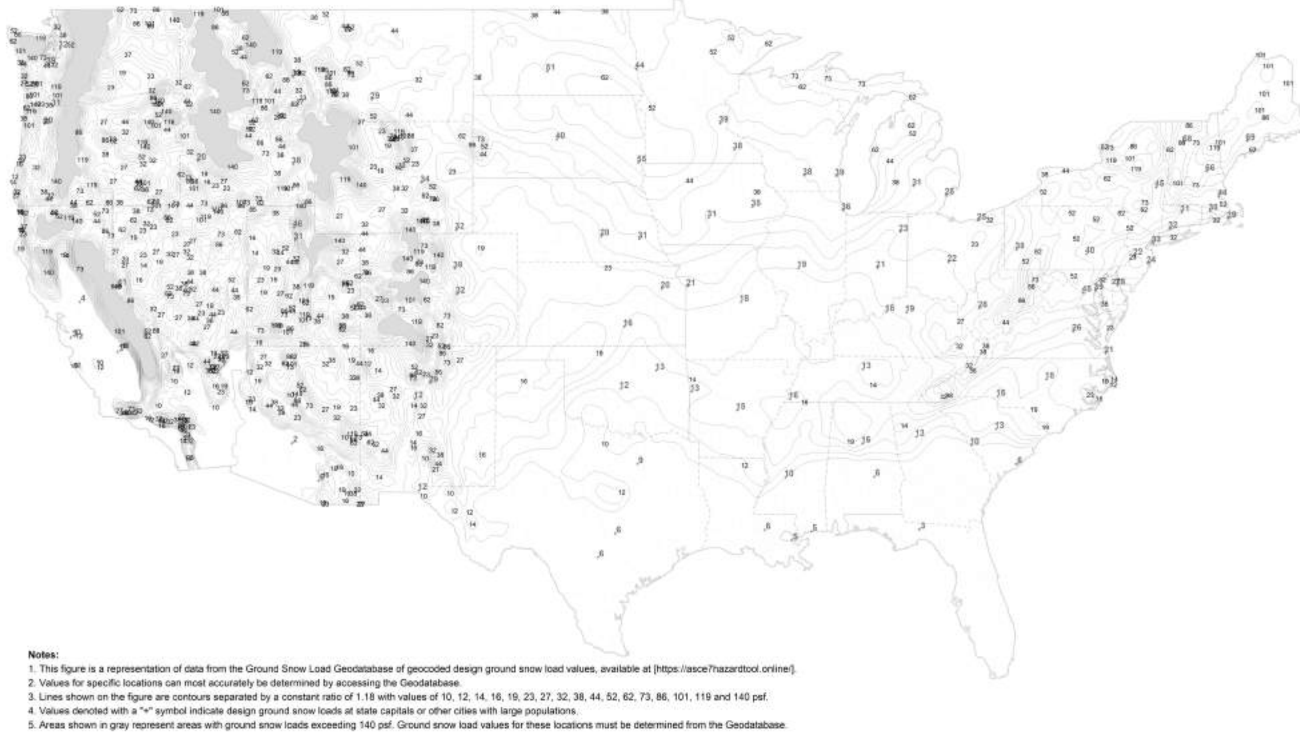


~~For SI: 1 foot = 34.8 mm, 1 pound per square foot =0.0479 kPa, 1 mile =1.61 km.~~

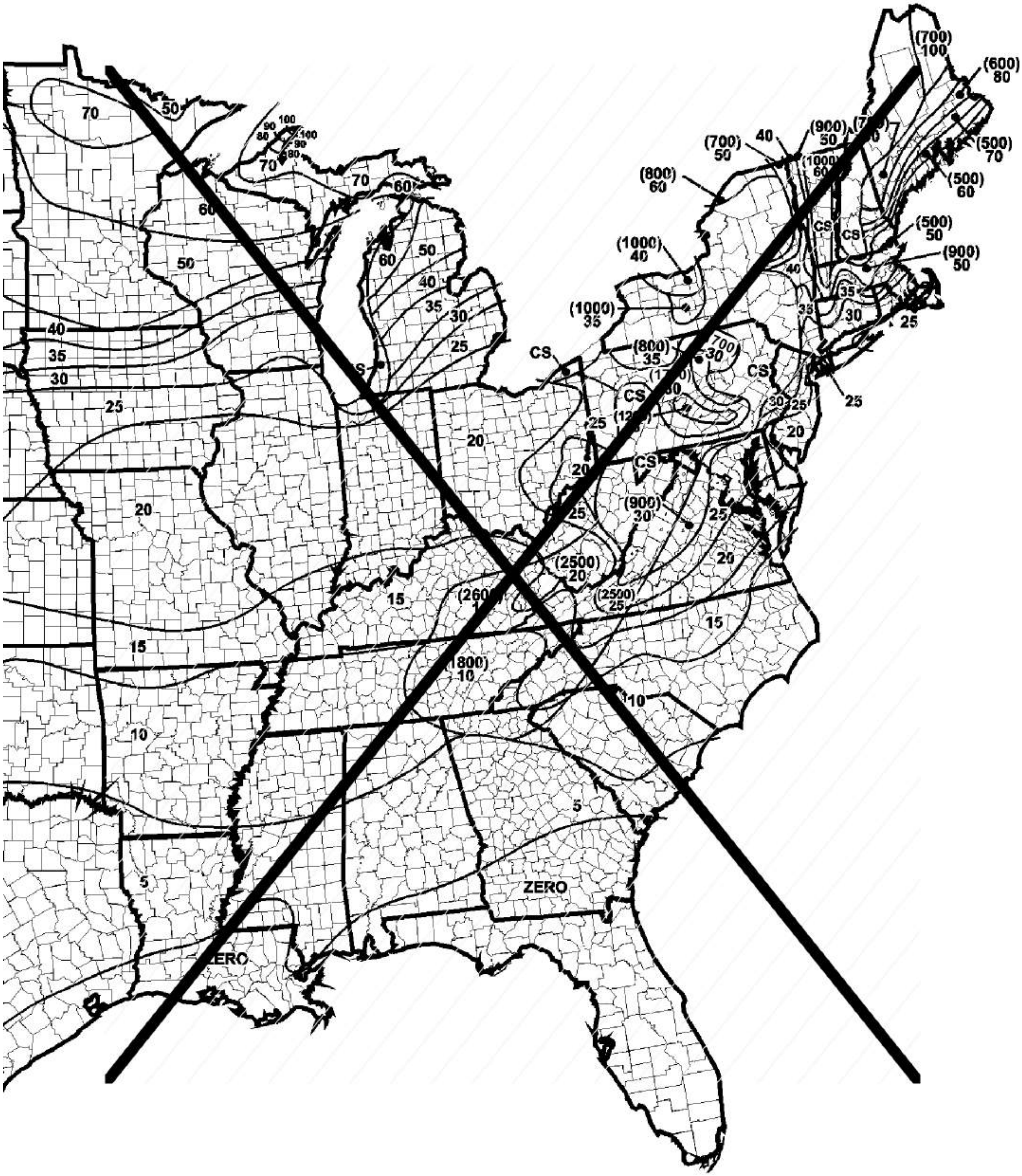
~~a. In CS areas, site-specific case studies are required to establish ground snow loads. Extreme local variations in ground snow loads in these areas preclude mapping at this scale.~~

~~b. Numbers in parentheses represent the upper elevation limits in feet for the ground snow load values presented below. Site-specific case studies are required to establish ground snow loads at elevations not covered.~~

1. Location-specific ground snow load values are provided in the Ground Snow Load Geodatabase of geocoded design ground snow load values, which can be accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/ or an approved equivalent.
2. Lines shown on the figure are contours separated by a constant ratio 1.18 with values of 10, 12, 14, 16, 19, 23, 27, 32, 38, 44, 52, 62, 73, 86, 101, 119, and 140 psf.
3. Values denoted with a "+" symbol indicate design ground snow loads at state capitals or other high-population locations.
4. Areas shown in gray represent areas with ground snow loads exceeding 140 psf. Ground snow load values for these locations can be determined from the Geodatabase.

FIGURE R301.2(3) ALLOWABLE STRESS DESIGN GROUND SNOW LOADS, $p_{g(asd)}$, FOR THE UNITED STATES (lb/ft^2)

Delete without substitution:



~~For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 mile = 1.61 km.~~

~~a. In CS areas, site-specific case studies are required to establish ground snow loads. Extreme local variations in ground snow loads in these areas~~

~~preclude mapping at this scale.~~
~~b. Numbers in parentheses represent the upper elevation limits in feet for the ground snow load values presented below. Site-specific case studies are required to establish ground snow loads at elevations not covered.~~

~~**FIGURE R301.2(4) GROUND SNOW LOADS, P_g, FOR THE UNITED STATES (lb/ft^2)**~~

Revise as follows:

R301.2.3 Snow loads. <u>Ground snow loads shall be determined in accordance with Figure R301.2(3) Allowable Stress Design Ground Snow Loads, *$p_{g(asd)}$*, or shall be determined in accordance in with Section 1608 of the IBC.</u> Wood-framed construction, cold-formed, steel-framed construction and masonry and concrete construction, and *structural insulated panel* construction in regions with <u>*allowable stress design*</u> ground snow loads, <u>*$p_{g(asd)}$*</u>, 70 pounds per square foot (3.35 kPa) or less, shall be in accordance with Chapters 5, 6 and 8. Buildings in regions with <u>*allowable stress design*</u> ground snow loads, <u>*$p_{g(asd)}$*</u>, greater than 70 pounds per square foot (3.35 kPa) shall be designed in accordance with accepted engineering practice.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal includes technical updates as well as editorial coordination. Technical updates are explained further below, along with a rationale for developing the new ground snow load data.

A summary of the specific coordination changes is provided below.

Table R301.2 Climatic and Geographic Design Criteria. This table is updated to clarify that this is an allowable stress design ground snow load, *$p_{g(asd)}$*, in both the header and in footnote o. The definition for "Ground Snow Loads, *$p_{g(asd)}$*. Allowable stress design ground snow load" was submitted to Section 202 in the IBC.

Figure R301.2(3) Ground Snow Loads. This map was replaced with a new Allowable Stress Design Ground Snow Load, <u>*$p_{g(asd)}$*</u>, map

Section R301.2.3 Snow Loads. This section was updated with a pointer to the Allowable Stress Design Ground Snow Loads map, as well as a pointer to Section 1608 in the IBC. This was also clarified that all of the limits are for allowable stress design ground snow loads.

<u>*Technical Rationale*</u>

The previous editions of ASCE 7 included mapped values for ground snow load, p_g, (GSL) based on a statistical analysis using National Weather Service snowfall data from 1952 to 1992. This map was first included in the 1992 edition of ASCE 7 and was updated with additional information for the 1995 edition. It has remained essentially as it was in 1995 for each subsequent edition through 2016. Additionally, at the time that map was generated, the authors (researchers at the Cold Regions Research and Engineering Laboratory [CRREL] of the US Army Corps of Engineers) marked as Case Study or 'CS' several significant regions, encompassing large parts of eighteen states, where the statistical analysis had not been completed or the data were insufficient to perform the analysis. The CS regions place significant burden on structural engineers to do snow load hazard analysis, and very little guidance has been provided as to how to conduct such studies.

The new GSL in ASCE 7-22 are included in four updated national GSL datasets in electronic and map form. The electronic datasets are defined in the Ground Snow Loads Geodatabase (version 2022-1.0) in ASCE 7-22, and the maps in Chapter 7 are a representation of that data. The new snow loads are also based on nearly 30 years of additional snow load data since the previous study and updated procedures for estimating snow loads from depth-only measurements. The loads account for site-specific variability throughout the United States in both the magnitude and variation of the annual ground snow loads. Additionally, this approach incorporates advanced spatial mapping that has reduced the number and size of case study regions in mountainous areas significantly and eliminates discontinuities in design values across state boundaries (Bean et al. 2021).

A very small fraction of the locations defined in the Ground Snow Loads Geodatabase indicate that a case study must be completed to determine the ground snow load. These case-study regions are now limited and apply only to locations higher than any locally available snow measurement locations. Database ground snow load values are still provided to the user, with a warning that the estimated value lies outside the range of elevations of surrounding measurement locations. Information from local experts, from the Bean et al. (2021) report, or from Buska et al. (2020) can be used to determine values at these locations.

ASCE 7-22 also includes GSL maps for each Risk Category. Each of these maps (and associated datasets) is based on reliability calculations that target the reliability objectives of Chapter 1 of ASCE 7-22. The adoption of reliability-targeted design ground snow loads represents a significant change from ASCE/SEI 7-16 and prior editions, which previously used ground snow loads with a 50-year mean recurrence interval (MRI). Reliability-targeted loads are adopted to address the nonuniform reliability of roofs designed according to the 50-year snow load in different parts of the country, due to climatic differences. In some parts of the country, designing for the 1.6 load factor times the 50-year value does not meet the reliability targets of the standard (and, in some of these places, failures due to an underestimated ground snow load have been observed); in other places, designing for the 1.6 load factor times the 50-year value is unnecessarily conservative.

Given that the values of GSL have been provided as allowable stress loads up until this point, there are many provisions within the IBC and the IRC that rely on ASD values. Therefore this proposed new map provide a conversion from the strength-based values provided in the reliability-targeted ground snow loads maps in ASCE 7 and the IBC to an ASD map for the IRC.

References

Bean, B., Maguire, M., Sun, Y, Wagstaff, J., Al-Rubaye, S., Wheeler, J., Jarman, S., and Rogers, M. (2021). “The 2020 National Snow Load Study.” Mathematics and Statistics Faculty Publications. Paper 276.

Buska, J., Greatorex, A., and Tobiasson, W. (2020). “Site-specific Case Studies for Determining Ground Snow Loads in the United States”. U.S. Army Corps of Engineers Engineer Research and Development Center. ERDC/CRREL SR-20-1.

Cost Impact: The code change proposal will increase the cost of construction
ASCE 7 is a national minimum design load standard. Therefore, as the study of each hazard advances from one edition to the next, updates to the national maps will impact the nation differently. In this case, the ground snow loads developed for ASCE 7-22 will result in some decreases in loads, but on average results in an increase in loads. The proposed code change will modestly increase the cost of construction in the areas where the snow loads have increased.

In order to estimate this impact, roof total loads that would be used in specifying roof secondary structural members, such as open-web roof joists, were calculated for approximately 80 locations throughout the portion of the conterminous US affected by snow loading. The box plot in Figure 1 shows the ratio of these Total Load results.

The average change in Total Load is a 5% increase. At most locations, the change is between a 5% reduction to a 15% increase. Regarding the effect of this average 5% increase, the increase in Total Load would generally equate to an increase in weight of these secondary members of +5% and a structural cost impact of about +2-3%. Extending this to the effects on the total in-place cost of the structure, we expect an estimated impact of +0.5-0.7%.

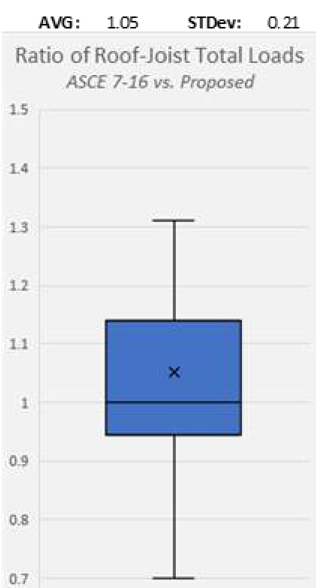


Figure 1. Box plot of ratio of roof-joist total loads of ASCE 7-16 vs. ASCE 7-22.

Included in the final report (Bean et al. 2021) comparisons were made between the ASCE 7-16 ground snow loads and the ASCE 7-22 ground snow loads maps after adjusting for ASD values; Figure 2 shows a map of the ratio between the ASCE 7-22 Risk Category II map and the ASCE 7-16

ASD map. Ratios are only calculated in areas where both 7-22 and 7-16 snow load requirements are between 10 and 100 psf. There is some resolution limitations to the mapped values that make comparisons difficult in the western states. From the map, areas of increase snow load and decrease snow load can be demonstrated.

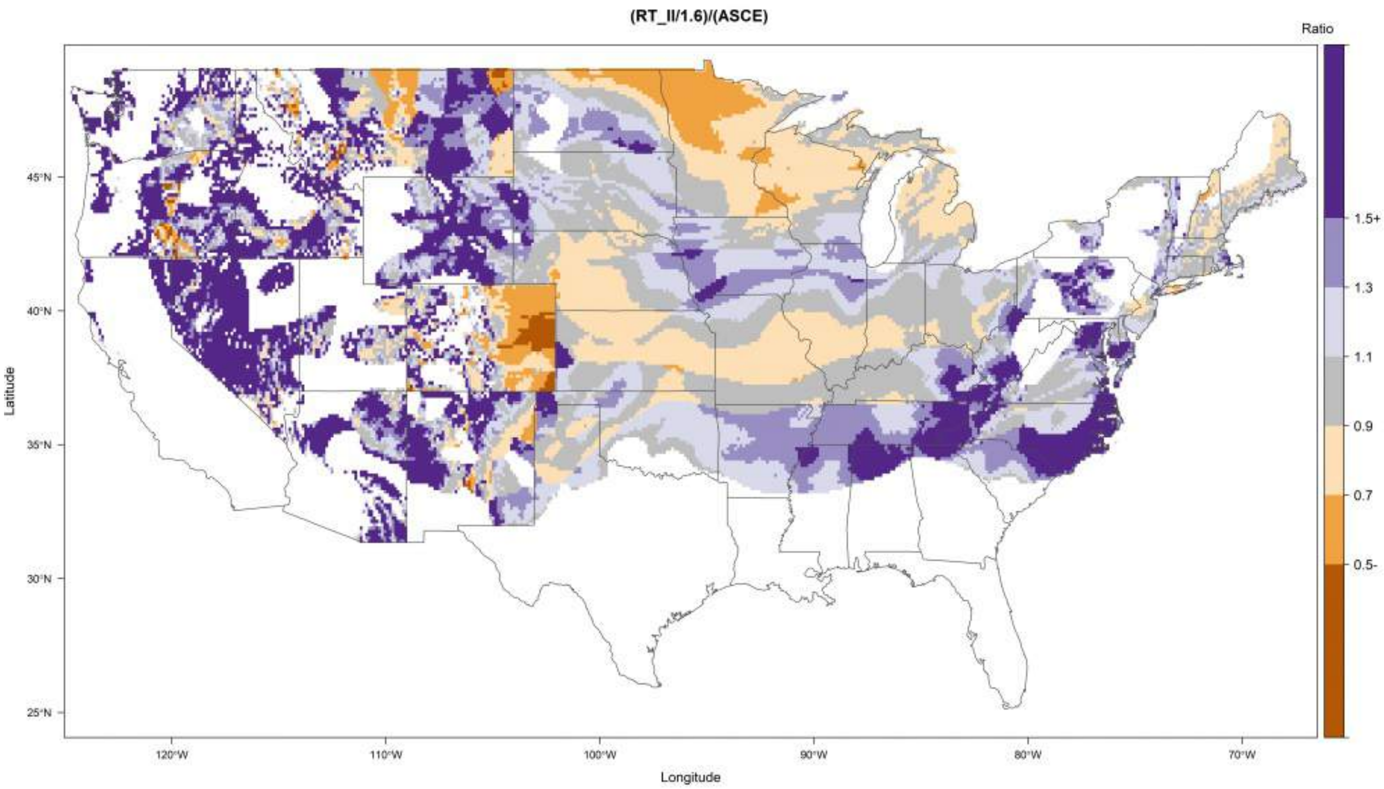


Figure 2. Ratio of ASCE 7-22 to ASCE 7-16 (Bean et al. 2021)

References

Bean, B., Maguire, M., Sun, Y, Wagstaff, J., Al-Rubaye, S., Wheeler, J., Jarman, S., and Rogers, M. (2021). “The 2020 National Snow Load Study.” Mathematics and Statistics Faculty Publications. Paper 276.

RB34-22

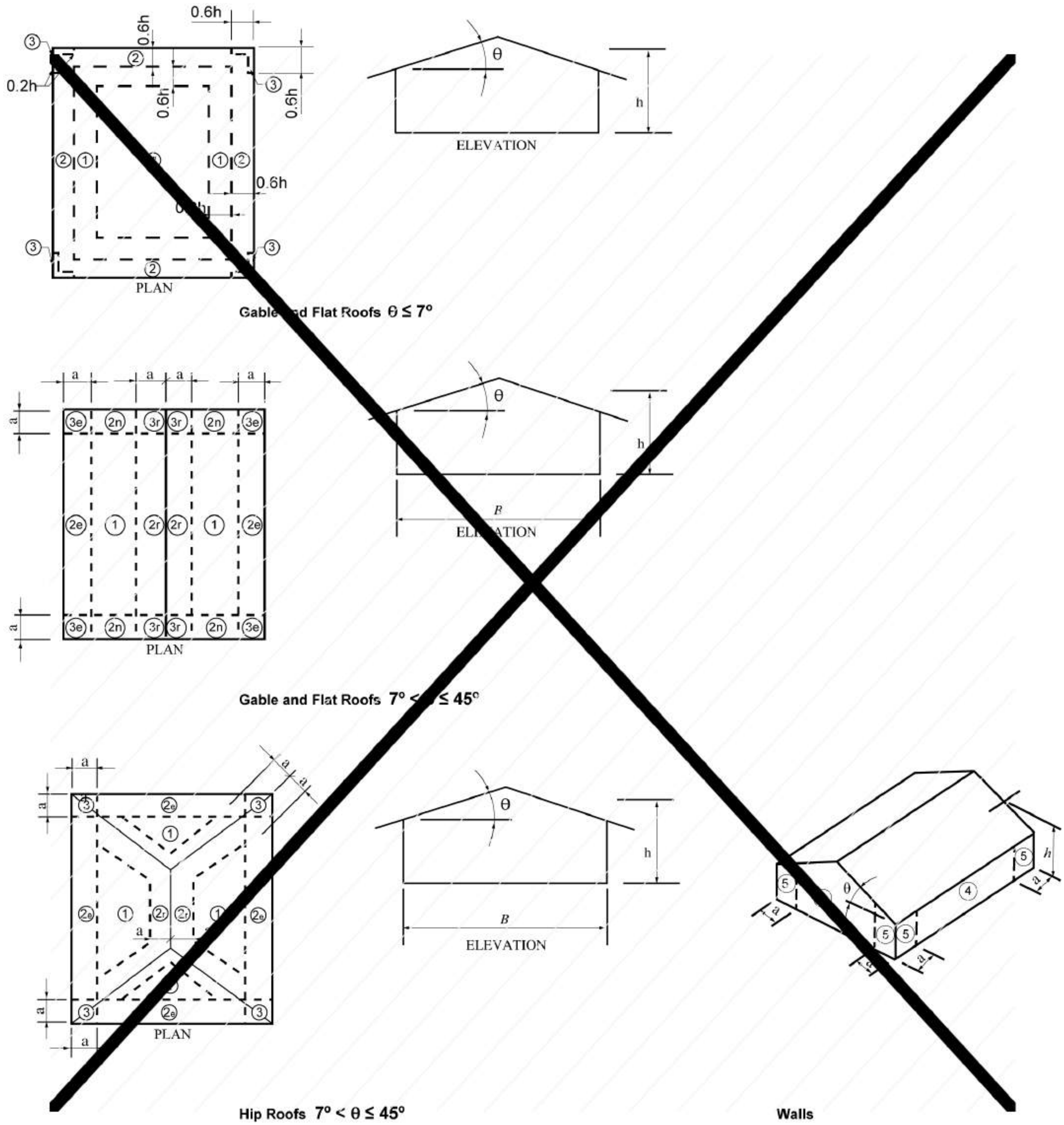
RB35-22

IRC: FIGURE R301.2.1, TABLE R301.2.1(1), TABLE R301.2.1(2), FIGURE R301.2.1.1, FIGURE R301.2(2), R301.2.1.5

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety (testafford@charter.net); Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org); Don Scott, representing ASCE 7 Wind Load Subcommittee (dscott@pcs-structural.com)

2021 International Residential Code

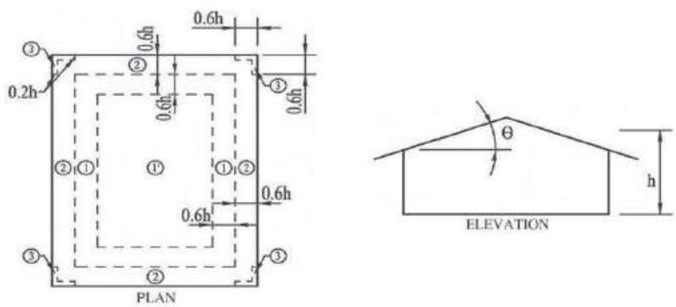
Delete and substitute as follows:



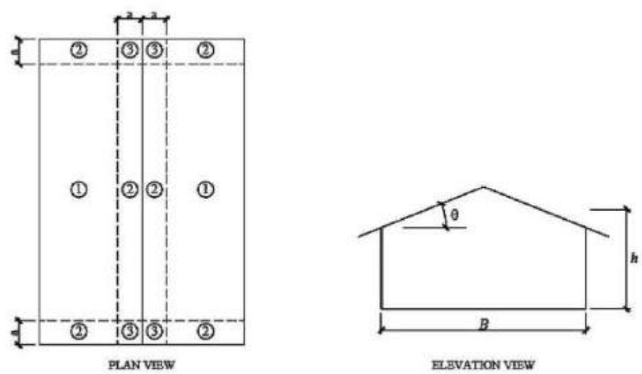
~~For SI: 1 foot = 304.8 mm, 1 degree = 0.0175 rad.~~

~~**Note:** a = 4 feet in all cases.~~

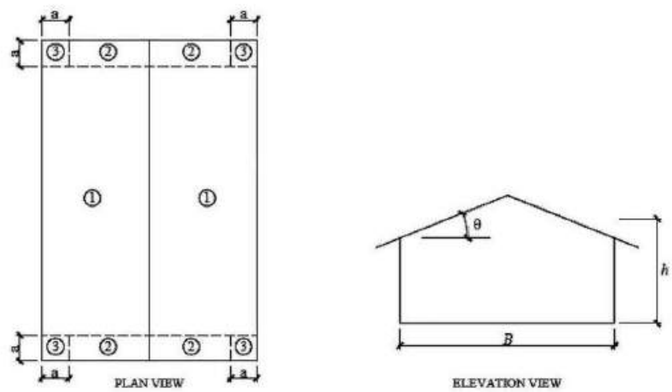
~~**FIGURE R301.2.1 COMPONENT AND CLADDING PRESSURE ZONES**~~



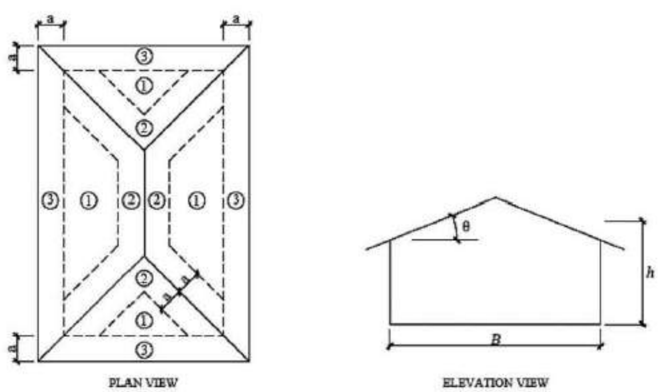
Gable and Flat Roofs θ ≤ 7°



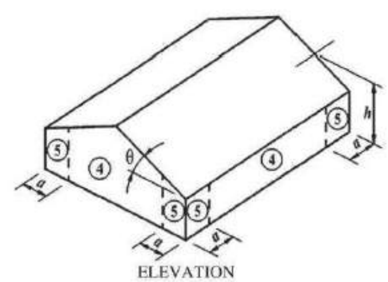
Gable Roofs 7° < θ ≤ 27°



Gable Roofs 27° < θ ≤ 45°



Hip Roofs 7° < θ ≤ 45°



Walls

For SI: 1 foot = 304.8mm, 1 degree = 0.0175 rad

Note: a = 4 feet in all cases

FIGURE R301.2.1 COMPONENT AND CLADDING PRESSURE ZONES

Revise as follows:

TABLE R301.2.1(1) COMPONENT AND CLADDING LOADS FOR A BUILDING WITH A MEAN ROOF HEIGHT OF 30 FEET LOCATED IN EXPOSURE B (ASD) (psf) [a, b, c, d, e, f, g]

	Zone	Effective Wind Area	90		95		100		105		110		115		120		130		140		150		1
			POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS
Gable Roof < 7	1,1'	10	3.6	-13.9	4.0	-15.5	4.4	-17.2	4.8	-19.0	5.3	-20.8	5.8	-22.7	6.3	-24.8	7.4	-29.1	8.6	-33.7	9.9	-38.7	11.2
	1,1'	20	3.3	-12.4	3.7	-13.8	4.1	-15.3	4.5	-16.8	5.0	-18.5	5.4	-20.2	5.9	-22.0	7.0	-25.8	8.1	-29.9	9.3	-34.4	10.5
	1,1'	50	3.0	-10.3	3.4	-11.5	3.8	-12.7	4.1	-14.0	4.5	-15.4	5.0	-16.8	5.4	-18.3	6.3	-21.5	7.4	-24.9	8.4	-28.6	9.6
	1,1'	100	2.8	-8.7	3.1	-9.7	3.5	-10.8	3.8	-11.9	4.2	-13.1	4.6	-14.3	5.0	-15.5	5.9	-18.2	6.8	-21.2	7.8	-24.3	8.9
	2	10	3.6	-18.4	4.0	-20.5	4.4	-22.7	4.8	-25.0	5.3	-27.4	5.8	-30.0	6.3	-32.7	7.4	-38.3	8.6	-44.5	9.9	-51.0	11.2
	2	20	3.3	-16.4	3.7	-18.2	4.1	-20.2	4.5	-22.3	5.0	-24.5	5.4	-26.7	5.9	-29.1	7.0	-34.2	8.1	-39.6	9.3	-45.5	10.5
	2	50	3.0	-13.7	3.4	-15.3	3.8	-16.9	4.1	-18.7	4.5	-20.5	5.0	-22.4	5.4	-24.4	6.3	-28.6	7.4	-33.2	8.4	-38.1	9.6
	2	100	2.8	-11.7	3.1	-13.0	3.5	-14.5	3.8	-15.9	4.2	-17.5	4.6	-19.1	5.0	-20.8	5.9	-24.4	6.8	-28.3	7.8	-32.5	8.9
	3	10	3.6	-25.0	4.0	-27.9	4.4	-30.9	4.8	-34.1	5.3	-37.4	5.8	-40.9	6.3	-44.5	7.4	-52.2	8.6	-60.6	9.9	-69.6	11.2
	3	20	3.3	-21.0	3.7	-23.4	4.1	-26.0	4.5	-28.6	5.0	-31.4	5.4	-34.4	5.9	-37.4	7.0	-43.9	8.1	-50.9	9.3	-58.4	10.5
	3	50	3.0	-15.7	3.4	-17.5	3.8	-19.4	4.1	-21.4	4.5	-23.5	5.0	-25.6	5.4	-27.9	6.3	-32.8	7.4	-38.0	8.4	-43.6	9.6
	3	100	2.8	-11.7	3.1	-13.0	3.5	-14.5	3.8	-15.9	4.2	-17.5	4.6	-19.1	5.0	-20.8	5.9	-24.4	6.8	-28.3	7.8	-32.5	8.9
Gable Roof > 7 to 20 degrees	1	10	5.8	-16.2	6.4	-18.0	7.1	-19.9	7.9	-22.0	8.6	-24.1	9.4	-26.4	10.3	-28.7	12.1	-33.7	14.0	-39.1	16.1	-44.9	18.3
	1	20	5.3	-13.9	5.9	-15.5	6.5	-17.1	7.2	-18.9	7.9	-20.7	8.6	-22.7	9.4	-24.7	11.0	-29.0	12.7	-33.6	14.6	-38.6	16.6
	1	50	4.6	-10.9	5.1	-12.1	5.7	-13.4	6.2	-14.8	6.8	-16.3	7.5	-17.8	8.2	-19.4	9.6	-22.7	11.1	-26.4	12.7	-30.3	14.5
	1	100	4.1	-8.6	4.5	-9.6	5.0	-10.7	5.5	-11.7	6.1	-12.9	6.6	-14.1	7.2	-15.3	8.5	-18.0	9.8	-20.9	11.3	-24.0	12.9
	2	10	5.8	-21.3	6.4	-23.8	7.1	-26.3	7.9	-29.0	8.6	-31.9	9.4	-34.8	10.3	-37.9	12.1	-44.5	14.0	-51.6	16.1	-59.3	18.3
	2	20	5.3	-18.4	5.9	-20.5	6.5	-22.7	7.2	-25.1	7.9	-27.5	8.6	-30.1	9.4	-32.8	11.0	-38.4	12.7	-44.6	14.6	-51.2	16.6
	2	50	4.6	-14.6	5.1	-16.2	5.7	-18.0	6.2	-19.8	6.8	-21.8	7.5	-23.8	8.2	-25.9	9.6	-30.4	11.1	-35.3	12.7	-40.5	14.5
	2	100	4.1	-11.7	4.5	-13.0	5.0	-14.4	5.5	-15.9	6.1	-17.4	6.6	-19.0	7.2	-20.7	8.5	-24.3	9.8	-28.2	11.3	-32.4	12.9
	3	10	5.8	-28.0	6.4	-31.2	7.1	-34.6	7.9	-38.1	8.6	-41.8	9.4	-45.7	10.3	-49.8	12.1	-58.4	14.0	-67.8	16.1	-77.8	18.3
	3	20	5.3	-24.0	5.9	-26.7	6.5	-29.6	7.2	-32.7	7.9	-35.8	8.6	-39.2	9.4	-42.7	11.0	-50.1	12.7	-58.1	14.6	-66.6	16.6
	3	50	4.6	-18.7	5.1	-20.8	5.7	-23.1	6.2	-25.4	6.8	-27.9	7.5	-30.5	8.2	-33.2	9.6	-39.0	11.1	-45.2	12.7	-51.9	14.5
	3	100	4.1	-14.7	4.5	-16.3	5.0	-18.1	5.5	-20.0	6.1	-21.9	6.6	-24.0	7.2	-26.1	8.5	-30.6	9.8	-35.5	11.3	-40.8	12.9

	1	10	5.8	-12.4	6.4	-13.9	7.1	-15.4	7.9	-16.9	8.6	-18.6	9.4	-20.3	10.3	-22.1	12.1	-26.0	14.0	-30.1	16.1	-34.6	18.3
	1	20	5.3	-11.2	5.9	-12.5	6.5	-13.9	7.2	-15.3	7.9	-16.8	8.6	-18.4	9.4	-20.0	11.0	-23.5	12.7	-27.2	14.6	-31.2	16.6
	1	50	4.6	-9.7	5.1	-10.8	5.7	-11.9	6.2	-13.1	6.8	-14.4	7.5	-15.8	8.2	-17.2	9.6	-20.2	11.1	-23.4	12.7	-26.8	14.5
	1	100	4.1	-8.5	4.5	-9.4	5.0	-10.4	5.5	-11.5	6.1	-12.6	6.6	-13.8	7.2	-15.0	8.5	-17.7	9.8	-20.5	11.3	-23.5	12.9
	2	10	5.8	-19.9	6.4	-22.1	7.1	-24.5	7.9	-27.0	8.6	-29.7	9.4	-32.4	10.3	-35.3	12.1	-41.4	14.0	-48.0	16.1	-55.2	18.3
Gable Roof > 20 to 27 degrees	2	20	5.3	-17.0	5.9	-18.9	6.5	-20.9	7.2	-23.1	7.9	-25.3	8.6	-27.7	9.4	-30.1	11.0	-35.4	12.7	-41.0	14.6	-47.1	16.6
	2	50	4.6	-13.1	5.1	-14.6	5.7	-16.2	6.2	-17.9	6.8	-19.6	7.5	-21.4	8.2	-23.3	9.6	-27.4	11.1	-31.8	12.7	-36.5	14.5
	2	100	4.1	-10.2	4.5	-11.4	5.0	-12.6	5.5	-13.9	6.1	-15.3	6.6	-16.7	7.2	-18.2	8.5	-21.3	9.8	-24.7	11.3	-28.4	12.9
	3	10	5.8	-23.6	6.4	-26.3	7.1	-29.1	7.9	-32.1	8.6	-35.2	9.4	-38.5	10.3	-41.9	12.1	-49.2	14.0	-57.0	16.1	-65.4	18.3
	3	20	5.3	-20.0	5.9	-22.3	6.5	-24.7	7.2	-27.2	7.9	-29.9	8.6	-32.6	9.4	-35.5	11.0	-41.7	12.7	-48.4	14.6	-55.5	16.6
	3	50	4.6	-15.3	5.1	-17.0	5.7	-18.9	6.2	-20.8	6.8	-22.8	7.5	-24.9	8.2	-27.2	9.6	-31.9	11.1	-37.0	12.7	-42.4	14.5
	3	100	4.1	-11.7	4.5	-13.0	5.0	-14.5	5.5	-15.9	6.1	-17.5	6.6	-19.1	7.2	-20.8	8.5	-24.4	9.8	-28.3	11.3	-32.5	12.9
	1	10	8.0	-14.7	8.9	-16.3	9.9	-18.1	10.9	-20.0	12.0	-21.9	13.1	-24.0	14.2	-26.1	16.7	-30.6	19.4	-35.5	22.2	-40.8	25.3
	1	20	7.3	-12.4	8.2	-13.9	9.0	-15.4	10.0	-16.9	10.9	-18.6	11.9	-20.3	13.0	-22.1	15.3	-26.0	17.7	-30.1	20.3	-34.6	23.1
	1	50	6.4	-9.5	7.1	-10.6	7.9	-11.7	8.7	-12.9	9.6	-14.2	10.5	-15.5	11.4	-16.9	13.4	-19.8	15.5	-23.0	17.8	-26.4	20.3
	1	100	5.7	-7.3	6.4	-8.1	7.1	-9.0	7.8	-9.9	8.6	-10.8	9.3	-11.9	10.2	-12.9	11.9	-15.1	13.9	-17.6	15.9	-20.2	18.1
	2	10	8.0	-16.2	8.9	-18.0	9.9	-19.9	10.9	-22.0	12.0	-24.1	13.1	-26.4	14.2	-28.7	16.7	-33.7	19.4	-39.1	22.2	-44.9	25.3
Gable Roof > 27 to 45 degrees	2	20	7.3	-14.4	8.2	-16.1	9.0	-17.8	10.0	-19.7	10.9	-21.6	11.9	-23.6	13.0	-25.7	15.3	-30.1	17.7	-34.9	20.3	-40.1	23.1
	2	50	6.4	-12.2	7.1	-13.6	7.9	-15.0	8.7	-16.6	9.6	-18.2	10.5	-19.9	11.4	-21.6	13.4	-25.4	15.5	-29.5	17.8	-33.8	20.3
	2	100	5.7	-10.5	6.4	-11.7	7.1	-12.9	7.8	-14.2	8.6	-15.6	9.3	-17.1	10.2	-18.6	11.9	-21.8	13.9	-25.3	15.9	-29.0	18.1
	3	10	8.0	-19.9	8.9	-22.1	9.9	-24.5	10.9	-27.0	12.0	-29.7	13.1	-32.4	14.2	-35.3	16.7	-41.4	19.4	-48.0	22.2	-55.2	25.3
	3	20	7.3	-17.3	8.2	-19.3	9.0	-21.3	10.0	-23.5	10.9	-25.8	11.9	-28.2	13.0	-30.7	15.3	-36.1	0.0	-41.8	20.3	-48.0	23.1
	3	50	6.4	-13.9	7.1	-15.5	7.9	-17.1	8.7	-18.9	9.6	-20.7	10.5	-22.7	11.4	-24.7	13.4	-29.0	15.5	-33.6	17.8	-38.6	20.3
	3	100	5.7	-11.3	6.4	-12.6	7.1	-14.0	7.8	-15.4	8.6	-16.9	9.3	-18.5	10.2	-20.1	11.9	-23.6	13.9	-27.4	15.9	-31.4	18.1
	1	10	6.5	-14.7	7.3	-16.3	8.0	-18.1	8.9	-20.0	9.7	-21.9	10.6	-24.0	11.6	-26.1	13.6	-30.6	15.8	-35.5	18.1	-40.8	20.6
	1	20	5.6	-13.0	6.3	-14.4	6.9	-16.0	7.7	-17.6	8.4	-19.4	9.2	-21.2	10.0	-23.0	11.7	-27.0	13.6	-31.3	15.6	-36.0	17.8

	1	50	4.4	-10.7	5.0	-11.9	5.5	-13.2	6.1	-14.5	6.6	-16.0	7.3	-17.5	7.9	-19.0	9.3	-22.3	10.8	-25.9	12.4	-29.7	14.1
	1	100	3.6	-9.0	4.0	-10.0	4.4	-11.1	4.8	-12.2	5.3	-13.4	5.8	-14.7	6.3	-16.0	7.4	-18.7	8.6	-21.7	9.9	-24.9	11.2
Hip Roof > 7 to 20 degrees	2	10	6.5	-19.1	7.3	-21.3	8.0	-23.6	8.9	-26.0	9.7	-28.6	10.6	-31.2	11.6	-34.0	13.6	-39.9	15.8	-46.3	18.1	-53.1	20.6
	2	20	5.6	-17.2	6.3	-19.2	6.9	-21.3	7.7	-23.5	8.4	-25.7	9.2	-28.1	10.0	-30.6	11.7	-35.9	13.6	-41.7	15.6	-47.9	17.8
	2	50	4.4	-14.7	5.0	-16.4	5.5	-18.2	6.1	-20.1	6.6	-22.0	7.3	-24.1	7.9	-26.2	9.3	-30.7	10.8	-35.7	12.4	-40.9	14.1
	2	100	3.6	-12.9	4.0	-14.3	4.4	-15.9	4.8	-17.5	5.3	-19.2	5.8	-21.0	6.3	-22.8	7.4	-26.8	8.6	-31.1	9.9	-35.7	11.2
	3	10	6.5	-20.6	7.3	-22.9	8.0	-25.4	8.9	-28.0	9.7	-30.8	10.6	-33.6	11.6	-36.6	13.6	-43.0	15.8	-49.8	18.1	-57.2	20.6
	3	20	5.6	-18.5	6.3	-20.7	6.9	-22.9	7.7	-25.2	8.4	-27.7	9.2	-30.3	10.0	-33.0	11.7	-38.7	13.6	-44.9	15.6	-51.5	17.8
	3	50	4.4	-15.8	5.0	-17.6	5.5	-19.5	6.1	-21.5	6.6	-23.6	7.3	-25.8	7.9	-28.1	9.3	-33.0	10.8	-38.3	12.4	-43.9	14.1
	3	100	3.6	-13.8	4.0	-15.3	4.4	-17.0	4.8	-18.7	5.3	-20.6	5.8	-22.5	6.3	-24.5	7.4	-28.7	8.6	-33.3	9.9	-38.2	11.2
	1	10	6.5	-11.7	7.3	-13.0	8.0	-14.5	8.9	-15.9	9.7	-17.5	10.6	-19.1	11.6	-20.8	13.6	-24.4	15.8	-28.3	18.1	-32.5	20.6
	1	20	5.6	-10.4	6.3	-11.6	6.9	-12.8	7.7	-14.1	8.4	-15.5	9.2	-16.9	10.0	-18.4	11.7	-21.6	13.6	-25.1	15.6	-28.8	17.8
	1	50	4.4	-8.6	5.0	-9.6	5.5	-10.6	6.1	-11.7	6.6	-12.8	7.3	-14.0	7.9	-15.3	9.3	-17.9	10.8	-20.8	12.4	-23.9	14.1
	1	100	3.6	-7.3	4.0	-8.1	4.4	-9.0	4.8	-9.9	5.3	-10.8	5.8	-11.9	6.3	-12.9	7.4	-15.1	8.6	-17.6	9.9	-20.2	11.2
	2	10	6.5	-16.2	7.3	-18.0	8.0	-19.9	8.9	-22.0	9.7	-24.1	10.6	-26.4	11.6	-28.7	13.6	-33.7	15.8	-39.1	18.1	-44.9	20.6
Hip Roof > 20 to 27 degrees	2	20	5.6	-13.9	6.3	-15.5	6.9	-17.2	7.7	-18.9	8.4	-20.8	9.2	-22.7	10.0	-24.7	11.7	-29.0	13.6	-33.7	15.6	-38.7	17.8
	2	50	4.4	-11.0	5.0	-12.2	5.5	-13.5	6.1	-14.9	6.6	-16.4	7.3	-17.9	7.9	-19.5	9.3	-22.9	10.8	-26.6	12.4	-30.5	14.1
	2	100	3.6	-8.7	4.0	-9.7	4.4	-10.8	4.8	-11.9	5.3	-13.1	5.8	-14.3	6.3	-15.5	7.4	-18.2	8.6	-21.2	9.9	-24.3	11.2
	3	10	6.5	-16.2	7.3	-18.0	8.0	-19.9	8.9	-22.0	9.7	-24.1	10.6	-26.4	11.6	-28.7	13.6	-33.7	15.8	-39.1	18.1	-44.9	20.6
	3	20	5.6	-13.9	6.3	-15.5	6.9	-17.2	7.7	-18.9	8.4	-20.8	9.2	-22.7	10.0	-24.7	11.7	-29.0	13.6	-33.7	15.6	-38.7	17.8
	3	50	4.4	-11.0	5.0	-12.2	5.5	-13.5	6.1	-14.9	6.6	-16.4	7.3	-17.9	7.9	-19.5	9.3	-22.9	10.8	-26.6	12.4	-30.5	14.1
	3	100	3.6	-8.7	4.0	-9.7	4.4	-10.8	4.8	-11.9	5.3	-13.1	5.8	-14.3	6.3	-15.5	7.4	-18.2	8.6	-21.2	9.9	-24.3	11.2
	1	10	6.5	-12.4	7.3	-13.9	8.0	-15.4	8.9	-16.9	9.7	-18.6	10.6	-20.3	11.6	-22.1	13.6	-26.0	15.8	-30.1	18.1	-34.6	20.6
	1	20	5.6	-10.7	6.3	-11.9	6.9	-13.2	7.7	-14.5	8.4	-15.9	9.2	-17.4	10.0	-19.0	11.7	-22.2	13.6	-25.8	15.6	-29.6	17.8
	1	50	4.4	-8.3	5.0	-9.3	5.5	-10.3	6.1	-11.3	6.6	-12.4	7.3	-13.6	7.9	-14.8	9.3	-17.3	10.8	-20.1	12.4	-23.1	14.1
	1	100	3.6	-6.5	4.0	-7.3	4.4	-8.0	4.8	-8.9	5.3	-9.7	5.8	-10.6	6.3	-11.6	7.4	-13.6	8.6	-15.8	9.9	-18.1	11.2

Hip Roof = 45 degrees	2	10	6.5	-14.7	7.3	-16.3	8.0	-18.1	8.9	-20.0	9.7	-21.9	10.6	-24.0	11.6	-26.1	13.6	-30.6	15.8	-35.5	18.1	-40.8	20.6
	2	20	5.6	-12.4	6.3	-13.9	6.9	-15.4	7.7	-16.9	8.4	-18.6	9.2	-20.3	10.0	-22.1	11.7	-26.0	13.6	-30.1	15.6	-34.6	17.8
	2	50	4.4	-9.5	5.0	-10.6	5.5	-11.7	6.1	-12.9	6.6	-14.2	7.3	-15.5	7.9	-16.9	9.3	-19.8	10.8	-23.0	12.4	-26.4	14.1
	2	100	3.6	-7.3	4.0	-8.1	4.4	-9.0	4.8	-9.9	5.3	-10.8	5.8	-11.9	6.3	-12.9	7.4	-15.1	8.6	-17.6	9.9	-20.2	11.2
	3	10	6.5	-19.1	7.3	-21.3	8.0	-23.6	8.9	-26.0	9.7	-28.6	10.6	-31.2	11.6	-34.0	13.6	-39.9	15.8	-46.3	18.1	-53.1	20.6
	3	20	5.6	-16.0	6.3	-17.8	6.9	-19.7	7.7	-21.8	8.4	-23.9	9.2	-26.1	10.0	-28.4	11.7	-33.4	13.6	-38.7	15.6	-44.4	17.8
	3	50	4.4	-11.9	5.0	-13.2	5.5	-14.6	6.1	-16.1	6.6	-17.7	7.3	-19.4	7.9	-21.1	9.3	-24.8	10.8	-28.7	12.4	-33.0	14.1
	3	100	3.6	-8.7	4.0	-9.7	4.4	-10.8	4.8	-11.9	5.3	-13.1	5.8	-14.3	6.3	-15.5	7.4	-18.2	8.6	-21.2	9.9	-24.3	11.2
Walls	4	10	8.7	-9.5	9.7	-10.6	10.8	-11.7	11.9	-12.9	13.1	-14.2	14.3	-15.5	15.5	-16.9	18.2	-19.8	21.2	-22.9	24.3	-26.3	27.6
	4	20	8.3	-9.1	9.3	-10.1	10.3	-11.2	11.4	-12.4	12.5	-13.6	13.6	-14.8	14.8	-16.2	17.4	-19.0	20.2	-22.0	23.2	-25.2	26.4
	4	50	7.8	-8.6	8.7	-9.5	9.7	-10.6	10.7	-11.7	11.7	-12.8	12.8	-14.0	13.9	-15.2	16.3	-17.9	18.9	-20.7	21.7	-23.8	24.7
	4	100	7.4	-8.2	8.3	-9.1	9.2	-10.1	10.1	-11.1	11.1	-12.2	12.1	-13.3	13.2	-14.5	15.5	-17.1	18.0	-19.8	20.7	-22.7	23.5
	5	10	8.7	-11.7	9.7	-13.0	10.8	-14.5	11.9	-15.9	13.1	-17.5	14.3	-19.1	15.5	-20.8	18.2	-24.4	21.2	-28.3	24.3	-32.5	27.6
	5	20	8.3	-10.9	9.3	-12.2	10.3	-13.5	11.4	-14.9	12.5	-16.3	13.6	-17.8	14.8	-19.4	17.4	-22.8	20.2	-26.4	23.2	-30.3	26.4
	5	50	7.8	-9.9	8.7	-11.0	9.7	-12.2	10.7	-13.4	11.7	-14.8	12.8	-16.1	13.9	-17.6	16.3	-20.6	18.9	-23.9	21.7	-27.4	24.7
	5	100	7.4	-9.1	8.3	-10.1	9.2	-11.2	10.1	-12.4	11.1	-13.6	12.1	-14.8	13.2	-16.2	15.5	-19.0	18.0	-22.0	20.7	-25.2	23.5

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m2, 1 mile per hour = 0.447 m/s, 1 pound per square foot = 0.0479 kPa.

a. The effective wind area shall be equal to the span length multiplied by an effective width. This width shall be not less than one-third the span length. For cladding fasteners, the effective wind areas shall not be greater than the area that is tributary to an individual fastener.

b. For effective areas between those given, the load shall be interpolated or the load associated with the lower effective areas shall be used.

c. Table values shall be adjusted for height and exposure by multiplying by the adjustment coefficient in Table R301.2.1(2).

d. See Figure R301.2.1 for locations of zones.

e. Plus and minus signs signify pressures acting toward and away from the building surfaces.

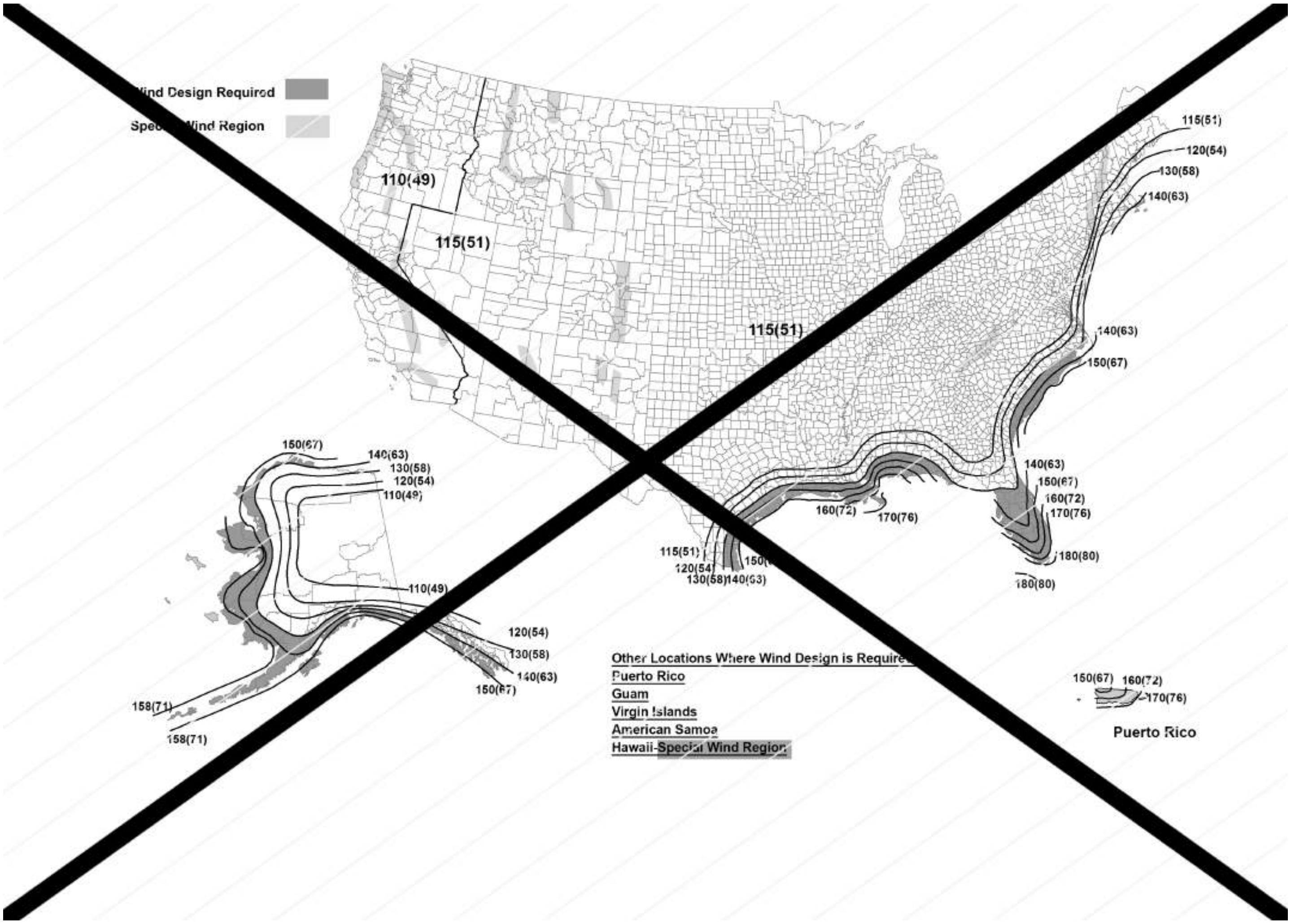
f. Positive and negative design wind pressures shall not be less than 10 psf.

g. Roof overhang loads shall be determined by summing the aplicable roof zone pressure with the adjacent wall zone pressure.

TABLE R301.2.1(2) HEIGHT AND EXPOSURE ADJUSTMENT COEFFICIENTS FOR Table R301.2.1(1)

MEAN ROOF HEIGHT	EXPOSURE		
	B	C	D
15	0.82	1.21	1.47
20	0.89	1.29	1.55
25	0.94	1.35	1.61
30	1.00	1.40	1.66
35	1.05	1.45	1.70
40	~~1.09~~ 1.06	1.49	1.74
45	~~1.12~~ 1.10	1.53	1.78
50	~~1.16~~ 1.13	1.56	1.81
55	~~1.19~~ 1.16	1.59	1.84
60	~~1.22~~ 1.19	1.62	1.87

Delete and substitute as follows:



~~FIGURE R301.2.1.1 REGIONS WHERE WIND DESIGN IS REQUIRED~~

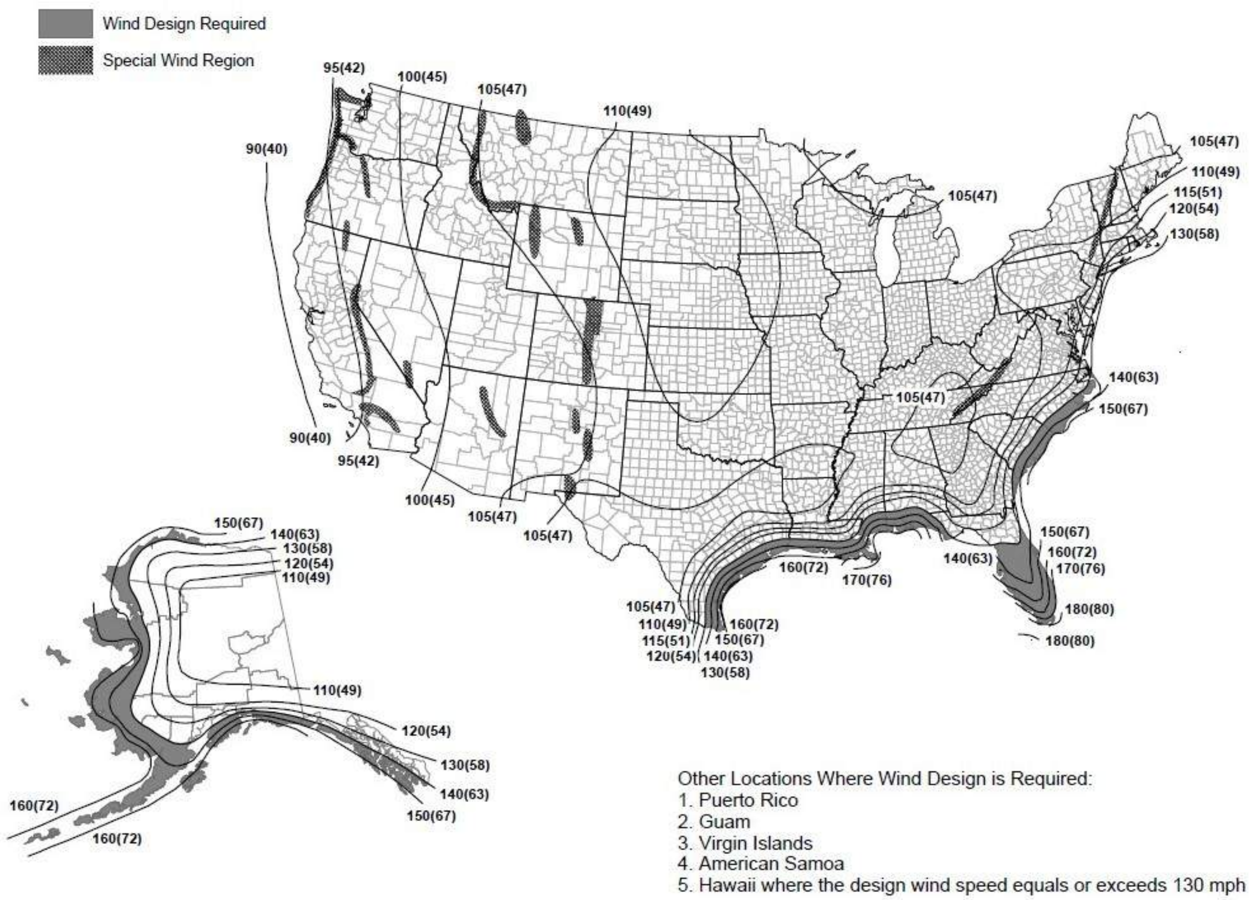
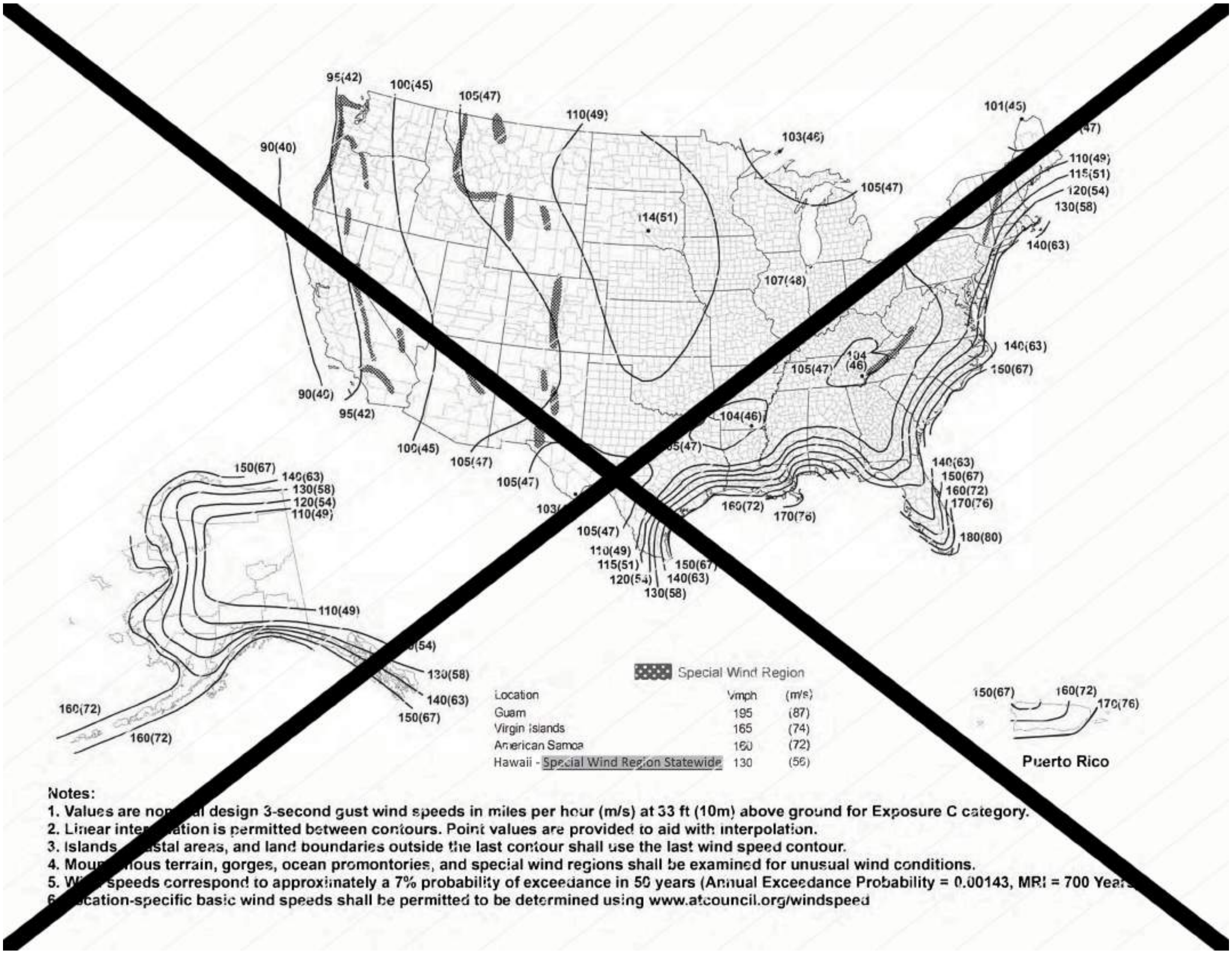
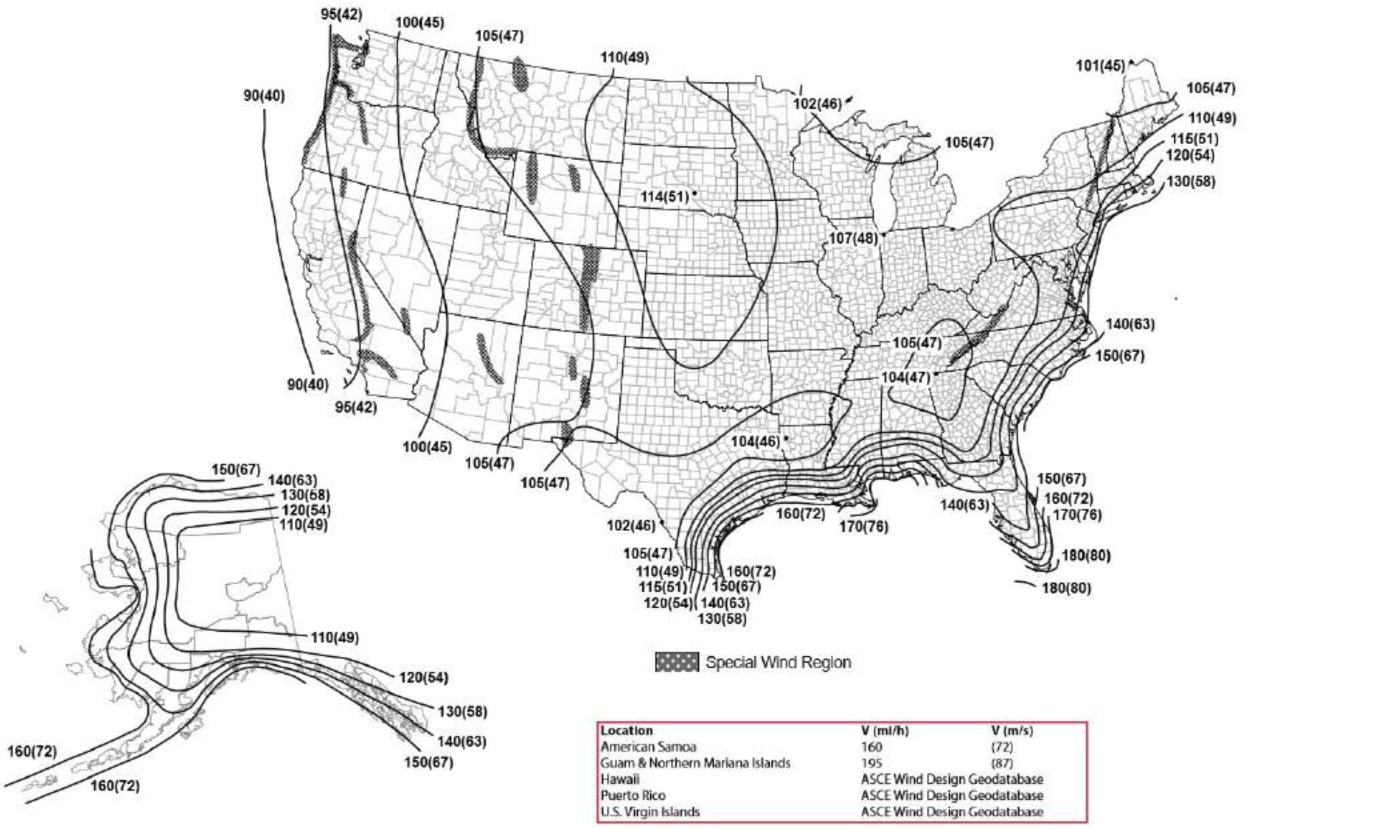


FIGURE R301.2.1.1 REGIONS WHERE WIND DESIGN IS REQUIRED



~~FIGURE R301.2(2) ULTIMATE DESIGN WIND SPEEDS~~



Notes:

1. Values are 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.
5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.
7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 years).
8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE R301.2(2) ULTIMATE DESIGN WIND SPEEDS

Revise as follows:

R301.2.1.5 Topographic wind effects. In areas designated in Table R301.2 as having local historical data documenting structural damage to buildings caused by wind speed-up at isolated *hills*, ridges and escarpments that are abrupt changes from the general topography of the area, topographic wind effects shall be considered in the design of the building in accordance with Section R301.2.1.5.1 or in accordance with the provisions of ASCE 7. See Figure R301.2.1.5.1(1) for topographic features for wind speed-up effect.
In these designated areas, topographic wind effects shall apply only to buildings sited on the top half of an isolated *hill*, *ridge* or escarpment where all

of the following conditions exist:

1. The average slope of the top half of the *hill*, *ridge* or escarpment is 10 percent or greater.
2. The *hill*, *ridge* or escarpment is 60 feet (18 288 mm) or greater in height for Exposure B, 30 feet (9144 mm) or greater in height for Exposure C, and 15 feet (4572 mm) or greater in height for Exposure D.
3. ~~The *hill*, *ridge* or escarpment is isolated or unobstructed by other topographic features of similar height in the upwind direction for a distance measured from its high point of 100 times its height or 2 miles (3.2 km), whichever is less. See Figure R301.2.1.5.1(3) for upwind obstruction.~~
4. ~~The *hill*, *ridge* or escarpment protrudes by a factor of two or more above the height of other upwind topographic features located in any quadrant within a radius of 2 miles (3.2 km) measured from its high point.~~

Reason Statement: This proposal is a coordination proposal to bring the 2024 IRC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal includes technical updates as well as editorial corrections or re-organizations. Technical updates to the wind speed maps within ASCE/SEI 7-22 include new hurricane coastline wind speed contours from the Carolina's through Texas, as well as, new Special Wind Region definitions in Southern California and Northern Colorado. All of these updates are based upon recent wind studies conducted in these areas. These wind speeds for the contiguous United States and Alaska are available from the maps in ASCE 7-22, which are updated in Figure R301.2(2) of this proposal.

Along with the continental United States, the wind speeds for US Virgin Island and Puerto Rico were also updated based upon recent wind studies of these islands. The resulting wind speeds accounting for the steep terrain of these island created a very dense contour map that is not easily read by a map that is sized practically for inclusion into a printed standard. Therefore the wind speeds for US Virgin Islands and Puerto Rico - along with wind speeds for Hawaii - are only included in the ASCE Wind Design Geodatabase and therefore are no longer represented with maps in ASCE/SEI 7-22. Consequently, Hawaii and Puerto Rico maps - as well as values for US Virgin Islands - are being removed from the IBC and replaced with a pointer to the ASCE Wind Design Geodatabase. The wind speeds within the updated Special Wind Regions also are available for the designer ASCE Wind Design Geodatabase. This database of geocoded wind speed design data is freely available and accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/, or from an approved equivalent.

A summary of the coordination changes is provided below.

Figure R301.2(2) Ultimate design wind speed: This section updates the basic wind speed map for the 700 MRI map (Risk Category II) for the contiguous United States and Alaska, as well as the Notes, to match what is in ASCE/SEI 7-22. The pointer to the ASCE Wind Design Geodatabase is added for Hawaii, US Virgin Islands, and Puerto Rico, and because maps for these three areas are no longer produced in ASCE/SEI 7-22, the maps have been removed from the IBC and are not replaced.

Figure R301.2.1 Component and Cladding Pressure Zones.

The zones for roof design have been simplified, see the changes in the Plan View diagrams. The corresponding simplification is updated in **Table R301.2.1(1)**.

Table R301.2.1(2) Height and Exposure Adjustment Coefficients.

Vales for exposure B at 40 feet and above have been slightly reduced.

Figure R301.2.1.1 Regions where wind design is required.

This figure has been updated with the new base map from 7-22.

Section R302.2.1.5 Topographic wind effects.

The designated conditions identified in 3., and in 4., were removed from the requirements in ASCE 7-22.

Cost Impact: The code change proposal will increase the cost of construction
ASCE 7 is a national minimum design load standard. Therefore as the study of each hazard advances from one edition to the next, updates to the national maps will impact the nation differently. In this case, the wind speeds for ASCE 7-22 largely remain unchanged, therefore the is no impact to the cost of construction from the updated maps. However, in some areas the wind speeds decrease and in other areas the wind speeds increase.

The proposed code change will modestly increase the cost of construction along in some areas along the hurricane coastline between the Carolinas and Texas where the windspeeds have increased. Although the wind speeds do increase in some locations along the hurricane coastline, the higher wind speeds influence less than 3% of the United States. The wind speeds decrease in most areas along the hurricane coastline (as shown by the wind speed contours moving closer to the coastline), while in the Gulf Coast area of the Florida Panhandle the contours extend further inland, which indicates higher wind speeds for this area. And most of the rest of the continental United States the speeds do not change and therefore the cost of construction will be unchanged; see the Risk Category II map below that compared ASCE 7-22 to ASCE 7-16. ASCE 7 Wind speeds are available at the ASCE 7 Hazard Tool (https://asce7hazardtool.online/), which is free to all users, to view and compare various locations.

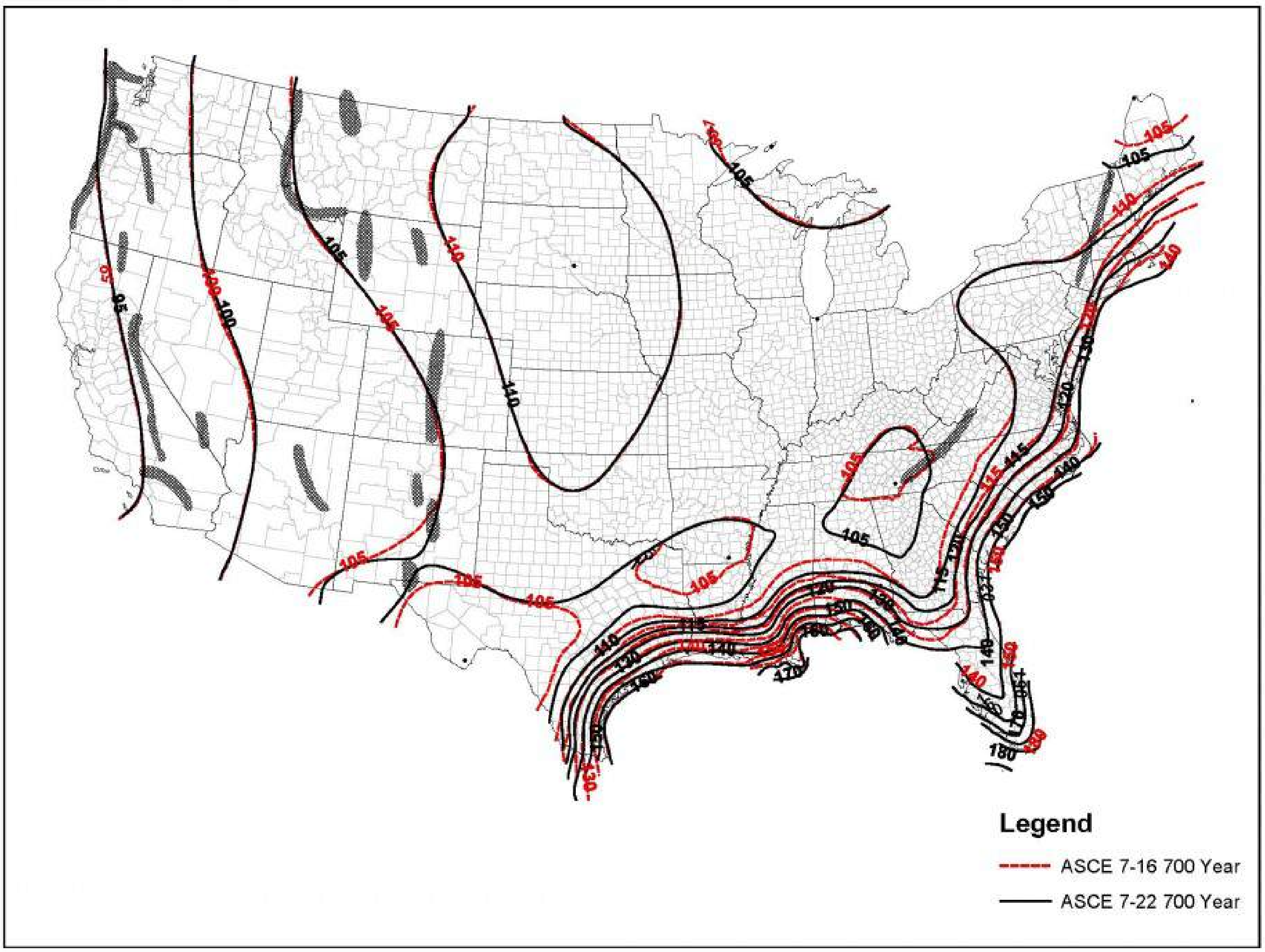


FIGURE: Comparison of ASCE/SEI 7-22 basic wind speeds for Risk Category II (700 Year MRI) to ASCE/SEI 7-16. (Courtesy ARA)

All of the other proposed changes are editorial and will not impact the cost of construction.

RB35-22

RB36-22

IRC: R301.2.1.1

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety

2021 International Residential Code

Revise as follows:

R301.2.1.1 Wind limitations and wind design required. ~~The wind provisions of this code shall not apply to the design of buildings where wind design is required in accordance with Figure R301.2.1.1, or where the ultimate design wind speed, V_{ult}, in Figure R301.2(2) equals or exceeds 140 miles per hour (225 kph) in a special wind region.~~

~~**Exceptions:**~~

1. ~~For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R404 and R608.~~
2. ~~For structural insulated panels, the wind provisions of this code shall apply in accordance with the limitations of Section R610.~~
3. ~~For cold-formed steel *light-frame construction*, the wind provisions of this code shall apply in accordance with the limitations of Sections R505, R603 and R804.~~

In regions where wind design is required in accordance with Figure R301.2.1.1 or where the ultimate design wind speed, V_{ult}, in Figure R301.2(2) equals or exceeds 140 miles per hour (225 kph) in a special wind region, the structural design of buildings for wind loads shall be in accordance with one or more of the following methods:

1. AWC *Wood Frame Construction Manual* (WFCM).
2. ICC *Standard for Residential Construction in High-Wind Regions* (ICC 600).
3. ASCE *Minimum Design Loads for Buildings and Other Structures* (ASCE 7).
4. AISI *Standard for Cold-Formed Steel Framing—Prescriptive Method for One- and Two-Family Dwellings* (AISI S230).
5. International Building Code.

Exceptions:

1. For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R404 and R608.2.
2. For structural insulated panels, the wind provisions of this code shall apply in accordance with the limitations of Section R610.2.
3. For cold-formed steel *light-frame construction*, the wind provisions of this code shall apply in accordance with the limitations of Sections R505.1.1, R603.1.1 and R804.1.1.
4. The seismic provisions of this code apply in accordance with the scope of Section R301.2.2.
5. Exterior wall coverings, roof coverings, and fenestrations shall comply with the provisions of this code.
6. The design of exterior decks for dead, live, and snow loads shall be in accordance with Section R507.

~~The elements of design not addressed by the methods in Items 1 through 5 shall be in accordance with the provisions of this code.~~
Where ASCE 7 or the International Building Code is used for the design of the building, the wind speed map and exposure category requirements as specified in ASCE 7 and the International Building Code shall be used.

Reason Statement: This proposal is one of two proposals intended to clarify the wind limitations in the IRC. Currently, the IRC contains an assortment of requirements for wind loads scattered throughout the code. While Section R301.2.1.1 intends to limit the applicability of the IRC to areas where wind design is not required in accordance with Figure R301.2.1.1, it's not very clear what exactly applies in the IRC in regions where wind design is required. Current Section R301.2.1.1 states that the "wind provisions" of this code do not apply where wind design is required but is not clear anywhere in the code as to what the wind provisions in this code do apply to. The use of the phrase "wind provisions of this code" is very confusing. Clearly the prescriptive fastening schedule in Table R602.3(1) should not apply where wind design is required. However, it's not very clear that this table is actually part of the "wind provisions in this code." This proposal makes it clear that the prescriptive provisions in Chapters 4 through 9 do not apply where wind design is required except as identified in the proposed new exceptions. Provisions in the IRC that do apply in wind design required regions have been consolidated into the Exceptions to Section R301.2.1.1. New language clarifies that it is the "structural design of buildings for wind loads" that is limited in IRC. Therefore, Section R405 (foundation drainage), Section R406 (dampproofing and waterproofing provisions), Section R702 (interior coverings), Section R806 (roof ventilation), Section R807 (attic access) and others would apply as specified in the code.
Additionally, this proposal reorders the language so that the code tells the user directly what is required to be used when located in a wind design required region (WFCM, ICC 600, ASCE 7, AISI S230, and/or IBC). This improves the flow of the code text and is similar to the approach used in the

2000, 2003, 2006 and 2009 IRC.

A new exception is proposed to be added that clarifies that the seismic requirements in the code, including the scope as specified in Section R301.2.2, apply regardless.

A new exception is proposed to be added for roof coverings, wall coverings, and fenestrations which have specific wind limitations and/or specific wind design requirements in the IRC.

A new exception is proposed for decks that clarifies that the design of exterior decks for dead, live, and snow loads is to be in accordance with Section R507.

A similar proposal was submitted last cycle that, with a few modifications, had broad support. However, a couple of points could not be agreed upon prior to the item being brought to the floor. This proposal addresses those concerns from the last cycle.

This proposal is not intended to change any technical requirements in the IRC related to wind design. It is intended to simply clarify the wind limitations in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not impact the cost of construction as it is simply a clarification.

RB36-22

RB37-22

IRC: R301.2.2

Proponents: Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Revise as follows:

R301.2.2 Seismic provisions. Buildings within the scope of this code as defined in Section R101.2 ~~in *Seismic Design Categories* C, D_0, D_1 and D_2~~ shall be constructed in accordance with the requirements of this section and other seismic requirements of this code. The seismic provisions of this code shall apply as follows:

1. *Townhouses* and buildings as permitted by the exceptions to Section R101.2 containing three or more dwelling units in *Seismic Design Categories* C, D_0, D_1 and D_2.
2. Detached one- and two-family *dwellings* and buildings as permitted by the exceptions to Section R101.2 containing less than three dwelling units in *Seismic Design Categories*, D_0, D_1 and D_2.

Buildings in Seismic Design Category E shall be designed to resist seismic loads in accordance with the *International Building Code* , except where the *Seismic Design Category* ~~seismic design category~~ is reclassified to a lower *Seismic Design Category* ~~seismic design category~~ in accordance with Section R301.2.2.1. Components of buildings not required to be designed to resist seismic loads shall be constructed in accordance with the provisions of this code.

Reason Statement: This proposal clarifies when seismic design provisions are required for buildings that are not clearly identifiable as a traditional townhouse or one- or two-family designation. Three dwelling units was selected as the threshold based on the current definition of townhouse which is "A building that contains three or more attached townhouse units."

The IRC seismic provisions have always been required for all buildings within the scope of this code, based upon the Seismic Design Category and use. In Seismic Design Category C, certain seismic provisions are only required for townhouses or similar structures and do not apply to one- and two-family dwellings. However, under Section R101.2, building uses that fall within the scope of the IRC are not always clearly identifiable as one of these traditional designations: townhouses or one- or two-family dwellings. Specifically, Section R101.2 exception 2, identifies "lodging houses" as within the IRC scope but there is no guidance that specifies if this should comply with requirements for townhouse or one- or two-family dwellings, where they diverge. The current language leaves the application of seismic provisions for non-traditional designations (other than townhouses or one- or two-family dwellings) open to interpretation by the code official when the project is located in Seismic Design Category C. The proposed language clearly states when seismic provisions are required for these buildings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal revises the language used to determine when seismic design provisions are required, to accommodate the intended scope of the IRC which includes non-traditional uses that cannot be clearly classified as either a townhouse or one- or two-family dwelling. There is no change to the technical content of the provisions or the intended scope of seismic provisions. Seismic provisions have always been determined based on the Seismic Design Category and number of dwelling units, so there will be no cost impact when approving this proposal.

RB37-22

RB38-22

IRC: R301.2.2.1, R301.2.2.1.2, R301.2.2.1.1, FIGURE R301.2.2.1(1), FIGURE R301.2.2.1(2), FIGURE R301.2.2.1(3), FIGURE R301.2.2.1(4), FIGURE R301.2.2.1(5), FIGURE R301.2.2.1(6), FIGURE R301.2.2.1(7) (New)

Proponents: Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); J Daniel Dolan, representing Seismic Code Support Committee (jddolan@wsu.edu); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov); Sanaz Rezaeian, representing USGS (srezaeian@usgs.gov); Nicolas Luco, representing U.S. Geological Survey

2021 International Residential Code

Revise as follows:

R301.2.2.1 Determination of seismic design category. Buildings shall be assigned a seismic design category in accordance with Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7).

R301.2.2.1.2 Alternative determination of Seismic Design Category E. Buildings located in Seismic Design Category E in accordance with Figures R301.2.2.1(1) through R301.2.2.1(7) ~~R301.2.2.1(6), or Figures R301.2.2.1.1(1)through R301.2.2.1.1(6) where applicable,~~ are permitted to be reclassified as being in Seismic Design Category D_2 provided that one of the following is done:

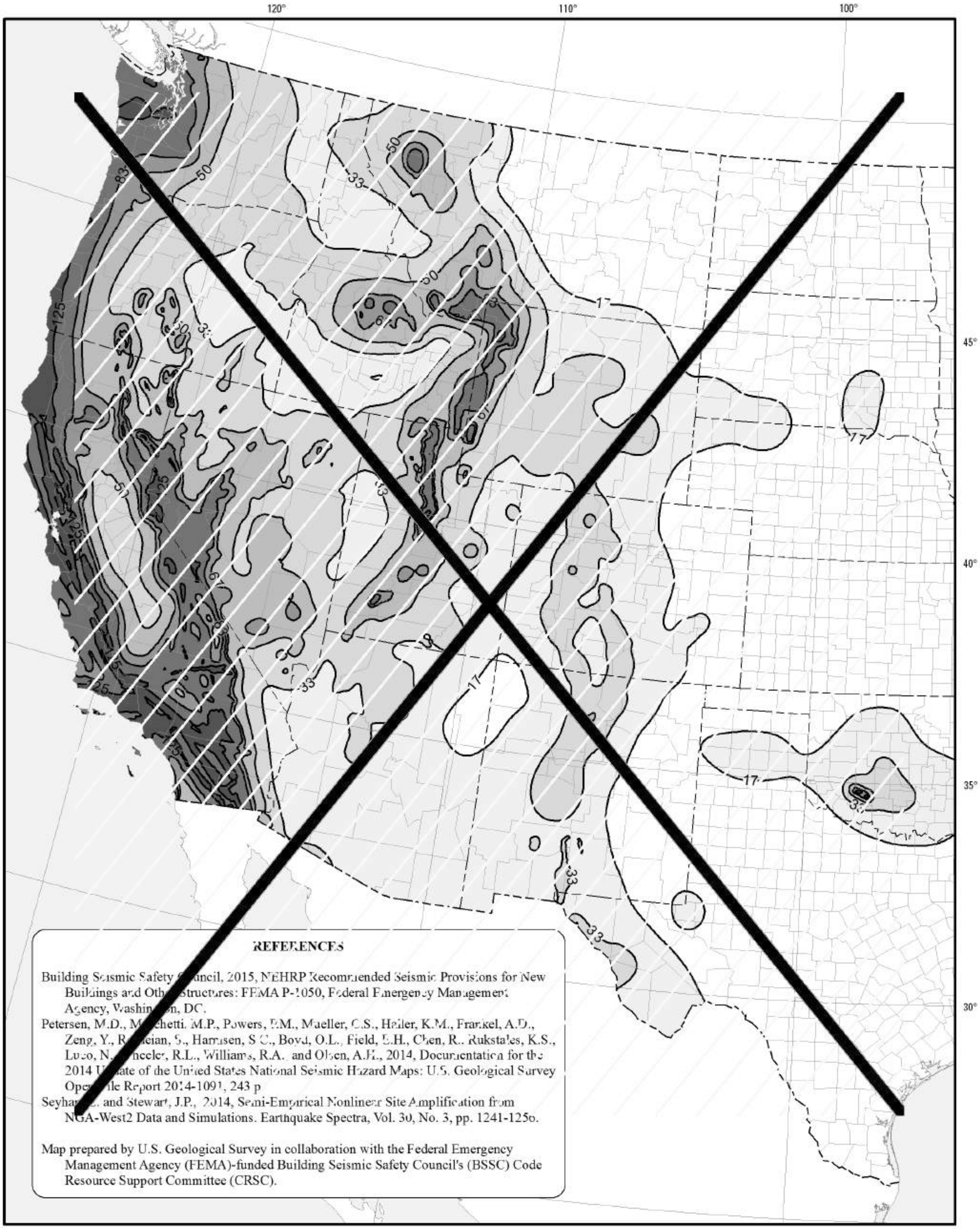
1. A more detailed evaluation of the seismic design category is made in accordance with the provisions and maps of the *International Building Code* . Buildings located in Seismic Design Category E in accordance with Table R301.2.2.1.1, but located in Seismic Design Category D in accordance with the *International Building Code* , shall be permitted to be designed using the Seismic Design Category D_2 requirements of this code.
2. Buildings located in Seismic Design Category E that conform to all of the following additional restrictions are permitted to be constructed in accordance with the provisions for Seismic Design Category D_2 of this code:

    2.1. All exterior shear wall lines or *braced wall panels* are in one plane vertically from the foundation to the uppermost *story*.

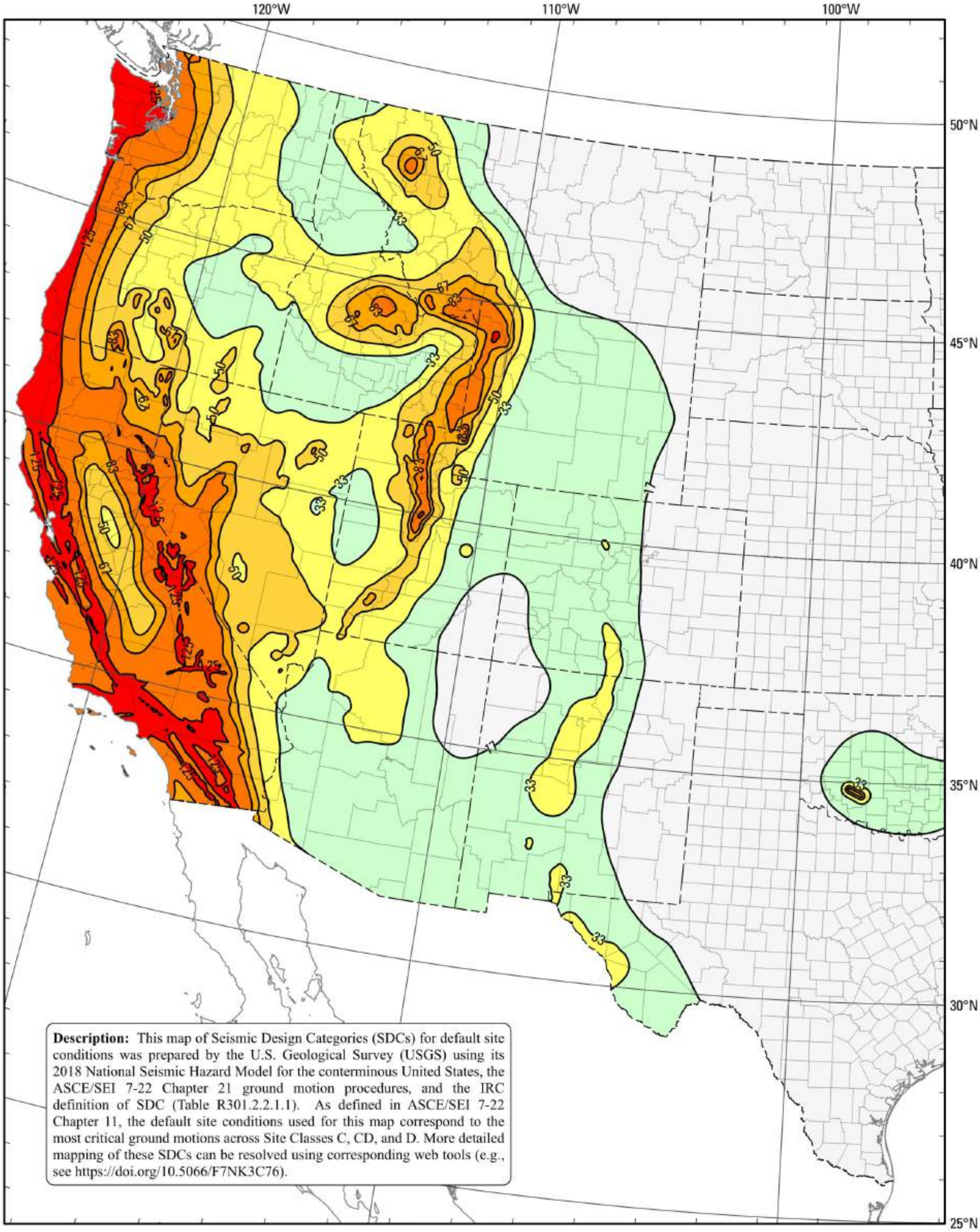
    2.2. Floors shall not cantilever past the *exterior walls*.

    2.3. The building is within the requirements of Section R301.2.2.6 for being considered as regular.

R301.2.2.1.1 Alternate determination of ~~seismic design category~~ Seismic Design Category. ~~If soil conditions are determined by the building official to be Site Class A, B, or D, the~~ The *Seismic Design Category* ~~seismic design category~~ and short-period design spectral response accelerations, S_{DS}, for a site shall be allowed to be determined in accordance with ~~Figures R301.2.2.1.1(1) through R301.2.2.1.1(6), or~~ Section 1613 ~~1613.2~~ of the International Building Code. The value of S_{DS} determined in accordance with ~~Section 1613.2 of~~ the International Building Code is permitted to be used to set the *Seismic Design Category* s~~eismic design category~~ in accordance with Table R301.2.2.1.1, and to interpolate between values in Tables R602.10.3(3) and R603.9.2(1) and other seismic design requirements of this code.

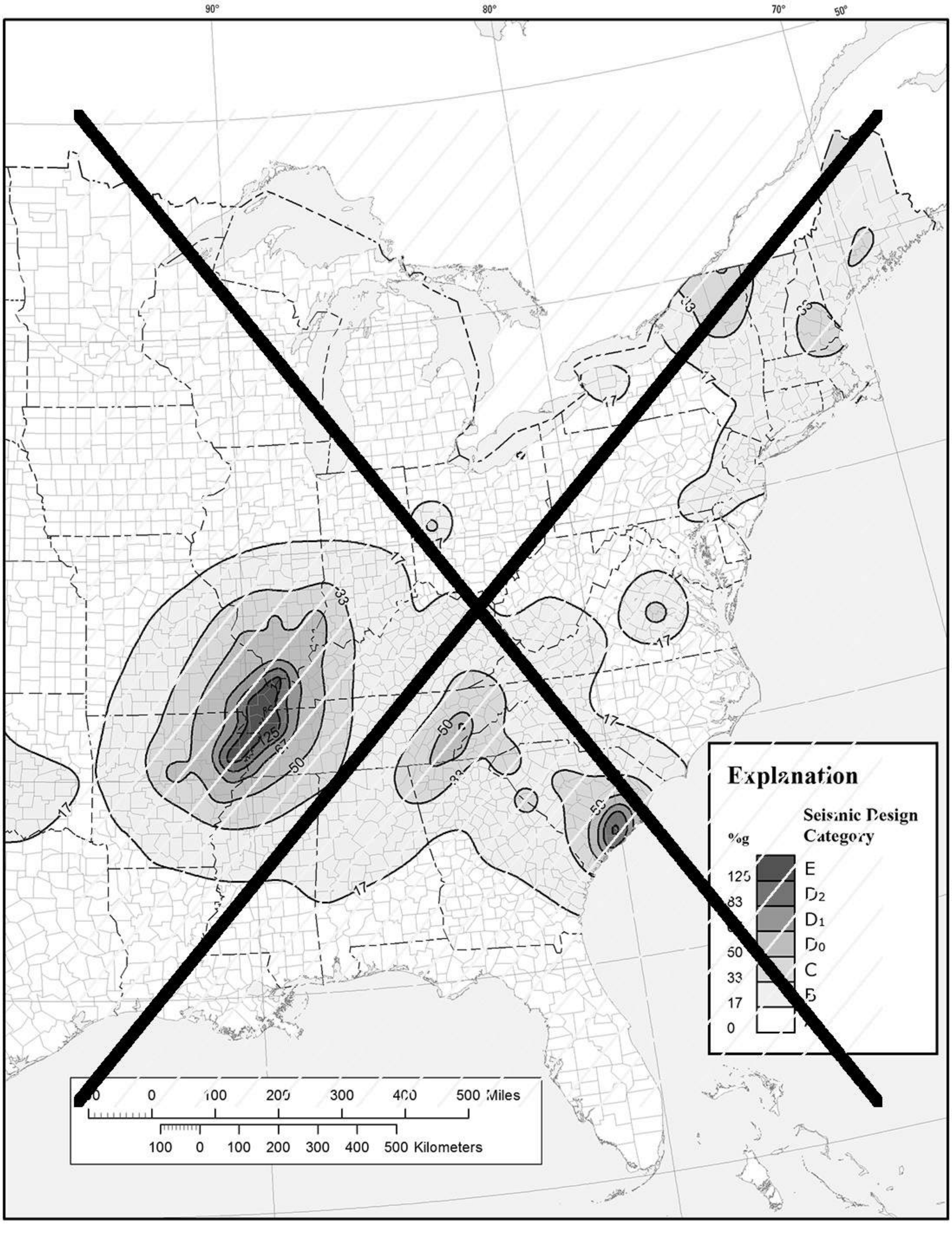


120°
110°
100°
45°
40°
35°
30°
REFERENCES
Building Seismic Safety uncil, 2015, NEHRP Recommended Seismic Provisions for New Buildings and Oth Structures: FEMA P-1050, Federal Emergency Management Agency, Washin n, DC.
Petersen, M.D., M chetti. M.P., Powers, P.M., Mueller, C.S., Haller, K.M., Frankel, A.D., Zeng, Y., R eian, S., Harmsen, S.C., Boyd, O.L., Field, E.H., Chen, R., Rukstales, K.S., Luco, N., heeler, R.L., Williams, R.A., and Olsen, A.H., 2014, Documentation for the 2014 ate of the United States National Seismic Hazard Maps: U.S. Geological Survey Ope ile Report 2014-1091, 243 p.
Seyha . and Stewart, J.P., 2014, Semi-Empirical Nonlinear Site Amplification from NGA-West2 Data and Simulations. Earthquake Spectra, Vol. 30, No. 3, pp. 1241-1256.
Map prepared by U.S. Geological Survey in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council's (BSSC) Code Resource Support Committee (CRSC).

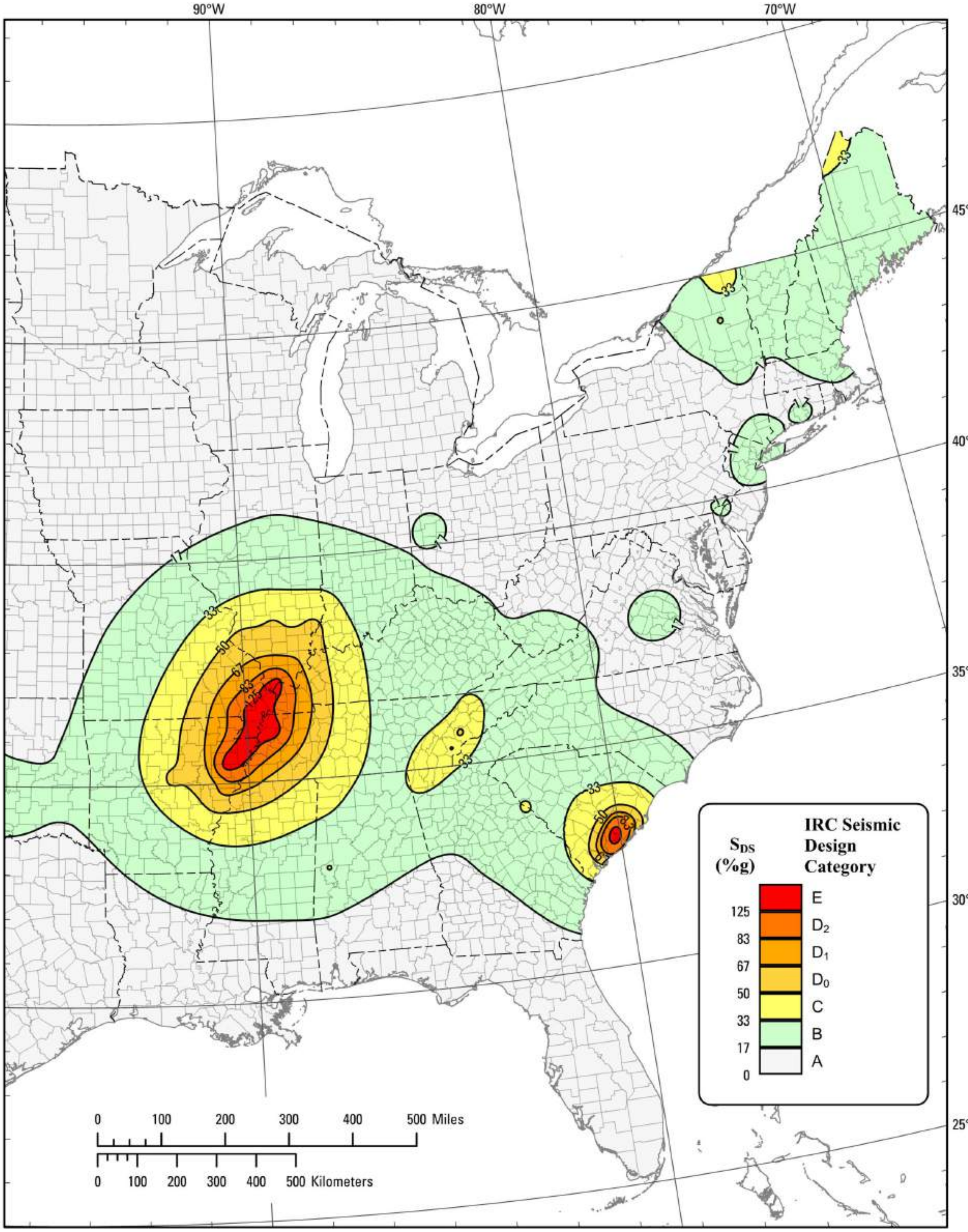


a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7) are based on the default Site Class as defined in Chapter 11 of ASCE 7. ~~soil Site Class D, used as an assumed default, as defined in Section 1613.2.2 of the *International Building Code*.~~

FIGURE ~~R301.2.2.1(5)~~ R301.2.2.1(1) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR THE CONTERMINOUS UNITED STATES[a]

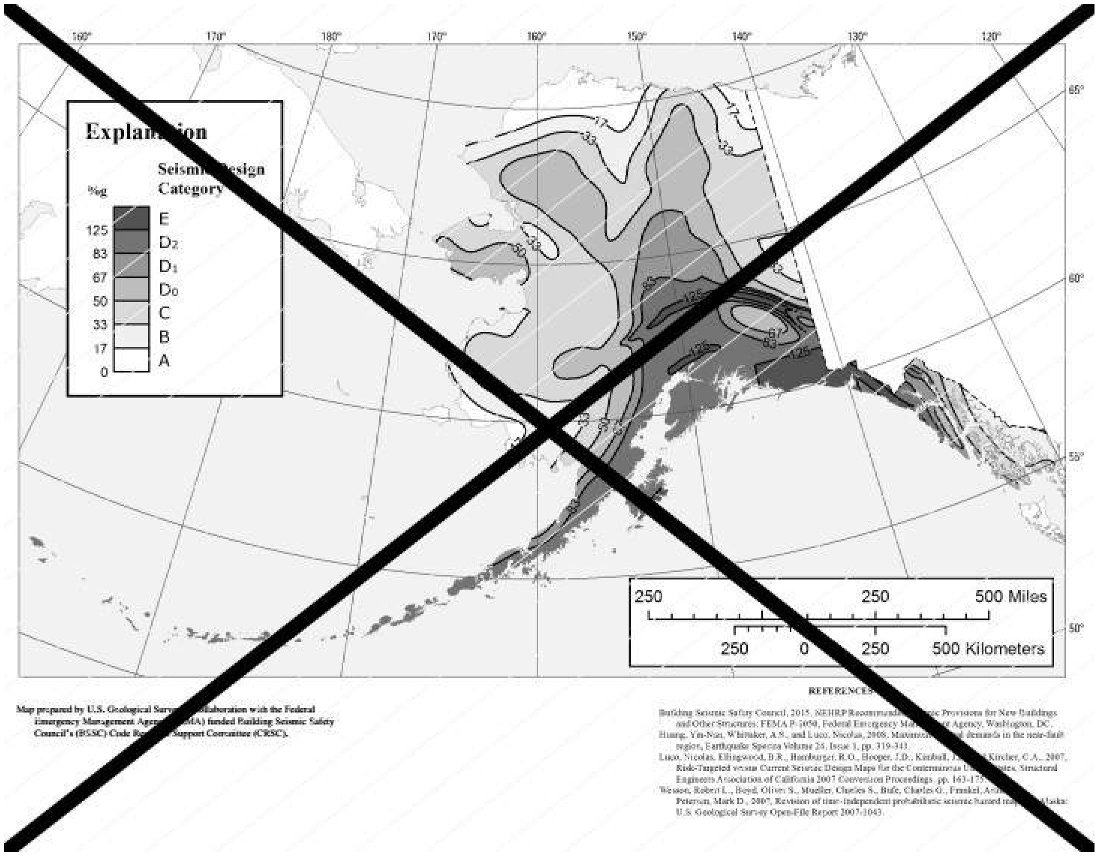


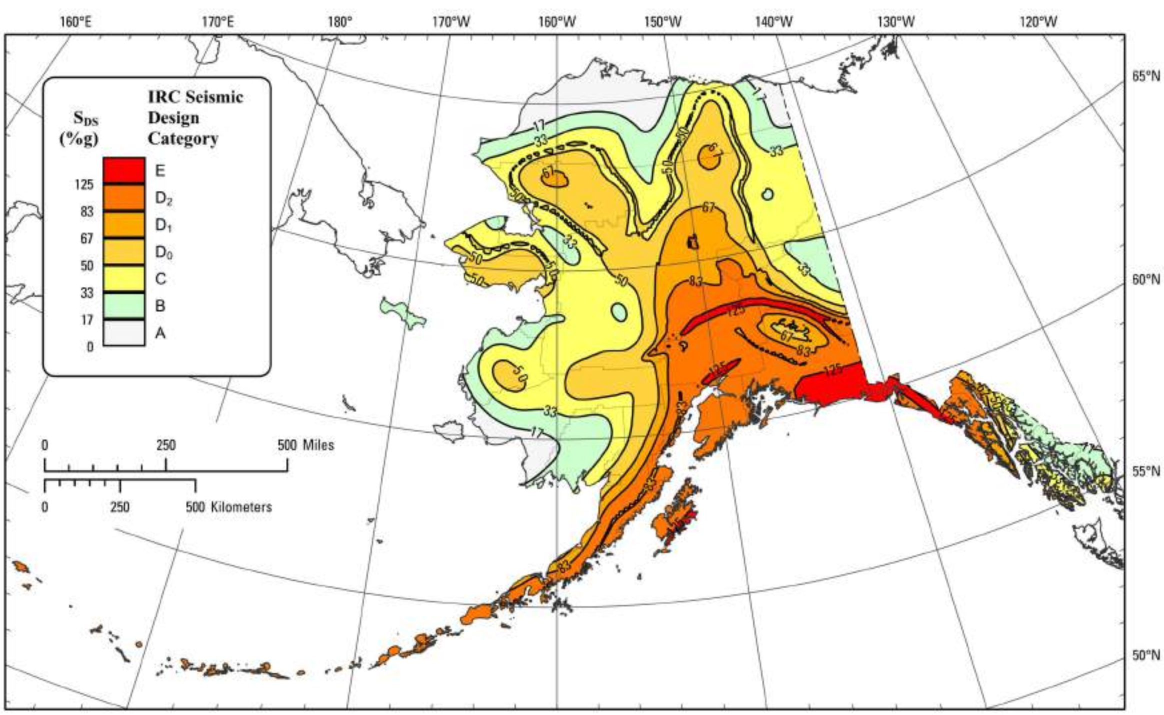
90°
80°
70°
50°
45°
40°
35°
30°
25°
17
33
50
67
125
Explanation
Seismic Design Category
%g
125
83
50
33
17
0
E
D_2
D_1
D_0
C
B
0
100
200
300
400
500 Miles
100
0
100
200
300
400
500 Kilometers



a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7), are based on the default Site Class as defined in Chapter 11 of ASCE 7. ~~soil Site Class D, used as an assumed default, as defined in Section 1613.2.2 of the *International Building Code*.~~

FIGURE ~~R301.2.2.1(6)~~ R301.2.2.1(2) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR THE CONTERMINOUS UNITED STATES - CONTINUED[a]



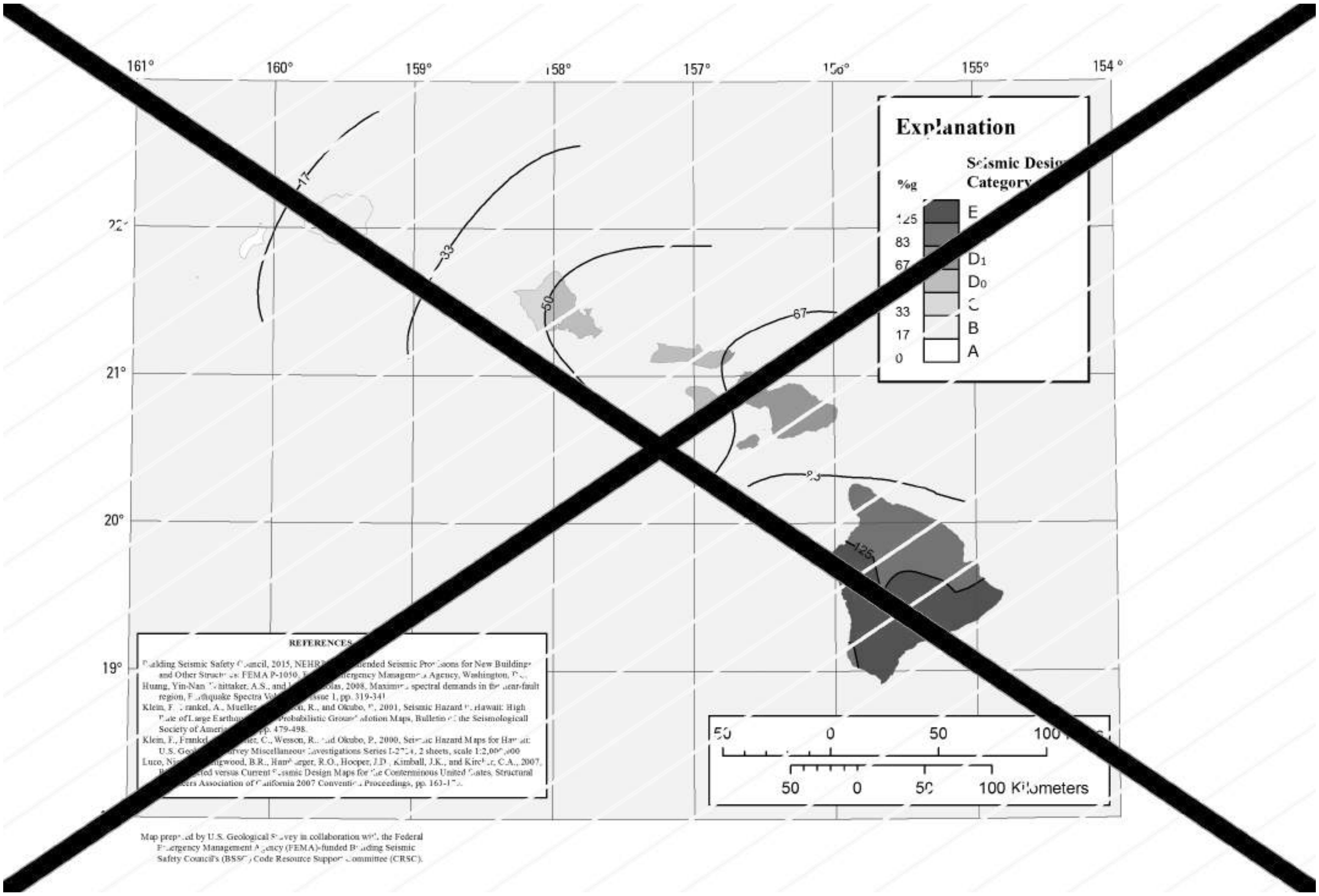


Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2007 National Seismic Hazard Model for Alaska, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the IRC definition of SDC (Table R301.2.2.1.1). As defined in ASCE/SEI 7-22 Chapter 11, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D. More detailed mapping of these SDCs can be resolved using corresponding web tools (e.g., see https://doi.org/10.5066/F7NK3C76).

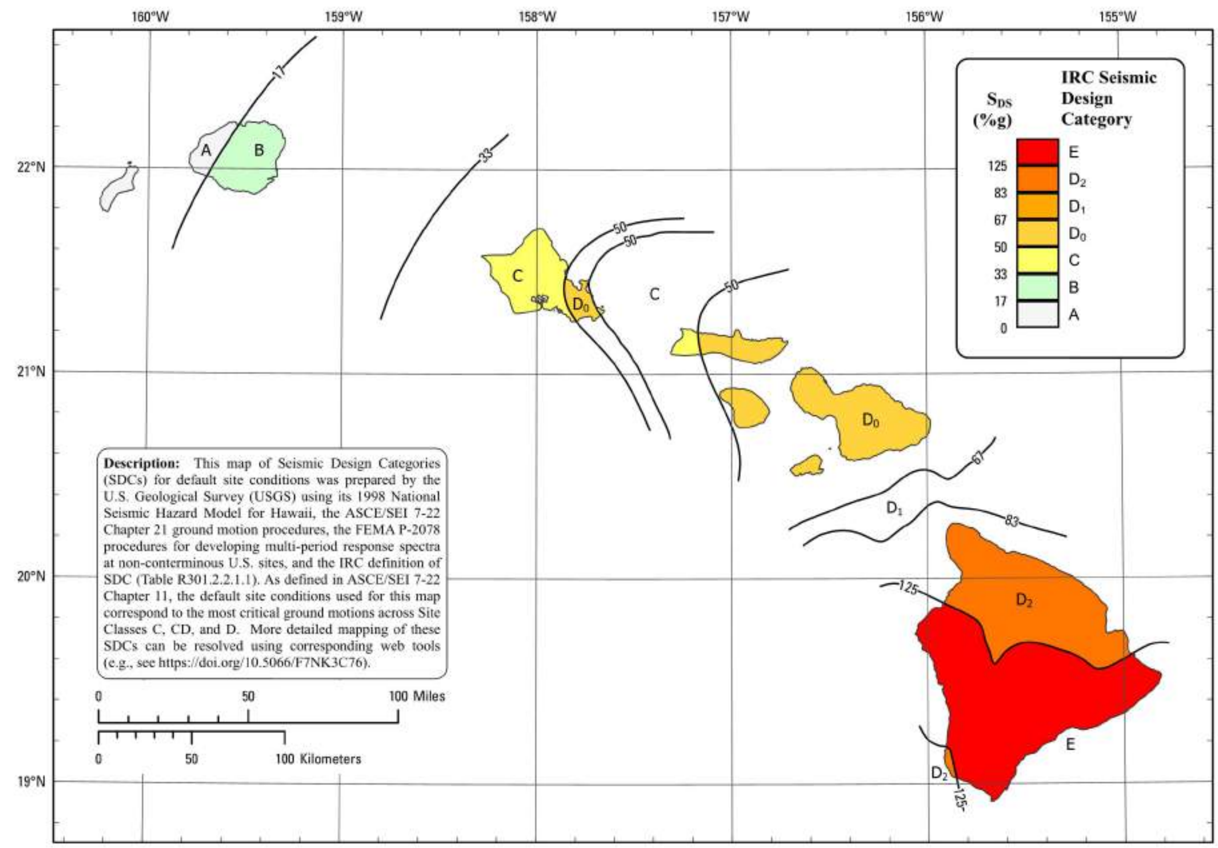
a. The Seismic Design Categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7) are based on the default Site Class as defined in Chapter 11 of ASCE 7. ~~soil Site Class D, used as an assumed~~

~~default, as defined in Section 1613.2.2 of the *International Building Code.*~~

FIGURE ~~R301.2.2.1(1)~~ R301.2.2.1(3) SEISMIC DESIGN CATEGORIES FOR DEFAULT CLASS FOR ALASKA[a]

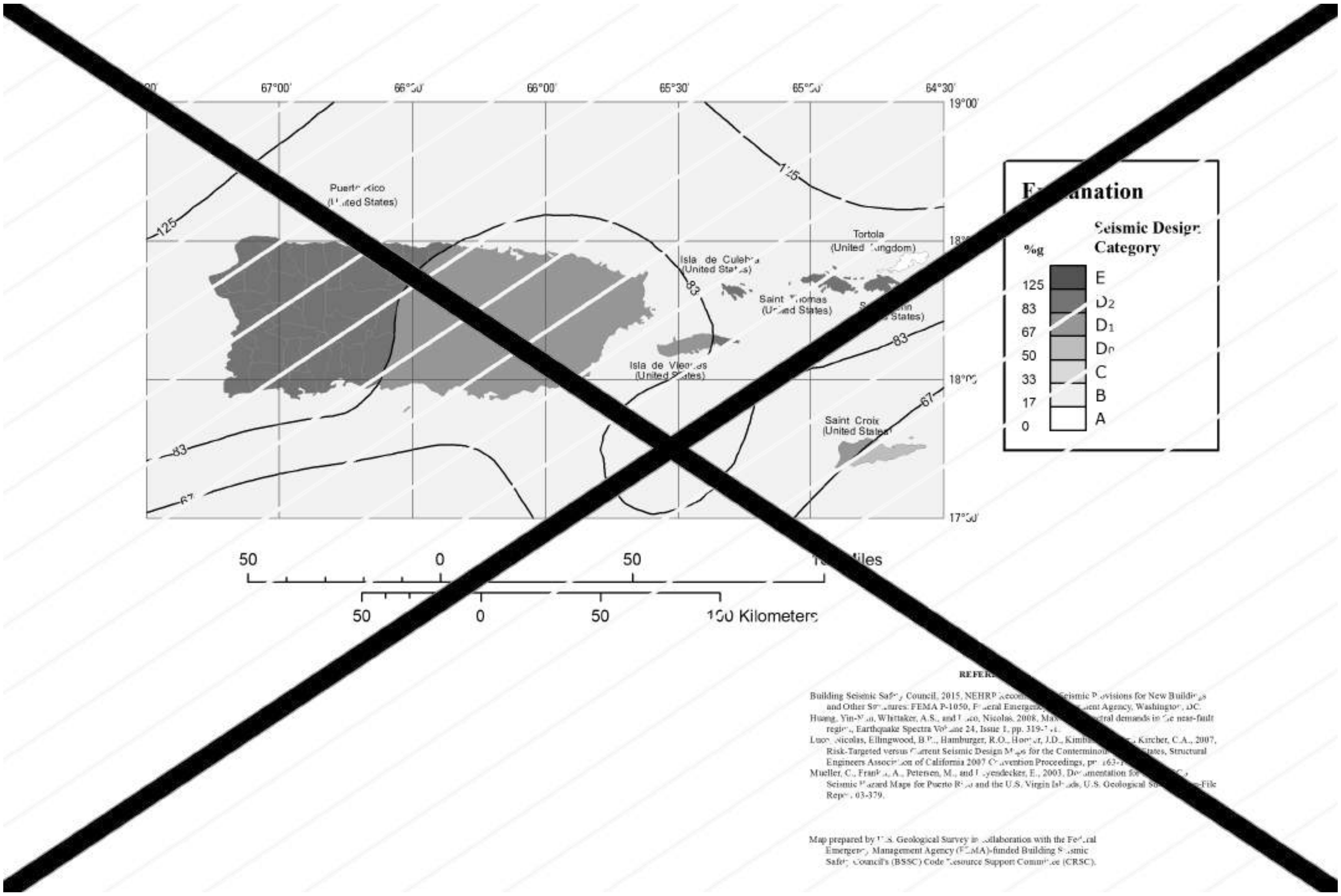


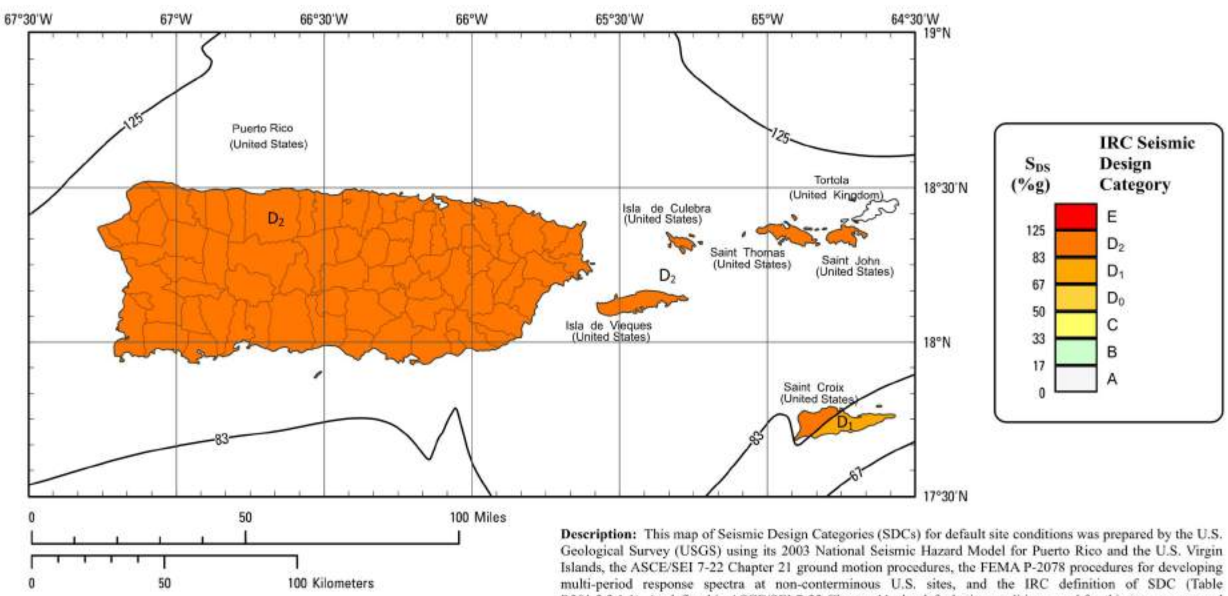
Explanation
Seismic Design Category
%g
125
83
67
33
17
0
E
D1
D0
C
B
A
REFERENCES
50
0
50
100 Kilometers
Map prepared by U.S. Geological Survey in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council's (BSSC) Code Resource Support Committee (CRSC).



a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7) are based on the default Site Class as defined in Chapter 11 of ASCE 7. ~~soil Site Class D, used as an assumed default, as defined in Section 1613.2.2 of the *International Building Code*.~~

FIGURE ~~R301.2.2.1(2)~~ R301.2.2.1(4) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR HAWAII[a]



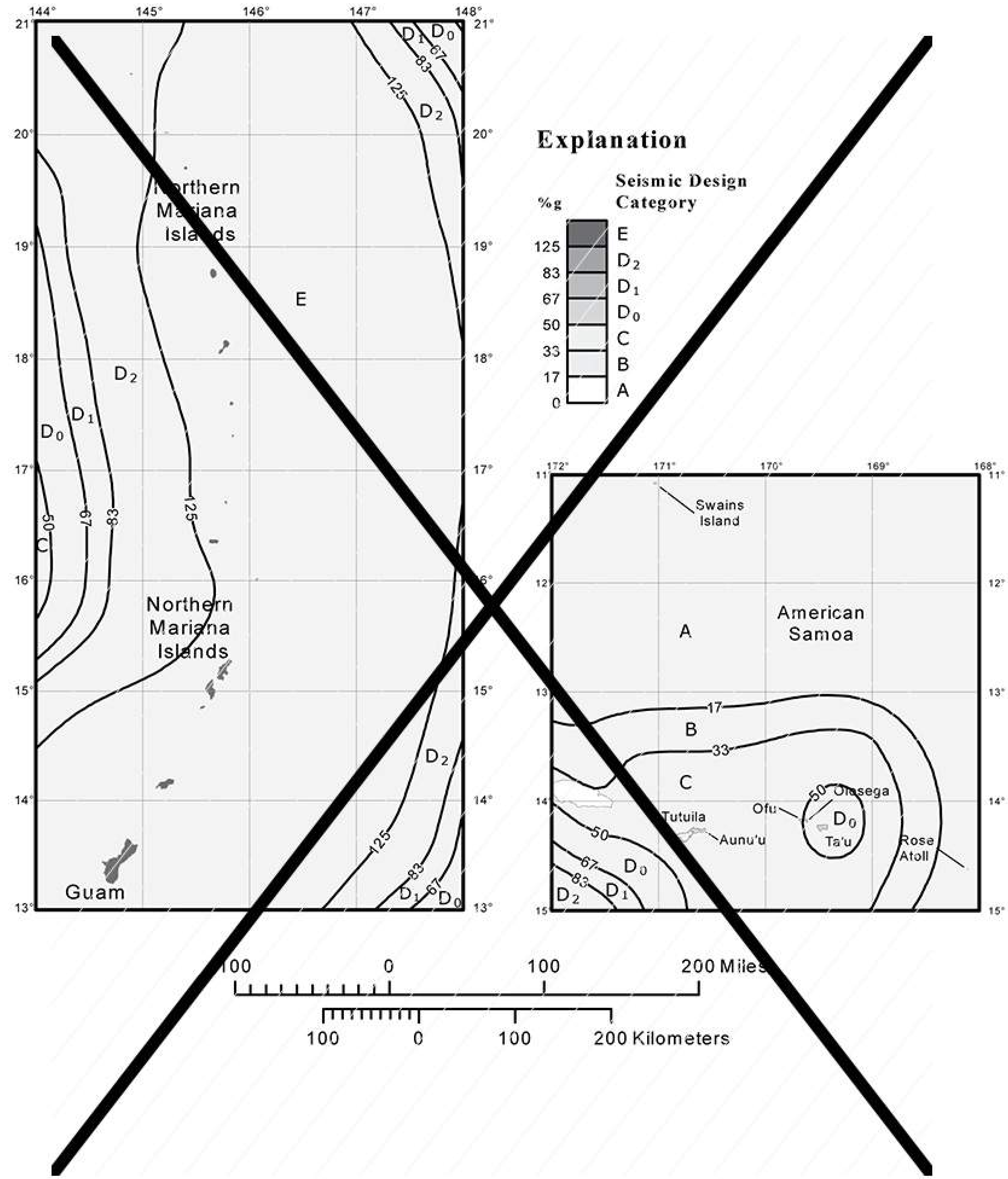


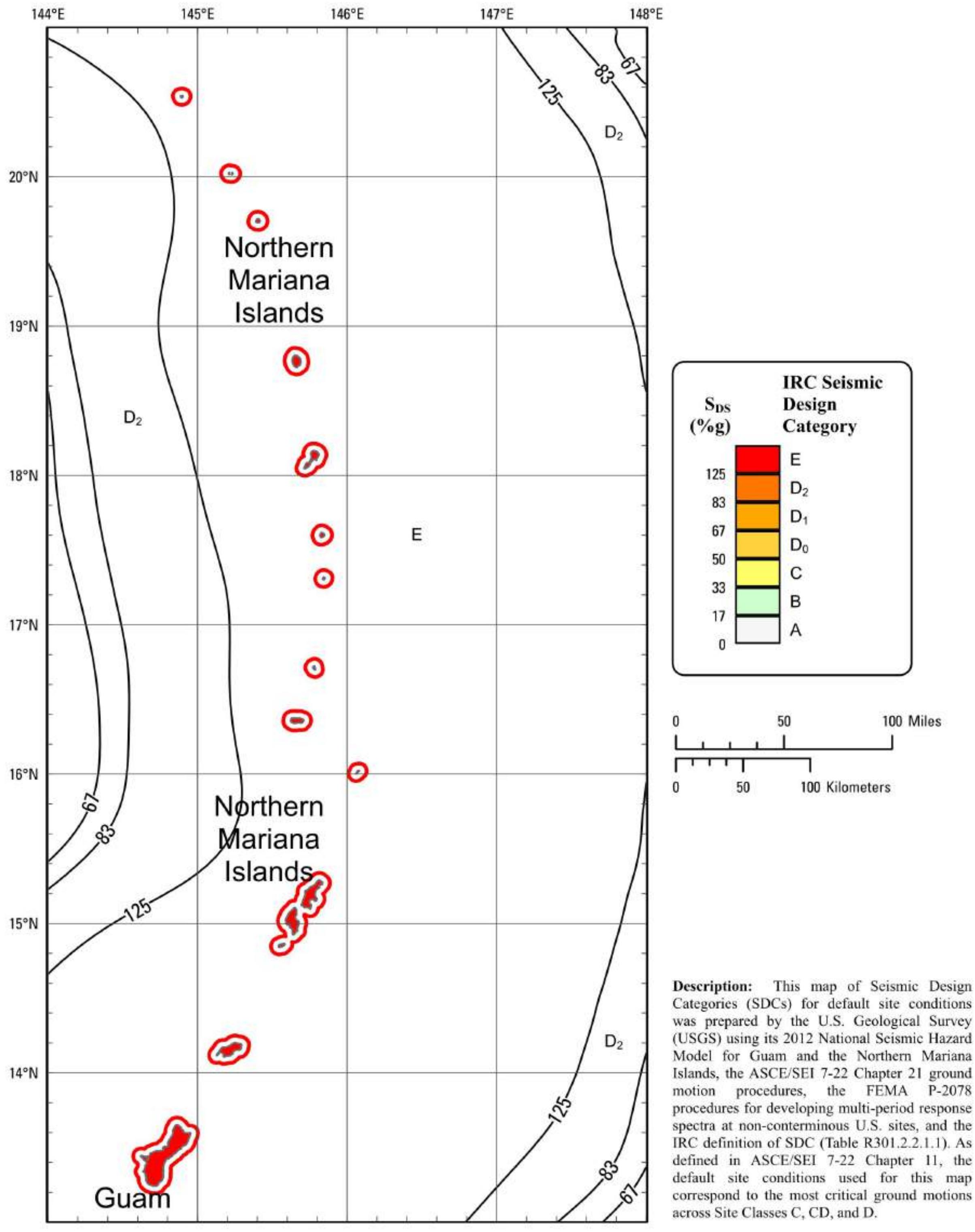
Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2003 National Seismic Hazard Model for Puerto Rico and the U.S. Virgin Islands, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the IRC definition of SDC (Table R301.2.2.1.1). As defined in ASCE/SEI 7-22 Chapter 11, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D. More detailed mapping of these SDCs can be resolved using corresponding web tools (e.g., see https://doi.org/10.5066/F7NK3C76).

a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7) are based on the default Site Class as defined in Chapter 11 of ASCE 7. ~~soil Site Class D, used as an~~

~~assumed default, as defined in Section 1613.2.2 of the *International Building Code.*~~

FIGURE ~~R301.2.2.1(3)~~ R301.2.2.1(5) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR PUERTO RICO[a]

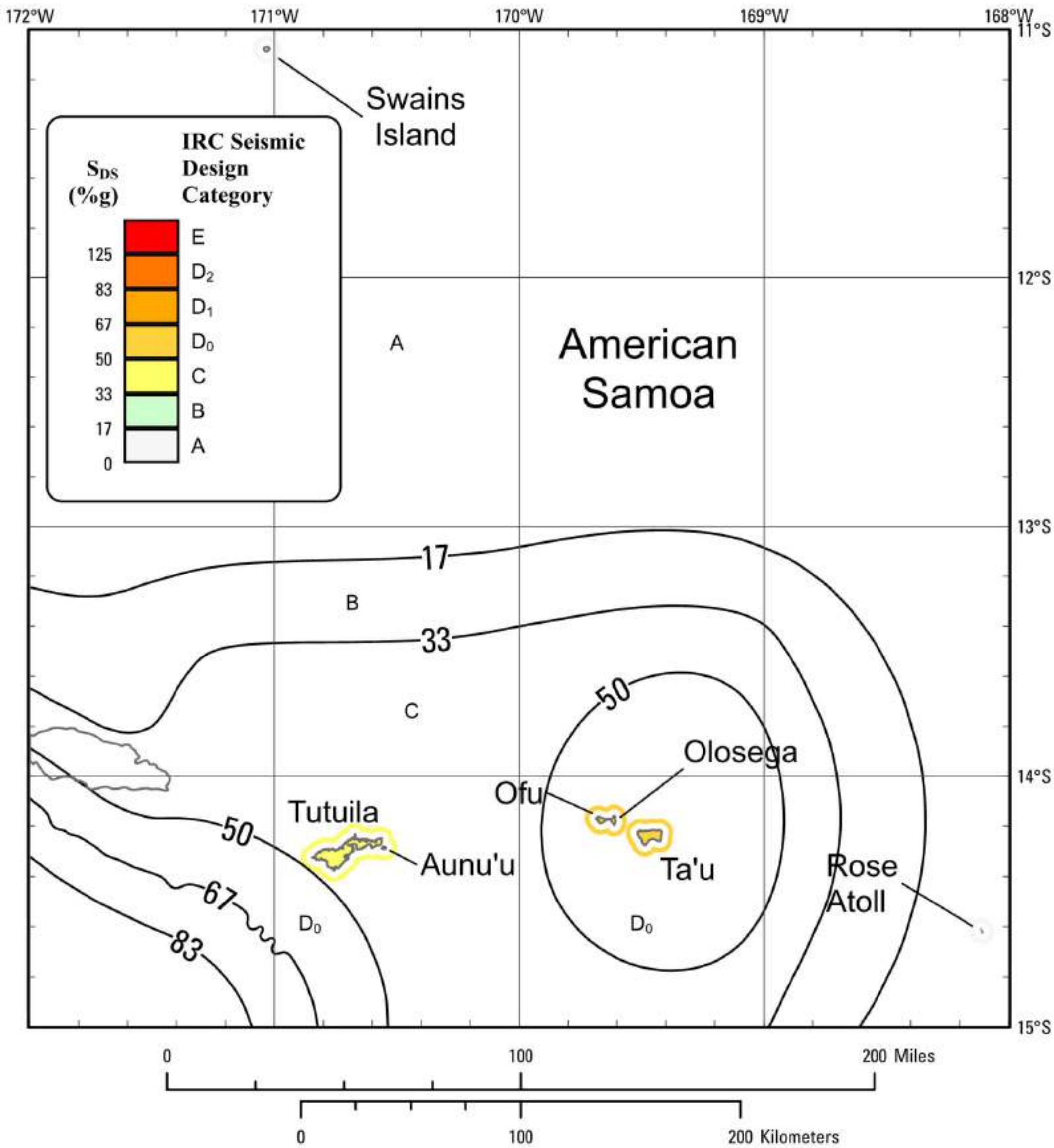

Northern Mariana Islands
Northern Mariana Islands
Guam
Explanation
%g
Seismic Design Category
125
83
67
50
33
17
0
E
D2
D1
D0
C
B
A
Swains Island
American Samoa
Tutuila
Aunu'u
Ofu
Olosega
Ta'u
Rose Atoll
100 0 100 200 Miles
100 0 100 200 Kilometers



a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7) are based on the default Site Class as defined in Chapter 11 of ASCE 7. ~~soil Site Class D, used as an assumed default, as defined in Section 1613.2.2 of the *International Building Code*.~~

FIGURE ~~R301.2.2.1(4)~~ R301.2.2.1(6) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR GUAM AND THE NORTHERN MARIANA ISLANDS ~~AND AMERICAN SAMOA~~[a]

Add new text as follows:

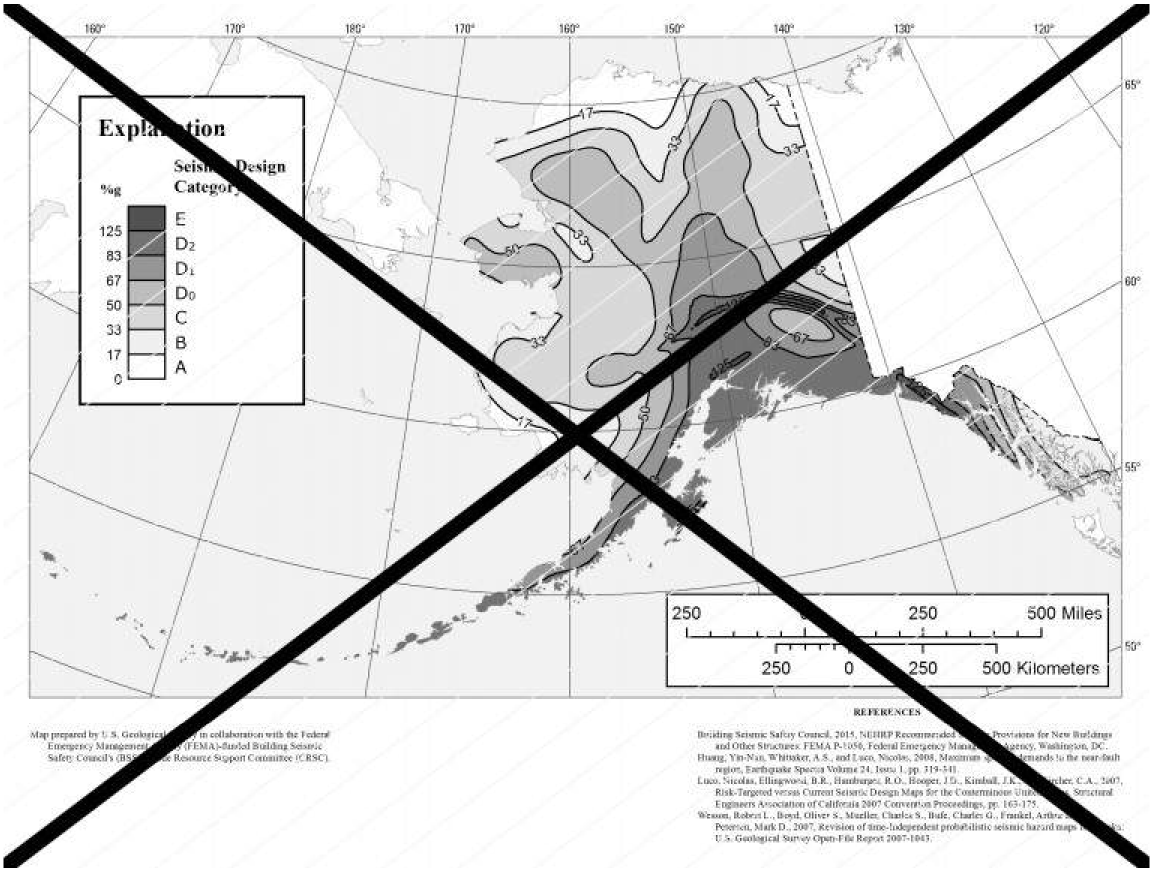


Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2012 National Seismic Hazard Model for American Samoa, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the IRC definition of SDC (Table R301.2.2.1.1). As defined in ASCE/SEI 7-22 Chapter 11, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through R301.2.2.1(7), are based on the default Site Class as defined in Chapter 11 of ASCE 7.

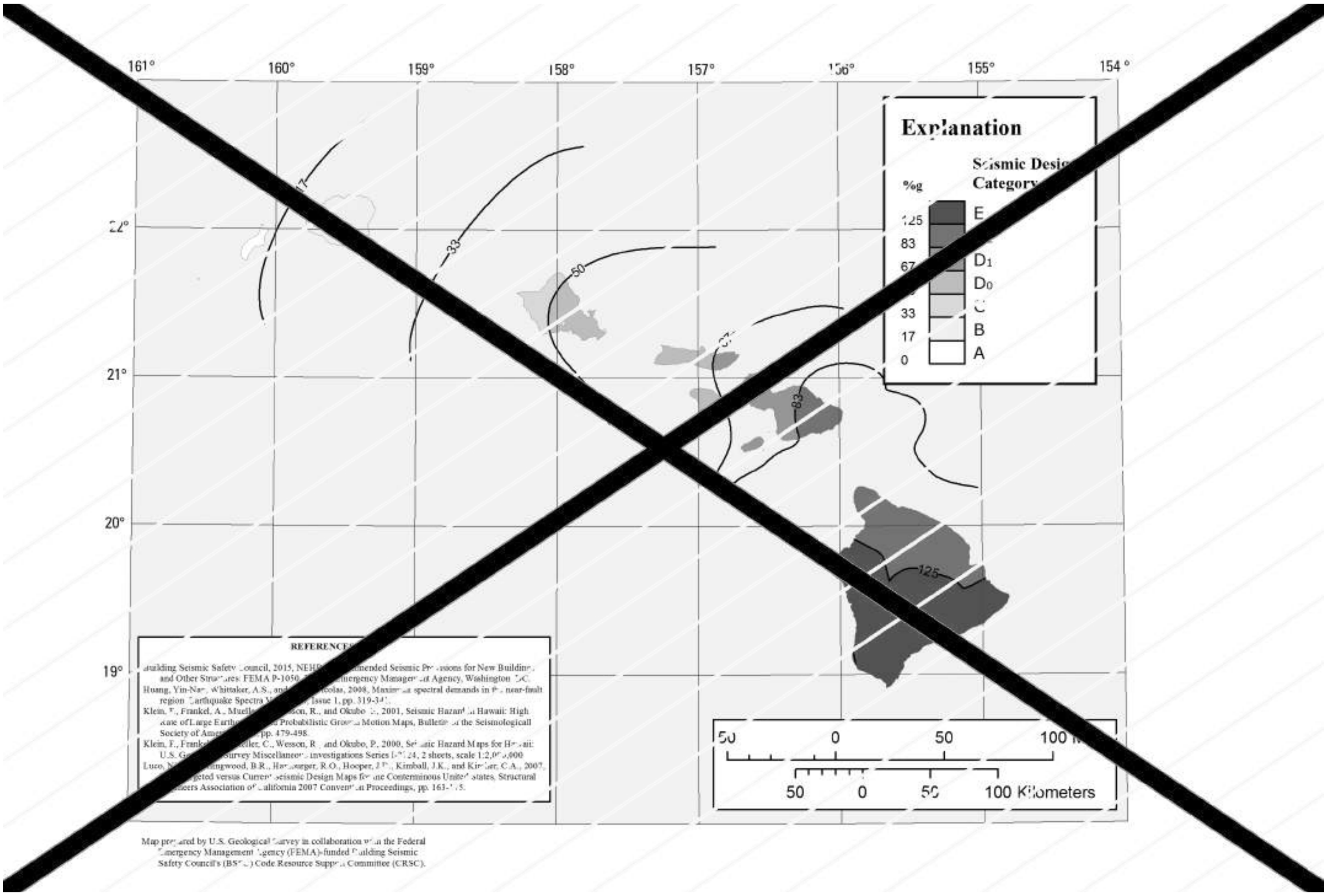
FIGURE R301.2.2.1(7) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR AMERICAN SAMOA[a]

Delete without substitution:



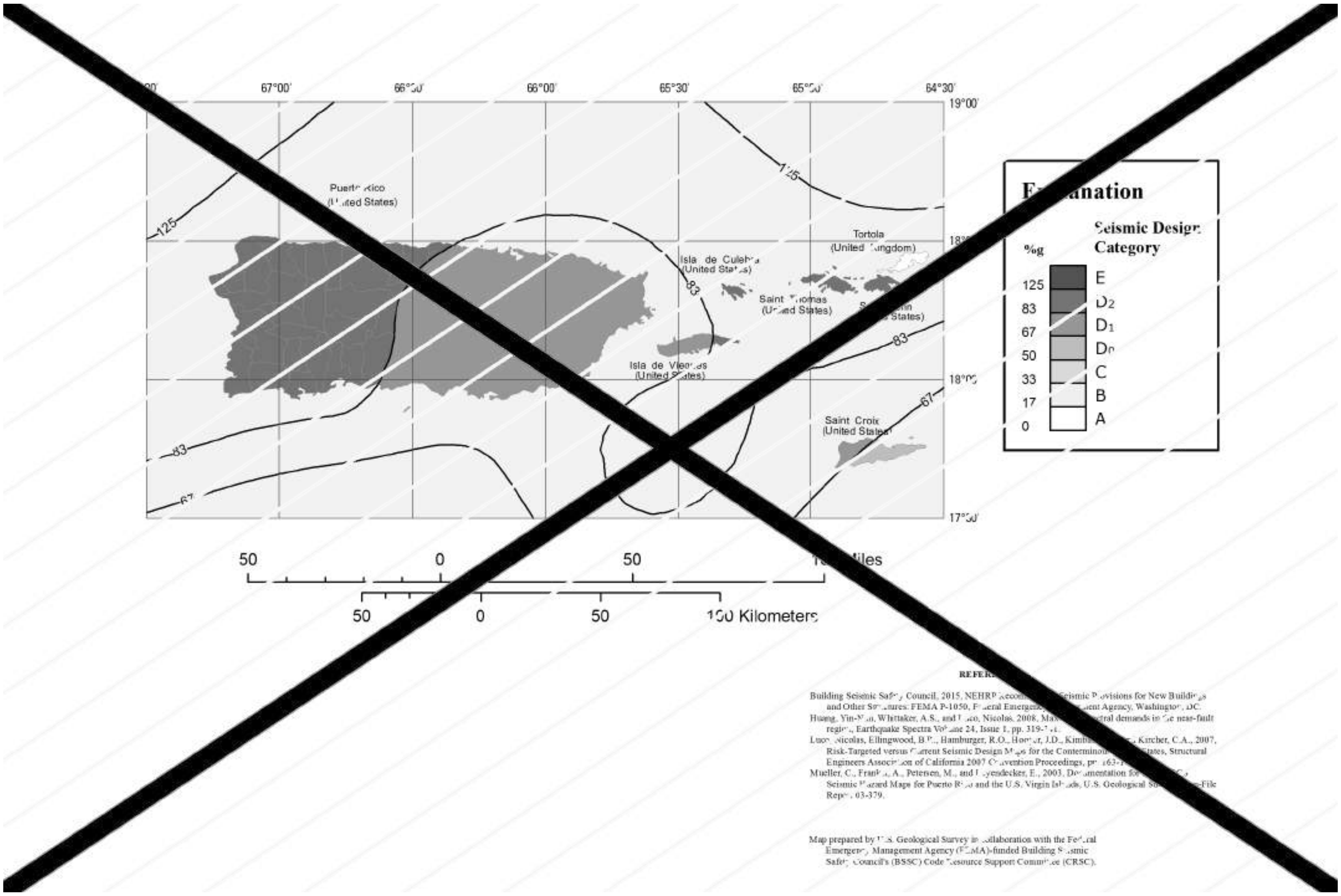
~~a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~FIGURE R301.2.2.1.1(1) ALTERNATE SEISMIC DESIGN CATEGORIES—ALASKA[a]~~



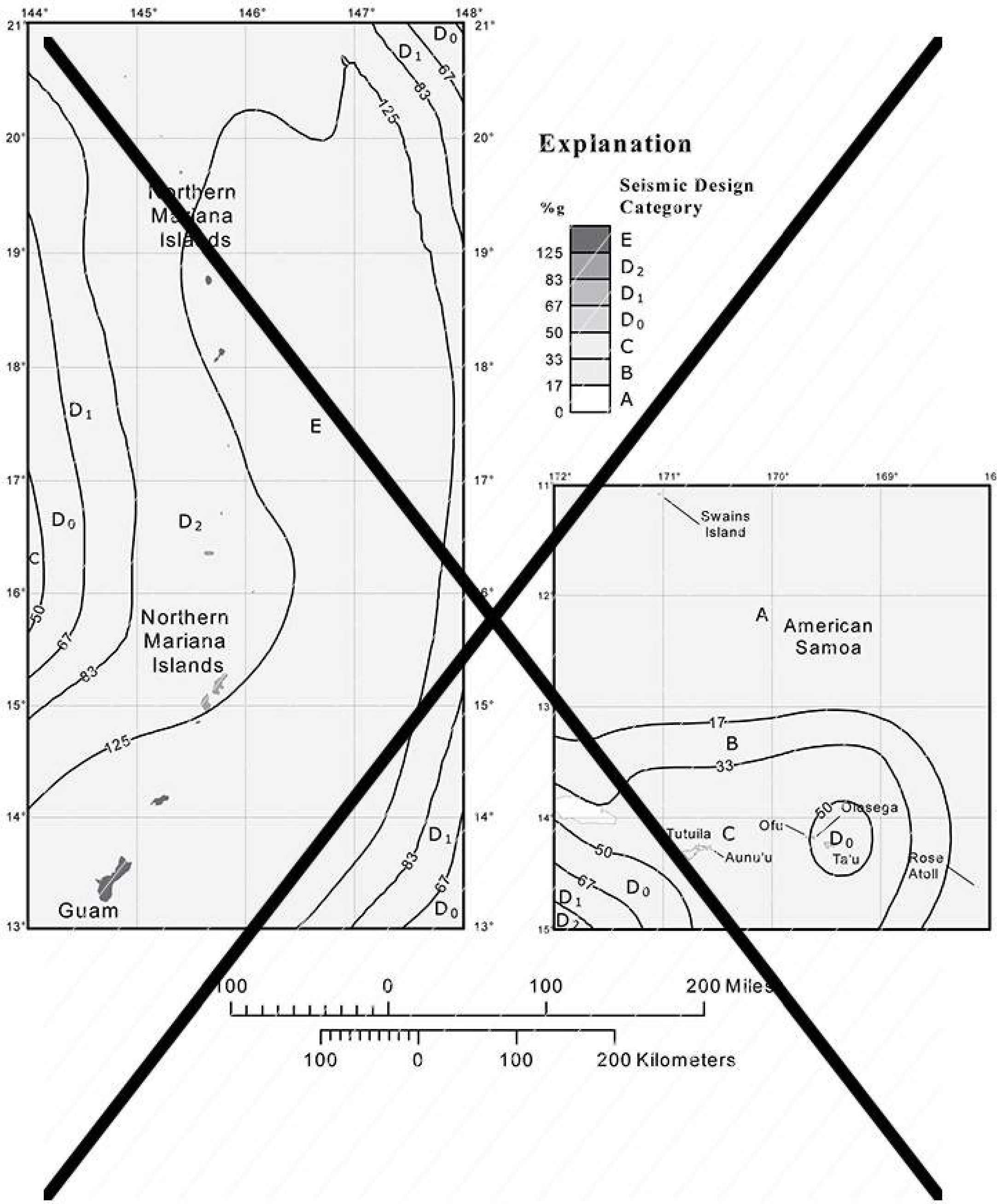
~~a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~**FIGURE R301.2.2.1.1(2) ALTERNATE SEISMIC DESIGN CATEGORIES—HAWAII[a]**~~



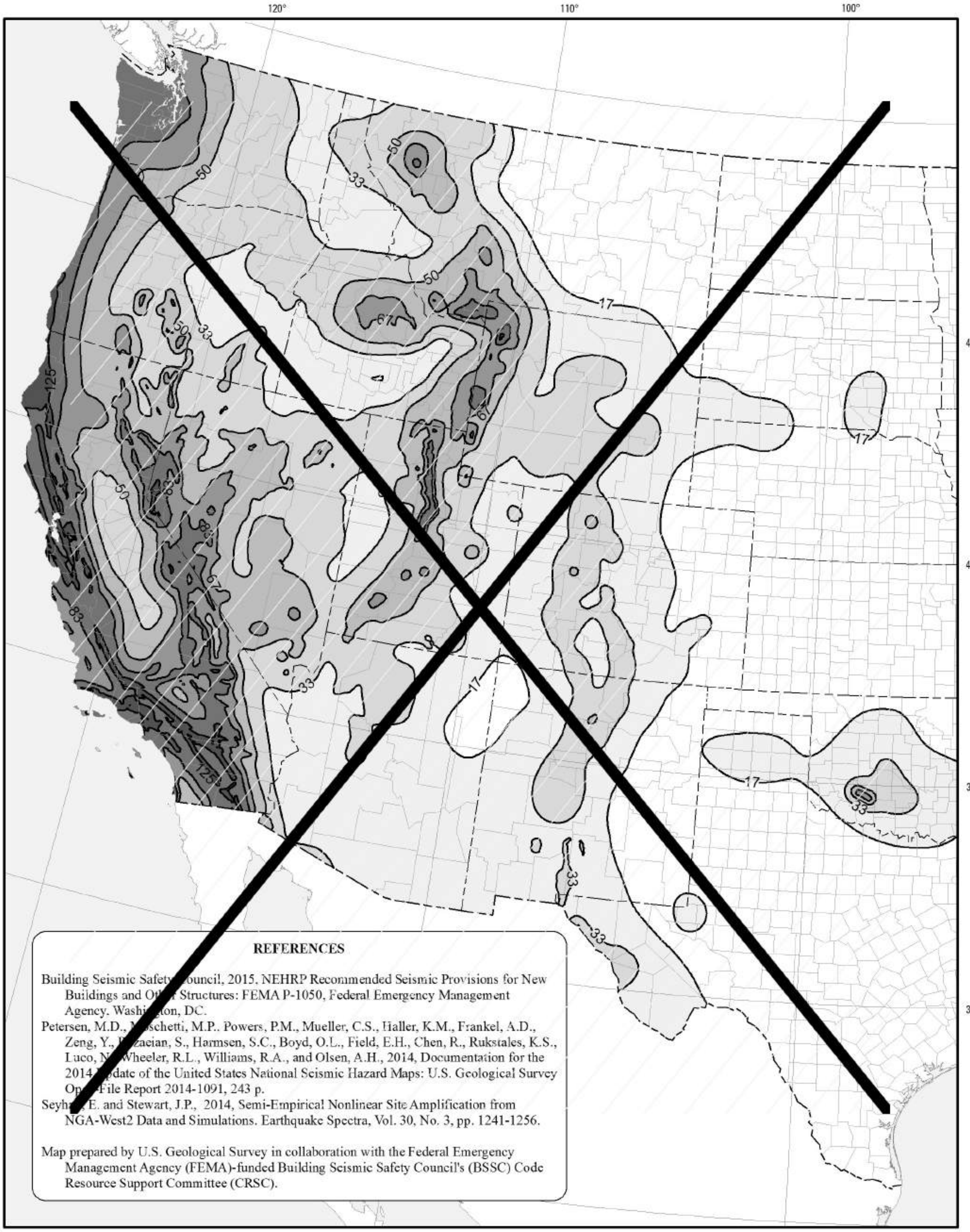
~~a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~FIGURE R301.2.2.1.1(3) ALTERNATE SEISMIC DESIGN CATEGORIES—PUERTO RICO[a]~~



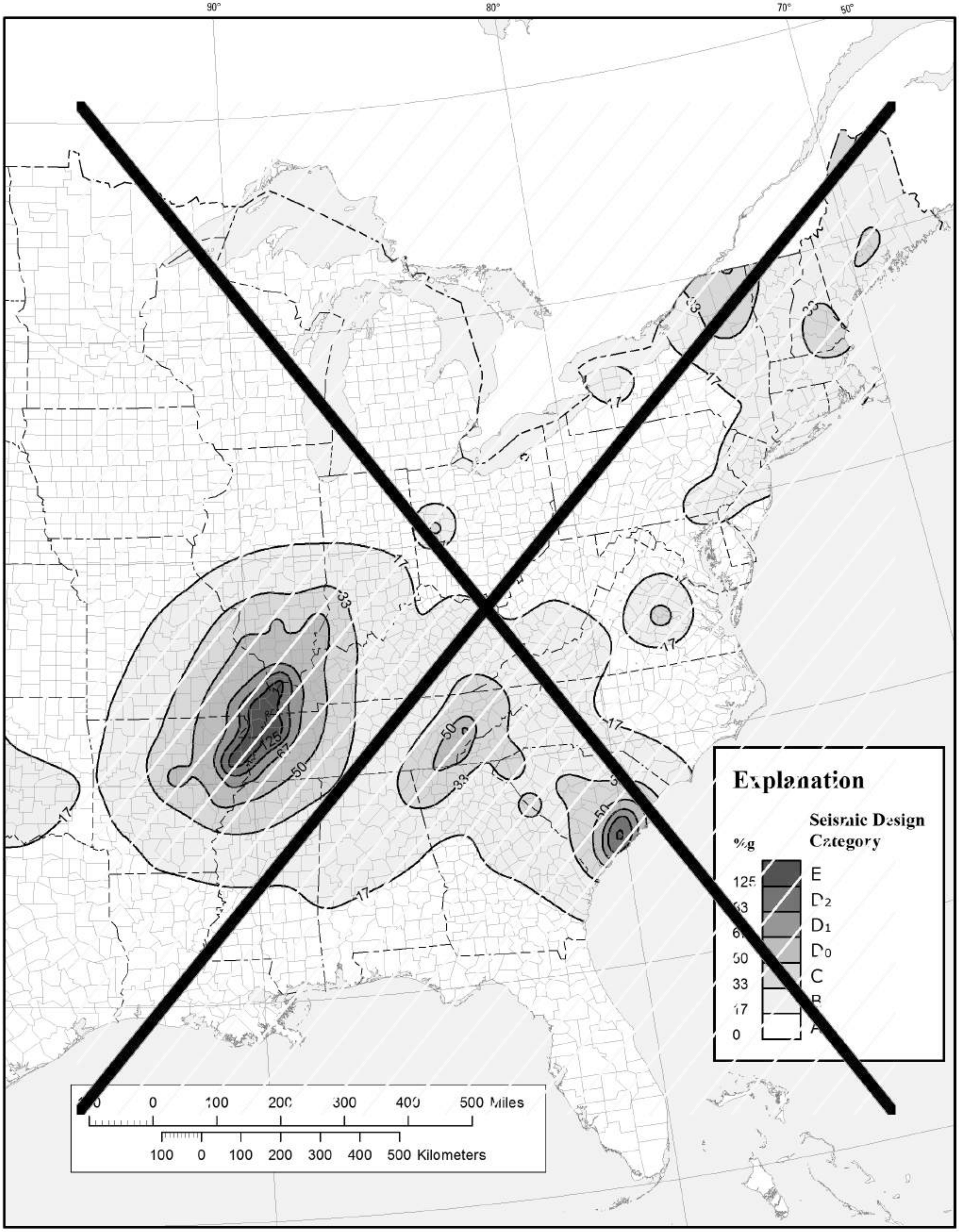
~~a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~**FIGURE R301.2.2.1.1(4) ALTERNATE SEISMIC DESIGN CATEGORIES—NORTHERN MARIANA ISLANDS AND AMERICAN SAMOA[a]**~~



~~a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~**FIGURE R301.2.2.1.1(5) ALTERNATE SEISMIC DESIGN CATEGORIES—UNITED STATES[a]**~~



~~a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~**FIGURE R301.2.2.1.1(6) ALTERNATE SEISMIC DESIGN CATEGORIES—UNITED STATES[a]**~~

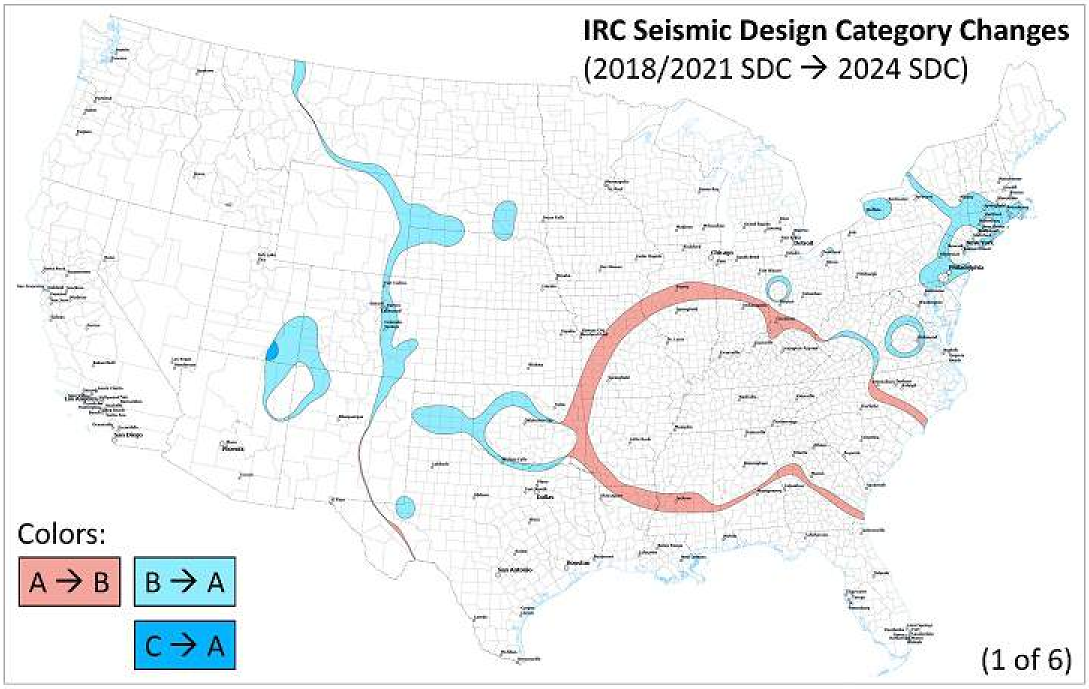
Reason Statement: This proposal updates the IRC Seismic Design Category (SDC) maps to be consistent with updates to the seismic design maps proposed for the IBC (in a separate proposal) and already included in the 2020 NEHRP Recommended Seismic Provisions for New Buildings and Other Structures and ASCE/SEI 7-22. As in past updates, the proposed IRC maps have been developed in collaboration with the U.S. Geological Survey (USGS) and are based on their National Seismic Hazard Models (NSHMs), the site-specific ground motion procedures of the 2020 NEHRP Provisions and ASCE/SEI 7-22 (Chapter 21), and the IRC definition of SDC (Table R301.2.2.1.1). Adoption of these maps will result in a consistent technical basis for the IRC and IBC seismic design maps. Figures at the bottom of this reason statement, prepared by USGS, illustrates the locations where SDC is increasing and decreasing due to this update.
While based on the same mapping of risk-targeted spectral response accelerations as the seismic maps in the 2020 NEHRP Provisions and ASCE/SEI 7-22, for greater ease of use in the IRC, the Seismic Design Category (SDC) is mapped directly. In order to directly map the SDC, the same simplifying assumptions as in prior IRC map updates have been used. First, it is assumed that the dwelling seismic demand is controlled by short-period behavior, allowing mapping based on the short-period design spectral response acceleration parameter, S_{DS}, ignoring the one-second parameter additionally considered in the IBC, S_{D1}. Second, default site (soil) conditions (most critical of Site Classes C, CD, and D) are assumed. With these two assumptions, the mapping information from the 2020 NEHRP Provisions and ASCE/SEI 7-22 are translated to SDC, using Table R301.2.2.1.1. The intent of adopting SDC maps is to spare the non-technical user of the IRC from having to implement the provisions of ASCE/SEI 7 Chapter 11.

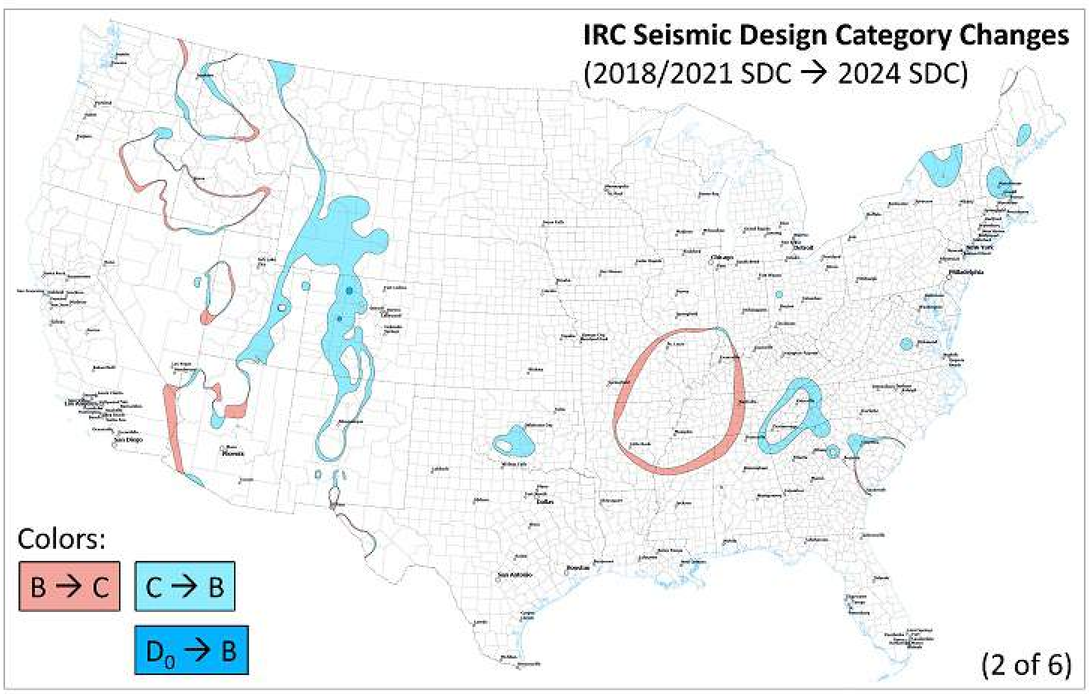
In the 2018 and 2021 editions of the IRC, two separate sets of SDC maps were incorporated. These were identified as the Seismic Design Category Maps (Figures R301.2.2.1(1) through R301.2.2.1(6)) and the Alternate Seismic Design Category Maps (Figures R301.2.2.1.1(1) through R301.2.2.1.1(6)). The Seismic Design Category Maps, consistent with ASCE/SEI 7-16, were determined using default site conditions, defined as the most conservative of Site Classes C and D. Because concern was expressed that use of the SDC maps would cause conservative SDC assignments in some locations relative to the use of Site Class D in previous editions of IRC, Alternate Seismic Design Category Maps were developed based on Site Class D alone and permitted to be used where information was available to justify, to the satisfaction of the building official, that Site Classes A, B, or D could be assigned. These provided reduced SDCs in some locations.

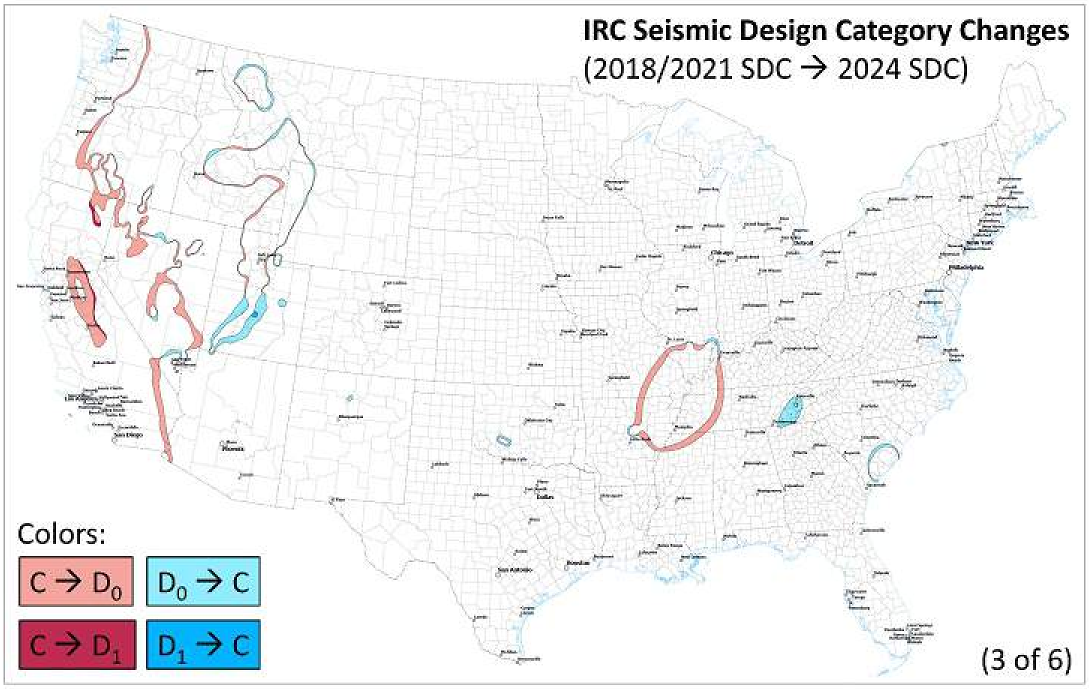
For the 2024 IRC, a single SDC map set is proposed that can be conservatively used for any site, excepting poor soil sites as discussed in Section R401. Because of further changes occurring to site class assignments and default site conditions in the 2020 NEHRP Provisions and ASCE/SEI 7-22, the proposed 2024 IRC maps incorporate the most critical of Site Classes C, CD, and D. This is consistent with default site conditions of the 2020 NEHRP Provisions and ASCE/SEI 7-22, as well as the proposed 2024 IBC maps. The need for an alternative SDC map set was investigated during the development of the proposed 2024 IRC SDC maps; it was found that differences that would occur between the map sets if the alternative map set was developed were in very few locations and of limited effect. As a result, the creation of a second map set was judged to be unnecessary. It is hoped that the return to a single map set will simplify use of the IRC seismic provisions. As in the past, use of the IBC provisions to determine SDC and seismic design parameters is permitted.

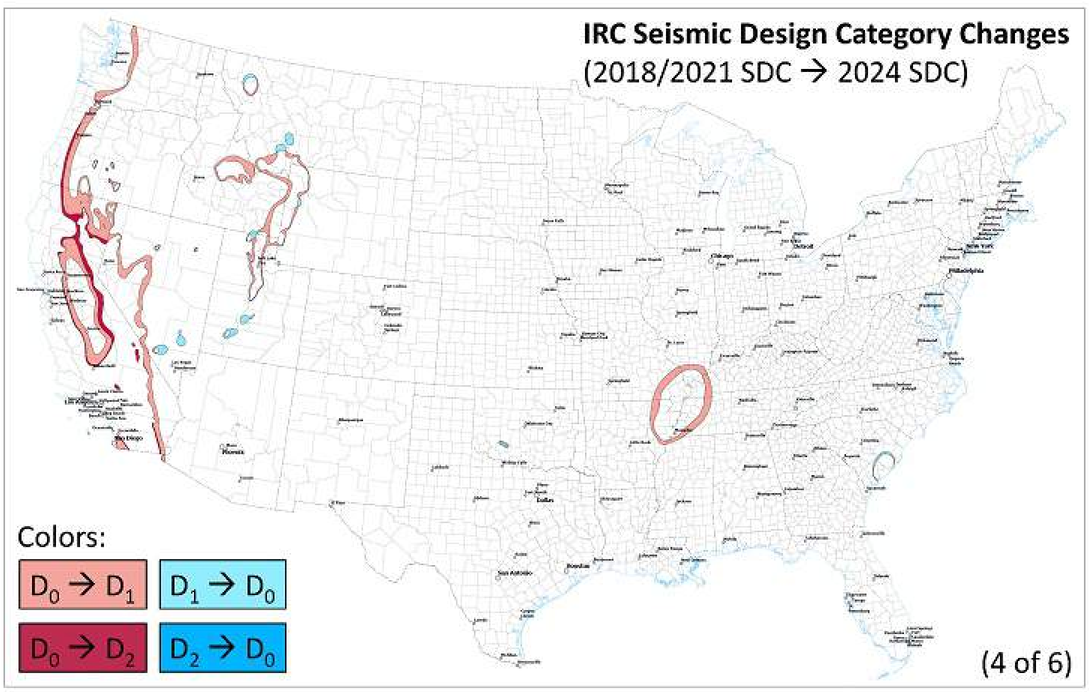
For the conterminous U.S., the proposed updates to the IRC SDC (and IBC) maps, like the map updates already adopted by the 2020 NEHRP Provisions and ASCE/SEI 7-22 are based on (1) recommendations of the Project 17 collaboration between the Building Seismic Safety Council (BSSC) and the USGS (BSSC, 2019), and (2) the 2018 update of the USGS NSHM (Petersen et al., 2020) for the conterminous U.S. The Project 17 recommendations include modifications to (1) site-class effects, (2) spectral periods defining short-period and one-second ground-motion parameters, (3) deterministic caps on the otherwise probabilistic ground motions, and (4) maximum-direction scale factors. The updates in the 2018 USGS NSHM from the previous (2014) version (used in the 2018 and 2021 versions of the IRC) include incorporation of (1) new NGA-East and other ground-motion models for the central and eastern U.S., (2) deep sedimentary basin effects in the Los Angeles, Seattle, San Francisco, and Salt Lake City regions, (3) earthquakes that occurred in 2013 through 2017, and (4) updated weights for the western U.S. ground-motion models.

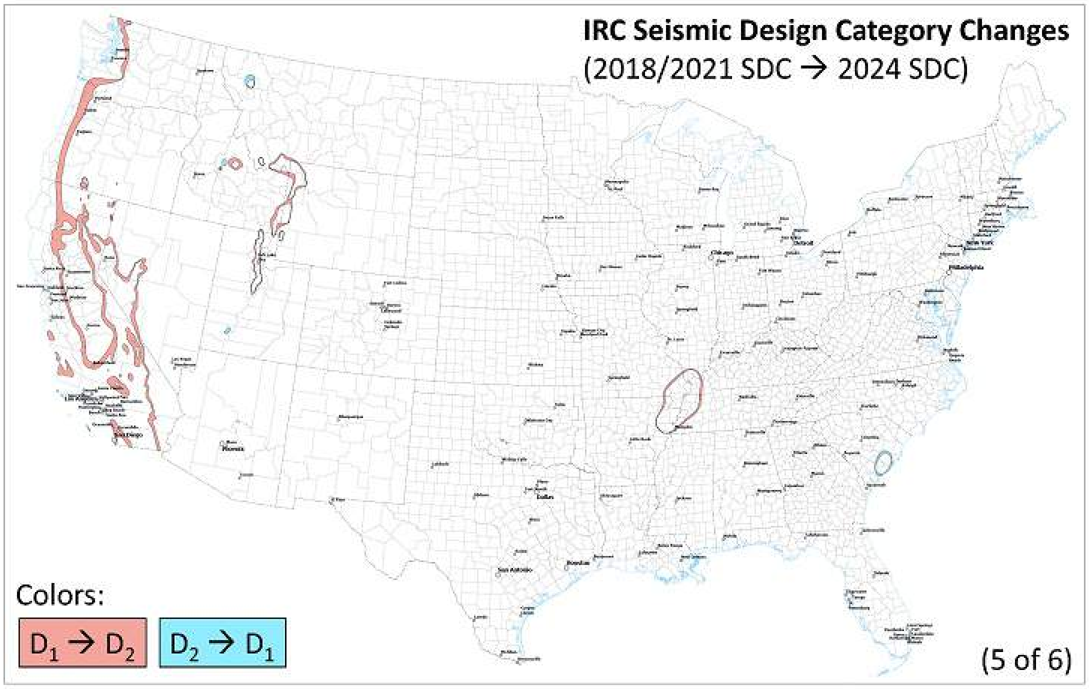
For the states and territories outside of the conterminous U.S., where the existing USGS NSHMs did not yet support direct development of multi-period response spectra (MPRS) needed for the above-mentioned modifications to site-class effects and spectral periods, MPRS were developed using the FEMA P-2078 “Procedures for developing multi-period response spectra at non-conterminous United States sites” (Applied Technology Council, 2020). Via these procedures, the ground motion parameter values for default site conditions were approximated from Site Class BC values of short-period and one-second parameters, using the existing USGS seismic hazard models for Alaska (Wesson et al., 2007), Hawaii (Klein et al., 2001), Puerto Rico and the U.S. Virgin Islands (Mueller et al., 2003), Guam and the Northern Mariana Islands (Mueller et al., 2012), and American Samoa (Petersen et al., 2012). Other relatively minor updates were made to the short-period and one-second Site Class BC values for each region so that they are consistent with the risk-targeted calculations and maximum-direction scale factors used for the conterminous U.S.

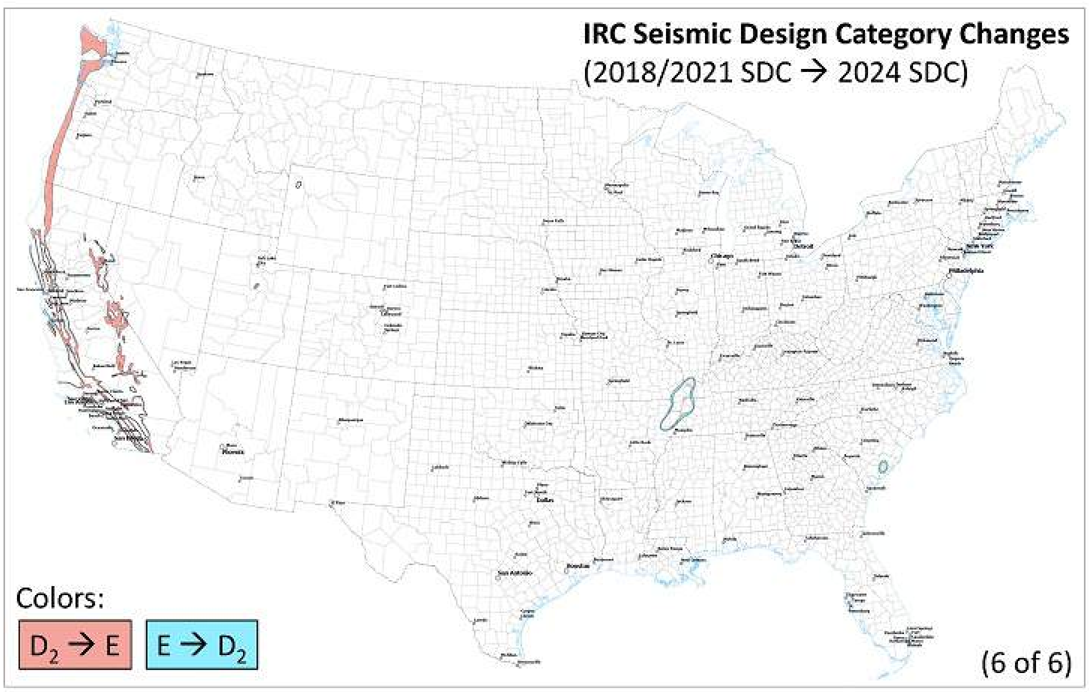

IRC Seismic Design Category Changes
(2018/2021 SDC → 2024 SDC)
Colors:
A → B
B → A
C → A
(1 of 6)


IRC Seismic Design Category Changes
(2018/2021 SDC → 2024 SDC)
Colors:
B → C
C → B
D_0 → B
(2 of 6)


IRC Seismic Design Category Changes
(2018/2021 SDC → 2024 SDC)
Colors:
C → D0
D0 → C
C → D1
D1 → C
(3 of 6)


IRC Seismic Design Category Changes
(2018/2021 SDC → 2024 SDC)
Colors:
D0 → D1
D1 → D0
D0 → D2
D2 → D0
(4 of 6)





Cost Impact: The code change proposal will not increase or decrease the cost of construction
The updated maps result in changes to SDC both upward and downward in a limited number of locations, but do not broadly increase SDC or the cost of construction. An attached file prepared by USGS illustrates the specific locations where SDC is increasing and decreasing. An increase in SDC can result in a nominal increase in cost due to an increase in required amount of seismic bracing, whereas a decrease in SDC will result in a decrease in cost. An increase to SDC E will result in increased cost for seismic design using engineered methods.

RB38-22

RB39-22

IRC: SECTION 202 (New), R301.2.2.10, R301.2.2.10 (New), R301.2.2.10.1 (New), M1307.2, M2301.2.13, G2404.8, P2801.8

Proponents: Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Add new definition as follows:

SYSTEM COMPONENTS. Mechanical, electrical, plumbing, fuel-gas, fire-protection, photovoltaic, thermal energy, and other components. Such components shall include but are not limited to: utilities and appliances such as water heaters, thermal storage units, HVAC cabinets, and components of a similar height and weight.

Delete without substitution:

~~**R301.2.2.10 Anchorage of water heaters.** In *Seismic Design Categories* D_0, D_1 and D_2, and in *townhouses* in Seismic Design Category C, water heaters and thermal storage units shall be anchored against movement and overturning in accordance with Section M1307.2 or P2801.8.~~

Add new text as follows:

R301.2.2.10 Seismic restraint of system components required. In Seismic Design Categories D_0, D_1, and D_2 and in townhouses in SDC C, system components that are designed to be fixed in position shall be supported and braced or anchored to the structure in accordance with the component manufacturer's recommendations or per Section R301.2.2.10.1.

Exception: Seismic support, bracing, and anchorage are not required for the following:

1. Suspended mechanical ducts, electrical conduit, and plumbing systems that are not part of a fire-suppression or other life-safety system.
2. Where the component or housing is bearing on an elevated floor or roof and the housing height is not greater than 1.5 times the width of the housing base in either direction.
3. Where the component or housing is suspended from the structure less than 7-inches (152.4 mm) below the supporting structural element and the net operating weight is less than 50 pounds per support.
4. Where the operating weight of the component and its housing is less than 400 pounds and is less than 4 feet above floor level.

R301.2.2.10.1 Seismic restraint resistance. Supports, bracing, and anchorage of system components in Seismic Design Categories D_0, D_1 and D_2, and in townhouses in Seismic Design Category C, shall resist a horizontal force equal to one-third times the operating weight of the component, acting in any direction. Bracing shall comply with the following:

1. Components supported at the base shall be braced with strapping at points within the upper one-third of the component's vertical dimensions, or the component anchorage shall be designed to resist overturning.
2. Components suspended from the structure shall be braced to the structure, using either flexible or rigid bracing. Flexible bracing such as wires or straps shall be provided in each of the four orthogonal directions. Rigid bracing such as struts or bars may be provided in two orthogonal directions.

Revise as follows:

M1307.2 Anchorage of appliances. *Appliances* designed to be fixed in position shall be fastened or anchored in an *approved* manner. In Seismic Design Categories D_0, D_1 and D_2, and in townhouses in Seismic Design Category C, water heaters and thermal storage units shall be anchored or strapped to resist horizontal displacement caused by earthquake motion in accordance with Section R301.2.2.10.~~one of the following:~~

1. ~~Anchorage and strapping shall be designed to resist a horizontal force equal to one-third of the operating weight of the water heater storage tank, acting in any horizontal direction. Strapping shall be at points within the upper one-third and lower one-third of the *appliance's* vertical dimensions. At the lower point, the strapping shall maintain a minimum distance of 4 inches (102 mm) above the controls.~~
2. ~~The anchorage strapping shall be in accordance with the appliance manufacturer's recommendations.~~

M2301.2.13 Thermal storage unit seismic bracing. In *Seismic Design Categories* D_0, D_1 and D_2 and in townhouses in Seismic Design Category C, thermal storage units shall be anchored in accordance with Section R301.2.2.10. ~~M1307.2.~~

G2404.8 Seismic resistance. Where earthquake loads are applicable in accordance with this code, the supports shall be designed and installed for the seismic forces in accordance with Section R301.2.2.10 ~~this code~~.

P2801.8 Water heater seismic bracing. In Seismic Design Categories D_0, D_1 and D_2 and townhouses in Seismic Design Category C, water heaters shall be anchored in accordance with Section R301.2.2.10. ~~or strapped in the upper one-third and in the lower one-third of the *appliance* to resist a horizontal force equal to one-third of the operating weight of the water heater, acting in any horizontal direction, or in accordance with the *appliance* manufacturer's recommendations.~~

Reason Statement: This proposal clarifies currently undefined IRC seismic restraint requirements for non-structural systems that pose a hazard if displaced during an earthquake. This proposal provides prescriptive direction that does NOT require a registered design professional, but still allows compliance with the intent of the IRC.
The new Section R301.2.2.10 makes use of current IRC language, while adjusting the provisions to better suit a variety of sizes and shapes. Exceptions have been added to limit the scope so that only larger and heavier components are subject to the required restraint. The limits on these exceptions have been correlated with ASCE 7 Chapter 13, which in some instances reduced the scope of the requirements (i.e. 300 lb limit has been increased to a 400 lb limit). These exclusions prevent components like common ductwork, electrical conduit, etc. from being subject to additional and unnecessary restraints.

By consolidating the seismic restraint requirements into Chapter 3, users no longer have to jump between chapters and the requirements can be uniformly defined without contradictions. This also follows the established precedent to define applicable scope criteria for seismic provisions within Chapter 3.

Issue this Addresses

While sections such as G2404.8 reference "seismic forces in accordance with this code", the IRC does not provide direction on how to determine the "seismic forces" or how to select anchorage and bracing that will support that force. As a result, the user is left with a choice between the responsibility of properly selecting the anchorage and bracing themselves or turning to an engineered solution to truly comply with the IRC.

Utility and non-structural systems other than water heaters (M1307.2) and thermal storage units (M2301.2.13) are just as vulnerable to displacement during an earthquake but are not explicitly covered by the current language. Displacements of these systems pose as much or more of a hazard than water heaters, from falling debris, containment failure of systems, or gas leaks within the residence. The current IRC provisions provide insufficient direction on how to adequately brace non-structural systems other than water heaters.

Cost Impact: The code change proposal will increase the cost of construction
The cost increase will be small since the anchorage and bracing can be achieved with typical construction materials readily available from local hardware stores. Non-structural items subject to this proposal can be braced with coil strapping, wire bracing, or rigid struts with approximate costs as follows:

- $9 - $15 => basic water heater strap kit
- $36 - $42 => 25-feet of 20-gage coil strapping
- $6 - $10 => 175-feet of 20-gage galvanized steel wire
- $21 - $35 => 10-foot long 14-gage channel strut

RB39-22

RB40-22

IRC: R301.2.2.11 (New), ICC Chapter 44 (New)

Proponents: Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); J Daniel Dolan, representing Seismic Code Support Committee (jddolan@wsu.edu); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Add new text as follows:

R301.2.2.11 Voluntary lateral force-resisting system alterations.. Structural alterations that are intended exclusively to strengthen the lateral force-resisting system and are not required by other provisions of this code shall be permitted in accordance with one of the following:

1. ICC 1300, for buildings that meet its eligibility requirements.
2. Appendix A Chapter A3 of the *International Existing Building Code.*
3. Appendix A Chapter A4 of the I*nternational Existing Building Code.*
4. Section 503.13 or 806.4 of the *International Existing Building Code.*

Such alterations shall not trigger compliance with other requirements of this code.

