**Sections: C202, C401, C407, C502, C505, CC102, R202, R401, R403, R405, R502, R505**

**CHAPTER 2 [CE]**

**DEFINITIONS**

**PROPOSED DESIGN.** A description of the proposed building used to estimate annual energy use for determining compliance based on total **simulated** building performance.

**SIMULATED BUILDING PERFORMANCE OPTION. The process in which the total simulated performance of a proposed building design is compared to that of a standard reference design for the purposes of estimating relative energy in order to determine code compliance.**

**STANDARD REFERENCE DESIGN.** A version of the *proposed design* that meets the minimum requirements of this code and is used to determine the maximum annual energy use requirement for compliance based on total **simulated** building performance.

**C401.2.1 International Energy Conservation Code.**

Commercial buildings shall comply with one of the following:

1. Prescriptive Compliance. The Prescriptive Compliance option requires compliance with Sections C402 through C406 and Section C408. Dwelling units and sleeping units in Group R-2 buildings without systems serving multiple units shall be deemed to be in compliance with this chapter, provided that they comply with Section R406.
2. Total **Simulated** Building Performance. The Total **Simulated** Building Performance option requires compliance with Section C407.

**SECTION C407**

**TOTAL SIMULATED BUILDING PERFORMANCE**

**C407.1 Scope.** This section establishes criteria for compliance using total **simulated** building performance. The following systems and loads shall be included in determining the total **simulated** building performance: heating systems, cooling systems, service water heating, fan systems, lighting power, receptacle loads and process loads.

C407.2 Mandatory requirements. Compliance based on total **simulated** building performance requires that a proposed design meet all of the following:

**TABLE C407.2**

**REQUIREMENTS FOR TOTAL SIMULATED BUILDING PERFORMANCE**

**C407.5.3 Exceptional calculation methods.** Where the simulation program does not model a design, material or device of the *proposed design*, an exceptional calculation method shall be used where approved by the *code official*.

Where there are multiple designs, materials or devices that the simulation program does not model, each shall be calculated separately and exceptional savings determined for each. The total exceptional savings shall not constitute more than half of the difference between the baseline **simulated** building performance and the proposed **simulated** building performance. Applications for approval of an exceptional method shall include all of the following:

**C502.2 Change in space conditioning.** Any nonconditioned or low-energy space that is altered to become *conditioned space* shall be required to comply with Section C502.

**Exceptions:**

1. Where the component performance alternative in Section C402.1.5 is used to comply with this section, the proposed UA shall be not greater than 110 percent of the target UA.
2. Where the total **simulated** building performance option in Section C407 is used to comply with this section, the annual energy cost of the proposed design shall be not greater than 110 percent of the annual energy cost otherwise permitted by Section C407.2.

**C505.1 General.** Spaces undergoing a change in occupancy that would result in an increase in demand for either fossil fuel or electrical energy shall comply with this code. Where the use in a space changes from one use in Table C405.3.2(1) or C405.3.2(2) to another use in Table C405.3.2(1) or C405.3.2(2), the installed lighting wattage shall comply with Section C405.3. Where the space undergoing a change in occupancy or use is in a building with a fenestration area that exceeds the limitations of Section C402.4.1, the space is exempt from Section C402.4.1 provided that there is not an increase in fenestration area.

**Exceptions:**

1. Where the component performance alternative in Section C402.1.5 is used to comply with this section, the proposed UA shall not be greater than 110 percent of the target UA.
2. Where the total **simulated** building performance option in Section C407 is used to comply with this section, the annual energy cost of the proposed design shall not be greater than 110 percent of the annual energy cost otherwise permitted by Section C407.3.

**SECTION CC102**

**DEFINITIONS**

**ZERO ENERGY PERFORMANCE INDEX (ZEPI PB/EE).** The ratio of the proposed **simulated** building EUI without renewables to the baseline **simulated** building EUI, expressed as a percentage.

**SECTION R202**

**GENERAL DEFINITIONS**

**PROPOSED DESIGN.** A description of the proposed *building* used to estimate annual energy use for determining compliance based on total **simulated** building performance.

