**Revise as follows**

**SECTION R502 ADDITIONS**

**R502.1 (N1110.1) General.** *Additions* to an existing *building*, *building*

system or portion thereof shall conform to the provisions of

this code as those provisions relate to new construction. ~~without~~

~~requiring the unaltered portion of the existing~~ *~~building~~* ~~or~~

*~~building~~* ~~system to comply with this code.~~ *Additions* shall not

create an unsafe or hazardous condition or overload existing

*building* systems. ~~An~~ *~~addition~~* ~~shall be deemed to comply~~

~~with this code where the~~ *~~addition~~* ~~alone complies, where the~~

~~existing~~ *~~building~~* ~~and~~ *~~addition~~* ~~comply with this code as a~~

~~single building, or where the~~ *~~building~~* ~~with the~~ *~~addition~~* ~~does~~

~~not use more energy than the existing~~ *~~building~~*~~.~~ *~~Additions~~*

~~shall be in accordance with Section R502.2 or R502.3~~.

**R502.2 (N1110.2) Compliance.** An *addition* shall be deemed to comply with this code where the existing building with the addition complies prescriptively using the Total UA compliance approach listed below in Section R502.2.1 or does not use more energy than the existing building and demonstrates compliance using ~~either~~ the Building Performance energy cost~~, or Energy Rating Index~~ compliance option listed below in Section R502.2.2. Alternatively, existing buildings with an addition may demonstrate compliance using the Energy Rating Index approach outlined below in Section R502.2.3. Existing building envelope and energy features used to demonstrate compliance with this code shall be evaluated per ANSI/RESNET/ICC 301-2022 or ANSI/BPI 1200-S-2017 standards.

**Exceptions:** Unaltered portions of the existing *building* or *building* systems are not required to comply with this code section if:

1. The existing building was constructed to the 2009 building energy code or later or
2. The addition does not exceed 600 square feet
3. ~~the addition is less than 30% of the total conditioned floor area of the existing building or~~
4. ~~the building has undergone a documented energy efficiency upgrades to the envelope within the last 10 years.~~

**(Section R502.2 moved to section R501 in its entirety)**

**~~R502.2 Change in space conditioning.~~** ~~Any unconditioned~~

~~or low-energy space that is altered to become~~ *~~conditioned~~*

*~~space~~* ~~shall be required to be brought into full compliance~~

~~with this code.~~

**~~Exceptions:~~**

~~1. Where the simulated performance option in~~

~~Section R405 is used to comply with this section,~~

~~the annual energy cost of the~~ *~~proposed design~~* ~~is~~

~~permitted to be 110 percent of the annual energy~~

~~cost otherwise allowed by Section R405.2.~~

~~2. Where the Total UA, as determined in Section~~

~~R402.1.5, of the existing~~ *~~building~~* ~~and the~~ *~~addition~~*~~,~~

~~and any~~ *~~alterations~~* ~~that are part of the~~

~~project, is less than or equal to the Total UA~~

~~generated for the existing~~ *~~building~~*~~.~~

~~3. Where complying in accordance with Section~~

~~R405 and the annual energy cost or energy use of~~

~~the~~ *~~addition~~* ~~and the existing~~ *~~building~~*~~, and any~~ *~~alterations~~* ~~that are part of the project, is less than~~

~~or equal to the annual energy cost of the existing~~

*~~building~~*~~. The~~ *~~addition~~* ~~and any~~ *~~alterations~~* ~~that are~~

~~part of the project shall comply with Section R405~~

~~in its entirety.~~

**R502.2.1 Existing Building plus addition (Prescriptive compliance).** *~~Additions~~* ~~shall comply~~

~~with Sections R502.3.1 through R502.3.4.~~

Total UA compliance verification in Section R402.1.5 shall demonstrate that the addition complies with this code. A blower door test of the existing building plus the addition shall demonstrate a combined maximum air-leakage rate of 5.0 air changes per hour or 0.28 cubic feet per minute (CFM) per square foot of dwelling unit enclosure area when tested in accordance with Section R402.4.1.2. ~~, has a total UA that is less than or equal to the Total UA of the existing~~ *~~building~~* ~~prior to the addition~~. This method requires the project to create two Total UA compliance verification and air leakage test reports as outlined in Section R502.2.1.1.

**R502.2.1.1 Reporting.**

1. For permitting: A Total UA compliance ~~benchmark~~ report for the proposed addition. ~~of the existing structure prior to construction.~~
2. For Permitting: A benchmarking air leakage test results report of the existing structure prior to construction.
3. For certificate of occupancy: Total UA compliance report for the confirmed addition, and a confirmed air leakage report for ~~of~~ the existing building plus the addition ~~based on the proposed design~~.

**Section R502.2.2 Existing plus addition compliance (Total Building Performance).** Total building performance Section R405 compliance verification shall demonstrate that the existing building plus the addition uses no more energy than the existing *building* did prior to the addition. This method requires the project to create cost compliance verification at three stages as outlined in Section R502.2.2.2.