Add new standard(s) as follows:

ICC

International Code Council, Inc.
500 New Jersey Avenue NW 6th Floor
Washington, DC 20001

1300-2022 Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings

Staff Analysis: A review of the standard proposed for inclusion in the code, ICC 1300-2022 Vulnerability-Based Seismic Assessment and Retrofit of One and Two Family Dwellings, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The recently published document *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings Volume 1 - Prestandard* (FEMA P-1100, 2018) is in the process of being converted to Standard ICC-1300 by the ICC Residential Assessment and Seismic Retrofit Standard Committee. The FEMA prestandard and the ICC standard have used state of the art analysis tools and performance-based methods to develop seismic retrofit provisions for cripple wall, living-space-over-garage, and hillside dwellings as well as residential brick masonry chimneys.
This proposal recognizes voluntary seismic retrofit and allows such retrofit to be provided without triggering other code provisions. This is intended to facilitate use of the ICC-1300 retrofit standard on a voluntary basis by interested persons. Two existing IEBC appendix chapters that contain prescriptive voluntary retrofit provisions are also listed as acceptable voluntary improvement methods, as are the IEBC prescriptive compliance provisions (IEBC Section 503.13) or Level 2 alterations provisions (IEBC Section 806.4).

Bibliography: ICC-1300, Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings, Under development (ICC, 2022)

Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings (FEMA P-1100), Federal Emergency Management Agency, Washington, D.C, 2018.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this proposal only provides a new alternative method for voluntary retrofit, it will not impact the cost of construction.

RB40-22

RB41-22

IRC: R301.2.2.11 (New), ICC Chapter 44 (New)

Proponents: Kelly Cobeen, representing ICC Residential Seismic Assessment and Retrofit Standard Consensus Committee (IS-RSARC) (kcobeen@wje.com)

2021 International Residential Code

Add new text as follows:

R301.2.2.11 Voluntary seismic alterations. Structural alterations that are intended exclusively for strengthening of the seismic force-resisting system or masonry chimneys and are not required by other provisions of this code shall be permitted in accordance with ICC-1300.

Add new standard(s) as follows:

ICC

International Code Council, Inc.
500 New Jersey Avenue NW 6th Floor
Washington, DC 20001

1300-2022	Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings

Staff Analysis: A review of the standard proposed for inclusion in the code, ICC 1300-2022 Vulnerability-Based Seismic Assessment and Retrofit of One and Two Family Dwellings, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This proposal adds to IRC Section R303.2.2 "Seismic provisions" a new Section R301.2.2.11 to reference new standard ICC 1300-2022, *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings*. Section R301.2.2.11 recognizes the standard and authorizes its use for owners, contractors, registered design professionals, and building officials where seismic retrofits may be desired. The new standard is also added to Chapter 44, Reference Standards. It is the general intent that voluntary seismic retrofit per ICC 1300 be permitted without triggering other requirements of the IEBC or the IRC, but discretion is left to the building official. A companion proposal provides a similar adoption of ICC 1300 into the IEBC.
ICC 1300-2022 is an optional design and construction standard that allows, under certain circumstances, one- and two-family dwelling units and townhouses to be assessed and retrofitted to provide a higher level of seismic resistance than structures built to legacy codes or prior to building codes being in effect. Damage assessments from earthquakes and application of modern seismic design standards and modeling techniques have shown hillside homes, crawl space homes, homes with living areas over garages, and brick masonry chimneys to be vulnerable to significant earthquake damage. Prestandard FEMA P-1100, *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings,* developed by the Applied Technology Council, was used as the basis of the new ICC 1300 standard. Also included is the evaluation and retrofit of masonry chimneys.

As an ANSI accredited standards developing organization, the Code Council is developing New ICC 1300-2022. The Residential Seismic Assessment and Retrofit Standard Consensus Committee (IS-RSARC) has the primary responsibility for the development of minimum requirements to safeguard the public health, safety, general welfare by providing a methodology for the identification, evaluation and retrofit of specific known vulnerabilities for one- and two-family wood light-frame dwellings up to 2 stories in height located in Seismic Design Categories B through E. This includes the use of the best available seismic numerical modeling tools and engineering practices to assist in development of assessment methods and to identify retrofit criteria to best achieve targeted performance objectives. Use of the provisions is anticipated to improve earthquake performance but is not necessarily intended to prevent earthquake damage. IS-RSARC was appointed by the ICC Board of Directors in June 2020 and has primary responsibility for the development as an American National Standard. All standards development is subject to ICC's ANSI Approved Consensus Procedures. The development of the standard is currently ongoing. The first public ballot version is included with this proposal; the final version is anticipated to be available in late 2022, as required by ICC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code proposal does not increase nor decrease cost of construction, as the standard and the charging language is voluntary.

RB41-22

RB42-22

IRC: R301.2.4, R322.1

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Revise as follows:

R301.2.4 Floodplain construction. Buildings and structures constructed in whole or in part in flood hazard areas ~~(including A or V Zones) as~~ established in Table R301.2, and substantial improvement and *repair* of substantial damage of buildings and structures located in whole or in part in flood hazard areas, shall be designed and constructed in accordance with Section R322. Buildings and structures that are located in more than one flood hazard area , including A Zones, Coastal A Zones, and V Zones, shall comply with the provisions associated with the most restrictive flood hazard area. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

R322.1 General. Buildings and structures constructed in whole or in part in flood hazard areas~~, including A or V Zones and Coastal A Zones, as~~ established in Table R301.2, and substantial improvement and *repair* of substantial damage of buildings and structures located in whole or in part in flood hazard areas, shall be designed and constructed in accordance with the provisions contained in this section. Buildings and structures that are located in more than one flood hazard area , including A Zones, Coastal A Zones, and V Zones, shall comply with the provisions associated with the most restrictive flood hazard area. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

Reason Statement: This proposal makes it clearer that the flood provisions that apply to both new dwellings and substantially improved or substantially damaged dwellings must comply when located in whole or in part in flood hazard areas. It further clarifies what is meant by “located in more than one flood hazard area.” The NFIP requires buildings that straddle a boundary between two zones meet the requirements of the more restrictive flood zone. The proposal also results in R301.2.4 and R322.1 using the same phrasing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal relocates and explains what is meant by “located in more than one flood hazard area.” There is no change to the technical content of the provisions. By clarifying existing requirements, there will be no cost impact when approving this proposal.

RB42-22

RB43-22

IRC: TABLE R301.7

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2021 International Residential Code

R301.7 Deflection. The allowable deflection of any structural member under the *live load* listed in Sections R301.5 and R301.6 or wind loads determined by Section R301.2.1 shall not exceed the values in Table R301.7.

Revise as follows:

TABLE R301.7 ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS[b, c]

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
Rafters having slopes greater than 3:12 with finished ceiling not attached to rafters	*L*/180
Interior walls and partitions	*H*/180
Floors	*L*/360
Ceilings with brittle finishes (including plaster and stucco)	*L*/360
Ceilings with flexible finishes (including gypsum board)	*L*/240
All other structural members	*L*/240
Guards [f] Horizontal Deflection Vertical Deflection	 *H/24 + L/96* *L/96*
Handrails [g h]	*L/96*
Exterior walls—wind loads[a] with plaster or stucco finish	*H*/360
Exterior walls—wind loads[a] with other brittle finishes	*H*/240
Exterior walls—wind loads[a] with flexible finishes	*H*/120[d]
Lintels supporting masonry veneer walls[e]	*L*/600

Note: *L* = span length, *H* = span height.

a. For the purpose of the determining deflection limits herein, the wind load shall be permitted to be taken as 0.7 times the component and cladding (ASD) loads obtained from Table R301.2.1(1).

b. For cantilever members, *L* shall be taken as twice the length of the cantilever.

c. For aluminum structural members or panels used in roofs or walls of sunroom additions or patio covers, not supporting edge of glass or sandwich panels, the total load deflection shall not exceed *L*/60. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed *L*/175 for each glass lite or *L*/60 for the entire length of the member, whichever is more stringent. For sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed *L*/120.

d. Deflection for exterior walls with interior gypsum board finish shall be limited to an allowable deflection of *H*/180.

e. Refer to Section R703.8.2. The dead load of supported materials shall be included when calculating the deflection of these members.

f. Deflection shall be measured at the top of the guard

g. Vertical, horizontal, and longitudinal deflection.

h. For longitudinal deflection *L* = the span of the support bracket/post

Reason Statement: This proposal provides reasonable deflection allowance for guards and handrails based upon long accepted standards for guards and handrails (as noted below) responsible for a long history of serviceable products without safety issues in the built environment. Guards and handrails are structural members listed in Table R301.5. They are without a specific listing for allowable deflection in Table R301.7 and are caught in the catch all of “All other structural members” by default. It is our belief that guards and handrails fall in this category as an unintentional oversight. The allowances in this table are intended for elements of the building's envelope and core structure, e.g., floor, ceilings, roof, and walls to limit vibration and prevent cracking of applied finishes. As stated in R301.7 the deflection allowances in the table are to be considered under the required live load, which for these elements are uniformly distributed live loads. However, the loads on guards and handrails are concentrated loads to correlate with their function that is uniquely different from floors, walls, etc.
The default "All other..." allowed deflection of only L/240 is simply not enforceable nor is it being enforced. L/240 is over restrictive for the length of any guard system, as guards are not susceptible to the same kind of loading as floors, nor does regulating deflection of length address deflection of height which is a far more critical parameter when applying the required load to a guard. Any horizontal deflection of the guard system as the user experiences is dependent upon the vertical support when the required live load is applied to the top of the guard system. Height may not be a factor in deflection of a handrail system depending upon how it is mounted as with a rail mounted to a wall with brackets. In any case it is plain to see that L/240 has not factored in height.

Guards are commonly made of many different materials, wood, steel, aluminum, miscellaneous metals, glass, composites, plastics, etc. each having unique properties affecting deflection. Guards and handrails of each of these materials have been manufactured based upon the requirements of long accepted standards:

ASTM E985, *Standard Specification for Permanent Metal Railing Systems and Rails for Buildings*,
ASTM D7032, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)*,
ICC-ES AC273, *Acceptance Criteria for Handrails and Guards*.

These standards represent current practice for testing the deflection of manufactured guard systems and their approval by ICC-ES acceptance criteria as well as other product evaluators that use the same ASTM Tests. Such approved products are common throughout the built environment. If enforced L/240 would eliminate these products without any evidence contrary to their serviceability. Furthermore in the supporting statement of RB61-13, Cole Graveen PE, SE, the proponent stated:

> "*It should be noted that if the current deflection limit of L/240 for All other structural members is applied to wood guards on common residential decks, as it should be per the current text of the IRC, it is highly likely that many of the typical wood guard constructions would not comply with L/240. The deflection of a typical mid-grade wood 4x4 post connected to a 2x10 band joist will exceed L/240 when both the bending deflection of the post and the rotation of the support is considered.*"

RB61-13 (as shown below) suggested that L/240 be replaced with the requirements set forth in the standards cited above that are used to approve product by the ICC. This proposal however makes two modifications:

1. The test standards allow for independent testing of posts and rails however in use the deflection realized is due to loads applied to the assembled guard system. Such systems may or may not have posts as supports. Furthermore a requirement for post deflection is unnecessary because the deflection of the guard system includes deflection due to the supports when loads are applied to the top of the guard system.
2. We have included a limit for handrails of L/96 comparable to the vertical deflection of the top of the guard. Since handrails must resist the live load in any direction footnote 'g' states that the deflection would be applicable in all primary axes vertical, horizontal and longitudinal. Footnote 'h' clarifies that for longitudinal deflection "L= the span of the support for handrails, e.g., bracket length or post length.

RB61-13
Table R301.7

Proposed Change as Submitted

Proponent: Cole Graveen PE, SE, Raths, Raths & Johnson, Inc., representing self (cwgraveen@rrj.com)

Revise as follows:

TABLE R301.7
ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS[b,c]

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
All other structural members	L/240
Guards[f,g] Post (horizontal deflection) Top Rail (horizontal deflection) Top Rail (vertical deflection)	 H/12 H/24 + L/96 L/96

(Portions of table not shown remain unchanged)

a through e *(No change to current text)*
f. For the guard post, H shall be taken as the distance from the top of the top rail to the first point of support.
g. For the guard top rail, H shall be taken as the height of the rail and L shall be taken as the distance between edges of the post supports. The deflection of the top rail is measured relative to the center of the two posts.

Reason: Specific deflection limits for guards are proposed to clarify serviceability requirements and to help ensure occupant safety and comfort.

The serviceability requirements for guards in the both the IBC and IRC are vague and open to interpretation. The IBC requires all structural systems and members to have adequate stiffness to limit deflections and lateral drift, Section 1604.3, however it contains no specific deflection limits for guards. The IRC contains a general deflection limit of L/240 in Table R301.7 for all structural members not otherwise listed in the table. However, it is not likely that this limit was originally intended to apply to guards structural members not otherwise listed in the table. However, it is not likely that this limit was originally intended to apply to guards nor does it appear that this limit is commonly applied to guards in design or code enforcement.

The deflection limits proposed in this code change are based upon existing requirements in ASTM E985, *Standard Specification for Permanent Metal Railing Systems and Rails for Buildings*, ASTM D7032, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)*, and ICC-ES AC273, *Acceptance Criteria for Handrails and Guards*. The proposed limits allow reasonable deflection of the guard post and top rail while still ensuring that the guard will perform its intended function of preventing accidental falls. It is important to note that while excessive deflection is undesirable, some deflection is desirable[4] as it can provide warning to the occupant that they are at an edge of an elevated surface and may be unduly loading the guard.

Specific deflection limits are needed not only for clarity, but also to establish acceptable performance. Guards are provided to minimize the possibility of occupants accidentally falling from an elevated surface. The ability of a guard to prevent such an accidental fall depends on its stiffness as well as its height and strength. Guards that meet the strength and height requirements of the code but that move excessively under load could potentially not prevent an accidental fall. Limiting guard deflections to appropriate amounts will help protect occupants against accidentally falling from an elevated surface.

In addition, specific deflection limits are also necessary to help ensure that occupants are comfortable and feel safe. Similar to floor deflection limits that ensure that occupants are not uncomfortable or annoyed with bouncy floors or building drift limits that ensure that occupants are not uncomfortable or sick due to the swaying motion of tall buildings, reasonable lateral deflection limits for guards will help ensure that occupants do not feel that the guard is unsafe.

Example: Under the proposed deflection provisions, the post for a residential guard with a top rail height of 36" above the walking surface and a point of support 3" below the walking surface would have a deflection limit of (36 + 3)/12 = 3.25 inches. The top rail spanning between 4" wide posts that are spaced 4' apart would have a horizontal deflection limit of (48 – 4)/96 + (36 + 3)/24 = 2.10 inches.

References:

1. ASTM E985-00(2006), Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
2. ASTM D7032-08, Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)
3. ICC-ES AC273, Acceptance Criteria for Handrails and Guards, Corrected January 2009
4. Loferski, J., Albright, D., and Woeste, F. (July 2007) Tested Guardrail Post Connections for Residential Decks, Structure Magazine

Committee Action Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change proposal because they felt that a) it permitted excessive levels of deflection that would be disconcerting to homeowners and b) there are problems with footnotes f and g that were pointed out in testimony on the floor.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Cole Graveen, Raths, Raths & Johnson, Inc., representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE R301.7
ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS[illegible]

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
All other structural members	L/240
Guards[f,g] Post (horizontal deflection) Top Rail of the guard (horizontal deflection) Top Rail of the guard (vertical deflection)	 H/12 H/24 + L/96 L/96

(Portions of table not shown do not change)

f. For the guard post, H shall be taken as the distance from the top of the top ~~rail~~ guard to the first point of support. The post deflection shall consider the rotation of the post support.

g. For the top of the guard ~~top rail~~, H shall be taken as the height of the ~~rail~~ guard and L shall be taken as the distance between edges of the post (vertical) supports. The deflection of the top rail of the guard is measured relative to the center of the two posts (vertical supports).

Commenter's Reason: This proposal, as modified, changes the deflection limits for guards in the IRC. The general deflection limit of L/240 which currently applies to guards under the *All other structural members* listing was most likely never intended to apply to guards and does not appear to be commonly applied to guards in design or code enforcement. Appropriate allowable deflections for guards, limits which are currently contained in ASTM and ICC-ES documents, are inserted into Table R301.7.

The modifications improve the original proposal by revising the text to more clearly indicate the proposed allowable deflection for guards.

The removal of the reference to the top rail addresses comments made at the public hearing that not all guards have rails. The text of the proposal was revised to simply refer to the top of the guard rather than the top rail.

The additional sentence in footnote f was added to make it clear that the post deflection includes the movement of the post and its support. If the effects of the support are not accounted for, a stiff post attached to a flimsy support could be considered to comply with the proposed limits even though the rotation at the bottom of the post would cause considerable deflection. Think of holding a long stick in your hand. Even slightly rotating your hand will cause the top of the stick to move. This effect cannot be ignored in deflection calculations.

In addition, the committee commented that they felt that this code change would permit excessive levels of deflection that would be disconcerting to homeowners. I disagree. The proposed limits are taken directly from ASTM E985, *Standard Specification for Permanent Metal Railing Systems and Rails for Buildings*, ASTM D7032, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)*, and ICC-ES AC273, *Acceptance Criteria for Handrails and Guards*. These documents are currently in use and I am unaware of any problems that have resulted from the application of these deflection limits.

It should be noted that if the current deflection limit of L/240 for *All other structural members* is applied to wood guards on common residential decks, as it should be per the current text of the IRC, it is highly likely that many of the typical wood guard constructions would not comply with L/240. The deflection of a typical mid-grade wood 4x4 post connected to a 2x10 band joist will exceed L/240 when both the bending deflection of the post and the rotation of the support is considered.

The proposed limits allow reasonable deflection of the guard post and the top of the guard while still ensuring that the guard will perform its intended function of preventing accidental falls. The proposed limits are taken from active published standards. The general deflection limit for *All other structural members* of L/240 was most likely never intended to apply to guards and this proposal clarifies this by inserting appropriate deflection limits for guards.

RB61-13
Final Action: AS AM AMPC____ D

Bibliography: 1. ICC-ES AC273, Acceptance Criteria for Handrails and Guards, Corrected January 2009
2. ICC-ES AC273, Acceptance Criteria for Handrails and Guards, Corrected January 2017 (updated 2021)
3. ASTM E985-00(2006), Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
4. ASTM E985-00 E1, Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
5. ASTM D7032-08, Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)
6. Loferski, J., Albright, D., and Woeste, F. (July 2007) Tested Guardrail Post Connections for Residential Decks, Structure Magazine
7. Review of Fall Safety of Children Between the Ages of 18 Months and 4 Years in Relation to Guards and Climbing in the Built Environment, Prepared for National Ornamental & Miscellaneous Metals Association (NOMMA), Prepared by NAHB Research Center, Inc., December 2007
8. Horizontal Static Forces Exerted by Men Standing in Common Working Positions on Surfaces of Various Tractions - Including Coefficients of Friction Between Various Floor and Shoe Materials, K. H. E. Kroemer, et al, Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, January 1971
9. RB61-13, 2013 Code Development Cycle of the 2015 International Residential Code

Cost Impact: The code change proposal will decrease the cost of construction
Based upon the premise that the code will be enforced as written this will at the very least prevent a landslide of re-evaluation and testing subsequent to obsolescence of many guard and handrail products, all at an undetermined increase in cost.

RB43-22

RB44-22

IRC: TABLE R301.7

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2021 International Residential Code

R301.7 Deflection. The allowable deflection of any structural member under the *live load* listed in Sections R301.5 and R301.6 or wind loads determined by Section R301.2.1 shall not exceed the values in Table R301.7.

Revise as follows:

TABLE R301.7 ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS[b, c]

Portions of table not shown remain unchanged.

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
All other structural members excluding guards and handrails.	*L*/240

Note: *L* = span length, *H* = span height.

a. For the purpose of the determining deflection limits herein, the wind load shall be permitted to be taken as 0.7 times the component and cladding (ASD) loads obtained from Table R301.2.1(1).

b. For cantilever members, *L* shall be taken as twice the length of the cantilever.

c. For aluminum structural members or panels used in roofs or walls of sunroom additions or patio covers, not supporting edge of glass or sandwich panels, the total load deflection shall not exceed *L*/60. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed *L*/175 for each glass lite or *L*/60 for the entire length of the member, whichever is more stringent. For sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed *L*/120.

d. Deflection for exterior walls with interior gypsum board finish shall be limited to an allowable deflection of *H*/180.

e. Refer to Section R703.8.2. The dead load of supported materials shall be included when calculating the deflection of these members.

Reason Statement: This proposal eliminates guards and handrails from the IRC allowed deflection table and removes the requirement that conflicts with the long accepted standards related to Guards and Handrails.

Guards and handrails are structural members listed in Table R301.5. However without a specific listing for allowable deflection in Table R301.7 they are caught in the catch all of “All other structural members” by default. It is our belief that guards and handrails fall in this category as an unintentional oversight. The allowances in this table are intended for elements of the building's envelope and core structure, e.g., floor, ceilings, roof, and walls to limit vibration and prevent cracking of applied finishes. As stated in R301.7 the deflection allowances in the table are to be considered under the required live load, which for these elements are uniformly distributed live loads. However, the loads on guards and handrails are concentrated loads to correlate with their function that is uniquely different from floors, walls, etc.

The default "All other..." allowed deflection of only L/240 is simply not enforceable nor is it being enforced. L/240 is over restrictive for the length of any guard system, as guards are not susceptible to the same kind of loading as floors, nor does regulating deflection of length address deflection of height which is a critical parameter when applying the required load to the top of the guard. Any horizontal deflection of the guard system as the user experiences it is dependent upon the vertical support when the required live load is applied to the top of a guard system. Height may not be a factor in deflection of a handrail system depending upon how it is mounted as with a rail mounted to a wall with brackets. However, in any case it is plain to see L/240 does not factor in height of the guard.
Guards are commonly made of many different materials, wood, steel, aluminum, miscellaneous metals, glass, composites, plastics, etc. each having unique properties affecting deflection. Guards and handrails of each of these materials have been manufactured based upon the requirements of long accepted standards:

ASTM E985, *Standard Specification for Permanent Metal Railing Systems and Rails for Buildings*,
ASTM D7032, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)*,
ICC-ES AC273, *Acceptance Criteria for Handrails and Guards*.

These standards represent current practice for testing the deflection of manufactured guard systems and their approval by ICC-ES acceptance criteria as well as other product evaluators that use the same ASTM Tests. Such approved products are common throughout the built environment. If enforced L/240 would eliminate these products without any evidence contrary to their serviceability. Furthermore in the supporting statement of RB61-13, Cole Graveen PE, SE, the proponent stated:

> “*It should be noted that if the current deflection limit of L/240 for All other structural members is applied to wood guards on common residential decks, as it should be per the current text of the IRC, it is highly likely that many of the typical wood guard constructions would not comply with L/240. The deflection of a typical mid-grade wood 4x4 post connected to a 2x10 band joist will exceed L/240 when both the bending deflection of the post and the rotation of the support is considered.”*

RB61-13 suggested that L/240 be replaced with the requirements set forth in the standards cited above that are used to approve product by the ICC. RB61-13 was disapproved. This proposal however simply eliminates guards and handrails from the IRC allowed deflection Table R301.7and removes any conflict with the long accepted standards.

We will also propose an amended version of RB16-13 with a substitution for L/240 in an attempt to harmonize the IRC with the long existing standards cited above and as the proponent it is our intention to ask that it be heard first.

Bibliography: 1. ICC-ES AC273, Acceptance Criteria for Handrails and Guards, Corrected January 2009
2. ICC-ES AC273, Acceptance Criteria for Handrails and Guards, Corrected January 2017 (updated 2021)
3. ASTM E985-00(2006), Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
4. ASTM E985-00 E1, Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
5. ASTM D7032-08, Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)
6. Loferski, J., Albright, D., and Woeste, F. (July 2007) Tested Guardrail Post Connections for Residential Decks, Structure Magazine
7. Review of Fall Safety of Children Between the Ages of 18 Months and 4 Years in Relation to Guards and Climbing in the Built Environment, Prepared for National Ornamental & Miscellaneous Metals Association (NOMMA), Prepared by NAHB Research Center, Inc., December 2007
8. Horizontal Static Forces Exerted by Men Standing in Common Working Positions on Surfaces of Various Tractions - Including Coefficients of Friction Between Various Floor and Shoe Materials, K. H. E. Kroemer, et al, Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, January 1971
9. RB61-13, 2013 Code Development Cycle of the 2015 International Residential Code

Cost Impact: The code change proposal will decrease the cost of construction
Based upon the premise that the code will be enforced as written this will at the very least prevent a landslide of re-evaluation and testing subsequent to obsolescence of many guard and handrail products, all at an undetermined increase in cost.

RB44-22

RB45-22

IRC: R301.9 (New), R502.3, R802.4.1, R802.5

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Add new text as follows:

R301.9 Framing Member Splices. Splices in floor, ceiling, or roof framing members shall occur over vertical supports or shall be designed by a registered design professional in accordance with Section R301.1.3. Purlins, purlin braces, and collar ties shall not be considered a vertical support for determining splice locations.

Revise as follows:

R502.3 Allowable joist spans. Spans for floor joists shall be in accordance with Tables R502.3.1(1) and R502.3.1(2). For other grades and species and for other loading conditions, refer to the AWC STJR. Joist splices shall comply with Section R301.9.

R802.4.1 Rafter size. Rafters shall be sized based on the rafter spans in Tables R802.4.1(1) through R802.4.1(8). Rafter spans shall be measured along the horizontal projection of the rafter. For other grades and species and for other loading conditions, refer to the AWC STJR. Joist splices shall comply with Section R301.9.

R802.5 Ceiling joists. Ceiling joists shall be continuous across the structure or securely joined where they meet over interior partitions in accordance withSection R802.5.2.1. Ceiling joists shall be fastened to the top plate in accordance with Table R602.3(1). Rafter splices shall comply with Section R301.9.

Reason Statement: This proposal adds language to address members spliced between bearing walls. The clear spans and loads provided in all IRC tables assume a continuous condition between supports. Although a continuous member can be achieved by splicing two members together, the splice must be properly designed to transfer forces across the spliced connection and avoid a hinge condition. Where splices have not been properly designed, members (especially rafters) have displayed visible out-of-plane deformation. In these situations, the members have required repair or replacement to stop and reverse the deformation process.
This proposal clarifies that framing member splices between bearing walls need to be engineered and references section R301.1.3. Engineered design.

“Where a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the International Building Code is permitted for buildings and structures, and parts thereof, included in the scope of this code.”

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification change only; the intent is to clarify Rafter splices need to be engineered which is what required currently but it is not addressed in the code text.

RB45-22

RB46-22

IRC: R302.1

Proponents: Timothy Pate, representing Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Residential Code

Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings* and accessory buildings shall comply with Table R302.1(1); or *dwellings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2). Fire-resistant rated *exterior walls* shall extend from the top of the foundation to the underside of the roof sheathing. Where the soffit is protected with one hour fire rated construction the fire-resistant rated exterior wall shall be permitted to terminate in line with the level of the soffit protection.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Reason Statement: This proposal is a companion change to go with the proposed change to the definitiion of exterior wall with adding gable end wall trusses to be included as an exterior wall. This proposal is to clarify that when a fire rated exterior wall is required due to FSD it needs to extend all the way from top of foundation to the underside of the roof sheathing unless the soffit projection is protected with one hour rated construction.

Cost Impact: The code change proposal will increase the cost of construction
This change will increase the cost of construction only for jurisdictions that have not interpreted that the requirement for the fire rating should be continuous from top of foundation to the roof sheathing.

RB46-22

RB47-22

IRC: R302.1

Proponents: David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC (david.renn@denvergov.org)

2021 International Residential Code

Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings*, *townhouses* and ~~accessory buildings~~ *accessory structures* shall comply with Table R302.1(1) based on *fire separation distance*; or *dwellings* and *townhouses* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2) based on *fire separation distance*.

For the purposes of determining *fire separation distance*, *buildings* on the same *lot* shall be assumed to have an imaginary line between them. Where a new *building* is to be erected on the same *lot* as an *existing building*, the location of the assumed imaginary line with relation to the *existing building* shall be such that the *existing building* meets requirements of this section.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of individual *dwelling units* and their *accessory structures* that face each other and are located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* or *townhouse* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Reason Statement: The main purpose of this proposal is to add language into the body of the code that specifically dictates where imaginary lines must be assumed to determine fire separation distance. Currently, the definition of fire separation distance includes a distance to an imaginary line between two buildings on a lot, but the code doesn't tell you where an imaginary line must be assumed. Without specific language in the code that states where an imaginary line must be assumed, this part of the fire separation distance definition is somewhat moot. The proposed language addresses projects with multiple buildings on a lot, as well as when a new building is added to an existing lot. It should be noted that Exception 2 exempts walls between dwelling units and their accessory structures from fire-resistant exterior wall requirements and this proposal does not change this as the exception still applies.

There is a definite need to measure fire separation distance to an imaginary line between two buildings on lot as there are many projects with multiple dwellings or townhouses on the same lot and this requirement helps to prevent spread of fire from one building to the next (safety to property from fire is part of the intent of the code per Section 101.3). Furthermore, the alarm systems of these buildings are not tied together so it is appropriate to provide these buildings with the same protection as would be provided if the buildings were on separate lots (safety to life from fire is part of the intent of the code per Section 101.3).

This proposal also provides other improvements to this section as follows:

1. Adds the defined term "fire separation distance" into the body of this section. This defined term currently only occurs in an exception and in the tables referenced, which is not typical code language.

2. "accessory buildings" is changed to the defined term "accessory structures".

3. Townhouses are added to the scoping of the exterior wall requirements.

4. Exception 2 is revised to clarify that the exception only applies to walls of individual dwelling units and their accessory structures that face each other. As currently written, this exception could be read to apply to all walls of the dwelling units and accessory structures.

5. "Individual" in Exception 2 is revised to not be in italics as this is not a defined term.

6. Exception 4 for detached garages is revised to include garages accessory to a townhouse.

I urge your support of this proposal as it brings much needed clarity to the code regarding where imaginary lines must be assumed and provides several other improvements to the language of this section. These changes will aid in consistent interpretation and enforcement of fire-resistant exterior wall requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Along with miscellaneous editorial changes, this proposal adds requirements to the body of the code that are already in the definition of 'fire separation distance', with no change in technical content of the code, therefore, there will be no change in cost of construction.

RB47-22

RB48-22

IRC: SECTION 202, R302.1

Proponents: David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC (david.renn@denvergov.org)

2021 International Residential Code

Revise as follows:

[RB] FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. To the closest interior *lot line*.
2. To the centerline of a street, an alley or public way.
3. To an imaginary line between two buildings or *townhouse units* on the *lot*.

The distance shall be measured at a right angle from the face of the wall.

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings* and accessory buildings shall comply with Table R302.1(1); or *dwellings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2).

Where *lot lines* do not exist between *townhouse units*, an imaginary line shall be assumed between the *townhouse units* for the purpose of determining *fire separation distance.*

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Reason Statement: Per definitions in Chapter 2, a "lot" is a measured portion of a parcel of land considered as a unit having fixed boundaries, and a "lot line" is a line that bounds a plot of ground described as a lot in the title to a property. For townhouse units that are individually owned, a lot line is the property line that describes the lot in the title to the property, and this lot line would be used for the purposes of determining fire separation distance and fire-resistance rated exterior wall requirements. However, the IRC does not require townhouse units to be individually owned and does not require lot lines, or property lines, between units. In many cases, a townhouse building is owned by one entity and the townhouse units are rented instead of owned. In this case, the lot is the larger parcel of land that the townhouse building is on and there are no lot lines between the units, which results in no exterior wall requirements for exterior walls close to another townhouse unit.
It should be noted that the commentary for Section R302.2, which gives requirements for walls separating townhouses, indicates that the application of this section has its basis in the exterior wall requirements of R302.1 that deal with the building's location on a lot, and goes on to discuss "Where adjacent townhouse dwelling units meet at common or imaginary lot lines...". Based on this it is clear the intent of the code is to assume imaginary lines where common lot lines do not exist, but there is no code requirement for this. To clarify the intent of the code, this proposal adds specific language to require an imaginary line between townhouse units where a lot line does not exist. The result is that the protection from fire between individual units is always provided, regardless of whether a lot line exists or not.

The figures below show the fire hazard this proposal is intended to address. Note that this configuration of townhouse units is from a real project - it is not hypothetical. Figure 1 shows the configuration of townhouse units on a lot where lot lines do not exist between units. Figure 2 shows exterior walls from two units that are perpendicular to each other with garage door openings adjacent to the intersection of these two walls. A fire originating in one garage could easily spread to the next since these large door openings are adjacent to each other (a similar condition occurs between Garage 6 door and Garage 5 window). Note that this condition is completely compliant with exterior wall requirements of the IRC since fire separation distance of these walls is measured to the lot lines of the lot the building is on. Figure 3 shows this same condition with an assumed imaginary line for fire separation distance, which results in a fire-resistance rated wall with no openings at this wall intersection, helping to prevent the spread of fire between units.

Please support this proposal to bring clarity to the intent of the code regarding exterior walls of adjacent townhouse units.

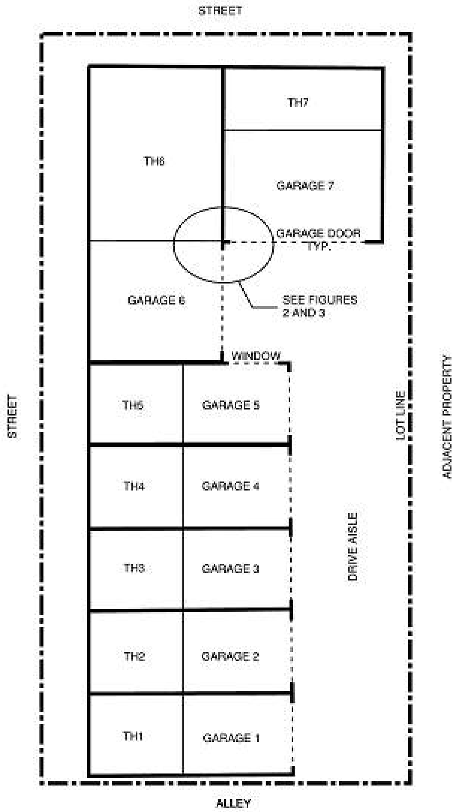


FIGURE 1 - TOWNHOUSE LAYOUT

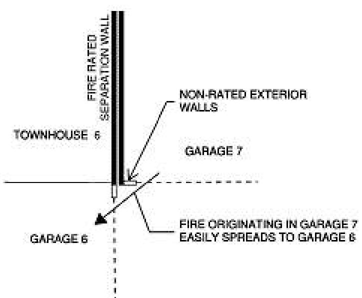


FIGURE 2 - NO IMAGINARY LINE FOR FSD

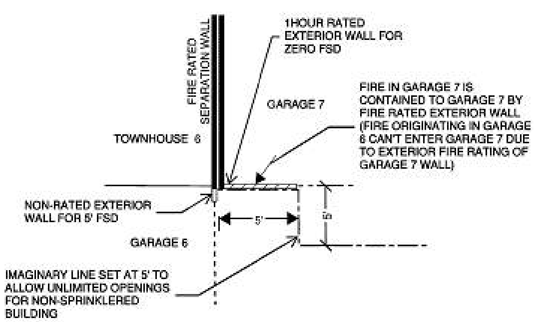


FIGURE 3 - IMAGINARY LINE FOR FSD

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of the code is to provide townhouse units with protection from fire in other units and this is typically provided by measuring fire separation distances to lot lines between townhouse units. This proposal applies this intent to townhouse units without lot lines to provide consistent requirements for all townhouse units, which matches common enforcement practices. Since there is not change to the intent of the codes, there should be no change in the cost of construction.

RB49-22

IRC: TABLE R302.1(1)

Proponents: Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Residential Code

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings* and accessory buildings shall comply with Table R302.1(1); or *dwellings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2).

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Revise as follows:

TABLE R302.1(1) EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.3 of the International Building Code with exposure from both sides	0 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[a, b]	≥ 2 feet to < 5 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Openings in walls	Not allowed	NA	< 3 feet
	25% maximum of wall area in any *story*	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet

For SI: 1 foot = 304.8 mm.
NA = Not Applicable.

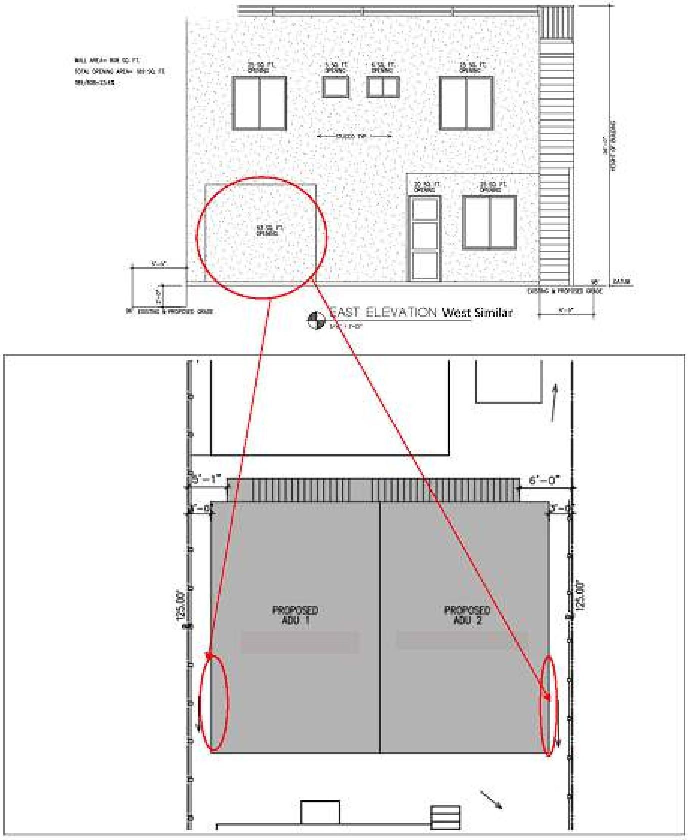
a. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where gable vent openings are not installed.

Reason Statement: The proposed code change addresses a significant omission in the IRC in that where the area of exterior openings is restricted based on fire separation distance the IRC does not identify the method of measurement. The IRC regulates 3 story townhouses and it is not reasonable to permit a large 10 ft by 7 ft opening located at a FSD of 3 ft in a non-sprinkler protected building to be located adjacent to a similar building on an adjacent lot. IBC Section 705.8.1 regulates the area of the exterior wall per story and it makes no sense that a 4-story dwelling regulated under the IBC differently than a 3-story dwelling or townhouse under the IRC since the fire exposure is the same and not impacted by the third dimension, building height.

The attached figure shows a dwelling with two dwelling units where the east and west sides are located at an FSD of 3 feet. If the proposed cod change is adopted the wall area on the first story will be 380 sq ft and not 808 sq ft and the permitted allowable area of wall openings on the first story will be 95 sq ft and the large opening to the first patio will be reduce to 50 sq ft from 83 sq ft. The area of exterior wall openings on the second story will be unchanged.

We request the committee's support for approval as submitted this simple code change.



Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change is adding a clarification and the cost of wall construction is less than door and window construction. The proposed code change should not impact building planning on the site.

RB49-22

RB50-22

IRC: TABLE R302.1(2), R302.2.6, SECTION R313, R313.1, R326.3, TABLE AG101.1, P2902.5.4, SECTION P2904, P2904.3.1

Proponents: John Swanson, representing National Fire Sprinkler Association (swanson@nfsa.org)

2021 International Residential Code

Revise as follows:

TABLE R302.1(2) EXTERIOR WALLS—DWELLINGS WITH ~~A FIRE SPRINKLERS~~ AN AUTOMATIC SPRINKLER SYSTEM

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet[a]
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[b, c]	2 feet[a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	NA	< 3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the fire separation distance for exterior walls not fire-resistance rated and for fire-resistance-rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

c. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where gable vent openings are not installed.

R302.2.6 Structural independence. Each *townhouse unit* shall be structurally independent.

Exceptions:

1. Foundations supporting exterior walls or common walls.
2. Structural roof and wall sheathing from each unit fastened to the common wall framing.
3. Nonstructural wall and roof coverings.
4. Flashing at termination of roof covering over common wall.
5. *Townhouse units* separated by a common wall as provided in Section R302.2.2, Item 1 or 2.
6. *Townhouse units* protected by ~~a fire~~ an automatic sprinkler system complying with Section P2904 or NFPA 13D.

SECTION R313
AUTOMATIC ~~FIRE~~ SPRINKLER SYSTEMS

R313.1 Townhouse automatic ~~fire~~ sprinkler systems. An automatic sprinkler system shall be installed in *townhouses*.

Exception: An automatic sprinkler system shall not be required where *additions* or *alterations* are made to existing *townhouses* that do not have an automatic sprinkler system installed.

R326.3 Story above grade plane. A habitable attic shall be considered a story above grade plane.
Exceptions: A habitable attic shall not be considered to be a story above grade plane provided that the habitable attic meets all the following:

1. The aggregate area of the habitable attic is either of the following:

    1.1. Not greater than one-third of the floor area of the story below.

    1.2. Not greater than one-half of the floor area of the story below where the habitable attic is located within a dwelling unit equipped with ~~a fire~~ an automatic sprinkler system in accordance with Section P2904.

2. The occupiable space is enclosed by the roof assembly above, knee walls, if applicable, on the sides and the floor-ceiling assembly below.
3. The floor of the habitable attic does not extend beyond the exterior walls of the story below.
4. Where a habitable attic is located above a third story, the dwelling unit or townhouse unit shall be equipped with ~~a fire~~ an automatic sprinkler system in accordance with Section P2904.

TABLE AG101.1 PLASTIC PIPING STANDARDS FOR VARIOUS APPLICATIONS[a, b]

APPLICATION	LOCATION	TYPE OF PLASTIC PIPING								
		ABS	CPVC	PE	PE-AL-PE	PE-RT	PEX	PEX-AL-PEX	PP	PVC
Central vacuum	System piping	—	—	—	—	—	—	—	—	ASTM F2158
Foundation drainage	System piping	ASTM F628	—	ASTM F405	—	—	—	—	—	ASTM D2665; ASTM D2729; ASTM D3034
Geothermal ground loop	System piping	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855; CSA B137.6	ASTM D2239; ASTM D2737; ASTM D3035	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2241; CSA B137.3
	Loop piping	—	—	ASTM D2239; ASTM D2737; ASTM D3035; NSF 358-1	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	—	ASTM F2389; CSA B137.11	—
Graywater	Nonpressure distribution/collection	ASTM F628	—	ASTM D2239; ASTM D2737; ASTM D3035; ASTM F2306	—	—	—	—	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2729; ASTM D2949; ASTM D3034; ASTM F891; ASTM F1760 ; CSA B137.3
	Pressure/distribution	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855; CSA B137.6	ASTM D2239; ASTM D2737; ASTM D3035	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2241; CSA B137.3
Radiant cooling	Loop piping	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855	ASTM D2239; ASTM D2737; ASTM D3035	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	—
Radiant heating	Loop piping	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855	—	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	—
	Nonpressure/collection	ASTM F628	—	ASTM F1901	—	—	—	—	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2729; ASTM D2949; ASTM F891; ASTM F1760 ; CSA B137.3

Rainwater harvesting **APPLICATION**	**LOCATION**	**TYPE OF PLASTIC PIPING**								
		ABS	**CPVC**	**PE**	**PE-AL-PE**	**PE-RT**	**PEX**	**PEX-AL-PEX**	**PP**	**PVC**
	Pressure/distribution	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855; CSA B137.6	ASTM D2239 ASTM D2737; ASTM D3035	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2241; CSA B137.3
Radon venting	System piping	ASTM F628	—	—	—	—	—	—	—	ASTM D1785; ASTM F891; ASTM F1760
Reclaimed water	Main to building service	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855; CSA B137.6	ASTM D3035; AWWA C901; CSA B137.1	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; AWWA C904; CSA B137.5	—	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2241; AWWA C905; CSA B137.3
	Pressure/distribution/irrigation	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855; CSA B137.6	ASTM D2239; ASTM D2737; ASTM D3035	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; AWWA C900 ; CSA B137.11	ASTM D1785; ASTM D2241; AWWA C900
~~Residential fire sprinklers~~ Automatic Sprinkler Systems[c]	Sprinkler piping	—	ASTM F441; ASTM F442; CSA B137.6; UL 1821	—	—	ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5; UL 1821	—	ASTM F2389; CSA B137.11	—
Solar heating	Pressure/distribution	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855	—	—	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	—

a. This table indicates manufacturing standards for plastic piping materials that are suitable for use in the applications indicated. Such applications support green and sustainable building practices. The system designer or the installer of piping shall verify that the piping chosen for an application complies with local codes and the recommendations of the manufacturer of the piping.

b. Fittings applicable for the piping shall be as recommended by the manufacturer of the piping.

c. Piping ~~systems~~ for ~~fire~~ automatic sprinkler systems ~~applications~~ shall be listed for the application.

P2902.5.4 Connections to automatic ~~fire~~ sprinkler systems. The potable water supply to automatic ~~fire~~ sprinkler systems shall be protected against backflow by a double-check backflow prevention assembly, a double-check fire protection backflow prevention assembly, a reduced pressure principle backflow prevention assembly or a reduced pressure principle fire protection backflow prevention assembly.

Exception: Where an automatic sprinkler system~~s are~~ is installed in accordance with Section P2904.1, backflow protection for the water supply system shall not be required.

SECTION P2904
DWELLING UNIT ~~FIRE~~ AUTOMATIC SPRINKLER SYSTEMS

P2904.3.1 Nonmetallic pipe and tubing. Nonmetallic pipe and tubing, such as CPVC, PEX, and PE-RT shall be *listed* for use in residential ~~fire~~ automatic sprinkler systems.

Reason Statement: The intent of this code change proposal is to coordinate terminology between the IBC, IFC, IEBC and IRC when referring to "automatic sprinkler system" since this term is used and defined in the International Building Code and International Fire Code. This change is intended to coordinate terminology in the IRC so the term is used consistently throughout the document. It is <u>not</u> the intent of this proposal to make any substantive changes to automatic sprinkler system requirements in the IRC. Existing code sections referencing specific components or appurtenances of an automatic sprinkler system were left untouched. For example, this proposal is not recommending any changes to R302.2.2, R302.4.1, or any other section referencing "water-filled sprinkler piping", since these sections are referring to specific components of an automatic sprinkler system. This proposal also attempts to mirror F75-21 Part II (attached) in relation to clarifying terminology relating to automatic sprinkler systems in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no technical changes to this code section. This proposal is being made for correlation purposes with the terminology used.

RB50-22

RB51-22

IRC: TABLE R302.1(1), TABLE R302.1(2)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

TABLE R302.1(1) EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.3 of the International Building Code with exposure from both sides	0 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[a, b]	≥ 2 feet to < 5 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Openings in walls	Not allowed	NA	< 3 feet
	25% maximum of wall area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet

For SI: 1 foot = 304.8 mm.
NA = Not Applicable.

a. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where ~~gable~~ vent openings are not installed in the overhang or in any gable end walls that are common to attic areas .

TABLE R302.1(2) EXTERIOR WALLS—DWELLINGS WITH FIRE SPRINKLERS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet[a]
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[b, c]	2 feet[a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	NA	< 3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the fire separation distance for exterior walls not fire-resistance rated and for fire-resistance-rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

c. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where ~~gable~~ vent openings are not installed in the overhang or in any gable end walls that are common to attic areas .

Reason Statement: The intent of this proposed code change is to address conditions where if there were no vents at the underside of the roof overhang, or in any gable end walls (both of which would allow fire to freely move into attic areas), then there should be no requirement to rate the underside of the overhang. This could be applied to gable, hip, and any other roof style overhangs. Where additional attic ventilation is required to make up for the loss of vents at overhangs where fire-separation distance is an issue in accordance with these tables and footnotes, additional vents could be added at the underside of eaves in other areas of the dwelling where fire-separation distance is not an issue, or at ridge vents.
This proposal change was submitted during the 2019 Group B code cycle but was disapproved. It was disapproved not based on the intent or principle, but on an editorial error to correlate the footnotes for both tables.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a clarification of current code requirements.

RB52-22

IRC: R302.2

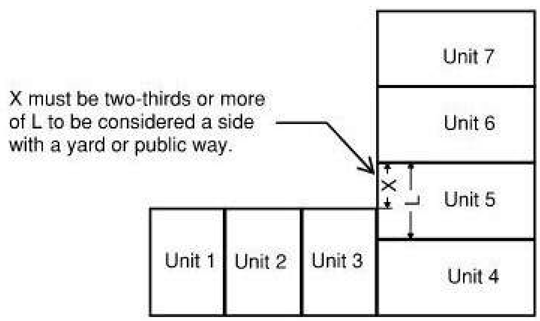
Proponents: David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC (david.renn@denvergov.org)

2021 International Residential Code

Revise as follows:

R302.2 Townhouses. *Townhouse units* shall have a *yard* or *public way* on the entire length of one side and on at least two-thirds the length of another side. Walls separating *townhouse units* shall be constructed in accordance with Section R302.2.1 or R302.2.2 and shall comply with Sections 302.2.3 through 302.2.5.

Reason Statement: Per definition, a "townhouse unit" must have a yard or public way on not less than two sides; however, the definition does not dictate the length required for a yard or public way. Per the IRC commentary, these open sides are intended to provide some degree of independence from other townhouse units. Ideally these two sides would have a yard or public way along the entire length of each side, but this is not always feasible, such as when townhouse units change direction at a corner of a townhouse as shown below. This proposal requires one side to have a yard or public way along the entire length of one side, which is easily achieved at the front side of the unit, and requires a yard or public way along at least two-thirds of another side - we feel this provides the independence intended while also allowing for the common unit configuration show below. We don't believe the short overlap of units allowed in this proposal is enough justification to require the building to be designed to the IBC instead of the IRC. Since the code is silent on how much of the sides are to have a yard or public way, some jurisdictions may require the full length of these sides to be open, while others may allow as little as 3 feet (width of a door). This proposal will bring consistency to the interpretation of this requirement which will benefit developers, designers and building officials.



Cost Impact: The code change proposal will decrease the cost of construction
For jurisdictions where the full length of a side is required to be open, this proposal will decrease the cost of construction since more structures will be allowed to be designed under the IRC instead of the IBC. For jurisdictions that allow some townhouse unit overlap on an open side, this proposal is simply a clarification of how much overlap is allowed and will have little or no impact on the cost of construction.

RB52-22

RB53-22

IRC: R302.2, R302.2.1, R302.2.2, R302.2.3, R302.2.4, R302.2.5, R302.2.6

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Residential Code

Add new text as follows:

R302.2 Townhouses. Townhouses shall comply with Sections R302.2.1 through R302.2.3.

R302.2.1 Open sides. Each *townhouse unit* shall have not less than two open sides adjoining a *yard* or *public way*. The wall on one open side shall have a length that is not less than 20 percent of the total perimeter of the *townhouse unit*, and the wall the second open side shall have a length that is not less than 10 percent of the total perimeter of the *townhouse unit*.

> **Exception:** Walls on open sides of *townhouse units* in *townhouses* that are provided with automatic sprinklersthroughout in accordance with Section P2904 shall have a length of not less than 10 feet (3048 mm) on one open side and 3 feet (914 mm) on the second open side.

Revise as follows:

~~R302.2~~ R302.2.2 ~~Townhouses~~ Separation walls. Walls separating *townhouse units* shall be constructed in accordance with Section ~~R302.2.1 or R302.2.2~~ R302.2.2.1 or R302.2.2.2 and shall comply with Sections ~~R302.2.3 through R302.2.5~~ R302.2.2.3 through R302.2.2.4.1.

R302.2.2.1 ~~R302.2.1~~ Double walls. Each *townhouse unit* shall be separated from other *townhouse units* by two 1-hour fire-resistance-rated wall assemblies tested in accordance with ASTM E119, UL 263 or established by an analytical method in accordance with Section 703.2.2 of the International Building Code.

R302.2.2.2 ~~R302.2.2~~ Common walls. Common walls separating *townhouse units* shall be assigned a fire-resistance rating in accordance with Item 1 or 2 and shall be rated for fire exposure from both sides. Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing. The common wall shared by two *townhouse units* shall be constructed without plumbing or mechanical equipment, ducts or vents, other than water-filled fire sprinkler piping in the cavity of the common wall. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.

1. Where ~~c~~an automatic sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or established by an analytical method in accordance with Section 703.2.2 of the International Building Code.
2. Where an automatic sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or established by an analytical method in accordance with Section 703.2.2 of the International Building Code.

> **Exception:** Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.

R302.2.2.3 ~~R302.2.3~~ Continuity. The fire-resistance-rated wall or assembly separating *townhouse units* shall be continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed accessory structures.

R302.2.2.4 ~~R302.2.4~~ Parapets ~~for townhouses~~. Parapets ~~constructed in accordance with Section R302.2.5~~ shall be constructed for *townhouses* as an extension of exterior walls or common walls separating *townhouse units* in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is not more than 30 inches (762 mm) above the lower roof, the parapet shall extend not less than 30 inches (762 mm) above the lower roof surface.

> **Exception:** A parapet is not required in the preceding two cases where the roof covering complies with a minimum Class C rating as tested in accordance with ASTM E108 or UL 790 and the roof decking or sheathing is of *noncombustible materials* or fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of $^{5}/_{8}$-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by not less than nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a distance of not less than 4 feet (1219 mm) on each side of the wall or walls and any openings or penetrations in the roof are not within 4 feet (1219 mm) of the common walls. Fire-retardant-treated wood shall meet the requirements of Sections R802.1.5 and R803.2.1.2.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is more than 30 inches (762 mm) above the lower roof. The common wall construction from the lower roof to the underside of the higher *roof deck* shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides.

R302.2.2.4.1~~R302.2.5~~ Parapet construction. Parapets shall have the same fire-resistance rating as that required for the supporting wall or walls. On any side adjacent to a roof surface, the parapet shall have noncombustible faces for the uppermost 18 inches (457 mm), to include counterflashing and coping materials. Where the roof slopes toward a parapet at slopes greater than 2 units vertical in 12 units horizontal (16.7-percent slope), the parapet shall extend to the same height as any portion of the roof within a distance of 3 feet (914 mm), and the height shall be not less than 30 inches (762 mm).

R302.2.3 ~~R302.2.6~~ Structural independence. Each *townhouse unit* shall be structurally independent.

Exceptions:

1. Foundations supporting exterior walls or common walls.
2. Structural roof and wall sheathing from each unit fastened to the common wall framing.
3. Nonstructural wall and roof coverings.
4. Flashing at termination of roof covering over common wall.
5. *Townhouse units* separated by a common wall as provided in Section R302.2.2.2 ~~R302.2.2~~, Item 1 or 2.
6. *Townhouse units* protected by a fire sprinkler system complying with Section P2904 or NFPA 13D.

Reason Statement: This proposal builds on discussions of Proposal RB22-19 in the last cycle. Constructive discussion of that proposal took place at the Technical Committee Hearing, but at the Public Comment Hearing, consensus could not be reached among different interested parties. Nevertheless, there was clear support by the Technical Committee and ICC members and chapters for coming up with a fix that addresses shortcomings in the current text.
Bearing in mind that the original concept of townhouses was rectangular units in a linear configuration that was open on three sides for end units and front/rear for center units, the current code remains sufficient for its original purpose. However, over time, townhouse designers have gotten very creative in interpreting what constitutes a "side" that adjoins a yard or public way. Odd shapes and configurations that have townhouse units partially surrounded by other units, sometimes sharing walls with 3 or more neighboring units, have evolved. What constitutes a "side" in such cases has led to disagreements between code officials and designers, and lacking guidance in the code, code officials have little to fall back on beyond "I'm the code official," which that puts the code official in a difficult situation. These varied perspectives were clearly on display at last cycle's hearings, as different individuals testified with different interpretations and different perspectives on what is "reasonable."

In addition to improving the structure of the existing provisions in Section R302.2 and clarifying text referencing the IBC for fire resistance ratings (IBC Section 703.2.2 is not a test method, so the current IRC text referencing the IBC is incorrect), this proposal adds a new section 302.2.1 to support the definition of "townhouse unit" with respect to establishing minimum requirements for open sides.

The 20% requirement for the first side is derived from a typical 20x30 townhouse and follows the logic that the front side would traditionally be entirely open (20 foot front wall / 100 foot total unit perimeter = 20%); whereas, the 10% requirement for the second side generously allows the back or adjacent side to be partially blocked (10% is half of the 20-foot rear wall) by another unit or units. The exception for townhouses that are equipped with fire sprinklers, technically always required by the IRC but not enforced in some jurisdictions, is appropriate because, with sprinklers being provided, the need for large open sides for fire department access and suppression activity is drastically reduced. The allowance for a minimum of 10 feet on the primary side is considered to be a reasonable accommodation of the occasional need for narrow infill units. The allowance for the second open side to be as small as 3 feet for sprinklered townhouse units correlates with R310.1 in the 2021 IRC (from Proposal RB86-19), which clarified that emergency escape and rescue openings require a minimum of 36-inches of clear space between the opening and a public way.

Although there is no "perfect" fix to this issue given the multitude of configurations that designers might come up with, this proposal provides a fair, reasonable and flexible basis for quantifying a level of openness for townhouses that should be acceptable given the history of the townhouse provisions and interests of today's designers.

For disclosure, I am a consultant to NFSA, but this proposal is not submitted on NFSA's behalf and was not provided to NFSA prior to submittal. It is submitted as a personal proposal based on my personal interest in this topic.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no way to universally quantify any cost impact of this change because of the ambiguity in existing text with respect to what constitutes an open side. Applied in jurisdictions that interpret the IRC such that two sides of a townhouse unit must be open to a yard or public way for the entire length of both sides, this change would reduce the cost of construction by adding clarity to the IRC that would relax application of the open side requirement. On the other hand, in jurisdictions that might interpret the IRC such that there is minimal length required to constitute an open side, this change would make application of the code more stringent.

RB54-22

IRC: R302.2.2

Proponents: Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Residential Code

Revise as follows:

R302.2.2 Common walls. Common walls separating *townhouse units*shall be assigned a fire-resistance rating in accordance with Item 1 or 2 and shall be rated for fire exposure from both sides. Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing. The common wall shared by two *townhouse units* shall be constructed without openings, plumbing or mechanical equipment, ducts or vents, other than water-filled fire sprinkler piping in the cavity of the common wall. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.

1. Where ~~e~~an automatic sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code.
2. Where an automatic sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code.

Exception: Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.

Reason Statement: This code change is a necessary clarification in the IRC that unlike the IBC the IRC does not intend for openings such as doors to be located within common walls. The section being modified restricts penetrations in the common wall and limits what can be placed within the common wall. It therefore stands to reason that the IRC should also address openings that are not explicitly prohibited. A common wall is treated like an exterior wall located at a zero fire separation distance.
Unlike the IRC, the IBC does not address townhouses and requires that dwelling units and sleeping units be separated with fire partitions since the dwelling units are no considered attached single family dwellings like Townhouses in the IRC. As a result the IBC requires in Section 708.6 and TABLE 716.1(2) that openings in fire partitions separating dwelling or sleeping units units be protected for 1/3 or 3/4 hour opening protectives.

The IRC does not require protected openings and restricts the location of openings and in the case of protection based on fire separation distance limits opening size through % of wall are limits.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code change is a clarification and reflects current regulatory practice.

RB54-22

RB55-22

IRC: R302.2.2

Proponents: Shane Nilles, representing Self (snilles@cityofcheney.org)

2021 International Residential Code

Revise as follows:

R302.2.2 Common walls. Common walls separating *townhouse units*shall be assigned a fire-resistance rating in accordance with Item 1 or 2 and shall be rated for fire exposure from both sides. Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing. The common wall shared by two *townhouse units* shall be constructed without plumbing or mechanical equipment, ducts or vents, other than water-filled fire sprinkler piping in the cavity of the common wall. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.

1. Where ean automatic sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code.
2. Where an automatic sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code.

Exceptions:

1. Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.
2. Plumbing and mechanical piping is permitted to pass directly through common walls provided they are protected in accordance with Section R302.4.

Reason Statement: As the 2021 code now recognizes the entire structure as the townhouse building, and each townhouse as a unit within the building, piping serving plumbing and mechanical systems in townhouse buildings need to be able to pass through townhouse separation walls. The language as currently written in Section R302.2.2 to say that no such piping is permitted within the cavity of the wall at all, which would therefore prohibit piping that is simply passing directly through it. This proposal adds an exception to the section to make it consistent with the intent of townhouse units being able to share utility services as they are in a single building, with the condition that they are protected as penetrations per R302.4 which thereby maintains the required protection of the wall.

Cost Impact: The code change proposal will decrease the cost of construction
The proposal creates an exception that allows for additional options and therefore decreases the cost of construction

RB55-22

RB56-22

IRC: R302.2.3

Proponents: David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC (david.renn@denvergov.org)

2021 International Residential Code

Revise as follows:

R302.2.3 Continuity. The fire-resistance-rated wall or assembly separating *townhouse units* shall be continuous from the foundation to the underside of the roof sheathing, deck or slab~~.~~ and shall be continuous through attached enclosed *accessory structures*. The fire-resistance-rated wall or assembly shall extend through concealed roof overhangs to separate the *attics* of adjacent *townhouse units*.~~The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed *accessory structures*.~~

Reason Statement: This proposal is intended to clarify the continuity requirements of townhouse separation walls in two ways:
1. As currently written, this section requires wall extensions through attached enclosed accessory structures to have a fire-resistance-rating, but doesn't actually require the extensions. It is clear the intent of the code is to provide separation walls through attached enclosed accessory structures, such as garages, and this proposal makes this a specific requirement.

2. This section requires separation walls to continue to the roof sheathing and Section R302.2.2 requires common walls to continue to the exterior sheathing of exterior walls, but there are no code requirements for continuity through concealed roof overhangs. If a common wall in an attic space stops in line with the exterior wall sheathing below the attic, there is a gap in the continuity of this wall as fire in one attic could wrap around the end of the wall through the enclosed roof overhang. This proposal remedies this by requiring the separation wall to continue through this concealed space to separate the attics of adjacent units. It is believed that this is common practice to provide the separation intended.

Please support this proposal to bring clarity to continuity requirements for townhouse walls.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of the code is to require separation walls to extend through enclosed accessory structures and this proposal rewords the current wording to require this. Also, the intent of the code is to provide a fire-rated separation wall between units to prevent the spread of fire between units. This proposal adds requirements to provide a separation through roof overhangs which is common construction practice and is commonly enforced. Since the intent of the code, common construction practice and common enforcement isn't changing, this proposal will not change the cost of conctruction.

RB56-22

RB57-22

IRC: R302.2, R302.2.3 (New), R302.2.3.1 (New)

Proponents: Tim Earl, representing the Gypsum Association (tearl@gbhint.com)

2021 International Residential Code

Revise as follows:

R302.2 Townhouses. Walls separating *townhouse units* shall be constructed in accordance with Section R302.2.1 , ~~or~~ R302.2.2 , or R302.2.3 and shall comply with Sections 302.2.3 through 302.2.5.

Add new text as follows:

R302.2.3 Area Separation Walls. Area separation wall assemblies separating *townhouses* shall consist of the following:

1. A central wall consisting of two (2) 1-inch (25.4 mm) Type X gypsum shaft liner panels inserted between steel H-studs and rated for two hours per ASTM E119, UL 263 or Section 703.3 of the *International Building Code.*
2. A non-fire-resistance rated flanking wall on one or both sides attached to the steel H-studs via aluminum clips set a minimum of ¾-inch (19 mm) off the central wall. The flanking walls shall consist of minimum ½-inch (12.7 mm) gypsum panels attached to minimum nominal 2 x 4 wood studs or minimum 15 mil (0.38 mm) 3-5/8” (92 mm) steel studs.

R302.2.3.1 Penetrations. The central wall shall not be penetrated. The non-fire-resistance rated flanking walls shall be permitted to be penetrated as needed to allow for utilities, ducts or vents in the wall cavity.

Reason Statement: This proposal provides needed clarification regarding area separation walls and allowable penetrations in the flanking walls, which are not fire-rated.
Adjacent townhomes are separated in one of three ways:

1. Double walls (two 1-hour fire-resistance-rated wall assemblies)

2. A common wall (fire-resistance rated, 1 or 2 hours depending on sprinklers)

3. An “area separation wall” (ASW), consisting of one central two-hour fire-resistance-rated wall with a flanking wall attached with aluminum clips on one or both sides.

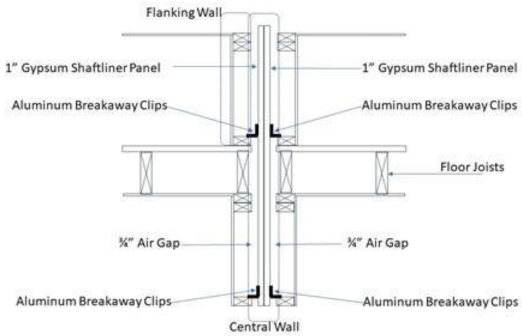
For various reasons, each of these options is more common in different regions of the US. #1 and #2 are already addressed in Section R302.2. ASWs are currently being built, but not mentioned in the code. Further clarification is required, particularly with regards to penetrations of the non-rated flanking walls, as some users have believed that the space between the central fire-rated wall and the non-rated flanking walls cannot contain plumbing or mechanical equipment. In fact, an ICC staff interpretation took this position

In an ASW system, the fire-rated central wall meets all requirements of Section R302.2 by:

- Providing a 2- hour fire resistance rating when built to the applicable design
- Not allowing penetrations
- Maintaining continuity
- Allowing for parapets
- Maintaining structural independence

This proposal provides a clear description of Area Separation Walls and where penetrations are allowed. Specifically, it makes it clear that the non-rated flanking walls may be penetrated, but the fire-rated central wall may not.

The figure below illustrates the typical installed system.



DRAWING NOT TO SCALE – FOR DEMONSTRATIVE PURPOSES ONLY

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds to the IRC a type of wall which is already being built today. It is simply another option.

RB57-22

RB58-22

IRC: R302.2.4

Proponents: Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Residential Code

Revise as follows:

R302.2.4 Parapets for townhouses. Parapets constructed in accordance with Section R302.2.5 shall be constructed for *townhouses* as an extension of exterior walls or common walls separating *townhouse units* in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is not more than 30 inches (762 mm) above the lower roof, the parapet shall extend not less than 30 inches (762 mm) above the lower roof surface.

   Exception: A parapet is not required in the preceding two cases where the roof covering complies with a minimum Class C rating as tested in accordance with ASTM E108 or UL 790 and the roof decking or sheathing is of *noncombustible materials* or fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of $^5/_8$-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by not less than nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a distance of not less than 4 feet (1219 mm) on each side of the wall or walls and any openings or penetrations in the roof are not within 4 feet (1219 mm) of the common walls. Fire-retardant-treated wood shall meet the requirements of Sections R802.1.5 and R803.2.1.2.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is more than 30 inches (762 mm) above the lower roof. The common wall construction from the lower roof to the underside of the higher *roof deck* shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides. Openings shall not be permitted in the wall.

Reason Statement: The code change is necessary to address a significant omission in the IRC that predates the 2005 edition where exterior wall openings located in common walls extending above a lower roof in a stepped Townhouse are neither prohibited nor required to be protected. While the common wall is not a party-wall that is regulated in the IBC as a fire wall, common walls are protected similar to exterior walls located at zero fire separation distance; Section R302.2.2 does not permit openings in the common wall and restricts penetrations. Additionally, communicating openings are not permitted between dwelling units it would seem reasonable to prohibit exterior wall openings in exterior portions of the common wall. The proposed code change takes an approach to solving the problem caused by the regulatory omission that is consistent with Table R302.1(1) and R302.1(2) where the IRC does not require fire protection for exterior wall openings but accomplishes the desired level of protection either prohibiting exterior wall openings or restricting their area. Additionally, the proposed code change is also consistent in the way that the IBC regulates party walls. Since the FSD at a common wall is zero the proposed code change takes the simplest solution to prevent fire from the dwelling unit below from reaching the dwelling unit above by prohibiting the exterior wall opening. This is consistent with approach R202.2.3 and R302.3.4 and it's sub parts.

The attached figures 1 and 2 attempt to illustrate the issue. Figure one shows a plan view of the third story and roof and figure 2 shows a building section depicting the elevation difference. The common wall is depicted in the dotted blue line.Proponent feels that the code change to be editorial and to add clarity for consistent and uniform code application.

Figure 1

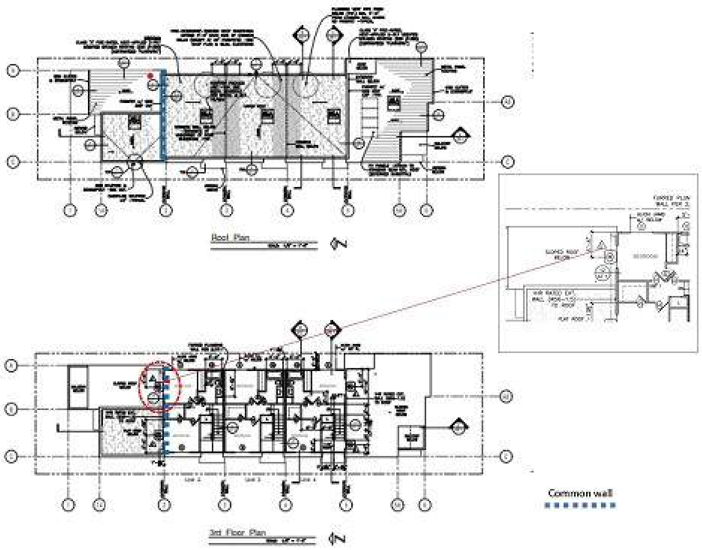
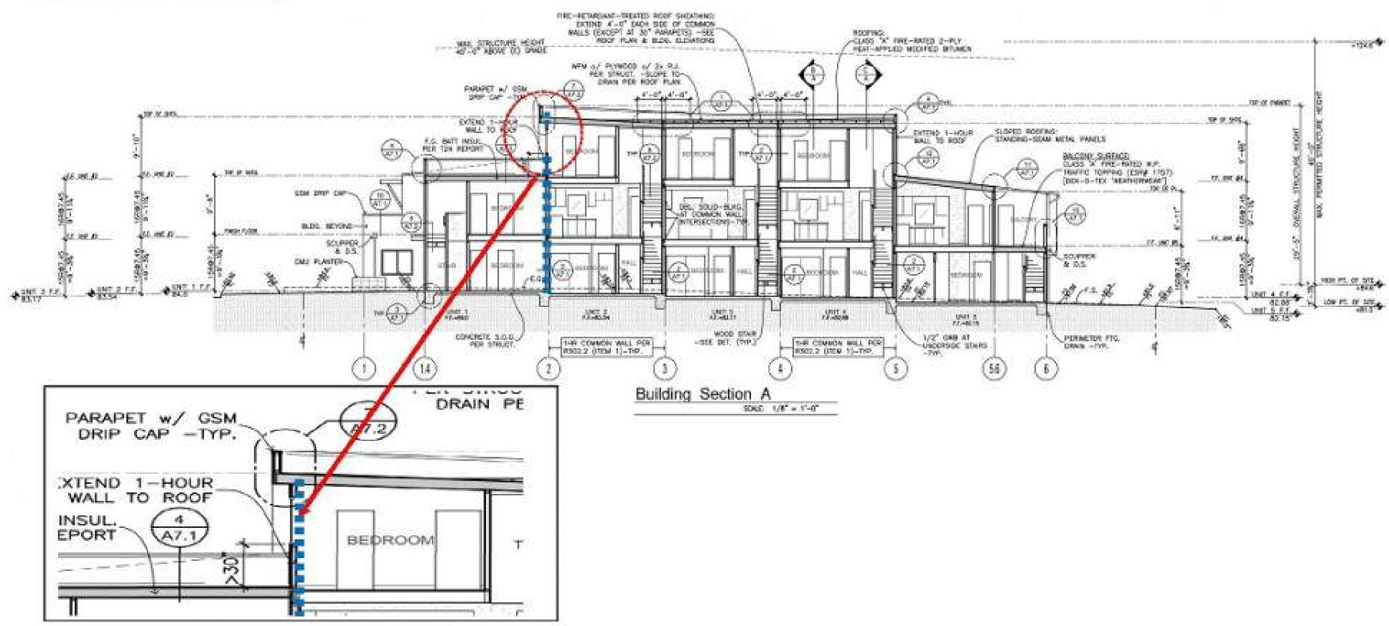
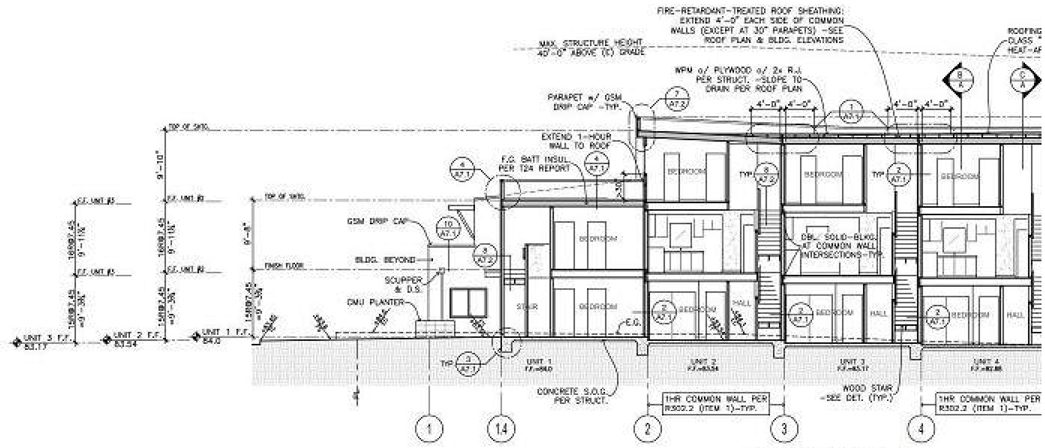


Figure 2





Building Section A

SCALE: 1/8" = 1'-0"

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is editorial however it may be considered to increase the cost of construction in jurisdictions that previously considered the regulatory omission to be justification to permit exterior wall openings.

RB58-22

RB59-22

IRC: R302.2.4

Proponents: Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Residential Code

Revise as follows:

R302.2.4 Parapets for townhouses. Parapets constructed in accordance with Section R302.2.5 shall be constructed for *townhouses* as an extension of exterior walls or common walls separating *townhouse units* in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is not more than 30 inches (762 mm) above the lower roof, the parapet shall extend not less than 30 inches (762 mm) above the lower roof surface.

    Exception: A parapet is not required in the preceding two cases where the roof covering complies with a minimum Class C rating as tested in accordance with ASTM E108 or UL 790 and the roof decking or sheathing is of *noncombustible materials* or fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of $^{5}/_{8}$-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by not less than nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a distance of not less than 4 feet (1219 mm) on each side of the wall or walls and any openings or penetrations in the roof are not within 4 feet (1219 mm) of the common walls. Fire-retardant-treated wood shall meet the requirements of Sections R802.1.5 and R803.2.1.2.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is more than 30 inches (762 mm) above the lower roof. The common wall construction from the lower roof to the underside of the higher *roof deck* shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides. Openings in the wall shall be protected with assemblies having a fire protection rating of not less than 3/4 hour. Portions of the exterior walls greater than 15 feet (4572 mm) above the lower roof shall be of non fire-resistance- rated construction. Openings in the wall shall be protected with assemblies having a fire protection rating of not less than 3/4 hour.

Reason Statement: The proposed code change is necessary to address a significant omission in the IRC that predates the 2005 edition where exterior wall openings located in common walls extending above a lower roof in a stepped Townhouse are neither prohibited nor required to be protected.
While the common wall is not a party-wall that is regulated in the IBC as a fire wall, common walls are protected similar to exterior walls located at zero fire separation distance; IRC Section R302.2.2 does not permit openings in the common wall and restricts penetrations. Additionally, communicating openings are not permitted between dwelling units it would seem reasonable to prohibit exterior wall openings in exterior portions of the common wall.

The proposed code change takes an approach to solving the problem caused by the regulatory omission that is consistent with method in which the IBC regulates fire walls. While communicating openings are not permitted between dwelling units it would seem onerous to prohibit exterior wall openings in exterior portions of the common wall. The proposed modification and addition to item # 3 adds regulatory language from IBC Section 706.6.1.

The attached figures 1 and 2 attempt to illustrate the issue. Figure one shows a plan view of the third story and roof and figure 2 shows a building section depicting the elevation difference. The common wall is depicted in the dotted blue line.

This code change is option 2 in the event that the committee prefers to permit a protected opening however proponent feels the other option submitted whereby openings in the wall are prohibited is the preferred option.

Figure 1

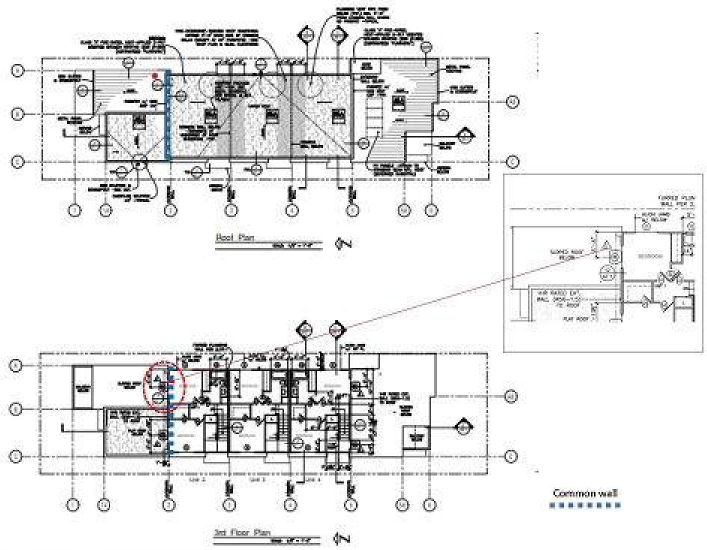
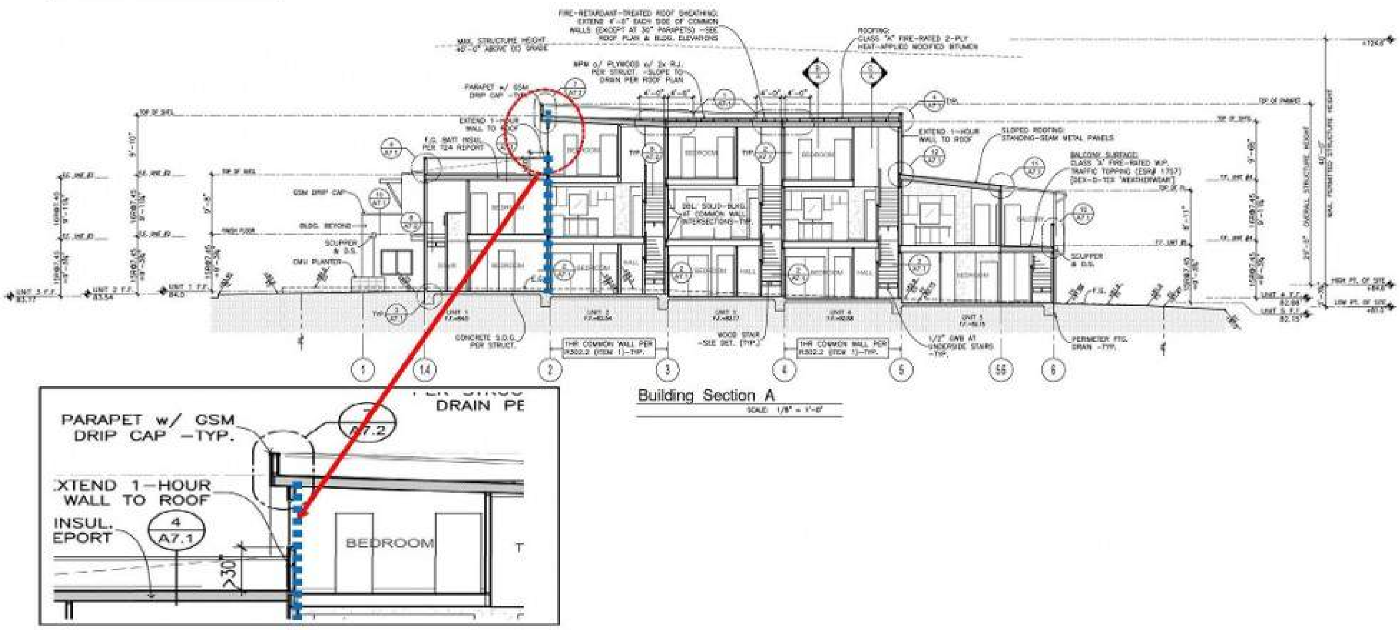
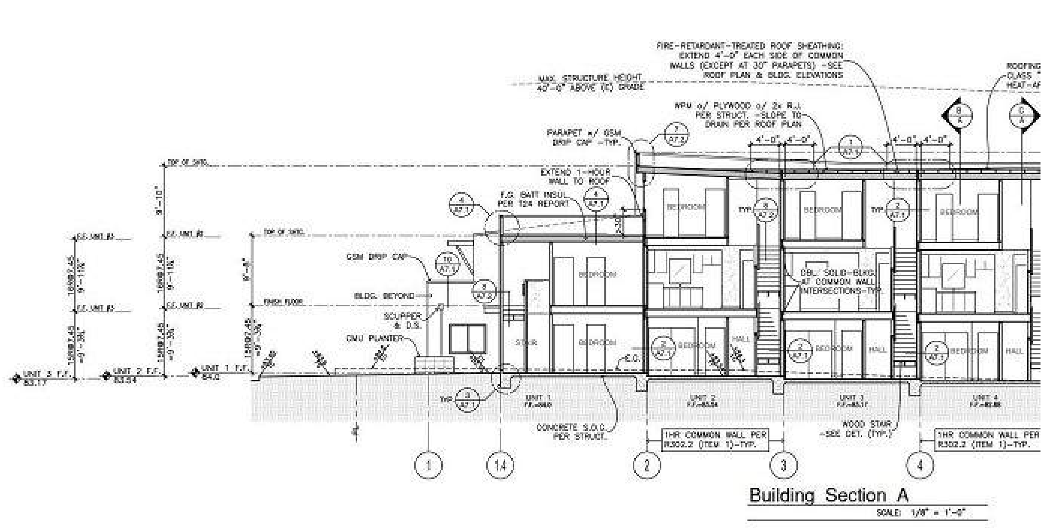


Figure 2





Cost Impact: The code change proposal will increase the cost of construction
The proposed change is a clarification however if the project chooses to add an opening in the wall then the code of a fire protection rated opening will increase the cost of construction.

RB59-22

RB60-22

IRC: SECTION 202 (New), R302.3, R314.4

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Residential Code

Add new definition as follows:

ACCESSORY DWELLING UNIT (ADU). An additional, subordinate dwelling unit on the same lot, that is entirely within a dwelling unit, attached to a dwelling unit, or in a detached structure.

Revise as follows:

R302.3 Two-family dwellings. *Dwelling units* in two-family dwellings , including dwelling units with an attached *accessory dwelling unit*, shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

Exceptions:

1. A fire-resistance rating of $^{1}/_{2}$ hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.
2. Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than $^{5}/_{8}$-inch (15.9 mm) Type X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than $^{1}/_{2}$-inch (12.7 mm) gypsum board or equivalent.
3. A fire-resistance rated separation is not required where one of the dwelling units is an *accessory dwelling unit* and the other is an owner-occupied dwelling unit.

R314.4 Interconnection. Where more than one smoke alarm is required to be installed within an individual *dwelling unit* in accordance with Section R314.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual *dwelling unit*. Where an owner-occupied dwelling unit and an *accessory dwelling unit* create a two-family dwelling without a fire separation in accordance with Section R302.3, alarm devices in both dwelling units shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in both dwelling units. Physical interconnection of smoke alarms shall not be required where *listed* wireless alarms are installed and all alarms sound upon activation of one alarm.

Reason Statement: In Group A, Code Change Z1-21 added a new definition of Accessory Dwelling Unit, or ADU, with the apparent intent of formally recognizing what has become an increasingly common practice of adding additional dwelling unit(s) to a property or building that was originally intended and limited to function as a single family dwelling unit. The proliferation of ADUs in many jurisdictions as a means of increasing available housing has had an undiscussed consequence of often creating buildings that essentially constitute illegal two-family dwellings / duplexes, in that such buildings do not meet adopted IRC provisions for a two-family dwelling.
The trend essentially allows construction of a single-family dwelling, issuance of a certificate of occupancy, then subdividing the floorplan to provide an additional dwelling unit, completely circumventing the fire safety considerations in the IRC, particularly the requirement for a fire-rated separation. There is no logic behind requiring a building permitted as a two-family dwelling to provide a suitable fire barrier between units, but not requiring that separation for a building permitted as a one-family dwelling that immediately or thereafter adds an ADU. This proposal will return parity between the fire separation requirements for two-family dwellings and dwellings with an ADU. An exception is provided for ADUs in owner occupied housing because, like lodging houses these situations at least provide some level of on-site oversight of the ADU.

To those who might argue that "owner occupied" is not something that's enforceable under the IRC or otherwise, note that the concept of using this as a limitation is already baked into other portions of the IRC for lodging houses (see R101.2, Exception 2 and R320.1). The intent here is to simply duplicate that precedent for ADUs.

Cost Impact: The code change proposal will decrease the cost of construction
The code currently requires all two-family dwellings to have a fire separation between dwelling units, and there is currently no differentiation that applies to dwelling units with an added ADU. This proposal provides a limited reduction in the code requirements by allowing an ADU to be unseparated when the primary dwelling unit is owner-occupied, thereby reducing the cost of construction for such cases.

RB60-22

RB61-22

IRC: R302.3, R302.3.1 (New), R302.3.2 (New), R302.2.1

Proponents: Quyen Thai, representing Washington Association of Building Officials Technical Code Committee (qthai76@gmail.com); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Revise as follows:

R302.3 Two-family dwellings. *Dwelling units* in two-family dwellings shall be separated from each other by wall and floor assemblies ~~having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code~~ constructed in accordance with Section R302.3.1 through R302.3.3. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. ~~Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.~~

~~**Exceptions:**~~

1. ~~A fire-resistance rating of $^1/_2$ hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.~~
2. ~~Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than $^5/_8$-inch (15.9 mm) Type X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than $^1/_2$-inch (12.7 mm) gypsum board or equivalent.~~

Add new text as follows:

R302.3.1 Separation. *Dwelling units* in two-family *dwellings* shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E 119, UL 263 or Section 703.3 of the *International Building Code*.

Exception: A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.

R302.3.2 Continuity. Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the *exterior wall*, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

Exception: Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than 5/8-inch (15.9 mm) Type-X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.

Revise as follows:

R302.3.3 ~~R302.2.1~~ Supporting construction. Where floor assemblies are required to be fire-resistance rated by Section R302.3, the supporting construction of such assemblies shall have an equal or greater fire-resistance rating.

Reason Statement: The intent of this change is to pull out the construction requirement of the common wall as a subsection to align with proper code location. There is already a construction subsection in R302.3.1 and this just creates another subsection that discusses the construction of the common wall. All three subsections are not new language to the code but rather a reorganization.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact to this proposal because the language did not change. This is just a reorganization to create better readability.

RB61-22

RB62-22

IRC: R302.3, R302.3.2 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

R302.3 Two-family dwellings. *Dwelling units* in two-family dwellings shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. ~~Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.~~

Exceptions:

1. A fire-resistance rating of $^{1}/_{2}$ hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.
2. Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than $^{5}/_{8}$-inch (15.9 mm) Type X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than $^{1}/_{2}$-inch (12.7 mm) gypsum board or equivalent.

Add new text as follows:

R302.3.2 Continuity. The fire-resistance-rated floor/ceiling and wall assemblies separatingdwelling units shall include extensions through and separating attached enclosed accessory structures. The fire-resistance rated assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

Reason Statement: This proposal aligns the rated assembly requirements for a two-family dwelling in R302.3 with the current requirements for townhouses in R302.2.3. Rated assembly extensions through and separating attached enclosed accessory structures are not currently addressed for two-family dwellings, which allows for the creation of a discontinuity in the rated barrier.
Individual dwelling units may be separated in a two-family dwelling by a horizontal floor assembly (stacked duplex) or the more traditional vertical wall assemblies. Where attached enclosed accessory structures project above a horizontal or vertical assembly, careful consideration is required in the planning and construction to extend the assembly through/around the accessory structure in order to maintain the rated assembly continuity. Therefore, this proposal adds a new sub-section, R302.3.2, for Continuity. The new 302.3.2 for Continuity includes the last sentence of R302.3 and the text required for townhouses to the two-family dwelling section since the need to maintain such separation is equally necessary for both building types.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will increase the cost of construction
This is a technical change to two-family dwellings, despite the fact that the original intent has always been for the separation assemblies to continue through two-family attached accessory structures. Depending on the layout, this may require a longer wall to separate the units.

RB62-22

RB63-22

IRC: R302.3, R302.3.1, R302.3.2 (New), R302.3.3 (New), R302.3.3.1 (New), R302.3.3.2 (New), R302.3.5 (New)

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Residential Code

Delete and substitute as follows:

~~**R302.3 Two-family dwellings.** *Dwelling units* in two-family dwellings shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.~~

~~**Exceptions:**~~

1. ~~A fire-resistance rating of $^1/_2$ hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.~~
2. ~~Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than $^5/_8$-inch (15.9 mm) Type X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than $^1/_2$-inch (12.7 mm) gypsum board or equivalent.~~

R302.3 Two-family dwellings. *Dwelling units* in two-family dwellings shall be separated from each other in accordance with Sections 302.3.1 through 302.3.5, regardless of whether a *lot line* exists between two *dwelling units*.

Add new text as follows:

R302.3.1 Dwelling unit separation. The two dwelling units shall be separated by fire-resistance rated assemblies that are vertical, horizontal, or a combination thereof.

R302.3.2 Fire-resistance rating. Vertical and horizontal assemblies separating dwelling units shall have a fire-resistance rating of 1-hour, or a fire-resistance rating of 1/2 hour in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904. Fire-resistance ratings shall be based on testing in accordance with ASTM E119 or UL 263, or an analytical method in accordance with Section 703.2.2 of the International Building Code.

R302.3.3 Continuity. Vertical and horizontal assemblies separating dwelling units shall be constructed in a manner that provides a continuous and complete separation between the dwelling units.

R302.3.3.1 Horizontal assemblies. Horizontal assemblies separating dwelling units shall extend to and be tight against exterior walls or vertical separation assemblies complying with Section 302.3.2.

R302.3.3.2 Vertical assemblies. Vertical assemblies separating dwelling units shall extend to and be tight against any combination of the following:

1. The foundation.
2. A horizontal assembly complying with Section 302.3.2
3. The underside of roof sheathing.
4. The ceiling beneath an uninhabitable attic, provided that the ceiling is constructed using not less than 5/8-inch (15.9 mm) Type X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the vertical assembly terminating at the ceiling, and the structural framing supporting the ceiling is protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.

Revise as follows:

R302.3.4 ~~R302.3.1~~ Supporting construction. ~~Where floor assemblies are required to be fire-resistance rated by Section R302.3, the supporting construction of such assemblies have~~ Vertical and horizontal assemblies separating dwelling units shall be supported by construction having an equal or greater fire-resistance rating.

Add new text as follows:

R302.3.5 Vertically stacked dwelling units. Where one dwelling unit in a two-family dwelling is located above the other and an automatic sprinkler system complying with Section P2904 is not provided in both dwelling units, both of the following shall apply:

1. Horizontal and vertical assemblies separating the dwelling units, including an interior stairway serving as the means of egress for the upper dwelling unit, shall be constructed in a manner that limits the transfer of smoke.
2. A notification appliance connected to smoke alarms in the other dwelling unit shall be provided in each dwelling unit.

Reason Statement: This proposal accomplishes two things. First, it provides a cleanup and update of Section R302.3, including moving the exceptions to the main code text. Provisions have been reorganized and divided into subsections to more clearly delineate current requirements, and the section has been broadened to recognize that separations between dwelling units might not be limited to either a floor assembly or a wall assembly. The current text restricts horizontal assemblies to only include floors, as opposed to floor-ceiling or ceiling-only assemblies, and it fails to clearly recognize and accommodate that separations may involve a combination of vertical and horizontal elements, which always occurs if an interior stairway is used as the means of egress for the upper unit. Terminology in IBC Section 707.3.10 has been used as guidance for the proposed IRC text.
Second, Section 302.3.5 has been added to recognize that stacked duplexes are inherently more hazardous than side-by-side duplexes, particularly with respect to the upper unit due to the tendency of smoke and flames to spread vertically, which increases the risk of charging the upper unit with smoke and cutting off the means of egress and the means of escape if/when fire vents through exterior doors or windows. Providing a smoke separation, in addition to the current requirement for a fire-rated separation, will delay smoke transmission to the upper unit. The proposed text related to construction of the smoke separation is derived from the IBC definition of "smoke partition," which establishes the performance requirement "...is constructed to limit the transfer of smoke."

Providing a remote sounder for the opposite dwelling unit will allow more escape time for occupants who are not in the unit of origin, recognizing that smoke alarms are designed to provide sufficient warning to escape an incipient fire but not necessarily a well-developed fire spreading from another part of the building. Additional warning is particularly important where: 1) The downstairs unit occupants are not home or are home but don't or are unable to warn the upstairs occupants, and 2) The upstairs unit is two stories tall, perhaps even with a habitable attic above, which increases escape distance and the associated escape time, particularly for individuals who may have difficulty rapidly traversing stairs or using a means of escape window that would be 3 or 4 stories above grade.

For disclosure, I am a consultant to NFSA, but this proposal is not submitted on NFSA's behalf and was not provided to NFSA prior to submittal. It is submitted as a personal proposal based on my personal interest in this topic.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Technically, the IRC requires all buildings to be sprinklered, so this doesn't have a cost impact with respect to the model code. However, in jurisdictions that choose to amend the IRC by removing the sprinkler requirement, there would be a cost. Alternately, the increased flexibility provided for using additional types of separation assemblies and a combination of vertical and horizontal assemblies may provide a reduction in the cost of construction.

RB63-22

RB64-22

IRC: R302.3.2 (New), TABLE R302.3.2 (New), R302.3.2.1 (New), R302.3.2.2 (New), R302.3.2.3 (New)

Proponents: Quyen Thai, representing Washington Association of Building Officials Technical Code Committee (qthai76@gmail.com); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Add new text as follows:

R302.3.2 **Common accessory rooms.** A common accessory room shall be separated as required by Table R302.3.2. Openings in a common accessory room shall comply with Section R302.3.2.1. Attachment of gypsum board shall comply with Table R702.3.5. The wall separation provisions of Table R302.3 shall not apply to common accessory room walls that are perpendicular to the adjacent dwelling unit wall.

TABLE R302.3.2 DWELLING-COMMON ACCESSORY ROOM SEPERATION

SEPERATION	**MATERIAL**
From the dwelling units and attics	Not less than 1/2-inch gypsum board or equivalent applied to the accessory room side wall
From habitable rooms above or below the common accessory room	Not less than 5/8-inch Type X gypsum board or equivalent
Structures supporting floor/ceiling and wall assemblies used for separation required by this section	Not less than 1/2-inch gypsum board or equivalent
Common accessory rooms located less than 3 feet from a dwelling unit on the same lot	Not less than 1/2-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch=25.4 m, 1 foot=304.8 mm

R302.3.2.1 Opening protection. Openings from a common accessory room or area directly into a room used for sleeping purposes shall not be permitted. Other openings between the shared common accessory room or area and dwelling units shall be equipped with solid wood doors not less than 1 3/8 inches in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches thick, or a fire door assembly with a 20-minute fire-protection rating, equipped with a self-closing or automatic-closing device.

R302.3.2.2 Duct penetration. Ducts penetrating the walls or ceilings separating the *dwelling* from the common accessory room shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel or other *approved* material and shall not have openings into the common accessory room.

R302.3.2.3 Other penetrations. Penetrations through the walls, ceiling, and floor level separation required in Section R302.3.2 shall be protected as required by Section R302.11, Item 4.

Reason Statement: Designers are beginning to incorporate optional design common accessory rooms such as common laundry facilities and storage rooms that are connected to both dwelling units in their design. The IRC is currently silent on such a room but due to potential storage hazards as well as gas appliances of the washer/dryers and other appliances, there is a need to provide clear directions to protect the dwelling units from a shared common accessory space. The proposal is to treat these common rooms similar to garages and therefore, much of the proposed language draws from the dwelling-garage provision of the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since this is just a clarifying addition where the code is silent, several jurisdictions have already required the construction of the separation wall between habitable space and their accessory spaces. Therefore no increase in cost is noted.

RB64-22

RB65-22

IRC: R302.3.2 (New)

Proponents: Quyen Thai, representing Washington Association of Building Officials Technical Code Committee (qthai76@gmail.com); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Add new text as follows:

R302.3.2 Opening Protection. Openings in the common fire resistance-rated wall assembly separating *dwelling units* shall be equipped with a fire door assembly with not less than a 45-minute fire-protection-rating.

> **Exception:** A fire door assembly with a 20-minute fire-protection-rating is permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.

Reason Statement: Currently the IRC is silent on when there are openings (doors) between units of a duplex. Some designers have begun designing duplexes with a door in the common fire-rated wall assembly to access both dwelling units. This code addition provides direction and clarity to both the designer and reviewer when this situation comes up to maintain the intended minimum fire-rating of the common wall assembly and remain consistent with the required 1-hour fire assembly separation between the two dwelling units. This requirement is also consistent with the required unit separation in the IBC.
With two-family dwellings being designed for flexibility, the use of doors between the dwelling units is becoming a common design feature. This proposal provides clarity for maintaining appropriate dwelling unit separation when an opening between dwelling units is desired and also aligns with the IBC requirements for openings in a fire partition. In addition, it clarifies that the only opening permitted within the common fire-resistance rated wall separating dwelling units is a door.

The residential and building code treats openings and penetrations separately. And all we're doing here is clarifying the requirements when a designer wants to incorporate a door opening into that common wall.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There will not be any additional cost. This is a design option and not a specific requirement when and only when an opening is included in the design of the two-family dwelling units.

RB65-22

RB66-22

IRC: R302.3.2 (New)

Proponents: Chad Sievers, representing Deparment of State (chad.sievers@dos.ny.gov); Jeanne Rice, representing NYSDOS (jeanne.rice@dos.ny.gov)

2021 International Residential Code

Add new text as follows:

R302.3.2 Opening Protectives. Where there are openings in the fire-rated wall or floor assemblies required by Section R302.3 the opening shall have a fire-protection rating of 3/4 hour as determined by tests specified in Section 716 of the *International Building Code*. Doors shall be self-latching and equipped with a self-closing or automatic closing device.

> **Exception:** Solid wood doors not less than 1-3/8 inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than 1-3/8 inches (35mm) thick, or a door with a 20-minute fire protection rating shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904. Doors shall be self-latching.

Reason Statement: The code is currently silent on openings between dwelling units in a two-family dwelling. This silence neither prohibits nor allows doorways between the units, leaving the code enforcement officer unsure of their requirements when one is proposed. Often the code enforcement officer must use personal discretion to decide what is appropriate. The wall between the dwelling units is required to have a one-hour fire protection rating period to ensure the separation between the dwellings is not compromised.
There are several occasions when door openings between dwelling units of two-family dwellings are appropriate. The first instance is most common: the dwelling units share a common foyer for their entrance, either side-by-side unit entrances on a single story with a shared vestibule entrance; or a two-story building with a vestibule entrance on the first floor, an entrance to the first floor unit on the ground floor, and an entrance to the second floor unit at the top of a stairway that is within the vestibule. Another instance is the addition of a full mother-in-law apartment to a single-family dwelling unit. Less commonly, a single-family dwelling may be converted to a two-family dwelling with the option to convert the home back to a single-family dwelling depending on the occupant. Finally, other situations can arise where the occupants, typically extended families, may wish to share living space in a manner similar to the mother-in-law apartment situation but with a more traditional two-family home.

To stay consistent with the code, the language is mirrored after R302.3 including the leniency for sprinklers. The fire protection ratings were referenced from Table 716.1(2) of the IBC for “Other Fire Partitions” and language was utilized from R302.5 to maintain the prescriptive nature of the code and the allowance of “practical solutions”. A requirement for a self-closing mechanism was not included because

Cost Impact: The code change proposal will increase the cost of construction
The cost of a two-family home may slightly increase, but only when a door between the two units is installed, as the door is now specifically required to be a fire-rated door. This code change will not have any impact on most two-family dwellings because and openings are not typically installed within the fire-rated wall assembly between dwelling units.

RB66-22

RB67-22

IRC: R302.4.1, R302.4.2

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council

2021 International Residential Code

Revise as follows:

R302.2.2 Common walls. Common walls separating *townhouse units*shall be assigned a fire-resistance rating in accordance with Item 1 or 2 and shall be rated for fire exposure from both sides. Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing. The common wall shared by two *townhouse units* shall be constructed without plumbing or mechanical equipment, ducts or vents, other than water-filled fire sprinkler piping in the cavity of the common wall. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.

1. Where an automatic sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code.
2. Where an automatic sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code.

Exception: Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.

R302.4.1 Through penetrations. Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with Section R302.4.1.1 or R302.4.1.2.

Exceptions:

1. Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space shall be protected as follows:

   1.1. In concrete or masonry wall or floor assemblies, concrete, grout or mortar shall be permitted where installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating, provided that both of the following are complied with:

   1.1.1. The nominal diameter of the penetrating item is not more than 6 inches (152 mm).

   1.1.2. The area of the opening through the wall does not exceed 144 square inches (92 900 mm^2).

   1.2. The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 or UL 263 time temperature fire conditions under a positive pressure differential of not less than 0.01 inch of water (3 Pa) at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.

2. The annular space created by the penetration of water-filled <u>plastic </u>fire sprinkler piping, provided~~ that the annular space is filled using a material complying with Item 1.2 of Exception 1. ~~<u> the penetration complies with Section R302.4.1.1 or R302.4.1.2.</u>

R302.4.2 Membrane penetrations. Membrane penetrations shall comply with Section R302.4.1. Where walls are required to have a fire-resistance rating, recessed fixtures shall be installed so that the required fire-resistance rating will not be reduced.

Exceptions:

1. Membrane penetrations of not more than 2-hour fire-resistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0103 m^2) in area provided that the aggregate area of the openings through the membrane does not exceed 100 square inches (0.0645 m^2) in any 100 square feet (9.29 m^2) of wall area. The annular space between the wall membrane and the box shall not exceed $^1/_8$ inch (3.1 mm). Such boxes on opposite sides of the wall shall be separated by one of the following:

    1.1. By a horizontal distance of not less than 24 inches (610 mm) where the wall or partition is constructed with individual noncommunicating stud cavities.

    1.2. By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose-fill, rockwool or slag mineral wool insulation.

    1.3. By solid fireblocking in accordance with Section R302.11.

    1.4. By protecting both boxes with *listed* putty pads.

    1.5. By other *listed* materials and methods.

2. Membrane penetrations by *listed* electrical boxes of any materials provided that the boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the *listing*. The annular space between the wall membrane and the box shall not exceed $^1/_8$ inch (3.1 mm) unless *listed* otherwise. Such boxes on opposite sides of the wall shall be separated by one of the following:

    2.1. By the horizontal distance specified in the *listing* of the electrical boxes.

    2.2. By solid fireblocking in accordance with Section R302.11.

    2.3. By protecting both boxes with *listed* putty pads.

    2.4. By other *listed* materials and methods.

3. The annular space created by the penetration of a fire sprinkler ~~or water-filled fire sprinkler piping,~~ provided that the annular space is covered by a metal escutcheon plate.
4. Ceiling membrane penetrations by *listed* luminaires or by luminaires protected with *listed* materials that have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the *listing*.

Reason Statement: RB67-19 introduced new text to R302.2.2 to permit water filled sprinkler piping to penetrate townhouse separation walls. The need to penetrate a common wall with water filled sprinkler pipping is reasonable, however any penetrations of fire-resistance rated assemblies need to be properly protected, even if water filled sprinkler piping is used. This modification will provide language that would require sprinkler piping penetrations to be protected with a tested system, in lieu of an untested material solution.
The concern with a material solution is that it would be difficult for an AHJ to validate the effectiveness of the installation without any testing. As an example, there was rationale provided with RB67-19 that plastic sprinkler pipe is ignition resistant and would therefore minimize the need for firestopping materials. Common plastic sprinkler pipe does ignite, has a flame spread rating when tested to ASTM E84 or UL 723, and will melt or decompose when subjected to the exposure of an ASTM E119 fire. When protection of plastic pipe penetrations fails in an ASTM E814 or UL 1479 test, it is because the pipe will melt (or decompose) at the penetration, allowing flames and hot gases to enter into and through the breach. The ignition resistance and flame spread rating are not relevant to the fire resistance performance required to protect penetrations when successful membrane or through-penetration firestop systems are tested. Our experience with testing thousands of assemblies with plastic pipe penetrations clearly confirms this.

Section R302.4.2 for membrane penetrations does not require annular space protection for water filled sprinkler piping. In lieu of protection, it would rely on a metal escutcheon plate. This approach does not work based on fire testing and will create a condition where the fire resistance rated wall can readily be compromised. Although a sprinkler head has long been permitted to penetrate a fire resistance rated wall with only a metal escutcheon plate to cover the annular space, the justification has been that 1) the sprinkler is the point of discharge, so we are assured water will be available, and 2) it was a specific allowance to minimize the potential to impact the sprinkler discharge pattern.

There are many proven systems available for these conditions. Based on years of collective fire testing experience, we are very concerned that the existing language will not provide the protection assumed, and required, for these townhome common walls. The protection of penetrations in fire rated wall assemblies is independent of whether a sprinkler system is installed or not.

Cost Impact: The code change proposal will increase the cost of construction
The material solution presented R302.4.1 already requires labor costs to install the material. The actual material cost increase to construction is small.

RB67-22

RB68-22

IRC: R302.5.2

Proponents: Mike Moore, representing Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Revise as follows:

R302.5.2 Duct penetration. Ducts in the garage and ducts penetrating the walls or ceilings separating the *dwelling* from the garage shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel or other *approved* material~~ and shall not have openings into the garage~~. Ducts serving heating or cooling appliances and penetrating walls or ceilings separating the dwelling from the garage shall not have openings into the garage. Exhaust fan inlets or ducts terminating outside the building and penetrating the walls or ceiling separating the dwelling from the garage shall be protected as required by Section R302.11, Item 4.

Reason Statement: As written, this section could be read to prohibit installation of exhaust fans in garages when such fans are ducted through a garage ceiling, through an attic that opens to an adjacent dwelling, and terminating outside the building. Presumably, the intention of this section is not to prohibit exhaust ventilation from garages to the exterior but to prevent communication of air between garages and the dwelling. This proposal provides greater specificity for how to protect exhaust fan inlets or ducts (which should be permitted to open into the garage to perform their function) while continuing to prohibit heating and cooling appliance ducts serving dwelling units from opening into garages. The proposal introduces a requirement for exhaust fan inlets or ducts penetrating the walls or ceiling separating the dwelling from the garage to be "protected as required by Section 302.11, Item 4." This requirement is identical to the Section 302.5.3 protection requirement for "other penetrations," as follows:
R302.11 Fireblocking. Item 4: "At openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with an *approved* material to resist the free passage of flame and products of combustion. The material filling this annular space shall not be required to meet the ASTM E136 requirements."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies how to protect exhaust ventilation fan openings and ducts when installed in garages by referencing the protection requirements for "other penetrations" within the code.

RB68-22

RB69-22

IRC: R302.6, TABLE R302.6

Proponents: China Clarke, representing NYS DOS Division of Building Standards and Codes (china.clarke@dos.ny.gov); Gerard Hathaway, representing self (gerard.hathaway@dos.ny.gov)

2021 International Residential Code

Revise as follows:

R302.6 ~~Dwelling-garage~~ Garage fire separation. ~~The garage~~ Private garages attached to dwelling units and detached garages containing habitable space shall be separated as required by Table R302.6. Openings in garage walls shall comply with Section R302.5. Attachment of gypsum board shall comply with Table R702.3.5. The wall separation provisions of Table R302.6 shall not apply to garage walls that are perpendicular to the adjacent *dwelling unit* wall.

TABLE R302.6 DWELLING-GARAGE SEPARATION [a]

SEPARATION	MATERIAL
From the residence and attics [b]	Not less than $^{1}/_{2}$-inch gypsum board or equivalent applied to the garage side
From habitable rooms above the garage	Not less than $^{5}/_{8}$-inch Type X gypsum board or equivalent
Structure(s) supporting floor/ceiling assemblies used for separation required by this section	Not less than $^{1}/_{2}$-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than $^{1}/_{2}$-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Includes habitable space-detached garage separation.

b. Includes the separation from habitable rooms and associated attics attached to detached garages.

Reason Statement: The residential code allows for structures accessory to buildings constructed to the residential code to also be constructed to the residential code; however, the residential code is then lacking some essential safety provisions that are necessary to make these detached accessory structures safe.
In this code change proposal, we are addressing the concern of a detached accessory garage structure that may also have habitable space. In New York, we frequently see large, detached garages that are accessory to single-family homes, but with habitable space within them, such as recreational rooms, private art studios, exercise spaces, or even sleeping rooms.

Without this code change proposal, those garage spaces are not required to have any fire separation from the habitable space or vice versa. Without first interpreting that the accessory nature of the spaces means they are all in fact part of the dwelling, therefore triggering the dwelling garage separation requirements. This change simply requires any habitable space attached to both a detached and attached garage built to the residential code have the same fire separation.

Cost Impact: The code change proposal will increase the cost of construction
Some jurisdictions either already interpret the habitable space of a detached accessory garage to be part of the dwelling or do not permit habitable space in a detached accessory garage. In these instances, the cost of construction would not increase, or, in the case of the second option where it is not permitted, the cost of construction would likely decrease due to the building needing to be constructed to the more stringent International Building Code.

However, if jurisdictions interpret that the code as written permits habitable spaces in detached accessory garage structures to not need fire separation, the cost of construction would increase between $1 and $2 per square foot of wall/ceiling to provide the separation. This would vary widely based on the size of the spaces being separated and the region in which the construction is occurring.

RB69-22

RB70-22

IRC: R302.6

Proponents: Raymond Steadward Jr, representing Town Of Enfield CT (rsteadward@enfield.org)

2021 International Residential Code

Revise as follows:

R302.6 Dwelling-garage fire separation. The garage shall be separated as required by Table R302.6.

> **Exception:** Wood structural members of the minimum dimension specified in the *International Building Code* for Type IV construction shall not require additional protection.

Openings in garage walls shall comply with Section R302.5. Attachment of gypsum board shall comply with Table R702.3.5. The wall separation provisions of Table R302.6 shall not apply to garage walls that are perpendicular to the adjacent *dwelling unit* wall.

Reason Statement: It makes sense to allow heavy timber that is "equivalent" to one hour construction (in certain instances of the IBC) to be used in an area with no real fire rating and a 20 minute opening protective commonly found in 1 hour walls. This would allow log homes and similar Type IV IRC structures to forgo a prescriptive layer of gypsum and save unnecessary cost.
Table 601

c. **In all occupancies, heavy timber complying with Section 2304.11 shall be allowed** for roof construction, including primary structural frame members, where a 1-hour or less fire-resistance rating is required.

705.2.3 Projection protection. Projections extending to within 5 feet (1524 mm) of the line used to determine the fire separation distance shall be one of the following:

1. Noncombustible materials.

2. Combustible materials of not less than 1-hour fire resistance-rated construction.

3. Heavy timber construction complying with Section 2304.11

2304.11.2.1 Exterior walls. Exterior walls shall be permitted to be cross-laminated timber not less than 4 inches (102 mm) in thickness meeting the requirements of Section 2303.1.4.

2304.11.2.2 Interior walls and partitions. Interior walls and partitions shall be of solid wood construction formed by not less than two layers of 1-inch (25 mm) matched boards or laminated construction 4 inches (102 mm) thick, **or of 1-hour fire-resistance-rated construction.**

Cost Impact: The code change proposal will decrease the cost of construction
Eliminating a prescriptive layer of drywall will reduce costs.

RB70-22

RB71-22

IRC: TABLE R302.6

Proponents: Glenn Mathewson, representing Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

TABLE R302.6 DWELLING-GARAGE SEPARATION

SEPARATION	MATERIAL
From the residence and attics	Not less than $^1/_2$-inch gypsum board or equivalent applied to the garage side
From *living space* ~~habitable rooms~~ above the garage	Not less than $^5/_8$-inch Type X gypsum board or equivalent
Structure(s) supporting floor/ceiling assemblies used for separation required by this section	Not less than $^1/_2$-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than $^1/_2$-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Reason Statement: Habitable space is a defined term that specifically does not apply to bathrooms or storage rooms. This is a critical part of the definition so that code provisions related specifically to habitable space won't unnecessarily apply to rooms not typically inhabited for long periods, like bathrooms and storage rooms. However, this section is about protecting the dwelling from the fire hazard of the garage and that does not seem like a concern specific to "habitable space". If a bedroom connected to the remaining dwelling unit was over the garage, is there really a greater fire hazard than if the bathroom off the bedroom is the only thing over the garage? There may be no door between the two, as is common in master bedrooms. Use of the defined term "living space" will include rooms like a laundry room or bathroom when located over the garage. A storage room over the garage would still not be affected by this proposal. If others believe it should, please consider a public comment modification at that time.

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction when bathrooms or laundry rooms are built over a garage but no other habitable rooms are. The cost increase will depend on how large these spaces are and which walls are supporting the floor/ceiling separation, as they will require 5/8" type X gypsum board instead of 1/2".

The following prices were found online at a major home improvement retailer in Colorado. A standard 1/2" 4x8 sheet of gypsum board is listed at $13.94. A 5/8" 4x8 type X sheet is listed at $16.23. This is an approximately 16% increase in material costs. Assuming upwards of a 500 square foot master bathroom and laundry room, this would be approximately 16 to 17 sheets for the ceiling. If this area was 20 x 25 with the 20 foot length down two outside walls of the garage approximately 10 feet tall, this would be another 400 square feet and approximately 14 more sheets. This wall protection is required to support the horizontal assembly. If 32 sheets total were estimated at an increase of $2.29 per sheet the cost increase for materials is approximately $73.28 There would likely be a minimal increase in the labor costs for installing the heavier sheets. Total cost increase for a very large example should be under $500 conservatively. However, I welcome any better cost analysis from professional cost estimators.

RB71-22

RB72-22

IRC: R302.9.3

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2021 International Residential Code

R302.9 Flame spread index and smoke-developed index for wall and ceiling finishes. Flame spread and smoke-developed indices for wall and ceiling finishes shall be in accordance with Sections R302.9.1 through R302.9.4.

R302.9.1 Flame spread index. Wall and ceiling finishes shall have a flame spread index of not greater than 200.

> **Exception:** Flame spread index requirements for finishes shall not apply to *trim* defined as picture molds, chair rails, baseboards and *handrails*; to doors and windows or their frames; or to materials that are less than $^{1}/_{28}$ inch (0.91 mm) in thickness cemented to the surface of walls or ceilings if these materials exhibit flame spread index values not greater than those of paper of this thickness cemented to a noncombustible backing.

R302.9.2 Smoke-developed index. Wall and ceiling finishes shall have a *smoke-developed index* of not greater than 450.

Revise as follows:

R302.9.3 Testing. Tests shall be made in accordance with ASTM E84 or UL 723. Specimen preparation and mounting shall comply with the applicable standard practice referenced in ASTM E84 when the test method requires it.

Reason Statement: Section 6.8 of ASTM E84 provides instructions on specimen preparation and mounting for a variety of specific materials and products, as shown below.
The use of these standard practices is very important because they give specific instructions as to how to mount materials or products in the ASTM E84 Steiner tunnel. For example, ASTM E2404 explains that wall and ceiling covering materials must be tested using the substrate the material is intended for and the adhesive intended for actual use. By doing this it prevents testing the wall covering material (which is typically quite thin) on cement with a high fire performance adhesive, which would make it look much better than it will look in practice. The same concept applies to some specialized products (like site-fabricated stretch systems and radiant barriers) and to wood panels with veneers or facings.

In fact, this is clarification because ASTM E84 already requires it but the guidance is often ignored. Also, some materials may be accompanied by very old test reports, with tests conducted before the standard practices were issued.

Language in ASTM E84 (2021a)

6.8 In addition to the above provisions, the standard practices listed below shall be used for specimen preparation, mounting and reporting of the relevant test materials.

E2231 for pipe and duct insulation materials.

E2404 for paper, polymeric (including vinyl and expanded vinyl) and textile wall and ceiling covering materials, facings or wood veneers intended to be applied on site over a wood substrate.

E2573 for site-fabricated stretch systems.

E2579 for the following wood products: solid board, lumber and timber products (including solid boards, lumber, timber, fingerjoined lumber, glulam, laminate wood, laminated veneer lumber and parallel strand lumber products), panel products (including fibreboard, hardboard, oriented strandboard, waferboard, and plywood panel products), decorative wood products (including fine woodwork, millwork and moulding) and shingles and shakes used as interior wall and ceiling finish and interior trim as well as to laminated products factory-produced with a wood substrate.

E2599 for reflective insulation, radiant barrier and vinyl stretch ceiling materials for building applications.

E2688 for tapes.

E2690 for caulks or sealants.

E2988 for flexible fibrous glass insulation for metal buildings.

E3202 for plastic composites for use as deck boards, stair treads, guards or handrails.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is clarification, because ASTM E84 already requires it.

RB73-22

IRC: R302.10.4, R302.10.5

Proponents: Tim Earl, representing Self (tearl@gbhint.com)

2021 International Residential Code

Revise as follows:

R302.10.4 Exposed attic insulation. Exposed insulation materials installed on attic floors shall have a critical radiant flux of not less than 0.12 watt per square centimeter when tested in accordance with ASTM E970.

Delete without substitution:

~~**R302.10.5 Testing.** Tests for critical radiant flux shall be made in accordance with ASTM E970.~~

Reason Statement: Editorial cleanup. There is no reason to have a separate paragraph to tell readers which test applies to the preceding paragraph.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple editorial cleanup.

RB73-22

RB74-22

IRC: R302.13, ASTM Chapter 44 (New)

Proponents: Jason Smart, representing American Wood Council (jsmart@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org); Raymond O'Brocki, representing American Wood Council (robrocki@awc.org)

2021 International Residential Code

Revise as follows:

R302.13 Fire protection of floors. Floor assemblies that are not required elsewhere in this code to be fire-resistance rated, shall be provided with a $^{1}/_{2}$-inch (12.7 mm) gypsum wallboard membrane, $^{5}/_{8}$-inch (16 mm) *wood structural panel* membrane, or equivalent on the underside of the floor framing member. Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 13D, or other *approved* equivalent sprinkler system.
2. Floor assemblies located directly over a *crawl space* not intended for storage or for the installation of fuel-fired or electric-powered heating *appliances*.
3. Portions of floor assemblies shall be permitted to be unprotected where complying with the following:
    3.1. The aggregate area of the unprotected portions does not exceed 80 square feet (7.4 m^2) per story.
    3.2. Fireblocking in accordance with Section R302.11.1 is installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Wood floor assemblies using dimension lumber or *structural composite lumber* equal to or greater than 2-inch by 10-inch (50.8 mm by 254 mm) nominal dimension, or other *approved* floor assemblies demonstrating equivalent fire performance in accordance with ASTM D8391.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8391-22	Specification for Demonstrating Equivalent Fire Performance for Wood-Based Floor Framing Members to Unprotected 2 by 10 Dimension Lumber or Equal-Sized Structural Composite Lumber

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D8391-22 Specification for Demonstrating Equivalent Fire Performance for Wood-Based Floor Framing Members to Unprotected 2 by 10 Dimension Lumber or Equal-Sized Composite Lumber, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: To provide code and fire officials with a standardized approach to "… *approve floor assemblies* as *demonstrating equivalent fire performance…"* as permitted by Exception #4, a new standard, *ASTM D8391-22, Specification for Demonstrating Equivalent Fire Performance of Wood-Based Floor Framing Members to Unprotected 2x10 Dimension lumber or Equal-Sized Structural Composite Lumber* has been developed. The ASTM standard referenced in this proposal uses the same method as currently used by the International Code Council Evaluation Service (ICC-ES). Adding the standard to Exception #4 will establish a universal baseline for how products are tested and safeguards to ensure their durability.
ASTM D8391-22 leverages the current criteria provided by ICC-ES. Specifically, it expands the scope from trusses (ICC-ES AC224) and I-joists (ICC-ES AC14) to include "any wood-based residential framing member." Additionally, the scope includes "floor framing members with or without applied treatments or materials used to increase fire resistance, including fire-resistive paints, coatings, or chemical treatments, and including mechanically attached or adhered fire protection materials." Robust quality control criteria for applied treatments are included in the standard.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It provides additional clarity for demonstrating equivalent performance under one option of complying with the code.

RB74-22

RB75-22

IRC: R302.13

Proponents: Raymond Steadward Jr, representing Town Of Enfield CT (rsteadward@enfield.org)

2021 International Residential Code

Revise as follows:

R302.13 Fire protection of floors. Floor assemblies that are not required elsewhere in this code to be fire-resistance rated, shall be provided with a $^{1}/_{2}$-inch (12.7 mm) gypsum wallboard membrane, $^{5}/_{8}$-inch (16 mm) *wood structural panel* membrane, or equivalent on the underside of the floor framing member. Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 13D, or other *approved* equivalent sprinkler system.
2. Floor assemblies located directly over a *crawl space* not intended for storage or for the installation of fuel-fired or electric-powered heating *appliances*.
3. Portions of floor assemblies shall be permitted to be unprotected where complying with the following:
   - 3.1. The aggregate area of the unprotected portions does not exceed 80 square feet (7.4 m^2) per story.
   - 3.2. Fireblocking in accordance with Section R302.11.1 is installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Wood floor assemblies using dimension lumber or *structural composite lumber* equal to or greater than 2-inch by 10-inch (50.8 mm by 254 mm) nominal dimension, or other *approved* floor assemblies demonstrating equivalent fire performance.
5. <u>Wood floor assemblies less than 600 square feet (55.7 m^2) within detached accessory structures with no habitable space above them.</u>

Reason Statement: Small haylofts or other small/ low/ limited occupancy or risk floor systems should not have to be held to the same standards as a dwelling unit because the likely-hood of an egress issue or the need for entrance to rescue or for fire suppression is so small in non-habitable spaces and structures. This will also close a small gap for "on-grade" prefab type structures that may not exempted by Exemption #2

Cost Impact: The code change proposal will decrease the cost of construction
This will lower the cost of construction for some small accessory structures.

RB75-22

RB76-22

IRC: R303.1, R303.1.1 (New), R303.1.2 (New), R303.2, R303.9, R303.9.1

Proponents: Glenn Mathewson, representing Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R303.1 Habitable rooms. *Habitable* space ~~rooms~~ shall be provided natural light and natural ventilation in accordance with Sections R303.1.1 through R303.1.3. ~~have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. Natural *ventilation* shall be through windows, skylights, doors, louvers or other *approved* openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants. The openable area to the outdoors shall be not less than 4 percent of the floor area being ventilated.~~

Exceptions:

1. ~~For habitable rooms other than kitchens, the glazed areas need not be openable where the opening is not required by Section R310 and a whole-house mechanical *ventilation* system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.~~
2. ~~For kitchens, the glazed areas need not be openable where the opening is not required by Section R310 and a local exhaust system is installed in accordance with Section M1505.~~
3. ~~The glazed areas need not be installed in rooms where Exception 1 is satisfied and artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.~~
4. ~~Use of *sunroom* and patio covers, as defined in Section R202, shall be permitted for natural *ventilation* if in excess of 40 percent of the exterior *sunroom* walls are open, or are enclosed only by insect screening.~~

Add new text as follows:

R303.1.1 Natural light. Habitable rooms shall have an aggregate area of glazed openings not less than 8 percent of the floor area of such rooms. Required glazed openings shall open directly onto a street, alley or *public way*, or a *yard* or *court* located on the same *lot* as the *building.*

Exceptions:

1. Required glazed openings shall be permitted to face into a roofed porch, deck or patio adjacent to a street, alley, *public way*, *yard* or *court*, where there the longer side of the roofed area is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).
2. Required glazed openings shall be permitted to face into a sunroom adjacent to a street, alley, public way, yard or court.
3. Glazed openings are not required where artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.
4. Eave projections shall not be considered as obstructing the clear open space of a yard or court.

R303.1.2 Natural ventilation. Habitable rooms shall have an aggregate area openable to the outdoors not less than 4 percent of the floor area of such rooms. Openings shall be through windows, skylights, doors, louvers or other approved openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants.

Exceptions:

1. Natural ventilation shall not be required in habitable rooms other than kitchens where a whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.
2. Natural ventilation shall not be required in kitchens where a local exhaust system is installed in accordance with Section M1505.
3. Required ventilation openings shall be permitted to open into a thermally isolated sunroom or roofed porch, deck, or patio where not less than 40 percent of the roofed area perimeter is open to the outdoor air.
4. Required ventilation openings shall be permitted to open into a thermally isolated sunroom provided there is an openable area between the adjoining room and the sunroom of not less than one-tenth of the floor area of the interior room and not less than 20 square feet (2 m^2). The minimum openable area of the sunroom to outdoor air shall be based on the total floor area of the adjoining room and the sunroom.

Revise as follows:

~~**R303.2**~~ <u>**R303.1.3**</u> **Adjoining rooms.** For the purpose of determining light and *ventilation* requirements, rooms shall be considered to be a portion of an adjoining room where not less than one-half of the area of the common wall is open and unobstructed and provides an opening of not less than one-tenth of the floor area of the interior room and not less than 25 square feet (2.3 m^2).

~~**Exception:** Openings required for light or *ventilation* shall be permitted to open into a *sunroom* with thermal isolation or a patio cover, provided that there is an openable area between the adjoining room and the *sunroom* or patio cover of not less than one-tenth of the floor area of the interior room and not less than 20 square feet (2 m^2). The minimum openable area to the outdoors shall be based on the total floor area being ventilated.~~

Delete without substitution:

~~**R303.9 Required glazed openings.** Required glazed openings shall open directly onto a street or public alley, or a *yard* or court located on the same *lot* as the building.~~

~~**Exceptions:**~~

1. ~~Required glazed openings that face into a roofed porch where the porch abuts a street, *yard* or court and the longer side of the porch is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).~~
2. ~~Eave projections shall not be considered as obstructing the clear open space of a *yard* or court.~~
3. ~~Required glazed openings that face into the area under a deck, balcony, bay or floor cantilever where a clear vertical space not less than 36 inches (914 mm) in height is provided.~~

~~**R303.9.1 Sunroom additions.** Required glazed openings shall be permitted to open into *sunroom additions* or patio covers that abut a street, *yard* or court if in excess of 40 percent of the exterior *sunroom* walls are open, or are enclosed only by insect screening, and the ceiling height of the *sunroom* is not less than 7 feet (2134 mm).~~

Reason Statement: In the 1800's natural light and ventilation were married in the only feature to provide them, windows. Today, the IRC offers other ways to provide light and ventilation that are no longer the same feature, yet they are still married together in Section R303.1. It's time for the IRC to modernize and allow light and ventilation to be separately addressed. Currently, the provisions and choices for light and ventilation are incredibly difficult to understand and scattered throughout sections that have been modified in pieces since the 2000 edition. Nothing reveals just how confusion these provisions are presented than when you are trying to teach them to new professionals.
Very little has been removed or changed in the application of these provisions, but you have to carefully look them over to realize this. The majority of the deletions have simply been moved and reworded. They have been applied to what they are meant to apply to, light, ventilation, or both.

SOME MOTIVATION FOR THIS PROPOSAL.

1) Glazed openings are required in Section R301.1. However, you have to skip ahead to R301.9 to get the full story of what they face into.

2) Ventilation can be provided through windows, skylights, doors and louvers, yet there is language like "the glazed area need not be openable". This would not need to be said if glazed openings and ventilation openings were looked at individually.

3) "Roofed porches" (R303.9) have different requirements for obstructed perimeters than "patio covers" (R303.1). I am unable to find anyway to interrupt these two features distinctly using the IRC. These terms are similar jargon.

4) Sunroom provisions are just plain confusing. There is no reason to site a definition, such as "as defined in Section R202". That is not standard form.

COMMENTARY EXPLAINING THE INTENT OF EACH MODIFICATION [WRITTEN AS IF APPROVED]

<u>**R303.1 Habitable rooms:** Habitable space shall be provided natural light and natural ventilation in accordance with Sections R303.1.1 through R303.1.3.</u>

This purposefully begins with the defined term "habitable space" which connects the entire section and use of the term "habitable rooms" back to the definition of habitable space. This sets the general requirement that they shall have light and ventilation.

<u>**R303.1.1 Natural light:** Habitable rooms shall have an aggregate area of glazed openings not less than 8 percent of the floor area of such rooms. Required glazed openings shall open directly onto a street, alley or public way, or a yard or court located on the same lot as the building.</u>

This allows the methods for natural light to be presented independently of them being an option for ventilation as well. "habitable room" is now used when referencing measurements of floor area, speaking to the presence of dividing walls that create "rooms" and affect where natural light will reach.

<u>**R303.1.1, Exception 1:** Required glazed openings shall be permitted to face into a roofed porch, deck or patio adjacent to a street, alley, public</u>

way, yard or court, where there the longer side of the roofed area is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).

[relocated from R303.9 Ex. 1] This clarifies when the glazed openings face into an area covered with a roof. All jargon terms for the floor have been included as to not confuse interpretation (porch, deck, patio). This exception is from R303.9 which is specific to "glazed openings" not ventilation.

R303.1.1, Exception 2: Required glazed openings shall be permitted to face into a sunroom adjacent to a street, alley, public way, yard or court.

By definition, sunrooms have 40% of their wall and ceiling area in glazed openings. Sunrooms are sunny inside. Section R303.9.1 Sunroom additions is a subsection to "required glazed openings". These provisions appear to be about natural light. A sunroom that needs to bring light in to the room it adjoins need not be open to the outside air (ventilation). Glazed openings can open into sunrooms.

R303.1.1, Exception 3: Glazed openings are not required where artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux)
over the area of the room at a height of 30 inches (762 mm) above the floor level.

[relocated from R303.1, ex 3] The original exception is rewritten simply in reference to glazed openings for natural light. It no longer must address the other exception about ventilation.

R303.1.1, Exception 4: Eave projections shall not be considered as obstructing the clear open space of a yard or court.

[relocated from R303.9, exception 2] Text unchanged.

R303.1.2 Natural ventilation: Habitable rooms shall have an aggregate area openable to the outdoors not less than 4 percent of the floor area of such rooms. Openings shall be through windows, skylights, doors, louvers or other approved openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants.

This language from R303.1 related to ventilation has been relocated to it's own section. Text is unchanged.

R303.1.2, Exception 1: Natural ventilation shall not be required in habitable rooms other than kitchens where a whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.

[relocated from R303.1, ex. 1] The original text is relocated as an exception only to ventilation, so the reference to "glazed areas need not be openable" is deleted.

R303.1.2, Exception 2: Natural ventilation shall not be required in kitchens where a local exhaust system is installed in accordance with Section M1505.

[relocated from R303.1, ex. 2] The original text is relocated as an exception only to ventilation, so the reference to "glazed areas need not be openable" is deleted.

R303.1.2, Exception 3: Required ventilation openings shall be permitted to open into a thermally isolated sunroom or roofed porch, deck, or patio where not less than 40 percent of the roofed area perimeter is open to the outdoor air.

[intent relocated from R303.1, ex 4 and 303.9.1] This change will require more explanation. This exception is for "exterior floor areas covered in a roof and partially enclosed with walls" and addresses how enclosed the walls are and if ventilation can get through. This is why the location of the openings in the walls are not important, as they are in the "roof porch exception for light to hit the windows under the natural lighting provisions". This is why thermally isolated sunrooms and roofed porch, deck, or patio is referenced. Often these floor areas will be larger than the portion that is covered. Therefore the proposed exception refers to the "roofed area perimeter". Using the term "area" is in lieu of repeating all the jargon terms.

R303.1.2 Exception 4: Required ventilation openings shall be permitted to open into a thermally isolated sunroom provided there is an openable area between the adjoining room and the sunroom of not less than one-tenth of the floor area of the interior room and not less than 20 square feet (2 m2). The minimum openable area of the sunroom to outdoor air shall be based on the total floor area of the adjoining room and the sunroom.

[relocated from R303.2] Though this exception is about an adjoining space, it is better suited in the exceptions for ventilation. A sun room has 40% glazing, so it's sunny glazed openings can open into any of them under proposed R303.1.1, ex 2. A thermally isolated sunroom according to the categories in R301.2.1.1.1 is always nonhabitable. Therefore the sunroom does not require ventilation. The goal of this exception is for fully enclosed sunrooms and how much openable area is required to pass through the sunroom and reach the adjoining habitable space. The original motivation for this exception is related to sunroom additions and not requiring relocation of windows for ventilation. Thus the provisions for a large opening between the two that occupants can open to "connect" the air of the sunroom and adjoining room. Though the sunroom is not "required" to be ventilated, the air does not know this and the sunroom is ventilated regardless. Therefore the minimum openable area of the sunroom walls must account for 4% percent of the floor area for the sunroom and the adjoining room combined.

DELETIONS THAT WERE NOT REWRITTEN.

Exception 3 of R303.9 is unnecessary. 303.9 is about glazed openings which is about natural light reaching the opening. It makes no sense to expect a window under a deck of unlimited size and unlimited percent of perimeter enclosed to the ground would provide natural light to a window. For a glazed opening under a "roofed porch" to get sunlight, the ceiling must be seven feet high and open around 65% of the perimeter. This does NOT equate to burying a glazed opening under a deck. This exception appears to be included due to emergency escape and rescue opening provisions, which is unnecessary and confusing. This has been deleted.

Mentions of "insect screening" has been deleted. There is no mention of screens on windows, a common practice and requirement of the IPMC. Any reasonable interpretation of ventilation should not be affected by screens.

A FEW MORE NOTES:

All mentions of glazed openings toward obstructions have been worded as "facing into". The term "glazed openings" is a noun. When used in a sentence as "Required glazed openings shall be permitted to OPEN into a..." the term "open" is read more as a verb, an action and appears to be about ventilation. Therefore all glazed opening provisions are written as "facing into"

All mention of ventilation opens are phrased "open into" to further assist in interpretation.

The goal of this proposal is for the provisions to make logical sense, to be specific in language, and to most effectively "Present the Intent"

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial in nature and does not change the original intent in any manner that creates a substantial cost impact in either direction. Readers will save money on headache medicine from not reading these sections as is ever again.

RB76-22

RB77-22

IRC: R303.3

Proponents: Mike Moore, representing Broan-NuTone (mmoore@statorllc.com); Anthony Floyd, representing City of Scottsdale (afloyd@scottsdaleaz.gov); Kevin Gore, representing Borough of West Chester (KGore@west-chester.com)

2021 International Residential Code

Revise as follows:

R303.3 Bathrooms. Bathrooms, ~~water closet compartments~~ toilet rooms, and other similar rooms shall be provided with ~~aggregate glazing area in windows of not less than 3 square feet (0.3 m^2), one-half of which shall be openable~~ a local exhaust system in accordance with Section M1505 and with artificial light.

> **Exception:** A local exhaust system is not required in spaces exempt from the mechanical ventilation requirement of Section R303.4 and provided with a window having an opening area not less than 1.5 square feet (0.14 m^2). ~~The glazed areas shall not be required where artificial light and a local exhaust system are provided. The minimum local exhaust rates shall be determined in accordance with Section M1505. Exhaust air from the space shall be exhausted directly to the outdoors.~~

Reason Statement: Section R303.4 requires mechanical ventilation in accordance with Section M1505 for dwelling units and buildings complying with Section N1102.4.1 (building envelope air sealing provisions). Section M1505 establishes requirements for ventilation of bathrooms and toilet rooms (referred to as water closet compartments within R303.3). To correlate with Section R303.4 requirements for ventilation of bathrooms and toilet rooms, this proposal modifies Section R303.3 to reference the R303.4 requirements. Where R303.4 requirements for mechanical ventilation do not apply, this proposal maintains the option to use local exhaust or window openings for ventilation. For safety reasons, the proposal introduces a requirement for artificial light in all cases, and because artificial light is required, the exception for natural ventilation can be distilled to 1.5 square feet of opening area (the additional 1.5 feet of inoperable glazing area would not be required). Finally, this proposal replaces the term "water closet compartment," (used only here within the IRC) with the term, "toilet room," to better coordinate with the terminology in Section M1505.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Mechanical ventilation of bathrooms and water closet compartments/toilet rooms is required by R303.4 under certain conditions. By aligning ventilation requirements of R303.3 with R303.4, there is no additional cost. In the case where artificial light is not provided in bathrooms, this code change could increase the cost of construction by requiring artificial light. In the case where artificial light is provided in bathrooms and ventilation of bathrooms is not required by R303.4, this code change could decrease the cost of construction by reducing the minimum glazing area required from 3.0 square feet total (with 1.5 square feet of openable area) to 1.5 square feet of openable area.

RB77-22

RB78-22

IRC: R303.5.1

Proponents: Mike Moore, representing Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Revise as follows:

R303.5.1 Intake openings. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks.
For the purpose of this section, the exhaust from *dwelling* unit <u>living space</u> ~~toilet rooms, bathrooms and *kitchens*~~shall not be considered as hazardous or noxious.

Exceptions:

1. The 10-foot (3048 mm) separation is not required where the intake opening is located 3 feet (914 mm) or greater below the contaminant source.
2. Vents and chimneys serving fuel-burning *appliances* shall be terminated in accordance with the applicable provisions of Chapters 18 and 24.
3. Clothes dryer exhaust ducts shall be terminated in accordance with Section M1502.3.

Reason Statement: Through action on RM12-21, IRC M1504.3 was modified to eliminate the requirement for maintaining a minimum separation distance between exhaust terminations and mechanical air intake openings where a "factory-built intake/exhaust combination termination fitting (is) installed in accordance with the fan manufacturer's instructions, and the exhaust air is drawn from a *living space*." This proposed modification to Section R303.5.1 is needed to correlate with the change to M1504.3. By replacing "dwelling unit toilet rooms, bathrooms, and kitchens" with "dwelling unit *living space*," these sections are better correlated.
For reference, the IRC definition of *living space* provided below. *Living space* includes toilet rooms, bathrooms, and kitchens (currently identified within R303.5.1 as spaces that are not considered to be sources of hazardous or noxious exhaust) as well as other areas that are expected to have lower concentrations of pollutants, water vapor, or odors than these rooms.

LIVING SPACE. Space within a *dwelling unit* utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal may reduce the cost of construction by correlating with M1504.3, clarifying the conditions under which factory-built intake/exhaust combination termination fittings may be used to separate exhaust from mechanical outdoor air intakes.

RB78-22

RB79-22

IRC: R303.8

Proponents: Glenn Mathewson, representing Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R303.8 Exterior stairway illumination. Exterior *stairways* shall be provided with an artificial light source located at the top landing of the *stairway*. Exterior *stairways* providing access to a *basement* from the outdoor *grade* level shall be provided with an artificial light source located at the bottom landing of the *stairway*.

Exception: A light source shall not be required at the top of exterior stairways less than 30 inches (762 mm) in total rise.

Reason Statement: This section was considerably revised in the 2015 edition to only require illumination at the top of exterior stairways. Using an exterior stairway in the dark is a conscience choice of the occupant and with an assumption of risk they must make themselves aware of. It is not the job of the local government to mandate protection from this hazard. However, the top of a stairway is often an opening in a required guard. There is always a fall hazard at this opening, but in the dark it is greater. Therefore the minimum required lighting for exterior stairways is only a light source at the top landing. This change has remained with no challenge in the 2018 and 2021 edition.
This proposed exception addresses decks that are low to the ground and do not require guards. A small stairway from these decks do not create more of a fall hazard from the deck when there are no required guards. A multilevel deck, with a few steps between is not a greater fall hazard of the upper deck than if no stair existed between the two. Therefore, if it is reasonable to not require guards for fall protection it is also reasonable to not provide a light for fall protection.

For a risk assessment comparison, Section R303.7 for interior stairway lighting only requires a switch at the top and bottom of interior stairways with 6 or more risers. At a conventional riser height of 7 ¾ inches, a five riser stairway could be 38 ¾ inches high. If it is reasonable for an occupant to ascend or descend an interior stairway at this height without access to a switch and therefore without light, then it is reasonable for a 30 inch high exterior stairway much less frequently used in the evening to also have no light.

Cost Impact: The code change proposal will decrease the cost of construction
Exterior floor surfaces such as decks and porches with stairways less than 30 inches in height will be less expensive to construction without a required light. There is no requirement for the operation or type of lighting, so the most conservative choice would be using low voltage lighting. This lighting does not typically require a licensed electrician to install. In the least, this proposal will reduce the cost of construction for certain deck and porch designs by perhaps a couple hundred dollars. However, it is difficult to assume what type of lighting requirements are being interpreted by building authorities with the current provision. If non-permanent solar lighting is being accepted, such as plastic "post cap lights" the cost reduction could be under $50.

RB79-22

RB80-22

IRC: R305.1

Proponents: Glenn Mathewson, representing Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R305.1 Minimum height. *Habitable space*, hallways and portions of *basements* containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a ceiling height of not less than 7 feet (2134 mm).
2. The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a ceiling height of not less than 6 feet 8 inches (2032 mm) above an area of not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead <u>or an area in accordance with Section P2708.1</u>.
3. Beams, girders, ducts or other obstructions in *basements* containing *habitable space* shall be permitted to project to within 6 feet 4 inches (1931 mm) of the finished floor.
4. Beams and girders spaced apart not less than 36 inches (914 mm) in clear finished width shall project not more than 78 inches (1981 mm) from the finished floor.

Reason Statement: Section P2708.1 provides more variety in shower pan area than is provided in exception 2 of this section for the ceiling height area. A requirement for a 6 feet 8 inch ceiling height in a 30 inch by 30 inch square area under a shower head is not possible in many common shower arrangements. The inside clear distance of most bathtubs is not 30 inches and while a 30 inch diameter circle will fit in a 36 inch neo angle shower pan, a 30 inch by 30 inch square will not. However, Section P2708.1 and its exceptions provide for these showers. By referencing Section P2708.1 in Section 305.1 we eliminate a conflict between the two provisions.
The exception to P2708.1 is provided below for your reference.

P2708.1 General. Shower compartments shall have not less than 900 square inches (0.6 m2) of interior cross-sectional area. Shower compartments shall be not less than 30 inches (762 mm) in minimum dimension measured from the finished interior dimension of the shower compartment, exclusive of fixture valves, shower heads, soap dishes, and safety grab bars or rails. The minimum required area and dimension shall be measured from the finished interior dimension at a height equal to the top of the threshold and at a point tangent to its centerline and shall be continued to a height of not less than 70 inches (1778 mm) above the shower drain outlet. Hinged shower doors shall open outward. The wall area above built-in tubs having installed shower heads and in shower compartments shall be constructed in accordance with Section R702.4. Such walls shall form a watertight joint with each other and with either the tub, receptor or shower floor.
Exceptions:
1. Fold-down seats shall be permitted in the shower, provided that the required 900-square-inch (0.6 m2) dimension is maintained when the seat is in the folded-up position.
2. Shower compartments having not less than 25 inches (635 mm) in minimum dimension measured from the finished interior dimension of the compartment provided that the shower compartment has a cross-sectional area of not less than 1,300 square inches (0.838 m2).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal has no effect on the cost of construction, as most sensible building officials are likely already interpreting the provision in this manner.

RB80-22

RB81-22

IRC: R305.1

Proponents: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com)

2021 International Residential Code

Revise as follows:

R305.1 Minimum height. *Habitable space*, hallways and portions of *basements* containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a ceiling height of not less than 7 feet (2134 mm).
2. The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a ceiling height of not less than 6 feet 8 inches (2032 mm) above an area of not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.
3. Beams, girders, ducts or other obstructions in *basements* containing *habitable space* shall be permitted to project to within 6 feet 4 inches (1931 mm) of the finished floor.
4. Beams and girders spaced apart not less than 36 inches (914 mm) in clear finished width shall project not more than 78 inches (1981 mm) from the finished floor.
5. *Habitable spaces* created in existing non-habitable basements in buildings not less than 5 years old, established with *approved* documentation, shall be permitted to have a ceiling height of not less than 6 feet 8 inches (2032 mm) and their bathrooms, toilet rooms and laundry rooms a ceiling height of not less than 6 feet 4 inches (2032 mm). Beams, girders, ducts, light fixtures and other obstructions are not permitted to project below these minimum ceiling heights.

Reason Statement: In many locations the need for additional, more affordable housing, or other habitable space, is driving increasing conversion of non-habitable basements into habitable spaces. Many of these spaces have height limitations between those in the proposed exception and what is currently required, meaning they are cannot be converted or are done so without permits. In these cases, the work is not plan checked or inspected for electrical, plumbing, fire safety, lighting, ventilation, and egress, potentially creating hazardous conditions. This code change would reduce the number of these occurrences and their associated hazards.
This proposal allows reduced minimum ceiling heights when creating habitable space in a non-habitable basement in a building not less than five years old. The five-year minimum is intended to prevent owners from constructing a new building with a non-habitable basement, then applying this exception immediately after the building is completed. Though somewhat arbitrary, five years is long enough to dissuade owners from abusing this exception for financial or other advantage, without preventing its intended valid use.

The onus for establishing the minimum 5-year age of the building is placed on the owner or owner's agent, to provide documentation that must be approved by the building official. Common forms could be property tax records, a certificate of occupancy, final inspection records, or other documentation deemed acceptable.

The proposed reduced heights are reasonable because they are already allowed in some circumstances. The proposed 6'8" minimum for habitable space is the same as currently allowed for all bathrooms and laundry rooms. The proposed 6'4" minimum for bathrooms and laundry rooms is the same as currently allowed for beams, ducts and other projections in habitable basements. Beams and other obstructions would not be allowed to project below these reduced minimum ceiling heights. This eliminates use of exception #3 (that allows beam, ducts, etc. to project within 6'4" of the floor) for basement spaces with ceiling heights less than 7 feet, and can be seen as a tradeoff that attempts to preserve a similar and reasonable volume of space for habitability.

The space would need to satisfy all other current code requirements for egress, natural light and ventilation, sanitation, energy conservation, etc., including Section R311.2 for egress doors. The 78-inch egress door height requirement is achievable from rooms with a 6'8"(80") ceiling height. Section R311.2 explicitly has no dimensional requirement for non-egress doors, so doors shorter than 78 inches into a bathroom or laundry room with a 6'4" (76") ceiling height would be acceptable.

Cost Impact: The code change proposal will decrease the cost of construction
This code change would reduce construction costs in some cases by allowing the creation of low-cost habitable space in existing basements, that under the current code is not permitted.

RB81-22

RB82-22

IRC: R305.1.2 (New), AJ109.7

Proponents: Ardel Jala, representing Seattle Department of Construction & Inspections (ardel.jala@seattle.gov); Micah Chappell, representing Seattle Department of Construction & Inspections (micah.chappell@seattle.gov)

2021 International Residential Code

R305.1 Minimum height. *Habitable space*, hallways and portions of *basements* containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a ceiling height of not less than 7 feet (2134 mm).
2. The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a ceiling height of not less than 6 feet 8 inches (2032 mm) above an area of not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.
3. Beams, girders, ducts or other obstructions in *basements* containing *habitable space* shall be permitted to project to within 6 feet 4 inches (1931 mm) of the finished floor.
4. Beams and girders spaced apart not less than 36 inches (914 mm) in clear finished width shall project not more than 78 inches (1981 mm) from the finished floor.

R305.1.1 Basements. Portions of *basements* that do not contain *habitable space* or hallways shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

Exception: At beams, girders, ducts or other obstructions, the ceiling height shall be not less than 6 feet 4 inches (1931 mm) from the finished floor.

Add new text as follows:

R305.1.2 Habitable attics and basements in existing buildings. Where a *change of occupancy* creates a *habitable attic* or *habitable* space in a *basement*, ceiling height shall not be less than 6 foot 8 inches (2032 mm

Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a ceiling height of not less than 6 feet 8 inches (2134 mm).
2. At beams, girders, ducts or other obstructions, the ceiling height shall be not less than 6 feet 4 inches (1931 mm) from the finished floor.

Delete without substitution:

~~**AJ109.7 Ceiling height.** *Habitable spaces* created in existing *basements* shall have ceiling heights of not less than 6 feet, 8 inches (2032 mm), except that the ceiling height at obstructions shall be not less than 6 feet 4 inches (1930 mm) from the *basement* floor. Existing finished ceiling heights in nonhabitable spaces in *basements* shall not be reduced.~~

Reason Statement: This is one of (4) proposals that pulls existing "breaks" found in Appendix J for Existing Buildings into the main body of the code. Each proposal permits flexibility from meeting full code compliance for existing construction while maintaining a reasonable level of safety. This proposal deletes the provision for ceiling height in existing buildings from Appendix J section AJ109.7 and moves it into the ceiling height provisions of section R305. This proposal permits a lower ceiling height in basements and habitable attics in existing buildings.

Historic minimum ceiling heights varied across the legacy codes over time. For example, the Uniform Building codes prior to 1979 permitted habitable space ceiling height as low as 6 foot 4 inches. The 1979 Uniform Building Code established minimum ceiling heights of 7 feet 6 inches in habitable spaces and 7 feet in other spaces. This was the UBC standard until the 1997 Uniform Building Code which adopted 7 feet as the minimum ceiling height. Habitable spaces under current code must maintain 7 feet minimum ceiling height per section R305.1.
Homeowners regularly convert unfinished attics and basements into habitable space as a way to maximize the usable square footage in their existing home. Though the space may have been established with a legal ceiling height per a legacy code, it is often impractical to lower existing basement floors or raise existing roof construction to achieve the ceiling heights for habitable space in new construction as per current code. The code's ceiling height requirements for new construction also make it difficult to incorporate attached accessory dwelling units into existing buildings, which runs counter to the goals of many zoning codes. In response some jurisdictions, including Seattle, approve lower ceiling heights for converting to habitable space in existing buildings when they were constructed and met ceiling heights allowed in previous legacy codes.

This proposal provides flexibility for ceiling height in basements and habitable attics in existing buildings. It permits a ceiling height of not less than 6 feet 8 inches as is currently permitted in Appendix J section AJ109.7. It extends this flexibility to habitable attics. The first exception maintains the sloped ceiling height provisions per R305.1 for new construction but lowers the minimum ceiling height requirement for 50% of the room from 7 feet to 6 feet 8 inches. The second exception maintains the allowance for beams, girders, and other obstructions that is permitted in new construction.

Cost Impact: The code change proposal will decrease the cost of construction
This code change proposal reduces when a basement floor must be lowered or an existing roof raised to meet ceiling height requirements when converting existing basements or habitable attics to habitable space.

RB82-22

RB83-22

IRC: R308.4.4

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

SECTION R308
GLAZING

Revise as follows:

R308.4.4 Glazing in guards and ~~railings~~ handrails. Glazing in *guards* and ~~railings~~ handrails, including structural baluster panels and nonstructural in-fill panels, regardless of area or height above a walking surface shall be considered to be a hazardous location.

Reason Statement: The title and charging statement reference "railings" however the code does not define the word railing nor does it use this description anywhere else within the IRC. The correct terms that this section is referencing are "Guards & Handrails". Thus the title and charging statement should align with the intent of the enforcement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to the actual requirements of the code, the title name change provides alignment of the intent of the requirement already in place.

RB83-22

RB84-22

IRC: R308.4.6

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R308.4.6 Glazing adjacent to stairs and ramps. Glazing where the bottom exposed edge of the glazing is less than 36 inches (914 mm) above the plane of the adjacent walking surface of *stairs* ~~*stairways*~~, landings between flights of stairs and *ramps* shall be considered to be a hazardous location.

Exceptions:

1. Where glazing is adjacent to a walking surface and a horizontal rail is installed at 34 to 38 inches (864 to 965 mm) above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and have a cross-sectional height of not less than $1^1/_2$ inches (38 mm).
2. Glazing 36 inches (914 mm) or more measured horizontally from the walking surface.

Reason Statement: The title of this section references “stairs”. A “stairway” includes all necessary landings, such as top, bottom, and intermediate. In this section, after listing “stairways” it then refers to “landings between flights”. This is because the intent of this section is not “stairways”, but rather “stairs”.
There is already a hazardous location at the bottom of a stairway, as specified in Section R308.4.7, which extends for 5 feet horizontally from the nosing. There is no need for section 308.4.6 to reference “stairways” and capture the bottom landing, as otherwise it would result in a hazardous location 3 feet from the outer edge of the 3-foot landing, effectively 6 feet from the bottom tread nosing. This would result in a larger area at the bottom of stairways than the section specifically addressing the bottom of stairways.

If the top landing were included in this using the term “stairway” as defined, it would require glazing just under 6 feet away from the top of the stairway to be safety glazed. This does not sound like the intent of this section. Changing stairway to stairs clarifies a better minimum application of the code.

Cost Impact: The code change proposal will decrease the cost of construction
Where this section is interpreted precisely as the terms are defined, this proposal will reduce the cost of construction by reducing the area at the top and bottom of stairways where safety glazing is required. Where this is interpreted more practically, there will be no change in the cost of construction.

RB84-22

RB85-22

IRC: R308.6.5

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

R308.6.5 Screens not required. Screens shall not be required where laminated glass complying with Item 1 of Section R308.6.2 is used as single glazing or the inboard pane in multiple glazing. Screens shall not be required where fully tempered glass is used as single glazing or the inboard pane in multiple glazing and either of the following conditions is met:

1. The glass area is 16 square feet (1.49 m^2) or less; the highest point of glass is not more than 12 feet (3658 mm) above a walking surface; the nominal glass thickness is not more than $^3/_{16}$ inch (4.8 mm); and for multiple glazing only the other pane or panes are fully tempered, laminated or wired glass.
2. The ~~glass area is greater than 16 square feet (1.49 m²); the~~ glass is sloped 30 degrees (0.52 rad) or less from vertical; and the highest point of glass is not more than 10 feet (3048 mm) above a walking surface.

Reason Statement: Reason: R308.6.5, Item 2 is not consistent with IBC 2405.3, Item 1. This change would provide consistency and eliminate an issue in the IRC where glass areas smaller than 16 square feet would require a screen if glass thickness exceeds 3/16". See below 2405.3
2405.3 Screening

. Exception: In monolithic and multiple-layer sloped glazing systems, the following applies:

1. Fully tempered glass installed without protective screens where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane shall have the highest point of the glass 10 feet (3048 mm) or less above the walking surface.

For clarification, the tables below show Examples R308.6.5 Glass Retention Screens NOT Required, and IBC 2405.3 Glass Retention Screens NOT Required:

R308.6.5 Glass Retention Screens NOT Required – Shaded Cells

Glazing Area – A (ft^2)	Glazing Slope (degrees)	Height above Walking Surface – H (ft)	Glass Thickness - t (in)
> 16	≤ 30°	≤ 10	n/a
≤ 16	n/a	≤ 12	≤ 3/16
Examples			
20	30°	10	any
20	45°	10	any
20	30°	11	any
16	any	12	3/16
16	any	13	3/16
16	any	12	1/4
4	any	10	1/4
4	any	10	1/4
4	any	11	1/4

Thicker glass (>3/16”) means screens are required even for small glass areas? Why?

IBC 2405.3 Glass Retention Screens NOT Required – Shaded Cells

Glazing Area – A (ft^2)	Glazing Slope (degrees)	Height above Walking Surface – H (ft)	Glass Thickness - t (in)
n/a	≤ 30°	≤ 10	n/a
≤ 16	n/a	≤ 12	≤ 3/16
Examples			
any	30°	10	any
any	45°	10	any
any	30°	11	any
16	any	12	3/16
16	any	13	3/16
16	any	12	1/4

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is for clarification and consistency between codes only. There are no technical changes.

RB85-22

RB86-22

IRC: R309.4

Proponents: Mike Fischer, representing International Door Association (mfischer@kellencompany.com)

2021 International Residential Code

Revise as follows:

R309.4 Automatic garage door openers. Automatic garage door openers, if provided, shall be *listed* and *labeled* in accordance with UL 325, <u>and shall be installed in accordance with UL 325 and the manufacturer’s installation instructions</u>.

Reason Statement: Garage door openers are required to comply with UL 325. Typical residential garage door openers include devices such as photoelectric sensors, wall-mounted controls, and release mechanisms. It is important that the installer follow the manufacturers instructions and the requirements of UL 325. DASMA publishes a series of technical data sheets covering a variety of topics related to garage door opener safety and compliance to UL 325.
One example included in the DASMA TDS 364 is the following: "to reduce the risk of severe injury or death, it is essential that photoelectric sensors be installed properly according to manufacturer's instructions."

IDA supports the proper installation of garage doors and automatic openers to help ensure that appropriate safety standards are met. This proposal will help improve compliance and safety of installed products.

Bibliography: DASMA TDS 364: Installation Location of Photoelectric Sensors on Residential Garage Doors
https://www.dasma.com/wp-content/uploads/2021/12/TDS364.pdf

DASMA TDS 369: Frequently Asked Questions Regarding Automated Residential Garage Door Systems

https://www.dasma.com/wp-content/uploads/pubs/TechDataSheets/OperatorElectronics/TDS369.pdf

DASMA TDS 167: Residential Sectional Garage Door and Electric Operator Checklist for Home Inspectors and Consumers

https://www.dasma.com/wp-content/uploads/2021/06/TDS167.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proper installation of garage door openers is part of the requirements to meet listings and labels. The proposal does not add additional requirements but clarifies the intent of the code and referenced standards.

RB86-22

RB87-22

IRC: 309.6 (New), 309.6.1 (New), 309.6.2 (New), ALI (New)

Proponents: Dale Soos, representing Automotive Lift Institute, Inc. (ALI) (dale@autolift.org); RW Bob O'Gorman, representing Automotive Lift Institute (ALI) (bob@autolift.org)

2021 International Residential Code

Add new text as follows:

309.6 Automotive Lifts. Where provided, automotive lifts shall comply with ANSI/ALI ALCTV and Sections 309.6.1 and 309.6.2.

309.6.1 Installation. Automotive lifts shall be installed in accordance with ANSI/ALI ALIS, the lift manufacturer's installation instructions, and listing and labeling requirements. Consideration shall be given to the foundation where an automotive lift will be affixed, to ensure it will support the weight and structural reactions of an installed automotive lift. Automotive lifts shall not be installed within the habitable space of a dwelling unit.

309.6.2 Electrical Installation. Automotive lifts shall be installed in accordance with NFPA 70, and shall be *listed* and *labeled* to UL 201 and other standards as determined by the listing agency when evaluated to the requirements of ANSI/ALI ALCTV.

Add new standard(s) as follows:

ALI

Automotive Lift Institute, Inc.
P. O. Box 85
Cortland, NY 13045

ALI ALCTV-2017. Standard for Automotive Lifts-Safety Requirements for Construction, Testing and Validation (ANSI)

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, ALI ALCTV-2017 Standard for Automotive Lifts - Safety Requirements for Construction, Testing and Validation (ANSI), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: The reason for adding this new section to the IRC is to close the loophole where uncertified products with a real threat to life-safety are being installed in the residence and bypassing all safety requirements and to make sure that automotive lift products are safe. Uncertified automotive lift products are available to the homeowner, who assumes that all products on the marketplace must be tested and certified to meet applicable product standards. This is not the case for automotive lift products. Retailers are often not aware they are marketing uncertified products. They are being dumped on the marketplace and the unsuspecting homeowner purchases these, to his detriment. By including already a requirement in the *International Building Code*, the homeowner can have a product which is backed by a valid certification such as those available in the workplace.

Other life-safety devices such as furnaces, boilers, water heaters, A/C units & heat pumps and more mundane products such as fans, water heaters, computers, televisions, luminaires, home appliances, etc. now carry product safety listings. The ANSI/ALI ALCTV automotive lift standard does not have separate performance criteria to establish or define commercial, industrial or homeowner categories .
Chapter 30 of the *International Building Code* specifies in both Section & Table 3001.3 the ANSI/ALI ALCTV standard is used for the design, construction, installation, alteration, repair and maintenance of these automotive lifting products. This entry is an attempt to harmonize the *International Building Code* and the *International Residential Code* for these products.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Other industries have discovered that, by making mandatory certification of products a requirement, there has been little to no increase in the overall cost to the consumer by increasing manufacturing efficiencies and having a defined standard to work toward. There are currently 21 reputable manufacturer's producing automotive lifts for the marketplace, both commercial and residential. Any impact created by inclusion of these requirements will be to those importers that are skirting North America's safety standards.

RB87-22

RB88-22

IRC: R309.6 (New), UL Chapter 44 (New)

Proponents: Larry Sherwood, representing Solar Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Add new text as follows:

R309.6 Electric vehicle charging stations and systems. Where provided, electric vehicle charging systems shall be installed in accordance with NFPA 70. Electric vehicle charging system equipment shall be listed and labeled in accordance with UL 2202. Electric vehicle supply equipment shall be listed and labeled in accordance with UL 2594.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

2202—2009	Electric Vehicle (EV) Charging System Equipment—with Revisions through February 2018
2594—2016	Electric Vehicle Supply Equipment

Staff Analysis: UL 2202-2009 Electric Vehicle Charging System Equipment - with revisions through February 2018 and UL 2594-2016 Electric Vehicle Supply Equipment are already referenced in the IBC. These are simply new occurrences of the references in the I-Codes

Reason Statement: Electric vehicles are rapidly becoming more common. This proposal is in alignment with the requirements in both the 2018 and 2021 IBC for motor vehicle-related occupancies (IBC Section 406.2.7), which includes private garages. These requirements on how to install these systems should also be in the IRC, for those installations where these systems are provided.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

BCAC REASON: Electric vehicles are rapidly becoming more common. This proposal is in alignment with the requirements in both the 2018 and 2021 IBC for motor vehicle-related occupancies (IBC Section 406.2.7), which includes private garages. These requirements on how to install these systems should also be in the IRC, for those installations where these systems are provided.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Bibliography: Reference:
IBC 406.2.7 Electric vehicle charging stations and systems. Where provided, electric vehicle charging systems shall be installed in accordance with NFPA 70. Electric vehicle charging system equipment shall be listed and labeled in accordance with UL 2202. Electric vehicle supply equipment shall be listed and labeled in accordance with UL 2594. Accessibility to electric vehicle charging stations shall be provided in accordance with Section 1108.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal aligns with the requirements in the IBC. These systems are not mandated to be installed, but if they are, the installation should be done properly.

BCAC Cost Impact: This proposal aligns with the requirements in the IBC. These systems are not mandated to be installed, but if they are, the installation should be done properly.

RB89-22

IRC: SECTION R310.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

SECTION R310 EMERGENCY ESCAPE AND RESCUE OPENINGS

Revise as follows:

R310.1 Emergency escape and rescue opening required. *Basements, habitable attics* and every sleeping room shall have not less than one operable *emergency escape and rescue opening*. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room. *Emergency escape and rescue openings* shall open directly into a *public way*, or to a *yard* or court ~~having a minimum width of 36 inches (914 mm)~~ that opens to a *public way*.

Exceptions:

1. *Storm shelters* and *basements* used only to house mechanical *equipment* not exceeding a total floor area of 200 square feet (18.58 m^2).
2. Where the *dwelling unit* or *townhouse unit* is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   2.1. One means of egress complying with Section R311 and one *emergency escape and rescue opening*.

   2.2. Two means of egress complying with Section R311.
3. A *yard* shall not be required to open directly into a *public way* where the *yard* opens to an unobstructed path from the *yard* to the *public way*. Such path shall have a width of not less than 36 inches (914 mm).

Reason Statement: The intent is to remove redundant language Code change RB86-19 AM added a 36” wide route to the public way to the main text, and RB87-19 AS added exception 3 which is intended to also require a 36” wide route to the public way. The exception addresses a specific concern, so the 36” requirement is not needed in the main paragraph.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are not changes to construction requirements for the route from the EERO to the public way. These are clarifications only by a removal of duplicate language.

RB89-22

RB90-22

IRC: R310.1

Proponents: Quyen Thai, representing Washington Association of Building Officials Technical Code Committee (qthai76@gmail.com); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Revise as follows:

R310.1 Emergency escape and rescue opening required. *Basements, habitable attics* and every sleeping room shall have not less than one operable *emergency escape and rescue opening*. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room. *Emergency escape and rescue openings* shall open directly into a *public way*, or to a *yard* or court having a minimum width of 36 inches (914 mm) and provides an unobstructed path of egress travel that opens to a *public way*. Such an unobstructed path of egress travel shall have a minimum clear width of 3-feet and a minimum height of 7-feet.

Exceptions:

1. *Storm shelters* and *basements* used only to house mechanical *equipment* not exceeding a total floor area of 200 square feet (18.58 m^2).
2. Where the *dwelling unit* or *townhouse unit* is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   2.1. One means of egress complying with Section R311 and one *emergency escape and rescue opening*.

   2.2. Two means of egress complying with Section R311.
3. A *yard* shall not be required to open directly into a *public way* where the *yard* opens to an unobstructed path from the *yard* to the *public way*. Such path shall have a width of not less than 36 inches (914 mm).
4. Gates with operational constraints and opening control devices without the use of keys, tools or special knowledge.
5. Window wells equipped with a cover complying with Section R310.4.4.

Reason Statement: It is recognized that as development density increases, site yards are being utilized for a variety of purposes, including landscaping and amenity requirements, on-site drainage retention, and mechanical installations. In addition to topographic constraints, these installations may become barriers for EERO use, preventing occupants from self-evacuating to the public way or access by emergency personnel. Section R310.1 is silent on what constitutes an acceptable path from an EERO to the public way which leads to inconsistency in what is permitted within these yards and courts.
This proposal clarifies that an unobstructed path is required to have minimum physical dimensions for safe and timely occupant self-evacuation and emergency rescue personnel access. These 36-inch x 7-ft dimensions align with the requirements for egress courts under the International Building Code and the minimum height accounts for cantilever and projection conditions common in residential construction. In addition, Exceptions 4 & 5 allow for flexibility by permitting common gate and window well features within the unobstructed path with conditions that ensure timely evacuation and access along the path.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies what is unobstructed and not obstructed and does not create any construction requirements to a project.

RB90-22

RB91-22

IRC: R310.1, R310.1.1 (New), R310.1.1

Proponents: Jenifer Gilliland, representing Seattle Department of Construction and Inspections (jenifer.gilliland@seattle.gov); Richard Pellinger, representing Seattle Department of Construction and Inspections (richard.pellinger@seattle.gov)

2021 International Residential Code

Revise as follows:

R310.1 Emergency escape and rescue opening required. *Basements, habitable attics* and every sleeping room shall have not less than one operable *emergency escape and rescue opening*. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room. ~~*Emergency escape and rescue openings* shall open directly into a *public way*, or to a *yard* or court having a minimum width of 36 inches (914 mm) that opens to a *public way*.~~

Exceptions:

1. *Storm shelters* and *basements* used only to house mechanical *equipment* not exceeding a total floor area of 200 square feet (18.58 m^2).
2. Where the *dwelling unit* or *townhouse unit* is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   2.1. One means of egress complying with Section R311 and one *emergency escape and rescue opening*.

   2.2. Two means of egress complying with Section R311.

3. ~~A *yard* shall not be required to open directly into a *public way* where the *yard* opens to an unobstructed path from the *yard* to the *public way*. Such path shall have a width of not less than 36 inches (914 mm).~~

Add new text as follows:

<u>**R310.1.1** **Access.** *Emergency escape and rescue openings* shall open directly into a *public way*, or to a *yard* or court that provides an unobstructed path with a minimum width of 36 inches (914 mm) that opens to a *public way*. The following are permitted within the unobstructed path:</u>

1. <u>Gates readily operable without the use of a key or special knowledge or effort.</u>
2. <u>Window wells equipped with a cover complying with Section R310.4.4.</u>

Revise as follows:

~~**R310.1.1**~~ <u>**R310.1.2**</u> **Operational constraints and opening control devices.** *Emergency escape and rescue openings* shall be operational from the inside of the room without the use of keys, tools or special knowledge. Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as a required *emergency escape and rescue opening* and shall be not more than 70 inches (178 cm) above the finished floor.

Reason Statement: For clarity, this proposal separates the provisions and exceptions for where Emergency Escape and Rescue Openings (EERO) are required under Section R310.1 from the access/evacuation path conditions under new Section R310.1.1. In addition, Exception #3 has been removed as it is now covered under Section R310.1.1. This proposal also provides for flexibility by identifying which objects are permitted within the unobstructed path.
Currently, Section R310.1 is silent on what constitutes an acceptable path from an EERO to the public way, which leads to inconsistency in the application of this code section. As development density increases, yards are used to satisfy a variety of landscaping, amenity, on-site drainage retention, and mechanical requirements. In addition to topographic features, these objects and physical features can prevent occupants from self-evacuating or impede access to the EERO by fire service personnel.

This proposal limits obstructions to gates and window wells with conditions. It is reasonable to permit a gate, typically associated with privacy fencing, to be located within the unobstructed path. The associated conditions ensure that the gate allows for free passage and does not impede occupants self-evacuating to the public way or access by emergency personnel. In addition, window wells are commonly located within narrow side yards which can encroach into the required 36-inch wide path. The requirement that the cover complies with Section R310.4.4 eliminates any fall/tripping hazard, removes the potential hazard of a window well within the path of EEROs to the ROW, and ensures the continuity of the evacuation/access path.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal clarifies what is permitted in the unobstructed path and does not create any additional construction requirements for a project.

RB92-22

IRC: R310.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

CHAPTER 3
BUILDING PLANNING

SECTION R310
EMERGENCY ESCAPE AND RESCUE OPENINGS

Revise as follows:

R310.1 Emergency escape and rescue opening required. *Basements, habitable attics* and every sleeping room shall have not less than one operable *emergency escape and rescue opening*. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room. *Emergency escape and rescue openings* shall open directly into a *public way*, or to a *yard* or court having a minimum width of 36 inches (914 mm) that opens to a *public way*.

Exceptions:

1. ~~*Storm shelters* and *basements*~~ *Basements* used only to house mechanical *equipment* not exceeding a total floor area of 200 square feet (18.58 m^2).
2. Storm shelters constructed in accordance with ICC 500.
~~2.~~ 3. Where the *dwelling unit* or *townhouse unit* is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

    ~~2.1.~~ 3.1. One means of egress complying with Section R311 and one *emergency escape and rescue opening*.

    ~~2.2.~~ 3.2. Two means of egress complying with Section R311.

~~3.~~ 4. A *yard* shall not be required to open directly into a *public way* where the *yard* opens to an unobstructed path from the *yard* to the *public way*. Such path shall have a width of not less than 36 inches (914 mm).

Reason Statement: The intent of this proposal is to eliminate a possible mis-interpretation. The 200 sq.ft. limit is meant to be only for basements used to house mechanical equipment. The EERO should not be installed in any size residential shelter because the additional opening is a reduction in safety for the occupants in the storm shelter during a tornado. Residential shelters have specific criteria in ICC 500.
This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no changes to construction requirements. These are clarifications only for storm shelters.

RB92-22

RB93-22

IRC: R310.1.1, R310.4.4, R311.2

Proponents: Glenn Mathewson, representing Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R310.1.1 Operational constraints and opening control devices. *Emergency escape and rescue openings* shall be operational from the inside of the room without the use of a key, tool, ~~keys, tools or~~ special knowledge, or effort. Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as a required *emergency escape and rescue opening* and shall be not more than 70 inches (178 cm) above the finished floor.

R310.4.4 Bars, grilles, covers and screens. Where bars, grilles, covers, screens or similar devices are placed over *emergency escape and rescue openings*, bulkhead enclosures or area wells that serve such openings, the minimum net clear opening size shall comply with Sections R310.2 through R310.2.2 and R310.4.1. Such devices shall be releasable or removable from the inside without the use of a key , tool, special knowledge or effort. ~~or tool or force greater than that required for the normal operation of the escape and rescue opening.~~

R311.2 Egress door. Not less than one egress door shall be provided for each *dwelling* unit. The egress door shall be side-hinged, and shall provide a clear width of not less than 32 inches (813 mm) where measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The clear height of the door opening shall be not less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the *dwelling* without the use of a key , tool, ~~or~~ special knowledge or effort.

Reason Statement: The operational constraints of these three features need to be functional to one person. I presume this person's cognitive ability to operate these three features as described is not as varied as the requirements in these three sections.
The door can require a tool, but not effort. The EERO can't require special knowledge, but can require unlimited effort. The area well cover can require special knowledge but it can't require force. Well it can, but not more than the force to open the window... which is unlimited... What if I get a new window that opens easier? Now I have to get a new lighter cover?

In this proposal, no expectations of this occupant to free themselves from a building have been altered. The capabilities of the human are the same. The only terms proposed for modification are terms already used. I expect some may have small opposition to certain words in certain sections, but those words are capabilities that we already expect or don't expect of the occupant.

My motivation for this proposal was from developing and teaching a course specific to sections 310 and 311 where the complete intent of each section is discussed. I was unable to explain the rationale behind these three sections without leaving the student rolling their eyes and distrusting the inconsistency and seemingly arbitrary requirements. I was also quite surprised when "special knowledge" was removed from covers in 2021.

No effort, tools, keys or special knowledge to get you out of the house. Easy. Reliable. Understandable.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Nothing in this proposal changes minimum code in a manner that would require the purchase or increase of cost of a construction product or required installation.

RB93-22

RB94-22

IRC: R310.2, R310.2.5 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

R310.2 Emergency escape and rescue openings. *Emergency escape and rescue openings* shall have minimum dimensions in accordance with Sections R310.2.1 through R310.2.5 ~~R310.2.4~~.

R310.2.1 Minimum size. Emergency escape and rescue openings shall have a net clear opening of not less than 5.7 square feet (0.530 m^2).

Exception: The minimum net clear opening for *grade-floor emergency escape and rescue openings* shall be 5 square feet (0.465 m^2).

R310.2.2 Minimum dimensions. The minimum net clear opening height dimension shall be 24 inches (610 mm). The minimum net clear opening width dimension shall be 20 inches (508 mm). The net clear opening dimensions shall be the result of normal operation of the opening.

R310.2.3 Maximum height from floor. Emergency escape and rescue openings shall have the bottom of the clear opening not greater than 44 inches (1118 mm) above the floor.

R310.2.4 Emergency escape and rescue openings under decks, porches and cantilevers. *Emergency escape and rescue openings* installed under decks, porches and cantilevers shall be fully openable and provide a path not less than 36 inches (914 mm) in height and 36 inches (914 mm) in width to a *yard* or court.

Add new text as follows:

R310.2.5 Emergency escape and rescue openings to a carport.. *Emergency escape and rescue openings* discharging to a carport shall be fully openable and provide an unobstructed path not less than 80 inches (2032 mm) in height and 36 inches (914 mm) in width to a yard or court.

Reason Statement: The ICC Building Code Action Committee reviewed the existing code language pertaining to the possible location of an Emergency Escape and Rescue Opening (EERO) to a balcony, porch, under a carport, or to a similar location. There is a separate code change for balconies and porches.
The purpose of an EERO is to facilitate two (2) actions in the event of an emergency, the first is to provide a viable path for a building occupant out to a public way, and the second is for a first responder such as a firefighter in full garb to enter the building for rescue efforts.

As presently codified, there is question whether a carport constitutes an interior or exterior space, and by extension whether an EERO can legally discharge thereto. Carports are effectively defined in Section R309 as “open on not less than two sides” and with “floor surfaces of… approved noncombustible material,” those with additional enclosure being considered a garage. It is the opinion of the ICC BCAC that a carport is an exterior space benefiting from open-air conditions and access to a public way, and therefore provides a suitable location for an EERO.

One specific hazardous condition was identified with an EERO below a carport; the possibility of a parked vehicle obstructing either the EERO or the path to a yard or court. The word “unobstructed” is added as a qualifier to describe the exterior path of egress travel. Accordingly, the planning for an EERO below a carport will require planning that accommodates the practical egress concerns with the sheltering of a vehicle; the maintenance of this condition in perpetuity being the responsibility of the building Owner.

The 36 inches (914 mm) width is consistent with previous parts of the Section.

The 80 inches (2032 mm) height along the path of travel is in accordance with the minimum ceiling height permitted for a non-habitable room per Section R305.1 or a habitable space created in existing basements per Appendix J (AJ110.4). It is also very unlikely that a carport would be provided with less ceiling height.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will increase the cost of construction
This proposal will incidentally increase the cost of construction as a result of the likely increased clear floor area required for an egress path that otherwise served only as a parking area. Dwelling units will still be required to provide an EERO in the same locations, and to the same overall dimension, but now there is clarity that a carport is a viable location.

RB95-22

IRC: R310.2, R310.2.4, R310.2.5 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

R310.2 Emergency escape and rescue openings. *Emergency escape and rescue openings* shall have minimum dimensions in accordance with Sections R310.2.1 through ~~R310.2.4~~ R310.2.5.

R310.2.1 Minimum size. Emergency escape and rescue openings shall have a net clear opening of not less than 5.7 square feet (0.530 m^2).

Exception: The minimum net clear opening for *grade-floor emergency escape and rescue openings* shall be 5 square feet (0.465 m^2).

R310.2.2 Minimum dimensions. The minimum net clear opening height dimension shall be 24 inches (610 mm). The minimum net clear opening width dimension shall be 20 inches (508 mm). The net clear opening dimensions shall be the result of normal operation of the opening.

R310.2.3 Maximum height from floor. Emergency escape and rescue openings shall have the bottom of the clear opening not greater than 44 inches (1118 mm) above the floor.

Revise as follows:

R310.2.4 Emergency escape and rescue openings under decks, and porches ~~and cantilevers~~. *Emergency escape and rescue openings* installed under decks, and porches ~~and cantilevers~~ shall be fully openable and provide a path not less than 80 inches (2032 mm) ~~36 inches (914 mm)~~ in height and 36 inches (914 mm) in width to a *yard* or court.

Add new text as follows:

R310.2.5 Emergency escape and rescue openings below cantilevers. Emergency escape and rescue openings installed below cantilevers and similar projections not exceeding 36 inches (914 mm) in depth shall be fully openable and provide a path not less than 36 inches (914 mm) in height and 36 inches (914 mm) in width to a yard or court. Emergency escape and rescue openings installed below cantilevers and similar projections measuring 36 inches (914 mm) or more in depth shall be fully openable and provide a path not less than 80 inches (2032 mm) in height and 36 inches (914 mm) in width to a yard or court.

Reason Statement: The ICC Building Code Action Committee reviewed the existing code language pertaining to the possible location of an Emergency Escape and Rescue Opening (EERO) to a balcony, porch, under a carport, or to a similar location. There is a separate change to address carports.

The purpose of an EERO is to facilitate two (2) actions in the event of an emergency, the first is to provide a viable path for a building occupant out to a public way, and the second is for a first responder such as a firefighter in full garb to enter the building for rescue efforts. As presently codified, the height requirements applicable to an EERO under a deck, porch or cantilever pose credible threats to both aforementioned parties.

1. Depending on the field conditions, an EERO located beneath or below a building / structure could easily be concealed from the view of a first responder.

1. Consider a scenario where the first floor of a dwelling is 42” above grade, and there is an enclosed porch to the front and a wood deck to the rear. It is plausible that a 36” high and wide path could be provided underneath these structures, but it is questionable whether a first responder could readily identify said EERO; if a skirting material was provided it would be nearly impossible.

1. An EERO to / from a subgrade location necessitates a presumed level of occupant mobility, and this difficulty in maneuvering is exacerbated within a confined space.

1. This also necessitates an additional property maintenance burden on the owner to ensure that concealed spaces serving as part of an egress pathway are free of obstructions at all times; a condition that is likely only to be discovered as non-compliant in the event of a tragic loss of life or injury.

1. An EERO to a confined exterior space poses secondary challenges regarding air circulation, and increases the risk of incidental self-harm (such as hitting one’s head). A person with compromised faculties in a perilous situation is less likely to maintain the necessary level of self-preservation if their evacuation pathway is effectively an obstacle course.

1. A first-responder should be able to approach a situation without volunteering additional risk of personal harm. In the same sense as fire services tending to avoid driving / parking emergency vehicles under building cantilevers, porte-cochère, etc. for fear of potential structural compromise, an individual should be presented a reasonably safe path at the dwelling without concern of portions of the building collapsing above.

There are scenarios wherein an EERO could safely be provided below another structure. For example, an EERO below a second-story deck, balcony, or sunroom would not be concealed from view, nor would someone going in / out need to navigate a confined space.

The proposed increase to an 80-inch (2032 mm) recommended height along the path of travel is in accordance with the minimum ceiling height permitted for a non-habitable room per Section R305.1 or a habitable space created in existing basements per Appendix J (AJ110.4).

The existing 36-inch (914 mm) height is maintained to accommodate shallower projections such as a balcony or bay window, where there is a reasonable expectation that the EERO is visible to a first responder, said first responder can effectively maneuver to gain access to the EERO, and an occupant exiting the EERO will rapidly find themselves in an open-air exterior environment. Less common deeper projections held to the higher height established in R310.2.4.

A building may still be provided with a window or crawlspace access opening below a deck, porch, or similar structure; however, it would not qualify as an EERO unless the above-mentioned criteria are provided.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Dwelling units will still be required to provide an EERO in the same locations, and to the same overall dimension. The clarification of the language is to provide a safer path of egress travel for all parties as experienced outside of the building enclosure.

RB95-22

RB96-22

IRC: R310.2.3 (New), R310.2.3

Proponents: Shane Nilles, representing Self (snilles@cityofcheney.org)

2021 International Residential Code

Add new text as follows:

R310.2.3 Landing required. There shall be a floor or landing at the interior side of the emergency escape and rescue opening. The width of the landing shall be no less than the width of the clear opening. The depth of the landing perpendicular to the opening shall be not less than 36 inches (914 mm).

Revise as follows:

~~**R310.2.3**~~ **R310.2.4 Maximum height from floor.** Emergency escape and rescue openings shall have the bottom of the clear opening not greater than 44 inches (1118 mm) above the floor or landing.

Reason Statement: The code currently only makes reference to a floor as where the height of an EERO must be measured to, but does not clarify how much area of floor there must be. So it is unclear if there can simply be a small step that the opening is measured to, or an area of floor that is restricted on one or more sides by a wall or other obstruction. This proposal adds the requirement that there must be a landing on the interior side of the EERO and provides minimum dimensions for the landing. This will clarify for code users what is permissible on the interior side of the EERO and prevent greater variety in interpretation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It is not clear whether the proposal will increase or decrease the cost of construction. It is possible that there may be some scenarios where a building may have been constructed with less area at the interior side of an EERO than the proposal will require, though it is unlikely, in such scenario the proposal increases the cost of construction by requiring additional floor area. In scenarios where a window may have been built too high, or in more common cases where the an existing building is undergoing renovations where the EERO may not be able to meet the height requirement easily due to a roof on the exterior side, this will give the option to provide a landing that is raised above the adjacent floor instead of altering the roof structure, which would reduce the cost of construction.

RB96-22

RB97-22

IRC: R310.4.3, R405.3 (New)

Proponents: Joseph Summers, representing ICC Region VI (summersj@cityofgroton-ct.gov)

2021 International Residential Code

Revise as follows:

R310.4.3 Drainage. Area wells shall be designed for proper drainage~~ by connecting to the building’s foundation drainage system required by Section R405.1~~.

> **Exception:** A drainage system for area wells is not required where the foundation is on well-drained soil or sand-gravel mixture soils in accordance with the United Soil Classification System, Group I Soils, as detailed in Table R405.1.

Add new text as follows:

R405.3 Above Grade Drainage. Above grade drainage systems, including but not limited to, gutters and downspouts, roof drains, area wells and yard drains, shall not be connected to the foundation drainage system.

Reason Statement: Foundation drainage systems are intended to divert ground water away from below grade spaces. Connecting area wells, yard drains and gutters to a foundation drainage system will overload the system and cause water migration into below grade spaces.

Cost Impact: The code change proposal will increase the cost of construction
The increase cost would the installation of additional drainage piping, which can be installed in the same trench as the foundation drainage pipe.

RB97-22

RB98-22

IRC: R310.5

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

R310.5 Replacement windows for emergency escape and rescue openings. Replacement windows installed in buildings meeting the scope of this code shall be exempt from Sections R310.2 and R310.4.4, provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window ~~is~~ shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. Thereplacement window is not part of a change of occupancy.

Reason Statement: The change to shall be permitted is for two reasons:
1)Consistency with IEBC 505.3, 702.5.1 and IRC R310.7.1 and Appendix J AJ102.4.3.1

2) Allows for the largest window with or without a change in the style of the window.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This increases options for the designer for replacement windows.

RB98-22

RB99-22

IRC: R310.5.1 (New), AJ102.4.3, AJ102.4.3.1

Proponents: Ardel Jala, representing Seattle Department of Construction & Inspections (ardel.jala@seattle.gov); Micah Chappell, representing Seattle Department of Construction & Inspections (micah.chappell@seattle.gov)

2021 International Residential Code

R310.5 Replacement windows for emergency escape and rescue openings. Replacement windows installed in buildings meeting the scope of this code shall be exempt from Sections R310.2 and R310.4.4, provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window is of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. The replacement window is not part of a change of occupancy.