**SIMULATED BUILDING PERFORMANCE OPTION. The process in which the total simulated performance of a proposed building design is compared to that of a standard reference design for the purposes of estimating relative energy in order to determine code compliance.**

**STANDARD REFERENCE DESIGN.** A version of the *proposed design* that meets the minimum requirements of this code and is used to determine the maximum annual energy use requirement for compliance based on total **simulated** building performance.

**R401.2 Application.** Residential buildings shall comply with Section R401.2.5 and either Sections R401.2.1,

R401.2.2, R401.2.3 or R401.2.4.

**Exception:** Additions, *alterations*, repairs and changes of occupancy to existing buildings complying with

Chapter 5.

**R401.2.1 Prescriptive Compliance Option.** The Prescriptive Compliance Option requires compliance with Sections R401 through R404.

**R401.2.2 Total Simulated Building Performance Option.** The Total **Simulated** Building Performance Option requires compliance with Section R405.

**R403.3.3.1 Effective *R*-value of deeply buried ducts.**

Where using the Total **Simulated** Building Performance Compliance Option in accordance with Section R401.2.2, sections of ducts that are installed in accordance with Section R403.3.3, located directly on or within 5.5 inches (140 mm) of the ceiling, surrounded with blown-in attic insulation having an *R*-value of R-30 or greater and located such that the top of the duct is not less than 3.5 inches (89 mm) below the top of the insulation, shall be considered as having an effective duct insulation *R*-value of R-25.

**SECTION R405**

**TOTAL SIMULATED BUILDING PERFORMANCE**

**R405.1 Scope.** This section establishes criteria for compliance using total **simulated** building performance analysis. Such analysis shall include heating, cooling, mechanical ventilation and service water-heating energy only.

**R405.2 Simulated ~~P~~performance-based compliance.** Compliance based on total **simulated** building performance requires that a *proposed design* meets all of the following:

**R405.3 Documentation.** Documentation of the software used for the **proposed** ~~performance~~ design and the parameters for the **baseline** *building* shall be in accordance with Sections R405.3.1 through R405.3.2.2.

**TABLE R405.2**

**REQUIREMENTS FOR TOTAL SIMULATED BUILDING PERFORMANCE**

**R405.3.2.2 Compliance report for certificate of occupancy.** A compliance report submitted for obtaining the certificate of occupancy shall include the following:

1. Building street address, or other building site identification.
2. Declaration of the total **simulated** building performance path on the title page of the energy report and the title page of the building plans.

**R405.4 Calculation procedure.** Calculations of the **proposed** ~~performance~~ design shall be in accordance with Sections R405.4.1 and R405.4.2.

**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 **building** 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.

**R505.1 General.** Any space that is converted to a dwelling unit or portion thereof from another use or occupancy shall comply with this code.

**Exception:** Where the simulated **building** 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 allowed by Section R405.2.

Reason statement:

The “Total Building Performance” path, as prescribed by the IECC, uses simulation software to compare elements of the *proposed building* with that of a *baseline building*. In this simulation, many building elements are simulated using default values, as those elements do not affect the results of the comparison. The path title leads many to the false conclusion that the results of this building simulation will align with the actual building energy use – its performance – once it is built and occupied; however, that is not the intent of the simulation in this case.

While generally confusing in the past, this misconception is more critical now with the adoption of Building Performance Standards (BPS) in many jurisdictions. While BPS govern existing buildings, they will apply to newly constructed buildings once those structures have been occupied for a set number of years. The misunderstanding of the purpose and the results of the code-required proposed building model may lead owners and operators to assume that a building was designed to meet the future BPS requirements and that that design intent is backed up by the model results. Changing the language to clarify that the results of the code-required proposed building model are not necessarily aligned with future building performance will adjust expectations and potentially minimize future legal concerns.

Cost statement:

This proposal will neither increase nor decrease design and construction costs.

Cost effectiveness:

While the change itself will neither increase nor decrease costs, bringing awareness to the limitations of the current total building performance path will aid owners and designers in the conversation about predicted building performance and potentially reduce costs associated with changes made later on in the process.