

Testing Metric for Building Envelope Leakage 703.1.2



Summary

This interpretation allows buildings seeking 2020 NGBS certification and using the Chapter 703 Prescriptive Path to comply with the testing requirements of 2021 IECC R402.4.1.2 and R402.4.1.3.

The 2020 NGBS is based on the 2018 suite of I-Codes: 2018 IECC; 2018 IRC; and 2018 IBC. Most NGBS mandatory practices are derived from these codes. The Chapter 7 Prescriptive Path requires the building thermal envelope to be in accordance with 2018 IECC R402.4.1.2 (buildings under 4 stories) or C402.5 (building 4 stories and above). R402.4.1.2 establishes an air leakage limit of 5ACH50 for Climate Zones 1-2 and 3ACH50 for Climate Zones 3-8. No exceptions are provided. Low-rise multifamily buildings with relatively small air volume to envelope ratios struggle to meet the testing metric even when they are properly sealed and caulked as opposed to larger single-family homes with larger air volume to envelope ratios. The 2021 IECC addresses this problem by providing an option for 0.3 cfm per square foot of enclosure area for multifamily dwelling units 1,500 sq ft or smaller.

Overview

The 2020 NGBS defers to the IECC to set the building envelope leakage testing requirements. Specifically, IECC R402.4.1.2 requires the building or dwelling unit to be tested and verified as having an air leakage rate not exceeding five air changes per hour in Climate Zones 1 and 2, and three air changes per hour in Climate Zones 3 through 8. 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).

Verifiers have confirmed that low-rise multifamily buildings, especially those with relatively small apartments, even when properly sealed and caulked, have a difficult time meeting the required ACH metric. Single-family homes in contrast have an easier time meeting this metric.

The 2021 IECC updated the building envelope leakage metric to address the bias for large homes over small dwelling units inflicted by ACH. The 2021 IECC now provides an option for 0.3 cfm per square foot of enclosure area for multifamily dwelling units 1,500 sq ft or smaller. ENERGY STAR Multifamily New Construction also uses 0.3 cfm/sq ft as the blower door standard.