Add new text as follows:

<u>**R310.5.1**</u> <u>**Window opening control device and fall protection device height.**</u> <u>Window opening control devices or fall protection device shall be located at a height in accordance with Section R310.1.1 or at as low a height as the device can be installed within the existing clear opening.</u>

Delete without substitution:

~~**AJ102.4.3 Replacement windows for emergency escape and rescue openings.** Where windows are required to provide emergency escape and rescue openings, replacement windows shall be exempt from Sections R310.2 and R310.4.4 provided that the replacement window meets the following conditions:~~

1. ~~The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.~~
2. ~~Where the replacement window is not part of a change of occupancy.~~

~~Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as required emergency escape and rescue openings.~~

~~**AJ102.4.3.1 Control devices.** Emergency escape and rescue openings with window opening control devices or fall prevention devices complying with ASTM F2090, after operation to release the control device allowing the window to fully open, shall not reduce the net clear opening area of the window unit. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.~~

Reason Statement: This is one of (4) proposals that pulls existing "breaks" found in Appendix J for Existing Buildings into the main body of the code. Each proposal permits flexibility from meeting full code compliance for existing construction while maintaining a reasonable level of safety. Appendix J section AJ102.4.3 and section R310.5 both provide a break on full compliance for replacement windows for emergency escape and rescue openings. This proposal provides flexibility for the vertical height of the window opening control devices and fall protection devices in existing construction. This proposal deletes Appendix J section AJ102.4.3 which is already covered in sections R310.5 and R310.1.1.

The maximum height to the bottom of the clear opening, i.e. the sill height, of an emergency escape and rescue opening is 44" per section R310.2.3. Under limited conditions, section R310.5 permits replacement windows to re-use the existing frame or existing rough opening and waives the requirements of section R310.2 including the maximum height from floor requirement of section R310.2.3.
The maximum height of window opening control devices and fall prevention devices for emergency escape and rescue openings is 70 inches above the finished floor per section R310.1.1. However since replacement windows for emergency escape and rescue openings have no maximum sill height requirement, the existing sill height could be located at a height 70 inches above the finished floor or higher.

This proposal adds a new section R310.5.1 that permits window opening control devices and fall prevention devices for replacement windows in emergency escape and rescue openings to be installed at the lowest height that the device can be installed within the clear opening when the bottom of the clear opening is higher than 70 inches and cannot be installed at the maximum height of 70 inches above the finished floor as per section R310.1.1. The proposal aligns the required window opening control device or fall prevention device height for a replacement window with the break given to replacement windows on maximum sill height.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the height the window control device or fall prevention device may be installed under certain conditions. It does not change the technical requirements for when a control window device is required so there is no cost impact.

RB99-22

RB100-22

IRC: R311.3.2, R311.7.6

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

R311.3 Floors and landings at exterior doors. There shall be a landing or floor on each side of each exterior door. The width of each landing shall be not less than the door served. Landings shall have a dimension of not less than 36 inches (914 mm) measured in the direction of travel. The slope at exterior landings shall not exceed $^1/_4$ unit vertical in 12 units horizontal (2 percent).

> **Exception:** Exterior balconies less than 60 square feet (5.6 m^2) and only *accessed* from a door are permitted to have a landing that is less than 36 inches (914 mm) measured in the direction of travel.

R311.3.1 Floor elevations at the required egress doors. Landings or finished floors at the required egress door shall be not more than $1^1/_2$ inches (38 mm) lower than the top of the threshold.

> **Exception:** The landing or floor on the exterior side shall be not more than $7^3/_4$ inches (196 mm) below the top of the threshold provided that the door does not swing over the landing or floor.

Where exterior landings or floors serving the required egress door are not at *grade*, they shall be provided with access to *grade* by means of a *ramp* in accordance with Section R311.8 or a *stairway* in accordance with Section R311.7.

Revise as follows:

R311.3.2 Floor elevations at other exterior doors. <u>At exterior</u> ~~Doors~~ <u>doors</u> other than the required egress door<u>, the exterior side</u> shall be provided with landings or floors not more than $7^3/_4$ inches (196 mm) below the top of the threshold.

> **Exception:** ~~A top~~ <u>An exterior</u> landing <u>or floor</u> is not required <u>at the exterior doorway</u> where a *stairway* of not more than two *risers* is located on the exterior side of the door, provided that the door does not swing over the *stairway*.

R311.3.3 Storm and screen doors. Storm and screen doors shall be permitted to swing over exterior stairs and landings.

Revise as follows:

R311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each *stairway*. The width perpendicular to the direction of travel shall be not less than the width of the flight served. For landings of shapes other than square or rectangular, the depth at the walk line and the total area shall be not less than that of a quarter circle with a radius equal to the required landing width. Where the *stairway* has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).

> ~~**Exception**~~ <u>Exceptions</u>**:**
>
> <u>1.</u> A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided that a door does not swing over the stairs.
>
> <u>2. At an enclosed garage, the top landing at the stair shall be permitted to be not more than 7 3/4 inches (196 mm) below the top of the threshold.</u>
>
> <u>3. At exterior doors, a top landing is not required for an exterior stairway of not more than two risers, provided that the door does not swing over the stairway.</u>

R311.7.8 Handrails. *Handrails* shall be provided on not less than one side of each flight of stairs with four or more *risers*.

Reason Statement: This proposal started as question – Can the landing or steps into a garage be the same as permitted for exterior doors or not?

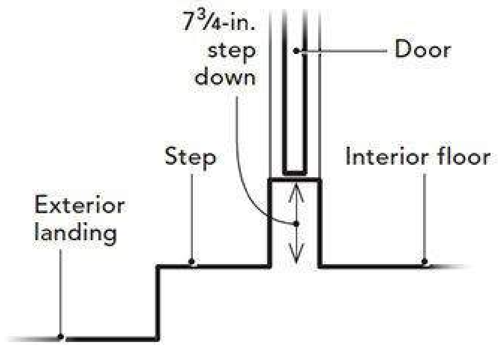
The following are current requirements - There is a requirement for landings at exterior doors (R311.3) and a requirement for landings at the top and bottom of stairways (R311.7.6). The required egress door has to open directly into a public way, yard or court (R311.1), so it has to be an exterior door. Egress is not permitted through a garage (R311.1).

Interior doors not have requirements for landings, so going out to a single step or multiple steps would be covered by the stairway landing requirement in Section R311.7.6. The current exception clarifies that steps into a garage are considered interior stairways.

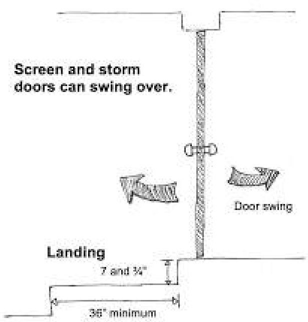
The modifications –

R311.3.2 – This is a requirement for a landing or floor at both sides of an exterior doorway. This section has 'exterior' in the title, and is a subsection of 'exterior doors', but does not have 'exterior' in the text. Since titles are not part of the text, this could be read as all door, or it could be read to allow a 7-3/4" drop between the floor and the threshold on both sides of the door. The modification to the body of the text would limit this to exterior doors and the exterior side for the step down. The current exception is for a stairway landing, not a door landing, so this needs to be more specific to door landings to match the requirement in the main paragraph. “Floor” is added to address balconies and decks.

This is what is permitted with current text for exterior doors other than the means of egress doorway. While perhaps there should be a threshold limit (not proposed here), the current allowances is a serious tripping hazard.

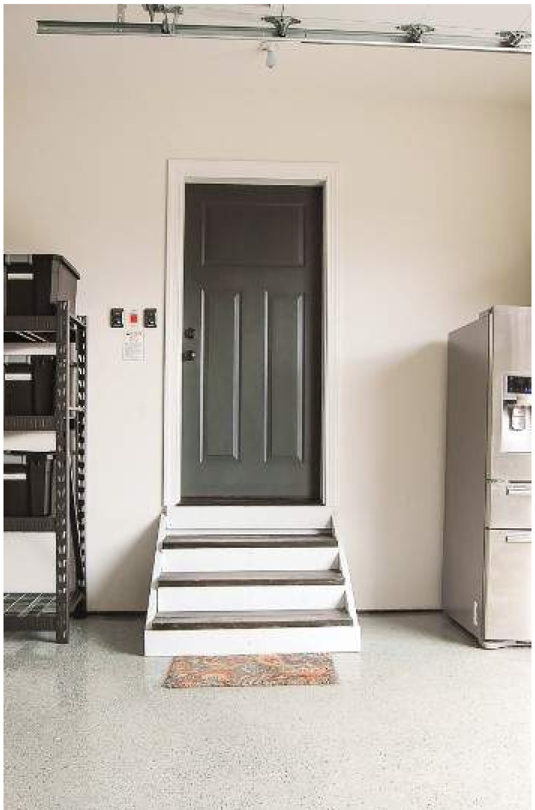


Was this not the intended allowance?



R311.7.6 – This is the section for stairway landings. Interior doors do not have a doorway landing requirement in the IRC. The new exception #2 allows for a garage access door to swing out over a landing that is a step down, similar to an exterior door. The current exception #1 says the door has to swing in. Exception 3 for stairway landings at exterior stairways is added so that R311.3.2 and R311.7.6 are coordinated for landings at exterior doors with steps – literally this is the same landing space, but from two different requirements.

This is an example of the R311.7.6 with the current Exception 1.



This is an example of R311.7.6 new exception 2 – allowing for a step down to a landing or floor in a garage – the door can swing in or out. This is currently permitted for exterior doors (R311.3.2)

This is an example of R311.7.6 new exception 3 – which is equal to the intent of R311.3.2 exception.

This proposal is submitted by the ICC Building Code Action Committee (BCAC)..

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies existing requirements and provides additional design options for door leading into attached garages. This option could improve safety without additional costs.

RB100-22

RB101-22

IRC: R311.4

Proponents: Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov); Gerard Hathaway, representing self (gerard.hathaway@dos.ny.gov); Daniel Carroll, representing New York State Department of State (daniel.carroll@dos.ny.gov)

2021 International Residential Code

Revise as follows:

R311.4 Vertical egress. Egress from basements andhabitable levels ~~including habitable attics and *basements*~~ that are not provided with an egress door in accordance with Section R311.2 shall be by a *ramp* in accordance with Section R311.8 or a *stairway* in accordance with Section R311.7.

Reason Statement: The way this section is worded has provided some confusion in interpretation by the code enforcement community. By placing basements at the end, and including the term habitable attics before it, some have interpreted that the word habitable applies to both attics and basements. As supported by the ICC commentary to this section of code, this is intended to apply to all basements, not just habitable ones. Additionally, by saying habitable levels, habitable attics is already included. Therefore, to make it even cleaner, habitable attics can be removed from the statement. If it is preferred to leave habitable attics in to insure it is included, moving basements to the beginning is still necessary.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is simply a clean up of existing text to increase clarity. It does not change the actual provision based on how the ICC commentary interprets the text.

RB101-22

RB102-22

IRC: R311.7.5.2 (New), R311.7.5.2, R311.7.5.2.1

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2021 International Residential Code

Add new text as follows:

R311.7.5.2 Stair treads. Treads of stairs shall comply with section R311.7.5.2.1 or R311.7.5.2.2.

Revise as follows:

~~**R311.7.5.2**~~ **R311.7.5.2.1** ~~**Treads**~~ **Rectangular treads.** The tread depth shall be not less than 10 inches (254 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm).

~~**R311.7.5.2.1**~~ **R311.7.5.2.2** **Winder treads.** *Winder* treads shall have a tread depth of not less than 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. *Winder* treads shall have a tread depth of not less than 6 inches (152 mm) at any point within the clear width of the *stair*. Within any flight of stairs, the largest *winder* tread depth at the walkline shall not exceed the smallest *winder* tread by more than $^3/_8$ inch (9.5 mm). Consistently shaped *winders* at the walkline shall be allowed within the same flight of stairs as rectangular treads and shall not be required to be within $^3/_8$ inch (9.5 mm) of the rectangular tread depth.

Exception: The tread depth at spiral stairways shall be in accordance with Section R311.7.10.1.

Reason Statement: Rectangular treads are not clearly identified in the code except by reference . Although both Rectangular and Winder are types of stair treads the code currently creates confusion by associating the winder requirements as a subsection of the requirements for rectangular treads.
The tread section title has been changed and a charging statement added to reference a new subsection for rectangular treads as well as the winder tread subsection. The text of the tread section has been moved without change to a new subsection titled "Rectangular treads".
Rectangular treads, and winders are two uniquely different types of stair treads. The term "rectangular treads" is used in the last sentence of the winder requirements to differentiate the two types of treads by their shape and is also used within the definition of flight.

[RB] FLIGHT. A continuous run of ***rectangular treads*** or winders or combination thereof from one landing to another. ***(Emphasis added)***

The code is easier to understand as suggested here. It clearly identifies two separate sections with titles precisely correlated with each of the described requirements. This proposal is editorial in nature and makes no changes to the requirements.
We would appreciate your approval as submitted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial in nature by providing charging language to separate requirements for stairway treads. There are no technical change to the requirements.

RB102-22

RB103-22

IRC: R311.7.5.3

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2021 International Residential Code

Revise as follows:

R311.7.5.3 Nosings. ~~*Nosings* at treads~~ Treads, landings and floors of *stairways* shall have a radius of curvature at the *nosing* not greater than $^{9}/_{16}$ inch (14 mm) or a bevel not greater than $^{1}/_{2}$ inch (12.7 mm). A *nosing* projection not less than $^{3}/_{4}$ inch (19 mm) and not more than $1^{1}/_{4}$ inches (32 mm) shall be provided on *stairways*. The greatest *nosing* projection shall not exceed the smallest *nosing* projection by more than $^{3}/_{8}$ inch (9.5 mm) within a *stairway*.

Exception: A *nosing* projection is not required where the tread depth is not less than 11 inches (279 mm).

Reason Statement: Nosing is a defined term in both the IRC and IBC as: *"The leading edge of treads of stairs and of landings at the top of stairway flights"*. Deleting the confusing redundant use of the term at the beginning of the sentence is editorial and clarifies. Please approve as submitted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is and editorial revision for clarification with no technical changes to the requirements for nosings.

RB103-22

RB104-22

IRC: R311.7.5.3

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R311.7.5.3 Nosings. *Nosings* at treads, landings and floors of *stairways* shall have a radius of curvature at the *nosing* not greater than $^{9}/_{16}$ inch (14 mm) or a bevel not greater than $^{1}/_{2}$ inch (12.7 mm). A *nosing* projection not less than $^{3}/_{4}$ inch (19 mm) and not more than $1^{1}/_{4}$ inches (32 mm) shall be provided on *stairways*. The greatest *nosing* projection shall not exceed the smallest *nosing* projection by more than $^{3}/_{8}$ inch (9.5 mm) within a *flight* of *stairs* ~~*stairway*~~.

Exception: A *nosing* projection is not required where the tread depth is not less than 11 inches (279 mm).

Reason Statement: Both riser height in R311.7.5.1 and tread depth in R311.7.5.2 are only required to be uniform "within any flight of stairs" but nosing projection references "stairway" which would include all the flights in a single stairway. If the riser height and tread depth can change after a landing, so should the nosing projection be permitted to change.
It is not uncommon for a single flight of exterior deck stairs to land on a concrete landing. It is also not uncommon for this landing to have a single tread and two risers down to grade, making it another stair in the stairway. It is common to use an 11 inch concrete tread depth to eliminate a nosing projection. There is no reason that the concrete flight of stairs would need a nosing projection simply because the deck stair flight has them and they share a path in a stairway to reach grade.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal expands the design freedom of stairway construction without reducing safety. In itself, this does not affect the cost of construction.

RB104-22

RB105-22

IRC: R311.7.5.3

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

SECTION R311
MEANS OF EGRESS

Revise as follows:

R311.7.5.3 Nosings. *Nosings* at treads, landings and floors of *stairways* shall have a radius of curvature at the *nosing* not greater than $^9/_{16}$ inch (14 mm) or a bevel not greater than $^1/_2$ inch (12.7 mm). A *nosing* projection not less than $^3/_4$ inch (19 mm) and not more than $1^1/_4$ inches (32 mm) shall be provided on *stairways*. The greatest *nosing* projection shall not exceed the smallest *nosing* projection by more than $^3/_8$ inch (9.5 mm) within a ~~*stairway*~~ *flight* and the landing at the top of the *flight*.

Exception: A *nosing* projection is not required where the tread depth is not less than 11 inches (279 mm).

[RB] FLIGHT. A continuous run of rectangular treads or *winders* or combination thereof from one landing to another.

[RB] NOSING. The leading edge of treads of stairs and of landings at the top of *stairway* flights.

[RB] RISER (STAIR). The vertical component of a step or *stair*.

[RB] STAIR. A change in elevation, consisting of one or more *risers*.

[RB] STAIRWAY. One or more flights of stairs, either interior or exterior, with the necessary landings and connecting platforms to form a continuous and uninterrupted passage from one level to another.

Reason Statement: Both the IRC & the IBC regulate tread depth, *riser* height and *nosing* projection within a *flight* of *stair*s. *Stairways* are made up of multiple *flight*s of *stair*s with landings in between. Each *flight* is allowed to have different *riser* heights and tread depths, however the current language locks in the *nosing* projection to all the *flight*s within the *stairway*, rather than just the *flight*. The reason the current language uses *stairway* over *flight* is that the *nosing* on the top landing needs to be included with the *flight* to make sure the *nosing* projection on both meet the criteria within R311.7.5.3. Because the top landing's *nosing* is not a part of the definition of a *flight*, see definition, the additional text "and the landing at the top of the *flight*" is being added to tie-in the top landing's *nosing* to the *flight* it serves and clarify that the 3/8" maximum between the smallest and largest *nosing* projection includes the top landing for the *flight*.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is not adding or subtracting any technical requirements within the code which will increase or decrease cost.

RB105-22

RB106-22

IRC: R311.7.5.3

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

SECTION R311
MEANS OF EGRESS

Revise as follows:

R311.7.5.3 Nosings. *Nosings* at treads, landings and floors of *stairways* shall have a radius of curvature at the *nosing* not greater than $^9/_{16}$ inch (14 mm) or a bevel not greater than $^1/_2$ inch (12.7 mm). A *nosing* projection not less than $^3/_4$ inch (19 mm) and not more than $1^1/_4$ inches (32 mm) shall be provided on *stairways*. The greatest *nosing* projection shall not exceed the smallest *nosing* projection by more than $^3/_8$ inch (9.5 mm) within a *stairway*.

~~Exception~~ Exceptions:

1. A *nosing* projection is not required where the tread depth is not less than 11 inches (279 mm).
2. Where risers are *open*, the maximum nosing projection shall be permitted to exceed 1 1/4 inches (32 mm).

[RB] FLIGHT. A continuous run of rectangular treads or *winders* or combination thereof from one landing to another.

[RB] NOSING. The leading edge of treads of stairs and of landings at the top of *stairway* flights.

[RB] STAIR. A change in elevation, consisting of one or more *risers*.

[RB] STAIRWAY. One or more flights of stairs, either interior or exterior, with the necessary landings and connecting platforms to form a continuous and uninterrupted passage from one level to another.

Reason Statement: This is the second of 2 code change proposals to allow an exception to the code to exceed the maximum nosing projection limit of 1-1/4" on stair treads when open risers are allowed and installed within a stair flight. The first code change was submitted during the Part A portion of this current code cycle, proposal number E64-21 was approved by the means of egress committee in the spring of 2021, the final action hearing vote in the fall of 2021 and the government members vote in 2021 and is slated to be published in the model 2024 IBC. The code change allows for when open risers are within a stair flight, a user's foot can exceed the end of the tread on ascent. Allowing the tread to be extended further under the tread above, nosing, allows for more tread surface and foot support. This code change will provide uniformity between the IBC and IRC.

Bibliography: Approved Code Change E64-21 for the PART A Means of Egress 2024 Code Cycle

Cost Impact: The code change proposal will decrease the cost of construction
Any cost impact will be through the non-alteration of stock materials by the manufacture and or installer during fabrication and or installation, which would now not be required to be altered.

EX: Stock 12-inch tread, where the location can only accommodate a 10-inch tread depth, the material would not be required to be cut down or altered for the 3/4-inch, to reduce the nosing projection to meet the maximum 1.25-inch current requirement (10” + 1.25” = 11.25”).

RB106-22

RB107-22

IRC: R311.7.6

Proponents: Glenn Mathewson, representing Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each *flight of stairs* ~~*stairway*~~. The width perpendicular to the direction of travel shall be not less than the width of the flight served. For landings of shapes other than square or rectangular, the depth at the walk line and the total area shall be not less than that of a quarter circle with a radius equal to the required landing width. Where the *stairway* has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).

> **Exception.** The top landing of an interior *stairway*, including those in an enclosed garage, shall be permitted to be on the other side of a door located at the top of the *stairway* ~~A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage~~, provided ~~that a~~ the door does not swing over the *stairs*.

Reason Statement: A stairway is defined as all stairs and necessary landings. It may be made up of multiple stairs/flights. Therefore, it is actually each “flight of stairs” that requires a landing at top and bottom. The current exception for interior stairway top landings is poorly worded and does not present the intent. The intent is that there is still a landing surface at the top of interior stairways, but that it can be on the other side of a door. As worded, the sentence literally states that a landing is not required at the top of the stairway. Period. The mention of a door is only that it can’t swing over the stairs, not that there must be a door at all. But worse… it says a landing is not required at the top of a “flight of stairs” not the whole stairway. So that could be an intermediate landing between two “flights of stairs” that is not required, when the real intent is on the top landing of the “stairway” The top landing of the top flight of stairs.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the intent of the code as it is most likely already being interpreted. Therefore there is no definitive change in the cost of construction in any direction.

RB107-22

RB108-22

IRC: R311.7.6

Proponents: Glenn Mathewson, representing Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each *stairway*. The width perpendicular to the direction of travel shall be not less than the width of the flight served. For landings of shapes other than square or rectangular, the depth at the walk line and the total area shall be not less than that of a quarter circle with a radius equal to the required landing width. Where the *stairway* has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).

~~**Exception:**~~ **Exceptions:**

1. A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided that a door does not swing over the stairs.
2. Exterior *stairways* to grade with three or fewer risers serving a deck, porch or patio shall have a minimum bottom landing width of 36 inches, provided the stairway is not the required access to grade serving the required egress door.

Reason Statement: This proposal specifically addresses the popular design of ground level backyard decks desired by your fellow Americans. Ground level decks with monumental wrap-around stairs are a wonderful way to create a deck that is an extension of the house and an extension of the yard. However, once a single tread is built around the edge of a deck only 14 inches above grade, two risers are created and you now have a flight of stairs and a stairway, and that means a landing at the bottom. In increasing frequency, building authorities across the country are interpreting the bottom landing of a stairways to require a solid, manufactured surface, such as concrete, flagstone, or other hardscaping. Some of these authorities would require the lawn cut out and a manufactured surface installed around the entire edge of the deck (width of the stairs) and 3 feet out into the yard. For a single tread this is nearly four feet into the yard. It is my opinion that this is excessive guidance to governments for the regulation of our backyards, and will only serve to further alienate the public's trust in the code.

This proposal will retain a "landing", however interpreted, for only a minimum width of 36 inches on very specific stairways. It is expected that occupants seeking a safer stairway portion in a private home will choose this portion of the stairway. The IBC acknowledges an expectation for the general public in an unfamiliar location to similarly recognize the safer place for their travel on monumental stairways. Though in regard to handrails and not landings, the idea of reduced safety features dependent on the purposefully choice of travel by the occupant is identical. Section 1014.9 of the IBC does not require intermediate handrails on monumental stairways outside of the direct path of egress travel, regardless of the number of risers.
I think we cant trust our neighbors to navigate their own backyard monumental stairways without our complete protection.

The limit of 3 risers was selected as another recognition of reduced hazard, as a handrail is not required. The photo below is just one example of many found in happy backyards across the US. This is an example of how a minimum width landing, as required or interpreted, is provided. However, the remaining edge of the deck can flow into the yard without removing the yard. To tell this homeowner that to meet the minimum safety codes they need to either remove the steps and leave a 20 inch drop, or cut out the grass and install pavers is likely the last conversation any inspector will ever have with them.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will decrease the cost of construction by whatever excessive expense of landing material and labor is being required by certain building officials.

RB108-22

RB109-22

IRC: R311.7.7.1 (New)

Proponents: Timothy Pate, representing City and County of Broomfield (tpate@broomfield.org)

2021 International Residential Code

R311.7.7 Stairway walking surface. The walking surface of treads and landings of *stairways* shall be sloped not steeper than 1 unit vertical in 48 units horizontal (2-percent slope).

> **Exception:** Where the surface of a landing is required elsewhere in the code to drain surface water, the walking surface of the landing shall be sloped not steeper than 1 unit vertical in 20 units horizontal (5-percent slope) in the direction of travel.

Add new text as follows:

R311.7.7.1 Landings at grade. Stairway landings located at grade shall be solid and stable.

Reason Statement: This proposal is to add language for what type of surface a stair landing at grade needs to be. Currently the IRC would allow any surface which would include grass or dirt and only says the maximum slope. Grass will not always be there if homeowner does not take care of it and dirt turns into mud when wet.

Landings are a very important component of the stairway and surface needs to be solid and stable to allow a safe area when exiting the flight of stairs.

Cost Impact: The code change proposal will increase the cost of construction

This code change will increase construction in jurisdictions that now allow grass or dirt for stair landings at grade

RB109-22

RB110-22

IRC: R311.7.8, R311.7.11.2, R311.7.12.2, R311.8.3, R311.8.3.1, R311.8.3.2, R311.8.3.3, SECTION R312 (New), R312.1 (New), R311.7.8.1, R311.7.8.2, R311.7.8.3, R311.7.8.4, R311.7.8.5, R311.7.8.6

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

[RB] HANDRAIL. A horizontal or sloping rail intended for grasping by the hand for guidance or support.

SECTION R311
MEANS OF EGRESS

Revise as follows:

R311.7.8 Handrails. *Handrails* shall be provided on not less than one side of each flight of stairs with four or more *risers* and shall comply with Section R312.

R311.7.11.2 Handrails of alternating tread devices. *Handrails* shall be provided on both sides of alternating tread devices and shall comply with Section R312. ~~Sections R311.7.8.2 through R311.7.8.6. *Handrail* height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).~~

R311.7.12.2 Handrails of ship's ladders. *Handrails* shall be provided on both sides of ship's ladders and shall comply with Section R312. ~~Sections R311.7.8.2 through R311.7.8.6. *Handrail* height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).~~

R311.8.3 Handrails required. *Handrails* shall be provided on not less than one side of *ramps* exceeding a slope of 1 unit vertical in 12 units horizontal (8.33-percent slope) and shall comply with Section R312.

Delete without substitution:

~~**R311.8.3.1 Height.** *Handrail* height, measured above the finished surface of the *ramp* slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).~~

~~**R311.8.3.2 Grip size.** *Handrails* on *ramps* shall comply with Section R311.7.8.5.~~

~~**R311.8.3.3 Continuity.** *Handrails* where required on *ramps* shall be continuous for the full length of the *ramp*. *Handrail* ends shall be returned or shall terminate in newel posts or safety terminals. *Handrails* adjacent to a wall shall have a space of not less than $1^1/_2$ inches (38 mm) between the wall and the *handrails*.~~

Add new text as follows:

SECTION R312
HANDRAILS

R312.1 General. Handrails shall comply with Section R312.

Revise as follows:

~~**R311.7.8.1**~~ **R312.2 Height.** *Handrail* height, measured vertically from the sloped plane adjoining the tread *nosing*, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm). Handrail height on alternating tread devices and ship's ladders shall be uniform and not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

Exceptions:

1. The use of a volute, turnout or starting easing shall be allowed over the lowest tread.
2. Where *handrail* fittings or bendings are used to provide continuous transition between flights, transitions at *winder* treads, the transition from *handrail* to *guard*, or used at the start of a flight, the *handrail* height at the fittings or bendings shall be permitted to exceed 38 inches (965 mm).

~~**R311.7.8.2**~~ **R312.3 Handrail projection.** *Handrails* shall not project more than $4^1/_2$ inches (114 mm) on either side of the *stairway or ramp*.

Exception: Where *nosings* of landings, floors or passing flights project into the *stairway* reducing the clearance at passing *handrails*, *handrails* shall project not more than $6^1/_2$ inches (165 mm) into the *stairway*, provided that the stair width and *handrail* clearance are not reduced to less than that required.

~~R311.7.8.3~~ R312.4 **Handrail clearance.** *Handrails* adjacent to a wall shall have a space of not less than $1^1/_2$ inches (38 mm) between the wall and the *handrails*.

~~R311.7.8.4~~ R312.5 **Continuity.** Handrails shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrails where required for ramps shall be continuous for the full length of the ramp. Handrail ends shall be returned toward a wall, guard walking surface continuous to itself, or terminate to a post.

Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top landing.

~~R311.7.8.5~~ R312.6 **Grip size.** Required *handrails* shall be of one of the following types or provide equivalent graspability.

1. Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1^1/_4$ inches (32 mm) and not greater than 2 inches (51 mm). If the *handrail* is not circular, it shall have a perimeter of not less than 4 inches (102 mm) and not greater than $6^1/_4$ inches (160 mm) and a cross section of not more than $2^1/_4$ inches (57 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).
2. Type II. *Handrails* with a perimeter greater than $6^1/_4$ inches (160 mm) shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin within $^3/_4$ inch (19 mm) measured vertically from the tallest portion of the profile and have a depth of not less than $^5/_{16}$ inch (8 mm) within $^7/_8$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $^3/_8$ inch (10 mm) to a level that is not less than $1^3/_4$ inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than $1^1/_4$ inches (32 mm) and not more than $2^3/_4$ inches (70 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).

~~R311.7.8.6~~ R312.7 **Exterior plastic composite handrails.** *Plastic composite* exterior *handrails* shall also comply with the requirements of Section R507.2.2.

Reason Statement: Currently the 2021 IRC and prior editions duplicated the requirements for handrails under both the stairway and ramp sections, while also duplicating height requirements under alternating treads and ships ladders.
This proposal creates a separate new section for all Handrail's and consolidates the duplicated information in the code, without changing any of the parameters except as noted below.

Specific changes to the text Noted:

1. When moving section R311.8.3.3 to R311.9.4, changed "on" to "for"
    1. "required **on** ramps" now reads "required **for** ramps"
2. In the 2021 IRC code cycle Section R311.7.8.4 removed the catch all wording Safety Terminals, and replaced it with "shall be returned toward a wall, guard walking surface continuous to itself, or terminate to a post.". However, the same change was not updated to Section R311.8.3.3 for ramps. This left the code with 2 different termination requirements, one for stairs and one for ramps. This code change returns handrails on stairways and ramps to the same requirements.
3. The pointers in R311.11.2 and R311.12.2 text deleted and moved to Section R312.2 Height.
4. "or ramp" was added to the section R312.3 Handrail Projection, this does add a new requirement to ramp handrails within the IRC, it is the same in the IBC.
5. We inserted "also" in Section R312.7 which was moved from R311.7.8.6, this was done to clarify that plastic composite handrails need to comply with R312 and R507.2.2, not just R507.2.2.

This code change clarifies and consolidates the handrail requirements under one area within the code and we believe simplifies the code by removing all the duplications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal consolidates duplicate information spread out over many sections and rearranges the provisions into one logical section. There is only one slight technical change is section R312.3, which I believe does not increase cost, as the same pre-manufactured handrail bracket materials are used on stairs as ramps, and stairs have the requirement already in place. Except for this one technical change the rest of the content is just editorial and rearrangement of the text into a more logical order and therefore, there will be no cost impact when approving this proposal.

RB110-22

RB111-22

IRC: R311.7.8.4, R311.8.3.3

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2021 International Residential Code

Revise as follows:

R311.7.8.4 Continuity. Handrails shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned toward or terminate at a post, wall, guard , walking surface , or wrap continuous to itself ~~or terminate to a post~~. The end of the handrail shall not form a gap more than 1/4 inch (6.4 mm) from the adjacent surface.

Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top landing.

R311.8.3.3 Continuity. *Handrails* where required on *ramps* shall be continuous for the full length of the *ramp*. *Handrail* ends shall be returned toward or shall terminate ~~in~~ at ~~newel posts or safety terminals~~ a post, wall , guard, walking surface, or wrap continuous to itself. The end of the handrail shall not form a gap more than 1/4 inch (6.4 mm) from the adjacent surface. *Handrails* adjacent to a wall shall have a space of not less than $1^1/_2$ inches (38 mm) between the wall and the *handrails*.

Reason Statement: In addition to providing for a continuous handrail the intent of this section has been to restrict open handrails such that they do not snag loose clothing or objects carried that might cause an accidental fall. In the last cycle we worked with others to successfully eliminate the term safety terminal that had been open to wide interpretation. In doing so we tried to better define what should be considered safe terminations of the end of the handrail. This change clarifies that a handrail can terminate at any of the described surfaces not just a post as well as be returned toward all these same surfaces. In the added sentence we have included a limitation for any gap that might be formed between the end of the handrail and the adjacent surface when handrails are returned *toward* a surface to maintain the intent to restrict the possibility of snagging loose clothing or carried objects.
ICC staff pointed out that the term safety terminal still remained in the ramp section under continuity and requested we address this in this cycle. This proposal does so and if passed both sections will have parallel language.

This proposal provides needed clarification for interpretation and enforcement of handrail terminations on both stairs and ramps.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal follows the original intent of the provisions for handrail extensions and provides additional information on what is required to meet that intent, however, there are no technical changes to the requirements that will result in an increase in cost.

RB111-22

RB112-22

IRC: R311.7.8.4

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

SECTION R311
MEANS OF EGRESS

Revise as follows:

R311.7.8.4 Continuity. Handrails shall be continuous for the full length of the flight, from a point directly above the top ~~riser~~ nosing of the flight to a point directly above the lowest ~~riser~~ nosing of the flight. Handrail ends shall be returned toward a wall, guard walking surface continuous to itself, or terminate to a post.

Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top landing.

Reason Statement: With the addition of the defined term nosing in both the IRC and IBC the use of "riser" for the vertical and horizontal intersection point of the lowest tread edge and top landing edge is no longer correct and the correct term is nosing. This term and measuring point were changed in the Part A cycle and will be the point of measurement where handrail extensions are to be measured from in the 2024 IBC. Keeping the terminology, the same in both codes will prevent confusion within the industry as adoption of the newest model codes are done over time.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial reorganization of two defined terms within the requirement to the more appropriate term and does not change any technical requirements that will increase or decrease cost.

RB112-22

RB113-22

IRC: R311.7.8.4

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

Revise as follows:

R311.7.8.4 Continuity. Handrails shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned toward a wall, guard, walking surface, continuous to itself, or terminate to a post.

Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top or bottom landings ~~landing~~.

Reason Statement: Exception 2 for volutes, turnouts and starting easing's, added terminating over the top landing allowed. However, it left out bottom landings for volutes, turnouts and starting easing's. This proposal adds the clarification to the exception.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is adding minimal technical clarification which was removed with the deletion of the generalized term “Safety Termination” last model 2021 IRC publication within the code and just reaffirming an implied allowance which will not increase or decrease cost.

RB113-22

RB114-22

IRC: R311.7.9 (New), R311.7.9.1 (New), R311.7.9.2 (New), R311.7.9.3 (New), R311.7.9.4 (New), AJ109.8, AJ109.8.1, AJ109.8.2, AJ109.8.3

Proponents: Ardel Jala, representing Seattle Department of Construction & Inspections (ardel.jala@seattle.gov); Micah Chappell, representing Seattle Department of Construction & Inspections (micah.chappell@seattle.gov)

2021 International Residential Code

Add new text as follows:

R311.7.9 Stairways in existing buildings. Where an existing stair is completely reconstructed or an existing stair serves *habitable space* created by a *change of occupancy*, the stairs shall comply with the requirements of this code for new construction. Alterations to existing stairs shall comply with the Sections R311.7.8 and R311.7.9.1 through R311.7.9.4.

R311.7.9.1 Stair width. Existing stairs not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing *handrails*.

R311.7.9.2 Stair headroom. Headroom height on existing stairs being altered or modified shall not be reduced below the existing *stairway* finished headroom. Existing stairs not otherwise being altered shall be permitted to maintain the current finished headroom.

R311.7.9.3 Stair landing. Landings serving existing stairs being altered or modified shall not be reduced below the existing *stairway* landing depth and width. Existing stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.

R311.7.9.4 Stair treads and risers. An existing stairway shall not be required to comply with Section R311.7.5 where the existing space and construction does not allow a reduction in pitch or slope. Where *risers* are added to an existing stair, the tread and riser dimensions of the added *risers* shall match the existing stair.

Revise as follows:

~~**AJ109.8 Stairs.**~~ ~~.~~

Delete without substitution:

~~**AJ109.8.1 Stair width.** Existing *basement* stairs and *handrails* not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing *handrails*.~~

~~**AJ109.8.2 Stair headroom.** Headroom height on existing *basement* stairs being altered or modified shall not be reduced below the existing *stairway* finished headroom. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current finished headroom.~~

~~**AJ109.8.3 Stair landing.** Landings serving existing *basement* stairs being altered or modified shall not be reduced below the existing *stairway* landing depth and width. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.~~

Reason Statement: This is one of (4) proposals that pull existing "breaks" found in Appendix J for Existing Buildings into the main body of the code. Each proposal permits flexibility from meeting full code compliance for existing construction while maintaining a reasonable level of safety.
This proposal creates a new section for existing stairs that incorporates provisions from Section AJ109.8 into the main body of the code and aligns the IRC existing stair requirements with flexibility currently found in IEBC. The proposal provides breaks on full compliance for stair width, headroom and landings for alterations to existing stairs. The proposal also gives a break for stair treads and risers that is consistent with a more general break for existing stairs in IEBC Section 506.3.

Alterations, repairs, and reconfiguration of spaces often require altering, extending or completely rebuilding the existing stairs. However, existing stairs may not conform to current code though they were compliant at the time they were built. For example, legacy codes permitted a residential stair to have an 8 inch riser and a 9 inch tread versus today's rise/run requirements of 7 3/4 inches and 10 inches. Reducing the pitch to make the stair comply requires enlarging the stair footprint. It can be impractical to reframe the stair opening or reconfigure the floor plan where the existing space and construction does not easily accommodate a larger stair footprint.

In this proposal, alterations to existing stairs are permitted some flexibility. Existing stairs not being altered are allowed to remain as existing non-conforming. Sections R311.7.9.1 through R311.7.9.3 brings the code provisions from Appendix J Sections AJ109.8.1 through AJ109.8.3 into the main body of the code and deletes them from Appendix J. These sections state that stair width, headroom, and landing shall not be made more non-conforming but otherwise are permitted to maintain their current dimensions. While the breaks in Appendix J apply to existing basement stairs only, these allowances seemed reasonable to extend to all existing stairs.

Section R311.7.9.4 of this proposal applies to stair treads and risers in existing buildings. This section is based on IEBC Section 506.3 which permits a stair to not comply with new stair provisions when the existing space does not permit the reduced pitch or slope. In the proposal, I did not copy the IEBC language over in its entirety because the other sections of this proposal already provide breaks on stair width, headroom and landing. For clarity, I revised the IEBC language to apply to the tread and riser requirements for the existing stairs.

Section R311.7.9.4 also adds an allowance to match the tread and riser dimensions of an existing stair when extending the run of a stair. This allows an owner to extend an existing stair that has an 8 inch rise and 9 inch tread to be extended with risers that match the existing rise and run and that do not create a tripping hazard by a reduction in pitch mid-run.

Section R311.7.9 makes it clear that when a stair in an existing building is completely rebuilt, those stairs must be made fully compliant. For example, an existing stair is demolished and a new stair constructed as part of alterations. This should be regulated as a new stair as this is an opportunity for the stair to be built compliant to current code.

Section R3117.9 also makes it clear that when a stair is serving an area where a change of occupancy creates habitable space, that the existing stair must be made fully compliant. This requirement is consistent with Section R102.7.1 which states the alterations shall not cause an existing structure to become less compliant.

In summary, while Section R104.10 allows the building official discretion to offer flexibility where full compliance is not practical, the code does not provide explicit relief from full compliance with new code requirements for alterations to existing stairs. This proposal clarifies when full compliance is required and provides flexibility from full code compliance for alterations to an existing stair. This proposal provides greater flexibility for existing stair code compliance to homeowners wanting to maximize the usable square footage in their home.

Cost Impact: The code change proposal will decrease the cost of construction
This code change proposal reduces the extent that an existing stair must be altered to meet new code requirements for an existing building that falls under the scoping of the IRC. With this additional flexibility explicitly stated in the code it eliminates the need for reframing floor openings to accommodate larger stairs to meet current code, resulting in a savings in construction cost.

RB114-22

RB115-22

IRC: R311.8.2

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

SECTION R311
MEANS OF EGRESS

Revise as follows:

R311.8 Ramps. Where required by this code or provided, *ramps* shall comply with this section.

Exception: *Ramps* not within or serving a building, porch or deck.

R311.8.1 Maximum slope. *Ramps* serving the egress door required by Section R311.2 shall have a slope of not more than 1 unit vertical in 12 units horizontal (8.3-percent slope).
Other *ramps* shall have a maximum slope of 1 unit vertical in 8 units horizontal (12.5 percent).

Exception: Where it is technically infeasible to comply because of site constraints, *ramps* shall have a slope of not more than 1 unit vertical in 8 units horizontal (12.5 percent).

Add new text as follows:

R311.8.2 Vertical Rise. *The rise for any ramp run shall be 30 inches (762 mm) maximum.*

Revise as follows:

~~**R311.8.2**~~ **R311.8.3 Landings required.** There shall be a floor or landing at the top and bottom of each *ramp*, where doors open onto *ramps*, and where *ramps* change directions. The width of the landing perpendicular to the *ramp* slope shall be not less than the width of the *ramp*. The depth of the landing in the direction of the ramp slope shall be not less than 36 inches (914 mm).

~~**R311.8.3**~~ **R311.8.4 Handrails required.** *Handrails* shall be provided on not less than one side of *ramps* exceeding a slope of 1 unit vertical in 12 units horizontal (8.33-percent slope).

~~**R311.8.3.1**~~ **R311.8.4.1 Height.** *Handrail* height, measured above the finished surface of the *ramp* slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

~~**R311.8.3.2**~~ **R311.8.4.2 Grip size.** *Handrails* on *ramps* shall comply with Section R311.7.8.5.

~~**R311.8.3.3**~~ **R311.8.4.3 Continuity.** *Handrails* where required on *ramps* shall be continuous for the full length of the *ramp*. *Handrail* ends shall be returned or shall terminate in newel posts or safety terminals. *Handrails* adjacent to a wall shall have a space of not less than $1^1/_2$ inches (38 mm) between the wall and the *handrails*.

2021 International Building Code

1012.4 Vertical rise. The rise for any *ramp* run shall be 30 inches (762 mm) maximum.

Reason Statement: The 2021 IRC and previous editions do not require handrails on any ramp with a slope of 1:12 or less, and also do not set a limit to the maximum vertical rise that a ramp can be between landings.
The combination of a ramp with an infinite elevation incline and no handrails when the slope is 1:12 or less is perplexing.

This proposal is aiming to add a limit to the vertical rise a ramp can be and is basing the limit on the same maximum vertical rise set in Section 1012.4 Vertical Rise of the IBC. Section included for reference above.

Though one might contend that it is unnecessary, the IRC only requires the *Ramp* serving the egress door required by Section R311.2 be limited to the 1:12 maximum slope, and as thus allows ramps to not only exceed 30 inches of rise between landings, but you also have the possibility that a secondary ramp with a slope greater than 1:12 up to 1:8 can be installed to an unlimited vertical rise between landings also, even though the steeper slope would require a handrail on one side.

The vertical limit between landings for the rise of a ramp run is proposed to provide resting locations and control the possibility of never-ending ramp runs between landings.

Bibliography: 2021 IBC Section 1012.4 Vertical Rise

Cost Impact: The code change proposal will increase the cost of construction

This requirement will increase the cost of initial construction when extremely long ramp runs are designed to be installed by requiring the addition of another landing, estimated cost to be $200.00 - $500.00, depending on geographical location and materials used.

RB115-22

RB116-22

IRC: R311.8.3

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

[RB] RAMP. A walking surface that has a running slope steeper than 1 unit vertical in 20 units horizontal (5-percent slope).

SECTION R311
MEANS OF EGRESS

Revise as follows:

R311.8 Ramps. Where required by this code or provided, *ramps* shall comply with this section.

Exception: *Ramps* not within or serving a building, porch or deck.

R311.8.1 Maximum slope. *Ramps* serving the egress door required by Section R311.2 shall have a slope of not more than 1 unit vertical in 12 units horizontal (8.3-percent slope).
Other *ramps* shall have a maximum slope of 1 unit vertical in 8 units horizontal (12.5 percent).

Exception: Where it is technically infeasible to comply because of site constraints, *ramps* shall have a slope of not more than 1 unit vertical in 8 units horizontal (12.5 percent).

R311.8.2 Landings required. There shall be a floor or landing at the top and bottom of each *ramp*, where doors open onto *ramps*, and where *ramps* change directions. The width of the landing perpendicular to the *ramp* slope shall be not less than the width of the *ramp*. The depth of the landing in the direction of the ramp slope shall be not less than 36 inches (914 mm).

Revise as follows:

R311.8.3 Handrails required. *Handrails* shall be provided on not less than one side of *ramps* exceeding a slope of 1 unit vertical in 12 units horizontal (8.33-percent slope) <u>or with a vertical rise greater than 16 1/2 inches (419 mm) between landings</u>.

Reason Statement: The current language within the 2021 IRC has not changed since the publication of the 2000 IRC.
The question as to why the IBC, ANSI 117.1 & ADA/ABA mandate handrails for ramps with a rise over 6 inches between landings but require none for any ramp within the IRC that does not exceed a slope of 1:12 has been a mystery in our research for this code change proposal, especially since the IRC does not limit the vertical rise between landings either.

The assumption we have found is that since entry walkways are not regulated under the IRC, and only the transition from grade to entry door landing. Most changes in elevation leading up to a new home are accomplished prior to the regulated area of the entry to the home.

Additionally, the IRC exempts handrails on stair flights with less than 4 risers, thus if we look at (4) 7.75" risers equaling 31", and this height being more than the 30" maximum rise for triggering guards, the common thought path is, that handrails are not normally required until reaching an elevation change that guards maybe required on the upper landing, and as thus handrails on ramps should follow suit with the precedent set for stair flights.

However, stair flights and ramps are different in their area of coverage. Stair flights ascend vastly quicker in a much smaller footprint than ramps do. As thus the user transverses a much small distance to achieve the goal from landing to landing on a stair flight, then on a ramp run. The question we sought was why does the IRC not require handrails at all on ramps of the same design that the IBC, ANSI A117.1 and ADA/ABA requires for ramps till exceeding a slope of 1:12 between landings? That is ramps starting at 1:20 up to 1:12 don't require handrails period. However, once you exceed 1:12 even for just 3 feet you are now required to have a handrail on the ramp within the IRC.

The trigger for when a handrail for a ramp is required is the pitch of the ramp exceeding a slope over 1:12 and up to 1:8 and has always been required within the IRC. This is even for ramps technically below a rise of 6-inches. In reviewing all this information, we found a large disconnect between the IRC and every other requirement for when handrails are required on ramps.

As thus we looked for a limiting factor as to when a trigger would become reasonable for any ramp within the IRC to require a handrail and we used the formula of half the height of the trigger for stair flights, or 2 risers. We based our conclusion on that a ramp run at 1:12 would travel approximately 8 times the distance to transverse half the height. With the 2-riser trigger for requiring a handrail for any ramp settled on for submitting this proposal, we next looked at the 15.5" height of 2 risers, and researched if the 7.75" riser height was being modified on adoption and found that a good number of adopting jurisdictions modify the 7.75" riser height to allow for 8" standard masonry units to be used, and as thus to limit this number would only invite more modification on adoption, as thus we selected 16.5-inches, as the additional 1-inch of height between landings in a ramp run is minimal and works also with the 7.75" model code maximum riser limit and also covers any jurisdiction modifying the code on adoption to allow use of standard 8-inch masonry units.

Cost Impact: The code change proposal will increase the cost of construction
Since the code does not require the handrails for ramps of 1:12 or less slope, there is technically a definitely an increase in cost. However, due to the limited nature of when the majority of ramps are installed for residences, our limited research believes that handrails are already being installed, and as thus, the cost increase is minimal in reality.

RB116-22

RB117-22

IRC: R311.8.3.3, R311.8.3.4 (New)

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2021 International Residential Code

Revise as follows:

R311.8.3.3 Continuity. *Handrails* where required on *ramps* shall be continuous for the full length of the *ramp*. *Handrail* ends shall be returned or shall terminate in newel posts or safety terminals.~~*Handrails* adjacent to a wall shall have a space of not less than 1$^{1}/_{2}$ inches (38 mm) between the wall and the *handrails*.~~

Add new text as follows:

<u>**R311.8.3.4** **Handrail clearance.** *Handrails* adjacent to a wall shall have a space of not less than 1$^{1}/_{2}$ inches (38 mm) between the wall and the *handrails*.</u>

Reason Statement: This proposal moves the last sentence related to handrail clearance to a new section with the intent to create a separate **Handrail Clearance** requirement within the ramp section. This change parallels the format of the same requirement in the stairway section for the purpose of consistent formatting of requirements throughout the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial relocation of requirements for consistency with handrails for stairways and ramps. There will be no technical change to the code requirements.

RB117-22

RB118-22

IRC: R312.1.3

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

SECTION R312
GUARDS AND WINDOW FALL PROTECTION

Revise as follows:

R312.1.3 Opening limitations. Required *guards* shall not have openings from the walking surface to the required *guard* height that allow passage of a sphere 4 inches (102 mm) in diameter. Opening Limitations shall be determined without any force applied to the sphere.

Exceptions:

1. The triangular openings at the open side of *stair*, formed by the *riser*, tread and bottom rail of a *guard*, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. *Guards* on the open side of stairs shall not have openings that allow passage of a sphere $4^3/_8$ inches (111 mm) in diameter.

Reason Statement: This code change simplifies any current and future debates by prescriptively clarifying that there is no force or load test on the sphere directly within the text of the IRC and is intended as written to be a simple dimensional measurement for pass or fail only.

The Misconception

For as long as the sphere measurement method for opening limitations in guards has been in the model codes and adopted by jurisdictions there has been a back room and front room debate as to the process.

It has been well established that the 4-inch, 4.375-inch and 6-inch sphere dimension is a dimensional measurement and not a load test.

Even with this, questions continue to be discussed across multiple local jurisdictions, forums and other forms of communication questioning if you are to take the correct dimensionally sized sphere and apply a force to shove it through the in-fill of guards and pool barriers, and what that force level should be. The direction of these debates goes on within many jurisdictions and amongst the building enforcement industry less and less as time passes, but as with anything as new eyes enter the field, this discussion returns to the debate floor.

Standards & Criteria

For years, fabricators within the guard industry used the in-fill (part C) method for load testing in-fill in ASTM E935-00 to the loads specified in the R301.5 table of the IRC and some also applied the cone test (part D) methodology published in ASTM Standard E935-00, the part D cone test in E935-00 and prior versions was a methodology to verify the in-fill spread of balusters, however this has never been required in or by the model IRC or IBC codes. When the Part D test methodology was removed from the standard and not included in the ASTM E935-13 edition, and furthermore was not replaced with any other similar in-fill load test directed at in-fill spread specifically, any pathway moving forward was removed as the newer standard signifies progress.

ICC-ES AC-273-17, Acceptance Criteria for Handrails and Guards, in sections 4.2.1, 4.2.4 & 4.5 directs and points to follow the 1sqft area method in Section 10.4 in ASTM E935-13, with no spread test on in-fill under load. Furthermore, the 1 square foot area is also repeated in ASTM D7032 Section 6.2.2 In-Fill Load Test for the Wood-Plastic Composite and Plastic Lumber.

The guard industry follows established engineering practices and when engineers are presented to review projects and prepare project calculation packages and sealed drawings, per the requirements set forth within the IRC, loads being applied to the 4-inch sphere are not within the requirements, nor is there a test method spelled out to follow for physical testing a load on the sphere directly. With the deletion of Part D of ASTM E935-00 in ASTM E935-13, the only similar in-fill spread testing method was removed. Why it was removed is not known to this author, but one can extrapolate or assume it was because the model codes, nor ASCE-7 provide a direction or requirement for this type of load being applied to guard in-fill. With the lack of a requirement, the Part D test method was deleted to streamline the standard to follow the model codes and ASCE-7.

What has been followed by engineers and industry is to apply the loads with designated safety factors designated in the test standards, acceptance criteria and within the code over a 1sqft area and then **MEASURE** for if a 4-inch sphere would pass through the in-fill without a load applied to the sphere directly, a simple measurement. This code change proposal removes any straying into whether inspectors should be carrying a certified fish-scale with an attachment method for 3 sizes of spheres for testing in-fill spreading and removes any mystery number pulled from the sky for improvised field test hanging 50-lbs kettle bells or even requesting a special inspection without a standard for the engineers to follow.

NON-Applicable theories and information not in the Model Codes, Current Standards or ES Acceptance Criteria

To further extrapolate on a small and limited number of posts on forums that theorize applying a load directly to the sphere, we will theories how does one define the load? The requirements within the model 2021 IRC Table R301.5, under Guard in-fill components with note f, directs you to use a normal load of 50 pounds on an area equal to 1 square foot.

Now with the only in-fill load listed within the IRC in table R301.5 being for an area equal to 1 square foot established.

How does one extrapolate a number from this, we stipulate that it is not the intent of the code, nor listed in R301.5 for in-fill, however there are still inspectors who inject this undesignated structural failure test as being required by code and to use the 50 pounds listed for a 1 square foot area, on the sphere directly! We know the IRC does not specify this so,

Even if you pull from the sky and hypothesize a load should be applied to a sphere, which is only a portion of the 1 square foot area. Continuing with this unsupported hypothesis that the area of the sphere is somehow connected, what number do you use? Do you use the area of a 4-inch circle, or do you use half the surface area of a 4-inch sphere, both are an area measurement of the sphere?

If we first start a theory with using 1 square foot covers both non-contact and contact area of the in-fill area, and then input the area of a 4-inch diameter circle which is approximately 12.57 square inches, then divide the area of the circle by the area of 1square foot, 144 square inches, we get 8.73%, and 8.73% of 50 pounds equals 4.367 lbs. Thus, we have extrapolated a hypothetical force for the sphere in direct proportion of 50 pounds on the area of 1 square foot to be equivalent to 4.367 pounds for the area of the circle.

However, some will argue that the actual number should be half the surface area of the sphere. If we follow this direction and start with a 4-inch sphere has an approximate surface area of 50.27 square inches, and since the 1 square foot area is not doubled for front and back, we need to remove the back half of the sphere and divide the sphere's surface area by 2. This reduces the surface area to 25.135 square inches. Next we divide the 25.135 square inches by 144 square inches, and we get 17.5% and applying this percentage to the 50 pounds, we extrapolate 8.75 pounds applied to a theoretical testing device not specified in any current testing standard or Acceptance Criteria published in the 2021 IRC Part IX - Referenced Standards or prior model IRC codes as a requirement.

We have walked through theories hypothesizing a 4-inch sphere's load, and we haven't even touched the surface as do these values change for each sphere designated in the exceptions? The simple thing is to return to reality and remember that none of these theories are actual code language within the IRC. For those inspectors that question that a guard's in-fill meets the requirements of the IRC, they can request that the owner supply engineering documents be provided establishing compliance with the code adopted in their jurisdiction, and the reality is none of these theories will be reviewed as they have never been a part of the model IRC.

The reason statement submitted for this proposal has walked through more than a few theories, however the defining facts are that the most current editions of ASTM E935 and ICC ES-AC273, and all published editions of the model IRC do not provided direction or a standard to follow for testing a load directly applied on any sphere for a measurement for guards.

Bibliography: ASTM Editions: ASTM E935-13ε1, ASTM E935-00 & E935-83

ASTM E935-xx Current edition approved Aug. 1, 2021. Published September 2021. Originally approved in 1983. Last previous edition approved in 2013 as E935–13ε1.

ICC ES AC273 Current edition editorially revised May 2021. Originally approved in 2004. Last previous edition approved in June 2017.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No cost change, as this code change just clarifies that the dimensional measurement is not a load test.

RB118-22

RB119-22

IRC: R312.1.4

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R312.1.4 Exterior plastic composite guards. *Plastic composite* exterior *guards* shall comply with the requirements of Section R507.2.2 ~~R317.4~~.

Reason Statement: Section R317.4 is about decay resistance of wood and wood-based products. Plastic composites are often wood based, so R317.4 is simply a pointer to R507.2.2 where all the details for plastic composite are provided. This proposal simple points the guard section directly to the plastic composite provisions. This is the same reference as R311.7.5.4 for stair treads and R311.7.8.6 for handrails.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is only editorial and will not affect the cost of construction.

RB119-22

RB120-22

IRC: R312.2, R312.2.1, R312.2.2 (New), R312.2.2, AJ102.4.4

Proponents: Ardel Jala, representing Seattle Department of Construction & Inspections (ardel.jala@seattle.gov); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Revise as follows:

R312.2 Window fall protection. Window fall protection shall be provided in accordance with Sections R312.2.1 ~~and R312.2.2.~~ through R312.2.3.

R312.2.1 Window opening height. In *dwelling units*, where the bottom of the clear opening of an operable window opening is located less than 24 inches (610 mm) above the finished floor and greater than 72 inches (1829 mm) above the finished *grade* or other surface below on the exterior of the building, the operable window shall comply with one of the following:

1. Operable window openings will not allow a 4-inch-diameter (102 mm) sphere to pass through where the openings are in their largest opened position.
2. Operable windows are provided with window opening control devices or fall prevention devices that comply with ASTM F2090.
3. Operable windows are provided with window opening control devices that comply with Section ~~R312.2.2.~~ R312.2.3.

Add new text as follows:

R312.2.2 Fall protection at replacement windows. Window fall protection is not required where window replacement is of glazing only.

Revise as follows:

~~**R312.2.2**~~ **R312.2.3 Emergency escape and rescue openings.** Where an operable window serves as an *emergency escape and rescue opening*, a window opening control device or fall prevention device, after operation to release the control device or fall prevention device allowing the window to fully open, shall not reduce the net clear opening area of the window unit to less than the area required by Sections R310.2.1 and R310.2.2.

Delete without substitution:

~~**AJ102.4.4 Window control devices.** Window opening control devices or fall prevention devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:~~

1. ~~The window is operable.~~
2. ~~One of the following applies:~~
    - 2.1. ~~The window replacement includes replacement of the sash and the frame.~~
    - 2.2. ~~The window replacement includes the sash only when the existing frame remains.~~
3. ~~The bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.~~
4. ~~The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere where the window is in its largest opened position.~~
5. ~~The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).~~

Reason Statement: This is one of (4) proposals that pulls existing "breaks" found in Appendix J for Existing Buildings into the main body of the code. Each proposal permits flexibility from meeting full code compliance for existing construction while maintaining a reasonable level of safety. This proposal deletes Appendix J section AJ102.4.4, most of which is already in section R312.2. This proposal clarifies when opening control devices and fall protection are not required for a replacement window.

Section AJ102.4.4 provides criteria for when window opening control devices or fall protection devices are required for window replacement. Items 1 through 5 of this provision must be met to trigger the installation requirement for a window opening control or fall prevention device at a replacement window. Items 1, 3, 4 and 5 are already included in section R312.2.1 as criteria for when a window opening control device or fall prevention device is required at a new window. The criteria of item 2 is satisfied when the window replacement includes replacement of either the sash and frame or when the sash only is replaced and the existing frame remains. Another way to say that is if you meet the criteria of 1, 3, 4 and 5 but only the glass is being replaced than you do not have to install a window opening control device or fall prevention device at the replacement window. That's the same as saying window fall protection is not required when you replace the glass only at a replacement window. This is a reasonable break to give existing construction when replacing the glazing and should be part of the main body of the code.

Cost Impact: The code change proposal will decrease the cost of construction

This proposal eliminates a base code requirement that requires a window control device when replacing the window glazing only in existing windows.

RB120-22

RB121-22

IRC: R314.1, R314.3.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

SECTION R314
SMOKE ALARMS

Revise as follows:

R314.1 General. Smoke alarms shall comply with NFPA 72, ~~and~~ Section R314 and the manufacturer's installation instructions .

R314.1.1 Listings. Smoke alarms shall be *listed* in accordance with UL 217. Combination smoke and carbon monoxide alarms shall be *listed* in accordance with UL 217 and UL 2034.

Revise as follows:

R314.3.1 Installation near cooking appliances. Smoke alarms shall ~~not~~ be installed a minimum of 10 ft. (3.0 m) horizontally from a permanently installed cooking appliance. ~~in the following locations unless this would prevent placement of a smoke alarm in a location required by Section R314.3.~~

1. ~~Ionization smoke alarms shall not be installed less than 20 feet (6096 mm) horizontally from a permanently installed cooking *appliance*.~~
2. ~~Ionization smoke alarms with an alarm-silencing switch shall not be installed less than 10 feet (3048 mm) horizontally from a permanently installed cooking *appliance*.~~
3. ~~Photoelectric smoke alarms shall not be installed less than 6 feet (1828 mm) horizontally from a permanently installed cooking *appliance*.~~
4. ~~Smoke alarms *listed* and marked "helps reduce cooking nuisance alarms" shall not be installed less than 6 feet (1828 mm) horizontally from a permanently installed cooking *appliance*.~~

Exception: Smoke alarms shall be permitted to be installed a minimum of 6 ft. (1.8 m) horizontally from a permanently installed cooking appliance where necessary to comply with Section R314.3.

Reason Statement: This change correlates the IRC requirements for smoke alarms with the changes to the IFC and IPMC as approved by F89-21.
This proposal simply aligns the code requirements in the I-Codes with the current edition of NFPA 72 and the 8th Edition of UL 217.

This proposal removes the outdated requirements related to specifying ionization or photoelectric smoke alarm technologies because all smoke alarms will be listed for resistance to common nuisance sources from cooking when the 2024 edition of the IRC is published.

NFPA 72 Section 29.11.3.4(4)(2) requires smoke alarms to be listed for resistance to common nuisance sources from cooking in accordance with the 8th Edition of UL 217 or subsequent editions. The reason UL smoke alarm and detector standards have new performance tests is to reduce the frequency of unwanted alarm activation from normal cooking activities such as pan-frying, sauteing or baking. The new cooking resistance tests are necessary because normal cooking activities are the leading cause of unwanted alarm activations that result in homeowners removing or deactivating their smoke alarms. Therefore, the technology specific requirement for devices installed between 6 and 20 feet are now longer relevant.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply aligns the IRC with NFPA 72 and UL 217. Since this is already required by the standards, this change to the code will not change the technical requirements.

RB121-22

RB122-22

IRC: R314.1.1, R314.1.2 (New)

Proponents: Jonathan Roberts, representing UL (jonathan.roberts@ul.com)

2021 International Residential Code

Revise as follows:

R314.1.1 Listings. Smoke alarms shall be *listed* and *labeled* in accordance with UL 217. Combination smoke and carbon monoxide alarms shall be *listed* in accordance with UL 217 and UL 2034.

Add new text as follows:

R314.1.2 Installation. Smoke alarms shall be installed in accordance with their listing and the manufacturer’s instructions.

Reason Statement: This proposal adds requirement for these devices to be listed and labeled, since listed alarms will include a listing mark (label). It also requires smoke alarms to be installed in accordance with the listing and the manufacturer’s installation instructions. "Listed" and "Labeled" are both defined terms.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Listed smoke alarms are already identified by a label, and there is no additional cost associated with verifying they are installed in accordance with their listing and the manufacturer's instructions.

RB122-22

RB123-22

IRC: R314.4 (New), R314.7.3 (New)

Proponents: Mark Larson, representing National Disability Rights Network (mark@marklarsonandassociates.com)

2021 International Residential Code

Add new text as follows:

R314.4 Smoke alarm audible alarm signal in sleeping rooms. The audible alarm signal activated by single- or multiple-station smoke alarms in the sleeping rooms shall be a 520-Hz signal complying NFPA 72. Where a sleeping room smoke alarm is unable to produce a 520-Hz signal, the 520-Hz alarm signal shall be provided by a listed notification appliance or a smoke detector with an integral 520-Hz sounder.

R314.7.3 Audible alarm signal in sleeping rooms. The audible alarm signal activated by a fire alarm system in the sleeping rooms shall be a 520-Hz low-frequency signal complying with NFPA 72.

Reason Statement: This Proposal seeks to enhance the waking effectiveness of high-risk segments of the population in the International Residential Code (IRC) by requiring the 520 Hz low frequency audible fire alarm signal in sleeping rooms. Peer-reviewed research has concluded the 520 Hz low frequency is six times more effective than the standard 3 kHz signal at waking high risk segments of the population (people over 65, people who are hard of hearing, school age children and people who are alcohol impaired). The standard 3 kHz audible alarm signal has been used in the majority of fire alarm horns and smoke alarms for the past 30 years.
Currently there are no smoke alarms available with an integral sounder capable of producing the low frequency signal because of the higher current required by the low frequency sounding appliance. A recent Fire Protection Research Foundation report FPRF concluded that the sound pressure level of low frequency sounders could be decreased from 85 dBA to 79 dBA and still achieve greater waking performance than traditional 3 kHz sounders. This level of sound output reduction will allow for significantly reduced power consumption without compromising life safety.

After the FPRF report, a modification to the UL 217 product listing standard that lowered the sound pressure level of low frequency sounders in smoke alarm from decreased from 85 dBA to 79 dBA. The new reduced power consumption in UL 217 will eliminate the high current challenge that smoke alarm manufacturers have experienced for the past 15 years and provide a cost-effective solution for waking high-risk segments of the population.

Peer-Reviewed Research:

· Ian R. Thomas and Dorothy Bruck, Waking Effectiveness of Alarms for Adults Who Are Hard of Hearing (Melbourne, Australia: Victoria University), National Fire Protection Association, 2007.

· 2020-04, “Audible Alarm Signal Waking Effectiveness: Literature Review,”

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal will increase the cost of construction. The estimated total installation price increase is $57 per sleeping room. This is based on the cost impact statement in the 2021 IFC proposal F144-18. Proposal F144-18 was submitted by the ICC Fire Code Action Committee (FCAC) and approved during the Committee Action Hearing.

RB123-22

RB124-22

IRC: R315.1.1, R315.1.2 (New)

Proponents: Jonathan Roberts, representing UL (jonathan.roberts@ul.com)

2021 International Residential Code

Revise as follows:

R315.1.1 Listings. Carbon monoxide alarms shall be *listed* and *labeled* in accordance with UL 2034. Combination carbon monoxide and smoke alarms shall be *listed* and *labeled* in accordance with UL 2034 and UL 217.

Add new text as follows:

R315.1.2 Installation. Carbon monoxide alarms shall be installed in accordance with their *listing* and the manufacturer's instructions.

Reason Statement: This proposal adds requirement for these devices to be listed and labeled, since listed alarms will include a listing mark (label). It also requires CO alarms to be installed in accordance with the listing and the manufacturer's installation instructions. "Listed" and "Labeled" are both defined terms.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Listed carbon monoxide alarms are already identified by a label, and there is no additional cost associated with verifying they are installed in accordance with their listing and the manufacturer's instructions.

RB124-22

RB125-22

IRC: R315.7.1, R315.7.2, NFPA Chapter 44

Proponents: John Swanson, representing National Fire Sprinkler Association (swanson@nfsa.org)

2021 International Residential Code

Revise as follows:

R315.7.1 General. Household carbon monoxide detection systems shall comply with NFPA ~~720~~ 72. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

R315.7.2 Location. Carbon monoxide detectors shall be installed in the locations specified in Section R315.3. These locations supersede the locations specified in NFPA ~~720~~ 72.

Delete without substitution:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

~~720—15~~ ~~Standard for the Installation of Carbon Monoxide (CO) Detectors and Warning Equipment~~

Reason Statement: NFPA 720 has been discontinued after the 2015 edition. All carbon monoxide alarm and detection criteria has been relocated and is now addressed in NFPA 72.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no technical changes to this code section. This proposal is being made to clarify the NFPA standard now addressing carbon monoxide alarms/detection equipment.

RB125-22

RB126-22

IRC: SECTION R111.1, R111.2, R111.3

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

SECTION R111
SERVICE UTILITIES

Revise as follows:

R111.1 Connection of service utilities. A *person* shall not make connections from a utility, a source of energy, fuel, ~~or~~ power, or water system or sewer system to any building or system that is regulated by this code for which a *permit* is required, until *approved* by the *building official*.

R111.2 Temporary connection. The *building official* shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel, ~~or~~ power, or the water system or sewer system for the purpose of testing systems for use under a temporary approval.

R111.3 Authority to disconnect service utilities. The *building official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards ~~set forth in Section R102.4~~ in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section R111.1 or R111.2. The *building official* shall notify the serving utility and where possible the *owner* or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnection, the *owner*, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

Reason Statement: ADM39-19 was a 2 part proposal. The revised text for service utilities was approved for IBC, IPC, IMC, IFGC, IEBC, IPSDC, IWUIC, ISPSC. The reason for disapproval by the IRC code development committee was "This would be in violation of the requirements of many public utilities across the country. (Vote 6-4)."
The BCAC respectively disagrees with the IRC development committee. The code official is not making the connection or disconnection, he just has the power to approve it were warranted. This is not over riding the public utility companies.

The main purpose of this proposal is coordination IRC with the other codes for the section on connection to services – including those coming from utilities or generated on-site

- R111.3 - Codes have references to codes and standards throughout the document, so a reference back to the list at the beginning of Chapter 1 is not inclusive.

- R111.1 and R111.2 - The list should include all the systems –including water and sewer.

The BCAC is working from the philosophy that ICC is a family of codes, so administrative requirements should be consistent across books. Most administrative and enforcement matters are the same for any code. Those matters unique for a specific code remain unchanged. This is one of a series of proposals being submitted relating to technical, editorial and organizational changes proposed for the Administrative chapters (Chapter 1) in all of the I-Codes.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change that provides consistency between I-codes. This is an administrative provision that provides options for code officials for system testing and response in emergencies. Delays in waiting for a response from utilities could be costly.

RB126-22

RB127-22

IRC: SECTION R316.1.1 (New), R316.1.2 (New), TABLE R316.1.2 (New), ICC Chapter 44 (New)

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

SECTION R316
FOAM PLASTIC

R316.1 General. The provisions of this section shall govern the materials, design, application, construction and installation of foam plastic materials.

Add new text as follows:

R316.1.1 Spray-applied foam plastic. Single- and multiple-component spray-applied foam plastic insulation shall comply with the provisions of Section R316 and ICC 1100-2018.

R316.1.2 Insulating sheathing. Foam plastic materials used as *insulating sheathing* shall comply with the provisions of Section R316 and the material standards in Table R316.1.2.

TABLE R316.1.2 MATERIAL STANDARDS FOR FOAM PLASTIC INSULATING SHEATHING

Expanded Polystyrene (EPS)	ASTM C578
Extruded Polystyrene (XPS)	ASTM C578
Polyisocyanurate	ASTM C1289

Add new standard(s) as follows:

ICC

International Code Council, Inc.
500 New Jersey Avenue NW 6th Floor
Washington, DC 20001

1100-2018 Standard for Spray-applied Foam Plastic Insulation

Staff Analysis: ICC 1100-2018, Standard Practice for the Installation of Roof Mounted Photovoltaic Arrays on Steep-Slope Roofs, is already referenced in the IBC. This is simply a new occurrence of the reference in the I-Codes

Reason Statement: This proposal provides references to applicable standards that govern material characteristics in addition to the requirements in Section R316. This proposal also coordinates with identical provisions in the 2021 IBC Section 2603.1 including revisions that were approved as submitted by FS152-21 for the 2024 IBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal consolidates reference material standards that are applicable to foam plastic materials already addressed in the code.

RB127-22

RB128-22

IRC: R316.3

Proponents: Tim Earl, representing Self (tearl@gbhint.com)

2021 International Residential Code

Revise as follows:

R316.3 Surface burning characteristics. Unless otherwise allowed in Section R316.5, foam plastic, or foam plastic cores used as a component in manufactured assemblies, used in building construction shall comply with Section R316.3.1 or R316.3.2. Loose-fill-type foam plastic insulation shall be tested as board stock for the flame spread index and *smoke-developed index*.

> **Exception:** Spray foam plastic insulation more than 4 inches (102 mm) in thickness shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450 where tested at a thickness of 4 inches (102 mm) and at the density intended for use. Such spray foam plastic shall be separated from the interior of a building by $^{1}/_{2}$-inch (12.7 mm) gypsum wallboard or by a material that ~~has been tested in accordance with NFPA 275, and shall meet the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test.~~ <u>is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.</u>

R316.4 Thermal barrier. Unless otherwise allowed in Section R316.5, foam plastic shall be separated from the interior of a building by an *approved* thermal barrier of not less than $^{1}/_{2}$-inch (12.7 mm) gypsum wallboard, $^{23}/_{32}$-inch (18.2 mm) *wood structural panel* or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

Reason Statement: This is editorial cleanup. The exception to R316.3 and the text of R316.4 say the same thing in different ways. The language in R316.4 is better code language, so this proposal revises the exception to R316.3 to match.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple editorial cleanup.

RB128-22

RB129-22

IRC: R316.6

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Residential Code

Revise as follows:

R316.6 Specific approval. Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically *approved* on the basis of one of the following *approved* tests: NFPA 286 with the acceptance criteria of Section R302.9.4, FM 4880, UL 1040 or UL 1715~~, or fire tests related to actual end-use configurations~~. Approval shall be based on a large-scale test reflecting the actual end-use configuration and shall be performed on the finished foam plastic assembly in the maximum thickness intended for use. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Reason Statement: This change correlates with a change made to the IBC by F60-21, Part II, which eliminated a loophole in the IBC that permitted creative testing of foam plastics without use of controls in Chapter 1 that are applicable to every other case where someone would want to propose an alternative method or material. When this "loose" code text was added to legacy codes, standardized testing of foam plastics had not yet reached maturity. Today however, we have several recognized and standardized tests for this purpose cited in the code text and additional options developed by evaluation services that can be considered as alternative methods under Chapter 1. Continuing to maintain "loose" text in this section that circumvents Chapter 1 is unjustified. If the general alternative methods provisions are good enough for everything else in the code, there is no reason for foam plastics to be treated differently. The technical committee agreed with this in Group A (vote 13-0), and the members rejected a public comment asking for that action to be overturned and upheld the committee in the OGCV.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not add any requirements but deletes a permitted approach for approval of foam plastic materials. There is the potential that materials that had been approved based on non-standard tests would have to be retested.

RB129-22

RB130-22

IRC: R316.6, R316.6.1 (New)

Proponents: Eric Banks, representing North American Modern Building Alliance (NAMBA) (eric.banks@ewbanksconsulting.com)

2021 International Residential Code

Revise as follows:

R316.6 Specific approval. Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically *approved* on the basis of one of the following ~~*approved*~~ tests:

1. NFPA 286 with the acceptance criteria of Section R302.9.4,
2. FM 4880,
3. UL 1040, or
4. UL 1715~~, or fire tests related to actual end-use configurations.~~

Alternatively, foam plastics shall be permitted on the basis of the other approved large scale test.

R316.6.1 Conditions of testing and approval. Approval shall be based on tests of the actual end-use configuration ~~and shall be performed on~~ of the finished foam plastic assembly ~~in~~ with the foam plastic installed at the maximum thickness intended for use. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use. Foam plastics used as interior finish on the basis of these tests shall also conform to the flame spread and smoke developed requirements of Section R302.9.

Reason Statement: This proposal is provided to improve and clarify guidance provided under IRC Section R316.6 regarding requirements for large scale tests required for the Specific Approval of foam plastics not meeting the requirements of Section R316.3 (surface burning characteristics), Section R316.4 (thermal barrier), and Section R316.5 (specific requirements).
Section R316.6 identifies five (5) testing options for the specific approval of foam plastics; four (4) standard test methods and, "…fire tests related to actual end-use configurations." Tests other than the four identified methods become necessary when the four standard methods are either inappropriate, inadequate, or cannot be configured to evaluate the actual intended end-use configuration. This proposed revision clarifies a hierarchy for testing whereby the four standard test methods are the requirement with the use of other large-scale tests (standard or non-standard) as a permitted alternate that must be *approved* by the building official.

The proposal also restructures Section R316.6 to (1) present the four identified standard test methods in a list format and (2) move requirements regarding conditions of testing and approval to a new sub-section R316.6.1. Moving the conditions of testing and approval in this fashion ensures their application to any testing conducted under Section R316.6.

Finally, a reference to Section R302.9 is included to ensure that conformance with interior finish requirements, when applicable, is required for these Specific Approvals.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

RB130-22

RB131-22

IRC: R316.8

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R316.8 Wind resistance. Foam plastic insulation complying with ASTM C578 and ASTM C1289 and used as exterior wall sheathing on framed wall assemblies shall comply with SBCA FS 100 for wind pressure resistance unless installed directly over or under a sheathing material that is separately capable of resisting the wind load or otherwise exempted from the scope of SBCA FS 100.

Reason Statement: This proposal adds “under” sheathing which is another method by which foam sheathing is installed with structural sheathing materials that are separately capable of resisting the wind load. This addresses an omission when Section R316.8 was first brought into the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an option for installation of foam sheathing to resist wind load and will not increase cost.

RB131-22

RB132-22

IRC: R317.1.1, R317.1.1.1 (New)

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R317.1.1 Field treatment. Field-cut ends, notches and drilled holes of preservative-treated wood shall be treated in the field in accordance with Section R317.1.1.1 or AWPA M4.

Add new text as follows:

R317.1.1.1 Preservatives. Field treatment preservatives shall be the same type as the wood treatment and applied in accordance with the field-treatment manufacturer's installation instructions. Where the type of preservative of the treated wood cannot be effectively applied as a field treatment, the following treatments shall be permitted:

1. Copper naphthenate preservatives containing a minimum of 1.0% copper metal shall be permitted in above or below grade, interior or exterior applications.
2. Oilborne oxine copper preservatives containing a minimum 0.675% oxine copper (0.12% copper metal) shall be permitted in above grade, interior or exterior applications.
3. Inorganic boron preservatives having a minimum concentration of 1.5% shall be permitted for above grade, interior applications.
4. Coal-tar roofing cement complying with ASTM D5643 shall be permitted for treatment of holes in above or below grade, interior or exterior applications.

Reason Statement: The reference to the AWPA M4 standard for field treatment of treated lumber has been in the IRC since the 2006 edition. However, 15 years later, it is far from an industry standard. Very few builders and even less building authorities are requiring field treatment or even aware of it. Unlike ICC, NFPA, UL, AWC, AISI, and many other standard publishers, the AWPA M4 standard is not viewable for free and is currently $40. It is less than three pages of information and very little of it is of significance to the residential construction industry. This $40 standard is essentially the building code (i.e. government) mandated installation instructions for treated lumber available at every lumberyard and home improvement store across the country. Treated lumber is heavily purchased by average DIY owners and deck builders, yet the instructions for proper installation to achieve the expected useful life is behind a paywall and inconvenient to access.
The instructions to build an entire house and deck are available for free view in the 2021 IRC. In the preface of the IRC under the title "Effective Use of the International Residential Code" the text twice refers to the IRC in this manner: "It has been said that the IRC is the complete cookbook for residential construction." "This is consistent with the cookbook philosophy of the IRC." I do not believe the IRC is effective as a cookbook if a common ingredient requires the purchase of another cookbook.

It is, however, appropriate for the IRC to reference the many manufacturing standards that it does, such as the AWPA U1 standard. The purchase and use of these standards are not required by the consumer end user. Investment in proper manufacturing standards is an investment in a business with a financial return. For nearly all other products, the manufacturer is referenced for the installation instructions, and they are generally provided with the purchase of the product. Treated lumber though… not the same.

As for the copyright of the AWPA standard, this proposal is written in different form and without many of the unnecessary details in the M4 standard. Terms have been changed, requirements simplified and minimized, and the general presentation of the information is formatted uniquely. The knowledge of appropriate field treatments for preservative treated lumber is not solely in the possession of the AWPA. The following information (below) can be found for free from the United States Forest Service, a Federal Government entity and thus public domain information. However, it is my expectation that the AWPA membership and leadership will recognize the need to make this information more readily available to the public and recognize that the IRC is the most appropriate document to do so. I believe in the professionalism of their membership and that they will positively contribute their knowledge to the development of the IRC, ultimately helping their customers use their treated lumber as effectively and correctly as possible.

One important note. The AWPA M4 standard requires copper naphthenate to have a minimum of 2% copper, but allows only 1% where 2% formulations are not regionally available. It does not seem appropriate to have different minimum standards based on the availability of a retail product to a region. If a 2% copper content product is not available everywhere in the US, it should not be the minimum. The end user of this code will purchase what is available to them. It is unlikely to presume they will be offered two choice or investigate the difference between them. Field treatment is not even standard practice, so a 1% formulation that's actually used is better than nothing.

The following information is available for FREE from the United States Forest Service at this link:

https://www.fs.fed.us/t-d/pubs/htmlpubs/htm06772809/page02.htm#oc

Copper Naphthenate

Copper naphthenate is effective when used in ground contact, water contact, or aboveground. It is not standardized for use in saltwater applications. Copper naphthenate's effectiveness as a preservative has been known since the early 1900s, and various formulations have been used commercially since the 1940s. It is an organometallic compound formed as a reaction product of copper salts and naphthenic acids derived from petroleum. Unlike other commercially applied wood preservatives, small quantities of copper naphthenate can be purchased at retail hardware stores and lumberyards. Cuts or holes in treated wood can be treated in the field with copper naphthenate.

Wood treated with copper naphthenate has a distinctive bright green color that weathers to light brown. The treated wood also has an odor that dissipates somewhat over time. Depending on the solvent used and treatment procedures, it may be possible to paint wood treated with copper naphthenate after it has been allowed to weather for a few weeks.

Copper naphthenate can be dissolved in a variety of solvents. The heavy oil solvent (specified in AWPA Standard P9, Type A) or the lighter solvent (AWPA Standard P9, Type C) are the most commonly used. Copper naphthenate is listed in AWPA standards for treatment of major softwood species that are used for a variety of wood products. It is not listed for treatment of any hardwood species, except when the wood is used for railroad ties. The minimum copper naphthenate retentions (as elemental copper) range from 0.04 pounds per cubic foot (0.6 kilograms per cubic meter) for wood used aboveground, to 0.06 pounds per cubic foot (1 kilograms per cubic meter) for wood that will contact the ground and 0.075 pounds per cubic foot (1.2 kilograms per cubic meter) for wood used in critical structural applications

When dissolved in No. 2 fuel oil, copper naphthenate can penetrate wood that is difficult to treat. Copper naphthenate loses some of its ability to penetrate wood when it is dissolved in heavier oils. Copper naphthenate treatments do not significantly increase the corrosion of metal fasteners relative to untreated wood.

Copper naphthenate is commonly used to treat utility poles, although fewer facilities treat utility poles with copper naphthenate than with creosote or pentachlorophenol. Unlike creosote and pentachlorophenol, copper naphthenate is not listed as an RUP by the EPA. Even though human health concerns do not require copper naphthenate to be listed as an RUP, precautions such as the use of dust masks and gloves should be used when working with wood treated with copper naphthenate.

Oxine Copper (Copper-8-Quinolinolate)

Oxine copper is effective when used aboveground. Its efficacy is reduced when it is used in direct contact with the ground or with water. It has not been standardized for those applications. Oxine copper (copper-8-quinolinolate) is an organometallic compound. The formulation consists of at least 10 percent copper-8-quinolinolate, 10 percent nickel-2-ethylhexanoate, and 80 percent inert ingredients. It is accepted as a standalone preservative for aboveground use to control sapstain fungi and mold and also is used to pressure-treat wood.

Oxine copper solutions are greenish brown, odorless, toxic to both wood decay fungi and insects, and have a low toxicity to humans and animals. Oxine copper can be dissolved in a range of hydrocarbon solvents, but provides protection much longer when it is delivered in heavy oil. Oxine copper is listed in the AWPA standards for treating several softwood species used in exposed, aboveground applications. The minimum specified retention for these applications is 0.02 pounds per cubic foot (0.32 kilograms per cubic meter, as elemental copper).

Oxine copper solutions are somewhat heat sensitive, which limits the use of heat to increase penetration of the preservative. However, oxine copper can penetrate difficult-to-treat species, and is sometimes used to treat Douglas-fir used aboveground in wooden bridges and deck railings. Oilborne oxine copper does not accelerate corrosion of metal fasteners relative to untreated wood. A water-soluble form can be made with dodecylbenzene sulfonic acid, but the solution corrodes metals. Oxine copper is not widely used by pressure-treatment facilities, but is available from at least one plant on the West Coast.

Wood treated with oxine copper presents fewer toxicity or safety and handling concerns than oilborne preservatives that can be used in ground contact. Sometimes, it is used as a preservative to control sapstain fungi or incorporated into retail stains for siding, shingles, and cabin logs. Oxine copper is listed by the U.S. Food and Drug Administration (FDA) as an indirect additive that can be used in packaging that may come in direct contact with food.

Precautions such as wearing gloves and dust masks should be used when working with wood treated with oxine copper. Because of its somewhat limited use and low mammalian toxicity, there has been little research to assess the environmental impact of wood treated with oxine copper.

Borates

Borate compounds are the most commonly used unfixed waterborne preservatives. Unfixed preservatives can leach from treated wood. They are used for pressure treatment of framing lumber used in areas with high termite hazard and as surface treatments for a wide range of wood products, such as cabin logs and the interiors of wood structures. They are also applied as internal treatments using rods or pastes. At higher rates of retention, borates also are used as fire-retardant treatments for wood.

Boron has some exceptional performance characteristics, including activity against fungi and insects, but low mammalian toxicity. It is relatively inexpensive. Another advantage of boron is its ability to diffuse with water into wood that normally resists traditional pressure treatment. Wood treated with borates has no added color, no odor, and can be finished (primed and painted).

While boron has many potential applications in framing, it probably is not suitable for many Forest Service applications because the chemical will leach from the wood under wet conditions. It may be a useful treatment for insect protection in areas continually protected from water.

Inorganic boron is listed as a wood preservative in the AWPA standards, which include formulations prepared from sodium octaborate, sodium tetraborate, sodium pentaborate, and boric acid. Inorganic boron is also standardized as a pressure treatment for a variety of species of softwood lumber used out of contact with the ground and continuously protected from water. The minimum borate (B2O3) retention is 0.17 pounds per cubic foot (2.7 kilograms per cubic meter). A retention of 0.28 pounds per cubic foot (4.5 kilograms per cubic meter) is specified for areas with Formosan subterranean termites.

Borate preservatives are available in several forms, but the most common is disodium octaborate tetrahydrate (DOT). DOT has higher water solubility than many other forms of borate, allowing more concentrated solutions to be used and increasing the mobility of the borate through the wood. With the use of heated solutions, extended pressure periods, and diffusion periods after treatment, DOT can penetrate species that are relatively difficult to treat, such as spruce. Several pressure treatment facilities in the United States use borate solutions.

Although borates have low mammalian toxicity, workers handling borate-treated wood should use standard precautions, such as wearing gloves and dust masks. The environmental impact of borate-treated wood for construction projects in sensitive areas has not been evaluated. Because borate-treated wood is used in areas protected from precipitation or water, little or no borate should leach into the environment. Borates have low toxicity to birds, aquatic invertebrates, and fish. Boron occurs naturally at relatively high levels in the environment. Because borates leach readily, extra care should be taken to protect borate-treated wood from precipitation when it is stored at the jobsite. Precipitation could deplete levels of boron in the wood to ineffective levels and harm vegetation directly below the stored wood.

Borate-treated wood should be used only in applications where the wood is kept free from rainwater, standing water, and ground contact.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will decrease the cost of the knowledge necessary for code compliant installations of treated lumber. This is a design cost. Therefore the overall cost of construction will be reduced.

RB132-22

RB133-22

IRC: R317.3, ASTM Chapter 44

Proponents: Rick Allen, representing ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R317.3 Fasteners and connectors in contact with preservative-treated and fire-retardant-treated wood. Fasteners, including nuts and washers, and connectors in contact with preservative-treated wood and fire-retardant-treated wood shall be in accordance with this section. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A153. The coating weight for zinc-coated nails shall be in accordance with ASTM A153 Class D (1 oz / ft²) or ASTM A641 Class 3S (1 oz / ft²). Stainless steel driven fasteners shall be in accordance with the material requirements of ASTM F1667.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M~~—09a(2014)~~ 2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, ASTM A641/A641M-2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Galvanized nails are made from wire. The wire may be uncoated or galvanized. Nails that are made from uncoated wire are hot-dip galvanized after forming to specification A153 Class D which provides a minimum average coating weight of 1 oz./ft². Nails that are made from galvanized wire are made from wire coated to specification A641 Class 3S which provides a minimum average coating weight of 1 oz/ft². Although commercially available and used for many years, Class 3S was added to Specification A641 in 2019

Specification A641 Class 3S was added to ASTM F1667 in 2020.

Bibliography: ASTM F1667/F1667M-21a: Standard Specification for Driven Fasteners: Nails, Spikes and Staples
ASTM A153/A153M-16a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A641/A641-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Nails have been made by both methods for a very long time. This just formalizes what is/has been done and will not add cost to construction.

RB133-22

RB134-22

IRC: SECTION R320.1, R320.3(New)

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com)

2021 International Residential Code

SECTION R320
ACCESSIBILITY

Revise as follows:

R320.1 ~~Scope~~ <u>Dwelling units or sleeping units</u>. Where there are four or more *dwelling units* or *sleeping units* in a single structure, the provisions of Chapter 11 of the International Building Code for Group R-3 shall apply.

Exception: Owner-occupied *lodging houses* with five or fewer guestrooms are not required to be accessible.

R320.2 Live/work units. In *live/work units,* the nonresidential portion shall be accessible in accordance with Sections 508.5.9 and 508.5.11 of the *International Building Code*. In a structure where there are four or more *live/work units,* the dwelling portion of the *live/work unit* shall comply with Section 1108.6.2.1 of the *International Building Code*.

Add new text as follows:

<u>**R320.3 Care facilities.** Where care facilities are permitted to be constructed in accordance with this code, the portions of the dwelling used to operate a business providing care shall be accessible in accordance with Chapter 11 of the International Building Code.</u>

Reason Statement: The Department of Justice Americans with Disabilities Act (ADA) regulations require home businesses that are defined as "public accommodations" or "commercial facilities" to be accessible. Care facilities would be defined under the ADA as public accommodations, either Category #6 (a service establishment) or Category #11 (a day care center, senior citizen center, homeless shelter, or other social service center establishment). Areas of the home that are not part of a public accommodation or commercial facility are not required to be accessible. A link to these requirements is included in the bibliography. The only exception to these ADA requirements is reflected in Exception #1 to Section R101.2 and the Exception to R320.1 for owner-occupied transient lodging facilities.

Change to the title of R320.1

Section R320.1 does not limit application of subsequent sections e.g., R320.2 because these sections have equal weight (i.e., one is not a subsection of the other). For this reason, the title "Scope" is misleading in that it does not establish the scope of the entire section. We elected to use the title "Dwelling units or sleeping units" because it describes the units covered by the provision and coordinates well with the titles of the subsequent section(s).

New R320.2

We have elected to describe the non-residential portion of the dwellings as a "business" operated to

provide care. We have done this so as not to net-up facilities where people elect to co-cohabitate and share resources such as care givers, as with a family that does not provide care to applicants that are members of the public. Such an arrangement would not fall into the DOJ category of "public accommodation" because it is not a business with services available to the public.

Consistent with the ADA, we have proposed to require only those portions of one- and two-family dwellings used to provide care to comply with Chapter 11 of the International Building Code. New construction and alterations to portions of the dwelling unit or single-family dwelling that are not part of the care facility are outside the scope of the IBC and would not be required to be accessible.

It has been argued that the facilities addressed in proposed new Section R320.3 Care facilities are live/work units addressed in Section R320.2. While we agree that a care facility could be constructed as a live/work unit, the IRC does not require this. Exceptions 3, 4, and 5 to Section R101.2 Scope permit certain types of care facilities to comply with the IRC provided they have an automatic sprinkler system. Exceptions 3, 4, and 5 do not require compliance with IBC Section 508.5 as does Exception 1. Furthermore, Exception #1 only addresses live/work units located in "townhouses" which are unlikely to include care facilities of any type. IBC Section 508.5.1 imposes a number of limitations on live/work units not imposed by the IRC on the care facilities addressed by Section R101.2 including: a 3,000 square foot max. limitation where the nonresidential portion is not greater than 50 percent of the overall area; location of the non-residential portion on the "first" or "main" floor; and, no more than five non-residential workers or employees can occupy the non-residential area(s).

Exceptions 3, 4 and 5 to Section R102.1 appear to exempt care facilities for five or fewer persons without any of the limitations applicable to live/work units and, more importantly, without reference IBC Sections 508.5.9 Accessibility (for live/work units) or Chapter 11, including Section 1108.6.2.1 also requiring accessibility to the non-residential portions of a live/work unit. This proposal remedies this inconsistency with the Americans with Disabilities Act.

Bibliography: See 28 CFR 36.207 Places of public accommodation located in a private residence; 28 CFR 36.401(b) Commercial facilities located in a private residence; and the definition of "place of public accommodation" at 28 CFR 36.104. All are available at https://www.ada.gov/regs2010/titleIII_2010/titleIII_2010_regulations.htm.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Under the ADA, when someone designs or constructs a private home containing a public accommodation or commercial facility, the portions of the home used for the public accommodation or commercial facility must be accessible. Similarly, if a home is altered to include a public accommodation or commercial facility, the alteration must comply with the ADA Standards unless technically infeasible. Consequently, these facilities are covered by federal law and failure to comply with the federal law has a potential cost to the owner, operator, and individuals involved in the design and construction of such facilities.

RB134-22

RB135-22

IRC: SECTION R321.1.1 (New), R321.1.1.1 (New), R321.1.1.2 (New)

Proponents: Kevin Brinkman, representing National Elevator Industry, Inc. (klbrinkman@neii.org)

2021 International Residential Code

SECTION R321
ELEVATORS AND PLATFORM LIFTS

R321.1 Elevators. Where provided, passenger elevators, limited-use and limited-application elevators or private residence elevators shall comply with ASME A17.1/CSA B44.

Add new text as follows:

<u>**R321.1.1** **Private Residence Elevators.** The design, construction, and installation of private residence elevators installed within a residential unit or providing access to one individual dwelling unit shall conform to ASME A17.1/CSA B44, Section 5.3.</u>

<u>**R321.1.1.1** **Hoistway Enclosures..** Hoistway enclosures for private residence elevators shall comply with ASME A17.1/CSA B44, Requirement 5.3.1.1</u>

<u>**R321.1.1.2** **Hoistway Opening Protection.** Hoistway landing doors for private residence elevators shall comply with ASME A17.1/CSA B44, Requirements 5.3.1.8.1 through 5.3.1.8.3.</u>

R321.2 Platform lifts. Where provided, platform lifts shall comply with ASME A18.1.

R321.3 Accessibility. Elevators or platform lifts that are part of an accessible route required by Chapter 11 of the International Building Code, shall comply with ICC A117.1.

Reason Statement: Excessive clearances between the car door and the hoistway door on private residence elevators presents a serious hazard to young children and slight built adolescents or adults. Proper installation of the hoistway landing doors is critical to ensuring the gap between the hoistway door and the car door or gate does not exceed a 4 inch gap. The 4 inch maximum clearance is based on anthropometric data for young children. However, private residence elevators are not inspected by elevator inspectors in most jurisdictions and the few jurisdictions that do inspect them are mostly limited to the installation of new equipment. On the other hand, almost all private residence construction is inspected by construction officials.
The General Contractor typically constructs the hoistway enclosure and installs the hoistway doors on private residence elevators. Ensuring the installation of the hoistway doors to the 0.75 inch requirement, will greatly increase the likelihood that the clearance between the hoistway and car doors will comply with the 4 inch gap. The proposed language increases awareness for the building designers, contractors and building code officials to the need to mitigate this serious hazard, while retaining the actual code requirements in A17.1/B44.

The proposed changes are consistent with similar changes approved for Chapter 30 of the IBC during the Group A hearings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no additional cost because these requirements are already contained in the A17.1/B44 code referenced in Section 3001.3. This is being added to alert builders to these requirements.

RB135-22

RB136-22

IRC: R322.1.6

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Revise as follows:

R322.1.6 Protection of mechanical, plumbing and electrical systems. Electrical systems, *equipment* and components; heating, ventilating, air-conditioning; plumbing *appliances* and plumbing fixtures; *duct systems*; and other service *equipment* shall be located at or above the elevation required in Section R322.2 or R322.3. <u>Replacement of exterior equipment and exterior appliances damaged by flood shall meet the requirements of this section.</u> If replaced as part of a substantial improvement, electrical systems, *equipment* and components; heating, ventilating, air-conditioning and plumbing *appliances* and plumbing fixtures; *duct systems*; and other service *equipment* shall meet the requirements of this section. Systems, fixtures, and *equipment* and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

> **Exception:** Locating electrical systems, *equipment* and components; heating, ventilating, air-conditioning; plumbing *appliances* and plumbing fixtures; *duct systems*; and other service *equipment* is permitted below the elevation required in Section R322.2 or R322.3 provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the required elevation in accordance with ASCE 24. Electrical wiring systems are permitted to be located below the required elevation provided that they conform to the provisions of the electrical part of this code for wet locations.

Reason Statement: Many buildings in floodplain were built before communities started regulating and requiring buildings to be elevated and constructed to minimize exposure to flooding. During a flood, exterior equipment that serves those buildings gets damaged, even when the building itself is not substantially damaged. When homes are flooded and elevated exterior equipment remains functional, clean up and drying out are easier and faster. This means dangerous mold conditions are less likely to develop and families can more quickly move back into safer homes.
The code change requires replacement exterior equipment damaged by flood to be raised to or above the elevation required based on flood zone, unless the replacement equipment meets the limitations of the exception to be located below those elevations. Methods used to raise replacement exterior equipment are the same as the methods used when equipment is installed to serve new construction (pedestal, platforms, or platforms that are cantilevered from or knee braced to the structure). Photographs below show typical methods of elevating equipment that serves dwellings.

FEMA's Mitigation Assessment Team reports prepared after some significant flood events document widespread damage to non-elevated exterior equipment. Elevating equipment at the time of replacement also saves homeowners from having to pay for replacement equipment after the subsequent flood event.

Photographs are provided courtesy of: FEMA P-348, Rebecca Quinn, and Rebecca Quinn

Cost Impact: The code change proposal will increase the cost of construction
When nonconforming dwellings have non-elevated exterior equipment, this code change proposal requires compliance when the exterior equipment is replaced after being damaged by flooding. Most equipment is elevated; although most typical exterior equipment is not designed to satisfy the requirements and limitations of the exception, that option remains available. Increased costs incurred would be the cost of the pedestal or platform on which the replacement equipment is raised elevated and minor costs to extend wiring and piping, if necessary. The actual cost increase depends on the method of elevation (pedestal, platform, cantilevered/knee braced platform), how high above grade is necessary to meet the elevation requirements of R322.2 or R322.3, as applicable, and other factors such as soil type. The cost of a professionally built 6-foot high wooden platform is approximately $500, with an additional estimated $100 for 10 feet of copper refrigerant line, for a total of approximately $600. At least two long-term benefits off-set the upfront additional installation costs: damage avoided and cost of complete replacement if flooded, and faster drying, clean-up, and reoccupancy after subsequent flood events.

RB136-22

RB137-22

IRC: R322.2.1, R322.3.2

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Revise as follows:

R322.2.1 Elevation requirements.

1. Buildings and structures in flood hazard areas, not including flood hazard areas designated as Coastal A Zones, shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.
2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including *basement*) elevated to a height above the highest adjacent *grade* of not less than the depth number specified in feet (mm) on the FIRM plus 1 foot (305 mm), or not less than 3 feet (915 mm) if a depth number is not specified.
3. *Basement* floors that are below *grade* on all sides shall be elevated to or above base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.
4. Attached garages and carports ~~Garage and carport floors~~ shall comply with one of the following:

   4.1. ~~They~~ The floors shall be elevated to or above the elevations required in Item 1 or Item 2, as applicable.

   4.2. ~~They~~ The floors shall be at or above *grade* on not less than one side. Where ~~a~~ an attached garage or carport is enclosed by walls , the walls shall have flood openings that comply with Section R322.2.2 and the attached garage or carport shall be used solely for parking, building access or storage.

5. Detached accessory structures and detached garages shall comply with either of the following:

   5.1. The floors shall be elevated to or above the elevations required in Item 1 or Item 2, as applicable.

   5.2. The floors are permitted below the elevations required in Item 1 or Item 2, as applicable, provided such detached structures comply with all of the following:

   5.2.1. Are used solely for parking or storage.

   5.2.2. Are one story and not larger than 600 square feet (55.75 m^2).

   5.2.3. Are anchored to resist flotation, collapse or lateral movement resulting from design flood loads.

   5.2.4. Have flood openings that comply with Section R322.2.2.

   5.2.5. Are constructed of flood damage-resistant materials that comply with Section R322.1.8.

   5.2.6. Have mechanical, plumbing and electrical systems, if applicable, that comply with Section R322.1.6.

Exception: Enclosed areas below the elevation required in this section, including *basements* with floors that are not below *grade* on all sides, shall meet the requirements of Section R322.2.2.

R322.3.2 Elevation requirements.

1. Buildings and structures erected within coastal high-hazard areas and Coastal A Zones, shall be elevated so that the bottom of the lowest horizontal structural members supporting the lowest floor, with the exception of piling, pile caps, columns, grade beams and bracing, is elevated to or above the base flood elevation plus 1 foot (305 mm) or the design flood elevation, whichever is higher.
2. *Basement* floors that are below *grade* on all sides are prohibited.
3. Attached garages ~~Garages~~ used solely for parking, building access or storage, and carports shall comply with Item 1 or shall be at or above *grade* on not less than one side and, if enclosed with walls, such walls shall comply with Item ~~6~~ 7.

4. Detached accessory structures and detached garages shall comply with either of the following:
   4.1. The bottom of the lowest horizontal structural member supporting the floors shall be elevated to or above the elevation required in Item 1.
   4.2. The floors are permitted below the elevations required in Item 1, provided such detached structures comply with all of the following:
      4.2.1. Are used solely for parking or storage.
      4.2.2. Are one story and not larger than 100 square feet (9.29 m^2).
      4.2.3. Are anchored to resist flotation, collapse or lateral movement resulting from design flood loads.
      4.2.4. Are constructed of flood damage-resistant materials that comply with Section R322.1.8.
      4.2.5. Have mechanical, plumbing and electrical systems, if applicable, that comply with Section R322.1.6.

~~4.~~ 5. The use of fill for structural support is prohibited.

~~5.~~ 6. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.

~~6.~~ 7. Walls and partitions enclosing areas below the elevation required in this section shall meet the requirements of Sections R322.3.5 and R322.3.6.

Reason Statement: The regulations of the National Flood Insurance Program require all structures to be elevated or dry floodproofed (nonresidential only). The regulations do not explicitly address accessory structures and detached garages. FEMA guidance issued in 1993 (NFIP Technical Bulletin 7) states that communities must use variances to authorize non-elevated detached accessory structures that are wet floodproofed. Wet floodproofing measures minimize flood damage by allowing certain areas to flood, relieving hydrostatic loads and using materials resistant to flood damage.
In 2020, FEMA issued a policy and bulletin specifying requirements for communities to issue permits for non-elevated, wet floodproofed accessory structures rather than variances. Notably, the policy and bulletin establish size limits as a function of flood zone. In flood hazard areas identified as Zone A (all zones that start with “A”), the size limit is one-story two car garage (600 sq ft) and in areas identified as Zone V (start with “V”), the size limit is 100 sq ft. Detached accessory structures that are larger than these sizes must fully comply with the elevation or dry floodproofing requirements for buildings in flood hazard areas. Alternatively, communities may consider individual variances for those larger accessory structures (local floodplain management regulations have criteria for considering variances). FEMA expects to reissue Technical Bulletin 7 in early 2022, revised to be consistent with the policy.

The proposal adds provisions to the elevation requirements of Section R322, Flood-Resistant Construction, specifically to allow wet floodproofed accessory structures and detached garages in flood hazard areas with floors below the required lowest floor elevations. The IRC Section 105.2 states that accessory structures smaller than 200 square feet are exempt from permits but must not “be done in any manner in violation” of the code. Therefore, strictly read, accessory structures in flood hazard areas must be fully elevated or dry floodproofed. This proposal provides some relief to full compliance by allowing some accessory structures to be wet floodproofed (based on size). The proposal also modifies the requirements of R322.2.1 and R322.3.2 to apply to attached garages, with no size limits. Note that for floodplain management purposes, enclosures under elevated buildings used solely for parking, storage and building access are enclosures, not garages.

The proposal specifies that detached accessory structures and detached garages are allowed below the elevations required for other structures (or without dry floodproofing in Zone A/AE) if wet floodproofed and:·

- In flood hazard areas other than coastal high hazard areas, the structures are one-story and not larger than 600 sq. ft. (approximately a two-car garage). Detached garages and accessory structures larger than the size limit are allowed if elevated and otherwise comply with the requirements or if dry floodproofed (treated as nonresidential), or if communities authorize them by variance. Note that Section R403.1.4.1 does not require footings for “free-standing accessory structures with an area of 600 square feet or less, of light-frame construction” to extend meet the frost protection requirements.
- In coastal high hazard areas (Zone V), the structures are not larger than 100 sq. ft. Note that breakaway walls and flood openings are not required. Detached accessory structures larger than the size limit are allowed if elevated and otherwise comply with the requirements, or if communities authorize them by variance.

Bibliography: The Floodplain Management Agricultural Structures Policy and FEMA P-2140, *Floodplain Management Bulletin: Requirements for Agricultural Structures and Accessory Structures*, are available here: https://www.fema.gov/media-collection/floodplain-management-requirements-agricultural-and-accessory-structures

Cost Impact: The code change proposal will decrease the cost of construction
Costs for many detached accessory structures will decrease because they will no longer be required to be elevated or dry floodproofed when they are smaller than the specified limits, and there are cost savings because communities will not be expected to approve non-elevated accessory structures by variance. The code change proposal limits the size of detached accessory structures and detached garages that can be wet floodproofed rather than elevated or dry floodproofed. An increase in costs occurs only when property owners want accessory structures or detached garages in flood hazard areas that are larger than the specified limits because those larger structures must be installed on elevated foundations (or dry floodproofed in Zone A/AE), unless approved by individually considered variances to be wet floodproofed. However, it is

reasonable to assume that the larger the size, the more costly would be the losses resulting from flooding. Additional costs for those larger structures to be elevated depend on the type of foundation chosen. In the report “Natural Hazard Mitigation Saves,” the National Institute of Building Sciences estimated that for elevating a single-family home, the cost is $33 per foot of elevation per pile and $325 per foot of elevation for stairs. Therefore, for a 1152 square foot accessory structure (24 ft by 48 ft) with 15 piles spaced 12 feet on center, the added cost of elevation would be $820 per foot of elevation. It is reasonable to assume the cost would be less when more typical pier foundation elements and anchoring are used.

Bibliography: Natural Hazard Mitigation Saves (2019), National Institute of Building Sciences. https://www.nibs.org/projects/natural-hazard-mitigation-saves-2019-report.

RB137-22

RB138-22

IRC: R322.2.2, R322.3.5

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Revise as follows:

R322.2.2 Enclosed area below required elevation. Enclosed areas, including crawl spaces, that are below the elevation required in Section R322.2.1 shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria and are installed in accordance with Section R322.2.2.1:

    2.1. The total net area of nonengineered openings shall be not less than 1 square inch (645 mm^2) for each square foot (0.093 m^2) of enclosed area where the enclosed area is measured on the exterior of the enclosure walls, or the openings shall be designed as engineered openings and the *construction documents* shall include a statement by a registered *design professional* that the design of the openings will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters as specified in Section 2.7.2.2 of ASCE 24.

    2.2. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall.

    2.3. The presence of louvers, blades, screens and faceplates or other covers and devices shall allow the automatic flow of floodwater into and out of the enclosed areas and shall be accounted for in the determination of the net open area.

Exceptions: The following shall not be required to comply with this section:

1. Elevator shafts.
2. Utility chases that protect utility lines from freezing, provided the utility chases are the minimum size necessary to protect the utility lines and do not provide access for a person to enter the space.

R322.3.5 Walls below required elevation. Walls and partitions are permitted below the elevation required in Section R322.3.2, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a resistance of not less than 10 (479 Pa) and not more than 20 pounds per square foot (958 Pa) as determined using allowable stress design; or
4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa), as determined using allowable stress design, the *construction documents* shall include documentation prepared and sealed by a registered *design professional* that:

    4.1. The walls and partitions below the required elevation have been designed to collapse from a water load less than that which would occur during the base flood.

    4.2. The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on structural and nonstructural building components. Water-loading values used shall be those associated with the design flood. Wind-loading values shall be those required by this code.

5. Walls intended to break away under flood loads as specified in Item 3 or 4 have flood openings that meet the criteria in Section R322.2.2, Item 2.

Exceptions: The following shall not be required to comply with this section:

1. Elevator shafts.

2. Utility chases that protect utility lines from freezing, provided the utility chases are the minimum size necessary to protect the utility lines and do not provide access for a person to enter the space.

Reason Statement: FEMA regularly responds to questions about whether utility chases and elevator shafts that extend below elevated buildings are enclosures. Strictly read, Sections R322.2.2 and R322.3.5 apply to elevator shafts and utility chases that extend below elevated buildings, which means the walls must have flood openings and breakaways wall (Zone V and Coastal A Zones). This code change relaxes those requirements, with some limits, in line with IRC Commentary, ASCE 24, and published FEMA guidance. Those sources explain that elevator shafts do not require openings and breakaway walls, but the shafts must meet other requirements (materials, resistance to flood loads). Those sources also explain that utility chases do not require openings and breakaway walls as long as the chases are the minimize size necessary and are not sized or constructed to allow a person to enter the space. If chases allow entry by a person, they must fully comply with the requirements for enclosures, including the use limitations. Chases must meet other requirements (materials, resistance to flood loads).

Bibliography: NFIP Technical Bulletin 9, Design and Construction Guidance for Breakaway Walls (2021), https://www.fema.gov/emergency-managers/risk-management/building-science/national-flood-insurance-technical-bulletins

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal explicitly allows elevator shafts and utility chases to be conventionally built without the installation of flood openings or use of breakaway walls which are required for enclosures below elevated buildings in flood hazard areas. The code change proposal will decrease the cost of construction by avoiding the installation of at two flood openings in each chase and shaft. Engineered flood opening devices cost approximately $100-$150 each, not including the cost of installation (nonengineered openings, such as typical air vent device disabled in the open position, cost less). Cost data for fabrication of breakaway walls is not available. NFIP Technical Bulletin 9 contains prescriptive solutions for breakaway walls that do not require certification of design. A typical utility chase is on the order of two to three feet square, thus cost savings are attributable to not having to fabricate approximately eight to twelve feet of breakaway wall.

RB138-22

RB139-22

IRC: R322.3.2

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

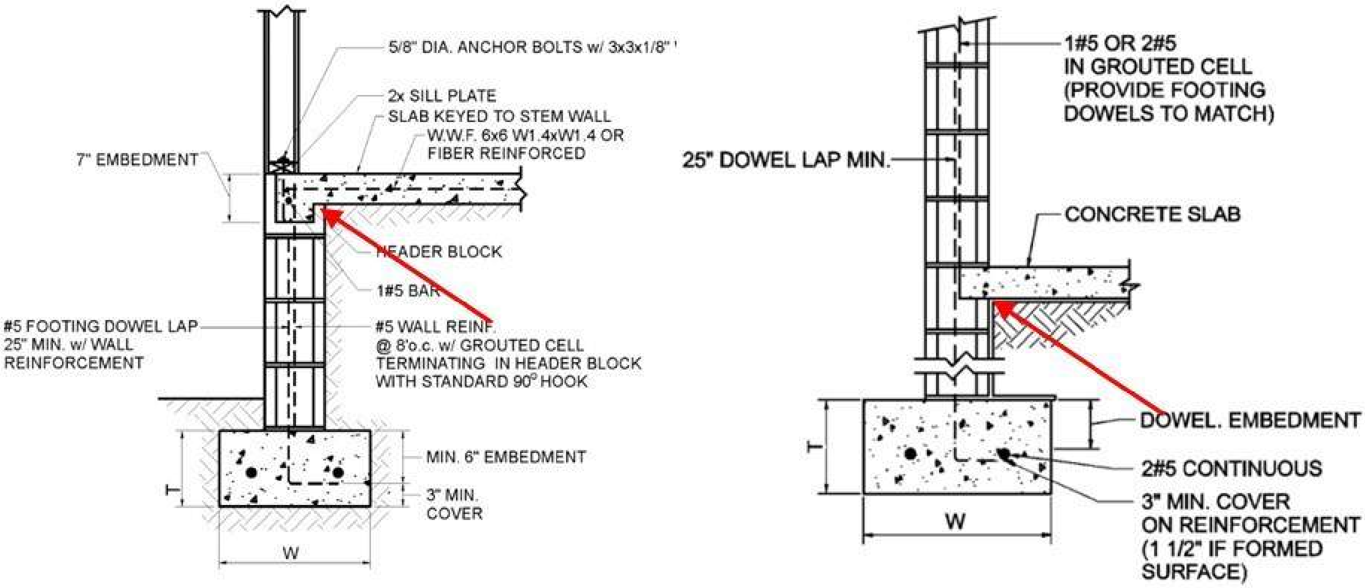
2021 International Residential Code

Revise as follows:

R322.3.2 Elevation requirements.

1. Buildings and structures erected within coastal high-hazard areas and Coastal A Zones, shall be elevated so that the bottom of the lowest horizontal structural members supporting the lowest floor, with the exception of piling, pile caps, columns, grade beams and bracing, is elevated to or above the base flood elevation plus 1 foot (305 mm) or the design flood elevation, whichever is higher. Where stem wall foundations are permitted in Coastal A Zones in accordance with Section R322.3.3, the bottom of the lowest horizontal structural member supporting the lowest floor is the top of the foundation wall, or top of the portion of the foundation wall, supporting the slab.
2. *Basement* floors that are below *grade* on all sides are prohibited.
3. Garages used solely for parking, building access or storage, and carports shall comply with Item 1 or shall be at or above *grade* on not less than one side and, if enclosed with walls, such walls shall comply with Item 6.
4. The use of fill for structural support is prohibited.
5. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.
6. Walls and partitions enclosing areas below the elevation required in this section shall meet the requirements of Sections R322.3.5 and R322.3.6.

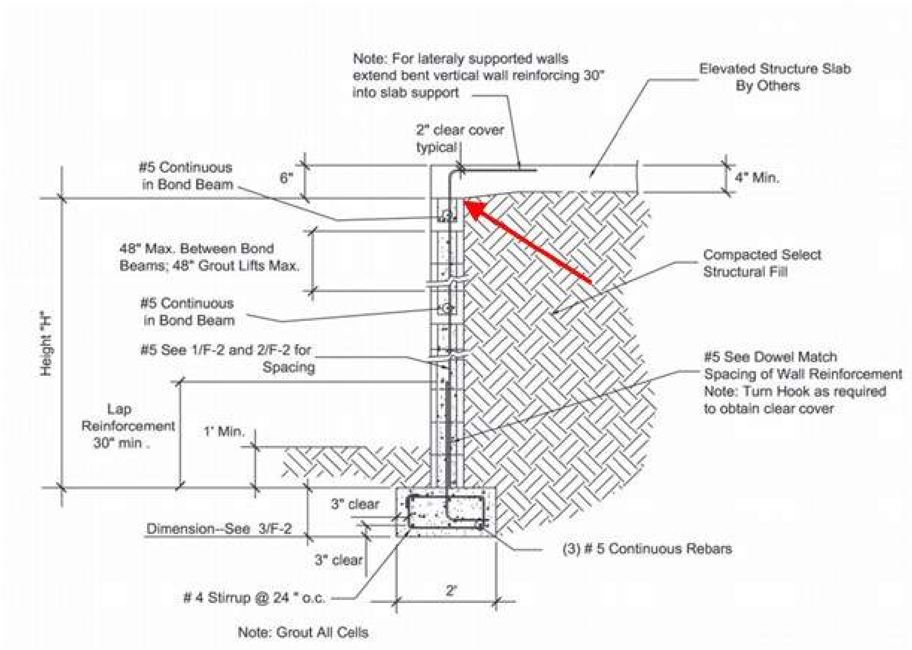
Reason Statement: Section R322.3.3 Foundations, by exception, allows backfilled stem wall foundations in flood hazard areas designated as Coastal A Zones. Coastal A Zones are areas subject to waves that are between 3 feet and 1.5 feet high. Section R322.3.2 specifies elevation of the "bottom of the lowest horizontal structural members supporting the lowest floor." This proposal does not change the requirement. It clarifies where the "bottom of the lowest horizontal structural member" is located when applicants elect to use backfilled stem wall foundations so that designers, builders, and building officials can readily determine compliance. Relating the required elevation to the wall also removes any confusion should a slab have varying thicknesses at points interior to the perimeter walls. There are different ways to configure the foundation wall and slab connection. Three common options are shown in the figures, with arrows pointing to the top of the foundation wall, or top of the portion of the wall, supporting the slab.



FOOTING G
STEMWALL FOUNDATION WITH SLAB ON GRADE

FOOTING H

Figure 403.1(1) Concrete and Masonry Foundation Details (2020 Florida Residential Code)



2 F-1 Case F - Closed Foundation Reinforced Masonry Foundation - Stem Wall Typical Section

FEMA P-550 Recommended Residential Construction for Coastal Areas

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal clarifies where the “bottom of the lowest horizontal structural member” is when backfilled stem wall foundations are used in Coastal A Zones. There is no change to the actual requirements for elevation of the bottom of the lowest horizontal structural member. By clarifying existing requirements, there will be no cost impact when approving this proposal.

RB139-22

RB140-22

IRC: R322.3.3

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Revise as follows:

R322.3.3 Foundations. Buildings and structures erected in coastal high-hazard areas and Coastal A Zones shall be supported on pilings or columns and shall be adequately anchored to such pilings or columns and shall comply with the following:

1. The space below the elevated building shall be either free of obstruction or, if enclosed with walls, the walls shall meet the requirements of Section R322.3.5.
2. Pilings shall be designed in accordance with ASCE 24 to have adequate soil penetrations to resist the combined wave and wind loads (lateral and uplift) and pile embedment shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the piling.
3. Columns and their supporting foundations shall be designed in accordance with ASCE 24 to resist combined wave and wind loads, lateral and uplift, and shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the columns. Spread footing, mat, raft or other foundations that support columns shall not be permitted where soil investigations that are required in accordance with Section R401.4 indicate that soil material under the spread footing, mat, raft or other foundation is subject to scour or erosion from wave-velocity flow conditions. If permitted, spread footing, mat, raft or other foundations that support columns shall be designed in accordance with ASCE 24.
4. Flood and wave loads shall be determined in accordance with ASCE 7 and shall include loads ~~those~~ associated with the design flood. Wind loads shall be those required by this code.
5. Foundation designs and *construction documents* shall be prepared and sealed in accordance with Section R322.3.9.

Exception: In Coastal A Zones, stem wall foundations supporting a floor system above and backfilled with soil or gravel to the underside of the floor system shall be permitted provided that the foundations are designed to account for wave action, debris impact, erosion and local scour. Where soils are susceptible to erosion and local scour, stem wall foundations shall have deep footings to account for the loss of soil.

Reason Statement: Section R322.3.3 applies to buildings in coastal high hazard areas and Coastal A Zones. Those are flood zones with wave action. In coastal high hazard areas, also called V Zones, waves are 3 feet and higher during base flood conditions. Wave heights in Coastal A Zones range from 3 ft to 1.5 feet. FEMA has delineated the inland extent of 1.5 foot waves on many Flood Insurance Rate Maps for coastal communities, labeling the line as the Limit of Moderate Wave Action. Section R322.3.9 requires construction documents to be prepared and sealed by registered design professionals. Section R322.3.3 describes the performance expectations for pilings and columns. This proposal requires pilings and columns to be designed in accordance ASCE 24 Flood Resistant Design and Construction, which is the standard of practice for design and construction in flood hazard areas. Relying on the recognized standard of practice facilitates the design professional's task to satisfy the performance expectations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to the technical content of the section. The code already requires foundations in coastal high hazard areas and Coastal A Zones to be designed by registered design professionals to satisfy the performance expectations of Sec. R322.3.3. The change requires designs in accordance with the recognized standard of practice, which facilitates the design professional's task. There will be no cost impact when this proposal is approved.

RB140-22

RB141-22

IRC: R322.2.3, TABLE R322.2.3 (New), R404.1.1

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Delete and substitute as follows:

~~**R322.2.3 Foundation design and construction.** Foundation walls for buildings and structures erected in flood hazard areas shall meet the requirements of Chapter 4.~~

~~**Exception:** Unless designed in accordance with Section R404:~~

1. ~~The unsupported height of 6-inch (152 mm) plain masonry walls shall be not more than 3 feet (914 mm).~~
2. ~~The unsupported height of 8-inch (203 mm) plain masonry walls shall be not more than 4 feet (1219 mm).~~
3. ~~The unsupported height of 8-inch (203 mm) reinforced masonry walls shall be not more than 8 feet (2438 mm).~~

~~For the purpose of this exception, unsupported height is the distance from the finished *grade* of the under-floor space to the top of the wall.~~

R322.2.3 Foundation design and construction. Foundation walls shall meet the following limitations and requirements:

1. Plain masonry foundation walls are not permitted in flood hazard areas.
2. Concrete foundation walls shall meet the requirements of Chapter 4.
3. Reinforced masonry foundation walls shall meet the requirements of Chapter 4 and Table R322.2.3, where applicable, or shall be designed in accordance with ASCE 24.

Add new text as follows:

TABLE R322.2.3 Foundation design and construction

WALL THICKNESS	MAXIMUM UNSUPPORTED WALL HEIGHT[a]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)[b]
8-inch, with reinforcing in accordance with Table R404.1.1(2)	7 feet 4 inches	#4 at 48
8-inch, with reinforcing in accordance with Table R404.1.1(2)	8 feet	#4 at 40
8-inch, with reinforcing in accordance with Table R404.1.1(2)	8 feet 8 inches	#4 at 32
8-inch, with reinforcing in accordance with Table R404.1.1(2)	9 feet 4 inches	#4 at 24 or #5 at 40
8-inch, with reinforcing in accordance with Table R404.1.1(2)	10 feet	#4 at 24 or #5 at 40
10-inch, with reinforcing in accordance with Table R404.1.1(3)	7 feet 4 inches	#4 at 56
10-inch, with reinforcing in accordance with Table R404.1.1(3)	8 feet	#4 at 48
10-inch, with reinforcing in accordance with Table R404.1.1(3)	8 feet 8 inches	#4 at 40
10-inch, with reinforcing in accordance with Table R404.1.1(3)	9 feet 4 inches	#4 at 32 or #5 at 56
10-inch, with reinforcing in accordance with Table R404.1.1(3)	10 feet	#4 at 32 or #5 at 48
12-inch, with reinforcing in accordance with Table R404.1.1(4)	7 feet 4 inches	#4 at 72
12-inch, with reinforcing in accordance with Table R404.1.1(4)	8 feet	#4 at 64
12-inch, with reinforcing in accordance with Table R404.1.1(4)	8 feet 8 inches	#4 at 48
12-inch, with reinforcing in accordance with Table R404.1.1(4)	9 feet 4 inches	#4 at 40 or #5 at 72
12-inch, with reinforcing in accordance with Table R404.1.1(4)	10 feet	#4 at 40 or #5 at 64

a. Unsupported wall height is the difference in height between the top of foundation wall and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level.

b. Where unbalanced fill conditions exist, then vertical reinforcement shall be the greater of that required by this table or referenced table in Section R404 (Tables R404.1.2(2) through R404.1.2(4)).

Revise as follows:

R404.1.1 Design required. Concrete or masonry foundation walls shall be designed in accordance with accepted engineering practice where one or more ~~either~~ of the following conditions exists:

1. Walls are subject to hydrostatic pressure from ground water.
2. Walls supporting more than 48 inches (1219 mm) of unbalanced backfill that do not have permanent lateral support at the top or bottom.
3. Walls in flood hazard areas other than coastal high hazard areas and Coastal A Zones that do not conform to Section R322.2.3.

Reason Statement: The code change proposal would no longer allow unreinforced plain masonry walls in flood hazard areas and would replace a single prescriptive wall thickness and wall height for reinforced masonry with a table that offers many combinations of wall thickness and wall height, along with vertical reinforcement and spacing specifications. Wall heights in the proposed table are in 8” increments to match the Chapter 4 reinforcement tables (Tables R404.1.1(2-4)), which corresponds to standard concrete masonry unit height. The table also prescribes reinforcement as a function of wall thickness and wall height, increasing the maximum wall height for 8” wall thickness from 8 feet to 10 feet. The table will facilitate field application for builders and subsequent verification by code officials.The current wall height limitations in R322.2.3 are based on analyses performed in 1998 for a range of flood depths and velocities. After observing foundation wall damage during post-disaster investigations, FEMA re-

examined those limitations in 2012. The analyses produced at that time were developed through collaboration with industry groups, and evaluated the resistance of masonry walls of different heights, with flood openings, over a range of velocities, in combination with wind loading conditions covered in the IRC, using Allowable Stress Design (ASD) Load Combination 7, according to ASCE 7-10 and ASCE 7-16 Section 2.4.2 (2), which is Load Combination 7b, according to ASCE 7-22.
The proposal removes the plain masonry wall provisions because they are structurally deficient for a range of flood depths and velocities. The analyses demonstrated the need to specify minimal reinforcement, which is not included in two of the current options for plain masonry. The analyses used the flood depth to determine flood loads and used a basic wind speed of 115 mph for Exposure Category B (ASCE 7-10) for wind loads. Those loads result in net tension at the top of the foundation wall. Higher design wind speeds result in greater uplift. The design criteria of Section 2.2.4 of ACI 530 (used for the 2012 analyses) specify that the tensile strength of unreinforced masonry is neglected when subjected to axial tension forces. ACI 530 commentary for Section 2.2.4 stated that "Net axial tension in unreinforced masonry walls due to axially applied load are not permitted. If axial tension develops in walls due to uplift of connected roofs or floors, the walls must be reinforced to resist the tension. Compressive stress from dead load can be used to offset axial tension" (emphasis added). Accordingly, unreinforced wall sections analyzed with net axial tension at the top of wall from the combined effects of wind and flood loading did not perform.
Preventing failure of masonry foundation walls by providing prescriptive solutions that specifically address flood hazards meets the intent of the IRC to provide affordable solutions for structural strength and to safeguard property from hazards.

Evidence from FEMA's post-disaster Mitigation Assessment Team (MAT) reports indicates unreinforced masonry wall failures occur under design wind loads (see FEMA P-908 Spring 2011 Tornadoes) and flood loads (see FEMA P-765 Midwest Floods of 2008 in Iowa and Wisconsin, FEMA P-942 Hurricane Sandy in New Jersey and New York).

Bibliography: FEMA MAT reports are accessible online: https://www.fema.gov/emergency-managers/risk-management/building-science/mitigation-assessment-team

Cost Impact: The code change proposal will increase the cost of construction
The only situations where costs will slightly increase are those where plain masonry is currently permitted by both Chapter 4 and Section R322.2.3. Because of those limitations, and because wind and seismic conditions in many areas require reinforced foundations, the aggregate cost increase across all flood hazard areas should be minimal. Offsetting costs for reinforcement are reduced risk of flood damage.

Section R322.2.1 requires lowest floors to be at or above the base flood elevation plus one foot, which means the current allowance for plain masonry walls applies only where flood depths are 3 to 4 feet or less (assuming the floor system is approximately 12" deep, a 4 ft high foundation walls puts the floor surface at about 5 ft. The cost increase includes rebar, grout, and labor. Considering only the rebar, a 2,400 square foot foundation that is 40x60 has 200 linear feet of foundation wall. Reinforcing 200 linear feet of 4-tall foundation wall with #4 rebar at 48" spacing requires approximately 250 ft of rebar. Based on cost estimates available online, 20 feet of #4 rebar costs about $13. The increase for rebar is less than $300. Based on the same wall scenario, using a homeowner cost estimating online application, the cost of grout is less than $400 and the increase in labor is approximately 9 hours.

RB141-22

RB142-22

IRC: R322.3.5

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Revise as follows:

R322.3.5 Walls below required elevation. Walls and partitions are permitted below the elevation required in Section R322.3.2, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a resistance of not less than 10 (479 Pa) and not more than 20 pounds per square foot (958 Pa) as determined using allowable stress design, or a resistance to an ultimate load of not less than 17 (814 Pa) and not more than 33 pounds per square foot (1580 Pa); or
4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa), as determined using allowable stress design or an ultimate load of 33 pounds per square foot (1580 Pa), the *construction documents* shall include documentation prepared and sealed by a registered *design professional* that:
   - 4.1. The walls and partitions below the required elevation have been designed to collapse from a water load less than that which would occur during the base flood.
   - 4.2. The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on structural and nonstructural building components. Water-loading values used shall be those associated with the design flood. Wind-loading values shall be those required by this code.
5. Walls intended to break away under flood loads as specified in Item 3 or 4 have flood openings that meet the criteria in Section R322.2.2, Item 2.

Reason Statement: This code change does not change the loads used to design breakaway walls. It just shows how the loads expressed using allowable stress design are expressed as ultimate loads, which is used in ASCE 7 for seismic design and wind loads. One of the reasons for the lower load shown in the existing section is to avoid breakaway walls that might fail under wind loads. Showing the loads expressed as ultimate loads will make it easier to compare to calculated wind loads and seismic loads.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal shows how the loads expressed using allowable stress design are expressed as ultimate loads to better align with ASCE 7. There is no change to the technical content of the provisions. By showing how existing load values are expressed as ultimate loads, there will be no cost impact when approving this proposal.

RB142-22

RB143-22

IRC: SECTION 202, R323.1, R323.2 (New), R323.1.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Marc Levitan, representing ICC 500 Storm Shelter Standard Development Committee (icc500@iccsafe.org)

2021 International Residential Code

Revise as follows:

[RB] IMPACT PROTECTIVE SYSTEM. Impact protective systems are defined as follows:

1. Construction that has been shown by testing to withstand the impact of test missiles and that is applied, attached, or locked over exterior glazing.
2. For storm shelters, an assembly or device, subject to static or cyclic pressure and impact testing as detailed in ICC 500, installed to protect an opening in the storm shelter envelope.

R323.1 General. This section applies to the design, construction and installation of *storm shelters* where constructed as either separate detached buildings or ~~where constructed as safe~~ rooms or spaces within buildings for the purpose of providing ~~refuge~~ protection from ~~storms that produce high winds, such as~~ tornados , ~~and~~ hurricanes and other severe windstorms. ~~In addition to other applicable requirements in this code, storm shelters shall be constructed in accordance with ICC 500.~~

Add new text as follows:

R323.2 Construction. Storm shelters shall be constructed in accordance with this code and ICC 500.

Revise as follows:

~~R323.1.1~~ R323.2.1 Sealed documentation. The *construction documents* for all structural components and *impact protective systems* ~~of the~~ installed in *storm shelters* shall be prepared and sealed by a *registered design professional* indicating ~~that the design meets the criteria of~~ compliance with ICC 500.

Exception: *Storm shelters*, structural components and impact-protective systems that are *listed* and *labeled* to indicate compliance with ICC 500.

Reason Statement: The purpose of this proposal is to correlate IRC Section 323 with the 2020 edition of ICC 500 and with the corresponding IBC Section 423. The changes are editorial and match editorial revisions to the scope of ICC 500, including recognizing extratropical storms are known as hurricanes, typhoons or cyclones depending on the region of the world where they occur.

To match changes made to IBC Section 423 as modified for the 2024 IBC by approved proposal G94-19, and to reflect the division between scoping requirements and construction requirements in ICC 500, a new Section R323.2 is created to hold the basic requirement to construct storm shelters per ICC 500 and the requirement for signed and sealed storm shelter construction documents added to the 2021 IRC.

The current IRC definition of Impact Protective Systems differs from ICC 500 as the IRC definition only applies to protection of exterior glazing from the typical wind-borne debris associated with design-level hurricane events in the IRC and IBC. ICC 500 requires the entire storm shelter envelope – including solid doors, louvers, and other openings – resist debris impacts associated with severe tornadoes and hurricanes exceeding code-level design wind speeds. Since this difference could be misleading for someone unfamiliar with ICC 500, it is suggested to modify the IRC definition. The format matches other definitions such as Wind-Borne Debris Regions, Story Above Grade Plane and Mechanical Joint.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The changes are editorial and correlate with the current edition of ICC 500. The changes do not impact how a storm shelter is designed, constructed, or installed and thus do not affect the cost of providing a storm shelter.

RB143-22

RB144-22

IRC: SECTION 202 (New), R323.1.2 (New)

Proponents: Stephen Skalko, representing Masonry Alliance for Codes and Standards (svskalko@svskalko-pe.com); Scott Campbell, representing NRMCA (scampbell@nrmca.org)

2021 International Residential Code

[RB] STORM SHELTER. A building, structure or portion thereof, constructed in accordance with ICC 500 and designated for use during a severe wind storm event, such as a hurricane or tornado.

Add new definition as follows:

Community storm shelter. A storm shelter not defined as a "Residential storm shelter." This includes storm shelters intended for use by the general public, by building occupants or a combination of both.

Residential storm shelter. A storm shelter serving occupants of dwelling units and having a design occupant capacity not exceeding 16 persons.

Add new text as follows:

R323.1.2 Shelters required. In areas where the shelter design wind speed for tornados is 250 mph in accordance with Figure 304.2(1) of ICC 500, a storm shelter shall be provided in accordance with ICC 500. *Residential storm shelters* serving dwelling units shall be located in accordance with ICC 500 Section 403.2. *Community storm shelters* shall be located where the maximum distance of travel from not fewer than one exterior door of each dwelling unit to a door of the shelter serving that dwelling unit does not exceed 1,000 feet (305 m).

Exception: Dwellings meeting the requirements for shelter design in ICC 500.

Reason Statement: Section R323 of the IRC tells the code user to use ICC 500, *Standard for the Design and Construction of Storm Shelters* for requirements to be met if storm shelters associated with one-and two-family dwellings are provided. However, the code does not require that such shelters be provided. Recent tornado events continue to show the need to provide such shelters for one-and two-family dwellings in high tornado wind regions. Experience has shown that storm shelters in high tornado wind regions provide protection for persons from injury or death due to structural collapse and/or wind-borne debris.
This proposal will require storm shelters be provided for one-and two-family dwellings built in areas where the tornado wind speeds are 250 mph or higher according to ICC 500 Figure 304.2(1). The area covered by this tornado wind speed is consistent with the areas in five states that recently experienced devastating damage, reportedly over 100 deaths and many more injured from a series of tornado events occurring within a 24-hour period December 10-11, 2021.

The proposal also permits a stand-alone shelter, either as an accessory building to the dwelling or a community shelter, to meet the requirements of this section. Where a stand-alone storm shelter is provided, the proposal limits the travel distance to the stand-alone shelter based on ICC 500 Section 403.2 for Residential storm shelters, or within 1000 feet from at least one exterior door of the dwelling unit to a Community storm shelter door.

Bibliography: Satellites Spot Tornado Tracks Across Midwest (nasa.gov)

Cost Impact: The code change proposal will increase the cost of construction
Including a storm shelter within a dwelling unit or as a stand-alone structure will increase the cost of construction. The actual costs will depend on the materials of choice and design features of the shelter. Insofar as any cost-benefit conclusion, that is extremely difficult to quantify when considering actions to save lives. However, it can be stated that a shelter does increase the probability that persons are more likely to survive an event with the shelter rather than being exposed to the elements outside the shelter.

RB144-22

RB145-22

IRC: R324.3.1

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R324.3.1 Equipment listings. *Photovoltaic panels* and modules shall be *listed* and *labeled* in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Inverters shall be *listed* and *labeled* in accordance with UL 1741. Systems connected to the utility grid shall use inverters *listed* for utility interaction. Mounting systems *listed* and *labeled* in accordance with UL 2703 shall be installed in accordance with the manufacturer's installation instructions and their listings. <u>BIPV roof coverings and BIPV roof assemblies shall be listed and labeled in accordance with UL 7103</u>.

Reason Statement: This aligns with the 2021 IRC, where UL 7103 replaced UL 1703 as the standard for listing BIPV roofing in Chapter 9.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This aligns with requirements covered in Chapter 9 of the IRC, and provides clarity as to the applicable standard to be used.

RB145-22

RB146-22

IRC: R324.5, R324.5.1, R324.5.2, R324.5.3, R324.5.2 (New)

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R324.5 Building-integrated photovoltaic systems. Building-integrated photovoltaic (BIPV) systems ~~that serve as roof coverings~~ shall be designed and installed in accordance with Section ~~R905~~ Sections R324.5.1 through R324.5.2.

R324.5.1 ~~Photovoltaic shingles~~ BIPV roofing systems. ~~Photovoltaic shingles~~ BIPV roofing systems shall comply with Section R905.16. BIPV roof panels shall comply with Section R905.17.

~~R324.5.2~~ R324.5.1.1 Fire classification. *Building-integrated photovoltaic systems* shall have a fire classification in accordance with Section R902.3.

~~R324.5.3 BIPV roof panels.~~ ~~BIPV roof panels shall comply with Section R905.17.~~

Add new text as follows:

R324.5.2 BIPV Exterior wall coverings and fenestration. BIPV exterior wall coverings and fenestration shall comply with Section R705.

Reason Statement: This proposal recognizes that BIPV systems can be in the form of roofing, exterior wall coverings, or fenestration.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This recognizes other types of BIPV systems that are available for installation, and does not limit to just roofing applications.

RB146-22

RB147-22

IRC: R324.6, R324.6.3, UL Chapter 44 (New)

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R324.6 Roof access and pathways. Roof access, pathways and setback requirements shall be provided in accordance with Sections R324.6.1 through R324.6.2.1. Access and minimum spacing shall be required to provide emergency access to the roof, to provide pathways to specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof.

Exceptions:

1. Detached, nonhabitable structures, including but not limited to detached garages, parking shade structures, carports, solar trellises and similar structures, shall not be required to provide roof access.
2. Roof access, pathways and setbacks need not be provided where the code official has determined that rooftop operations will not be employed.
3. These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (17-percent slope) or less.
4. BIPV systems *listed* in accordance with ~~Section 690.12(B)(2) of NFPA 70~~ UL 3741, where the removal or cutting away of portions of the BIPV system during fire-fighting operations has been determined to not expose a fire fighter to electrical shock hazards.

R324.6.3 Emergency escape and rescue openings. Panels and modules installed on dwellings shall not be placed on the portion of a roof that is below an *emergency escape and rescue opening*. A pathway not less than 36 inches (914 mm) wide shall be provided to the emergency escape and rescue opening.

Exception: BIPV systems *listed* in accordance with ~~Section 690.12(B)(2) of NFPA 70~~ UL 3741, where the removal or cutting away of portions of the BIPV system during fire-fighting operations has been determined to not expose a fire fighter to electrical shock hazards.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

3741-2020	Photovoltaic Hazard Control

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 3741-2020 Photovoltaic Hazard Control, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This aligns with the revisions made in F129-21 in the Group A cycle to the IFC.UL 3741 is the national test standard developed to address Section 690.12(B)(2) of NFPA 70. It is a consensus standard developed specifically for the evaluation and testing of rapid shutdown systems and equipment. This proposal will provide clarity on the specific requirements to be used for listing these systems and equipment, and provide the performance anticipated by rapid shutdown operations.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Bibliography: F129-21
IFC: 1205.2.3, UL Chapter 80

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is identifying the standard already referred to indirectly within the code.

RB147-22

RB148-22

IRC: R324.6.1

Proponents: Jason Laws - VBCOA, Chesterfield County, Virginia, representing VBCOA (lawsj@chesterfield.gov)

2021 International Residential Code

Delete and substitute as follows:

~~**R324.6.1 Pathways.** Not fewer than two pathways, on separate roof planes from lowest roof edge to ridge and not less than 36 inches (914 mm) wide, shall be provided on all buildings. Not fewer than one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, a pathway not less than 36 inches wide (914 mm) shall be provided from the lowest roof edge to ridge on the same roof plane as the photovoltaic array, on an adjacent roof plane, or straddling the same and adjacent roof planes. Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment.~~

R324.6.1 Pathways. A minimum 36" wide pathway shall be provided on all roof planes with photovoltaic arrays. Each pathway shall provide access from the lowest roof edge to the ridge and be free of obstructions such as vent pipes, conduit, or mechanical equipment.

Reason Statement: The purpose of this proposal is for clarification. The current code provision includes excessive, unneeded language which makes this section confusing and hard to follow.
The language requiring a pathway "on the street or driveway side of the roof" is not needed. If you have a pathway where ever a photovoltaic panel is installed, you will always meet this requirement. If panels are only on the rear of the house, the entire front roof plane is clear and creates a pathway by default. If you have panels on the front of the house, then a pathway is needed and would still meet this requirement.

The language requiring a pathway "on an adjacent roof plane, or straddling the same and adjacent roof planes." only creates confusion and could result in "pathways" that are not functional.

The language requiring "Pathways shall be over areas capable of supporting fire fighters accessing the roof." is not needed. The minimum design loads in R301.6 already cover this.

The intent of the code would remain the same but this proposal makes it much easier to understand, making it easier to design and enforce.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not increase or decrease the cost of construction. This proposal keeps the intent of the code the same, simply makes it easier for everyone to understand and apply.

RB148-22

RB149-22

IRC: R324.6.4 (New), UL Chapter 44 (New)

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Add new text as follows:

R324.6.4 Building-integrated photovoltaic (BIPV) systems. Where building-integrated photovoltaic (BIPV) systems are installed in a manner that creates areas with electrical hazards to be hidden from view, markings shall be provided to identify the hazardous areas to avoid for ladder placement. The markings shall be reflective and be visible from grade beneath the eaves or other location *approved* by the fire code official.

> **Exception:** BIPV systems *listed* in accordance with UL 3741, where the removal or cutting away of portions of the BIPV system during fire-fighting operations have been determined to not expose a fire fighter to electrical shock hazards.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

3741-2020	Photovoltaic Hazard Control

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 3741-2020 Photovoltaic Hazard Control, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement:
This aligns with IFC Section 1205.2.3 and F129-21 from the Group A cycle.

This provides fire fighters with means to determine where the BIPV is on the roof, and aligns with the requirements in the 2021 IFC Section 1205.2.3. The original intent is for reflective marking that could be under an eave and visible from grade, or could be in some other location visible from grade, such that the reflective marking identifies locations where a ladder should not be placed. The BIPV roof covering products themselves do not all need to be reflectorized.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Bibliography: F129-21
IFC: 1205.2.3, UL Chapter 80 (New)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal aligns with the fire code requirements.

RB149-22

RB150-22

IRC: SECTION 202 (New), R324.7 (New), R324.7.1 (New), 324.7.2 (New)

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Add new definition as follows:

PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED. An independent photovoltaic (PV) panel support structure designed with useable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of motor vehicles.

Add new text as follows:

R324.7 Elevated photovoltaic (PV) support structures. Elevated PV support structures used as an accessory structure shall comply with either Section R324.7.1 or R324.7.2.

R324.7.1 PV panels installed over open-grid framing or non-combustible deck. Elevated PV support structures with PV panels installed over open-grid framing or over a noncombustible deck shall have PV panels tested, *listed*, and *labeled* with a fire type rating in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Photovoltaic panels marked "not fire rated" shall not be installed on elevated PV support structures.

324.7.2 PV panels installed over a roof assembly. Elevated PV support structures with a PV panel system installed over a roof assembly shall have a fire classification in accordance with Section R902.4.

Reason Statement:
This is in alignment with G193-21 for the IBC in the Group A cycle.

The primary purpose of this proposal is to establish appropriate fire testing and listing criteria for overhead photovoltaic (PV) support structures that could have people or vehicles in the space beneath them. Sometimes referred to as "solar shade structures," they are most commonly constructed over vehicle parking spaces of surface parking lots, but could be built in a variety of locations with or without cars parked beneath.

This addresses structures with open grid framing and without a roof deck or sheathing, which supports the photovoltaic panel systems.

Most PV panels in the marketplace have been fire tested and assigned a "type rating" in accordance with UL 1703. However, some PV panels might not have that fire testing, and could be marked "not fire rated." This proposal clarifies that PV panels marked "not fire rated" cannot be used on elevated/overhead PV structures that could have people or cars beneath them, with or without a full roof assembly.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction. This proposal provides more options in construction with clear requirements for another type of photovoltaic installation (i.e. an alternative to rooftop mounted PV or building-integrated PV).

RB150-22

RB151-22

IRC: R325.2

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

SECTION R325
MEZZANINES

Revise as follows:

R325.2 Mezzanines. The clear height above and below *mezzanine* floor construction shall be not less than 7 feet (2134 mm).

> **Exception:** The ceiling height above the mezzanine shall be permitted to comply with Section 305.1 where the mezzanine meets the minimum room size in Section R304.

SECTION R326
HABITABLE ATTICS

R326.2 Minimum dimensions. A habitable attic shall have a floor area in accordance with Section R304 and a ceiling height in accordance with Section R305.

Reason Statement: The provisions for minimum room area (R304) and ceiling height (R305) provide criteria for with habitable rooms/spaces and basements, but neither specifically mentions mezzanines (R325) or habitable attics (R326). Habitable attics does reference R304 and R305 for minimum size and height, so you can do sloped ceilings or beams in the habitable attic. However, the current text does not address a sloped ceiling or beams in a mezzanine. While I do not believe it is the intent to require a mezzanine to be at least 70 sq.ft. or at least 7 feet in each direction the same as a room (per R304), the proposal would allow for mezzanines with sloped ceilings beams where the mezzanine was the size of a room. Below are sections R304 and R305 for reference. Mezzanines are habitable spaces.

SECTION R304
MINIMUM ROOM AREASR

304.1 Minimum area. Habitable rooms shall have a floor area of not less than 70 square feet (6.5 m2).

Exception: Kitchens.

R304.2 Minimum dimensions. Habitable rooms shall be not less than 7 feet (2134 mm) in any horizontal dimension.

Exception: Kitchens.

R304.3 Height effect on room area. Portions of a room with a sloping ceiling measuring less than 5 feet (1524 mm) or a furred ceiling measuring less than 7 feet (2134 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required habitable area for that room.

SECTION R305
CEILING HEIGHT

R305.1 Minimum height. Habitable space, hallways and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a ceiling height of not less than 7 feet (2134 mm).

2. The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a ceiling height of not less than 6 feet 8 inches (2032 mm) above an area of not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.

3. Beams, girders, ducts or other obstructions in basements containing habitable space shall be permitted to project to within 6 feet 4 inches (1931 mm) of the finished floor.

4. Beams and girders spaced apart not less than 36 inches (914 mm) in clear finished width shall project not more than 78 inches (1981 mm)

from the finished floor.

R305.1.1 Basements. Portions of basements that do not contain habitable space or hallways shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

Exception: At beams, girders, ducts or other obstructions, the ceiling height shall be not less than 6 feet 4 inches (1931 mm) from the finished floor.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification only for mezzanines constructed under sloped roofs. It will increase design options without increasing requirements.

RB151-22

RB152-22

IRC: R325.3, R325.5

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2021 International Residential Code

SECTION R325
MEZZANINES

R325.1 General. *Mezzanines* shall comply with Sections R325 through R325.5.

R325.2 Mezzanines. The clear height above and below *mezzanine* floor construction shall be not less than 7 feet (2134 mm).

Revise as follows:

R325.3 Area limitation. The aggregate area of a *mezzanine* or *mezzanines* shall be not greater than one-third of the floor area of the room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the *mezzanine* is located.

Exception: The aggregate area of a *mezzanine* located within a *dwelling unit* equipped with an automatic sprinkler system in accordance with Section P2904 shall not be greater than one-half of the floor area of the room, provided that the *mezzanine* meets all of the following requirements:

1. Except for enclosed closets and bathrooms, the *mezzanine* is open to the room in which such *mezzanine* is located.
2. The opening to the room is unobstructed except for walls not more than 36 ~~42~~ inches (914 ~~1067~~ mm) in height, columns and posts.
3. The exceptions to Section R325.5 are not applied.

R325.4 Means of egress. The means of egress for *mezzanines* shall comply with the applicable provisions of Section R311.

Revise as follows:

R325.5 Openness. *Mezzanines* shall be open and unobstructed to the room in which they are located except for walls not more than 36 inches (914 mm) in height, columns and posts.

~~Exceptions~~ Exception:

~~1.~~ *Mezzanines* or portions thereof are not required to be open to the room in which they are located, provided that the aggregate floor area of the enclosed space is not greater than 10 percent of the *mezzanine* area.

~~2. In buildings that are not more than two stories above *grade plane* and equipped throughout with an automatic sprinkler system in accordance with Section R313, a *mezzanine* shall not be required to be open to the room in which the *mezzanine* is located.~~

Reason Statement:
This amendment reduces the allowable height of a wall enclosing a mezzanine that is greater than one-third of the room below but less than one-half of the room below to 36” to match the standard guard height required in the IBC as well as matching the allowable wall height in section R325.5 and adds beams to exception #2 and section R325.5 as part of the list of structural components.

This change also deletes exception #2 to the openness requirements of the mezzanine. This exception was extracted directly from the IBC and addresses mezzanines in office buildings, supermarkets, industrial facilities, and other types of buildings where it may be desirable to fully enclose a mezzanine to provide office space, employee breakrooms, storage rooms, or similar uses. In a typical one- and two-family dwelling or a townhouse, mezzanines are generally open to the floor below except for the guard required by code or any closets or bathrooms. If a homeowner or builder desires an enclosed mezzanine, they could apply IBC Section 505 to the construction of the mezzanine.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposed change should provide some reduction in cost by allowing a 36" wall in lieu of the current requirement of 42".

RB152-22

RB153-22

IRC: SECTION 202 (New), SECTION R314.3, SECTION R325.1, SECTION R326 (New), R326.1 (New), R326.2 (New), R326.3 (New), R326.4 (New), R326.5 (New), R326.5.1 (New), R326.5.2 (New), R326.5.2.1 (New), R326.5.2.2 (New), R326.5.2.3 (New), R326.5.3 (New), R326.5.3.1 (New), R326.5.3.2 (New)

Proponents: Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Add new definition as follows:

SLEEPING LOFT. A space on an intermediate level or levels between the floor and ceiling of a story, open on one or more sides to the room in which the space is located, and in accordance with Section R326.

Add new text as follows:

SECTION R326
SLEEPING LOFTS

R326.1 Sleeping lofts. Where provided in dwelling units or sleeping units, sleeping lofts shall comply with this code as modified by Sections R326.2 through R326.5. Sleeping lofts constructed in compliance with this section shall be considered a portion of the story below. Such sleeping lofts shall not contribute to the number of stories as regulated by this code.

Exception: Sleeping lofts need not comply with Section R326 where they meet any of the following conditions:

1. The sleeping loft has a maximum depth of less than 3 feet (914 mm).
2. The sleeping loft has a floor area of less than 35 square feet (3.3 m).
3. The sleeping loft is not provided with a permanent means of egress.

R326.2 Sleeping loft limitations. Sleeping lofts shall comply with the following conditions:

1. The sleeping loft floor area shall be less than 70 square feet (6.5 m).
2. The sleeping loft ceiling height shall not exceed 7 feet (2134 mm) for more than one-half of the sleeping loft floor area.

The provisions of Sections R326.3 through R326.5 shall not apply to sleeping lofts that do not comply with Items 1 and 2.

R326.3 Sleeping loft ceiling height. The clear height below the sleeping loft floor construction shall not be less than 7 feet (2134 mm). The ceiling height above the finished floor of the sleeping loft shall not be less than 3 feet (914 mm). Spaces adjacent to the sleeping loft with a sloped ceiling measuring less than 3 feet (914 mm) from the finished floor to the finished ceiling shall not contribute to the sleeping loft floor area.

R326.4 Sleeping loft area. The aggregate area of all sleeping lofts and mezzanines within a room shall comply with Section R325.3.

Exception: The area of a single sleeping loft located within a dwelling unit or sleeping unit equipped with an automatic sprinkler system in accordance with Section P2094 shall not be greater than two-thirds of the area of the room in which it is located, provided that no other sleeping lofts or mezzanines are open to the room in which the sleeping loft is located.

R326.5 Permanent egress for sleeping lofts. A permanent means of egress shall be provided for sleeping lofts. The means of egress shall comply with Section 311 as modified by Sections R326.5.1 through R326.5.3.

R326.5.1 Ceiling height at sleeping loft means of egress. A minimum ceiling height of 3 feet (914 mm) shall be provided for the entire width of the means of egress from the sleeping loft.

R326.5.2 Stairways. Stairways providing egress from sleeping lofts shall be permitted to comply with Sections R326.5.2.1 through R326.5.2.3.

R326.5.2.1 Width. Stairways providing egress from a sleeping loft shall not be less than 17 inches (432 mm) in clear width at or above the handrail. The width below the handrail shall be not less than 20 inches (508 mm).

R326.5.2.2 Treads and risers. Risers for stairs providing egress from a sleeping loft shall be not less than 7 inches (178 mm) and not more than 12 inches (305 mm) in height. Tread depth and riser height shall be calculated in accordance with one of the following formulas:

1. The tread depth shall be 20 inches (508 mm) minus four-thirds of the riser height.
2. The riser height shall be 15 inches (381 mm) minus three-fourths of the tread depth.

R326.5.2.3 Landings. Landings at stairways providing egress from sleeping lofts shall comply with Section R311.7.6, except that the depth of landings in the direction of travel shall be not less than 24 inches (508 mm).

R326.5.3 Ladders. Ladders complying with Sections R326.5.3.1 and R326.5.3.2 shall be permitted as a means of egress from sleeping lofts.

R326.5.3.1 Size and capacity. Ladders providing egress from sleeping lofts shall have a rung width of not less than 12 inches (305 mm), and 10-inch (254 mm) to 14-inch (356 mm) spacing between rungs. Ladders shall be capable of supporting a 300-pound (136 kg) load on any rung. Rung spacing shall be uniform within 3/8 inch (9.5 mm).

R326.5.3.2 Incline. Ladders shall be inclined at 70 to 80 degrees from horizontal.

SECTION R314
SMOKE ALARMS

Revise as follows:

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of ~~the~~ bedrooms and sleeping lofts.
3. On each additional story of the *dwelling*, including *basements* and *habitable attics* and not including crawl spaces and uninhabitable *attics*. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.
4. Not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by this section.
5. In the hallway and in the room open to the hallway in *dwelling units* where the ceiling height of a room open to a hallway serving bedrooms exceeds that of the hallway by 24 inches (610 mm) or more.

SECTION R325
MEZZANINES

Revise as follows:

R325.1 General. *Mezzanines* shall comply with Sections R325 through R325.5.

Exception: Sleeping lofts in dwelling units and sleeping units shall be permitted to comply with Section R326, subject to the limitations in Section R326.2.

Reason Statement: Lofts in dwelling units and sleeping units are being designed and built around the country, but there is nothing in the codes to give designers or code officials guidance as to what's acceptable. This proposal places provisions into the body of the code that balance flexibility of design with maintaining a reasonable minimum standard of safety for these spaces.
A similar proposal placing this option into the appendix of the IBC was approved in Group A (G112-21, AMPC 2). Because we believe the issue of how to reasonably regulate sleeping lofts is prevalent and important enough to warrant placement in the body of the code, and because there was substantial support from a range of stakeholders at the Group A Public Comment Hearings (61% of the voters at the PCH supported the public comment that would have placed this in the body of the code), we are placing these provisions into the main body of the IRC, not in an appendix.

Figure 1 below shows a very recent example of an as-built (but not as-approved) sleeping loft constructed as part of a larger bedroom in a one-family dwelling in eastern Washington State. Figure 2 shows the same photo with an approximation of an IRC-compliant guard added.

Technical features of this proposal:

- We've inserted the sleeping loft provisions into a new Section R326, between mezzanines and habitable attics. We think sleeping lofts are more closely related to mezzanines (R325) than they are to habitable attics (current R326). (Note: This does not replace the existing Section R326. We expect ICC Staff will renumber the remaining sections in the chapter.)
- Sleeping lofts are an option (R326.1, "Where provided….") It will be up to the designer to decide whether or not to designate these areas as sleeping lofts.
- Sleeping lofts are required to comply with the base code, except where the provisions of this new section modify them (R326.1).
- Small spaces that might technically meet the definition of a sleeping loft, or sleeping loft-like spaces that don't have a permanent means of egress are exempt from the requirements of this section (R326.1, Exception).

- Similar to mezzanines, sleeping lofts are considered a portion of the story to which they open, and do not add to the number of stories of the building (R326.1).
- Sleeping lofts must be smaller than 70 square feet, and any ceiling height above the sleeping loft cannot exceed 7 feet for more than half of its area. The intent is to keep sleeping lofts as small spaces. Once the space is provided with dimensions that are equivalent to habitable residential living spaces, the breaks for height, ceiling height, area, and means of egress in this section no longer apply, and the space must meet the full requirements of the code (R326.2)
- The requirement for 7 feet below the sleeping loft (R326.3) is drawn from Section R325.2 regarding clear height below mezzanines. This was added in our Group A proposal last year in response to comments we received from a General Committee member. We actually don't see an issue with having shorter, usable spaces below sleeping lofts, but the 7-foot dimension is consistent with the required height of spaces below mezzanines, and also reflects what we have seen in real-world project proposals (see Figure 1 below). Ceiling heights in sleeping lofts can be as little as 3 feet.
- One or more sleeping lofts and mezzanines are allowed, but only if the cumulative area complies with the Section R325.3 area limitations for mezzanines (R326.4). The exception allows a single sleeping loft in a smaller room in a sprinklered dwelling unit up to 69.9 square feet (R326.2), as long as the sleeping loft area does not exceed two-thirds of the area of the main room. The two-thirds figure is based on IBC allowances for mezzanines and equipment platforms (see IBC 505.2.1.1).
- A permanent means of egress is required for sleeping lofts complying with this new section (R326.5). (The exception to R326.1 kicks you out of this section if you don't have a permanent means of egress.) Although for the most part, the means of egress is required to comply with Section R311, this section allows some modifications:
  - Steeper and narrower stairs (R236.5.2) are allowed, based on the stair requirements in IRC Appendix Q for lofts in tiny houses.
  - Permanently installed ladders are permitted as the means of egress (R326.5.3), again using the tiny house parameters from IRC Appendix Q.
  - Note: Sections R311.7.11 and R311.7.12 already allow the use of alternating tread devices or ship's ladders "to be used as an element of the means of egress for **lofts** [emphasis added] … of 200 gross square feet or less …," and therefore do not need to be mentioned in this section.
- Smoke alarms are required to be installed in the "immediate vicinity" of sleeping lofts (revised R314.3, Item 2). At the Group A PCH last year, we received feedback from two former fire officials that smoke alarms shouldn't be required in the sleeping loft itself, but because there are cases where a smoke alarm may not be nearby, we believe one should be located in the vicinity of the loft to provide early warning. Looking at Figure 1 below, because this is a bedroom, a smoke alarm is required to be located in the vaulted area per the smoke alarm listing, not in the hallway as constructed. However, if instead this sleeping loft opened to a living room, the current Section R314.3 would not require a smoke alarm in the vaulted ceiling area.
- Sleeping lofts may be confused with mezzanines, so the exception to R325.1 points the user from the mezzanine section to the sleeping loft section.

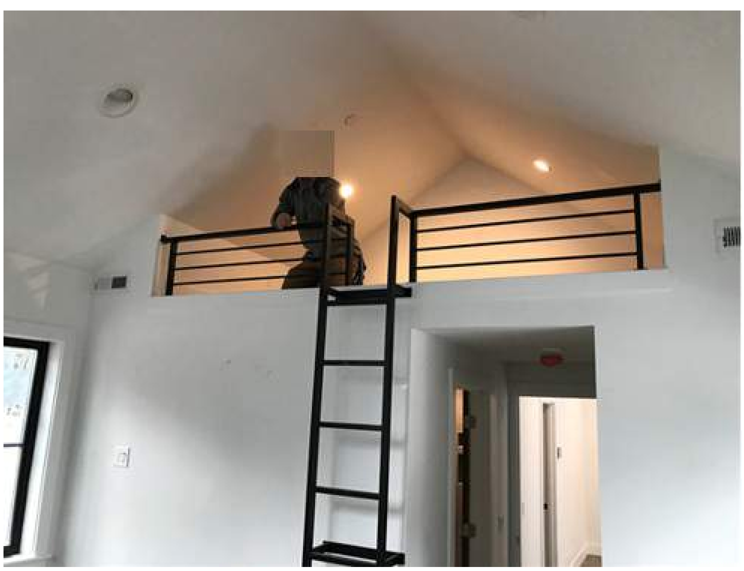


FIGURE 1: Sleeping loft in a bedroom (as built)

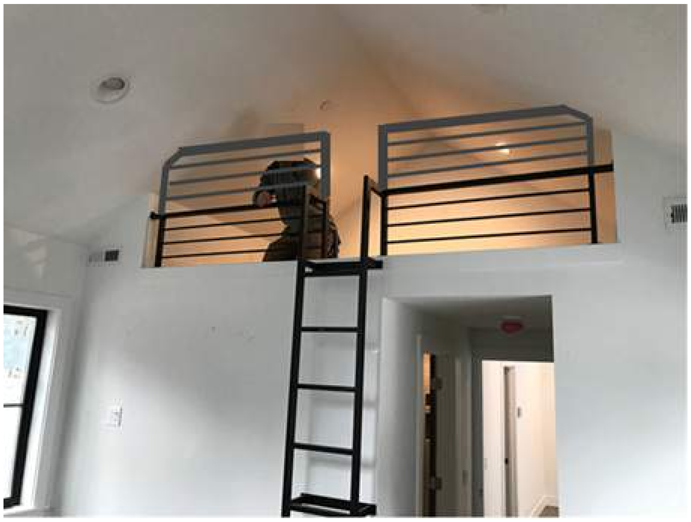


FIGURE 2: Sleeping loft in a bedroom, with code-compliant guard

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because sleeping lofts are an option, not a requirement, this proposal has no impact on the cost of construction. When a sleeping loft is provided, this proposal provides a uniform set of requirements.

RB153-22

RB154-22

IRC: R326.3

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Residential Code

Revise as follows:

R326.3 Story above grade plane. A habitable attic shall be considered a story above grade plane.
Exceptions: A habitable attic shall not be considered to be a story above grade plane provided that the habitable attic meets all the following:

1. The aggregate area of the habitable attic is either of the following:
   1.1. Not greater than one-third of the floor area of the story below.
   1.2. Not greater than one-half of the floor area of the story below where the habitable attic is located within a dwelling unit equipped with a fire sprinkler system in accordance with Section P2904.
2. The occupiable space is enclosed by the roof assembly above, knee walls, if applicable, on the sides and the floor-ceiling assembly below.
3. The floor of the habitable attic does not extend beyond the exterior walls of the story below.
4. Where a habitable attic is located above a third story~~, the dwelling unit or townhouse unit shall be equipped with~~ a fire sprinkler system in accordance with Section P2904 shall be installed in the habitable attic and the townhouse unit or dwelling unit or units located beneath the habitable attic.

Reason Statement: This revision corrects an oversight in the existing text that could be interpreted to not require sprinklers in both dwelling units beneath a habitable attic if the attic were located above a stacked duplex. This was the intent of the current provision but was not clearly stated.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is intended as a clarification of how the existing provisions are to be applied.

RB154-22

RB155-22

IRC: R328.3.1, R328.4

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R328.3.1 Spacing. Individual units shall be separated from each other by not less than 3 feet (914 mm) except where ~~smaller~~ other separation distances are ~~documented to be adequate based on large-scale fire testing complying with Section 1207.1.5 of the *International Fire Code*~~ specified by the ESS listing and the manufacturer's installation instructions.

R328.4 Locations. *ESS* shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the dwelling unit living space in accordance with Section R302.6.
3. Outdoors or on the exterior side of exterior walls located not less than 3 feet (914 mm) from doors and windows directly entering the dwelling unit, except where smaller separation distances are permitted by the UL 9540 listing and manufacturer's installation instructions.
4. Enclosed utility closets, basements, storage or utility spaces within dwelling units with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than $^5/_8$-inch (15.9 mm) Type X gypsum wallboard.

ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.

Reason Statement: UL 9540 is in the process of being revised to strengthen the connection to UL 9540A large scale fire testing. UL 9540A captures data and introduces pass/fail performance criteria for spacings between units, and between unit and window/door openings, minimum room sizes, and clearances from combustible mounting substrates. The UL 9540 listing is contingent on this pass/fail criteria and the results are required to be included in the manufacturer's installation instructions.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides an alternative in accordance with UL 9540, and part of the required listing.

RB155-22

RB156-22

IRC: R328.4

Proponents: Larry Sherwood, representing Solar Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R328.4 Locations. *ESS* shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the dwelling unit living space in accordance with Section R302.6.
3. Outdoors or on the exterior side of exterior walls located not less than 3 feet (914 mm) from doors and windows directly entering the dwelling unit.
4. Enclosed utility closets, basements, storage or utility spaces within dwelling units with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than $^5/_8$-inch (15.9 mm) Type X gypsum wallboard <u>or equivalent</u>.

ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.

Reason Statement: The “or equivalent” language allows contractors to use other materials that may be more durable or easier to work with in certain situations. AHJs have approved the use of cementitious board, fire-retardant-treated wood, and other rated materials, for example.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It provides additional options for installers.

RB156-22

RB157-22

IRC: R328.4

Proponents: Chad Sievers, representing Deparment of State (chad.sievers@dos.ny.gov)

2021 International Residential Code

Revise as follows:

R328.4 Locations. *ESS* shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the dwelling unit living space in accordance with Section R302.6.
3. Outdoors or on the exterior side of exterior walls located not less than 3 feet (914 mm) from doors and windows directly entering the dwelling unit.
4. Enclosed utility closets, basements, storage or utility spaces within dwelling units with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than $^5/_8$-inch (15.9 mm) Type X gypsum wallboard. <u>Openings shall be equipped with solid wood doors not less than 1-3/8 inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than 1-3/8 inches (35 mm) thick, or door with a 20-minute fire protection rating. Doors shall be self-latching and equipped with a self-closing or automatic-closing device. Penetrations through the required gypsum wallboard shall be protected as required by Section R302.11, Item 4.</u>

ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.

Reason Statement: The energy storage system presents a fire hazard to the occupants of the dwelling. The code already requires a fire protective envelope around ESS but the code has left holes in this envelope, including penetrations and the door. To reduce the chance of fire spread and allow its occupants ample amount of time to evacuate the building the envelope must be sealed. This can easily be done by requiring a fire-rated door or equivalent and to seal any penetrations.

Cost Impact: The code change proposal will increase the cost of construction
The additional cost of the door and sealants will increase the cost of a dwelling with an energy storage system but will be a small fraction of the total cost for an ESS installed.

RB157-22

RB158-22

IRC: R328.1

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R328.1 General. *Energy storage systems (ESS)* shall comply with the provisions of this section.

Exceptions:

1. *ESS listed* and *labeled* in accordance with UL 9540 and marked "~~For~~ Suitable for use in residential ~~dwelling units~~ habitable spaces" where installed in accordance with the manufacturer's instructions and NFPA 70.
2. *ESS* less than 1 kWh (3.6 megajoules).

Reason Statement: Intended to clarify what the product marking actually is. To align with the wording that will ultimately be in the standard.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It aligns with the marking requirements in UL 9540.

RB158-22

RB159-22

IRC: R328.5, TABLE R328.5 (New)

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R328.5 Energy ratings. Individual *ESS* units shall have a maximum rating of 20 kWh. The ~~aggregate rating~~ ratings of the *ESS* in each location shall not exceed the ratings in Table R328.5. ~~:~~The total aggregate ratings of ESS on the property shall not exceed 600 kWh.

~~1. 40 kWh within utility closets, basements, and storage or utility spaces.~~

~~2. 80 kWh in attached or detached garages and detached accessory structures.~~

~~3. 80 kWh on exterior walls.~~

~~4. 80 kWh outdoors on the ground.~~

ESS installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with Section 1207 of the *International Fire Code*.

Add new text as follows:

TABLE R328.5 MAXIMUM AGGREGATE RATINGS OF ESS

LOCATION	**MAXIMUM AGGREGATE RATINGS (kWh)**	**INSTALLATION REQUIREMENTS**
Within utility closets, basements and storage or utility spaces located within dwellings	40	
In attached garages	100	
On or within 3 feet of exterior walls of dwellings and attached garages	100	
	200	Exterior walls and eaves are constructed with *noncombustible* surfaces[a]
In detached garages and detached accessory structures	200	
	600	Detached garage or detached accessory structure is a minimum 10 feet away from property lines and dwellings.
Outdoors on the ground	200	ESS is a minimum 3 feet away from property lines and dwellings.
	600	ESS is a minimum 10 feet away from property lines and dwellings.

For SI: 1 foot = 304.8 mm

a. Noncombustible wall surface shall extend in accordance with all of the following:

1. A minimum of 5 feet horizontally from the edge of the ESS.
2. A minimum of 1 foot vertically below the bottom edge of the ESS.
3. A minimum of 8 feet vertically above the ESS, or to a non combustible eave, whichever is less.

The code official is authorized to approve reductions based on large-scale fire testing complying with Section 1207.1.5 of the International Fire Code.

Reason Statement: The proposed changes to the first three sentences of R328.5 clarify the original intent for this section, which was to provide a maximum threshold for each location. It was not the intent to limit installations to one location on the property, or to limit to only 80 kWh for all ESS installed on the property.
Providing the various maximum thresholds in tabular form provides an easier method for the code user to determine the limits for each location.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Within utility closets, basements and storage or utility spaces

:

The 40 kWh limit is unchanged from the 2021 IRC. That language clarifies that the 40 kWh limit does not apply to spaces or closets located within garages or accessory structures. It only applies to within the dwelling.

In attached garages

As the ESS industry has gained more experience with the needs of their customers and the grid, and the building safety community has gained more experience with ESS, it is becoming clear that the arbitrary capacity restrictions in the residential code are a hinderance to the deployment of clean energy technologies and are unneeded for safety. Hundreds of thousands of residential batteries have been installed and constructed to standards leading to greater levels of safety. Taken together these facts support a reasonable increase in kWh capacity to align with other anticipated hazards and fuel loads that may be present in a residential garage.

A modest increase in the allowable aggregate ESS capacity from 80 kWh to 100 kWh does not pose a significant elevated fire risk in the garage. Manufacturers design ESS to well-established safety standards, have proven track records of operating without igniting in homes, and are built in ways to resist adding fuel to fires from other sources. In the rare event of an ESS fire, a fire from 100 kWh of energy storage does not pose a significantly greater threat to occupant safety and is not significantly more difficult to extinguish than a fire from 80 kWh of energy storage.

The fuel energy density and heat release rate potential presented by a 100-kWh energy storage system are comparable to that of vehicles parked in garages. 100 kWh is a typical capacity of currently available electric vehicles (EVs), which use lithium-ion chemistries as do many stationary ESS.[1] EVs also present significant additional fuel load through materials like upholstered seating and plastic trim. Internal combustion engine (ICE) vehicles have fuel, engine lubricants, and other components with the potential for very significant heat release rates. While the fuel load in a vehicle fueled by a gaseous fuel such as CNG or hydrogen can be less than that of a 100-kWh ESS in total energy output, the dynamics of a designed quick release of a gaseous fuel due to fire exposure in an attached garage can pose a significant concentrated fire exposure, or potentially a deflagration hazard risk to occupants and emergency responders.

This proposal allows homes to add an aggregate of 100 kWh of energy storage to an attached garage, while keeping the content fuel loads at safe levels. While actual fuel loads in garages can vary widely, this can be demonstrated using typical and conservative figures:

A reasonable fuel load for a garage is approximately 22,300 MJ. This assumes the garage is 20' x 20'[2] and that a reasonable fuel load density is 600 MJ/m^2.[3] Parking two gasoline powered cars in the garage makes up approximately 10,600 MJ of fuel load.[4] Other garage items can make up approximately 3,300 MJ of fuel load.[5] The remaining fuel load available to an ESS (22,300 MJ minus 10,600 MJ minus 3,300 MJ) is 8,400 MJ. 8,400 MJ is equivalent to an ESS with an aggregate capacity of 100 kWh, assuming the ESS has a fuel load of 84 MJ/kWh.[6]

On or within 3 feet (914 mm) of exterior walls of dwellings and attached garages

ESS on the exterior side of exterior walls pose less of a safety risk than ESS inside attached garages. If an ESS with an aggregate rating of 100 kWh in an attached garage is considered reasonable, then an ESS with an aggregate rating of 100 kWh on the exterior side of exterior walls should also be reasonable.

If an ESS with an aggregate rating of more than 100 kWh catches on fire, the non-combustible surface would protect occupant safety. Batteries that undergo burn tests on non-combustible surfaces, including masonry and cementitious board, perform well. Some tests have been done as part of 9540A.

In detached garages and detached accessory structures

This scenario poses minimal risk to occupant safety, considering the distance from the dwelling and testing required of ESS. ESS in detached structures pose less of a safety risk than ESS on the exterior side of the dwelling. If an ESS with an aggregate rating of 200 kWh on the exterior side of the dwelling is considered reasonable, then an ESS with an aggregate rating of 200 kWh should be reasonable for ESS in detached structures.

600 kWh matches Table 1207.5 of the IFC. ESS in structures separated from the dwelling by 10 feet do not pose demonstrable risk to occupants.

Outdoors on the ground

This scenario poses minimal risk to occupant safety, considering the distance from the dwelling and the testing required of ESS. Ground mount ESS pose less of a safety risk than ESS on the exterior side of the dwelling. If an ESS with an aggregate rating of 200 kWh on the exterior side of the dwelling is considered reasonable, then an ESS with an aggregate rating of 200 kWh should be reasonable for ESS mounted on the ground.

Additionally, 200 kWh is equivalent to two typical EVs that can be parked anywhere on the property.

600 kWh matches Table 1207.5 of the IFC. ESS separated from the dwelling by 10 feet do not pose demonstrable risk to occupants.

Endnotes

1. Tesla Model X has a capacity of 100 kWh. Tesla Model S has a capacity of 70-85 kWh. Chevy Bolt has a capacity of 66 kWh. The electric Ford F150 has a capacity of 110-130 kWh or 150-180 kWh with extended range. Sources: https://www.forbes.com/wheels/cars/tesla/model-x/, https://www.tesla.com/sites/default/files/tesla-model-s.pdf, https://media.chevrolet.com/media/us/en/chevrolet/vehicles/bolt-ev/2021.tab1.html, https://www.forbes.com/wheels/news/2022-ford-f-150-lightning-ev-pickup-debuts-300-mile-range-priced-at-40k.

2. Builders' websites show the typical two-garage is around 20' x 20'. For example, HWS Garages' website states that "The average 2-car garage size is anywhere from 18' x 20' to 22′ x 22'." While some garages are one-car and some are three-car, a poll conducted by Garage Living shows that 61 percent of garages are two-car. Sources: www.hwsgarage.com/average-garage-sizes/ and www.garageliving.com/blog/home-garage-stats.

3. The average fuel load of a living room is 600 MJ/m^2. 600 MJ/m^2 is also the business standard in NFPA 557. Sources: Alex Bwalya et al., "A Pilot Survey of Fire Loads in Canadian Homes," *National Research Council Canada,* March 9, 2004; National Fire Protection Association, "NFPA 557: Standard for Determination of Fire Loads for Use in Structural Fire Protection Design," 2020 Edition, Section 6.1.3.

4. 10,577 MJ (rounded to 10,600 MJ) assumes a small car (2,909 MJ) and large car (7,648 MJ). Sources: Mohd Tohir and Michael Spearpoint, "Distribution analysis of the fire severity characteristics of single passenger road vehicles using heat release rate data," *Fire Science Reviews*, 2013. Also see M.J. Spearpoint, et. al., "Fire load energy densities for risk-based design of car parking buildings*," Case Studies in Fire Safety*, 29 April 2015.

5. 3,341 MJ (rounded to 3,300 MJ) is equivalent to half the fuel load items in a typical basement living room. Source: Bwalya, A.C., et. al., "Survey Results of Combustible Contents and Floor Areas in Multi-Family Dwellings," *National Research Council Canada*, 24 October 2008.

6. 84 MJ/kWh is derived from the estimated fuel load of the gases released by an ESS in thermal runaway (44 MJ/kWh) and the estimated fuel load of the burnable contents inside the ESS (40 MJ/kWh). 44 MJ/kWh was derived from reviewing several studies referenced below. 40 MJ/kWh was derived from multiplying 2 kg/kWh (a conservative figure for burnable contents inside the ESS – the weight of internal contents for some ESS is 1.0-1.5 kg/kWh) by 20 MJ/kg (the typical fuel load of a computer). Sources for fuel load of gases: Frederik Larsson, "Toxic fluoride gas emissions from lithium-ion battery fires," *Scientific Reports*, 30 August 2017; David Sturk et. al., "Fire Tests on E-vehicle Battery Cells and Packs," *Traffic Injury Prevention,* 25 February 2015. Sources for kg/kWh weight of internal burnable contents: Tesla, SimpliPhi, and Solaredge. Source for fuel load of a computer: Alex Bwalya et al., "A Pilot Survey of Fire Loads in Canadian Homes," *National Research Council Canada*, March 9, 2004.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It clarifies how the maximum thresholds are applied. Allows for more ESS while maintaining a level of safety.

RB159-22

RB160-22

IRC: R328.7

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R328.7 Fire detection. ESS installed in *dwellings* and attached garages shall comply with the following:

1. Rooms and areas within *dwelling units, sleeping units* , basements and attached garages in which *ESS* are installed shall be protected by smoke alarms in accordance with Section R314.
2. A ~~heat detector, listed and interconnected to the smoke alarms,~~ *listed* heat alarm shall be installed in locations ~~within dwelling units and attached garages~~ where smoke alarms cannot be installed based on their listing.

Reason Statement:
This proposal aligns with F154-21 in the Group A cycle for the IFC.

The purpose of this proposal is to:

1. Divide the single paragraph into distinct parts for clarity, separating the charging language from the provisions to provide single-station or multi-station smoke alarms per the code.

2. Correct the section pointer to section 907.2.10 to the revised location in the 2021 IFC, 907.2.11.

3. Clarify the intent is to provide both heat detection and alarm annunciation in the ESS location through the use of listed heat alarms.

The term heat detector was replaced because the heat detectors do not include a local annunciator. A heat detector is only required to detect a heat event, and safety officials want an audible alarm.The term interconnected is removed from this section as the requirements for interconnection are provided in section 907.2.11 of the code.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies existing code language, and aligns with the IFC.

RB160-22

RB161-22

IRC: R328.8, R328.8.1 (New), FIGURE R328.8.1 (New), R328.8.2 (New), R328.8.3 (New)

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R328.8 Protection from impact. *ESS* installed in a location subject to vehicle damage shall be protected ~~by *approved* barriers~~ in accordance with Section R328.8.1 or R328.8.2.

Add new text as follows:

R328.8.1 Garages. Where an ESS is installed in the normal driving path of vehicle travel within a garage, impact protection complying with Section R328.8.3 shall be provided. The normal driving path is a space between the garage vehicle opening and the interior face of the back wall to a height of 48 inches (1219 mm) above the finished floor. The width of the normal driving path shall be equal to the width of the garage door opening. Impact protection shall also be provided for an ESS installed at either of the following locations (see Figure R328.8.1):

1. On the interior face of the back wall and located within 36 inches (914 mm) to the left or to the right of the normal driving path.
2. On the interior face of a side wall and located within 24 inches (610 mm) from the back wall and 36 inches (914 mm) of the normal driving path.

Exception: Where the clear height of the vehicle garage opening is 7 feet 6 inch (2286 mm) or less, ESS installed not less than 36 inches (914 mm) above finished floor are not subject to vehicle impact protection requirements.

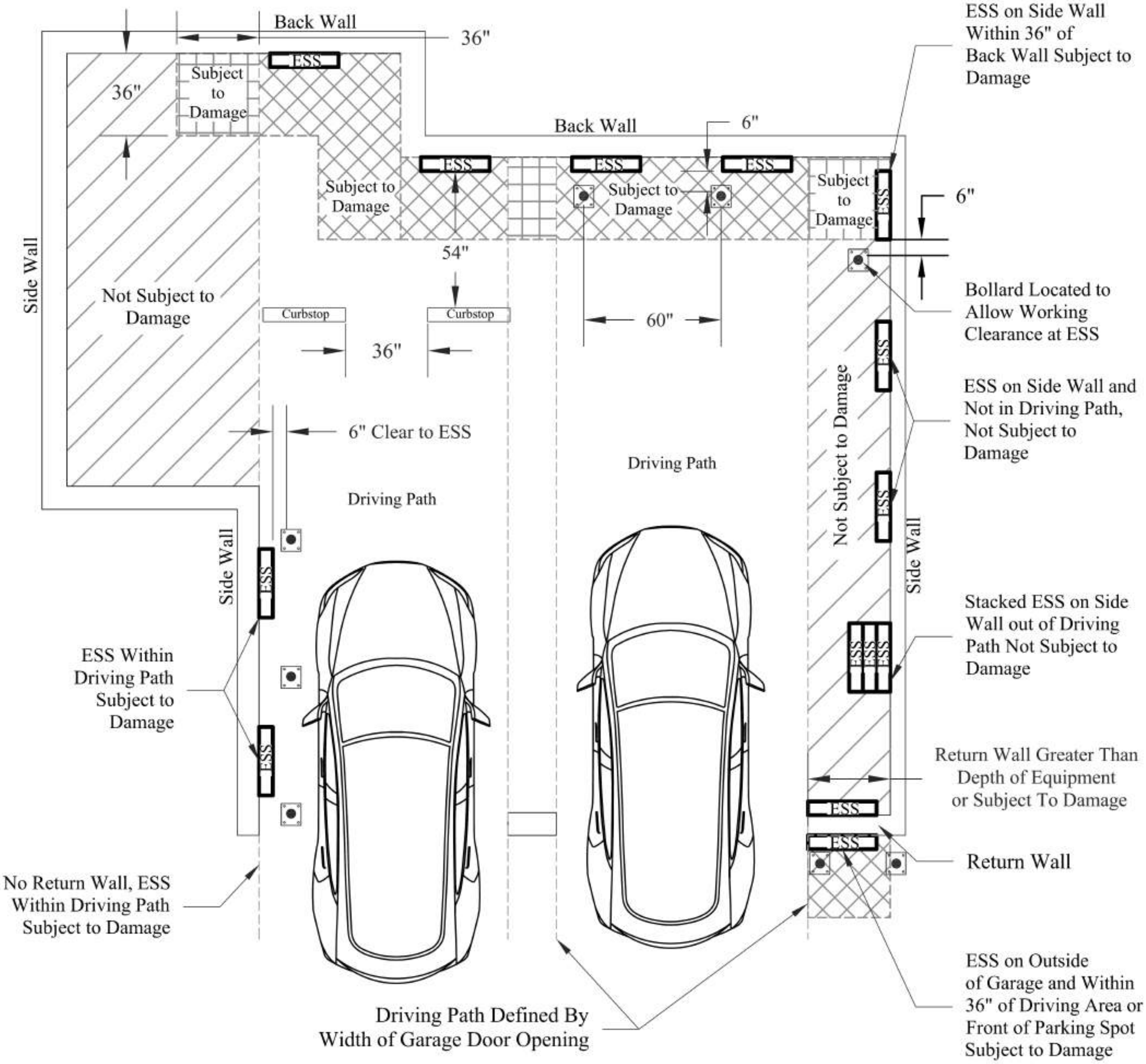


FIGURE R328.8.1 ESS VEHICLE IMPACT PROTECTION

R328.8.2 Other locations subject to vehicle impact. Where an ESS is installed in a location other than as defined in Section R328.8.1, and is subject to vehicle damage, impact protection shall be provided in accordance with Section R328.8.3.

R328.8.3 Impact protection options. ESS protection shall comply with one of the following:

1. Bollards constructed in accordance with one of the following:
   1.1. Minimum 48 inches (1219 mm) in length by 3 inches (76 mm) in diameter schedule 80 steel pipe embedded in a concrete pier not less than 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with at least 36 inches (914 mm) of pipe exposed, filled with concrete, and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from an ESS.
   1.2. Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter schedule 80 steel pipe fully welded to a minimum 8 inches (203 mm) by ¼ inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of 4-1/2 inch (114 mm) concrete anchors with 3 inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the ESS.
   1.3. Pre-manufactured steel pipe bollards filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than 60 inches (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from the ESS.

