

EC-C402.4-21

VCC: 1301.1.1.1, TABLE C402.4, TABLE C402.4.3

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2018 Virginia Construction Code

Revise as follows:

1301.1.1.1 Changes to the International Energy Conservation Code (IECC). The following changes shall be made to the IECC:

1. Add Sections C402.1.4.2, C402.1.4.2.1, C402.1.4.2.2, C402.1.4.2.3, C402.2.1.2, C402.2.1.3, C402.2.1.4, C402.2.1.5 and Change Section C402.2.1.1 to read:

C402.1.4.2 Roof/ceiling assembly. The maximum roof/ceiling assembly *U*-factor shall not exceed that specified in Table C402.1.4 based on *construction* materials used in the roof/ceiling assembly.

C402.1.4.2.1 Tapered, above-deck insulation based on thickness. Where used as a component of a maximum roof/ceiling assembly *U*-factor calculation, the tapered roof insulation *R*-value contribution to that calculation shall use the average thickness in inches (mm) along with the material *R*-value-per-inch (per-mm) for *U*-factor compliance as prescribed in Section C402.1.4.

C402.1.4.2.2 Suspended ceilings. Insulation installed on suspended ceilings having removable ceiling tiles shall not be considered part of the assembly *U*-factor of the roof/ceiling *construction*.

C402.1.4.2.3 Multiple layers and staggered joints. Continuous insulation board shall be installed in not less than two layers and the edge joints between each layer of insulation shall be staggered. Multiple layers and staggered joints are not required where insulation tapers to the *roof deck* at a gutter edge, roof drain or scupper.

C402.2.1 Roof assembly The minimum thermal resistance (*R*-value) of the insulating material installed either between the roof framing or continuously on the roof assembly shall be as specified in Table C402.1.3, based on *construction* materials used in the *roof assembly*.

C402.2.1.1 Tapered, above-deck insulation based on thickness. Where used as a component of a roof/ceiling assembly *R*-value calculation, the tapered roof insulation *R*-value contribution to that calculation shall use the average thickness in inches (mm) along with the material *R*-value per inch (per mm) for *R*-value compliance as prescribed in Section C402.1.3.

C402.2.1.2 Minimum thickness, lowest point. The minimum thickness of above-deck roof insulation at its lowest point, gutter edge, roof drain or scupper, shall be no less than 1 inch (25 mm).

C402.2.1.3 Suspended ceilings. Insulation installed on suspended ceilings having removable ceiling tiles shall not be considered part of the minimum thermal resistance (*R*-value) of roof insulation in roof/ceiling *construction*.

C402.2.1.4 Multiple layers and staggered joints. Continuous insulation board shall be installed in not less than two layers and the edge joints between each layer of insulation shall be staggered. Multiple layers and staggered joints are not required where insulation tapers to the *roof deck* at a gutter edge, roof drain or scupper.

C402.2.1.5 Skylight curbs. Skylight curbs shall be insulated to the level of roofs with insulation entirely above the deck or R-5, whichever is less.

Exception: Unit skylight curbs included as a component of a skylight listed and labeled in accordance with NFRC 100 shall not be required to be insulated.

2. Change the SHGC for Climate Zone 4 (Except Marine) of Table C402.4 to read:

~~PF = A/B~~
3:

(Equation 4-5)

~~Where different windows or glass doors have different PF values, they shall each be evaluated separately.~~

~~Where the fenestration projection factor for a specific vertical fenestration product is greater than or equal to 0.20, the required maximum projection shall be:~~

PF = Projection factor (decimal).

A = Distance measured horizontally from the farthest continuous extremity of any overhang, eave, or permanently attached shading

B = Distance measured vertically from the bottom of the glazing to the underside of the overhang, eave, or permanently attached shading

~~4.~~

5. Add an exception to the first paragraph of Section 403.7.7 to read:

Exception: Any grease duct serving a Type I hood installed in accordance with the *International Mechanical Code (IMC)* Section 506.3 shall not be required to have a motorized or gravity damper.

