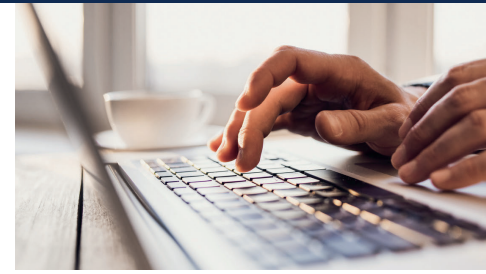
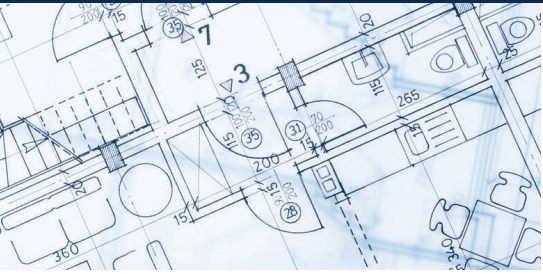


Expanded Compliance Path Options

2021 VRC/VECC Update Guide



Pathways to Energy Code Compliance:

Summary: The International Energy Conservation Code (IECC) has included both prescriptive and performance pathways for energy compliance since its conception, beginning with the 1998 IECC. The 2021 Virginia Residential Code updates the allowable compliance pathways to include three options – Prescriptive, Total Building Performance, and Energy Rating Index. Each option also requires meeting a new requirement, “additional energy efficiency” (N1101.13.5 (R401.2.5)), described below:

- Prescriptive pathway compliance can be achieved by utilizing a checklist of minimum performance thresholds for various building components. This is the easy-to-follow compliance option that guides builders with minimum R-Values, window values, air changes per hour, etc. Collectively, these prescribed thresholds provide for a home that meets the code’s energy utilization goal.
- Performance pathway compliance options utilize software during the design phase to simulate – or “model” – the as-designed home’s overall energy utilization. A home design complies with the code so long as the energy utilization of the modeled home does not exceed that of the “reference” home. Performance pathways allow a builder to, for example, use less insulation in one portion of the building envelope if more is provided elsewhere or to install a less efficient HVAC system if overall insulation levels are increased. A designer can create the basic structure of the home in the software and then pick and choose among efficiency measures as desired, periodically “running the model” to see if that combination of efficiency elements meets or exceeds the performance of the reference design.

Virginia’s 2021 Energy Code provides two performance pathway options:

- The Total Building Performance Path (N1105 (R405)), previously called the Simulated Performance Path, models energy utilization based on that home’s needs for heating and cooling, mechanical ventilation, and service hot water.
- The Energy Rating Index or ERI, (N1106 (R406)) is comparable to the Home Energy Rating Score (HERS) Index offered by the Residential Energy Services Network (RESNET). The ERI’s energy model incorporates nearly every element of the home that affects energy use, including building geometry, insulation and window values, shading and orientation of glazing, mechanical equipment, mechanical ventilation, air tightness, duct tightness, appliances, etc. The ERI software then calculates a numerical score, with a lower number indicating a more efficient home. For instance, an ERI of 100 indicates performance equivalent to that of the 2006 IECC and an ERI of 0 indicates a “net zero” home. The as-designed home should score not greater than the reference design thresholds listed in Table N1106.5 (R406.5): 51 for Climate Zone 3, 54 for Climate Zone 4, and 55 for Climate Zone 5. However, the new Additional Energy Efficiency

requirement states that homes using the ERI pathway must have a score that is at least 5% less than the maximum scores listed in that table. That reduces the maximum scores to 48 for CZ 3, 51 for CZ 4, and 52 for CZ 5.

Even as they allow a designer flexibility to customize particular building elements, both performance pathways also stipulate minimum thresholds for key elements. For example, the Total Building Performance Path will not allow R-Values less than those in the 2009 IECC, and both pathways require testing of whole-home air leakage and duct leakage.

Additional Resources:

- <https://www.iccsafe.org/building-safety-journal/bsj-technical/residential-compliance-options-of-the-international-energy-conservation-code/>

2021 VRC/VECC Code References:

N1101.13 (R401.2) Application. Residential buildings shall comply with Section N1101.13.5 and Section N1101.13.1, N1101.13.2, N1101.13.3 or N1101.13.4.

Exception: Additions, alterations, repairs and changes of occupancy to existing buildings complying with Section N1109.

N1101.13.1 (R401.2.1) Prescriptive Compliance Option. The Prescriptive Compliance Option requires compliance with Sections N1101 through N1104.

N1101.13.2 (R401.2.2) Total Building Performance Option. The Total Building Performance Compliance Path requires compliance with Section N1105. [Available at https://codes.iccsafe.org/content/VARC2021P1/chapter-11-re-energy-efficiency#VARC2021P1_Ch11_SecN1105.]

N1101.13.3 (R401.2.3) Energy Rating Index Option. The Energy Rating Index (ERI) option requires compliance with Section N1106. [Available at https://codes.iccsafe.org/content/VARC2021P1/chapter-11-re-energy-efficiency#VARC2021P1_Ch11_SecN1106.]

N1101.13.5 (R401.2.5) Additional energy efficiency. This section establishes additional requirements applicable to all compliance approaches to achieve additional energy efficiency.

1. For buildings complying with Section N1101.13.1, one of the additional efficiency package options shall be installed according to Section N1108.2.
2. For buildings complying with Section N1101.13.2, the building shall meet one of the following:
 - 2.1. One of the additional efficiency package options in Section N1108.2 shall be installed without including such measures in the proposed design under Section N1105.
 - 2.2. The proposed design of the building under Section N1105.2 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 with the Energy Rating Index alternative Section N1101.13.3, the Energy Rating Index value shall be at least 5 percent less than the Energy Rating Index target specified.

The option selected for compliance shall be identified on the certificate required by Section N1101.14.

Definitions:

ENERGY ANALYSIS. A method for estimating the annual energy use of the proposed design and standard reference design based on estimates of energy use.

ENERGY COST. The total estimated annual cost for purchased energy for the building functions regulated by this code, including applicable demand charges.

ENERGY SIMULATION TOOL. An approved software program or calculation-based methodology that projects the annual energy use of a building.

ERI REFERENCE DESIGN. A version of the rated design that meets the minimum requirements of the 2006 International Energy Conservation Code.

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

RATED DESIGN. A description of the proposed building used to determine the energy rating index.

