CEDI-90

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2021 International Energy Conservation Code

Revise as follows:

C303.1.3 Fenestration product rating. *U*-factors, *solar heat gain coefficient* (SHGC), and *visible transmittance* (VT) of fenestration products shall be determined as follows:

1. For windows, doors and skylights, *U*-factor, SHGC, and VT ratings shall be determined in accordance with NFRC 100 and NFRC 200.
2. Where required for garage doors and rolling doors, *U*-factor ratings shall be determined in accordance with either NFRC 100 or ANSI/DASMA 105.

U-factors, SHGC, and VT shall be determined by an accredited, independent laboratory, ~~and *labeled*~~ and certified by the manufacturer by one of the following means:

1) A label affixed to the product
   or
2) A signed and dated label certificate specific to the project.

For the Total Building Performance option in Section C407, where fenestration label certificates are provided, the U-factor, SHGC, and VT shall be based on either the proposed project specific size(s) and configuration(s) for all fenestration products using label certificates, or based on the NFRC 100 standard sizes and configurations for all fenestration. Physical testing of fenestration at the project size and configuration fenestration to verify U-factor is not required.

Products lacking such a *labeled U*-factor shall be assigned a default *U*-factor from Table C303.1.3(1) or Table C303.1.3(2). ~~The *solar heat gain coefficient* (SHGC) and *visible transmittance* (VT) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and *labeled* and certified by the manufacturer.~~ Products lacking such a *labeled* SHGC or VT shall be assigned a default SHGC or VT from Table C303.1.3(3). For Tubular Daylighting Devices, VT_{annual} shall be measured and rated in accordance with NFRC 203.

Reason:

Clarification on what constitutes an NFRC “label” is needed so code officials know that fenestration can be labeled using either an affixed label or using a label certificate. This is often an area of misunderstanding in code interpretation and NFRC offers both paths for certifying fenestration performance.

On larger projects using the performance path, label certificates are typically provided for custom architectural fenestration since such fenestration has unique sizes and configurations and is often site built and/or glazed. NFRC has a specific labeling and certification path for these types of fenestration (see below). In these large projects increased rigor is warranted, and use of project-specific size and configurations yield more accurate values for U-factor, SHGC and VT than NFRC 100/200 standard sizes. This helps ensure that HVAC equipment capacity sizing, energy consumption modeling and product comparisons are based on accurate values. This increased level of accuracy is becoming more important to meet energy efficiency targets and to ensure occupant comfort. This is especially important for cooling systems, where SHGC increases with increasing product size and can significantly impact peak loads and annual cooling energy requirements.

The NFRC 100 and NFRC 200 standard size U-factor and SHGC values provide a simplified approach when employing the prescriptive path and do not deliver a robust output for HVAC sizing. In this modification, only fenestration using label certificates would be allowed to use size specific values and where this route is chosen, size specific values must be used for all fenestration certified using a label certificates (no picking and choosing allowed). The choice can also be made to use NFRC standard size values for all label-certificate fenestration. Where windows with affixed labels (such as residential-style unit windows) are used in combination with fenestration provided with label certificates, in say a mixed-use building, NFRC standard size performance values would always be utilized for the label-affixed products since no size specific values can be provided by those manufacturers under the label affixed NFRC program. In the NFRC certification path that provides commercial fenestration with a label certificate, project specific size performance is provided as well as standard size performance (As discussed below).

The new 2023 version of NFRC 100, which will be published next year (2023), introduces a new, easier to use, methodology (the Commercial Trendline Approach) for calculating commercial fenestration performance, and the accompanying NFRC certification process provides a project-size and configuration specific path for certifying commercial fenestration performance. The project specific size calculation methodology (aspect ratio calculation)

is described in Appendix A4 of NFRC 100-2023 which ensures consistency in size-specific calculation methodology. A pre-publication version of NFRC 100-2023 has been provided by NFRC for the purpose of supporting documentation for this proposal and is uploaded with this proposal. This standard has already been approved by the NFRC board and membership, and will be published once the new web tools and certification program are rolled out to accompany it in 2023. For ease of reference, the commercial trendline approach is detailed in section 5.12, starting on P121, and the size specific U-factor determination is detailed in Appendix A4, page 135.

In addition, the proposed language will help clarify the confusion among design teams on whether to consider NFRC sizes, or the project specific size and configurations, streamlining the design process. It also clarifies that the project size U-factor, SHGC and VT, shall be calculated according to the NFRC 100 standard and does not require separate physical testing.

The proposal does not change the fact that the NFRC 100 and NFRC 200 methodologies remain the standard, and prescriptive U-factors for fenestration remain based on the standard NFRC size.

Clause C402.4.3.4 Area-weighted U-factor listed below would still allow for using an area-weighted average of the different project size.

We have suggested this section of the code for this clarification to be inserted, but the committee may find a more appropriate place for it.

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

This proposal aims to clarify the way U-factor is defined in the total energy compliance path. There should be no impact in the cost of construction. Some project teams already simulate and submit both project size and NFRC size because of lack of clarity, so clarifying this point could actually reduce the cost of the design process.