6. Add Section C403.2.2.1 to read:

C403.2.2.1 Dwelling unit mechanical ventilation. Mechanical ventilation shall be provided for *dwelling units* in accordance with the IMC.

7. Delete Section C403.7.5 and Table C403.7.5.
8. Delete Sections C404.5 through C404.5.2.1, including Tables.
9. Change Section C405.4 to read:

C405.4 Exterior lighting (Mandatory). All exterior lighting, other than low-voltage landscape lighting, shall comply with Section C405.4.1.

Exception: Where *approved* because of historical, safety, signage, or emergency considerations.

10. Change Section C502.1 to read:

C502.1 General. Additions to an existing building, building system or portion thereof shall conform to the provisions of Section 805 of the *Virginia Existing Building Code (VEBC)*.

11. Delete Sections C502.2 through C502.2.6.2.
12. Change Section C503.1 to read:

C503.1 General. Alterations to any *building or structure* shall comply with the requirements of Chapter 6 of the VEBC.

13. Delete Sections C503.2 through C503.6.
14. Change Section C504.1 to read:

C504.1 General. *Buildings and structures*, and parts thereof, shall be repaired in compliance with Section 510 of the VEBC.

15. Delete Section C504.2.

16. Change Section R401.2 to read:

R401.2 Compliance. Projects shall comply with all provisions of Chapter 4 labeled “Mandatory” and one of the following:

1. Sections R401 through R404.
2. Section R405.
3. Section R406.
4. The most recent version of REScheck, keyed to the 2018 IECC.

17. Change Section R401.3 to read:

R401.3 A permanent certificate shall be completed by the builder or other *approved* party and posted on a wall in the space where the furnace is located, a utility room or an *approved* location inside the *building*. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label, or other required labels. Where *approved*, certificates for multifamily *dwelling units* shall be permitted to be located off-site at an identified location. The certificate shall indicate the predominant *R*-values of insulation installed in or on ceilings, roofs, walls, foundation components such as slabs, basement walls, crawl space walls and floors, and ducts outside conditioned spaces; *U*-factors of fenestration and the solar heat gain coefficient (SHGC) of fenestration; and the results from any required duct system and *building* envelope air leakage testing performed on the *building*. Where there is more than one value for each component, the certificate shall indicate the value covering the largest area. The certificate shall indicate the types and efficiencies of heating, cooling, and service water heating *equipment*. Where a gas-fired unvented room heater, electric furnace, or baseboard electric heater is installed in the residence, the certificate shall indicate “gas-fired unvented room heater,” “electric furnace,” or “baseboard electric heater,” as appropriate. An efficiency shall not be indicated for gas-fired unvented room heaters, electric furnaces, and electric baseboard heaters.

18. Change the wood frame wall *R*-value categories for Climate Zone 4 (Except Marine) in Table R402.1.2 to read:

19. Change the frame wall *U*-factor categories for Climate Zone 4 (Except Marine) in Table R402.1.4 to read:

20. Change Section R402.2.4 to read:

R402.2.4 Access hatches and doors. Access doors from conditioned spaces to unconditioned spaces (e.g., *attics* and crawl spaces) shall be weatherstripped and insulated in accordance with the following values:

1. Hinged vertical doors shall have a minimum overall R-5 insulation value;
2. Hatches and scuttle hole covers shall be insulated to a level equivalent to the insulation on the surrounding surfaces; and
3. Pull down stairs shall have a minimum of 75 percent of the panel area having R-5 rigid insulation.

Access shall be provided to all *equipment* that prevents damaging or compressing the insulation. A wood framed or equivalent baffle or retainer is required to be provided when loose fill insulation is installed, the purpose of which is to prevent the loose fill insulation from spilling into the living space when the attic access is opened and to provide a permanent means of maintaining the installed *R*-value of the loose fill insulation.