2. Wheel barriers constructed in accordance with one of the following:
   2.1. Four inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the ESS. Minimum 3– ½ inch (90 mm) diameter concrete anchors with 3 inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be no greater than 36 inches (914 mm).
   2.2. Pre-manufactured wheel barriers shall be anchored in accordance with the manufacturer's installation instructions.
3. *Approved* method designed to resist a 2000 pounds per square foot (8899 Newtons) impact in the direction of travel at 24 inches (608 mm) above grade.

Reason Statement: This proposal aligns with F155-21 in the Group A cycle for the IFC. The intent is to provide clear methods for providing vehicle impact protection.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Technical Justification
An engineering review of the impact protection guidance found across the I-Codes and ASCE 7-16 was completed. Specifically Section 312 of both the prior and existing IFC, Section 4.5.3 of ASCE 7-16, and commentary language and figures associated with Section 304.6 of the IMC.

It is important to recognize that the prescription of the IFC Section 312 for bollards in public driving areas does not lead to a bollard that will resist 12k lbs. as prior editions of the code suggested.. In actual testing ((Harrison (SwRI), Evaluation of collision protection provided by vehicle impact bollards and propane cylinder exchange cabinets 2013)) the static resistance was between 900 lbs. at 36" (2.7k lbs. reaction) and 11k lbs. at 36" (33k lbs. reaction).

ASCE 7-16 specifies vehicle barrier systems must resist 6k lbs. load at between 18" and 27" (9k to 13.5k lbs. reaction.) There are no commonly available retrofittable bollards that can do this in an average residential garage without adding thickness to the concrete.

The IMC commentary figure when back calculated sets a bar of physical resistance which seems more appropriate to this risk and allows for solutions that are more practical to apply. For example, the bollard shown in IMC commentary Figure 304.6(2) will take an impact of about 625 lbs. load applied at 24", resulting in a 1250 lb reaction force at the post to base plate connection. Likely outcomes based on this force include:

No damage at 0.5 mph impact from an average passenger car.

Bollard would deflect permanently a few inches at a 2 mph collision speed

Anchor bolts would shear off or blowout at a 5 mph collision speed.

The limitation is mostly the concrete to base plate connection. The IRC requires a 2500-3000 psi mix for garages, and garages are often of stronger mix, especially in freeze prone areas. The average garage concrete slab will fall within these specifications: 2500 - 4000 psi concrete with 5" min thickness. Using 1/2" epoxy anchors this equates to roughly a 2mph impact that could be sustained without significant damage to the bollard. This is aligned with a standard Uline 4.5" bollard with 1/8" wall thickness and a 8x8x3/8" base plate. More strength requires a larger base plate, as the limitation is the connection to the concrete.

The bolt down bollard specified in this proposal will take a 2000 lb impact, 24" off the ground with no damage, given 3000 psi concrete. More than 6" of permanent deflection would require a very significant force, and then only touching the face of the ESS. This seems a reasonable level of protection, and clearance distance.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Bibliography: Harrison, O. (2013). Evaluation of Collision Protection provided by vehicle impact bollards and propane cylinder exchange cabinets (Rep. No. 18.19083.01.107.FR1). Southwest Research Institute.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies existing code language, and aligns with the IFC.

RB161-22

RB162-22

IRC: SECTION R331 (New), R331.1 (New), R331.1.1 (New), R331.1.2 (New), R331.1.2.1 (New), R331.1.2.2 (New), R331.1.2.3 (New), R331.1.2.4 (New), R331.1.2.5 (New)

Proponents: Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Add new text as follows:

SECTION R331
ALTERATIONS

R331.1 Alterations to an existing building. Where an *existing building* with the alteration is within the scope of the International Residential Code, *alterations* to the *existing building* shall comply with this section and other applicable provisions of this code. New elements shall meet all of the requirements of this code for new construction. Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section. *Alterations* shall not cause the *existing building* to become less compliant with the provisions of this code for new construction than the *existing building* was prior to the work.

R331.1.1 Alterations that decrease structural capacity. Where an *alteration* causes a decrease in capacity in any structural component, that structural component shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6, and 8.

R331.1.2 Alterations that increase structural loads. Where an *alteration* causes an increase in loads as described in this section, the existing structural components that support the increased load, including the foundation, shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6, and 8. Existing structural components that do not provide support for the increased loads shall not be required to comply with this section.

R331.1.2.1 Dead load increase. *Dead load* shall be considered to be increased for purposes of this section when the weight of materials used for the alteration exceeds the weight of the materials replaced, or when new materials or elements are added.

> **Exception:** Buildings in which the increase in dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m2) or less over an existing single layer of roof covering.

R331.1.2.2 Live load increase. An increase in *live load* shall be determined based on Table R301.5.

R331.1.2.3 Snow load increase. Snow load shall be considered to be increased for purposes of this section when alteration of the roof configuration creates new areas that accumulate drifted snow.

R331.1.2.4 Wind load increase. Wind load shall be considered to be increased for purposes of this section when the surface area of any exterior elevation subject to wind pressure is increased by more than 5%.

R331.1.2.5 Seismic load increase. Seismic load shall be considered to be increased for purposes of this section where the actual dead load has increased by more than 5% in *existing buildings* assigned to Seismic Design Category C, D_0, D_1, or D_2 and subject to the seismic provisions of Section R301.2.2.

Reason Statement: This proposal clarifies current IRC provisions as they apply to structural alterations of existing buildings within the scope of the IRC. IRC Section R102.7.1 provides broad guidance for alterations but does not provide clear direction on how to apply this guidance in common and specific circumstances. Use of the IEBC is permitted but is not consistent with the intent of the IRC to function as a standalone code. This proposal facilitates use of the IRC as a standalone code for both new and existing buildings within the scope of the IRC.
The language used in this proposal has been laid out to be consistent with the IRC approach and to keep the intended users (not engineers) in mind. The alteration provisions have been separated into 2 conditions:

- A decrease in structural capacity
- An increase in the supported loads

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification of existing, but ambiguous, rules already provided in Section R102.7.1.

RB162-22

RB163-22

IRC: SECTION R331 (New), R331.1 (New), R331.1.1 (New), R331.1.2 (New), R331.1.3 (New)

Proponents: Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Add new text as follows:

SECTION R331
ADDITIONS

R331.1 Additions to an existing building. Where *existing buildings* with the addition are within the scope of the International Residential Code, additions shall comply with this section and other applicable provisions of this code. Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section.

R331.1.1 Horizontal Attached Addition. Where an *addition* involves new construction next to and attached to an *existing building* and includes *alterations* to the *existing building*, the new construction shall meet all of the requirements of this code for new construction. Alterations to the *existing building* shall comply with the requirements governing alterations within this code. The addition structural components shall be connected to the *existing building* in accordance with accepted engineering practice.

Exception: In wood light-frame additions, connection of the structural components shall be permitted to be provided using wall top plates and addition studs that abut the *existing building*. Wall top plates shall be lapped and spliced in accordance with Section R602.3.2. Abutting studs shall be fastened in accordance with Table R602.3(1).

R331.1.2 Horizontal Detached Addition. Where an *addition* involves new construction next to an *existing building*, without structural alterations to the existing building, the *existing building* need not comply with the requirements of this code for new construction. The addition shall meet all of the requirements of this code for new construction and a minimum clear space not less than 6-inches shall be provided between the addition structural components and the *existing building*. Exterior and interior finish materials and non-structural framing infill shall be permitted to bridge the clear space between the addition and *existing building*. Existing foundations shall not be used to support the addition.

Exceptions:

1. At parallel wall lines between the *existing building* and the *addition*, the existing foundation is permitted to be altered to support the addition provided the modified foundation is designed in accordance with Section R301.1.3.
2. At parallel wall lines between the *existing building* and the *addition*, an existing window opening is permitted to be altered to create a shared door, provided there are no modifications to the existing wall framing above and beside the existing opening, or to the existing braced wall panels.

R331.1.3 Vertical Addition. Where an *addition* involves new construction that adds a story to any part of the *existing building* or vertically increases the height of any part of the *existing building*, the new construction and the existing building together shall meet all of the requirements of this code for new construction.

Reason Statement: This proposal provides model prescriptive provisions for additions to existing buildings within the scope of the IRC. The current governing language on existing IRC buildings (R102.7.1) leaves significant questions open to broad interpretation by the user and AHJ, which is clarified by these provisions. The language used in this proposal has been laid out to be consistent with the IRC approach and to keep the intended users (not engineers) in mind. This code change proposal does not add new requirements, but rather explains in more detail how the existing general requirements should be implemented.
The addition provisions have been separated into 3 conditions:

- Horizontal Attached Addition – additions that do rely on the existing structure for stability
- Horizontal Detached Addition – additions that do not rely on the existing structure for stability
- Vertical Addition – vertical additions that rely on the existing structure below to provide adequate support without failure or excessive deformation.

The model code that governs existing buildings (IEBC) includes multiple exceptions that allow the user to use the IRC for one- and two-family dwellings and townhouses. Once under IRC Section R102.7.1, questions arise on how to apply new code provisions to an existing structure, short of triggering a full upgrade or engaging a registered design professional. The ambiguity of R102.7.1 has resulted in AHJ's developing their own local amendments, to establish when existing conditions must be upgraded to comply with new code provisions.

Note:

A separate proposal has been submitted to create a new IRC Chapter 44 for Existing Buildings with new sections for existing provisions. If both proposals are approved, the sections proposed here would be relocated into Chapter 44 and appropriately renumbered.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification of existing, but ambiguous, rules already provided in R102.7.1.

RB163-22

RB164-22

IRC: R301.2.2.1, R401.4

Proponents: Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); J Daniel Dolan, representing Seismic Code Support Committee (jddolan@wsu.edu); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Revise as follows:

R301.2.2.1 Determination of seismic design category. Buildings shall be assigned a seismic design category in accordance with Figures R301.2.2.1(1)through R301.2.2.1(6), except as otherwise required by Section R401.4.

R401.4 Soil tests. Where quantifiable data created by accepted soil science methodologies indicate *expansive soils, compressible soils*, shifting soils or other questionable soil characteristics are likely to be present, the *building official* shall determine whether to require a soil test to determine the soil's characteristics at a particular location. This test shall be done by an *approved agency* using an *approved* method. Where soil testing is performed, the geotechnical report shall include the determination of the Site Class and the short-period spectral response acceleration, S_{DS}, in accordance with Section 1613 of the *International Building Code.* The *Seismic Design Category* shall be assigned in accordance with Table R301.2.2.1.1.

Reason Statement: In accordance with the seismic provisions of IBC Section 1613 and ASCE 7, sites with what the IRC describes as questionable soils would trigger the requirement for a site-specific site response analysis to identify the applicable Site Class and Seismic Design Category. For consistency with the IBC and ASCE 7, this proposal expands the already required geotechnical investigation to include determination of the Site Class and short-period spectral response acceleration, S_{DS}. Providing this information will help ensure that the correct Seismic Design Category is assigned, resulting in the seismic performance intended by the IRC. Once a geotechnical investigation is to be provided, it is a small increment in effort to make a determination of the Site Class and S_{DS}. This information is already very commonly included in geotechnical reports. To help direct the user to this provision, a pointed is added from Section R301.2.2.1 to Section R401.4.

Cost Impact: The code change proposal will increase the cost of construction
This proposal will result in a small increase in cost of construction where a soil test is already required.

RB164-22

RB165-22

IRC: R310.4.3, R401.4.1, TABLE R405.1, R403.3.3, TABLE R403.4, TABLE R404.1.1(1), TABLE R404.1.1(2), TABLE R404.1.1(3), TABLE R404.1.1(4), TABLE R404.1.2(2), TABLE R404.1.2(3), TABLE R404.1.2(4), TABLE R404.1.2(5), TABLE R404.1.2(6), TABLE R404.1.2(7), TABLE R404.1.2(8), R405.1, R506.2.2

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2021 International Residential Code

Revise as follows:

R310.4.3 Drainage. Area wells shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section R405.1.

> **Exception:** A drainage system for area wells is not required where the foundation is on well-drained soil or sand-gravel mixture soils in accordance with the United Soil Classification System, Group I Soils, as detailed in Table R401.4.1(2) ~~R405.1~~.

R401.4.1 Geotechnical evaluation. In lieu of a complete geotechnical evaluation, the load-bearing values in Table R401.4.1(1) and the soil classifications in Table R401.4.1(2) shall be assumed.

TABLE R401.4.1(2) ~~R405.1~~ PROPERTIES OF SOILS CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL GROUP	UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOL	SOIL DESCRIPTION	USDA TEXTURAL SOIL CLASSIFICATION	DRAINAGE CHARACTERISTICS[a]	FROST HEAVE POTENTIAL	VOLUME CHANGE POTENTIAL EXPANSION[b]
Group I	GW	Well-graded gravels, gravel sand mixtures, little or no fines	N/A	Good	Low	Low
	GP	Poorly graded gravels or gravel sand mixtures, little or no fines	N/A	Good	Low	Low
	SW	Well-graded sands, gravelly sands, little or no fines	N/A	Good	Low	Low
	SP	Poorly graded sands or gravelly sands, little or no fines	Sand	Good	Low	Low
	GM	Silty gravels, gravel-sand-silt mixtures	N/A	Good	Medium	Low
	SM	Silty sand, sand-silt mixtures	Loamy Sand, Sandy Loam	Good	Medium	Low
Group II	GC	Clayey gravels, gravel-sand-clay mixtures	N/A	Medium	Medium	Low
	SC	Clayey sands, sand-clay mixture	Sandy Clay Loam, Sandy Clay	Medium	Medium	Low
	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Silt, Silt Loam	Medium	High	Low
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Loam, Clay Loam, Silty Clay Loam	Medium	Medium	Medium to Low
Group III	CH	Inorganic clays of high plasticity, fat clays	Clay, Silty Clay	Poor[c]	Medium	High
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	N/A	Poor[c]	High	High
Group IV	OL	Organic silts and organic silty clays of low plasticity	N/A	Poor[c]	Medium	Medium
	OH	Organic clays of medium to high plasticity, organic silts	N/A	Unsatisfactory[c]	Medium	High
	Pt	Peat and other highly organic soils	N/A	Unsatisfactory[c]	Medium	High

For SI: 1 inch = 25.4 mm.

a. The percolation rate for good drainage is over 4 inches per hour, medium drainage is 2 inches to 4 inches per hour, and poor is less than 2 inches per hour.

b. Soils with a low potential expansion typically have a plasticity index (PI) of 0 to 15, soils with a medium potential expansion have a PI of 10 to 35 and soils with a high potential expansion have a PI greater than 20.

c. Unsuitable as backfill material.

R403.3.3 Drainage. Final *grade* shall be sloped in accordance with Section R401.3. In other than Group I Soils, as detailed in Table R401.4.1(2) ~~R405.1~~, gravel or crushed stone beneath horizontal insulation below ground shall drain to daylight or into an *approved* sewer system.

TABLE R403.4 MINIMUM DEPTH (D) AND WIDTH (W) OF CRUSHED STONE FOOTINGS[a, b] (inches)

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 pound per square foot = 47.9 N/m^2.

a. Linear interpolation of stone depth between wall widths is permitted within each Load-Bearing Value of Soil (psf).

b. Crushed stone must be consolidated in 8-inch lifts with a plate vibrator.

c. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R401.4.1(2) ~~R405.1~~.

TABLE R404.1.1(1) PLAIN MASONRY FOUNDATION WALLS[f]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond. Ungrouted hollow masonry units are permitted except where otherwise indicated.

b. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R401.4.1(2) ~~R405.1~~.

c. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

d. Solid indicates solid masonry unit; grout indicates grouted hollow units.

e. Wall construction shall be in accordance with Table R404.1.1(2), R404.1.1(3) or R404.1.1(4), or a design shall be provided.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.1(2) 8-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 5 INCHES[a, c, f]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 5 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R401.4.1(2) ~~R405.1~~.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.1(3) 10-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 6.75 INCHES[a, c, f]
Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in *Seismic Design Categories* A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 6.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R401.4.1(2) ~~R405.1~~.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.1(4) 12-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 8.75 INCHES[a, c, f]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 8.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R401.4.1(2) ~~R405.1~~.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground levels. Where an interior concrete slab-on-grade is provided and in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height is permitted to be measured from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(2) MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, g, h, i, j, k]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R401.4.1(2) ~~R405.1~~.
b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.
c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).
d. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.
e. Interpolation is not permitted.
f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.
g. NR indicates vertical wall reinforcement is not required, except for 6-inch-nominal walls formed with stay-in-place forming systems in which case vertical reinforcement shall be No. 4@48 inches on center.
h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.
i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.
j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.
k. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(3) MINIMUM VERTICAL REINFORCEMENT FOR 8-INCH (203 mm) NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, f, h, i, j]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R401.4.1(2) ~~R405.1~~.
b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi, concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.
c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).
d. NR indicates vertical reinforcement is not required.
e. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.
f. Interpolation is not permitted.
g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.
h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.
i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.
j. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(4) MINIMUM VERTICAL REINFORCEMENT FOR 10-INCH NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, f, h, i, j]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R401.4.1(2) ~~R405.1~~.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).

d. NR indicates vertical reinforcement is not required.

e. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

f. Interpolation is not permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(5) MINIMUM VERTICAL WALL REINFORCEMENT FOR 6-INCH WAFFLE-GRID BASEMENT WALLS[b, c, d, e, g, h, i, j]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R401.4.1(2) ~~R405.1~~.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).

d. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

e. Interpolation is not permitted.

f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

g. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

h. See Table R608.3 for thicknesses and dimensions of waffle-grid walls.

i. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(6) MINIMUM VERTICAL REINFORCEMENT FOR 8-INCH WAFFLE-GRID BASEMENT WALLS[b, c, d, e, f, h, i, j, k]
Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R401.4.1(2) ~~R405.1~~.
b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.
c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 (420 MPa) and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).
d. NR indicates vertical reinforcement is not required.
e. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.
f. Interpolation shall not be permitted.
g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.
h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.
i. See Table R608.3 for thicknesses and dimensions of waffle-grid walls.
j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.
k. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(7) MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH (152 mm) SCREEN-GRID BASEMENT WALLS[b, c, d, e, g, h, i, j]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R401.4.1(2) ~~R405.1~~.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi, concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).

d. Deflection criterion is $L/240$, where L is the height of the basement wall in inches.

e. Interpolation is not permitted.

f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

g. See Sections R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

h. See Table R608.3 for thicknesses and dimensions of screen-grid walls.

i. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(8) MINIMUM VERTICAL REINFORCEMENT FOR 6-, 8-, 10- AND 12-INCH NOMINAL FLAT BASEMENT WALLS[b, c, d, e, f, h, i, k, n, o]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R401.4.1(2) ~~R405.1~~.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).

d. NR indicates vertical wall reinforcement is not required, except for 6-inch nominal walls formed with stay-in-place forming systems in which case vertical reinforcement shall be No. 4@48 inches on center.

e. Allowable deflection criterion is *L*/240, where *L* is the unsupported height of the basement wall in inches.

f. Interpolation is not permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. Vertical reinforcement shall be located to provide a cover of $1^1/_4$ inches measured from the inside face of the wall. The center of the steel shall not vary from the specified location by more than the greater of 10 percent of the wall thickness or $^3/_8$ inch.

i. Concrete cover for reinforcement measured from the inside face of the wall shall be not less than $^3/_4$ inch. Concrete cover for reinforcement measured from the outside face of the wall shall be not less than $1^1/_2$ inches for No. 5 bars and smaller, and not less than 2 inches for larger bars.

j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

k. Concrete shall have a specified compressive strength, f_c, of not less than 2,500 psi at 28 days, unless a higher strength is required by Note l or m.

l. The minimum thickness is permitted to be reduced 2 inches, provided that the minimum specified compressive strength of concrete, f_c, is 4,000 psi.

m. A plain concrete wall with a minimum nominal thickness of 12 inches is permitted, provided that the minimum specified compressive strength of concrete, f_c, is 3,500 psi.

n. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

o. The use of this table shall be prohibited for soil classifications not shown.

R405.1 Concrete or masonry foundations. Drains shall be provided around concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below *grade*. Drainage tiles, gravel or crushed stone drains, perforated pipe or other *approved* systems or materials shall be installed at or below the top of the footing or below the bottom of the slab and shall discharge by gravity or mechanical means into an *approved* drainage system. Gravel or crushed stone drains shall extend not less than 1 foot (305 mm) beyond the outside edge of the footing and 6 inches (152 mm) above the top of the footing and be covered with an *approved* filter membrane material. The top of open joints of drain tiles shall be protected with strips of building paper. Except where otherwise recommended by the drain manufacturer, perforated drains shall be surrounded with an *approved* filter membrane or the filter membrane shall cover the washed gravel or crushed rock covering the drain. Drainage tiles or perforated pipe shall be placed on not less than 2 inches (51 mm) of washed gravel or crushed rock not less than one sieve size larger than the tile joint opening or perforation and covered with not less than 6 inches (152 mm) of the same material.

Exception: A drainage system is not required where the foundation is installed on well-drained ground or sand-gravel mixture soils according to the Unified Soil Classification System, Group I soils, as detailed in Table R401.4.1(2) ~~R405.1~~.

R506.2.2 Base. A 4-inch-thick (102 mm) base course consisting of clean graded sand, gravel, crushed stone, crushed concrete or crushed blast-furnace slag passing a 2-inch (51 mm) sieve shall be placed on the prepared subgrade where the slab is below *grade*.

Exception: A base course is not required where the concrete slab is installed on well-drained or sand-gravel mixture soils classified as Group I according to the United Soil Classification System in accordance with Table R401.4.1(2) ~~R405.1~~.

Reason Statement: This proposal accomplishes three things. First, it relocates existing IRC Table R405.1 to Section R401.4.1. The soil classifications in the table are referred to repeatedly throughout IRC Section R401 and R402, yet somehow the user must flip all the way to Section R405 to find where the classifications are defined.

Secondly, a column is added providing U.S. Department of Agriculture (USDA) soil classifications in addition to the traditional Unified Soil Classification System (USCS) soil classifications. This provides a readily accessible resource which can be referenced if a geotechnical investigation is not being done, which is often the case in residential projects as such investigations can be cost-prohibitive. In the absence of a geotechnical investigation, enabling the use of the USDA data and textural descriptions may help ensure builders select a proper soil classification which is used to size footings based on assumed bearing pressures and determine foundation wall thickness and reinforcing. The latter is especially critical as assuming a higher quality soil than is actually present could lead to a foundation wall failure, creating a life safety issue.

The U.S. Army Corps of Engineers Engineer Research and Development Center conducted a study in 2015 to develop a consensus methodology for relating the USCS system to the USDA classification scheme. The USACE study compiled data from six soil databases containing thousands of soil samples with recorded properties, including water capacity, soil reaction, electrical conductivity, textural class, PH, salinity, clay fraction, and sand fraction. Using these records USASCE was able to identify samples classified under both the USDA and UCSC systems, determine the frequency of USDA classified soils occurring in the various UCSC categories, and reach a consensus scheme mapping between USDA soil types and USGS soil classifications. It is noted the mapping scheme does not apply to gravelly soils or to organic soils.

Lastly, a new footnote "c" is added to clarify certain soil types are unsuitable for backfill due to their poor drainage characteristics. A similar footnote appears in the IBC.

Bibliography:

García-Gaines, R. A., & Frankenstein, S. (2015). *USCS and the USDA Soil Classification System, Development of a Mapping Scheme.* Vicksburg, MS: U.S. Army Engineer Research and Development Center. Accessed at https://erdc-library.erdc.dren.mil/jspui/bitstream/11681/5485/1/ERDC-CRREL-TR-15-4.pdf.

Cost Impact: The code change proposal will increase the cost of construction

The proposal will increase the cost of construction where use of the USDA textural soil classifications leads to an identification of soils with less stiffness or lower drainage characteristics than what would have previously been assumed, resulting in additional foundation wall thickness, additional foundation wall reinforcing, or wider footing widths. Conversely, a cost savings may occur if better soil conditions are identified. Further, a geotechnical investigation typically costs around $1,000-$1,500 for a single-family dwelling project. Additional savings could accrue to the builder and homeowner if consideration of the USDA data suggests a site-specific investigation is not necessary.

RB165-22

RB166-22

IRC: R403.1.1, R403.5 (New), FIGURE R403.5(1) (New), FIGURE R403.5(2) (New)

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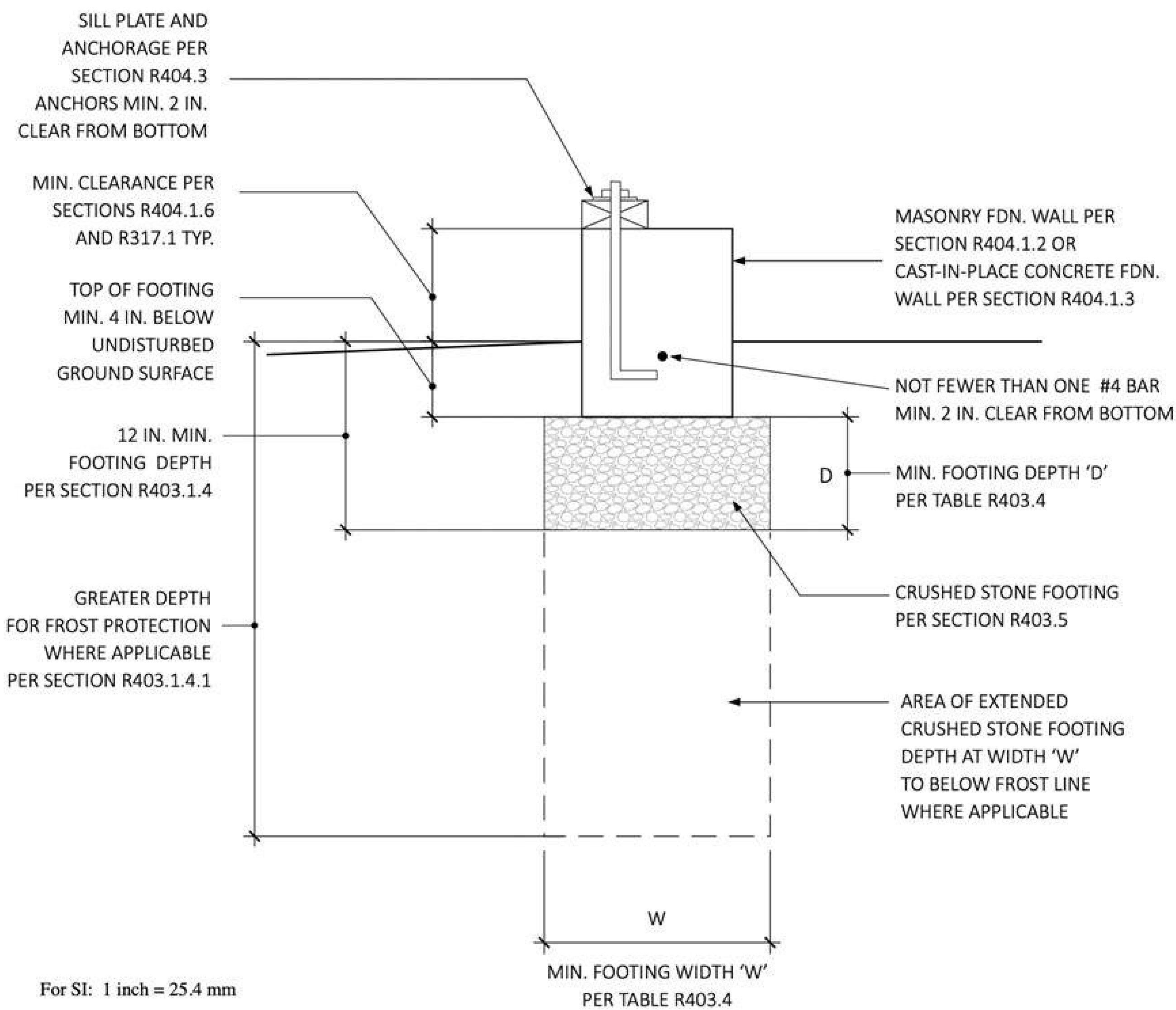
2021 International Residential Code

Revise as follows:

R403.1.1 Minimum size. The minimum width, W, and thickness, T, for concrete footings shall be in accordance with Tables R403.1(1) through R403.1(3) and Figure R403.1(1) or R403.1.3, as applicable, but not less than 12 inches (305 mm) in width and 6 inches (152 mm) in depth. The footing width shall be based on the load-bearing value of the soil in accordance with Table R401.4.1. Footing projections, P, shall be not less than 2 inches (51 mm) and shall not exceed the thickness of the footing. Footing thickness and projection for fireplaces shall be in accordance with Section R1001.2. The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1. Footings for wood foundations shall be in accordance with the details set forth in Section R403.2, and Figures R403.1(2) and R403.1(3). Footings for precast foundations shall be in accordance with the details set forth in Section R403.4, Table R403.4, and Figures R403.4(1) and R403.4(2). Crushed stone footings for masonry or cast-in-place concrete foundations shall be in accordance with Section R403.5.

Add new text as follows:

R403.5 Crushed stone footings for cast-in-place foundations. Crushed stone footings for masonry or cast-in-place concrete foundations complying with Section R404.1 shall comply with Section R403.4.1 except they shall be installed in accordance with Figures R403.5(1) or R403.5(2).



For SI: 1 inch = 25.4 mm

1 MASONRY OR CAST-IN-PLACE CONCRETE FOUNDATION WALL
NOT TO SCALE

FIGURE R403.5
CRUSHED STONE FOOTINGS
FOR CAST-IN-PLACE FOUNDATIONS
IN SEISMIC DESIGN CATEGORIES A, B, AND C

FIGURE R403.5(1) CRUSHED STONE FOOTINGS FOR CAST-IN-PLACE FOUNDATIONS IN SEISMIC DESIGN CATEGORIES A, B, AND C - MASONRY OR CAST-IN-PLACE CONCRETE FOUNDATION WALL

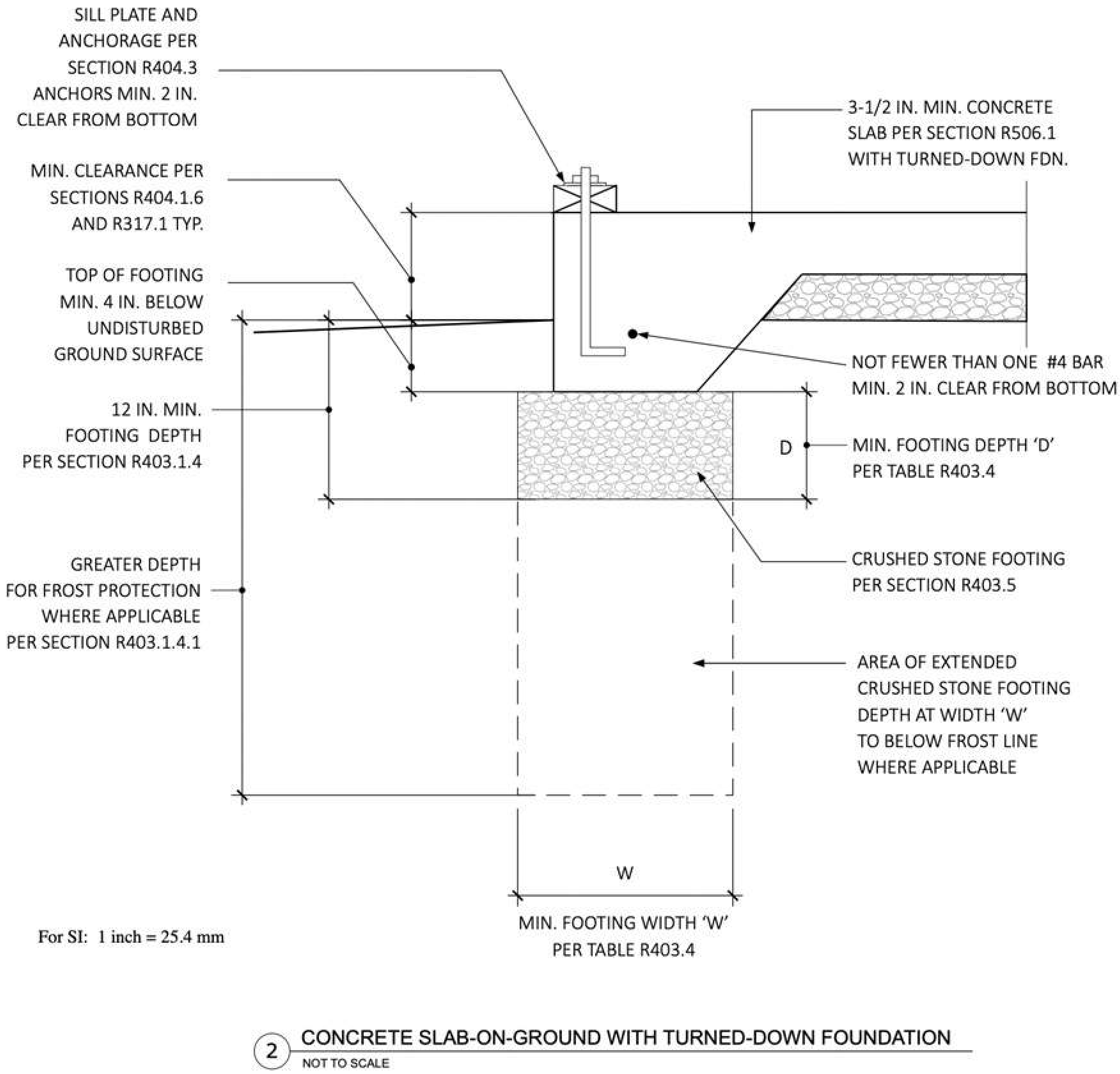


FIGURE R403.5
CRUSHED STONE FOOTINGS
FOR CAST-IN-PLACE FOUNDATIONS
IN SEISMIC DESIGN CATEGORIES A, B, AND C

FIGURE R403.5(2) CRUSHED STONE FOOTINGS FOR CAST-IN-PLACE FOUNDATIONS IN SEISMIC DESIGN CATEGORIES A, B, AND C - CONCRETE SLAB-ON-GROUND WITH TURNED DOWN FOUNDATION

Reason Statement: Crushed stone footings for wood foundations and precast concrete foundations are currently permitted in IRC Sections R403.2 and R403.4.1 respectively. There is also the well-established geotechnical practice of using crushed stone underlayment for foundations of all types. This proposal simply allows these provisions to also be used for masonry foundations and cast-in-place concrete foundations.

This proposal uses identical requirements for crushed stone and its placement as those for analogous pre-cast concrete foundations in Section R403.4.1 (by reference), and for footing width and depth in the associated Table R403.4. The proposal limits the proposed use of crushed stone to Seismic Design Categories A, B, and C, by reference as stated in Section R403.4.1. New Figures R403.5(1) and (2) illustrate the requirements, including minimums regarding the top of the footing relative to undisturbed ground surface. The Figures illustrate two conditions for crushed stone footings: 1) masonry or concrete wall foundation, and 2) slab-on-ground with turned down foundation.
Conservatively, not less than one #4 bar is required for these foundations over a crushed stone footing. This is not currently required for plain concrete footings or turned-down footings in Seismic Design Categories A, B, and C. Minimum clearances for the #4 bar and the sill plate anchor are also stated in the Figures.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal adds a less material-intensive, less labor-intensive and therefore less expensive foundation option, by allowing the use of crushed stone instead of concrete for footings in some situations.

RB166-22

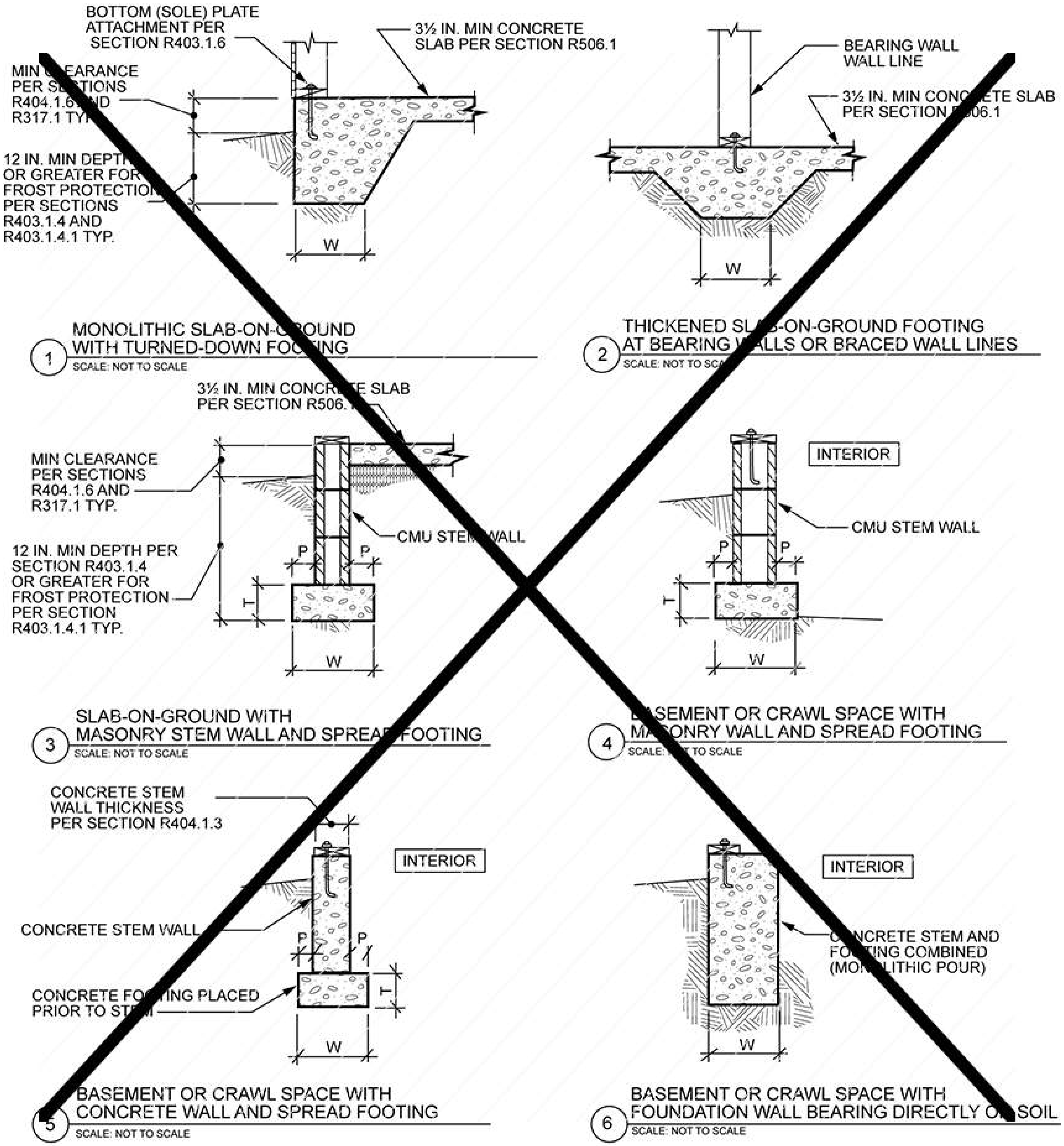
RB167-22

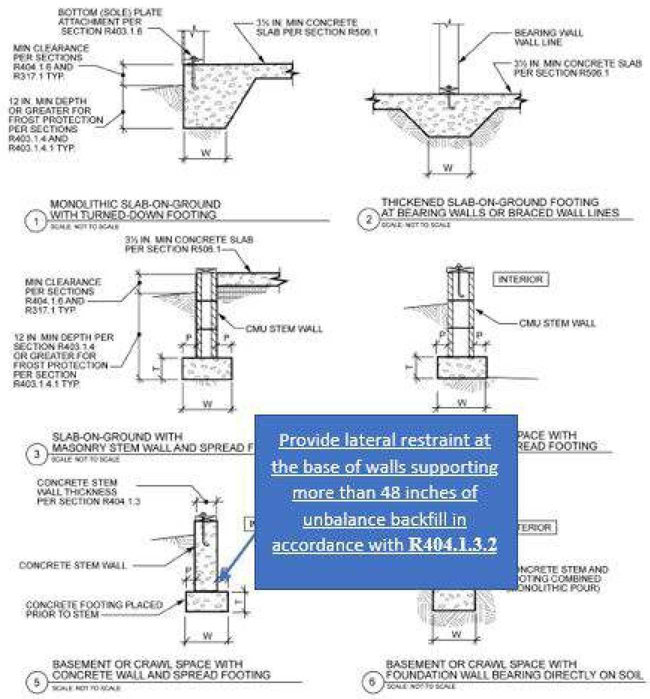
IRC: FIGURE R403.1(1)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:


BOTTOM (SOLE) PLATE
ATTACHMENT PER
SECTION R403.1.6
3½ IN. MIN CONCRETE
SLAB PER SECTION R506.1
12 IN. MIN DEPTH
OR GREATER FOR
FROST PROTECTION
PER SECTIONS
R403.1.4 AND
R403.1.4.1 TYP.
W
BEARING WALL
WALL LINE
W
WITH TURNED-DOWN FO
SCALE: NOT TO SCALE
AT BEARING
SCALE: NOT TO SC
MIN CLEARANCE
PER SECTIONS
R404.1.6 AND
R317.1 TYP.
12 IN. MIN DEPTH PER
SECTION R403.1.4
OR GREATER FOR
FROST PROTECTION
PER SECTION
R403.1.4.1 TYP.
CMU STEM WALL
P
T
W
INTERIOR
CMU STEM WALL
SLAB-ON-GROUND WITH
SCALE: NOT TO SCALE
CONCRETE STEM
WALL THICKNESS
PER SECTION R404.1.3
CONCRETE STEM WALL
INTERIOR
INTERIOR
BASEMENT OR CRAWL SPACE WITH
CONCRETE WALL AND SPREAD FOOTING
SCALE: NOT TO SCALE
BASEMENT OR CRAWL SPACE WITH
SCALE: NOT TO SCALE



For SI: 1 inch = 25.4 mm.
W = Width of footing, T = Thickness of footing and P = Projection per Section R403.1.1.
NOTES:
a. See Section R404.3 for sill requirements.
b. See Section R403.1.6 for sill attachment.
c. See Section R506.2.3 for vapor barrier requirements.
d. See Section R403.1 for base.
e. See Figure R403.1.3 for additional footing requirements for structures in Seismic Design Categories D_0, D_1 and D_2 and townhouses in Seismic Design Category C.
f. See Section R408 for under-floor ventilation and access requirements.

FIGURE R403.1(1)
PLAIN CONCRETE FOOTINGS WITH MASONRY AND CONCRETE STEM WALLS IN SEISMIC DESIGN CATEGORIES A, B AND C[a, b, c, d, e, f]

For SI: 1 inch = 25.4 mm.
W = Width of footing, T = Thickness of footing and P = Projection per Section R403.1.1.

a. See Section R404.3 for sill requirements.
b. See Section R403.1.6 for sill attachment.
c. See Section R506.2.3 for vapor barrier requirements.
d. See Section R403.1 for base.
e. See Figure R403.1.3 for additional footing requirements for structures in Seismic Design Categories D_0, D_1 and D_2 and townhouses in Seismic Design Category C.
f. See Section R408 for under-floor ventilation and access requirements.

FIGURE R403.1(1) PLAIN CONCRETE FOOTINGS WITH MASONRY AND CONCRETE STEM WALLS IN SEISMIC DESIGN CATEGORIES A, B AND C[a, b, c, d, e, f]

Reason Statement: All basement walls tables assumed the wall is laterally supported at the top and bottom. See foot notes in all concrete walls tables. Footnote g. states “Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling”. R403.1.1 Minimum size for footing reference Figure R403.1(1). Figure R403.1(1) does not show any connection requirements. This proposal gives options for footing to wall connections in FIGURE R403.1(1) by adding a pointer states “Provide lateral restraint at the base of walls supporting more than 48 inches of unbalance backfill in accordance with R404.1.3.2”.
This lateral restraint can be provided by a keyway, footing dowels, or by a slab-on-ground poured against the base of the wall.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the requirements in the current code text. All basement walls tables assumed the wall is laterally supported at the top and bottom. This proposal clarifies the options for connections. There is no change in the cost since this is based on the current practice.

RB167-22

RB168-22

IRC: TABLE R404.1.1(1)

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2021 International Residential Code

Revise as follows:

TABLE R404.1.1(1) PLAIN MASONRY FOUNDATION WALLS[f]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[c] (feet)	PLAIN MASONRY[a] MINIMUM NOMINAL WALL THICKNESS (inches)		
		Soil classes and lateral soil load[b] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, MH, ML-CL and inorganic CL soils 60
5	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	10
6	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	10
	6	8	10	12
7	4	6 solid[d] or 8	8	8
	5	6 solid[d] or 8	10	10
	6	10	12	10 solid[d]
	7	12	10 solid[d]	12 solid[d]
8	4	6 solid[d] or 8	6 solid[d] or 8	8
	5	6 solid[d] or 8	10	12
	6	10	12	12 solid[d]
	7	12	12 solid[d]	Note e
	8	10 grout[d]	12 grout[d]	Note e
9	4	6 grout[d] or 8 solid[d] or 12	6 grout[d] or 8 solid[d]	8 grout[d] or 10 solid[d]
	5	6 grout[d] or 10 solid[d]	8 grout[d] or 12 solid[d]	8 grout[d]
	6	8 grout[d] or 12 solid[d]	10 grout[d]	10 grout[d]
	7	10 grout[d]	10 grout[d]	12 grout
	8	10 grout[d]	12 grout	Note e
	9	12 grout	Note e	Note e

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond. Ungrouted hollow masonry units are permitted except where otherwise indicated.
b. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.
c. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.
d. Solid indicates solid masonry unit; grout indicates grouted hollow units.
e. Wall construction shall be in accordance with Table R404.1.1(2), R404.1.1(3) or R404.1.1(4), or a design shall be provided.
f. The use of this table shall be prohibited for soil classifications not shown.

Reason Statement: This proposal revises the header of Table R404.1.1(1) on Plain Masonry Foundation Walls to match the rest of the foundation reinforcing tables. Every other table for masonry or concrete walls in Chapter 4 provides the lateral soil load associated with the soil classes, but somehow over various revisions to Table R404.1.1(1) the header was not coordinated. This change will make the table consistent with Tables R404.1.1(2)-(4) and Tables R404.1.2(2)-(8).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change is editorial and provides consistency with the other foundation wall tables in Chapter 4. The specified design lateral soil loads are those used in developing the table, so there is no change to the technical requirements. Therefore, there is no impact on cost.

RB168-22

RB169-22

IRC: R403.1.2, TABLE R403.1.2 (New)

Proponents: Borjen Yeh, representing APA - The Engineered Wood Association (borjen.yeh@apawood.org)

2021 International Residential Code

Revise as follows:

R403.1.2 Continuous footing in Seismic Design Categories D_0, D_1 and D_2. Exterior walls of buildings located in *Seismic Design Categories* D_0, D_1 and D_2 shall be supported by continuous solid or fully grouted masonry or concrete footings in accordance with Table R403.1.2. Other footing materials or systems shall be designed in accordance with accepted engineering practice. ~~Required interior *braced wall panels* in buildings located in *Seismic Design Categories* D_0, D_1 and D_2 with plan dimensions greater than 50 feet (15 240 mm) shall be supported by continuous solid or fully grouted masonry or concrete footings in accordance with Section R403.1.3.4, except for two-story buildings in Seismic Design Category D_2, in which all *braced wall panels*, interior and exterior, shall be supported on continuous foundations.~~

> ~~**Exception:** Two-story buildings shall be permitted to have interior *braced wall panels* supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:~~
>
> 1. ~~The height of cripple walls does not exceed 4 feet (1219 mm).~~
> 2. ~~First-floor *braced wall panels* are supported on doubled floor joists, continuous blocking or floor beams.~~
> 3. ~~The distance between bracing lines does not exceed twice the building width measured parallel to the *braced wall line*.~~

Add new text as follows:

TABLE R403.1.2 CONTINUOUS FOOTING REQUIREMENTS IN SEISMIC DESIGN CATEGORIES D_0, D_1 AND D_2

PLAN DIMENSIONS	**1-STORY**						**2-STORY**					
	50 feet or less			**> 50 feet**			**50 feet or less**			**> 50 feet**		
SDC	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1	D_2
Exterior Brace Wall Panel												
Continuous Footings	R	R	R	R	R	R	R	R	R	R	R	R
Interior Brace Wall Panel												
Continuous Footings	NR	NR	NR	R[a]	R[a]	R[a]	NR	NR	R[a]	R[a]	R[a]	R[a]

R = Continuous solid or fully grouted masonry or concrete footings in accordance with Section R403.1.3.4 required.
NR = Continuous footings not required.

a. NR when the following conditions are all met:
   1. The height of cripple walls does not exceed 4 feet (1219 mm).
   2. First-floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.
   3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.

Reason Statement: Section R403.1.2 contains exceptions over exceptions and is confusing with various possible interpretations. The intent of this change proposal is to tabulate the provision in the new Table R403.1.2 without changing the intent of the existing provisions. Please note that Footnote (1) to Table R403.1.2 are identical to the exceptions contained in the existing Section R403.1.2.Table R403.1.2 is consistent with the IRC with the only exception for the 1-story with plan dimension of greater than 50 feet in interior brace wall panels, in which the "IRC Commentary Figure R403.1.2" indicates continuous footings are required. However, under the same conditions, the IRC indicates continuous footings are not required for 2-story buildings if the exceptions listed in the existing Section R403.1.2 are met. It seems irrational that 2-story buildings (more mass in seismic loading) are not required to have continuous footings, while 1-story buildings (less mass in seismic loading) are required to have continuous footings under the same plan dimension and interior brace wall panel. Therefore, the proposed new Table R403.1.2 conservatively applies the same 2-story building requirements to 1-story buildings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction because the proposal is intended to present the current code requirements in a tabulated format for ease of understanding and implementation.

RB169-22

RB170-22

IRC: R403.1.6

Proponents: Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Residential Code

Revise as follows:

R403.1.6 Foundation anchorage. Wood sill plates and wood walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section.
Cold-formed steel framing shall be anchored directly to the foundation or fastened to wood sill plates in accordance with Section R505.3.1 or R603.3.1, as applicable. Wood sill plates supporting cold-formed steel framing shall be anchored to the foundation in accordance with this section.

Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of *braced wall panels* at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with minimum $^{1}/_{2}$-inch-diameter (12.7 mm) anchor bolts spaced not greater than 6 feet (1829 mm) on center or *approved* anchors or anchor straps spaced as required to provide equivalent anchorage to $^{1}/_{2}$-inch-diameter (12.7 mm) anchor bolts. Bolts shall extend not less than 7 inches (178 mm) into concrete or grouted cells of *concrete masonry units*. The bolts shall be located in the middle third of the width of the plate. A nut and washer shall be tightened on each anchor bolt. There shall be not fewer than two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundation that are not part of a *braced wall panel* shall be positively anchored with *approved* fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Anchor bolts shall be permitted to be located while concrete is still plastic and before it has set. Where anchor bolts resist placement or the consolidation of concrete around anchor bolts is impeded, the concrete shall be vibrated to ensure full contact between the anchor bolts and concrete.

Exceptions:

1. Walls 24 inches (610 mm) total length or shorter connecting offset *braced wall panels* shall be anchored to the foundation with not fewer than one anchor bolt located in the center third of the plate section and shall be attached to adjacent *braced wall panels* at corners as shown in Item 9 of Table R602.3(1).
2. Connection of walls ~~12~~ 7 inches (~~305~~ 178 mm) total length or shorter connecting offset *braced wall panels* to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent *braced wall panels* at corners as shown in Item 9 of Table R602.3(1).

Reason Statement: Exception 2 needs to be either eliminated or reduced. Wall corners at braced wall panels are required to have special fastening by Table R602.3(1) because the overturning uplift of the braced wall panel is partially resisted by the connection to the perpendicular wall, which is anchored to the foundation with anchor bolts. If the perpendicular wall is not anchored to the foundation, it can not resist this uplift force. As written, this exception allows omission of anchor bolts on certain walls that are perpendicular to braced wall panels, so the walls will not be able to resist the overturning in the perpendicular wall.
Anchor bolts are required to be placed so that they are no more than 12" from the end of a plate, and no closer than 7 anchor bolt diameters, which is 3-1/2" for a 1/2" diameter anchor bolt. So for Exception 1, the single bolt is properly located within 12" from each end of the plate when the plate is 24" long or less, so it is effective. Exception 2 should only allow the omission of the anchor bolt when it is not effective. It is possible to install an effective anchor bolt in plates over 7" in length. For plates less than 7" in length, the bolt will be closer than the 7 bolt diameters so its effectiveness will be reduced, so therefore it might make sense to allow its omission.

Cost Impact: The code change proposal will increase the cost of construction
It is possible in very limited cases that this would increase the cost of construction if it required an anchor bolt where the 2021 IRC would not require one (for plates between 7" and 12" long).

RB170-22

RB171-22

IRC: R404.1.2, R404.1.2.1, TABLE R404.1.1(1), TABLE R404.1.1(2), TABLE R404.1.1(3), TABLE R404.1.1(4), R404.1.3.2, TABLE R404.1.2(1), TABLE R404.1.2(2), TABLE R404.1.2(3), TABLE R404.1.2(4), TABLE R404.1.2(5), TABLE R404.1.2(6), TABLE R404.1.2(7), TABLE R404.1.2(8), TABLE R404.1.2(9), R404.1.3.3.7.2, R404.1.3.3.7.6, R404.1.4.1, R404.1.4.2, R404.1.5.2

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

R404.1.2 Design of masonry foundation walls. Masonry foundation walls shall be designed and constructed in accordance with the provisions of this section or in accordance with the provisions of TMS 402. Where TMS 402 or the provisions of this section are used to design masonry foundation walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the *jurisdiction* having authority.

Revise as follows:

R404.1.2.1 Masonry foundation walls. *Concrete masonry* and *clay masonry* foundation walls shall be constructed as set forth in Table ~~R404.1.1(1)~~ R404.1.2.1(1), ~~R404.1.1(2)~~ R404.1.2.1(2), ~~R404.1.1(3)~~ R404.1.2.1(3) or ~~R404.1.1(4)~~ R404.1.2.1(4) and shall comply with applicable provisions of Section R606. In buildings assigned to *Seismic Design Categories* D_0, D_1 and D_2, *concrete masonry* and *clay masonry* foundation walls shall also comply with Section R404.1.4.1. Rubble stone masonry foundation walls shall be constructed in accordance with Sections R404.1.8 and R606.4.2. Rubble stone masonry walls shall not be used in *Seismic Design Categories* D_0, D_1 and D_2, or in *townhouses* in Seismic Design Category C.

TABLE ~~R404.1.1(1)~~ R404.1.2.1(1) PLAIN MASONRY FOUNDATION WALLS[f]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[c] (feet)	PLAIN MASONRY[a] MINIMUM NOMINAL WALL THICKNESS (inches)		
		Soil classes[b]		
		GW, GP, SW and SP	GM, GC, SM, SM-SC and ML	SC, MH, ML-CL and inorganic CL
5	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	10
6	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	10
	6	8	10	12
7	4	6 solid[d] or 8	8	8
	5	6 solid[d] or 8	10	10
	6	10	12	10 solid[d]
	7	12	10 solid[d]	12 solid[d]
8	4	6 solid[d] or 8	6 solid[d] or 8	8
	5	6 solid[d] or 8	10	12
	6	10	12	12 solid[d]
	7	12	12 solid[d]	Note e
	8	10 grout[d]	12 grout[d]	Note e
9	4	6 grout[d] or 8 solid[d] or 12	6 grout[d] or 8 solid[d]	8 grout[d] or 10 solid[d]
	5	6 grout[d] or 10 solid[d]	8 grout[d] or 12 solid[d]	8 grout[d]
	6	8 grout[d] or 12 solid[d]	10 grout[d]	10 grout[d]
	7	10 grout[d]	10 grout[d]	12 grout
	8	10 grout[d]	12 grout	Note e
	9	12 grout	Note e	Note e

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond. Ungrouted hollow masonry units are permitted except where otherwise indicated.

b. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

c. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

d. Solid indicates solid masonry unit; grout indicates grouted hollow units.

e. Wall construction shall be in accordance with Table ~~R404.1.1(2)~~ R404.1.2.1(2), ~~R404.1.1(3)~~ R404.1.2.1(3) or ~~R404.1.1(4)~~ R404.1.2.1(4), or a design shall be provided.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.1(2)~~ R404.1.2.1(2) 8-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 5 INCHES[a, c, f]

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)[b, c]		
		Soil classes and lateral soil load[d] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
6 feet 8 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#4 at 48
	6 feet 8 inches	#4 at 48	#5 at 48	#6 at 48
7 feet 4 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#4 at 48
	6 feet	#4 at 48	#5 at 48	#5 at 48
	7 feet 4 inches	#5 at 48	#6 at 48	#6 at 40
8 feet	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#4 at 48
	6 feet	#4 at 48	#5 at 48	#5 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet	#5 at 48	#6 at 48	#6 at 32
8 feet 8 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet 8 inches	#6 at 48	#6 at 32	#6 at 24
9 feet 4 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet	#6 at 48	#6 at 40	#6 at 24
	9 feet 4 inches	#6 at 40	#6 at 24	#6 at 16
10 feet	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 32
	8 feet	#6 at 48	#6 at 32	#6 at 24
	9 feet	#6 at 40	#6 at 24	#6 at 16
	10 feet	#6 at 32	#6 at 16	#6 at 16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 5 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.1(3)~~ R404.1.2.1(3) 10-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 6.75 INCHES[a, c, f]

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)[b, c]		
		Soil classes and later soil load[d] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
6 feet 8 inches	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet 8 inches	#4 at 56	#5 at 56	#5 at 56
7 feet 4 inches	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#4 at 56	#5 at 56
	7 feet 4 inches	#4 at 56	#5 at 56	#6 at 56
8 feet	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#4 at 56	#5 at 56
	7 feet	#4 at 56	#5 at 56	#6 at 56
	8 feet	#5 at 56	#6 at 56	#6 at 48
8 feet 8 inches	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#4 at 56	#5 at 56
	7 feet	#4 at 56	#5 at 56	#6 at 56
	8 feet 8 inches	#5 at 56	#6 at 48	#6 at 32
9 feet 4 inches	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#5 at 56	#5 at 56
	7 feet	#4 at 56	#5 at 56	#6 at 56
	8 feet	#5 at 56	#6 at 56	#6 at 40
	9 feet 4 inches	#6 at 56	#6 at 40	#6 at 24
10 feet	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#5 at 56	#5 at 56
	7 feet	#5 at 56	#6 at 56	#6 at 48
	8 feet	#5 at 56	#6 at 48	#6 at 40
	9 feet	#6 at 56	#6 at 40	#6 at 24
	10 feet	#6 at 48	#6 at 32	#6 at 24

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in *Seismic Design Categories* A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 6.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.1(4)~~ R404.1.2.1(4) 12-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 8.75 INCHES[a, c, f]

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)[b, c]		
		Soil classes and lateral soil load[d] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
6 feet 8 inches	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet 8 inches	#4 at 72	#4 at 72	#5 at 72
7 feet 4 inches	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#4 at 72	#5 at 72
	7 feet 4 inches	#4 at 72	#5 at 72	#6 at 72
8 feet	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#4 at 72	#5 at 72
	7 feet	#4 at 72	#5 at 72	#6 at 72
	8 feet	#5 at 72	#6 at 72	#6 at 64
8 feet 8 inches	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#4 at 72	#5 at 72
	7 feet	#4 at 72	#5 at 72	#6 at 72
	8 feet 8 inches	#5 at 72	#7 at 72	#6 at 48
9 feet 4 inches	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#5 at 72	#5 at 72
	7 feet	#4 at 72	#5 at 72	#6 at 72
	8 feet	#5 at 72	#6 at 72	#6 at 56
	9 feet 4 inches	#6 at 72	#6 at 48	#6 at 40
10 feet	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#5 at 72	#5 at 72
	7 feet	#4 at 72	#6 at 72	#6 at 72
	8 feet	#5 at 72	#6 at 72	#6 at 48
	9 feet	#6 at 72	#6 at 56	#6 at 40
	10 feet	#6 at 64	#6 at 40	#6 at 32

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 8.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground levels. Where an interior concrete slab-on-grade is provided and in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height is permitted to be measured from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

R404.1.3.2 Reinforcement for foundation walls. Concrete foundation walls shall be laterally supported at the top and bottom. Horizontal reinforcement shall be provided in accordance with Table ~~R404.1.2(1)~~ R404.1.3.2(1). Vertical reinforcement shall be provided in accordance with Table ~~R404.1.2(2)~~ R404.1.3.2 (2), ~~R404.1.2(3)~~ R404.1.3.2 (3), ~~R404.1.2(4)~~ R404.1.3.2(4), ~~R404.1.2(5)~~ R404.1.3.2(5), ~~R404.1.2(6)~~ R404.1.3.2(6), ~~R404.1.2(7)~~ R404.1.3.2(7) or ~~R404.1.2(8)~~ R404.1.3.2(8). Vertical reinforcement for flat *basement* walls retaining 4 feet (1219 mm) or more of unbalanced backfill is permitted to be determined in accordance with Table ~~R404.1.2(9)~~ R404.1.3.2(9). For *basement* walls supporting above-grade concrete walls, vertical reinforcement shall be the greater of that required by Tables ~~R404.1.2(2)~~ R404.1.3.2(2) through ~~R404.1.2(8)~~ R404.1.3.2(8) or by Section R608.6 for the above-grade wall. In buildings assigned to Seismic Design Category D_0, D_1 or D_2, concrete foundation walls shall also comply with Section R404.1.4.2.

TABLE ~~R404.1.2(1)~~ R404.1.3.2(1) MINIMUM HORIZONTAL REINFORCEMENT FOR CONCRETE BASEMENT WALLS[a, b]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	LOCATION OF HORIZONTAL REINFORCEMENT
≤ 8	One No. 4 bar within 12 inches of the top of the wall story and one No. 4 bar near mid-height of the wall story.
> 8	One No. 4 bar within 12 inches of the top of the wall story and one No. 4 bar near third points in the wall story.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa.

a. Horizontal reinforcement requirements are for reinforcing bars with a minimum yield strength of 40,000 psi and concrete with a minimum concrete compressive strength of 2,500 psi.

b. See Section R404.1.3.2 for minimum reinforcement required for foundation walls supporting above-grade concrete walls.

TABLE ~~R404.1.2(2)~~ R404.1.3.2(2) MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, g, h, i, j, k]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[f] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)		
		Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	NR	NR	NR
	5	NR	6 @ 39	6 @ 48
	6	5 @ 39	6 @ 48	6 @ 35
	7	6 @ 48	6 @ 34	6 @ 25
	8	6 @ 39	6 @ 25	6 @ 18
9	4	NR	NR	NR
	5	NR	5 @ 37	6 @ 48
	6	5 @ 36	6 @ 44	6 @ 32
	7	6 @ 47	6 @ 30	6 @ 22
	8	6 @ 34	6 @ 22	6 @ 16
	9	6 @ 27	6 @ 17	DR
10	4	NR	NR	NR
	5	NR	5 @ 35	6 @ 48
	6	6 @ 48	6 @ 41	6 @ 30
	7	6 @ 43	6 @ 28	6 @ 20
	8	6 @ 31	6 @ 20	DR
	9	6 @ 24	6 @ 15	DR
	10	6 @ 19	DR	DR

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).

d. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

e. Interpolation is not permitted.

f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

g. NR indicates vertical wall reinforcement is not required, except for 6-inch-nominal walls formed with stay-in-place forming systems in which case vertical reinforcement shall be No. 4@48 inches on center.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

k. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(3)~~ R404.1.3.2(3) MINIMUM VERTICAL REINFORCEMENT FOR 8-INCH (203 mm) NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, f, h, i, j]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[g] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)		
		Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6 @ 37
	7	NR	6 @ 36	6 @ 35
	8	6 @ 41	6 @ 35	6 @ 26
9	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6 @ 35
	7	NR	6 @ 35	6 @ 32
	8	6 @ 36	6 @ 32	6 @ 23
	9	6 @ 35	6 @ 25	6 @ 18
10	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6 @ 35
	7	NR	6 @ 35	6 @ 29
	8	6 @ 35	6 @ 29	6 @ 21
	9	6 @ 34	6 @ 22	6 @ 16
	10	6 @ 27	6 @ 17	6 @ 13

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi, concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).

d. NR indicates vertical reinforcement is not required.

e. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

f. Interpolation is not permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(4)~~ R404.1.3.2(4) MINIMUM VERTICAL REINFORCEMENT FOR 10-INCH NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, f, h, i, j]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[g] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)		
		Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	NR
	7	NR	NR	NR
	8	6 @ 48	6 @ 35	6 @ 28
9	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	NR
	7	NR	NR	6 @ 31
	8	NR	6 @ 31	6 @ 28
	9	6 @ 37	6 @ 28	6 @ 24
10	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	NR
	7	NR	NR	6 @ 28
	8	NR	6 @ 28	6 @ 28
	9	6 @ 33	6 @ 28	6 @ 21
	10	6 @ 28	6 @ 23	6 @ 17

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).

d. NR indicates vertical reinforcement is not required.

e. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

f. Interpolation is not permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(5)~~ R404.1.3.2(5) MINIMUM VERTICAL WALL REINFORCEMENT FOR 6-INCH WAFFLE-GRID BASEMENT WALLS[b, c, d, e, g, h, i, j]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[f] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)		
		Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	4 @ 48	4 @ 46	6 @ 39
	5	4 @ 45	5 @ 46	6 @ 47
	6	5 @ 45	6 @ 40	DR
	7	6 @ 44	DR	DR
	8	6 @ 32	DR	DR
9	4	4 @ 48	4 @ 46	4 @ 37
	5	4 @ 42	5 @ 43	6 @ 44
	6	5 @ 41	6 @ 37	DR
	7	6 @ 39	DR	DR
	> 8	DR[i]	DR	DR
10	4	4 @ 48	4 @ 46	4 @ 35
	5	4 @ 40	5 @ 40	6 @ 41
	6	5 @ 38	6 @ 34	DR
	7	6 @ 36	DR	DR
	> 8	DR	DR	DR

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).

d. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

e. Interpolation is not permitted.

f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

g. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

h. See Table R608.3 for thicknesses and dimensions of waffle-grid walls.

i. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(6)~~ R404.1.3.2(6) MINIMUM VERTICAL REINFORCEMENT FOR 8-INCH WAFFLE-GRID BASEMENT WALLS[b, c, d, e, f, h, i, j, k]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[g] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches) Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	NR	NR	NR
	5	NR	5 @ 48	5 @ 46
	6	5 @ 48	5 @ 43	6 @ 45
	7	5 @ 46	6 @ 43	6 @ 31
	8	6 @ 48	6 @ 32	6 @ 23
9	4	NR	NR	NR
	5	NR	5 @ 47	5 @ 46
	6	5 @ 46	5 @ 39	6 @ 41
	7	5 @ 42	6 @ 38	6 @ 28
	8	6 @ 44	6 @ 28	6 @ 20
	9	6 @ 34	6 @ 21	DR
10	4	NR	NR	NR
	5	NR	5 @ 46	5 @ 44
	6	5 @ 46	5 @ 37	6 @ 38
	7	5 @ 38	6 @ 35	6 @ 25
	8	6 @ 39	6 @ 25	DR
	9	6 @ 30	DR	DR
	10	6 @ 24	DR	DR

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.
b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.
c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 (420 MPa) and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).
d. NR indicates vertical reinforcement is not required.
e. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.
f. Interpolation shall not be permitted.
g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.
h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.
i. See Table R608.3 for thicknesses and dimensions of waffle-grid walls.
j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.
k. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(7)~~ R404.1.3.2(7) MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH (152 mm) SCREEN-GRID BASEMENT WALLS[b, c, d, e, g, h, i, j]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[f] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)		
		Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	4 @ 48	4 @ 48	5 @ 43
	5	4 @ 48	5 @ 48	5 @ 37
	6	5 @ 48	6 @ 45	6 @ 32
	7	6 @ 48	DR	DR
	8	6 @ 36	DR	DR
9	4	4 @ 48	4 @ 48	4 @ 41
	5	4 @ 48	5 @ 48	6 @ 48
	6	5 @ 45	6 @ 41	DR
	7	6 @ 43	DR	DR
	> 8	DR	DR	DR
10	4	4 @ 48	4 @ 48	4 @ 39
	5	4 @ 44	5 @ 44	6 @ 46
	6	5 @ 42	6 @ 38	DR
	7	6 @ 40	DR	DR
	> 8	DR	DR	DR

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi, concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).

d. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

e. Interpolation is not permitted.

f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

g. See Sections R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

h. See Table R608.3 for thicknesses and dimensions of screen-grid walls.

i. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(8)~~ R404.1.3.2(8) MINIMUM VERTICAL REINFORCEMENT FOR 6-, 8-, 10- AND 12-INCH NOMINAL FLAT BASEMENT WALLS[b, c, d, e, f, h, i, k, n, o]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[g] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)											
		Soil classes[a] and design lateral soil (psf per foot of depth)											
		GW, GP, SW, SP 30				GM, GC, SM, SM-SC and ML 45				SC, ML-CL and inorganic CL 60			
		Minimum nominal wall thickness (inches)											
		6	8	10	12	6	8	10	12	6	8	10	12
5	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
6	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	NR	NR[l]	NR	NR	4 @ 35	NR[l]	NR	NR
	6	NR	NR	NR	NR	5 @ 48	NR	NR	NR	5 @ 36	NR	NR	NR
7	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	NR	NR	NR	NR	5 @ 47	NR	NR	NR
	6	NR	NR	NR	NR	5 @ 42	NR	NR	NR	6 @ 43	5 @ 48	NR[l]	NR
	7	5 @ 46	NR	NR	NR	6 @ 42	5 @ 46	NR[l]	NR	6 @ 34	6 @ 48	NR	NR
8	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	4 @ 38	NR[l]	NR	NR	5 @ 43	NR	NR	NR
	6	4 @ 37	NR[l]	NR	NR	5 @ 37	NR	NR	NR	6 @ 37	5 @ 43	NR[l]	NR
	7	5 @ 40	NR	NR	NR	6 @ 37	5 @ 41	NR[l]	NR	6 @ 34	6 @ 43	NR	NR
	8	6 @ 43	5 @ 47	NR[l]	NR	6 @ 34	6 @ 43	NR	NR	6 @ 27	6 @ 32	6 @ 44	NR
9	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	4 @ 35	NR[l]	NR	NR	5 @ 40	NR	NR	NR
	6	4 @ 34	NR[l]	NR	NR	6 @ 48	NR	NR	NR	6 @ 36	6 @ 39	NR[l]	NR
	7	5 @ 36	NR	NR	NR	6 @ 34	5 @ 37	NR	NR	6 @ 33	6 @ 38	5 @ 37	NR[l]
	8	6 @ 38	5 @ 41	NR[l]	NR	6 @ 33	6 @ 38	5 @ 37	NR[l]	6 @ 24	6 @ 29	6 @ 39	4 @ 48[m]
	9	6 @ 34	6 @ 46	NR	NR	6 @ 26	6 @ 30	6 @ 41	NR	6 @ 19	6 @ 23	6 @ 30	6 @ 39
	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	4 @ 33	NR[l]	NR	NR	5 @ 38	NR	NR	NR
	6	5 @ 48	NR[l]	NR	NR	6 @ 45	NR	NR	NR	6 @ 34	5 @ 37	NR	NR
	7	6 @ 47	NR	NR	NR	6 @ 34	6 @ 48	NR	NR	6 @ 30	6 @ 35	6 @ 48	NR[l]

10 **MAXIMUM UNSUPPORTED WALL HEIGHT (feet)**	**MAXIMUM UNBALANCED BACKFILL HEIGHT (feet)**	**MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)**											
		Soil classes and design lateral soil (psf per foot of depth)											
		GW, GP, SW, SP 30				**GM, GC, SM, SM-SC and ML 45**				**SC, ML-CL and inorganic CL 60**			
		Minimum nominal wall thickness (inches)											
		6	**8**	**10**	**12**	**6**	**8**	**10**	**12**	**6**	**8**	**10**	**12**
	8	6 @ 34	5 @ 38	NR	NR	6 @ 30	6 @ 34	6 @ 47	NR[l]	6 @ 22	6 @ 26	6 @ 35	6 @ 45[m]
	9	6 @ 34	6 @ 41	4 @ 48	NR[l]	6 @ 23	6 @ 27	6 @ 35	4 @ 48[m]	DR	6 @ 22	6 @ 27	6 @ 34
	10	6 @ 28	6 @ 33	6 @ 45	NR	DR[j]	6 @ 23	6 @ 29	6 @ 38	DR	6 @ 22	6 @ 22	6 @ 28

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).

d. NR indicates vertical wall reinforcement is not required, except for 6-inch nominal walls formed with stay-in-place forming systems in which case vertical reinforcement shall be No. 4@48 inches on center.

e. Allowable deflection criterion is *L*/240, where *L* is the unsupported height of the basement wall in inches.

f. Interpolation is not permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. Vertical reinforcement shall be located to provide a cover of $1^1/_4$ inches measured from the inside face of the wall. The center of the steel shall not vary from the specified location by more than the greater of 10 percent of the wall thickness or $^3/_8$ inch.

i. Concrete cover for reinforcement measured from the inside face of the wall shall be not less than $^3/_4$ inch. Concrete cover for reinforcement measured from the outside face of the wall shall be not less than $1^1/_2$ inches for No. 5 bars and smaller, and not less than 2 inches for larger bars.

j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

k. Concrete shall have a specified compressive strength, f_c, of not less than 2,500 psi at 28 days, unless a higher strength is required by Note l or m.

l. The minimum thickness is permitted to be reduced 2 inches, provided that the minimum specified compressive strength of concrete, f_c, is 4,000 psi.

m. A plain concrete wall with a minimum nominal thickness of 12 inches is permitted, provided that the minimum specified compressive strength of concrete, f_c, is 3,500 psi.

n. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

o. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(9)~~ R404.1.3.2(9) MINIMUM SPACING FOR ALTERNATE BAR SIZE AND ALTERNATE GRADE OF STEEL[a, b, c]

BAR SPACING FROM APPLICABLE TABLE IN SECTION R404.1.3.2 (inches)	BAR SIZE FROM APPLICABLE TABLE IN SECTION R404.1.3.2														
	#4					#5					#6				
	Alternate bar size and alternate grade of steel desired														
	Grade 60		Grade 40			Grade 60		Grade 40			Grade 60		Grade 40		
	#5	#6	#4	#5	#6	#4	#6	#4	#5	#6	#4	#5	#4	#5	#6
	Maximum spacing for alternate bar size and alternate grade of steel (inches)														
8	12	18	5	8	12	5	11	3	5	8	4	6	2	4	5
9	14	20	6	9	13	6	13	4	6	9	4	6	3	4	6
10	16	22	7	10	15	6	14	4	7	9	5	7	3	5	7
11	17	24	7	11	16	7	16	5	7	10	5	8	3	5	7
12	19	26	8	12	18	8	17	5	8	11	5	8	4	6	8
13	20	29	9	13	19	8	18	6	9	12	6	9	4	6	9
14	22	31	9	14	21	9	20	6	9	13	6	10	4	7	9
15	23	33	10	16	22	10	21	6	10	14	7	11	5	7	10
16	25	35	11	17	23	10	23	7	11	15	7	11	5	8	11
17	26	37	11	18	25	11	24	7	11	16	8	12	5	8	11
18	28	40	12	19	26	12	26	8	12	17	8	13	5	8	12
19	29	42	13	20	28	12	27	8	13	18	9	13	6	9	13
20	31	44	13	21	29	13	28	9	13	19	9	14	6	9	13
21	33	46	14	22	31	14	30	9	14	20	10	15	6	10	14
22	34	48	15	23	32	14	31	9	15	21	10	16	7	10	15
23	36	48	15	24	34	15	33	10	15	22	10	16	7	11	15
24	37	48	16	25	35	15	34	10	16	23	11	17	7	11	16
25	39	48	17	26	37	16	35	11	17	24	11	18	8	12	17
26	40	48	17	27	38	17	37	11	17	25	12	18	8	12	17
27	42	48	18	28	40	17	38	12	18	26	12	19	8	13	18
28	43	48	19	29	41	18	40	12	19	26	13	20	8	13	19
29	45	48	19	30	43	19	41	12	19	27	13	20	9	14	19
30	47	48	20	31	44	19	43	13	20	28	14	21	9	14	20
31	48	48	21	32	45	20	44	13	21	29	14	22	9	15	21
32	48	48	21	33	47	21	45	14	21	30	15	23	10	15	21
33	48	48	22	34	48	21	47	14	22	31	15	23	10	16	22
34	48	48	23	35	48	22	48	15	23	32	15	24	10	16	23
35	48	48	23	36	48	23	48	15	23	33	16	25	11	16	23
36	48	48	24	37	48	23	48	15	24	34	16	25	11	17	24
37	48	48	25	38	48	24	48	16	25	35	17	26	11	17	25
38	48	48	25	39	48	25	48	16	25	36	17	27	12	18	25
39	48	48	26	40	48	25	48	17	26	37	18	27	12	18	26
40	48	48	27	41	48	26	48	17	27	38	18	28	12	19	27
41	48	48	27	42	48	26	48	18	27	39	19	29	12	19	27
42	48	48	28	43	48	27	48	18	28	40	19	30	13	20	28
43	48	48	29	44	48	28	48	18	29	41	20	30	13	20	29
44	48	48	29	45	48	28	48	19	29	42	20	31	13	21	29
45	48	48	30	47	48	29	48	19	30	43	20	32	14	21	30

BAR SPACING FROM APPLICABLE TABLE IN SECTION R404.1.3.2 (inches)	BAR SIZE FROM APPLICABLE TABLE IN SECTION R404.1.3.2														
	#4					#5					#6				
	Alternate bar size and alternate grade of steel desired														
	Grade 60		Grade 40			Grade 60		Grade 40			Grade 60		Grade 40		
	#5	#6	#4	#5	#6	#4	#6	#4	#5	#6	#4	#5	#4	#5	#6
	Maximum spacing for alternate bar size and alternate grade of steel (inches)														
46	48	48	31	48	48	30	48	20	31	44	21	32	14	22	31
47	48	48	31	48	48	30	48	20	31	44	21	33	14	22	31
48	48	48	32	48	48	31	48	21	32	45	22	34	15	23	32

For SI: 1 inch = 25.4 mm.

a. This table is for use with tables in Section R404.1.3.2 that specify the minimum bar size and maximum spacing of vertical wall reinforcement for foundation walls and above-grade walls. Reinforcement specified in tables in Section R404.1.3.2 is based on Grade 60 steel reinforcement.

b. Bar spacing shall not exceed 48 inches on center and shall be not less than one-half the nominal wall thickness.

c. For Grade 50 steel bars (ASTM A996, Type R), use spacing for Grade 40 bars or interpolate between Grades 40 and 60.

R404.1.3.3.7.2 Location of reinforcement in wall. The center of vertical reinforcement in *basement* walls determined from Tables ~~R404.1.2(2)~~ R404.1.3.2(2) through ~~R404.1.2(7)~~ R404.1.3.2(7) shall be located at the centerline of the wall. Vertical reinforcement in *basement* walls determined from Table ~~R404.1.2(8)~~ R404.1.3.2(8) shall be located to provide a maximum cover of $1^1/_4$ inches (32 mm) measured from the inside face of the wall. Regardless of the table used to determine vertical wall reinforcement, the center of the steel shall not vary from the specified location by more than the greater of 10 percent of the wall thickness and $^3/_8$ inch (10 mm). Horizontal and vertical reinforcement shall be located in foundation walls to provide the minimum cover required by Section R404.1.3.3.7.4.

R404.1.3.3.7.6 Alternate grade of reinforcement and spacing. Where tables in Section R404.1.3.2 specify vertical wall reinforcement based on minimum bar size and maximum spacing, which are based on Grade 60 (414 MPa) steel reinforcement, different size bars or bars made from a different grade of steel are permitted provided that an equivalent area of steel per linear foot of wall is provided. Use of Table ~~R404.1.2(9)~~ R404.1.3.2(9) is permitted to determine the maximum bar spacing for different bar sizes than specified in the tables or bars made from a different grade of steel. Bars shall not be spaced less than one-half the wall thickness, or more than 48 inches (1219 mm) on center.

R404.1.4.1 Masonry foundation walls. In buildings assigned to Seismic Design Category D_0, D_1 or D_2, as established in Table R301.2, masonry foundation walls shall comply with this section. In addition to the requirements of Table ~~R404.1.1(1)~~ R404.1.2.1(1), plain masonry foundation walls shall comply with the following:

1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum nominal thickness for plain masonry foundation walls shall be 8 inches (203 mm).
4. Masonry stem walls shall have a minimum vertical reinforcement of one No. 4 (No. 13) bar located not greater than 4 feet (1219 mm) on center in grouted cells. Vertical reinforcement shall be tied to the horizontal reinforcement in the footings.

Foundation walls, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be constructed in accordance with Table ~~R404.1.1(2)~~ R404.1.2.1(2), ~~R404.1.1(3)~~ R404.1.2.1(3) or ~~R404.1.1(4)~~ R404.1.2.1(4). Masonry foundation walls shall have two No. 4 (No. 13) horizontal bars located in the upper 12 inches (305 mm) of the wall.

R404.1.4.2 Concrete foundation walls. In buildings assigned to Seismic Design Category D_0, D_1 or D_2, as established in Table R301.2, concrete foundation walls that support light-frame walls shall comply with this section, and concrete foundation walls that support above-grade concrete walls shall comply with ACI 318, ACI 332 or PCA 100 (see Section R404.1.3). In addition to the horizontal reinforcement required by Table ~~R404.1.2(1)~~ R404.1.3.2(1), plain concrete walls supporting light-frame walls shall comply with the following:

1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum thickness for plain concrete foundation walls shall be 7.5 inches (191 mm) except that 6 inches (152 mm) is permitted where the maximum wall height is 4 feet, 6 inches (1372 mm).

Foundation walls less than 7.5 inches (191 mm) in thickness, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet

(2438 mm) in height shall be provided with horizontal reinforcement in accordance with Table ~~R404.1.2(1)~~ R404.1.3.2(1), and vertical reinforcement in accordance with Table ~~R404.1.2(2)~~ R404.1.3.2(2), ~~R404.1.2(3)~~ R404.1.3.2(3), ~~R404.1.2(4)~~ R404.1.3.2(4), ~~R404.1.2(5)~~ R404.1.3.2(5), ~~R404.1.2(6)~~ R404.1.3.2(6), ~~R404.1.2(7)~~ R404.1.3.2(7) or ~~R404.1.2(8)~~ R404.1.3.2(8). Where Tables ~~R404.1.2(2)~~ R404.1.3.2(2) through ~~R404.1.2(8)~~ R404.1.3.2(8) permit plain concrete walls, not less than No. 4 (No. 13) vertical bars at a spacing not exceeding 48 inches (1219 mm) shall be provided.

R404.1.5.2 Concrete wall thickness. The thickness of concrete foundation walls shall be equal to or greater than the thickness of the wall in the story above. Concrete foundation walls with corbels, brackets or other projections built into the wall for support of masonry veneer or other purposes are not within the scope of the tables in this section.Where a concrete foundation wall is reduced in thickness to provide a shelf for the support of masonry veneer, the reduced thickness shall be equal to or greater than the thickness of the wall in the story above. Vertical reinforcement for the foundation wall shall be based on Table ~~R404.1.2(8)~~ R404.1.3.2(8) and located in the wall as required by Section R404.1.3.3.7.2 where that table is used. Vertical reinforcement shall be based on the thickness of the thinner portion of the wall.

> **Exception:** Where the height of the reduced thickness portion measured to the underside of the floor assembly or sill plate above is less than or equal to 24 inches (610 mm) and the reduction in thickness does not exceed 4 inches (102 mm), the vertical reinforcement is permitted to be based on the thicker portion of the wall.

Reason Statement: This proposal fixes the masonry and concrete tables issue in IRC 2021. Currently, the masonry tables are listed under R404.1.1 Design required for general concrete and masonry accepted engineering practice, which is inaccurate. The concrete tables are listed under R404.1.2 Design of masonry foundation walls which is not accurate. This proposal relocates the tables to the correct technical sections they belong to. All Masonry tables moved to section R404.1.2.1 Masonry foundation walls, and all concrete tables moved to section R404.1.3.2 Reinforcement for foundation walls.
This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proponent is proposing the relocation of the tables. The tables are relocated under the first related subsections mentioned in the code. The proposal does not make any technical changes in the tables that could affect construction costs.

RB171-22

RB172-22

IRC: R502.3.3, TABLE R502.3.3(1), TABLE R502.3.3(2)

Proponents: Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com)

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Revise as follows:

R502.3.3 Floor cantilevers. Floor cantilever spans shall not exceed the nominal depth of the wood floor joist. Floor cantilevers constructed in accordance with Table R502.3.3(1) shall be permitted where supporting a light-frame bearing wall and roof only. Floor cantilevers constructed in accordance with Table R502.3.3(2) shall be permitted where supporting an exterior balcony ~~are permitted to be constructed in accordance with Table R502.3.3(2)~~. A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the support for the cantilever. Where the cantilever length is 24 inches (610 mm) or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the support for the cantilever shall not be required.

TABLE R502.3.3(1) CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING LIGHT-FRAME EXTERIOR BEARING WALL AND ROOF ONLY[a, b, c, f, g~~, h~~] (Floor live load ≤ 40 psf, roof live load ≤ 20 psf)

MEMBER & SPACING	MAXIMUM CANTILEVER SPAN (uplift force at backspan support in lb)[d, e]											
	Ground Snow Load											
	≤ 20 psf			30 psf			50 psf			70 psf		
	Roof Width			Roof Width			Roof Width			Roof Width		
	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft
2 × 8 @ 12″	20″ (177)	15″ (227)	—	18″ (209)	—	—	—	—	—	—	—	—
2 × 10 @ 16″	29″ (228)	21″ (297)	16″ (364)	26″ (271)	18″ (354)	—	20″ (375)	—	—	—	—	—
2 × 10 @ 12″	36″ (166)	26″ (219)	20″ (270)	34″ (198)	22″ (263)	16″ (324)	26″ (277)	—	—	19″ (356)	—	—
2 × 12 @ 16″	—	32″ (287)	25″ (356)	36″ (263)	29″ (345)	21″ (428)	29″ (367)	20″ (484)	—	23″ (471)	—	—
2 × 12 @ 12″	—	42″ (209)	31″ (263)	—	37″ (253)	27″ (317)	36″ (271)	27″ (358)	17″ (447)	31″ (348)	19″ (462)	—
2 × 12 @ 8″	—	48″ (136)	45″ (169)	—	48″ (164)	38″ (206)	—	40″ (233)	26″ (294)	36″ (230)	29″ (304)	18″ (379)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Tabulated values are for clear-span roof supported solely by exterior bearing walls.

b. Spans are based on No. 2 Grade lumber of Douglas fir-larch, Southern pine, hem-fir and spruce-pine-fir for repetitive (three or more) members.

c. Ratio of backspan to cantilever span shall be not less than 3:1.

d. Connections capable of resisting the indicated uplift force shall be provided at the backspan support.

e. Uplift force is for a backspan to cantilever span ratio of 3:1. Tabulated uplift values are permitted to be reduced by multiplying by a factor equal to 3 divided by the actual backspan ratio provided (3/backspan ratio).

f. See Section R301.2.2.6, Item 1, for additional limitations on cantilevered floor joists for detached one- and two-family dwellings in Seismic Design Category D_0, D_1 or D_2 and townhouses in Seismic Design Category C, D_0, D_1 or D_2.

~~g. A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the support for the cantilever shall not be required.~~

~~h.~~ g. Linear interpolation shall be permitted for building widths and ground snow loads other than shown.

TABLE R502.3.3(2) CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING EXTERIOR BALCONY[a, b, ~~e, f~~]

MEMBER SIZE	SPACING	MAXIMUM CANTILEVER SPAN (uplift force at backspan support in lb)[c, d]		
		Ground Snow Load		
		≤ 30 psf	50 psf	70 psf
2 × 8	12″	42″ (139)	39″ (156)	34″ (165)
2 × 8	16″	36″ (151)	34″ (171)	29″ (180)
2 × 10	12″	61″ (164)	57″ (189)	49″ (201)
2 × 10	16″	53″ (180)	49″ (208)	42″ (220)
2 × 10	24″	43″ (212)	40″ (241)	34″ (255)
2 × 12	16″	72″ (228)	67″ (260)	57″ (268)
2 × 12	24″	58″ (279)	54″ (319)	47″ (330)

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are based on No. 2 Grade lumber of Douglas fir-larch, Southern pine, hem-fir, and spruce-pine-fir for repetitive (three or more) members.

b. Ratio of backspan to cantilever span shall be not less than 2:1.

c. Connections capable of resisting the indicated uplift force shall be provided at the backspan support.

d. Uplift force is for a backspan to cantilever span ratio of 2:1. Tabulated uplift values are permitted to be reduced by multiplying by a factor equal to 2 divided by the actual backspan ratio provided (2/backspan ratio).

~~e. A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the support for the cantilever shall not be required.~~

~~f~~ e. Linear interpolation shall be permitted for ground snow loads other than shown.

Reason Statement: This code change is meant to do three things: move a construction-related requirement from a table footnote to the appropriate text section, clarify the location of the required blocking, and make the sentence structures parallel in the two cantilever cases. The intent is for this to be editorial, with no change to actual requirements.
Footnote g in Table R502.3.3(1) and Footnote e in Table R502.3.3(2) are both identical and state "A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the support for the cantilever shall not be required." This is a construction requirement that is not related to the use of the table, so it is more appropriately placed in the charging text section. The second sentence is a bit unclear, in that it states that the blocking must be provided "at the supported end". Actually both ends of the joist are the supported end. So it is proposed to take the wording from the next sentence and state that the blocking must be provided "at the support for the cantilever". The requirements of R502.7 will apply to the supported end at the interior of the building.

Finally, the language of R502.3.3 is slightly revised so that each sentence has the same structure and meaning.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no intent to change the requirements. So there should be no cost impact.

RB172-22

RB173-22

IRC: R502.11 (New), R502.11.1 (New), 502.11.2 (New), 502.11.3 (New)

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2021 International Residential Code

Add new text as follows:

R502.11 Floor framing supporting guards. The framing at the open edge of a floor supporting a required guard assembly not exceeding 44 inches (1118 mm) in height shall be constructed in accordance with Sections R502.11.1 or R502.11.2 or shall be designed in accordance with accepted engineering practice to support the guard assembly. Trusses and I-joists are prohibited as edge framing members supporting guards except where the effects of the guard loads are specifically considered in the design of the edge member.

R502.11.1 Conventional edge framing. The framing at the edge of the floor shall consist of a solid or built-up wood member having a minimum net width of 3 inches (76mm) and a minimum net depth of 9-1/4 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section 502.11.3 with a roll brace aligned with each guard post.

502.11.2 Timber edge framing. The framing at the edge of the floor shall consist of a minimum 6x10 sawn timber or a minimum 5-1/8 inch x 9-1/4 inch (130 mm x 235 mm) glued laminated timber and shall be braced to resist rotation by roll bracing as described in Section 502.11.3 at intervals of 48 inches (1219 mm) or less.

502.11.3 Roll bracing. Each roll brace shall be a joist or blocking matching the depth of the edge member and extending perpendicular to the edge member a minimum of 16 inches (406 mm) from the edge. Blocking shall have end connections with a minimum of six (6) – 16d common nails. Floor sheathing shall be continuous for a minimum of 24 inches (610 mm) from the edge and shall be fastened to each roll brace with a minimum of twelve (12) – 10d common nails and shall be fastened to the edge member with a minimum of twelve (12) – 10d common nails within 12 inches (305 mm) of the roll brace.

Reason Statement: The Problem:
Guards are required to transfer the outward and downward loads applied at the top of the guard to the structure. If the structure fails, the guard cannot perform its defined function to minimize the possibility of a fall. Many floor systems (both conventional and engineered) are not being designed and constructed to resist guard loads at the edge of walking surfaces where guards are required. Manufacturers and designers of engineered floor systems (e.g., trusses and I-joists) and plan reviewers are commonly unaware of guard attachment requirements and do not ensure that framing is adequate to support guards. Inadequate framing is commonly encountered with costly reinforcement (and possibly redesign) needed at the time of guard installation.

In current practice where inadequate framing is encountered, flooring or ceilings are ripped out to install blocking to harden the edge beam for attachment of the guard. Such fixes are not engineered and, in many cases, occur after the rough inspection. The problem will persist unless a solution can be codified.

A Collaborative Formed:

The SMA surveyed our membership and found the problem to be chronic across the nation and assembled a task group representing manufacturers of, trusses, I- joists, framing and post connection hardware, and guard components as well as, home builders, guard fabricators, guard installers, stairbuilders, and others from industry at large, some 18 participants in all. About half of the team are engineers, and about half have extensive involvement in code and standard development. Meeting biweekly since early fall of 2021 this team has worked together to develop consensus upon an engineered solution presented here with two prescriptive options suitable for inclusion in the 2024 IRC.

A Prescriptive Solution:

By recommendation of the manufacturers of I-joists and trusses and consensus of the entire task group this proposal prohibits the use of I-joists and trusses *as edge framing members supporting guards except where the effects of the guard loads are specifically considered in the design of the edge member.* This is based upon the limited embedment of fasteners in the thickness of the joist and truss materials, open areas/voids, and surfaces where fasteners cannot be used that would weaken the component or connections between the truss/I-joist components.

Both top mount and side mount guards are suitable provided there is sufficient material to engage threaded fasteners and the edge beam/joist is not subject to rotation or torsion. Based upon calculation of the loads transferred to the structure from the top of the guard, two options are provided. (Calculations may be reviewed at the link below.)

R502.11.1 Conventional edge framing, describes the minimal thickness to resist withdrawal of fasteners and height of the edge beam/joist as that of a common double 2 x 10. Blocking/roll bracing is aligned with the post locations to resist rotation and eliminate torsion induced by guard loads.

R502.11.2 Timber edge framing, provides specifications to allow use of a thicker timber or glulam which is sized to resist torsion allowing roll bracing to be spaced at a maximum distance of 48 inches on center to alleviate the need for precise alignment of the post with the roll bracing or a joist.

Although the minimum guard height in the IRC is 36 inches it is not unusual that portions of the guard, post caps, or finials extend above the guard height. We agreed that a height of 44 inches would be reasonably conservative to use for the purpose of calculating the edge beam size and roll bracing requirements. To restrict outward movement of the top of the edge beam, specific nailing of the floor sheathing is called out at the location of roll bracing. Floor sheathing must be continuous for a minimum distance from the open edge to assure the structural integrity of the bracing and edge beam. The nailing requirements for attachment of the blocking used as roll bracing to the joists prevents uplift of the blocking, and the minimum length allows it to fit into one joist bay where joist spacing is taken from the open edge of the edge beam. These details are specified in **R502.11.3 Roll Bracing.**

This proposal has been clearly and carefully constructed to be understood and enforced without figures referenced in the code text. We have included drawings to aid understanding among the many proposals to be considered in this cycle. The drawings submitted would however be suitable for inclusion in the commentary.

Engineering Calculations supporting this proposal can be found at this link: https://stairways.org/guard-calculations/

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will decrease the cost of construction due to the elimination of necessary after-the-fact demolition and repair to install blocking at each post location. An average job with guards has three or more posts with 1 to 2 hours each for blocking plus repairs to finish surfaces estimated at approximately $400 - $800 in extra charges per 3 post job. This does not include any engineering fees if applicable.

RB173-22

RB174-22

IRC: R506.1, R506.2 (New), PTI (New), Chapter 44

Proponents: Paul Armstrong, representing Post-Tensioned Institute; Kerry Sutton, representing American Concrete Institute (kerry.sutton@concrete.org); Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org)

2021 International Residential Code

Revise as follows:

R506.1 General. Concrete slab-on-ground floors shall be designed and constructed in accordance with the provisions of this section or ACI 332. Such floors ~~Floors~~ shall be a minimum $3^1/_2$ inches (89 mm) thick (for *expansive soils*, see Section R403.1.8). The specified compressive strength of concrete shall be as set forth in Section R402.2.

Add new text as follows:

R506.2 Post-tensioned slab-on-ground floors. Post-tensioned concrete slabs-on-ground floors placed on expansive or stable soils shall be designed in accordance with PTI DC10.5.

Add new standard(s) as follows:

PTI

Post-Tensioning Institute
38800 Country Club Drive
Farmington Hills, MI 48331

PTI DC10.5-19. Standard Requirements for Design and Analysis of Shallow Concrete Foundations on Expansive and Stable Soils

Staff Analysis: A review of the standard proposed for inclusion in the code, PTI DC10.5-19 Standard Requirements for Design and Analysis of Shallow Concrete Foundations on Expansive and Stable Soils, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: There are currently no provisions for designing post-tensioned slabs on expansive or stable soils in the IRC. This proposal includes a new reference to PTI standard PTI DC10.5-19, Standard Requirements for Design and Analysis of Shallow Concrete Foundations on Expansive and Stable Soils. Post-tensioned slabs are commonly used on stable soils for crack control as well as reduced slab thickness and non-prestressed steel use. This reduction in material use typically offsets the cost of the post-tensioning materials and labor. Additional documentation can be viewed at http://www.post-tensioning.org/Portals/13/Files/PDFs/Committees/PTI_DC10.5-19.pdf.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Post-tensioned slabs are commonly used on expansive and stable soils for crack control as well as reduced slab thickness and non-prestressed steel use. This reduction in material use typically offsets the cost of the posttensioning materials and labor.

RB174-22

RB175-22

IRC: R506.2.3

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2021 International Residential Code

Revise as follows:

R506.2.3 Vapor retarder. A minimum 6 mil (0.006 inch; 152 µm) polyethylene or *approved* ~~10-mil (0.010 inch; 0.254 mm)~~ vapor retarder ~~conforming to ASTM E1745 Class A requirements~~ with joints lapped not less than 6 inches (152 mm) shall be placed between the concrete floor slab and the base course or the prepared subgrade where a base course does not exist.

Exception: The vapor retarder is not required for the following:

1. Garages, utility buildings and other unheated *accessory structures*.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports.
3. Driveways, walks, patios and other flatwork not likely to be enclosed and heated at a later date.
4. Where *approved* by the *building official*, based on local site conditions.

Reason Statement: This amendment restores the minimum requirement for a 6 mil sheet vapor retarder under concrete slabs that existed prior to the 2021 IRC and removes the requirement for a 10 mil vapor retarder meeting ASTM D1745 Class A specifications. The language approved for the 2021 IRC limits product choice and significantly increases cost by requiring the use of proprietary underslab vapor retarder products as opposed to standard polyethylene sheet vapor retarders.
No technical data was provided that the 2021 change was necessary for houses. The proponents cited ACI 302.1R "Guide to Concrete Floor and Slab Construction" in their reason statement. However, ACI 302.1R is a guide intended for slabs in industrial, commercial, and institutional buildings, not residential buildings. No mention of houses is made anywhere in ACI 302.1R.

Even if one were inclined to apply the recommendations in ACI 302.1R to dwellings, the current edition does not specify a minimum thickness of vapor retarders complying with ASTM E1745, nor does it specify a class of vapor retarder (ASTM E1745 defines three classes – Class A, Class B and Class C – with Class A being the most stringent). The proponents of the code change for the 2021 IRC provided no substantiation as to why the most stringent class of underslab vapor retarder is necessary for a house. The proponents also referenced ACI 302.2R "Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials", however many common floor coverings used in houses are permeable or semipermeable or do not rely on water-borne adhesives. They are not susceptible to trapping moisture coming up from the slab and thus do not need the protection of a thick, proprietary vapor retarder.

The proponents significantly underestimated the cost of their code change. An analysis conducted by Home Innovation Research Labs as part of their report "Estimated Costs of the 2021 IRC Code Changes" suggested the vapor retarder requirement could add from $540 to $1,100 to the cost of an average home, a high cost for a change that is not needed to protect the life safety of homeowners and their families.

Cost Impact: The code change proposal will decrease the cost of construction
An analysis conducted by Home Innovation Research Labs suggested restoring the traditional minimum requirement for 6 mil sheet polyethylene that existed through the 2018 IRC could reduce the cost of constructing an average home by $540 to $1,100.

RB175-22

RB176-22

IRC: R317.1, R507.2.1, R507.9.1.1

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R317.1 Location required. Protection of wood and wood-based products from decay shall be provided in the following locations by the use of decay-resistant *naturally durable wood* or wood that is preservative-treated in accordance with AWPA U1.

1. In crawl spaces or unexcavated areas located within the periphery of the building foundation, wood joists or the bottom of a wood structural floor where closer than 18 inches (457 mm) to exposed ground, wood girders where closer than 12 inches (305 mm) to exposed ground, and wood columns where closer than 8 inches (204 mm) to exposed ground.
2. Wood framing members, including columns, that rest directly on concrete or masonry exterior foundation walls and are less than 8 inches (203 mm) from the exposed ground.
3. Sills and sleepers on a concrete or masonry slab that is in direct contact with the ground unless separated from such slab by an impervious moisture barrier.
4. The ends of wood girders entering exterior masonry or concrete walls having clearances of less than $^{1}/_{2}$ inch (12.7 mm) on tops, sides and ends.
5. Wood siding, sheathing and wall framing on the exterior of a building having a clearance of less than 6 inches (152 mm) from the ground or less than 2 inches (51 mm) measured vertically from concrete steps, porch slabs, patio slabs and similar horizontal surfaces exposed to the weather.
6. Wood structural members supporting moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, unless separated from such floors or roofs by an impervious moisture barrier.
7. Wood furring strips or other wood framing members attached directly to the interior of exterior masonry walls or concrete walls below *grade* except where an *approved* vapor retarder is applied between the wall and the furring strips or framing members.
8. Portions of wood structural members that form the structural supports of buildings, decks, balconies, porches or similar permanent building appurtenances where those members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering that prevents ~~would prevent~~ moisture or water accumulation on the surface or at joints between members.

   Exception: Sawn lumber used in structures ~~buildings~~ located in a geographical region where experience has demonstrated that climatic conditions preclude the need to use naturally durable or preservative-treated wood where the structure is exposed to the weather.

9. Wood columns in contact with *basement* floor slabs unless supported by concrete piers or metal pedestals projecting not less than 1 inch (25 mm) above the concrete floor and separated from the concrete pier by an impervious moisture barrier.

R507.2.1 Wood materials. Wood structural members for joists, beams, and posts ~~materials~~ shall be No. 2 grade or better lumber, protected from decay where required by Section R317.1 and R317.1.2, and protected from termites where required by Section R318.1. ~~preservative-treated in accordance with Section R317, or *approved*, naturally durable lumber, and termite protected where required in accordance with Section R318.~~ Where design in accordance with Section R301 is provided, wood structural members shall be designed using the wet service factor defined in AWC NDS. Cuts, notches and drilled holes of preservative-treated wood members shall be treated in accordance with Section R317.1.1. ~~All preservative-treated wood products in contact with the ground shall be *labeled* for such usage.~~

R507.9.1.1 Ledger details. Deck ledgers shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, No. 2 grade or better ~~pressure-~~preservative-treated Southern pine, incised ~~pressure-~~preservative-treated hem-fir, or ~~*approved*,~~ decay-resistant *naturally durable wood*~~,~~ ~~No. 2 grade or better lumber~~. Deck ledgers shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

Reason Statement: The intent of Section R507.2.1 when first added to the IRC was to require wood materials of deck construction to be decay resistant, whether treated or natural species. However, rather than repeat the AWPA referenced standard for treatment, the section pointed back to R317 in general. In 2021 the IRC was modified by other proponents in Section R317.1 item #8 where “balconies and porches” is discussed in regard to decay resistance. This section is not definitive that all materials must be decay resistant in the way R507.2.1 is for decks. This has led to confusion regarding the required decay resistance of deck wood materials. Is it required or not?
Item 8 provides more flexibility to jurisdictions to evaluate the exact minimum threshold of each project design to determine if the characteristics contributing to decay are present. For this reason, it is most reasonable to change R507.2.1 to reference R317.1 for determining when decay resistance is required. However, note that R507.9.1.1 specifically requires deck ledgers to be decay resistant. This section is more specific and would thus always be required, universally, on deck ledgers. Deck ledger decay is not always visible, as it may be occurring on the backside due to a failure in the flashing detail. There is no redundant connection to the ledger. Therefore the hazard associated with decay is a greater risk and decay resistance is specifically required.

Terms were changed to “wood structural member” to match the language in the remaining text. “Buildings” was changed to “structures” in the exception since decks and porches are not buildings and the last sentence of the exception speaks to “structures”. Clarification that Section R507.2.1 and the reference to R317.1 only applies to joists, beams, and posts, allows for decking not to be included for required decay resistance or grading. Many tropical hardwoods and other alternative wood decking materials are not graded lumber or naturally durable yet have had no history of insufficient performance as decking in the American market for at least two decades. Decay in decking is more easily visible to the occupant than the other structural members. The requirement for decay resistance is not to provide a greater useful service life, it is to reduce safety hazards due to unseen decay.

The modifications proposed to R507.9.1.1 are simply clean up associated with the subject of this proposal. The AWPA U1 standard provides methods of treatment that do not require “pressure” and the required field treatment in Section R317.1.1 is not a “pressure” treatment. Using this term is unnecessary. All lumber for ledgers using these prescriptive methods of attachment must be “No. 2 grade or better”. Where currently located in the provision, it appears the grade requirement is only related to naturally durable wood. The definition is “naturally durable wood” so the term in the body of the code should be as defined and not “lumber”. It also doesn’t need to be “approved” because it is a defined term.

Cost Impact: The code change proposal will decrease the cost of construction
This code change will decrease the cost of deck construction in regions and designs where the wood materials are not subject to decay and in accordance with Section R317.1 do not require decay resistant materials.

RB176-22

RB177-22

IRC: TABLE R507.2.3, ASTM Chapter 44

Proponents: Rick Allen, representing ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

TABLE R507.2.3 FASTENER AND CONNECTOR SPECIFICATIONS FOR DECKS[a, b]

<table>
<tr><th>ITEM</th><th>MATERIAL</th><th>MINIMUM FINISH/COATING</th><th>ALTERNATE FINISH/COATING[e]</th></tr>
<tr><td>Nails and glulam rivets</td><td>In accordance with ASTM F1667</td><td>Hot-dipped galvanized per ASTM A153, Class D or ASTM A641 Class 3S for $^{3}/_{8}$-inch diameter and less</td><td>Stainless steel, silicon bronze or copper</td></tr>
<tr><td>Bolts[c]</td><td rowspan="2">In accordance with ASTM A307 (bolts), ASTM A563 (nuts), ASTM F844 (washers)</td><td rowspan="2">Hot-dipped galvanized per ASTM A153, Class C (Class D for $^{3}/_{8}$-inch diameter and less) or mechanically galvanized per ASTM B695, Class 55 or 410 stainless steel</td><td rowspan="2">Stainless steel, silicon bronze or copper</td></tr>
<tr><td>Lag screws[d](including nuts and washers)</td></tr>
<tr><td>Metal connectors</td><td>Per manufacturer's specification</td><td>ASTM A653 type G185 zinc-coated galvanized steel or post hot-dipped galvanized per ASTM A123 providing a minimum average coating weight of 2.0 oz./ft^2 (total both sides)</td><td>Stainless steel</td></tr>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Equivalent materials, coatings and finishes shall be permitted.

b. Fasteners and connectors exposed to salt water or located within 300 feet of a salt water shoreline shall be stainless steel.

c. Holes for bolts shall be drilled a minimum $^{1}/_{32}$ inch and a maximum $^{1}/_{16}$ inch larger than the bolt.

d. Lag screws $^{1}/_{2}$ inch and larger shall be predrilled to avoid wood splitting per the *National Design Specification (NDS) for Wood Construction*.

e. Stainless-steel-driven fasteners shall be in accordance with ASTM F1667.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M~~—09a(2014)~~ 2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, ASTM A641/A641M-2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Rationale: Galvanized nails are made from wire. The wire may be uncoated or galvanized. Nails that are made from uncoated wire are hot-dip galvanized after forming to specification A153 Class D which provides a minimum average coating weight of 1 oz./ft². Nails that are made from galvanized wire are made from wire coated to specification A641 Class 3S which provides a minimum average coating weight of 1 oz/ft². Although commercially available and used for many years, Class 3S was added to Specification A641 in 2019

Specification A641 Class 3S was added to ASTM F1667 in 2020.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proposal aligns with current industry practices.

RB177-22

RB178-22

IRC: TABLE R507.2.3, R507.9.1.3

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

TABLE R507.2.3 FASTENER AND CONNECTOR SPECIFICATIONS FOR DECKS[a, b]

<table>
<tr><th>ITEM</th><th>MATERIAL</th><th>MINIMUM FINISH/COATING</th><th>ALTERNATE FINISH/COATING[e]</th></tr>
<tr><td>Nails and glulam rivets</td><td>In accordance with ASTM F1667</td><td>Hot-dipped galvanized per ASTM A153, Class D for $^3/_8$-inch diameter and less</td><td>Stainless steel, silicon bronze or copper</td></tr>
<tr><td>Bolts~~[c]~~</td><td rowspan="2">In accordance with ASTM A307 (bolts), ASTM A563 (nuts), ASTM F844 (washers)</td><td rowspan="2">Hot-dipped galvanized per ASTM A153, Class C (Class D for $^3/_8$-inch diameter and less) or mechanically galvanized per ASTM B695, Class 55 or 410 stainless steel</td><td rowspan="2">Stainless steel, silicon bronze or copper</td></tr>
<tr><td>Lag screws~~[d]~~(including nuts and washers)</td></tr>
<tr><td>Metal connectors</td><td>Per manufacturer's specification</td><td>ASTM A653 type G185 zinc-coated galvanized steel or post hot-dipped galvanized per ASTM A123 providing a minimum average coating weight of 2.0 oz./ft^2 (total both sides)</td><td>Stainless steel</td></tr>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Equivalent materials, coatings and finishes shall be permitted.

b. Fasteners and connectors exposed to salt water or located within 300 feet of a salt water shoreline shall be stainless steel.

~~c Holes for bolts shall be drilled a minimum $^1/_{32}$ inch and a maximum $^1/_{16}$ inch larger than the bolt.~~

~~d Lag screws $^1/_2$ inch and larger shall be predrilled to avoid wood splitting per the *National Design Specification (NDS) for Wood Construction*.~~

e. Stainless-steel-driven fasteners shall be in accordance with ASTM F1667.

R507.9.1.3 Ledger to band joist details. ~~Fasteners used in deck ledger connections~~ Where ledgers are fastened in accordance with Table R507.9.1.3(1) , fasteners shall comply with Section R507.2.3 ~~be hot-dipped galvanized or stainless steel~~ and shall be installed in accordance with Table R507.9.1.3(2) and Figures R507.9.1.3(1) and R507.9.1.3(2). Holes ½-inch (12.7 mm) in diameter shall be drilled through the ledger and holes 5/16-inch (7.9 mm) in diameter shall be drilled through the band joist prior to lag screw installation. Holes ½-inch (12.7 mm) in diameter shall be drilled through the ledger and band joist prior to bolt installation.

Reason Statement: 1) R507.9.3.1 is redundant and does not need to specify the properties of lag screws and bolts as this is the purpose of Table R507.2.3.

2) Table R507.2.3 is titled "Fastener and connector specifications for decks". This table provides material specifications for metal fasteners and connectors. It is not the appropriate place to present installation requirements in the footnotes (drilling of holes).

3) The NDS is a design document for engineers. It is not appropriate to reference such a document from the IRC for "installation" requirements of a prescriptive design.

4) The 2018 NDS provisions for lag screw installation are provided below. It is unrealistic to expect an IRC user to reference these engineering provisions and determine the specific gravity of the species of band joist the lag screw is fastening to.

NDS provisions

"12.1.4.2 Lead holes for lag screws loaded laterally and in withdrawal shall be bored as follows to avoid splitting of the wood member during connection fabrication.

A) The clearance hole for the shank shall have the same diameter as the shank, and the same depth of penetration as the length of the unthreaded shank.

B) The lead hole for the threaded portion shall have a diameter equal to 65% to 85% of the shank diameter in wood with G > 0.6, 60% to 75% in wood with 0.5 < G <= 0.6, and 40% to 70% in wood with G <= 0.5 (see Table 12.3.3A) and a length equal to at least the length of the threaded portion. The larger percentile in each range shall apply to lag screws of greater diameters."

5) 65% of a 1/2-inch diameter lag screw falls within the range for all three specific gravity and is thus an acceptable value for basic prescriptive code. This results in a 5/16-inch hole in the band joist as proposed in the relocated footnotes.

6) The allowable tolerance for holes for bolts being measured to a 32 of an inch is not practical for rough framing construction. A slight side-to-side movement of a hand tool while drilling is greater than a 32 of an inch. It is not necessary or realistic to require such precise values in prescriptive wood framing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact to this proposal, as it simply clarifies the intent of the IRC as currently written.

RB178-22

RB179-22

IRC: R507.3.1, TABLE R507.3.1

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.3.1 Minimum size. The minimum size of ~~concrete~~ deck footings shall be in accordance with Table R507.3.1, based on the tributary area and allowable soil-bearing pressure in accordance with Table R401.4.1.

TABLE R507.3.1 MINIMUM FOOTING SIZE FOR DECKS

LIVE OR GROUND SNOW LOAD[b] (psf)	TRIBUTARY AREA (ft^2)	LOAD-BEARING VALUE OF SOILS[a, c, d] (psf)								
		1,500[e]			2,000[e]			≥ 3,000[e]		
		Side of a square footing (inches)	Diameter of a round footing (inches)	Plain concrete Thickness (inches)[f]	Side of a square footing (inches)	Diameter of a round footing (inches)	Plain concrete Thickness (inches)[f]	Side of a square footing (inches)	Diameter of a round footing (inches)	Plain concrete Thickness (inches)[f]
40	5	7	8	6	7	8	6	7	8	6
	20	10	12	6	9	9	6	7	8	6
	40	14	16	6	12	14	6	10	12	6
	60	17	19	6	15	17	6	12	14	6
	80	20	22	7	17	19	6	14	16	6
	100	22	25	8	19	21	6	15	17	6
	120	24	27	9	21	23	7	17	19	6
	140	26	29	10	22	25	8	18	21	6
	160	28	31	11	24	27	9	20	22	7
50	5	7	8	6	7	8	6	7	8	6
	20	11	13	6	10	11	6	8	9	6
	40	15	17	6	13	15	6	11	13	6
	60	19	21	6	16	18	6	13	15	6
	80	21	24	8	19	21	6	15	17	6
	100	24	27	9	21	23	7	17	19	6
	120	26	30	10	23	26	8	19	21	6
	140	28	32	11	25	28	9	20	23	7
	160	30	34	12	26	30	10	21	24	8
60	5	7	8	6	7	8	6	7	8	6
	20	12	14	6	11	12	6	9	10	6
	40	16	19	6	14	16	8	12	14	6
	60	20	23	7	17	20	6	14	16	6
	80	23	26	9	20	23	7	16	19	6
	100	26	29	10	22	25	8	18	21	6
	120	28	32	11	25	28	9	20	23	7
	140	31	35	12	27	30	10	22	24	8
	160	33	37	13	28	32	11	23	26	9
70	5	7	8	6	7	8	6	7	8	6
	20	12	14	6	11	13	6	9	10	6
	40	18	20	6	15	17	6	12	14	6
	60	21	24	8	19	21	6	15	17	6
	80	25	28	9	21	24	8	18	20	6
	100	28	31	11	24	27	9	20	22	7
	120	30	34	12	26	30	10	21	24	8
	140	33	37	13	28	32	11	23	26	9
	160	35	40	15	30	34	12	25	28	9

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2, 1 pound per square foot = 0.0479 kPa.

a. Interpolation permitted, extrapolation not permitted.

b. Based on highest load case: Dead + Live or Dead + Snow.

c. Footing dimensions shall allow complete bearing of the post.

d. If the support is a brick or CMU pier, the footing shall have a minimum 2-inch projection on all sides.

e. Area, in square feet, of deck surface supported by post and footings.

~~f. Minimum thickness shall only apply to plain concrete footings.~~

Reason Statement: Table R507.3.1 provides a minimum bearing area for round and square footings based on the loads and the soil bearing capacity. Only the minimum footing thickness column is based on the material of the footing being plain concrete footings (no reinforcing steel or other). Modifying section R507.3.1 by replacing “concrete” with “deck” where referencing Table R507.3.1 is a subtle alignment and reminder that the table simply provides a minimum horizontal bearing area sufficient for the loads and the soil type, independent of the footing material.
Prescriptive design language in the IRC should be as generic as possible. There are proprietary footing products on the market made of alternative materials. The bearing area for these products need not be different than that of a concrete footing. This proposal would allow a bearing area to be selected from the code that can be used to select an appropriate size footer of any material.
Including the term “plain concrete” in the thickness column achieves two goals. It makes it clear that the minimum thickness is only in relation to concrete footings, and it makes it clear that reinforcing steel (“rebar”) is not required. Footnotes are often overlooked so footnote f can be easily eliminated with the simply clarification in the column titles.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies and expands the usefulness and potential application of prescriptive design methods. In itself, this does not affect the cost of construction

RB179-22

RB180-22

IRC: R507.4.1

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.4.1 Deck post to deck footing connection. Where posts bear on concrete footings in accordance with Section R403 and Figure R507.3, lateral restraint shall be provided by manufactured connectors or a minimum post embedment of 12 inches (305 mm) in surrounding soils or concrete piers. ~~Other footing systems shall be permitted.~~

> **Exception:** Where expansive, compressible, shifting or other questionable soils are present, surrounding soils shall not be relied on for lateral support.

Reason Statement: Though this line is supportive of alternative footing systems, it is unnecessary. Section R507.3 Footings, already states that “other approved structural systems…” are permitted. And, of course, R104.11 allows for alternative means, methods, and materials. As it is currently written, this line states that these "other systems" "shall be permitted". There is no mention of them having to be reviewed and approved. It just directly states that they "shall be permitted". This is inappropriate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Alternative methods of construction are always able to be reviewed and possibly approved. This proposal does not change that, therefore it does not affect the cost of construction.

RB180-22

RB181-22

IRC: R507.4.1

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.4.1 Deck post to deck footing connection. Where posts bear on concrete footings in accordance with Section R403 and Figure R507.3, lateral restraint shall be provided by ~~manufactured~~ *approved* connectors or a minimum post embedment of 12 inches (305 mm) in surrounding soils or concrete piers. Other footing systems shall be permitted.

> **Exception:** Where expansive, compressible, shifting or other questionable soils are present, surrounding soils shall not be relied on for lateral support.

Reason Statement: There is no known or defined magnitude of minimum lateral load resistance between a post and a footing utilizing any standard practices, codes, or design standards. The intent of this provision is to simply ensure some connection is made. Stating that it “shall be provided by manufactured connectors” provides no characteristics of this connection other than it being something “manufactured”. Replacing “manufactured” with “approved” allows a building authority to make a rational determination as to whether a particular connection will provide sufficient lateral restraint to retain the post on the footing under normal usage. Until further research can provide an agreeable, minimum, measurable magnitude of resistance, we must continue to rely on the professional discretion of the building authority to determine acceptable connections.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not have a definitive affect on the cost of construction. Use of the term "approved" as opposed to "manufactured" simply provides more discretion to the building official to approve this connection that is otherwise not provided for prescriptively in the IRC.

RB181-22

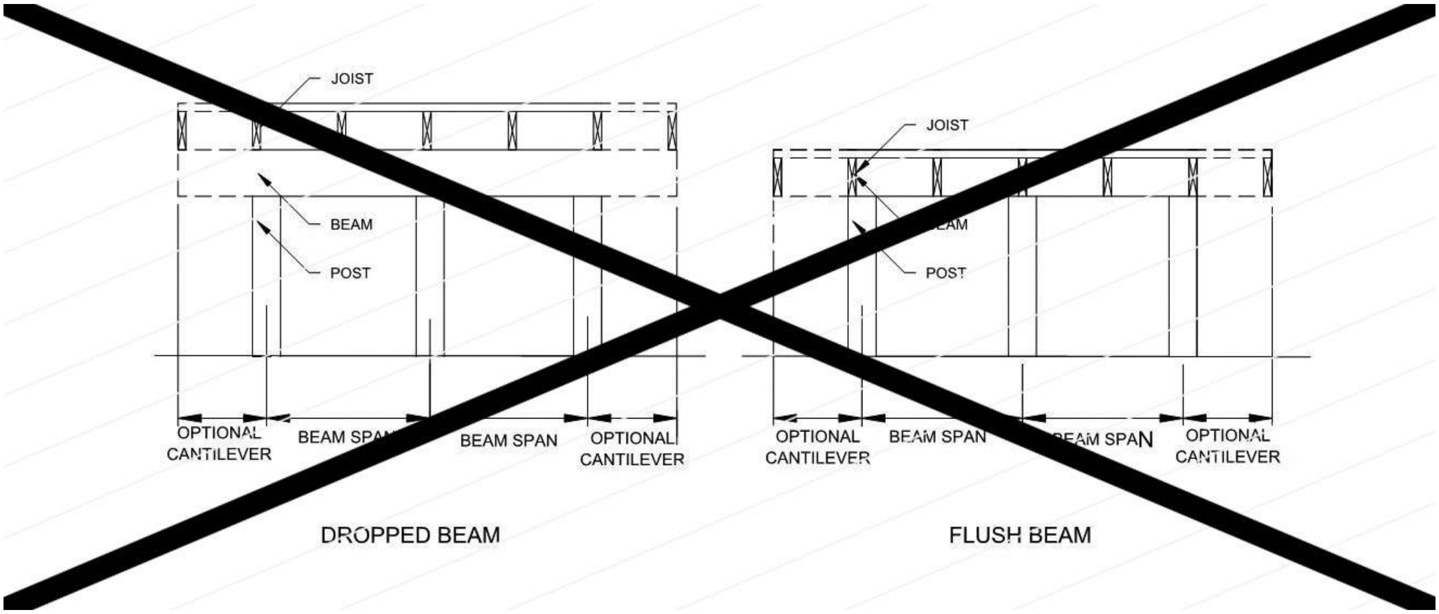
RB182-22

IRC: FIGURE R507.5

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:



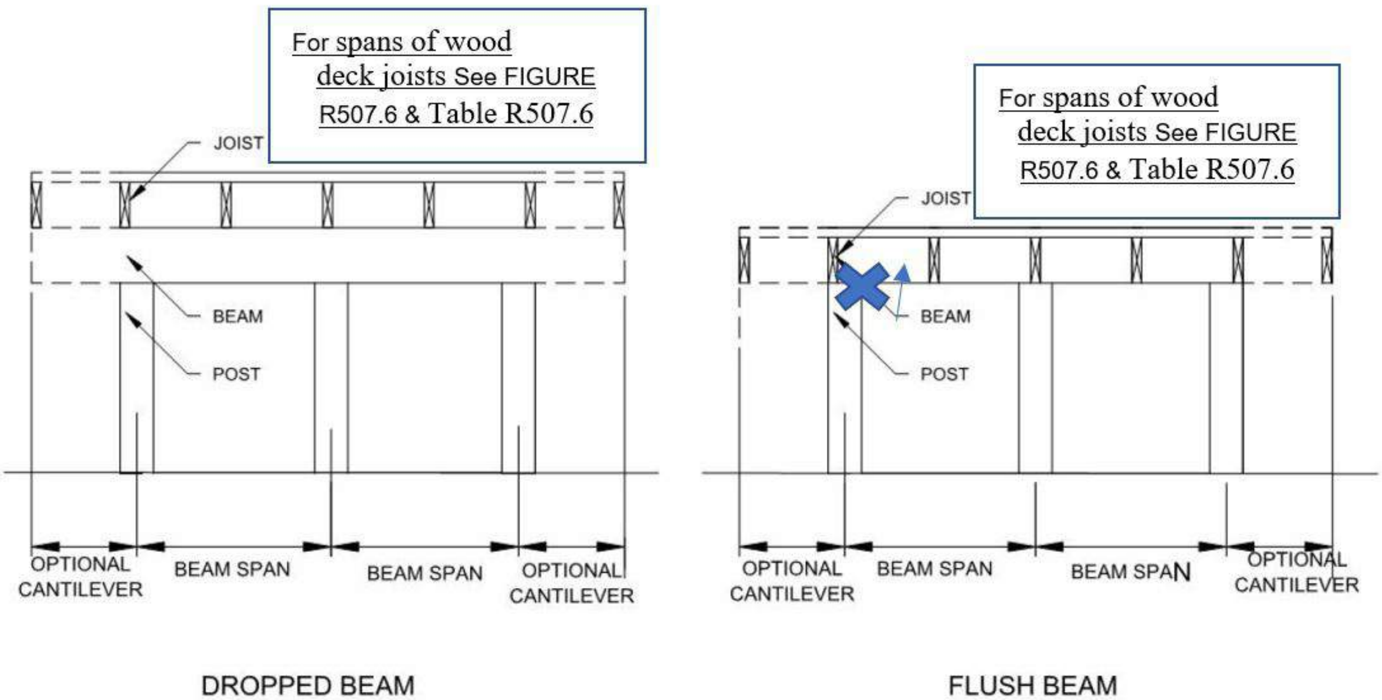


FIGURE R507.5 TYPICAL DECK ~~JOIST~~ BEAM SPANS

Reason Statement: This proposal clarifies that FIGURE R507.5 shows TYPICAL DECK BEAM SPANS, not TYPICAL DECK JOIST SPANS. It also references the code users to the correct figure and table for TYPICAL DECK JOIST-SPANS by adding "For spans of wood deck joists See FIGURE R507.6 & Table R507.6". Also, the arrow of the beam is pointing to the joist, which is not correct. Therefore, the proposal changes the pointer to the beam to point to the beam.
This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification only for the requirements for wood deck joist in Figure R507.5.

RB183-22

IRC: R507.5, TABLE R507.5(1), TABLE R507.5(2), TABLE R507.5(3), TABLE R507.5(4), TABLE R507.5(5), FIGURE R507.5

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.5 Deck beams. Maximum allowable spans for wood deck beams, as shown in Figure R507.5, shall be in accordance with Tables R507.5(1) through R507.5(4) and based on the joist span length and cantilever length as shown in Figure R507.5. Beam plies shall be fastened together with two rows of 10d (3-inch × 0.128-inch) nails minimum at 16 inches (406 mm) on center along each edge. Beams shall be permitted to cantilever at each end up to one-fourth of the actual beam span. Deck beams of other materials shall be permitted where designed in accordance with accepted engineering practices.

TABLE R507.5(1) MAXIMUM DECK BEAM SPAN—40 PSF LIVE LOAD[c]

	JOIST SPAN	_	JOIST SPAN LENGTH & JOIST CANTILEVER LENGTH[a, i] (feet & feet)								
	6	6 & 0	6 & 1.5	_	_	_	_	_	_	_	_
	8	_	8 & 0	8 & 1	8 & 2	_	_	_	_	_	_
	10	_	_	10 & 0	10 & 1	10 & 2.5	_	_	_	_	_
	12	_	_	_	12 & 0	12 & 1	12 & 2	12 & 3	_	_	_
	14	_	_	_	_	14 & 0	14 & 1	14 & 2	14 & 3.5	_	_
	16	_	_	_	_	_	16 & 0	16 & 1	16 & 2.5	16 & 4	_
	18	_	_	_	_	_	_	18 & 0	18 & 1.5	18 & 3	18 & 4.5
BEAM SPECIES[d]	BEAM SIZE[e]		~~EFFECTIVE DECK JOIST SPAN LENGTH[a, i, j] (feet)~~								
			~~6~~		~~8~~	~~10~~	-	~~12~~	~~14~~	~~16~~	~~18~~
			MAXIMUM DECK BEAM SPAN LENGTH[a, b, f] (feet-inches) ~~(feet-inches)[a, b, f]~~								
Southern pine	1 – 2 × 6	4-10	4-7	4-3	4-0	3-7	3-5	3-3	3-0	2-10	2-8
	1 – 2 × 8	6-4	5-11	5-6	5-1	4-7	4-4	4-2	3-10	3-7	3-5
	1 – 2 × 10	7-6	7-0	6-6	6-0	5-5	5-2	4-11	4-7	4-3	4-0
	1 – 2 × 12	8-8	8-3	7-8	7-1	6-4	6-1	5-10	5-5	5-0	4-9
	2 – 2 × 6	7-4	6-11	6-5	5-11	5-4	5-1	4-10	4-6	4-3	4-0
	2 – 2 × 8	9-4	8-9	8-2	7-7	6-9	6-5	6-2	5-9	5-4	5-0
	2 – 2 × 10	11-0	10-4	9-8	9-0	8-0	7-8	7-4	6-9	6-4	6-0
	2 – 2 × 12	13-0	12-2	11-4	10-7	9-5	9-0	8-7	8-0	7-5	7-0
	3 – 2 × 6	9-0	8-6	7-11	7-5	6-8	6-4	6-1	5-8	5-3	4-11
	3 – 2 × 8	11-7	10-11	10-3	9-6	8-6	8-1	7-9	7-2	6-8	6-4
	3 – 2 × 10	13-11	13-0	12-1	11-2	10-0	9-7	9-2	8-6	7-11	7-6
	3 – 2 × 12	16-3	15-3	14-3	13-3	11-10	11-3	10-9	10-0	9-4	8-10
Douglas fir-larch[g] Hem-fir[g] Spruce-pine-fir	1 – 2 x 6	4-5	4-1	3-9	3-6	3-0	2-10	2-8	2-5	2-3	2-1
	1 – 2 × 8	5-11	5-6	5-1	4-8	4-0	3-9	3-6	3-2	2-11	2-9
	1 – 2 × 10	7-1	6-8	6-3	5-10	5-1	4-9	4-6	4-1	3-9	3-6
	1 – 2 × 12	8-3	7-9	7-3	6-9	6-0	5-9	5-6	5-0	3-9	3-6
	2 – 2 × 6	6-6	6-1	5-8	5-3	4-9	4-6	4-4	3-11	3-7	3-3
	2 – 2 × 8	8-8	8-2	7-7	7-1	6-4	6-0	5-9	5-2	4-8	4-4
	2 – 2 × 10	10-8	10-0	9-3	8-7	7-9	7-4	7-0	6-6	6-0	5-6
	2 – 2 × 12	12-4	11-7	10-9	10-0	8-11	8-6	8-2	7-7	7-1	6-8
	3 – 2 × 6	8-2	7-8	7-2	6-8	6-0	5-9	5-6	5-1	4-9	4-6
	3 – 2 × 8	10-11	10-3	9-6	8-10	7-11	7-7	7-3	6-8	6-3	5-11
	3 – 2 × 10	13-4	12-6	11-8	10-10	9-8	9-3	8-10	8-2	7-8	7-2
	3 – 2 × 12	15-6	14-6	13-6	12-7	11-3	10-9	10-3	9-6	8-11	8-5
	1 – 2 × 6	4-5	4-2	3-10	3-7	3-1	2-11	2-9	2-6	2-3	2-2
	1 – 2 × 8	5-8	5-4	4-11	4-7	4-1	3-10	3-7	3-3	3-0	2-10
	1 – 2 × 10	6-11	6-6	6-0	5-7	5-0	4-9	4-7	4-2	3-10	3-7
	1 – 2 × 12	8-0	7-6	7-0	6-6	5-10	5-7	5-4	4-11	4-7	4-4
	2 – 2 × 6	6-7	6-2	5-9	5-4	4-10	4-7	4-5	4-0	3-8	3-4
	2 – 2 × 8	8-4	7-10	7-4	6-10	6-1	5-10	5-7	5-2	4-10	4-5
	2 – 2 × 10	12-2	9-7	8-11	8-4	7-5	7-1	6-9	6-3	5-10	5-6
	2 – 2 × 12	11-9	11-1	10-4	9-8	8-7	8-2	7-10	7-3	6-10	6-5
	3 – 2 × 6	8-1	7-8	7-2	6-9	6-0	5-9	5-6	5-1	4-9	4-6
	3 – 2 × 8	10-6	9-10	9-2	8-6	7-7	7-3	6-11	6-5	6-0	5-8

	JOIST SPAN	_	JOIST SPAN LENGTH & JOIST CANTILEVER LENGTH (feet & feet)								
Redwood[h] ~~Western cedars[h]~~	6	6 & 0	6 & 1.5	_	_	_	_	_	_	_	_
Ponderosa pine[h]	8	_	8 & 0	8 & 1	8 & 2	_	_	_	_	_	_
Red pine[h]	10	_	_	10 & 0	10 & 1	10 & 2.5	_	_	_	_	_
	12	_	_	_	12 & 0	12 & 1	12 & 2	12 & 3	_	_	_
	14	_	_	_	_	14 & 0	14 & 1	14 & 2	14 & 3.5	_	_
	16	_	_	_	_	_	16 & 0	16 & 1	16 & 2.5	16 & 4	_
	18	_	_	_	_	_	_	18 & 0	18 & 1.5	18 & 3	18 & 4.5
BEAM SPECIES	BEAM SIZE		~~EFFECTIVE DECK JOIST SPAN LENGTH (feet)~~								
			~~6~~		~~8~~	~~10~~	-	~~12~~	~~14~~	~~16~~	~~18~~
			MAXIMUM DECK BEAM SPAN LENGTH (feet-inches) ~~(feet-inches)~~								
	3 – 2 × 10	12-9	12-0	11-2	10-5	9-4	8-11	8-6	7-10	7-4	6-11
	3 – 2 × 12	14-10	13-11	13-0	12-1	10-9	10-3	9-10	9-1	8-6	8-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. Interpolation permitted for conditions with zero joist cantilever length. Extrapolation not permitted.

b. Beams supporting a single span of joists with or without cantilever.

c. Dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever. Snow load is not assumed to be concurrent with live load.

b. Beams supporting deck joists from one side only.

d. No. 2 grade, wet service factor included.

e. Beam depth shall be equal to or greater than the depth of intersecting joist for a flush beam connection.

f. Beam cantilevers are limited to the adjacent beam’s span divided by 4.

g. Includes incising factor.

h. Incising factor not included.

i. Deck joist span as shown in Figure R507.5.

~~j. For calculation of effective deck joist span, the actual joist span length shall be multiplied by the joist span factor in accordance with Table R507.5(5).~~

TABLE R507.5(2) MAXIMUM DECK BEAM SPAN—50 PSF GROUND SNOW LOAD[c]

	JOIST SPAN	JOIST SPAN LENGTH & JOIST CANTILEVER LENGTH[a, i] (feet & feet)									
	6	6 & 0	6 & 1.5								
	8		8 & 0	8 & 1	8 & 2						
	10			10 & 0	10 & 1	10 & 2.5					
	12				12 & 0	12 & 1	12 & 2	12 & 3			
	14					14 & 0	14 & 1	14 & 2	14 & 3.5		
	16						16 & 0	16 & 1	16 & 2.5		
	18							18 & 0	18 & 1.5	18 & 3	18 & 4.5
BEAM SPECIES[d]	BEAM SIZE[e]		~~EFFECTIVE DECK JOIST SPAN LENGTH (feet)[a, i, j]~~								
			~~6~~		~~8~~	~~10~~		~~12~~	~~14~~	~~16~~	~~18~~
			MAXIMUM DECK BEAM SPAN LENGTH[a, b, f] (feet-inches) ~~(feet-inches)[a, b, f]~~								
Southern pine	1 – 2 × 6	4-9	4-6	4-2	3-11	3-6	3-4	3-2	2-11	2-9	2-7
	1 – 2 × 8	6-2	5-9	5-4	4-11	4-5	4-2	4-0	3-9	3-6	3-3
	1 – 2 × 10	7-2	6-9	6-3	5-10	5-3	5-0	4-9	4-5	4-2	3-11
	1 – 2 × 12	8-6	8-0	7-5	6-11	6-2	5-11	5-8	5-3	4-11	4-7
	2 – 2 × 6	7-1	6-8	6-2	5-9	5-2	4-11	4-9	4-4	4-1	3-10
	2 – 2 × 8	9-1	8-6	7-11	7-4	6-7	6-3	6-0	5-7	5-2	4-11
	2 – 2 × 10	10-9	10-1	9-5	8-9	7-10	7-5	7-1	6-7	6-2	5-10
	2 – 2 × 12	12-9	11-11	11-1	10-3	9-2	8-9	8-5	7-9	7-3	6-10
	3 – 2 × 6	8-3	7-11	7-6	7-2	6-6	6-2	5-11	5-6	5-1	4-10
	3 – 2 × 8	11-0	10-5	9-10	9-3	8-3	7-10	7-6	6-11	6-6	6-2
	3 – 2 × 10	13-6	12-8	11-9	10-11	9-9	8-4	8-11	8-3	7-9	7-3
	3 – 2 × 12	15-11	14-11	13-11	12-11	11-6	11-0	10-6	9-9	9-1	8-7
Douglas fir-larch[g] Hem-fir[g] Spruce-pine-fir[g]	1 – 2 × 6	4-3	4-0	3-8	3-5	2-11	2-9	2-7	2-4	2-2	2-0
	1 – 2 × 8	5-9	5-4	4-11	4-7	3-11	3-8	3-5	3-1	2-10	2-8
	1 – 2 × 10	7-0	6-7	6-1	5-8	4-11	4-8	4-5	4-0	3-8	3-5
	1 – 2 × 12	8-1	7-7	7-1	6-7	5-11	5-7	5-4	4-10	4-6	4-2
	2 – 2 × 6	6-5	6-0	5-7	5-2	4-7	4-4	4-2	3-10	3-5	3-2
	2 – 2 × 8	8-6	8-0	7-5	6-11	6-2	5-11	5-8	5-0	4-7	4-2
	2 – 2 × 10	10-5	9-9	9-1	8-5	7-7	7-3	6-11	6-4	5-10	5-4
	2 – 2 × 12	12-1	11-4	10-7	9-10	8-9	8-4	8-0	7-5	6-11	6-6
	3 – 2 × 6	8-0	7-6	7-0	6-6	5-9	5-6	5-3	4-11	4-7	4-4
	3 – 2 × 8	10-8	10-0	9-4	8-8	7-9	7-5	7-1	6-6	6-1	5-8
	3 – 2 × 10	13-1	12-3	11-5	10-7	9-6	9-1	8-8	8-0	7-6	7-0
	3 – 2 × 12	15-2	14-3	13-3	12-4	11-0	10-6	10-1	9-4	8-9	8-3
Redwood[h] Western cedars[h] Ponderosa pine[h] Red pine[h]	1 – 2 × 6	4-4	4-1	3-9	3-6	3-0	2-10	2-8	2-5	2-3	2-1
	1 – 2 × 8	5-6	5-2	4-10	4-6	4-0	3-9	3-6	3-2	2-11	2-9
	1 – 2 × 10	6-9	6-4	5-11	5-6	4-11	4-8	4-6	4-1	3-9	3-6
	1 – 2 × 12	7-10	7-4	6-10	6-4	5-8	5-5	5-2	4-10	4-6	4-3
	2 – 2 × 6	6-6	6-1	5-8	5-3	4-8	4-6	4-4	3-11	3-6	3-3
	2 – 2 × 8	8-2	7-8	7-2	6-8	5-11	5-8	5-5	5-0	4-8	4-3
	2 – 2 × 10	10-0	9-5	8-9	8-2	7-3	6-11	6-8	6-2	5-9	5-5
	2 – 2 × 12	11-8	10-11	10-2	9-5	8-5	8-0	7-8	7-2	6-8	6-3
	3 – 2 × 6	7-5	7-1	6-9	6-5	5-11	5-8	5-5	5-0	4-8	4-5

	3 – 2 × 8	9-10	9-4	8-10	8-4	7-5	7-1	6-10	604	5-11	5-7
	3 – 2 × 10	12-6	11-9	10-11	10-2	9-1	8-8	8-4	7-8	7-2	6-9
	3 – 2 × 12	14-7	13-8	12-9	11-10	10-7	10-1	9-8	8-11	8-4	7-10

For SI: 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. Interpolation ~~allowed~~ permitted for conditions with zero joist cantilever length. Extrapolation not permitted. ~~is not allowed.~~

b. Beams supporting a single span of joists with or without cantilever.

c. Dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever. Snow load not assumed to be concurrent with live load.

d. No. 2 grade, wet service factor included.

e. Beam depth shall be equal to or greater than the depth of intersecting joist for a flush beam connection.

f. Beam cantilevers are limited to the adjacent beam's span divided by 4.

g. Includes incising factor.

h. Incising factor not included.

i. Deck joist span as shown in Figure R507.5.

~~j. For calculation of effective deck joist span, the actual joist span length shall be multiplied by the joist span factor in accordance with Table R507.5(5).~~

TABLE R507.5(3) MAXIMUM DECK BEAM SPAN—60 PSF GROUND SNOW LOAD[c]

	JOIST SPAN	JOIST SPAN LENGTH & JOIST CANTILEVER LENGTH[a, i] (feet & feet)									
	6	6 & 0	6 & 1.5								
	8		8 & 0	8 & 1	8 & 2						
	10			10 & 0	10 & 1	10 & 2.5					
	12				12 & 0	12 & 1	12 & 2	12 & 3			
	14					14 & 0	14 & 1	14 & 2	14 & 3.5		
	16						16 & 0	16 & 1	16 & 2.5	16 & 4	
	18							18 & 0	18 & 1.5	18 & 3	18 & 4.5
BEAM SPECIES[d]	BEAM SIZE[e]		~~EFFECTIVE DECK JOIST SPAN LENGTH[a, i, j] (feet)~~								
			~~6~~		~~8~~	~~10~~		~~12~~	~~14~~	~~16~~	~~18~~
			MAXIMUM DECK BEAM SPAN LENGTH[a, b, f] (feet-inches) ~~(feet-inches)[a, b, f]~~								
Southern pine	1 – 2 × 6	4-5	4-2	3-10	3-7	3-3	3-1	2-11	2-9	2-6	2-5
	1 – 2 × 8	5-7	5-3	4-11	4-7	4-1	3-11	3-9	3-5	3-3	3-0
	1 – 2 × 10	6-8	6-3	5-10	5-5	4-10	4-7	4-5	4-1	3-10	3-7
	1 – 2 × 12	7-11	7-5	6-11	6-5	5-9	5-6	5-3	4-10	4-6	4-3
	2 – 2 × 6	6-7	6-2	5-9	5-4	4-9	4-6	4-4	4-0	3-9	3-7
	2 – 2 × 8	8-4	7-10	7-4	6-10	6-1	5-10	5-7	5-2	4-10	4-6
	2 – 2 × 10	9-10	9-4	8-8	8-1	7-3	6-11	6-7	6-1	5-8	5-4
	2 – 2 × 12	11-9	11-0	10-3	9-6	8-6	8-1	7-9	7-2	6-9	6-4
	3 – 2 × 6	7-9	7-5	7-1	6-9	6-0	5-9	5-6	5-1	4-9	4-6
	3 – 2 × 8	10-4	9-9	9-1	8-6	7-8	7-3	6-11	6-5	6-0	5-8
	3 – 2 × 10	12-5	11-8	10-11	10-2	9-1	8-8	8-3	7-8	7-2	6-9
	3 – 2 × 12	14-8	13-9	12-10	11-11	10-8	10-2	9-9	9-0	8-5	7-11
Douglas fir-larch[g] Hem-fir[g] Spuce-pine-fir[g]	1 – 2 × 6	3-11	3-8	3-4	3-1	2-8	2-6	2-4	2-2	2-0	1-10
	1 – 2 × 8	5-5	5-0	4-6	4-1	3-6	3-3	3-1	2-10	2-7	2-5
	1 – 2 × 10	6-6	6-1	5-7	5-2	4-6	4-3	4-0	3-7	3-4	3-2
	1 – 2 × 12	7-7	7-1	6-7	6-1	5-5	5-1	4-10	4-5	4-1	3-10
	2 – 2 × 6	5-10	5-6	5-1	4-9	4-3	4-0	3-10	3-5	3-1	2-10
	2 – 2 × 8	7-11	7-5	6-11	6-5	5-9	5-4	5-0	4-6	4-1	3-9
	2 – 2 × 10	9-7	9-0	8-5	7-10	7-0	6-8	6-4	5-9	5-2	4-10
	2 – 2 × 12	11-2	10-6	9-9	9-1	8-1	7-9	7-5	6-10	6-4	5-10
	3 – 2 × 6	7-4	6-11	6-5	6-0	5-4	5-1	4-11	4-6	4-2	3-10
	3 – 2 × 8	9-10	9-3	8-7	8-0	7-2	6-10	6-6	6-1	5-6	5-0
	3 – 2 × 10	12-1	11-4	10-7	9-10	8-9	8-4	8-0	7-5	6-11	6-5
	3 – 2 × 12	13-6	13-2	11-9	11-5	10-2	9-9	9-4	8-7	8-1	7-7
Redwood[h] Western cedars[h] Ponderosa pine[h] Red pine[h]	1 – 2 × 6	4-0	3-9	3-5	3-2	2-9	2-7	2-5	2-2	2-0	1-11
	1 – 2 × 8	5-2	4-10	4-6	4-2	3-7	3-4	3-2	2-11	2-8	2-6
	1 – 2 × 10	6-2	5-10	5-5	5-1	4-6	4-3	4-1	3-8	3-5	3-3
	1 – 2 × 12	7-3	6-10	6-4	5-11	5-3	5-0	4-10	4-5	4-2	3-11
	2 – 2 × 6	5-11	5-7	5-2	4-10	4-4	4-1	3-11	3-6	3-2	2-11
	2 – 2 × 8	7-6	7-1	6-7	6-2	5-6	5-3	5-0	4-7	4-2	3-10
	2 – 2 × 10	9-3	8-8	8-1	7-6	6-9	6-5	6-2	5-8	5-4	4-11
	2 – 2 × 12	10-8	10-1	9-5	8-9	7-10	7-6	7-2	6-7	6-2	5-10

	3 – 2 × 6	6-11	6-8	6-4	6-1	5-5	5-2	5-0	4-7	4-3	3-11
	3 – 2 × 8	9-3	8-9	8-3	7-9	6-11	6-7	6-4	5-10	5-5	5-3
	3 – 2 × 10	11-8	10-11	10-2	9-5	8-5	8-0	7-8	7-3	6-8	6-3
	3 – 2 × 12	13-6	12-8	11-9	10-11	9-9	8-4	8-11	8-3	7-9	7-3

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. Interpolation ~~allowed~~ permitted for conditions with zero joist cantilever length. Extrapolation not permitted. ~~is not allowed.~~

b. Beams supporting a single span of joists with or without cantilever.

c. Dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever. Snow load not assumed to be concurrent with live load.

d. No. 2 grade, wet service factor included.

e. Beam depth shall be equal to or greater than the depth of intersecting joist for a flush beam connection.

f. Beam cantilevers are limited to the adjacent beam's span divided by 4.

g. Includes incising factor.

h. Incising factor not included.

i. Deck joist span as shown in Figure R507.5.

~~j. For calculation of effective deck joist span, the actual joist span length shall be multiplied by the joist span factor in accordance with Table R507.5(5).~~

TABLE R507.5(4) MAXIMUM DECK BEAM SPAN—70 PSF GROUND SNOW LOAD[c]

	JOIST SPAN	JOIST SPAN LENGTH & CANTILEVER LENGTH[a, i] (feet & feet)									
	6	6 & 0	6 & 1.5								
	8		8 & 0	8 & 1	8 & 2						
	10			10 & 0	10 & 1	10 & 2.5					
	12				12 & 0	12 & 1	12 & 2	12 & 3			
	14					14 & 0	14 & 1	14 & 2	14 & 3.5		
	16						16 & 0	16 & 1	16 & 2.5	16 & 4	
	18							18 & 0	18 & 1	18 & 3	18 & 4.5
BEAM SPECIES[d]	BEAM SIZE[e]		~~EFFECTIVE DECK JOIST SPAN LENGTH (feet)[a, i, j]~~								
			~~6~~		~~8~~	~~10~~		~~12~~	~~14~~	~~16~~	~~18~~
			MAXIMUM DECK BEAM SPAN LENGTH[a, b, f] (feet-inches) ~~(feet-inches)[a, b, f]~~								
Southern pine	1 – 2 × 6	4-2	3-11	3-7	3-4	3-0	2-10	2-9	2-6	2-4	2-3
	1 – 2 × 8	5-4	4-11	4-8	4-3	3-10	3-8	3-6	3-3	3-0	2-10
	1 – 2 × 10	6-2	5-10	5-5	5-1	4-6	4-4	4-2	3-10	3-7	3-4
	1 – 2 × 12	7-4	6-11	6-5	6-0	5-4	5-1	4-11	4-6	4-3	4-0
	2 – 2 × 6	6-3	5-9	5-4	5-0	4-6	4-3	4-1	3-9	3-6	3-4
	2 – 2 × 8	7-10	7-4	6-10	6-4	5-8	5-5	5-2	4-10	4-6	4-3
	2 – 2 × 10	9-6	8-9	8-2	7-7	6-9	6-5	6-2	5-8	5-4	5-0
	2 – 2 × 12	10-11	10-3	9-7	8-11	8-0	7-7	7-3	6-9	6-3	5-11
	3 – 2 × 6	7-4	7-0	6-7	6-3	5-7	5-4	5-1	4-9	4-5	4-2
	3 – 2 × 8	9-10	9-3	8-7	8-0	7-2	6-10	6-6	6-0	5-8	5-4
	3 – 2 × 10	11-7	10-11	10-2	9-6	8-6	8-1	7-9	7-2	6-8	6-4
	3 – 2 × 12	13-9	12-11	12-0	11-2	10-0	9-6	9-1	8-5	7-11	7-5
Douglas fir-larch[g] Hem-fir[g] Spruce-pine-fir[g]	1 – 2 × 6	3-8	3-5	3-1	2-10	2-5	2-3	2-2	2-0	1-10	1-9
	1 – 2 × 8	4-10	4-7	4-1	3-8	3-2	3-0	2-10	2-7	2-5	2-4
	1 – 2 × 10	6-1	5-8	5-2	4-9	4-1	3-10	3-8	3-4	3-1	2-11
	1 – 2 × 12	7-0	6-7	6-1	5-8	5-0	4-9	4-6	4-1	3-10	3-7
	2 – 2 × 6	5-6	5-2	4-10	4-6	4-0	3-8	3-5	3-1	2-10	2-7
	2 – 2 × 8	7-4	6-11	6-5	6-0	5-3	4-11	4-7	4-1	3-8	3-5
	2 – 2 × 10	8-11	8-5	7-10	7-4	6-6	6-2	5-10	5-2	4-9	4-5
	2 – 2 × 12	10-6	9-10	9-2	8-6	7-7	7-3	6-11	6-4	5-9	5-4
	3 – 2 × 6	6-11	6-6	6-0	5-7	5-0	4-9	4-7	4-2	3-9	3-5
	3 – 2 × 8	9-3	8-8	8-1	7-6	6-8	6-4	6-1	5-6	5-0	4-7
	3 – 2 × 10	11-3	10-7	9-10	9-2	8-2	7-10	7-6	6-11	6-4	5-10
	3 – 2 × 12	13-2	12-4	11-6	10-8	9-7	9-2	8-9	8-1	7-7	7-1
Redwood[h] Western cedars[h] Ponderosa pine[h] Red pine[h]	1 – 2 × 6	3-9	3-6	3-2	2-11	2-6	2-4	2-3	2-0	1-11	1-9
	1 – 2 × 8	4-10	4-6	4-2	3-10	3-3	3-1	2-11	2-8	2-6	2-4
	1 – 2 × 10	5-10	5-6	5-1	4-9	4-2	3-11	3-9	3-5	3-2	3-0
	1 – 2 × 12	6-9	6-4	5-11	5-6	4-11	4-8	4-6	4-2	3-11	3-8
	2 – 2 × 6	5-7	5-3	4-11	4-7	4-1	3-9	3-6	3-2	2-11	2-8
	2 – 2 × 8	7-1	6-8	6-2	5-9	5-2	4-11	4-8	4-2	3-10	3-6
	2 – 2 × 10	8-8	8-2	7-7	7-1	6-4	6-0	5-9	5-4	4-10	4-6
	2 – 2 × 12	10-0	9-5	8-9	8-2	7-4	7-0	6-8	6-2	5-9	5-5
	3 – 2 × 6	6-8	6-4	6-0	5-8	5-1	4-10	4-8	4-3	3-10	3-6
	3 – 2 × 8	8-10	8-4	7-9	7-3	6-5	6-2	5-11	5-5	5-1	4-8

	3 – 2 × 10	10-10	10-2	9-6	8-10	7-11	7-6	7-2	6-8	6-3	5-11
	3 – 2 × 12	12-7	11-10	11-0	10-3	9-2	8-9	8-4	7-9	7-3	6-10

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. Interpolation ~~allowed~~ permitted for conditions with zero joist cantilever length. Extrapolation not permitted. ~~is not allowed~~.

b. Beams supporting a single span of joists with or without cantilever.

c. Dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever. Snow load not assumed to be concurrent with live load.

d. No. 2 grade, wet service factor included.

e. Beam depth shall be equal to or greater than the depth of intersecting joist for a flush beam connection.

f. Beam cantilevers are limited to the adjacent beam's span divided by 4.

g. Includes incising factor.

h. Incising factor not included.

i. Deck joist span as shown in Figure R507.5.

~~j. For calculation of effective deck joist span, the actual joist span length shall be multiplied by the joist span factor in accordance with Table R507.5(5).~~

Delete without substitution:

~~TABLE R507.5(5) JOIST SPAN FACTORS FOR CALCULATING EFFECTIVE DECK JOIST SPAN [for use with Note j in Tables R507.5(1), R507.5(2), R507.5(3) and R507.5(4)]~~

~~C/J[a]~~	~~JOIST SPAN FACTOR~~
~~0 (no cantilever)~~	~~0.66~~
~~1/12 (0.87)~~	~~0.72~~
~~1/10 (0.10)~~	~~0.80~~
~~1/8 (0.125)~~	~~0.84~~
~~1/6 (0.167)~~	~~0.90~~
~~1/4 (0.250)~~	~~1.00~~

~~For SI: 1 foot = 304.8 mm.~~

~~a. C = actual joist cantilever length (feet); J = actual joist span length (feet).~~

Revise as follows:

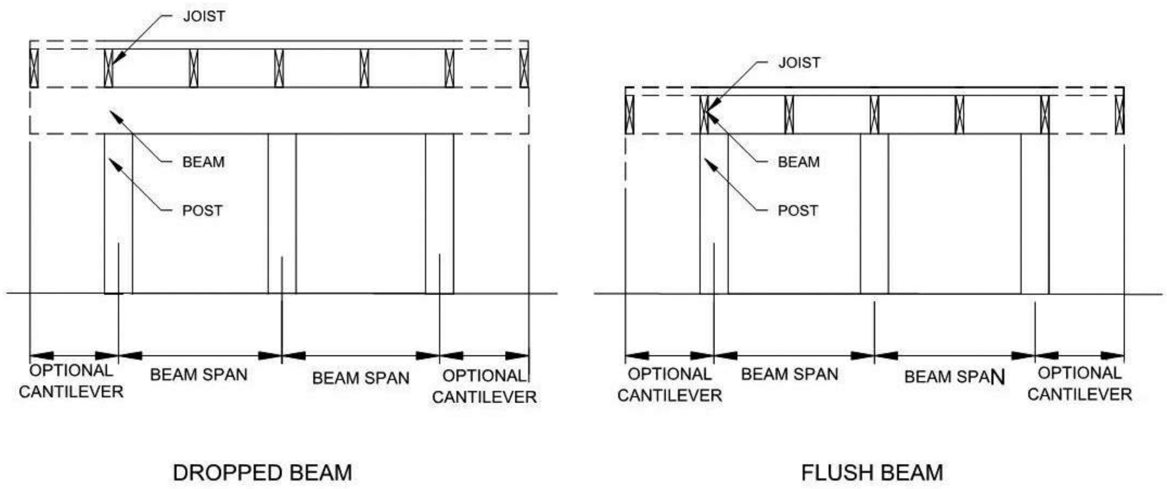


FIGURE R507.5 TYPICAL DECK ~~JOIST~~ BEAM SPANS

Reason Statement: Since first appearing in the the 2015 IRC, Table R507.5 for deck beam sizing has always assumed a load from joists cantilevering their maximum amount beyond the beam. In most conditions, joists can cantilever beyond a beam up to 1/4 their back span, and this entire load is placed on the beam. This places up to 50 percent more load on the beam than a joist that does not cantilever beyond. For example, a joist that spans 12 feet with no cantilever loads the beam with 6 feet. But with an additional 3-foot cantilever, the beam is now loaded with 9 feet. Currently, Table R507,5 sizes every beam based only on the joist span, and simply includes the additional maximum cantilever loading every time. When there is no cantilever, or less than the maximum, the beam is being oversized or overly restricted in maximum span. For a 12 foot joist span with no cantilever, the beam is sized for 9 feet of joist. This is equivalent to an 18-foot joist span with no cantilever.
It is woefully inaccurate to size a minimum beam for a 12-foot joist span based on loads from a 18-foot span.

In 2021 a new table was added in the footnotes of Table R507.5 that provided a factor based on the actual cantilever to joist span ratio. This factor could then be used for the input joist span value in order to generate an accurately sized beam. Though this adjustment method works, it is incredibly inconvenient and not user friendly. This proposal eliminates this footnote and its table and embeds various joist span and cantilever combinations in an expanded heading that is currently shown as only joist span. Each column that currently represent a joists span and it's maximum cantilever has been expanded to show equivalent spans and cantilever combinations. Each combination in the same column loads the beam equivalent or slightly less. Note that under the previous "effective joist span length" column for 12 feet, the new heading reveals that this column covers four different designs, an 18 foot span with no cantilever (18 & 0), a 16 foot span with a 1 foot cantilever (16 & 1), and 14 foot span with a 2 foot cantilever (14 & 2), and a 12 foot span with a 3 foot cantilever (12 & 3).

A 6 foot joist span with a 1.5 foot cantilever was the first column in the current table. In order to provide a beam size for each joist span length from 6 feet to 18 feet and with zero cantilever length, a new column was added at the left of the table.

The footnote for interpolation was modified to only permit interpolation between columns for evaluating joists with no cantilever. For example, a 13 foot joist span with no cantilever, could be easily interpolated by taking the value between the (12 & 0) and (14 & 0) columns. However, trying to interpolate a 13 foot span with a 2 foot cantilever is not quite so simply and would invite error.

To further clarify the use of the beam span table, Section R507.5 was modified to reference the joist span length and joist cantilever length and point the reader to Figure R507.6 which illustrates these terms.

Figure R507.5 for deck BEAMS is incorrectly titled "JOIST". This merely editorial, perhaps errata, perhaps mistake. Let's fix it!

Cost Impact: The code change proposal will decrease the cost of construction
This proposal provides three new columns of maximum beam spans within the table, which allows beams to be sized more accurately, and thus not oversized and more expensive. The current beam span table sizes beams with the assumption that the joists are fully cantilevered beyond the beam. This is 50% more loading on the beam than when there is no joist cantilever. When there is no joist cantilever or less than the maximum, the beam is oversized and more expensive. A footnote with a complicated cantilever to joist ratio table yielding a factor to adjust the input joist span for a more accurate beam size is available. However, it is very difficult to use and not convenient. Offering a way to quickly size the beam based on a few different cantilever lengths, allows a more affordable beam to be sized and purchased.

RB183-22

RB184-22

IRC: R507.5, R507.5.1, R507.5.2, FIGURE R507.5.1(1), FIGURE R507.5.1(2), R507.6.1

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

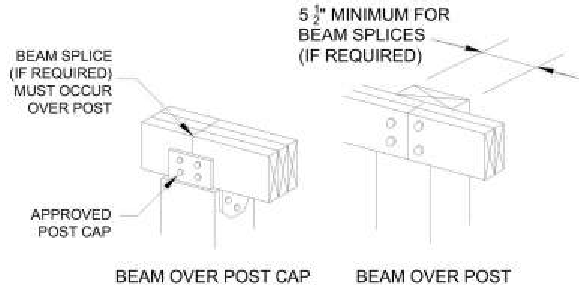
2021 International Residential Code

Revise as follows:

R507.5 Deck beams. Maximum allowable spans for wood deck beams, as shown in Figure R507.5, shall be in accordance with Tables R507.5(1) through R507.5(4). Beam plies shall be fastened together with two rows of 10d (3-inch × 0.128-inch) nails minimum at 16 inches (406 mm) on center along each edge. ~~Beams shall be permitted to cantilever at each end up to one-fourth of the actual beam span~~. Deck beams of other materials shall be permitted where designed in accordance with accepted engineering practices.

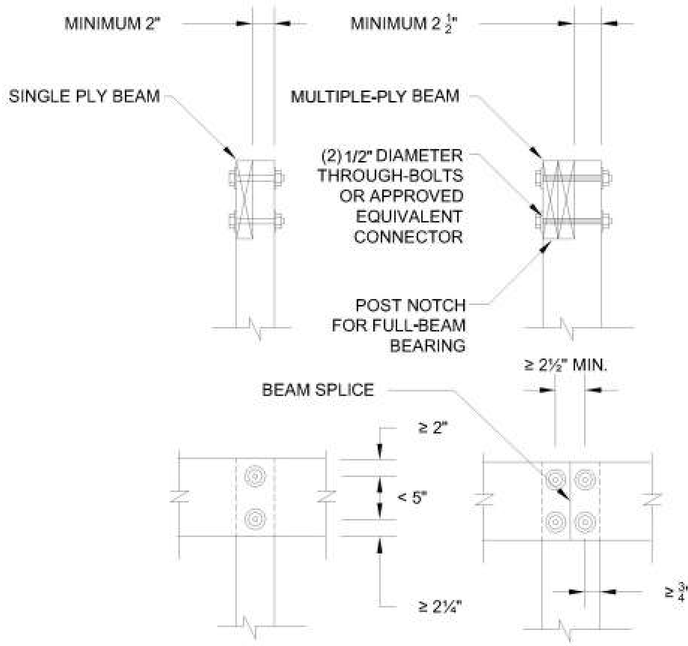
R507.5.1 Deck beam bearing. Beams and individual beam plies of built-up beams shall be continuous between bearing locations and continuous across bearing locations supporting beam cantilevers. Beams shall be permitted to cantilever beyond bearing locations up to one fourth of the actual beam span. The ends of beams shall have not less than $1^1/_2$ inches (38 mm) of bearing length on wood or metal and not less than 3 inches (76 mm) of bearing length on concrete or masonry for the entire width of the beam. ~~Where multiple-span beams bear on intermediate posts, each ply must have full bearing on the post in accordance with Figures R507.5.1(1) and R507.5.1(2).~~

R507.5.2 Deck beam connection to supports. Deck beams shall be connected to supporting members to prevent lateral ~~attached to supports in a manner capable of transferring vertical loads and resisting horizontal~~ displacement. Deck beam connections to wood posts shall be in accordance with Figures R507.5.2(1) and R507.5.2(2) ~~R507.5.1(1) and R507.5.1(2)~~. Manufactured post-to-beam connectors shall be sized for the post and beam sizes. Bolts shall have washers under the head and nut.



For SI: 1 inch = 25.4 mm.

FIGURE ~~R507.5.1(1)~~ R507.5.2(1) DECK BEAM TO DECK POST



For SI: 1 inch = 25.4 mm.

FIGURE ~~R507.5.1(2)~~ R507.5.2(2) NOTCHED POST-TO-BEAM CONNECTION

R507.6.1 Deck joist bearing. The ends of joists shall have not less than $1^1/_2$ inches (38 mm) of bearing length on wood or metal and not less than 3 inches (76 mm) of bearing length on concrete or masonry over its entire width. Joists bearing on top of a multiple-ply beam or ledger shall be fastened in accordance with Table R602.3(1). Joists bearing on top of a single-ply beam or ledger shall be attached by a mechanical connector. Joist framing into the side of a beam or ledger board shall be supported by *approved* joist hangers.

Reason Statement: 1) There is still uncertainty by some code readers as to whether each end of each ply of a multi-ply ("built-up") beam must be supported on a bearing location. This is indeed the intent and is what this proposal attempts to clarify. Please note that in prescriptive wood frame construction, this has always been the rule. The 1931 edition of "Light Frame House Construction" by the Federal Board of Vocational Education" provides the following on page 40: "At the point of bearing the beam should be carefully sized, so that every piece of the built-up girder is in full contact with the support".
2) The term "length" was included to clarify the direction of the minimum bearing measurement. This term compliments the existing term "width" regarding the beam.
3) The reference to Figures R507.5.1(1) and (2) was removed in section R507.5.1 "deck beam bearing", because those figures speak to the connection of the beam to the post and not the bearing. A reference to those figures is already provided in the section on beam connections, Section R507.5.2. Along with this change, the two Figures need to be given a new section number title that matches the section they are referenced from (deck beam connection). (Table R507.5.2(1) and (2))
4) The allowance for beam cantilevers was moved to the section about beam bearing, as it is related to the need for all beam plies to be continuous over the last bearing point to support the cantilever.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies the existing intent of these sections and therefore does not directly affect the cost of construction.

RB184-22

RB185-22

IRC: R507.7

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.7 Decking. Maximum allowable spacing for joists supporting wood decking, excluding *stairways*, shall be in accordance with Table R507.7. Wood decking shall be attached to each supporting member with not less than two 8d deformed ~~threaded~~ nails or two No. 8 wood screws. Maximum allowable spacing for joists supporting *plastic composite* decking shall be in accordance with Section R507.2. Other *approved* decking or fastener systems shall be installed in accordance with the manufacturer's installation requirements.

Reason Statement: The fasteners specified are not based on any known magnitude of load resistance, thus they need not be so specific. "Threaded" is a very specific nail shank design, however the intent of this IRC provision is simply to provide additional friction between the shank and the wood than a smooth shank provides. The term "threaded nails" is not used anywhere else in the IRC. The term "deformed nails" is more generic, as it could be ring, threaded, or otherwise designed to increase friction. This term is used in the following IRC provisions: Table R602.3(1), R703.3.3, and Table R905.1.1(3). Using the term "deformed" will broaden the allowable products available for use in decking fastening and increase the consistency of terms used in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply broadens the available shank design of nails in prescriptive design methods. In itself, this does not affect the cost of construction. It simply provides greater freedom in construction.

RB185-22

RB186-22

IRC: R507.7

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.7 Decking. Maximum allowable spacing for joists supporting wood decking, excluding *stair* treads ~~*stairways*~~, shall be in accordance with Table R507.7. Wood decking shall be attached to each supporting member with not less than two 8d threaded nails or two No. 8 wood screws. Maximum allowable spacing for joists supporting *plastic composite* decking shall be in accordance with Section R507.2. Other *approved* decking or fastener systems shall be installed in accordance with the manufacturer's installation requirements.

Reason Statement: The decking spans (joist spacing) provided in R507.7 are not designed to support the 300 pound concentrated design load required for "stair treads" under footnote c in Table R301.5. This additional load is only required on "stair treads", as specifically stated in Table R301.5.
A "stairway" includes the top, bottom, and intermediate landings. These landings are often constructed like decks and the landings do not require the additional concentrated load required on "stair treads". Therefore, the exclusion for using Table R507.7 should be for "stair treads" and not "stairways". The construction of the stairway landing decking does not need to be excluded from the provisions of R507.7

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposals has the potential to reduce construction costs by allowing for prescriptive design of decking for stairway landings that is not currently provided in the IRC.

RB186-22

RB187-22

IRC: TABLE R507.9.1.3(2)

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

TABLE R507.9.1.3(2) PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS

MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS				
	TOP EDGE	BOTTOM EDGE	ENDS	ROW SPACING
Ledger[a]	2 inches[d]	$^3/_4$ inch	2 inches[b]	$1^5/_8$ inches[b]
Band Joist[c]	$^3/_4$ inch	2 inches	2 inches~~[b]~~	$1^5/_8$ inches[b]

For SI: 1 inch = 25.4 mm.

a. Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.9.1.3(1).

b. Maximum 5 inches.

c. For engineered rim joists, the manufacturer's recommendations shall govern.

d. The minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Figure R507.9.1.3(1).

Reason Statement: This proposal deletes the superscript "b" adjacent to the "2 inches" under the column "ends" and the row "band joist". This footnote states that lag screws and bolts must be within 5 inches of the end of band joists but is incorrect. For the ledger, due to the distribution of load on the ledger, there must be a fastener within 5 inches of the end. But for the band joist, it doesn't matter if a fastener is away from the end. A deck ledger could be fastened completely within one length of band joist material and not near the ends and it doesn't matter. This is most likely just an oversight or typo to begin with.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not affect the cost of construction, because it does not affect the number of fasteners necessary to attach a deck ledger.

RB187-22

RB188-22

IRC: R311.5, R507.8, R507.9, R507.9.1, R507.9.1.1, R507.9.1.2, R507.9.1.3, R507.9.1.4, R507.9.2, R507.9.1 (New)

Proponents: Glenn Mathewson, representing Self (glenn@glennmathewson.com)

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Delete without substitution:

~~**R311.5 Landing, deck, balcony and stair construction and attachment.**~~ ~~Exterior landings, decks, balconies, stairs and similar facilities shall be positively anchored to the primary structure to resist both vertical and lateral forces or shall be designed to be self-supporting. Attachment shall not be accomplished by use of toenails or nails subject to withdrawal.~~

Revise as follows:

R507.8 ~~**Vertical and lateral supports**~~ **<u>Deck ledgers</u>.** Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. For decks with cantilevered framing members, connection to exterior walls or other framing members shall be designed and constructed to resist uplift resulting from the full *live load* specified in Table R301.5 acting on the cantilevered portion of the deck. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting. <u>Deck ledgers shall not be supported on stone or masonry veneer.</u>

Delete without substitution:

~~**R507.9 Vertical and lateral supports at band joist.**~~ ~~Vertical and lateral supports for decks shall comply with this section.~~

Revise as follows:

~~**R507.9.1**~~ **<u>R507.8.1</u>** ~~**Vertical supports**~~ **<u>Ledger attachment</u>.** <u>Where</u> Vertical loads <u>are</u> ~~shall be~~ transferred to band joists ~~with ledgers~~ in accordance with this section, <u>ledgers shall be installed in accordance with Sections R507.8.1.1 through R507.8.3.</u>

~~**R507.9.1.1**~~ **<u>R507.8.1.1</u> Ledger details.** ~~Deck~~ ledgers shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, pressure-preservative-treated Southern pine, incised pressure-preservative-treated hem-fir, or *approved*, naturally durable, No. 2 grade or better lumber. Deck ledgers shall not support concentrated loads from beams or girders. ~~Deck ledgers shall not be supported on stone or masonry veneer.~~

~~**R507.9.1.2**~~ **<u>R507.8.1.2</u> Band joist details.** Band joists supporting a ledger shall be a minimum 2-inch-nominal (51 mm), solid-sawn, spruce-pine-fir or better lumber or a minimum 1-inch (25 mm) nominal engineered wood rim boards in accordance with Section R502.1.7. Band joists shall bear fully on the primary structure capable of supporting all required loads.

~~**R507.9.1.3**~~ **<u>R507.8.1.3</u>** ~~**Ledger to band joist**~~ **<u>Fastener</u> details.** Fasteners used in deck ledger connections in accordance with Table R507.9.1.3(1) shall be hot-dipped galvanized or stainless steel and shall be installed in accordance with ~~Table R507.9.1.3(2)~~ <u>R507.8.1.3(2)</u> and Figures ~~R507.9.1.3(1) and R507.9.1.3(2)~~. <u>R507.8.1.3(1) and R507.8.1.3(2)</u>

~~**R507.9.1.4**~~ **<u>R507.8.2</u> Alternate ledger details.** Alternate framing configurations<u>, fasteners, or hardware</u> supporting a ledger constructed to meet the load requirements of Section R301.5 shall be permitted<u>, where approved.</u>

~~**R507.9.2**~~ **<u>R507.9</u> Lateral connection.** <u>Decks shall be designed to transfer</u> Lateral loads ~~shall be transferred~~ to the ground or to a structure capable of transmitting them to the ground. <u>Bracing shall be required in all lateral directions in accordance with accepted engineering practice, utilizing *approved* braced wall panels, knee braces, cross braces, K braces, moment frame post connections, embedded support posts, horizontal diaphragms, lateral connections in accordance with Section R507.9.1, or through other approved methods.</u> ~~Where the lateral load connection is provided in accordance with Figure R507.9.2(1), hold-down tension devices shall be installed in not less than two locations per deck, within 24 inches (610 mm) of each end of the deck. Each device shall have an allowable stress design capacity of not less than 1,500 pounds (6672 N). Where the lateral load connections are provided in accordance with Figure R507.9.2(2), the hold-down tension devices shall be installed in not less than four locations per deck, and each device shall have an allowable stress design capacity of not less than 750 pounds (3336 N).~~

Add new text as follows:

<u>R507.9.1</u> <u>Lateral connection</u>. <u>Lateral bracing perpendicular to a ledger shall be permitted in accordance with the following connection methods:</u>

1. <u>Tension devices with a minimum allowable stress design capacity of not less than 1,500 pounds (6672 N) shall be installed in not less than two locations per deck, in accordance with Figure R507.9.1 (1), and within 24 inches (610 mm) of each end of the deck</u>
2. <u>Tension devices with a minimum allowable stress design capacity of not less than 750 pounds (3336 N) shall be installed in not less than four locations per deck, in accordance with Figure R507.9.1 (2), and with one within 24 inches (610 mm) of each end of the deck.</u>

Reason Statement: The lateral load connection methods included in the 2009 IRC and 2015 IRC have stopped the important discussion and realization that connections on one side of a deck to another structure is not a complete lateral load design. This is like a braced wall panel with only

hold-down anchors yet no bracing in the panel. Incomplete. Though lateral loads and design methods are not yet standardized, the IRC has a responsibility to not elude to providing a complete structural system when it does not. This proposal reorganizes the ledger and lateral connection provisions so they can be more transparent and ready for further development. It makes it clear that some type of bracing of the deck in all directions is necessary.
Section R311.5 is out of place in chapter three now that Section 507 address decks more comprehensively.

Section R507.9.1 is modified into a "general" ledger attachment section with requirements for all ledger attachments.

Section R507.8.1 provides a prescriptive method of ledger attachment and references the critical subsections.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not change the cost of construction, because it does not create any additional requirements that a sound structure would already require.

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IRC: FIGURE R507.9.1.3(2), FIGURE R507.9.2(1), FIGURE R507.9.2(2)

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

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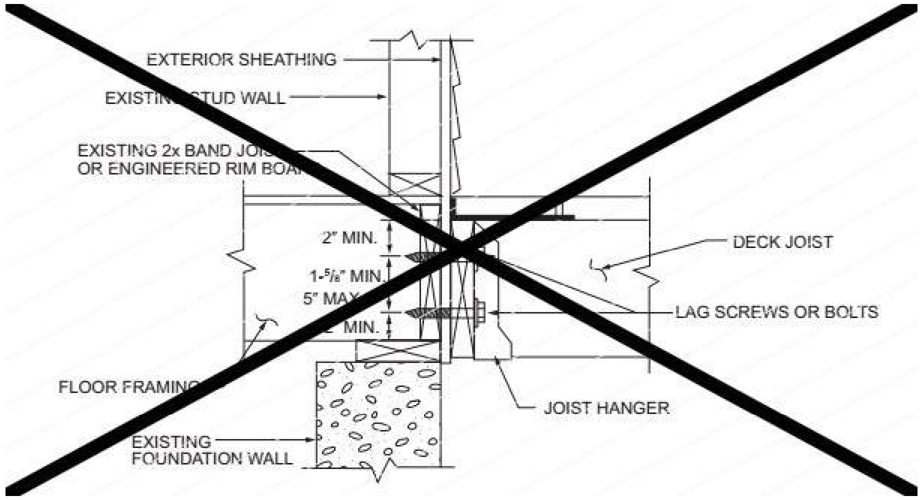
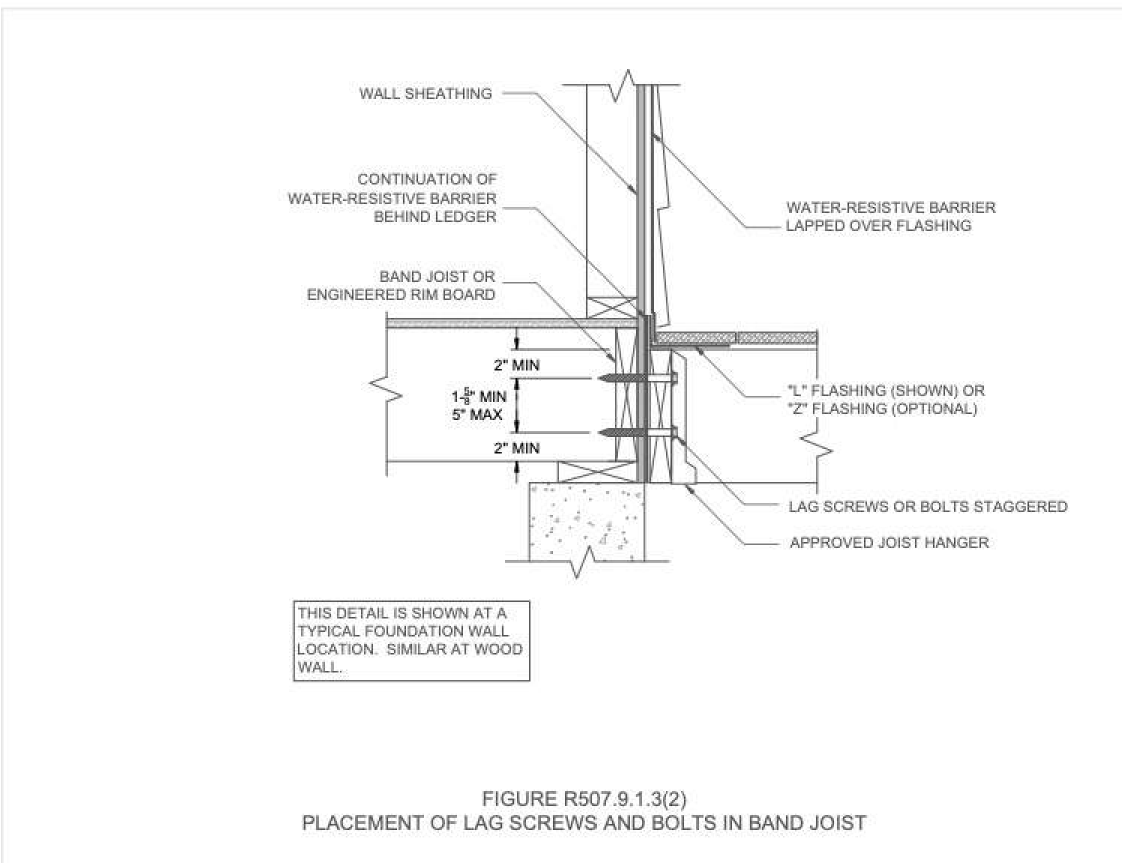
Delete and substitute as follows:



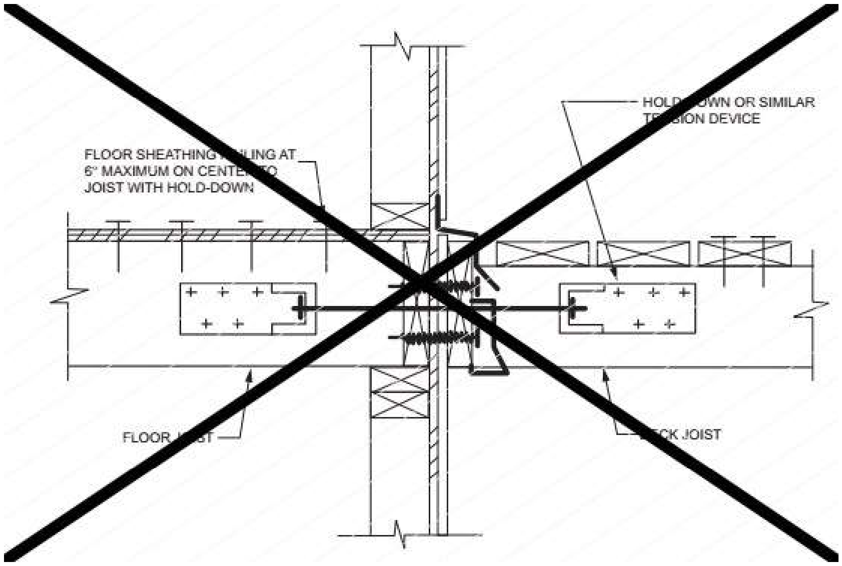
~~For SI: 1 inch = 25.4 mm.~~

~~**FIGURE R507.9.1.3(2) PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS**~~



For SI: 1 inch = 25.4 mm.

FIGURE R507.9.1.3(2) PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS



~~For SI: 1 inch = 25.4 mm.~~

~~FIGURE R507.9.2(1) DECK ATTACHMENT FOR LATERAL LOADS~~

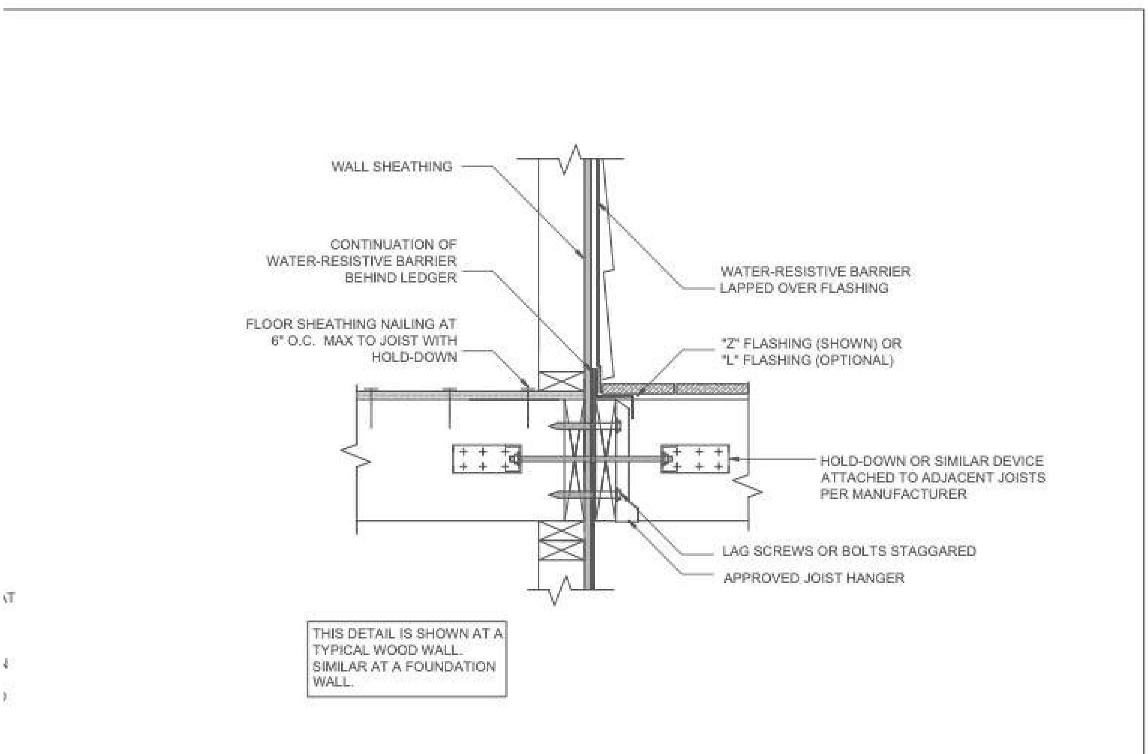
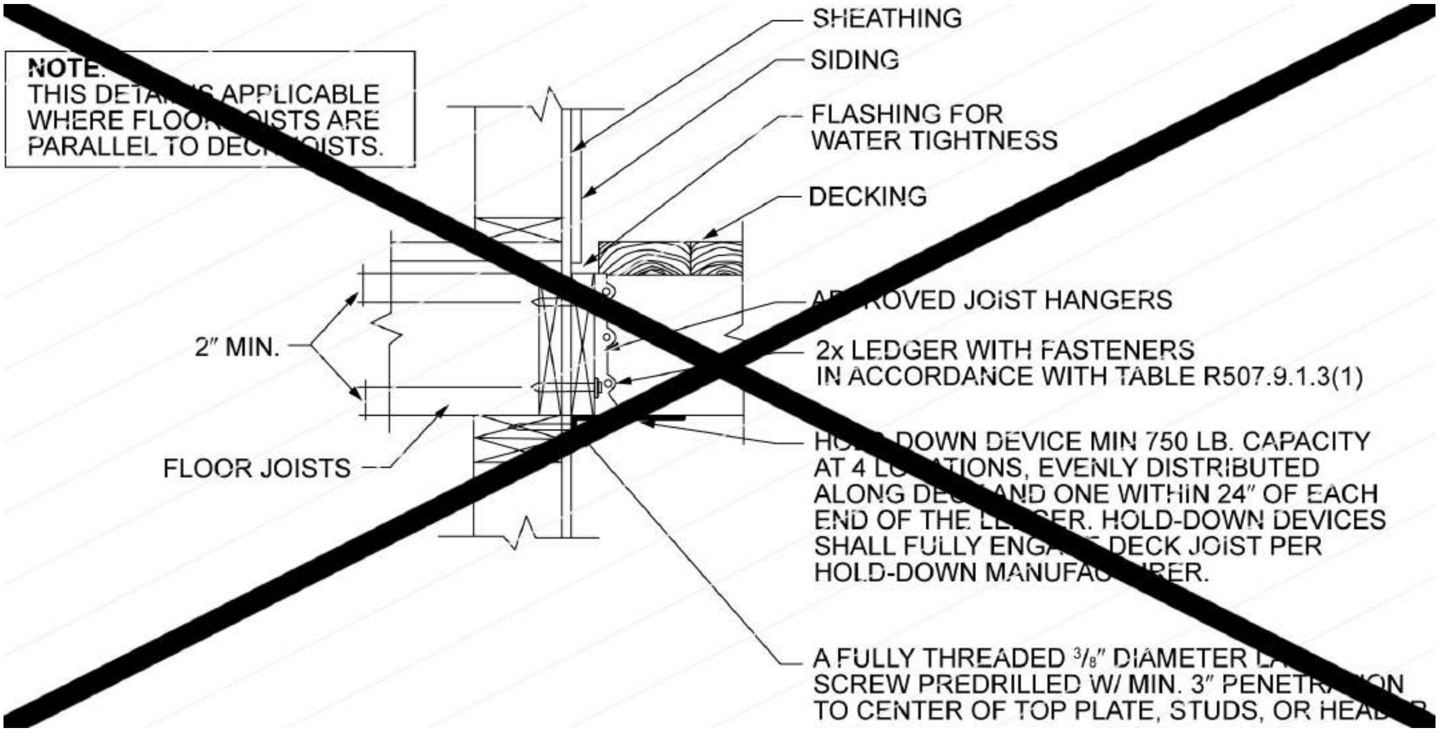


FIGURE R507.9.2(1)
DECK ATTACHMENT FOR LATERAL LOADS

For SI: 1 inch = 25.4 mm.