**R502.2.2.2 Reporting.**

1. For permitting: A baseline total building performance cost compliance report of the existing structure prior to construction.
2. For permitting: Projected total building performance cost compliance report of the existing building plus the addition based on the proposed design for the building in its entirety.
3. For Certificate of Occupancy: A final confirmed total building performance cost compliance report shall be submitted prior to final inspection.

**Section R502.2.3 Existing plus addition compliance (Energy Rating Index Alternative).** An Energy Rating Index score shall demonstrate that the existing building plus the addition has an energy rating index of less than 100, without including on site power production, when generated using the RESNET/ANSI/IECC 301 standard. ~~uses no more energy than the existing~~ *~~building~~* ~~did prior to the addition.~~ This method requires the project to obtain an Energy Rating Index score at three stages as outlined in Section R502.2.3.1

**R502.2.3.1 Reporting.**

1. For permitting: A baseline ERI of the existing structure prior to construction.
2. For Permitting: A projected ERI of the existing building plus the addition based on the proposed design for the building in its entirety that demonstrates an ERI score of less than 100.
3. For Certificate of Occupancy: A confirmed ERI report shall be submitted prior to final inspection, that demonstrates that the existing structure plus the addition has an ERI score of less than 100.

**R502.3 ~~.1~~ Building envelope.** New *building* envelope assemblies that are part of the *addition* shall comply with Sections R402.1, R402.2, R402.3.1 through R402.3.5, and R402.4.

**~~Exception:~~** ~~New envelope assemblies are exempt from the requirements of Section R402.4.1.2.~~

**R502.4 ~~3.2~~ Heating and cooling systems.** HVAC ducts newly installed as part of an *addition* shall comply with Section R403.1, R403.3 through R403.3.7, R403.7.

**Exceptions:**

1. Where ducts from an existing heating and cooling system are extended to an *addition* that does not exceed 600 square feet. ~~is less than 30% of the total conditioned floor area of the existing building.~~
2. **~~HVAC Design~~**~~: Manual J, S, and D are not required for additions that increase the existing floor area less than 30% of the total conditioned floor area of the existing building~~

**R502.5 ~~3.3~~ Service hot water systems.** New service hot water systems that are part of the *addition* shall comply with Section R403.5.

**R502.6 ~~3.4~~ Lighting.** New lighting systems that are part of the *addition* shall comply with Section R404.1.

**Reason Statement:**

The additions section R502 struggle with how to determine compliance with the requirements of the IECC as they relate to existing home additions. The existing section R502.1 general spoke loosely to demonstrating compliance but it is not specific enough to guide enforcement well. We therefore stuck language from this section and created a true compliance section for additions in Section R502.2. This new incorporates the reality that the house is an integrated system and that compliance with the IECC when associated with an existing building requires that the existing building also get evaluated. For example, currently an addition is not exempt from the requirement of air leakage testing yet there is not way to conduct an air leakage test on an addition alone.

This new section leverages some existing compliance language but now offers three distinct compliance alternatives. The prescriptive approach limits compliance to using the Total UA alternative as it can analyze compliance on the addition alone. However, we know that the impact of the energy use of the entire house is also impacted by an addition and therefore this compliance approach also requires that the existing building plus the addition achieve an air leakage rate of no higher than 5.0 ACH50. This is in recognition that an air leakage test cannot be performed on the addition in isolation from the existing building.

The Total Building Performance or energy cost compliance approach, leverages an existing compliance option in this section of code that states that the building with the addition can demonstrate that it does not use more energy than the existing building did prior to the addition. The code never spelled out how to demonstrate compliance with this approach and now the proposed Section R502.2.2 does. Modeling has demonstrated that this approach works well for older homes.

The last approach is the most flexible compliance approach as it uses an ERI score and requires that the ERI score of the existing building plus the addition be less than 100. 100 was chosen as the RESNET/ANSI/ICC 301 standard has established the ERI score of 100 as equivalent to the energy performance of the 2006 IECC. This is a flexible compliance option as it includes the efficiency of appliances and mechanicals, as well as air leakage and building thermal envelope features in the house. It does not include on site power production in the analysis.

Additions on existing building like alterations are perhaps one of the primary opportunities to reduce national energy consumption, yet Chapter 5 does little to address this need. There are many opportunities to cost-effectively improve energy efficiency of the existing building stock using reasonable criteria to trigger requirements with flexibility in the manner or extent of compliance where needed. This proposal strikes a balance in a practical and cost-effective manner for addressing manageable energy efficiency upgrades at the same time an addition is being proposed on an existing building. It is clear that the intent of the existing IECC chapter 5 is to ensure that energy use of the existing building plus the addition uses no more energy than the building did prior to the addition. This proposal now offers a means by which compliance for this statement can be verified. It does so by providing flexibility and choice of what to address in the existing structure while offering a logical way to enforce the base code on the addition. This was not possible in the past because the base energy code addresses the house in its entirety not sections of the house in isolation.

The existing Section **R502.2 Change in space conditioning** in the additions chapter 5 Existing homes has not reference to additions. Is speaks to a general condition of changing a low energy space during an alteration to become a conditioned space. This is not an addition, so it was moved to a new section in R501 General as an overarching general requirement rather than one specific to additions.