21. Change Sections R402.4 and R402.4.1.1 to read:

R402.4 Air leakage. The *building* thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Sections R402.4.1 through R402.4.5.

R402.4.1.1 Installation (Mandatory). The components of the *building* thermal envelope as listed in Table R402.4.1.1 shall be installed in accordance with the manufacturer’s instructions and the criteria listed in Table R402.4.1.1, as applicable to the method of *construction*. Where required by the code official, an *approved* third party shall inspect all components and verify compliance.

22. Change the title of the “Insulation Installation Criteria” category of Table R402.4.1.1; change the “Shower/tub on exterior wall” category of Table R402.4.1.1, and add footnotes “b” and “c” to Table R402.4.1.1 to read:

23. Change Section R402.4.1.2 to read:

R402.4.1.2 Testing. The *building* or *dwelling unit* shall be tested and verified as having an air leakage rate not exceeding five air changes per hour in Climate Zone 4. Testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779, or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). A written report of the results of the test shall be signed by the party conducting the test and provided to the *building official*. Testing shall be conducted by a Virginia licensed general contractor, a Virginia licensed HVAC contractor, a Virginia licensed home inspector, a Virginia *registered design professional*, a certified BPI Envelope Professional, a certified HERS rater, or a certified duct and envelope tightness rater. The party conducting the test shall have been trained on the *equipment* used to perform the test. Testing shall be performed at any time after creation of all penetrations of the *building* thermal envelope.

Note: Should additional sealing be required as a result of the test, consideration may be given to the issuance of a temporary certificate of occupancy in accordance with Section 116.1.1.

During testing:

1. Exterior windows and doors and *fireplace* and stove doors shall be closed, but not sealed beyond the intended weatherstripping or other infiltration control measures;
2. Dampers, including exhaust, intake, makeup air, backdraft, and flue dampers, shall be closed, but not sealed beyond intended infiltration control measures;
3. Interior doors, if installed at the time of the test, shall be open;
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling systems, if installed at the time of the test, shall be turned off; and
6. Supply and return registers, if installed at the time of the test, shall be fully open.

24. Change Section R403.3.3 to read:

R403.3.3 Duct testing (Mandatory). Ducts shall be pressure tested to determine air leakage by one of the following methods:

1. Rough-in test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure if installed at the time of the test. All registers shall be taped or otherwise sealed during the test.
2. Postconstruction test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. Registers shall be taped or otherwise sealed during the test.

Exception: A duct air leakage test shall not be required where the ducts and air handlers are located entirely within the building thermal envelope.

A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. The licensed mechanical contractor installing the mechanical system shall be permitted to perform the duct testing. The contractor shall have been trained on the equipment used to perform the test.

25. Delete Section R403.3.5.

26. Change Section R403.7 to read:

R403.7 Equipment and appliance sizing. Heating and cooling equipment and appliances shall be sized in accordance with ACCA Manual S or other *approved* sizing methodologies based on *building* loads calculated in accordance with ACCA Manual J or other *approved* heating and cooling calculation methodologies.

Exception: Heating and cooling equipment and appliance sizing shall not be limited to the capacities determined in accordance with Manual S or other *approved* sizing methodologies where any of the following conditions apply:

1. The specified equipment or appliance utilizes multistage technology or variable refrigerant flow technology and the loads calculated in accordance with the *approved* heating and cooling methodology fall within the range of the manufacturer's published capacities for that equipment or appliance.
2. The specified equipment or appliance manufacturer's published capacities cannot satisfy both the total and sensible heat gains calculated in accordance with the *approved* heating and cooling methodology and the next larger standard size unit is specified.
3. The specified equipment or appliance is the lowest capacity unit available from the specified manufacturer.