FIGURE R507.9.2(1) DECK ATTACHMENT FOR LATERAL LOADS



~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.~~

~~**FIGURE R507.9.2(2) DECK ATTACHMENT FOR LATERAL LOADS**~~

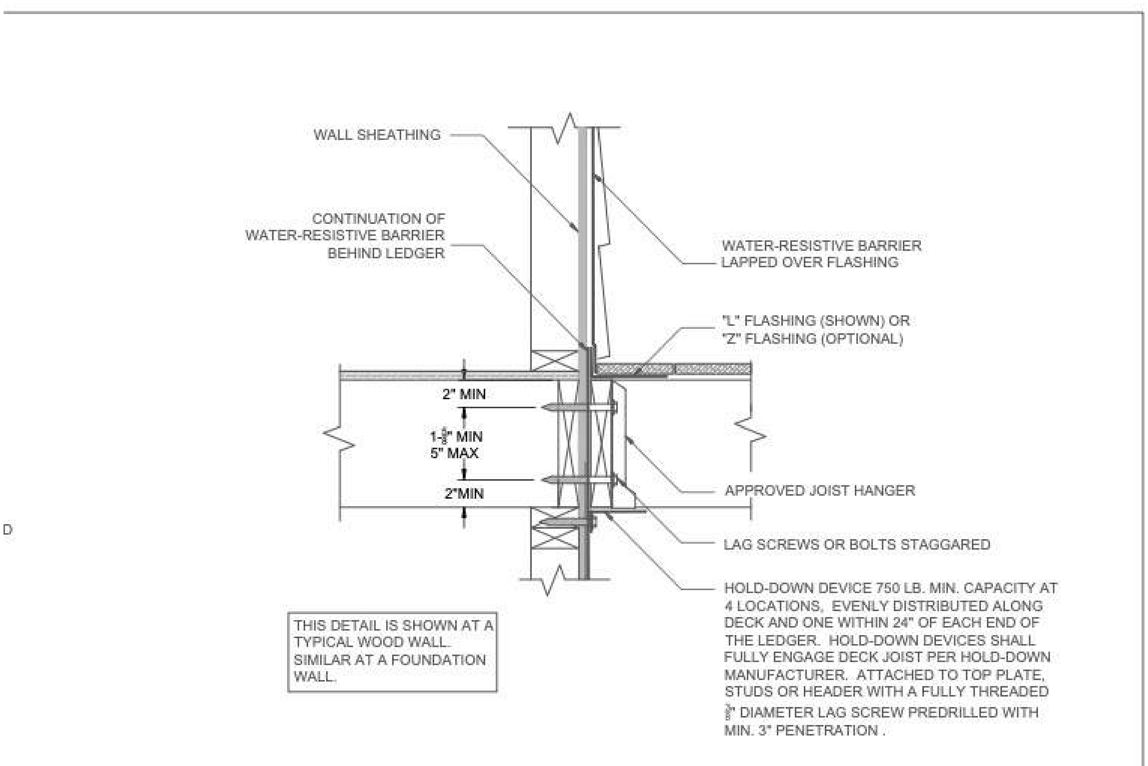


FIGURE R507.9.2(2)
DECK ATTACHMENT FOR LATERAL LOADS

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R507.9.2(2) DECK ATTACHMENT FOR LATERAL LOADS

Reason Statement: Three details related to structural connection of ledgers were included in the IRC from three different proponents over three different editions and differ in their style. As a proud and professional standard, it seemed appropriate for this sixth edition of IRC deck codes to clean these up and bring some consistency.

Notably, the flashing depictions in the original figures varied incredibly and some were not good guidance. The flashing was never the intent of these figures, yet as a graphic, they still sent a confusing and contradictory message to readers.
We have submitted a different proposal that describes new deck ledger flashing methods. Rather than create specific flashing details to support the newly suggested code text, it seemed more efficient to include more appropriate flashing depictions in these structural figures. However, these figures are submitted as a separate proposal for the value of better structural details.

If the flashing proposal is not approved, the flashing details in these figures are still better depictions than the current figures. No structural connection is sufficient if the materials connected prematurely decay. The flashing in these details do contribute to the longevity and reliability of the structural performance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The modifications of this proposal do not affect the cost of construction.

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RB190-22

IRC: R507.2.4, 507.9.1.5 (New), R507.9.1.6 (New), R507.9.1.7 (New), R507.9.1.8 (New), R703.2, R703.4

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

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Revise as follows:

R507.2.4 Flashing. Flashing shall be corrosion-resistant metal of nominal thickness not less than 0.019 inch (0.48 mm) or *approved* nonmetallic material that is compatible with the substrate of the structure and the decking materials. Self-adhered membranes used as flashing and counterflashing shall comply with AAMA 711.

Add new text as follows:

507.9.1.5 Ledger Flashing. Where ledgers are attached to wood-frame construction, flashing shall be installed above the ledger to prevent the entry of water into the wall cavity or behind the ledger. Flashing shall extend vertically a minimum of 2 inches (51 mm) above the ledger. Flashing shall extend horizontally a minimum of 4 inches (102 mm) beyond the ledger face or shall extend to the ledger face and a minimum of ¼ inch down the ledger face.

R507.9.1.6 Water-resistive barrier. The *water-resistive* barrier required by Section R703.2 shall be lapped not less than 2 inches (51 mm) over a vertical leg of the ledger flashing or counterflashing extending up the wall. The *water-resistive barrier* shall continue from the top of the ledger flashing down the wall and behind the ledger flashing and ledger.

Exceptions:

1. Flashing shall be permitted to be placed against the face of the water-resistive barrier, where a self-adhering membrane counterflashing is installed a minimum of 2 inches (51 mm) over the vertical leg of the flashing and a minimum of 2 inches (51 mm) onto the water-resistive barrier.
2. Flashing shall be permitted to be placed in front of the water-resistive barrier and behind the cladding where ledgers are spaced horizontally from the exterior wall a minimum of 1/4 inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

R507.9.1.7 Existing walls. Where ledgers are attached to existing walls without *water-resistive barriers*, a *water-resistive barrier* shall be installed behind the ledger and ledger flashing. The *water-resistive barrier* shall extend to the top of the ledger flashing vertical leg and a minimum of ½ inch (12.7 mm) beyond the sides and bottom of the ledger. A self-adhering membrane counterflashing shall be installed a minimum of 2 inches (51 mm) over the vertical leg of the ledger flashing and a minimum of 2 inches (51 mm) onto the existing sheathing.

R507.9.1.8 Exterior cladding. Exterior cladding shall be terminated above the finished deck surface in accordance with the cladding manufacturer's requirements and Chapter 7, as applicable to the type of cladding.

Revise as follows:

R703.2 Water-resistive barrier. Not fewer than one layer of *water-resistive barrier* shall be applied over studs or sheathing of all exterior walls with flashing as indicated in Section R703.4, in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer and behind deck ledgers. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1. Water-resistive barrier materials shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type 1 or 2.
3. ASTM E331 in accordance with Section R703.1.1.
4. Other approved materials in accordance with the manufacturer's installation instructions.

No.15 asphalt felt and *water-resistive barriers* complying with ASTM E2556 shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and where joints occur, shall be lapped not less than 6 inches (152 mm).

R703.4 Flashing. *Approved* corrosion-resistant flashing shall be applied *shingle-fashion* in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. Fluid-applied membranes used as flashing in exterior walls shall comply with AAMA 714. The flashing shall extend to the surface of the exterior wall finish. Flashing shall be installed above deck ledgers in accordance with Section R507.9.1.5. *Approved* corrosion-resistant flashings shall be installed at the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall be installed in accordance with Section R703.4.1.

2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood *trim*.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

Reason Statement: The sound connection of a deck ledger to a house band joist depends on materials that are free from decay. Ledger flashing is critical to ensuring the band joist of the house floor system does not decay, resulting in a failure of the deck fasteners. The IRC has long required deck ledgers to be flashed when attached to wood construction, but other than requiring they prevent the entry of water, there is no guidance. Deck builders from around the country have learned methods of flashing that are effective in their region and methods that aren't. This proposal attempts to provide more details about the interface between the deck ledger, ledger flashing, water resistive barrier and cladding type, while providing the most flexibility in assembly choice.
The primary goals of this proposal are:

1) Support the variety of flashing methods currently in use.

2) Recognize the different ledger fastening methods in Section 507: Fastened in contact with the sheathing/water-resistive barrier and fastened with 1/2-inch of stacked washer spacing the ledger off the sheathing/water-resistive barrier.

3) Recognize the different cladding materials and types of installations (drainage plane, back-vented)

4) Recognize the higher risk of cutting into an existing water resistive barrier for a deck attachment.

5) Recognize that many houses do not have a water resistive barrier.

6) Protect the house framing when cladding is replaced with a deck ledger.

NOTE: There is a companion, but stand alone, proposal that helps to further clarify the intent of this proposal. Figures R507.9.1.3(2), R507.9.2(2), and R507.9.2(1) depict the structural connection of a ledger but also show an illustrative example of ledger flashing... very poor ones currently. Rather than propose specific, new ledger flashing figures, the flashing in those figures were altered to support the language in this proposal.

COMMENTARY FOR EACH SECTION MODIFICATION:

R703.2 Water-resistive barrier: In this section it is made clear that the water reistive barrier is to continue behind deck ledgers and not terminated on top of them as a "building appendage" as seen in the next sentence in this section.

R703.4 Flashing: A reference to the new sections specifically for deck ledgers is added. Item 5 in the list could not be removed at this time because it includes the terms porches and stairs. There is no harm in item 5 remaining, though future modifications could address this. The IRC does not do well at distinguishing between a "deck" and "porch" or if there even is a distinction.

R507.2.4 Flashing: A reference to AAMA 711 is included for flashing and counterflashing. This standard is already included in Section R703.4

507.9.1.5 Ledger flashing. This section requires flashing to extend at least 2 inches above the ledger which coincides with standard "shingle fashion" laps required in the water resistive barrier (R703.2). Two common flashing practices are recognized regarding the lower termination of the ledger flashing. An "L" flashing can extend out 4 inches beyond the face of the ledger, which provides added protection to the hardware from moisture. This distance has been found sufficient through practice to sufficiently break the surface tension of water rolling under the flashing such that it drips in front of the ledger. 4 inches was selected to accommodate a 1.5 inch thick ledger spaced 1/2" from the sheathing as provided for in the ledger fastening methods of the IRC. A common "4x6 L flashing" works for this method. Another option provided is for "Z" flashing that turns down the face of the ledger. 1/4 inch was selected as it is the minimum required downward distance of drip edge flashing at the edges of roofs (R905.2.8.5). This vertical leg must be installed between the joist and ledger so it is not bent out horizontally on top of the joist.

R507.9.1.6 Water resistive barrier. The "general" provision is for the barrier to lap a minimum of two inches over the top of the flashing or counterflashing on the wall, regardless of the height of this flashing above the ledger (min 2 inches). In this option, the vertical leg of the ledger flashing must be aligned in a lap in the WRB so that the upper sheet of barrier laps both the flashing and the next sheet by a minimum of 2 inches. The WRB shall be continuous behind the ledger.

R507.9.1.6 Exception 1. Even in new construction of a dwelling, it may be impractical for the WRB lap to be at the ledger flashing location and a deck builder in new or existing construction is understandably reluctant to cut into the barrier. This exception allows for a self-adhering counterflashing to be installed over the flashing and sealed onto the barrier. The counterflashing must be compliant to AAMA 711, per the new reference in R507.2.4 This flashing follows the same minimum 2 inch lap requirements. 4-inch wide rolls of this flashing are a common product on the market.R507.9.1.6 Exception 2. This option allows for when ledgers are spaced off the wall and a drainage plane is behind the ledger. The ledger fastening table allows for up to 1/2 inch of spacers behind the ledger. though, the established minimum space for drainage behind certain cladding in the IRC is only 3/16 inch (R703.7.3.3), due to the critical connection of a ledger and the standardized 1/2 inch standoff, 1/2 inch was chosen as the minimum drainage space. This method is meant to work with vented claddings or back drained claddings held off the wall. In these conditions, the ledger flashing does not need to seal to the water resistive barrier, but rather is placed behind the cladding. Bulk water traveling down the cladding surface is directed by the flashing onto the ledger surface, while bulk water traveling on the surface of the WRB and behind a ledger can freely drain and vent.

R507.9.1.7 Existing walls. Many existing homes do not have a water resistive barrier behind the cladding. These sheathings may be more prone to decay, but they are only supporting cladding. When cladding is removed for a deck ledger attachment, the integrity of the wall framing must now support human occupancy. For this reason, the area behind the ledger and flashing must be covered in a water resistive barrier, just as if there was one above and below. Since there is no existing WRB to connect to, the barrier installed behind the ledger must extend at least 1/2 inch beyond the sides and bottom of the deck. This allows a deck addition to be installed with a cut to the existing cladding at the ends of the ledger that does not require the cladding be cut back further than 1/2 inch. This is a balance between assuring the barrier extends completely behind the ledger, but with minimal repair required to existing cladding. Above the ledger, a self adhering counterflashing is used to seal over the ledger flashing and the barrier behind the flashing to the existing exposed sheathing.

R507.9.1.8 Cladding. This is a reminder that different cladding types require different clearances to the finished deck surface. This is something very overlooked in the deck and code administration industry.

Cost Impact: The code change proposal will increase the cost of construction
This code change will have a different cost increase depending on many variables, including the size of the deck and the existing conditions. This proposal allows various options to meet minimum code and they have different costs associated. A few examples are provided in this cost impact statement. All product cost estimates were found through online retailers.

1) For new construction, these practices may already be taking place. New material costs from this proposal could be from lacing the flashing into the water-resistive barrier or sealing it to the surface. The self adhered flashing tape was found for approximately $20 for a 50 ft. roll and a 140 ft roll of #30 asphalt paper for $100. Another search for a larger bulk purchase resulted in a 216 ft. roll of #30 paper for $23. The material costs for this method are less than $0.50 per linear foot.

2) For deck additions, the addition of a water resistive barrier behind the ledger and the self adhering tape over the ledger flashing would include both products in the first example. This is approximately $1.0 per linear foot of ledger in additional material costs. This is a conservatively high estimate.

The labor costs associated with this modification to current ledger flashing installation practices is minimal. Paper is cut and installed before installing the ledger and self adhering tape is installed over the flashing. This is the added labor.

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IRC: TABLE R602.3(1)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

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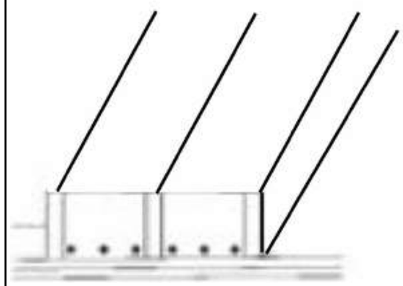
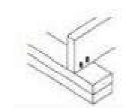
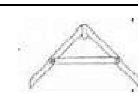
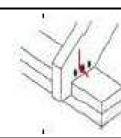
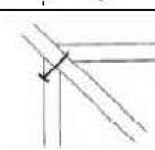
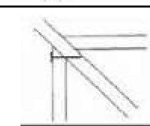
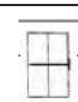
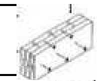
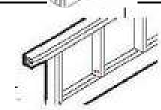
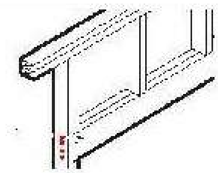
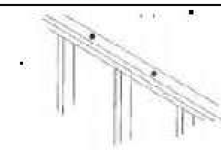
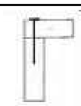
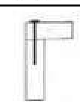
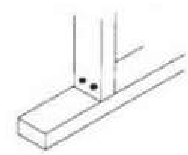
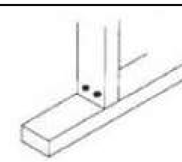
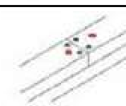
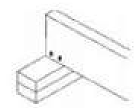
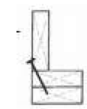
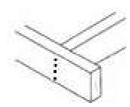
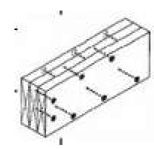
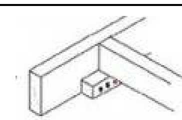
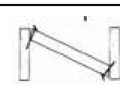
Revise as follows:

TABLE R602.3(1) FASTENING SCHEDULE

DESCRIPTION OF BUILDING ELEMENTSsss	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING AND LOCATION	
Roof			
Blocking between ceiling joists, rafters or trusses to top plate or other framing below	4-8d box (2$^{1}/_{2}$″ × 0.113″); or 3-8d common (2$^{1}/_{2}$″ × 0.131″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails	Toe nail	
Blocking between rafters or truss not at the wall top plates, to rafter or truss	2-8d common (2$^{1}/_{2}$″ × 0.131″); or 2-3″ × 0.131″ nails	Each end toe nail	
	2-16d common (3$^{1}/_{2}$″ × 0.162″); or 3-3″ × 0.131″ nails	End nail	
Flat blocking to truss and web filler	16d common (3$^{1}/_{2}$″ × 0.162″); or (3″ × 0.131″ nails	6″ o.c. face nail	
Ceiling joists to top plate	4-8d box (2$^{1}/_{2}$″ × 0.113″); or 3-8d common (2$^{1}/_{2}$″ × 0.131″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails	Per joist, toe nail	
Ceiling joist not attached to parallel rafter, laps over partitions [see Section R802.5.2 and Table R802.5.2(1)]	4-10d box (3″ × 0.128″); or 3-16d common (3$^{1}/_{2}$″ × 0.162″); or 4-3″ × 0.131″ nails	Face nail	
Ceiling joist attached to parallel rafter (heel joint) [see Section R802.5.2 and Table R802.5.2(1)]	Table R802.5.2(1)	Face nail	
Collar tie to rafter, face nail	4-10d box (3″ × 0.128″); or 3-10d common (3″ × 0.148″); or 4-3″ × 0.131″ nails	Face nail each rafter	
Rafter or roof truss to plate	3-16d box (3$^{1}/_{2}$″ × 0.135″); or 3-10d common (3″ × 0.148″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss[i]	
Roof rafters to ridge, valley or hip rafters or roof rafter to minimum 2″ ridge beam	4-16d box (3$^{1}/_{2}$″ × 0.135″); or 3-10d common (3″ × 0.148″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails	Toe nail	
	3-16d box (3$^{1}/_{2}$″ × 0.135″); or 2-16d common (3$^{1}/_{2}$″ × 0.162″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails	End nail	
Wall			
Stud to stud (not at braced wall panels)	16d common (3$^{1}/_{2}$″ × 0.162″)	24″ o.c. face nail	
	10d box (3″ × 0.128″); or 3″ × 0.131″ nails	16″ o.c. face nail	
Stud to stud and abutting studs at intersecting wall corners (at braced wall panels)	16d box (3$^{1}/_{2}$″ × 0.135″); or 3″ × 0.131″ nails	12″ o.c. face nail	
	16d common (3$^{1}/_{2}$″ × 0.162″)	16″ o.c. face nail	
Built-up header (2″ to 2″ header with	16d common (3$^{1}/_{2}$″ × 0.162″)	16″ o.c. each edge face nail	
	16d box (3$^{1}/_{2}$″ × 0.135″)	12″ o.c. each edge face nail	

$^{1}/_{2}$″ spacer) DESCRIPTION OF BUILDING ELEMENTSsss	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION	
Continuous header to stud	5-8d box ($2^{1}/_{2}$″ × 0.113″); or 4-8d common ($2^{1}/_{2}$″ × 0.131″); or 4-10d box (3″ × 0.128″)	Toe nail	
Adjacent full-height stud to end of header	4-16d box ($3^{1}/_{2}$″× 0.135″); or 3-16d common ($3^{1}/_{2}$″ × 0.162″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails	End nail	
Top plate to top plate	16d common ($3^{1}/_{2}$″ × 0.162″)	16″ o.c. face nail	
	10d box (3″ × 0.128″); or 3″ × 0.131″ nails	12″ o.c. face nail	
Double top plate splice	8-16d common ($3^{1}/_{2}$″ × 0.162″); or 12-16d box ($3^{1}/_{2}$″ × 0.135″); or 12-10d box (3″ × 0.128″); or 12-3″ × 0.131″ nails	Face nail on each side of end joint (minimum 24″ lap splice length each side of end joint)	
Bottom plate to joist, rim joist, band joist or blocking (not at braced wall panels)	16d common ($3^{1}/_{2}$″ × 0.162″)	16″ o.c. face nail	
	16d box ($3^{1}/_{2}$″ × 0.135″); or 3″ × 0.131″ nails	12″ o.c. face nail	
Bottom plate to joist, rim joist, band joist or blocking (at braced wall panel)	3-16d box ($3^{1}/_{2}$″ × 0.135″); or 2-16d common ($3^{1}/_{2}$″ × 0.162″); or 4-3″ × 0.131″ nails	16″ o.c. face nail	
Top or bottom plate to stud	4-8d box ($2^{1}/_{2}$″ × 0.113″); or 3-16d box ($3^{1}/_{2}$″ × 0.135″); or 4-8d common ($2^{1}/_{2}$″ × 0.131″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails	Toe nail	
	3-16d box ($3^{1}/_{2}$″ × 0.135″); or 2-16d common ($3^{1}/_{2}$″ × 0.162″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails	End nail	
Top plates, laps at corners and intersections	3-10d box (3″ × 0.128″); or 2-16d common ($3^{1}/_{2}$″ × 0.162″); or 3-3″ × 0.131″ nails	Face nail	
1″ brace to each stud and plate	3-8d box ($2^{1}/_{2}$″ × 0.113″); or 2-8d common ($2^{1}/_{2}$″ × 0.131″); or 2-(3” x 0.131”): or 2-10d box (3″ × 0.128″)	Face nail	
1″ × 6″ sheathing to each bearing	3-8d box ($2^{1}/_{2}$″ × 0.113″); or 2-8d common ($2^{1}/_{2}$″ × 0.131″); or 2-10d box (3″ × 0.128″); or 2 staples, 1″ crown, 16 ga., 1 $^{3}/_{4}$″ long	Face nail	
	3-8d box ($2^{1}/_{2}$″ × 0.113″); or 3-8d common ($2^{1}/_{2}$″ × 0.131″); or 3-10d box (3″ × 0.128″); or 3 staples, 1″ crown, 16 ga., 1 $^{3}/_{4}$″ long		

DESCRIPTION OF BUILDING ELEMENTSsss 1″ × 8″ and wider sheathing to each bearing	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION Face nail	
	Wider than 1″ × 8″ 4-8d box (2$^1/_2$″ × 0.113″); or 3-8d common (2 $^1/_2$″ × 0.131″); or 3-10d box (3″ × 0.128″); or 4 staples, 1″ crown, 16 ga., 1 $^3/_4$″ long		
Floor			
Joist to sill, top plate or girder	4-8d box (2$^1/_2$″ × 0.113″); or 3-8d common (2$^1/_2$″ × 0.131″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails	Toe nail	
Rim joist, band joist or blocking to sill or top plate (roof applications also)	8d box (2$^1/_2$″ × 0.113″)	4″ o.c. toe nail	
	8d common (2$^1/_2$″ × 0.131″); or 10d box (3″ × 0.128″); or 3″ × 0.131″ nails	6″ o.c. toe nail	
1″ × 6″ subfloor or less to each joist	3-8d box (2$^1/_2$″ × 0.113″); or 2-8d common (2$^1/_2$″ × 0.131″); or 3-10d box (3″ × 0.128″); or 2 staples, 1″ crown, 16 ga., 1 $^3/_4$″ long	Face nail	
Floor			
2″ subfloor to joist or girder	3-16d box (3$^1/_2$″ × 0.135″); or 2-16d common (3$^1/_2$″ × 0.162″)	Blind and face nail	
2″ planks (plank & beam—floor & roof)	3-16d box (3$^1/_2$″ × 0.135″); or 2-16d common (3$^1/_2$″ × 0.162″)	At each bearing, face nail	
Band or rim joist to joist	3-16d common (3$^1/_2$″ × 0.162″); or 4-10 box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-3″ × 14 ga. staples, $^7/_{16}$″ crown	End nail	
Built-up girders and beams, 2-inch lumber layers	20d common (4″ × 0.192″); or	Nail each layer as follows: 32″ o.c. at top and bottom and staggered.	
	10d box (3″ × 0.128″); or 3″ × 0.131″ nails	24″ o.c. face nail at top and bottom staggered on opposite sides	
	And: 2-20d common (4″ × 0.192″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails	Face nail at ends and at each splice	
Ledger strip supporting joists or rafters	4-16d box (3$^1/_2$″ × 0.135″); or 3-16d common (3$^1/_2$″ × 0.162″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails	At each joist or rafter, face nail	
Bridging or blocking to joist, rafter or truss	2-10d box (3″ × 0.128″); or 2-8d common (2$^1/_2$″ × 0.131″); or 2-3″ × 0.131″ nails	Each end, toe nail	
DESCRIPTION OF BUILDING ELEMENTS	**NUMBER AND TYPE OF FASTENER[a, b, c]**	**SPACING OF FASTENERS** **Edges[h] (inches)** / **Intermediate supports[c, e] (inches)**	
Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing [see Table R602.3(3) for wood structural panel exterior wall sheathing to wall framing]			

DESCRIPTION OF BUILDING ELEMENTSsss	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION		
3/8″ – 1/2″	6d common or deformed (2″ × 0.113″ × 0.266″ head);2 3/8″ × 0.113″ × 0.266″ head nail (subfloor, wall)[i]	6	6[f]	
	8d common (2 1/2″ × 0.131″) nail (roof); or RSRS-01 (2 3/8″ × 0.113″) nail (roof)[b]	6	6[f]	
19/32" – 3/4″	8d common (2-2 1/2″ × 0.131″) nail (subfloor, wall)	6	12	
	8d common (2 1/2″ × 0.131″) nail (roof); or RSRS-01; (2 3/8″ × 0.113″) nail (roof)[b]	6	6[f]	
	Deformed 2 3/8″ × 0.113″ × 0.266″ head (wall or subfloor)	6	12	
7/8″ – 1 1/4″	10d common (3″ × 0.148") nail; or (2 1/2″ × 0.131 × 0.281″ head) deformed nail	6	12	
Other wall sheathing[g]				
1/2″ structural cellulosic fiberboard sheathing	1 1/2″ × 0.120″ galvanized roofing nail, 7/16″ head diameter, or 1 1/4″ long 16 ga. staple with 7/16″ or 1″ crown	3	6	
25/32″ structural cellulosic fiberboard sheathing	1 3/4″ × 0.120″ galvanized roofing nail, 7/16″ head diameter, or 1 1/4″ long 16 ga. staple with 7/16″ or 1″ crown	3	6	
1/2″ gypsum sheathing[d]	1 1/2″ × 0.120″ galvanized roofing nail, 7/16″ head diameter, or 1 1/4″long 16 ga.; staple galvanized, 1 1/2″ long; 7/16″ or 1″ crown or 1 1/4″ screws, Type W or S	7	7	
5/8″ gypsum sheathing[d]	1 3/4″ × 0.120″ galvanized roofing nail, 7/16″ head diameter, or 1 1/4″ long 16 ga.; staple galvanized, 1 1/2″ long; 7/16″ or 1″crown or 1 1/4″ screws, Type W or S	7	7	
Wood structural panels, combination subfloor underlayment to framing				
3/4″ and less	Deformed (2″ × 0.113″) or Deformed (2″ × 0.120″) nail; or 8d common (2 1/2″ × 0.131″) nail	6	12	
7/8″ – 1″	8d common (2 1/2″ × 0.131″) nail; or Deformed (2 1/2″ x 0.131″); or Deformed (2 1/2″ × 0.120″) nail	6	12	
1 1/8″ – 1 1/4″	10d common (3″ × 0.148″) nail; or Deformed (2 1/2″ x 0.131″); or Deformed (2 1/2″ × 0.120″) nail	6	12	

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 ksi = 6.895 MPa.

a. Nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections are carbon steel and shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less. Connections using nails and staples of other materials, such as stainless steel, shall be designed by accepted engineering practice or approved under Section R104.11.

b. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.

d. Four-foot by 8-foot or 4-foot by 9-foot panels shall be applied vertically.

e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).

f. For wood structural panel roof sheathing attached to gable end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ultimate design wind speed is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C.

g. Gypsum sheathing shall conform to ASTM C1396 and shall be installed in accordance with ASTM C1280 or GA 253. Fiberboard sheathing shall conform to ASTM C208.

h. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.

i. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and toe nails from the ceiling joist to top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.

j. The sketches shown in this column are for illustration purposes only. Refer to the “NUMBER AND TYPE OF FASTENER” column of this table for the actual requirements.

Attached Files

- **updated fig- cdp-C #21-Update-Table R602.3(1) with figures.pdf**
  https://cdpaccess.com/proposal/8511/24827/files/download/2974/

Reason Statement: This proposal adds sketches clarifying the connecting building elements used in wood-framed construction described in table R602.3(1) FASTENING SCHEDULE. The proposal also adds a footnote explaining that “The sketches shown in this column are for illustration purposes only. Refer to the “NUMBER AND TYPE OF FASTENER” column of this table for the actual requirements.
This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The graphics are a visual clarification for existing requirments.

RB191-22

RB192-22

IRC: TABLE R602.3(1)

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

2021 International Residential Code

Revise as follows:

TABLE R602.3(1) FASTENING SCHEDULE

Portions of table not shown remain unchanged.

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING OF FASTENERS Edges[h] (inches)	Intermediate supports[c, e] (inches)
Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing [see Table R602.3(3) for wood structural panel exterior wall sheathing to wall framing]				
31	3/8″ – 1/2″	6d common or deformed (2″ × 0.113″ × 0.266″ head); 2 3/8″ × 0.113″ × 0.266″ head nail (subfloor, wall)[i]	6	12 ~~6[f]~~
		8d common (2 1/2″ × 0.131″) nail (roof); or RSRS-01 (2 3/8″ × 0.113″) nail (roof)[b]	6[f]	6[f]
32	19/32″ – 3/4″	8d common (~~2-~~2 1/2″ × 0.131″) nail (subfloor, wall)	6	12
		8d common (2 1/2″ × 0.131″) nail (roof); or RSRS-01; (2 3/8″ × 0.113″) nail (roof)[b]	6[f]	6[f]
		Deformed 2 3/8″ × 0.113″ × 0.266″ head (wall or subfloor)	6	12

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 ksi = 6.895 MPa.

a. Nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections are carbon steel and shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less. Connections using nails and staples of other materials, such as stainless steel, shall be designed by accepted engineering practice or approved under Section R104.11.

b. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.

d. Four-foot by 8-foot or 4-foot by 9-foot panels shall be applied vertically.

e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).

f. For wood structural panel roof sheathing attached to gable end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ultimate design wind speed is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C.

g. Gypsum sheathing shall conform to ASTM C1396 and shall be installed in accordance with ASTM C1280 or GA 253. Fiberboard sheathing shall conform to ASTM C208.

h. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.

i. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and toe nails from the ceiling joist to top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.

Reason Statement: This proposal places footnote f on edge spacing values for roof sheathing fastening to be consistent with the original change proposal (RB196-16) and the 2018 Wood Frame Construction Manual. The occurrence of footnote f to modify (subfloor, wall) spacing of 6 inches at intermediate supports is removed because footnote f applies to roof sheathing fastening, and the 6 inch value is revised to 12 inch as a correction given the entry is for subfloor and wall applications. An extra "2-" is proposed for editorial removal in the first row of item 32.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The changes are clarifications for roof sheathing attachment consistent with the original change (RB196-19) and the 2018 Wood Frame Construction Manual and corrections to footnote locations and fastener spacing at intermediate supports for subfloor and wall applications.

RB192-22

RB193-22

IRC: TABLE R602.3(1)

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

2021 International Residential Code

Revise as follows:

TABLE R602.3(1) FASTENING SCHEDULE

Portions of table not shown remain unchanged.

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING OF FASTENERS	
			Edges[h] (inches)	Intermediate supports[c, e] (inches)
Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing [see Table R602.3(3) for wood structural panel exterior wall sheathing to wall framing]				
31	$^{3}/_{8}$″ – $^{1}/_{2}$″	6d common or deformed (2″ × 0.113″ × 0.266″ head);2$^{3}/_{8}$″ × 0.113″ × 0.266″ head nail (subfloor, wall)[i]	6	6[f]
		8d common (2$^{1}/_{2}$″ × 0.131″ × 0.281″ head) nail (roof); or RSRS-01 (2$^{3}/_{8}$″ × 0.113″ × 0.281″ head) nail (roof)[b]	6	6[f]
32	$^{19}/_{32}$" – $^{3}/_{4}$″	8d common (2-2$^{1}/_{2}$″ × 0.131″) nail (subfloor, wall)	6	12
		8d common (2$^{1}/_{2}$″ × 0.131″ × 0.281″ head) nail (roof); or RSRS-01; (2$^{3}/_{8}$″ × 0.113″ × 0.281″ head) nail (roof)[b]	6	6[f]
		Deformed 2$^{3}/_{8}$″ × 0.113″ × 0.266″ head (wall or subfloor)	6	12

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 ksi = 6.895 MPa.

a. Nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections are carbon steel and shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less. Connections using nails and staples of other materials, such as stainless steel, shall be designed by accepted engineering practice or approved under Section R104.11.

b. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.

d. Four-foot by 8-foot or 4-foot by 9-foot panels shall be applied vertically.

e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).

f. For wood structural panel roof sheathing attached to gable end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ultimate design wind speed is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C. Spacing exceeding 6 inches on center at intermediate supports shall be permitted where the fastening is designed in accordance with AWC NDS. Where the specific gravity of the wood species used for roof framing is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, fastening of roof sheathing shall be with RSRS-03 (2-1/2″× 0.131″× 0.281″head) nails unless alternative fastening is designed in accordance with AWC NDS. Where the specific gravity of the wood species used for roof framing is less than 0.35, fastening of the roof sheathing shall be designed in accordance with AWC NDS.

g. Gypsum sheathing shall conform to ASTM C1396 and shall be installed in accordance with ASTM C1280 or GA 253. Fiberboard sheathing shall conform to ASTM C208.

h. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.

i. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and toe nails from the ceiling joist to top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.

Reason Statement: Fastening of roof sheathing to resist wind uplift forces is based on wood framing of species with specific gravity equal to 0.42 (per proposal RB196-19). To address possible applications using lower specific gravity wood species for roof framing (i.e., specific gravity less than 0.42 but equal to or greater than 0.35), the footnote is expanded to require use of the RSRS-03 nail unless alternative fastening is designed. The use of RSRS-03 nail (a standard ring shank nail) will maintain the same fastener spacing recommendations within the scope of applicability which is up to 140 mph wind speed. Engineered design of the fastening is required when specific gravity of the species used for roof framing is less than 0.35.

Cost Impact: The code change proposal will increase the cost of construction
Increased cost of construction will occur where low specific gravity wood species are used. For wood species with specific gravity of 0.35, the added ring shank nail option for resisting ASCE 7 wind uplift forces will provide equivalent withdrawal performance to the 0.42 specific gravity and smooth nail basis of the existing fastening schedule without requiring engineered design. The added language for permissible use of engineered design for fastener spacing greater than 6 inches on center at intermediate supports may reduce amount of required nailing such as in lower wind

speed zones.

RB193-22

RB194-22

IRC: TABLE R602.3(2)

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

2021 International Residential Code

Revise as follows:

TABLE R602.3(2) ALTERNATE ATTACHMENTS TO TABLE R602.3(1)

Portions of table not shown remain unchanged.

NOMINAL MATERIAL THICKNESS (inches)	DESCRIPTION[a, b] OF FASTENER AND LENGTH (inches)	SPACING[c] OF FASTENERS	
		Edges (inches)	Intermediate supports (inches)
Wood structural panels subfloor, roof[g] and wall sheathing to framing and particleboard wall sheathing to framing[f]			
Up to $^1/_2$	Staple 15 ga. $1^3/_4$	4	8
	0.097–0.099 Nail $2^1/_4$	3	6
	Staple 16 ga. $1^3/_4$	3	6
$^{19}/_{32}$ and $^5/_8$	0.113 Nail 2	3	6
	Staple 15 and 16 ga. 2	4	8
	0.097–0.099 Nail $2^1/_4$	4	8
$^{23}/_{32}$ and $^3/_4$	Staple 14 ga. 2	4	8
	Staple 15 ga. $1^3/_4$	3	6
	0.097–0.099 Nail $2^1/_4$	4	8
	Staple 16 ga. 2	4	8
1	Staple 14 ga. $2^1/_4$	4	8
	0.113 Nail $2^1/_4$	3	6
	Staple 15 ga. $2^1/_4$	4	8
	0.097–0.099 Nail $2^1/_2$	4	8

For SI: 1 inch = 25.4 mm.

a. Nail is a general description and shall be permitted to be T-head, modified round head or round head.

b. Staples shall have a minimum crown width of $^7/_{16}$-inch except as noted.

c. Nails or staples shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater. Nails or staples shall be spaced at not more than 12 inches on center at intermediate supports for floors.

d. Fasteners shall be placed in a grid pattern throughout the body of the panel.

e. For 5-ply panels, intermediate nails shall be spaced not more than 12 inches on center each way.

f. Hardboard underlayment shall conform to CPA/ANSI A135.4.

g. Alternate fastening is only permitted for roof sheathing where the ultimate design wind speed is less than or equal to 110 mph, and where fasteners are installed 3 inches on center at all supports, and where fastening is to wood framing of a species with specific gravity greater than or equal to 0.42 in accordance with AWC NDS.

h. Fiber-cement underlayment shall conform to ASTM C1288 or ISO 8336, Category C.

Reason Statement: Fastening of roof sheathing to resist wind uplift forces is based on wood framing of a species with specific gravity equal to 0.42 (per proposal RB198-19). To address possible applications using species with lower specific gravity, the footnote is expanded to limit applicability to wood framing species with specific gravity equal to 0.42 or greater. Lack of design information in AWC NDS on staple withdrawal is why a lower specific gravity option is not prescribed for staples as part of this change. Prescriptive options for fastening with nails in wood with specific gravity of 0.35 or greater are proposed for Table R602.3(1) and include an option for design of reduced fastener spacing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the specific gravity limit for the prescribed alternative fastening. Prescriptive fastening options for wood species of lower specific gravity are proposed for inclusion in Table R602.3(1).

RB194-22

RB195-22

IRC: TABLE R602.3(3)

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

2021 International Residential Code

Revise as follows:

TABLE R602.3(3) REQUIREMENTS FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES[a, b, c]

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		ULTIMATE DESIGN WIND SPEED V_{ult} (mph)		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	Wind exposure category		
							B	C	D
6d Common (2.0″ × 0.113″)	1.5	24/0	$^{3}/_{8}$	16	6	12[d]	140	115	110
8d Common (2.5″ × 0.131″)	1.75	24/16	$^{7}/_{16}$	16	6	12[d]	170	140	135
				24	6	12[d]	140	115	110

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. Panel strength axis parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.

b. Table is based on wind pressures acting toward and away from building surfaces in accordance with Section R301.2. Lateral bracing requirements shall be in accordance with Section R602.10.

c. Wood structural panels with span ratings of Wall-16 or Wall-24 shall be permitted as an alternate to panels with a 24/0 span rating. Plywood siding rated 16 o.c. or 24 o.c. shall be permitted as an alternate to panels with a 24/16 span rating. Wall-16 and Plywood siding 16 o.c. shall be used with studs spaced not more than 16 inches on center.

d. Where the specific gravity of the wood species used for wall framing is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, maximum nail spacing in the field of the panel shall be 8 inches. Where the specific gravity of the wood species used for wall framing is less than 0.35, fastening of the wall sheathing shall be designed in accordance with AWC NDS.

Reason Statement: The change addresses the use of wall framing of wood species having lower specific gravity wall framing than the value of 0.42 associated with prescribed spacing of nails in the field of the panel. Footnote 2 is added to reduce maximum spacing permissible when species with low specific gravity are used. The resulting maximum nail spacing of 8 inch results from 2/3 of the prescribed 12 inch spacing to account for reduced withdrawal capacity of wall framing of species with low specific gravity. Engineered design of the fastening is required when specific gravity of the species used for wall framing is less than 0.35.

Cost Impact: The code change proposal will increase the cost of construction
Increased cost of construction will occur where low specific gravity wood species are used. For wood species with specific gravity of 0.35, closer fastener spacing is required to provide equivalent withdrawal performance to the 0.42 specific gravity basis of the existing fastening schedule without requiring engineered design.

RB195-22

RB196-22

IRC: TABLE R602.3(6)

Proponents: Aaron Dodds, representing City of Cedar Rapids Building Department (a.dodds@cedar-rapids.org)

2021 International Residential Code

Revise as follows:

TABLE R602.3(6) ALTERNATE WOOD BEARING WALL STUD SIZE, HEIGHT AND SPACING

STUD HEIGHT	SUPPORTING	STUD SPACING[a]	ULTIMATE DESIGN WIND SPEED					
			115 mph		130 mph[b]		140 mph[b]	
			Maximum roof/floor span[c]		Maximum roof/floor span[c]		Maximum roof/floor span[c]	
			12 ft	24 ft	12 ft	24 ft	12 ft	24 ft
11 ft	Roof only	12 in	2 × 4	2 × 4	2 × 4	2 × 4	2 × 4	2 × 4
		16 in	2 × 4	2 × 4	2 × 4	2 × 6	2 × 4	2 × 6
		24 in	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
	Roof and one floor	12 in	2 × 4	2 × 6	2 × 4	2 × 6	2 × 4	2 × 6
		16 in	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
		24 in	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
12 ft	Roof only	12 in	2 × 4	2 × 4	2 × 4	2 × 6	2 × 4	2 × 6
		16 in	2 × 4	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
		24 in	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
	Roof and one floor	12 in	2 × 4	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
		16 in	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
		24 in	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	DR

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mph = 0.447 m/s, 1 pound = 4.448 N.

DR = Design Required.

a. Wall studs ~~not~~ exceeding 16 inches on center shall be sheathed with minimum $^{1}/_{2}$-inch gypsum board on the interior and $^{3}/_{8}$-inch wood structural panel sheathing on the exterior. Wood structural panel sheathing shall be attached with 8d (2.5″ × 0.131″) nails not greater than 6 inches on center along panel edges and 12 inches on center at intermediate supports, and all panel joints shall occur over studs or blocking.

b. Where the ultimate design wind speed exceeds 115 mph, studs shall be attached to top and bottom plates with connectors having a minimum 300-pound lateral capacity.

c. The maximum span is applicable to both single- and multiple-span roof and floor conditions. The roof assembly shall not contain a habitable attic.

Reason Statement: I believe footnote a. for Table R602.3(6) incorrectly has the word "not" included. This does not make sense as closer stud spacing should not require the additional interior wall sheathing. I believe this was originally intended to cover stud spacing exceeding 16" on center, but as written requires the addition of interior sheathing for 12" and 16" on center stud spacing. If enforced as written, this section would fail to require the additional interior sheathing for weaker walls framed 24" on center. This section would also cause an unnecessary increase in cost of construction requiring walls to be sheathed on the interior side when framed with studs 12" on center or 16" on center when not necessary.

Cost Impact: The code change proposal will decrease the cost of construction
This change will simply switch the requirement for interior wall sheathing in these situations from 12" and 16" on center stud walls to 24" on center walls which is less common and will therefore decrease the standard cost of construction.

RB196-22

RB197-22

IRC: R602.7.2

Proponents: Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Residential Code

Revise as follows:

R602.7.2 Rim board headers. Rim board header size, material and span shall be in accordance with Table R602.7(1). Rim board headers shall be constructed in accordance with Figure R602.7.2 and shall be supported at each end by full-height studs. The number of full-height studs at each end shall be not less than <u>one plus</u> the number of studs displaced by half of the header span based on the maximum stud spacing in accordance with Table R602.3(5). Rim board headers supporting concentrated loads shall be designed in accordance with accepted engineering practice.

Reason Statement: The reason for this change is to correct the number of full-height studs required at the edge of openings using rim board headers. The code currently says that the number of full-height studs needs to be half the number of studs displaced by the opening. But that neglects the single stud that is already required to be at the edge of the opening. The total number of full height studs needs to be the one already at the opening edge, PLUS half the number of studs displaced by the opening. This is actually shown correctly in Figure R602.7.2. It shows two studs at each end of the opening. Note that there are two cripple studs in the opening, so half that number would go to each side of the opening. Using the existing text, only one stud would be required at each edge of the opening. But the number needs to be one (existing stud) PLUS one (half the number of studs displaced), or two total at each edge.

Cost Impact: The code change proposal will increase the cost of construction
This proposal could increase the cost of construction by requiring an additional stud at the edge of each opening using rim board headers. However, I think that what is contained in this change is common practice so there may not be any actual increase in cost. The extra cost is balanced by the safety of having adequate bearing for the rim board header and adequate out of plane wind load resistance by the wall.

RB197-22

RB198-22

IRC: R602.7.5

Proponents: Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Residential Code

Revise as follows:

R602.7.5 Supports for headers. Headers shall be supported on each end with one or more jack studs or with *approved* framing anchors in accordance with Table R602.7(1) or R602.7(2). The full-height stud adjacent to each end of the header shall be end nailed to each end of the header in accordance with Table R602.3(1). The minimum number of full-height studs at each end of a header shall be in accordance with Table R602.7.5. <u>Columns supporting exterior porches shall be restrained to prevent lateral displacement at the bottom end.</u>

Reason Statement: This proposal is to provide the same restraint at the bottom of posts for porch beams as is required for columns support a foundation.
Porch posts are structural members that support loads from the roof. If porch posts are accidentally displaced it could cause collapse of a section of the roof. Requirements were added to this section in the 2015 IRC for beams/girders supporting porches, but nothing was added regarding the posts supporting the beams.

This change proposes language almost exactly the same as required in Section R403.7 for foundation columns. R407.3 states "The columns shall be restrained to prevent lateral displacement at the bottom end." If anything, porch columns are more likely to be damaged by accidental collision than foundation columns would be.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction in most cases. Most of the time, a manufactured post base will be used anyway to provide the 1 inch standoff so that the post does not have to be treated. However, in the case where a standoff base is not used, this proposal would increase costs.

RB198-22

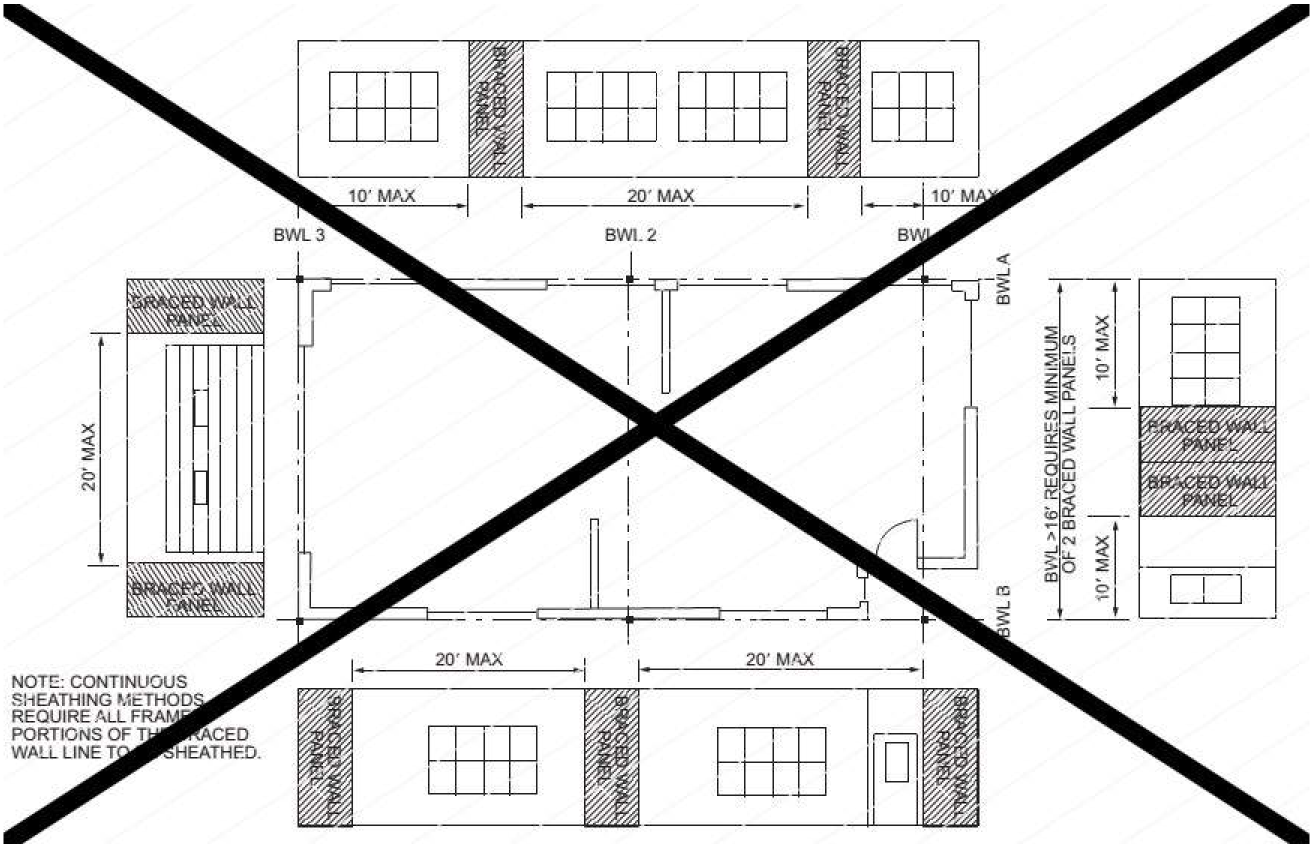
RB199-22

IRC: FIGURE R602.10.2.2

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

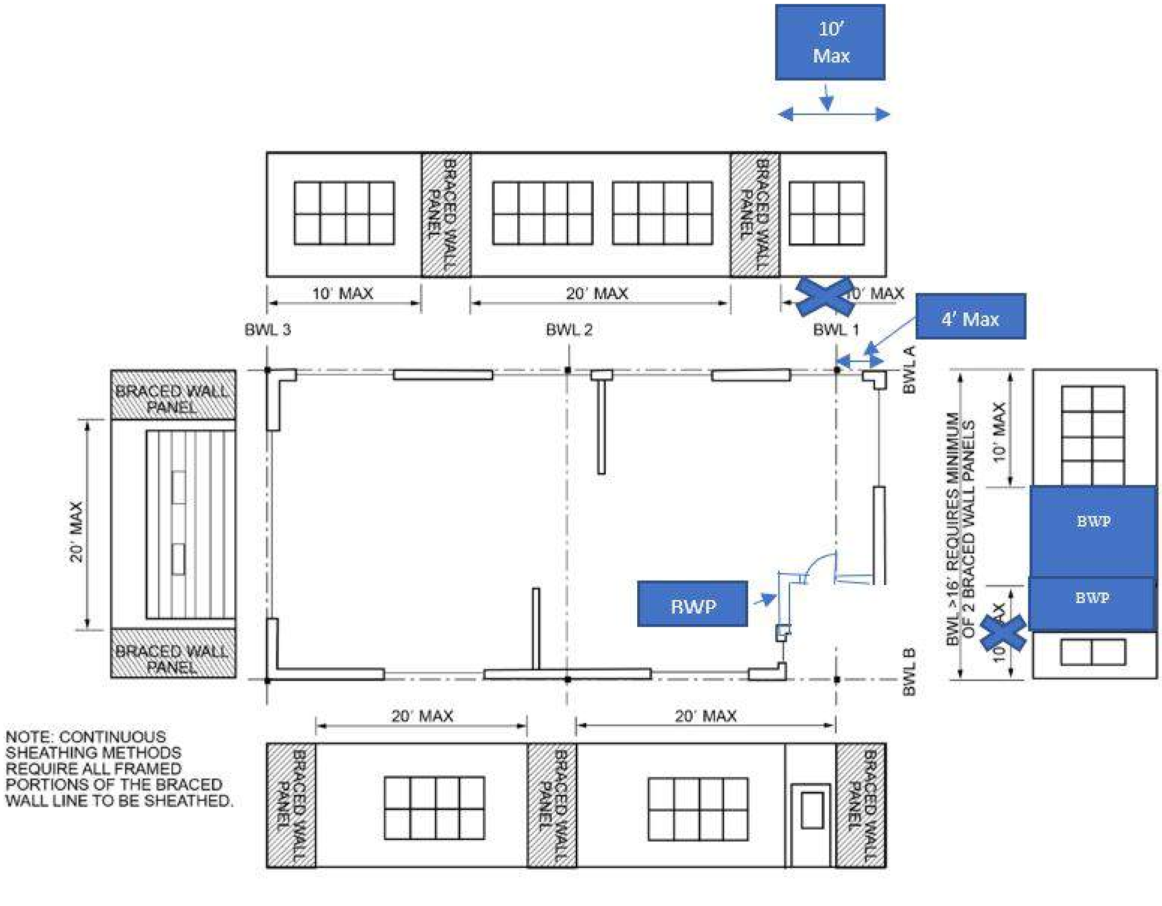
2021 International Residential Code

Delete and substitute as follows:



~~For SI: 1 foot = 304.8 mm.~~

~~FIGURE R602.10.2.2 LOCATION OF BRACED WALL PANELS~~



For SI: 1 foot = 304.8 mm.

FIGURE R602.10.2.2
LOCATION OF BRACED WALL PANELS

For SI: 1 foot = 304.8 mm.

FIGURE R602.10.2.2 LOCATION OF BRACED WALL PANELS

Reason Statement: Figure R602.10.2.2 is no longer accurate with the change to BWL placement in IRC 2021 Section R602.10.1.2. This proposal corrects two graphical inaccuracies in Figure R602.10.2.2:

1. The 10' dimension along BWL A between the top right corner and BWL 1. Per R602.10.1.1, the 10' should be measured from the perpendicular wall at the end of the BWL, not the perpendicular BWL centerline. <= We found this while looking closely at the figure

2. BWL 1 was improperly shown with all panels on one side of BWL 1. Per R602.10.1.2, no more than 2/3 of the required braced wall panel length is allowed to be located on one side of the BWL. <= this was the 2021 change

3. In addition, the existing pair of side-by-side braced wall panels along BWL 1 were combined into one large braced wall panel. This was done to emphasize the requirement in Section R602.10.2.3 that a braced wall line greater than 16 feet in length must be provided with a minimum of two braced wall panels, regardless of the size of those panels. This change also eliminates the misconception that installation of 2 braced wall panels side-by-side in a > 16-foot BWL provides equal performance to having the 2 braced wall panels spaced further apart. Installation of side-by-side braced wall panels runs counter to the function and purpose of requiring a minimum of 2 braced wall panels in the longer BWLs.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification change only; the intent is to update Figure R602.10.2.2 to match the updated requirements in IRC 2021 Section R602.10.1.2.

RB199-22

RB200-22

IRC: R602.10.2.2, TABLE R602.10.5, R602.10.6

Proponents: Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Residential Code

Revise as follows:

R602.10.2.2 Locations of braced wall panels. ~~A~~ The nearest edge of a *braced wall panel* shall ~~begin~~ be located within 10 feet (3810 mm) from each end of a *braced wall line* as determined in Section R602.10.1.1. The distance between adjacent edges of braced wall panels along a *braced wall line* shall be not greater than 20 feet (6096 mm) as shown in Figure R602.10.2.2.

Exceptions:

1. Braced wall panels in *Seismic Design Categories* D_0, D_1 and D_2 shall comply with Section R602.10.2.2.1.
2. Braced wall panels with continuous sheathing in *Seismic Design Categories* A, B or C shall comply with Section R602.10.7.

TABLE R602.10.5 MINIMUM LENGTH OF BRACED WALL PANELS

METHOD (See Table R602.10.4)		**MINIMUM LENGTH[a] (inches)**					**CONTRIBUTING LENGTH (inches)**
		Wall Height					
		8 feet	**9 feet**	**10 feet**	**11 feet**	**12 feet**	
DWB, WSP, SFB, PBS, PCP, HPS, BV-WSP		48	48	48	53	58	Actual[b]
GB		48	48	48	53	58	Double sided = ActualSingle sided = 0.5 × Actual
LIB		55	62	69	NP	NP	Actual[b]
ABW	SDC A, B and C, ultimate design wind speed < 140 mph	28	32	34	38	42	48
	SDC D_0, D_1 and D_2, ultimate design wind speed < 140 mph	32	32	34	NP	NP	
CS-G		24	27	30	33	36	Actual[b]
CS-WSP, CS-SFB	Adjacent clear opening height (inches)						
	≤ 64	24	27	30	33	36	Actual[b]
	68	26	27	30	33	36	
	72	27	27	30	33	36	
	76	30	29	30	33	36	
	80	32	30	30	33	36	
	84	35	32	32	33	36	
	88	38	35	33	33	36	
	92	43	37	35	35	36	
	96	48	41	38	36	36	
	100	—	44	40	38	38	
	104	—	49	43	40	39	
	108	—	54	46	43	41	
	112	—	—	50	45	43	
	116	—	—	55	48	45	
	120	—	—	60	52	48	
	124	—	—	—	56	51	
	128	—	—	—	61	54	
	132	—	—	—	66	58	
	136	—	—	—	—	62	
	140	—	—	—	—	66	
	144	—	—	—	—	72	
METHOD (See Table R602.10.4)		**Portal header height**					
		8 feet	**9 feet**	**10 feet**	**11 feet**	**12 feet**	
PFH	Supporting roof only	16	16	16	Note c	Note c	48
	Supporting one story and roof	24	24	24	Note c	Note c	
PFG		24	27	30	Note d	Note d	1.5 × Actual[b]
	SDC A, B and C	16	18	20	Note e	Note e	1.5 × Actual[b]

CS-PF	**METHOD (See Table R602.10.4)**	**MINIMUM LENGTH (inches)** **Wall Height**					**CONTRIBUTING LENGTH (inches)**
		8 feet	**9 feet**	**10 feet**	**11 feet**	**12 feet**	
	SDC D_0, D_1 and D_2	16	18	20	Note e	Note e	Actual[b]

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.
NP = Not Permitted.

a. Linear interpolation shall be permitted.

b. Use the actual length where it is greater than or equal to the minimum length. The actual length of Methods CS-G, CS-WSP, CS-SFB, PFH, PFG, and CS-PF is the length of the full-height sheathed section.

c. Maximum header height for PFH is 10 feet in accordance with Figure R602.10.6.2, but wall height shall be permitted to be increased to 12 feet with pony wall.

d. Maximum header height for PFG is 10 feet in accordance with Figure R602.10.6.3, but wall height shall be permitted to be increased to 12 feet with pony wall.

e. Maximum header height for CS-PF is 10 feet in accordance with Figure R602.10.6.4, but wall height shall be permitted to be increased to 12 feet with pony wall.

R602.10.6 Construction of Methods ABW, PFH, PFG, CS-PF and BV-WSP. Methods ABW, PFH, PFG, CS-PF and BV-WSP shall be constructed as specified in Sections R602.10.6.1 through R602.10.6.5. For the purposes of determining braced wall panel spacing, the edge of Methods PFH, PFG, and CS-PF shall be defined as the end of the header.

Reason Statement: There has been confusion by users on where to locate the edge of a single portal frame when applying the braced wall panel spacing rules in R602.10.2.2. There is disagreement whether the spacing should be measured from the vertical sheathed portal located at one end, or the end of the header. Since the full length of the header is taking shear loads out of the top plate, and the purpose of the braced wall panel spacing requirements is to ensure that excessive load does not accumulate in the top plate, it makes sense that the edge of the portal is the end of the header.
Since the term “edge” is now being used for portals, Section R602.10.2.2 should be revised to be consistent and use the term “edge” instead of saying “begin”. Note b in Table R602.10.5 is amended to clarify that the “actual length” is the length of the vertical sheathed portion of a portal frame. If the edges are defined as the ends of the header, that might lead to confusion on what is the “actual length” of the portal frame. The minimum length is indicated in the Figures so it does not need clarification.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will definitely not increase the cost of construction. It could decrease the cost of construction if a user was interpreting the code to say that the edge of a portal frame is measured from the sheathing edge. That would require a closer spacing of braced wall panels than necessary using the new proposed interpretation.

RB200-22

RB201-22

IRC: SECTION 202 (New), R602.10.3.1 (New), FIGURE R602.10.3.1 (New), TABLE R602.10.3(2), TABLE R602.10.3(4)

Proponents: Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Add new definition as follows:

HEIGHT, LIGHT-FRAME STUD WALL. The vertical distance from the lower edge of the bottom plate to the upper edge of the upper top plate.

Add new text as follows:

R602.10.3.1 Wall Height for Wood Framing. For determination of braced wall and panel adjustment factors in accordance with Section R602.10, wall height shall be the *light-frame stud wall height* determined in accordance with Figure R602.10.3.1.

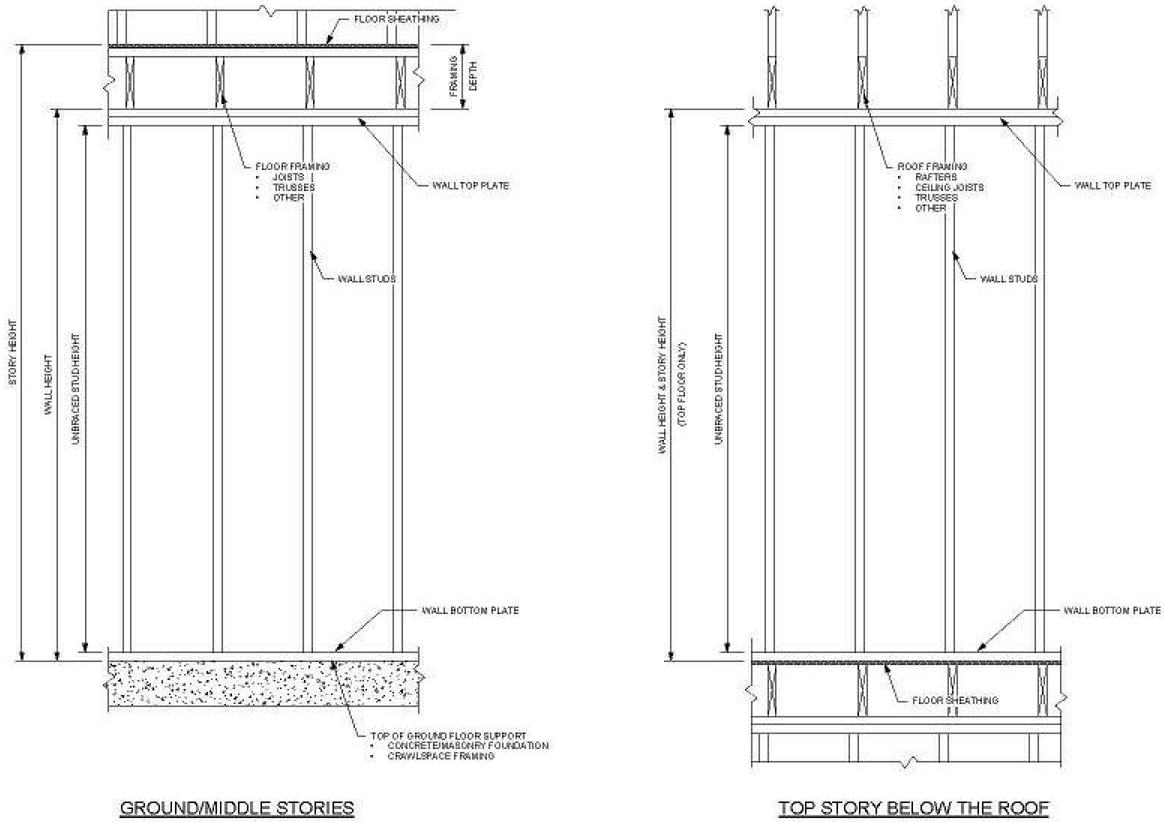


FIGURE R602.10.3.1 Wall Height for Wood Framing

Revise as follows:

TABLE R602.10.3(2) WIND ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ITEM NUMBER	ADJUSTMENT BASED ON	STORY/SUPPORTING	CONDITION	ADJUSTMENT FACTOR[a, b] [multiply length from Table R602.10.3(1) by this factor]	APPLICABLE METHODS
1	Exposure category[d]	One-story structure	B	1.00	All methods
			C	1.20	
			D	1.50	
		Two-story structure	B	1.00	
			C	1.30	
			D	1.60	
		Three-story structure	B	1.00	
			C	1.40	
			D	1.70	
2	Roof eave-to-ridge height	Roof only	≤ 5 feet	0.70	
			10 feet	1.00	
			15 feet	1.30	
			20 feet	1.60	
		Roof + 1 floor	≤ 5 feet	0.85	
			10 feet	1.00	
			15 feet	1.15	
			20 feet	1.30	
		Roof + 2 floors	≤ 5 feet	0.90	
			10 feet	1.00	
			15 feet	1.10	
			20 feet	Not permitted	
3	Wall Height (Section R601.10.3.1) ~~Story height (Section R301.3)~~	Any story	8 feet	0.90	
			9 feet	0.95	
			10 feet	1.00	
			11 feet	1.05	
			12 feet	1.10	
4	Number of braced wall lines (per plan direction)[c]	Any story	2	1.00	
			3	1.30	
			4	1.45	
			≥ 5	1.60	
5	Additional 800-pound hold-down device	Top story only	Fastened to the end studs of each braced wall panel and to the foundation or framing below	0.80	DWB, WSP, SFB, PBS, PCP, HPS
6	Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.40	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB
7	Gypsum board fastening	Any story	4 inches o.c. at panel edges, including top and bottom plates, and all horizontal joints blocked	0.7	GB
8	Horizontal blocking	Any story	Horizontal block is omitted	2.0	WSP, PBS, CS-WSP

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.48 N.

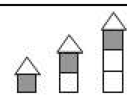
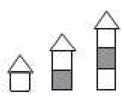
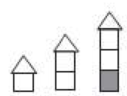
a. Linear interpolation shall be permitted.

b. The total adjustment factor is the product of all applicable adjustment factors.

c. The adjustment factor is permitted to be 1.0 when determining bracing amounts for intermediate braced wall lines provided the bracing amounts on adjacent braced wall lines are based on a spacing and number that neglects the intermediate braced wall line.

d. The same adjustment factor shall be applied to all braced wall lines on all floors of the structure, based on the worst-case exposure category.

TABLE R602.10.3(4) SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ITEM NUMBER	ADJUSTMENT BASED ON	STORY[g]	CONDITION	ADJUSTMENT FACTOR[a, b] [Multiply length from Table R602.10.3(3) by this factor]	APPLICABLE METHODS
1	Wall Height (Section R601.10.3.1) ~~Story height (Section 301.3)~~	Any story	≤ 10 feet	1.0	All methods
			> 10 feet and ≤ 12 feet	1.2	
2	Braced wall line spacing, townhouses in SDC C	Any story	≤ 35 feet	1.0	
			> 35 feet and ≤ 50 feet	1.43	
3	Braced wall line spacing, in SDC D_0, D_1, D_2[c]	Any story	> 25 feet and ≤ 30 feet	1.2	
			> 30 feet and ≤ 35 feet	1.4	
4	Wall dead load	Any story	> 8 psf and < 15 psf	1.0	
			< 8psf	0.85	
5	Roof/ceiling dead load for wall supporting	1-, 2- or 3-story building	≤15 psf	1.0	
		2- or 3-story building	> 15 psf and ≤ 25 psf	1.1	
		1-story building or top story	> 15 psf and ≤ 25 psf	1.2	
6	Walls with stone or masonry veneer, townhouses in SDC C[d, e]		1.0		All methods
			1.5		
			1.5		
7	Walls with stone or masonry veneer, detached one- and two-family dwellings in SDC $D_0 – D_2$[d, f]	Any story	See Section R602.10.6.5.4		BV-WSP
8	Walls with stone or masonry veneer, detached one- and two-family dwellings in SDC $D_0 – D_2$[d, f]	First and second story of two-story dwelling	Limited brick veneer on second story. See Section R602.10.6.5.3.	1.2	WSP, CS-WSP
9	Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.5	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB
10	Horizontal blocking	Any story	Horizontal blocking omitted	2.0	WSP, PBS, CS-WSP

For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation shall be permitted.

b. The total length of bracing required for a given wall line is the product of all applicable adjustment factors.

c. The length-to-width ratio for the floor/roof diaphragm shall not exceed 3:1.

d. Applies to stone or masonry veneer exceeding the first story height.

e. The adjustment factor for stone or masonry veneer shall be applied to all exterior braced wall lines and all braced wall lines on the interior of the building, backing or perpendicular to and laterally supporting veneered walls.

f. See Section R602.10.6.5 for requirements where stone or masonry veneer does not exceed the first-story height.

g. One- and two-family dwellings in Seismic Design Category D_2 exceeding two stories shall be designed in accordance with accepted engineering practice.

Reason Statement: This proposal clarifies how to determine the vertical dimension of the wall height for wood stud framing, which has been subject to varying interpretations. It also cleans up braced wall adjustment factor table references (story heights) that are currently in conflict with the listed wall height dimensions.
Requirements such as braced wall line lengths and adjustment factors are based on the “wall height”, which can be ambiguous when using coffered ceilings, knee-walls, and other common framing features and techniques. Because shorter wall heights are allowed to use lower factors, there is an economic incentive to classify the wall height as short as possible. This requires a clear and concise definition of “wall height” to eliminate confusion and varying interpretations.

Braced Wall Design Basis - Seismic

The seismic design basis calculations for the IRC rely upon expected relationships between the story height, top of “wall height”, and the braced wall panel heights. Use of shorter wall heights in combination with taller story heights will lead to unconservative lengths of braced walls and wall panels and will compromise the structural integrity during a seismic event.

Places that Wall Height is Used

The following tables in Chapter 6 are keyed on variations of story height, wall height, or a similar vertical measurement:

- Table R602.10.3(1) Bracing Requirements Based on Wind Speed
- Table R602.10.5 Minimum Length of Braced Wall Panels
- Table R602.10.5.2 Partial Credit for Braced Wall Panels Less than 48 inches in Actual Length
- TABLE R602.10.3(3) Bracing Requirements Based on Seismic Design Category

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of intent and does not impose new requirements.

RB201-22

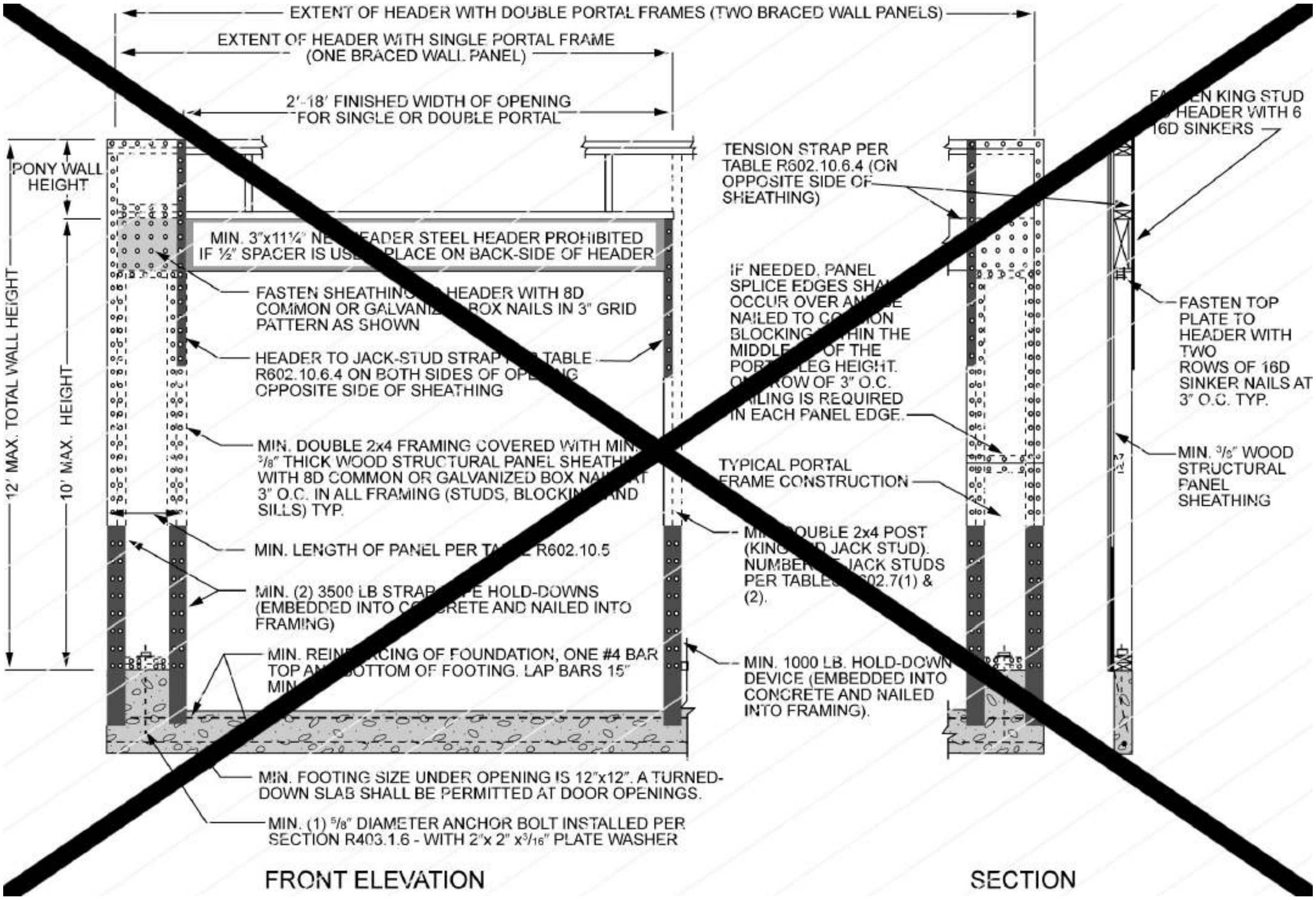
RB202-22

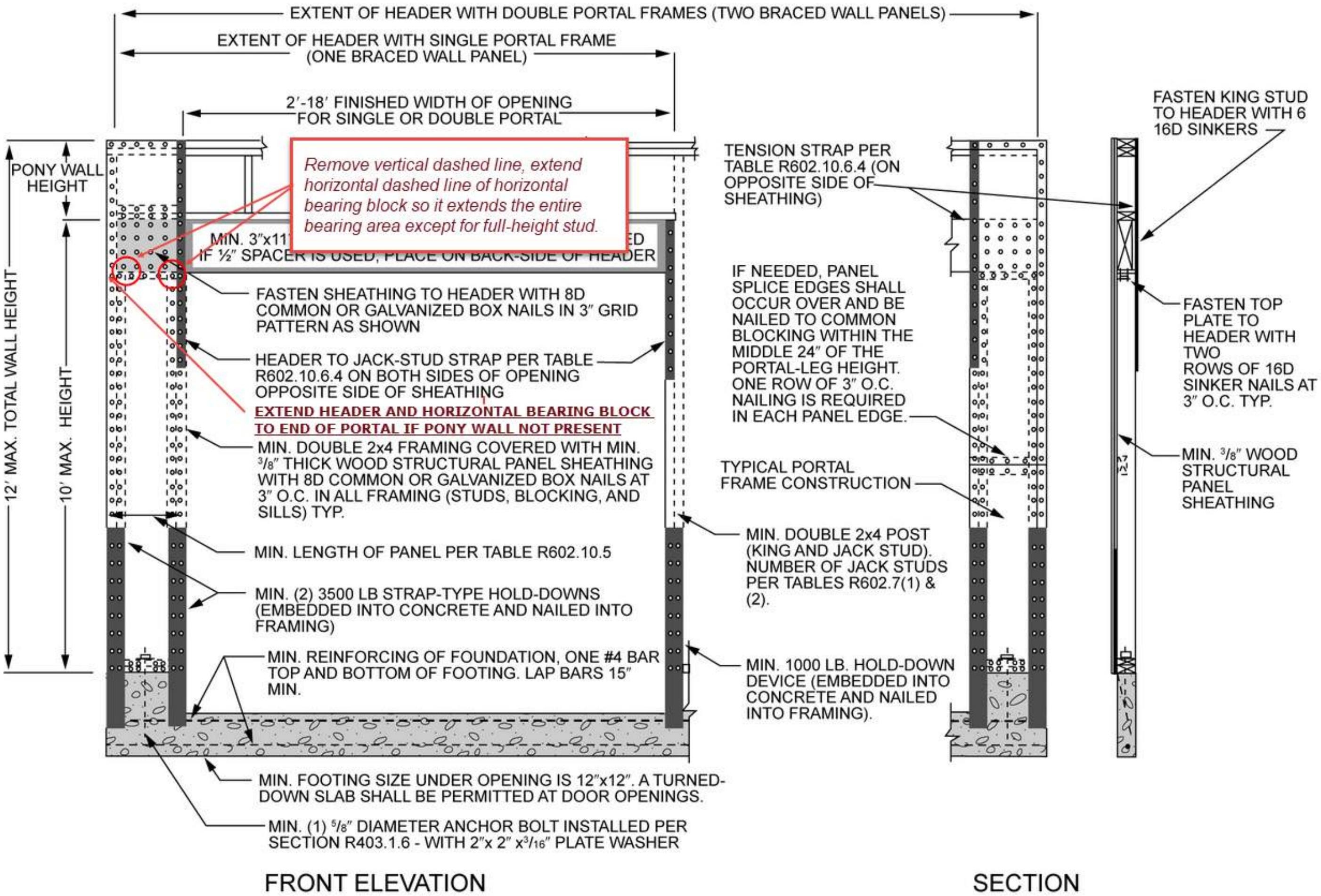
IRC: FIGURE R602.10.6.2

Proponents: Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Residential Code

Revise as follows:


EXTENT OF HEADER WITH DOUBLE PORTAL FRAMES (TWO BRACED WALL PANELS)
EXTENT OF HEADER WITH SINGLE PORTAL FRAME (ONE BRACED WALL PANEL)
FOR SINGLE OR DOUBLE PORTAL
PONY WALL HEIGHT
12' MAX. TOTAL WALL HEIGHT
10' MAX. HEIGHT
FASTEN SHEATHING
HEADER WITH 8D
PATTERN AS SHOWN
HEADER TO JACK-STUD STRAP
R602.10.6.4 ON BOTH SIDES OF
OPPOSITE SIDE OF SHEATHING
MIN. DOUBLE 2x4 FRAMING COVERED WITH MIN.
WITH 8D COMMON OR GALVANIZED BOX
3" O.C. IN ALL FRAMING (STUDS, BLOCKIN
SILLS) TYP.
MIN. LENGTH OF PANEL PER
R602.10.5
MIN. (2) 3500 LB STRAP
HOLD-DOWNS
(EMBEDDED INTO
FRAMING)
MIN. REINF
CING OF FOUNDATION, ONE #4 BAR
MIN. FOOTING SIZE UNDER OPENING IS 12"x12". A TURNED-DOWN SLAB SHALL BE PERMITTED AT DOOR OPENINGS.
MIN. (1) 5/8" DIAMETER ANCHOR BOLT INSTALLED PER SECTION R403.1.6 - WITH 2"x 2" x3/16" PLATE WASHER
TENSION STRAP PER TABLE R602.10.6.4 (ON OPPOSITE SIDE OF SHEATHING)
IF NEEDED, PANEL
BLOCKING
IN EACH PANEL EDGE.
TYPICAL PORTAL
FRAME CONSTRUCTION
(2).
MIN. 1000 LB. HOLD-DOWN DEVICE (EMBEDDED INTO CONCRETE AND NAILED INTO FRAMING).
16D SINKERS
FASTEN TOP PLATE TO HEADER WITH TWO ROWS OF 16D SINKER NAILS AT 3" O.C. TYP.
MIN. 3/8" WOOD STRUCTURAL PANEL SHEATHING
FRONT ELEVATION
SECTION



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.10.6.2 METHOD PFH—PORTAL FRAME WITH HOLD-DOWNS

Reason Statement: This proposal is made to correct the PFH Figure to reflect how the portal frame was originally tested. In the original testing, the horizontal bearing block beneath the end of the header extended the full bearing width of the vertical section. That is reflected in the photo shown below, taken from the original APA testing as reported in T2002-46. Currently it appears as if the vertical studs extend completely up to the header. A note is also needed to be added that in the event that there is not a pony wall above the header, the header and the bearing block need to extend completely to the end of the portal frame, again to reflect the original testing. Note that if this is accepted, the illustration will match those of the PFG and CS-PF.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change just clarifies how the bearing of the header at each end is constructed. It should not result in any increase or decrease in costs.

RB202-22

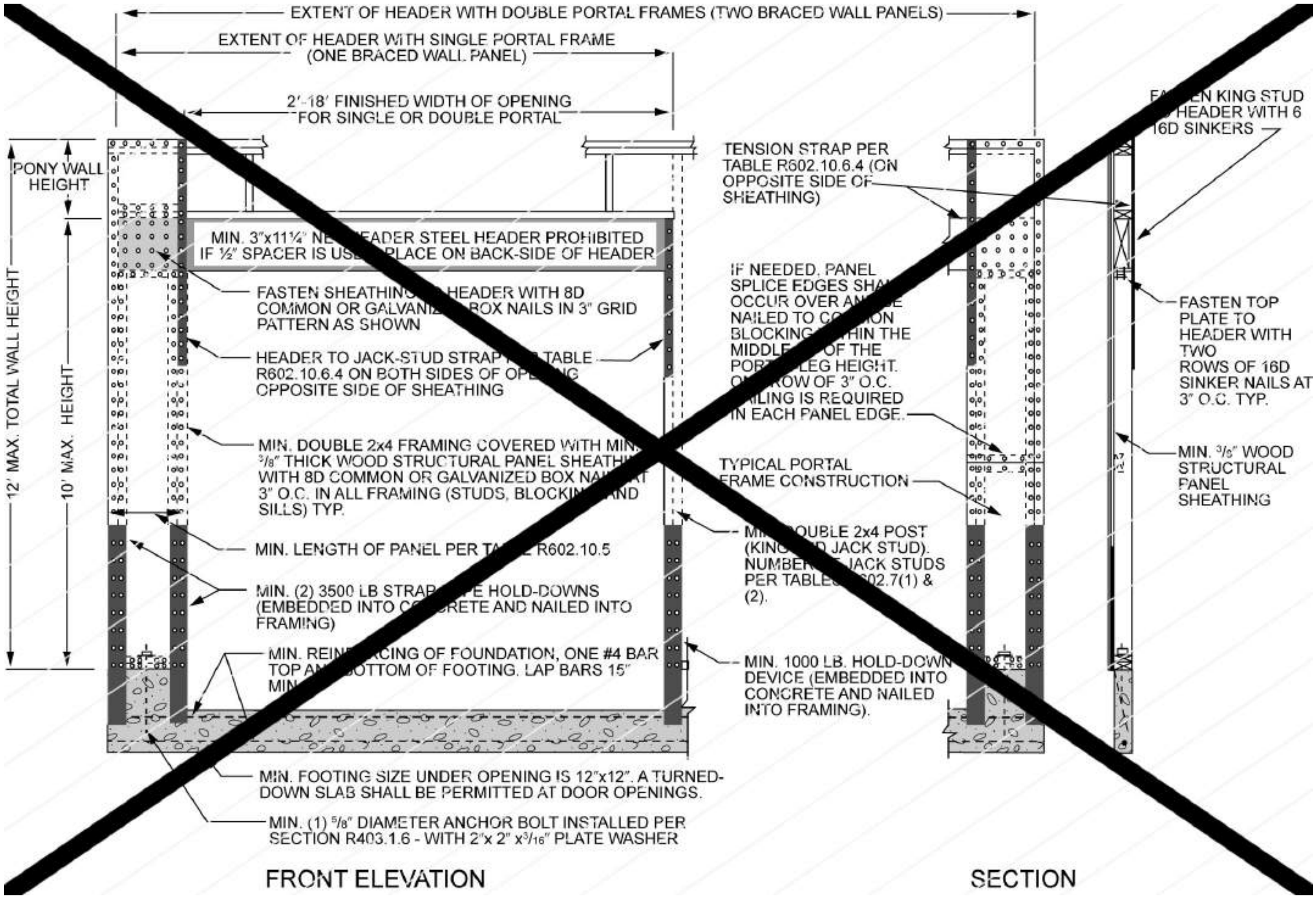
RB203-22

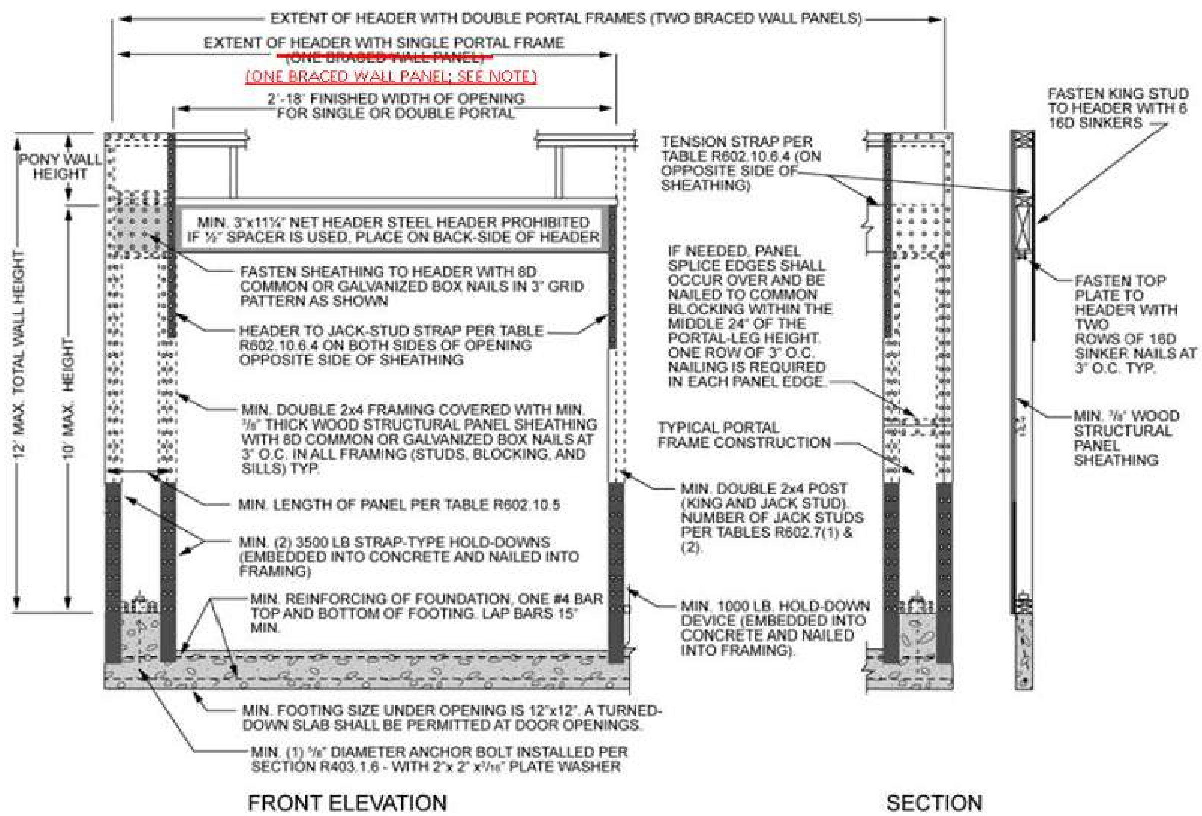
IRC: FIGURE R602.10.6.2, FIGURE R602.10.6.3, FIGURE R602.10.6.4

Proponents: Borjen Yeh, representing APA - The Engineered Wood Association (borjen.yeh@apawood.org)

2021 International Residential Code

Revise as follows:

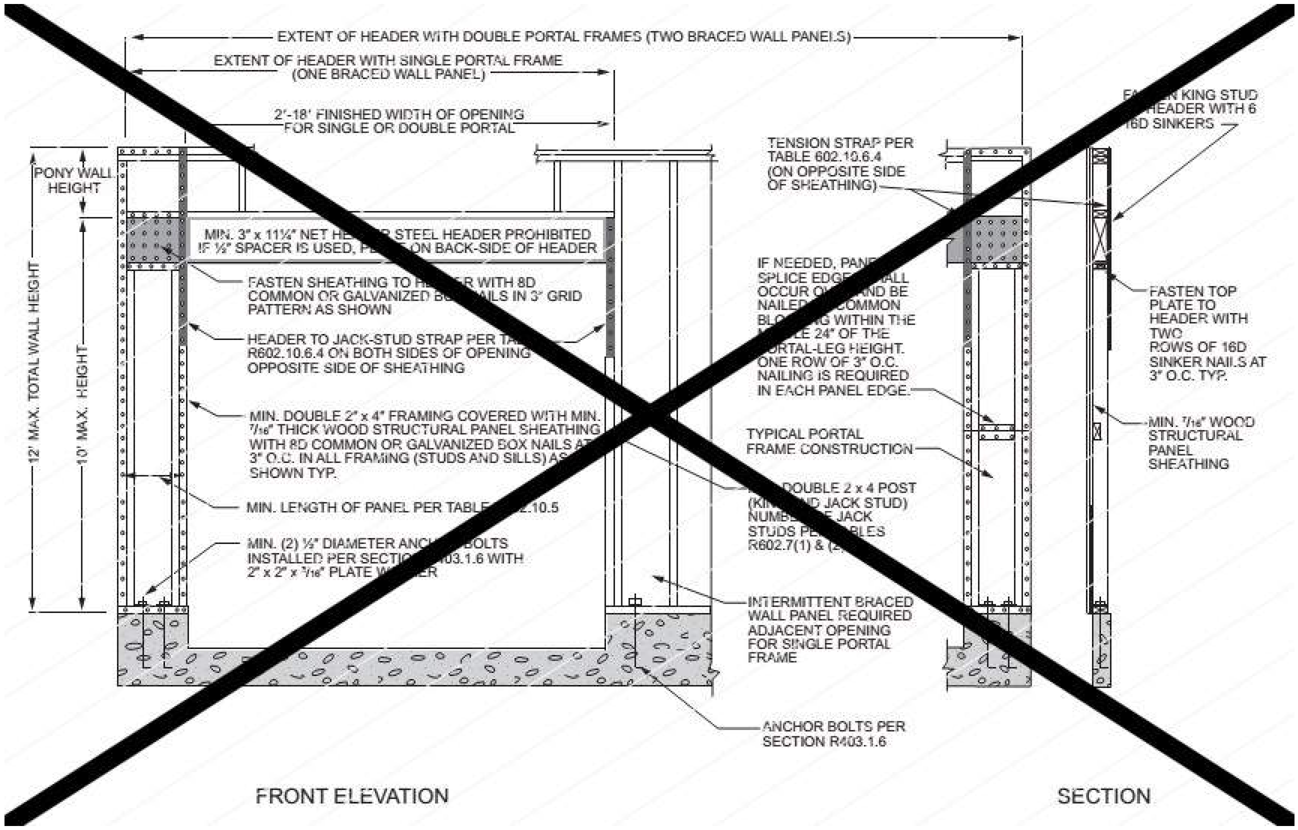


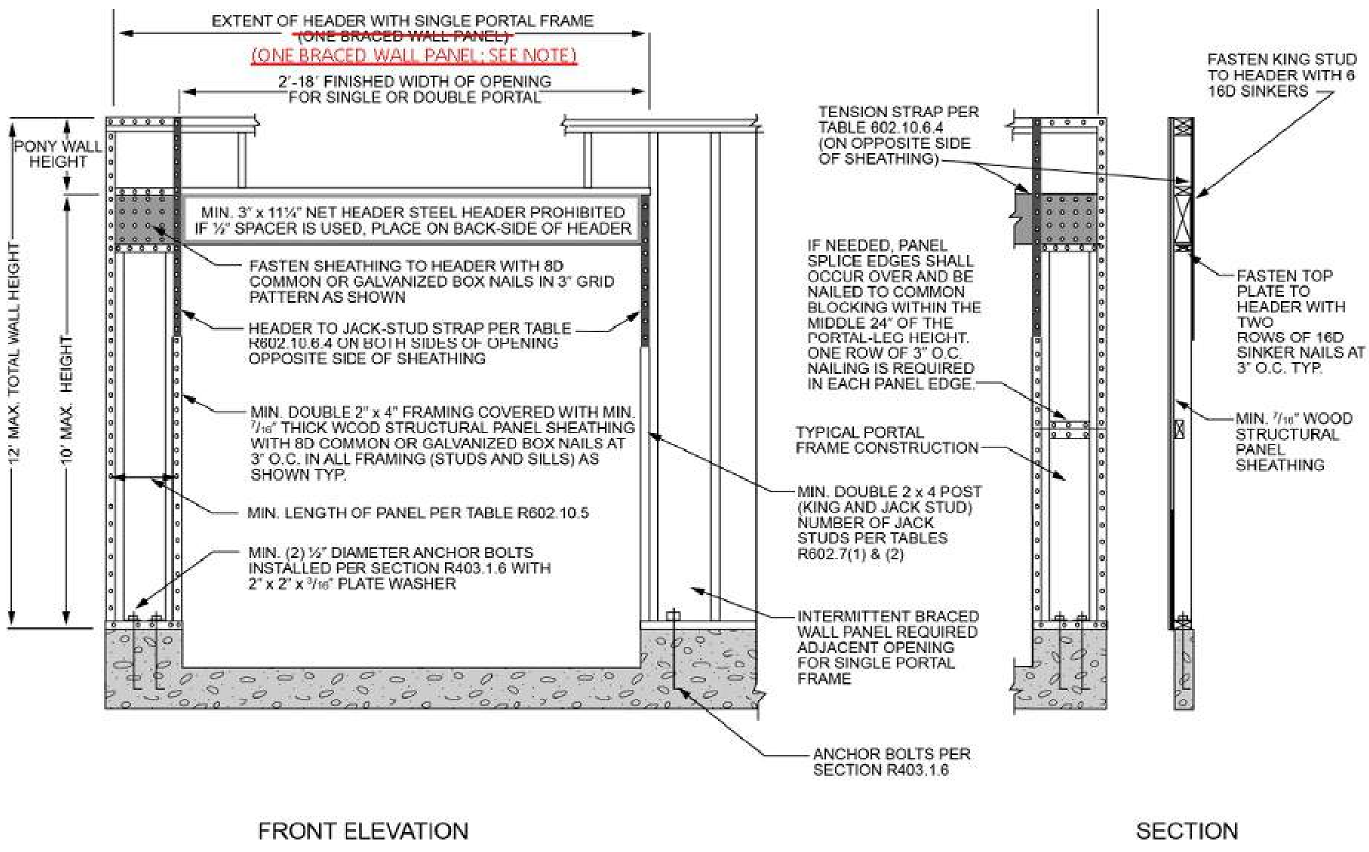


For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Note: Header shall not extend over more than one opening.

FIGURE R602.10.6.2 METHOD PFH—PORTAL FRAME WITH HOLD-DOWNS

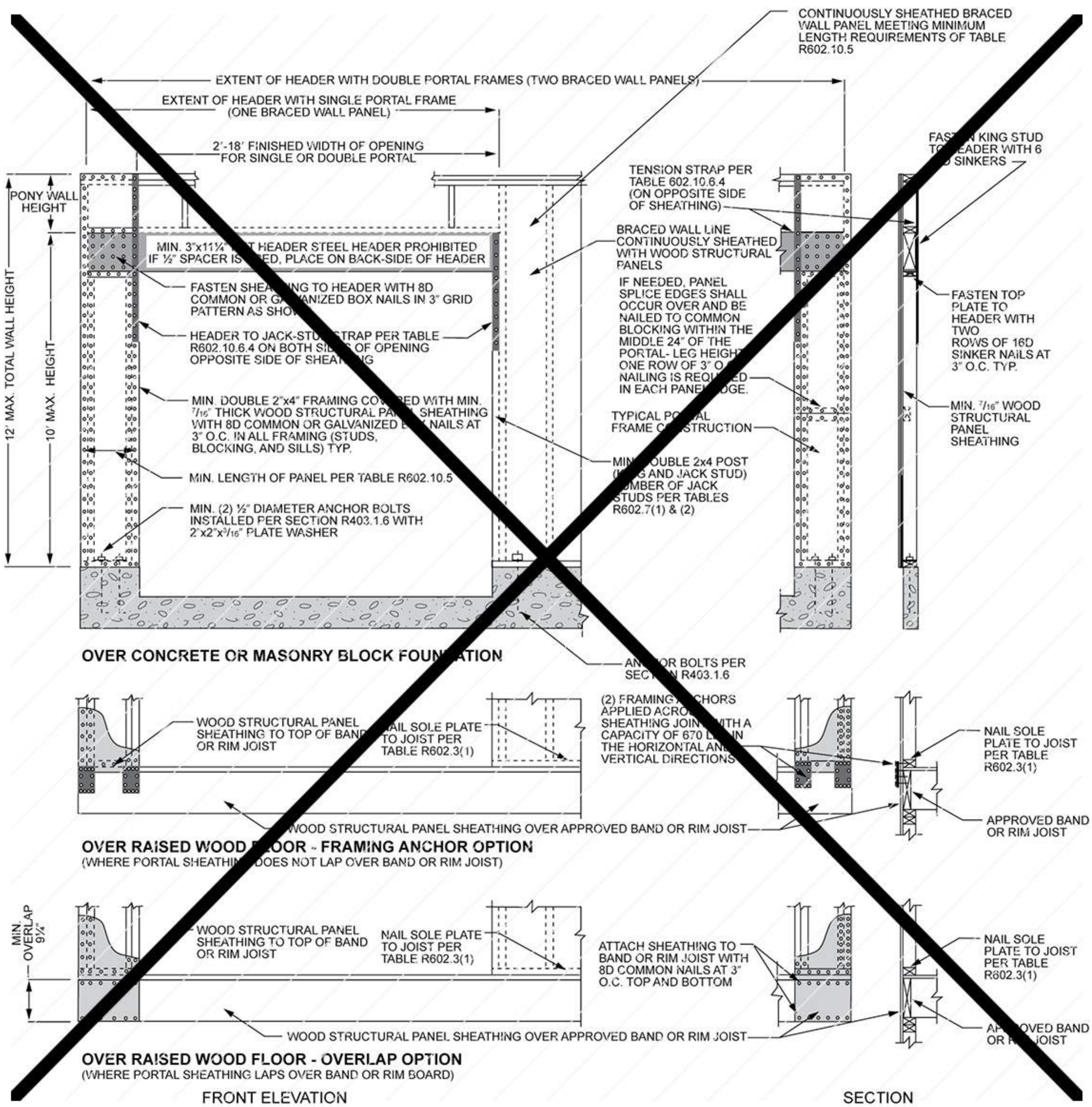


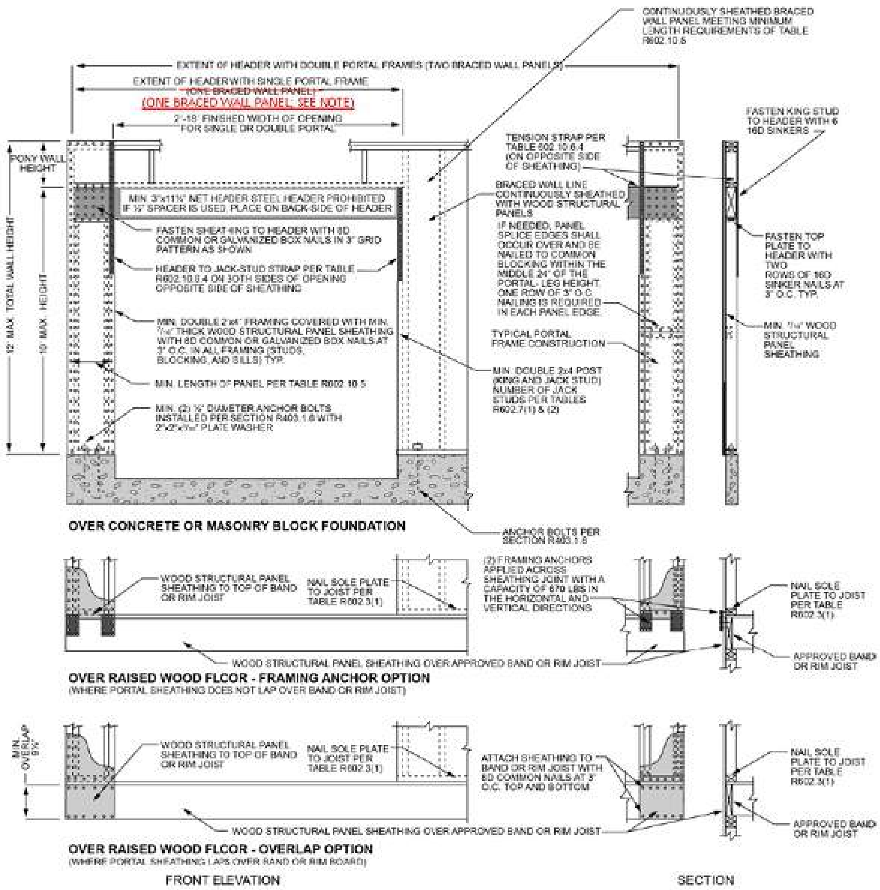


For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

NOTE: Header shall not extend over more than one opening.

FIGURE R602.10.6.3 METHOD PFG—PORTAL FRAME AT GARAGE DOOR OPENINGS IN SEISMIC DESIGN CATEGORIES A, B AND C


CONTINUOUSLY SHEATHED BRACED WALL PANEL MEETING MINIMUM LENGTH REQUIREMENTS OF TABLE R602.10.5
EXTENT OF HEADER WITH DOUBLE PORTAL FRAMES (TWO BRACED WALL PANELS)
EXTENT OF HEADER WITH SINGLE PORTAL FRAME (ONE BRACED WALL PANEL)
2'-18' FINISHED WIDTH OF OPENING FOR SINGLE OR DOUBLE PORTAL
PONY WALL HEIGHT
12' MAX. TOTAL WALL HEIGHT
10' MAX. HEIGHT
FASTEN SHEATHING TO HEADER WITH 8D COMMON OR GALVANIZED BOX NAILS IN 3" GRID PATTERN AS SHOWN
HEADER TO JACK-STUD STRAP PER TABLE R602.10.6.4 ON BOTH SIDES OF OPENING OPPOSITE SIDE OF SHEATHING
MIN. LENGTH OF PANEL PER TABLE R602.10.5
MIN. (2) ½" DIAMETER ANCHOR BOLTS INSTALLED PER SECTION R403.1.6 WITH 2"x2"x3/16" PLATE WASHER
TENSION STRAP PER TABLE 602.10.6.4 (ON OPPOSITE SIDE OF SHEATHING)
BRACED WALL LINE CONTINUOUSLY SHEATHED WITH WOOD STRUCTURAL PANELS
TYPICAL PORTAL FRAME CONSTRUCTION
R602.7(1) & (2)
FASTEN TOP PLATE TO HEADER WITH TWO ROWS OF 16D SINKER NAILS AT 3" O.C. TYP.
MIN. 7/16" WOOD STRUCTURAL PANEL SHEATHING
OVER CONCRETE OR MASONRY BLOCK FOUNDATION
WOOD STRUCTURAL PANEL SHEATHING TO TOP OF BAND OR RIM JOIST
TO JOIST PER TABLE R602.3(1)
NAIL SOLE PLATE TO JOIST PER TABLE R602.3(1)
APPROVED BAND OR RIM JOIST
WOOD STRUCTURAL PANEL SHEATHING OVER APPROVED BAND OR RIM JOIST
(WHERE PORTAL SHEATHING DOES NOT LAP OVER BAND OR RIM JOIST)
MIN. OVERLAP 9¼"
NAIL SOLE PLATE TO JOIST PER TABLE R602.3(1)
ATTACH SHEATHING TO BAND OR RIM JOIST WITH 8D COMMON NAILS AT 3" O.C. TOP AND BOTTOM
OVER RAISED WOOD FLOOR - OVERLAP OPTION
(WHERE PORTAL SHEATHING LAPS OVER BAND OR RIM BOARD)
FRONT ELEVATION
SECTION



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
NOTE: Header shall not extend over more than one opening.

FIGURE R602.10.6.4 METHOD CS-PF—CONTINUOUSLY SHEATHED PORTAL FRAME PANEL CONSTRUCTION

Reason Statement: The intent of this change proposal is to clarify the header requirement for portal frames and to limit the header to a single-span configuration, as originally tested, with double portal frames. This question has been frequently raised in the field and is worth clarification in the IRC.Portal frames first appeared in the 2009 IRC and were based on tests conducted by APA and NAHB, in which the headers were tested in a single-span configuration. While it can be argued that this is reflected in the detailed drawings of the existing Figures R602.10.6.2, R602.10.6.3, and R602.10.6.4, a careful examination is usually required to spot such a subtle difference. The addition of the clarification note as proposed will make these figures easier to follow and less prone to confusion. In practical applications, continuous headers if purchased for double portal frames can be cut into 2 single-span headers before installation into each portal frame.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction because it clarifies the double portal frame construction as originally intended.

RB203-22

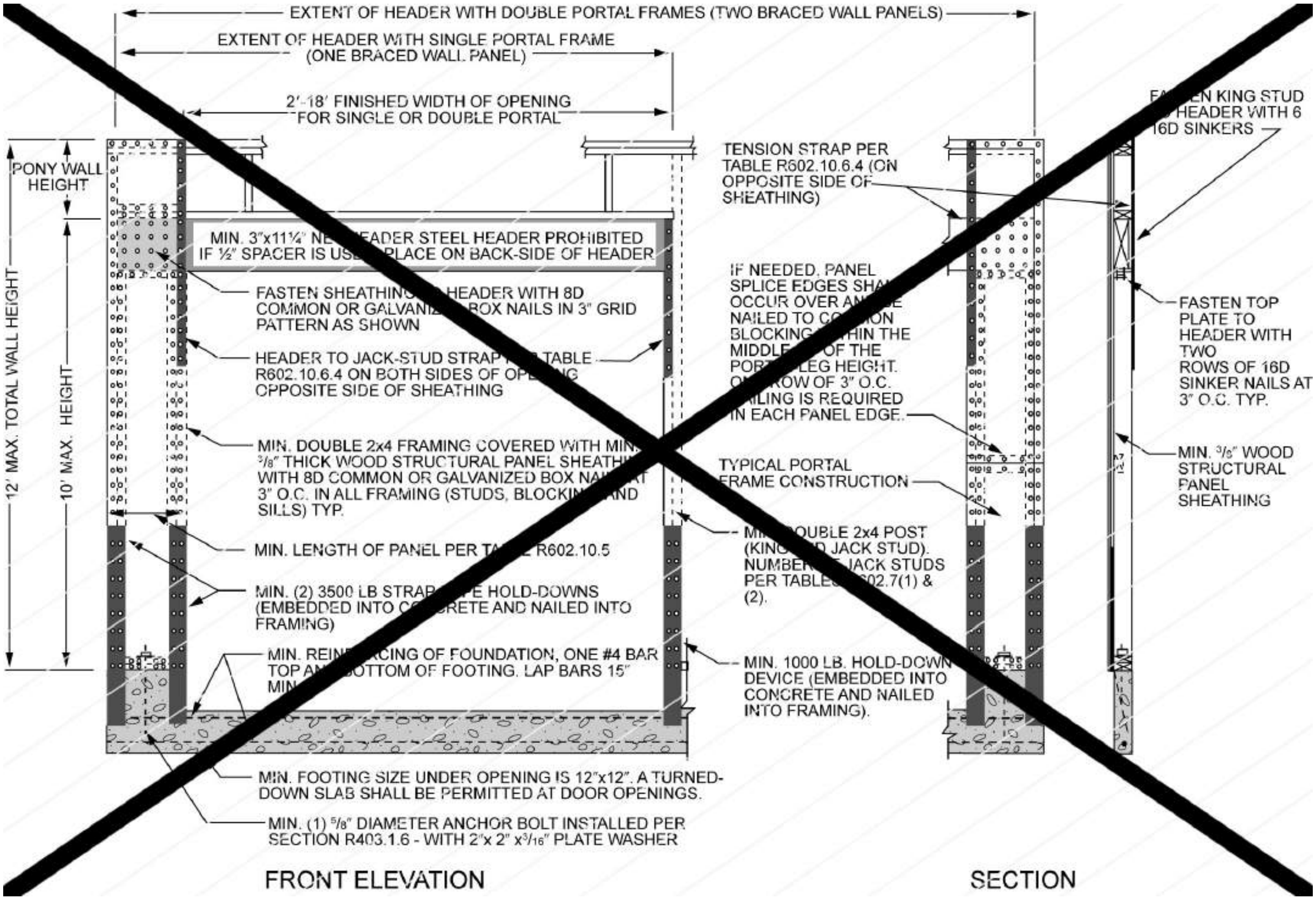
RB204-22

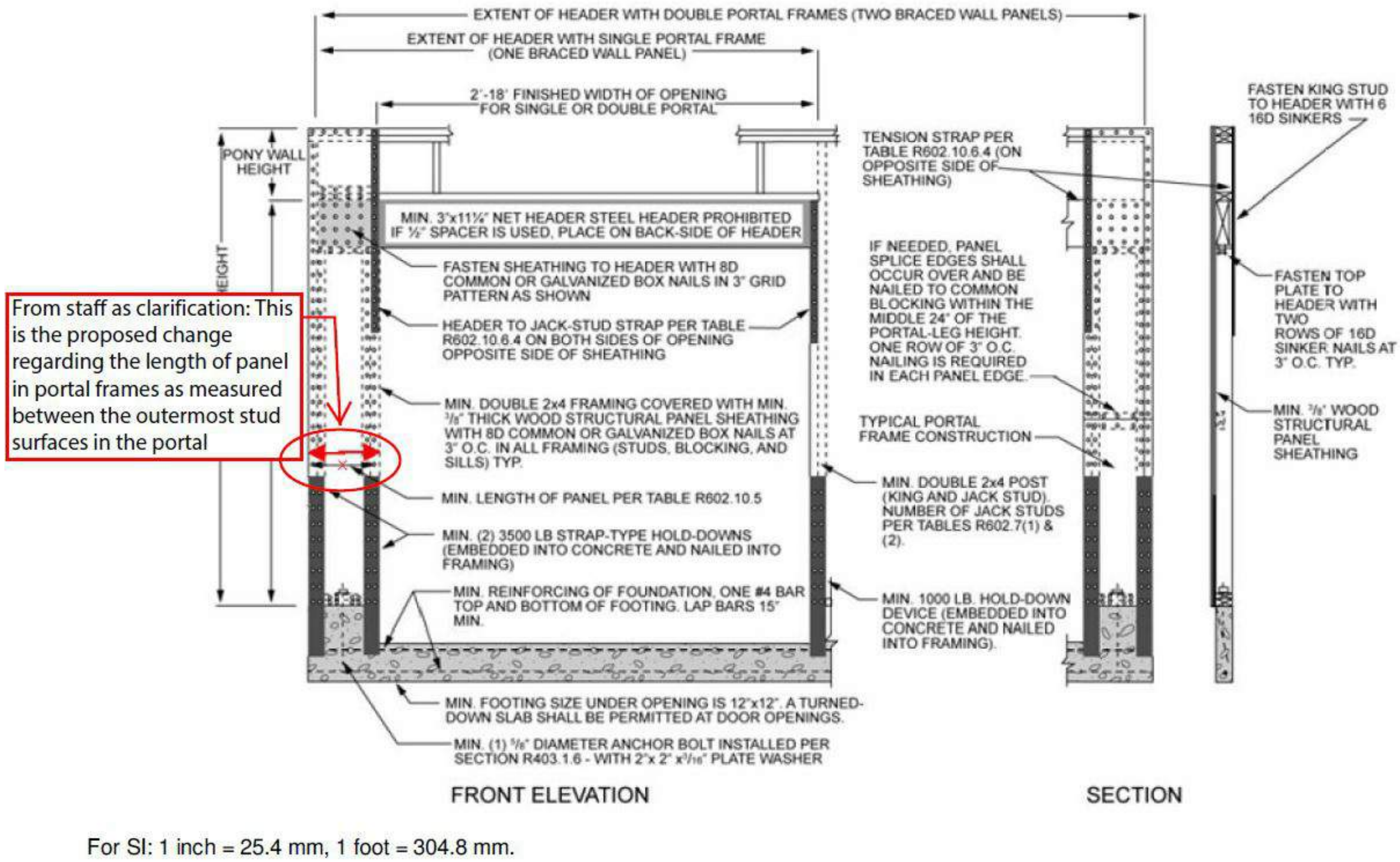
IRC: FIGURE R602.10.6.2, FIGURE R602.10.6.3, FIGURE R602.10.6.4

Proponents: Borjen Yeh, representing APA - The Engineered Wood Association (borjen.yeh@apawood.org)

2021 International Residential Code

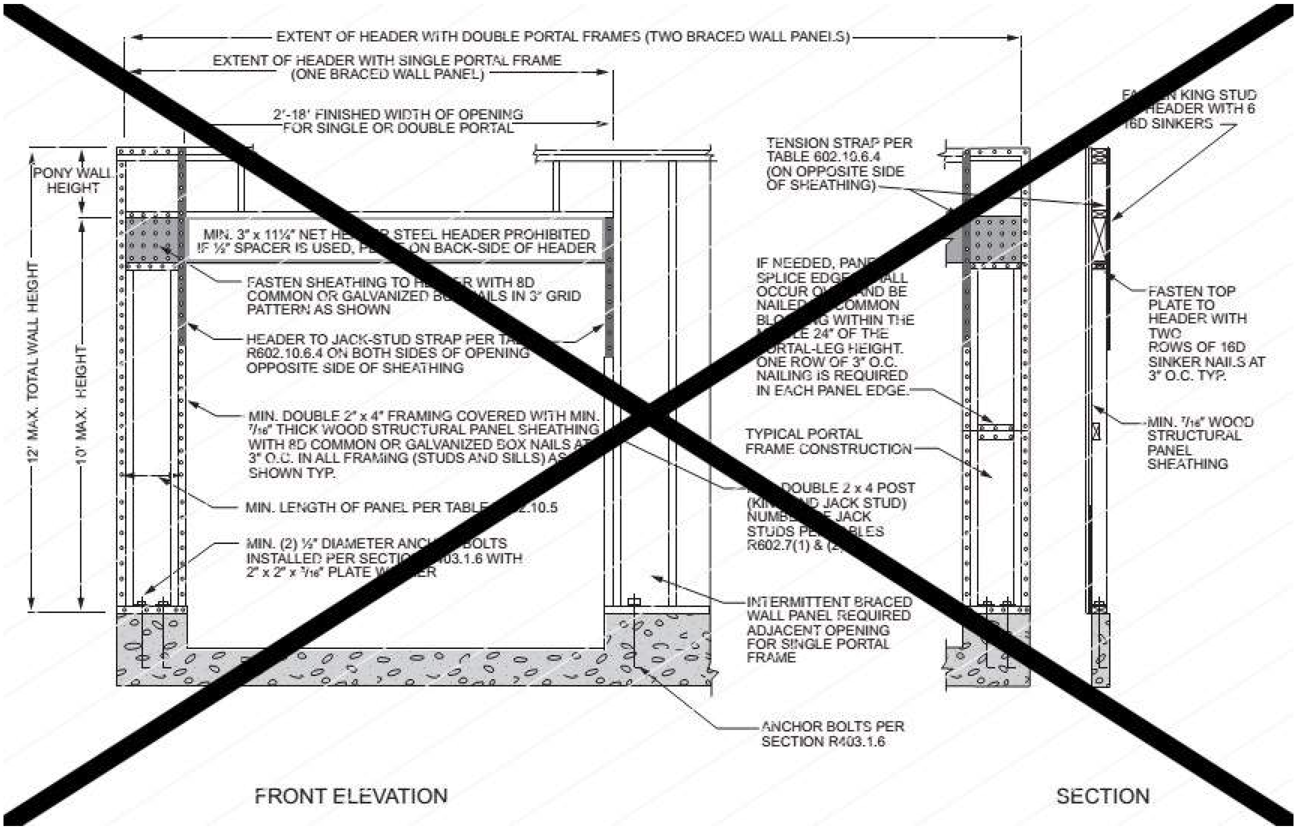
Revise as follows:

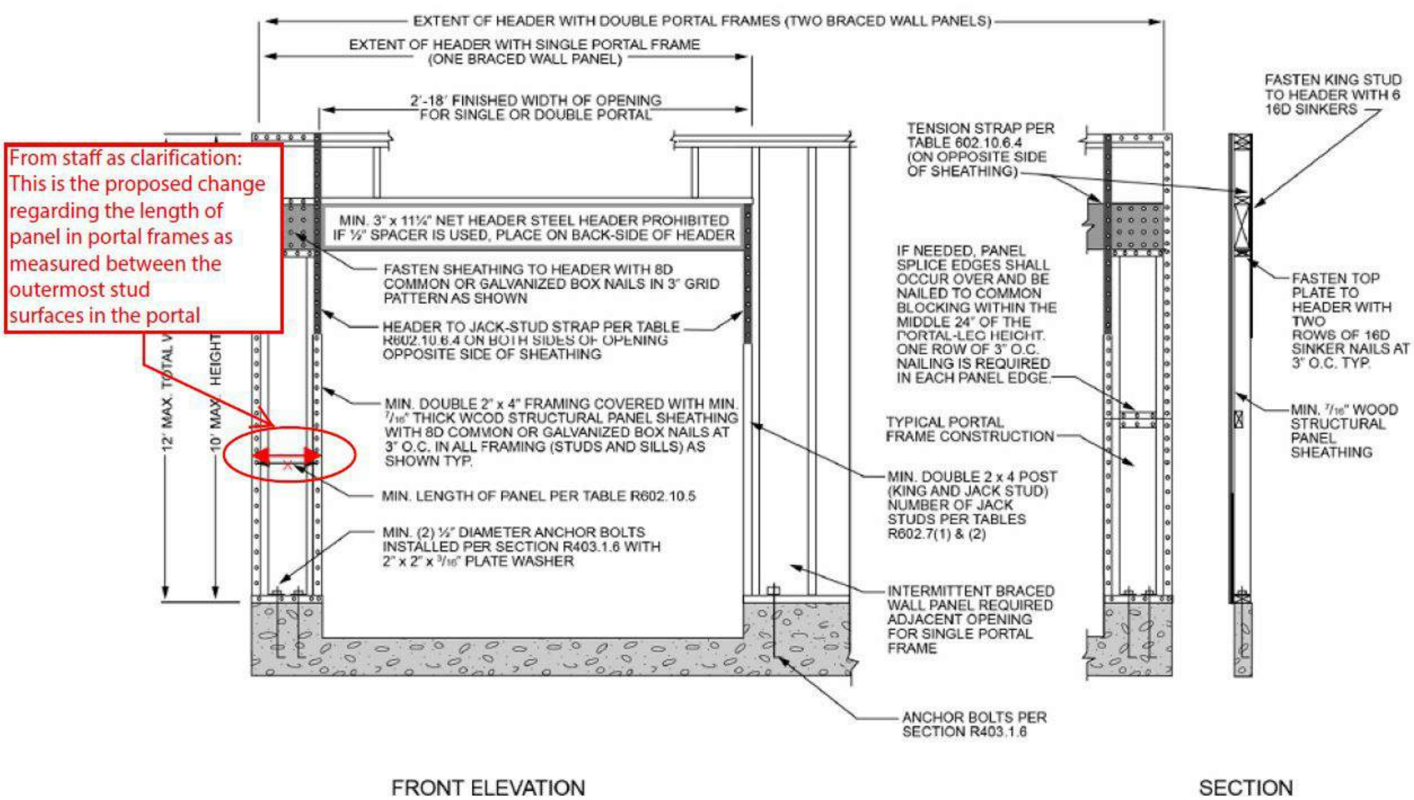

EXTENT OF HEADER WITH DOUBLE PORTAL FRAMES (TWO BRACED WALL PANELS)
EXTENT OF HEADER WITH SINGLE PORTAL FRAME (ONE BRACED WALL PANEL)
2'-18' FINISHED WIDTH OF OPENING FOR SINGLE OR DOUBLE PORTAL
PONY WALL HEIGHT
12' MAX. TOTAL WALL HEIGHT
10' MAX. HEIGHT
TENSION STRAP PER TABLE R602.10.6.4 (ON OPPOSITE SIDE OF SHEATHING)
FASTEN TOP PLATE TO HEADER WITH TWO ROWS OF 16D SINKER NAILS AT 3" O.C. TYP.
MIN. 3/8" WOOD STRUCTURAL PANEL SHEATHING
TYPICAL PORTAL FRAME CONSTRUCTION
MIN. 1000 LB. HOLD-DOWN DEVICE (EMBEDDED INTO CONCRETE AND NAILED INTO FRAMING).
MIN. LENGTH OF PANEL PER TABLE R602.10.5
MIN. FOOTING SIZE UNDER OPENING IS 12"x12". A TURNED-DOWN SLAB SHALL BE PERMITTED AT DOOR OPENINGS.
MIN. (1) 5/8" DIAMETER ANCHOR BOLT INSTALLED PER SECTION R403.1.6 - WITH 2"x 2" x3/16" PLATE WASHER
FRONT ELEVATION
SECTION



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.10.6.2 METHOD PFH—PORTAL FRAME WITH HOLD-DOWNS

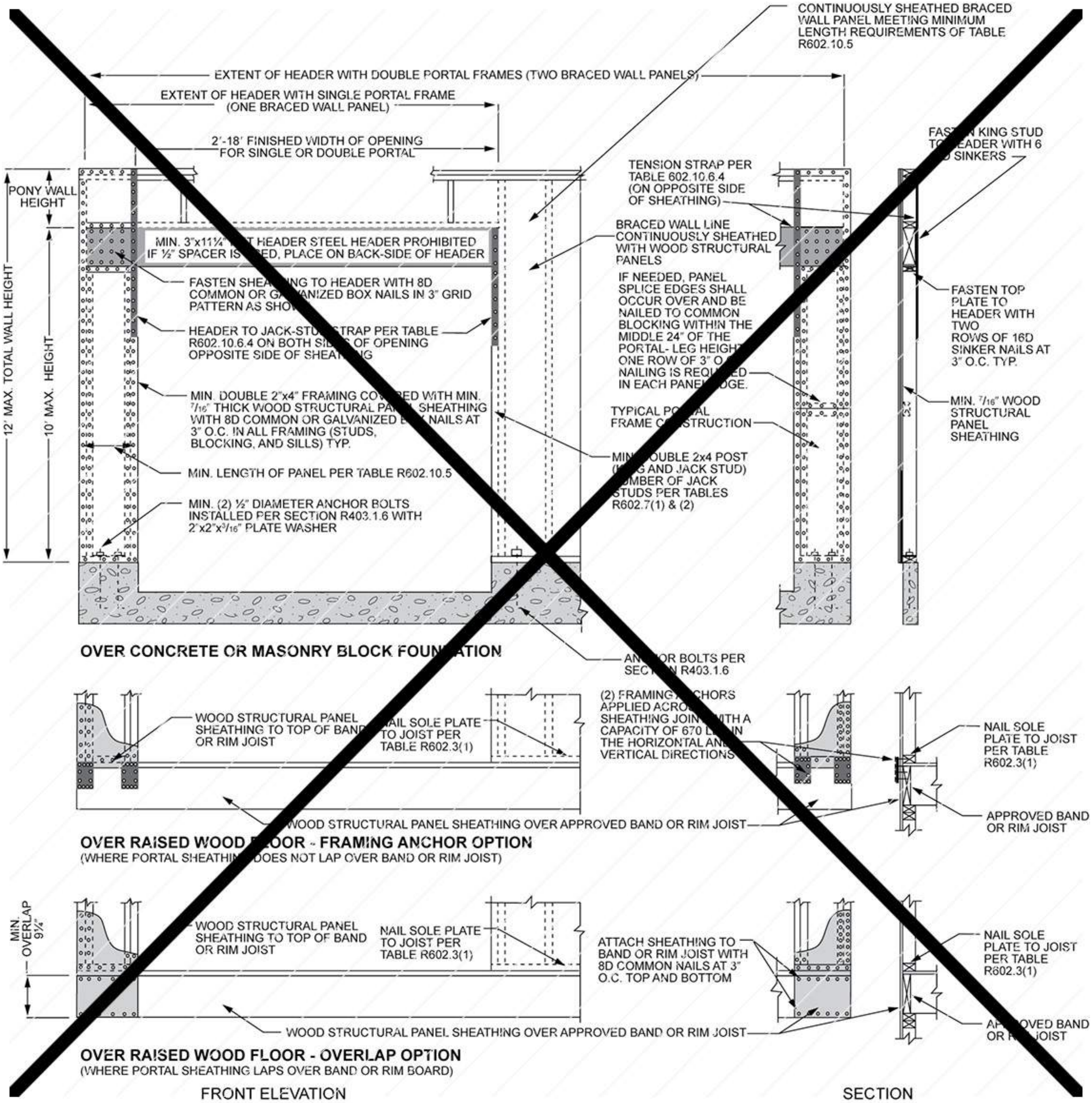




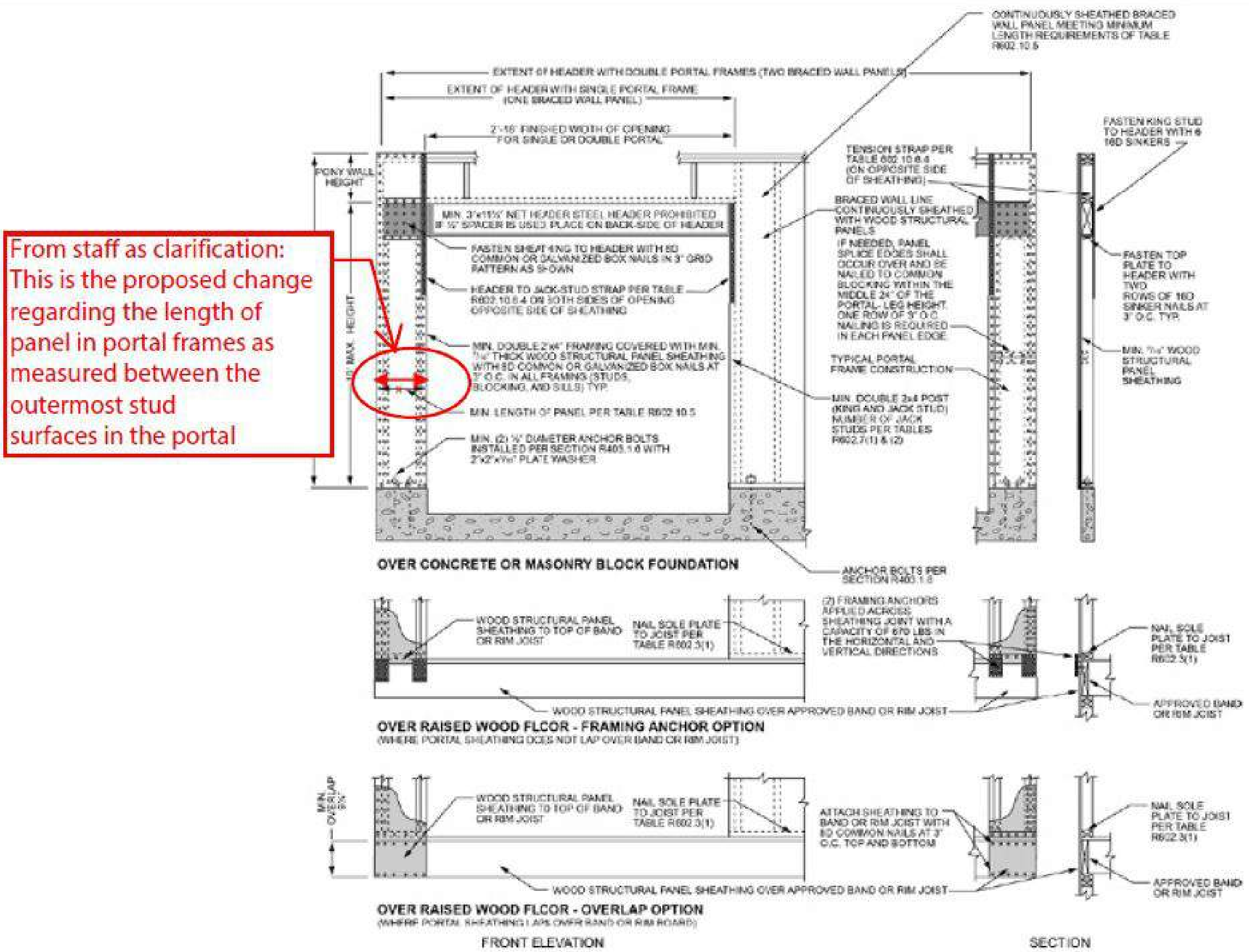
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.10.6.3 METHOD PFG—PORTAL FRAME AT GARAGE DOOR OPENINGS IN SEISMIC DESIGN CATEGORIES A, B AND C



CONTINUOUSLY SHEATHED BRACED WALL PANEL MEETING MINIMUM LENGTH REQUIREMENTS OF TABLE R602.10.5
EXTENT OF HEADER WITH DOUBLE PORTAL FRAMES (TWO BRACED WALL PANELS)
EXTENT OF HEADER WITH SINGLE PORTAL FRAME (ONE BRACED WALL PANEL)
2'-18' FINISHED WIDTH OF OPENING FOR SINGLE OR DOUBLE PORTAL
PONY WALL HEIGHT
12' MAX. TOTAL WALL HEIGHT
10' MAX. HEIGHT
TENSION STRAP PER TABLE 602.10.6.4 (ON OPPOSITE SIDE OF SHEATHING)
BRACED WALL LINE CONTINUOUSLY SHEATHED WITH WOOD STRUCTURAL PANELS
IF NEEDED, PANEL SPLICE EDGES SHALL OCCUR OVER AND BE NAILED TO COMMON BLOCKING WITHIN THE MIDDLE 24" OF THE PORTAL- LEG HEIGHT
MIN. DOUBLE 2"x4" FRAMING COVERED WITH MIN. 7/16" THICK WOOD STRUCTURAL PANEL SHEATHING WITH 8D COMMON OR GALVANIZED BOX NAILS AT 3" O.C. IN ALL FRAMING (STUDS, BLOCKING, AND SILLS) TYP.
MIN. LENGTH OF PANEL PER TABLE R602.10.5
MIN. (2) ½" DIAMETER ANCHOR BOLTS INSTALLED PER SECTION R403.1.6 WITH 2"x2"x3/16" PLATE WASHER
TYPICAL PORTAL FRAME CONSTRUCTION
FASTEN TOP PLATE TO HEADER WITH TWO ROWS OF 16D SINKER NAILS AT 3" O.C. TYP.
MIN. 7/16" WOOD STRUCTURAL PANEL SHEATHING
OVER CONCRETE OR MASONRY BLOCK FOUNDATION
WOOD STRUCTURAL PANEL SHEATHING TO TOP OF BAND OR RIM JOIST
TABLE R602.3(1)
THE HORIZONTAL AND VERTICAL DIRECTIONS
NAIL SOLE PLATE TO JOIST PER TABLE R602.3(1)
APPROVED BAND OR RIM JOIST
WOOD STRUCTURAL PANEL SHEATHING OVER APPROVED BAND OR RIM JOIST
OVER RAISED WOOD FLOOR - FRAMING ANCHOR OPTION
MIN. OVERLAP 9¼"
WOOD STRUCTURAL PANEL SHEATHING TO TOP OF BAND OR RIM JOIST
NAIL SOLE PLATE TO JOIST PER TABLE R602.3(1)
ATTACH SHEATHING TO BAND OR RIM JOIST WITH 8D COMMON NAILS AT 3" O.C. TOP AND BOTTOM
NAIL SOLE PLATE TO JOIST PER TABLE R602.3(1)
WOOD STRUCTURAL PANEL SHEATHING OVER APPROVED BAND OR RIM JOIST
OVER RAISED WOOD FLOOR - OVERLAP OPTION
(WHERE PORTAL SHEATHING LAPS OVER BAND OR RIM BOARD)
FRONT ELEVATION
SECTION



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.10.6.4 METHOD CS-PF—CONTINUOUSLY SHEATHED PORTAL FRAME PANEL CONSTRUCTION

Reason Statement: The length of panel in portal frames should be based on the length of the portal segment, as measured between the outermost stud surfaces in the portal. This was how the portal frame was tested and published in previous editions of the IRC (e.g., Figure R602.10.6.2 of the 2006 IRC, and Figures R602.10.3.3 and R602.10.3.4 of the 2009 IRC). Unfortunately, these figures have been redrawn many times over the years, resulting in Figures R602.10.6.2, R602.10.6.3, and R602.10.6.4 of the current (2021) IRC, which seem to show the distance between the outermost rows of nails. There have been no code change proposals to make such a subtle change over the years and it is believed that this is simply a detail in those figures that were overlooked. However, this has caused some questions by some code users to ICC staff who contacted APA for clarification. The intent of this proposal is to clarify it, as shown by the double-headed arrows in those figures, for consistency with the original portal frame figures that were previously approved by the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction because it clarifies the length of panel in the portal frames as originally intended without changing the material or labor requirements.

RB204-22

RB205-22

IRC: R606.1.1, R606.2.10, R606.12.2.3.1, R606.12.2.3.2, R703.12, TMS Chapter 44

Proponents: Phillip Samblanet, representing The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

2021 International Residential Code

Revise as follows:

R606.1.1 Professional registration not required. Where ~~the empirical design provisions of Appendix A of TMS 402,~~ the provisions of TMS 403, or the provisions of this section are used to design masonry, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the *jurisdiction* having authority.

R606.2.10 Mortar for AAC masonry. Thin-bed mortar for AAC masonry shall comply with Article 2.2 D.1~~2.1 C.1~~ of TMS 602. Mortar used for the leveling courses of AAC masonry shall comply with Article 2.2 D.2 ~~2.1 C.2~~ of TMS 602.

R606.12.2.3.1 Connections to masonry shear walls. Connectors shall be provided to transfer forces between masonry walls and horizontal elements in accordance with the requirements of Chapter 4 ~~Section 4.1.4~~ of TMS 402. Connectors shall be designed to transfer horizontal design forces acting either perpendicular or parallel to the wall, but not less than 200 pounds per linear foot (2919 N/m) of wall. The maximum spacing between connectors shall be 4 feet (1219 mm). Such anchorage mechanisms shall not induce tension stresses perpendicular to grain in ledgers or nailers.

R606.12.2.3.2 Connections to masonry columns. Connectors shall be provided to transfer forces between masonry columns and horizontal elements in accordance with the requirements of Chapter 4 ~~Section 4.1.4~~ of TMS 402. Where anchor bolts are used to connect horizontal elements to the tops of columns, the bolts shall be placed within lateral ties. Lateral ties shall enclose both the vertical bars in the column and the anchor bolts. There shall be not less than two No. 4 lateral ties provided in the top 5 inches (127 mm) of the column.

R703.12 Adhered masonry veneer installation. Adhered masonry veneer shall comply with the requirements of Section R703.7.3 and the requirements in Sections 13.1~~12.1~~ and 13.3 ~~12.3~~ of TMS 402. Adhered masonry veneer shall be installed in accordance with Section R703.7.1, Article 3.3D~~3.3C~~ of TMS 602 or the manufacturer's instructions.

TMS

The Masonry Society
105 South Sunset Street, Suite Q
Longmont, CO 80501

402—~~2016~~ 2022	Building Code Requirements for Masonry Structures
602—~~2016~~ 2022	Specification for Masonry Structures

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, TMS 402-2022 Building Code Requirements for Masonry Structures and TMS 602-2022 Specification for Masonry Structures, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This change updates the IRC references and requirements to TMS 402-22 and TMS 602-22. In most cases, the changes are entirely related to moving provisions and updating the references. The deletion of the permission to use empirical design is needed because that appendix has been removed from TMS 402-22 as the Committee no longer supports the provisions for new construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply updates references. As such, there is no impact on construction costs.

RB205-22

RB206-22

IRC: R606.12.4.3 (New), R908.1.1 (New), AJ108.4

Proponents: Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Add new text as follows:

R606.12.4.3 Unreinforced Masonry Parapets. Unreinforced masonry parapets located in Seismic Design Category D_2, shall have wall anchors installed at the roofline and bracing above the roofline whenever a *reroofing permit* is issued, and work involves removal of roofing materials from more than 25 percent of the roof area. Such masonry bracing and wall anchors shall be of an *approved* design, unless an evaluation demonstrates compliance of the existing bracing and anchorage.

> **Exception:** Bracing above the roof line shall not be required where the maximum height of unbraced unreinforced masonry does not exceed a height-to-width ratio of 2.5. Height shall be measured from the top of the parapet down to the highest existing brace or anchor point attached to the structure.

R908.1.1 Structure. Whenever a *reroofing permit* is issued for work done in Seismic Design Category D_2, parapets constructed of unreinforced masonry shall comply with R606.12.4.3.

APPENDIX AJ
EXISTING BUILDINGS AND STRUCTURES

SECTION AJ108
RENOVATIONS

Revise as follows:

~~**AJ108.4 Structural.** Unreinforced masonry buildings located in Seismic Design Category D_2 or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.~~

Reason Statement: Appendix AJ has not been updated to correlate with changes in the IRC and IEBC provisions that have occurred during recent code cycles. This proposal aligns the unbraced masonry provisions of Appendix AJ with similar IEBC Section 503.6 provisions and relocates these provisions within the main body of the IRC. This provision applies only to the highest seismic design category, D_2, and targets unreinforced masonry elements which have proven to be exceptionally vulnerable to ground shaking from earthquakes.

Photo of damage to masonry building in Christchurch.
COURTESY OF FRED TURNER, AVAILABLE AT WWW.EERI.ORG,
LAST ACCESSED 8/3/19

Unreinforced parapets (Figure 1) have proven to be vulnerable to ground motion. Aside from the damage to the building, falling masonry poses a hazard to occupants sheltering in the building and pedestrians immediately outside of the building. This vulnerability can be significantly reduced by installing braces to reduce the unsupported length of masonry that projects above the roof decking (Figure 2).

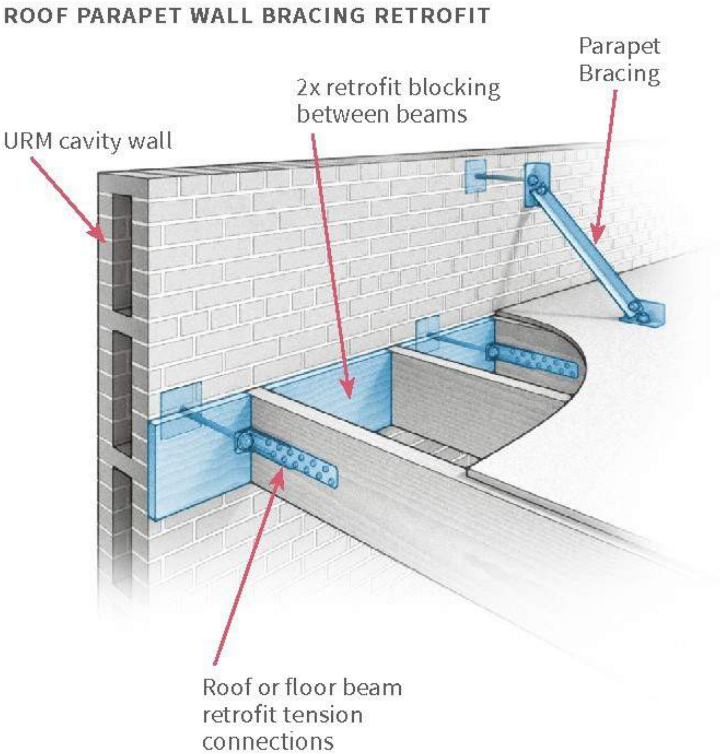


Figure 2 Caption: Parapet bracing and added tension ties to the roof/floor framing. FEMA P-530

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction by moving this provision within the main body of the IRC. However, this provision has been revised from the current Appendix AJ provision and is limited to SDC D2 only, applies only if roof work involves more than 25% of the roof area, and provides an exception for shorter more squat URM parapets.

RB206-22

RB207-22

IRC: R609.1, R609.4.1

Proponents: Mike Fischer, representing International Door Association (mfischer@kellencompany.com)

2021 International Residential Code

Revise as follows:

R609.1 General. This section prescribes performance and construction requirements for exterior windows, ~~and~~ doors, and garage doors installed in walls. Windows and doors shall be installed in accordance with the fenestration manufacturer's written instructions. Window and door openings shall be flashed in accordance with Section R703.4. Written installation instructions shall be provided by the fenestration manufacturer for each window or door.

R609.4 Garage doors. Garage doors shall be tested in accordance with either ASTM E330 or ANSI/DASMA 108, and shall meet the pass/failcriteria of ANSI/DASMA 108.

Revise as follows:

R609.4.1 Garage door labeling. Garage doors shall be *labeled* with a permanent *label* provided by the garage door manufacturer. The *label* shall identify the garage door manufacturer, the garage door model/series number, the positive and negative design wind pressure rating, the installation instruction drawing reference number, and the applicable test standard. Garage doors shall be installed in accordance with the manufacturer's installation instructions.

Reason Statement: The proposal makes two changes. The first change in Section R609.1 is editorial; Section R609 includes provisions for exterior windows and doors, and also for garage doors. The proposed text includes garage doors within the scope of Section R609 to clarify the intent of the section.

The second proposed change is in R609.4.1 adds a requirement that garage doors be installed in accordance with the manufacturer's installation instructions. Note that R609.4 includes product testing requirements, and R609.4.1 includes labeling details with a reference to the "installation instruction drawing", but does not specifically state that the garage door be installed in accordance with the installation instructions. Those instructions often contain additional information regarding jamb attachments and anchoring and other details necessary to ensure proper installation and compliance with the intent of the code. The proposal clarifies the intent and is consistent with the provisions for exterior windows and doors in Section R609.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal clarifies the current expectation that tested garage doors be installed in accordance with the manufacturers installation instructions. It adds no new requirements.

RB207-22

RB208-22

IRC: R702.7, R702.7.1 (New)

Proponents: Theresa Weston, representing Air Barrier Association of America (ABAA) (holtweston88@gmail.com)

2021 International Residential Code

Revise as follows:

R702.7 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table R702.7(1). A vapor retarder shall be provided on the interior side of frame walls of the class indicated in Table R702.7(2), including compliance with Table R702.7(3) or R702.7(4) where applicable. An *approved* design using accepted engineering practice for hygrothermal analysis shall be permitted as an alternative. Vapor retarders shall be installed in accordance with Section R702.7.1 The climate zone shall be determined in accordance with Section N1101.7 .

Exceptions:

1. *Basement walls*.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. A vapor retarder shall not be required in Climate Zones 1, 2 and 3.

Add new text as follows:

R702.7.1 Vapor Retarder Installation. Vapor retarders shall be installed in accordance with the manufacturer's instructions or an approved design. Where a vapor retarder also functions as a component of a continuous air barrier, the vapor retarder shall be installed as an air barrier in accordance with Section N1102.4.1.1.

Reason Statement: This proposal recognizes the challenge of materials that serve multiple functions. In addition to protection from condensation, vapor retarders may also function as a component in an air barrier assembly. This proposal seeks coordination of the installation of vapor retarders between Part III - Building Planning and Construction and Part IV -- Energy Conservation of the IRC in order to streamline the compliance with both sections. Vapor retarders are commonly installed as part of or in conjunction with an air barrier. Air leakage control is currently addressed within the I-codes based on energy efficiency considerations, but it also critical to the protection against moisture condensation.
This proposal correlates with a proposal that was approved for the IBC in Group A.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will neither increase nor decrease the cost of construction as it does not add new technical requirements, but rather coordinates between existing requirements in two Parts of the code. The coordination is to ensure that existing requirements are implemented in an effective manner.

RB208-22

RB209-22

IRC: SECTION 202 (New), R702.7, TABLE R702.7(2), TABLE R702.7(3), TABLE R702.7(4), R702.7(5) (New), R702.7.2 (New)

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Add new definition as follows:

RESPONSIVE VAPOR RETARDER. A vapor retarder material complying with a *vapor retarder class* of Class I or Class II but which also has a vapor permeance of 1 perm or greater in accordance with ASTM E96, water method (Procedure B).

Revise as follows:

R702.7 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table R702.7(1). A vapor retarder shall be provided on the interior side of frame walls of the class indicated in Table R702.7(2), including compliance with Table R702.7(3) or R702.7(4) where applicable. An *approved* design using accepted engineering practice for hygrothermal analysis shall be permitted as an alternative. The climate zone shall be determined in accordance with Section N1101.7 .

Exceptions:

1. *Basement walls*.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. A vapor retarder shall not be required in Climate Zones 1, 2 and 3.
5. In Climate Zones 4 through 8, a vapor retarder shall not be required where the assembly complies with Table R702.7(5).

TABLE R702.7(1) VAPOR RETARDER MATERIALS AND CLASSES

CLASS	ACCEPTABLE MATERIALS
I	Sheet polyethylene, nonperforated aluminum foil or other approved materials with a perm rating less than or equal to 0.1.
II	Kraft-faced fiberglass batts, vapor retarder paint or other approved materials applied in accordance with the manufacturer's installation instructions for a perm rating greater than 0.1 and less than or equal to 1.0.
III	Latex paint, enamel paint or other approved materials applied in accordance with the manufacturer's installation instructions for a perm rating greater than 1.0 and less than or equal to 10.0.

TABLE R702.7(2) VAPOR RETARDER OPTIONS

CLIMATE ZONE	VAPOR RETARDER CLASS		
	CLASS I[a]	CLASS II[a]	CLASS III
1, 2	Not Permitted	Not Permitted	Permitted
3, 4 (except Marine 4)	Not Permitted	Permitted[c]	Permitted
Marine 4, 5, 6, 7, 8	Permitted[b,c]	Permitted[c]	See Table R702.7(3)

a. A *responsive vapor retarder* ~~Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B)~~ shall be allowed on the interior side of any frame wall in all climate zones.

b. Use of a Class I interior vapor retarder, that is not a *responsive vapor retarder*, in frame walls with a Class I vapor retarder on the exterior side shall require an *approved* design.

c. Where a Class I or II vapor retarder is used in combination with foam plastic insulating sheathing installed as *continuous insulation* on the exterior side of frame walls, the *continuous insulation* shall comply with Table R702.7(4) and the Class I or II vapor retarder shall be a *responsive vapor retarder* ~~have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B)~~.

TABLE R702.7(3) CLASS III VAPOR RETARDERS

CLIMATE ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
Marine 4	Vented cladding over wood structural panels.
	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 2.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 3.75 over 2 × 6 wall.
5	Vented cladding over wood structural panels.
	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 7.5 over 2 × 6 wall.
6	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 7.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 11.25 over 2 × 6 wall.
7	Continuous insulation with *R*-value ≥ 10 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 15 over 2 × 6 wall.
8	Continuous insulation with *R*-value ≥ 12.5 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 20 over 2 × 6 wall.

a. Vented cladding shall include vinyl, polypropylene, or horizontal aluminum siding, brick veneer with a clear airspace as specified in Table R703.8.4(1), rainscreen systems, and other approved vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of Chapter 11.

TABLE R702.7(4) CONTINUOUS INSULATION WITH CLASS I OR II RESPONSIVE VAPOR RETARDER

CLIMATE ZONE	~~CLASS II VAPOR RETARDERS~~ PERMITTED CONDITIONS ~~FOR~~:[a]
3	Continuous insulation with *R*-value ≥ 2.
4, 5 and 6	Continuous insulation with *R*-value ≥ 3 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 5 over 2 × 6 wall.
7	Continuous insulation with *R*-value ≥ 5 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 7.5 over 2 × 6 wall.
8	Continuous insulation with *R*-value ≥ 7.5 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 10 over 2 × 6 wall.

a. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class II vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of Chapter 11.

Add new text as follows:

R702.7(5) CONTINUOUS INSULATION ON WALLS WITHOUT A CLASS I, II, OR III INTERIOR VAPOR RETARDER[a]

CLIMATE ZONE	PERMITTED CONDITIONS:[b,c]
4	*Continuous insulation* with R-value >= 4.5
5	*Continuous insulation* with R-value >= 6.5
6	*Continuous insulation* with R-value >= 8.5
7	*Continuous insulation* with R-value >= 11.5
8	*Continuous insulation* with R-value >= 14

a. The total insulating value of materials to the interior side of the exterior *continuous insulation*, including any cavity insulation, shall not exceed R-5. Where the R-value of materials to the interior side of the exterior *continuous insulation* exceed R-5, an *approved* design shall be required.

b. A water vapor control material layer having a permeance not greater than 1 perm in accordance with ASTM E96, Procedure A (dry cup) shall be placed on the exterior side of the wall and to the interior side of the exterior *continuous insulation*. The exterior *continuous insulation* shall be permitted to serve as the vapor control layer where, at its installed thickness or with a facer on its interior face, the exterior *continuous insulation* is a Class I or II vapor retarder.

c. The requirements in this table apply only to insulation used to control moisture in order to allow walls without a Class I, II, or III interior vapor retarder. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the *International Energy Conservation Code*.

R702.7.1 Spray foam plastic insulation for moisture control with Class II and III vapor retarders. For purposes of compliance with Tables R702.7(3) and R702.7(4), spray foam with a maximum permeance of 1.5 perms at the installed thickness applied to the interior side of wood structural panels, fiberboard, *insulating sheathing* or gypsum shall be deemed to meet the continuous insulation moisture control requirement in accordance with one of the following conditions:

1. The spray foam *R*-value is equal to or greater than the specified continuous insulation *R*-value.
2. The combined *R*-value of the spray foam and continuous insulation is equal to or greater than the specified continuous insulation *R*-value.

Add new text as follows:

R702.7.2 Vapor retarder installation. Vapor retarders shall be installed in accordance with the manufacturer's instructions or an *approved* design. Where a vapor retarder also functions as a component of a continuous air barrier, the vapor retarder shall be installed as an air barrier in accordance with the *International Energy Conservation Code*.

Reason Statement: The purpose of this proposal is to coordinate the IRC vapor retarder provisions with incremental improvements made for the 2024 IBC vapor retarder provisions in the 2021 code as a result of FS138-21 approved as modified. The major improvements include:
1. inclusion of a definition for responsive vapor retarders and correlating changes to text to streamline use of the definition,

2. the ability to use Class I or II responsive vapor retarders with Table R702.7(4),

3. inclusion of a new exception and option (Table R702.7(5)) to control water vapor using exterior continuous insulation without an interior vapor retarder,

4. recognition of rainscreen systems as a vented cladding for use with Table R702.7(3), and

5. addition of a new subsection R702.7.2 for vapor retarder installation.

These changes will make the IBC and IRC consistent with the one exception being that the Class III vapor retarder provisions in Table R702.7(3) remain unchanged with regard to applying only to the Marine 4 climate zone and not all of Climate Zone 4 as in the 2021 and 2024 IBC. This difference was the result of a compromise made in the prior code development cycle for the IRC based on builder experience. Outside of that exception, all of the changes made are consistent with and expand on the original research and technical basis of the existing vapor retarder provisions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal coordinates with the 2024 IBC provisions by providing clarifications and additional options for compliance.

RB209-22

RB210-22

IRC: TABLE R702.7(2)

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Revise as follows:

TABLE R702.7(2) VAPOR RETARDER OPTIONS

CLIMATE ZONE	VAPOR RETARDER CLASS		
	CLASS I[a]	CLASS II[a]	CLASS III
1, 2	Not Permitted	Not Permitted	Permitted
3, 4 (except Marine 4)	Not Permitted	Permitted[c]	Permitted
Marine 4, 5, 6, 7, 8	Permitted[b]	Permitted[c]	See Table R702.7(3)

a. Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones.

b. Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design.

c. Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing or insulated siding installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table R702.7(4) and the Class II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B).

Reason Statement: This is a simple change to include other forms of continuous insulation in this footnote in addition to insulated sheathing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply adds an option when this section of the code is applied.

RB210-22

RB211-22

IRC: R703.1.1

Proponents: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com)

2021 International Residential Code

Revise as follows:

R703.1.1 Water resistance. The exterior wall envelope shall be designed and constructed in a manner that prevents the accumulation of water within the wall assembly by providing a ~~water-resistant barrier~~ *water-resistive barrier* behind the exterior cladding as required by Section R703.2 and a means of draining to the exterior water that penetrates the exterior cladding.

Exceptions:

1. A weather-resistant exterior wall envelope shall not be required over concrete or masonry walls designed in accordance with Chapter 6 and flashed in accordance with Section R703.4 or R703.8.
2. Compliance with the requirements for a means of drainage, and the requirements of Sections R703.2 and R703.4, shall not be required for an exterior wall envelope that has been demonstrated to resist wind-driven rain through testing of the exterior wall envelope, including joints, penetrations and intersections with dissimilar materials, in accordance with ASTM E331 under the following conditions:

   2.1. Exterior wall envelope test assemblies shall include at least one opening, one control joint, one wall/eave interface and one wall sill. All tested openings and penetrations shall be representative of the intended end-use configuration.

   2.2. Exterior wall envelope test assemblies shall be at least 4 feet by 8 feet (1219 mm by 2438 mm) in size.

   2.3. Exterior wall assemblies shall be tested at a minimum differential pressure of 6.24 pounds per square foot (299 Pa).

   2.4. Exterior wall envelope assemblies shall be subjected to the minimum test exposure for a minimum of 2 hours.

The exterior wall envelope design shall be considered to resist wind-driven rain where the results of testing indicate that water did not penetrate control joints in the exterior wall envelope, joints at the perimeter of openings penetration or intersections of terminations with dissimilar materials.

Reason Statement: This proposal changes the term "water-resistant barrier" in Section R703.1.1 to "*water-resistive barrier*", because the section and sentence using that term directly references Section R703.2 Water-resistive barriers. "Water-resistive barrier" is a defined term whereas "water-resistant barrier" is not.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal replaces an improper term with the proper term, and does not affect construction costs.

RB211-22

RB212-22

IRC: R703.2

Proponents: Theresa Weston, representing Air Barrier Association of America (ABAA) (holtweston88@gmail.com)

2021 International Residential Code

Revise as follows:

R703.2 Water-resistive barrier. Not fewer than one layer of *water-resistive barrier* shall be applied over studs or sheathing of all exterior walls with flashing as indicated in Section R703.4, in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1. <u>Where the water-resistive barrier also functions as a component of a continuous air barrier, the water-resistive barrier shall be installed as an air barrier in accordance with Section N1102.4.1.1.</u> Water-resistive barrier materials shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type 1 or 2.
3. ASTM E331 in accordance with Section R703.1.1.
4. Other approved materials in accordance with the manufacturer's installation instructions.

No.15 asphalt felt and *water-resistive barriers* complying with ASTM E2556 shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and where joints occur, shall be lapped not less than 6 inches (152 mm).

Reason Statement: This proposal recognizes the challenge of materials that serve multiple functions. In many applications a water-resistive barrier also serves as a major component of an air barrier assembly. This proposal seeks coordination of installation of water-resistive barrier between Part III - Building Planning and Construction and Part IV -- Energy Conservation of the IRC in order to streamline the compliance with both sections.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will neither increase nor decrease the cost of construction, as it only coordinates between existing requirements that are in different Parts of the code and does not add new technical requirements. The coordination is to ensure that existing requirements are implemented in an effective manner.

RB212-22

RB213-22

IRC: R703.2

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.2 Water-resistive barrier. Not fewer than one layer of *water-resistive barrier* shall be applied over studs or sheathing of all exterior walls with flashing as indicated in Section R703.4, in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1. Water-resistive barrier materials shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type 1 or 2.
3. Foam plastic insulating sheathing water-resistive barrier systems complying with Section R703.1.1 and installed in accordance with the manufacturer's installation instructions.

4.~~3.~~ ASTM E331 in accordance with Section R703.1.1.

5.~~4.~~ Other approved materials in accordance with the manufacturer's installation instructions.

No.15 asphalt felt and *water-resistive barriers* complying with ASTM E2556 shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and where joints occur, shall be lapped not less than 6 inches (152 mm).

Reason Statement: This proposal coordinates the IRC language with the IBC 2024 language approved as submitted in accordance with proposal FS128-21. Foam sheathing has been used successfully for many years as an approved WRB system when qualified for this application and installed in accordance with manufacturer instructions. It is appropriate to recognize this WRB method in the code because it has consistently demonstrated at least equivalent performance of other materials prescriptively recognized in this list (e.g., No. 15 felt, Grade D papers, and wraps per ASTM E2556). Section R703.1.1 is referenced because those performance criteria have been historically applied as the water-resistance requirements of foam sheathing WRB system – tested in an exposed condition on full-scale wall assemblies for qualification purposes. Installation in accordance with the manufacturer's instructions also is required because those instructions address the use of qualified components, such as joint treatments (e.g., tapes) and installation procedures consistent with tested performance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal has no cost impact because it simply adds a WRB option to the code. The performance and installation requirements are consistent with current successful use.

RB213-22

RB214-22

IRC: R703.2

Proponents: Matthew Hunter, representing Wood Manufacturing (mhunter@awc.org)

2021 International Residential Code

Revise as follows:

R703.2 Water-resistive barrier. Not fewer than one layer of *water-resistive barrier* shall be applied over studs or sheathing of all exterior walls with flashing as indicated in Section R703.4, in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1. Water-resistive barrier materials shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type 1 or 2.
3. ASTM E331 in accordance with Section R703.1.1.
4. Other approved materials in accordance with the manufacturer's installation instructions.

No.15 asphalt felt and *water-resistive barriers* complying with ASTM E2556 shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and where joints occur, shall be lapped not less than 6 inches (152 mm).

Exception: A water-resistive barrier shall not be required in unconditioned detached tool sheds, storage sheds, playhouses, and other similar accessory structures provided all of the following requirements are met:

1. Exterior wall covering is limited to siding that is attached direct to studs.
2. Exterior walls are uninsulated.
3. Interior side of exterior walls has no wall covering or wall finishes.

Reason Statement: This proposal takes into account feedback from prior code development cycles on the omission of water-resistive barriers (WRB) for detached accessory structures. For many years, the code exempted accessory structures from the requirement for a water-resistive barrier. The exception was removed in the 2018 code development cycle (RB284-16), but the exception that was removed applied to all accessory structures, regardless of their purpose and regardless of whether they were heated or cooled. Unconditioned detached accessory structures such as tool sheds and storage sheds with open stud construction have a proven record of performance when complying with the normal siding installation requirements without a water-resistive barrier. The Committee was split (6-4) in favor of a previous proposal (RB231-19) to reinstate the exemption of accessory structures from WRB requirement during the 2019 Group B cycle, but there were objections raised during the Public Comment Hearings regarding the lack of requirements for open stud construction (i.e., no insulation, wall coverings, or wall finishes) on the inside of these structures to facilitate drying action from both sides of the wall. The three proposed exceptions are very clear as to when a WRB is not required. The permissible omission or the WRB does not waive requirements for WRB installation where WRB use is required by the siding manufacturer's installation instructions. Should an uninsulated, not fit for human occupancy tool shed, storage shed, playhouse, or other equipment shed be proposed to serve as a future tiny home or home office, compliance with all applicable building code provisions associated with that specific use and occupancy would be required. Please refer to Section R302 for use of terms detached tool sheds, storage sheds, and playhouses also used in this proposal to describe types of detached accessory structures.

Cost Impact: The code change proposal will decrease the cost of construction
The proposal clarifies where water-resistive barriers (WRB) may be omitted.

RB214-22

RB215-22

IRC: TABLE R703.3(1)

Proponents: Rick Allen, representing ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

TABLE R703.3(1) SIDING MINIMUM ATTACHMENT AND MINIMUM THICKNESS

Portions of table not shown remain unchanged.

SIDING MATERIAL		NOMINAL THICKNESS (inches)	JOINT TREATMENT	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud[l]	Direct to studs	Number or spacing of fasteners
Fiber cement siding	Panel siding (see Section R703.10.1)	$^{5}/_{16}$	Section R703.10.1	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	4d common ($1^{1}/_{2}$″ × 0.099″)	6″ panel edges 12″ inter. sup.
	Lap siding (see Section R703.10.2)	$^{5}/_{16}$	Section R703.10.2	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″) or 0.120" dia. (11 gage) roofing nail	Note f
Insulated vinyl siding[j,m]		0.035 (vinyl siding layer only)	Lap	0.120" nail (shank) with a 0.313" head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h, i]	0.120" nail (shank) with a 0.313" head or 16- gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h]	0.120" nail (shank) with a 0.313" head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h]	0.120" nail (shank) with a 0.313" head Section R703.11.2	Not allowed	16 inches on center or specified by manufacturer instructions, test report or other sections of this code
Vinyl siding[m] (see Section R703.11)		0.035	Lap	0.120″ nail (shank) with a 0.313″ head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h, i]	0.120″ nail (shank) with a 0.313″ head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h]	0.120″ nail (shank) with a 0.313″ head or 16- gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h]	0.120″ nail (shank) with a 0.313 head Section R703.11.2	Not allowed	16 inches on center or as specified by the manufacturer instructions or test report

For SI: 1 inch = 25.4 mm.

a. Aluminum nails shall be used to attach aluminum siding.

b. Aluminum (0.019 inch) shall be unbacked only where the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.

c. Shall be of approved type.

d. Where used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.

e. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.

f. Face nailing: one 6d common nail through the overlapping planks at each stud. Concealed nailing: one 11-gage 0.120" diameter $1^{1}/_{2}$-inch-long galv. roofing nail through the top edge of each plank at each stud in accordance with the manufacturer's installation instructions.

g. Vertical joints, if staggered, shall be permitted to be away from studs if applied over wood structural panel sheathing.

h. Minimum fastener length must be sufficient to penetrate sheathing other nailable substrate and framing a total of a minimum of $1^{1}/_{4}$ inches or in accordance with the manufacturer's installation instructions.

i. Where specified by the manufacturer's instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or other nailable substrate of minimum thickness specified by the instructions or test report, without penetrating into framing.

j. Insulated vinyl siding shall comply with ASTM D7793.

k. Polypropylene siding shall comply with ASTM D7254.

l. Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Sections R703.15, R703.16 and R703.17.

m Fastener shall be aluminum, galvanized steel or stainless steel.

Reason Statement: ASTM F1667 requires a decimal diameter to be indicated when gage is used as a nail diameter.
Staples shown in table did not have crown widths indicated. The Vinyl Siding Institute (VSI) standard provided the appropriate crown widths.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change clarified information already provided.

RB215-22

RB216-22

IRC: R703.3.1 (New)

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Add new text as follows:

R703.3.1 Siding clearance at wall and adjacent surfaces. Unless otherwise specified by the cladding manufacturer or this code, cladding shall have clearance of at least 6 inches (152 mm) from grade and at least 1/2 inch (13 mm) from other adjacent surfaces (decks, roofs, slabs).

Reason Statement: This code contains various clearance between grade, slabs, and other horizontal surfaces. With siding there are several reasons to require this spacing including heat building up on horizontal surfaces, expansion and contraction issues that come along with certain sidings like polymeric siding, and moisture management issues. A 1/2” clearance will provide a good distance between materials and intersection surfaces/planes and 6” is consistent with specific codes requirements in R317.1, protection of wood products including wood siding.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a common practice but worth noting in the code to ensure proper siding performance and moisture / heat issues.

RB216-22

RB217-22

IRC: R703.3.4

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Revise as follows:

R703.3.4 Minimum fastener length and penetration. Fasteners shall have the greater of the minimum length specified in Table R703.3(1) or as required to provide a minimum penetration into framing as follows:

1. Fasteners for horizontal aluminum siding, steel siding, particleboard panel siding, wood structural panel siding in accordance with ANSI/APA-PRP 210, fiber-cement panel siding and fiber-cement lap siding installed over foam plastic sheathing shall penetrate not less than $1^1/_2$ inches (38 mm) into framing or shall be in accordance with the manufacturer's installation instructions.
2. Fasteners for hardboard panel and lap siding shall penetrate not less than $1^1/_2$ inches (38 mm) into framing.
3. Fasteners for vinyl siding and insulated vinyl siding shall be installed in accordance with Section R703.11 or R703.13. ~~over wood or wood structural panel sheathing shall penetrate not less than 1¹/₄ inches (32 mm) into sheathing and framing combined. Vinyl siding and insulated vinyl siding shall be permitted to be installed with fasteners penetrating into or through wood or wood structural sheathing of minimum thickness as specified by the manufacturer's instructions or test report, with or without penetration into the framing. Where the fastener penetrates fully through the sheathing, the end of the fastener shall extend not less than ¹/₄ inch (6.4 mm) beyond the opposite face of the sheathing. Fasteners for vinyl siding and insulated vinyl siding installed over foam plastic sheathing shall be in accordance with Section R703.11.2. Fasteners for vinyl siding and insulated vinyl siding installed over fiberboard or gypsum sheathing shall penetrate not less than 1¹/₄ inches (32 mm) into framing.~~
4. Fasteners for polypropylene siding shall be installed in accordance with Section R703.14.

~~4.~~ 5. Fasteners for vertical or horizontal wood siding shall penetrate not less than $1^1/_2$ inches (38 mm) into studs, studs and wood sheathing combined, or blocking.

~~5.~~ 6. Fasteners for siding material installed over foam plastic sheathing shall have sufficient length to accommodate foam plastic sheathing thickness and to penetrate framing or sheathing and framing combined, as specified in Items 1 through 4.

Reason Statement: This change shortens the code and points to the appropriate section for these two product categories for minimum fastener length and penetration. These same requirements are in the pointed to sections in the change.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple clean up and reduces code size!

RB217-22

RB218-22

IRC: R703.4

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.4 Flashing. *Approved* corrosion-resistant flashing shall be applied ~~*shingle-fashion*~~ in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. <u>Overlapped flashing shall be applied in *shingle-fashion.*</u> Self-adhered membranes used as flashing shall comply with AAMA 711. Fluid-applied membranes used as flashing in exterior walls shall comply with AAMA 714. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall be installed in accordance with Section R703.4.1.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood *trim*.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

Reason Statement: "Shingle fashion" describes only one method of flashing. However, it is not the only method of installing flashing in a manner to prevent entry of water. For example, while adhered flexible flashing can be lapped shingle fashion and should be in cases where they are lapped, there are many applications where they rely on sealing to prevent water entry, including vertical seams, horizontal seams, and head seams (just as is the case with adhered joints in roofing membranes). In addition, fluid applied flashings are applied continuously to a joint, rely on sealing, and cannot be applied "shingle fashion". Therefore, this proposal distinguishes "shingle fashion" as a separate requirement where flashing is installed in an overlapping manner. The first sentence is revised by deleting "shingle fashion" so that it focuses on describing the performance intent of flashing in a non-exclusive manner irrespective of the type, material, or method of installation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal allows for flashing options and, consequently, may decrease the cost of construction or improve performance in some flashing applications.

RB218-22

RB219-22

IRC: R703.4.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.4.1 Flashing installation at exterior window and door openings . Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to a *water-resistive barrier* complying with Section 703.2 for subsequent drainage. Air sealing shall be installed around all window and door openings on the interior side of the rough opening gap. Mechanically attached flexible flashings shall comply with AAMA 712. Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:

1. The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing <u>or *water-resistive barrier*</u> manufacturer's instructions. Where flashing instructions or details are not provided, *pan flashing* shall be installed at the sill of exterior window and door openings. *Pan flashing* shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Openings using *pan flashing* shall incorporate flashing or protection at the head and sides.
2. In accordance with the flashing design or method of a *registered design professional*.
3. In accordance with other *approved* methods.

Reason Statement: This proposal coordinates the IRC language with the IBC 2024 language approved as submitted in accordance with proposal FS145-21. Flashing of window and door penetrations involves multiple products including the window or door product, the flashing materials, and WRB materials used on a wall assembly. Each of these product manufacturers have a vested interest to ensure that their products are properly integrated with other wall components to ensure continuity of water resistance of the whole wall assembly. Currently, the WRB manufacturer is missing from Item 1 as a source for flashing installation instructions. This proposal is needed to ensure that all manufacturers, including the WRB manufacturer, have a means to communicate their flashing instructions for interfacing walls with windows and doors. This is needed because instructions from any one manufacturer may not include instructions for appropriate use of materials manufactured by others, but which is part of the overall flashing system.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds another important option for flashing instructions to be used where needed.

RB219-22

RB220-22

IRC: R703.6.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.6.1 Application. Wood shakes or shingles shall be applied either single course or double course over nominal $^{1}/_{2}$-inch (12.7 mm) wood-based sheathing or to furring strips over $^{1}/_{2}$-inch (12.7 mm) nominal nonwood sheathing. A *water-resistive barrier* shall be provided over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51 mm) and vertical overlaps of not less than 6 inches (152 mm). Where horizontal furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25 mm by 76 mm or 25 mm by 102 mm) and shall be fastened to the studs with minimum 7d or 8d box nails and shall be spaced a distance on center equal to the actual weather exposure of the shakes or shingles, not to exceed the maximum exposure specified in Table R703.6.1. When installing shakes or shingles over a nonpermeable *water-resistive barrier*, furring strips shall be placed first vertically over the barrier and in addition, horizontal furring strips shall be fastened to the vertical furring strips prior to attaching the shakes or shingles to the horizontal furring strips. Where installed over foam plastic *insulating sheathing*, furring attachments shall comply with Sections R703.15, R703.16, or R703.17. The spacing between adjacent shingles to allow for expansion shall be $^{1}/_{8}$ inch (3.2 mm) to $^{1}/_{4}$ inch (6.4 mm) apart, and between adjacent shakes shall be $^{3}/_{8}$ inch (9.5 mm) to $^{1}/_{2}$ inch (12.7 mm) apart. The offset spacing between joints in adjacent courses shall be not less than $1^{1}/_{2}$ inches (38 mm).

Reason Statement: This proposal ensures that furring installed over foam sheathing complies with the attachment requirements found in other sections of the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change requirements or cost, and ensures compliance with existing furring attachment requirements.

RB220-22

RB221-22

IRC: R703.6.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.6.1 Application. Wood shakes or shingles shall be applied either single course or double course over nominal $^{1}/_{2}$-inch (12.7 mm) wood-based sheathing or to furring strips over $^{1}/_{2}$-inch (12.7 mm) nominal nonwood sheathing. A *water-resistive barrier* shall be provided in accordance with Section R703.2 ~~over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51 mm) and vertical overlaps of not less than 6 inches (152 mm)~~. Where horizontal furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25 mm by 76 mm or 25 mm by 102 mm) and shall be fastened to the studs with minimum 7d or 8d box nails and shall be spaced a distance on center equal to the actual weather exposure of the shakes or shingles, not to exceed the maximum exposure specified in Table R703.6.1. When installing shakes or shingles over a nonpermeable *water-resistive barrier*, furring strips shall be placed first vertically over the *water-resistive barrier* and in addition, horizontal furring strips shall be fastened to the vertical furring strips prior to attaching the shakes or shingles to the horizontal furring strips. The spacing between adjacent shingles to allow for expansion shall be $^{1}/_{8}$ inch (3.2 mm) to $^{1}/_{4}$ inch (6.4 mm) apart, and between adjacent shakes shall be $^{3}/_{8}$ inch (9.5 mm) to $^{1}/_{2}$ inch (12.7 mm) apart. The offset spacing between joints in adjacent courses shall be not less than $1^{1}/_{2}$ inches (38 mm).

Reason Statement: This proposal is a clean-up to ensure WRB requirements and installation are based on Section R703.2 which more completely addresses the subject. This avoids redundant requirements in the code that can become out of sync. It also corrects the term "barrier" by replacing it with the defined term "water-resistive barrier".

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal removes a redundancy and coordinates with existing requirements in the code for WRB installation.

RB221-22

RB222-22

IRC: R703.6.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.6.1 Application. Wood shakes or shingles shall be applied either single course or double course over nominal $^1/_2$-inch (12.7 mm) wood-based sheathing or to furring strips over $^1/_2$-inch (12.7 mm) nominal nonwood sheathing. A *water-resistive barrier* shall be provided over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51 mm) and vertical overlaps of not less than 6 inches (152 mm). Where horizontal furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25 mm by 76 mm or 25 mm by 102 mm) and shall be fastened to the studs with minimum 7d or 8d box nails and shall be spaced a distance on center equal to the actual weather exposure of the shakes or shingles, not to exceed the maximum exposure specified in Table R703.6.1. When installing shakes or shingles over a nonpermeable *water-resistive barrier*, furring strips shall be placed first vertically over the barrier and in addition, horizontal furring strips shall be fastened to the vertical furring strips prior to attaching the shakes or shingles to the horizontal furring strips. <u>Alternatively, horizontal furring shall be gapped a minimum of 3/16-inch from the surface of the *water-resistive barrier* without the requirement for a vertical furring strip.</u> The spacing between adjacent shingles to allow for expansion shall be $^1/_8$ inch (3.2 mm) to $^1/_4$ inch (6.4 mm) apart, and between adjacent shakes shall be $^3/_8$ inch (9.5 mm) to $^1/_2$ inch (12.7 mm) apart. The offset spacing between joints in adjacent courses shall be not less than $1^1/_2$ inches (38 mm).

Reason Statement: This proposal provides an alternative horizontal furring installation that provides a gap for drainage and ventilation for vertical furring installed over a nonpermeable water-resistive barrier. The minimum 3/16-in gap is consistent with minimum drainage and ventilation space provided for other claddings in moist and marine climate zones (e.g., see R703.7.3.3).

Cost Impact: The code change proposal will decrease the cost of construction
The proposal provides a means to maintain the intended drainage and back ventilation that is less costly and more easily constructed.

RB222-22

RB223-22

IRC: R703.6.3, ASTM Chapter 44

Proponents: Rick Allen, representing ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R703.6.3 Attachment. Wood shakes or shingles shall be installed according to this chapter and the manufacturer's instructions. Each shake or shingle shall be held in place by two stainless steel Type 304, Type 316 or hot-dipped zinc-coated galvanized corrosion-resistant box nails in accordance with Table R703.6.3(1) or R703.6.3(2). The hot-dipped zinc-coated galvanizing shall be in compliance with ASTM A153 Class D or ASTM A641 Class 3S, 1.0 ounce per square foot . Alternatively, 16-gage stainless steel Type 304 or Type 316 staples with crown widths $^{7}/_{16}$ inch (11 mm) minimum, $^{3}/_{4}$ inch (19 mm) maximum, shall be used and the crown of the staple shall be placed parallel with the butt of the shake or the shingle. In single-course application, the fasteners shall be concealed by the course above and shall be driven approximately 1 inch (25 mm) above the butt line of the succeeding course and $^{3}/_{4}$ inch (19 mm) from the edge. In double-course applications, the exposed shake or shingle shall be face-nailed with two fasteners, driven approximately 2 inches (51 mm) above the butt line and $^{3}/_{4}$ inch (19 mm) from each edge. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shakes or shingles in accordance with Section R902 or pressure-impregnated-preservative-treated shakes or shingles in accordance with AWPA U1 shall be stainless steel Type 316. The fasteners shall penetrate the sheathing or furring strips by not less than $^{1}/_{2}$ inch (13 mm) and shall not be overdriven. Fasteners for untreated (natural) and treated products shall comply with ASTM F1667.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M~~-09a(2014)~~ 2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, ASTM A641/A641M-2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Galvanized nails are made from wire. The wire may be uncoated or galvanized. Nails that are made from uncoated wire are hot-dip galvanized after forming to specification A153 Class D which provides a minimum average coating weight of 1 oz./ft². Nails that are made from galvanized wire are made from wire coated to specification A641 Class 3S which provides a minimum average coating weight of 1 oz/ft². Although commercially available and used for many years, Class 3S was added to Specification A641 in 2019

Specification A641 Class 3S was added to ASTM F1667 in 2020.

Bibliography: Referenced standard
ASTM F1667/F1667M-21a: Standard Specification for Driven Fasteners: Nails, Spikes and Staples

ASTM A153/A153M-16a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A641/A641-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Nails have been made by both methods for a very long time. This just formalizes what is/has been done and will not add cost to construction.

RB223-22

RB224-22

IRC: R703.7.1

Proponents: Rick Allen, representing ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R703.7.1 Lath. Lath and lath attachments shall be of corrosion-resistant materials in accordance with ASTM C1063. Expanded metal, welded wire, or woven wire lath shall be attached to wood framing members or furring. Where the exterior plaster is serving as wall bracing in accordance with Table R602.10.4, the lath shall be attached directly to framing. The lath shall be attached with $1^1/_2$-inch-long (38 mm), 0.120 inch (3 mm) diameter (11-gage) nails having a $^7/_{16}$-inch (11.1 mm) head, or $^7/_8$-inch-long (22.2 mm), 16-gage staples, spaced not more than 7 inches (178 mm) on center along framing members or furring and not more than 24 inches (610 mm) on center between framing members or furring, or as otherwise *approved*. Additional fastening between wood framing members shall not be prohibited. Lath attachments to cold-formed steel framing or to masonry, stone, or concrete substrates shall be in accordance with ASTM C1063. Where lath is installed directly over foam sheathing, lath connections shall also be in accordance with Section R703.15, R703.16 or R703.17. Where lath is attached to furring installed over foam sheathing, the furring connections shall be in accordance with Section R703.15, R703.16 or R703.17.

> **Exception:** Lath is not required over masonry, cast-in-place concrete, *precast concrete* or stone substrates prepared in accordance with ASTM C1063.

Reason Statement: Multiple wire gage tables are in existence and sometimes conflict with one another. Because of this, ASTM F1667 was updated in 2017 with the requirement that when gage is used for a nail diameter, the equivalent decimal diameter is to also be indicated. This proposal addresses the F1667 requirement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only add clarity to the diameter requirement and will not change costs.

RB224-22

RB225-22

IRC: R703.7.3, R703.7.3.1

Proponents: Emily Lorenz, representing International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com)

2021 International Residential Code

Revise as follows:

R703.7.3 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section R703.2 and, where applied over ~~wood-based~~ sheathing, shall comply with Section R703.7.3.1 or R703.7.3.2 i.

> **Exception:** Where the *water-resistive barrier* that is applied over wood-based sheathing has a water resistance equal to or greater than that of 60-minute Grade D paper and is separated from the stucco by an intervening, substantially nonwater-absorbing layer or designed drainage space.

R703.7.3.1 Dry climates . In Dry (B) climate zones indicated in Figure N1101.7, *water-resistive barriers* shall comply with one of the following:

1. The *water-resistive barrier* shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of a *water-resistive barrier* complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane. Flashing installed in accordance with Section R703.4 and intended to drain to the *water-resistive barrier* shall be directed ~~between the layers~~ over the top of the *water-resistive barrier.*
2. The *water-resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of a *water-resistive barrier* complying with ASTM E2556, Type II. The *water-resistive barrier* shall be separated from the stucco by a layer of foam plastic *insulating sheathing* or other non-water-absorbing layer, or a designed drainage space.

Reason Statement:
Option 1 of Section R703.7.3.1 of the IRC currently specifies that any flashing is to be installed between the two layers of building paper. This current direction by the IRC causes the bulk water to be trapped between the layers of paper/water-resistive barrier, and not expeditiously exiting the wall cavity, which can lead to unintended water migration to structural components within the wall assembly. With this simple change, the code statement is modified to require flashing to be applied over the top of the water-resistive barrier so that water effectively drains to its downstream weep assembly.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This should be standard practice, thus will not impact the cost of construction.

RB225-22

RB226-22

IRC: R703.8.2.2, FIGURE R703.8.2.2, FIGURE R703.8.2.2(2) (New)

Proponents: Charles Clark Jr, representing Brick Industry Association (cclark@bia.org)

2021 International Residential Code

Revise as follows:

R703.8.2.2 Support by ledger or roof construction. A steel angle shall be placed directly on top of the ledger or roof construction. The ledger or roof ~~supporting~~ construction ~~for~~ supporting the steel angle shall consist of not fewer than three 2-inch by 6-inch (51 mm by 152 mm) wood members for wood construction or three 550S162 cold-formed steel members for cold-formed steel light frame construction. ~~A~~ The wood member abutting the vertical wall stud construction shall be anchored with not fewer than three $^{5}/_{8}$-inch (15.9 mm) diameter by 5-inch (127 mm) lag screws to every wood stud spacing. Each additional wood roof member shall be anchored by the use of two 10d nails at every wood stud spacing. A cold-formed steel member abutting the vertical wall stud shall be anchored with not fewer than nine No. 8 screws to every cold-formed steel stud. Each additional cold-formed steel roof member shall be anchored to the adjoining roof member using two No. 8 screws at every stud spacing. Not less than two-thirds the width of the masonry veneer thickness shall bear on the steel angle. Flashing and weep holes shall be located in the masonry veneer wythe in accordance with Figure R703.8.2.2 (1) or Figure R703.8.2.2(2). The maximum height of the masonry veneer above the steel angle support shall be 12 feet 8 inches (3861 mm). The airspace separating the masonry veneer from the wood backing shall be in accordance with Sections R703.8.4 and R703.8.4.2. The support for the masonry veneer shall be constructed in accordance with Figure R703.8.2.2 (1) or Figure R703.8.2.2(2).

The maximum slope of ~~the~~ a steel angle installed ~~roof construction~~ without stops shall be 7:12. A steel angle installed ~~Roof construction~~ with a slope~~s~~ greater than 7:12 but not more than 12:12 shall have stops of a minimum 3-inch by 3-inch by $^{1}/_{4}$-inch (76 mm by 76 mm by 6.4 mm) steel plate welded to the angle at 24 inches (610 mm) on center along the angle or as *approved* by the *building official*.

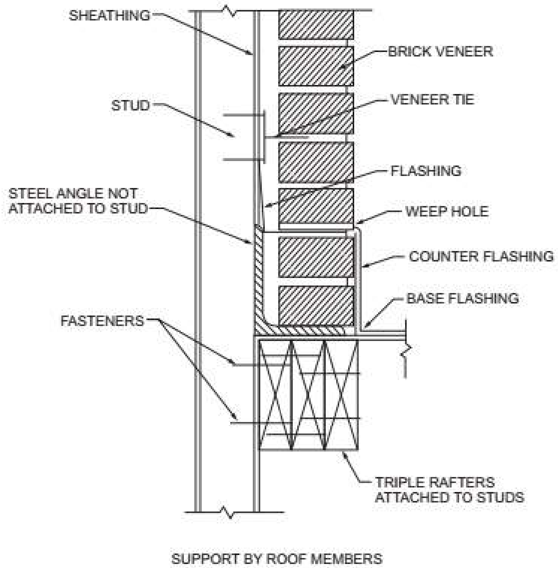


FIGURE R703.8.2.2(1) EXTERIOR MASONRY VENEER SUPPORT BY ROOF MEMBERS

Add new text as follows:

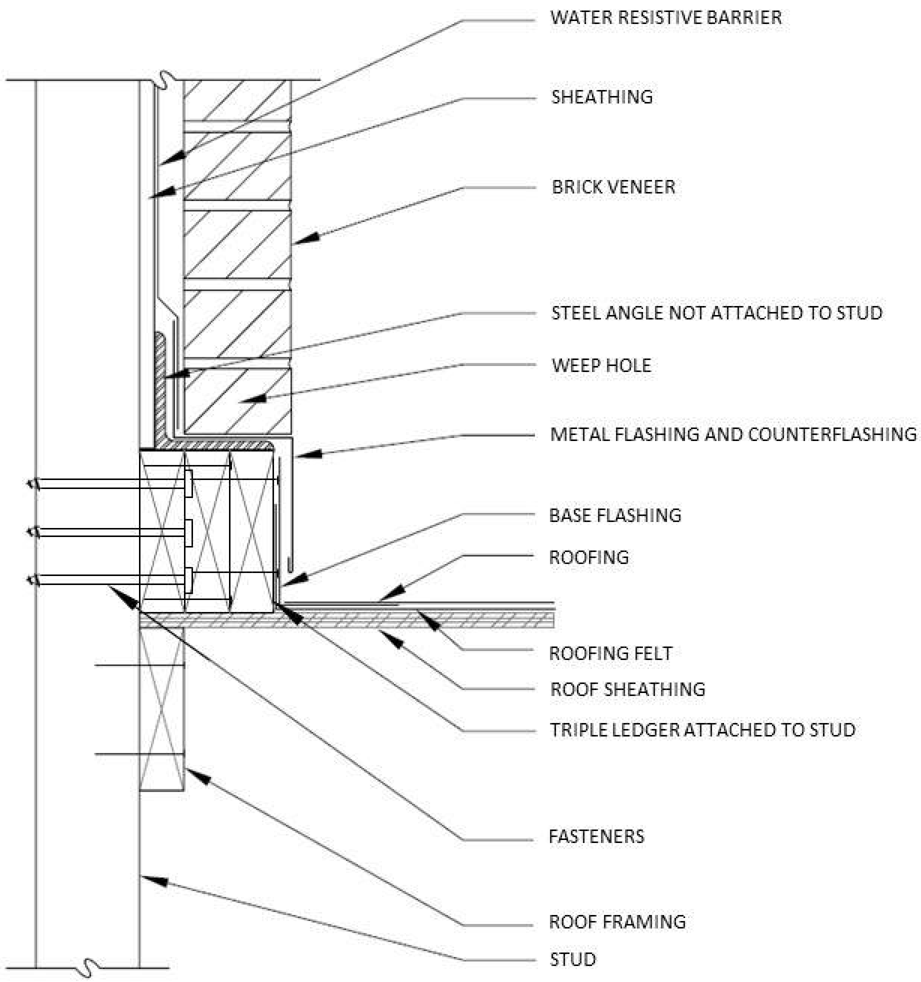


FIGURE R703.8.2.2(2) EXTERIOR MASONRY VENEER SUPPORT BY LEDGER

FIGURE R703.8.2.2(2) EXTERIOR MASONRY VENEER SUPPORT BY LEDGER

Reason Statement: This code change proposal provides an option for placing a triple ledger above the roof construction instead of within the roof construction. As a result, one continuous piece of flashing can be installed between the top of the steel angle and the bottom of the veneer instead of multiple pieces of step flashing between the masonry veneer courses such that it follows the slope of the roof. Doing so simplifies the installation of the flashing and the masonry veneer.

