RECD1-8-22

IECC: R405.3, R405.3.1, R405.3.2, R405.3.2.1, R405.3.2.2, R405.4, R405.4.1, R405.4.2; IECC: R405.4.3 (New); IECC: R405.5, R405.5.1, R405.5.2, R405.5.3; IECC: R405.5.2 (New), R405.5.3 (New), R405.5.4 (New), R405.5.4.1 (New), R405.5.4.2 (New)

Proponents: Ian Finlayson, representing ICC RE Economic, Modeling, Whole Building Metrics subcommittee

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Revise as follows:

R405.3 Compliance Documentation. ~~Documentation of the software used for the proposed design and the parameters for the baseline *building* shall be in accordance with Sections R405.3.1 through R405.3.2.2.~~ The following compliance reports, which document that the performance of the *proposed design* complies with the requirements of Section R405, shall be submitted to the *code official*.

1. A compliance report, in accordance with Section R405.5.4.1, shall be submitted with the application for the building permit.
2. Upon completion of the building, a confirmed compliance report, in accordance with Section R405.5.4.2, based on the confirmed condition of the building shall be submitted to the code official before a certificate of occupancy is issued.

Delete without substitution:

~~**R405.3.1 Compliance software tools.** Documentation verifying that the methods and accuracy of the compliance software tools conform to the provisions of this section shall be provided to the *code official.*~~

~~**R405.3.2 Compliance report.** Compliance software tools shall generate a report that documents that the *proposed design* complies with Section R405.3. A compliance report on the *proposed design* shall be submitted with the application for the building permit. Upon completion of the building, a confirmed compliance report based on the confirmed condition of the building shall be submitted to the *c ode official* before a certificate of occupancy is issued.~~
~~Compliance reports shall include information in accordance with Sections R405.3.2.1 and R405.3.2.2.~~

~~**R405.3.2.1 Compliance report for permit application.** A compliance report submitted with the application for building permit shall include the following:~~

1. ~~Building street address, or other *building site* identification.~~
2. ~~The name of the individual performing the analysis and generating the compliance report.~~
3. ~~The name and version of the compliance software tool.~~
4. ~~Documentation of all inputs entered into the software used to produce the results for the reference design and/or the rated home.~~
5. ~~A certificate indicating that the proposed design complies with Section R405.3. The certificate shall document the building components' energy specifications that are included in the calculation including: component level insulation *R*-values or *U*-factors; duct system and building envelope air leakage testing assumptions; and the type and rated efficiencies of proposed heating, cooling, mechanical ventilation and service water-heating equipment to be installed. If on-site renewable energy systems will be installed, the certificate shall report the type and production size of the proposed system.~~
6. ~~Where a site-specific report is not generated, the proposed design shall be based on the worst-case orientation and configuration of the rated home.~~

~~**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 simulated building performance path on the title page of the energy report and the title page of the building plans.~~
3. ~~A statement, bearing the name of the individual performing the analysis and generating the report, indicating that the as-built building complies with Section R405.3.~~
4. ~~The name and version of the compliance software tool.~~
5. ~~A site-specific energy analysis report that is in compliance with Section R405.3.~~
6. ~~A final confirmed certificate indicating compliance based on inspection, and a statement indicating that the confirmed rated design of the built home complies with Section R405.3. The certificate shall report the energy features that were confirmed to be in the home, including component level insulation *R*-values or *U*-factors; results from any required duct system and building envelope air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical ventilation and service water-heating equipment installed.~~
7. ~~When on-site renewable energy systems have been installed, the certificate shall report the type and production size of the installed system.~~

Revise as follows:

R405.4 Calculation procedure. ~~Calculations~~ Performance calculations of the *proposed design* shall be in accordance with Sections R405.4.1, ~~and~~ R405.4.2, R405.4.3. Except as specified by this section, the standard reference design and proposed design shall be configured and analyzed using identical methods and techniques.

R405.4.1 General. ~~Except as specified by this section, the *standard reference design* and *proposed design* shall be configured and analyzed using identical methods and techniques.~~ Calculation procedures used to comply with Section R405 shall use an approved software tool, in accordance with R405.5, capable of calculating the annual energy consumption of all building elements that differ between the standard reference design and the proposed design.

R405.4.2 Residence specifications. The *standard reference design* and *proposed design* shall be configured and analyzed as specified by Table R405.4.2(1). Table R405.4.2(1) shall include, by reference, all notes contained in Table R402.1.3.

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Add new text as follows:

R405.4.3 Input values. When calculations require input values not specified by Sections R402, R403, R404 and R405, those input values shall be taken from an *approved* source.

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Revise as follows:

R405.5 Calculation software tools. ~~Calculation software, where used, shall be in accordance with Sections R405.5.1 through R405.5.3.~~ Performance analysis tools meeting the applicable provisions of Sections R405.5.1 through R405.5.4 shall be permitted to be approved. Tools are permitted to be *approved* based on meeting a specified threshold for a jurisdiction. The code official shall be permitted to *approve* such tools for a specified application or limited scope.

