

RE209-19

IECC: R401.2, R401.2.1 (New), SECTION R407 (New), R407.1 (New), R407.2 (New), R407.2.1 (New), R407.2.2 (New), R407.2.3 (New), R407.2.4 (New), R407.2.5 (New)

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2018 International Energy Conservation Code

Revise as follows:

R401.2 Compliance. Projects shall comply with Section R401.2.1 and one of the following:

1. Sections R401 through R404.
2. Section R405 and the provisions of Sections R401 through R404 indicated as "Mandatory."
3. The energy rating index (ERI) approach in Section R406.

Add new text as follows:

R401.2.1 Additional Energy Efficiency (Mandatory). This section establishes additional requirements applicable to all compliance approaches to achieve additional energy efficiency.

1. For buildings complying under Sections R401 through R404, one of the Additional Efficiency Package Options shall be installed according to Section R407.2.
2. For buildings complying under the simulated performance alternative in Section R405, the building shall meet one of the following::
 - 2.1. One of the Additional Efficiency Package Options in Section R407.2 shall be installed without including such measures in the proposed design under Section R405; or
 - 2.2. The proposed design of the building under Section R405.3 shall have an annual energy cost that is less than or equal to 95 percent of the annual energy cost of the *standard reference design*.
3. For buildings complying under the energy rating index alternative in Section R406, the energy rating index value shall be at least 5 percent less than the energy rating index target specified in Table R406.4.

The option selected for compliance shall be identified in the Certificate required by Section R401.3.

SECTION R407 **ADDITIONAL EFFICIENCY PACKAGE OPTIONS**

R407.1 Scope. This section establishes Additional Efficiency Package Options to achieve additional energy efficiency in accordance with Section R401.2.1.

R407.2 Additional Efficiency Package Options. Additional efficiency package options for compliance with Section R401.2.1 are set forth in Sections R407.2.1 through R407.2.5.

R407.2.1 Enhanced envelope performance option. The total building thermal envelope UA, the sum of U-factor times assembly area, shall be less than or equal to 95 percent of the total UA resulting from multiplying the U-factors in Table R402.1.4 by the same assembly area as in the proposed building. The UA calculation shall be performed in accordance with Section R402.1.5. The area-weighted average SHGC of all glazed fenestration shall be less than or equal to 95 percent of the maximum glazed fenestration SHGC in Table R402.1.2.

R407.2.2 More efficient HVAC equipment performance option. Heating and cooling equipment shall meet or exceed one of the following efficiencies:

1. Greater than or equal to 95 AFUE natural gas furnace and 16 SEER air conditioner.
2. Greater than or equal to 10 HSPF / 16 SEER air source heat pump.
3. greater than or equal to 3.5 COP ground source heat pump.

For multiple cooling systems, all systems shall meet or exceed the minimum efficiency requirements in this section and shall be sized to serve 100 percent of the cooling design load. For multiple heating systems, all systems shall meet or exceed the minimum efficiency requirements in this section and shall be sized to serve 100 percent of the heating design load.

R407.2.3 Reduced energy use in service water heating option. The hot water system shall meet or exceed one of the following efficiencies:

1. Greater than or equal to 82 EF fossil fuel service water heating system.
2. Greater than or equal to 2.0 EF electric service water heating system.
3. Greater than or equal to 0.4 Solar Fraction solar water heating system.

R407.2.4 More efficient duct thermal distribution system option. The thermal distribution system shall meet or exceed one of the following efficiencies:

1. 100 percent of ducts and air handlers located entirely within the *building thermal envelope*.
2. 100 percent of ductless thermal distribution system or hydronic thermal distribution system located completely inside the *building thermal envelope*.
3. 100 percent of duct thermal distribution system located in *conditioned space* as defined by Section R403.3.7.

R407.2.5 Improved air sealing and efficient ventilation system option. The measured air leakage rate shall be less than or equal to 3.0 ACH50, with either an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) installed. Minimum HRV and ERV requirements, measured at the lowest tested net supply airflow, shall be greater than or equal to 75 percent Sensible Recovery Efficiency (SRE), less than or equal to 1.1 W/CFM Fan Energy and shall not use recirculation as a defrost strategy. In addition, the ERV shall be greater than or equal to 50 percent Latent Recovery/Moisture Transfer (LRMT).

Reason: The purpose of this code change proposal is to improve the energy efficiency of residential buildings by roughly 5% or more, and to provide code users with flexibility to select the measures that make the most sense for each project. This proposal largely mirrors the format of Section C406 Additional Efficiency Package Options—an approach to improving commercial buildings that has been included in the commercial energy code since the 2012 IECC. Like Section C406, new Section R407 offers multiple straightforward improvements that will increase energy savings and reduce costs to the homeowner over the useful life of the building. In addition, Section R401.2.1 provides two additional means of demonstrating compliance: 1) code users may achieve a 5% improvement in the performance path; or 2) code users may comply by applying a 5% improvement in ERI Target score. The range of options will provide multiple paths for projects to achieve the intended improvement in the code. The technologies included in the packages of improvements are currently available in the relevant markets and the improved building practices have been proven feasible in residential buildings. However, many of these measures would be difficult to include in the current code format because of federal preemption of covered products, inapplicability to certain home designs, or other limitations. This proposal follows the lead of states like Oregon and Washington that have successfully created a list of options available to builders to meet the residential code improvements. This approach increases flexibility for code users while advancing the code's efficiency baseline.

Although the historic energy efficiency gains in the 2009 and 2012 IECC have been largely maintained in the 2015 and 2018 IECC, there is a clear need for more substantial improvements in the 2021 IECC. It is well understood that buildings have an outsized impact on the nation's energy demands. Buildings consume 42% of the nation's energy, including 54% of the nation's natural gas and 71% of its electricity. The nation's policymakers are increasingly turning to building energy codes as a means of addressing energy and climate goals. Several states have adopted improvements beyond the 2018 IECC, and the U.S. Conference of Mayors recently called for "putting future triennial IECC updates on a 'glide path' of steady efficiency gains that will improve the efficiency performance of millions of U.S. residential, multi-family, and commercial buildings." See 2018 U.S.C.M. Resolution 86 (June 11, 2018). While a much larger improvement in overall efficiency is warranted, a roughly 5% improvement through the adoption of this proposal would be a step in the right direction.

This proposal provides policymakers with additional options for improving the code going forward. A jurisdiction could increase the number of required options (and make a corresponding increase in the performance path and ERI required improvement). And as additional technologies and building methods become available, more options may be added to the initial list of improvements. (For example, Section C406 was expanded from 5 to 8 options in the 2018 IECC.) In sum, this proposal will allow the IECC to build upon recent improvements and create a new model for improving and adding flexibility to residential building energy codes going forward.

Bibliography: *Uniting Cities to Accelerate Focus on the Economic and Climate Benefits of Boosting America's Building Energy Efficiency*, 2019 U.S.C.M. Resolution 86 (June 11, 2018), available at <https://www.usmayors.org/the-conference/resolutions/?category=c9211&meeting=86th%20Annual%20Meeting>.

Cost Impact: The code change proposal will increase the cost of construction. For each climate zone, there are cost-effective options available that will generate energy savings and be cost effective over the useful life of the building. Although the savings will vary based on the option selected and design choices made in the building, there are multiple sensible options for achieving improved efficiency in each climate zone. On a broader scale, these improvements will help curb the nation's increasing demands for energy and contribute to a more secure energy future.

Proposal # 4685

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