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal will decrease the cost of construction by simplifying the laying of the masonry veneer by allowing one continuous piece of flashing to be installed instead of multiple pieces of step flashing. This allows the construction of the masonry veneer to proceed at a quicker pace resulting in a reduction in cost.

RB226-22

RB227-22

IRC: TABLE R703.8.3.1

Proponents: Charles Clark Jr, representing Brick Industry Association (cclark@bia.org)

2021 International Residential Code

Revise as follows:

TABLE R703.8.3.1 ALLOWABLE SPANS FOR LINTELS SUPPORTING MASONRY VENEER[a, b, c, d]

Portions of table not shown remain unchanged.

SIZE OF STEEL ANGLE[a, c, d] (inches)	NO STORY ABOVE	ONE STORY ABOVE	TWO STORIES ABOVE	NO. OF $^1/_2$-INCH OR EQUIVALENT REINFORCING BARS IN REINFORCED LINTEL[b, d]
5 x 3 x 5/16 or $5 \times 3^1/_2 \times {}^5/_{16}$	10′-0″	8′-0″	6′-0″	2
$6 \times 3^1/_2 \times {}^5/_{16}$ or 5 x 3 x 5/16 with 2-9 gauge wires between first and second course	14′-0″	9′-6″	7′-0″	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Long leg of the angle shall be placed in a vertical position.

b. Depth of reinforced lintels shall be not less than 8 inches and all cells of hollow masonry lintels shall be grouted solid. Reinforcing bars shall extend not less than 8 inches into the support.

c. Steel members indicated are adequate typical examples; other steel members meeting structural design requirements shall be permitted to be used.

d. Use either ~~Either~~ steel angle or reinforced lintel ~~shall~~ to span opening.

Reason Statement: This code change proposal provides steel angle lintel sizes for brick veneer made of nominal 3-inch wide masonry units such as queen-size and king-size brick. This change is needed as more and more residential masonry veneer is constructed with queen-size and king size brick. Rational analysis was used to determine the proposed spans. The analysis indicated that a 5 x 3 x 5/16 would be adequate to support a nominal 4-inch thick veneer as well as one which was nominally 3-inches thick. The slightly longer horizontal leg of the 5 x 3-1/2 x 5/16 does not significantly increase the angle's moment capacity nor significantly limit the angle's deflection for this particular application.
This proposal also clarifies Footnote d to better convey its intent.

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal WILL NOT increase the cost of construction. For brick veneers constructed of queen-size or king-size brick, it may decrease the cost of construction as less steel is required to span an opening of a given size.

RB227-22

RB228-22

IRC: R703.11, R703.13, R703.14, R902.2

Proponents: Sara Krompholz, representing Vinyl Siding Institute (VSI) (skrompholz@vinylsiding.org)

2021 International Residential Code

Revise as follows:

R703.11 Vinyl siding. Vinyl siding shall be certified and *labeled* as conforming to the requirements of ASTM D3679 by an *approved* ~~quality control~~ agency.

R703.13 Insulated vinyl siding. *Insulated vinyl siding* shall be certified and *labeled* as conforming to the requirements of ASTM D7793 by an *approved* ~~quality control~~ agency.

R703.14 Polypropylene siding. *Polypropylene siding* shall be certified and *labeled* as conforming to the requirements of ASTM D7254, and those of Section R703.14.2 or Section R703.14.3, by an *approved* ~~quality control~~ agency.

R902.2 Fire-retardant-treated shingles and shakes. Fire-retardant-treated wood shakes and shingles shall be treated by impregnation with chemicals by the full-cell vacuum-pressure process, in accordance with AWPA C1. Each bundle shall be marked to identify the manufactured unit and the manufacturer, and shall be *labeled* to identify the classification of the material in accordance with the testing required in Section R902.1, the treating company and the ~~quality control~~ <u>approved</u> agency.

Reason Statement: This is a simple change to make the correct reference to the defined term "approved agency". The term "quality control" is not correct nor defined.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply an edit to correct a defined term in the code.

RB228-22

RB229-22

IRC: R703.11.1, R703.11.1.1, R703.11.1.2, R703.11.1.3

Proponents: Matthew Dobson, Vinyl Siding Institute, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Revise as follows:

R703.11.1 Installation. Vinyl siding, ~~soffit~~ *insulated vinyl siding,* and accessories shall be installed in accordance with the *manufacturer's* *installation instructions*.

R703.11.1.1 Fasteners. Unless specified otherwise by the manufacturer's instructions, fasteners for vinyl siding shall be 0.120-inch (3 mm) shank diameter nail with a 0.313-inch (8 mm) head or 16-gage staple with a $^3/_8$-inch (9.5 mm) to $^1/_2$-inch (12.7 mm) crown or in accordance with Table R703.3(1).

R703.11.1.2 Penetration depth. Unless specified otherwise by the manufacturer's instructions or in accordance with Table R703.3(1), fasteners shall penetrate into building framing. The total penetration into sheathing, furring, framing or other *nailable substrate* shall be a minimum $1^1/_4$ inches (32 mm). ~~Where specified by the manufacturer's instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or other *nailable substrate* of minimum thickness specified by the instructions or test report without penetrating into framing. Where the fastener penetrates fully through the sheathing, the end of the fastener shall extend a minimum of $^1/_4$ inch (6.4 mm) beyond the opposite face of the sheathing or *nailable substrate*.~~

R703.11.1.3 Spacing. Unless specified otherwise by the manufacturer's instructions, the maximum spacing between fasteners for horizontal siding shall be 16 inches (406 mm), and for vertical siding 12 inches (305 mm)~~ both horizontally and vertically~~. Where specified by the manufacturer's instructions and supported by a test report, 24 inches (610 mm) ~~greater~~ fastener spacing is permitted.

Reason Statement: This change is a clean-up and will help to understand what is necessary should alternative fastening like 24" oc become necessary. It also points to alternative fasteners in table R703.3.3 which is helpful to use when hitting studs becomes difficult. Finally, it brings in installation provisions for insulated vinyl siding as it is the same as vinyl siding.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is editorial clean up and also offers alternative installation techniques as an option.

RB229-22

RB230-22

IRC: R703.11.1, R703.11.1.1 (New), Figure R703.11.1.1 (1) (New), R703.11.1.2 (New), Figure R703.11.1.2 (1) (New), Figure R703.11.1.2 (2) (New), R703.13.1

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org); Glenn Overcash, representing Federal Emergency Management Agency (glenn.overcash@aecom.com); Pataya Scott, representing Federal Emergency Management Agency (pataya.scott@fema.dhs.gov)

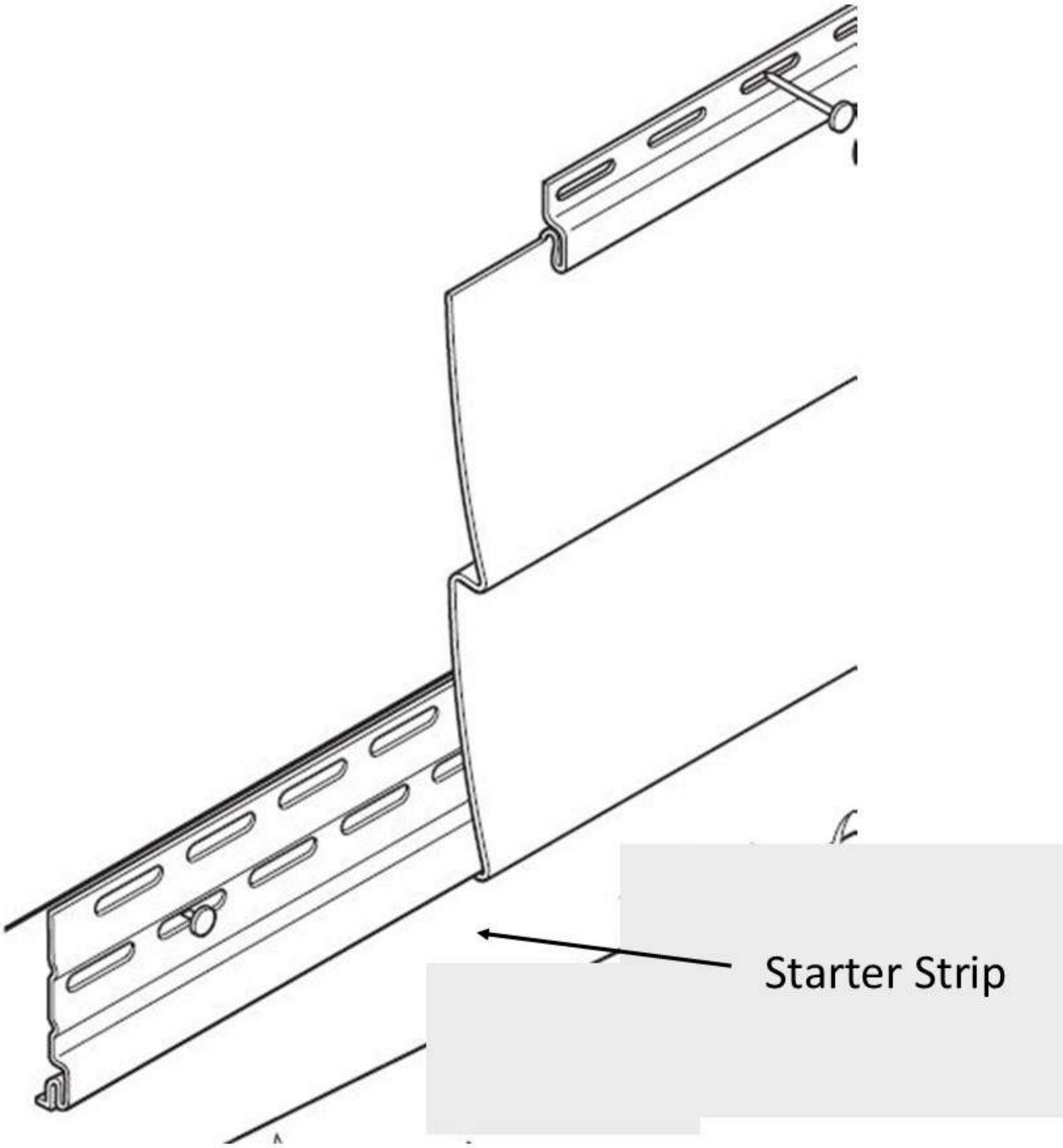
2021 International Residential Code

Revise as follows:

R703.11.1 Installation. Vinyl siding, ~~soffit~~ insulated vinyl siding, and compatible accessories shall be installed in accordance with the *manufacturer's installation instructions*.

Add new text as follows:

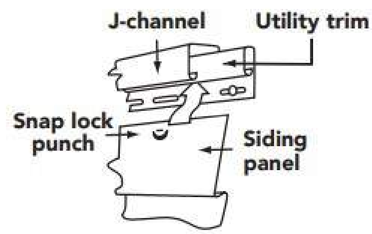
R703.11.1.1 Starter Strip. The first course of horizontal siding shall be secured using a starter strip as specified in the manufacturer's installation instructions. See Figure R703.1.1 (1).



a. Figure R703.11.1.1(1) illustrates typical installation details. See manufacturer's installation instructions for actual installation details.

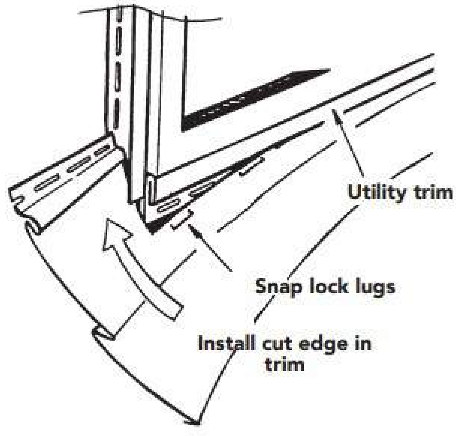
Figure R703.11.1.1 (1) Typical Starter Strip[a]

R703.11.1.2 Utility Trim. Where horizontal siding has to be cut or trimmed below windows and at the top of walls, the top edge of the siding shall be secured with utility trim and snap locks or as specified by the manufacturer's installation instructions. See Figures R703.11.1.2 (1) and R703.11.1.2 (2).



a. Figure R703.11.2.(1) illustrates typical installation details. See manufacturer's installation instructions for actual installation details.

Figure R703.11.1.2 (1) Typical Snap Lock & Utility Trim[a]



a. Figure R703.11.1.2(2) illustrates typical installation details. See manufacturer's installation instructions for actual installation details

Figure R703.11.1.2 (2) Typical Snap Lock & Utility Trim Under Window[a]

Revise as follows:

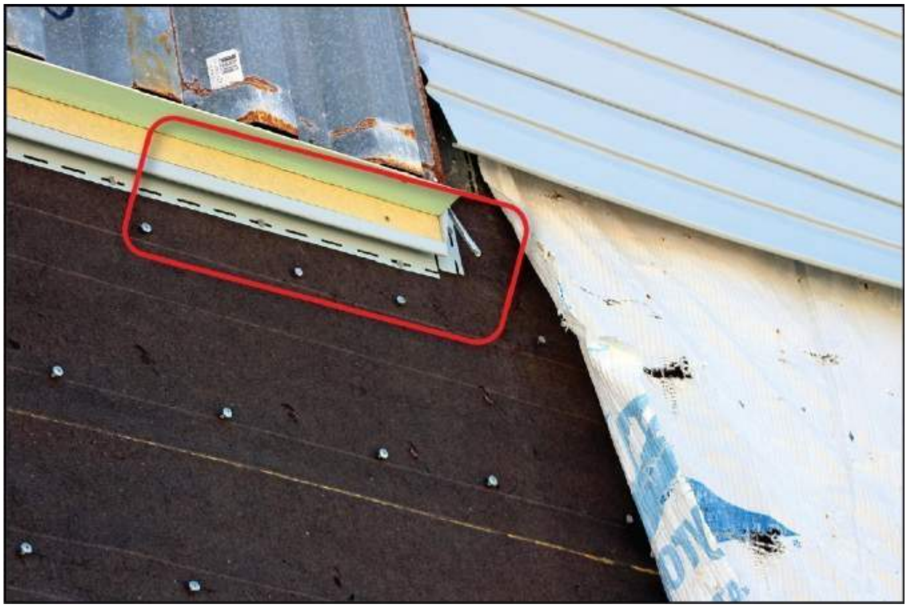
R703.13.1 Insulated vinyl siding and accessories. *Insulated vinyl siding* and compatible accessories shall be installed in accordance with Sections R703.11.1, R703.11.2, and the *manufacturer's installation instructions*.

Reason Statement: This code change proposal provides requirements for starter strips and utility trim, two critical installation elements for vinyl siding, insulated vinyl siding, and polypropylene siding that are sometime ignored by installers. Including these provisions will help to ensure proper installation. Starter strips and utility trim are important to highlight as they are part of the wind performance system, and when omitted or installed incorrectly, have resulted in product performance failure in high wind events. The proposed requirements reflect standard installation procedures for horizontal polymeric cladding.

As part of the response to Hurricane Irma in Florida, the Federal Emergency Management Agency (FEMA) deployed a Mitigation Assessment Teams (MAT) composed of national and regional building science experts who assess building performance after a disaster. These experts then incorporate lessons learned to make recommendations on improving the resilience of new construction and repairs and retrofits of existing buildings.

The following MAT-related conclusion and supporting observations are included in FEMA P-2023, Hurricane Irma in Florida MAT Report (https://www.fema.gov/sites/default/files/2020-07/mat-report_hurricane-irma_florida.pdf). The Hurricane Irma in Florida MAT observed evidence of inadequate resistance to wind pressures for certain wall coverings of residential buildings (Conclusion FL11). In particular, failure of vinyl siding on residential structures was widespread. The MAT observed several instances of vinyl siding wind damage on buildings that appeared to have been due to installation issues addressed in this code change proposal. The image below (FL MAT Report Figure 4-28) shows a Marathon Key duplex building (built 2017) with vinyl siding loss across the front and left exterior walls. Vinyl siding loss inside the red outline (above the front porch) appears to have been initiated where a J-channel was installed instead of the manufacturer's specified starter strip.

The Marathon Key house shown in the image below (FL MAT Report Figure 4-29) was permitted to have its vinyl siding replaced in 2015, with work completed in 2016. As shown in the red outline, the house appeared to lack utility trim under the window where siding was lost. Notably, the estimated maximum wind speed on Marathon Key during Hurricane Irma was 120 mph, so within the wind limitations of the IRC.



Vinyl Siding Institute (VSI) conducted several recent post-hurricane analyses and noted the need to have these requirements added to the IRC to avoid future cladding system failures. An example showing failure from Hurricane Irma that resulted from improper installation is shown below.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed requirements are standard practices that are sometimes neglected during construction, so this code change should not affect cost.

RB230-22

RB231-22

IRC: R703.14, R703.14.2, R703.14.3

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Revise as follows:

R703.14 Polypropylene siding. *Polypropylene siding* shall be certified and *labeled* as conforming to the requirements of ASTM D7254~~, and those of Section R703.14.2 or Section R703.14.3,~~ by an *approved* quality control agency.

Delete without substitution:

~~**R703.14.2 Fire separation.** *Polypropylene siding* shall not be installed on walls with a *fire separation distance* of less than 5 feet (1524 mm) and walls closer than 10 feet (3048 mm) to a building on another lot.~~

~~**Exception:** Walls perpendicular to the line used to determine the *fire separation distance.*~~

~~**R703.14.3 Flame spread index.** The certification of the flame spread index shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E84 or UL 723.~~

Reason Statement: Currently polypropylene siding is the only cladding in both the IBC and IRC that requires an ASTM E84 test respective to specific Fire Separation Distance areas; 10 feet or closer to another building.
Sections proposed for deletion do not provide any additional protection as the code already requires that if the product is used in these settings, it will need to be a part of an ASTM E119 fire rated assembly, typically a 1-hour rated assembly. In addition, as part of the ASTM product standard, D7254, the product is required to meet an E84 tested fire performance property (max flame spread of 200) that is consistent with other exterior, combustible building materials.

The current code language proposed for deletion is superfluous. The code has adequate provisions for regulating building materials used with Fire Separation Distance areas, for example as specified in Tables 601 and 705.5.

To help the committee understand the fire properties of polypropylene siding better, which has been questioned, VSI conducted a series of tests, at the Western Fire Center, that provide good fire safe characteristic insights by using ASTM E2707 Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure and an exposed wall to this test. Attached is a VSI Technical Report from these tests to help the committee better understand the fire characteristics of this product category.
Also, here is a link to the report.

https://www.vinylsiding.org/wp-content/uploads/2022/01/PolypropyleneFireTest.2020reportsubmitted-004.pdf

The following is an overview of these tests:
-The product was tested in a setting and application that represents tight lot line settings (close Fire Separation Distance) by having a burner wall and exposed (receiver wall) facing each other – tests were spaced at 4’ and 6’ with gypsum backing to represent a rated assembly

-The product was also tested at a typical unprotected separation distance 10+’ apart

-The product was tested with gypsum sheathing as on a protected wall assembly, and as part of an unprotected, combustible material wall assembly.

Based on the results of the test, it is worth noting the following:
-Polypropylene typically melts, spits, and falls off the wall and, in some cases, will collect and continue to burn on the ground within 18 inches of the burner wall

-At no point did any portion of the receiver wall with polypropylene siding combust, even at the 4’ wall spacing

-The heat release rate of the polypropylene siding / gypsum sheathing (protected) base wall was about 65% less than the heat release rate of the polypropylene siding / fully combustible wood wall-Heat release peaks occurred faster into the tests and at higher magnitudes for the polypropylene siding /wood combustible wall vs. the wall with polypropylene siding / gypsum assembly-Observation of the reaction of all the wall assemblies to the fire exposures during the tests clearly show and confirm that the respective fire resistive and fire separation distance sections within the building code provide the intended protection of exterior walls with polypropylene siding.

There are no examples of the hazard this specific product presents. All data provides has not been in the application of siding.

In fact the below is an example of a house fire that occurred in close proximity to another house (approximately 15 feet) during Hurricane Isaias. The resulting fire cause no hazard to the house next to it with polypropylene siding on it other than melting the cladding. This is exactly what the provision is supposedly highlighting as a problem. It clearly is not.

Cost Impact: The code change proposal will decrease the cost of construction
This change will remove unwarranted additional testing procedures which could reduce the overall cost of material testing requirements.

RB231-22

RB232-22

IRC: R703.14.1.1, R703.14.1.1.1 (New), R703.14.1.1.2 (New), Figure R703.14.1.1.2 (1) (New), R703.14.1.2

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Revise as follows:

R703.14.1.1 Installation. Unless otherwise specified in the *manufacturer's installation instructions*, *polypropylene siding* shall be installed over and attached to wood structural panel sheathing with minimum thickness of $^{7}/_{16}$ inch (11.1 mm), or other *nailable substrate*~~, composed of wood or wood-based material and fasteners having equivalent withdrawal resistance~~. Accessories shall be installed in accordance with the *manufacturer's installation instructions*.

Add new text as follows:

R703.14.1.1.1 Starter Strip. Horizontal siding shall be installed with a starter strip at the initial course at any location.

R703.14.1.1.2 Under Windows and Top of Walls. Where nail hem is removed such as under windows and at top of walls, nail slot punch or predrilled holes shall be constructed as shown in Figure R703.14.1.1.2 (1).

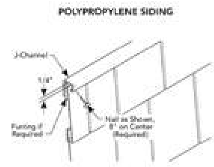


Figure R703.14.1.1.2 (1) Trim Under Window and Top of Walls Polypropylene Siding

Revise as follows:

R703.14.1.2 Fastener requirements. Unless otherwise specified in the ~~approved~~ *manufacturer's* *installation* *instructions*, nails shall be corrosion resistant, with a minimum 0.120-inch (3 mm) shank and minimum 0.313-inch (8 mm) head diameter. Nails shall be a minimum of $1^1/_4$ inches (32 mm) long or as necessary to penetrate sheathing or *nailable* *substrate* not less than $^3/_4$ inch (19.1 mm). Where the nail fully penetrates the sheathing or *nailable substrate*, the end of the fastener shall extend not less than $^1/_4$ inch (6.4 mm) beyond the opposite face of the sheathing or *nailable substrate*. ~~Staples are not permitted.~~ Spacing of fasteners shall be installed in accordance with the *manufacturer's installation instructions.*

Reason Statement: This change cleans up the section on polypropylene siding. This type of siding is unique in that it has varying installation spacing for fasteners and because of the must be installed over some type of nailble substrate sheathing as defined by the code. In some cases the product can be installed using staples, with proper testing information so that prohibition should be removed. It is also important the installation instructions be referenced be because of the unique panel sizes with each manufacturer.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These changes are editorial and also adds standard installation practices.

RB232-22

RB233-22

IRC: TABLE R703.15.1, TABLE R703.15.2

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz); Philip Line, representing American Wood Council (pline@awc.org)

2021 International Residential Code

Revise as follows:

TABLE R703.15.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

CLADDING FASTENER MINIMUM PENETRATION INTO WOOD WALL FRAMING~~THROUGH FOAM SHEATHING~~[b]	CLADDING FASTENER TYPE AND MINIMUM SIZE[c]	CLADDING FASTENER VERTICAL SPACING[d] (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING~~[d]~~[e] (inches)									
			16″ o.c. Fastener Horizontal Spacing					24″ o.c. Fastener Horizontal Spacing				
			Cladding Weight[f]:					Cladding Weight[f]:				
			3 psf	11 psf	15 psf	18 psf	25 psf	3 psf	11 psf	15 psf	18 psf	25 psf
~~Wood framing (minimum~~ $1\frac{1}{4}$-inch ~~penetration)~~	0.113″ diameter nail	6	2.00	1.45	1.00	0.75	DR	2.00	0.85	0.55	DR	DR
		8	2.00	1.00	0.65	DR	DR	2.00	0.55	DR	DR	DR
		12	2.00	0.55	DR	DR	DR	1.85	DR	DR	DR	DR
	0.120″ diameternail	6	3.00	1.70	1.15	0.90	0.55	3.00	1.05	0.65	0.50	DR
		8	3.00	1.20	0.80	0.60	DR	3.00	0.70	DR	DR	DR
		12	3.00	0.70	DR	DR	DR	2.15	DR	DR	DR	DR
	0.131″ diameter nail	6	4.00	2.15	1.50	1.20	0.75	4.00	1.35	0.90	0.70	DR
		8	4.00	1.55	1.05	0.80	DR	4.00	0.90	0.55	DR	DR
		12	4.00	0.90	0.55	DR	DR	2.70	0.50	DR	DR	DR
	0.162″ diameter nail	6	4.00	3.55	2.50	2.05	1.40	4.00	2.25	1.55	1.25	0.80
		8	4.00	2.55	1.80	1.45	0.95	4.00	1.60	1.10	0.85	0.50
		12	4.00	1.60	1.10	0.85	0.50	4.00	0.95	0.60	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

a. Wood framing shall be Spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with AWC NDS.

b. The thickness of wood structural panels complying with the specific gravity requirement of Note a shall be permitted to be included in satisfying the minimum penetration into framing. For cladding connections to wood structural panels, refer to Table R703.3.3. For brick veneer tie connections to wood structural panels, refer to Table R703.8.4(2).

c. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

d. Fastener vertical spacing is an average spacing associated with the following nail count per foot: 6 inch spacing is associated with 2 nails per foot, 8 inch spacing is associated with 1.5 nails per foot, and 12 inch spacing is associated with 1 nail per foot.

~~d.~~ e. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

f. Cladding weight is the maximum weight of cladding materials in pounds per square foot of wall area. The 3 psf category typically applies to panel and lap siding materials; the 11 psf category typically applies to conventional 3-coat stucco of not more than 7/8-inch thickness; and 15 psf to 25 psf categories typically apply to adhered masonry veneers.

TABLE R703.15.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a, b]

Portions of table not shown remain unchanged.

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE	MINIMUM PENETRATION INTO WALL FRAMING (inches)[c]	FASTENER SPACING IN FURRING (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING[e](inches)									
					16″ o.c. Furring[f]					24″ o.c. Furring[f]				
					Siding Weight:[g]					Siding Weight:[g]				
					3 psf	11 psf	15 psf	18 psf	25 psf	3 psf	11 psf	15 psf	18 psf	25 psf

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

g. Cladding weight is the maximum weight of cladding materials in pounds per square foot of wall area. The 3 psf category typically applies to panel and lap siding materials; the 11 psf category typically applies to conventional 3-coat stucco of not more than 7/8-inch thickness; and 15 psf to 25 psf categories typically apply to adhered masonry veneers.

Reason Statement: This proposal is a clarification of three items related to proper application of the Table R703.15.1 requirements. First, the column heading for minimum fastener penetration is revised to clearly indicate its focus on minimum fastener penetration into wood framing. Second, a new footnote 'd' is added to clarify application of prescribed vertical spacing requirements for cladding fasteners. Third, a new footnote 'f' is added to clarify application of the cladding weight categories used in the table. These clarifications are based on field experience, questions, and feedback in the use of the tables. For Table R703.15.2, the addition of footnote 'g' is proposed to clarify weight categories consistent with the revision proposed for Table R703.15.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is a clarification and has no cost impact.

RB233-22

RB234-22

IRC: TABLE R703.16.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

TABLE R703.16.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a, b]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

a. Steel framing shall be minimum 33-ksi steel for 33-mil and 43-mil steel, and 50-ksi steel for 54-mil steel or thicker.
b. Where cladding is attached to wood structural panel sheathing only, fastening requirements shall be in accordance with Table R703.3.3. For brick veneer tie connections to wood structural panels, refer to Table R703.8.4(2).
c. Screws shall comply with the requirements of ASTM C1513.
d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

Reason Statement: This proposal coordinates reference to brick veneer tie connection requirements when fastened to wood structural panels. This provision is already included in footnote ‘b’ of Table R703.15.1 but was overlooked in the same footnote for Table R703.16.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal may reduce cost by clarifying that attachment of brick ties to wood structural panels on steel frame wall assemblies is permitted, just as it is permitted for wood frame wall assemblies with wood structural panels.

RB234-22

RB235-22

IRC: R703.18 (New)

Proponents: Michael Gardner, representing National Gypsum Company (michael@mgardnerservices.com)

2021 International Residential Code

Add new text as follows:

R703.18 Fiber-mat reinforced cementitious backer units. Fiber-mat reinforced cementitious backer units used on exterior walls as a substrate for the application of exterior finish materials shall comply with ASTM C1325. Installation shall be in accordance with manufacturer's installation instructions. Backer units shall be installed using corrosion-resistant fasteners. Finish materials shall be installed in accordance with manufacturer's instructions.

Reason Statement: ASTM C1325 cement board (technically, fiber-mat reinforced cementitious backer unit) was incorporated into the IRC in the mid-2000s when it was added to Section 702 as a substrate for interior wall tile in shower and tub areas.
In the interim period, C1325 cement board has gained use as an exterior substrate. It is primarily used for architectural stone and direct-applied finish system applications.

Exterior use of cement board is permitted by the C1325 standard and the two applicable Acceptance Criteria for cement board: AC 376, which addresses the cement board itself, and AC 59, which addresses direct-applied finish systems.

But because the only IRC reference to the material is the interior use described in Section 702 confusion occurs regarding the ability to use cement board as an exterior substrate. This proposal intends to clarify that cement board conforming with the ASTM C1325 standard can be used as a substrate in exterior applications by expanding the existing IRC reference to apply to exterior applications under Section R703.

A change to the IBC with the same intent was approved during the 'A' Cycle.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal has no cost impact. The intent of the proposal is to clarify that C1325 material can be used in an exterior application.

RB235-22

RB236-22

IRC: SECTION 202 (New), SECTION 202, R703.1.2, R703.3.1, R703.11.1, SECTION R704, R704.1, R704.2, R704.2.1, FIGURE R704.2.1(1), FIGURE R704.2.1(2), R704.2.2, R704.2.3, R704.2.4, R704.3, R704.3.1, R704.3.2, R704.3.3, R704.3.4, TABLE R704.3.4

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Add new definition as follows:

EXTERIOR SOFFIT. A material or assembly of materials applied on the underside of exterior overhangs, decks and floors, porches, and carport ceilings.

Revise as follows:

[RB] EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls ~~for the purpose of providing a weather-resistive barrier, insulation or for aesthetics~~, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural *trim* and embellishments such as cornices~~, soffits, and fascias~~.

R703.1.2 Wind resistance. Wall coverings, backing materials and their attachments shall be capable of resisting wind loads in accordance with Tables R301.2.1(1) and R301.2.1(2). Wind-pressure resistance of the siding, exterior soffit and backing materials shall be determined by ASTM E330 or other applicable standard test methods. Where wind-pressure resistance is determined by design analysis, data from *approved* design standards and analysis conforming to generally accepted engineering practice shall be used to evaluate the siding, exterior soffit and backing material and its fastening. All applicable failure modes including bending rupture of siding, fastener withdrawal and fastener head pull-through shall be considered in the testing or design analysis. Where the wall covering, exterior soffit and backing material resist wind load as an assembly, use of the design capacity of the assembly shall be permitted.

R703.3.1 Exterior Soffit installation. Exterior Soffits shall comply with Section R704.

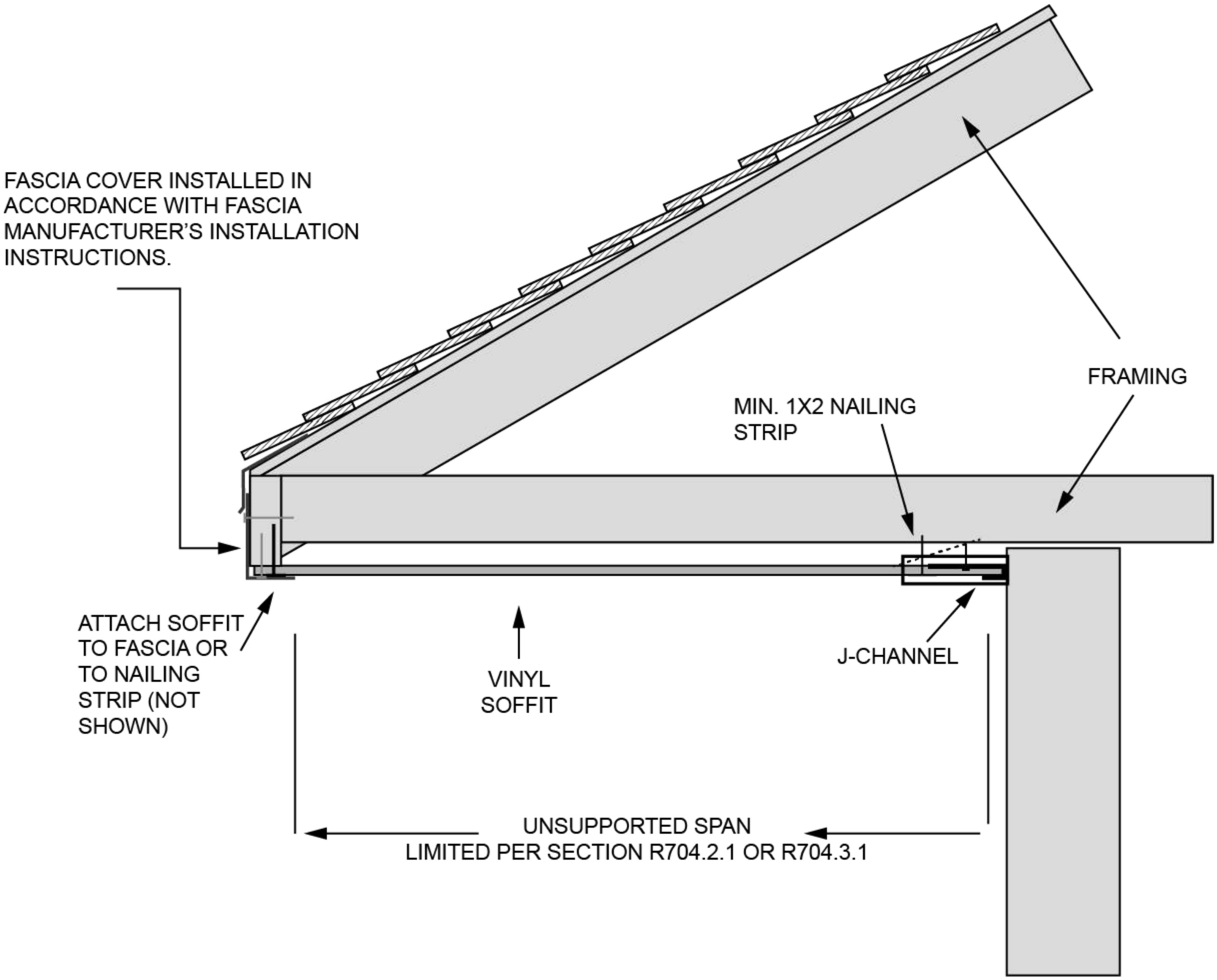
R703.11.1 Installation. Vinyl siding, exterior soffit and accessories shall be installed in accordance with the manufacturer’s instructions.

SECTION R704
EXTERIOR SOFFITS

R704.1 General wind limitations. Where the design wind pressure is 30 pounds per square foot (1.44 kPa) or less, exterior soffits shall comply with Section R704.2. Where the design wind pressure exceeds 30 pounds per square foot (1.44 kPa), exterior soffits shall comply with Section R704.3. The design wind pressure on exterior soffits shall be determined using the component and cladding loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.93 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2).

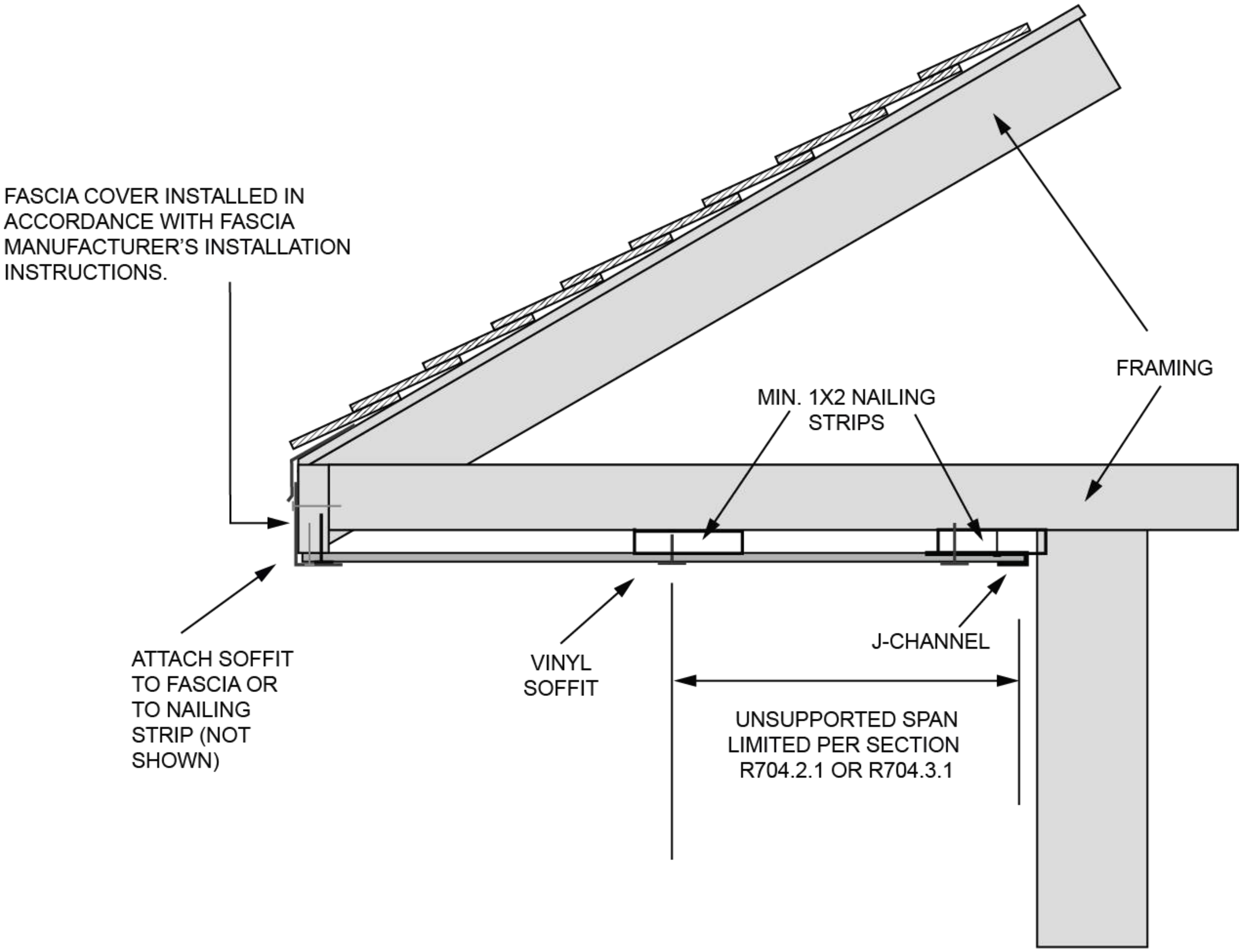
R704.2 Exterior Soffit installation where the design wind pressure is 30 psf or less. Where the design wind pressure is 30 pounds per square foot (1.44 kPa) or less, exterior soffit installation shall comply with Section R704.2.1, R704.2.2, R704.2.3 or R704.2.4. Exterior Soffit materials not addressed in Sections R704.2.1 through R704.2.4 shall be in accordance with the manufacturer’s installation instructions.

R704.2.1 Vinyl exterior soffit panels. Vinyl exterior soffit panels shall be installed using fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia or subfascia component in accordance with Figure R704.2.1(1). Where the unsupported span of exterior soffit panels is greater than 16 inches (406 mm), intermediate nailing strips shall be provided in accordance with Figure R704.2.1(2). Vinyl exterior soffit panels shall be installed in accordance with the manufacturer’s installation instructions. Fascia covers shall be installed in accordance with the manufacturer’s installation instructions.



(Add 'exterior' in front of 'soffit' in three locations.)

FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT



(Add 'exterior' in front of 'soffit' in three locations.)

FIGURE R704.2.1(2) TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT

R704.2.2 Fiber-cement exterior soffit panels. Fiber-cement exterior soffit panels shall be a minimum of $^1/_4$ inch (6.4 mm) in thickness and shall comply with the requirements of ASTM C1186, Type A, minimum Grade II, or ISO 8336, Category A, minimum Class 2. Panel joints shall occur over framing or over wood structural panel sheathing. Exterior Soffit panels shall be installed with spans and fasteners in accordance with the manufacturer's installation instructions.

R704.2.3 Hardboard exterior soffit panels. Hardboard exterior soffit panels shall be not less than $^7/_{16}$ inch (11.11 mm) in thickness and shall be fastened to framing or nailing strips with $2^1/_2$-inch by 0.113-inch (64 mm by 2.9 mm) siding nails spaced not more than 6 inches (152 mm) on center at panel edges and 12 inches (305 mm) on center at intermediate supports.

R704.2.4 Wood structural exterior panel soffit. The minimum nominal thickness for wood exterior structural panel soffits shall be $^3/_8$ inch (9.5 mm) and shall be fastened to framing or nailing strips with 2-inch by 0.099-inch (51 mm by 2.5 mm) nails. Fasteners shall be spaced not less than 6 inches (152 mm) on center at panel edges and 12 inches (305 mm) on center at intermediate supports.

R704.3 Exterior Soffit installation where the design wind pressure exceeds 30 psf. Where the design wind pressure is greater than 30 psf, exterior soffit installation shall comply with Section R704.3.1, R704.3.2, R704.3.3 or R704.3.4. Exterior Soffit materials not addressed in Sections R704.3.1 through R704.3.4 shall be in accordance with the manufacturer's installation instructions.

R704.3.1 Vinyl exterior soffit panels. Vinyl exterior soffit panels and their attachments shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.929 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2) . Vinyl exterior soffit panels shall be installed using fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia or subfascia component in accordance with Figure R704.2.1(1). Where the unsupported span of exterior soffit panels is greater than 12 inches (305 mm), intermediate nailing strips shall be provided in accordance with Figure R704.2.1(2). Vinyl exterior soffit panels shall be installed in accordance with the manufacturer's installation instructions. Fascia covers shall be installed in accordance with the manufacturer's installation instructions.

R704.3.2 Fiber-cement exterior soffit panels. Fiber-cement exterior soffit panels shall comply with Section R704.2.2 and shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.929 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2).

R704.3.3 Hardboard exterior soffit panels. Hardboard exterior soffit panels shall comply with the manufacturer's installation instructions and shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.929 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2) .

R704.3.4 Wood structural panel exterior soffit. Wood structural panel exterior soffits shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.929 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2). Alternatively, wood structural panel exterior soffits shall be installed in accordance with Table R704.3.4.

TABLE R704.3.4 PRESCRIPTIVE ALTERNATIVE FOR WOOD STRUCTURAL PANEL EXTERIOR SOFFIT [b, c, d, e]

MAXIMUM DESIGN PRESSURE (+ or - psf)	MINIMUM PANEL SPAN RATING	MINIMUM PANEL PERFORMANCE CATEGORY	NAIL TYPE AND SIZE	FASTENER[a] SPACING ALONG EDGES AND INTERMEDIATE SUPPORTS	
				Galvanized Steel	Stainless Steel
30	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	6[f]	4
40	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	6	4
50	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	4	4
			8d common ($2^{1}/_{2}$ × 0.131 × 0.281 head diameter)	6	6
60	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	4	3
			8d common ($2^{1}/_{2}$ × 0.131 × 0.281 head diameter)	6	4
70	24/16	7/16	8d common ($2^{1}/_{2}$× 0.131 × 0.281 head diameter)	4	4
			10d box (3 × 0.128 × 0.312 head diameter)	6	4
80	24/16	7/16	8d common ($2^{1}/_{2}$ × 0.131 × 0.281 head diameter)	4	4
			10d box (3 × 0.128 × 0.312 head diameter)	6	4
90	32/16	15/32	8d common ($2^{1}/_{2}$ × 0.131 × 0.281 head diameter)	4	3
			10d box (3 × 0.128 × 0.312 head diameter)	6	4

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Fasteners shall comply with Sections R703.3.2 and R703.3.3.

b. Maximum spacing of exterior soffit framing members shall not exceed 24 inches.

c. Wood structural panels shall be of an exterior exposure grade.

d. Wood structural panels shall be installed with strength axis perpendicular to supports with not fewer than two continuous spans.

e. Wood structural panels shall be attached to exterior soffit framing members with specific gravity of at least 0.42. Framing members shall be minimum 2 × 3 nominal with the larger dimension in the cross section aligning with the length of fasteners to provide sufficient embedment depths.

f. Spacing at intermediate supports shall be not greater than 12 inches on center.

Reason Statement: Over the past few cycles the treatment of exterior wall coverings and soffits has become separated and addressed in different sections of the code. R704 is now an entire section of the code dedicated to soffit and now fascia. The construction methods for these parts of the exterior of the structure are unique and prior to the last few cycles were not addressed at all. This has been a noticeable area in need of requirements based on wind performance failures due to lack of direction. With this change in definitions and resulting other areas of the code, it will help builders, installers and building officials better understand how R704 applies and how R703 applies. These definitions create clearer understanding of application.

Cost Impact: The code change proposal will increase the cost of construction
This code change will bring a necessary broadening of installation requirement for non-traditionally considered soffit applications. But without the change there is limited guidance on how this should be handled and regulated.

RB236-22

RB237-22

IRC: SECTION R703, SECTION R704, FIGURE R704.2.1(1), FIGURE R704.2.1(2), R704.3.1, R704.4 (New), R704.4.1 (New), R704.4.1.1 (New), R704.4.1.2 (New)

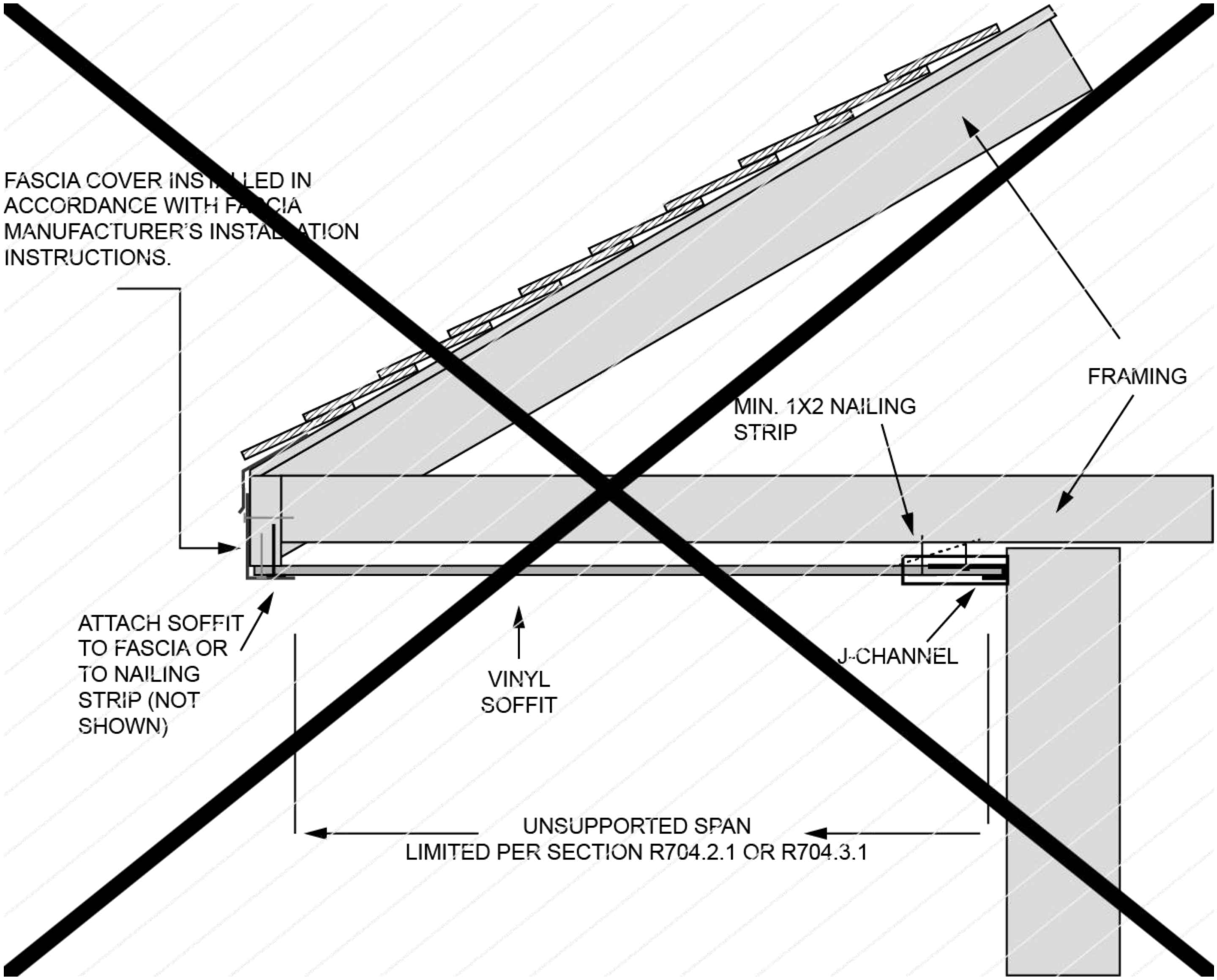
Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org); T. Eric Stafford, representing Insurance Institute for Business and Home Safety (testafford@charter.net)

2021 International Residential Code

Revise as follows:

SECTION R703
EXTERIOR WALL COVERING

SECTION R704
EXTERIOR SOFFITS AND FASCIAS


FASCIA COVER INSTALLED IN ACCORDANCE WITH FASCIA MANUFACTURER'S INSTALLATION INSTRUCTIONS.
FRAMING
MIN. 1X2 NAILING STRIP
FRAMING
ATTACH SOFFIT TO FASCIA OR TO NAILING STRIP (NOT SHOWN)
VINYL SOFFIT
J-CHANNEL
UNSUPPORTED SPAN
LIMITED PER SECTION R704.2.1 OR R704.3.1

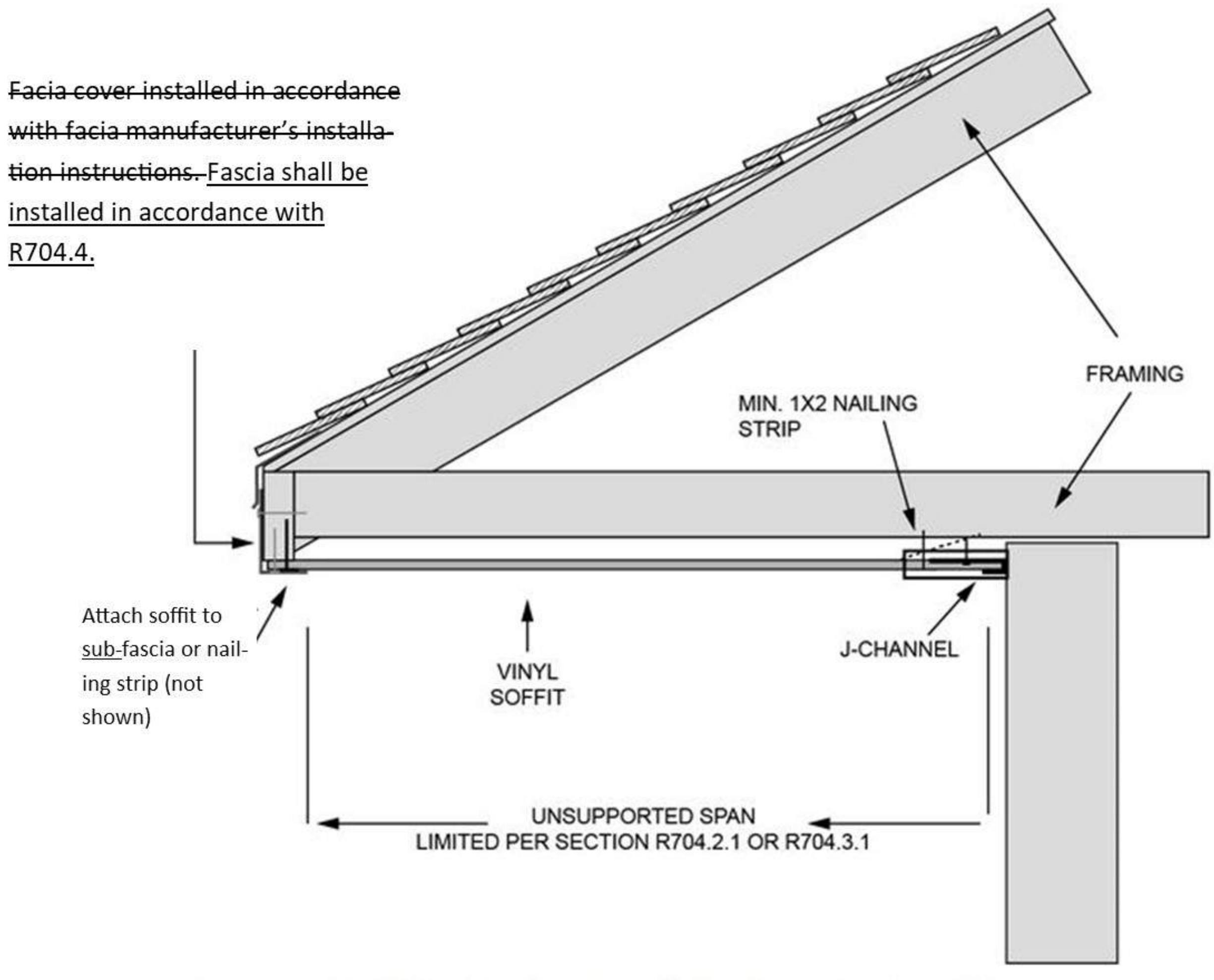
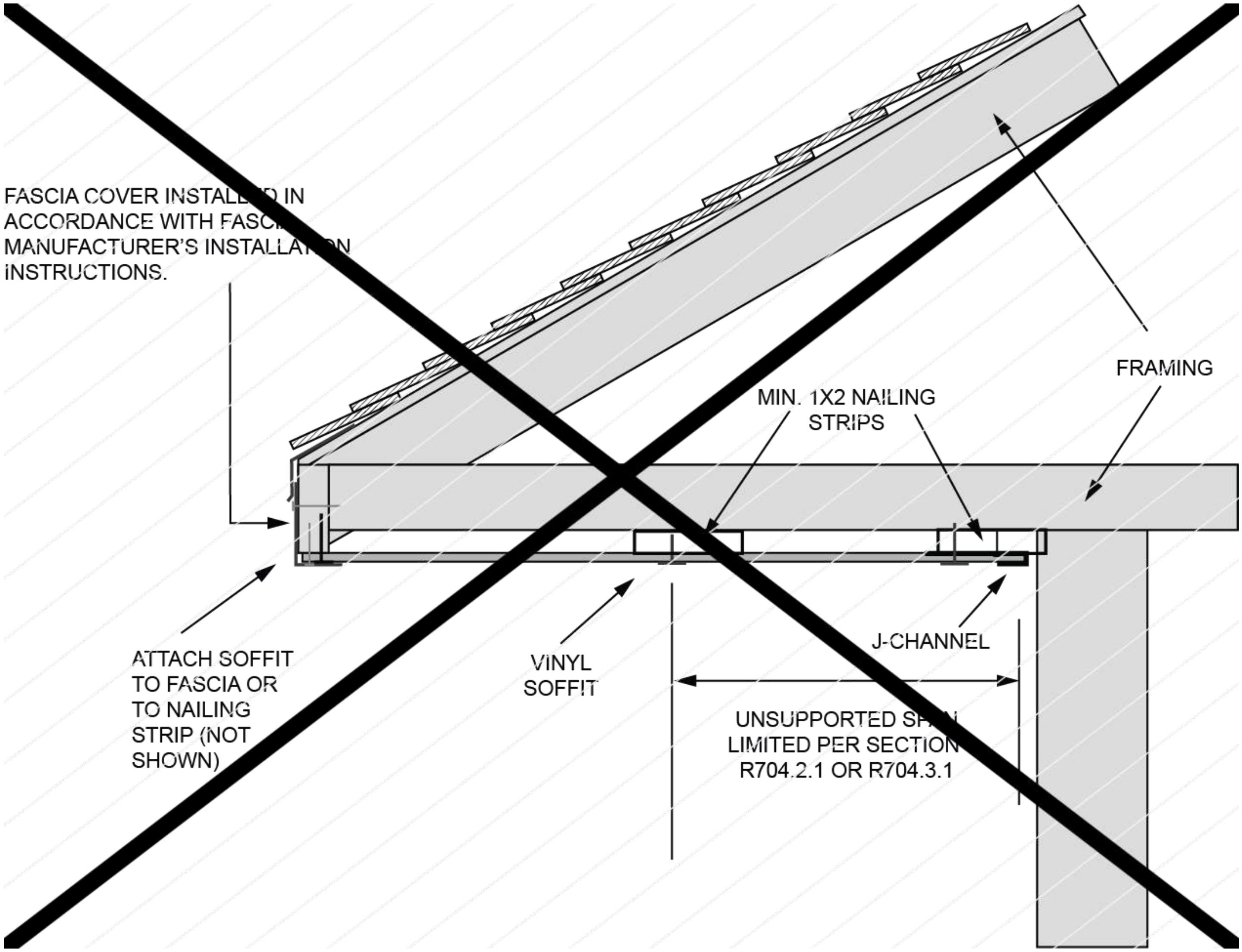


FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT

FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT


FASCIA COVER INSTALLED IN
ACCORDANCE WITH FASCIA
MANUFACTURER'S INSTALLATION
INSTRUCTIONS.
FRAMING
MIN. 1X2 NAILING
STRIPS
ATTACH SOFFIT
TO FASCIA OR
TO NAILING
STRIP (NOT
SHOWN)
VINYL
SOFFIT
J-CHANNEL
UNSUPPORTED SPAN
LIMITED PER SECTION
R704.2.1 OR R704.3.1

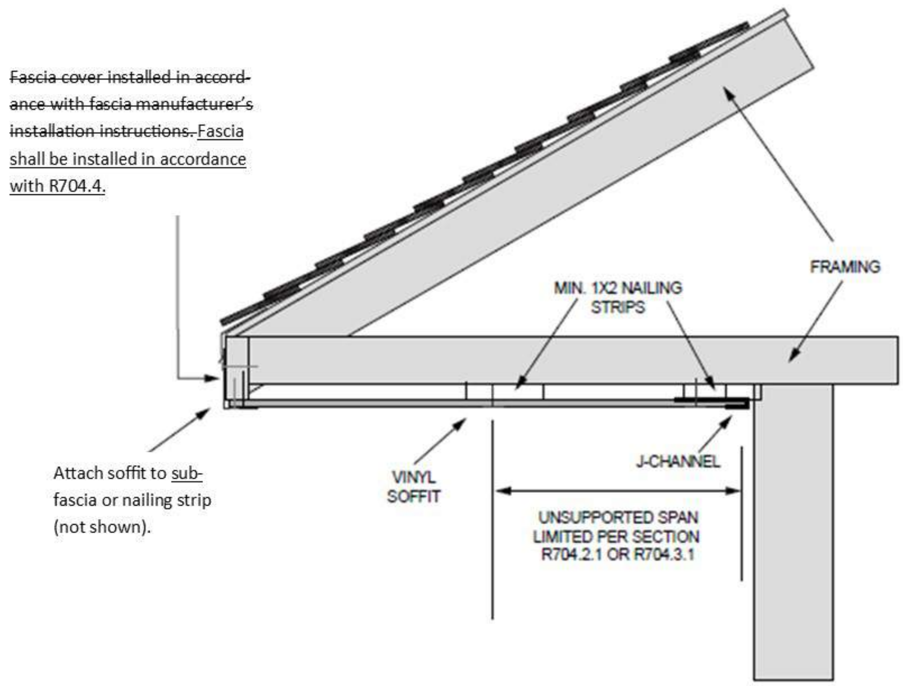


FIGURE R704.2.1(2)
TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT

FIGURE R704.2.1(2) TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT

R704.3.1 Vinyl soffit panels. Vinyl soffit panels and their attachments shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.929 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2) . Vinyl soffit panels shall be installed using fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia or subfascia component in accordance with Figure R704.2.1(1). Where the unsupported span of soffit panels is greater than 12 inches (305 mm), intermediate nailing strips shall be provided in accordance with Figure R704.2.1(2). Vinyl soffit panels shall be installed in accordance with the manufacturer's installation instructions. ~~Fascia covers shall be installed in accordance with the manufacturer's installation instructions.~~

Add new text as follows:

R704.4 Fascia. Fascia shall be installed in accordance with *manufacturer's installation instructions*.

R704.4.1 Aluminum Fascia. Aluminum Fascia shall be installed in accordance with manufacturer's installation instructions and comply with Sections R704.4.1.1 or R704.4.1.2.

R704.4.1.1 Fascia installation where the design wind pressure is 30 psf or less. Where the design wind pressure is 30 pounds per square foot (1.44kPA) or less, aluminum fascia shall be a attached with one finish nail (1 ¼ x 0.057 x 0.177 head diameter) in the return leg spaced a maximum of 24 inches (610 mm) on center, and the fascia shall be inserted under the drip edge with at least 1 inch (305 mm) of fascia material covered by the drip edge. Where the fascia can not be inserted under the drip edge, the top edge of the fascia shall be secured using one finish nail (1 ¼ x 0.057 x 0.177 head diameter) located not more than 1 inch (25 mm) below the drip edge and spaced a maximum of 24 inches (610 mm) on center.

R704.4.1.2 Fascia installation where the design wind pressure exceeds 30 psf. Where the design wind pressure is greater than 30 pounds per square foot (1.44kPA), aluminum fascia shall be attached with one finish nail (1 ¼ x 0.057 x 0.177 head diameter) in the return leg spaced a maximum of 16 inches (406 m) on center and one finish nail located no more than 1 inch (25 mm) below the drip edge spaced a maximum of 16 inches (406 mm) on center. As an alternative, the top edge of the fascia is permitted to be secured using utility trim installed beneath the drip edge with snap locks punched into the fascia spaced no more than 6 inches (152 mm) on center.

Reason Statement: Currently the code does not provide specific instructions for the installation of fascia at the eaves and rakes. This is an area the code needs to address, as it has been identified as a point of weakness for failure during wind events. Based on results of recent testing, aluminum fascia can be installed with one fastener at the leg with a 1" or more coverage at the drip edge, although issues with fascia in non-high wind areas is not a noted issue.
In high wind conditions fascia will be required to have two fasteners, at the face and leg, or using utility trim and punch locks at drip edge.

Attached are results from those tests and here is a link to the report as well.

https://www.vinylsiding.org/wp-content/uploads/2022/01/m9254.01-109-40-r0.pdf

Example from FEMA MAT reports include noted issues that this change will address.

- H-Harvey: See Section 4.1.4: "Being the leading edge of the roof system, soffits and fascia are particularly vulnerable to high winds."
- H-Irma: Multiple observations of fascia failure that appeared to initiate soffit and roof covering damage.

Here are examples of a failure from Hurricane Laura from 2020 where the fascia failed and also led to fascia and soffit failure.

Cost Impact: The code change proposal will increase the cost of construction
This change will increase the cost of construction in high wind areas. The increase would be the addition of finish nails and labor for installation which if fairly minimal consider how fascia is installed today or a more significant cost would be the addition of utility trim and punch locks. But again this would be for just high wind areas and this change really completes the exterior wall covering / roof connection point of the building where failures have been noted during hurricane and high wind conditions.'

The change will not increase the cost of construction in non-coastal areas as the proposed prescription is already being done in many cases.

RB237-22

RB238-22

IRC: R703.3.1, R703.3.2, R703.3.3, R704.2.1, FIGURE R704.2.1(1), FIGURE R704.2.1(2)

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org); Glenn Overcash, representing Federal Emergency Management Agency (glenn.overcash@aecom.com)

2021 International Residential Code

Delete without substitution:

~~**R703.3.1 Soffit installation.** Soffits shall comply with Section R704.~~

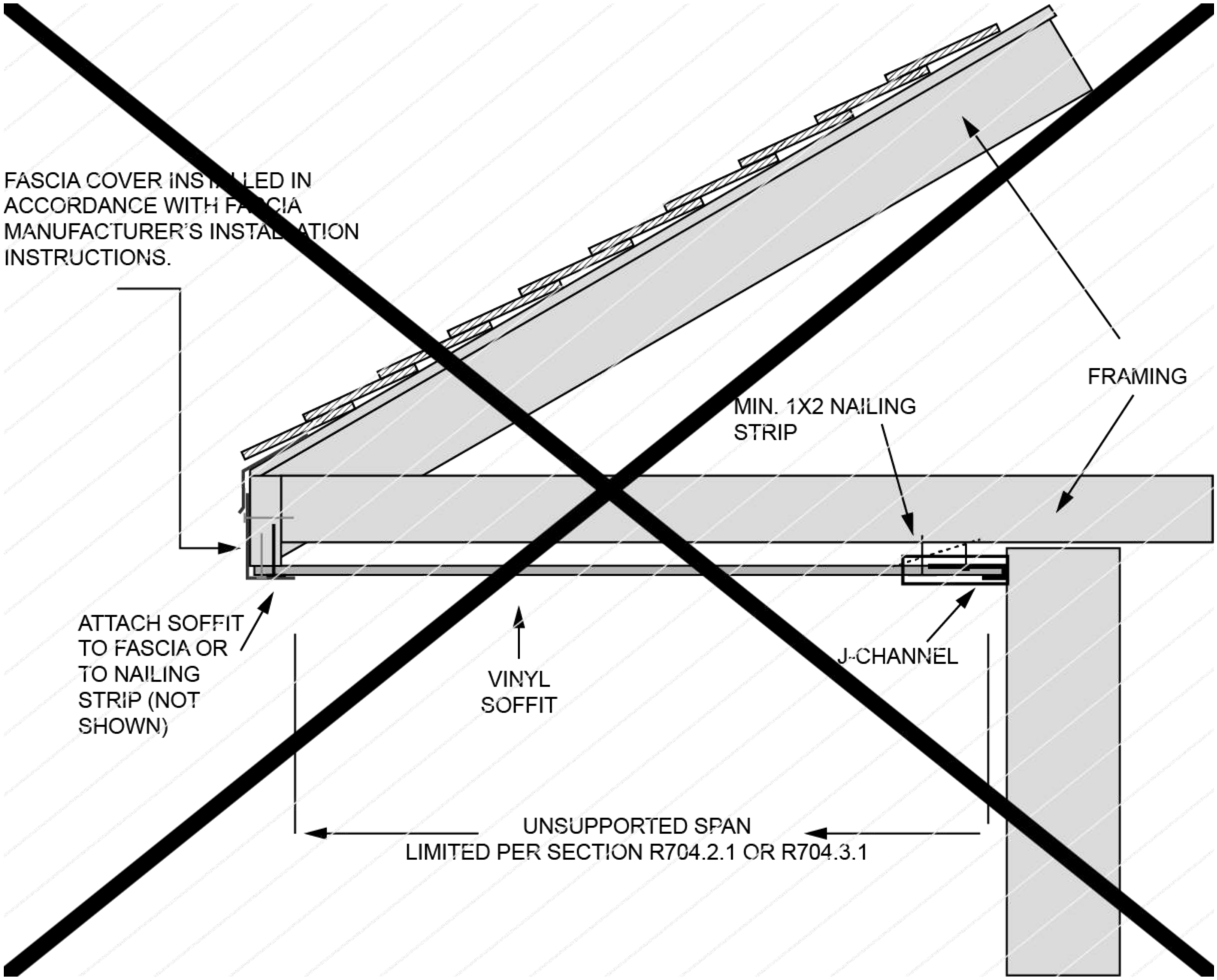
Revise as follows:

R703.3.2 Wind limitations. Where the design wind pressure exceeds 30 psf or where the limits of Table R703.3.2 are exceeded, the attachment of wall coverings ~~and soffits~~ shall be designed to resist the component and cladding loads specified in Table R301.2.1(1) for walls, adjusted for height and exposure in accordance with Table R301.2.1(2). For the determination of wall covering ~~and soffit attachment,~~ component and cladding loads shall be determined using an effective wind area of 10 square feet (0.93 m^2).

R703.3.3 Fasteners. Exterior wall coverings ~~and roof overhang soffits~~ shall be securely fastened with aluminum, galvanized, stainless steel or rust-preventative coated nails or staples in accordance with Table R703.3(1) or with other *approved* corrosion-resistant fasteners in accordance with the wall covering manufacturer's installation instructions. Nails and staples shall comply with ASTM F1667. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples shall have a minimum crown width of $^{7}/_{16}$ inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire. Where fiberboard, gypsum, or foam plastic sheathing backing is used, nails or staples shall be driven into the studs. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with either the siding manufacturer's installation instructions or Table R703.3.3.

R704.2.1 Vinyl and aluminum soffit panels. Vinyl and aluminum soffit panels shall be installed using aluminum, galvanized, stainless steel or rust-preventative coated nails or staples or other *approved* corrosion-resistant fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia or subfascia component in accordance with Figure R704.2.1(1). Where the unsupported span of soffit panels is greater than 16 inches (406 mm), intermediate nailing strips shall be provided in accordance with Figure R704.2.1(2). Vinyl and aluminum soffit panels shall be installed in accordance with the manufacturer's installation instructions. Fascia covers shall be installed in accordance with the manufacturer's installation instructions.

Delete and substitute as follows:



~~**FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT**~~

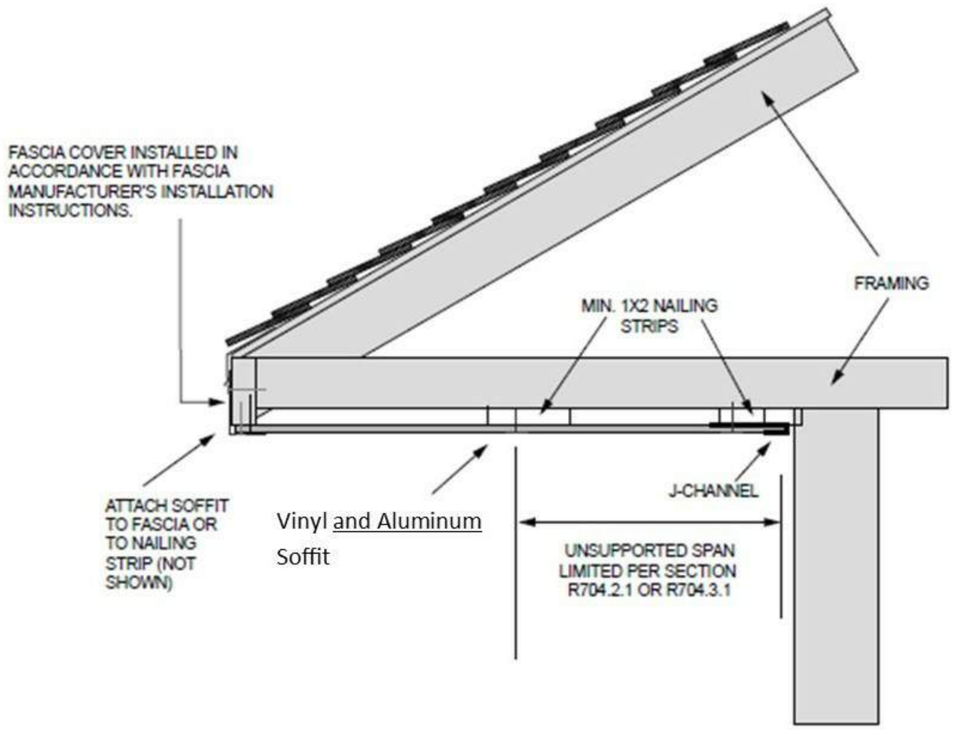
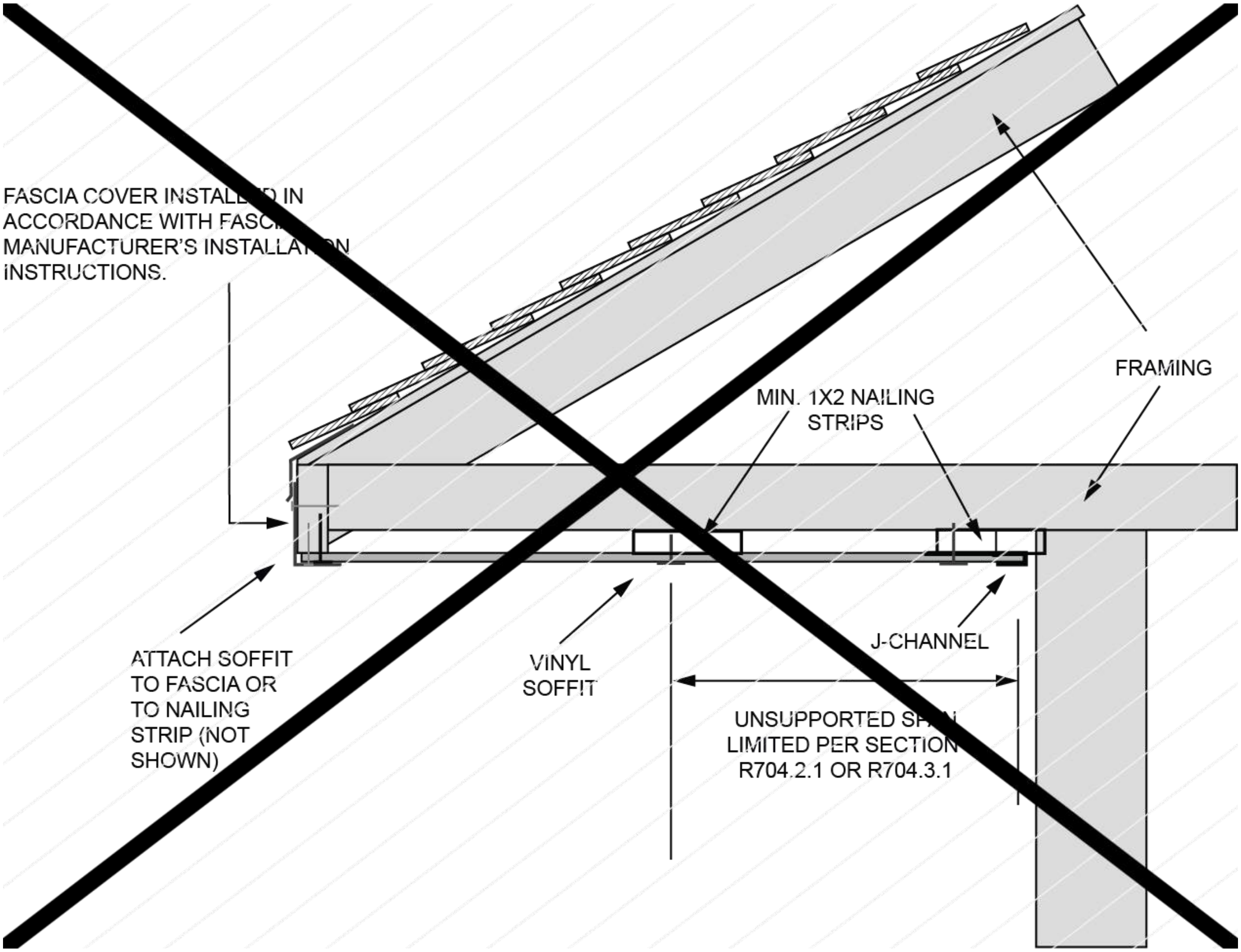


FIGURE R704.2.1(2)

Typical Single Span Vinyl and Aluminum Soffit Panel Support

FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT



~~FIGURE R704.2.1(2) TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT~~

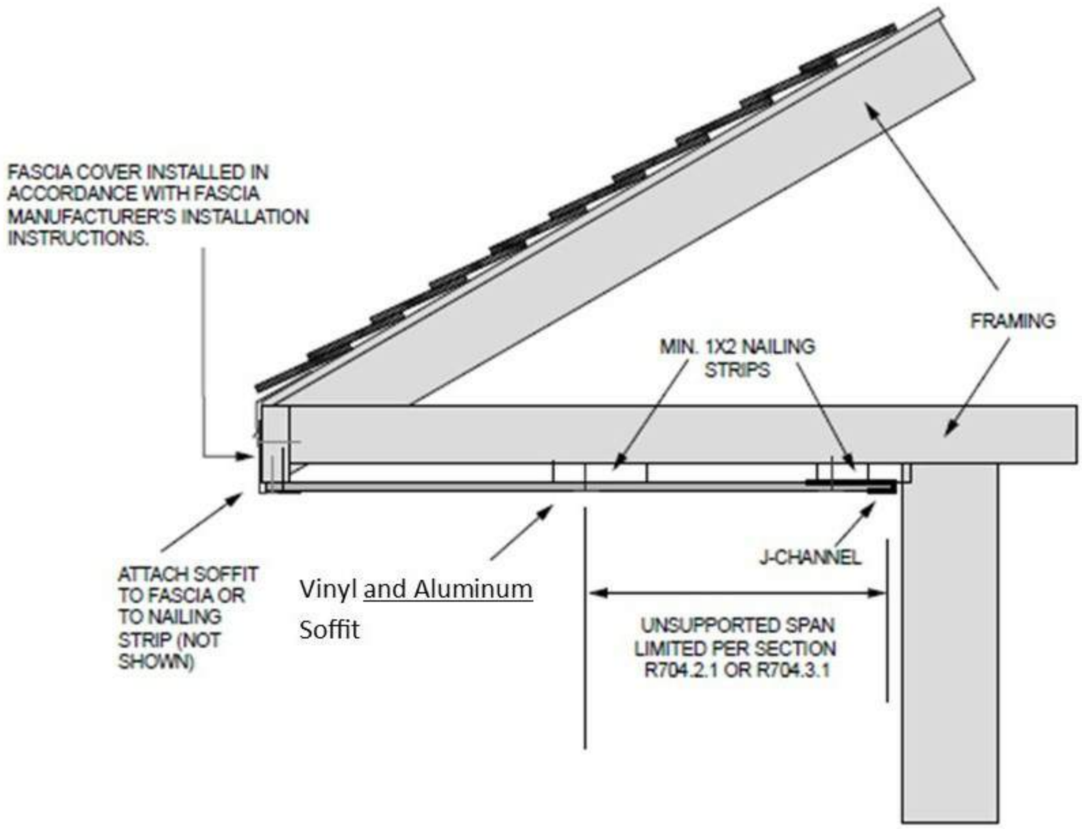


FIGURE R704.2.1(2)

Typical Single Span Vinyl <u>and Aluminum</u> Soffit Panel Support

<u>FIGURE R704.2.1(2) TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT</u>

Reason Statement: Currently the code does not provide specific requirements for the installation of aluminum soffit. This code change proposal adds aluminum soffit requirements to the existing vinyl soffit subsection because provisions for both materials are essentially the same. In addition, this change includes some correlation edits to remove soffit references from Section R703 where soffits were addressed prior to development of Section R704.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simple change brings common practice into the code without any technical changes.

RB238-22

RB239-22

IRC: TABLE R704.3.4

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

2021 International Residential Code

Revise as follows:

TABLE R704.3.4 PRESCRIPTIVE ALTERNATIVE FOR WOOD STRUCTURAL PANEL SOFFIT [b, c, d, e]

MAXIMUM DESIGN PRESSURE (+ or - psf)	MINIMUM PANEL SPAN RATING	MINIMUM PANEL PERFORMANCE CATEGORY	NAIL TYPE AND SIZE	FASTENER[a] SPACING [e] ALONG EDGES AND INTERMEDIATE SUPPORTS, inches	
				Galvanized Steel	Stainless Steel
30	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	6[f]	4
40	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	6	4
50	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	4	4
			8d common ($2^1/_2$ × 0.131 × 0.281 head diameter)	6	6
60	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	4	3
			8d common ($2^1/_2$ × 0.131 × 0.281 head diameter)	6	4
70	24/16	7/16	8d common ($2^1/_2$× 0.131 × 0.281 head diameter)	4	4
			10d box (3 × 0.128 × 0.312 head diameter)	6	4
80	24/16	7/16	8d common ($2^1/_2$ × 0.131 × 0.281 head diameter)	4	4
			10d box (3 × 0.128 × 0.312 head diameter)	6	4
90	32/16	15/32	8d common ($2^1/_2$ × 0.131 × 0.281 head diameter)	4	3
			10d box (3 × 0.128 × 0.312 head diameter)	6	4

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Fasteners shall comply with Sections R703.3.2 and R703.3.3.

b. Maximum spacing of soffit framing members shall not exceed 24 inches.

c. Wood structural panels shall be of an exterior exposure grade.

d. Wood structural panels shall be installed with strength axis perpendicular to supports with not fewer than two continuous spans.

e. ~~Wood structural panels shall be attached to soffit framing members with specific gravity of at least 0.42~~ Where the specific gravity of the wood species used for soffit framing members is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, the fastener spacing shall be multiplied by 0.67 or the same fastener spacing as prescribed for galvanized steel nails shall be permitted to be used where RSRS-01 (2″× 0.099″× 0.266″ head) nails replace 6d box nails and RSRS-03 (2-1/2″× 0.131″× 0.281″ head) nails replace 8d common nails or 10d box nails or alternative fastening shall be designed in accordance with AWC NDS. RSRS is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667. Framing members shall be minimum 2 × 3 nominal with the larger dimension in the cross section aligning with the length of fasteners to provide sufficient embedment depths.

f. Spacing at intermediate supports shall be not greater than 12 inches on center.

Reason Statement: The change addresses the use of soffit framing of wood species having lower specific gravity than the value of 0.42 associated with prescribed spacing of nails. The expanded footnote e provides equivalent performing prescriptive fastening options for cases where specific gravity is as low as 0.35 in accordance with AWC NDS. Withdrawal design values are provided in the AWC NDS for the RSRS nail (a standard ring shank nail) and the RSRS nail sizes prescribed in the footnote align with proposed RSRS nail options for roof sheathing fastening. An option for design of alternative fastening is also provided.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change provides prescriptive fastening options for soffit attachment to wood species with lower specific gravity than that existing 0.42 baseline for the tabulated requirements.

RB239-22

RB240-22

IRC: SECTION R705 (New), R705.1 (New)

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Add new text as follows:

SECTION R705
BIPV SYSTEMS FOR EXTERIOR WALL COVERINGS AND FENESTRATION

R705.1 Listing required.. In addition to complying with other provisions of this code, BIPV systems used as exterior wall coverings or fenestration shall be *listed* and *labeled* in accordance with UL 1703 or both UL 61730-1 and UL 61730-2.

Reason Statement: Building Integrated Photovoltaic (BIPV) Systems are increasingly becoming popular due to efforts to achieve Net Zero Energy. Requirements for BIPV Systems used as roof assemblies and roof coverings are already addressed in Chapter 9. New applications for BIPV systems are systems that are used as either exterior wall coverings or fenestration. The IRC is silent on the requirements for such systems.Chapter 7 contains a variety of requirements for exterior wall coverings and exterior wall assemblies. Clearly, if BIPV systems are included in exterior walls they should comply with all such requirements (including fire tests and weather protection). In addition to those requirements, this proposal requires that BIPV systems be listed and labeled in accordance with the applicable UL standards. Note these UL standards are already addressed in the IRC.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Bibliography: Reference:
FS150-21

IBC Section 1410 and 1410.1

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies what requirements apply to BIPV systems used as an exterior wall covering or fenestration.

RB240-22

RB241-22

IRC: R802.1.5, R802.1.5.1, R802.1.5.2, R802.1.5.3, R802.1.5.3.1, R802.1.5.4, R802.1.5.5, R802.1.5.6, R802.1.5.7, R802.1.5.8, R802.1.5.9, R802.1.5.10

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2021 International Residential Code

Revise as follows:

~~R802.1.5~~ R302.15 Fire-retardant-treated wood. Fire-retardant-treated wood (FRTW) is any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a listed flame spread index of 25 or less. In addition, the ASTM E84or UL 723 test shall be continued for an additional 20-minute period and the flame front shall not progress more than 10.5 feet (3200 mm) beyond the center line of the burners at any time during the test.

~~R802.1.5.1~~ R302.15.1 Pressure process. For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under pressures not less than 50 pounds per square inch gauge (psig) (344.7 kPa).

~~R802.1.5.2~~ R302.15.2 Other means during manufacture. For wood products impregnated with chemicals by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product. The use of paints, coating, stains or other surface treatments is not an *approved* method of protection as required by this section.

~~R802.1.5.3~~ R302.15.3 Testing. For fire-retardant-treated wood products, the front and back faces of the wood product shall be tested in accordance with and produce the results required in Section R302.15 ~~R802.1.5~~.

~~R802.1.5.3.1~~ R302.15.3.1 Fire testing of wood structural panels. *Wood structural panels* shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm).

~~R802.1.5.4~~ R302.15.4 Labeling. In addition to the *labels* required by Section 802.1.1 for sawn lumber and Section 803.2.1 for *wood structural panels*, each piece of *fire-retardant-treated* lumber and *wood structural panel* shall be *labeled*. The *label* shall contain:

1. The identification *mark* of an *approved agency* in accordance with Section 1703.5 of the International Building Code.
2. Identification of the treating manufacturer.
3. The name of the fire-retardant treatment.
4. The species of wood treated.
5. Flame spread index and *smoke-developed index*.
6. Method of drying after treatment.
7. Conformance to applicable standards in accordance with Sections R302.15.5 through R302.15.10 ~~R802.1.5.5 through R802.1.5.10~~.
8. For FRTW exposed to weather, or a damp or wet location, the words "No increase in the listed classification when subjected to the Standard Rain Test" (ASTM D2898).

~~R802.1.5.5~~ R302.15.5 Strength adjustments. Design values for untreated lumber and *wood structural panels* as specified in Section R802.1 shall be adjusted for fire-retardant-treated wood. Adjustments to design values shall be based on an *approved* method of investigation that takes into consideration the effects of the anticipated temperature and humidity to which the fire-retardant-treated wood will be subjected, the type of treatment and redrying procedures.

~~R802.1.5.6~~ R302.15.6 Wood structural panels. The effect of treatment and the method of redrying after treatment, and exposure to high temperatures and high humidities on the flexure properties of fire-retardant-treated softwood plywood shall be determined in accordance with ASTM D5516. The test data developed by ASTM D5516 shall be used to develop adjustment factors, maximum loads and spans, or both for untreated plywood design values in accordance with ASTM D6305. Each manufacturer shall publish the allowable maximum loads and spans for service as floor and roof sheathing for their treatment.

~~R802.1.5.7~~ R302.15.7 Lumber. For each species of wood treated, the effect of the treatment and the method of redrying after treatment and exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated lumber shall be determined in accordance with ASTM D5664. The test data developed by ASTM D5664 shall be used to develop modification factors for use at or near room temperature and at elevated temperatures and humidity in accordance with ASTM D6841. Each manufacturer shall publish the modification factors for service at temperatures of not less than 80°F (27°C) and for roof framing. The roof framing modification factors shall take into consideration the climatological location.

~~R802.1.5.8~~ R302.15.8 Exposure to weather. Where fire-retardant-treated wood is exposed to weather or damp or wet locations, it shall be identified as "Exterior" to indicate there is not an increase in the *listed* flame spread index as defined in Section R302.15 ~~R802.1.5~~ when subjected to

ASTM D2898.

~~R802.1.5.9~~ R302.15.9 Interior applications. Interior fire-retardant-treated wood shall have a moisture content of not over 28 percent when tested in accordance with ASTM D3201 procedures at 92-percent relative humidity. Interior fire-retardant-treated wood shall be tested in accordance with Section R302.15.6 or R302.15.7 ~~R802.1.5.6 or R802.1.5.7~~. Interior fire-retardant-treated wood designated as Type A shall be tested in accordance with the provisions of this section.

~~R802.1.5.10~~ R302.15.10 Moisture content. Fire-retardant-treated wood shall be dried to a moisture content of 19 percent or less for lumber and 15 percent or less for *wood structural panels* before use. For wood kiln dried after treatment (KDAT) the kiln temperatures shall not exceed those used in kiln drying the lumber and plywood submitted for the tests described in Section ~~R802.1.5.6~~ R302.15.6 for plywood and R302.15.7 ~~R802.1.5.7~~ for lumber.

Reason Statement: This proposal literally does not make any changes in code language, other than moving the entire section R802.1.5, on fire-retardant-treated wood, into chapter 3 as a new section R302.15 (and ensure the correct sections are referenced). The reason is chapter 3 is the chapter containing all the fire test requirements for materials. On the other hand, chapter 8 addresses roof-ceiling construction and fire-retardant-treated wood has applicability way beyond roofs and ceilings and it should be placed where all products that have fire safety requirements are placed.
The present section R302.9 addresses flame spread index and smoke developed index for wall and ceiling finishes. The section in front of it, R302.8, addresses a particular type of product (foam plastics), and, therefore, creating a new section R302.9 might have been a reasonable location for fire-retardant treated wood, which is a particular product, requiring fire testing, but is not restricted to wall and ceiling finishes (or to roofs and ceilings). The proposal instead just places the "moved" section to a new section at the end, so as not to renumber existing sections.

This proposal does not intend to replace any existing section or any existing requirements but just to add a new section, taken from chapter 8, unchanged.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply relocates the section on fire-retardant-treated wood, without changing any of the language.

RB241-22

RB242-22

IRC: R802.1.5, R802.1.5.1 (New), ASTM Chapter 44 (New)

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2021 International Residential Code

Revise as follows:

R802.1.5 Fire-retardant-treated wood. Fire-retardant-treated wood (FRTW) is any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a listed flame spread index of 25 or less. ~~In addition, the~~ The ASTM E84 or UL 723 test shall be continued for an additional 20-minute period and the flame front shall not progress more than 10.5 feet (3200 mm) beyond the center line of the burners at any time during the test.

Add new text as follows:

R802.1.5.1 Alternate fire testing. A wood product impregnated with chemicals by a pressure process or other means during manufacture, which, when tested to ASTM E2768, has a listed flame spread index of 25 or less and where the flame front does not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test, shall also be considered fire-retardant-treated wood.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E2768-11 (2018)	Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)

Staff Analysis: ASTM E2768-11(2018), Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test), is already referenced in the IWUIC. This is simply a new occurrence of the reference in the I-Codes

Reason Statement: ASTM E2768 was developed specifically intended for code use. It is a standardized version of ASTM E84 with the extension from 10 minutes to 30 minutes (meaning an additional 20 minutes) and it measures exactly what the extended ASTM E84 does, namely flame spread index and flame front progression beyond the centerline of the burners. This standard is already included in the IWUIC and the language proposed is consistent with the IWUIC language.

The change to the existing section is for language consistency (the exact same language is being proposed in the IBC). The wording of "In addition" as well as "additionally" is redundant.
Note that this change adds a new section without deleting any existing section. Thus, sections 802.1.5.1 through 802.1.5.10 will have to be renumbered as 802.1.5.2 through 802.1.5.11.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simple clarification: ASTM E2768 is the same as the extended ASTM E84 test.

RB242-22

RB243-22

IRC: R802.1.5.3, R802.1.5.3.1, R802.1.5.4, R802.1.5.6, R802.1.5.7, R802.1.5.10

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2021 International Residential Code

R802.1.5.3 Testing. For fire-retardant-treated wood products, the front and back faces of the wood product shall be tested in accordance with and produce the results required in Section R802.1.5.

Revise as follows:

R802.1.5.3.1 Fire testing of fire-retardant-treated wood structural panels. ~~*Wood*~~ *Fire-retardant-treated wood structural panels* shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm).

R802.1.5.4 Labeling. In addition to the *labels* required by Section 802.1.1 for sawn lumber and Section 803.2.1 for *wood structural panels*, each piece of *fire-retardant-treated* lumber and fire-retardant-treated *wood structural panel* shall be *labeled*. The *label* shall contain:

1. The identification *mark* of an *approved agency* in accordance with Section 1703.5 of the International Building Code.
2. Identification of the treating manufacturer.
3. The name of the fire-retardant treatment.
4. The species of wood treated.
5. Flame spread index and *smoke-developed index*.
6. Method of drying after treatment.
7. Conformance to applicable standards in accordance with Sections R802.1.5.5 through R802.1.5.10.
8. For FRTW exposed to weather, or a damp or wet location, the words “No increase in the listed classification when subjected to the Standard Rain Test” (ASTM D2898).

R802.1.5.5 Strength adjustments. Design values for untreated lumber and *wood structural panels* as specified in Section R802.1 shall be adjusted for fire-retardant-treated wood. Adjustments to design values shall be based on an *approved* method of investigation that takes into consideration the effects of the anticipated temperature and humidity to which the fire-retardant-treated wood will be subjected, the type of treatment and redrying procedures.

R802.1.5.6 ~~Wood~~ Fire-retardant-treated wood structural panels. The effect of treatment and the method of redrying after treatment, and exposure to high temperatures and high humidities on the flexure properties of fire-retardant-treated softwood plywood shall be determined in accordance with ASTM D5516. The test data developed by ASTM D5516 shall be used to develop adjustment factors, maximum loads and spans, or both for untreated plywood design values in accordance with ASTM D6305. Each manufacturer shall publish the allowable maximum loads and spans for service as floor and roof sheathing for their treatment.

R802.1.5.7 ~~Lumber~~ Fire-retardant-treated lumber. For each species of wood treated, the effect of the treatment and the method of redrying after treatment and exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated lumber shall be determined in accordance with ASTM D5664. The test data developed by ASTM D5664 shall be used to develop modification factors for use at or near room temperature and at elevated temperatures and humidity in accordance with ASTM D6841. Each manufacturer shall publish the modification factors for service at temperatures of not less than 80°F (27°C) and for roof framing. The roof framing modification factors shall take into consideration the climatological location.

R802.1.5.10 Moisture content. Fire-retardant-treated wood shall be dried to a moisture content of 19 percent or less for fire-retardant treated lumber and 15 percent or less for fire-retardant-treated *wood structural panels* before use. For wood kiln dried after treatment (KDAT) the kiln temperatures shall not exceed those used in kiln drying the fire-retardant-treated wood structural panels and fire-retardant-treated lumber ~~and plywood~~ submitted for the tests described in Section R802.1.5.6 for fire-retardant-treated wood structural panels ~~plywood~~ and R802.1.5.7 for fire-retardant-treated lumber.

Reason Statement: This section deals with fire-retardant-treated wood of two kinds and it is important to distinguish between them: fire-retardant-treated lumber and fire-retardant-treated wood structural panels. Also, section R802.1.5.3.1 talks about requirements for "fire testing of wood structural panels" but this should refer purely to fire-retardant-treated wood structural panels and not to other wood structural panels.

Note that section R802.1.5.4 (Labeling) addresses labeling of all types of wood structural panels (as required by R803.2.1) and then clarifies that the additional labels in this section apply to both fire-retardant-treated lumber and fire-retardant-treated wood structural panels.

The proposal addresses distinguishing these products without changing requirements, making it basically editorial clarification.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This is basically editorial clarification.

RB243-22

RB244-22

IRC: TABLE R802.5.2(1)

Proponents: Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Residential Code

Revise as follows:

TABLE R802.5.2(1) RAFTER/CEILING JOIST HEEL JOINT CONNECTIONS[g]

RAFTER SLOPE	RAFTER SPACING (inches)	GROUND SNOW LOAD (psf)											
		20[e]			30			50			70		
		Roof span (feet)											
		12	24	36	12	24	36	12	24	36	12	24	36
		Required number of 16d common nails per heel joint ~~splices~~ connection [a, b, c, d, f]											
3:12	12	3	5	8	3	6	9	5	9	13	6	12	17
	16	4	7	10	4	8	12	6	12	17	8	15	23
	19.2	4	8	12	5	10	14	7	14	21	9	18	27
	24	5	10	15	6	12	18	9	17	26	12	23	34
4:12	12	3	4	6	3	5	7	4	7	10	5	9	13
	16	3	5	8	3	6	9	5	9	13	6	12	17
	19.2	3	6	9	4	7	11	6	11	16	7	14	21
	24	4	8	11	5	9	13	7	13	19	9	17	26
5:12	12	3	3	5	3	4	6	3	6	8	4	7	11
	16	3	4	6	3	5	7	4	7	11	5	9	14
	19.2	3	5	7	3	6	9	5	9	13	6	11	17
	24	3	6	9	4	7	11	6	11	16	7	14	21
7:12	12	3	3	4	3	3	4	3	4	6	3	5	8
	16	3	3	5	3	4	5	3	5	8	4	7	10
	19.2	3	4	5	3	4	6	3	6	9	4	8	12
	24	3	5	7	3	5	8	4	8	11	5	10	15
9:12	12	3	3	3	3	3	3	3	3	5	3	4	6
	16	3	3	4	3	3	4	3	4	6	3	5	8
	19.2	3	3	4	3	4	5	3	5	7	3	6	9
	24	3	4	5	3	4	6	3	6	9	4	8	12
12:12	12	3	3	3	3	3	3	3	3	4	3	3	5
	16	3	3	3	3	3	3	3	3	5	3	4	6
	19.2	3	3	3	3	3	4	3	4	6	3	5	7
	24	3	3	4	3	3	5	3	5	7	3	6	9

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. 10d common (3″ × 0.148″) nails shall be permitted to be substituted for 16d common ($3^{1}/_{2}$″ × 0.162″) nails where the required number of nails is taken as 1.2 times the required number of 16d common nails, rounded up to the next full nail.

b. Heel joint connections are not required where the ridge is supported by a load-bearing wall, header or ridge beam.

c. Where intermediate support of the rafter is provided by vertical struts or purlins to a load-bearing wall, the tabulated heel joint connection requirements shall be permitted to be reduced proportionally to the reduction in span.

d. Equivalent nailing patterns are required for ceiling joist to ceiling joist lap splices.

e. Applies to roof live load of 20 psf or less.

f. Tabulated heel joint connection requirements assume that ceiling joists or rafter ties are located at the bottom of the attic space. Where ceiling joists or rafter ties are located higher in the attic, heel joint connection requirements shall be increased by the adjustment factors in Table 802.5.2(2).

g. Tabulated requirements are based on 10 psf roof dead load in combination with the specified roof snow load and roof live load.

Reason Statement: This is a simple editorial change. Currently the table column heading calls out the number of nails in "heel joint splices". This connection is not a splice. This is a connection between the ends of the ceiling joists and the rafters. So it is proposed to simply change "splices" to "connections" to match the wording used in the Table title.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No cost impact. Just an editorial change.

RB244-22

RB245-22

IRC: R802.10.1, R802.10.3, FIGURE R802.10.3(1) (New), FIGURE R802.10.3(2) (New), FIGURE R802.10.3(3) (New), FIGURE R802.10.3(4) (New)

Proponents: John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com); Larry Wainright, representing DrJ Engineering (lwainright@drjengineering.org)

2021 International Residential Code

Revise as follows:

R802.10.1 Truss design drawings. *Truss design drawings*, prepared in conformance to Section R802.10.1, shall be provided to the *building official* and *approved* prior to installation. *Truss design drawings* shall be provided with the shipment of trusses delivered to the job site. *Truss design drawings* shall include, at a minimum, the following information:

1. Slope or depth, span and spacing.
2. Location of all joints.
3. Required bearing widths.
4. Design loads as applicable.

    4.1. Top chord *live load* (~~as determined from~~ per Section ~~R301.6~~ R301.5)

    4.2 Roof live load (per section R301.6).

    4.3 Snow load (per section R301.2.3)

    4.4. ~~4.2.~~ Top chord dead load.

    4.5. ~~4.3.~~ Bottom chord *live load*.

    4.6. ~~4.4.~~ Bottom chord dead load.

    4.7. ~~4.5.~~ Concentrated loads and their points of application.

    4.8 ~~4.6.~~ Controlling wind and earthquake loads.

5. Adjustments to lumber and joint connector design values for conditions of use.
6. Each reaction force and direction.
7. Joint connector type and description such as size, thickness or gage and the dimensioned location of each joint connector except where symmetrically located relative to the joint interface.
8. Lumber size, species and *grade for each member.*
9. Connection requirements for:

    9.1. Truss to girder-truss.

    9.2. Truss ply to ply.

    9.3. Field splices.

10. Calculated deflection ratio or maximum description for live and total load.
11. Maximum axial compression forces in the truss members to enable the building designer to design the size, connections and anchorage of the permanent continuous lateral bracing. Forces shall be shown on the *truss design drawing* or on supplemental documents.
12. Required permanent ~~truss member bracing location.~~ individual truss member restraint location and the method and details of restraint and diagonal bracing to be used in accordance with Section R802.10.3.

R802.10.3 Bracing. Trusses shall be braced to prevent rotation and provide lateral stability in accordance with the requirements specified in the *construction documents* for the building and on the individual *truss design drawings*. ~~In the absence of specific bracing requirements, trusses shall be braced in accordance with accepted industry practice such as the SBCA Building Component Safety Information (BCSI) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses.~~ All trusses shall be installed with a fully sheathed top chord (roof or floor) with wood structural panels, and a fully sheathed bottom chord (ceiling) with gypsum board ceilings. Any trusses installed without fully sheathed top and bottom chords shall require a project specific bracing design prepared by any *registered design professional*. Permanent individual truss member restraint where shown on the truss design drawings shall be accomplished by one of the following methods:

1. Permanent individual truss member restraint (PITMR) and permanent individual truss member diagonal bracing (PITMDB) shall be installed using standard industry lateral restraint and diagonal bracing details in accordance with TPI 1, Section 2.3.3.1.1; or Figures R802.10.3 (1) and R802.10.3(3).

2. Individual truss member reinforcement in place of the specified lateral restraints (such as buckling reinforcement such as T-reinforcement, L- reinforcement, proprietary reinforcement) such that the buckling of any individual truss member is resisted internally by the individual truss. The buckling reinforcement of individual truss members shall be installed as shown on the truss design drawing; on supplemental truss member buckling reinforcement details provided by the truss designer; or in accordance with Figures R802.10.3 (2) and R802.10.3(4).
3. A project-specific PITMR and PITMDB design provided by any registered design professional.

Add new text as follows:

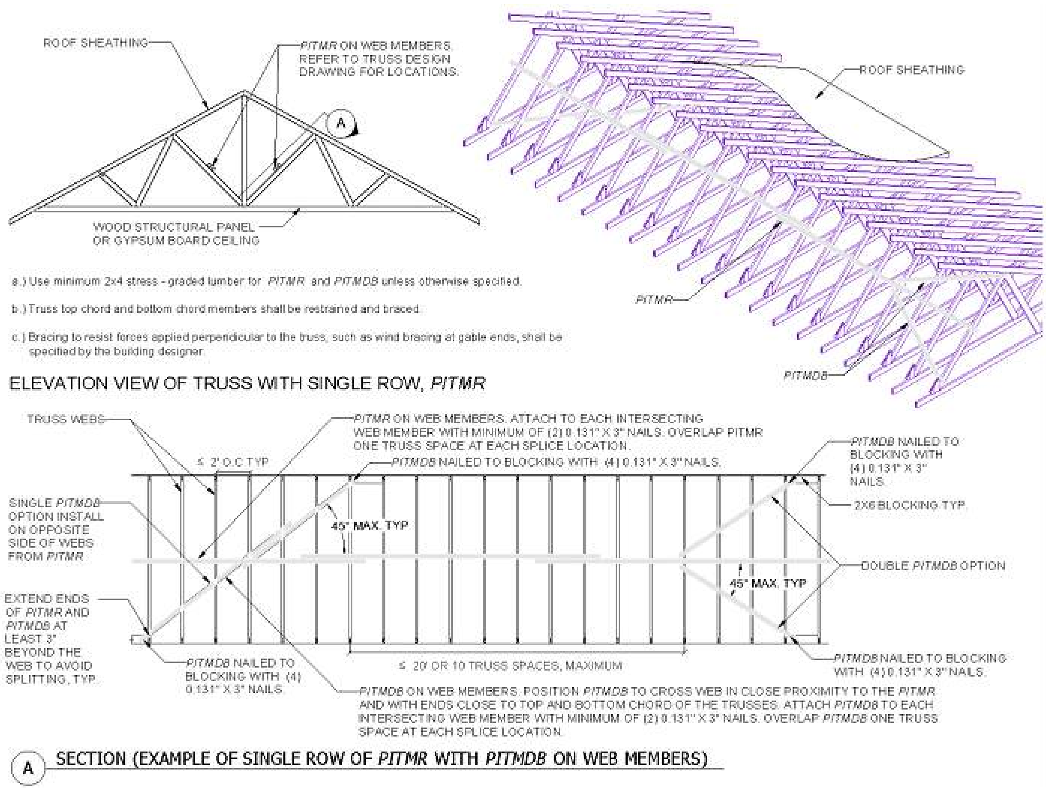
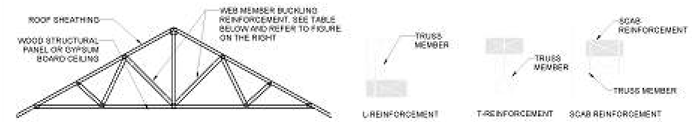


FIGURE R802.10.3(1) PITMR AND PITMB FOR TRUSS MEMBERS REQUIRING ONE ROW OF PITMR



ELEVATION VIEW OF L, T OR SCAB REINFORCEMENT

TYPES OF WEB MEMBER BUCKLING REINFORCEMENT

a.) Truss top chord and bottom chord members shall be restrained and braced.

b.) Bracing to resist forces applied perpendicular to the truss, such as wind bracing at gable ends, shall be specified by the building designer.

c.) Use the table below unless project specific web member reinforcement is provided on the truss design drawing or supplemental truss buckling reinforcement details are provided by the truss designer.

NUMBER OF ROWS OF PITMR SPECIFIED ON WEB MEMBER	SIZE OF TRUSS WEB	TYPE AND SIZE OF WEB REINFORCEMENT[1] FOR T, L OR SCAB[2]	GRADE OF WEB REINFORCEMENT	MINIMUM LENGTH OF WEB REINFORCEMENT	MINIMUM CONNECTION OF WEB REINFORCEMENT TO WEB
ONE	2x4	2x4	Same species and grade or better than web member	90% of web or extend to within 6" of end of web member, whichever is greater	(0.131" x 3") nails at 6" on-center[2]
	2x6	2x6			
	2x8	2x8			

[1]Maximum allowable web length is 14'

[2]Attach Scab reinforcement to web with two rows of minimum 0.131" x 3" nails at 6" on-center

FIGURE R802.10.3(2) ALTERNATE INSTALLATION USING BUCKLING REINFORCEMTN FOR TRUSS WEB MEMBERS REQUIRED ONE ROW OF PITMR

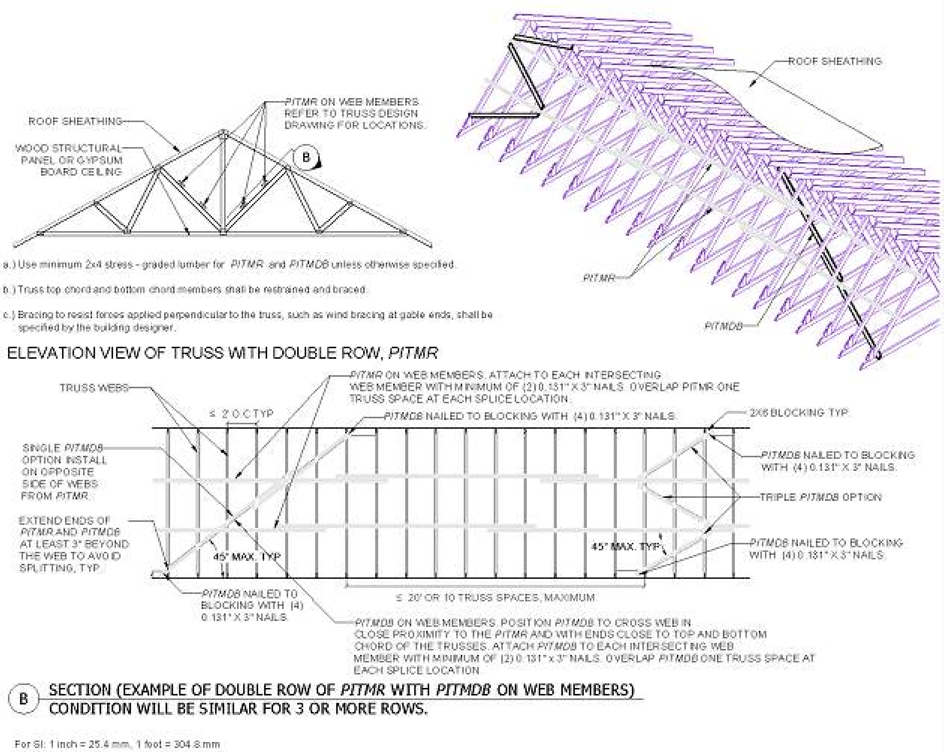
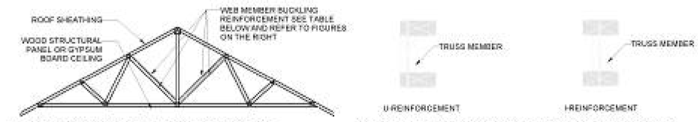


FIGURE R802.10.3(3) PITMR AND PITMDB FOR TRUSS WEB MEMBERS REQUIRING MULTIPLE ROWS OF PITMR



ELEVATION VIEW OF I OR U REINFORCEMENT

TYPES OF WEB MEMBER BUCKLING REINFORCEMENT

a.) Truss top chord and bottom chord members shall be restrained and braced

b.) Bracing to resist forces applied perpendicular to the truss, such as wind bracing at gable ends, shall be specified by the building designer.

c.) Use the table below unless project specific web member reinforcement is provided on the truss design drawing or supplemental truss buckling reinforcement details are provided by the truss designer.

NUMBER OF ROWS OF PITMR SPECIFIED ON WEB MEMBER	SIZE OF TRUSS WEB	TYPE AND SIZE OF WEB FOR I OR U REINFORCEMENT*	GRADE OF WEB REINFORCEMENT	MINIMUM LENGTH OF WEB REINFORCEMENT	MINIMUM CONNECTION OF WEB REINFORCEMENT TO WEB
TWO	2x4	(2) -2x4	Same species and grade or better than web member	90% of web or extend to within 6" of end of web member, whichever is greater	(0.131" x 3") nails at 6" on-center
	2x6	(2) -2x6			
	2x8	(2) -2x8			

*Maximum allowable web length is 14'

FIGURE R802.10.3(4) ALTERNATIVE INSTALLATION USING BUCKLING REINFORCEMENT FOR TRUSS WEB MEMBERS REQUIRING TWO ROWS OF PITMR

Reason Statement: 1. The change to R802.10.1 #4.1 simply clarifies that floor live, roof live and roof snow loads must be listed on the Truss Design Drawings. The current language only says top chord live load.
2. A reference to TPI-1, section 2.3.3.1.1 was missing in section R802.10.3 Bracing, and has been added. TPI-1 section 2.3.3.1.1 Standard Industry Details, references BCSI-B3, and the redundant reference in IRC section R802.10.3 was removed.

3. Section R802.10.3 Bracing has been modified to state that the top and bottom chords must be fully sheathed for this prescriptive method to be used. If the chords are not fully sheathed, then a project specific Bracing Design must be provided. For the majority of residential projects, this is already being done, so it is no change to the normal practice. For jobs that don't have fully sheathed top and bottom chords, there could be a stability and a safety issue if all of the required bracing and restraints are not installed. This is especially important for roof trusses without a ceiling attached and the stability concerns due to wind uplift.

4. By having the new sections for bracing methods 1,2 and 3 2 added, that include new figures, will provide options to the Home Owner and Contractor regarding bracing installation, and allows for a variety of project types and field conditions.

5. For projects where the SBCA Building Component Safety Information (BCSI) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses is not available or was not provided to the project, then having in the bracing details in the Code will help ensure that the trusses are installed and braced as required by the truss design.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of construction will not change for typical residential projects since permanent individual truss member restraint and diagonal bracing of wood truss members is already required by the Code when required by the Truss Design Drawings.

RB245-22

RB246-22

IRC: R802.10.1, R802.10.3

Proponents: Stephanie Young, representing National Council of Structural Engineers Associations (NCSEA) (stephanie@mattsonmacdonald.com); Larry Wainright, representing DrJ Engineering (lwainright@drjengineering.org)

2021 International Residential Code

Revise as follows:

R802.10.1 Truss design drawings. *Truss design drawings*, prepared in conformance to Section R802.10.1, shall be provided to the *building official* and *approved* prior to installation. *Truss design drawings* shall be provided with the shipment of trusses delivered to the job site. *Truss design drawings* shall include, at a minimum, the following information:

1. Slope or depth, span and spacing.
2. Location of all joints.
3. Required bearing widths.
4. Design loads as applicable.

   4.1. Top chord *live load* (~~as determined from~~ per Section ~~R301.6~~ R301.5).

   4.2. Roof live load (per section R301.6).

   4.3. Snow load (per section R301.2.3).

   4.4. ~~4.2.~~ Top chord dead load.

   4.5. ~~4.3.~~ Bottom chord *live load*.

   4.6. ~~4.4.~~ Bottom chord dead load.

   4.7. ~~4.5.~~ Concentrated loads and their points of application.

   4.8. ~~4.6.~~ Controlling wind and earthquake loads.

5. Adjustments to lumber and joint connector design values for conditions of use.
6. Each reaction force and direction.
7. Joint connector type and description such as size, thickness or gage and the dimensioned location of each joint connector except where symmetrically located relative to the joint interface.
8. Lumber size, species and *grade for each member.*
9. Connection requirements for:

   9.1. Truss to girder-truss.

   9.2. Truss ply to ply.

   9.3. Field splices.

10. Calculated deflection ratio or maximum description for live and total load.
11. Maximum axial compression forces in the truss members to enable the building designer to design the size, connections and anchorage of the permanent continuous lateral bracing. Forces shall be shown on the *truss design drawing* or on supplemental documents.
12. Required permanent ~~truss member bracing location.~~ individual truss member restraint location and the method and details of restraint and diagonal bracing to be used in accordance with Section R802.10.3.

R802.10.3 Bracing. Trusses shall be braced to prevent rotation and provide lateral stability in accordance with the requirements specified in the *construction documents* for the building and on the individual *truss design drawings*. ~~In the absence of specific bracing requirements, trusses shall be braced in accordance with accepted industry practice such as the SBCA Building Component Safety Information (BCSI) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses.~~ All trusses shall be installed with a fully sheathed top chord (roof or floor) with wood structural panels, and a fully sheathed bottom chord (ceiling) with gypsum board ceilings. Any Trusses installed without fully sheathed top and bottom chords shall require a project specific Bracing Design prepared by any registered design professional. Permanent individual truss member restraint where shown on the truss design drawings shall be accomplished in accordance with Section 2303.4.1.2 of the International Building Code.

Reason Statement: 1. The change to R802.10.1 #4.1 simply clarifies that floor live, roof live and roof snow loads must be listed on the Truss

Design Drawings. The current language only says top chord live load.
2. Section R802.10.3 Bracing has been modified to state that the top and bottom chords must be fully sheathed for this prescriptive method to be used. If the chords are not fully sheathed, then a project specific Bracing Design must be provided. For the majority of residential projects, this is already being done, so it is no change to the normal practice. For jobs that don't have fully sheathed top and bottom chords, there could be a stability and a safety issue if all of the required bracing and restraints are not installed. This is especially important for roof trusses without a ceiling attached and the stability concerns due to wind uplift.
3. Instead of adding new bracing details and figures to the IRC, this proposal is referencing IBC Section 2303.4.1.2. Having access to those details and figures will provide options to the Home Owner and Contractor regarding bracing installation, and allows for a variety of project types and field conditions.

4. A reference to TPI-1, section 2.3.3.1.1 is in IBC Section 2303.4.1.2, and TPI-1 references Standard Industry Details as BCSI-B3, and the redundant reference to SBCA Building Component Safety Information (BCSI) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses in IRC section R802.10.3 is removed.

5. For projects where the SBCA Building Component Safety Information (BCSI - B3) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses is not available or was not provided to the project, then having access to the bracing details in the IBC will help ensure that the trusses are safely installed and braced as required by the truss design.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of construction will not change for typical residential projects since permanent individual truss member restraint and diagonal bracing of wood truss members is already required by the Code when required by the Truss Design Drawings.

RB246-22

RB247-22

IRC: R802.11

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

2021 International Residential Code

Revise as follows:

R802.11 Roof tie uplift resistance. *Roof assemblies* shall have uplift resistance in accordance with Sections R802.11.1 and R802.11.2.

Exceptions: Rafters or trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1) where either of the following occur:

1. Where the specific gravity of the wood species used for wall framing is greater than or equal to 0.42 in accordance with AWC NDS and the uplift force per rafter or truss does not exceed 200 pounds (90.8 kg) as determined by Table R802.11.
2. Where the basic wind speed does not exceed 115 miles per hour (51.4 m/s), the wind exposure category is B, the roof pitch is 5 units vertical in 12 units horizontal (42-percent slope) or greater, the roof span is 32 feet (9754 mm) or less, and rafters and trusses are spaced not more than 24 inches (610 mm) on center.

Reason Statement: The change addresses the potential use of wall framing of wood species having lower specific gravity than the value of 0.42 which is associated with the 200 pound capacity for prescriptive nailing of rafter/ceiling joist to top plates. With this change, Exception 1 is limited to most commonly used wood species with a minimum specific gravity of 0.42. For wall framing of species with low specific gravity (i.e., 0.35) the withdrawal capacity is approximately only 2/3 of that associated with specific gravity of 0.42. While a 133 pound capacity for prescriptive nailing could be associated with wood species having specific gravity of 0.35, the approach to limit application of the exception to specific gravity of 0.42 or greater associated with commonly used wood species is proposed for simplicity of requirements.

Cost Impact: The code change proposal will increase the cost of construction
Increased cost are associated with use of lower specific gravity wood species where the exception will not apply because this change identifies the existing specific gravity basis for the 200 lb capacity. For lower specific gravity framing, provisions for uplift connections to meet forces contained in existing Table R802.11 are applicable.

RB247-22

RB248-22

IRC: R806.5, R806.6 (New), R806.7 (New)

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Self (joe@buildingscience.com)

2021 International Residential Code

Revise as follows:

R806.5 Unvented attic ~~and unvented enclosed rafter assemblies~~ where thermal boundary located at roof deck. Unvented *attics* created where the thermal boundary is located at the roof deck ~~and unvented enclosed roof framing assemblies created by ceilings that are applied directly to the underside of the roof framing members and structural roof sheathing applied directly to the top of the roof framing members/rafters,~~ shall be permitted where all the following conditions are met:

1. The unvented *attic* space is completely within the *building thermal envelope*.
2. Interior Class I vapor retarders are not installed on the ceiling side (*attic* floor) of the unvented *attic* assembly ~~or on the ceiling side of the unvented enclosed roof framing assembly~~.
3. Where wood shingles or shakes are used, a minimum $^{1}/_{4}$-inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing underlayment above the structural sheathing.
4. In Climate Zones 5, 6, 7 and 8, any *air-impermeable insulation* shall be a Class II vapor retarder, or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Insulation shall comply with Item 5.3 and either Item 5.1 or 5.2:

    5.1. Item 5.1.1, 5.1.2, 5.1.3 or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.

    5.1.1. Where only *air-impermeable insulation* is provided, it shall be applied in direct contact with the underside of the structural roof sheathing.

    5.1.2. Where *air-permeable insulation* is installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the *R*-values in Table R806.5 for condensation control.

    5.1.3. Where both *air-impermeable* and *air-permeable insulation* are provided, the *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing in accordance with Item 5.1.1 and shall be in accordance with the *R*-values in Table R806.5 for condensation control. The *air-permeable insulation* shall be installed directly under the *air-impermeable insulation*.

    5.1.4. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45°F (7°C). For calculation purposes, an interior air temperature of 68°F (20°C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

5.2. In Climate Zones <u>0,</u> 1, 2 and 3, air-permeable insulation installed in unvented *attics* shall meet the following requirements:

5.2.1. An approved *vapor diffusion port* shall be installed not more than 12 inches (305 mm) from the highest point of the roof, measured vertically from the highest point of the roof to the lower edge of the port.

5.2.2. The port area shall be greater than or equal to ~~1:600~~ <u>1:150</u> of the ceiling area. Where there are multiple ports in the attic, the sum of the port areas shall be greater than or equal to the area requirement.

5.2.3. The vapor-permeable membrane in the *vapor diffusion port* shall have a vapor permeance rating of greater than or equal to 20 perms when tested in accordance with Procedure A of ASTM E96.

5.2.4. The *vapor diffusion port* shall serve as an air barrier between the *attic* and the exterior of the building.

5.2.5. The *vapor diffusion port* shall protect the *attic* against the entrance of rain and snow.

5.2.6. Framing members and blocking shall not block the free flow of water vapor to the port. Not less than a 2-inch (51 mm) space shall be provided between any blocking and the roof sheathing. Air-permeable insulation shall be permitted within that space.

5.2.7. The roof slope shall be greater than or equal to 3:12 (vertical/horizontal).

5.2.8. Where only air-permeable insulation is used, it shall be installed directly below the structural roof sheathing~~, on top of the attic floor, or on top of the ceiling~~.

5.2.9. *Air-impermeable insulation*, where used in conjunction with air-permeable insulation, shall be directly above or below the structural roof sheathing and is not required to meet the *R*-value in Table R806.5. Where directly below the structural roof sheathing, there shall be no space between the *air-impermeable insulation* and air-permeable insulation.

5.2.10. Where air-permeable insulation is used and is installed directly below the roof structural sheathing, air shall be supplied at a flow rate greater than or equal to 50 CFM (23.6 L/s) per 1,000 square feet (93 m^2) of ceiling. The air shall be supplied from ductwork providing supply air to the occupiable space when the conditioning system is operating. Alternatively, the air shall be supplied by a supply fan when the conditioning system is operating.

~~Exceptions~~ <u>Exception</u>:

~~1.~~ Where both air-impermeable and air-permeable insulation are used, and the *R*-value in Table 806.5 is met, air supply to the attic is not required.

~~2. Where only air-permeable insulation is used and is installed on top of the attic floor, or on top of the ceiling, air supply to the attic is not required.~~

~~5.3. Where preformed insulation board is used as the~~ air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

Add new text as follows:

<u>**R806.6 Sealed attic plus vapor diffusion port where air-permeable insulation and thermal boundary located at the attic floor or ceiling.** In Climate Zones 0, 1, 2 & 3, sealed attics with vapor diffusion ports where air-permeable insulation and thermal boundary are located at the attic floor or ceiling shall be permitted where all the following conditions are met:</u>

1. <u>An approved vapor diffusion port shall be installed not more than 12 inches (305 mm) from the highest point of the roof, measured vertically from the highest point of the roof to the lower edge of the port.</u>
2. <u>The port area shall be greater than or equal to 1:150 of the ceiling area. Where there are multiple ports in the attic, the sum of the port areas shall be greater than or equal to the area requirement.</u>
3. <u>The vapor-permeable membrane in the vapor diffusion port shall have a vapor permeance rating of greater than or equal to 20 perms when tested in accordance with Procedure A of ASTM E96.</u>
4. <u>The vapor diffusion port shall serve as an air barrier between the attic and the exterior of the building.</u>
5. <u>The vapor diffusion port shall protect the attic against the entrance of rain and snow.</u>
6. <u>Framing members and blocking shall not block the free flow of water vapor to the port. Not less than a 2-inch (51 mm) space shall be provided between any blocking and the roof sheathing. Air-permeable insulation shall be permitted within that space.</u>
7. <u>The roof slope shall be greater than or equal to 3:12 (vertical/horizontal).</u>
8. <u>Air-permeable insulation shall be installed on top of the attic floor, or on top of the ceiling.</u>
9. <u>Air-permeable insulation shall be installed on top of the attic floor, or on top of the ceiling.</u>

<u>**R806.7 Enclosed Rafter Spaces.** Enclosed roof framing assemblies created by ceilings that are applied directly to the underside of the roof framing members and structural roof sheathing applied directly to the top of the roof framing members/rafters, shall comply with the following:</u>

1. <u>Interior Class I vapor retarders shall not be installed on the ceiling side of the unvented enclosed roof framing assembly.</u>
2. <u>Where wood shingles or shakes are used, a minimum 1/4 -inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing underlayment above the structural sheathing.</u>
3. <u>Enclosed rafter spaces shall comply with Sections R806.1, R806.2 and R806.3 of this Code.</u>

Reason Statement: R806.5 / Unvented Attic-- Needed revision as the language was not easily understood
Determined that we needed 3 sections for clarity-- R806.5 – Unvented attic where thermal boundary located at roof deckAll applications where

insulation is at roof deck would be addressed here (SPF, CI, Hybrid & Air-Permeable with Diffusion port plus air supply)R806.6 – Sealed attic plus vapor diffusion port where air-permeable insulation and thermal boundary located at the attic floor or ceiling -- Would now provide clarity for attic floor applications with diffusion port at ridge.
Removes Condition #1 which could not be met with this application.

R806.7 – Enclosed rafter spaces - - This application is regularly confused with a traditional unvented attic

R806.5 – Subject name adjustment & removed language that was relevant to enclosed rafter spaces

R806.5.2 – Removed language that was relevant to enclosed rafter spaces

R806.5.5.2.2 – changed 1:600 to 1:150

R806.5.5.2.8 & exception 2 – removed language for air-permeable insulation to be allowed on attic floor/ceiling (will be addressed in R806.6)

Added section R806.6 – Sealed attic plus vapor diffusion port where air-permeable insulation and thermal boundary located at the attic floor or ceiling

Used same language from 806.5 but now language is specific to air permeable insulation at attic floor or ceiling

Added section R806.7 – Enclosed rafter spaces

Used same language just separated out language from R806.5. Makes it clearer to understand application language.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
In some situations this may increase costs. In other situations this may create options. Options can reduce costs.

RB248-22

RB249-22

IRC: R807.1

Proponents: Timothy Pate, representing Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Residential Code

Revise as follows:

R807.1 Attic access. Buildings with ~~combustible ceiling or roof construction~~ attics shall have an ~~attic~~ access opening to attic areas that have a vertical height of 30 inches (762 mm) or greater over an area of not less than 30 square feet (2.8 m^2). The vertical height shall be measured from the top of the ceiling framing members to the underside of the roof framing members.
The rough-framed opening shall be not less than 22 inches by 30 inches (559 mm by 762 mm) and shall be located in a hallway or other location with *ready access*. Where located in a wall, the opening shall be not less than 22 inches wide by 30 inches high (559 mm wide by 762 mm high). Where the access is located in a ceiling, minimum unobstructed headroom in the attic space shall be 30 inches (762 mm) at some point above the access measured vertically from the bottom of ceiling framing members. See Section M1305.1.2 for access requirements where mechanical *equipment* is located in *attics*.

Reason Statement: This proposal would expand the requirements for attic access to not only combustible construction but any type of construction. Currently if a house was built out of metal framing the code would not require the attic access. The intent of the existing code language as explained in the Code Commentary is "The requirement for attic access is predicated on the likelihood that during the life of the structure, access to an attic space for repair of piping, electrical, and mechanical systems will be required." Also these attic accesses allow homeowners and contractors ability to install new equipment such as ductwork for swamp coolers, radon fans, whole house fans, solar piping, etc. Since the Code now allows the use of non combustible materials to frame a house this section needs to change to accomodate that.

Cost Impact: The code change proposal will increase the cost of construction
This proposed new language would increase construction cost since it would now apply to structures not built out of combustible construction.

RB249-22

RB250-22

IRC: R807.1

Proponents: Timothy Pate, representing Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Residential Code

Revise as follows:

R807.1 Attic access. Buildings with combustible ceiling or roof construction shall have an attic access opening to attic areas that have a vertical height of 30 inches (762 mm) or greater over an area of not less than 30 square feet (2.8 m^2). The vertical height shall be measured from the top of the ceiling framing members to the underside of the roof framing members.

The rough-framed opening shall be not less than 22 inches by 30 inches (559 mm by 762 mm) and shall be located in a hallway or other location with *ready access*. Where located in a wall, the opening shall be not less than 22 inches wide by 30 inches high (559 mm wide by 762 mm high). Where the access is located in a ceiling, minimum unobstructed headroom in the attic space shall be 30 inches (762 mm) along at least one side ~~at some point~~ above the access measured vertically from the bottom of the ceiling framing members. See Section M1305.1.2 for access requirements where mechanical *equipment* is located in *attics*.

Reason Statement: This proposal is to change the language to show that you would measure for the requirement for 30" minimum height above the ceiling framing member which could be from top of the bottom web of an engineered roof truss and to measure from top of the vertical framing member around the opening which is used as a barrier to hold back the insulation which is always taller than the bottom web. It also changes the language in second paragraph to match the first paragraph for the upper roof framing members.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is to just clarify how to get the required 30" minimum headroom height.

RB250-22

RB251-22

IRC: R902.1

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R902.1 Roof covering materials. Roofs shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C *roof assemblies*~~roofing~~ shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a *lot line*. Where Class A, B, or C *roof assemblies* are required, they shall be tested in accordance with ASTM E108 or UL 790. Where required, the *roof assembly* shall be *listed* and identified as to Class by an *approved* testing agency. ~~Class A, B and C roofing required by this section to be *listed* shall be tested in accordance with ASTM E108 or UL 790.~~

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete *roof deck*.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible decks.

Reason Statement: Changing "roofing" to "roof assemblies" in Section R902.1 is important to recognize that roof assemblies are classified, not "roofing." The additional changes create a logical progression of thought that establishes when fire classification is required, what tests are to be done when fire classification is necessary, and provisions for listing when that additional step is appropriate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal corrects language and restates and reorders existing provisions to reduce opportunities for confusion. Since there are no technical changes introduced, no change in cost of construction is anticipated if the proposal is approved.

RB251-22

RB252-22

IRC: R902.1

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2021 International Residential Code

Revise as follows:

R902.1 Roof ~~covering materials~~ assemblies. Roofs shall be covered with materials as set forth in Section ~~Sections~~ R904 ~~and~~ or with roof coverings as set forth in Section R905. Class A, B or C ~~roofing~~ roof assemblies shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a *lot line*. Where Class A, B or C roof assemblies are required, they shall be tested in accordance with ASTM E108 or UL 790. Where required, the roof assembly shall be listed ~~Class A, B and C roofing required by this section to be *listed* shall be tested in accordance with ASTM E108 or UL 790~~.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete *roof deck*.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible decks.

Reason Statement: This proposal clarifies the section and makes the terminology consistent with chapter 2 definitions, with the subsections (all of which describe roof assemblies) and with sections 904 and 905.

Chapter 2 defines "roof assembly" as "A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6." Chapter 2 does not define "roofing" or "roof covering material" but it defines "roof covering" as "The covering applied to the roof deck for weather resistance, fire classification or appearance."

The section contains the words "roof covering materials" and "roofing" as well as "roof assembly" (or actually its plural, roof assemblies).

The fire test in ASTM E108 or UL 790 must be conducted on the "roof assembly", meaning that it must be conducted on the entire ***roof covering system*** and not on the individual roofing material or roof covering (the chapter on definitions clarifies that "roof covering system" is the same as "roof assembly").

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply corrects the terminology for consistency.

RB252-22

RB253-22

IRC: R324.4.2, R324.5.2, R703.6.3, R806.4, SECTION R901, R901.1, R901.2 (New), SECTION R902, R902.1, R902.2, R902.3, R902.4, SECTION R903, R903.1, R903.2, R903.2 (New), R903.2.2, R903.3, R903.3 (New), R903.4, R903.4 (New), R903.4.1, R905.7.5, R905.8.6, R908.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

SECTION R901
GENERAL

R901.1 Scope. The provisions of this chapter shall govern the design, materials, construction and quality of *roof assemblies*.

Add new text as follows:

R901.2 **Roof covering**. Roofs shall be covered with materials as set forth in Sections R904 and R905.

Revise as follows:

SECTION ~~R903~~ R902
WEATHER PROTECTION

~~R903.1~~ R902 .1 General. *Roof decks* shall be covered with *approved* roof coverings secured to the building or structure in accordance with the provisions of this chapter. *Roof assemblies* shall be designed and installed in accordance with this code and the *approved* manufacturer's instructions such that the *roof assembly* shall serve to protect the building or structure.

~~R903.2~~ R902.2 Flashing. Flashings shall be installed in a manner that prevents moisture from entering the wall and roof through joints in copings, through moisture permeable materials and at intersections with parapet walls and other penetrations through the roof plane.

~~R903.2.1~~ R902.2.1 Locations. Flashings shall be installed at wall and roof intersections, wherever there is a change in roof slope or direction and around roof openings. A flashing shall be installed to divert the water away from where the eave of a sloped roof intersects a vertical sidewall. Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet).

~~R903.2.2~~ R902.2.2 Crickets and saddles. A cricket or saddle shall be installed on the ridge side of any chimney or penetration more than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

> **Exception:** *Unit skylights* installed in accordance with Section R308.6 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle.

~~R903.3~~ R902.3 Coping. Parapet walls shall be properly coped with noncombustible, weatherproof materials of a width not less than the thickness of the parapet wall.

~~R903.4~~ R902.4 Roof drainage. Unless roofs are sloped to drain over roof edges, roof drains shall be installed at each low point of the roof.

~~R903.4.1~~ R902.4.1 Secondary (emergency overflow) drains or scuppers. Where roof drains are required, secondary emergency overflow roof drains or *scuppers* shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason. Overflow drains having the same size as the roof drains shall be installed with the inlet flow line located 2 inches (51 mm) above the low point of the roof, or overflow *scuppers* having three times the size of the roof drains and having a minimum opening height of 4 inches (102 mm) shall be installed in the adjacent parapet walls with the inlet flow located 2 inches (51 mm) above the low point of the roof served. The installation and sizing of overflow drains, leaders and conductors shall comply with Sections 1106 and 1108 of the International Plumbing Code, as applicable.
Overflow drains shall discharge to an *approved* location and shall not be connected to roof drain lines.

SECTION ~~R902~~ R903
FIRE CLASSIFICATION

~~R902.1~~ R903.1 ~~Roof covering materials~~ General. ~~Roofs shall be covered with materials as set forth in Sections R904 and R905.~~ Fire classification of roof assemblies shall be in accordance with Section R903. Class A, B or C roof assemblies and roof coverings ~~roofing~~ shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a *lot line*. Class A, B and C roof assemblies and roof coverings ~~roofing~~ required to be listed by this section ~~to be *listed*~~ shall be tested in accordance with ASTM E108 or UL 790. In addition, fire-retardant-treated wood roof coverings shall be tested in accordance with ASTM D2898.

> ~~**Exceptions:**~~

1. ~~Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete *roof deck*.~~
2. ~~Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.~~
3. ~~Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible decks.~~
4. ~~Class A *roof assemblies* include slate installed over *underlayment* over combustible decks.~~

Add new text as follows:

R903.2 Class A roof assemblies. Class A roof assemblies are those that are effective against severe fire test exposure. Class A roof assemblies and roof coverings shall be listed and identified as Class A by an approved testing agency. Class A roof assemblies shall be permitted for use in buildings or structures of all types of construction.

Exceptions:

1. Class A roof assemblies include those with coverings of brick, masonry or an exposed concrete roof deck.
2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a roof deck on noncombustible framing.
3. Class A roof assemblies include minimum 16 ounce per square foot (0.0416 kg/m2) copper sheets installed over combustible decks.
4. Class A roof assemblies include slate installed over ASTM D226, Type II underlayment over combustible decks or ASTM D4869, Type IV.

R903.3 Class B roof assemblies. Class B roof assemblies are those that are effective against moderate fire-test exposure. Class B roof assemblies and roof coverings shall be listed and identified as Class B by an approved testing agency.

R903.4 Class C roof assemblies.
Class C roof assemblies are those that are effective against light fire-test exposure. Class C roof assemblies and roof coverings shall be listed and identified as Class C by an approved testing agency.

Revise as follows:

~~R902.2~~ R903.5 Fire-retardant-treated shingles and shakes. Fire-retardant-treated wood shakes and shingles shall be treated by impregnation with chemicals by the full-cell vacuum-pressure process, in accordance with AWPA C1. Each bundle shall be marked to identify the manufactured unit and the manufacturer, and shall be *labeled* to identify the classification of the material in accordance with the testing required in Section ~~R902.1~~ R903.1, the treating company and the quality control agency.

~~R902.3~~ R903.6 Building-integrated photovoltaic (BIPV) product . *Building-integrated photovoltaic* (BIPV) *products* installed as the roof covering shall be tested, *listed* and *labeled* for fire classification in accordance with UL 7103. Class A, B or C BIPV products shall be installed where required in accordance with Section R903.1. ~~the edge of the roof is less than 3 feet (914 mm) from a *lot line*.~~

~~R902.4~~ R903.7 Rooftop-mounted photovoltaic (PV) panel systems. Rooftop-mounted *photovoltaic panel systems* installed on or above the roof covering shall be tested, *listed* and identified with a fire classification in accordance with UL 2703. Systems tested, listed and identified with a fire classification shall be installed in accordance with the manufacturer's installation instructions and their listing. Class A, B or C rooftop-mounted *photovoltaic panel systems* ~~and modules~~ shall be installed where required in accordance with Section R903.1 ~~in *jurisdictions* designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a *lot line*.~~

R324.4.2 Fire classification. Rooftop-mounted *photovoltaic panel systems* shall have the same fire classification as the *roof assembly* required in Section ~~R902~~ R903.

R324.5.2 Fire classification. *Building-integrated photovoltaic systems* shall have a fire classification in accordance with Section ~~R902.3~~ R903.3.

R703.6.3 Attachment. Wood shakes or shingles shall be installed according to this chapter and the manufacturer's instructions. Each shake or shingle shall be held in place by two stainless steel Type 304, Type 316 or hot-dipped zinc-coated galvanized corrosion-resistant box nails in accordance with Table R703.6.3(1) or R703.6.3(2). The hot-dipped zinc-coated galvanizing shall be in compliance with ASTM A153, 1.0 ounce per square foot. Alternatively, 16-gage stainless steel Type 304 or Type 316 staples with crown widths $^{7}/_{16}$ inch (11 mm) minimum, $^{3}/_{4}$ inch (19 mm) maximum, shall be used and the crown of the staple shall be placed parallel with the butt of the shake or the shingle. In single-course application, the fasteners shall be concealed by the course above and shall be driven approximately 1 inch (25 mm) above the butt line of the succeeding course and $^{3}/_{4}$ inch (19 mm) from the edge. In double-course applications, the exposed shake or shingle shall be face-nailed with two fasteners, driven approximately 2 inches (51 mm) above the butt line and $^{3}/_{4}$ inch (19 mm) from each edge. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shakes or shingles in accordance with Section ~~R902~~ R903 or pressure-impregnated-preservative-treated shakes or shingles in accordance with AWPA U1 shall be stainless steel Type 316. The fasteners shall penetrate the sheathing or furring strips by not less than $^{1}/_{2}$ inch (13 mm) and shall not be overdriven. Fasteners for untreated (natural) and treated products shall comply with ASTM F1667.

R806.4 Installation and weather protection. Ventilators shall be installed in accordance with manufacturer's instructions. Installation of ventilators in roof systems shall be in accordance with the requirements of Section ~~R903~~ R902 . Installation of ventilators in wall systems shall be in accordance with the requirements of Section R703.1.

R905.7.5 Application. Wood shingles shall be installed in accordance with this chapter and the manufacturer's instructions. Wood shingles shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in courses, and two joints shall not be in direct alignment in any three adjacent courses. Spacing between shingles shall be not less than $^1/_4$ inch to $^3/_8$ inch (6.4 mm to 9.5 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.5(1). Fasteners for untreated (naturally durable) wood shingles shall be box nails in accordance with Table R905.7.5(2). Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized with a coating weight of ASTM A153 Class D (1.0 oz/ft^2). Alternatively, two 16-gage stainless steel Type 304 or 316 staples with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shingles in accordance with Section ~~R902~~ R903 or pressure-impregnated-preservative-treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). For sheathing less than $^3/_4$ inch in (19.1 mm) thickness, each fastener shall penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned in accordance with the manufacturer's installation instructions. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

R905.8.6 Application. Wood shakes shall be installed in accordance with this chapter and the manufacturer's installation instructions. Wood shakes shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^3/_8$ inch to $^5/_8$ inch (9.5 mm to 15.9 mm) including tapersawn shakes. Weather exposures for wood shakes shall not exceed those set in Table R905.8.6. Fasteners for untreated (naturally durable) wood shakes shall be box nails in accordance with Table R905.7.5(2). Nails shall be stainless steel Type 304, or Type 316 or hot-dipped with a coating weight of ASTM A153 Class D (1.0 oz/ft^2). Alternatively, two 16-gage Type 304 or Type 316 stainless steel staples, with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Wood shakes shall be attached to the roof with two fasteners per shake positioned in accordance with the manufacturer's installation instructions. Fasteners for fire-retardant-treated (as defined in Section ~~R902~~ R903) shakes or pressure-impregnated-preservative-treated shakes of *naturally durable wood* in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). Where the sheathing is less than $^3/_4$ inch (19.1 mm) thick, each fastener shall penetrate through the sheathing. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

R908.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 9.

Exceptions:

1. *Reroofing* shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section R905 for roofs that provide *positive roof drainage*.
2. For roofs that provide positive drainage, recovering or replacing an existing roof covering shall not require the secondary (emergency overflow) drains or *scuppers* of Section ~~R903.4.1~~ R902 .4.1 to be added to an existing roof.

Reason Statement: Reason: This proposal is intended to provide consistency and clarification within Section R902 Fire Classification. Section R902.1 has been revised several times since the initial 2000 IRC, and Sections R902.3 on BIPV and R902.4 on rooftop PV added recently. This proposal includes the below elements:

1) The first sentence of R902.1 "Roofs shall be covered with materials as set forth in Sections R904 and R905" is relocated to a new subsection under R901 using the same text. This requirement applies to all roofs, not only ones where a fire classification is required. While the first sentence of R903.1 under Weather Protection similarly requires all roof decks to be provided with approved roof coverings, it was felt best to state right from the start that roof assemblies are expected to have roof coverings, and that material and installation requirements can be found in R904 and R905 respectively.
2) Since R902.1 is generic to all roof covering materials and specifies when and where Class A, B or C roofing is required, it is not necessary to restate in R902.3 and R902.4 where such classifications are required. The redundant requirements for where BIPV products or rooftop PV systems are required to be Class A, B or C are deleted and replaced with references to R902.1.

3) The proposal moves Section R902 behind Section R903 Weather Protection. In addition to the fact Section R903.1 requires roof decks be provided with a roof covering, this will provide consistency with IBC Chapter 15 where Section 1505 Fire Classification follows Section 1503 Weather Protection and Section 1504 Performance Requirements.

4) The proposed revisions Iin section R902.1 old (R903.1 new)within this Section are in alignment with IBC Section 1505.1, and the actions taken on S1-21 from Group A.

5) The IRC is missing how fire-retardant-treated wood roof coverings are to be tested. Therefore, a sentence have been added to section R902.1 old (R903.1 new) states "fire-retardant-treated wood roof coverings shall be tested in accordance with ASTM D2898."

6) The exception in section R902.1 old (R903.1 new) are not correct as exceptions to R902.1 old (R903.1 new). These are exceptions to the different fire classifications of A, B, and C. Furthermore, these are not aligned with the conditions for these exceptions in IBC Section 1505.2.

7) Class A, B, and C have been added as R903.2, R903.3 and R903.4. This would align more appropriately with IBC Sections 1505.2, 1505.3, and 1505.4.

8) In the new section R903.2, exception #4, " ASTM D4869, Type IV" have been added based on the approved S2-21.

9) In section (R902.4 old) (R903.7 new), "installed in accordance with the manufacturer's installation instructions and their listing." have been added. Aligns with the wording in IBC Section 1505.910) In section (R902.4 old) (R903.7 new), "modules" have been deleted. This clarifies what has the fire classification. PV modules do not have any fire classification. Only the rooftop mounted PV panel systems do. If modules were left in, it would be very confusing and inaccurate.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is intended to provide editorial clarification to the fire classification requirements for roof coverings. No technical changes are intended.

RB253-22

RB254-22

IRC: R302.2.3, R302.2.4, R902.1, R905.1.1, R905.2.1, R905.3.1, R905.3.2, R905.3.6, R905.4.1, R905.4.2, R905.4.4.1, R905.5.1, R905.5.2, R905.6.1, R905.6.2, R905.7.1, R905.7.1.1, R905.7.2, R905.8.1, R905.8.1.1, R905.8.2, R905.10.1, R905.16.1, R905.16.2, R905.17.1, R905.17.2

Proponents: Glenn Mathewson, representing Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R302.2.3 Continuity. The fire-resistance-rated wall or assembly separating *townhouse units shall be continuous from the* foundation to the underside of the roof sheathing, *roof deck* or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed *accessory structures.*

R302.2.4 Parapets for townhouses. Parapets constructed in accordance with Section R302.2.5 shall be constructed for *townhouses* as an extension of exterior walls or common walls separating *townhouse units* in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where *roof decks* ~~surfaces~~ adjacent to the wall or walls are at different elevations and the higher *roof deck* is not more than 30 inches (762 mm) above the lower *roof deck*, the parapet shall extend not less than 30 inches (762 mm) above the lower *roof deck* ~~surface~~.

   Exception: A parapet is not required in the preceding two cases where the roof covering complies with a minimum Class C rating as tested in accordance with ASTM E108 or UL 790 and the ~~roof decking~~ *roof deck* or sheathing is of *noncombustible materials* or fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of $^5/_8$-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by not less than nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a distance of not less than 4 feet (1219 mm) on each side of the wall or walls and any openings or penetrations in the *roof deck* are not within 4 feet (1219 mm) of the common walls. Fire-retardant-treated wood shall meet the requirements of Sections R802.1.5 and R803.2.1.2.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher *roof deck* is more than 30 inches (762 mm) above the lower *roof deck*. The common wall construction from the lower *roof deck* to the underside of the higher *roof deck* shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides.

R902.1 Roof covering materials. ~~Roofs~~ *Roof decks* shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C roofing shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the *roof deck* is less than 3 feet (914 mm) from a *lot line*. Class A, B and C roofing required by this section to be *listed* shall be tested in accordance with ASTM E108 or UL 790.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete *roof deck*.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible *roof decks.*
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible *roof decks*.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible *roof decks*.

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the *roof deck* material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the *roof deck* material, shall be applied over all joints in the *roof deck* ~~decking~~. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering

R905.2.1 Sheathing requirements. Asphalt shingles shall be fastened to *wood structural panels* or solid lumber sheathing. ~~solidly sheathed decks~~.

R905.3.1 ~~Deck~~ Sheathing requirements. Concrete and clay tile shall be installed ~~only~~ over ~~solid sheathing.~~ *wood structural panels* or solid lumber sheathing.

Exception: Spaced lumber sheathing in accordance with Section R803.1 shall be permitted in *Seismic Design Categories* A, B and C.

R905.3.2 ~~Deck slope~~ Slope. Clay and concrete roof tile shall be installed on roof slopes of $2^1/_2$ units vertical in 12 units horizontal (25-percent slope) or greater. For roof slopes from $2^1/_2$ units vertical in 12 units horizontal (25-percent slope) to 4 units vertical in 12 units horizontal (33-percent slope), double *underlayment* application is required in accordance with Section R905.3.3.

R905.3.6 Fasteners. Nails shall be corrosion resistant and not less than 11-gage [0.120 inch (3 mm)], $^5/_{16}$-inch (11 mm) head, and of sufficient length to penetrate the *roof deck* not less than $^3/_4$ inch (19 mm) or through the thickness of the *roof deck*, whichever is less. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2 mm). Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.

R905.4.1 ~~Deck~~ Sheathing requirements. *Metal roof shingles* shall be fastened to *wood structural panels*, solid lumber sheathing, or closely-fitted lumber sheathing ~~applied to a solid or closely fitted deck,~~ except where the roof covering is specifically designed to be applied to spaced lumber sheathing.

R905.4.2 ~~Deck slope~~ Slope. *Metal roof shingles* shall not be installed on roof slopes below 3 units vertical in 12 units horizontal (25-percent slope).

R905.4.4.1 Wind resistance of metal roof shingles. *Metal roof shingles* ~~applied~~ fastened to wood structural panels, solid lumber sheathing or closely-fitted lumber sheathing ~~a solid or closely fitted deck~~ shall be tested in accordance with ASTM D3161, FM 4474, UL 580 or UL 1897. *Metal roof shingles* tested in accordance with ASTM D3161 shall meet the classification requirements of Table R905.4.4.1 for the appropriate maximum basic wind speed and the metal shingle packaging shall bear a *label* to indicate compliance with ASTM D3161 and the required classification in Table R905.2.4.1.

R905.5.1 ~~Deck~~ Sheathing requirements. Mineral-surfaced roll roofing shall be fastened to *wood structural panels* or solid lumber sheathing. ~~solidly sheathed roofs~~.

R905.5.2 ~~Deck slope~~ Slope. Mineral-surfaced roll roofing shall not be applied on roof slopes below 1 unit vertical in 12 units horizontal (8-percent slope).

R905.6.1 ~~Deck~~ Sheathing requirements. Slate shingles shall be fastened to *wood structural panels* or solid lumber sheathing. ~~solidly sheathed roofs.~~

R905.6.2 ~~Deck slope~~ Slope. Slate shingles shall be used only on slopes of 4 units vertical in 12 units horizontal (33-percent slope) or greater.

R905.7.1 ~~Deck~~ Sheathing requirements. Wood shingles shall be fastened to *wood structural panels*, solid lumber sheathing, or spaced lumber sheathing. ~~installed on solid or spaced sheathing.~~ Where spaced lumber sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners.

R905.7.1.1 Solid sheathing required. In areas where the average daily temperature in January is 25°F (-4°C) or less, *wood structural panels* or solid lumber sheathing is required on that portion of the *roof deck* requiring the application of an ice barrier.

R905.7.2 ~~Deck slope~~ Slope. Wood shingles shall be installed on slopes of 3 units vertical in 12 units horizontal (25-percent slope) or greater.

R905.8.1 ~~Deck~~ Sheathing requirements. Wood shakes shall be fastened to *wood structural panels*, solid lumber sheathing, or spaced lumber sheathing. ~~used only on solid or spaced sheathing.~~ Where spaced lumber sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced lumber sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards.

R905.8.1.1 Solid sheathing required. In areas where the average daily temperature in January is 25°F (-4°C) or less, *wood structural panels* or solid lumber sheathing is required on that portion of the *roof deck* requiring an ice barrier.

R905.8.2 ~~Deck slope~~ Slope. Wood shakes shall only be used on slopes of 3 units vertical in 12 units horizontal (25-percent slope) or greater.

R905.10.1 ~~Deck~~ Sheathing requirements. *Metal roof panel* roof coverings shall be fastened to *wood structural panels*, solid lumber sheathing, or ~~applied to solid or~~ spaced lumber sheathing, except where the roof covering is specifically designed to be applied to spaced supports.

R905.16.1 ~~Deck~~ Sheathing requirements. *Photovoltaic shingles* shall be fastened to *wood structural panels*, solid lumber sheathing, or closely-fitted lumber sheathing. ~~applied to a solid or closely-fitted deck~~, except where the roof covering is specifically designed to be applied over spaced lumber sheathing.

R905.16.2 ~~Deck slope~~ Slope. *Photovoltaic shingles* shall be used only on roof slopes of 2 units vertical in 12 units horizontal (2:12) or greater.

R905.17.1 ~~Deck~~ Sheathing requirements. *BIPV roof panels* shall be fastened to *wood structural panels*, solid lumber sheathing, or closely-fitted lumber sheathing. ~~applied to a solid or closely-fitted deck~~, except where the *roof covering* is specifically designed to be applied over spaced lumber sheathing.

R905.17.2 ~~Deck slope~~ Slope. *BIPV roof panels* shall be used only on roof slopes of 2 units vertical in 12 units horizontal (17-percent slope) or greater.

Reason Statement: The purpose of this proposal is to use common terminology throughout section 905 in regard to roof decks and sheathing. The subsections under 905 cover different roof coverings and are organized similar to each other, but with variation in titles. The IRC is a professional standard, but developed piece by piece in cycles. Every so often non glamorous code proposals are necessary to correlate the mess. We just have to wait for someone to take the time to do the work.
1) "Roof deck" has been defined in the IRC since the first draft over two decades ago. However, over time, proposals have used the term "deck" or "roof" in references that would fall under the defined term. Where "roof deck" is appropriate, it has been corrected in this proposal.

2) Use of the term "solid sheathing" in the IRC is often misunderstood as implying "wood structural panel" and not permitting "lumber sheathing". "Spaced sheathing" in the IRC is not interpreted or understood consistently either. Many incorrectly believe this to be any "lumber sheathing" due to the inconsistencies of milled width and shrinkage that result in small gaps (1/8 to 1/4) between boards, "spaces". This incorrect interpretation has lead to many existing roof decks constructed with lumber sheathing to be unnecessarily re-sheathed with wood structural panel sheathing during roof replacement projects with asphalt shingles. This proposal clarifies three different lumber sheathing applications that affect different roof coverings.

"Spaced lumber sheathing". This term has a very specific meaning for wood shake and wood shingles. This is an installation method where the lumber boards are spaced upward of 10 inches on center and only function as nailing strips for the ends of the shingles. Spaced lumber sheathing, also referred to in the industry as "skip sheathing" is an older method of construction, but is still provided for in the IRC today. However, it is very important that the IRC be more specific in references to this sheathing method so the various provisions can be appropriately understood. It is the observation of this proponent that fewer professionals in the industry have the historical understanding of "spaced sheathing" and thus modern times require more clarification to support accurate intepretations. Please reference Sections R905.7.1 and 905.8.1 for applications of spaced sheathing.

"Solid lumber sheathing" and wood structural panel sheathing are now terms used in place of "solid sheathing" in order to clarify that this applies to both lumber sheathing and wood structural panels.

"closely-fitted lumber sheathing" is a term this proponent finds a little ambiguous and inconsistent, yet this proposal does not intend to challenge any existing intent or application. Therefore only "lumber" was added anywhere this term was used in order to stay consistent with the other installations of lumber sheathing.

3) The section titles for slope were both "Deck slope" and "Slope". This proponent simply chose one and it was "Slope". If opponents disagree, please draft a public comment to change it. Just make it consistent, please.

4) The section titles for the "deck or sheathing requirements" were not consistent. Since these sections specifically discuss the different sheathing products and installations, this proponent chose "Sheathing requirements'. If opponents disagree, please draft a public comment to change it. Just make it consistent, please.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies the current intent of the IRC roof covering applications and does not directly affect the cost of construction. However, it will reduce the cost of construction where the inconsistent terms are better understood and roof decks with lumber sheathing are no longer required to be re-sheathed due to inaccurate interpretations no longer occurring.

RB254-22

RB255-22

IRC: R903.2.3 (New)

Proponents: Joseph Cain, representing Solar Energy Industries Association (SEIA) (JoeCainPE@gmail.com)

2021 International Residential Code

R903.1 General. *Roof decks* shall be covered with *approved* roof coverings secured to the building or structure in accordance with the provisions of this chapter. *Roof assemblies* shall be designed and installed in accordance with this code and the *approved* manufacturer's instructions such that the *roof assembly* shall serve to protect the building or structure.

R903.2 Flashing. Flashings shall be installed in a manner that prevents moisture from entering the wall and roof through joints in copings, through moisture permeable materials and at intersections with parapet walls and other penetrations through the roof plane.

R903.2.1 Locations. Flashings shall be installed at wall and roof intersections, wherever there is a change in roof slope or direction and around roof openings. A flashing shall be installed to divert the water away from where the eave of a sloped roof intersects a vertical sidewall. Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet).

R903.2.2 Crickets and saddles. A cricket or saddle shall be installed on the ridge side of any chimney or penetration more than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

> **Exception:** *Unit skylights* installed in accordance with Section R308.6 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle.

Add new text as follows:

R903.2.3 Photovoltaic (PV) panel systems. Flashing shall be installed in a manner that prevents moisture from entering the roof at attachment points for rooftop-mounted photovoltaic (PV) panel systems. A metallic or nonmetallic flashing material or system shall be installed in accordance with manufacturers installations instructions.

Reason Statement: While flashing and weather-sealing is required in IRC Section R903, this section is silent on specific requirements for rooftop-mounted photovoltaic (PV) panel systems. This proposal clarifies that flashing or weathersealing of rooftop attachments for PV systems can be metallic or nonmetallic, and requires them to be installed in accordance with manufacturers installation instructions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change cost of construction. It only serves to clarify requirements.

RB255-22

RB256-22

IRC: R903.2

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Revise as follows:

R903.2 Flashing. Flashings shall be installed in accordance with the *roof covering* manufacturer's installation instructions to prevent ~~in a manner that prevents~~ moisture from entering the wall and roof through joints in copings, through moisture permeable materials and at intersections with parapet walls and other penetrations through the roof plane.

Reason Statement: The code change proposal is intended to add clarity to the code by specifically indicating flashings are to be installed by the roof covering manufacturer's installation instructions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is a clarification of existing requirements; there are no changes to the code's technical requirements.

RB256-22

RB257-22

IRC: R903.5 (New)

Proponents: Emily Lorenz, representing International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com)

2021 International Residential Code

Add new text as follows:

R903.5 Waterproofing weather-exposed areas. Balconies, decks, landings, exterior stairways, occupied roofs, and similar surfaces exposed to the weather and sealed underneath shall be waterproofed and sloped a minimum of 1/4 unit vertical in 12 units horizontal (2% slope) for drainage.

Reason Statement:
To ensure life-safety of users of balconies in cold climates, and to promote bulk water flow away from exterior walls or assemblies that adjoin balconies, so that ponding does not occur. Proper drainage on balconies, decks, etc., is an important performance requirement to aid in draining liquid water away from the building. In cold climates, any ponding that may occur could potentially freeze, causing a safety issue. Add the original code reference from 1997 UBC Chapter 14 under the roof drainage sections of IBC Chapter 15 (1502) and IRC Chapter 9 (R903.4). Section 1402.3 of the 1997 Uniform Building Code (UBC) stated:

1402.3 Waterproofing Weather-exposed Areas.

Balconies, landings, exterior stairways, occupied roofs, and similar surfaces exposed to the weather and sealed underneath shall be waterproofed and sloped a minimum of 1/4 unit vertical in 12 units horizontal (2% slope) for drainage.

Section 1402.3 of the 1997 Uniform Building Code (UBC) is what most waterproofing consultants considered the gold standard for ensuring that architects and builders constructed balcony and stairways with a minimum of 2% slope. The 2% slope requirement referenced in the Section 1402.3 of the 1997 UBC does not exist at any location within any version of IBC from 2000 through 2018. Decks were also listed as an area that should be waterproofed and sloped.

During the transition from the UBC to the IBC, this valuable and useful reference to require a minimum 2% surface slope for balconies, landings, and exterior stairways was omitted from the IBC and IRC. There are no referenced statements or definitions anywhere in the current codes on this issue.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This should be standard practice, thus will not impact the cost of construction

RB257-22

RB258-22

IRC: R905.1.1

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety

2021 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering and design wind speed ~~areas where wind design is not required in accordance with Figure R301.2.1.1~~ shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table R905.1.1(2) using the application requirements for areas where wind design is not required in accordance with Figure R301.2.1.1. Underlayment shall be attached in accordance with Table R905.1.1(3) for the applicable roof covering and design wind speed.

Reason Statement: This proposal corrects an error in the 2021 IRC that technically was corrected during the 2019 cycle but was correlated incorrectly by staff. The public comment to RB274 did two things. It added the exception back to this section for a fully adhered underlayment that was mistakenly deleted by the original proponent. It also corrected an error in Exception 2 related to underlayment types permitted over the 4-inch-wide strips of self-adhering polymer modified bitumen membrane. However, when RB274-19 was correlated with RB275-19, the correction approved in the public comment to RB274-19 was not implemented in the printed version of the 2021 IRC. Staff was notified and a request was made to include it as an errata. However, at this point, we have not received clear confirmation from staff either way about the status of this item. This code change clarifies the underlayment types permitted, underlayment application and underlayment fastening for Exception 2 as staff apparently is not considering this an errata.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a clarification of a code change that was previously approved in the 2019 code cycle.

RB258-22

RB259-22

IRC: TABLE R905.1.1(1)

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or Type IV
Photovoltaic shingles	R905.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV

For SI: 1 mile per hour = 0.447 m/s.

Reason Statement: Underlayment options for photovoltaic shingles in Table R905.1.1(1) are updated to include ASTM D226 saturated felts. This aligns options in the International Residential Code with the ones already present in the International Building Code in Table 1507.1.1(1). In areas where wind design is required, ASTM D226 Type II is added as an alternative to ASTM D4869, Types III and IV, This is technically justified because the minimum net masses of saturated felt, saturant, and desaturated felt are equivalent for both ASTM D226 Type II and ASTM D4869 Type IV. Equivalent composition can be expected to yield equivalent results. In areas where wind design is not required, ASTM D226 Types I and II are proposed for addition. Felts meeting D226, Type I exceed the minimum saturated felt, saturant, and desaturated felt net masses of D4869 Type I, making both D226 Types I and II suitable for recognition as an alternative to ASTM D4869 Types I, II, III, and IV.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The addition of underlayment options is not expected to affect the cost of construction.

RB259-22

RB260-22

IRC: R905.1.1, TABLE R905.1.1(1)

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 , ~~and~~ D6757 ASTM D2626 Type I and ASTM D6380 Class M shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M ~~mineral-surfaced roll roofing~~	ASTM D226 Type II
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes <u>on solid sheathing</u>	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels <u>on solid sheathing</u>	R905.10	~~Manufacturer's instructions~~ <u>ASTM D226 Type I or II</u> <u>ASTM D4869 Type I, II III or IV</u>	ASTM D226 Type II ASTM D4869 Type III or Type IV
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV

For SI: 1 mile per hour = 0.447 m/s.

Reason Statement: This code change proposal is a clarification and clean-up of Section R905.1.1 and Table R905.1.1(1). Specifically:

- In Section 1507.1.1, ASTM D2626, Type I and ASTM D6380, Class M are added since these already occur in the table.
- In the table in the row for clay and concrete tile roof coverings, "mineral surface roof roofing" is deleted from the description of ASTM D6380, Class M as it is unnecessary. The Class M designation already identifies the product as being mineral granule-surfacing.
- In the table in the row for metal roof panel roof coverings, underlayment is only used over solid or closely fitted decks. Where a structural metal panel roof covering is applied over open framing without a roof deck, an underlayment is not applied. Also, "Manufacturer's instructions" is stuck from the cell for maximum basic wind design wind speed, V < 140 mph. This is replaced with ASTM designation underlayment standards similar to what is already appearing in the rows for Metal Roof Shingle through Wood Shakes.
- In the table for the row for wood shake roof coverings, underlayment is only used over solid roof deck sheathing. Where a wood shake roof covering is applied over spaced sheathing, an underlayment is not applied to allow for downward venting/drying of the wood shakes. An interlayment is unused between courses of wood shakes per Section R905.8.4.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply a clarification and clean-up of the table.

RB260-22

RB261-22

IRC: SECTION 202, R324.5.1, R905.1.1, TABLE R905.1.1(1), TABLE R905.1.1(2), R905.16, R905.16.1, R905.16.2, R905.16.4, R905.16.5, R905.16.6, TABLE R905.16.6,

Proponents: Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Delete without substitution:

~~**[RB] PHOTOVOLTAIC SHINGLES.** A *roof covering* that resembles shingles and that incorporates *photovoltaic modules*.~~

Add new definition as follows:

BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) ROOF COVERING. A BIPV system that also functions as a roof covering. Coverings include, but not limited to, shingles, tiles, and roof panels.

Revise as follows:

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and ~~*photovoltaic shingles*~~ *BIPV roof coverings* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or Type IV
~~Photovoltaic shingles~~ BIPV roof coverings	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV

For SI: 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Clay and concrete tile	R905.3	For roof slopes from $2^{1}/_{2}$ units vertical in 12 units horizontal ($2^{1}/_{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: starting at the eave, apply a 19-inch strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide strips of underlayment felt, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be not fewer than one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof shingles	R905.4	Apply in accordance with the manufacturer’s installation instructions.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		
~~Photovoltaic shingles~~ BIPV roof coverings	R905.16	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

R905.16 ~~Photovoltaic~~ BIPV shingles. The installation of ~~*photovoltaic*~~ BIPV shingles shall comply with the provisions of this section, Section R324 and NFPA 70.

R905.16.1 Deck requirements. ~~*Photovoltaic*~~ BIPV shingles shall be applied to a solid or closely-fitted deck, except where the roof covering is specifically designed to be applied over spaced sheathing.

R905.16.2 Deck slope. ~~*Photovoltaic*~~ BIPV shingles shall be used only on roof slopes of 2 units vertical in 12 units horizontal (2:12) or greater.

R905.16.4 Material standards. ~~*Photovoltaic*~~ BIPV shingles shall be *listed* and *labeled* in accordance with UL 7103 or with both UL 61730-1 and UL 61730-2.

R905.16.5 Attachment. ~~*Photovoltaic*~~ BIPV shingles shall be attached in accordance with the manufacturer's installation instructions.

R905.16.6 Wind resistance. ~~*Photovoltaic*~~ BIPV shingles shall comply with the classification requirements of Table R905.16.6 for the appropriate maximum basic wind speed.

TABLE R905.16.6 Classification of ~~Photovoltaic~~ BIPV Shingles

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult}, FROM FIGURE R301.2(2) (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD}, FROM TABLE R301.2.1.3 (mph)	UL 7103 SHINGLE CLASSIFICATION
110	85	A, D or F
116	90	A, D or F
129	100	A, D or F
142	110	F
155	120	F
168	130	F
181	140	F
194	150	F

For SI: 1 mile per hour = 1.609 kph.

R324.5.1 ~~Photovoltaic~~ BIPV shingles. ~~Photovoltaic~~ BIPV shingles shall comply with Section R905.16.

Reason Statement: For the definitions, there are different forms of BIPV roof coverings, just as there are different forms of traditional roof coverings. The code defines roof coverings in general, and the different forms are described in Chapter 9 for their specific application. This change aligns with the change to the definition of BIPV Systems, which clarifies this type of photovoltaic solar energy system.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This provides clarity and consistency in terminology related to BIPV used as roof assemblies and roof coverings.

RB261-22

RB262-22

IRC: R905.1.2

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R905.1.2 Ice barriers. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2, an ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles and wood shakes. The ice barrier shall consist of not fewer than two layers of *underlayment* cemented together, or a self-adhering polymer-modified bitumen sheet shall be used in place of normal *underlayment* and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the building. ~~On roofs with slope equal to or greater than 8 units vertical in 12 units horizontal (67-percent slope), the ice barrier shall also be applied not less than 36 inches (914 mm) measured along the roof slope from the eave edge of the building.~~

Exception: Detached *accessory structures* not containing conditioned floor area.

Reason Statement: Ice dams form at or downslope of the transition between above freezing and below freezing sections of the roof deck. Warm air rising from the interior of the building into the attic space may raise the roof deck temperature and cause snow or ice on the roof to melt, run downslope, and possibly refreeze if the roof deck temperature downslope is low enough. Building characteristics, including roof slope, determine where that transition occurs and affect whether and where an ice dam forms.

The special guideline for roofs at or above 8:12 slope overlooks many building construction variations. This proposal strikes the special language for roofs above 8:12 slope to ensure the minimum requirement causes installation of the ice dam protective membrane over an appropriate portion of the roof that includes extension within the exterior wall line. The existing language could create situations where the ice dam membrane terminates well before the location on the roof deck where there is a transition from above freezing to below freezing conditions, which could allow ice dam formation at an area not covered by an ice barrier and lead to water infiltration into the building.

Additionally, the existing language can be interpreted in multiple fashions due to use of the word "also" in the last sentence of Section R905.1.2, suggesting there may be a requirement for two layers of ice barrier for roofs 8:12 and higher in slope.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

If people interpret the existing provisions to require two layers of ice barrier for slopes 8:12 and above, one that runs at least 36" parallel to slope and one that runs at least 24" inside the exterior wall line, this proposal could result in a decrease in cost of construction by permitting one layer that runs at least 24" inside the exterior wall line. If people interpret the existing provisions to require only a single layer running at least 36" parallel to the slope, this proposal could result in an increase in cost of construction for situations in which more than a single 36" width of ice barrier will be required to reach 24" inside the exterior wall line. On balance for all projects, the proposal is expected to be approximately cost neutral.

RB262-22

RB263-22

IRC: TABLE R905.1.1(1), TABLE R905.1.1(2), TABLE R905.1.1(3), R905.1.1

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety

2021 International Residential Code

Revise as follows:

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS NOT WITHIN HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~	AREAS WITHIN HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D48696 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or Type IV
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV

For SI: 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS NOT WITHIN HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~	AREAS WITHIN HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~
Asphalt shingles	R905.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Clay and concrete tile	R905.3	For roof slopes from $2^{1}/_{2}$ units vertical in 12 units horizontal ($2^{1}/_{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: starting at the eave, apply a 19-inch strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide strips of underlayment felt, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be not fewer than one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof shingles	R905.4	Apply in accordance with the manufacturer's installation instructions.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		
Photovoltaic shingles	R905.16	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(3) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS NOT WITHIN HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~	AREAS WITHIN HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Clay and concrete tile	R905.3		
Photovoltaic	R905.16		
Metal roof shingles	R905.4	Manufacturer's installation instructions.	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) ~~for the applicable roof covering areas where wind design is not required in accordance with Figure R301.2.1.1~~ shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table R905.1.1(2) using the application requirements for areas not within Hurricane-prone Regions ~~where wind design is not required in accordance with Figure R301.2.1.1~~. Underlayment shall be attached in accordance with Table R905.1.1(3).

Reason Statement: This proposal expands the requirements for improved roof covering underlayment from the Wind Design Required Region to the Hurricane-prone Region. This effectively expands the secondary roof underlayment strategies recommended by the IBHS Fortified Home - Hurricane program (sealed roof deck) from areas where the design wind speed is 130 mph and greater to areas where the design wind speed is 115 mph and greater.

Damage due to water intrusion continues to be a significant problem for buildings impacted by hurricanes. Water entry can occur where it is able to infiltrate through the roof, walls, vents, windows, and/or doors, or at interfaces between these items. The roof deck, where the roof covering is lost or damaged, is particularly susceptible. Water intrusion can cause extensive damage to interior finishes, furnishings, and other contents, and can lead to ceiling collapse when attic insulation is saturated. When power is lost and/or a building cannot otherwise be dried out within 24–48 hours, additional issues such as mold can develop, potentially extending the period during which the property may not be available for use.

Tests performed by IBHS at the Research Center have consistently shown that a sealed roof deck as recommended by the IBHS Fortified Home - Hurricane program consistently show significantly reduced water intrusion rates when one of these strategies was employed. A summary of the results of the demonstration can be viewed at the following link:

http://ibhstest.wpengine.com/ibhsnews- releases/ibhs-hurricane-demonstration-illustrates-importance-of-sealed-roof-deck-3/.

The wind driven rain demonstration can be viewed at the following link:https://disastersafety.org/thunderstorms/winddriven-rain-demo/.

These underlayment strategies required reduce water entry into the attic space by 70% or more.

This expansion is being proposed primarily for 2 reasons. It is anticipated that ASCE 7 will be updated to the 2022 edition this cycle. ASCE 7-22 includes numerous changes to the wind design requirements including changes to the wind speed maps. While some wind speeds in the hurricane-prone region are increasing, notably, the 130 mph contour, which is the Wind Design Required Region trigger in the Hurricane-prone Region, is being reduced in many areas near the Gulf coast and North Atlantic coast. The following figures overlays the ASCE 7-22 design wind speeds for Risk Category II over the ASCE 7-16 design wind speeds for Risk Category II near the Gulf and Atlantic coasts. The areas shaded in blue indicate where the 130 mph contour has shifted more towards the coast effectively reducing wind speeds in these areas. As shown, the North Atlantic coast has been completely removed from the Wind Design Required Region. Without this proposed expansion, these hurricane-prone areas would no longer be required to use the improved underlayment strategies.

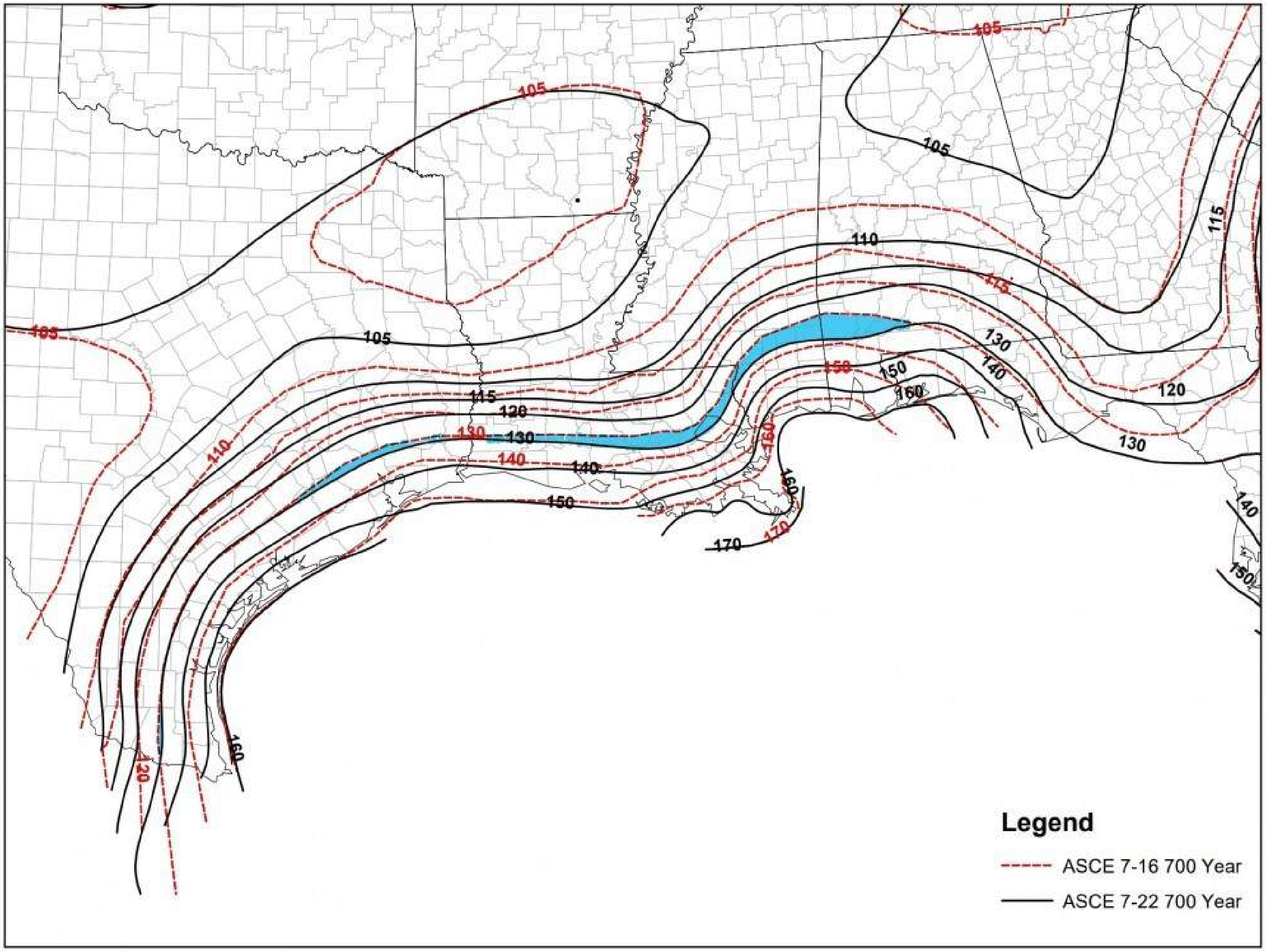


Figure 1

Loss of Wind Design Required Region in the Gulf Region Due to ASCE 7-22 Wind Speed Updates

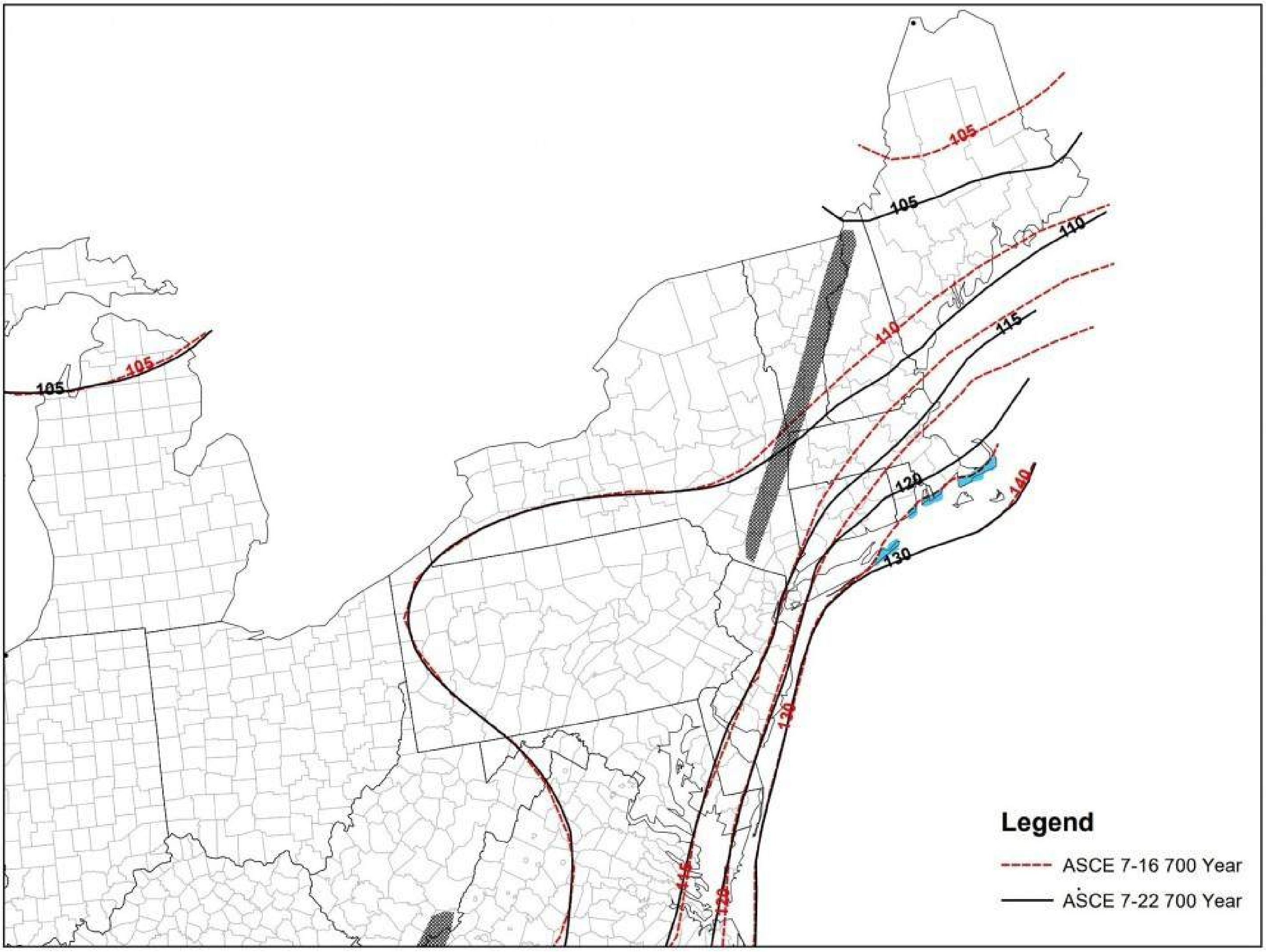


Figure 2

Loss of Wind Design Required Region in the North Atlantic Region Due to ASCE 7-22 Wind Speed Updates

Additionally, a recent report published by David Roueche with Auburn University for Home Innovation Research Labs shows that roof covering damage is by far the most common cladding damage and that even at lower wind speeds roof covering damage is frequently observed. The full report is attached to this proposal. The report is a curation of the windstorm building performance dataset collected by the StEER (Structural Extreme Events Reconnaissance) network. The dataset quantifies common wind damage patterns from recent windstorms. The following windstorm events were included in the dataset:

- Joplin Tornado
- Garland Tornado
- Hurricane Harvey
- Hurricane Irma
- Hurricane Michael
- Nashville/Cookeville Tornadoes
- Hurricane Laura

When stratified by hazard intensity, the data shows for wind speeds between 116 mph and 140 mph the frequency of roof covering damage is near 80%. Even for wind speeds between 91 mph and 115 mph the frequency of roof covering damage is near 70%.

The report notes that “considering all hazard intensities and years of construction, 26-50% of the roof cover on a single-family home is typically damaged in an extreme windstorm.”It should also be noted that the 7th Edition (2020) Florida Building Code adopted these underlayment strategies for the entire state. For Risk Category II buildings, design wind speeds in the state of Florida range from approximately 115 mph to 180 mph.

https://www.cdpaccess.com/proposal/7975/25356/files/download/2803/

Bibliography: Brown, T.M., Quarles, S.L., Giammanco, I.M., Brown, R., Insurance Institute for Business and Home Safety, "Building Vulnerability to Wind-Driven Rain Entry and Effectiveness of Mitigation Techniques." 14th International Conference on Wind Engineering (ICWE).

Roueche, D.B., Nakayama, J., Department of Civil Engineering, Auburn University Ginn College of Engineering, "Quantification of Common Wind Damage Patterns in Recent Windstorms." May 2021

Cost Impact: The code change proposal will increase the cost of construction
This proposal will only increase costs in the Hurricane-prone Regions for wind speeds between 115 mph and 129 mph. Exceptions 1 and 2 have existed in the IRC for several editions. If the double layer of underlayment option is used, the cost of the additional layer of underlayment will vary by region. However, for a 2000 square foot roof, the cost increase for the additional layer of underlayment will be between $100 to $200. Additional fasteners will be required in addition to the
additional layer of underlayment.

RB263-22

RB264-22

IRC: R905.2.8.2

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R905.2.8.2 Valleys. Valley linings shall be installed in accordance with the manufacturer's instructions before applying shingles. Valley linings of the following types shall be permitted:

1. For open valleys (valley lining exposed) lined with metal, the valley lining shall be not less than 24 inches (610 mm) wide and of any of the corrosion-resistant metals in Table R905.2.8.2.
2. For open valleys, valley lining of two plies of mineral-surfaced roll roofing, complying with ASTM D3909 or ASTM D6380 Class M, shall be permitted. The bottom layer shall be 18 inches (457 mm) and the top layer not less than 36 inches (914 mm) wide.
3. For closed valleys (valley covered with shingles), valley lining of one ply of smooth roll roofing complying with ASTM D6380 and not less than 36 inches wide (914 mm) or valley lining as described in Item 1 or 2 shall be permitted. Self-adhering polymer-modified bitumen *underlayment* complying with ASTM D1970 <u>and not less than 36 inches (914 mm) wide</u> shall be permitted in lieu of the lining material.

Reason Statement: Although implied, the minimum width of ASTM D1970 valley lining is not provided in the existing language of the IRC. This proposal establishes that ASTM D1970 underlayment used as closed valley lining must be at least 36" wide.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal defines an implied requirement to remove ambiguity. No change in cost of construction is expected if this proposal is approved.

RB264-22

RB265-22

IRC: R905.2.8.4

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R905.2.8.4 Other flashing. Flashing against a vertical front wall, as well as soil stack, vent pipe and chimney flashing, shall be applied in accordance with the asphalt shingle manufacturer's ~~printed~~ instructions.