27. Change footnote "a" in Table R406.4 to read:

- a. When onsite renewable energy is included for compliance using the ERI analysis of Section R406.4, the building shall meet the mandatory requirements of Section R406.2 and the building thermal envelope shall be greater than or equal to levels of energy efficiency and solar heat gain coefficient in Table R402.1.2, with a ceiling *R*-value of 49 and a wood frame wall *R*-value of 20 or 13 + 5, or Table R402.1.4, with a ceiling *U*-factor of 0.026 and a frame wall *U*-factor of 0.060.

28. Change Section R501.1 to read:

R501.1 Scope. The provisions of the *Virginia Existing Building Code* (VEBC) shall control the alteration, repair, addition and change of occupancy of existing *buildings* and *structures*.

29. Delete Sections R501.1.1 through R501.6.

30. Change Section R502.1 to read:

R502.1 General. Additions to an existing *building*, *building* system or portion thereof shall conform to the provisions of Section 811 of the VEBC.

31. Delete Sections R502.1.1 through R502.1.2.

32. Change Section R503.1 to read:

R503.1 General. Alterations to any *building* or *structure* shall comply with the requirements of Chapter 6 of the VEBC.

33. Delete Sections R503.1.1 through R503.2

34. Change Section R504.1 to read:

R504.1 General. *Buildings*, structures and parts thereof shall be repaired in compliance with Section 510 of the VEBC.

35. Delete Section R504.2.

TABLE C402.4 BUILDING ENVELOPE FENESTRATION MAXIMUM U-FACTOR AND SHGC REQUIREMENTS

CLIMATE ZONE	4 EXCEPT MARINE
SHGC	0.36

TABLE C402.4.3 SHGC ADJUSTMENT MULTIPLIERS

PROJECTION FACTOR	ORIENTED WITHIN 45 DEGREES OF TRUE NORTH	ALL OTHER ORIENTATIONS
$0.2 \leq PF < 0.5$	1.1	1.2
$PF \geq 0.5$	1.2	1.6

Reason Statement: This proposal improves and simplifies the Virginia Construction Code by eliminating state-specific amendments that are either already incorporated in the 2021 IECC or are no longer necessary. While some of these modifications may have been necessary or reasonable at the time, we see no reason for Virginia to continue to diverge from the model code in these areas. The intent of this proposal is not to increase or decrease stringency by a meaningful amount, but rather to simplify and streamline the code adoption process going forward. This proposal deletes Section 1301.1.1 subsections 2, 3, and 4.

Subsections 2 and 4 were originally proposed by RECA in a previous code update to maintain Virginia's commercial fenestration SHGC provisions, which were more stringent than the model code at the time. The 2021 IECC is now essentially at the same level of stringency as Virginia (requiring 0.36 for fixed fenestration with no overhangs), but the 2021 IECC has simplified the process by eliminating the orientation-specific SHGC requirements in the prescriptive table. The IECC has incorporated a single SHGC for fixed fenestration (0.36); a lower SHGC for operable fenestration (0.33), and higher SHGC when the fenestration is accompanied by overhangs. These SHGC requirements are consistent with the values in ASHRAE Standard 90.1-2019, so that design professionals will not have two different sets of SHGC requirements to follow depending on which compliance option they select. Design professionals can still claim efficiency credit for favorable orientation, but would need to do so in the performance path where a full simulated performance analysis could be completed.

Subsection 3, which deals with increased skylight area with daylight responsive controls, has been revised and updated since this amendment was adopted into Virginia's code. The 2021 IECC now allows up to 6% skylight area where paired with daylight responsive controls (as compared to 5% in Virginia's UCC), and the sections related to skylights are more detailed. We see no reason for Virginia to continue to carry forward this amendment to the model code.

It is our intention that these portions of Virginia's code would be consistent with the IECC language in both the VCC and the VA Energy Conservation Code.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency. We do not expect this proposal to have any impact on resiliency.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This proposal should not increase or decrease the costs of construction in a material way, but it should simplify the design process by bringing additional consistency between Virginia's commercial energy code requirements and the two model energy codes for commercial buildings.