R405.5.1 Minimum capabilities. ~~Calculation procedures used to comply with this section shall be software tools capable of calculating the annual energy consumption of all building elements that differ between the *standard reference design* and the *proposed design* and~~ *Approved* software tools shall include the following capabilities:

1. Computer generation of the *standard reference design* using only the input for the *proposed design.* The calculation procedure shall not allow the user to directly modify the building component characteristics of the *standard reference design.*
2. Calculation of whole-building (as a single *zone*) sizing for the heating and cooling equipment in the *standard reference design* residence in accordance with Section R403.7.
3. Hourly calculations of building operation for a full calendar year (8760 hours).

~~3.~~ 4. Calculations that account for ~~the effects~~ hourly variations of indoor and outdoor temperatures and part-load ratios on the performance of heating, ventilating and air-conditioning equipment based on climate and equipment sizing.

~~4.~~ 5. Printed *code official* inspection checklist listing each of the *proposed design* component characteristics from Table R405.4.2(1) determined by the analysis to provide compliance, along with their respective performance ratings such as *R*-value, *U*-factor, SHGC, HSPF, AFUE, SEER and EF.

Delete without substitution:

~~**R405.5.2 Specific approval.** Performance analysis tools meeting the applicable provisions of Section R405 shall be permitted to be *approved.* Tools are permitted to be *approved* based on meeting a specified threshold for a jurisdiction. The *code official* shall be permitted to approve such tools for a specified application or limited scope.~~

~~**R405.5.3 Input values.** When calculations require input values not specified by Sections R402, R403, R404 and R405, those input values shall be taken from an *approved* source.~~

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Add new text as follows:

R405.5.2 Testing required by software vendors. Prior to approval, software tools shall be tested by the software vendor in accordance with ANSI/ASHRAE Standard 140 Class II, Tier 1 test procedures. During testing, hidden inputs that are not normally accessible to the user shall be permitted to avoid introducing source code changes strictly used for testing. Software vendors shall publish, on a publicly available website, the following ANSI/ASHRAE Standard 140 test results, input files, and modeler reports for each tested version of a software tool:

1. Test results demonstrating the software tool was tested in accordance with ANSI/ASHRAE Standard 140.

2. The modeler report in ANSI/ASHRAE Standard 140, Annex A2, Attachment A2.7.

R405.5.3 Algorithms not tested. Algorithms not tested in accordance with R405.5.2 shall be permitted in accordance with ANSI/RESNET/ICC 301.. Numerical settings not tested, such as timestep duration and tolerances shall be permitted when they represent a higher resolution than the numerical settings used for testing.

R405.5.4 Compliance reports. *Approved* software tools shall generate compliance reports in accordance with R405.5.4.1 and R405.5.4.2.

R405.5.4.1 Compliance report for permit appliction. A compliance report generated for submission with the application for building permit shall include the following:

1. Building street address, or other *building site* identification.
2. The name of the individual performing the analysis and generating the compliance report.
3. The name and version of the compliance software tool.
4. Documentation of all inputs entered into the software used to produce the results for the reference design and/or the rated home.
5. A certificate indicating that the *proposed design* complies with Section R405.3. The certificate shall document the building components' energy specifications that are included in the calculation including: component-level insulation R-values or U-factors; duct system and building envelope air leakage testing assumptions; and the type and rated efficiencies of proposed heating, cooling, mechanical ventilation and service water-heating equipment to be installed. If on-site renewable energy systems will be installed, the certificate shall report the type and production size of the proposed system.
6. Where a site-specific report is not generated, the *proposed design* shall be based on the worst-case orientation and configuration of the rated home.

R405.5.4.2 Compliance report for certificate of occupancy. A compliance report generated for submission prior to obtaining the certificate of occupancy shall include the following:

1. Building street address, or other building site identification.
2. Declaration of the simulated building performance path on the title page of the energy report and the title page of the building plans.
3. A statement, bearing the name of the individual performing the analysis and generating the report, indicating that the as-built building complies with the requirements of Section R405.
4. The name and version of the compliance software tool.
5. A site-specific energy analysis report that is in compliance with the requirements of Section R405.
6. A final confirmed certificate indicating compliance based on inspection, and a statement indicating that the confirmed rated design of the built home complies with Section R405. The certificate shall report the energy features that were confirmed to be in the home, including component-level insulation R-values or U-factors; results from any required duct system and building envelope air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical ventilation and service water-heating equipment installed.
7. When on-site renewable energy systems have been installed, the certificate shall report the type and production size of the installed system.

Reason: This proposal adds language to align the software requirements for R405 with the requirements in R406. The changes are a joint effort in collaboration with members of ASHRAE Standard 140. The new language being proposed is in R405.5.2 and R405.5.3 and a new item #3 in R405.5.1. The rest of the changes are editorial to the existing language in R405.3, R405.4 and R405.454 to cleanup and reorganize the existing requirements.

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction.
The proposed changes will neither increase nor decrease the cost of construction.