Reason Statement: Manufacturer's instructions are increasingly made available in media other than printed versions. This proposal removes the word “printed” from the only instance in IRC Chapter 9 where it is used in conjunction with "instructions." Removal of the word “printed” will permit alternative methods for providing instructions, including digital formats that support greater sustainability. The proposed change is important in light of events such as the COVID-19 pandemic, which brought attention to the need to deliver information using alternative methods.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal expands available options for delivering manufacturer's instructions, which allows manufacturers to select the option that best serves their customers. There is no basis to expect either a general increase or decrease in cost of construction if this proposal is approved.

RB265-22

RB266-22

IRC: R905.3.6 (New), R905.5.6 (New), R905.6.5 (New), R905.6.5, TABLE R905.6.5, R905.7.5 (New), R905.7.5, TABLE R905.7.5(1), TABLE R905.7.5(2), R905.8.6 (New), R905.8.6, TABLE R905.8.6, R905.9.4 (New), R905.10.5 (New), R905.11.4 (New), R905.12.4 (New), R905.13.4 (New), R905.14.4 (New), R905.15.4 (New), R905.17.7 (New), ASTM Chapter 44 (New)

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety (testafford@charter.net)

2021 International Residential Code

Add new text as follows:

R905.3.6 **Wind resistance of concrete and clay tile.** In regions where wind design is required in accordance with Figure R301.2.1.1, wind loads on concrete and clay tile shall be determined in accordance with Section 1504.3 of the International Building Code. In regions where wind design is not required in accordance with Figure R301.2.1.1, concrete and clay tiles shall be attached in accordance with this Sections R905.3.7 and R905.3.8.

R905.5.6 **Wind resistance of mineral-surfaced roll roofing.** Mineral-surfaced roll roofing shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.6.5 **Wind resistance of slate shingles.** Slate shingles shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). In regions where wind design is not required in accordance with Figure R301.2.1.1, slate shingles shall be attached in accordance with Section R905.6.6.

Revise as follows:

R905.6.6 ~~R905.6.5~~ Application. Minimum headlap for slate shingles shall be in accordance with Table R905.6.6 ~~R905.6.5~~ . Slate shingles shall be secured to the roof with two fasteners per slate. Slate shingles shall be installed in accordance with this chapter and the manufacturer’s instructions.

TABLE R905.6.6 ~~R905.6.5~~ SLATE SHINGLE HEADLAP

SLOPE	HEADLAP (inches)
4:12 ≤ slope < 8:12	4
8:12 ≤ slope < 20:12	3
Slope ≥ 20:12	2

For SI: 1 inch = 25.4 mm.

Add new text as follows:

R905.7.5 Wind resistance of wood shingles. In regions where wind design is required in accordance with Figure R301.2.1.1, Wood shingles shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). In regions where wind design is not required in accordance with Figure R301.2.1.1, wood shingles are permitted to be attached in accordance with Section R905.7.6.

Revise as follows:

R905.7.6 ~~R905.7.5~~ Application. Wood shingles shall be installed in accordance with this chapter and the manufacturer's instructions. Wood shingles shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in courses, and two joints shall not be in direct alignment in any three adjacent courses. Spacing between shingles shall be not less than $^1/_4$ inch to $^3/_8$ inch (6.4 mm to 9.5 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.6(1) ~~R905.7.5(1)~~. Fasteners for untreated (naturally durable) wood shingles shall be box nails in accordance with Table R905.7.6(2) ~~R905.7.5(2)~~. Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized with a coating weight of ASTM A153 Class D (1.0 oz/ft^2). Alternatively, two 16-gage stainless steel Type 304 or 316 staples with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shingles in accordance with Section R902 or pressure-impregnated-preservative-treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). For sheathing less than $^3/_4$ inch in (19.1 mm) thickness, each fastener shall penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned in accordance with the manufacturer's installation instructions. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

TABLE R905.7.6(1) ~~R905.7.5(1)~~ WOOD SHINGLE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches)	
			3:12 pitch to < 4:12	4:12 pitch or steeper
Shingles of naturally durable wood	16	No. 1	$3^3/_4$	5
		No. 2	$3^1/_2$	4
		No. 3	3	$3^1/_2$
	18	No. 1	$4^1/_4$	$5^1/_2$
		No. 2	4	$4^1/_2$
		No. 3	$3^1/_2$	4
	24	No. 1	$5^3/_4$	$7^1/_2$
		No. 2	$5^1/_2$	$6^1/_2$
		No. 3	5	$5^1/_2$

For SI: 1 inch = 25.4 mm.

TABLE R905.7.6(2) ~~R905.7.5(2)~~ NAIL REQUIREMENTS FOR WOOD SHAKES AND WOOD SHINGLES

PRODUCT TYPE	NAIL TYPE, MINIMUM LENGTH AND SHANK DIAMETER (inches)
Shakes	
18″ straight-split	5d box $1^3/_4$″ × 0.080
18″ and 24″ handsplit and resawn	6d box 2″ × 0.099
24″ taper-split	5d box $1^3/_4$″ × 0.080
18″ and 24″ tapersawn	6d box 2″ × 0.099
Shingles	
16″ and 18″	3d box $1^1/_4$″ × 0.076
24″	4d box $1^1/_2$″ × 0.076

For SI: 1 inch = 25.4 mm.

Add new text as follows:

R905.8.6 Wind resistance of wood shakes. In regions where wind design is required in accordance with Figure R301.2.1.1, Wood shakes shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). In regions where wind design is not required in accordance with Figure R301.2.1.1, wood shakes are permitted to be attached in accordance with Section R905.8.7.

Revise as follows:

R905.8.7 ~~R905.8.6~~ Application. Wood shakes shall be installed in accordance with this chapter and the manufacturer's installation instructions. Wood shakes shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^3/_8$ inch to $^5/_8$ inch (9.5 mm to 15.9 mm) including tapersawn shakes. Weather exposures for wood shakes shall not exceed those set in Table R905.8.7 ~~R905.8.6~~. Fasteners for untreated (naturally durable) wood shakes shall be box nails in accordance with Table R905.7.6(2) ~~R905.7.5(2)~~. Nails shall be stainless steel Type 304, or Type 316 or hot-dipped with a coating weight of ASTM A153 Class D (1.0 oz/ft^2). Alternatively, two 16-gage Type 304 or Type 316 stainless steel staples, with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Wood shakes shall be attached to the roof with two fasteners per shake positioned in accordance with the manufacturer's installation instructions. Fasteners for fire-retardant-treated (as defined in Section R902) shakes or pressure-impregnated-preservative-treated shakes of *naturally durable wood* in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). Where the sheathing is less than $^3/_4$ inch (19.1 mm) thick, each fastener shall penetrate through the sheathing. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

TABLE R905.8.7 ~~R905.8.6~~ WOOD SHAKE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches) 4:12 pitch or steeper
Shakes of naturally durable wood	18	No. 1	$7^1/_2$
	24	No. 1	10[a]
Preservative-treated tapersawn shakes of Southern Yellow Pine	18	No. 1	$7^1/_2$
	24	No. 1	10
	18	No. 2	$5^1/_2$
	24	No. 2	$7^1/_2$
Taper-sawn shakes of naturally durable wood	18	No. 1	$7^1/_2$
	24	No. 1	10
	18	No. 2	$5^1/_2$
	24	No. 2	$7^1/_2$

For SI: 1 inch = 25.4 mm.

a. For 24-inch by $^3/_8$-inch handsplit shakes, the maximum exposure is $7^1/_2$ inches.

Add new text as follows:

R905.9.4 Wind resistance of built-up roofs. Built-up roof coverings shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.10.5 Wind resistance of metal roof panels. Metal roof panels shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). Metal roof panels applied to a solid or closely fitted deck shall be tested for wind resistance in accordance with FM 4474, UL 580, or UL 1897. Structural standing seam metal panel roof systems shall be tested for wind resistance in accordance with ASTM E1592 or FM 4474. Structural through-fastened metal panel roof systems shall be tested for wind resistance in accordance with ASTM E1592, FM 4474 or UL 580.

Exceptions:

1. Metal roofs constructed of cold-formed steel shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2210.1 of the International Building Code.
2. Metal roofs constructed of aluminum shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2002.1 of the International Building Code.

R905.11.4 Wind resistance of modified bitumen roofing. Modified bitumen roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.12.4 Wind resistance of thermoset single-ply roofing. Thermoset single-ply roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.13.4 Wind resistance of thermoplastic single-ply roofing. Thermoplastic single-ply roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.14.4 Wind resistance of sprayed polyurethane foam roofing. Sprayed polyurethane foam roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.15.4 Wind resistance of liquid-applied roofing. Liquid-applied roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.17.7 Wind resistance of BIPV roof panels. BIPV roof panels shall be tested in accordance with UL 1897 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E1592-2005(2017)	Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

Staff Analysis: ASTM E1592-2005(2017) is already referenced in the IBC. This is simply a new occurrence of the reference in the I-Codes

Reason Statement: This proposal is one of two proposals intended to clarify the wind limitations in the IRC. Section R301.2.1.1 intends to limit the applicability of the IRC to areas where wind design is not required in accordance with Figure R301.2.1.1. However, Chapter 9 contains high wind requirements for asphalt, metal, and photovoltaic shingles and for underlayment in wind design required regions, but for no other roof coverings. While Section R905.1 states that unless otherwise specified, roof coverings have to resist the component and cladding loads specified in Table R302(2), that requirement is not necessarily correct for all roof coverings. Prescriptive attachment methods are provided for concrete and clay tile but the code does not specify any wind limitations on the use of this prescriptive method.
Therefore, new sections are proposed for many roof coverings that specifically addresses the wind limitations in the IRC for roof covering attachment and specifies the performance requirements for roof coverings in wind design required regions. Where prescriptive attachment methods are provided, the proposal limits their use to areas where wind design is not required. The performance requirements specified are consistent with Section 1504 in the IBC. This proposal is not intended to change any technical requirements in the IRC related to wind design. It is intended to simply clarify the wind requirements for roof coverings in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase the cost of construction as it is primarily a clarification.

RB266-22

RB267-22

IRC: TABLE R905.3.7

Proponents: Glenn Mathewson, representing Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

TABLE R905.3.7 CLAY AND CONCRETE TILE ATTACHMENT

SHEATHING	ROOF SLOPE	NUMBER OF FASTENERS
Solid without battens	All	One per tile
Spaced or solid with battens ~~and slope < 5:12~~	~~Fasteners not required~~ slope < 5:12	Fasteners not required
Spaced sheathing without battens	5:12 ≤ slope < 12:12	One per tile/every other row
	12:12 ≤ slope < 24:12	One per tile

Reason Statement: At first glance, the data in the row “spaced or solid with battens and slope <5:12” appears to be shifted to the left and not in the correct columns. In researching, this table has been in this form since the 2000 IRC. This proposals suggests that the slope conditions for this row be placed under the column titled “roof slope” and the number of fasteners required should be under the column titled “number of fasteners”.
In reviewing the Concrete and Clay Roof Tile Installation Manual (2015-latest edition) by the Tile Roofing Institute and Western States Roofing Contractors Association, Table IB, it would appear that this shift of data in the IRC table is supported. This can be viewed online at this link:
https://tileroofing.org/wp-content/uploads/TRI-Installation-Guide-2015-1.pdf

The clay and concrete tile industry is welcome to further refine this proposal with floor modifications and/or public comments. The goal of this proposal is simply to make the presentation of the data in the cells align sensibly with the column titles.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial and does not change the application of the IRC provisions.

RB267-22

RB268-22

IRC: R905.6.5 (New), TABLE R905.6.5 (New)

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Add new text as follows:

R905.6.5 Wind resistance of slate shingles. Slate shingles shall be tested in accordance with ASTM D3161. Slate shingle packaging shall bear a label indicating compliance with ASTM D3161 and the required classification in Table R905.6.5.

TABLE R905.6.5 CLASSIFICATION OF SLATE SHINGLES TESTED IN ACCORDACNE WITH ASTM D3161

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult}, FROM FIGURE R301.2(2) (mph)	MAXIMUM BASIC WIND SPEED, V_{asd}, FROM TABLE R301.2.1.3 (mph)	ASTM D3161 CLASSIFICATION
110	85	A, D or F
116	90	A, D or F
129	100	A, D or F
142	110	F
155	120	F
168	130	F
181	140	F
194	150	F

For SI: 1 mph=0.447 m/s

Reason Statement: This code change proposal is intended to provide building officials and users of the code guidance regarding the wind resistance of slate roof covings. Wind resistance of slate roof coverings is not currently addressed in the IRC. This code change adds wind resistance testing in accordance with ASTM D3161 and its classification designations similar to what is already provided for in the IBC for asphalt shingles and metal roof shingles. A new table is added, Table R905.6.5 providing the required wind resistance classification based on the maximum ultimate design wind speed, V_{ult}, or maximum basic wind speed, V_{asd}. Slate package labeling is required to facilitate classification identification and enforcement. Such package labeling would be slate supplier specific, but most likely would be in the form of of a pallet tag.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
While this code change proposal adds a requirement for wind resistance testing, it will not result in an increase in the cost of construction. Slate suppliers have indicating they already have ASTM D3161 testing in-place and classifications available.

RB268-22

RB269-22

IRC: R905.7.1

Proponents: Chadwick Collins, representing Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Residential Code

Revise as follows:

R905.7.1 Deck requirements. Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. <u>Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) or greater, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When wood shingles are installed over spaced sheathing and the underside of the shingles are exposed to the attic space the attic shall be ventilated in accordance with Sections R806.1, R806.2, R806.3 and R806.4. The shingles shall not be backed with materials that prevent the free movement of air on the interior side of the spaced sheathing.</u>

Reason Statement: When shingles are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shingles and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process. Further, installation of components such as spray foam insulation also eliminates one surface for shingles to release heat gained through exposure. This slows the release of heat energy, requiring the shingle to hold on to heat load for longer durations, which leads to shorter service life cycles

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

RB269-22

RB270-22

IRC: R905.7.5, ASTM Chapter 44

Proponents: Rick Allen, representing ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R905.7.5 Application. Wood shingles shall be installed in accordance with this chapter and the manufacturer's instructions. Wood shingles shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in courses, and two joints shall not be in direct alignment in any three adjacent courses. Spacing between shingles shall be not less than $^1/_4$ inch to $^3/_8$ inch (6.4 mm to 9.5 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.5(1). Fasteners for untreated (naturally durable) wood shingles shall be box nails in accordance with Table R905.7.5(2). Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized with a coating weight of ASTM A153 Class D <u>or ASTM A641 Class 3S</u> (1.0 oz/ft^2). Alternatively, two 16-gage stainless steel Type 304 or 316 staples with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shingles in accordance with Section R902 or pressure-impregnated-preservative-treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). For sheathing less than $^3/_4$ inch in (19.1 mm) thickness, each fastener shall penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned in accordance with the manufacturer's installation instructions. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M~~—09a(2014)~~ <u>2019</u> Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, ASTM A641/A641M-2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Galvanized nails are made from wire. The wire may be uncoated or galvanized. Nails that are made from uncoated wire are hot-dip galvanized after forming to specification A153 Class D which provides a minimum average coating weight of 1 oz./ft². Nails that are made from galvanized wire are made from wire coated to specification A641 Class 3S which provides a minimum average coating weight of 1 oz/ft². Although commercially available and used for many years, Class 3S was added to Specification A641 in 2019

Specification A641 Class 3S was added to ASTM F1667 in 2020.

Bibliography: ASTM F1667/F1667M-21a: Standard Specification for Driven Fasteners: Nails, Spikes and Staples
ASTM A153/A153M-16a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A641/A641-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proposal will not add or reduce cost. The proposal aligns with current industry practices

RB270-22

RB271-22

IRC: R905.8.1

Proponents: Chadwick Collins, representing Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Residential Code

Revise as follows:

R905.8.1 Deck requirements. Wood shakes shall be ~~used only~~ <u>installed</u> on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. <u>When wood shakes are installed over spaced sheathing and the underside of the shakes are exposed to the attic space, the attic shall be ventilated in accordance with Sections R806.1, R806.2, R806.3 and R806.4. The shakes shall not be backed with materials that prevent the free movement of air on the interior side of the spaced sheathing.</u>

Reason Statement: When shakes are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shakes and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process. Further, installation of components such as spray foam insulation also eliminates one surface for shakes to release heat gained through exposure. This slows the release of heat energy, requiring the shake to hold on to heat load for longer durations, which leads to shorter service life cycles.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

RB271-22

RB272-22

IRC: R905.8.6, ASTM Chapter 44

Proponents: Rick Allen, representing ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R905.8.6 Application. Wood shakes shall be installed in accordance with this chapter and the manufacturer's installation instructions. Wood shakes shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^3/_8$ inch to $^5/_8$ inch (9.5 mm to 15.9 mm) including tapersawn shakes. Weather exposures for wood shakes shall not exceed those set in Table R905.8.6. Fasteners for untreated (naturally durable) wood shakes shall be box nails in accordance with Table R905.7.5(2). Nails shall be stainless steel Type 304, or Type 316 or hot-dipped with a coating weight of ASTM A153 Class D <u>or ASTM A641 Class 3S</u> (1.0 oz/ft^2). Alternatively, two 16-gage Type 304 or Type 316 stainless steel staples, with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Wood shakes shall be attached to the roof with two fasteners per shake positioned in accordance with the manufacturer's installation instructions. Fasteners for fire-retardant-treated (as defined in Section R902) shakes or pressure-impregnated-preservative-treated shakes of *naturally durable wood* in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). Where the sheathing is less than $^3/_4$ inch (19.1 mm) thick, each fastener shall penetrate through the sheathing. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

ASTM

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100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M~~—09a(2014)~~ <u>2019</u> Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Staff Analysis: The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, ASTM A641/A641M-2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Galvanized nails are made from wire. The wire may be uncoated or galvanized. Nails that are made from uncoated wire are hot-dip galvanized after forming to specification A153 Class D which provides a minimum average coating weight of 1 oz./ft². Nails that are made from galvanized wire are made from wire coated to specification A641 Class 3S which provides a minimum average coating weight of 1 oz/ft². Although commercially available and used for many years, Class 3S was added to Specification A641 in 2019

Specification A641 Class 3S was added to ASTM F1667 in 2020.

Referenced standard

ASTM F1667/F1667M-21a: Standard Specification for Driven Fasteners: Nails, Spikes and Staples

ASTM A153/A153M-16a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A641/A641-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proposal will not add or reduce to cost. Proposal aligns with current industry practice.

RB272-22

RB273-22

IRC: SECTION 202, R905.10.3, TABLE R905.10.3(1), R908.2

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Delete without substitution:

~~**[RB] ROOF COVERING SYSTEM.** See "Roof assembly."~~

Revise as follows:

[RB] ROOF COATING. A fluid-applied, adhered coating used for roof maintenance or *roof repair*, or as a component of a *roof covering* ~~system~~ or *roof assembly*.

R905.10.3 Material standards. Metal-sheet roof covering ~~systems~~ that incorporate supporting structural members shall be designed in accordance with the *International Building Code* . Metal-sheet roof coverings installed over structural decking shall comply with Table R905.10.3(1). The materials used for metal-sheet roof coverings shall be naturally corrosion resistant or provided with corrosion resistance in accordance with the standards and minimum thicknesses shown in Table R905.10.3(2).

TABLE R905.10.3(1) METAL ROOF COVERING STANDARDS

ROOF COVERING TYPE	STANDARD APPLICATION RATE/THICKNESS
Cold-rolled copper	ASTM B370 minimum 16 oz/sq ft and 12 oz/sq ft high-yield copper for metal~~-~~sheet roof-coverings ~~roof-covering systems~~; 12 oz/sq ft for preformed metal shingle systems.

For SI: 1 ounce per square foot = 0.305 kg/m^2, 1 pound per square foot = 4.214 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.

R908.2 Structural and construction loads. The structural roof components shall be capable of supporting the roof covering ~~system~~ and the material and equipment loads that will be encountered during installation of the roof covering ~~system~~.

Reason Statement: This code change proposal is intended to clarify the code's intent by eliminating the term "roof covering systems" in its five uses in the IRC. While the term "roof covering system" is defined in Chapter 2-Definitions, its definition provide a see-reference to the term and definition for roof assembly as follows:

ROOF COVERING SYSTEM: See "Roof assembly."

This change eliminates the need for the see-reference and is not intended to change the technical requirements of the code. The existing five uses of the current term are revised with this proposal.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of an existing definition. There is no change in the code's technical requirements.

RB273-22

RB274-22

IRC: R905.12, R905.12.1, R905.12.2, TABLE R905.12 (New), R905.12.3, R905.13, R905.13.1, R905.13.2, R905.13.3

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Revise as follows:

R905.12 ~~Thermoset single~~ Single-ply roofing. The installation of ~~thermoset single-ply roofing~~ *single-ply membrane roof coverings* shall comply with the provisions of this section.

R905.12.1 Slope. ~~Thermoset~~ ~~*single*~~ *Single-ply membrane* ~~roofs~~ *roof coverings* shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) for drainage.

R905.12.2 Material standards. ~~Thermoset single~~ *Single-ply membrane roof coverings* shall comply with ~~ASTM D4637 or ASTM D5019~~ the material standards in Table R905.12.

Add new text as follows:

TABLE R905.12 SINGLE-PLY ROOFING MATERIAL STANDARDS

MATERIAL	MATERIAL STANDARD
Chlorosulfanted polyethylene (CSPE) or polyisobutylene (PIB)	ASTM D5019
Ethylene propylene diene monomer (EPDM)	ASTM D4637
Ketone Ethylene Ester (KEE)	ASTM D6754
Polyvinyl chlorine (PVC) or (PVC/KEE)	ASTM D4434
Thermosplastic polyolefin (TPO)	ASTM D6878

Revise as follows:

R905.12.3 Application. ~~Thermoset single~~ *Single-ply* membrane roof ~~roofs~~ coverings shall be installed in accordance with this chapter and the manufacturer's installation instructions.

~~**R905.13 Thermoplastic single-ply roofing.** The installation of thermoplastic single-ply roofing shall comply with the provisions of this section.~~

~~**R905.13.1 Slope.** Thermoplastic *single-ply membrane* roofs shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope).~~

~~**R905.13.2 Material standards.** Thermoplastic single-ply roof coverings shall comply with ASTM D4434, D6754 or D6878.~~

~~**R905.13.3 Application.** Thermoplastic single-ply roofs shall be installed in accordance with this chapter and the manufacturer's instructions.~~

Reason Statement: This code change proposal is intended to clarify the code's requirements regarding single-ply membrane roof coverings. Currently, requirements for thermoset single-ply roofing are address in Section R905.12 and thermoplastic single-ply roofing are addressed in Section R905.13. Other than the material standards for specific membrane types, the requirements are identical in both sections.

This code change proposal combines the two sections into a new section, Section R905.12-Single-ply Roofing and combines the material standards in a new table, Table R905.12-Single-ply Roofing Material Standards.

This code change proposal makes no changes to the code's requirements for single-ply membrane roof coverings; it is simply a reformat of the code's already existing requirements.

This same consolidation and new table has already been incorporated into IBC 2021.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since this code change proposal makes no changes to the code's technical requirements, there is no cost impact.

RB274-22

RB275-22

IRC: R905.15.2

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Revise as follows:

R905.15.2 Material standards. Liquid-applied roofing shall comply with ASTM C836, C957, ~~D1227,~~ or D3468~~, D6083, D6694 or D6947~~.

Reason Statement: This code change proposal is intended to clarify the code's requirements for liquid-applied roof coverings. This proposal removes roof coating products from this section as these, in themselves, are not liquid-applied roof coverings. The following roof coatings products are being removed:

- ASTM D1227, "Standard Specification for Emulsified Asphalt Used as a Protective Roof Coating"
- ASTM D6083,"Standard Specification for Liquid Applied Acrylic Coating Used in Roofing"
- ASTM D6694, "Standard Specification for Liquid-applied Silicone Coating Use din Spray Polyurethane Foam Roofing Systems"
- ASTM D6947, "Standard Specification for Liquid Applied Moisture Cured Polyurethane Coating Used in Spray Polyurethane Foam Roofing Systems"

ASTM D6694 and ASTM D6947 already appear in Section R905.14-Sprayed Polyurethane Foam Roofing's Table R905.14.3-Protective Coating Material Material Standard's.

A separate code change proposal will move these material standards for roof coating products to a new code section specific to roof coatings.

This same removal of roof coating-specific standards from the material standards list for liquid-applied roof coverings has already been incorporated into IBC 2021.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is a clarification to the code's requirements and has no cost impact.

RB275-22

RB276-22

IRC: R905.15.4 (New)

Proponents: Chadwick Collins, Kellen Company, representing Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com)

2021 International Residential Code

Add new text as follows:

R905.15.4 Flashings. Flashings shall be applied in accordance with the liquid applied roofing manufacturer’s installation instructions.

Reason Statement: This proposal provides clarity and direction that is missing from section R905.15 regarding flashings. The manufacturer's installation instructions have the specifics for each specific product and should be the source material to consult for proper application and flashing guidance with these materials.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal updates R905.15 to ensure that the needed guidance for installation is pointed to by the code.

RB276-22

RB277-22

IRC: TABLE R906.2, ASTM Chapter 44 (New)

Proponents: Greg Keeler, Owens Corning, representing Owens Corning (greg.keeler@owenscorning.com)

2021 International Residential Code

Revise as follows:

TABLE R906.2 MATERIAL STANDARDS FOR ROOF INSULATION

Cellular glass board	ASTM C552 or ASTM C1902
Composite boards	ASTM C1289, Type III, IV, V or VI
Expanded polystyrene	ASTM C578
Extruded polystyrene board	ASTM C578
Fiber-reinforced gypsum board	ASTM C1278
Glass-faced gypsum board	ASTM C1177
Mineral wool board	ASTM C726
Perlite board	ASTM C728
Polyisocyanurate board	ASTM C1289, Type I or II
Wood fiberboard	ASTM C208

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

C1902-20 Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM C1902-20 Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: Today, the scope of ASTM C552, “Standard Specification for Cellular Glass Thermal Insulation”, encompasses applications where the cellular glass is intended to be used on surfaces that operate between -450 F and 800 F. While useful in industrial and pipe applications, this temperature range is much broader than needed for typical building material applications and limits the flexibility in the manufacturing operation to modify the formulation or process to tailor the properties to the needs of the building materials market. Therefore, the new material specification of ASTM C1902, “Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications”, is being proposed that is better aligned to service the building materials market. This specification would be differentiated from the existing ASTM C552 specification in the following ways:
1. Narrow the scope of the service temperature range to that of typical building applications

a. From the industrial temperature of -450 F to 800 F to the building temperature range of -50 F to 200 F

2. Remove properties that are not pertinent to the building materials market

a. Hot-surface performance warpage – This test refers primarily to high-temperature insulations that are applicable to hot-side temperatures as high as 800°F to determine material warpage or cracking and is not relevant to buildings.

b. Stress corrosion – This test is for insulation in contact with austenitic stainless-steel piping to assess corrosion of a stressed component and is not relevant to buildings.

3. Add properties that are pertinent to the building materials market

a. Dimensional stability – This is a measurement of a material’s change in dimensions in response to various environmental exposure conditions, which can be important to building systems.

Cost Impact: The code change proposal will decrease the cost of construction
The current code language requires products to be over-engineered for the building application and does not address dimensional stability, a key characteristic for building insulation. This proposed change addresses dimensional stability, over-engineering, and enables the product density to be reduced to enable lower cost and improved thermal resistance of the cellular glass. The improved thermal resistance further enables reduced energy usage for the occupied building.

RB277-22

RB278-22

IRC: R907.2 (New), ASTM Chapter 44 (New)

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

SECTION R907
ROOFTOP-MOUNTED PHOTOVOLTAIC PANEL SYSTEMS

R907.1 Rooftop-mounted photovoltaic panel systems. Rooftop-mounted *photovoltaic panel systems* shall be designed and installed in accordance with Section R324 and NFPA 70.

Add new text as follows:

R907.2 Roof penetration flashing. Flashing shall be installed in accordance with the *roof covering* manufacturer's installation instructions to prevent moisture from entering through roof penetrations.

Exception: The application of flashing in accordance with ASTM E2766 shall be permitted.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E2766-13(2019)	Standard Practice for the Installation of Roof Mounted Photovoltaic Arrays on Steep-Slope Roofs

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E2766-13(2019) Standard Practice for the Installation of Roof Mounted Photovoltaic Arrays on Steep-Slope Roofs, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This code change proposal is intended to provide additional guidance to building officials and users of the code regarding proper flashing for rooftop-mounted photovoltaic panel systems. Section R324.4.3-Roof Penetrations directs users to Chapter 9, yet Chapter 9 provides little guidance other than Section R903.2 and any requirements that are provided in the individual roof covering sections. The new subsection requires flashing installation to be in accordance with the roof covering manufacturer's installation instructions and provides the performance direction "...to prevent moisture from entering..." through the roof penetration. The new requirement also allows flashing installation according to ASTM E2766, "Standard Practice for Installation of Roof Mounted Photovoltaic Arrays on Steep-slope Roofs."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change provides additional additional guidance.

RB278-22

RB279-22

IRC: SECTION R908 (New), R908.1 (New), R908.2 (New), TABLE R908.2 (New), R908.3 (New), R908.4 (New)

Proponents: Chadwick Collins, representing Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com)

2021 International Residential Code

Add new text as follows:

SECTION R908
ROOF COATINGS

R908.1 General. The installation of a *roof coating* on a *roof covering* shall comply with the requirements of Section R902 and this section.

R908.2 Material Standards. Roof coating materials shall comply with the standards in Table R908.2.

TABLE R908.2 ROOF COATING MATERIAL STANDARDS

MATERIAL	STANDARD
Acrylic coating	ASTM D6083
Asphaltic emulsion coating	ASTM D1227
Asphalt coating	ASTM D2823
Asphalt roof coating	ASTM D4479
Aluminum-pigmented asphalt coating	ASTM D2824
Silicone coating	ASTM D6694
Moisture-cured polyurethane coating	ASTM D6947

R908.3 Application. Roof coatings shall be installed in accordance with the manufacturer's installation instructions.

R908.4 Flashings. Roof coatings shall be applied to flashing in accordance with the roof coating manufacturer’s installation instructions.

Reason Statement: The aim of this proposal is to provide specific requirements regarding the use of roof coating materials. *Roof coating* is defined in Chapter 2 - Definitions and is used in R908.3.1.4 but the code has little guidance or requirements for roof coatings use and application.
The proposed new section provides that coatings be tested as a part of a fire-classified assemblies or covering in accordance with section R902-Fire Classification and comply with applicable material standards.

Further, this mimics a code change from 2019 (S35-19) that was approved as modified, with the modification being the full table that is included in this proposal which would bring agreement between both documents.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal reformats the code's existing requirements for roof coatings without any increase or decrease to construction costs, nor the stringency of the code.

RB279-22

RB280-22

IRC: SECTION R908 (New), R908.1 (New), R908.2 (New), TABLE R908.2 (New)

Proponents: Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Add new text as follows:

SECTION R908
ROOF COATINGS

R908.1 General. The installation of a *roof coating* on a *roof covering* shall comply with the requirements of Section R902, R904 and this section. *Roof coatings* shall be installed in accordance with the manufacturer's installation instructions.

R908.2 Material standards. *Roof coating* materials shall comply with one of the standards in Table R908.2.

TABLE R908.2 ROOF COATING MATERIAL STANDARDS

COATING MATERIAL	STANDARD
Acrylic coating	ASTM D6083
Asphaltic emulsion coating	ASTM D1227
Asphalt coating	ASTM D2823
Asphalt roof coating	ASTM D4479
Aluminum-pigmented asphalt coating	ASTM D2824
Silicone coating	ASTM D6694
Moisture-cured polyurethane coating	ASTM D6947

Reason Statement: This code change proposal provides guidance to building officials and users of the code regarding the use of roof coatings. While the IRC already provides a definition for the term "roof coating" and a number of material standards for roof coating products are already referenced in the various roof covering sections of the code, the code currently provides little guidance regarding roof coating use.
This code change proposal adds a new section, Section R908-Roof Coatings, specific to roof coating used on roof coverings. The new section requires roof coating use to comply with the code's fire classification requirements, material requirements and the specific material standard for the roof coating product being used. Also, the installation is required to comply with the manufacturer's installation instructions.

The material standards for the roof coating products included in the table are already included elsewhere in Chapter 9.

This new code section is similar to Section 1509-Roof Coatings that first appears in IBC 2021.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal clarifies the code's requirements regarding the use of roof coatings.

RB280-22

RB281-22

IRC: R908.3

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety

2021 International Residential Code

Revise as follows:

R908.3 Roof replacement. *Roof replacement* shall include the removal of existing layers of roof coverings down to the *roof deck*.

~~**Exception**~~ **Exceptions**:

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck* and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905 where permitted by the roof covering manufacturer and self-adhered underlayment manufacturer.
2. Where the existing roof includes a self-adhered underlayment and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing , the existing self-adhered underlayment shall be permitted to remain in place and covered with an underlayment complying with Table R905.1.1(1), Table R905.1.1(2),and Table R905.1.1(3).
3. Where the existing roof includes one layer of self-adhered underlayment and the existing layer cannot be removed without damaging the roof deck, a second layer of self-adhered underlayment is permitted to be installed over the existing self-adhered underlayment provided the following conditions are met:
   3.1. It is permitted by the roof covering manufacturer and self-adhered underlayment manufacturer.
   3.2. The existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing.
   3.3. The second layer of self-adhered underlayment is installed such that buildup of material at walls, valleys, roof edges, end laps, and side laps does not exceed two layers.

Reason Statement: The use of a self-adhered polymer modified bitumen membrane complying with ASTM D1970 is one of several underlayment options permitted for roof coverings in the IRC. ASTM D1970 self-adhered membranes were first recognized in the 2000 IBC and IRC as an underlayment and as an option for an ice barrier. After 20 years of code implementation, it remains approved by shingle manufacturers, underlayment manufacturers and building codes, and has been consistently observed to perform very well as a method for preventing water intrusion in the event the roof covering is lost or damage.
While the code requires materials and methods for roof replacement to comply with Chapter 9, it doesn't provide any specific requirements for what to do where a roof is being replaced and there is an existing self-adhered underlayment other than ice barrier membranes. Section R908.3 requires roof replacement to include the removal of all roof covering layers down to the roof deck. An exception permits one additional layer of an ice barrier membrane where the existing roof has an ice barrier membrane.

As currently written, the code would imply that a self-adhered membrane would have to be removed during a roof replacement. However, depending on the decking material, many self-adhered membranes can be difficult to remove. Some may not be able to be removed without damaging or removing the roof deck. Damaging the deck and/or removing the roof decking can be expensive and unnecessary.

This proposal is a collaboration between the Insurance Institute for Business and Home Safety (IBHS), the Asphalt Roofing Manufacturers Association (ARMA), and the National Roofing Contractors Association (NRCA). It provides specific requirements on acceptable methods for dealing with existing self-adhered membranes during a roof replacement. The underlayment methods in the 2021 IRC include specific methods for preventing water intrusion in the event the roof covering is damaged or lost in high wind regions. The changes proposed herein seek to maintain that level of protection during roof replacement.

ARMA provides guidance on the removal of self-adhered membrane in their Technical Bulletin, Self-Adhering Underlayment Removal Prior to Steep Slope Re-Roofing: *"Removal of self-adhering underlayment is always recommended in situations in which it can be removed without damaging the deck….If one layer of self-adhering underlayment is in place, and it is not possible to remove it without damaging the deck, installation of a second layer of underlayment over the existing membrane may be permissible: Check with the underlayment manufacturer's installation instructions and local building codes for details. Offset end and side laps in the new and existing underlayment to minimize thickness build-up and "feather in" the new underlayment by extending the new material a minimum of 8" up the slope onto the bare deck. This will reduce the likelihood of problems with drainage and aesthetics. If two or more layers of self-adhering underlayment are in place, all layers should be removed."*

In lieu of an additional layer of self-adhered underlayment, this proposal also permits felt underlayment to be installed in accordance with Tables R905.1.1(1), R905.1.1(2), and R905.1.1(3).

This proposal also provides industry recommended clarifications regarding the installation of an additional layer of an ice barrier membrane.

Cost Impact: The code change proposal will decrease the cost of construction
For existing roofs with one layer of self-adhered membrane underlayment, this proposal would reduce the cost of construction by permitting the existing layer to remain in place.

RB281-22

RB282-22

IRC: R908.3

Proponents: Gregory Keeler, representing Owens Corning (greg.keeler@owenscorning.com)

2021 International Residential Code

Revise as follows:

R908.3 Roof replacement. *Roof replacement* shall include the removal of existing layers of roof coverings down to the *roof deck*.

~~Exception~~ Exceptions:

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall
be permitted to remain in place and covered with an additional layer of ice barrier ~~membrane in accordance with~~ self-adhering modified bitumen membrane complying with ASTM D1970 in accordance with the new ice barrier membrane manufacturer's installation instructions and Section R905.
2. Where the existing *roof assembly* includes a self-adhered underlayment that cannot be removed from the roof deck, the existing membrane shall be permitted to remain in place and covered with an additional layer of underlayment in accordance with Section R905.1.1.

Reason Statement: It is increasingly common to encounter an existing self-adhered membrane on a roof deck on which the roofing is being replaced. In many
cases, especially in high wind regions, the self-adhering underlayment is covering the entire deck. This modification adds additional language to deal with both ice dam and whole-roof self-adhered underlayment situations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Roofing contractors have been searching for guidance on how to handle these situations for years. This proposal simply codifies requirements that are consistent with how these situations have been handled historically.

RB282-22

RB283-22

IRC: R1001.11

Proponents: James Buckley, representing MACS, CFLI (buckley@rumford.com)

2021 International Residential Code

Revise as follows:

R1001.11 Fireplace clearance. Wood beams, joists, studs and other *combustible material* shall have a clearance of not less than 2 inches (51 mm) from the front faces and sides of masonry fireplaces and not less than 4 inches (102 mm) from the back faces of masonry fireplaces. The airspace shall not be filled, except for noncombustible insulation or to provide fireblocking in accordance with Section R1001.12.

Exceptions:

1. Masonry fireplaces *listed* and *labeled* for use in contact with combustibles in accordance with UL 127 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces.
2. Where masonry fireplaces are part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete walls less than 12 inches (306 mm) from the inside surface of the nearest firebox lining.
3. Exposed combustible *trim* and the edges of sheathing materials such as wood siding, flooring and gypsum board shall be permitted to abut the masonry fireplace sidewalls and hearth extension in accordance with Figure R1001.11, provided such combustible *trim* or sheathing is not less than 12 inches (305 mm) from the inside surface of the nearest firebox lining.
4. Exposed combustible mantels or *trim* is permitted to be placed directly on the masonry fireplace front surrounding the fireplace opening providing such *combustible materials* are not placed within 6 inches (152 mm) of a fireplace opening. *Combustible material* within 12 inches (306 mm) of the fireplace opening shall not project more than $^{1}/_{8}$ inch (3 mm) for each 1-inch (25 mm) distance from such an opening.

Reason Statement: Studies have shown that the heat transferred through an insulated space is less than through an airspace because the heat transfer in air is by convection - not conduction. see engineering report at https://www.rumford.com/articleairspace.html

Bibliography: See engineering report at https://www.rumford.com/articleairspace.html

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change provides an opting to include noncombustible insulation but it is not required.

RB283-22

RB284-22

IRC: R1001.11

Proponents: James Buckley, representing MACS, CFLI (buckley@rumford.com)

2021 International Residential Code

Revise as follows:

R1001.11 Fireplace clearance. Wood beams, joists, studs and other *combustible material* shall have a clearance of not less than 2 inches (51 mm) from the front faces and sides of masonry fireplaces and not less than 4 inches (102 mm) from the back faces of masonry fireplaces. The airspace shall not be filled, except to provide fireblocking in accordance with Section R1001.12.

Exceptions:

1. Masonry fireplaces *listed* and *labeled* for use in contact with combustibles in accordance with UL 127 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces.
2. Where masonry fireplaces are part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete walls less than 12 inches (306 mm) from the inside surface of the nearest firebox lining.
3. Exposed combustible *trim* and the edges of sheathing materials such as wood siding, flooring and gypsum board shall be permitted to abut the masonry fireplace sidewalls and hearth extension in accordance with Figure R1001.11, provided such combustible *trim* or sheathing is not less than ~~12 inches (305 mm)~~ <u>8 inches (203 mm)</u> from the inside surface of the nearest firebox lining. <u>Where the fireplace opening is 6 square feet (0.6 m2) or larger such combustible or sheathing shall be permitted to abut the masonry fireplace sidewalls and hearth extension provided such combustible or sheathing is not less than 12 inches (305 mm) from the inside surface of the nearest firebox lining.</u>
4. Exposed combustible mantels or *trim* is permitted to be placed directly on the masonry fireplace front surrounding the fireplace opening providing such *combustible materials* are not placed within 6 inches (152 mm) of a fireplace opening. *Combustible material* within 12 inches (306 mm) of the fireplace opening shall not project more than $^1/_8$ inch (3 mm) for each 1-inch (25 mm) distance from such an opening.

Reason Statement: To make this section of code consistent with Section R1001.10. If a fireplace with an opening 6 square feet or smaller is built with the hearth extension only 8" beyond each side of the fireplace opening, as is permitted by R1001.10, then the flooring and trim cannot abut the hearth extension if it must be 12 inches from the inside surface of the firebox lining.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is just a change in required dimensions which will cost nothing.

RB284-22

RB285-22

IRC: R1003.9, R1005.4

Proponents: Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Residential Code

Revise as follows:

R1003.9 Termination. Chimneys shall extend not less than 2 feet (610 mm) higher than any portion of a building, or roof mounted *Photovoltaic System,* within 10 feet (3048 mm), but shall be not less than 3 feet (914 mm) above the highest point where the chimney passes through the roof.

R1005.4 Factory-built fireplaces. *Chimneys* for use with factory-built fireplaces shall comply with the requirements of UL 127. Chimneys shall extend not less than 2 feet (610 mm) higher than any portion of a roof mounted *Photovoltaic System*, within 10 feet (3048 mm).

Reason Statement: The IRC is silent in regards to the impacts of chimneys when they are located in close proximity to roof mounted photovoltaic systems.
The IRC and prefabricated chimney manufacturers require that chimneys be higher than the building and the peak of a sloped roof to allow for efficient venting of the products of combustion out of a fire place served by the chimney.

Solar installations can cover a large portion of the roof and are protected like a roof covering when they are building integrated photovoltaic systems BIPV so it stands to reason that roof mounted systems whether on rack or otherwise should be treated like a portion of the building. Unlike discrete roof mounted mechanical equipment, roof mounted Photovoltaic Systems can cover large areas and can impact the aerodynamics of airflow on the roof.

The IRC requires spark arrestors to prevent burning embers from falling on the roof and requires clearance between the chimney and combustibles however a new product like roof mounted solar systems are not addressed. Chimney termination rules have not changed for decades.

https://www.cdpaccess.com/proposal/8525/24964/files/download/2923/

Cost Impact: The code change proposal will increase the cost of construction
The proposed code change may increase the cost of construction if the property owner chooses to extend the height of a chimney to comply with the proposed requirement especially when the chimney is existing. The proposed code change addresses the life safety hazards of an improperly drafting chimney as well as the fire hazards due to burning embers and the heat of the chimney.

RB285-22

RB286-22

IRC: R1003.18

Proponents: James Buckley, representing MACS, CFLI (buckley@rumford.com)

2021 International Residential Code

Revise as follows:

R1003.18 Chimney clearances. Any portion of a *masonry chimney* located in the interior of the building or within the exterior wall of the building shall have a minimum airspace clearance to combustibles of 2 inches (51 mm). Chimneys located entirely outside the exterior walls of the building, including chimneys that pass through the soffit or cornice, shall have a minimum airspace clearance of 1 inch (25 mm). The airspace shall not be filled, except for noncombustible insulation or to provide fire blocking in accordance with Section R1003.19.

Exceptions:

1. Masonry chimneys equipped with a chimney lining system *listed* and *labeled* for use in chimneys in contact with combustibles in accordance with UL 1777 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces.
2. Where masonry chimneys are constructed as part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete wall less than 12 inches (305 mm) from the inside surface of the nearest flue lining.
3. Exposed combustible *trim* and the edges of sheathing materials, such as wood siding and flooring, shall be permitted to abut the *masonry chimney* side walls, in accordance with Figure R1003.18, provided such combustible trim or sheathing is not less than 8 inches (203 mm) from the inside surface of the nearest flue lining.

Reason Statement: Studies have shown that the heat transferred through an insulated space is less than through an airspace because the heat transfer in air is by convection - not conduction. See engineering report at https://www.rumford.com/articleairspace.html

Bibliography: See engineering report at https://www.rumford.com/articleairspace.html

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposals clarifies that noncombustible insulation does not require insulation in air space.

RB286-22

RB287-22

IRC: R1003.18

Proponents: James Buckley, representing MACS, CFLI (buckley@rumford.com)

2021 International Residential Code

Revise as follows:

R1003.18 Chimney clearances. Any portion of a *masonry chimney* located in the interior of the building or within the exterior wall of the building shall have a minimum airspace clearance to combustibles of 2 inches (51 mm). Chimneys located entirely outside the exterior walls of the building, including chimneys that pass through the soffit or cornice, shall have a minimum airspace clearance of 1 inch (25 mm). The airspace shall not be filled, except to provide fire blocking in accordance with Section R1003.19.

Exceptions:

1. Masonry chimneys equipped with a chimney lining system *listed* and *labeled* for use in chimneys in contact with combustibles in accordance with UL 1777 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces.
2. Where masonry chimneys are constructed as part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete wall less than 12 inches (305 mm) from the inside surface of the nearest flue lining.
3. ~~Exposed combustible *trim* and the edges of sheathing materials, such as wood siding and flooring,~~ Combustible materials shall be permitted to abut the *masonry chimney* side walls, in accordance with Figure R1003.18, provided such combustible ~~trim or sheathing~~ material is not less than 8 inches (203 mm) from the inside surface of the nearest flue lining.

Reason Statement: The engineering study - https://www.rumford.com/code/EightInchThickTestReport.pdf - supporting the change from 12" to 8" in 2013 (RB458 - 13) compared an 8" thick chimney in contact with a combustible frame wall to a code-compliant 4" masonry wall plus 2" of air space to the framing and found the 8" thick masonry wall in contact with combustible framing was safer. There is no reason to limit the requirement for 8" thick chimney walls to "Exposed combustible trim and the edges of sheathing materials, such as wood siding and flooring".

Bibliography: Engineering study - https://www.rumford.com/code/EightInchThickTestReport.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is just a clarification consistent with testing.

RB287-22

RB288-22

IRC: R1003.18

Proponents: James Buckley, representing MACS, CFLI (buckley@rumford.com)

2021 International Residential Code

Revise as follows:

R1003.18 Chimney clearances. Any portion of a *masonry chimney* located in the interior of the building or within the exterior wall of the building shall have a minimum airspace clearance to combustibles of 2 inches (51 mm). Chimneys located entirely outside the exterior walls of the building, including chimneys that pass through the soffit or cornice, shall have a minimum airspace clearance of 1 inch (25 mm). The airspace shall not be filled, except to provide fire blocking in accordance with Section R1003.19.

Exceptions:

1. Masonry chimneys equipped with a chimney lining system *listed* and *labeled* for use in chimneys in contact with combustibles in accordance with UL 1777 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces.
2. Where masonry chimneys are constructed as part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete wall less than ~~12 inches (305 mm)~~ 8 inches (203 mm) from the inside surface of the nearest flue lining.
3. Exposed combustible *trim* and the edges of sheathing materials, such as wood siding and flooring, shall be permitted to abut the *masonry chimney* side walls, in accordance with Figure R1003.18, provided such combustible trim or sheathing is not less than 8 inches (203 mm) from the inside surface of the nearest flue lining.

Reason Statement: The engineering study - https://www.rumford.com/code/EightInchThickTestReport.pdf - supporting the change from 12" to 8" in Exception 3 in 2013 (RB458 - 13) compared an 8" thick chimney in contact with a combustible frame wall to a code-compliant 4" masonry wall plus 2" of air space to the framing and found the 8" thick masonry wall in contact with combustible framing was safer. This is just a special case. Keeping combustibles at least 8"of solid masonry away from the inside surface of the nearest flue lining to make Exception 2 consistent with Exception 3.

Bibliography: The engineering study - https://www.rumford.com/code/EightInchThickTestReport.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a change in dimension only that will cost nothing.

RB288-22

RB289-22

IRC: R1004.4

Proponents: Jonathan Roberts, representing UL (jonathan.roberts@ul.com)

2021 International Residential Code

Revise as follows:

R1004.4 Unvented gas log heaters. An unvented gas log heater or a fireplace insert shall not be installed in a factory-built fireplace unless the fireplace system has been specifically tested, *listed* and *labeled* for such use in accordance with UL 127.

Reason Statement: An unvented gas log heater is not permitted in a factory-built fireplace, unless the fire place system has been specifically tested, listed and labeled for such use in accordance with UL 127. This is because the addition of an unvented gas log heater within a firebox can alter the temperatures on the outside of the factory-built fireplace, which are typically installed with zero clearances to combustible materials. The same fire safety concern applies to the addition of a fireplace insert within a factory-built fireplace.

Cost Impact: The code change proposal will increase the cost of construction
It is possible that listed fireplace inserts might be slightly more expensive than unlisted units, but we are not aware of specific cost differences between the two.

RB289-22

RB290-22

IRC: AF103.6.1

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, American Association of Radon Scientists and Technologists, representing American Association of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crcpd.org)

2021 International Residential Code

Revise as follows:

AF103.6.1 Subslab Vent pipe. A minimum 3-inch-diameter (76 mm) ~~ABS, PVC or equivalent~~ gastight pipe shall be embedded vertically into the subslab aggregate or other permeable material before the slab is cast. A "T" fitting or equivalent method shall be used to ensure that the pipe opening remains within the subslab permeable material. <u>Not less than 4 feet (102 cm) of perforated pipe or geotextile matting shall be connected to each of the horizontal openings of the tee fitting.</u> Alternatively, the 3-inch (76 mm) pipe shall be inserted directly into an interior perimeter drain tile loop or through a sealed sump cover where the sump is exposed to the subslab aggregate or connected to it through a drainage system. The pipe shall be extended up through the building floors, and terminate not less than 12 inches (305 mm) above the surface of the roof in a location not less than 10 feet (3048 mm) away from any window or other opening into the *conditioned spaces* of the building that is less than 2 feet (610 mm) below the exhaust point, and 10 feet (3048 mm) from any window or other opening in adjoining or adjacent buildings. <u>All above ground material used shall comply with Section P3002.1.</u>

Reason Statement: This proposal prevents a common field problem where the plumbing "tee" fitting fills with concrete when the slab is cast and clarifies that the pipe and fitting material requirements shall be consistent with the IRC.

Cost Impact: The code change proposal will increase the cost of construction
Additional 10-foot pipe, costing approximately $10-15, is required.

RB290-22

RB291-22

IRC: AF103.8

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crcpd.org)

2021 International Residential Code

Revise as follows:

AF103.8 Vent pipe accessibility. Radon vent pipes shall be accessible for future fan installation through an attic ~~or other area outside the *habitable space*~~. The pipe shall be centered in an unobstructed cylindrical space having a height of not less than 36 inches (91 cm) and a diameter of not less than 18 inches (46 cm) in the location where the fan would be installed.

Exception: The radon vent pipe need not be ~~accessible~~ accessed from in an attic space where an *approved* ~~roof-top~~ electrical supply is provided for future use on the roof top or other area outside the habitable space.

Reason Statement: This change simply reserves adequate space in the attic for future installation of a radon fan. If there is not enough room to add a fan if needed then the entire piping system must be abandoned and redone. This is a common field failure where the pipe is run too close to the eave and is inaccessible.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal defines a volume of space in an attic location where a radon fan can be installed, if necessary. No new material costs are added, however, the defined volume space requirement assists with proper pipe layout design to facilitate any future fan installation.

RB291-22

RB292-22

IRC: AF103.5.3

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crcpd.org)

2021 International Residential Code

Revise as follows:

AF103.5.3 Submembrane Vent pipe. A plumbing tee or other *approved* connection shall be inserted horizontally beneath the sheeting and connected to a 3- or 4-inch-diameter (76 or 102 mm) fitting with a vertical vent pipe installed through the sheeting. Not less than 10 feet (254 cm) of perforated pipe or geotextile matting shall be connected to each of the horizontal openings of the tee fitting or the two hoizontal openings shall be connected to the interior drain tile system. The vent pipe shall be extended up through the building floors, and terminate not less than 12 inches (305 mm) above the roof in a location not less than 10 feet (3048 mm) away from any window or other opening into the *conditioned spaces* of the building that is less than 2 feet (610 mm) below the exhaust point, and 10 feet (3048 mm) from any window or other opening in adjoining or adjacent buildings. Above ground pipe material shall comply with Section P3002.1.

Reason Statement: It is a common field problem where the horizontal openings of the "tee" fitting will be closed off by suction on the membrane. This makes the suction point non-functional. The proposal further clarifies the piping material consistent with the IRC plumbing section.

Cost Impact: The code change proposal will increase the cost of construction
(2)10 foot stick of perforated pipe are additionally required for the system. This will cost $20-$25.

RB292-22

RB293-22

IRC: AF103.3

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crcpd.org)

2021 International Residential Code

Revise as follows:

AF103.3 Soil-gas-retarder. ~~A minimum 6-mil (0.15 mm) [or 3-mil (0.075 mm) cross-laminated] polyethylene~~ ASTM E1745 Class A or equivalent flexible sheeting material shall be placed on top of the gas-permeable layer prior to casting the slab or placing the floor assembly to serve as a soil-gas-retarder by bridging any cracks that develop in the slab or floor assembly, and to prevent concrete from entering the void spaces in the aggregate base material. The sheeting shall cover the entire floor area with separate sections of sheeting lapped not less than 12 inches (305 mm). The sheeting shall fit closely around any pipe, wire or other penetrations of the material. Punctures or tears in the material shall be sealed or covered with additional sheeting.

Reason Statement: This change makes the Appendix consistent with the material requirements in the body of the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
An ASTM 1745 Class A vapor retarder is already required in R506.2.3.

RB293-22

RB294-22

IRC: AF101.1, FIGURE AF101.1, TABLE AF101.1

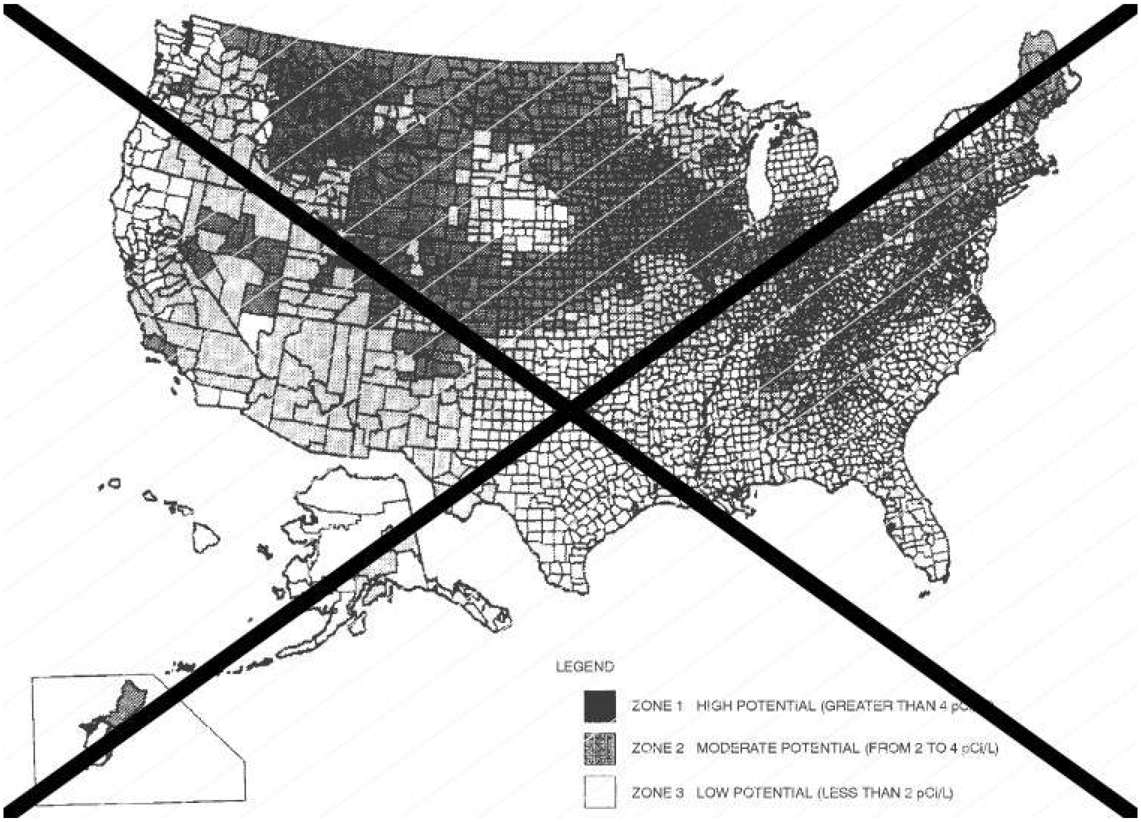
Proponents: Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors

2021 International Residential Code

Revise as follows:

AF101.1 General. This appendix contains requirements for new construction ~~in *jurisdictions*~~ where radon-resistant construction is required. ~~Inclusion of this appendix by *jurisdictions* shall be determined through the use of locally available data or determination of Zone 1 designation in Figure AF101.1 and Table AF101.1.~~

Delete without substitution:



1. ~~a.pCi/L stands for picocuries per liter of radon gas. The US Environmental Protection Agency (EPA) recommends that homes that measure 4 pCi/L and greater be mitigated.~~

   ~~The EPA and the US Geological Survey have evaluated the radon potential in the United States and have developed a map of radon zones designed to assist building officials in deciding whether radon-resistant features are applicable in new construction.~~

   ~~The map assigns each of the 3,141 counties in the United States to one of three zones based on radon potential. Each zone designation reflects the average short-term radon measurement that can be expected to be measured in a building without the implementation of radon-control methods. The radon zone designation of highest priority is Zone 1. Table AF101.1 lists the Zone 1 counties illustrated on the map. More detailed information can be obtained from state-specific booklets (EPA-401-R-93-021 through 070) available through the State Radon Offices or from the EPA Regional Offices.~~

~~FIGURE AF101.1 EPA MAP OF RADON ZONES~~

~~**TABLE AF101.1 HIGH RADON-POTENTIAL (ZONE 1) COUNTIES[a]**~~

~~**ALABAMA**~~

~~Calhoun~~

~~Clay~~

~~Cleburne~~

~~Colbert~~

~~Coosa~~

~~Franklin~~

~~Jackson~~

~~Lauderdale~~

~~Lawrence~~

~~Limestone~~

~~Madison~~

~~Morgan~~

~~Talladega~~

~~**CALIFORNIA**~~

~~Santa Barbara~~

~~Ventura~~

~~**COLORADO**~~

~~Adams~~

~~Arapahoe~~

~~Baca~~

~~Bent~~

~~Boulder~~

~~Chaffee~~

~~Cheyenne~~

~~Clear Creek~~

~~Crowley~~

~~Custer~~

~~Delta~~

~~Denver~~

~~Dolores~~

~~Douglas~~

~~El Paso~~

~~Elbert~~

~~Fremont~~

~~Garfield~~

~~Gilpin~~

~~Grand~~

~~Gunnison~~

~~Huerfano~~

~~Jackson~~

~~Jefferson~~

~~Kiowa~~

~~Kit Carson~~

~~Lake~~

~~Larimer~~

~~Las Animas~~

~~Lincoln~~

~~Logan~~

~~Mesa~~

~~Moffat~~

~~Montezuma~~

~~Montrose~~

~~Morgan~~

~~Otero~~

~~Ouray~~

~~Park~~

~~Phillips~~

~~Pitkin~~

~~Prowers~~

~~Pueblo~~

~~Rio Blanco~~

~~San Miguel~~

~~Summit~~

~~Teller~~

~~Washington~~

~~Weld~~

~~Yuma~~

~~CONNECTICUT~~

~~Fairfield~~

~~Middlesex~~

~~New Haven~~

~~New London~~

~~GEORGIA~~

~~Cobb~~

~~De Kalb~~

~~Fulton~~

~~Gwinnett~~

~~IDAHO~~

~~Benewah~~

~~Blaine~~

~~Boise~~

~~Bonner~~

~~Boundary~~

~~Butte~~

~~Camas~~

~~Clark~~

~~Clearwater~~

~~Custer~~

~~Elmore~~

~~Fremont~~

~~Gooding~~

~~Idaho~~

~~Kootenai~~

~~Latah~~

~~Lemhi~~

~~Shoshone~~

~~Valley~~

~~**ILLINOIS**~~

~~Adams~~

~~Boone~~

~~Brown~~

~~Bureau~~

~~Calhoun~~

~~Carroll~~

~~Cass~~

~~Champaign~~

~~Coles~~

~~De Kalb~~

~~De Witt~~

~~Douglas~~

~~Edgar~~

~~Ford~~

~~Fulton~~

~~Greene~~

~~Grundy~~

~~Hancock~~

~~Henderson~~

~~Henry~~

~~Iroquois~~

~~Jersey~~

~~Jo Daviess~~

~~Kane~~

~~Kendall~~

~~Knox~~

~~La Salle~~

~~Lee~~

~~Livingston~~

~~Logan~~

~~Macon~~

~~Marshall~~

~~Mason~~

~~McDonough~~

~~McLean~~

~~Menard~~

~~Mercer~~

~~Morgan~~

~~Moultrie~~

~~Ogle~~

~~Peoria~~

~~Piatt~~

~~Pike~~

~~Putnam~~

~~Rock Island~~

~~Sangamon~~

~~Schuyler~~

~~Scott~~

~~Stark~~

~~Stephenson~~

~~Tazewell~~

~~Vermilion~~

~~Warren~~

~~Whiteside~~

~~Winnebago~~

~~Woodford~~

~~**INDIANA**~~

~~Adams~~

~~Allen~~

~~Bartholomew~~

~~Benton~~

~~Blackford~~

~~Boone~~

~~Carroll~~

~~Cass~~

~~Clark~~

~~Clinton~~

~~De Kalb~~

~~Decatur~~

~~Delaware~~

~~Elkhart~~

~~Fayette~~

~~Fountain~~

~~Fulton~~

~~Grant~~

~~Hamilton~~

~~Hancock~~

~~Harrison~~

~~Hendricks~~

~~Henry~~

~~Howard~~

~~Huntington~~

~~Jay~~

~~Jennings~~

~~Johnson~~

~~Kosciusko~~

~~LaGrange~~

~~Lawrence~~

~~Madison~~

~~Marion~~

~~Marshall~~

~~Miami~~

~~Monroe~~

~~Montgomery~~

~~Noble~~

~~Orange~~

~~Putnam~~

~~Randolph~~

~~Rush~~

~~Scott~~

~~Shelby~~

~~St. Joseph~~

~~Steuben~~

~~Tippecanoe~~

~~Tipton~~

~~Union~~

~~Vermillion~~

~~Wabash~~

~~Warren~~

~~Washington~~

~~Wayne~~

~~Wells~~

~~White~~

~~Whitley~~

~~IOWA~~

~~All Counties~~

~~KANSAS~~

~~Atchison~~

~~Barton~~

~~Brown~~

~~Cheyenne~~

~~Clay~~

~~Cloud~~

~~Decatur~~

~~Dickinson~~

~~Douglas~~

~~Ellis~~

~~Ellsworth~~

~~Finney~~

~~Ford~~

~~Geary~~

~~Gove~~

~~Graham~~

~~Grant~~

~~Gray~~

~~Greeley~~

~~Hamilton~~

~~Haskell~~

~~Hodgeman~~

~~Jackson~~

~~Jewell~~

~~Johnson~~

~~Kearny~~

~~Kingman~~

~~Kiowa~~

~~Lane~~

~~Leavenworth~~

~~Lincoln~~

~~Logan~~

~~Marion~~

~~Marshall~~

~~McPherson~~

~~Meade~~

~~Mitchell~~

~~Nemaha~~

~~Ness~~

~~Norton~~

~~Osborne~~

~~Ottawa~~

~~Pawnee~~

~~Phillips~~

~~Pottawatomie~~

~~Pratt~~

~~Rawlins~~

~~Republic~~

~~Rice~~

~~Riley~~

~~Rooks~~

~~Rush~~

~~Saline~~

~~Scott~~

~~Sheridan~~

~~Sherman~~

~~Smith~~

~~Stanton~~

~~Thomas~~

~~Trego~~

~~Wallace~~

~~Washington~~

~~Wichita~~

~~Wyandotte~~

~~**KENTUCKY**~~

~~Adair~~

~~Allen~~

~~Barren~~

~~Bourbon~~

~~Boyle~~

~~Bullitt~~

~~Casey~~

~~Clark~~

~~Cumberland~~

~~Fayette~~

~~Franklin~~

~~Green~~

~~Harrison~~

~~Hart~~

~~Jefferson~~

~~Jessamine~~

~~Lincoln~~

~~Marion~~

~~Mercer~~

~~Metcalfe~~

~~Monroe~~

~~Nelson~~

~~Pendleton~~

~~Pulaski~~

~~Robertson~~

~~Russell~~

~~Scott~~

~~Taylor~~

~~Warren~~

~~Woodford~~

~~MAINE~~

~~Androscoggin~~

~~Aroostook~~

~~Cumberland~~

~~Franklin~~

~~Hancock~~

~~Kennebec~~

~~Lincoln~~

~~Oxford~~

~~Penobscot~~

~~Piscataquis~~

~~Somerset~~

~~York~~

~~MARYLAND~~

~~Baltimore~~

~~Calvert~~

~~Carroll~~

~~Frederick~~

~~Harford~~

~~Howard~~

~~Montgomery~~

~~Washington~~

~~MASS.~~

~~Essex~~

~~Middlesex~~

~~Worcester~~

~~MICHIGAN~~

~~Branch~~

~~Calhoun~~

~~Cass~~

~~Hillsdale~~

~~Jackson~~

~~Kalamazoo~~

~~Lenawee~~

~~St. Joseph~~

~~Washtenaw~~

~~**MINNESOTA**~~

~~Becker~~

~~Big Stone~~

~~Blue Earth~~

~~Brown~~

~~Carver~~

~~Chippewa~~

~~Clay~~

~~Cottonwood~~

~~Dakota~~

~~Dodge~~

~~Douglas~~

~~Faribault~~

~~Fillmore~~

~~Freeborn~~

~~Goodhue~~

~~Grant~~

~~Hennepin~~

~~Houston~~

~~Hubbard~~

~~Jackson~~

~~Kanabec~~

~~Kandiyohi~~

~~Kittson~~

~~Lac Qui Parle~~

~~Le Sueur~~

~~Lincoln~~

~~Lyon~~

~~Mahnomen~~

~~Marshall~~

~~Martin~~

~~McLeod~~

~~Meeker~~

~~Mower~~

~~Murray~~

~~Nicollet~~

~~Nobles~~

~~Norman~~

~~Olmsted~~

~~Otter Tail~~

~~Pennington~~

~~Pipestone~~

~~Polk~~

~~Pope~~
~~Ramsey~~
~~Red Lake~~
~~Redwood~~
~~Renville~~
~~Rice~~
~~Rock~~
~~Roseau~~
~~Scott~~
~~Sherburne~~
~~Sibley~~
~~Stearns~~
~~Steele~~
~~Stevens~~
~~Swift~~
~~Todd~~
~~Traverse~~
~~Wabasha~~
~~Wadena~~
~~Waseca~~
~~Washington~~
~~Watonwan~~
~~Wilkin~~
~~Winona~~
~~Wright~~
~~Yellow Medicine~~
~~MISSOURI~~
~~Andrew~~
~~Atchison~~
~~Buchanan~~
~~Cass~~
~~Clay~~
~~Clinton~~
~~Holt~~
~~Iron~~
~~Jackson~~
~~Nodaway~~
~~Platte~~
~~MONTANA~~
~~Beaverhead~~
~~Big Horn~~
~~Blaine~~
~~Broadwater~~
~~Carbon~~
~~Carter~~
~~Cascade~~
~~Chouteau~~
~~Custer~~
~~Daniels~~

~~Dawson~~

~~Deer Lodge~~

~~Fallon~~

~~Fergus~~

~~Flathead~~

~~Gallatin~~

~~Garfield~~

~~Glacier~~

~~Granite~~

~~Hill~~

~~Jefferson~~

~~Judith Basin~~

~~Lake~~

~~Lewis and Clark~~

~~Madison~~

~~McCone~~

~~Meagher~~

~~Missoula~~

~~Park~~

~~Phillips~~

~~Pondera~~

~~Powder River~~

~~Powell~~

~~Prairie~~

~~Ravalli~~

~~Richland~~

~~Roosevelt~~

~~Rosebud~~

~~Sanders~~

~~Sheridan~~

~~Silver Bow~~

~~Stillwater~~

~~Teton~~

~~Toole~~

~~Valley~~

~~Wibaux~~

~~Yellowstone~~

~~NEBRASKA~~

~~Adams~~

~~Boone~~

~~Boyd~~

~~Burt~~

~~Butler~~

~~Cass~~

~~Cedar~~

~~Clay~~

~~Colfax~~

~~Cuming~~

~~Dakota~~

~~Dixon~~

~~Dodge~~

~~Douglas~~

~~Fillmore~~

~~Franklin~~

~~Frontier~~

~~Furnas~~

~~Gage~~

~~Gosper~~

~~Greeley~~

~~Hamilton~~

~~Harlan~~

~~Hayes~~

~~Hitchcock~~

~~Hurston~~

~~Jefferson~~

~~Johnson~~

~~Kearney~~

~~Knox~~

~~Lancaster~~

~~Madison~~

~~Nance~~

~~Nemaha~~

~~Nuckolls~~

~~Otoe~~

~~Pawnee~~

~~Phelps~~

~~Pierce~~

~~Platte~~

~~Polk~~

~~Red Willow~~

~~Richardson~~

~~Saline~~

~~Sarpy~~

~~Saunders~~

~~Seward~~

~~Stanton~~

~~Thayer~~

~~Washington~~

~~Wayne~~

~~Webster~~

~~York~~

~~NEVADA~~

~~Carson City~~

~~Douglas~~

~~Eureka~~

~~Lander~~

~~Lincoln~~

~~Lyon~~

~~Mineral~~

~~Pershing~~

~~White Pine~~

~~NEW HAMPSHIRE~~

~~Carroll~~

~~NEW JERSEY~~

~~Hunterdon~~

~~Mercer~~

~~Monmouth~~

~~Morris~~

~~Somerset~~

~~Sussex~~

~~Warren~~

~~NEW MEXICO~~

~~Bernalillo~~

~~Colfax~~

~~Mora~~

~~Rio Arriba~~

~~San Miguel~~

~~Santa Fe~~

~~Taos~~

~~NEW YORK~~

~~Albany~~

~~Allegany~~

~~Broome~~

~~Cattaraugus~~

~~Cayuga~~

~~Chautauqua~~

~~Chemung~~

~~Chenango~~

~~Columbia~~

~~Cortland~~

~~Delaware~~

~~Dutchess~~

~~Erie~~

~~Genesee~~

~~Greene~~

~~Livingston~~

~~Madison~~

~~Onondaga~~

~~Ontario~~

~~Orange~~

~~Otsego~~

~~Putnam~~

~~Rensselaer~~

~~Schoharie~~

~~Schuyler~~

~~Seneca~~

~~Steuben~~

~~Sullivan~~

~~Tioga~~

~~Tompkins~~

~~Ulster~~

~~Washington~~

~~Wyoming~~

~~Yates~~

~~N. CAROLINA~~

~~Alleghany~~

~~Buncombe~~

~~Cherokee~~

~~Henderson~~

~~Mitchell~~

~~Rockingham~~

~~Transylvania~~

~~Watauga~~

~~N. DAKOTA~~

~~All Counties~~

~~OHIO~~

~~Adams~~

~~Allen~~

~~Ashland~~

~~Auglaize~~

~~Belmont~~

~~Butler~~

~~Carroll~~

~~Champaign~~

~~Clark~~

~~Clinton~~

~~Columbiana~~

~~Coshocton~~

~~Crawford~~

~~Darke~~

~~Delaware~~

~~Fairfield~~

~~Fayette~~

~~Franklin~~

~~Greene~~

~~Guernsey~~

~~Hamilton~~

~~Hancock~~

~~Hardin~~

~~Harrison~~

~~Holmes~~

~~Huron~~

~~Jefferson~~

~~Knox~~

~~Licking~~

~~Logan~~

~~Madison~~

~~Marion~~

~~Mercer~~

~~Miami~~

~~Montgomery~~

~~Morrow~~

~~Muskingum~~

~~Perry~~

~~Pickaway~~

~~Pike~~

~~Preble~~

~~Richland~~

~~Ross~~

~~Seneca~~

~~Shelby~~

~~Stark~~

~~Summit~~

~~Tuscarawas~~

~~Union~~

~~Van Wert~~

~~Warren~~

~~Wayne~~

~~Wyandot~~

~~PENNSYLVANIA~~

~~Adams~~

~~Allegheny~~

~~Armstrong~~

~~Beaver~~

~~Bedford~~

~~Berks~~

~~Blair~~

~~Bradford~~

~~Bucks~~

~~Butler~~

~~Cameron~~

~~Carbon~~

~~Centre~~

~~Chester~~

~~Clarion~~

~~Clearfield~~

~~Clinton~~

~~Columbia~~

~~Cumberland~~

~~Dauphin~~

~~Delaware~~

~~Franklin~~

~~Fulton~~

~~Huntingdon~~

~~Indiana~~

~~Juniata~~

~~Lackawanna~~

~~Lancaster~~

~~Lebanon~~

~~Lehigh~~

~~Luzerne~~

~~Lycoming~~

~~Mifflin~~

~~Monroe~~

~~Montgomery~~

~~Montour~~

~~Northampton~~

~~Northumberland~~

~~Perry~~

~~Schuylkill~~

~~Snyder~~

~~Sullivan~~

~~Susquehanna~~

~~Tioga~~

~~Union~~

~~Venango~~

~~Westmoreland~~

~~Wyoming~~

~~York~~

~~RHODE ISLAND~~

~~Kent~~

~~Washington~~

~~S. CAROLINA~~

~~Greenville~~

~~S. DAKOTA~~

~~Aurora~~

~~Beadle~~

~~Bon Homme~~

~~Brookings~~

~~Brown~~

~~Brule~~

~~Buffalo~~

~~Campbell~~

~~Charles Mix~~

~~Clark~~

~~Clay~~

~~Codington~~

~~Corson~~

~~Davison~~

~~Day~~

~~Deuel~~

~~Douglas~~

~~Edmunds~~

~~Faulk~~

~~Grant~~

~~Hamlin~~

~~Hand~~

~~Hanson~~

~~Hughes~~

~~Hutchinson~~

~~Hyde~~

~~Jerauld~~

~~Kingsbury~~

~~Lake~~

~~Lincoln~~

~~Lyman~~

~~Marshall~~

~~McCook~~

~~McPherson~~

~~Miner~~

~~Minnehaha~~

~~Moody~~

~~Perkins~~

~~Potter~~

~~Roberts~~

~~Sanborn~~

~~Spink~~

~~Stanley~~

~~Sully~~

~~Turner~~

~~Union~~

~~Walworth~~

~~Yankton~~

~~TENNESEE~~

~~Anderson~~

~~Bedford~~

~~Blount~~

~~Bradley~~

~~Claiborne~~

~~Davidson~~

~~Giles~~

~~Grainger~~

~~Greene~~

~~Hamblen~~

~~Hancock~~

~~Hawkins~~

~~Hickman~~

~~Humphreys~~

~~Jackson~~

~~Jefferson~~

~~Knox~~

~~Lawrence~~

~~Lewis~~

~~Lincoln~~

~~Loudon~~

~~Marshall~~

~~Maury~~

~~McMinn~~

~~Meigs~~

~~Monroe~~

~~Moore~~

~~Perry~~

~~Roane~~

~~Rutherford~~

~~Smith~~

~~Sullivan~~

~~Trousdale~~

~~Union~~

~~Washington~~

~~Wayne~~

~~Williamson~~

~~Wilson~~

~~UTAH~~

~~Carbon~~

~~Duchesne~~

~~Grand~~

~~Piute~~

~~Sanpete~~

~~Sevier~~

~~Uintah~~

~~VIRGINIA~~

~~Alleghany~~

~~Amelia~~

~~Appomattox~~

~~Augusta~~

~~Bath~~

~~Bland~~

~~Botetourt~~

~~Bristol~~

~~Brunswick~~

~~Buckingham~~

~~Buena Vista~~

~~Campbell~~

~~Chesterfield~~

~~Clarke~~

~~Clifton Forge~~

~~Covington~~

~~Craig~~

~~Cumberland~~

~~Danville~~

~~Dinwiddie~~

~~Fairfax~~

~~Falls Church~~

~~Fluvanna~~

~~Frederick~~

~~Fredericksburg~~

~~Giles~~

~~Goochland~~

~~Harrisonburg~~

~~Henry~~

~~Highland~~

~~Lee~~

~~Lexington~~

~~Louisa~~

~~Martinsville~~

~~Montgomery~~

~~Nottoway~~

~~Orange~~

~~Page~~

~~Patrick~~

~~Pittsylvania~~

~~Powhatan~~

~~Pulaski~~

~~Radford~~

~~Roanoke~~

~~Rockbridge~~

~~Rockingham~~

~~Russell~~

~~Salem~~

~~Scott~~

~~Shenandoah~~

~~Smyth~~

~~Spotsylvania~~

~~Stafford~~

~~Staunton~~

~~Tazewell~~

~~Warren~~

~~Washington~~

~~Waynesboro~~

~~Winchester~~

~~Wythe~~

~~WASHINGTON~~

~~Clark~~

~~Ferry~~

~~Okanogan~~

~~Pend Oreille~~

~~Skamania~~

~~Spokane~~

~~Stevens~~

~~**W. VIRGINIA**~~

~~Berkeley~~

~~Brooke~~

~~Grant~~

~~Greenbrier~~

~~Hampshire~~

~~Hancock~~

~~Hardy~~

~~Jefferson~~

~~Marshall~~

~~Mercer~~

~~Mineral~~

~~Monongalia~~

~~Monroe~~

~~Morgan~~

~~Ohio~~

~~Pendleton~~

~~Pocahontas~~

~~Preston~~

~~Summers~~

~~Wetzel~~

~~**WISCONSIN**~~

~~Buffalo~~

~~Crawford~~

~~Dane~~

~~Dodge~~

~~Door~~

~~Fond du Lac~~

~~Grant~~

~~Green~~

~~Green Lake~~

~~Iowa~~

~~Jefferson~~

~~Lafayette~~

~~Langlade~~

~~Marathon~~

~~Menominee~~

~~Pepin~~

~~Pierce~~

~~Portage~~

~~Richland~~

~~Rock~~

~~Shawano~~

~~St. Croix~~

~~Vernon~~

~~Walworth~~

~~Washington~~

~~Waukesha~~

~~Waupaca~~

~~Wood~~

~~**WYOMING**~~

~~Albany~~

~~Big Horn~~

~~Campbell~~

~~Carbon~~

~~Converse~~

~~Crook~~

~~Fremont~~

~~Goshen~~

~~Hot Springs~~

~~Johnson~~

~~Laramie~~

~~Lincoln~~

~~Natrona~~

~~Niobrara~~

~~Park~~

~~Sheridan~~

~~Sublette~~

~~Sweetwater~~

~~Teton~~

~~Uinta~~

~~Washakie~~

a. ~~The EPA recommends that this county listing be supplemented with other available state and local data to further understand the radon potential of a Zone 1 area.~~

Reason Statement: The EPA map and Zone 1 county list are based in part on a 1993 survey that measured radon in 5694 homes, less than two per each of the 3141 counties in the US. As more recent data have been compiled by states and the US Centers for Disease Control and Prevention, it is evident that more counties' average radon test results equal or exceed the EPA action level.

Radon Zone 1 counties are defined as having a predicted year-round average indoor radon screening level in the lowest livable area of a structure greater than or equal to four picocuries per liter of air (pCi/L). Relying on an average radon level does not address the full range of risk within a given county. Levels greater than 4 have been found in 85% of US counties tested.

Restricting localities as to when or how they may include the appendix ("shall be determined through") can cause this appendix to conflict with local authority.

While opponents may suggest otherwise, deleting the county information does not impose a requirement for adoption in Zones 2 and 3. Appendix F will remain an optional appendix that is only in effect where the jurisdiction has adopted it.

In response to stakeholder feedback EPA has been deemphasizing the use of the EPA zone map as a reference for building codes and specifications. The purpose of the EPA radon zone map, since its inception, has been to show potential of risk not ACTUAL risk. While it is still a useful tool, it unintentionally creates a false sense of security for those in Zone 2 and Zone 3 that risk in those areas is non-existent. With this in mind, the EPA Indoor airPLUS program (a voluntary partnership and labeling program that helps new home builders improve the Indoor Air Quality) plans to include testing in ALL ZONES in its upcoming Version 2 update. The fact remains that radon is found in all zones and to truly protect against radon you need to test regardless of zone.

It is suggested that the following information be added to the Commentary for the IRC: Code officials seeking radon risk information may consult with the state radon programs listed at https://www.crcpd.org/page/Radon or information listed at https://www.epa.gov/radon/epa-map-radon-zones-and-supplemental-information#datainfo.

Cost Impact: The code change proposal will increase the cost of construction
Adoption of the Appendix adds to the cost of construction. According to results from the Home Innovations Research Lab's survey of homebuilders, the average installation cost for a passive system in 2019 for a single-family detached home was approximately $463, up from the $377 reported for 2018 and $367 reported for 2017.

RB294-22

RB295-22

IRC: AF103.2

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crcpd.org)

2021 International Residential Code

Revise as follows:

AF103.2 Subfloor preparation. A layer of gas-permeable material shall be placed under all concrete slabs and other floor systems that directly contact the ground and are within the walls of the living spaces of the building, to facilitate future installation of a subslab depressurization system, if needed. The gas-permeable layer shall consist of one of the following:

1. A uniform layer of clean aggregate, not less than 4 inches (102 mm) thick. The aggregate shall consist of material that will pass through a 2-inch (51 mm) sieve and be retained by a $^{1}/_{4}$-inch (6.4 mm) sieve.
2. A uniform layer of sand (native or fill), not less than 4 inches (102 mm) thick, overlain by a layer or strips of geotextile drainage matting designed to allow the lateral flow of soil gases.

   Exception: A sand base course is not required under geotextile drainage matting where the concrete slab is installed on well-drained or sand-gravel mixture soil classified as Group 1 according to the United Soil Classification in accordance with Table R405.1

3. Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire subfloor area.

Reason Statement: Well drained soils do not require a sand layer and the matting can be laid right on the native soils, where applicable.

Cost Impact: The code change proposal will decrease the cost of construction
This will eliminate the requirement for a sand base layer where appropriate soils exist.

RB295-22

RB296-22

IRC: SECTION AJ108.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

SECTION AJ108
RENOVATIONS

Revise as follows:

AJ108.1 Materials and methods. The work shall comply with the materials and methods requirements of this code. For the purpose of compliance with Chapter 11 of this code, a *renovation* shall be included within the scope of an a*lteration* as defined in Chapter 11.

Reason Statement: Chapter 11 does not address energy efficiency requirements separately for "renovations" as it considers them in a more broadly defined category of "alterations" (see Chapter 11 and Appendix AJ definitions below). For example, the definition of "alteration" in Chapter 11 is inclusive of renovation but the connection to a separate use of the defined term "renovation" in Appendix AJ is not obvious. This proposal provides a necessary clarification to avoid conflict between requirements in Chapter 11 of the IRC for existing building (particularly Section N1111) and in Appendix AJ in relation to work performed on existing buildings.
The following are definitions for Alternation and Renovation in Appendix AJ Section 106:

> ALTERATION. The reconfiguration of any space; the addition or elimination of any door or window; the reconfiguration or extension of any system; or the installation of any additional equipment.
>
> RENOVATION. The change, strengthening or addition of load-bearing elements; or the refinishing, replacement, bracing, strengthening, upgrading or extensive repair of existing materials, elements, components, equipment or fixtures. Renovation does not involve reconfiguration of spaces. Interior and exterior painting are not considered refinishing for purposes of this definition, and are not renovation.

The following is the definition for Alteration in Chapter 11 of the IRC:

> ALTERATION. Any construction, retrofit or renovation to an existing structure other than repair or addition. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation.

Renovation is not separately defined in Chapter 11 of the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal establishes the proper usage of terms and their alignment between Appendix AJ and IRC Chapter 11 so that the application of the existing requirements are better coordinated. The proposal does not change the existing technical requirements in Chapter 11 or in Appendix AJ so there is no change in cost.

RB296-22

RB297-22

IRC: APPENDIX AJ, SECTION AJ101.1, AJ102.1, AJ102.2 (New), AJ104.1, AJ107.4 (New), AJ108.4, AJ109.4, AJ110.5 (New)

Proponents: Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Revise as follows:

APPENDIX AJ
EXISTING BUILDINGS~~ AND STRUCTURES~~

SECTION AJ101
PURPOSE AND INTENT

Revise as follows:

AJ101.1 General. The purpose of these provisions is to encourage the continued use or reuse of legally existing buildings~~ and structures~~. These provisions are intended to permit work in existing buildings that is consistent with the purpose of this code. Compliance with these provisions shall be deemed to meet the requirements of this code. Structural elements and systems shall comply with Section R102.7.1 and Chapter 3 through Chapter 10 of the *International Residential Code*.

SECTION AJ102
COMPLIANCE

Revise as follows:

AJ102.1 General. Regardless of the category of work being performed, the work shall not cause the building ~~structure~~ to become unsafe or adversely affect the performance of the building; shall not cause an existing mechanical or plumbing system to become unsafe, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the building any less compliant with this code or to any previously *approved* alternative arrangements than it was before the work was undertaken.

Add new text as follows:

AJ102.2 Structural. Structural elements and systems that are altered, repaired, or replaced shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the International Residential Code. The work performed shall not cause the structure to become less compliant with the International Residential Code than it was before the work was undertaken.

SECTION AJ104
EVALUATION OF AN EXISTING BUILDING

Revise as follows:

AJ104.1 General. The *building official* shall have the authority to require an existing building to be investigated and evaluated by a *registered design professional* in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions and Section R102.7.1 and structural provisions of the *International Residential Code*, and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:

1. Available documentation of the existing building.
   - 1.1. Field surveys.
   - 1.2. Tests (nondestructive and destructive).
   - 1.3. Laboratory analysis.

Exception: Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing an extensive reconstruction shall not be required to be evaluated.

SECTION AJ107
REPAIRS

Add new text as follows:

AJ107.4 Structural. Repaired structural elements and systems shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code*.

SECTION AJ108
RENOVATIONS

Revise as follows:

AJ108.4 Structural. Structural elements and systems modified by the renovation shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code.* Unreinforced masonry buildings located in Seismic Design Category D_2 or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.

SECTION AJ109
ALTERATIONS

Revise as follows:

AJ109.4 Structural. Altered structural elements and systems shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code.* ~~The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.~~

SECTION AJ110
RECONSTRUCTION

Add new text as follows:

AJ110.5 Structural. Reconstructed structural elements and systems shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code* for new construction.

Reason Statement: This proposal aligns the structural provisions of Appendix AJ with the main body of the IRC. Appendix AJ has not been updated to correlate with changes in the IRC and IEBC provisions that have occurred during recent code cycles. However, Section AJ101.1 states: *"Compliance with these provisions shall be deemed to meet the requirements of this code."* Given both the limitations of the structural requirements outlined in Appendix AJ and the disconnect between the appendix and main body of the codes (IRC and IEBC), allowing this Appendix to be considered "deemed to comply" is dangerous with regard to the structure.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction within the IRC, since the main body of the IRC is the default resource used given the present limitations of Appendix AJ.

RB297-22

RB298-22

IRC: AJ102.4.3, AJ102.4.3.1

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

AJ102.4.3 Replacement windows for emergency escape and rescue openings. Where windows are required to provide emergency escape and rescue openings, replacement windows shall be exempt from Sections R310.2 and R310.4.4 provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. Where the replacement window is not part of a change of occupancy.
3. Window opening control devices complying with F409—2017 shall be permitted for use on windows required to provide emergency escape and rescue openings.

~~Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as required emergency escape and rescue openings.~~

AJ102.4.3.1 Control devices. Window opening control devices or fall prevention devices complying with ASTM F2090 shall be permitted for use on windows required to provide emergency escape and rescue openings. ~~Emergency escape and rescue openings with window opening control devices or fall prevention devices complying with ASTM F2090,~~ A~~a~~fter operation to release the control device allowing the window to fully open, the control device shall not reduce the net clear opening area of the window unit. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.

Reason Statement: This is a coordination item. The proposed text is what is found in IEBC Section 505.3.1 and 702.5.1 for control devices on existing windows that are used for emergency escape and rescue. The same phraseology/intent is in appendix J, but is written differently. This could be read as asking for something different, which is not the case. This also better coordinates with R310.5.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification/coordination of requirements. It has no technical changes.

RB298-22

RB299-22

IRC: AJ110.5 (New)

Proponents: Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Add new text as follows:

AJ110.5 Exterior Wall Coverings. *Exterior wall coverings* shall comply with the requirements of Chapter 7. Exterior wall coverings shall be attached to a n*ailable substrate.*

Reason Statement: This is a simple addition to the existing building appendix, it is similar to how the IEBC handles wall coverings, as it points to the exterior wall covering chapter. In addition, a short provision is added on the importance of a nailable substrate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Just highlights an important component to re-siding installation.

RB299-22

RB300-22

IRC: AQ101.1

Proponents: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com)

2021 International Residential Code

Revise as follows:

AQ101.1 Scope. This appendix shall be applicable to *tiny houses* used as ~~single~~ *dwelling units* that are detached or are attached to another *dwelling unit*. *Tiny houses* shall comply with ~~this code~~ the *International Residential Code* except as otherwise stated in this appendix.

Reason Statement: This proposal changes the scope section of Appendix AQ to clarify that it applies to dwelling units either detached from or attached to another dwelling unit. The same relaxation of particular code requirements in the IRC justified by the small size of tiny houses (≤ 400 sf) is equally justified for detached and attached situations. Insufficient quantity of dwellings in many U.S. regions and states, especially affordable units, requires and has resulted in a variety of solutions. Allowing Appendix AQ to be used for detached and attached tiny houses provides a very helpful means of creating more dwelling units, especially more affordable ones.

Cost Impact: The code change proposal will decrease the cost of construction
Clarifying that Appendix AQ applies to tiny houses detached from or attached to another dwelling will tend to decrease construction costs, because attached tiny houses share parts of another dwelling's building envelope or foundation, and utilities such as water or sewer lines can often be shared or are less costly by proximity. This is the case in new construction, but even more so when creating a new dwelling unit within an existing structure. In general, all tiny houses provide a low cost means of constructing a dwelling unit, by virtue of their small size and efficiency.

RB300-22

RB301-22

IRC: TABLE N1105.4.2(1)

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Residential Code

Revise as follows:

TABLE N1105.4.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

Portions of table not shown remain unchanged.

h. For residences with conditioned basements, R-2 and R-4 residences, and for townhouse~~s~~ units, the following formula shall be used to determine glazing area:

. $AF = A_s \times FA \times F$

. where:

. AF = Total glazing area.

. A_s = Standard reference design total glazing area.

. FA = (Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 × below-grade boundary wall area).

. F = (above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.56, whichever is greater.

. and where:

. Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.

. Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.

. Below-grade boundary wall is any thermal boundary wall in soil contact.

. Common wall area is the area of walls shared with an adjoining dwelling unit.

Reason Statement: Last cycle, ADM5-19 Part 2 revised the IRC by dividing the term "townhouse" into either "townhouse" for the entire building, or "townhouse unit" for individual dwelling units in a townhouse. Although I had previously reviewed each occurrence of the term "townhouse" in the IRC at that time to make changes that appeared necessary to fully execute the terminology improvement under ADM5-19, I committed to repeat this review when the committee discussed that change. Initially, it was my intent to list each occurrence in the IRC in a public comment last cycle and explain the basis for using one term vs. the other. That time consuming exercise no longer seems necessary, given that the 2021 IRC has since been published with ADM5-19 included based on membership action on a public comment submitted by the Washington Association of Building Officials that overturned the committee recommendation.
Given that the term "townhouse" applies to a structure containing three or more "townhouse units," and by extension, it therefore applies to each individual townhouse unit in a townhouse building, I found only this one section in the IRC requiring further action in my opinion. This review and proposal fulfills my commitment to revisit this issue, and anyone with additional concerns is welcome to contact me to discuss drafting a floor amendment for consideration at the committee action hearing if any other changes are considered necessary.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The change is considered to be editorial to update terminology without changing intent or application of the code.

RB301-22

RB302-22

IRC: AR103.1.1 (New)

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Add new text as follows:

AR103.1.1 Flood hazard areas. In flood hazard areas established in Table R301.2, light straw-clay infill shall comply with the flood damage-resistant materials requirements of Section R322.1.8.

Reason Statement: Section R322 contains requirements for dwellings in flood hazard areas. Section R322.1.8 requires materials used for walls to be flood damage-resistant materials that conform to NFIP Technical Bulletin 2, Flood Damage-Resistant Materials Requirements. Light straw-clay materials that are inundated by floodwater, especially floodwater that remains high for more than a few hours, could deteriorate. Thus, referring to the flood-damage resistant materials requirement is not a new requirement. Similar “reminders” of the flood provisions appear in Appendix AE (manufactured housing used as dwellings) and Appendix AJ (existing buildings and structures).
We note that the current edition of TB 2 does not include light straw-claw materials. However, an ASTM testing standard is in development (expected to be available for the 2027 I-Codes). When the ASTM standard is cited in a future edition of the codes, that will allow for tested materials that are not specifically listed in TB 2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because dwellings in flood hazard areas must already comply with Section R322, a reminder of compliance with the flood-resistant materials requirements is not a change. By referring to the existing requirement, there will be no cost impact when approving this proposal.

RB302-22

RB303-22

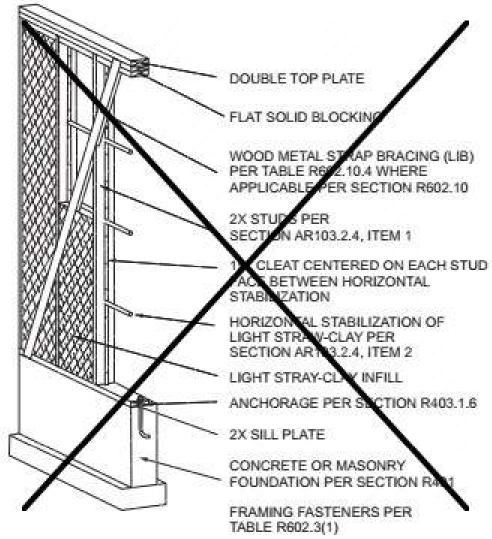
IRC: AR104.1, FIGURE AR103.2.4(2), FIGURE AR103.2.4(3)

Proponents: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Arkin, representing California Straw Building Association (david@arkintilt.com)

2021 International Residential Code

Revise as follows:

AR104.1 Thermal characteristics. Walls with light straw-clay infill of densities ~~of~~ greater than or equal to 20 pounds per cubic foot (480.6 kg/m^3) shall be classified as mass walls in accordance with Section N1102.2.5 (R402.2.5) and shall meet the *R*-value requirements for mass walls in Table N1102.1.3 (R402.1.2). Walls with light straw-clay infill of densities less than 20 pounds per cubic foot (480.6 kg/m^3) shall meet the *R*-value requirements for wood frame walls in Table N1102.1.3 (R402.1.2).


DOUBLE TOP PLATE
FLAT SOLID BLOCKING
WOOD METAL STRAP BRACING (LIB) PER TABLE R602.10.4 WHERE APPLICABLE PER SECTION R602.10
2X STUDS PER SECTION AR103.2.4, ITEM 1
1X CLEAT CENTERED ON EACH STUD FACE BETWEEN HORIZONTAL STABILIZATION
HORIZONTAL STABILIZATION OF LIGHT STRAW-CLAY PER SECTION AR103.2.4, ITEM 2
LIGHT STRAY-CLAY INFILL
ANCHORAGE PER SECTION R403.1.6
2X SILL PLATE
CONCRETE OR MASONRY FOUNDATION PER SECTION R401
FRAMING FASTENERS PER TABLE R602.3(1)

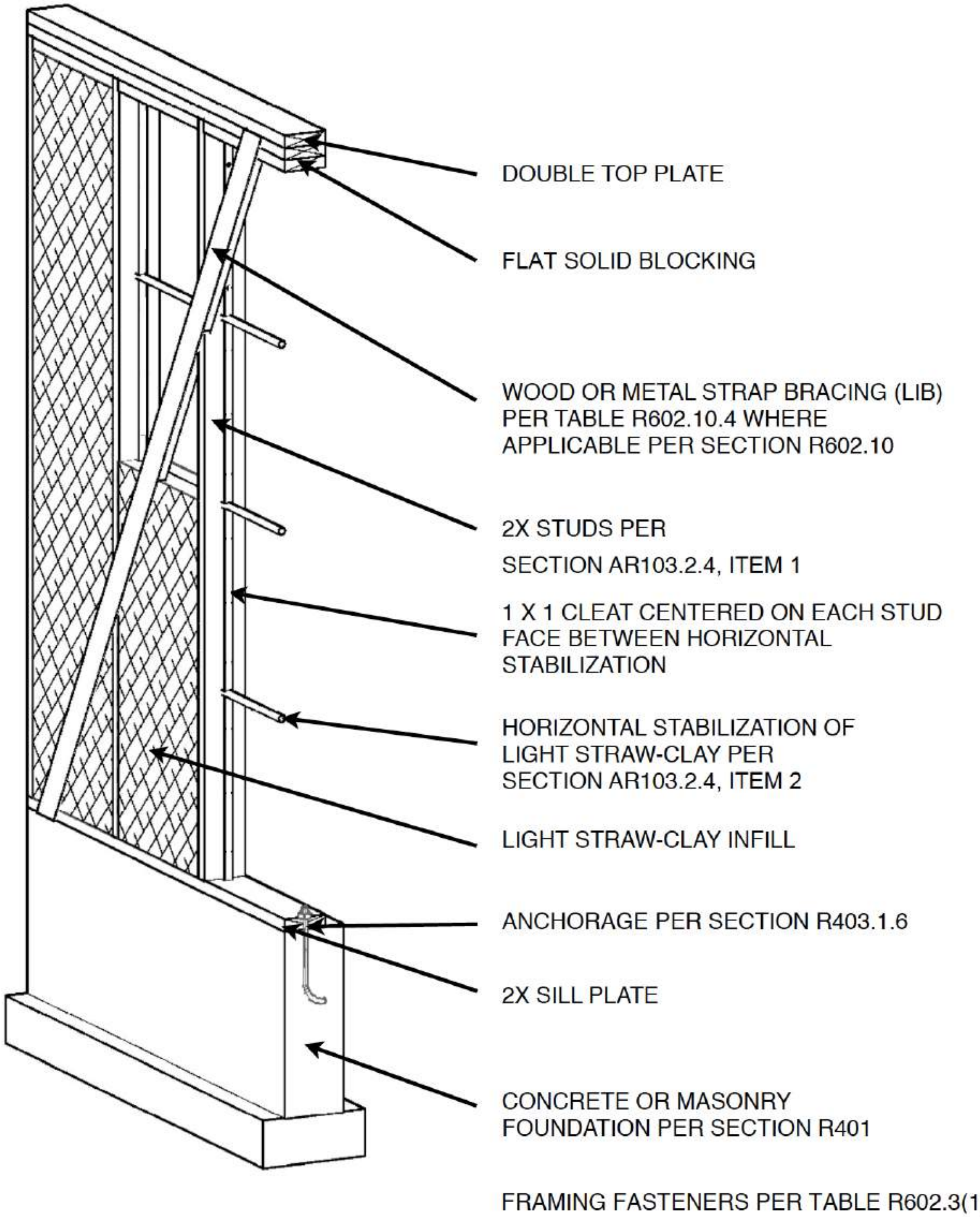
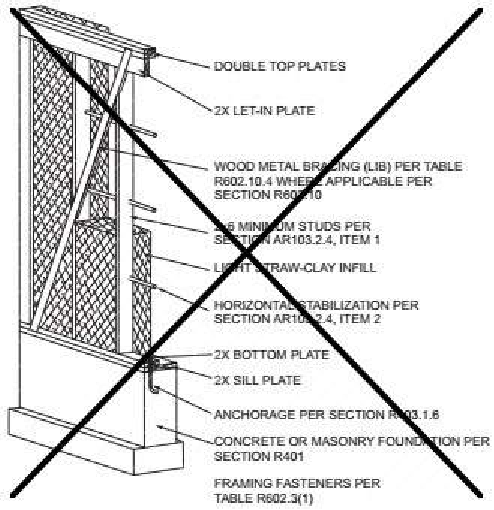


FIGURE AR103.2.4(2)
LIGHT STRAW-CLAY WALL
SINGLE STUD WIDTH

FIGURE AR103.2.4(2) LIGHT STRAW-CLAY WALL SINGLE STUD WIDTH


DOUBLE TOP PLATES
2X LET-IN PLATE
WOOD METAL BRACING (LIB) PER TABLE R602.10.4 WHERE APPLICABLE PER SECTION R602.10
2x6 MINIMUM STUDS PER SECTION AR103.2.4, ITEM 1
LIGHT STRAW-CLAY INFILL
HORIZONTAL STABILIZATION PER SECTION AR103.2.4, ITEM 2
2X BOTTOM PLATE
2X SILL PLATE
ANCHORAGE PER SECTION R403.1.6
CONCRETE OR MASONRY FOUNDATION PER SECTION R401
FRAMING FASTENERS PER TABLE R602.3(1)

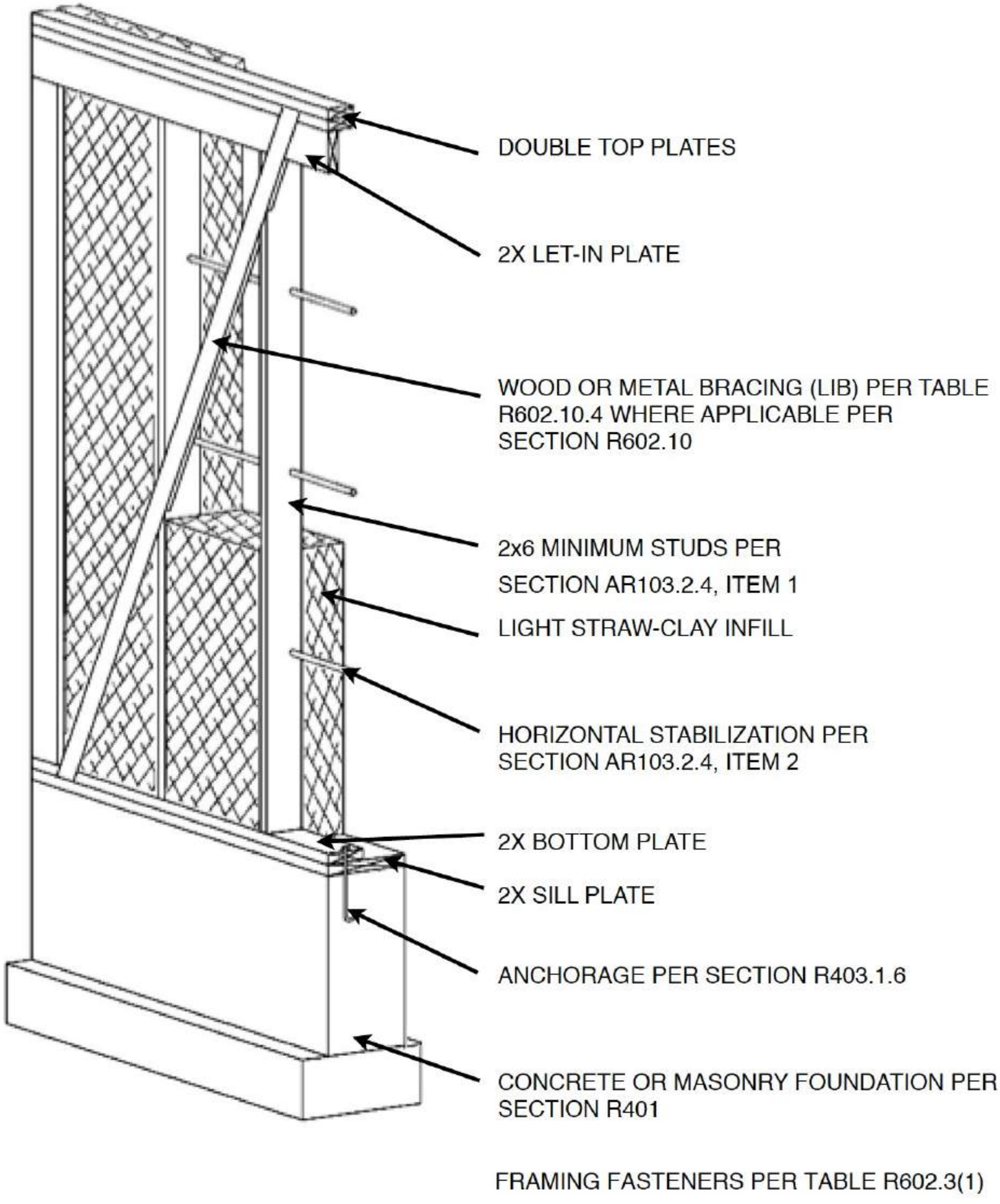


FIGURE AR103.2.4(3)
LIGHT STRAW-CLAY WALL
WITH BLIND STUDS

Note for errata in figure - 3rd note -

Wood or Metal strap bracing (lib) per.....

FIGURE AR103.2.4(3) LIGHT STRAW-CLAY WALL WITH BLIND STUDS

Reason Statement: This proposal removes an unnecessary word in Section AR104.1, and corrects typographical errors in Figures AR103.2.4(2) & (3). The words “WOOD METAL BRACING” are replaced with “WOOD OR METAL BRACING” in the third from top call-out note in those Figures.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The improvements to code language and the correction of typographical errors do not affect the cost of construction.

RB303-22

RB304-22

IRC: AS101.2 (New)

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Residential Code

Add new text as follows:

AS101.2 Flood hazard areas. In flood hazard areas established in Table R301.2, buildings using strawbale wall systems shall meet the requirements of Section R322.

Reason Statement: Section R322 contains requirements for dwellings in flood hazard areas. Thus, referring to Section R322 is not a new requirement. Similar "reminders" of the flood provisions appear in Appendix AE (manufactured housing used as dwellings) and Appendix AJ (existing buildings and structures).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because dwellings in flood hazard areas must already comply with Section R322, a reminder of compliance with the flood-resistant requirements is not a change. By referring to the existing requirements, there will be no cost impact when approving this proposal.

RB304-22

RB305-22

IRC: AS108.2, TABLE AS109.1

Proponents: Jonathan Roberts, representing UL (jonathan.roberts@ul.com)

2021 International Residential Code

Revise as follows:

AS108.2 Compliance with Section R302101. *Straw bales* meet the requirements for insulation materials in Section R302.10.1 for flame spread index and *smoke-developed index* as tested in accordance with ASTM E84 or UL 723.

AS109.1 General. See Table AS109.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title and the section or sections of this appendix that reference the standard.

Revise as follows:

TABLE AS109.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM C5—10	Standard Specification for Quicklime for Structural Purposes	AS104.4.6.1
ASTM C109/C109M—2015el	*Standard Test Method for Compressive Strength of Hydraulic Cement Mortars*	AS106.6.1
ASTM C141/C141M—14	*Standard Specification for Hydrated Hydraulic Lime for Structural Purposes*	AS104.4.6.1
ASTM C206—14	*Standard Specification for Finishing Hydrated Lime*	AS104.4.6.1
ASTM C926—15B	*Standard Specification for Application of Portland Cement Based Plaster*	AS104.4.8, AS104.4.9
ASTM C1707—11	*Standard Specification for Pozzolanic Hydraulic Lime for Structural Purposes*	AS104.4.6.1
ASTM E2392/ASTM E2392M —10	*Standard Guide for Design of Earthen Wall Building Systems*	AS104.4.3.2
CEN EN 459—2015	*Part 1: Building Lime. Definitions, Specifications and Conformity Criteria; Part 2: Test Methods*	AS104.4.6.1
UL 723-2018	Standard for Test for Surface Burning Characteristics of Building Materials	AS108.2

Staff Analysis: UL 723-2018 is already referenced in the IRC and IBC. This is simply a new occurrence of the reference in the I-Codes

Reason Statement: This change is purely editorial and provides correlation with ASTM E84 references in other sections of the codes. The phrase "E84" is followed by "or UL723" over one hundred times throughout the family of codes.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposed change actually provides an additional design option by referencing compliance with one of two standards. The reference to UL 723 is consistently found throughout the codes as an already acceptable compliance alternative where referencing compliance with ASTM E84 therefore approval of this proposal results is a zero dollar ($0.00) increase or decrease in construction costs.

RB305-22

RB306-22

IRC: SECTION AS102.1, AS104.4.2, AS104.4.6.1, AS104.4.6.3, AS105.3.1, AS105.4.1, TABLE AS105.4, AS105.6.1, AS105.6.2, AS105.6.3

Proponents: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Arkin, representing California Straw Building Association (david@arkintilt.com)

2021 International Residential Code

Revise as follows:

FINISH. Completed combination of materials on the interior or exterior face~~s~~ of a strawbale wall.~~stacked *bales*.~~

ON-EDGE. The orientation of a *bale* with its largest faces vertical, its longest dimension horizontal and parallel with the wall plane, its *ties* on the face of the wall and its *straw* lengths oriented predominantly vertically. See Figure AS102.1.

SHEAR WALL. A *strawbale* wall designed and constructed to resist in-plane lateral seismic and wind forces in accordance with Section AS106.13. ~~This term is synonymous~~ Synonymous with " Braced wall panel. "

SKIN. ~~The compilation of *plaster*~~ *Plaster* and its reinforcing, if any, applied to the ~~sur~~face of a strawbale wall. ~~stacked *bales*.~~

AS104.4.2 Lath and mesh for plaster. The surface of the *straw bales* functions as lath, and other lath or *mesh* shall not be required, except as required for out-of-plane load resistance by Table AS105.4 or for structural walls by Tables AS106.12 and AS106.13(1).

AS104.4.6.1 General. Lime *plaster* is any *plaster* with a binder that is composed of calcium hydroxide ~~(CaOH)~~ ($Ca(OH)_2$) including Type N or S hydrated lime, hydraulic lime, natural hydraulic lime or slaked quicklime. Hydrated lime shall comply with ASTM C206. Hydraulic lime shall comply with ASTM C1707. Natural hydraulic lime shall comply with ASTM C141 and CEN EN 459. Quicklime shall comply with ASTM C5.

AS104.4.6.3 On structural walls. Lime *plaster* on *strawbale* structural walls in accordance with Table AS106.12 or AS106.13(1) shall use hydraulic or natural hydraulic lime.

> **Exception:** A non-hydraulic lime plaster demonstrating the minimum compressive strength in accordance with Section AS106.6.1 and Table AS106.6.1.

AS105.3.1 Exterior sill plate flashing. Exterior sill plates shall receive flashing across the joint between the sill plate ~~to~~ and the slab or foundation ~~joints~~.

AS105.4.1 Determination of out-of-plane loading. Out-of-plane loading for the use of Table AS105.4 shall be in terms of the ultimate design wind speed and seismic design category ~~as~~ determined in accordance with Sections R301.2.1 and R301.2.2 respectively. An *approved* engineered design for out-of-plane load resistance in accordance with Section R301.2.1 shall be required ~~where~~ when the building is located in a special wind region or where wind design is required in accordance with Figure R301.2(2) and Section R301.2.1.1~~, respectively~~.

TABLE AS105.4 OUT-OF-PLANE LOAD RESISTANCE METHODS AND UNRESTRAINED WALL DIMENSION LIMITS

METHOD OF OUT-OF-PLANE LOAD RESISTANCE[a]	FOR ULTIMATE DESIGN WIND SPEEDS (mph)	FOR SEISMIC DESIGN CATEGORIES	UNRESTRAINED WALL DIMENSIONS, H [b]		MESH STAPLE SPACINGAT BOUNDARY RESTRAINTS
			Absolute limit in feet	Limit based on bale thickness T [c] in feet (mm)	
Nonplaster finish or unreinforced plaster	≤ 130	A, B, C, D_0	$H \le 8$	$H \le 5T$	None required
Pins per Section AS105.4.2	≤ 130	A, B, C, D_0	$H \le 12$	$H \le 8T$	None required
Pins per Section AS105.4.2	≤ 140	A, B, C, D_0, D_1, D_2	$H \le 10$	$H \le 7T$	None required
Reinforced[d] clay plaster	≤ 140	A, B, C, D_0, D_1, D_2	$H \le 10$	$H \le 8T^{0.5}$ ($H \le 140T^{0.5}$)	≤ 6 inches
Reinforced[d] clay plaster	≤ 140	A, B, C, D_0, D_1, D_2	$10 < H \le 12$	$H \le 8T^{0.5}$ ($H \le 140T^{0.5}$)	≤ 4 inches[e]
Reinforced[d] cement, cement-lime, lime or soil-cement plaster	≤ 140	A, B, C, D_0, D_1, D_2	$H \le 10$	$H \le 9T^{0.5}$ ($H \le 157T^{0.5}$)	≤ 6 inches
Reinforced[d] cement, cement-lime, lime or soil-cement plaster	≤ 155	A, B, C, D_0, D_1, D_2	$H \le 12$	$H \le 9T^{0.5}$ ($H \le 157T^{0.5}$)	≤ 4 inches[e]
2×6 load-bearing wood studs[f] at max. 6′ o.c.	≤ 140	A, B, C, D_0, D_1, D_2	H [g] ≤ 9	NA	None required
2×6 load-bearing wood studs[f] at max. 4′ o.c.	≤ 140	A, B, C, D_0, D_1, D_2	H [g] ≤ 10	NA	None required
2×6 load-bearing wood studs[f] at max. 2′ o.c.	≤ 140	A, B, C, D_0, D_1, D_2	H [g] ≤ 12	NA	None required
2×4 load-bearing wood studs[f] at max. 2′ o.c.	≤ 140	A, B, C, D_0, D_1, D_2	H [g] ≤ 10	NA	None required
2×6 nonload-bearing wood studs[f] at max. 6′ o.c.	≤ 140	A, B, C, D_0, D_1, D_2	H [g] ≤ 12	NA	None required

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

NA = Not Applicable.

a. Finishes applied to both sides of stacked bales. Where different finishes are used on opposite sides of a wall, the more restrictive requirements shall apply.

b. *H* = Stacked bale height in feet (mm) between sill plate and top plate or other approved horizontal restraint, or the horizontal distance in feet (mm) between approved vertical restraints. For load-bearing walls, *H* refers to vertical height only.

c. *T* = Bale thickness in feet (mm).

d. Plaster reinforcement shall be any mesh allowed in Table AS106.13(1) for the matching plaster type, and with staple spacing in accordance with this table. Mesh shall be installed in accordance with Section AS106.9.

e. Sill plate attachment shall be with $^5/_8$-inch anchor bolts or approved equivalent at not more than 48 inches on center where staple spacing is required to be ≤ 4 inches.

f. Bales shall be attached to the studs by an approved method. Horizontal framing and attachment at top and bottom of studs shall be in accordance with Section R602 or an approved alternative. Table R602.7(1) shall be used to determine the top framing member where load-bearing stud spacing exceeds 24 inches o.c.

g. *H* is vertical height only.

AS105.6.1 ~~Water-resistant~~ Water-resistive barriers and vapor permeance ratings. *Plastered bale* walls shall be constructed without any membrane barrier between *straw* and *plaster* to facilitate transpiration of moisture from the *bales*, and to secure a structural bond between *straw* and *plaster*, except as permitted or required elsewhere in this appendix. Where a ~~water-resistant~~ water-resistive barrier is placed behind an exterior finish, it shall have a vapor permeance rating of not less than 5 perms, except as permitted or required elsewhere in this appendix.

AS105.6.2 ~~Vapor~~ Interior vapor retarders. Wall *finishes* shall have an equivalent vapor permeance rating of a Class III vapor retarder on the interior side of exterior *strawbale walls* in Climate Zones 5, 6, 7, 8 and Marine 4, as defined in Chapter 11. *Bale* ~~Bales in~~ walls enclosing showers or steam rooms shall be protected on the interior side by a Class I or Class II vapor retarder.

AS105.6.3 Penetrations in exterior strawbale walls. Penetrations in exterior *strawbale* walls shall be sealed with an *approved* sealant or gasket on the exterior side of the wall in all climate zones. ~~, and~~ Penetrations, and joints at the floor and ceiling shall be sealed on the interior side of the wall in Climate Zones 5, 6, 7, 8 and Marine 4, as defined in Chapter 11.

Reason Statement: This proposal does the following:

1. Removes ambiguous language, and modifies language in some sections for clarity and consistency with other IRC appendices.
2. Adds needed detail for requirements for plaster on strawbale structural walls.
3. Clarifies requirements for determination of out-of-plane loading.
4. Corrects a terminology error replacing “water-resistant” with “water-resistive.”
5. Improves the section title for AS105.6.2 from “Vapor” to “Interior vapor retarders,” and improves language in the section.
6. Adds requirement for sealing penetrations and joints at the floor and ceiling for exterior walls.
7. Adds an alternative method for satisfying compressive strength requirement for natural hydraulic lime plasters.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The removal of ambiguous language, the modification of language for consistency with other IRC appendices, and clarification of requirements do not affect construction costs.

RB306-22

RB307-22

IRC: AS106.6.1

Proponents: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Eisenberg, representing DCAT (strawnet@gmail.com); David Arkin, representing California Straw Building Association (david@arkintilt.com)

2021 International Residential Code

Revise as follows:

AS106.6.1 Compressive strength. For plaster on *strawbale* structural walls, the *building official* is authorized to require a 2-inch (51mm) cube test conforming to ASTM C109 to demonstrate a minimum compressive strength in accordance with Table AS106.6.1. For natural hydraulic lime (NHL) plasters, the compressive strength in the NHL manufacturer's specifications is permitted to be used to satisfy the requirements in Table AS106.6.1, when the plaster mix used for the project is identical to that in the manufacturer's specifications.

Reason Statement: The time for lime plasters to develop 90% or more of their compressive strength is considerably longer (6 months or more) than those containing Portland cement, or those using a clay binder. This can create significant delays in construction if a sample demonstrating compressive strength of lime plaster is required. Natural hydraulic limes have proven highly reliable in producing plasters with compressive strengths that meet the values in the manufacturer's specifications. Therefore those specifications can be used to satisfy the compressive strength required in Table AS106.1.1, in lieu of a compressive strength test. The plaster used in the project must be identical to the manufacturer's specifications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Allowing a manufacturer's specification to be used to demonstrate an NHL plaster's compressive strength will not affect construction costs. Any tendency would be to reduce construction cost, because of time saved, as well as cost of testing no longer required.

RB307-22

RB308-22

IRC: AU105.3.4.2, AU106.6.1, AU106.8

Proponents: Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com); Kevin Donahue, representing Verdant Structural Engineers (kevin@verdantstructural.com)

2021 International Residential Code

Revise as follows:

AU105.3.4.2 Horizontal reinforcing. Two-inch by 2-inch (51 mm by 51 mm) 14-gage galvanized steel mesh shall be embedded 4 inches (102 mm) in the *cob* ~~above the rough opening and~~ below the rough opening for windows, and shall extend 12 inches (305 mm) beyond the sides of the opening. Walls below rough window openings greater than 4 feet 6 inches (1372 mm) in height shall be provided with additional horizontal reinforcing at midheight.

AU106.6.1 Demonstration of compressive strength. The compressive strength of the *cob* mix to be used in structural walls and *nonstructural walls* as required in Section AU106.6 shall be demonstrated to the building official before the placement of *cob* onto walls, with compressive strength tests and an associated report by an *approved* laboratory or with an *approved* on-site test as follows:

1. Five samples of the proposed cob mix shall be placed moist to completely fill a 4-inch by 4-inch by ~~4-inch~~ 8-inch (102 mm by 102 mm by ~~102~~ 203 mm) form and dried to ambient moisture conditions.
2. Samples shall not be oven dried.
3. ~~Any opposite~~ The 4-inch by 4-inch (102 mm by 102 mm) faces shall be ~~faced~~ capped with plaster of paris ~~if needed~~ to achieve smooth, parallel faces, after which the sample shall reach ambient moisture conditions before testing.
4. Samples shall be constructed, dried, and tested with the long dimension vertical.
5. ~~4.~~ The horizontal cross section of the dried sample as tested, and the maximum applied load at failure shall be used to calculate the sample's compressive strength.
6. ~~5.~~ The fourth-lowest value shall be used to determine the mix's compressive strength.

AU106.8 Bearing capacity. The allowable bearing capacity for *cob load-bearing walls* supporting vertical roof and/or ceiling loads imposed in accordance with Section R301 shall not exceed 2200 plf and shall be determined by Equation AU-2. Use of bearing capacities determined with Equation AU-2 exceeding 2200 plf requires an *approved* design prepared by a *registered design professional* that accounts for buckling.

$$\cancel{144}\ (C \times T_{min}\ \underline{\times 12})/3 - (H \times T_{avg}\underline{/12} \times D) \qquad \textbf{(Equation AU-2)}$$

BC = Allowable bearing capacity of wall (in pounds per lineal foot of wall).
C = Compressive strength (in psi) as determined in accordance with Section AU106.6.
T_{min} = Thickness of wall (in ~~feet~~ inches) at its minimum.
H = Height of *cob* portion of wall (in feet).
T_{avg} = Average thickness of wall (in ~~feet~~ inches).
D = Density of *cob* = 110 (in pounds per cubic foot), unless a lesser value at equilibrium moisture content is demonstrated.

Reason Statement: The proposed code changes in this proposal create new or revised requirements relative to the appendix as first approved for the 2021 IRC. These changes are based on further experience, laboratory testing, and additional information from prominent cob design and construction professionals. Reasons for proposed changes in this section are as follows:

1. Adjusted required compression test size as a result of University of California, Berkeley and University of San Francisco testing.
2. Limitations of allowable bearing loads of cob walls based on buckling considerations.

Cost Impact: The code change proposal will increase the cost of construction
The increase sample size for compression testing could increase cost of testing slightly. The limitation on loading due to buckling effects will not affect cost compared to systems that already exist in this code.

RB308-22

RB309-22

IRC: SECTION AU102 (NEW), SECTION AU102, AU103.8, AU104.1.2, AU104.4, AU104.4.1, AU105.2, TABLE AU105.3, AU105.4.1, AU105.4.2, AU105.4.5, FIGURE AU105.4.5 (New), AU106.1, AU106.6, AU106.8.2, AU109.2

Proponents: Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com)

2021 International Residential Code

Add new definition as follows:

BUCK. A frame, typically wood, anchored in a wall system, that creates the rough opening into which a window or door frame is installed.

Revise as follows:

COB. A composite building material consisting of refined *clay* or *clay subsoil* wet-mixed with loose straw and sometimes sand. ~~Also known as "Monolithic adobe."~~

COB CONSTRUCTION. A wall system of layers or lifts of moist cob placed to create monolithic walls, typically without formwork. Also known as "Monolithic Adobe."

UNSTABILIZED. ~~A cob~~ Cob or other earthen material that does not contain admixtures such as Portland cement, lime, asphalt emulsion or oil.

AU103.8 Drying holes. Where holes to facilitate drying are used, such holes shall be permitted to be of any depth and shall not exceed ~~exceeding~~ 3/4 inch (19 mm) in diameter ~~on the face of *cob* walls~~. Drying holes shall not be spaced closer than 10 hole-diameters , and~~. Drying holes~~ shall not be placed in *braced wall panels*. The design load on *load-bearing walls* with drying holes shall not exceed 90 percent of the allowable bearing capacity as determined in accordance with Section AU106.8. Drying holes shall be filled with *cob* before final inspection.

AU104.1.2 Exterior wall finishes. Where installed, exterior wall *finishes* shall be *plasters* in accordance with Section AU104.4, nonplaster exterior wall coverings in accordance with Section R703, or other *finish* systems in accordance with the following:

1. Specifications and details of the *finish* system's ~~means of~~ attachment to the wall or its independent support, and of its means of draining or evaporating water that penetrates the exterior *finish*, shall be ~~provided~~ *approved*.
2. The vapor permeance of the combination of *finish* materials shall be 5 perms or greater to allow the transpiration of water vapor from the wall.
3. *Finish* systems with weights greater than 10 pounds per square foot (48.9 kg/m) and less than or equal to 20 pounds per square foot (97.8 kg/m) of wall area shall require that the minimum total length of *cob braced wall panels* in Table AU106.11(3) be multiplied by a factor of 1.2.
4. *Finish* systems with weights greater than 20 pounds per square foot (97.8 kg/m) of wall area shall require an engineered design.

AU104.4 Plaster. *Plaster* applied to *cob* walls shall be any type described in this section. *Plaster* thickness shall not exceed 3 inches (76 mm) on each face except ~~where~~ with an *approved* engineered design ~~is provided~~.

AU104.4.1 Plaster and membranes. *Plaster* shall be applied directly to *cob* walls to facilitate transpiration of moisture from the walls and to secure a mechanical bond between the *plaster* and the *cob* , and shall comply with Section AU105.4.1. ~~A membrane shall not be located between the *cob* wall and the *plaster*.~~

AU105.2 Building limitations and requirements for cob wall construction. *Cob* walls shall be subject to the following limitations and requirements:

1. Number of stories: not more than one.
2. Building height: not more than 20 feet (6096 mm).
3. *Seismic design categories*: limited to use in *Seismic Design Categories* A, B and C, except ~~where~~ with an *approved* engineered design ~~is provided~~.
4. Wall height: in accordance with Table AU105.3, and with Table AU106.11(1) for *braced wall panels*.
5. Wall thickness, excluding *finish*, shall be not less than 10 inches (254 mm), not greater than 24 inches (610 mm) at the top two-thirds, not limited at the bottom third and, for structural walls, shall comply with Section AU106.2, Item 2. Wall taper is permitted in accordance with Section AU106.5, Item 1.
6. Interior *cob* walls shall require an *approved* engineered design that accounts for the seismic load of the interior *cob* walls, except in Seismic Design Category A for walls with a height to thickness ratio less than or equal to to 6.

TABLE AU105.3 OUT-OF-PLANE RESISTANCE METHODS AND UNRESTRAINED WALL HEIGHT LIMITS

WALL TYPE[a, g, h] AND METHOD OF OUT-OF-PLANE LOAD RESISTANCE	FOR ULTIMATE DESIGN WIND SPEEDS (mph)	FOR SEISMIC DESIGN CATEGORIES	UNRESTRAINED COB WALL HEIGHT *H* [b, c]		TOP ANCHOR[e] SPACING (inches)	TENSION TIE[f] SPACING (inches)
			Absolute Limit (feet)	Limit Based on Wall Thickness *T* [d] (feet)		
Wall 1[i]: no anchors, no steel wall reinforcing	≤ 110	A	$H \le 8$	$H \le 6T$	None	48
Wall 2: top anchors,[j] continuous vertical 6″ × 6″ × 6″ gage steel mesh in center of wall embedded in foundation 12 inches	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	12	24
Wall A[i]: top anchors, no vertical steel reinforcing	≤ 120	A, B	$H \le 8$	$H \le 6T$	12	48
Wall B[i]: top and bottom anchors, no vertical steel reinforcing	≤ 130	A, B	$H \le 8$	$H \le 6T$	12	48
Wall C: top and bottom anchors, continuous vertical threaded rod at 4 feet on center embedded in foundation and connected to bond beam	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	12	24
Wall D: continuous vertical threaded rod at 1 foot on center embedded in foundation and connected to bond beam	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	N/A	24
Wall E: top anchors, continuous vertical 6″ × 6″ × 6″ gage steel mesh 2 inches from each face of wall embedded in foundation	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	12	24

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.
N/A = Not Applicable

a. See Table AU106.11(1) for reinforcing and anchorage specifications for wall Types A, B, C, D and E.

b. *H* = height of the cob portion of the wall only. See Figure AU101.4. The maximum *H* is the absolute limit or the limit based on wall thickness, whichever is more restrictive.

c. Bond beams or other horizontal restraints are ~~capable of separating~~ permitted to divide a wall into more than one unrestrained wall height with an *approved* engineered design.

d. *T* = Cob wall thickness (in feet) at its minimum, without plaster.

e. $^{5}/_{8}$-inch threaded rod anchors at prescribed spacing with 12-inch embedment in cob, full embedment in concrete bond beams or full penetration in wood bond beam with a nut and washer.

f. Attach rafters to bond beam with 4-inch by 3-inch by 3-inch by 18 gage tension tie angles at prescribed spacing. See Figure AU106.9.5. Where rafters are attached to tension ties, roof sheathing shall be edge nailed.

g. All walls shall be tested for compressive strength in accordance with Section AU106.6.

h. For curved walls with an arc length (ARC_c) to radius (R_c) ratio of 1.5:1 or greater, the *H*/*T* factor shall be increased by 1, and the absolute height limit by 1 foot. See Section AU106.11.3.

i. Wall type requires a modulus of rupture test in accordance with Section AU106.7.

j. See wall Type A in Table AU106.11(1) for top anchor requirements.

AU105.4.1 ~~Water-resistant~~ Water-resistive barriers and vapor permeance. *Cob* walls shall be constructed without a membrane barrier ~~between the *cob* wall and *plaster* to facilitate transpiration of water vapor from the wall, and to secure a mechanical bond between the *cob* and *plaster*,~~ except as otherwise required elsewhere in this appendix. Where a ~~water-resistant~~ water-resistive barrier is placed behind an exterior *finish*, it shall be considered part of the *finish* system and shall comply with Item 2 of Section AU104.1.2 for the combined vapor permeance rating.

AU105.4.2 Horizontal surfaces. *Cob* walls and other *cob* elements shall be provided with a ~~water-resistant~~ water-resistive barrier at weather-exposed horizontal surfaces. The ~~water-resistant~~ water-resistive barrier shall be of a material and installation that will prevent erosion and prevent water from entering the wall system. Horizontal surfaces, including exterior window sills, sills at exterior niches and exterior buttresses, shall be sloped not less than 1 unit vertical in 12 units horizontal to drain away from *cob* walls or other *cob* elements.

AU105.4.5 Installation of windows and doors. Windows and doors shall be installed in accordance with the manufacturer's instructions to a wood~~en frame~~*buck* of not less than nominal 2-inch by 4-inch (51 mm by 102 mm) wood members. The installation of windows and doors and their bucks shall prevent the passage of air and water into or through the wall system. ~~anchored into the *cob* wall with 16d galvanized nails half-driven at a maximum 6-inch (152 mm) spacing, with the protruding half embedded in the *cob*. The wood frame shall be embedded not less than 1½ inches (38 mm) in the *cob* and shall be set in from each face of the wall not less than 3 inches (76 mm). Alternative window and door installation methods shall be capable of resisting the wind loads in Table R301.2.1(1). Windows and doors in *cob* walls shall be installed so as to mitigate the passage of air or moisture into or through the wall system.~~ Window sills shall comply with Section AU105.4.2. Window and door bucks shall be installed in accordance with Figure AU105.4.5 and one of the following methods:

1. Side members of the *bucks* shall be anchored into the cob wall by embedding the protruding half of half-driven 16d galvanized nails at a maximum 6-inch (152mm) spacing. The buck shall be embedded into the cob not less than 1½ inches (38mm) and set in from each face of the wall not less than 3 inches (76mm).
2. Wood stiffeners not less than nominal 2-inch by 4-inch (51mm by 102mm) shall be attached on-edge to the sides of the *buck* and embedded in the cob wall a minimum of 3½ inches (89mm). Stiffeners shall anchor into the cob wall with the protruding end of half-driven 16d galvanized nails at a maximum 6-inch (152mm) spacing. Stiffeners shall be set back not less than 3 inches (76mm) from each wall face. Bucks are permitted to be exposed and do not require anchoring nails when stiffeners are used with this method.
3. Other *approved* methods satisfying the performance requirements of Section AU105.4.5.

Exception: Windows and unframed glass shall be permitted to be embedded directly into a cob wall with an *approved* design.

Add new text as follows:

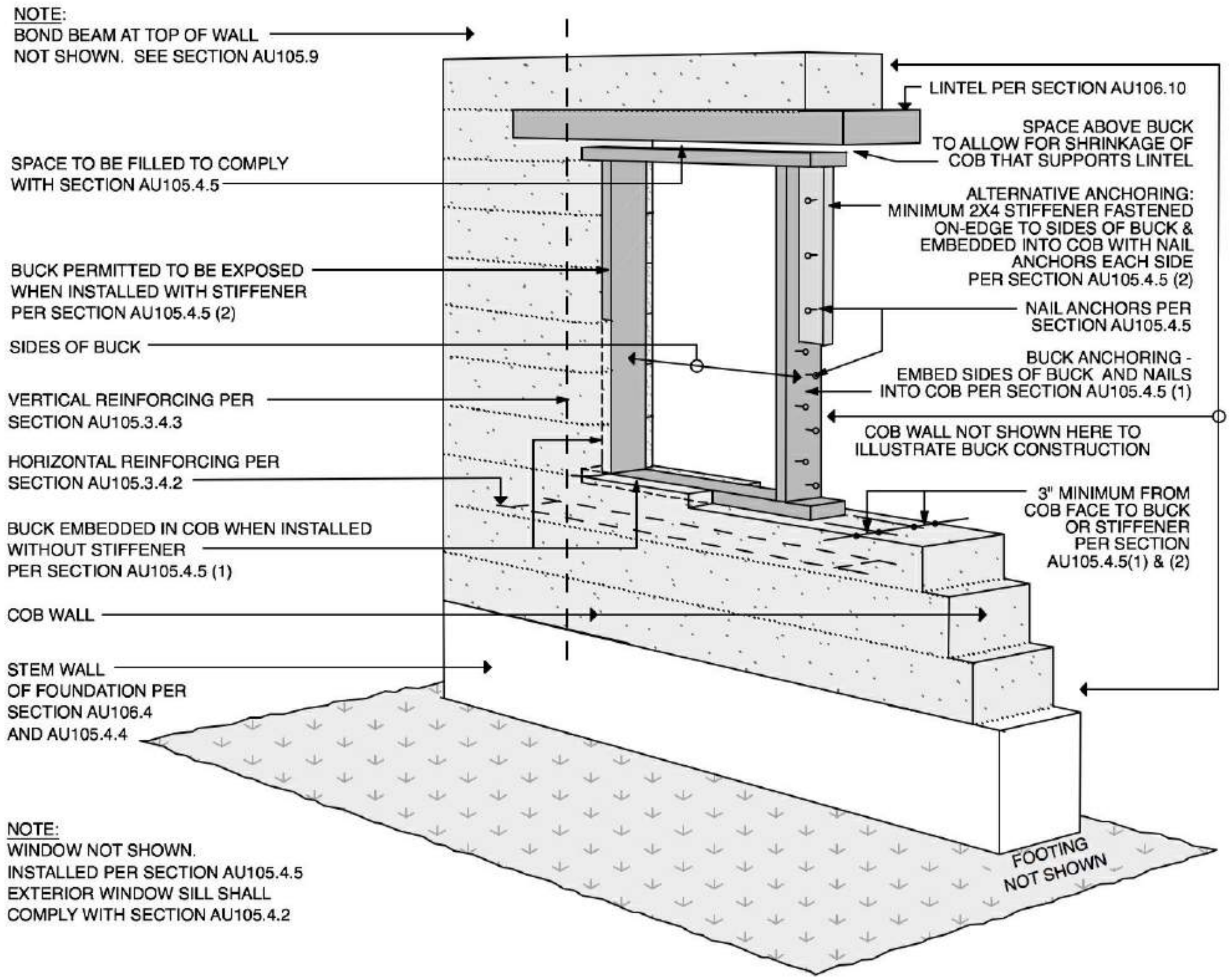


FIGURE AU105.4.5 WINDOW INSTALLATION (DOOR INSTALLATION SIMILAR)

Revise as follows:

AU106.1 General. *Cob* structural walls shall be in accordance with the prescriptive provisions of this section. Designs or portions of designs not complying with this section shall require an *approved* design by a *registered design professional* except where an engineered design is required.

AU106.6 Compressive strength of cob structural and nonstructural walls. All *cob* walls shall have a minimum compressive strength of 60 psi (414 kPa)~~. Cob~~ , and *cob* in walls used as *braced wall panels* shall have a minimum compressive strength of 85 psi (586 kPa) except with an approved engineered design.

AU106.8.2 Support of concentrated loads. Concentrated roof and ceiling loads shall be distributed by structural elements capable of distributing the loads to the *cob load-bearing wall* and within its allowable bearing capacity as determined in accordance with Section AU106.8. Concentrated loads over lintels or over bond beams spanning openings shall require an *approved* ~~engineered~~ design by a *registered design professional*.

AU109.2 Thermal resistance. The unit *R*-value for *cob* walls with a density of 110 pounds per cubic foot (1762 kg/m^3) shall be R-0.22 (RSI 0.0387) per inch of *cob* thickness. The unit *R*-value for cob walls with a density of 75 pounds per cubic foot (1762kg/m^3) shall be R-0.54 (RSI 0.095) per inch of cob thickness. Linear interpolation is permitted. Extrapolation is not permitted. Walls that vary in thickness along their height or length shall use the average thickness of the wall to determine its *R*-value. The thermal resistance values of air films and finish materials or additional insulation shall be added to the cob wall's thermal resistance value to determine the *R*-value of the wall assembly. Cob density shall be measured at equilibrium moisture content.

Reason Statement: This proposal does the following:

1. Removes ambiguous language, improves wording, and corrects errors.
2. Several existing definitions are modified for clarity, accuracy and consistency with other appendices.
3. Adds a definition for the term “buck” which, though used in Section R609.7.2.1, is currently not a defined term. This is the proper term associated with the predominant method of installing windows and doors in cob walls, and is used in conventional masonry construction in the IRC.

4. Moves a Commentary Figure related to window and door installation into the Appendix. This greatly assists the understanding of window and door installations in cob walls.
5. Provides historically successful options for anchoring and embedding window and door bucks, and installing windows without bucks.
6. Clarifies when an approved or engineered design is required.
7. Adds a unit R-value for cob laboratory tested at a density of 75 pcf. Linear interpolation is permitted between this density point and the 110 pcf point currently in Appendix U (based on previous testing). Linear interpolation is consistent with established R-values of the analogous material of straw-clay at densities 50 pcf and below. The R-value in the proposal for the newly tested 75 pcf is the lowest of three samples, therefore conservative, and fits on the line between 110 pcf and the 50 pcf and lower straw-clay values. Extrapolation is not permitted. Testing reports can be found at https://www.cobcode.org/cobcode-documents.
8. Removes redundancies in requirements for finishes and moisture control.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal's corrections, improved clarity and consistency, additional design options for windows and a new Figure to illustrate window installation, do not affect costs.

RB309-22

RB310-22

IRC: AU108.1, TABLE AU108.1 (New), TABLE AU105.3

Proponents: Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com); Kevin Donahue, representing Verdant Structural Engineers (kevin@verdantstructural.com); David Rich, representing Reax Engineering Inc. (rich@reaxengineering.com)

2021 International Residential Code

Revise as follows:

AU108.1 Fire-resistance rating. ~~*Cob* walls are not fire-resistance rated.~~ Cob walls that comply with Table AU108.1 shall be considered to provide a two-hour fire-resistance rating.

Add new text as follows:

TABLE AU108.1 TWO-HOUR FIRE-RESISTANCE RATED COB WALLS

Allowable superimposed load (plf)	**Density[a] (pcf)**	**Minimum compressive strength per Section AU106.6.1 (psi)**	**Wall type reinforcement per Table AU105.3**	**Minimum thickness[c] at top of wall (inches)**	**Minimum thickness[c] at bottom of wall (inches)**
1,200	100	85	E	9	12
475	50 pcf for the top 40 inches of wall height, maximum	40[b]	E or F	8	12
	70 pcf for the top 80 inches of wall height, maximum	55[b]			
non load-bearing	50 to 100[d]	>60 psi <60 psi[b]	E or F	9	9

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 0.45 kg

a. Density is to be measured at equilibrium moisture content. Average wall density shall be within +/- 5 pcf of the tabulated value.

b. Requires an *approved* engineered design per Section AU106.6.

c. Cob thickness only. The interior and exterior cob faces shall be permitted to be unfinished or receive any plaster finish allowed by this appendix.

d. Cob walls with more than one density shall be built with heavier densities below lighter densities.

Revise as follows:

TABLE AU105.3 OUT-OF-PLANE RESISTANCE METHODS AND UNRESTRAINED WALL HEIGHT LIMITS

WALL TYPE[a, g, h] AND METHOD OF OUT-OF-PLANE LOAD RESISTANCE	FOR ULTIMATE DESIGN WIND SPEEDS (mph)	FOR SEISMIC DESIGN CATEGORIES	UNRESTRAINED COB WALL HEIGHT H [b, c]		TOP ANCHOR[e] SPACING (inches)	TENSION TIE[f] SPACING (inches)
			Absolute Limit (feet)	Limit Based on Wall Thickness T [d] (feet)		
Wall 1[i]: no anchors, no steel wall reinforcing	≤ 110	A	$H \le 8$	$H \le 6T$	None	48
Wall 2: top anchors,[j] continuous vertical ~~6″ × 6″ × 6″~~ 6-inch x 6-inch 6-gage steel mesh in center of wall embedded in foundation 12 inches	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	12	24
Wall A[i]: top anchors, no vertical steel reinforcing	≤ 120	A, B	$H \le 8$	$H \le 6T$	12	48
Wall B[i]: top and bottom anchors, no vertical steel reinforcing	≤ 130	A, B	$H \le 8$	$H \le 6T$	12	48
Wall C: top and bottom anchors, continuous vertical threaded rod at 4 feet on center embedded in foundation and connected to bond beam	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	12	24
Wall D: continuous vertical threaded rod at 1 foot on center embedded in foundation and connected to bond beam	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	N/A	24
Wall E: top anchors, continuous vertical ~~6″ × 6″ × 6″~~ 6-inch x 6-inch 6-gage steel mesh 2 inches from each face of wall embedded in foundation	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	12	24
Wall F: top anchors, continuous vertical 6-inch × 6-inch 10-gage steel mesh 2 inches from each face of wall embedded in foundation	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	12	24

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.
N/A = Not Applicable

a. See Table AU106.11(1) for reinforcing and anchorage specifications for wall Types A, B, C, D and E.

b. H = height of the cob portion of the wall only. See Figure AU101.4. The maximum H is the absolute limit or the limit based on wall thickness, whichever is more restrictive.

c. Bond beams or other horizontal restraints are capable of separating a wall into more than one unrestrained wall height with an approved engineered design.

d. T = Cob wall thickness (in feet) at its minimum, without plaster.

e. $^5/_8$-inch threaded rod anchors at prescribed spacing with 12-inch embedment in cob, full embedment in concrete bond beams or full penetration in wood bond beam with a nut and washer.

f. Attach rafters to bond beam with 4-inch by 3-inch by 3-inch by 18 gage tension tie angles at prescribed spacing. See Figure AU106.9.5. Where rafters are attached to tension ties, roof sheathing shall be edge nailed.

g. All walls shall be tested for compressive strength in accordance with Section AU106.6.

h. For curved walls with an arc length to radius ratio of 1.5:1 or greater, the H/T factor shall be increased by 1, and the absolute height limit by 1 foot.

i. Wall type requires a modulus of rupture test in accordance with Section AU106.7.

j. See wall Type A in Table AU106.11(1) for top anchor requirements.

Reason Statement: A fire-resistance-rated cob wall assembly is added based on ASTM E119 test reports and an accompanying letter from the NTA/ICC testing engineers as well as Reax Engineering, which can be found at: https://www.cobcode.org/cobcode-documents. All Elements of Row 1 and 2, except for column 1 row 1 are references to the exact assembly tested in the ASTM E119 test with a field-common, 5% margin allowance for density. The requirement of column 1, row 1 is based on the ASTM E119 test and accompanying Engineering Judgment letters from NTA/ICC engineers and Reax Engineering. The requirement in footnote c is based on the unplastered assembly that was tested in the ASTM E119 test with the conservative allowance of the optional addition of plaster. The final row on the chart is based on conservatively removing the allowable superimposed load for the range of densities (50-100 pcf) tested in the ASTM E119 test. The reinforcing matches the ASTM E119 tests and the minimum thickness matches the minimum thickness of the ASTM E119 test for the highest density present (100pcf). An additional wall assembly was added to Table AU105.3 to allow for the exact gauge of reinforcing steel used in one of the ASTM E119 tests. Concerning out-of-plane loading, this system is stronger than the one tested and governing Table AU105.3, therefore this addition is conservative.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply offers options for tested fire-resistance-rated cob walls, which are no more costly than other non-rated cob walls.

RB310-22

RB311-22

IRC: AU108.1

Proponents: Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Eisenberg, representing DCAT (strawnet@gmail.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); Kevin Donahue, representing Verdant Structural Engineers (kevin@verdantstructural.com); David Rich, representing Reax Engineering Inc. (rich@reaxengineering.com); Nicholas Bartlett, representing Self (bartster84@gmail.com)

2021 International Residential Code

Revise as follows:

AU108.1 Fire-resistance rating. ~~*Cob* walls are not fire-resistance rated.~~ Cob walls that comply with all of the following shall be considered to provide a two-hour fire-resistance rating:

1. The reinforcing requirements of wall type E in Table AU106.11(1).
2. A minimum bottom of wall thickness of 12 inches (305 mm) and a minimum top of wall thickness of 10 inches (254 mm).
3. An average cob density at equilibrium moisture content, between 95 and 105 pounds per cubic foot (1602 kg/m).
4. A minimum compressive strength of 85 psi (586 kPa) per Section AU106.6.1.
5. The superimposed design load shall not exceed 1200 pounds per linear foot (2790 kg/m).
6. The interior and exterior cob faces shall be unfinished or receive a plaster finish permitted by this appendix.

Reason Statement: A fire-resistance-rated cob wall assembly is added based on ASTM E119 test reports and an accompanying letter from the NTA/ICC testing engineers as well as Reax Engineering, which can be found at: https://www.cobcode.org/cobcode-documents. Requirements in Items 1-4 are references to the exact assembly tested in the ASTM E119 test, with a field-common 5% margin allowance for density. The requirement in Item 5 is based on the ASTM E119 test and accompanying Engineering Judgment letters from NTA/ICC engineers and Reax Engineering. The requirement in Item 6 is based on the unplastered assembly that was tested in the ASTM E119 test with the conservative allowance of the optional addition of plaster.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply offers an option for a tested fire-resistance-rated cob wall, which is no more costly than other non-rated cob walls.

RB311-22

RB312-22

IRC: AW101.1

Proponents: Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org); Scott Campbell, representing NRMCA (scampbell@nrmca.org)

2021 International Residential Code

Revise as follows:

AW101.1 Scope. Buildings, structures and building elements fabricated in whole or in part using 3D-printed construction techniques shall be designed, constructed and inspected in accordance with the provisions contained in this appendix and other applicable requirements in this code.

Exception: This Appendix shall not be applicable to 3D printed buildings constructed of concrete.

Reason Statement: Experience in the field of construction 3D printing of concrete, an understanding of research in that field, and an understanding of the construction industry demonstrates that there is no consensus indicating that the material property tests called out in UL 3401 are representative of 3D printing technologies used for construction or that this particular standard in its current state considers all of the material properties necessary for a structural engineer to properly perform design calculations or ensure the safety of personnel during construction.
If this approach remains in the IRC, the concern is that this technology will be implemented for a short period of time, but will ultimately meet its demise due to issues in construction as there is not a consensus regarding construction and engineering design procedures that are addressed by this appendix. There is a lot to consider when a manufacturing method is adopted for use in construction, especially when expectations are often that structural systems are intended to last 100 years. There are many cases in construction where lack of oversite of construction considerations, such as connection or proper building energy performance (both of which have not been addressed for 3D printed construction), have led to failures in building systems. In an industry that can't accept failure, early adoption may lead early abandonment of the technology.

UL 3401 called out in this appendix does not incorporate the conclusions of current research in the field of 3D printed concrete construction. In terms of cementitious materials there is consensus that the act of 3D printing results in a difference in material strength from cast materials and that this strength differs based on element orientation (Ma et al 2018, Wolfs et al 2019, Panda et al 2017, Sanjayan et al 2018). The tests called out in UL3401 only account for vertical loading of elements with layers perpendicular to the load direction and does not account for other loading directions that may result in differences in material performance. This assumes that either this is the worst-case scenario or that buildings only undergo loading in the vertical direction. Not accounting for anisotropy does not provide an engineer with enough information to properly design for all loading conditions that a structure may experience.

Additionally, research has shown that material properties of printed materials are not the same as cast materials since they are extruded and not consolidated in a mold, which results in variation in materials performance. Therefore, tests like ASTM C157 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete are not applicable, since the test requires casting and consolidation of materials so that steel studs can be embedded for placement in the measuring device. Material performance also depends on layer height and so the test specimen sizes need to be sufficient enough to account for statistical variation in material properties due to layer height or variation in specimen dimensions based on layer height. As the ASTM tests referenced in the standard are intended for cast specimens, and such variations are not addressed in the standard, this material variation cannot be addressed by this proposal in its current state.

The most critical omission is that the UL 3401 does not account for very early age properties of cementitious materials, which is a potential construction site or facility safety issue. The standard specifically calls out slump tests (ASTM C143 or ASTM C1611). This type of test, while widely used in the field, is not applicable to printable concrete/mortars. It does not provide measurements required for determine stability of prints. Reliance on this test will lead to materials that are not printable or result in on-site safety issues. Concrete 3D printing processes can be done safely but rely on stability of the print, as there is no formwork. This requires an understanding of the yield strength, flow characteristics, elastic modulus gain over time, and strength gain over time (Perrot 2015, Roussel 2018, Wolfs 2018, Suiker 2020, Jayathilakage 2020). The slump test does not provide the level of detail required for an engineer to perform construction load and stability calculations.

While it is understood that this appendix is intended to only address the determination of material properties and printer systems, it is unclear based on the tests if design considerations were included in the determination of the material tests chosen. In general, whether for cementitious or polymeric type materials, there is a lack of publicly available studies or understanding in the structural load testing of representative components or systems for engineering applications found in construction that conclude that results from these tests can be used for design purposes. This applies whether these items are being used for structural or architectural applications. With this gap in research, it is unclear whether 3D printed elements or their connections using material values from this proposal can be properly designed for structural applications. Properties being investigated by concrete industry experts include but are not limited to: analytical methods; anchorage; bond between layers; cleanouts; durability; rheology; reinforcement types, placement and positioning; shrinkage; strength; thixotropy; time to bond; time to set; use of polymers; and viscosity.

While the appendix might be appropriate for other materials, it is not appropriate for additive manufacturing using concrete. Test and evaluation techniques used for conventional cast-in-place concrete are not sufficient and may not be appropriate for additive manufacturing using concrete. 3D printing of concrete buildings should remain an alternative means and methods until such time that the concrete industry experts develop appropriate inspection, testing, design, materials, and construction practices with an understanding of properties and performance. Designs and construction using 3D printers still can comply through Section R104.11 Alternative materials, design and methods of construction and equipment.

Bibliography: Ma et al 2018, Wolfs et al 2019, Panda et al 2017, Sanjayan et al 2018, Perrot 2015, Roussel 2018, Wolfs 2018, Suiker 2020, Jayathilakage 2020

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal excludes concrete systems from compliance with Appendix AW. It does not preclude the use of 3D printed buildings, but based on current concrete technology, encourages alternative means and methods for approval of 3D printed concrete buildings.

RB312-22

RB313-22

IRC: AW103.1

Proponents: Scott Campbell, representing NRMCA (scampbell@nrmca.org)

2021 International Residential Code

Revise as follows:

AW103.1 Design process~~organization~~. ~~3D-printed buildings, structures and building elements shall be designed by an organization certified in accordance with UL 3401 by an *approved* agency and approved by the building official in accordance with this section.~~ Designs shall be completed in accordance with the professional licensing requirements of the local jurisdiction and building code and designs shall be approved pursuant to the local jurisdiction's planning and review process.

Reason Statement: The requirement that the design of buildings, structures and building elements be performed by entities approved by a 3rd party organization is contrary to the professional licensing laws in all jurisdictions. A professional license is the legal requirement to perform design in the area of expertise of the licensee and, along with compliance with the building code, is sufficient for the design of any structure.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No change to construction practice is proposed. If anything, this proposal will decrease the cost of construction by eliminating a requirement for 3rd party certification of the design professional.

RB313-22

RB314-22

IRC: (New), APPENDIX AY (New), AY101 (New), AY101.1 (New), AY101.1.1 (New), AY101.2 (New), AY102 (New), AY201.1 (New), SECTION 202 (New), AY103 (New), AY103.1 (New), AY104 (New), AY104.1 (New), AY104.1.2 (New), AY104.1.3 (New), AY104.1.4 (New), AY105 (New), A105.1 (New), AY105.2 (New), AY105.3 (New), AY105.4 (New)

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Add new text as follows:

Users note. *The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*
About this appendix: *Appendix AY provides for the design and construction of accessory dwelling units (ADUs), an alternative to two- and multi-family residential construction that promotes increased housing supply and affordability.*

APPENDIX AY
ACCESSORY DWELLING UNITS (ADUs)

AY101
GENERAL

AY101.1 Scope. ADUs proposed for existing residential construction shall be in accordance with this appendix, other applicable requirements in this code and shall not exceed the scoping limitations of Section R101.2.

AY101.1.1 Prohibited Conditions. An ADU shall not be permitted within:

1. Live/work units located in townhouses.
2. Owner-occupied *lodging houses* with five or fewer guestrooms.
3. A care-facility with five or fewer persons receiving medical care or custodial care within a *dwelling unit*.
4. A care-facility with five or fewer persons receiving care within a single-family dwelling.

AY101.2 Conditions. ADUs shall be permitted without requiring a *change of occupancy* to either a two-or multi-family *dwelling* where in compliance with all of the following:

1. Only one ADU shall be permitted for each primary dwelling unit.
2. The owner of a property containing an ADU shall reside in either the primary dwelling unit or the ADU, as of the date of permit approval.
3. An ADU shall have a separate house number from the primary dwelling unit.
4. ADUs shall be secondary in size and function to the primary dwelling unit and shall comply with all of the following limits.
   4.1. Not less than 190 square feet (17.65 m^2) in area.
   4.2. Not more than 50 percent of the area of the primary dwelling unit.
   4.3. Not more than 1,200 square feet (111 m^2) in area.
5. An ADU shall be provided with a separate entrance than that serving the primary dwelling unit either from the exterior of the building or from a common hallway located within the building.
6. An ADU shall have a maximum number of two bedrooms.
7. The location of a detached ADU shall comply with Section R302.
8. An ADU shall be provided with adequate provisions for electricity, water supply and sewage disposal.

AY102
DEFINITIONS

AY201.1 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein.

Add new definition as follows:

ACCESSORY DWELLING UNIT (ADU). An additional, subordinate dwelling unit on the same lot, that is entirely within a dwelling unit, attached to a dwelling unit, or in a detached structure.

Add new text as follows:

AY103
PERMITS

AY103.1 Required. Any owner or owner's agent who intends to construct an ADU within an existing or proposed building or structure shall first make application to the building official and obtain the required permit.

AY104
ADU PLANNING

AY104.1 Design. Except as modified by this section, building planning shall be in accordance with Chapter 3 and building structure shall comply with Part III of this code.

AY104.1.2 Means of egress. The path of egress travel from an ADU to a public way or to a yard or court that opens to a public way shall be independent of, and not pass through the primary dwelling unit.

AY104.1.3 Fire separation. For ADUs adjoining the primary dwelling unit, the 1-hour fire-resistance rated wall and floor assembly provisions of Section R302.3 shall not be required provided that both of the following conditions have been met:

1. The interconnection of smoke alarms per Section R314.4 activates the smoke alarms in both the primary dwelling unit and the ADU.
2. The interconnection of carbon monoxide alarms per Section R315.5 activates the carbon monoxide alarms in both the primary dwelling unit and the ADU.

AY104.1.4 Smoke and carbon monoxide alarms. For ADUs adjoining the primary dwelling unit, the interconnectivity of smoke alarms and carbon monoxide alarms may be independent for the primary dwelling unit and the ADU provided that a 1-hour fire-resistance rating is provided for walls and floor assemblies as per R302.3.

AY105
UTILITIES

A105.1 Heating, ventilation and air-conditioning systems. A primary dwelling unit and an ADU shall be provided with:

1. A separate heating system.
2. Separate ducting for heating and cooling systems. Return air openings for heating, ventilation and air-conditioning shall not be taken from another dwelling unit.
3. Separate climate controls.

AY105.2 Electrical systems. A primary dwelling unit and an ADU shall be provided with:

1. Ready access to the service disconnecting means serving the dwelling unit.
2. Ready access for each occupant to all overcurrent devices protecting the conductors supplying the dwelling unit in which they reside.

AY105.3 Gas piping. A primary dwelling unit and an ADU shall be provided with:

1. Ready access to shutoff valves serving the dwelling unit in which they reside.
2. Ready access to appliance shutoff valves serving appliances in the dwelling unit in which they reside.

AY105.4 Water service. A primary dwelling unit and an ADU may share a common potable water system provided that there are separate, accessible main shutoff valves allowing the water to be turned off on one-side without affecting the other.

Reason Statement: Accessory dwelling unit (ADU) is a term already in use across the United States – including Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, the District of Columbia, Florida, Hawaii, Idaho, Illinois, Indiana, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, North Carolina, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Utah, Vermont, Virginia, Washington, and Wisconsin. However, the definition of an ADU and associated code requirements vary significantly not only state to state, but from jurisdiction to jurisdiction. Changes were made to the *International Zoning Code* (IZC) during the recent Group A Code Development Cycle to provide a definition and framework of requirements in an effort to create a uniform understanding of ADUs. It is also important to note the lack of building codes and standards has created circumstances where the requirements are being determined through local and state legislative processes, instead of ICC's code change process, which is a consensus process driven by the knowledge and experience of code officials.
This code change proposal to create a new voluntary appendix to the IRC incorporates those portions adopted into the IZC that are not inextricably

tied to zoning conditions, while adding fundamental building design criteria affecting life safety.

Section A__101

is nearly identical to the parameters established in the IZC. The distinctions being:

1) Clarifying language that creating / proposing an ADU does not automatically trigger a *change of occupancy* from a one-family to a two-family, or from a two-family to a multi-family, provided all conditions are met.

2) The IZC included one requirement affecting off-street parking which is beyond the scope of the IRC.

3) New language is provided that the additional design parameters for an ADU not addressed in this Appendix default back to the IRC.

4) New language makes it clear that ADUs within existing residential dwellings shall not be in addition to live/work units, lodging houses, or care facilities with five or fewer people.

As explained in the reason statement provided previously to the IZC:

Section A__101.1 Conditions

propose eight (8) requirements that ensure the ADU does not become a "duplex" or second single-family home on the same lot. Should these conditions not be met, the proposed ADU must be considered as a separate *dwelling unit* with all applicable regulations of the IBC, IEBC, or IRC in effect.

· Item 1 re-affirms the subordinate nature of the ADU to the primary dwelling unit;

· Item 2 establishes an Owner-occupancy requirement;

· Item 3 requires a separate address for the ADU from the primary unit.

· Item 4 sets size parameters for the ADU.

o The minimum square footage of 190 SF aligns with the IBC minimum for an efficiency unit.

o The maximum size is based on a comparison of requirements in effect in CO, OR, MA, CA, and VA which ranged from 750 SF to 1,400 SF; most between 1,000 SF and 1,200 SF.

o A similar comparison between percentages of the primary unit showed 30% to 50% with more jurisdictions favoring the higher value.

· Item 5 requires a separate entrance to prevent a house that has a second kitchen (such as a recreation room in a basement with a cooking area), but are not an ADU from being mandated to meet the ADU requirements.

· Item 6 limits the unit to two bedrooms to minimize parking demands normally associated with zoning ordinances while still allowing the ADU to address housing market demands and cost concerns.

· Item 7 is a pointer to the multiple buildings on a single lot requirements of Section R302.

· Item 8 recognizes the need for an ADU to have adequate utilities.

Section A__102 creates two definitions matching those added to the IZC. The first recognizes the common parlance of an Accessory Dwelling Unit (ADU) and points to the second definition, which describes the use more accurately as a subset of a *dwelling unit* defined in Chapter 2.

The content of the definition for an ADU was developed based on similarities found in existing Zoning ordinances in effect around the United States, and distinguishing the difference between and ADU and a Two-Family Dwelling; i.e., the subordinate nature of the size and function to the primary or second dwelling unit. Though subordinate is not a defined term in Chapter 2, there is precedent in the I-Codes for using the term (for example see the IZC definitions for *Accessory Building* – "an incidental <u>subordinate</u> building…" and *Home Occupation* – "the partial use of a home for commercial or nonresidential uses by a resident thereof, which is <u>subordinate</u> and incidental…"

The definition is intended for integration throughout the I-Codes, as further code development cycles address specific code regulations for the IBC, and IEBC, depending on the type of ADU proposed. This definition recognizes that an ADU features the same components of a dwelling unit in terms of living, sleeping, eating, cooking and sanitation which presently can only be defined in the I-Codes as a *dwelling unit*. The reality is that the application of the ADU concept in different jurisdictions is inconsistent, and at times may allow deviation from the full requirements the code prescribes for a two-family dwelling unit arrangement. It is necessary to recognize the unique circumstances wherein an ADU must comply with those two-family dwelling unit requirements, and when alternative arrangements are acceptable that do not compromise the health, safety, and welfare of the Public. The definition also recognizes that the ADU can either be within the primary dwelling unit (such as in the basement of a single-family home) or a detached accessory structure (similar to a detached garage).

The definition avoids non-enforceable provisions such as if the ADU is rented, the relationship between the person(s) in the ADU and the primary dwelling, and characteristics that would preclude placement within the IBC, IEBC, IRC, and IZC.

Section A__103

establishes consistent permitting criteria for an ADU as is expected for a *dwelling unit*.

Section A__104 establishes that the design of an ADU is similar in most respects to a *dwelling unit* but with a few allowances to avoid triggering a change of occupancy. The most important distinction pertains to an ADU that adjoins the primary dwelling unit whereby the design professional may consider an either / or proposition regarding the installation of fire-resistance rated separations tantamount to a two-family dwelling **or** making the smoke alarm and carbon monoxide alarms interconnected between both the primary and accessory dwelling units.

Section A__105 establishes consistency for both the primary and accessory dwelling units to access to / control of the utility connections affecting their respective spaces.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not increase nor decrease the cost of construction. The proposal creates a voluntary appendix allowing someone to build an accessory dwelling unit within a building legally constructed in accordance with the IRC. No one is under any obligation to build an ADU, nor are they required to plan for the construction of a future ADU.

For someone choosing not to construct an ADU these code provisions will not be applicable; there are no cost implications.

For someone choosing to construct an ADU these code provisions are applicable; the cost of construction will increase proportionally to the size of the project. According to an article titled *Calculating the Costs of Building an ADU* published on the BuildinganADU.com blog, the average cost for an ADU from 2016-2019 based on their research is as follows:

- Detached New Construction: $305/SF
- Basement ADU: $265/ SF
- Attached ADU: $300/ SF
- Garage Conversion: $297/ SF
- Detached New Construction Above a Garage: $212/ SF

RB314-22

RB315-22

IRC: APPENDIX AY (New)

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz); Rob Brooks, representing DuPont (rob@rtbrooks.com)

2021 International Residential Code

Add new text as follows:

APPENDIX AY
EXTENDED PLATE WALL CONSTRUCTION

SECTION AY101
GENERAL

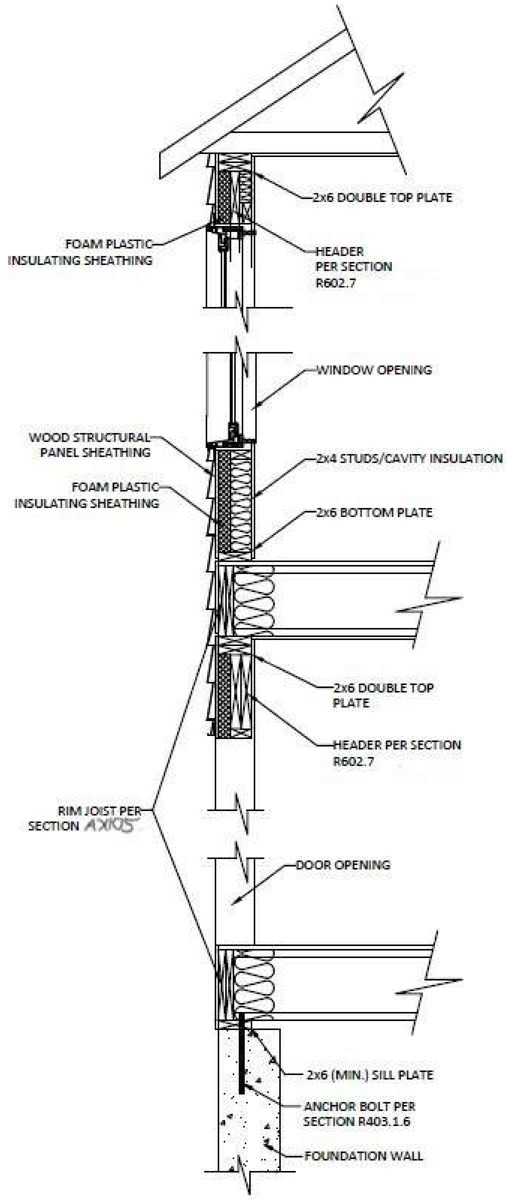
AY101.1 General. Detached one- and two-family or townhome buildings using extended plate wall (EPW) construction shall comply with the *International Residential Code* and all of the following:

1. Not more that two stories above grade plane in height.
2. Limited to Seismic Design Categories A and B as determined from Figures R301.2.2.1(1) through (6).
3. Limited to ultimate design wind speeds no more than 115 mph as determined from Figure R301.2(2).
4. Comply with the provisions of Section R602 of the *International Residential Code*, except as modified by the provisions of this Appendix.

   Exception: Buildings using EPW construction in accordance with an *approved* design by a *registered design professional*.

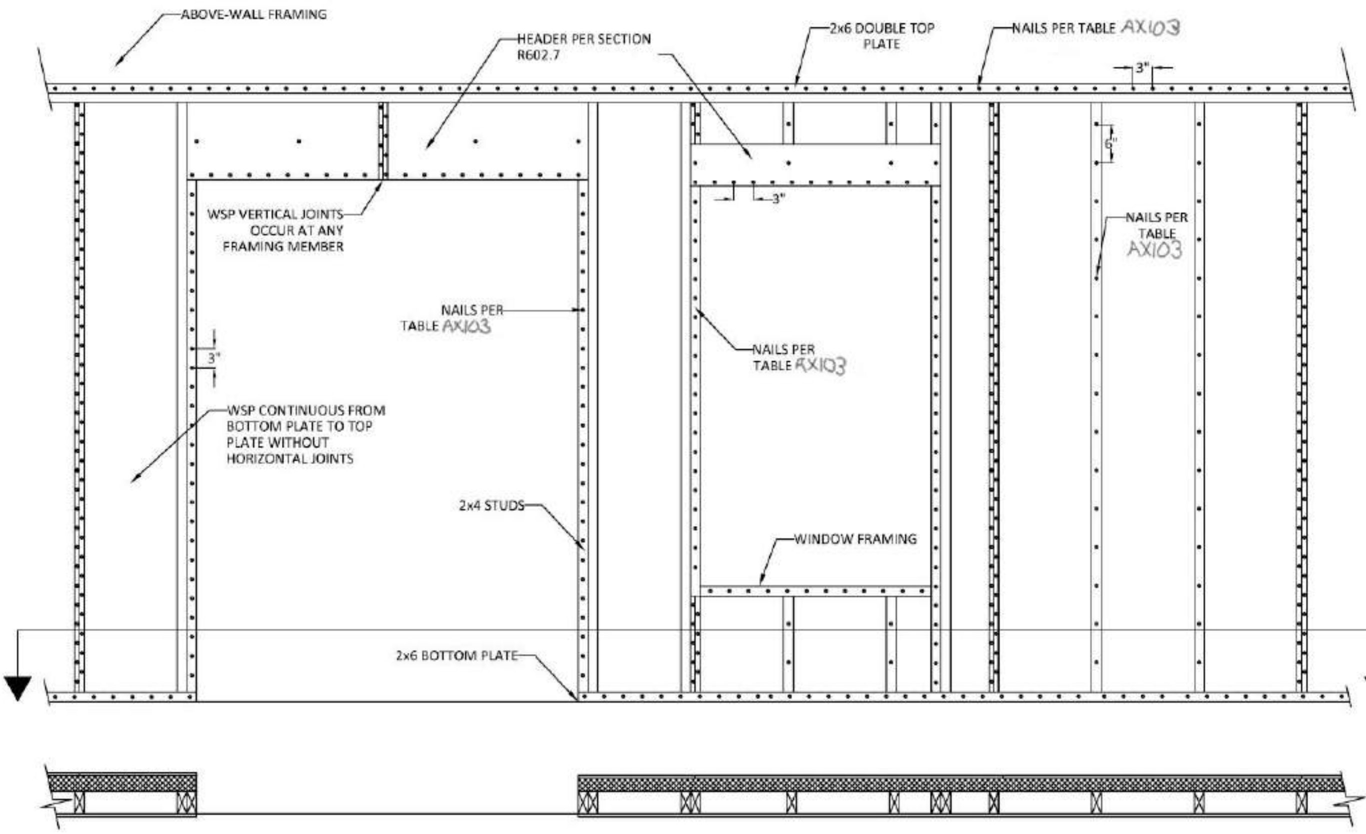
SECTION AY102
CONSTRUCTION REQUIREMENTS

AY102.1 Framing. The 2x6 top and bottom plates and 2x4 studs shall be used in accordance with Figures AY102.1(1) and AY102.1(2). A single top plate shall not be permitted. Wall framing shall comply with requirements for 2x4 framing in accordance with Section R602 of the *International Residential Code.*



(Reference in note on bottom left should be to AY102.4)

FIGURE AY102.1(1) Extended Plate Wall (EPW) Construction, Section View



(Reference in Figure should be to AY102.2 (6 locations))

FIGURE AY102.1(2) Extended Plate Wall, Elevation View

AY102.2 Wood structural panel sheathing. Wood structural panel sheathing with a nominal thickness of 7/16-inch (11 mm) to 1/2-inch (12.7mm) shall be installed vertically and attached to wall plates and studs in accordance with Table AY102.2 and Figure AY102.1(2). The vertical joints between adjacent wood structural panels shall occur only at framing members. Where used as part of wall bracing, each wood structural panel shall be installed without horizontal joints between the extended top and bottom plates.

TABLE AY102.2 Sheathing Fastener Requirements for EPW

Minimum Nail Length and Diameter	**Maximum Fastener Spacing**	
	At Perimeter of Wood Structural Panels (inches)	**In Field of Wood Structural Panels (inches)**
No. 37 Power-tool Driven Common Nail (3-1/2" x 0.131") [a,b,c]	3" O.C.	6" O.C.
16d Box Nail (3-1/2" x0.135")[a,cd]	3" O.C.	6" O.C.

For SI: 1-inch = 25.4 mm

a. At top and bottom plates where the wood structural panel is in direct contact with the framing, 8d common nail (2-1/2" x 0.131") shall be permitted.

b. Full round head nail with minimum head diameter of 0.281 inches (7 mm).

c. Nails are in accordance with ASTM F1667.

AY102.3 Wall bracing. Wall bracing for EPW construction shall comply with the requirements for WSP or CS-WSP or CS-G bracing methods in Section R602.10 of the *International Residential Code*, except that the sheathing fasteners shall comply with Table AY102.2.

AY102.3.1 Simplified wall bracing. With the exception of Section R602.12.2 Item 2, provisions of Section R602.12 of the *International Residential Code* shall be applicable to EPW construction. The fastening schedule for wood structural panels shall comply with Table AY102.2.

AY102.4 Rim joist. Rim joists supporting an EPW shall comply with Figure AY102.4(1) or Figure AY102.4(2). Sawn 2x lumber or engineered wood rim board shall be used to construct rim (band) joists. Engineered wood rim board shall comply with Section R602.1.7 of the *International Residential Code*. The minimum bearing length requirements for the floor joists shall be satisfied or joists shall be supported with metal hangers.

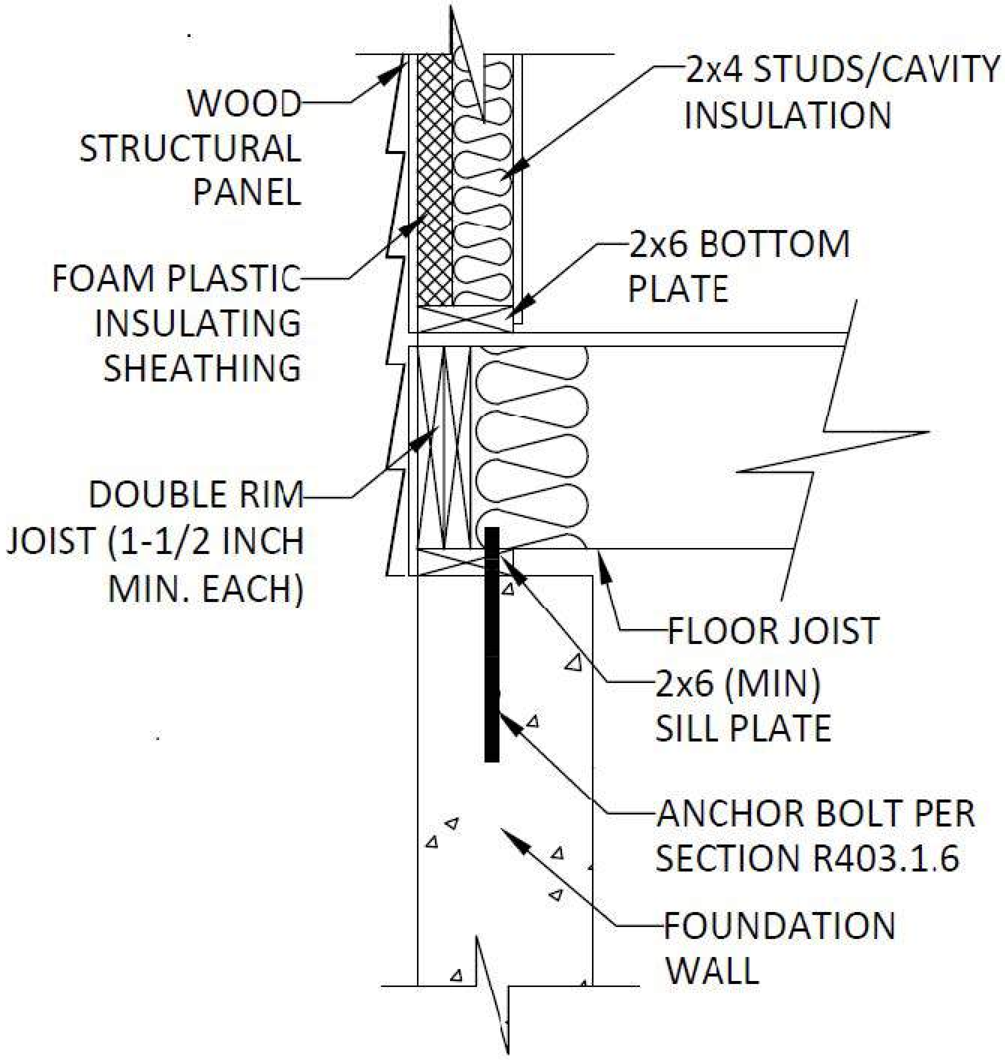


FIGURE AY102.4(1) Rim Joist Construction for EPW - Double Member

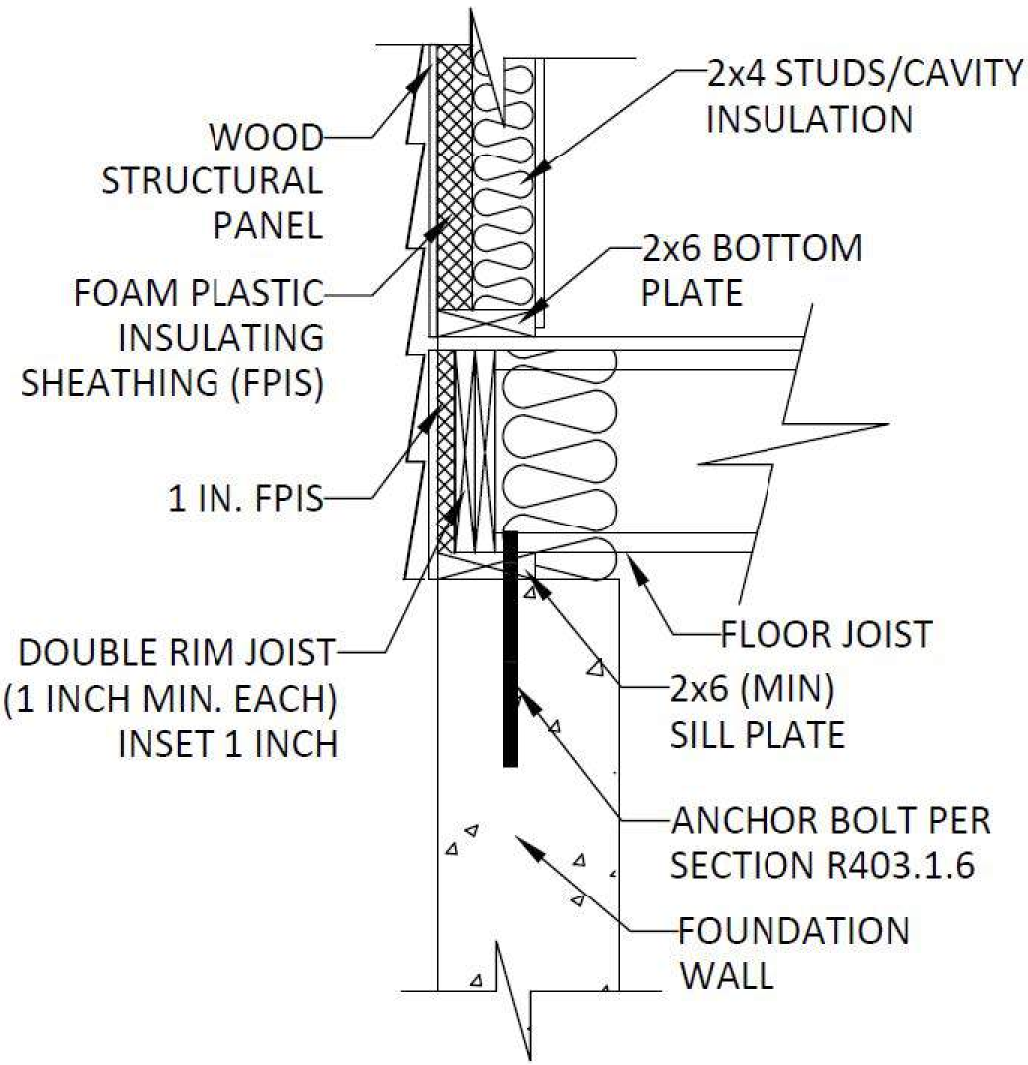


FIGURE AY102.4(2) Rim Joist Construction for EPW - Inset Double Member

AY102.4.1 Rim joist used as rim header. Wood rim boards, or band joists, that serve as rim board headers shall be constructed in accordance with Section R602.7.2 of the *International Residential Code*.

AY102.5 Foam plastic insulating sheathing. Foam plastic insulating sheathing with a total thickness of 2 inches (51 mm) shall be installed between top and bottom plates directly to the exterior surface of the 2x4 studs and flush with the 2x6 top and bottom plates as shown in Figure AY102.1(1). The foam plastic insulating sheathing shall comply with ASTM C578 or ASTM C1289 with a minimum compressive strength of 15 psi and shall be permitted to be installed in one or more layers.

AY102.6 Cladding attachment. Cladding shall be specified and installed in accordance with Section R703 of the *International Residential Code* and one of the following:

1. Table R703.3.3 for siding attachment to wood structural panels only.
2. Table R703.8.4(2) for brick tie-spacing and attachment to wood structural panels only.
3. Fastening schedule and fasteners as required by Table R703.3(1), except fastener length shall be selected to meet or exceed the minimum required penetration into framing.

AY102.7 Uplift connections. Where roof uplift tie-downs are required in accordance with Section R802.11 of the *International Residential Code*, the roof tie-downs shall be fastened to either side of the double top plate or, where required to be fastened to studs, shall be installed on the interior face of the EPW in accordance with manufacturer's installation instructions. Where uplift forces determined in accordance with Section R602.3.5 require approved uplift connectors between floors or between foundation and the floor, these uplift connectors shall not rely on wood structural panel sheathing for resisting the wind uplift forces.

Reason Statement: Jay Crandell, P.E., representing FSC:

This proposal includes requirements for Extended Plate Wall (EPW) construction in a non-mandatory appendix to the IRC, alongside other innovative construction methods found in other appendices. Where this proposed appendix is adopted, EPW construction will provide a practical compliance option for meeting energy code requirements for above-grade walls using conventional wood framing materials. EPW construction uses standard framing, sheathing, fastening and insulating materials configured for optimized constructibility and performance. The EPW framing system has been extensively evaluated in the lab and in practice for its structural performance, moisture performance, energy performance and constructibility in the field by the Home Innovation Research labs (see website link in the Bibliography for various technical reports, guides, and resources). The evaluations were funded by the USDA's Forest Products Laboratory, U.S. Department of Energy, New York State Energy Research and Development Authority, and the American Chemistry Council. Four demonstration homes have been constructed and have been occupied and in successful use for many years. The wall system can be assembled in the field or fabricated in a factory for on-site installation. Based on the scope of the evaluations, the proposed system is limited to low-seismic and low-wind areas. For conditions outside of the scope limitations, the proposal requires an approved engineering design.

Rob Brooks, RBA, representing DuPont:

The 2021 IECC has expanded the optional prescriptive use of continuous insulation to include much of the US covered by Climate Zones 3-8. This has increased interest in, and the need for, cost-effective and innovative methods to construct wood frame, above-grade residential walls with continuous insulation. DuPont, together with the government agencies listed in the FSC reason statement have partnered to offer an alternative wall framing method that uses 2x4 studs and 2x6 plates, complete with installation instructions. The construction method was designed to impact the fewest possible trades.

Testing of the EPW method was completed in 2017, training guides were produced in 2018, and a 2021 IRC code change proposal was introduced in 2019 for Section R602. The proposal was disapproved citing the need for engineering oversight of a system that could go up to 3 stories in height, higher wind and seismic areas with wind uplift.

This code change proposal adds further conservatism to the 2021 IRC proposal by using the following:

1) Adding these provisions through an Appendix, giving jurisdictions the option to adopt this construction method.

2) Limited the applicable areas to Seismic A and B, and wind speeds less than 115 mph.

3) Limit the building height to two stories or less.

4) Adding language to address wind uplift.

Bibliography: www.homeinnovation.com/EPW

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This framing method is an alternative to existing framing methods and will not increase the cost of construction. Where continuous insulation is to be installed, this method will decrease the cost of construction.

RB315-22

RB316-22

IRC: AY101 (New)

Proponents: Jacob Waddell, representing US Hemp Building Association (President@ushba.org); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com); Mary Dempsey, representing Mpactful Ventures, PBLLC (mary@mpactfulventures.org); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); Kiko Thébaud, representing Kiko Thébaud, Architect (kikothebaud@gmail.com); Cameron McIntosh, representing Americhanvre LLC (cameron@americhanvre.com); Matt Marino, representing Homeland Hempcrete (matt@homelandhempco.com); Anastasiya Konopitskaya, representing Coexist Build LLC (ana@coexist.build); Chris Magwood, representing Endeavour Centre (chris@endeavourcentre.org); Graham Durrant, representing Hemp-Lime Spray Limited (hemplimespray@yahoo.com); Timothy Callahan, representing Self (t.l.callahan@icloud.com); Matthew Mead, representing Hempitecture Inc. (mattie@hempitecture.com); Jennifer Martin, representing HempStone LLC (jennifer@hempstone.net); Tom Rossmassler, representing Hempstone, LLC (tom@hempstone.net); C Michael Donoghue, representing Maritech Engineering, Inc (cmd@maritechengineering.com); Anthony Néron, representing DuChanvre (info@duchanvre.com); Marilynn Hill, representing Self (knowledgeisliving@yahoo.com); Laurent Goudet, representing Expert hemp concrete builder; Sergiy Kovalenkov, Hempire International, representing Hempire International (sergiy@hempire.tech); Dion Lefebvre, representing Divita Hemp Block (8thfireinnovations@gmail.com)

2021 International Residential Code

Add new text as follows:

SECTION AY101
GENERAL

AY101.1 Scope. This appendix shall govern the use of hemp-lime as a nonbearing building material, and wall infill system in Seismic Design Categories A, B, and C, and in Seismic Design Categories D_0, D_1, and D_2 with an *approved* engineered design by a *registered design professional* in accordance with Section R301.1.3.

SECTION AY102
DEFINITIONS

AY102.1 General. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 for general definitions.

BINDER. The material that binds the hemp hurd in a hemp-lime mix.