The additions section R502 struggle with how to determine compliance with the requirements of the IECC as they relate to existing home additions. The existing section R502.1 general spoke loosely to demonstrating compliance but it is not specific enough to guide enforcement well. We therefore stuck language from this section and created a true compliance section for additions on Section R502.2. This new section leverages an existing compliance option and states that the addition shall be deemed to comply with this code where the existing building with the addition complies prescriptively (using Total UA) or does not use more energy than the existing building and demonstrates compliance using either Building Performance energy cost, or Energy Rating Index compliance option listed below. In this way a prescriptive nonenergy compliance base compliance path can be used, and two energy-based compliance paths are options. All of the compliance paths require that the building plus the addition be compared to the building before the addition to quantify that the building plus the addition is equal to or better than the building before the addition was added

This approach requires benchmarking the existing structure before construction begins so a comparison can be made using one of the three compliance approaches. ANSI/RESNET/ICC 301-2019 or ANSI/BPI 1200-S-2017 standards have been referenced as guidelines for how to evaluate insulation levels and other energy features needed to benchmark an existing building through computer modeling.

All compliance approaches compare the building plus addition to itself without the addition, so parity is achieved. The two performance approaches should be more flexible as they are whole house approaches meaning, for example, that a leaky house before an addition, is compared with a leaky house plus a tighter addition with more volume which can offset (trade) to be equal to or better than. In addition, the existing house could add LED lighting or do other low hanging, low cost, energy upgrades to ensure compliance.

This approach is new and forces us to consider and offer opportunity to upgrade existing homes at the time that an addition is added to the structure. New Homes become existing homes and they last a really long time. Jurisdictions around the country are struggling with how to encourage energy upgrades to help meet climate action and other goals they may have for their housing stock. This proposal offers a starting point by which a community grow from. It requires a look at the existing structure to consider if some level of upgrade must happen when an addition is added. Communities could go further and require that the existing structure plus the addition be x percentage better than the existing structure was before. This is the direction that communities are looking to go. If we want jurisdictions to continue to use the IECC this proposal needs to be considered. Otherwise, community goals will outpace the what the IECC can offer to meet their climate goals.

**Cost**

Cost of construction will increase with this proposal primarily due to the cost of demonstrating compliance. However, there was no true means developed in the past existing home additions section to demonstrate compliance other than a vague visual inspection. This approach truly quantifies compliance while offering an opportunity to address issues with the existing structure.

**If the above is acceptable then the following should be considered.**

**Revise as Follows:**

**SECTION R503 ALTERATIONS**

**R503.1 General.** *Alterations* to any building or structure

shall comply with the requirements of the code for new

construction, without requiring the unaltered portions of the

existing building or building system to comply with this

code. *Alterations* shall be such that the existing building or

structure is not less conforming to the provisions of this code

than the existing *building* or structure was prior to the

*alteration*.

*Alterations* shall not create an unsafe or hazardous condition

or overload *existing* building systems. *Alterations* shall

be such that the existing *building* or structure does not use

more energy than the existing building or structure prior to

the *alteration*. *Alterations* to existing *buildings* shall comply

with Sections R503.1.1 through R503.1.4.

**R503.1.1 Building envelope.** Building envelope assemblies

that are part of the *alteration* shall comply with

Section R402.1.2 or R402.1.4, Sections R402.2.1 through

R402.2.12, R402.3.1, R402.3.2, R402.4.3 and R402.4.5.

**Exception:** The following alterations shall not be

required to comply with the requirements for new

construction provided that the energy use of the building

is not increased:

1. Storm windows installed over existing

fenestration.

2. Existing ceiling, wall or floor cavities exposed

during construction provided that these cavities

are filled with insulation.

3. Construction where the existing roof, wall or

floor cavity is not exposed.

4. Roof recover.

5. Roofs without insulation in the cavity and

where the sheathing or insulation is exposed

during reroofing shall be insulated either above

or below the sheathing.

6. Surface-applied window film installed on

existing single pane fenestration assemblies to

reduce solar heat gain provided that the code

does not require the glazing or fenestration

assembly to be replaced.

**R503.1.1.1 Replacement fenestration.** Where some

or all of an existing fenestration unit is replaced with a

new fenestration product, including sash and glazing,

the replacement fenestration unit shall meet the applicable

requirements for *U*-factor and SHGC as

specified in Table R402.1.3. Where more than one

replacement fenestration unit is to be installed, an

area-weighted average of the *U*-factor, SHGC or both

of all replacement fenestration units shall be an alternative

that can be used to show compliance.

**R503.1.2 Heating and cooling systems.** HVAC ducts newly installed as part of an *alteration* shall comply with Section R403. 1, R403.3 through R403.3.7, R403.7.

**Exceptions:**

Where ducts from an existing heating and cooling system are extended to an *addition* that does not exceed 600 square feet.

**R503.1.3 Service hot water systems.** New service hot

water systems that are part of the *alteration* shall comply

with Section R403.5.

**R503.1.4 Lighting.** New lighting systems that are part of the *alteration* shall comply with Section R404.1.

**~~Exception:~~** *~~Alterations~~* ~~that replace less than 10 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.~~