BONDING COAT. The initial thin layer of binder-rich granulated plaster used in lined applications of hemp-lime construction to ensure adhesive and/or mechanical bonding. Also known as gobetis.

CAST-IN-PLACE. Installation of hemp-lime mix by hand or by spraying into forms in its permanent location.

CASTING. Placing wet hemp-lime into forms.

CLAY. Inorganic soil with particle sizes less than 0.00008 inch (0.002 mm) and having the characteristics of high dry strength and medium to high plasticity, used as a binder of other component materials in clay plaster.

CLAY SUBSOIL. Subsoil sourced directly from the earth, containing clay, sand and silt, and containing not more than trace amounts of organic matter.

FIBER CLUMPS. Long fibers that are attached to hemp hurd, or for other reasons, cause clumping of fibrous balls when agitated.

FINISH. Exposed surface material on the interior or exterior face of a hemp-lime infill wall.

FORM. The material into which hemp-lime infill, panels, or blocks are cast.

FORMWORK. The system of forms, their bracing and fasteners assembled for casting of hemp-lime infill.

HAND CAST. Hemp-lime infill cast by placing hemp-lime mix into formwork and evenly tamping by hand or with a tool.

HEMP. A class of the Cannabis sativa plant grown for industrial purposes in which the concentration of total delta-9 tetrahydrocannabinol (THC) in the flowering tops is equal to or less than the regulated maximum level established by authorities having jurisdiction.

HEMPCRETE. Common usage term for hemp-lime.

HEMP-LIME. A bio-aggregate composite consisting of hemp hurd and a lime-based binder. Also known as hempcrete.

HEMP HURD. The chopped woody core of the stalks of the hemp plant, stripped of its surrounding hemp fibers. Also known as hemp shiv or shive.

INFILL. Hemp-lime placed between or around the structural or nonstructural framing of a building as insulation, thermal mass, and a substrate for finish.

LIFT. A horizontal layer of hemp-lime infill.

LIME. Lime is composed of calcium hydroxide ($Ca(OH)_2$) including Type N or S hydrated lime, hydraulic lime, natural hydraulic lime or slaked quicklime.

LINED APPLICATION. Installation of a vertical hemp-lime layer, lining a masonry or concrete wall.

NATURAL CEMENT. Hydraulic cement made from naturally occurring limestone.

NONBEARING. Not bearing the weight of the building other than the weight of the hemp-lime infill and its finish.

PLASTER. Lime, clay, clay-lime, or hemp-lime plaster as described in Section AY104.3, applied to the interior or exterior face of hemp-lime walls.

POZZOLAN. A siliceous or alumino-siliceous material that when finely divided and combined with hydrated lime in the presence of water forms new chemical compounds with cementitious properties.

PRECAST. Blocks or panels of hemp-lime formed and cured before installation.

SCREEDING. Removal of excess material to form a planar surface.

REED MAT. A mat consisting of reed, cane, bamboo, or other similar plant material.

SPRAY-APPLIED. A method of mechanical projection of hemp-lime applied onto or into a form using compressed air.

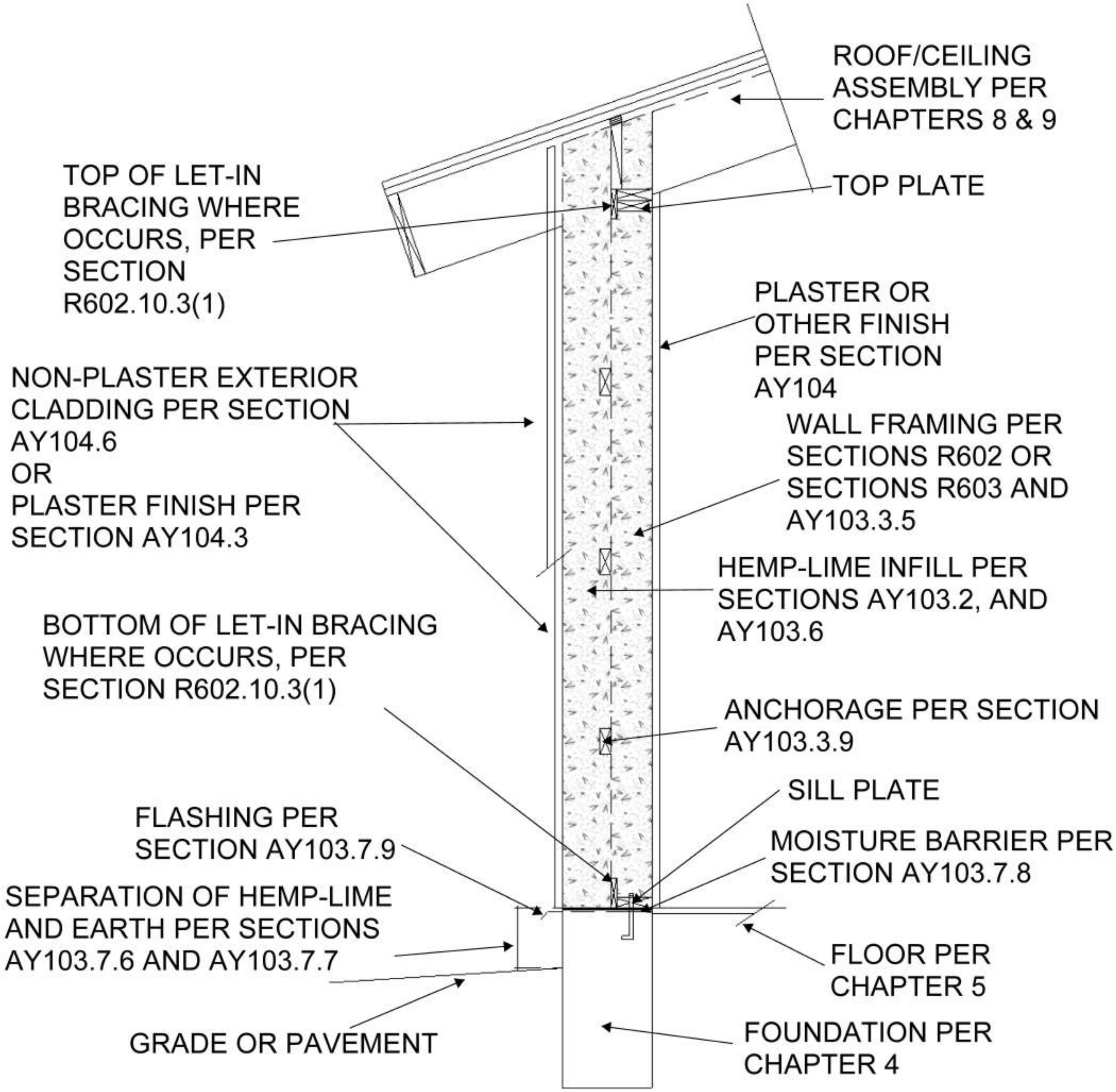
TADELAKT. A lime-plaster which is compressed, polished, and treated with oil-based soap to make it water-repellant.

UNIT WALL WEIGHT. The unit wall weight is the calculated weight of a 1 foot by 1 foot (305 mm by 305 mm) section of wall surface area times the full wall thickness, including finishes. The unit wall weight is the sum of the weight of each constituent material times its volume, expressed as psf.

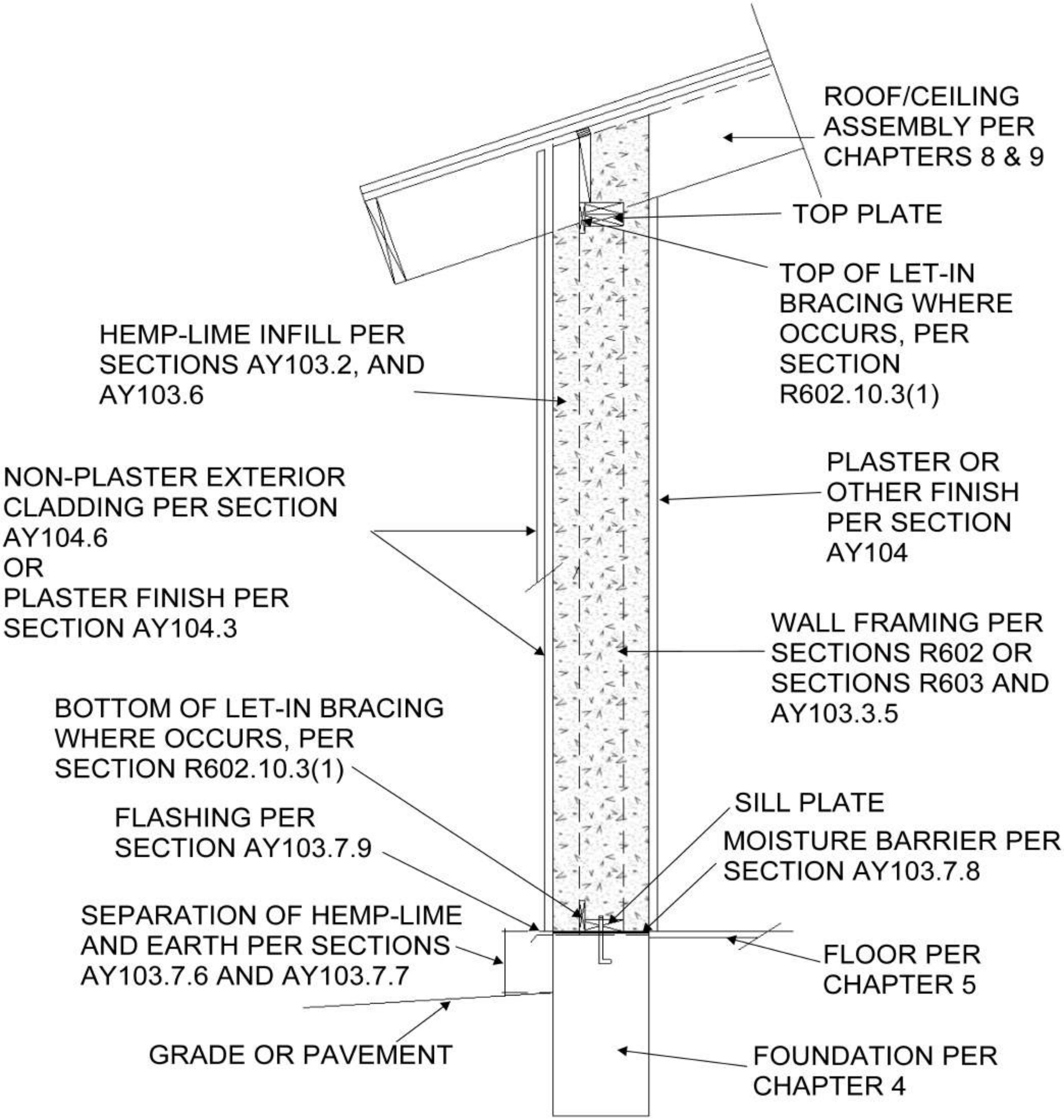
VOID. Any space in a hemp-lime wall greater than ¼ inch (6 mm) wide, 2 inches (51mm) long and 2 inches (51 mm) deep.

SECTION AY103
HEMP-LIME CONSTRUCTION

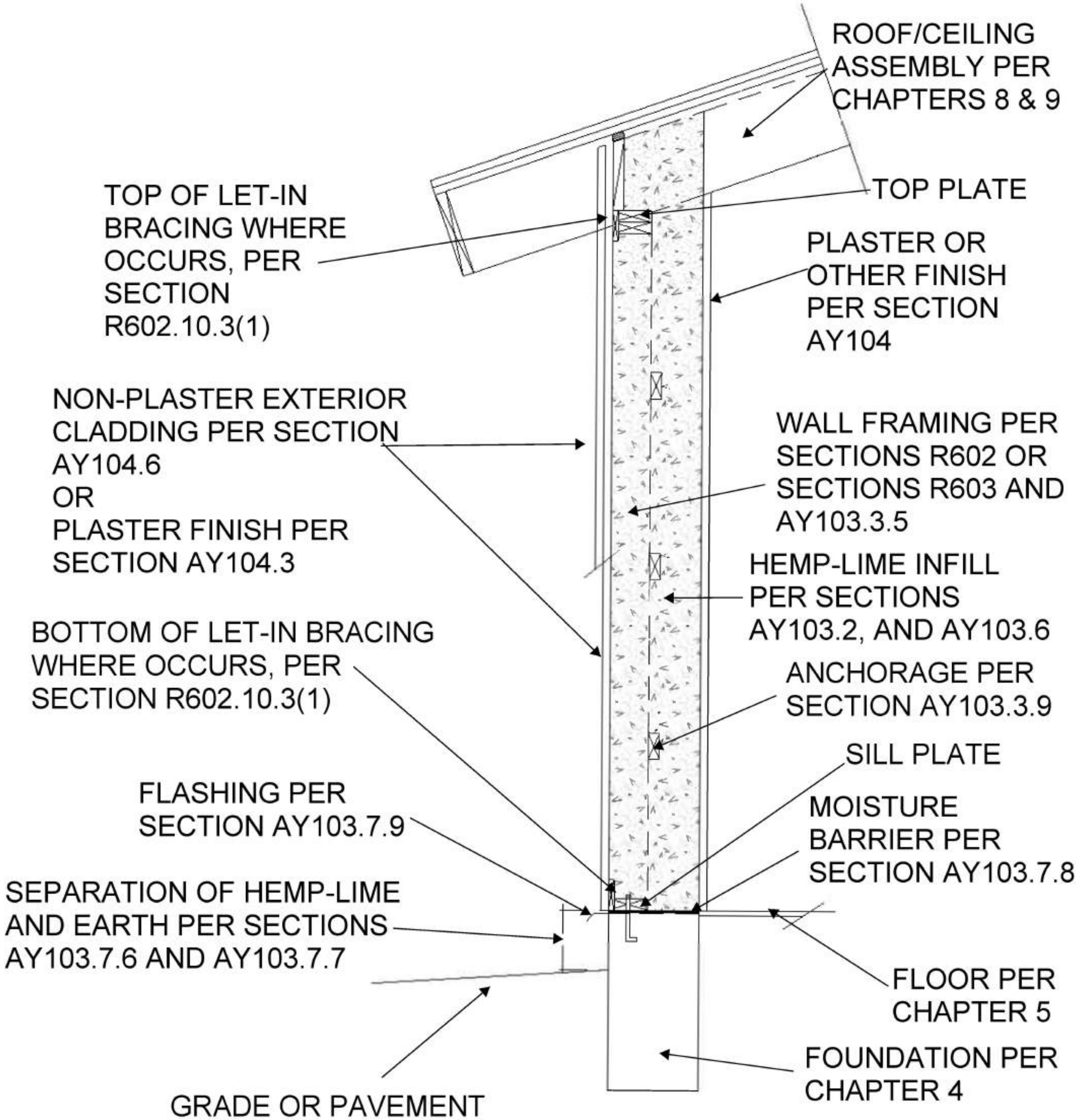
AY103.1 General. Hemp-lime construction shall be limited to the non-structural, solid *infill* mix of *hemp hurd* and its *binder* between or around structural and non-structural wall framing. Hemp-lime *infill* shall have a density ranging from 12.5 lb/ft^3 to 25 lb/ft^3 (200 kg/m^3 to 400 kg/m^3). Hemp-lime walls shall be designed and constructed in accordance with Section AY103 and with Figures AY103.1(1) through AY103.1(4) or an *approved* alternative design.



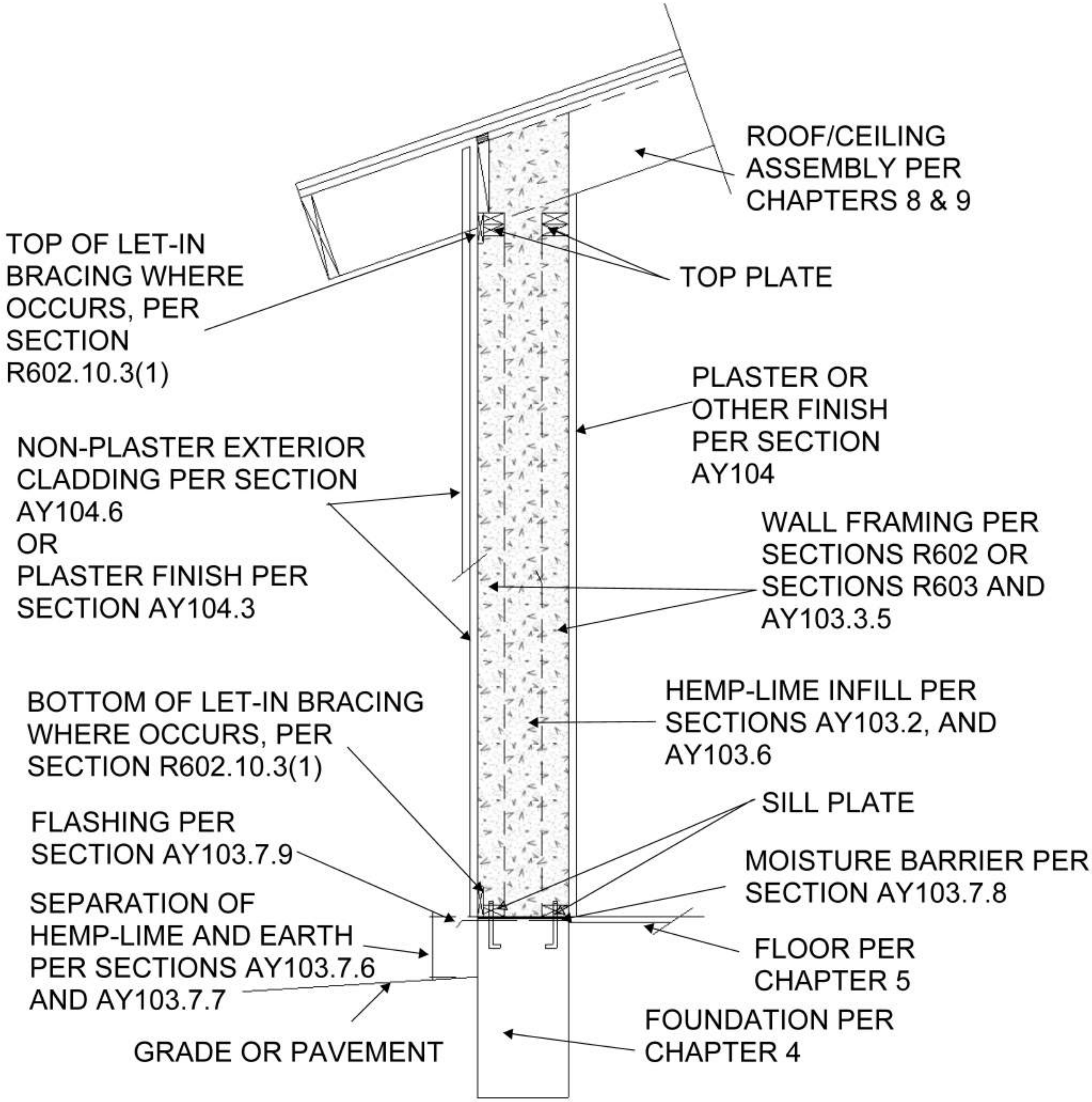
AY103.1(1) TYPICAL HEMP-LIME WITH INTERIOR STUD FRAMING



AY103.1(2) TYPICAL HEMP-LIME WITH CENTER STUD FRAMING



AY103.1(3) TYPICAL HEMP-LIME WITH EXTERIOR STUD FRAMING



AY103.1(4) TYPICAL HEMP-LIME WITH DOUBLE STUD WALL FRAMING

AY103.2 Materials. Materials to be used in hemp-lime construction shall be in accordance with Sections AY103.2 through AY103.2.3.

AY103.2.1 Hemp hurd. *Hemp hurd* shall match the specifications of the *approved* test samples in Sections AY106.3 and AY107.1. *Hemp hurd* shall be substantially free from dust and *fiber clumps* such that the installed hemp-lime maintains its integrity.

AY103.2.2 Binders. Acceptable *binders*, singular or in combination, include hydraulic *lime*, hydrated *lime*, *pozzolans*, *natural cements*, or other *binders* that match the specification of the *approved* test samples in Sections AY106.3 and AY107.1.

AY103.2.3 Water and water additives. Water and any water additives shall match the specifications of the *approved* test samples in Sections AY106.3 and AY107.1.

AY103.3 Structure. The structure of buildings using hemp-lime *infill* shall be in accordance with the IRC and Sections AY103.3.1 through AY103.3.9 or with an *approved* engineered design by a *registered design professional*.

AY103.3.1 Limitations and requirements for buildings using hemp-lime infill. *Buildings* using hemp-lime *infill* shall be subject to the following limitations and requirements:

1. Number of stories: not more than one *story above grade plane.*
2. The building height shall not be more than 25 feet (7620 mm).
3. Braced wall panel lengths: in accordance with Section R602.10.3 and Section AY103.3.2.
4. Unit wall height: Hemp-lime walls shall not exceed an average *unit wall weight* of 65 pounds per square foot (217 kg/m^2).

AY103.3.2 Bracing. Bracing for buildings with hemp-lime *infill* in Seismic Design Categories A, B, and C shall be in accordance with Section R602.10 and in accordance with the following. Walls with hemp-lime *infill* shall use Method LIB and shall not be braced with solid sheathing. Hemp-lime *infill* walls utilizing Method LIB shall not require gypsum board to be installed and the minimum braced wall lengths listed in Section R602.10. Adjustment factors in Table R602.10.3(4) shall be used as applicable. Alternatively, hemp-lime *infill* walls shall comply with Section R301.1. Walls or wall sections without hemp-lime *infill* shall be permitted to use any bracing method allowed in Section R602.10.

AY103.3.3 Connection of light-frame walls to hemp-lime walls. Light-frame walls perpendicular to, or at an angle to a hemp-lime wall assembly, shall be fastened to the hemp-lime wall in accordance with Section R602 or R603.

AY103.3.4 Hemp-lime thickness. Hemp-lime *infill* shall be not less than 3 inches (76 mm) thick between face of framing and finish. Maximum hemp-lime wall thickness is limited by the average *unit wall weight* limit of 65 pounds per square foot (317 kg/m^2) in Section AY103.3.1, Item 4.

AY103.3.5 Contact with structural metal. Structural metal members and components in contact with hemp-lime shall be protected in accordance with Section AY103.4.

AY103.3.6 Contact with wood members. Hemp-lime shall be permitted to be in contact with untreated wood members.

AY103.3.7 Openings in walls. Door, window, and similar openings in hemp-lime walls shall be in accordance with the following:

1. Rough framing for doors and windows shall be part of, or be fastened to the wall framing in accordance with the IRC.
2. An *approved water-resistive barrier* shall be installed at openings in hemp-lime walls in accordance with Sections AY103.7.4 and AY104.5.1.
3. Header size and their maximum span above openings in bearing walls with hemp-lime *infill* shall be determined with Table R602.7(1) and Table AY103.3.7 or a design approved by a registered design professional
4. *Cast-in-place* hemp-lime over and overhanging the face of a header more than 3 inches (76 mm) shall require an *approved* design of its support by a *registered design professional.*
5. Hemp-lime blocks overhanging headers shall require an *approved* design of their support by a *registered design professional.*

TABLE AY103.3.7 ALLOWABLE HEADER SPAN MULTIPLIER[a]

WALL HEIGHT ABOVE HEADER	UNIT WALL WEIGHT (psf)			
	15	30	45	65
1'-0"	1.00	1.00	1.00	1.00
1'-6"	1.00	1.00	0.90	0.90
2'-0"	1.00	0.90	0.90	0.85
2'-6"	1.00	0.90	0.90	0.85
3'-0"	1.00	0.90	0.90	0.80

a. Multiply the maximum allowable spans from Table R602.7(1) by the applicable factor to determine the adjusted maximum allowable header span.

AY103.3.8 Voids. *Voids* shall be filled with hemp-lime or other *approved* material before application of finish.

AY103.3.9 Anchorage of hemp-lime. Hemp-lime for interior and exterior stud walls shall be anchored, or shall be in accordance with an *approved* design by a *registered design professional.* Horizontal anchorage rails shall be installed at not more than 24 inches (610 mm) on center and in accordance with Figure AY103.1(1) and AY103.1(3). Horizontal anchorage rails shall be no less than 1 inch by 2 inch (25 mm by 51 mm). Anchorage rails shall be wood, metal per Section AY103.4, or other *approved* material. Anchorage rails should be attached to the side of the stud facing the interior of the wall with (1) - 8d box nail to each stud and run the entire length of the wall.

AY103.4 Contact with metal. Metal in contact with hemp-lime shall be stainless steel or primed and painted with a coating in accordance with Section AY103.4.1.

AY103.4.1 Protective coatings. Metal shall be painted with an epoxy, oil, bituminous paint or other *approved* coating. Water based paints shall not be used.

Exception: Heads of pneumatically driven hot-dip galvanized nails.

AY103.5 Mechanical, electrical and plumbing in hemp-lime infill. Electrical and telecommunication wiring, panels, and boxes, mechanical ducts, plumbing pipes, and other mechanical, electrical and plumbing components in or in contact with hemp-lime *infill* shall be isolated in sleeves, pipes, conduits, or tubing made of plastic, or of metal in accordance with Section AY103.4, or separated from hemp-lime with an *approved* alkaline-resistant material.

AY103.6 Hemp-lime installation methods. Hemp-lime shall be installed in accordance with Sections AY103.6.1 and AY103.6.2, and one of Sections AY103.6.3 through AY103.6.7.

AY103.6.1 Mix and mixing. The materials and ratio of *hemp hurd* to *binder* to water shall match the specifications of the *approved* test samples in Sections AY106.3 and AY107.1. The water to *binder* ratio shall be not less than 1:1 and not greater than 2:1 by weight or by *binder* manufacturer's recommendations. The *hemp hurd*, *binder*, and water shall be thoroughly and uniformly mixed by manual or mechanical means.

AY103.6.2 Formwork for hand cast and spray-applied methods. *Forms* shall be removable or permanent and shall not deform under the lateral pressure of the installed wet hemp-lime.

AY103.6.2.1 Permanent forms. Permanent *forms* shall be permitted to be installed on only one side. Permanent *forms* shall be *reed mats*, or other *approved* materials with an open weave. Sheet materials shall not be used as permanent *forms*. Permanent *forms* remain after curing as a finish or substrate for another finish.

Exception: Permanent *forms* of any material shall be permitted at the jambs, heads, and sills of openings.

AY103.6.2.2 Removable forms. Removable *forms* shall be removed within 24 hours after hemp-lime placement or per the *binder* manufacturer's specifications.

Exception: Removable *forms* temporarily supporting hemp-lime *infill* above wall openings shall not be removed for a minimum of 3 days or per *binder* manufacturer's specifications.

AY103.6.3 Hand cast. Hand cast hemp-lime *infill* shall be installed in uniform *lifts* not greater than 4 inches (102 mm) in height. Each *lift* shall be tamped to achieve stable walls free of *voids*.

AY103.6.4 Spray-applied. *Spray-applied* hemp-lime *infill* shall be installed in accordance with Sections AY103.6.4.1 through AY103.6.4.4.

AY103.6.4.1 Forms. *Forms* shall be installed on one side in accordance with Section AY103.6.2 or AY103.6.7.2 for *lined applications*.

AY103.6.4.2 Mixing. Mixing shall be in accordance with Sections AY103.6.1 or the spray equipment manufacturer's instructions.

AY103.6.4.3 Installation. Hemp-lime shall be sprayed from the base up and per the spray equipment manufacturer's and/or *binder* manufacturer's instructions.

AY103.6.4.4 Screeding. Excess hemp-lime shall be removed by *screeding* per the spray equipment manufacturer's and/or *binder* manufacturer's instructions.

AY103.6.5 Precast blocks. *Precast* hemp-lime blocks shall be cast and installed in accordance with Sections AY103.6.5.1 through AY103.6.5.5 or per manufacturer's specifications:

AY103.6.5.1 Block dimensions. Hemp-lime blocks shall be a minimum thickness of 3 inches (76 mm) in all dimensions and shall not exceed the maximum thickness in accordance with Section AY103.3.4.

AY103.6.5.2 Casting. Hemp-lime blocks shall be cast in accordance with Sections AY103.6.1 through AY103.6.6 as applicable, or by other means that produce *approved* blocks.

AY103.6.5.3 Mortar. Mortar shall consist of *lime* and sand or other aggregate with a ratio of not less than 1:1 and not greater than 1:3, or other *approved* mortar. The *lime* shall be hydrated Type N or S, or hydraulic *lime.*

AY103.6.5.4 Installation. Hemp-lime blocks shall be installed in a running bond between and around wall framing members. Mortar shall fill all voids between blocks and shall not be not less than ⅛ inch (3 mm) thick. Spaces between blocks and framing shall be not more than ¾ inch (19 mm) and shall be filled with mortar.

AY103.6.5.5 Hemp-lime block veneer. Hemp-lime block veneer shall not exceed 50 pounds per square foot (244 kg/m^2) of veneer only *unit wall weight*, shall be limited to 5-inch (127 mm) thickness, and shall be anchored to the supporting wall studs in accordance with Section R703.8.4 or secured with *approved* ties and fasteners to an *approved* backing. Metal ties and fasteners shall be protected in accordance with Section AY103.4.

AY103.6.6 Hemp-lime panels. Hemp-lime panels shall require an *approved* design by a *registered design professional.*

AY103.6.7 Lined application. Interior and exterior hemp-lime *lined applications* shall be installed in accordance with Section AY103.6.7.1 through AY103.6.7.6 and Sections AY103.6.3 through AY103.6.6 as applicable.

AY103.6.7.1 General. Prior to installation, the concrete or masonry walls receiving the installation shall be clean, and free of loose mortar. Lined installations on basement walls shall require an *approved* design by a *registered design professional.* Exterior applications shall be in accordance with Section AY103.7.6. Attachment of *precast* blocks to the receiving wall shall be in accordance with Section AY103.6.5.5. Attachment of hemp-lime panels to the receiving wall shall be in accordance with Section AY103.6.6.

AY103.6.7.2 Formwork. *Forms* shall be in accordance with Section AY103.6.2. Permanent *formwork* shall not be allowed on the non-receiving wall side.

AY103.6.7.3 Thin lining. Thin linings are from 3 to 4¾ inches (76 to 121 mm) thick. Hand troweled hemp-lime shall be installed over a *bonding coat*.

AY103.6.7.4 Medium lining. Medium linings exceed 4¾ inches (121 mm) and are not greater than 6½ inches (165 mm) thick. For *hand cast* or *spray-applied*, 1½ inch (38 mm) X 1½ inch (38 mm) dovetail shaped vertical anchorage rails shall be attached with the narrowest face to the receiving wall, spaced not less than 20 inches (508 mm) and not greater than 32 inches (813 mm), with fasteners not less than 2 feet (610 mm) and not greater than 3 feet (914 mm) apart. *Hand cast* medium linings shall be installed over a *bonding coat* on the receiving wall. See Figure AY103.6.7.4.

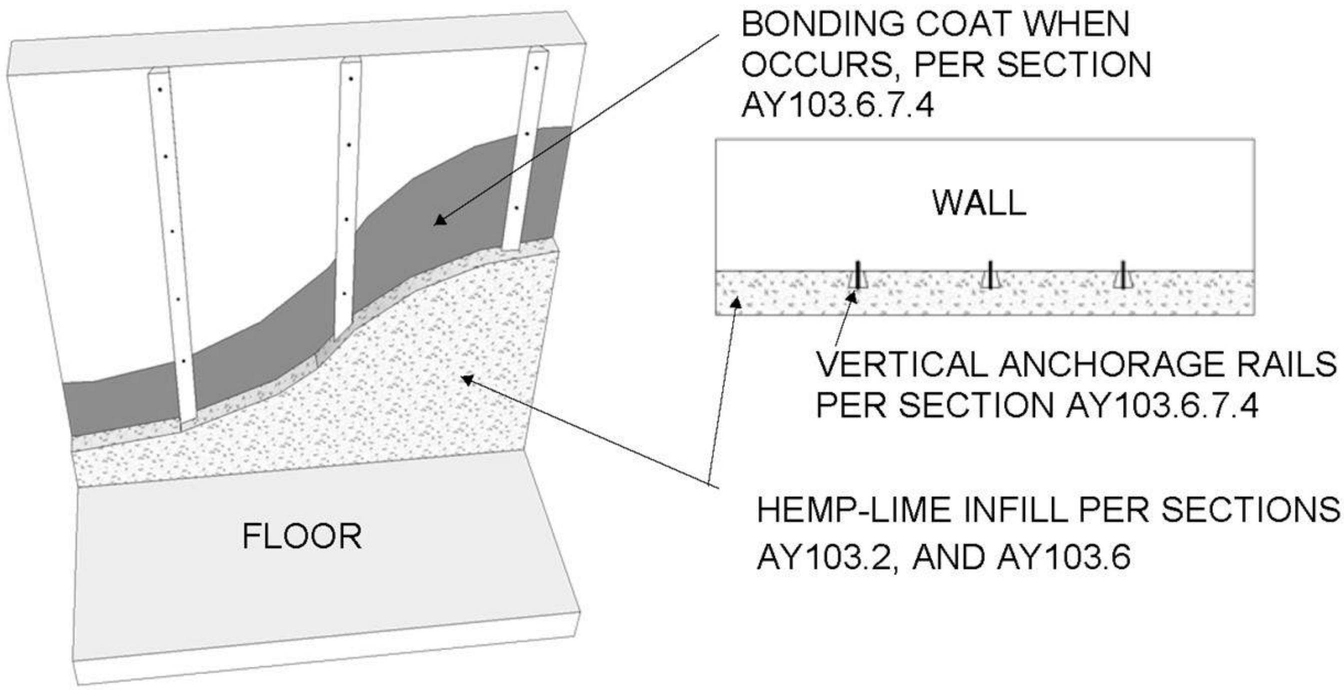


FIGURE AY103.6.7.4 TYPICAL HEMP-LIME MEDIUM LINING

AY103.6.7.5 Thick lining. Thick linings exceed 6½ inches (165 mm) and shall not be greater than 8 inches (203 mm) thick or per the binder manufacturer's specifications. For *hand cast* or *spray-applied*, 1½ inch (38 mm) x 2½ inch (64 mm) vertical anchorage rails shall be attached with the 2½ inch (64 mm) face parallel to the receiving wall and spaced not less than 20 inches (508 mm) and not greater than 32 inches (813 mm). The anchorage rails shall be fastened to and separated from the receiving wall with 2 inch (51 mm) spacers not less than 3 feet (914 mm) and not greater than 4 feet (1,219 mm) apart. *Hand cast* thick linings shall be installed over a *bonding coat* on the receiving wall. See Figure AY103.6.7.5.

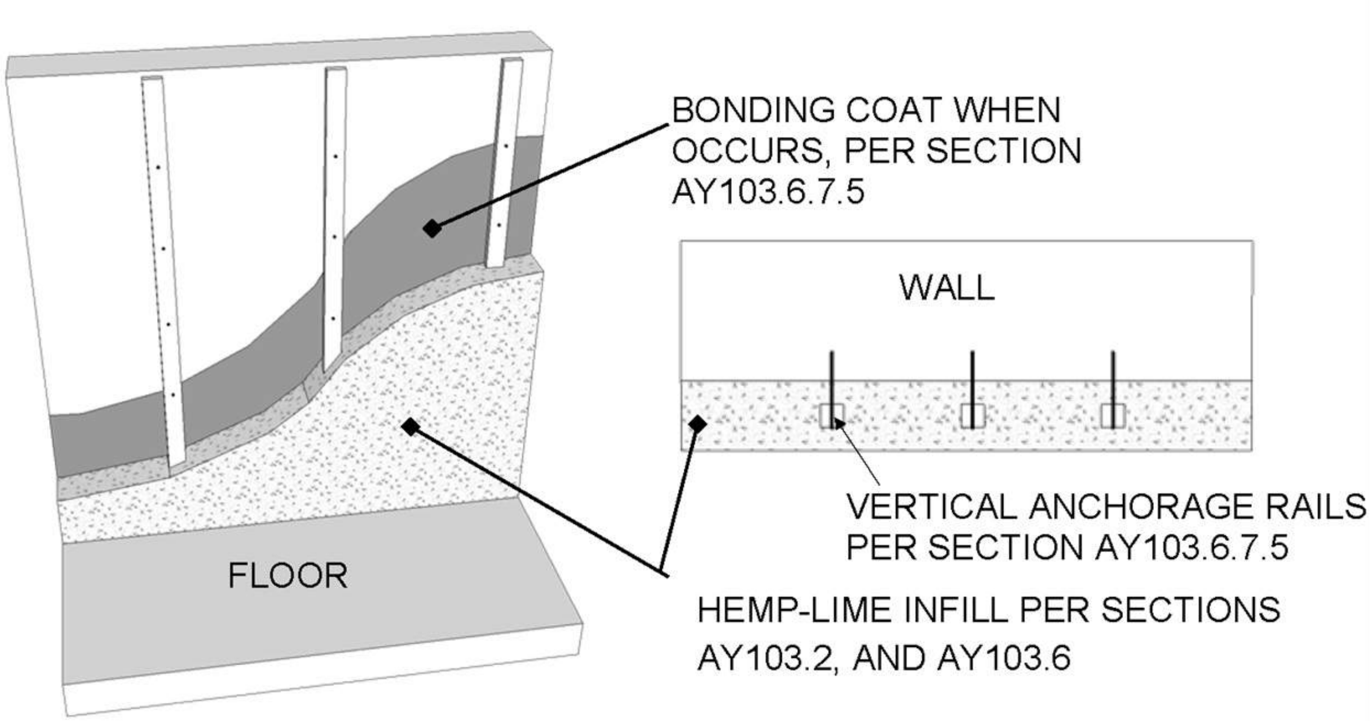


FIGURE AY103.6.7.5 TYPICAL HEMP-LIME THICK LINING

AY103.6.7.6 Minimum thickness at anchorage rails. The minimum thickness of hemp-lime between the exterior face of vertical anchorage rails and finished face of hemp-lime shall be 3 inches (76 mm) or in accordance with the *binder* manufacturer's specifications.

AY103.7 Moisture Control. Hemp-lime assemblies shall be protected from water intrusion and damage in accordance with Section AY103.7.1 through AY103.7.9.

AY103.7.1 Water-resistive barriers. *Water-resistive barriers* are prohibited on hemp-lime walls, except as permitted or required elsewhere in this appendix.

AY103.7.2 Vapor retarders. Vapor retarders are prohibited on hemp-lime walls, except as permitted or required elsewhere in this appendix.

AY103.7.3 Penetrations in hemp-lime walls. Penetrations in exterior hemp-lime walls shall be sealed with an *approved* sealant or gasket on the exterior side of the wall in all climate zones, and on the interior side of the wall in Climate Zones 5, 6, 7, 8 and Marine 4, as defined in Chapter 11.

AY103.7.4 Horizontal surfaces. Hemp-lime walls and other hemp-lime assemblies shall be provided with a *water-resistive barrier* at weather-exposed horizontal surfaces. The *water-resistive barrier* shall be of a material and installation that will prevent water from entering the wall system. Horizontal surfaces shall include exterior window sills, and sills at exterior niches. Horizontal surfaces shall be sloped not less than 1 unit vertical in 12 units horizontal (8-percent slope) and shall drain away from hemp-lime walls and other assemblies. Where the *water-resistive barrier* is below the finish material, it shall be sloped not less than 1 unit vertical in 12 units horizontal (8-percent slope) and shall drain to the exterior surface of the hemp-lime wall's vertical finish.

AY103.7.5 Air barrier. Exterior hemp-lime walls shall have a *vapor permeable air barrier* on all exterior and interior surfaces, except as permitted or required elsewhere in this appendix. Plaster in accordance with Section AY104.3 shall be acceptable as an *air barrier*.

AY103.7.6 Separation of hemp-lime and earth or paved areas. Hemp-lime shall be not less than 8 inches (203 mm) above exposed earth or paved areas.

AY103.7.7 Separation of exterior plaster and earth or paved areas. Exterior *plaster* applied to hemp-lime shall be not less than 8 inches (203 mm) above exposed earth or paved areas.

AY103.7.8 Separation of hemp-lime and exterior plaster from foundation. Hemp-lime and exterior *plaster* shall be separated from the foundation with an *approved* moisture barrier.

AY103.7.9 Base of wall flashing. Outer face of exterior walls shall be flashed to prevent water intrusion at the base of the wall.

SECTION AY104
FINISHES

AY104.1 General. The interior and exterior surfaces of hemp-lime walls shall be protected with a finish in accordance with Section AY104. Finishes shall have a vapor permeance rating of 5 perms or greater tested in accordance with Procedure B of ASTM E96.

AY104.2 Moisture content prior to application of finish. Hemp-lime *infill* shall have an average moisture content of no more than 20 percent at a depth of 1½ inches (38 mm), as measured from the face of the wall to which the finish will be applied for each wall. Moisture content shall be measured with a probe style wood moisture equivalent (WME) meter.

AY104.3 Plaster Finish. Exterior *plaster* shall be *lime plaster*, *clay plaster* in accordance with Section AY104.3.6.3, or other *approved plaster*. Interior *plasters* shall be any *plaster* permitted in Sections AY104.3.1 through AY104.3.9. *Plasters* shall be permitted to be applied directly to the surface of the hemp-lime *infill* without reinforcement, except that the juncture of dissimilar substrates shall be in accordance with Section AY104.5. *Plasters* shall have a thickness of not less than ½ inch (13 mm) on the interior and ¾ inch (19 mm) on the exterior, and shall be installed in not less than two coats, or per binder manufacturer's instructions. Not less than ⅜ inch (10 mm) exterior *plaster* is permitted behind exterior cladding in accordance with Section AY104.6.

AY104.3.1 Membranes. Membranes are prohibited between *plaster* and hemp-lime except where a membrane is allowed or required elsewhere in this appendix.

AY104.3.2 Lath and mesh for plaster. The surface of the hemp-lime functions as lath, and other lath or mesh shall not be required, except as required in Section AY104.5.

AY104.3.3 Plaster additives. Additives shall be permitted to increase *plaster* workability, durability, strength or water resistance. Additives shall not reduce the *plaster* vapor permeance rating to less than 5 perms. Additives containing polymers are prohibited.

AY104.3.4 Plaster reinforcing fibers. Reinforcing fibers shall be permitted in plaster. Acceptable reinforcing fibers include hemp fiber, chopped straw, sisal, animal hair and fiberglass.

AY104.3.5 Lime plaster. *Lime* plaster is any plaster with a *binder* primarily composed of calcium hydroxide ($Ca(OH)_2$) including Type N or S hydrated *lime*, hydraulic *lime*, natural hydraulic *lime* or slaked quicklime. Hydrated *lime* shall comply with ASTM C206. Hydraulic *lime* shall comply with ASTM C1707. Natural hydraulic *lime* shall comply with ASTM C141 and CEN EN 459. Quicklime shall comply with ASTM C5. *Lime* plaster shall contain sufficient *lime* to fully bind the sand or other aggregate, and shall be permitted to contain pozzolans.

AY104.3.6 Clay plaster. *Clay* plaster shall be any plaster having a *clay* or *clay subsoil binder*. Such plaster shall contain sufficient *clay* to fully bind the sand or other aggregate.

AY104.3.6.1 Clay subsoil requirements. The suitability of *clay subsoil* shall be determined in accordance with the Figure 2 Ribbon Test and the Figure 3 Ball Test in the appendix of ASTM E2392/E2392M.

AY104.3.6.2 Thickness and coats. *Clay* plaster shall be not less than ¾ inch (19 mm) thick, and shall be applied in not less than two coats.

AY104.3.6.3 Rain-exposed. *Clay* plaster, where exposed to rain, shall be finished with an *approved* erosion-resistant finish.

AY104.3.6.4 Prohibited finish coat. Plaster containing Portland cement shall not be permitted as a finish coat over *clay* plasters.

AY104.3.7 Clay-lime plaster. Clay-lime plaster shall be composed of refined *clay* or *clay subsoil*, sand, and *lime*.

AY104.3.8 Hemp-lime plaster. Hemp-lime plaster shall be composed of *hemp hurd* and *lime*, and shall be permitted to contain sand or other aggregate, and *pozzolans*.

AY104.3.9 Hemp-clay plaster. Hemp-clay plaster shall be composed of *hemp hurd* and *clay* or *clay subsoil*, and shall be permitted to contain sand or other aggregate.

AY104.4 Separation of wood and plaster. Wood framing at the exterior surface of hemp-lime walls shall be separated from exterior plaster with Grade D paper or other approved material, except where the wood is naturally durable.

Exception: Exterior *clay* plaster shall not be required to be separated from wood.

AY104.5 Bridging across dissimilar substrates. Bridging shall be installed onto and across dissimilar substrates prior to the application of plaster on the interior or exterior. Acceptable bridging materials include expanded metal lath, woven wire mesh, welded wire mesh, fiberglass mesh, *reed mat*, burlap, or other *approved* material. Bridging shall extend not less than 3 inches (76 mm), on both sides of the juncture.

AY104.5.1 Returns on recessed openings. Plaster or other exterior finish returns at recessed windows and doors shall require an *approved* design that prevents the intrusion of moisture.

AY104.6 Non-plaster exterior cladding. Non-plaster exterior *cladding* shall be spaced not less than 1 inch (25 mm) from the face of the *water-resistive barrier* or *air barrier* to the back of the cladding to allow for ventilation. The ventilation space shall be open at the top and bottom and be provided with insect screening.

AY104.6.1 Water-resistive and air barriers. *Water-resistive barriers* and *air barriers*, when *vapor permeable*, are permitted to be applied directly to the hemp-lime when exterior *cladding* is installed in accordance with Section AY104.6.

AY104.7 High moisture interior environments. Exterior hemp-lime walls enclosing showers or steam rooms shall be lined on the interior side with ceramic tiles on an *approved* tile backer board, ceramic tiles on a *lime* plaster, or a *tadelakt* finish.

SECTION AY105
FIRE RESISTANCE

AY105.1 Fire-resistance rating. Hemp-lime walls do not have a fire-resistance rating. Fire-resistance ratings for hemp-lime wall assemblies shall be determined in accordance with the required testing in Section R302.9.3.

AY105.2 Clearance to fireplaces and chimneys. Hemp-lime surfaces adjacent to fireplaces or chimneys shall be finished with not less than ⅜ inch (10 mm) thick plaster of any type permitted by this appendix. Clearance from the face of such plaster to fireplaces and chimneys shall be maintained as required from fireplaces and chimneys to combustibles in Chapter 10, or as required by manufacturer's instructions, whichever is more restrictive.

SECTION AY106
THERMAL PERFORMANCE

AY106.1 Mass Walls. Walls with hemp-lime infill shall be classified as mass walls in accordance with Section N1102.2.5 (R402.2.5) and shall meet the R-value requirements for mass walls in Table N1102.1.3 (R402.1.2), when their heat capacity (C) is greater than or equal to 6 $Btu/ft^2 \times °F$ (123 $kJ/m^2 \times K$) in Equation AY-1.

$C = \rho \times t \times 0.299$ $Btu/lb \times °F$ **(Equation AY-1)**

where:

C = Heat capacity ($Btu/ft^2 \times °F$).

ρ = Density of hemp-lime infill (pounds per cubic foot).

t = Thickness of hemp-lime infill (in feet).

AY106.2 Thermal resistance. Hemp-lime has the unit thermal resistance values in accordance with Table AY106.2. Alternatively, the unit R-value of hemp-lime shall be determined with one of the following tests by an approved laboratory: ASTM C518, ASTM C1363, ASTM C177, or ASTM C1114. Test results from a specific hemp-lime mix shall be permitted to be used for multiple projects.

Table AY106.2 Thermal Resistance of Hemp-Lime[a]

Density (pounds per cu.ft.)	R-value (ft^2 · °F·h/BTU per inch of thickness)
12.5	R-2.10
15	R-1.86
20	R-1.54
25	R-1.20

a. Linear interpolation is permitted. Extrapolation is not permitted.

AY106.3 Density measurement. Hemp-lime density shall be measured based on *approved* test samples as follows:

1. Three samples of the proposed hemp-lime mix shall be placed moist to completely fill a 6-inch by 6-inch by 12-inch (152 mm by 152 mm by 305 mm) form, a 6 inch (152mm) diameter x 12 inch (305 mm) length form or other *approved* form, following the application method and procedure that will be used during construction.
2. Samples shall be removed from the forms within 24 hours after hemp-lime placement or per the *binder* manufacturer's specifications.
3. Samples shall be cured/dried for a minimum of 14 days in indoor ambient conditions before density determination.
4. Density shall be determined by Equation AY-2.

$$\rho = w / V \qquad \textbf{(Equation AY-2)}$$

where:

ρ = Density of hemp-lime infill (pounds per cubic foot).

w = Weight of hemp-lime infill sample (pounds).

V = Volume of hemp-lime sample (in cubic feet).

AY106.4 Compliance with Section R302.10.1. Hemp-lime *infill* meet the requirements for insulation materials in Section R302.10.1 for flame spread index and smoke-developed index as tested in accordance with ASTM E84.

SECTION AY107
MECHANICAL PERFORMANCE

AY107.1 Hemp-lime infill integrity. The integrity of hemp-lime *infill* and its ability to hold a plaster finish shall be demonstrated with a minimum compressive strength of 29 psi (0.2 MPa). Test results from a specific hemp-lime mix shall be permitted to be used for multiple projects.

AY107.1.1 Demonstration of compressive strength. The compressive strength of the hemp-lime mix shall be demonstrated to the building official before the placement of hemp-lime infill, with compressive strength tests and an associated report by an *approved* laboratory tested as follows:

1. Three samples of the proposed hemp-lime mix shall be placed moist to completely fill a 6-inch by 6-inch by 12-inch (152 mm by 152 mm by 305 mm) form, a 6 inch (152mm) diameter x 12 inch (305 mm) length form, or other *approved* form, following the application method and procedure that will be used during construction.
2. Samples shall be removed from the forms within 24 hours after hemp-lime placement or per the *binder* manufacturer's specifications.
3. Samples shall be cured/dried for a minimum of 14 days in indoor ambient conditions before testing.
4. The opposite faces shall be capped with plaster of paris to achieve smooth and parallel faces, after which the sample shall reach ambient moisture conditions before testing.
5. The horizontal cross section of the dried sample as tested, and the maximum applied load at failure shall be used to calculate the sample's compressive strength.
6. The average value of the samples shall be used to determine the mix's compressive strength.

SECTION AY108
REFERENCED STANDARDS

AY108.1 General. See Table AY108.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference this standard.

TABLE AY108.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED	-
ASTM E96-00	*Standard Test Methods for Water Vapor Transmission of Materials*	AY104.1	
ASTM C5-10	*Standard Specification for Quicklime for Structural Purposes*	AY104.3.5	
ASTM C141/C141M-14	*Standard Specification for Hydrated Hydraulic LIme for Structural Purposes*	AY104.3.5	
ASTM C206-14	*Standard Specification for Finishing Hydrated Lime*	AY104.3.5	
ASTM C1707-11	*Standard Specification for Pozzolanic Hydraulic LIme for Structural Purposes*	AY104.3.5	
ASTM E2392/ ASTM E2392M-10	*Standard Guide for Design of Earth Wall Building Systems*	AY104.3.6.1	
CEN EN 459-2015	*Part 1: Building LIme. Definitions, Specifications and Conformity Criteria; Part 2: Test Methods*	AY104.3.5	
ASTM C518-21	*Transmission Properties by Means of the Heat Flow Meter Apparatus*	AY106.2	
ASTM C1363-19	*Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus*	AY106.2	
ASTM C177-19	*Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus*	AY106.2	
ASTM C1114-06(2019)	*Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus*	AY106.2	
ASTM E84-21a	*Standard Test Method for Surface Burning Characteristics of Building Materials*	AY106.4	

Staff Analysis: The following standards are already referenced in the IBC:

- CEN/EN 459-2015 Part 1: Building Lime. Definitions, Specifications and Conformity Criteria; Part 2: Test Methods
- ASTM C141/C141M-14 Standard Specification for Hydrated Hydraulic Lime for Structural Purposes
- ASTM C206-14 Standard Specification for Finishing Hydrated Lime
- ASTM E2392/E2392M-10 Standard Guide for Design of Earthen Wall Building Systems.

Also, the following are are also referenced in the current codes but under newer versions. These are simply new occurrences of the references in the I-Codes.

- ASTM E96-00 Standard Test Methods for Water Vapor Transmission of Materials
- ASTM C5-10 Standard Specification for Quicklime for Structural Purposes
- ASTM C1707-11 Standard Specification for Pozzolanic Hydraulic Lime for Structural Purposes

A review of the following standards proposed for inclusion in the code, and , with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

- ASTM C518-21 Transmission Properties by Means of the Heat Flow Meter Apparatus
- ASTM 1363-19 Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
- ASTM C177-19 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
- ASTM C1114-06(2019) Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus,

The proposal is referencing an updated version of an existing referenced standard . Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

- ASTM E84-21a Standard Test Method for Surface Burning Characteristics of Building Materials,

Reason Statement: Hemp-lime, commonly referred to as hempcrete, is a non-structural, bio-composite insulation infill material composed of hemp hurd and a lime-based binder. Hemp-lime originated in the mid-1980s in France as a method for renovating historic buildings that required the addition of insulation with sufficient vapor permeability to preserve the structure's integrity. Since then, hemp-lime has been utilized and studied around the world, with its viability demonstrated in thousands of single-family homes, multi-family housing and commercial buildings. The benefits of hemp-lime include high thermal performance, low embodied carbon emissions in production, high carbon sequestration in service, healthy living environments, and high fire-resistance. These benefits, along with the 2018 U.S. legalization of hemp as a commercial crop, are driving rapid growth in interest and projects across the U.S. Hemp-lime provisions in the building code are greatly needed to remove obstacles to its safe and proper use.

Coastal Compound photo courtesy of Tim Callhan

Triangle Housing Project source image

New Castle stairs photo courtesy of Cameron McIntosh

Examples of hemp-lime homes have existed in the U.S. for over a decade, but not until industrial hemp became legal to grow via the Agricultural Improvement Act of 2018 was there the potential for a U.S. hemp-lime industry. This emerging industry requires the development and availability of regulations in order to expand in a safe and controlled manner. The proposed Hemp-lime (Hempcrete) Construction appendix for the IRC is an important step in this process. This document has been reviewed and has received input from over 25 hemp-lime design and building professionals in the US and around the world, as well as experts in ICC code development.

Hemp-lime modulates interior temperature and humidity, creating a comfortable living environment with its low thermal conductivity, thermal mass, and dynamic hygrothermal effects. Hemp-lime's excellent thermal performance reduces energy use, lowering utility bills while broadly benefiting the environment.

Current construction methods often rely on vapor-closed building envelopes that can promote mold and mildew growth, which reduces interior air quality. Hemp-lime offers a non-toxic insulation option that resists or prevents mold growth. Hemp-lime buildings allow the free passage of water vapor through the exterior walls without creating a point where it becomes trapped to condense. As the binder for hemp-lime is composed primarily of lime, the entire wall system resists mold and mildew growth due to the alkalinity of the lime. This is a major benefit to occupants sensitive to such toxins, as well as others who want to minimize their exposure to mold.

Hemp-lime walls provide a high level of fire resistance because the lime encapsulates the hemp in the matrix. Hemp-lime does not emit smoke or ignite when exposed to direct flame, as demonstrated by European fire tests and an ASTM E84 test where hemp-lime recorded the lowest possible index for flame spread and smoke development.

Though this proposal does not seek a fire-resistance rating, the U.S. hemp industry is planning to conduct an ASTM E119 test to establish a rating for hemp-lime wall assemblies.

The U.S. government has made lowering its carbon footprint a priority as it tries to meet its global environmental commitments. The building industry accounts for up to 40% of the world's carbon footprint, including both the embodied carbon of materials and the operational impact of buildings. Hemp-lime construction can have an enormous impact with its negative embodied carbon and its high thermal performance that reduces energy use. Industrial-scale hemp crops absorb significant quantities of carbon from the atmosphere, and when used in hemp-lime, its carbon is sequestered for the life of the building. Hydrated lime in the binder also absorbs carbon dioxide as it cures. This presents a major reversal in impact compared with some carbon intensive materials currently used in the building industry.

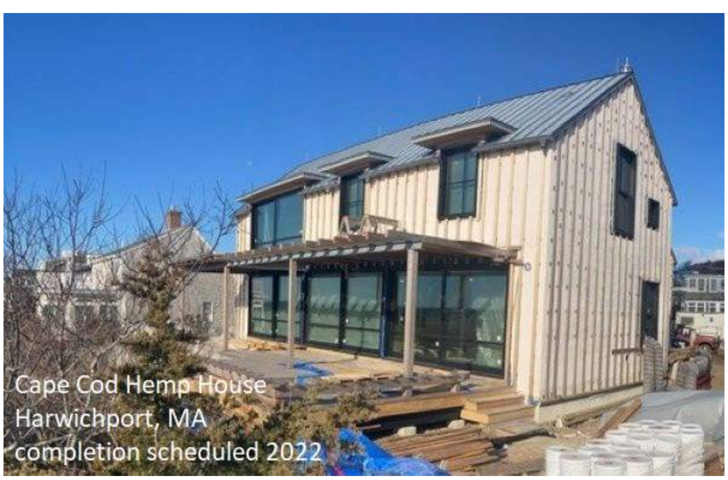
Supporting documents for the proposed Hemp-lime (Hempcrete) Construction appendix are available at:

https://ushba.org/icc-supporting-documents/

Appeldorn photo courtesy of Tim Callahan

Cape Cod Hemp House photo courtesy of Mpactful Ventures, PBLLC=

Hand Casting photo courtesy of Graham Durrant



CCHH photo courtesy of Mpactful Ventures

Rationale for Specific Sections of Proposed Appendix Y – Hemp-Lime (Hempcrete) Construction

SECTION AY101 - GENERAL:

Hemp-lime is limited to use as a nonbearing, wall infill material. It primarily functions as insulation and a substrate for finish. Until further seismic testing is done, hemp-lime construction is restricted to use in Seismic Design Categories (SDCs) A, B, and C, except with an approved engineered design. Engineering analysis based on structural and materials tests and accepted engineering practice have determined hemp-lime's safe prescriptive use in SDCs A, B, and C, within the limits of the IRC's structural provisions and this appendix. Testing reports, structural analysis, and other supporting documents are available at: https://ushba.org/icc-supporting-documents/

SECTION AY102 - DEFINITIONS:

Hemp-lime specific terms not found in the IRC are defined. Some definitions are consistent with identical or related terms defined in IRC appendices AR – Light Straw-Clay Construction, AS - Strawbale Construction, and AU - Cob Construction.

SECTION AY103 - HEMP-LIME CONSTRUCTION:

Hemp-lime as a non-structural infill must comply with the Figures in Section AY103 or an approved alternative. The four Figures show different locations of the structural stud wall framing; interior, center, exterior, or double (interior and exterior). These Figures indicate the IRC sections that the foundation, wall framing, floor, and roof/ceiling assembly must comply with, unless otherwise stated in the appendix. They also identify code sections for other elements of a hemp-lime wall. Hemp-lime infill is limited to densities within a range of 12.5 to 25 pcf. This range encompasses the practical and commonly used hemp-lime densities.

The description and requirements of hemp-lime materials in this appendix are based on ASTM standards currently under development, and on input from hemp-lime building professionals and researchers. The binder is restricted to lime based binders because of their well established performance. Most importantly, all materials used in hemp-lime projects must match the materials used in the approved density and integrity test samples required in Sections AY106.3 and AY107.1.

Section AY103.3 contains provisions related to structure. General limits and requirements are given for all hemp-lime buildings, including: 1) maximum one story; 2) maximum building height of 25 feet; 3) braced wall panel lengths, and 4) maximum unit wall weight. Bracing is restricted to the IRC's Method LIB due to the low vapor permeability of braced wall panel sheathing options in the IRC. Structural metal, and all metal in contact with hemp-lime, must be stainless steel or coated to prevent corrosion. Door and window openings are addressed, including the support of hemp-lime by headers with required adjustments. Anchorage rails must be fastened to studs for interior or exterior wall designs, to anchor the hemp-lime to resist out-of-plane forces. Anchorage rails are not required for center and double wall designs, because those stud locations provide sufficient out-of-plane resistance by containment (double wall) or anchoring the hemp-lime in both directions (center wall).

The required minimum spacing between studs is to allow sufficient space to insert the hemp-lime. The required minimum thickness of hemp-lime is to ensure a cohesive infill. Window and door openings must be designed and constructed to prevent water intrusion.

Hemp-lime infill can be installed by hand casting or spray applying on site, or by precasting blocks or panels. Mixing of the material must allow the binder to coat the hemp hurd and to hydrate. Formwork must be vapor permeable or removed within 24 hours to allow the hemp-lime to dry. Hand cast hemp-lime infill must be installed in lifts of no more than 4" to allow a uniform density consistent with approved samples. Spray applied hemp-lime must be installed per the manufacturer's directions for the spray equipment.

Precast blocks and panels are a developing market with great potential. They can be cast by hand, spray equipment, or mechanical means, and can provide highly consistent materials that can be installed ready to be finished. Lined applications provide an easy way to use hemp-lime infill to increase the performance of existing homes. Lined applications must not be used in areas with high moisture content. The appropriateness of hemp-lime lined applications must be evaluated and designed by a registered design professional before use below grade.

Though lime is excellent at inhibiting mold growth and preserving the hemp and wood framing, hemp-lime requires vapor permeable finishes and protection from water intrusion. Water-resistive barriers and vapor retarders are generally prohibited because they interfere with the required vapor permeability and the mechanical bond of plaster. They are allowed only where necessary to prevent water intrusion, for example at horizontal surfaces such as window sills. Interior and exterior air barriers, typically plaster, are essential for optimal thermal performance of hemp-lime walls and to satisfy IRC Section N11024.1.1. Adequate distance between hemp-lime infill and its plaster and the exterior grade is required to protect against water intrusion.

SECTION AY104 - FINISHES:

Hemp-lime infill requires vapor permeable finishes on the interior and exterior of the wall. The finish is necessary to create an air barrier and the high vapor permeability is required to allow vapor to move through the wall. As with many other building materials, hemp-lime infill must be sufficiently dry before finishes are applied.

Hemp-lime is most commonly finished with plaster. Plaster is best applied directly to the hemp-lime infill.

Membranes must not be applied between the hemp-lime infill and plaster to ensure adequate vapor permeability and a mechanical bond for plaster. Other lath or mesh is not required. Plaster additives are allowed if they do not reduce vapor permeability below the required minimum of 5 perms (the IRC definition of vapor permeable). Reinforcing fibers are allowed to strengthen the plaster. Lime plaster is the most common plaster used on hemp-lime, because of its high vapor permeability and compatibility with the hemp-lime substrate. Clay plaster, with its even higher vapor permeability, is also acceptable for hemp-lime. Exterior clay plaster must be protected with a more durable material. Clay-lime and hemp-lime plasters have also been successfully used on hemp-lime.

When wood members are on the surface of the wall where plaster is to be applied, it is necessary to cover the wood with a water-resistive barrier unless the wood is otherwise protected from water. Exterior clay plaster can be in direct contact with wood, because clay's hygroscopic properties protect wood from moisture damage.

Where plaster is to be applied to hemp-lime adjacent to another material, a bridging material is required to reinforce the plaster. The bridging material strengthens the plaster, improves bonding, and prevents cracking. Recessed window and door openings in hemp-lime infill must be designed to prevent water intrusion.

Non-plaster exterior cladding can be used over hemp-lime infill. The hemp-lime must be covered with a vapor permeable air barrier such as lime plaster, and an air gap must be provided between the hemp-lime wall and the exterior cladding that is vented to allow air movement. The exterior cladding can have a water-resistive barrier behind it.

In high moisture conditions, such as showers or steam rooms, a water-resistant finish must be applied on the interior side of exterior hemp-lime walls.

SECTION AY105 - FIRE RESISTANCE:

Hemp-lime is known for its fire-resistive properties through tests in Europe. When structural members are surrounded by hemp-lime infill, it can protect them from fire. However because ASTM E119 or UL263 tests have not yet been performed, a fire-resistance rating is not included in this proposal.

SECTION AY106 - THERMAL PERFORMANCE:

Hemp-lime walls provide well-balanced thermal performance, with a combination of low thermal conductivity, thermal mass, and hygrothermal effects. Hemp-lime walls in this appendix are classified as mass walls per Section N1102.2.5, if their heat capacity is greater than 6 Btu/ft2 x°F. An Equation is given to calculate a mix's heat capacity.Hemp-lime infill's density is a determining factor of its R-value. The lower the density, the higher the R-value per inch. The relationship of density to unit R-value in Table AY106.2 was determined from a thorough review of research and testing.

In order to determine the density of the hemp-lime infill, samples are made from the materials to be used to construct the hemp-lime infill and tested following a specified procedure representative of the planned installation method.A hemp-lime ASTM E84 test conducted in 2020 yielded the lowest possible values, thus easily meeting the IRC requirements in R302.10.1 for flame spread index and smoke-developed index for insulating materials in wall assemblies.

SECTION AY107 - MECHANICAL PERFORMANCE:

Though hemp-lime infill is not structural, it must be capable of bearing its own weight and maintaining its integrity for the lifetime of the wall. To determine the integrity of the hemp-lime infill, a compression test must be performed on a representative sample made with the materials to be used to construct the hemp-lime infill, created using a procedure representative of the planned installation method.

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Cost Impact: The code change proposal will not increase or decrease the cost of construction
As a wall system, hemp-lime construction can be more costly or less costly than conventional wall systems in the IRC, depending on many variables. Hemp is inexpensive, some lime binders are of modest expense while some proprietary lime binders are expensive. Installing hemp-lime is labor intensive, but in one installation it provides insulation, thermal mass, and a substrate for finish.

Clay plasters use the inexpensive materials of clay subsoil (often from the site) and sand. The lime binder in lime plasters is more costly than clay subsoil, as well as the Portland cement binder used in conventional cement plaster. Clay, lime, and cement plasters all require a similar amount of labor. However unlike cement plaster over wood-frame walls, clay and lime plasters applied to hemp-lime infill do not require wire lath or a water-resistive barrier.

Other elements or systems in a hemp-lime building such as the foundation, roof/ceiling, electrical, plumbing and mechanical are typically similar to those used in conventional construction and therefore of similar cost.

On average, this proposal will not affect the cost of construction.

RB316-22

RB317-22

IRC: APPENDIX AY (New)

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2021 International Residential Code

Add new text as follows:

APPENDIX AY
PHYSICAL SECURITY

SECTION AY101
GENERAL

AY101.1 Purpose. The purpose of this appendix is to establish minimum standards that incorporate physical security to make dwelling units resistant to unlawful entry.

AY101.2 Application. The provisions of this appendix shall apply to all new structures and to additions and alterations made to existing buildings as provided for in Section R102.7.1.

SECTION AY102
DOORS

AY102.1 Doors. All exterior doors and doors leading from the garage area into the dwelling unit, shall comply with Sections AY102.1.1 through AY102.1.5 based on the type of door installed.

Exceptions:

1. Vehicle access doors
2. Storm or screen doors

AY102.1.1 Wood doors. Wood doors shall be of solid core construction such as high-density particleboard, solid wood, or wood block core with a minimum thickness of 1-3/4 inches (45 mm) when measured at the locking device or hinge.

AY102.1.2 Steel doors. Steel doors shall be a minimum skin thickness of 24 gauge and have reinforcement material at the location of the deadbolt.

AY102.1.3 Fiberglass doors. Fiberglass doors shall have a minimum skin thickness of 1/16 inch (1.6 mm) and have reinforcement material at the location of the deadbolt.

AY102.1.4 Double doors. The inactive leaf of an exterior double door shall be provided with flush bolts having an engagement of not less than 1-inch (25.4 mm) into the head and threshold of the door frame, or by other approved methods.

AY102.1.5 Sliding doors. Sliding doors shall be installed to prevent the removal of the panels from the exterior.

SECTION AY103
DOOR FRAMES

AY103.1 Door frames. The exterior door frames shall be installed prior to the rough-in inspection. One and one-half inch (38 mm) nominal wood blocking shall be placed horizontally between studs at the door lock height for at least one stud space on each side of the door opening. Door frames shall comply with ATSM F476 Grade 40 for the bolt and hinge impact. Door frames shall comply with Sections AY103.1.1 through AY103.1.3 based on the type of door installed.

AY103.1.1 Wood frames. Wood frame doors shall be set in frame openings constructed of double studding or equivalent construction. Door frames, including those with sidelites, shall be reinforced.

AY103.1.2 Steel frames. Steel door frames shall be constructed of 18 gauge or heavier steel. Doors shall be anchored to the wall in accordance with the manufacturer's instructions.

AY103.1.3 Sidelite entry doors. Sidelite door units shall have framing of double stud construction or equivalent construction. Double stud construction or equivalent construction shall exist between the glazing unit of the sidelite and the wall structure of the dwelling.

SECTION AY104

DOOR HARDWARE

AY104.1 Door hardware. Exterior door hardware shall comply with Sections AY104.1.1 through AY104.1.4.

AY104.1.1 Hinges. Hinges for exterior swinging doors shall comply with the following:

1. At least two screws, 3 inches (76 mm) in length, penetrating at least 1-inch (25.4 mm) into the wall structure. Solid wood fillers or shims shall be used to eliminate any space between the wall structure and the door frame behind each hinge.
2. Hinges for out-swinging doors shall be equipped with mechanical interlock to prevent removal of the door from the exterior.

Exception: Sidelite doors complying with ASTM F476 for the bolt and hinge impact test.

AY104.1.2 Escutcheon plates. All exterior doors shall have escutcheon plates protecting the door's edge at the location of the deadbolt.

AY104.1.3 Locks. Exterior doors shall be provided with a deadbolt with a minimum grade B as determined by ANSI/BHMA A156.40.

AY104.1.4 Entry vision and glazing. Front entry doors to dwelling units shall be arranged so that the occupant has a 180 degree view of the area immediately outside the door without opening the door.

SECTION AY105
REFERENCED STANDARDS

AY105.1 General. See Table AY105.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that references the standard.

TABLE AY105.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM F476-14	Standard Test Methods for Security of Swinging Door Assemblies	AY103.1, AY104.1.1
ANSI/BHMA A156.40-2020	Residential Deadbolts	AY104.1.3

Staff Analysis: A review of the standards proposed for inclusion in the code, ASTM F476-14, Standard Test Methods for Security of Swinging Door Assemblies and ANSI/BHMA A156.40-2020, Residential Deadbolts Standard for the Protection of Records, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

Reason Statement: This change was originally submitted as RB300-19. What is being presented for this cycle is language that addressed the concerns of the committee members at the time. The committee agreed that language such as this should be placed in the appendix so that jurisdictions can make their choice of whether or not to adopt this code language that can provide for a minimum level of protection for the public safety in their own homes. This code change will provide for minimal provisions to be made to a new home under construction that will give the homeowner safety and peace of mind, while delaying and frustrating the criminal. Since this proposal is not dependent on electrical power, these provisions will always be available to the homeowner and will require no further action after installation. There is no on-going cost to the homeowner and these provisions will not affect the overall aesthetics of the home.

Much like a smoke detector provides the homeowner ample time to respond to a possible fire, this code change is an attempt to provide the homeowner ample time to respond to an attempted break-in. What helps to prevent crime is witness potential. By delaying the potential entry into a home, the probability of a witness increases. Whether you live in a rural or urban environment, this code change provides the homeowner ample time to respond.

In the summer of 1996, Overland Park, Kansas, experienced a series of home invasions resulting in the sexual assault of several women. For the victims of a home invasion, it's more than a property crime; it scares the victim into thinking that the criminal will return only to commit a more violent or heinous crime. To have an emotional investment in their residence is priceless. As a result of these home invasions, the City's Police Department conducted hundreds of surveys of residents in an effort to develop a solution to the home invasions. The results of the surveys lead the City to develop a building code that makes homes more safe and secure. You may ask, why secure the front door? What about installing an alarm? Communities across the country continue to report a growing increase in false alarms. In an effort to provide physical security to the homeowner, there needs to be a more reliable option available. The longer a criminal spends trying to gain access to a home, the greater the risk of detection. In addition, most home invaders will not attempt to break a window, as that makes noise that neighbors could potentially hear. Rather than face these risks, the invader is more likely to try to kick in an exterior door, where they can easily gain access without being detected. What about cameras, which are growing in popularity today? Those are a great help for after the fact; after the house has been broken into and the damage has already been done to not only the home but potentially the home owner.

The changes here reflect concerns and comments expressed from the committee for their decision on RB 161. The committee agreed this language belongs in the Appendix so the items presented in this public comment should address the concerns expressed by the committee members as well as others who spoke in opposition at the committee hearings.

Another concern expressed by the committee was that the building code is not a crime prevention code. We agree with the committee. However, the code does address life safety, which is what we believe this code change covers.

Cost Impact: The code change proposal will increase the cost of construction
The cost to secure a single door ranges from $40-60 for a single door unit and between $140-180 for a double sidelite unit.

RB317-22

ISPSC Code Change Proposals

The following code change proposals are labeled as Swimming Pool and Spa code change proposals because they are proposals for changes to sections in chapters of the International Swimming Pool and Spa Code that are designated as the responsibility of the ISPSC Development Committee (see page xii of the Introductory pages of this monograph). However the changes included in this Group B code development cycle are to sections of the code that have been prefaced with a [S], meaning that they are the responsibility of a different IBC Code Development Committee—IBC-Structural Committee [S].

The committee assigned for each code change proposal is indicated in a banner statement near the beginning of the proposal.

SP1-22

ISPSC: [BS] 304.3

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net)

THIS PROPOSAL WILL BE HEARD BY THE IBC-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2021 International Swimming Pool and Spa Code

Revise as follows:

[BS] 304.3 Pools and spas in coastal high-hazard areas and Coastal A Zones. Pools and spas installed in coastal high-hazard areas and Coastal A Zones shall be designed and constructed in accordance with ASCE 24.

Reason Statement: This proposal achieves consistency with the IRC and the IBC referenced standard ASCE 24, Flood Resistant Design and Construction. Since the 2015 editions, the IRC and IBC (by reference to ASCE 24) apply most of the coastal high hazard area (V Zone) requirements to buildings and structures in the Coastal A Zone, where delineated. ASCE 24-14 separates pool requirements for (1) Pools in flood hazard areas other than coastal high hazard areas and Coastal A Zones and (2) Pools in Coastal High Hazard Areas, Coastal A Zones, and Other High Risk Flood Hazard Areas.
The inland boundary of the coastal high hazard area (Zone V) is drawn by FEMA where breaking wave heights are expected to drop below 3.0 ft during base flood conditions. FEMA's many post-disaster investigations after severe coastal storms have long recommended application of coastal high hazard area (Zone V) requirements to areas inland of the Zone V/Zone A boundary – in the area subject to waves between 1.5 ft and 3 ft – the area referred to as "Coastal A Zone". Since fiscal year 2009, all coastal flood studies by FEMA include analyses of moderate wave action and FIRMs will show the Limit of Moderate Wave Action (LiMWA).

The total land area of the Coastal A Zone is small. FEMA has estimated that less than 3 percent of all mapped flood hazard areas are Zone V and the LiMWA generally is determined to be a relatively short distance inland from the Zone V boundary.

ASCE 24-14 requirements for pools in coastal high-hazard areas and Coastal A Zones comply with the free-of-obstruction requirements of the NFIP and the I-Codes and also address stability of pools as separate structures. At present, a pool not meeting these requirements could become an obstruction to an adjacent structure.

Cost Impact: The code change proposal will increase the cost of construction
ASCE 24 already requires pools in Coastal A Zones to be designed the same as pools in coastal high hazard areas (Zone V). Increased construction costs occur only for some pools located in Coastal A Zones, a relatively small area delineated immediately inland of many Zone V areas. ASCE 24 offers three options for pools in these areas. There is no cost increase when pools are in-ground (considered the most common configuration). There is a cost increase for the option to elevate the lowest horizontal structural member of a pool to at least the base flood elevation (in Coastal A Zones the depth of water above the ground ranges from approximately 5 feet to 3 feet). The third option also increases costs, and that is for pools to be designed to breakaway under flood conditions (the least commonly used configuration). A number of variables determine the increase in costs, including soil types and depth of flooding. The benefits of in-ground and elevated pools are avoidance of deflecting waves that damage structures and the pools are not damaged by flooding up to the design flood.

SP1-22

SP2-22

ISPSC: [BS] 304.4

Proponents: Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing Federal Emergency Management Agency (rcquinn@earthlink.net)

THIS PROPOSAL WILL BE HEARD BY THE IBC-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2021 International Swimming Pool and Spa Code

Revise as follows:

[BS] 304.4 Protection of equipment. Equipment shall be elevated to or above the design flood elevation ~~or be anchored to prevent flotation and protected to prevent water from entering or accumulating within the components during conditions of flooding~~.

> **Exception:** Equipment for pools, spas and water features shall be permitted below the required elevation provided the equipment is elevated to the highest extent practical, is anchored to prevent flotation and resist flood forces, and is protected to prevent water from entering or accumulating within the components during conditions of flooding.

Reason Statement: This proposal moves the requirement "or be anchored to prevent flotation and protected to prevent water from entering or accumulating within the components during conditions of flooding." to an exception and adds a requirement to elevate equipment to the highest extent practical, even if it is below the required elevation.

The exception also makes explicit that pool equipment below the required elevation must resist flood forces. The IRC and the IBC (via the standard ASCE 24, Flood Resistant Design and Construction) already require mechanical, plumbing, and electrical systems to resist hydrostatic and hydrodynamic loads and stresses. Proposals that achieve the same result were approved by the Florida Building Commission for the 2021 Florida Building Code, with concurrence by FEMA.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The additional cost of "elevating to the highest extent practical" is minimal, given the savings from not having damaged equipment in the event of frequent flooding that is shallower than the design flood elevation (or base flood elevation).

SP2-22

CCCIBC1-22

IBC: 1512.2.1, 1512.2.1.1, 1512.3; IEBC: [BS] 705.2.1, [BS] 705.2.1.1, [BS] 705.3

Proponents: Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org); Richard Justin Koscher, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1512.3 ~~1512.2.1~~ Roof recover. The installation of a new roof covering over an existing roof covering shall be permitted where any of the following conditions occur:

1. Where the new roof covering is installed in accordance with the roof covering manufacturer's approved instructions.
2. Complete and separate roofing systems, such as standing-seam *metal roof panel* systems, that are designed to transmit the roof *loads* directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.
3. Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 1512.3.
4. The application of a new protective roof coating over an existing protective roof coating, *metal roof panel*, built-up roof, spray polyurethane foam roofing system, *metal roof shingles*, mineral-surfaced roll roofing, modified bitumen roofing or thermoset and thermoplastic single-ply roofing shall be permitted without tear off of existing roof coverings.

~~1512.2.1.1 Exceptions~~ Exception:. A *roof recover* shall not be permitted where any of the following conditions occur:

1. Where the existing roof or *roof covering* is water soaked or has deteriorated to the point that the existing roof or *roof covering* is not adequate as a base for additional roofing.
2. Where the existing *roof covering* is slate, clay, cement or asbestos-cement tile.
3. Where the existing roof has two or more applications of any type of *roof covering*.

1512.3.1 ~~1512.3~~ Roof recovering over wood shingles or shakes. Where the application of a new *roof covering* over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with *gypsum board*, mineral fiber, glass fiber or other *approved* materials securely fastened in place.

2021 International Existing Building Code

Revise as follows:

[BS] 705.3 ~~705.2.1~~ Roof recover. The installation of a new roof covering over an existing roof covering shall be permitted where any of the following conditions occur:

1. The new roof covering is installed in accordance with the roof covering manufacturer's *approved* instructions.
2. Complete and separate roofing systems, such as standing-seam metal roof panel systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, are installed.
3. Metal panel, metal shingle and concrete and clay tile roof coverings are installed over existing wood shake roofs in accordance with Section 705.3.
4. A new protective *roof coating* is applied over an existing protective *roof coating*, a metal roof panel, metal roof shingles, mineral-surfaced roll roofing, a built-up roof, modified bitumen roofing, thermoset and thermoplastic single-ply roofing or a spray polyurethane foam roofing system.

[BS] ~~705.2.1.1 Exceptions~~ Exception:. A roof recover shall not be permitted where any of the following conditions occur:

1. The existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. The existing roof covering is slate, clay, cement or asbestos-cement tile.
3. The existing roof has two or more applications of any type of roof covering.

[BS] <u>705.3.1</u> ~~705.3~~ Roof recovering <u>over wood shingles or shakes</u>. Where the application of a new roof covering over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum board, mineral fiber, glass fiber or other *approved* materials securely fastened in place.

Reason Statement: This proposal separates roof recover from roof replacement because the two reroofing activities are distinct and only one activity (recover or replacement) can occur on a project at one time. Roof recover is not a subset of roof replacement but a stand alone activity and it is important to recognize it as such. Furthermore, the proposal eliminates number section (1512.2.1.1) in front of exemption for consistency with other sections of the IBC. This proposal creates a sub-section (1512.3.1 Roof recovering over wood shingles or shakes) to ensure consistency with the format of the IBC. Finally, in the International Residential Code, the proposal harmonizes language in the title for consistency with IBC and IEBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code proposal addresses important formatting clarification and does not impact the cost of construction. This proposal does not create new requirements in Section 15 of the IBC.

CCCIBC1-22

CCCIRC1-22

IRC: TABLE R301.2

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, representing Self (sorlowski@sbcc.codes)

2021 International Residential Code

Revise as follows:

TABLE R301.2 CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

GROUND SNOW LOAD[o]	WIND DESIGN				SEISMIC DESIGN CATEGORY[f]	SUBJECT TO DAMAGE FROM			ICE BARRIER UNDERLAYMENT REQUIRED[h]	FLOOD HAZARDS[g]	AIR FREEZIN INDEX[i]
	Speed[d] (mph)	Topographic effects[k]	Special wind region[l]	Windborne debris zone[m]		Weathering[a]	Frost line depth[b]	Termite[c]			
—	—	—	—	—	—	—	—	—	—	—	—
MANUAL J DESIGN CRITERIA[n]											
Elevation			Altitude correction factor[e]	Coincident wet bulb	Indoor winter design dry-bulb temperature	Indoor winter design dry-bulb temperature			Outdoor winter design dry-bulb temperture		**Heating**
—			—	—	—	—			—		
Latitude			Daily range	Summer design gains	Indoor summer design relative humidity	Indoor summer design dry-bulb temperature			Outdoor summer design dry-bulb temperature		Cooling
—			—	—	—	—			—		

For SI: 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.

a. Where weathering requires a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code, the frost line depth strength required for weathering shall govern. The weathering column shall be filled in with the weathering index, “negligible,” “moderate” or “severe” for concrete as determined from Figure R301.2(1). The grade of masonry units shall be determined from ASTM C34, ASTM C55, ASTM C62, ASTM C73, ASTM C90, ASTM C129, ASTM C145, ASTM C216 or ASTM C652.

b. Where the frost line depth requires deeper footings than indicated in Figure R403.1(1), the frost line depth strength required for weathering shall govern. The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.

c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.

d. The jurisdiction shall fill in this part of the table with the wind speed from the ~~basic wind speed~~ ultimate design wind speeds map ~~[~~Figure R301.2(2). Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.

e. The jurisdiction shall fill in this section of the table to establish the design criteria using Table 10A from ACCA Manual J or established criteria determined by the jurisdiction.

f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.

g. The jurisdiction shall fill in this part of the table with: the date of the jurisdiction’s entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas); and the title and date of the currently effective Flood Insurance Study or other flood hazard study and maps adopted by the authority having jurisdiction, as amended.

h. In accordance with Sections R905.1.2, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with “YES.” Otherwise, the jurisdiction shall fill in this part of the table with “NO.”

i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99 percent) value on the National Climatic Data Center data table “Air Freezing Index-USA Method (Base 32°F).”

j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table “Air Freezing Index-USA Method (Base 32°F).”

k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with “YES.” Otherwise, the jurisdiction shall indicate “NO” in this part of the table.

l. In accordance with Figure R301.2(2), where there is local historical data documenting unusual wind conditions, the jurisdiction shall fill in this part of the table with “YES” and identify any specific requirements. Otherwise, the jurisdiction shall indicate “NO” in this part of the table.

m. In accordance with Section R301.2.1.2 the jurisdiction shall indicate the wind-borne debris wind zone(s). Otherwise, the jurisdiction shall indicate “NO” in this part of the table.

n. The jurisdiction shall fill in these sections of the table to establish the design criteria using Table 1a or 1b from ACCA Manual J or established criteria determined by the jurisdiction.

o. The jurisdiction shall fill in this section of the table using the Ground Snow Loads in Figures R301.2(3) and R301.2(4).

Reason Statement: During the development of the 2015 IRC, Proposal RB39-13 was submitted to align the wind design provisions of the residential code with changes that were previously approved in the 2012 International Building Code and ASCE7-10. The change was submitted to remove all references to the term "basic wind speed" and update the IRC using the term "ultimate design wind speed". The proposal was approved as submitted and further revised during the public comment hearing, where additional public comment were approved to clean up additional references to the outdate terminology, not included in the original proposal. This proposal addresses one last clean up necessary in Footnote D of Table R301.2 which still uses the outdated term "basic wind speed" and replaces it with the correct term "ultimate design wind speed" as shown in Figure R301.2(2).

Bibliography: See RB39-13, Complete Revision History to the 2015 I-Codes: Successful Changes with Public Comments. First Printing: September 2014

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is editorial in nature and does not introduce any new requirements to the IRC.

CCCIRC1-22

CCCIBC2-22

IBC: 1601.1

Proponents: John-Jozef Proczka, representing Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1601.1 Scope. The provisions of this chapter shall govern the structural design of buildings, structures and portions thereof. ~~regulated by this code.~~

Reason Statement: Removes words that don't do anything. Will result in absolutely no changes besides a very slightly shorter code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Nothing changes.

CCCIBC2-22

CCCIEBC2-22

IEBC: [BS] 502.2

Proponents: David Bonowitz, representing FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov); Gwenyth Searer, representing myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Existing Building Code

Delete without substitution:

~~**[BS] 502.2 Disproportionate earthquake damage.** A building assigned to Seismic Design Category D, E or F that has sustained *disproportionate earthquake damage* shall be subject to the requirements for buildings with *substantial structural damage* to vertical elements of the lateral force-resisting system.~~

Reason Statement: Reason (David Bonowitz, Kelly Cobeen, Michael Mahoney):
This proposal is essentially errata, but ICC staff have advised that for procedural reasons it would be better to do as a code change proposal.Current Section 502.2 is an extraneous provision that somehow was left in Chapter 5, even though it has nothing to do with Additions, and even though an identical provision exists, properly in Section 405.2.2.

Reason (Gwenyth Searer):

The provision in question deals with the repair of disproportionate earthquake damage. There is no plausible reason (at least that I can think of) for a provision regarding the repair of disproportionate earthquake damage to be located in Section 502, which deals with additions.

Repairs are dealt with in Chapter 4, and that chapter already has requirements for repairing disproportionate earthquake damage (i.e., Section 405.2.2).

Further, no similar requirements are contained in Chapter 11, which is part of the Work Area Compliance Method and also deals with additions.

In my nearly three decades of experience, I have never seen someone propose to construct an addition as a means of repairing any kind of damage.

This provision serves no purpose and should be deleted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Cost Impact David Bonowitz, Kelly Cobeen, Michael Mahoney):

The proposal merely deletes an extraneous provision. The identical provision remains in Section 405.2.2.

Cost Impact (Gwenyth Searer):

This proposal deletes a superfluous, extraneous, unnecessary, and duplicative provision in the IEBC. Deletion of this provision will not affect the cost of construction because there already exists an identical provision in Chapter 4.

CCCIEBC2-22

CCCIEBC3-22

IEBC: CHAPTER 13

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Existing Building Code

CHAPTER 13
PERFORMANCE COMPLIANCE METHODS

SECTION 1301
GENERAL

1301.1 Scope. The provisions of this chapter shall apply to the *alteration*, *addition* and *change of occupancy* of *existing structures*, including historic structures, as referenced in Section 301.3.3. The provisions of this chapter are intended to maintain or increase the current degree of public safety, health and general welfare in *existing buildings* while permitting, *alteration*, *addition* and *change of occupancy* without requiring full compliance with Chapters 6 through 12, except where compliance with the prescriptive method of Chapter 5 or the work area method of other provisions of this code is specifically required in this chapter.

1301.1.1 Compliance with other methods. *Alterations*, *additions* and *changes of occupancy* to *existing structures* shall comply with the provisions of this chapter or with one of the methods provided in Section 301.3.

Add new text as follows:

SECTION 1302
APPLICABILITY

Revise as follows:

~~1301.2~~ 1302.1 Applicability. *Existing buildings* in which there is work involving *additions*, *alterations* or *changes of occupancy* shall be made to conform to the requirements of this chapter or the provisions of Chapters 6 through 12. The provisions of Sections ~~1301.2.1~~ 1302.1.1 through ~~1301.2.6~~ 1302.1.6 shall apply to existing occupancies that will continue to be, or are proposed to be, in Groups A, B, E, F, I-2, M, R and S. These provisions shall also apply to Group U occupancies where such occupancies are undergoing a *change of occupancy* or a partial change in occupancy with separations in accordance with Section ~~1301.2.2~~ 1302.1.2. These provisions shall not apply to buildings with occupancies in Group H, I-1, I-3 or I-4.

~~1301.2.1~~ 1302.1.1 Change in occupancy. Where an *existing building* is changed to a new occupancy classification and this section is applicable, the provisions of this section for the new occupancy shall be used to determine compliance with this code.

~~1301.2.2~~ 1302.1.2 Partial change in occupancy. Where a portion of the building is changed to a new occupancy classification and that portion is separated from the remainder of the building with fire barrier or horizontal assemblies having a fire-resistance rating as required by Table 508.4 of the International Building Code or Section R302 of the International Residential Code for the separate occupancies, or with *approved* compliance alternatives, the portion changed shall be made to conform to the provisions of this section. Only the portion separated shall be required to be evaluated for compliance.
Where a portion of the building is changed to a new occupancy classification and that portion is not separated from the remainder of the building with fire barriers or horizontal assemblies having a fire-resistance rating as required by Table 508.4 of the International Building Code or Section R302 of the International Residential Code for the separate occupancies, or with *approved* compliance alternatives, the provisions of this section which apply to each occupancy shall apply to the entire building. Where there are conflicting provisions, those requirements which secure the greater public safety shall apply to the entire building or structure.

~~1301.2.3~~ 1302.1.3 Additions. *Additions* to *existing buildings* shall comply with the requirements of the *International Building Code* or the *International Residential Code* for new construction. The combined height and area of the *existing building* and the new *addition* shall not exceed the height and area allowed by Chapter 5 of the International Building Code. Where a fire wall that complies with Section 706 of the International Building Code is provided between the *addition* and the *existing building*, the *addition* shall be considered a separate building.

~~1301.2.4~~ 1302.1.4 Alterations. An *existing building* or portion thereof shall not be altered in such a manner that results in the building being less safe or sanitary than such building is currently.

> **Exception:** Where the current level of safety or sanitation is proposed to be reduced, the portion altered shall conform to the requirements of the *International Building Code*.

~~1301.2.5~~ 1302.1.5 Escalators. Where escalators are provided in below-grade transportation stations, existing and new escalators shall be permitted to have a clear width of less than 32 inches (815 mm).

~~1301.2.6~~ 1302.1.6 Plumbing fixtures. Plumbing fixtures shall be provided in accordance with Section 1009 for a change of occupancy and Section

808 for *alterations*. Plumbing fixtures for *additions* shall be in accordance with the International Plumbing Code.

Add new text as follows:

SECTION 1303 ACCEPTANCE

Revise as follows:

~~**1301.3**~~ **1303.1 Acceptance.** For *repairs*, *alterations*, *additions* and *changes of occupancy* to *existing buildings* that are evaluated in accordance with this section, compliance with this section shall be accepted by the *code official*.

~~**1301.3.1**~~ **1303.1.1 Hazards.** Where the *code official* determines that an *unsafe* condition exists as provided for in Section 115, such *unsafe* condition shall be abated in accordance with Section 115.

~~**1301.3.2**~~ **1303.1.2 Compliance with other codes.** Buildings that are evaluated in accordance with this section shall comply with the *International Fire Code* and *International Property Maintenance Code*.

[BS] ~~**1301.3.3**~~ **1303.1.3 Compliance with flood hazard provisions.** In *flood hazard areas*, buildings that are evaluated in accordance with this section shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable, if the work covered by this section constitutes *substantial improvement*.

Add new text as follows:

SECTION 1304 INVESTIGATION AND EVALUATION

Revise as follows:

~~**1301.4**~~ **1304.1 Investigation and evaluation.** For proposed work covered by this chapter, the building owner shall cause the *existing building* to be investigated and evaluated in accordance with the provisions of Sections ~~1301.4~~ 1304 through ~~1301.9~~ 1307.

[BS] ~~**1301.4.1**~~ **1304.1.1 Structural analysis.** The owner shall have a structural analysis of the *existing building* made to determine adequacy of structural systems for the proposed *alteration*, *addition* or *change of occupancy*. The analysis shall demonstrate that the building with the work completed is capable of resisting the loads specified in Chapter 16 of the International Building Code.

~~**1301.4.2**~~ **1304.1.2 Submittal.** The results of the investigation and evaluation as required in Section ~~1301.4~~ 1304.1, along with proposed compliance alternatives, shall be submitted to the *code official*.

~~**1301.4.3**~~ **1304.1.3 Determination of compliance.** The *code official* shall determine whether the *existing building*, with the proposed *addition*, *alteration* or *change of occupancy*, complies with the provisions of this section in accordance with the evaluation process in Sections ~~1301.5~~ 1305 through ~~1301.9~~ 1307.

Add new text as follows:

SECTION 1305 SCORING AND EVALUATION

Revise as follows:

~~**1301.5**~~ **1305.1 Evaluation.** The evaluation shall be composed of three categories: fire safety, means of egress and general safety, as defined in Sections ~~1301.5.1~~ 1305.1.1 through ~~1301.5.3~~ 1305.1.3 .

~~**1301.5.1**~~ **1305.1.1 Fire safety.** Included within the fire safety category are the structural fire resistance, automatic fire detection, fire alarm, automatic sprinkler system and fire suppression system features of the *facility*.

~~**1301.5.2**~~ **1305.1.2 Means of egress.** Included within the means of egress category are the configuration, characteristics and support features for means of egress in the *facility*.

~~**1301.5.3**~~ **1305.1.3 General safety.** Included within the general safety category are the fire safety parameters and the means of egress parameters.

~~**1301.6**~~ **1305.2 Evaluation process.** The evaluation process specified herein shall be followed in its entirety to evaluate *existing buildings* in Groups A, B, E, F, M, R, S and U. For *existing buildings* in Group I-2, the evaluation process specified herein shall be followed and applied to each and every individual smoke compartment. Table ~~1301.7~~ 1306.1 shall be utilized for tabulating the results of the evaluation. References to other sections of this code or other codes indicate that compliance with those sections is required in order to gain credit in the evaluation herein outlined. In applying this section to a building with mixed occupancies, where the separation between the mixed occupancies does not qualify for any category indicated in Section ~~1301.6.16~~ 1305.2.16, the score for each occupancy shall be determined, and the lower score determined for each section of the evaluation

process shall apply to the entire building or to each smoke compartment for Group I-2 occupancies.
Where the separation between the mixed occupancies qualifies for any category indicated in Section ~~1301.6.16~~ 1305.2.16, the score for each occupancy shall apply to each portion or smoke compartment of the building based on the occupancy of the space.

~~1301.6.1~~ 1305.2.1 Building height and number of stories. The value for building height and number of stories shall be the lesser value determined by the formula in Section ~~1301.6.1.1~~ 1305.2.1.1. Section 504 of the International Building Code shall be used to determine the allowable height and number of stories of the building. Subtract the actual building height from the allowable height and divide by $12^1/_2$ feet (3810 mm). Enter the height value and its sign (positive or negative) in Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.1~~ 1305.2.1, Building Height, for fire safety, means of egress and general safety. The maximum score for a building shall be 10.

~~1301.6.1.1~~ 1305.2.1.1 Height formula. The following formulas shall be used in computing the building height value.

$$\text{Height value, feet} = \frac{(AH)-(EBH)}{12.5} \times CF$$ **(Equation 13-1)**

$$\text{Height value, stories} = (AS - EBS) \times CF$$ **(Equation 13-2)**

where:

AH = Allowable height in feet (mm) from Section 504 of the International Building Code.

EBH = *Existing building* height in feet (mm).

AS = Allowable height in stories from Section 504 of the International Building Code.

EBS = *Existing building* height in stories.

CF = 1 if (*AH*) – (*EBH*) is positive.

CF = Construction-type factor shown in Table ~~1301.6.6(2)~~ 1305.2.6(2) if (*AH*) – (*EBH*) is negative.

Note: Where mixed occupancies are separated and individually evaluated as indicated in Section ~~1301.6~~ 1305.2, the values *AH*, *AS*, *EBH* and *EBS* shall be based on the height of the occupancy being evaluated.

~~1301.6.2~~ 1305.2.2 Building area. The value for building area shall be determined by the formula in Section ~~1301.6.2.2~~ 1305.2.2.2. Section 506 of the International Building Code and the formula in Section ~~1301.6.2.1~~ 1305.2.2.1 shall be used to determine the allowable area of the building. Enter the area value and its sign (positive or negative) in Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.2~~ 1305.2.2, Building Area, for fire safety, means of egress and general safety. In determining the area value, the maximum permitted positive value for area is 50 percent of the fire safety score as listed in Table ~~1301.8~~ 1306.2
, Mandatory Safety Scores. Group I-2 occupancies shall be scored zero.

~~1301.6.2.1~~ 1305.2.2.1 Allowable area formula. The following formula shall be used in computing allowable area:

$$A_a = A_t + (NS \times I_f)$$ **(Equation 13-3)**

where:

A_a = Allowable building area per story (square feet).

A_t = Tabular allowable area factor (NS, S1, S13R, or SM value, as applicable) in accordance with Table 506.2 of the International Building Code.

NS = Tabular allowable area factor in accordance with Table 506.2 of the International Building Code for a nonsprinklered building (regardless of whether the building is sprinklered).

I_f = Area factor increase due to frontage as calculated in accordance with Section 506.3 of the International Building Code.

~~1301.6.2.2~~ 1305.2.2.2 Area formula. The following formulas shall be used in computing the area value. Equation 13-4 shall be used for a single occupancy buildings and Equation 13-5 shall be used for multiple occupancy buildings. Determine the area value for each occupancy floor area on a floor-by-floor basis. For multiple occupancy, buildings with the minimum area value of the set of values obtained for the particular occupancy shall be used as the area value for that occupancy.
For single occupancy buildings:

$$\text{Area value}_i = (\text{Allowable area} - \text{Actual area})/1200 \text{ square feet}$$ **(Equation 13-4)**

For multiple occupancy buildings:

$$\text{Area value}_i = \frac{\text{Allowable area}_i}{1200\text{square feet}}\left[1-\left(\frac{\text{Actual area}_i}{\text{Allowable area}_i}+\ldots+\frac{\text{Actual area}_n}{\text{Allowable area}_n}\right)\right]$$ **(Equation 13-5)**

where:

i = Value for an individual separated occupancy on a floor.

n = Number of separated occupancies on a floor.

~~1301.6.3~~ <u>1305.2.3</u> Compartmentation. Evaluate the compartments created by fire barriers or horizontal assemblies which comply with Sections ~~1301.6.3.2~~ <u>1305.2.3.2</u> and ~~1301.6.3.3~~ <u>1305.2.3.3</u> and which are exclusive of the wall elements considered under Sections ~~1301.6.4~~ <u>1305.2.4</u> and ~~1301.6.5~~ <u>1305.2.5</u>. Conforming compartments shall be figured as the net area and do not include shafts, chases, stairways, walls or columns. Using Table ~~1301.6.3~~ <u>1305.2.3</u>, determine the appropriate compartmentation value (CV) and enter that value into Table ~~1301.7~~ <u>1306.1</u> under Safety Parameter ~~1301.6.3~~ <u>1305.2.3</u>, Compartmentation, for fire safety, means of egress and general safety.

TABLE ~~1301.6.3~~ 1305.2.3 COMPARTMENTATION VALUES

OCCUPANCY	CATEGORIES[a]				
	a	b	c	d	e
A-1, A-3	0	6	10	14	18
A-2	0	4	10	14	18
A-4, B, E, S-2	0	5	10	15	20
F, M, R, S-1	0	4	10	16	22
I-2	0	2	8	10	14

a. For compartment sizes between categories, the compartmentation value shall be obtained by linear interpolation.

~~**1301.6.3.1**~~ **1305.2.3.1 Categories.** The categories for compartment separations are:

1. Category a—Compartment size of 15,000 square feet (1394 m^2) or more.
2. Category b—Maximum compartment size of 10,000 square feet (929 m^2).
3. Category c—Maximum compartment size of 7,500 square feet (697 m^2).
4. Category d—Maximum compartment size of 5,000 square feet (464 m^2).
5. Category e—Maximum compartment size of 2,500 square feet (232 m^2).

~~**1301.6.3.2**~~ **1305.2.3.2 Wall construction.** A wall used to create separate compartments shall be a fire barrier conforming to Section 707 of the International Building Code with a fire-resistance rating of not less than 2 hours. Where the building is not divided into more than one compartment, the compartment size shall be taken as the total floor area on all floors. Where there is more than one compartment within a story, each compartmented area on such story shall be provided with a horizontal exit conforming to Section 1026 of the International Building Code. The fire door serving as the horizontal exit between compartments shall be so installed, fitted and gasketed that such fire door will provide a substantial barrier to the passage of smoke.

~~**1301.6.3.3**~~ **1305.2.3.3 Floor/ceiling construction.** A floor/ceiling assembly used to create compartments shall conform to Section 711 of the International Building Code and shall have a fire-resistance rating of not less than 2 hours.

~~**1301.6.4**~~ **1305.2.4 Tenant and dwelling unit separations.** Evaluate the fire-resistance rating of floors and walls separating tenants, including dwelling units, and not evaluated under Sections ~~1301.6.3~~ 1305.2.3 and ~~1301.6.5~~ 1305.2.5. Group I-2 occupancies shall evaluate the rating of the separations between care recipient sleeping rooms.
Under the categories and occupancies in Table ~~1301.6.4~~ 1305.2.4, determine the appropriate value and enter that value in Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.4~~ 1305.2.4, Tenant and Dwelling Unit Separation, for fire safety, means of egress and general safety. The value shall be zero for single tenant buildings and buildings without dwelling units.

TABLE ~~1301.6.4~~ 1305.2.4 SEPARATION VALUES

OCCUPANCY	CATEGORIES				
	a	b	c	d	e
A-1	0	0	0	0	1
A-2	-5	-3	0	1	3
R	-4	-2	0	2	4
A-3, A-4, B, E, F, M, S-1	-4	-3	0	2	4
I-2	0	1	2	3	4
S-2	-5	-2	0	2	4

~~1301.6.4.1~~ 1305.2.4.1 Categories. The categories for tenant and dwelling unit separations are:

1. Category a—No fire partitions; incomplete fire partitions; no doors; doors not self-closing or automatic-closing.
2. Category b—Fire partitions or floor assemblies with less than 1-hour fire-resistance ratings or not constructed in accordance with Section 708 or 711 of the International Building Code, respectively.
3. Category c—Fire partitions with 1-hour or greater fire-resistance ratings constructed in accordance with Section 708 of the International Building Code and floor assemblies with 1-hour but less than 2-hour fire-resistance ratings constructed in accordance with Section 711 of the International Building Code or with only one tenant within the floor area.
4. Category d—Fire barriers with 1-hour but less than 2-hour fire-resistance ratings constructed in accordance with Section 707 of the International Building Code and floor assemblies with 2-hour or greater fire-resistance ratings constructed in accordance with Section 711 of the International Building Code.
5. Category e—Fire barriers and floor assemblies with 2-hour or greater fire-resistance ratings and constructed in accordance with Sections 707 and 711 of the International Building Code, respectively.

~~1301.6.5~~ 1305.2.5 Corridor walls. Evaluate the fire-resistance rating and degree of completeness of walls which create corridors serving the floor and that are constructed in accordance with Section 1020 of the International Building Code. This evaluation shall not include the wall elements considered under Sections ~~1301.6.3~~ 1305.2.3 and ~~1301.6.4~~ 1305.2.4. Under the categories and groups in Table ~~1301.6.5~~ 1305.2.5, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.5~~ 1305.2.5, Corridor Walls, for fire safety, means of egress and general safety.

TABLE ~~1301.6.5~~ 1305.2.5 CORRIDOR WALL VALUES

OCCUPANCY	CATEGORIES			
	a	b	c[a]	d[a]
A-1	-10	-4	0	2
A-2	-30	-12	0	2
A-3, F, M, R, S-1	-7	-3	0	2
A-4, B, E, S-2	-5	-2	0	5
I-2	-10	0	1	2

a. Corridors not providing at least one-half the exit access travel distance for all occupants on a floor shall use Category b.

~~**1301.6.5.1**~~ **1305.2.5.1 Categories.** The categories for corridor walls are:

1. Category a—No fire partitions; incomplete fire partitions; no doors; or doors not self-closing.
2. Category b—Less than 1-hour fire-resistance rating or not constructed in accordance with Section 708.4 of the International Building Code.
3. Category c—1-hour to less than 2-hour fire-resistance rating, with doors conforming to Section 716 of the International Building Code or corridors as permitted by Section 1020 of the International Building Codeto be without a fire-resistance rating.
4. Category d—2-hour or greater fire-resistance rating, with doors conforming to Section 716 of the International Building Code.

~~**1301.6.6**~~ **1305.2.6 Vertical openings.** Evaluate the fire-resistance rating of interior exit stairways or ramps, hoistways, escalator openings and other shaft enclosures within the building, and openings between two or more floors. Table ~~1301.6.6(1)~~ 1305.2.6(1) contains the appropriate protection values. Multiply that value by the construction-type factor found in Table ~~1301.6.6(2)~~ 1305.2.6(2). Enter the vertical opening value and its sign (positive or negative) in Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.6~~ 1305.2.6, Vertical Openings, for fire safety, means of egress and general safety. If the structure is a one-story building or if all the unenclosed vertical openings within the building conform to the requirements of Section 712 of the *International Building Code*, enter a value of 2. The maximum positive value for this requirement (VO) shall be 2.

TABLE ~~1301.6.6(1)~~ 1305.2.6(1) VERTICAL OPENING PROTECTION VALUE

PROTECTION	VALUE
None (unprotected opening)	-2 times number of floors connected
Less than 1 hour	-1 times number of floors connected
1 to less than 2 hours	1
2 hours or more	2

TABLE ~~1301.6.6(2)~~ 1305.2.6(2) CONSTRUCTION-TYPE FACTOR

FACTOR	TYPE OF CONSTRUCTION								
	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
	1.2	1.5	2.2	3.5	2.5	3.5	2.3	3.3	7

~~1301.6.6.1~~ 1305.2.6.1 **Vertical opening formula.** The following formula shall be used in computing vertical opening value.

$$VO = PV \times CF$$ **(Equation 13-6)**

where:

VO = Vertical opening value. The calculated value shall not be greater than positive 2.0.

PV = Protection value from Table 1301.6.6(1).

CF = Construction-type factor from Table 1301.6.6(2).

~~1301.6.7~~ **1305.2.7 HVAC systems.** Evaluate the ability of the HVAC system to resist the movement of smoke and fire beyond the point of origin. Under the categories in Section ~~1301.6.7.1~~ 1305.2.7.1, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.7~~ 1305.2.7, HVAC Systems, for fire safety, means of egress and general safety. *Facilities* in Group I-2 occupancies meeting Category a, b or c shall be considered to fail the evaluation.

~~1301.6.7.1~~ **1305.2.7.1 Categories.** The categories for HVAC systems are:

1. Category a—Plenums not in accordance with Section 602 of the International Mechanical Code. -10 points.
2. Category b—Air movement in egress elements not in accordance with Section 1020.6 of the International Building Code. -5 points.
3. Category c—Both Categories a and b are applicable. -15 points.
4. Category d—Compliance of the HVAC system with Section 1020.6 of the International Building Code and Section 602 of the International Mechanical Code. 0 points.
5. Category e—Systems serving one story; or a central boiler/chiller system without ductwork connecting two or more stories or where systems have no ductwork. +5 points.

~~1301.6.8~~ **1305.2.8 Automatic fire detection.** Evaluate the smoke detection capability based on the location and operation of automatic fire detectors in accordance with the International Mechanical Code and Section 907 of the International Building Code. Under the categories and occupancies in Table ~~1301.6.8~~ 1305.2.8, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.8~~ 1305.2.8, Automatic Fire Detection, for fire safety, means of egress and general safety. *Facilities* in Group I-2 occupancies meeting Category a, b or c shall be considered to fail the evaluation.

TABLE ~~1301.6.8~~ 1305.2.8 AUTOMATIC FIRE DETECTION VALUES

OCCUPANCY	CATEGORIES					
	a	**b**	**c**	**d**	**e**	**f**
A-1, A-3, F, M, R, S-1	-10	-5	0	2	6	NA
A-2	-25	-5	0	5	9	NA
A-4, B, E, S-2	-4	-2	0	4	8	NA
I-2	NP	NP	NP	4	5	2

NA = Not Applicable.

NP = Not Permitted.

~~1301.6.8.1~~ 1305.2.8.1 Categories. The categories for automatic fire detection are:

1. Category a—None.
2. Category b—Existing smoke detectors in HVAC systems and maintained in accordance with the *International Fire Code*.
3. Category c—Smoke detectors in HVAC systems. The detectors are installed in accordance with the requirements for new buildings in the *International Mechanical Code*.
4. Category d—Smoke detectors throughout all floor areas other than individual sleeping units, tenant spaces and dwelling units.
5. Category e—Smoke detectors installed throughout the floor area.
6. Category f—Smoke detectors in corridors only.

~~1301.6.9~~ 1305.2.9 Fire alarm systems. Evaluate the capability of the fire alarm system in accordance with Section 907 of the International Building Code. Under the categories and occupancies in Table ~~1301.6.9~~ 1305.2.9, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.9~~ 1305.2.9, Fire Alarm System, for fire safety, means of egress and general safety.

TABLE ~~1301.6.9~~ 1305.2.9 FIRE ALARM SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a	b[a]	c	d
A-1, A-2, A-3, A-4, B, E, R	-10	-5	0	5
F, M, S	0	5	10	15
I-2	-4	1	2	5

a. For buildings equipped throughout with an automatic sprinkler system, add 2 points for activation by a sprinkler water-flow device.

~~1301.6.9.1~~ 1305.2.9.1 Categories. The categories for fire alarm systems are:

1. Category a—None.
2. Category b—Fire alarm system with manual fire alarm boxes in accordance with Section 907.4 of the International Building Code and alarm notification appliances in accordance with Section 907.5.2 of the International Building Code.
3. Category c—Fire alarm system in accordance with Section 907 of the International Building Code.
4. Category d—Category c plus a required emergency voice/alarm communications system and a fire command station that conforms to Section 911 of the International Building Code and contains the emergency voice/alarm communications system controls, fire department communication system controls, and any other controls specified in Section 911 of the International Building Code where those systems are provided.

~~1301.6.10~~ 1305.2.10 Smoke control. Evaluate the ability of a natural or mechanical venting, exhaust or pressurization system to control the movement of smoke from a fire. Under the categories and occupancies in Table ~~1301.6.10~~ 1305.2.10, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.10~~ 1305.2.10, Smoke Control, for means of egress and general safety.

TABLE ~~1301.6.10~~ 1305.2.10 SMOKE CONTROL VALUES

OCCUPANCY	CATEGORIES					
	a	b	c	d	e	f
A-1, A-2, A-3	0	1	2	3	6	6
A-4, E	0	0	0	1	3	5
B, M, R	0	2[a]	3[a]	3[a]	3[a]	4[a]
F, S	0	2[a]	2[a]	3[a]	3[a]	3[a]
I-2	-4	0	0	0	3	0

a. This value shall be 0 if compliance with Category d or e in Section ~~1301.6.8.1~~ 1305.2.8.1 has not been obtained.

~~1301.6.10.1~~ 1305.2.10.1 Categories. The categories for smoke control are:

1. Category a—None.
2. Category b—The building is equipped throughout with an automatic sprinkler system. Openings are provided in exterior walls at the rate of 20 square feet (1.86 m^2) per 50 linear feet (15 240 mm) of exterior wall in each story and distributed around the building perimeter at intervals not exceeding 50 feet (15 240 mm). Such openings shall be readily openable from the inside without a key or separate tool and shall be provided with ready access thereto. In lieu of operable openings, clearly and permanently marked tempered glass panels shall be used.
3. Category c—One enclosed exit stairway, with ready access thereto, from each occupied floor of the building. The stairway has operable exterior windows, and the building has openings in accordance with Category b.
4. Category d—One smokeproof enclosure and the building has openings in accordance with Category b.
5. Category e—The building is equipped throughout with an automatic sprinkler system. Each floor area is provided with a mechanical air-handling system designed to accomplish smoke containment. Return and exhaust air shall be moved directly to the outside without recirculation to other floor areas of the building under fire conditions. The system shall exhaust not less than six air changes per hour from the floor area. Supply air by mechanical means to the floor area is not required. Containment of smoke shall be considered as confining smoke to the floor area involved without migration to other floor areas. Any other tested and *approved* design that will adequately accomplish smoke containment is permitted.
6. Category f—Each stairway shall be one of the following: a smokeproof enclosure in accordance with Section 1023.12 of the International Building Code; pressurized in accordance with Section 909.20.5 of the International Building Code; or shall have operable exterior windows.

~~1301.6.11~~ 1305.2.11 Means of egress capacity and number. Evaluate the means of egress capacity and the number of exits available to the building occupants. In applying this section, the means of egress are required to conform to the following sections of the International Building Code: 1003.7, 1004, 1005, 1006, 1007, 1016.2, 1026.1, 1028.3, 1028.5, 1030.2, 1030.3, 1030.4 and 1031. The number of exits credited is the number that is available to each occupant of the area being evaluated. Existing fire escapes shall be accepted as a component in the means of egress when conforming to Section 504.
Under the categories and occupancies in Table ~~1301.6.11~~ 1305.2.11, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.11~~ 1305.2.11, Means of Egress Capacity, for means of egress and general safety.

TABLE ~~1301.6.11~~ 1305.2.11 MEANS OF EGRESS VALUES

OCCUPANCY	CATEGORIES				
	a[a]	b	c	d	e
A-1, A-2, A-3, A-4, E, I-2	-10	0	2	8	10
M	-3	0	1	2	4
B, F, S	-1	0	0	0	0
R	-3	0	0	0	0

a. The values indicated are for buildings six stories or less in height. For buildings over six stories above grade plane, add an additional -10 points.

~~1301.6.11.1~~ 1305.2.11.1 Categories. The categories for means-of-egress capacity and number of exits are:

1. Category a—Compliance with the minimum required means-of-egress capacity or number of exits is achieved through the use of a fire escape in accordance with Section 405.
2. Category b—Capacity of the means of egress complies with Section 1005 of the International Building Code, and the number of exits complies with the minimum number required by Section 1006 of the International Building Code.
3. Category c—Capacity of the means of egress is equal to or exceeds 125 percent of the required means-of-egress capacity, the means of egress complies with the minimum required width dimensions specified in the *International Building Code*, and the number of exits complies with the minimum number required by Section 1006 of the International Building Code.
4. Category d—The number of exits provided exceeds the number of exits required by Section 1006 of the International Building Code. Exits shall be located a distance apart from each other equal to not less than that specified in Section 1007 of the International Building Code.
5. Category e—The area being evaluated meets both Categories c and d.

~~1301.6.12~~ 1305.2.12 Dead ends. In spaces required to be served by more than one means of egress, evaluate the length of the exit access travel path in which the building occupants are confined to a single path of travel. Under the categories and occupancies in Table ~~1301.6.12~~ 1305.2.12, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.12~~ 1305.2.12, Dead Ends, for means of egress and general safety.

TABLE ~~1301.6.12~~ 1305.2.12 DEAD-END VALUES

OCCUPANCY	CATEGORIES[a]			
	a	b	c	d
A-1, A-3, A-4, B, F, M, R, S	-2	0	2	-4
A-2, E	-2	0	2	-4
I-2	-2	0	2	-6

a. For dead-end distances between categories, the dead-end value shall be obtained by linear interpolation.

~~1301.6.12.1~~ 1305.2.12.1 **Categories.** The categories for dead ends are:

1. Category a—Dead end of 35 feet (10 670 mm) in nonsprinklered buildings or 70 feet (21 340 mm) in sprinklered buildings.
2. Category b—Dead end of 20 feet (6096 mm); or 50 feet (15 240 mm) in Group B in accordance with Section 1020.5, Exception 2, of the International Building Code.
3. Category c—No dead ends; or ratio of length to width (l/w) is less than 2.5:1.
4. Category d—Dead ends exceeding Category a.

~~1301.6.13~~ 1305.2.13 **Maximum exit access travel distance to an exit.** Evaluate the length of exit access travel to an *approved* exit. Determine the appropriate points in accordance with the following equation and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.13~~ 1305.2.13, Maximum Exit Access Travel Distance for means of egress and general safety. The maximum allowable exit access travel distance shall be determined in accordance with Section 1017.1 of the International Building Code.

$$\text{Points} = 20 \times \frac{\text{Maximum allowable travel distance} - \text{Maximum actual travel distance}}{\text{Maximum allowable travel distance}}$$

(Equation 13-7)

~~1301.6.14~~ 1305.2.14 **Elevator control.** Evaluate the passenger elevator equipment and controls that are available to the fire department to reach all occupied floors. Emergency recall and in-car operation of elevators shall be provided in accordance with the *International Fire Code*. Under the categories and occupancies in Table ~~1301.6.14~~ 1305.2.14, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.14~~ 1305.2.14, Elevator Control, for fire safety, means of egress and general safety. The values shall be zero for a single-story building.

TABLE ~~1301.6.14~~ 1305.2.14 ELEVATOR CONTROL VALUES

ELEVATOR TRAVEL	CATEGORIES			
	a	**b**	**c**	**d**
Less than 25 feet of travel above or below the primary level of elevator access for emergency fire-fighting or rescue personnel	-2	0	0	+2
Travel of 25 feet or more above or below the primary level of elevator access for emergency fire-fighting or rescue personnel	-4	NP	0	+4

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

~~1301.6.14.1~~ 1305.2.14.1 Categories. The categories for elevator controls are:

1. Category a—No elevator.
2. Category b—Any elevator without Phase I emergency recall operation and Phase II emergency in-car operation.
3. Category c—All elevators with Phase I emergency recall operation and Phase II emergency in-car operation as required by the *International Fire Code*.
4. Category d—All meet Category c; or Category b where permitted to be without Phase I emergency recall operation and Phase II emergency in-car operation; and at least one elevator that complies with new construction requirements serves all occupied floors.

~~1301.6.15~~ 1305.2.15 Means of egress emergency lighting. Evaluate the presence of and reliability of means of egress emergency lighting. Under the categories and occupancies in Table ~~1301.6.15~~ 1305.2.15, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.15~~ 1305.2.15, Means of Egress Emergency Lighting, for means of egress and general safety.

TABLE ~~1301.6.15~~ 1305.2.15 MEANS OF EGRESS EMERGENCY LIGHTING VALUES

NUMBER OF EXITS REQUIRED BY SECTION 1006 OF THE INTERNATIONAL BUILDING CODE	CATEGORIES		
	a	**b**	**c**
Two or more exits	NP	0	4
Minimum of one exit	0	1	1

NP = Not Permitted.

~~1301.6.15.1~~ 1305.2.15.1 Categories. The categories for means of egress emergency lighting are:

1. Category a—Means-of-egress lighting and exit signs not provided with emergency power in accordance with Section 2702 of the International Building Code.
2. Category b—Means of egress lighting and exit signs provided with emergency power in accordance with Section 2702 of the International Building Code.
3. Category c—Emergency power provided to means of egress lighting and exit signs, which provides protection in the event of power failure to the site or building.

~~1301.6.16~~ 1305.2.16 Mixed occupancies. Where a building has two or more occupancies that are not in the same occupancy classification, the separation between the mixed occupancies shall be evaluated in accordance with this section. Where there is no separation between the mixed occupancies or the separation between mixed occupancies does not qualify for any of the categories indicated in Section ~~1301.6.16.1~~ 1305.2.16.1, the building shall be evaluated as indicated in Section ~~1301.6~~ 1305.2, and the value for mixed occupancies shall be zero. Under the categories and occupancies in Table ~~1301.6.16~~ 1305.2.16, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.16~~ 1305.2.16, Mixed Occupancies, for fire safety and general safety. For buildings without mixed occupancies, the value shall be zero. *Facilities* in Group I-2 occupancies meeting Category a shall be considered to fail the evaluation.

TABLE ~~1301.6.16~~ 1305.2.16 MIXED OCCUPANCY VALUES[a]

OCCUPANCY	CATEGORIES		
	a	b	c
A-1, A-2, R	-10	0	10
A-3, A-4, B, E, F, M, S	-5	0	5
I-2	NP	0	5

NP = Not Permitted.

a. For fire-resistance ratings between categories, the value shall be obtained by linear interpolation.

~~1301.6.16.1~~ 1305.2.16.1 Categories. The categories for mixed occupancies are:

1. Category a—Occupancies separated by minimum 1-hour fire barriers or minimum 1-hour horizontal assemblies, or both.
2. Category b—Separations between occupancies in accordance with Section 508.4 of the International Building Code.
3. Category c—Separations between occupancies having a fire-resistance rating of not less than twice that required by Section 508.4 of the International Building Code.

~~1301.6.17~~ 1305.2.17 Automatic sprinklers. Evaluate the ability to suppress or control a fire based on the installation of an automatic sprinkler system in accordance with Section 903.3.1 of the International Building Code. "Required sprinklers" shall be based on the requirements of the International Building Code . Under the categories and occupancies in Table ~~1301.6.17~~ 1305.2.17, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.17~~ 1305.2.17, Automatic Sprinklers, for fire safety, means of egress divided by 2, and general safety. High-rise buildings defined in Chapter 2 of the *International Building Code* that undergo a *change of occupancy* to Group R shall be equipped throughout with an automatic sprinkler system in accordance with Section 403 of the International Building Code and Chapter 9 of the International Building Code. *Facilities* in Group I-2 occupancies meeting Category a, b, c or f shall be considered to fail the evaluation.

TABLE ~~1301.6.17~~ 1305.2.17 SPRINKLER SYSTEM VALUES

OCCUPANCY	CATEGORIES					
	a[a]	**b[a]**	**c**	**d**	**e**	**f**
A-1, A-3, F, M, R, S-1	-6	-3	0	2	4	6
A-2	-4	-2	0	1	2	4
A-4, B, E, S-2	-12	-6	0	3	6	12
I-2	NP	NP	NP	8	10	NP

NP = Not Permitted.

a. These options cannot be taken if Category a in Section ~~1301.6.18~~ 1305.2.18 is used.

~~1301.6.17.1~~ 1305.2.17.1 Categories. The categories for automatic sprinkler system protection are:

1. Category a— An *approved* automatic sprinkler system is required throughout; an *approved* automatic sprinkler system is not provided.
2. Category b—An *approved* automatic sprinkler system is required in a portion of a building; an *approved* automatic sprinkler system is not provided; the sprinkler system design is not adequate for the hazard protected in accordance withChapter 9 of the International Building Code.
3. Category c—An *approved* automatic sprinkler system is not required; none are provided.
4. Category d—An *approved* automatic sprinkler system is required in a portion of a building; an *approved* automatic sprinkler system is provided in a portion of a building in accordance with Chapter 9 of the International Building Code.
5. Category e—An *approved* automatic sprinkler system is required throughout; an *approved* automatic sprinkler system is provided throughout in accordance with Chapter 9 of the International Building Code.
6. Category f—An *approved* automatic sprinkler system is not required throughout; an *approved* automatic sprinkler system is provided throughout in accordance with Chapter 9 of the International Building Code.

~~1301.6.18~~ 1305.2.18 Standpipes. Evaluate the ability to initiate attack on a fire by making a supply of water readily available through the installation of standpipes in accordance with Section 905 of the International Building Code. "Required Standpipes" shall be based on the requirements of the *International Building Code*. Under the categories and occupancies in Table ~~1301.6.18~~ 1305.2.18, determine the appropriate value and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.18~~ 1305.2.18, Standpipes, for fire safety, means of egress and general safety.

TABLE ~~1301.6.18~~ 1305.2.18 STANDPIPE SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a[a]	b	c	d
A-1, A-3, F, M, R, S-1	-6	0	4	6
A-2	-4	0	2	4
A-4, B, E, S-2	-12	0	6	12
I-2	-2	0	1	2

a. This option cannot be taken if Category a or Category b in Section ~~1301.6.17~~ 1305.2.17 is used.

~~1301.6.18.1~~ 1305.2.18.1 Standpipe categories. The categories for standpipe systems are:

1. Category a—Standpipes are required; standpipe is not provided or the standpipe system design is not in compliance with Section 905.3 of the International Building Code.
2. Category b—Standpipes are not required; none are provided.
3. Category c—Standpipes are required; standpipes are provided in accordance with Section 905 of the International Building Code.
4. Category d—Standpipes are not required; standpipes are provided in accordance with Section 905 of the International Building Code.

~~1301.6.19~~ 1305.2.19 Incidental uses. Evaluate the protection of incidental uses in accordance with Section 509.4.2 of the International Building Code. Do not include those where this code requires automatic sprinkler systems throughout the building including covered and open mall buildings, high-rise buildings, public garages and unlimited area buildings. Assign the lowest score from Table ~~1301.6.19~~ 1305.2.19 for the building or floor area being evaluated and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.19~~ 1305.2.19, Incidental Uses, for fire safety, means of egress and general safety. If there are no specific occupancy areas in the building or floor area being evaluated, the value shall be zero.

TABLE ~~1301.6.19~~ 1305.2.19 INCIDENTAL USE AREA VALUES

PROTECTION REQUIRED BY TABLE 509.1 OF THE INTERNATIONAL BUILDING CODE	PROTECTION PROVIDED						
	None	1 hour	AS	AS with CRS	1 hour and AS	2 hours	2 hours and AS
2 hours and AS	-4	-3	-2	-2	-1	-2	0
2 hours, or 1 hour and AS	-3	-2	-1	-1	0	0	0
1 hour and AS	-3	-2	-1	-1	0	-1	0
1 hour	-1	0	-1	-1	0	0	0
1 hour, or AS with CRS	-1	0	-1	-1	0	0	0
AS with CRS	-1	-1	-1	-1	0	-1	0
1 hour or AS	-1	0	0	0	0	0	0

AS = Automatic Sprinkler System.

CRS = Construction capable of resisting the passage of smoke (see Section 509.4.2 of the International Building Code).

~~1301.6.20~~ 1305.2.20 Smoke compartmentation. Evaluate the smoke compartments for compliance with Section 407.5 of the International Building Code. Under the categories and occupancies in Table ~~1301.6.20~~ 1305.2.20, determine the appropriate smoke compartmentation value (SCV) and enter that value into Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.20~~ 1305.2.20, Smoke Compartmentation, for fire safety, means of egress and general safety. *Facilities* in Group I-2 occupancies meeting Category b or c shall be considered to fail the evaluation.

TABLE ~~1301.6.20~~ 1305.2.20 SMOKE COMPARTMENTATION VALUES

OCCUPANCY	CATEGORIES[a]		
	a	b	c
A, B, E, F, M, R and S	0	0	0
I-2	0	-10	NP

NP = Not Permitted.

a. For areas between categories, the smoke compartmentation value shall be obtained by linear interpolation.

~~1301.6.20.1~~ 1305.2.20.1 Categories. Categories for smoke compartment size are:

1. Category a—Smoke compartment complies with Section 407.5 of the *International Building Code*.
2. Category b—Smoke compartment are provided but do not comply with Section 407.5 of the *International Building Code*.
3. Category c—Smoke compartments are not provided.

~~1301.6.21~~ 1305.2.21 Care recipient ability, concentration, smoke compartment location and ratio to attendant. In I-2 occupancies, the ability of care recipients, their concentration and ratio to attendants shall be evaluated and applied in accordance with this section. Evaluate each smoke compartment using the categories in Sections ~~1301.6.21.1~~ 1305.2.21.1, ~~1301.6.21.2~~ 1305.2.21.2 and ~~1301.6.21.3~~ 1305.2.21.3 and enter the value in Table ~~1301.7~~ 1306.1. To determine the safety factor, multiply the three values together; if the product is less than 6, compliance has failed.

~~1301.6.21.1~~ 1305.2.21.1 Care recipient ability for self-preservation. Evaluate the ability of the care recipients for self-preservation in each smoke compartment in an emergency. Under the categories and occupancies in Table ~~1301.6.21.1~~ 1305.2.21.1, determine the appropriate value and enter that value in Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.21.1~~ 1305.2.21.1, Care Recipient Ability for Self-preservation, for means of egress and general safety.

TABLE ~~1301.6.21.1~~ 1305.2.21.1 CARE RECIPIENT ABILITY VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	3	2	1

~~1301.6.21.1.1~~ 1305.2.21.1.1 Categories. The categories for care recipient ability for self-preservation are:

1. Category a—(mobile) Care recipients are capable of self-preservation without assistance.
2. Category b—(not mobile) Care recipients rely on assistance for evacuation or relocation.
3. Category c—(not movable) Care recipients cannot be evacuated or relocated.

~~1301.6.21.2~~ 1305.2.21.2 Care recipient concentration. Evaluate the concentration of care recipients in each smoke compartment under Section ~~1301.6.21.2~~ 1305.2.21.2. Under the categories and occupancies in Table ~~1301.6.21.2~~ 1305.21.2 determine the appropriate value and enter that value in Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.21.2~~ 1305.2.21.2, Care Recipient Concentration, for means of egress and general safety.

TABLE ~~1301.6.21.2~~ 1305.2.21.2 CARE RECIPIENT CONCENTRATION VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	3	2	1

~~**1301.6.21.2.1**~~ **1305.2.21.2.1** **Categories:.** The categories for care recipient concentration are:

1. Category a—smoke compartment has 1 to 10 care recipients.
2. Category b—smoke compartment has more than 10 to 40 care recipients.
3. Category c—smoke compartment has more than 40 care recipients.

~~**1301.6.21.3**~~ **1305.2.21.3** **Attendant-to-care recipients ratio.** Evaluate the attendant-to-care recipients ratio for each compartment under Section ~~1301.6.21.3~~ 1305.2.21.3. Under the categories and occupancies in Table ~~1301.6.21.3~~ 1305.2.21.3 determine the appropriate value and enter that value in Table ~~1301.7~~ 1306.1 under Safety Parameter ~~1301.6.21.3~~ 1305.2.21.3, Attendant-to-Care Recipients Ratio, for means of egress and general safety.

TABLE ~~1301.6.21.3~~ 1305.2.21.3 ATTENDANT-TO-CARE RECIPIENTS RATIO VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	3	2	1

~~**1301.6.21.3.1**~~ **1305.2.21.3.1 Categories.** The categories for attendant-to-care recipient concentrations are:

1. Category a—attendant-to-care recipients concentration is 1:5 or no care recipients.
2. Category b—attendant-to-care recipients concentration is 1:6 to 1:10.
3. Category c—attendant-to-care recipients concentration is greater than 1:10.

Add new text as follows:

SECTION 1306
BUILDING SCORE

Revise as follows:

~~**1301.7**~~ **1306.1 Building score.** After determining the appropriate data from Section ~~1301.6~~ 1305.2, enter those data in Table ~~1301.7~~ 1306.1 and total the building score.

TABLE ~~1301.7~~ 1306.1 SUMMARY SHEET—BUILDING CODE

Year building was constructed:___________________________		Number of stories: ___________ Height in feet:_______________	
Type of construction: __________________________________		Area per floor: ____	
Percentage of open perimeter increase: ________ %			
Completely suppressed:	Yes_______ No_____	Corridor wall rating:____________________________________	
		Type:____	
Compartmentation:	Yes ______ No _______	Required door closers:	Yes__________ No___________
Fire-resistance rating of vertical opening enclosures:____			
Type of HVAC system:____, serving number of floors: ___________________________			
Automatic fire detection:	Yes_______ No_______	Type and location: _____________________________________	
Fire alarm system:	Yes_______ No_______	Type:____	
Smoke control:	Yes_______ No_______	Type:____	
Adequate exit routes:	Yes _______ No_______	Dead ends: ______________	Yes ________ No __________
Maximum exit access travel distance: _____________________		Elevator controls:	Yes ________ No __________
Means of egress emergency lighting:	Yes _______ No ______	Mixed occupancies:	Yes ________ No __________
Standpipes:	Yes_______ No_______	Care recipients ability for self-preservation: ________________________	
Incidental use:	Yes_______ No_______	Care recipients concentration: ___________________________________	
Smoke compartmentation less than 22,500 sq. feet (2092 m^2):	Yes_______ No_______	Attendant-to-care recipients ratio: ________________________________	
SAFETY PARAMETERS	**FIRE SAFETY (FS)**	**MEANS OF EGRESS (ME)**	**GENERAL SAFETY (GS)**
~~1301.6.1~~ 1305.2.1 Building height			
~~1301.6.2~~ 1305.2.2 Building area			
~~1301.6.3~~ 1305.2.3 Compartmentation			
~~1301.6.4~~ 1305.2.4 Tenant and dwelling unit separations			
~~1301.6.5~~ 1305.2.5 Corridor walls			
~~1301.6.6~~ 1305.2.6 Vertical openings			
~~1301.6.7~~ 1305.2.7 HVAC systems			
~~1301.6.8~~ 1305.2.8 Automatic fire detection			
~~1301.6.9~~ 1305.2.9 Fire alarm system			
~~1301.6.10~~ 1305.2.10 Smoke control	* * * *		
~~1301.6.11~~ 1305.2.11 Means of egress	* * * *		
~~1301.6.12~~ 1305.2.12 Dead ends	* * * *		
~~1301.6.13~~ 1305.2.13 Maximum exit access travel distance	* * * *		
~~1301.6.14~~ 1305.2.14 Elevator control			
~~1301.6.15~~ 1305.2.15 Means of egress emergency lighting	* * * *		
~~1301.6.16~~ 1305.2.16 Mixed occupancies		* * * *	
~~1301.6.17~~ 1305.2.17 Automatic sprinklers		÷ 2 =	
~~1301.6.18~~ 1305.2.18 Standpipes			

~~1301.6.19~~ 1305.2.19 Incidental use			
~~1301.6.20~~ 1305.2.20 Smoke compartmentation			
~~1301.6.21.1~~ 1305.2.21.1 Care recipients ability for self-preservation[a]	* * * *		
~~1301.6.21.2~~ 1305.2.21.2 Care recipients concentration[a]	* * * *		
~~1301.6.21.3~~ 1305.2.21.3 Attendant-to-care recipients ratio[a]	* * * *		
Building score–total value			

* * * *No applicable value to be inserted.

a. Only applicable to Group I-2 occupancies.

~~1301.8~~ 1306.2 Safety scores. The values in Table ~~1301.8~~ 1306.2 are the required mandatory safety scores for the evaluation process listed in Section ~~1301.6~~ 1305.2.

TABLE ~~1301.8~~ 1306.2 MANDATORY SAFETY SCORES[a]

OCCUPANCY	FIRE SAFETY(MFS)	MEANS OF EGRESS (MME)	GENERAL SAFETY (MGS)
A-1	20	31	31
A-2	21	32	32
A-3	22	33	33
A-4, E	29	40	40
B	30	40	40
F	24	34	34
I-2	19	34	34
M	23	40	40
R	21	38	38
S-1	19	29	29
S-2	29	39	39

a. MFS = Mandatory Fire Safety.

MME = Mandatory Means of Egress.

MGS = Mandatory General Safety.

Add new text as follows:

SECTION 1307
EVALUATION OF BUILDING SAFETY

Revise as follows:

~~1301.9~~ 1307.1 Evaluation of building safety. The mandatory safety score in Table ~~1301.8~~ 1306.2 shall be subtracted from the building score in Table ~~1301.7~~ 1306.1 for each category in accordance with the evaluation formulas in Table ~~1301.9~~ 1307.1. Where the final score for any category equals zero or more, the building is in compliance with the requirements of this section for that category. Where the final score for any category is less than zero, the building is not in compliance with the requirements of this section.

TABLE ~~1301.9~~ 1307.1 EVALUATION FORMULAS[a]

FORMULA	TABLE ~~1301.7~~ 1306.1	TABLE ~~1301.8~~ 1306.2		SCORE	PASS	FAIL
FS – MFS ≥ 0	______(FS) –	______(MFS)	=	______	______	______
ME – MME ≥ 0	______(ME) –	______(MME)	=	______	______	______
GS – MGS ≥ 0	______(GS) –	______(MGS)	=	______	______	______

a. FS = Fire Safety.

ME = Means of Egress.

GS = General Safety.

MFS = Mandatory Fire Safety.

MME = Mandatory Means of Egress.

MGS = Mandatory General Safety.

~~1301.9.1~~ 1307.1.1 Mixed occupancies. For mixed occupancies, the following provisions shall apply:

1. Where the separation between mixed occupancies does not qualify for any category indicated in Section ~~1301.6.16~~ 1305.2.16, the mandatory safety scores for the occupancy with the lowest general safety score in Table ~~1301.8~~ 1306.2 shall be utilized (see Section ~~1301.6~~ 1305.2).
2. Where the separation between mixed occupancies qualifies for any category indicated in Section ~~1301.6.16~~ 1305.2.16, the mandatory safety scores for each occupancy shall be placed against the evaluation scores for the appropriate occupancy. An evaluation is not required for areas of the building with separated occupancies in accordance with Table 508.4 of the *International Building Code* in which there are no *alterations* or *change of occupancy*.

Reason Statement: This is a reformatting of section numbers so that everything is not under one section.
This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal merely renumbers Chapter 13 so that all sections do not fall under Section 1301. This is meant to make the provisions easier to navigate. Therefore, because this is proposal is simply renumbering the chapter there is no increase in construction or compliance costs.

CCCIEBC3-22

CCCIRC3-22

IRC: R312.1.4

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R312.1.4 Exterior plastic composite guards. *Plastic composite* exterior *guards* shall comply with the requirements of Section R507.2.2 ~~R317.4~~.

Reason Statement: Section R317.4 is about decay resistance of wood and wood-based products. Plastic composites are often wood based, so R317.4 is simply a pointer to R507.2.2 where all the details for plastic composite are provided. This proposal simple points the guard section directly to the plastic composite provisions. This is the same reference as R311.7.5.4 for stair treads and R311.7.8.6 for handrails.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is only editorial and will not affect the cost of construction.

CCCIRC3-22

CCCIBC4-22

IBC: 1607.4

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.4 Concentrated live loads. Floors, roofs and other similar surfaces shall be designed to support the uniformly distributed *live loads* prescribed in Section 1607.3 or the concentrated *live loads*, given in Table 1607.1, whichever produces the greater *load effects*. Unless otherwise specified, the indicated ~~concentration~~ concentrated *load* shall be assumed to be uniformly distributed over an area of $2^1/_2$ feet by $2^1/_2$ feet (762 mm by 762 mm) and shall be located so as to produce the maximum *load effects* in the structural members.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

This proposal makes an editorial change to coordinate with the 2022 edition of ASCE 7. This same change was made to ASCE 7-16. The revised text is more clear and agrees with the typical terminology used for concentrated loads in the IBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Editorial change for clarity.

CCCIBC4-22

CCCIRC4-22

IRC: TABLE R302.1(2), R302.2.6, SECTION R313, R313.1, R326.3, TABLE AG101.1, P2902.5.4, SECTION P2904, P2904.3.1

Proponents: John Swanson, representing National Fire Sprinkler Association (swanson@nfsa.org)

2021 International Residential Code

Revise as follows:

TABLE R302.1(2) EXTERIOR WALLS—DWELLINGS WITH ~~A FIRE SPRINKLERS~~ AN AUTOMATIC SPRINKLER SYSTEM

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet[a]
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[b, c]	2 feet[a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	NA	< 3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the fire separation distance for exterior walls not fire-resistance rated and for fire-resistance-rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

c. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where gable vent openings are not installed.

R302.2.6 Structural independence. Each *townhouse unit* shall be structurally independent.

Exceptions:

1. Foundations supporting exterior walls or common walls.
2. Structural roof and wall sheathing from each unit fastened to the common wall framing.
3. Nonstructural wall and roof coverings.
4. Flashing at termination of roof covering over common wall.
5. *Townhouse units* separated by a common wall as provided in Section R302.2.2, Item 1 or 2.
6. *Townhouse units* protected by ~~a fire~~ an automatic sprinkler system complying with Section P2904 or NFPA 13D.

SECTION R313
AUTOMATIC ~~FIRE~~ SPRINKLER SYSTEMS

R313.1 Townhouse automatic ~~fire~~ sprinkler systems. An automatic sprinkler system shall be installed in *townhouses*.

Exception: An automatic sprinkler system shall not be required where *additions* or *alterations* are made to existing *townhouses* that do not have an automatic sprinkler system installed.

R326.3 Story above grade plane. A habitable attic shall be considered a story above grade plane.
Exceptions: A habitable attic shall not be considered to be a story above grade plane provided that the habitable attic meets all the following:

1. The aggregate area of the habitable attic is either of the following:
    1.1. Not greater than one-third of the floor area of the story below.
    1.2. Not greater than one-half of the floor area of the story below where the habitable attic is located within a dwelling unit equipped with ~~a fire~~ an automatic sprinkler system in accordance with Section P2904.
2. The occupiable space is enclosed by the roof assembly above, knee walls, if applicable, on the sides and the floor-ceiling assembly below.
3. The floor of the habitable attic does not extend beyond the exterior walls of the story below.
4. Where a habitable attic is located above a third story, the dwelling unit or townhouse unit shall be equipped with ~~a fire~~ an automatic sprinkler system in accordance with Section P2904.

TABLE AG101.1 PLASTIC PIPING STANDARDS FOR VARIOUS APPLICATIONS[a, b]

APPLICATION	LOCATION	TYPE OF PLASTIC PIPING								
		ABS	CPVC	PE	PE-AL-PE	PE-RT	PEX	PEX-AL-PEX	PP	PVC
Central vacuum	System piping	—	—	—	—	—	—	—	—	ASTM F2158
Foundation drainage	System piping	ASTM F628	—	ASTM F405	—	—	—	—	—	ASTM D2665; ASTM D2729; ASTM D3034
Geothermal ground loop	System piping	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855; CSA B137.6	ASTM D2239; ASTM D2737; ASTM D3035	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2241; CSA B137.3
	Loop piping	—	—	ASTM D2239; ASTM D2737; ASTM D3035; NSF 358-1	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	—	ASTM F2389; CSA B137.11	—
Graywater	Nonpressure distribution/collection	ASTM F628	—	ASTM D2239; ASTM D2737; ASTM D3035; ASTM F2306	—	—	—	—	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2729; ASTM D2949; ASTM D3034; ASTM F891; ASTM F1760 ; CSA B137.3
	Pressure/distribution	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855; CSA B137.6	ASTM D2239; ASTM D2737; ASTM D3035	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2241; CSA B137.3
Radiant cooling	Loop piping	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855	ASTM D2239; ASTM D2737; ASTM D3035	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	—
Radiant heating	Loop piping	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855	—	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	—
	Nonpressure/collection	ASTM F628	—	ASTM F1901	—	—	—	—	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2729; ASTM D2949; ASTM F891; ASTM F1760 ; CSA B137.3

Rainwater harvesting **APPLICATION**	**LOCATION**	**TYPE OF PLASTIC PIPING**								
		ABS	**CPVC**	**PE**	**PE-AL-PE**	**PE-RT**	**PEX**	**PEX-AL-PEX**	**PP**	**PVC**
	Pressure/distribution	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855; CSA B137.6	ASTM D2239 ASTM D2737; ASTM D3035	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2241; CSA B137.3
Radon venting	System piping	ASTM F628	—	—	—	—	—	—	—	ASTM D1785; ASTM F891; ASTM F1760
Reclaimed water	Main to building service	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855; CSA B137.6	ASTM D3035; AWWA C901; CSA B137.1	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; AWWA C904; CSA B137.5	—	ASTM F2389; CSA B137.11	ASTM D1785; ASTM D2241; AWWA C905; CSA B137.3
	Pressure/distribution/irrigation	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855; CSA B137.6	ASTM D2239; ASTM D2737; ASTM D3035	ASTM F1282	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; AWWA C900 ; CSA B137.11	ASTM D1785; ASTM D2241; AWWA C900
~~Residential fire sprinklers~~ Automatic Sprinkler Systems[c]	Sprinkler piping	—	ASTM F441; ASTM F442; CSA B137.6; UL 1821	—	—	ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5; UL 1821	—	ASTM F2389; CSA B137.11	—
Solar heating	Pressure/distribution	—	ASTM D2846; ASTM F441; ASTM F442; ASTM F2855	—	—	ASTM F2623; ASTM F2769; CSA B137.18	ASTM F876; CSA B137.5	ASTM F1281	ASTM F2389; CSA B137.11	—

a. This table indicates manufacturing standards for plastic piping materials that are suitable for use in the applications indicated. Such applications support green and sustainable building practices. The system designer or the installer of piping shall verify that the piping chosen for an application complies with local codes and the recommendations of the manufacturer of the piping.

b. Fittings applicable for the piping shall be as recommended by the manufacturer of the piping.

c. Piping ~~systems~~ for ~~fire~~ automatic sprinkler systems ~~applications~~ shall be listed for the application.

P2902.5.4 Connections to automatic ~~fire~~ sprinkler systems. The potable water supply to automatic ~~fire~~ sprinkler systems shall be protected against backflow by a double-check backflow prevention assembly, a double-check fire protection backflow prevention assembly, a reduced pressure principle backflow prevention assembly or a reduced pressure principle fire protection backflow prevention assembly.

Exception: Where an automatic sprinkler system~~s are~~ is installed in accordance with Section P2904.1, backflow protection for the water supply system shall not be required.

SECTION P2904
DWELLING UNIT ~~FIRE~~ AUTOMATIC SPRINKLER SYSTEMS

P2904.3.1 Nonmetallic pipe and tubing. Nonmetallic pipe and tubing, such as CPVC, PEX, and PE-RT shall be *listed* for use in residential ~~fire~~ automatic sprinkler systems.

Reason Statement: The intent of this code change proposal is to coordinate terminology between the IBC, IFC, IEBC and IRC when referring to “automatic sprinkler system” since this term is used and defined in the International Building Code and International Fire Code. This change is intended to coordinate terminology in the IRC so the term is used consistently throughout the document. It is not the intent of this proposal to make any substantive changes to automatic sprinkler system requirements in the IRC. Existing code sections referencing specific components or appurtenances of an automatic sprinkler system were left untouched. For example, this proposal is not recommending any changes to R302.2.2, R302.4.1, or any other section referencing "water-filled sprinkler piping", since these sections are referring to specific components of an automatic sprinkler system. This proposal also attempts to mirror F75-21 Part II (attached) in relation to clarifying terminology relating to automatic sprinkler systems in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no technical changes to this code section. This proposal is being made for correlation purposes with the terminology used.

CCCIRC4-22

CCCIBC5-22

IBC: 1607.12

Proponents: Jennifer Goupil, representing Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.12 Reduction in uniform live loads. Except for uniform roof *live loads* ~~at roofs~~, all other minimum uniformly distributed *live loads*, L_o, in Table 1607.1 are permitted to be reduced in accordance with Section 1607.12.1 or 1607.12.2. Uniform roof *live loads* ~~at roofs~~ are permitted to be reduced in accordance with Section 1607.14.2.

Reason Statement: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

These changes are proposed to improve the coordination between the IBC and ASCE 7 by aligning terminology. The proposed change modifies the text to use the defined term, *roof live load*, that is commonly used throughout the IBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The terminology change will not change the cost of construction.

CCCIBC5-22

CCCIRC5-22

IRC: R316.3

Proponents: Tim Earl, representing Self (tearl@gbhint.com)

2021 International Residential Code

Revise as follows:

R316.3 Surface burning characteristics. Unless otherwise allowed in Section R316.5, foam plastic, or foam plastic cores used as a component in manufactured assemblies, used in building construction shall comply with Section R316.3.1 or R316.3.2. Loose-fill-type foam plastic insulation shall be tested as board stock for the flame spread index and *smoke-developed index*.

> **Exception:** Spray foam plastic insulation more than 4 inches (102 mm) in thickness shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450 where tested at a thickness of 4 inches (102 mm) and at the density intended for use. Such spray foam plastic shall be separated from the interior of a building by $^{1}/_{2}$-inch (12.7 mm) gypsum wallboard or by a material that ~~has been tested in accordance with NFPA 275, and shall meet the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test.~~ is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

R316.4 Thermal barrier. Unless otherwise allowed in Section R316.5, foam plastic shall be separated from the interior of a building by an *approved* thermal barrier of not less than $^{1}/_{2}$-inch (12.7 mm) gypsum wallboard, $^{23}/_{32}$-inch (18.2 mm) *wood structural panel* or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

Reason Statement: This is editorial cleanup. The exception to R316.3 and the text of R316.4 say the same thing in different ways. The language in R316.4 is better code language, so this proposal revises the exception to R316.3 to match.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple editorial cleanup.

CCCIRC5-22

CCCIRC6-22

IRC: R703.1.1

Proponents: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com)

2021 International Residential Code

Revise as follows:

R703.1.1 Water resistance. The exterior wall envelope shall be designed and constructed in a manner that prevents the accumulation of water within the wall assembly by providing a ~~water-resistant barrier~~ *water-resistive barrier* behind the exterior cladding as required by Section R703.2 and a means of draining to the exterior water that penetrates the exterior cladding.

Exceptions:

1. A weather-resistant exterior wall envelope shall not be required over concrete or masonry walls designed in accordance with Chapter 6 and flashed in accordance with Section R703.4 or R703.8.
2. Compliance with the requirements for a means of drainage, and the requirements of Sections R703.2 and R703.4, shall not be required for an exterior wall envelope that has been demonstrated to resist wind-driven rain through testing of the exterior wall envelope, including joints, penetrations and intersections with dissimilar materials, in accordance with ASTM E331 under the following conditions:
   - 2.1. Exterior wall envelope test assemblies shall include at least one opening, one control joint, one wall/eave interface and one wall sill. All tested openings and penetrations shall be representative of the intended end-use configuration.
   - 2.2. Exterior wall envelope test assemblies shall be at least 4 feet by 8 feet (1219 mm by 2438 mm) in size.
   - 2.3. Exterior wall assemblies shall be tested at a minimum differential pressure of 6.24 pounds per square foot (299 Pa).
   - 2.4. Exterior wall envelope assemblies shall be subjected to the minimum test exposure for a minimum of 2 hours.

The exterior wall envelope design shall be considered to resist wind-driven rain where the results of testing indicate that water did not penetrate control joints in the exterior wall envelope, joints at the perimeter of openings penetration or intersections of terminations with dissimilar materials.

Reason Statement: This proposal changes the term "water-resistant barrier" in Section R703.1.1 to "*water-resistive barrier*", because the section and sentence using that term directly references Section R703.2 Water-resistive barriers. "Water-resistive barrier" is a defined term whereas "water-resistant barrier" is not.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal replaces an improper term with the proper term, and does not affect construction costs.

CCCIRC6-22

CCCIBC7-22

IBC: 1609.5, 1609.5.1, 1609.5.2, 1609.5.2.1 (New)

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Building Code

1609.5 Roof systems. Roof systems shall be designed and constructed in accordance with Sections 1609.5.1 through 1609.5.3, as applicable.

1609.5.1 Roof deck. The *roof deck* shall be designed to withstand the wind pressures determined in accordance with ASCE 7.

Revise as follows:

1609.5.2 Roof coverings. *Roof coverings* shall comply with Section 1609.5.1.

> **Exception:** Rigid tile *roof coverings* that are air permeable and installed over a *roof deck* complying with Section 1609.5.1 are permitted to be designed in accordance with Section 1609.5.3.

~~Asphalt shingles installed over a *roof deck* complying with Section 1609.5.1 shall comply with the wind-resistance requirements of Section 1504.2 .~~

Add new text as follows:

1609.5.2.1 Asphalt shingles. Asphalt shingles installed over a *roof deck* complying with Section 1609.5.1 shall comply with the wind-resistance requirements of Section 1504.2 .

Reason Statement: This proposal inserts a subsection into Section 1609.5.2 to clearly separate the provisions for asphalt shingles, which point to Section 1504.2, from the Exception that addresses rigid tile roof coverings, which points to 1609.5.3. Doing so removes the opportunity for misinterpretation of the requirements for asphalt shingles.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal reduces ambiguity and possible misinterpretation of existing provisions without making technical changes. No affect on cost of construction is expected.

CCCIBC7-22

CCCIRC7-22

IRC: R908.3.1, R908.3.1.1, R908.4

Proponents: Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org); Richard Justin Koscher, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org)

2021 International Residential Code

Revise as follows:

~~R908.3.1~~ R908.4 Roof recover. The installation of a new roof covering over an existing roof covering shall be permitted where any of the following conditions occur:

1. Where the new roof covering is installed in accordance with the roof covering manufacturer's approved instructions
2. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.
3. Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs where applied in accordance with Section R908.4.
4. The application of a new protective *roof coating* over an existing protective *roof coating*, *metal roof panel*, *metal roof shingle*, mineral surfaced roll roofing, built-up roof, modified bitumen roofing, thermoset and thermoplastic single-ply roofing and spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.

Exception: A *roof recover* shall not be permitted where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. Where the existing roof covering is slate, clay, cement or asbestos-cement tile.
3. Where the existing roof has two or more applications of any type of roof covering.

Delete without substitution:

~~**R908.3.1.1 Roof recover not allowed.** A *roof recover* shall not be permitted where any of the following conditions occur:~~

1. ~~Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.~~
2. ~~Where the existing roof covering is slate, clay, cement or asbestos-cement tile.~~
3. ~~Where the existing roof has two or more applications of any type of roof covering.~~

Revise as follows:

R908.4.1 ~~R908.4~~ Roof recovering over wood shingles or shakes. Where the application of a new roof covering over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum board, mineral fiber, glass fiber or other *approved* materials securely fastened in place.

Reason Statement: This proposal separates roof recover from roof replacement because the two reroofing activities are distinct and only one activity (recover or replacement) can occur on a project at one time. Roof recover is not a subset of roof replacement but a stand alone activity and it is important to recognize it as such. Furthermore, the proposal eliminates number section (1512.2.1.1) in front of exemption for consistency with other sections of the IBC. This proposal creates a sub-section (1512.3.1 Roof recovering over wood shingles or shakes) to ensure consistency with the format of the IBC. Finally, in the International Residential Code, the proposal harmonizes language in the title for consistency with IBC and IEBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code proposal addresses important formatting clarification and does not impact the cost of construction. This proposal does not create new requirements in Section 15 of the IBC.

CCCIRC7-22

CCCIRC8-22

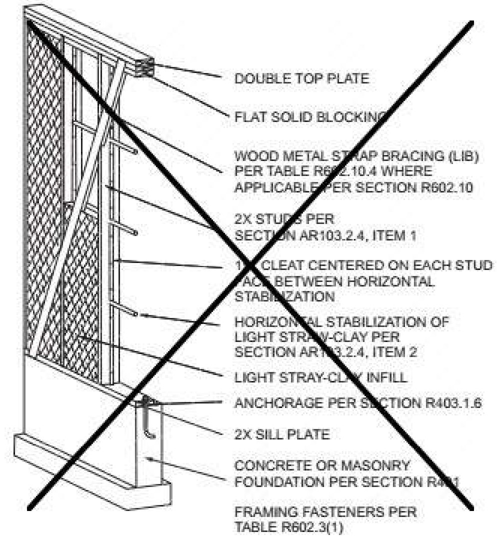
IRC: AR104.1, FIGURE AR103.2.4(2), FIGURE AR103.2.4(3)

Proponents: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Arkin, representing California Straw Building Association (david@arkintilt.com)

2021 International Residential Code

Revise as follows:

AR104.1 Thermal characteristics. Walls with light straw-clay infill of densities ~~of~~ greater than or equal to 20 pounds per cubic foot (480.6 kg/m^3) shall be classified as mass walls in accordance with Section N1102.2.5 (R402.2.5) and shall meet the *R*-value requirements for mass walls in Table N1102.1.3 (R402.1.2). Walls with light straw-clay infill of densities less than 20 pounds per cubic foot (480.6 kg/m^3) shall meet the *R*-value requirements for wood frame walls in Table N1102.1.3 (R402.1.2).


DOUBLE TOP PLATE
FLAT SOLID BLOCKING
WOOD METAL STRAP BRACING (LIB) PER TABLE R602.10.4 WHERE APPLICABLE PER SECTION R602.10
2X STUDS PER SECTION AR103.2.4, ITEM 1
CLEAT CENTERED ON EACH STUD BETWEEN HORIZONTAL STABILIZATION
HORIZONTAL STABILIZATION OF LIGHT STRAW-CLAY PER SECTION AR103.2.4, ITEM 2
LIGHT STRAY-CLAY INFILL
ANCHORAGE PER SECTION R403.1.6
2X SILL PLATE
CONCRETE OR MASONRY FOUNDATION PER SECTION R401
FRAMING FASTENERS PER TABLE R602.3(1)

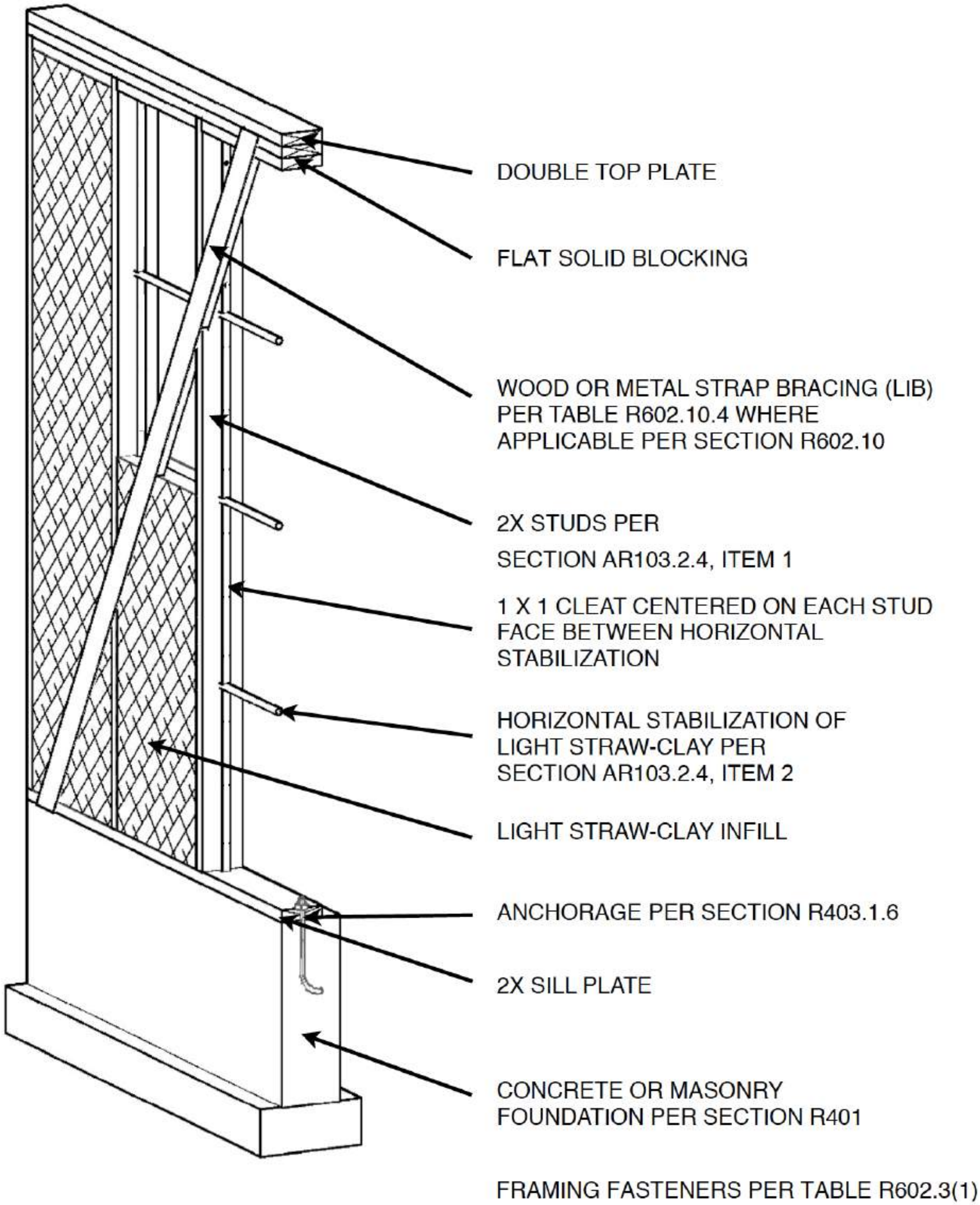
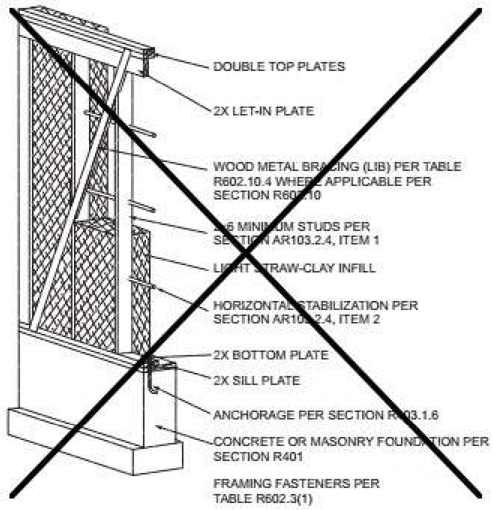
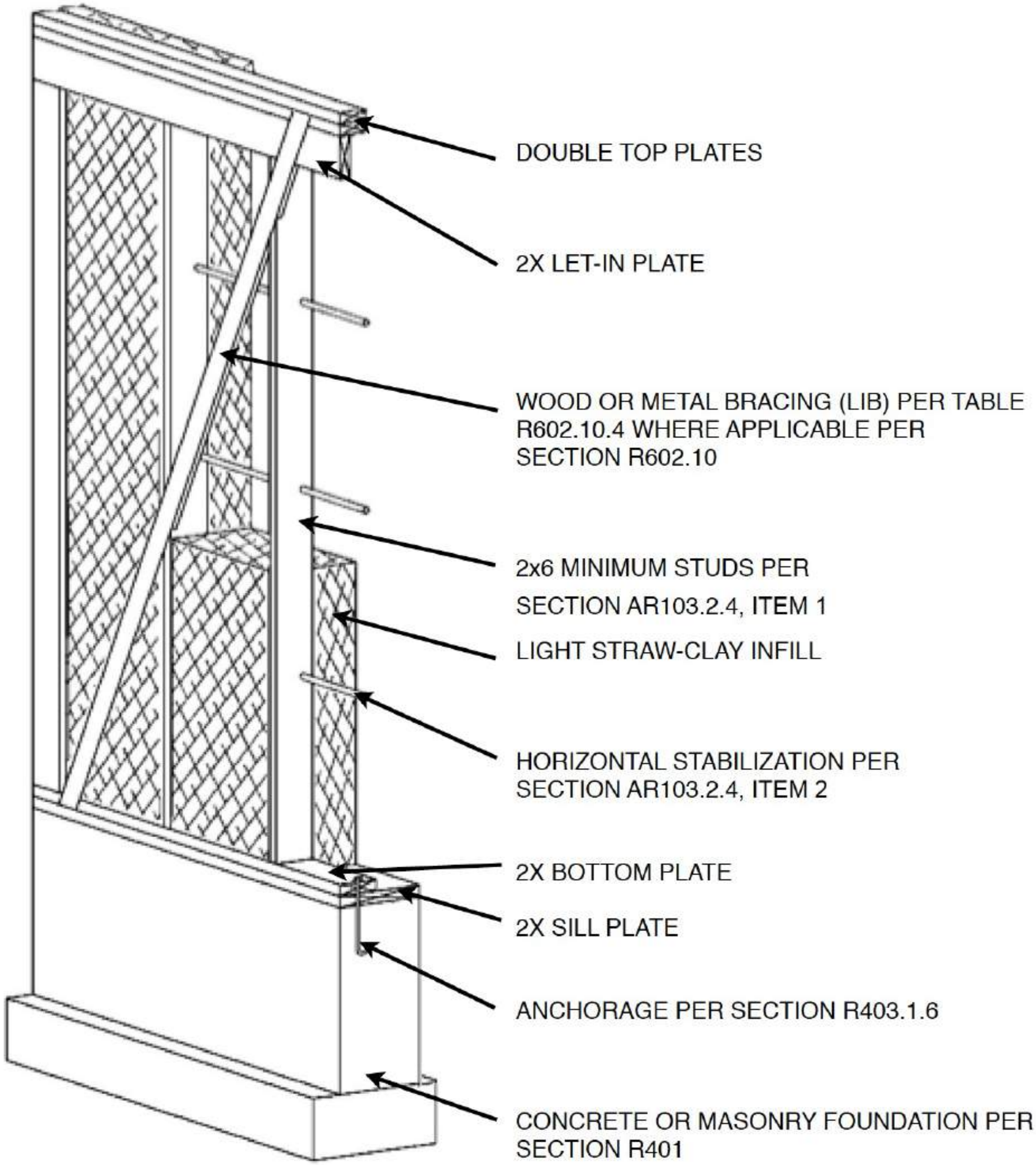


FIGURE AR103.2.4(2)
LIGHT STRAW-CLAY WALL
SINGLE STUD WIDTH

FIGURE AR103.2.4(2) LIGHT STRAW-CLAY WALL SINGLE STUD WIDTH


DOUBLE TOP PLATES
2X LET-IN PLATE
WOOD METAL BRACING (LIB) PER TABLE R602.10.4 WHERE APPLICABLE PER SECTION R602.10
2x6 MINIMUM STUDS PER SECTION AR103.2.4, ITEM 1
LIGHT STRAW-CLAY INFILL
HORIZONTAL STABILIZATION PER SECTION AR103.2.4, ITEM 2
2X BOTTOM PLATE
2X SILL PLATE
ANCHORAGE PER SECTION R403.1.6
CONCRETE OR MASONRY FOUNDATION PER SECTION R401
FRAMING FASTENERS PER TABLE R602.3(1)



FRAMING FASTENERS PER TABLE R602.3(1)

FIGURE AR103.2.4(3)
LIGHT STRAW-CLAY WALL
WITH BLIND STUDS

Note for errata in figure - 3rd note -

Wood or Metal strap bracing (lib) per.....

FIGURE AR103.2.4(3) LIGHT STRAW-CLAY WALL WITH BLIND STUDS

Reason Statement: This proposal removes an unnecessary word in Section AR104.1, and corrects typographical errors in Figures AR103.2.4(2) & (3). The words “WOOD METAL BRACING” are replaced with “WOOD OR METAL BRACING” in the third from top call-out note in those Figures.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The improvements to code language and the correction of typographical errors do not affect the cost of construction.

CCCIRC8-22

CCCIBC8-22

IBC: 1807.1.6.3

Proponents: Phillip Samblanet, representing The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

2021 International Building Code

Revise as follows:

1807.1.6.3 Masonry foundation walls. Masonry foundation walls shall comply with the following:

1. The thickness shall comply with the requirements of Table 1807.1.6.3(1) for *plain masonry* walls or Table 1807.1.6.3(2), 1807.1.6.3(3) or 1807.1.6.3(4) for masonry walls with reinforcement.
2. Vertical reinforcement shall have a minimum yield strength of 60,000 psi (414 MPa).
3. The specified location of the reinforcement shall equal or exceed the effective depth distance, *d*, noted in Tables 1807.1.6.3(2), 1807.1.6.3(3) and 1807.1.6.3(4) and shall be measured from the face of the exterior (soil) side of the wall to the center of the vertical reinforcement. The reinforcement shall be placed within the tolerances specified in TMS 602~~, Article 3.4.B.11,~~ for ~~of~~ the specified location.
4. Grout shall comply with Section 2103.3.
5. Concrete *masonry units* shall comply with ASTM C90.
6. Clay *masonry units* shall comply with ASTM C652 for hollow brick, except compliance with ASTM C62 or ASTM C216 shall be permitted where solid *masonry units* are installed in accordance with Table 1807.1.6.3(1) for *plain masonry*.
7. *Masonry units* shall be laid in *running bond* and installed with Type M or S *mortar* in accordance with Section 2103.2.1.
8. The unfactored axial *load* per linear foot of wall shall not exceed 1.2 $t\,f'_m$ where t is the specified wall thickness in inches and f'_m is the *specified compressive strength of masonry* in pounds per square inch.
9. Not less than 4 inches (102 mm) of *solid masonry* shall be provided at girder supports at the top of hollow *masonry unit* foundation walls.
10. Corbeling of masonry shall be in accordance with Section 2104.1. Where an 8-inch (203 mm) wall is corbeled, the top corbel shall not extend higher than the bottom of the floor framing and shall be a full course of headers not less than 6 inches (152 mm) in length or the top course *bed joint* shall be tied to the vertical wall projection. The tie shall be W2.8 (4.8 mm) and spaced at a maximum horizontal distance of 36 inches (914 mm). The hollow space behind the corbelled masonry shall be filled with *mortar* or grout.

Reason Statement: In an effort to delete unneeded words and future section references, the specific section is being proposed to be deleted. This section has moved in the 2022 edition of the standard and rather than to continually update references, it is deleted because just referencing TMS 602 pulls in that requirement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change updates a reference to a more general reference without changing what is required. As such, there is no impact on construction costs.

CCCIBC8-22

CCCIRC9-22 Part I

PART 1 -IRC: SECTION 202;

PART 2 - IBC: SECTION 202

Proponents: THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE AND PART 2 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[BS] DECORATIVE ~~GLASS~~ GLAZING. A carved, leaded or *Dalle glass* or glazing material whose purpose is decorative or artistic, not functional; whose coloring, texture or other design qualities or components cannot be removed without destroying the glazing material and whose surface, or assembly into which it is incorporated, is divided into segments.

Staff Analysis: The IBC definition was added to the proposal as a modification by the CCC committee. See CCC Item IRC9-22.

CCCIRC9-22 Part I

CCCIRC9-22 Part II

PART 1 -IRC: SECTION 202;

PART 2 - IBC: SECTION 202

Proponents: THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE AND PART 2 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

[RB] DECORATIVE GLAZING ~~GLASS~~. A carved, leaded or Dalle glass or glazing material with a purpose that is decorative or artistic, not functional; with coloring, texture or other design qualities or components that cannot be removed without destroying the glazing material; and with a surface, or assembly into which it is incorporated, that is divided into segments.

Staff Analysis: The IBC definition was added to the proposal as a modification by the CCC committee. See CCC Item IRC9-22.

Reason Statement: Nowhere in the IRC does it refer to “decorative glass”. This subject only comes up in Section R308 and R609.3 and it refers to “decorative glazing” or “decorative glazed openings”. This proposal simply aligns the defined term with the term used in the body of the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change the intent or application of the code as it has been customarily interpreted, therefore it has no impact on the cost of construction.

CCCIRC9-22 Part II

CCCIBC10-22

IBC: 2308.2.6

Proponents: Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

2308.2.6 Risk category limitation. The use of the provisions for *conventional light-frame construction* in this section shall not be permitted for *Risk Category* IV buildings assigned to a *Seismic Design Category* other than A. ~~B, C, D or F.~~

Reason Statement: This proposal is an editorial change that removes ambiguity from this section and does not change the technical requirements or limitations. This is consistent with the intent as stated in the 2018 IBC Commentary, “Risk Category IV structures that are not classified as Seismic Design Category A would therefore require an engineered design.”
In practice, Risk Category IV structures will never be assigned to SDC E. However, as it is currently written, users unfamiliar with how SDC’s are determined have occasionally interpreted this as stating RC IV structures in SDC E were not subject to this limitation. This revision in wording removes the potential for misinterpretation by making it clear that RC IV structures only in SDC A are permitted to use Section 2308.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change to clarify the intent of the section and does not impose any new technical requirements.

CCCIBC10-22

CCCIBC11-22

IBC: 2308.5.6, 2308.6.4

Proponents: David Tyree, representing American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2308.5.6 Cripple walls. Foundation *cripple walls* shall be framed of studs that are not less than the size of the ~~studding~~ studs above. Exterior *cripple wall* studs shall be not less than 14 inches (356 mm) in length, or shall be framed of solid blocking. Where exceeding 4 feet (1219 mm) in height, such walls shall be framed of studs having the size required for an additional *story*. See Section 2308.6.6 for *cripple wall* bracing.

2308.6.4 Braced wall panel construction. For Methods DWB, WSP, SFB, PBS, PCP and HPS, each panel must be not less than 48 inches (1219 mm) in length, covering three stud spaces where studs are spaced 16 inches (406 mm) on center and covering two stud spaces where studs are spaced 24 inches (610 mm) on center. *Braced wall panels* less than 48 inches (1219 mm) in length shall not contribute toward the amount of required bracing. *Braced wall panels* that are longer than the required length shall be credited for their actual length. For Method GB, each panel must be not less than 96 inches (2438 mm) in length where applied to one side of the studs or 48 inches (1219 mm) in length where applied to both sides.

Vertical joints of panel sheathing shall occur over studs and adjacent panel joints shall be nailed to common framing members. Horizontal joints shall occur over blocking or other framing equal in size to the studs ~~studding~~ except where waived by the installation requirements for the specific sheathing materials. Sole plates shall be nailed to the floor framing in accordance with Section 2308.6.7 and top plates shall be connected to the framing above in accordance with Section 2308.6.7.2. Where joists are perpendicular to *braced wall lines* above, blocking shall be provided under and in line with the braced *wall panels*.

Reason Statement: Editorial change to replace the term “studding” with “stud” which is the correct terminology.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This editorial change uses common terminology for studs.

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CCCIBC12-22

IBC: CHAPTER 25, 2501.1, 2502.1, 2503.1, 2504.1, 2504.1.1, 2504.1.2, 2505.1, 2505.2, SECTION 2506, 2506.1, 2506.2, TABLE 2506.2, 2508.1, TABLE 2508.1, 2508.3, 2508.4, 2508.5, 2508.6, TABLE 2508.6, 2508.6.2, 2508.6.3, 2508.6.4, 2508.6.5

Proponents: Tim Earl, representing the Gypsum Association (tearl@gbhint.com)

2021 International Building Code

Revise as follows:

CHAPTER 25
~~GYPSUM BOARD,~~ GYPSUM PANEL PRODUCTS AND PLASTER

2501.1 Scope. Provisions of this chapter shall govern the materials, design, construction and quality of ~~*gypsum board*,~~ *gypsum panel products*, lath, *gypsum plaster*, *cement plaster* and reinforced gypsum concrete.

2502.1 General. Lathing, plastering and ~~*gypsum board* and~~ *gypsum panel product* construction shall be done in the manner and with the materials specified in this chapter and, where required for fire protection, shall comply with the provisions of Chapter 7.

2503.1 Inspection. Lath~~, *gypsum board*~~ and *gypsum panel products* shall be inspected in accordance with Section 110.3.6.

2504.1 Scope. The following requirements shall be met where construction involves ~~*gypsum board*,~~ *gypsum panel products* or lath and plaster in vertical and *horizontal assemblies*.

2504.1.1 Wood framing. Wood supports for lath~~, *gypsum board*~~ or *gypsum panel products*, as well as wood stripping or furring, shall be not less than 2 inches (51 mm) nominal thickness in the least dimension.

Exception: The minimum nominal dimension of wood furring strips installed over solid backing shall be not less than 1 inch by 2 inches (25 mm by 51 mm).

2504.1.2 Studless partitions. The minimum thickness of vertically erected studless solid plaster partitions of $^3/_8$-inch (9.5 mm) and $^3/_4$-inch (19.1 mm) rib metal lath, $^1/_2$-inch-thick (12.7 mm) gypsum lath~~, *gypsum board*~~ or *gypsum panel product* shall be 2 inches (51 mm).

2505.1 Resistance to shear (wood framing). Wood-frame *shear walls* sheathed with ~~*gypsum board*,~~ *gypsum panel products* or lath and plaster shall be designed and constructed in accordance with Section 2306.3 and are permitted to resist wind and seismic *loads*. Walls resisting seismic *loads* shall be subject to the limitations in Section 12.2.1 of ASCE 7.

2505.2 Resistance to shear (steel framing). Cold-formed steel-frame shear walls sheathed with ~~*gypsum board* or~~ *gypsum panel products* and constructed in accordance with the materials and provisions of Section 2211.1.1 are permitted to resist wind and seismic *loads*. Walls resisting seismic *loads* shall be subject to the limitations in Section 12.2.1 of ASCE 7.

SECTION 2506
~~GYPSUM BOARD AND~~ GYPSUM PANEL PRODUCT MATERIALS

2506.1 General. *Gypsum* ~~*board*, *gypsum*~~ *panel products* and accessories shall be identified by the manufacturer's designation to indicate compliance with the appropriate standards referenced in this section and stored to protect such materials from the weather.

2506.2 Standards. *Gypsum* ~~*board* and *gypsum*~~ *panel products* shall conform to the appropriate standards listed in Table 2506.2 and Chapter 35 and, where required for fire protection, shall conform to the provisions of Chapter 7.

TABLE 2506.2 ~~GYPSUM BOARD AND~~ GYPSUM PANEL PRODUCTS, MATERIALS AND ACCESSORIES

MATERIAL	STANDARD
Accessories for gypsum board	ASTM C1047
Adhesives for fastening gypsum board	ASTM C557
Cold-formed steel studs and track, structural	AISI S240
Cold-formed steel studs and track, nonstructural	AISI S220
Elastomeric joint sealants	ASTM C920
Expandable foam adhesives for fastening gypsum wallboard	ASTM D6464
Factory-laminated gypsum panel products	ASTM C1766
Fiber-reinforced gypsum panels	ASTM C1278
Glass mat gypsum backing panel	ASTM C1178
Glass mat gypsum panel 5	ASTM C1658
Glass mat gypsum substrate	ASTM C1177
Joint reinforcing tape and compound	ASTM C474; C475
Nails for gypsum boards	ASTM C514, F547, F1667
Steel screws	ASTM C954; C1002
Standard specification for gypsum board	ASTM C1396
Testing gypsum and gypsum products	ASTM C22; C472; C473

2508.1 General. *Gypsum ~~board, gypsum~~ panel products* and *gypsum plaster* construction shall be of the materials listed in Tables 2506.2 and 2507.2. These materials shall be assembled and installed in compliance with the appropriate standards listed in Tables 2508.1 and 2511.1.1 and Chapter 35.

TABLE 2508.1 INSTALLATION OF GYPSUM CONSTRUCTION

MATERIAL	STANDARD
G~~ypsum board and g~~ypsum panel products	GA 216; ASTM C840
Gypsum sheathing and gypsum panel products	ASTM C1280
Gypsum veneer base	ASTM C844
Interior lathing and furring	ASTM C841
Steel framing for ~~gypsum board and~~ gypsum panel products	ASTM C754; C1007

2508.3 Single-ply application. Edges and ends of ~~*gypsum board* and~~ *gypsum panel products* shall occur on the framing members, except those edges and ends that are perpendicular to the framing members. Edges and ends of ~~*gypsum board* and~~ *gypsum panel products* shall be in moderate contact except in concealed spaces where fire-resistance-rated construction, shear resistance or *diaphragm* action is not required.

2508.4 Adhesives. ~~*Gypsum board* and g~~*ypsum panel products* secured to framing with adhesives in ceiling assemblies shall be attached using an approved fastening schedule. Expandable foam adhesives for fastening *gypsum wallboard* shall conform to ASTM D6464. Other adhesives for the installation of *gypsum wallboard* shall conform to ASTM C557.

2508.5 Joint treatment. ~~*Gypsum board* and g~~*ypsum panel product* fire-resistance-rated assemblies shall have joints and fasteners treated.

Exception: Joint and fastener treatment need not be provided where any of the following conditions occur:

1. Where the ~~*gypsum board* or the~~ *gypsum panel product* is to receive a decorative finish such as wood paneling, battens, acoustical finishes or any similar application that would be equivalent to joint treatment.
2. On single-layer systems where joints occur over wood framing members.
3. Square edge or tongue-and-groove edge *gypsum board* (V-edge), *gypsum panel products*, gypsum backing board or *gypsum sheathing*.
4. On multilayer systems where the joints of adjacent layers are offset.
5. Assemblies tested without joint treatment.

2508.6 Horizontal ~~gypsum board or~~ gypsum panel product diaphragm ceilings. ~~*Gypsum board* or g~~*ypsum panel products* shall be permitted to be used on wood joists to create a horizontal *diaphragm* ceiling in accordance with Table 2508.6.

TABLE 2508.6 SHEAR CAPACITY FOR HORIZONTAL WOOD-FRAME GYPSUM ~~BOARD~~ PANEL PRODUCT DIAPHRAGM CEILING ASSEMBLIES

MATERIAL	THICKNESS OF MATERIAL (MINIMUM) (inches)	SPACING OF FRAMING MEMBERS (inches)	SHEAR VALUE[a, b] (PLF OF CEILING)	MIMIMUM FASTENER SIZE
G~~ypsum board or~~ ~~g~~ypsum panel product	$^1/_2$	16 o.c.	90	5d cooler or wallboard nail; 1$^5/_8$-inch long; 0.086-inch shank; $^{15}/_{64}$-inch head[c]
G~~ypsum board or~~ ~~g~~ypsum panel product	$^1/_2$	24 o.c.	70	5d cooler or wallboard nail; 1$^5/_8$-inch long; 0.086-inch shank; $^{15}/_{64}$-inch head[c]

For SI: 1 inch = 25.4 mm, 1 pound per foot = 14.59 N/m.

a. Values are not cumulative with other horizontal *diaphragm* values and are for short-term wind or seismic loading. Values shall be reduced 25 percent for normal loading.

b. Values shall be reduced 50 percent in Seismic Design Categories D, E and F.

c. 1$^1/_4$-inch, No. 6 Type S or W screws are permitted to be substituted for the listed nails.

2508.6.2 Installation. *~~Gypsum board~~* ~~or~~ *~~g~~ypsum panel products* used in a horizontal *diaphragm* ceiling shall be installed perpendicular to ceiling framing members. End joints of adjacent courses of *gypsum* ~~*board*~~ *panel products* shall not occur on the same joist.

2508.6.3 Blocking of perimeter edges. Perimeter edges shall be blocked using a wood member not less than 2-inch by 6-inch (51 mm by 152 mm) nominal dimension. Blocking material shall be installed flat over the top plate of the wall to provide a nailing surface not less than 2 inches (51 mm) in width for the attachment of the *~~gypsum board~~* ~~or~~ *gypsum panel product*.

2508.6.4 Fasteners. Fasteners used for the attachment of *~~gypsum board~~* ~~or~~ *gypsum panel products* to a horizontal *diaphragm* ceiling shall be as defined in Table 2508.6. Fasteners shall be spaced not more than 7 inches (178 mm) on center at all supports, including perimeter blocking, and not more than $^3/_8$ inch (9.5 mm) from the edges and ends of the *~~gypsum board~~* ~~or~~ *gypsum panel product*.

2508.6.5 Lateral force restrictions. *~~Gypsum board~~* ~~or~~ *~~g~~ypsum panel products* shall not be used in *diaphragm* ceilings to resist lateral forces imposed by masonry or concrete construction.

Reason Statement: Another proposal this cycle revises the IBC definitions for gypsum products to match the correct terms used in industry publications. The definition of Gypsum Panel Product makes it clear that Gypsum Board is a subset of Gypsum Panel Product. As such, this is one of several proposals to remove Gypsum Board throughout the IBC whenever it reads as “Gypsum Board and Gypsum Panel Product” because the first item is a subset of the second item.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply removes redundant wording from the code.

CCCIBC12-22

CCCIBC13-22

IBC: TABLE 2506.2

Proponents: Tim Earl, representing the Gypsum Association (tearl@gbhint.com)

2021 International Building Code

Revise as follows:

TABLE 2506.2 GYPSUM BOARD AND GYPSUM PANEL PRODUCTS MATERIALS AND ACCESSORIES

MATERIAL	STANDARD
Accessories for gypsum board	ASTM C1047
Adhesives for fastening gypsum board to wood framing	ASTM C557
Cold-formed steel studs and track, structural	AISI S240
Cold-formed steel studs and track, nonstructural	AISI S220
Elastomeric joint sealants	ASTM C920
Expandable foam adhesives for fastening gypsum wallboard to wood framing	ASTM D6464
Factory-laminated gypsum panel product~~s~~	ASTM C1766
Fiber-reinforced gypsum panel~~s~~	ASTM C1278
Glass mat gypsum backing panel	ASTM C1178
Glass mat gypsum panels ~~5~~	ASTM C1658
Glass mat gypsum substrate used as sheathing	ASTM C1177
Joint reinforcing tape and compound	ASTM C474; C475
Nails for gypsum boards	ASTM C514, F547, F1667
Steel screws	ASTM C954; C1002
Standard specification for gypsum board	ASTM C1396
Testing gypsum and gypsum products	ASTM C22; C472; C473

Reason Statement: Apparent typo. The number 5 makes no sense and was likely meant to be the letter "s" which matches the title of the standard listed.
We also reviewed the other gypsum-related standards in this table and corrected other titles where they did not match.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple editorial correction.

CCCIBC13-22