

Expanded Reason Statement for CED1-132

(Theresa Weston, The Holt Weston Consultancy representing ABAA)

CED1-132 was submitted to correct an error in the inclusion in the public comment draft of the modification to CEPI-58 that was adjudicated in the first round of proposals. During the adjudication process, CEPI-58 was modified to allow dwelling unit air leakage testing in lieu of whole building air leakage testing in Group R-2 and I-1 occupancies instead of in all of Group R and I. The modification is clearly stated in the following committee documents:

- Meeting Notes IECC Envelope & Embodied Energy Subcommittee for 3/17/2022: Passed AM 18-0-4(CNV), with the amendment to “limit the scope of test method to Group R-2 and I-1” clearly stated as part of the amended text.
- Agenda for IECC Consensus Committee- Commercial for 4/13/2022, including code tracking sheet for CEPI-58 (attached). The code tracking sheet clearly states “limit the scope of test method to Group R-2 and I-1”.
- Minutes of IECC Consensus Committee – Commercial for 4/13/2022, showing the CEPI-58 was approved as modified by a vote of 34-0.

Regarding the substance of CED1-132, the change limits the use dwelling unit air leakage testing in lieu of whole building testing to Group R-2 and I-1 occupancies rather than the entire Group R and I occupancies. The dwelling unit air leakage testing option provides a bridge to the IECC-Residential Code provisions and allows more continuity between 3-story and 4-story projects. There is a range of opinions on which type of buildings should be allowed to be tested by dwelling unit. For example, CEPI-63 had proposed only allowing dwelling units that “are accessed directly from the outdoors” to be tested by dwelling unit. Limiting the dwelling unit testing Group R-2 and I-1, allows dwelling unit testing for multifamily residences (apartment buildings, etc.) including assisted living facilities, but does not allow it for hospitals, prisons or hotels. Based on the email discussion on this issue during the development on modifications to CEPI-58, it represents a consensus of interested parties.



International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	CEPI-058-21 Air Barrier Testing
CDP ID #	322
Code	IECC CE
Code Section(s)	C402.5, C402.5.1.2, C402.5.2, C402.5.3, C406.9 New Section n
Location	base
Proponent	Mark Lyles markl@newbuildings.org
Proposal Status	SC rev
Subcommittee	CE Envelope
Subcommittee Notes	<p>Reason statement: CEPI-58 was modified by the proponents to remove overlapping changes with other proposals that also addressed re-structuring, test exemptions, and test stringency.</p> <p>The remaining modifications were supported by the SC because they:</p> <ul style="list-style-type: none"> • clarify terminology, • clarify which spaces outside of dwelling or sleeping units must be tested, • limit the scope of this test method to Group R-2 and I-1, and • introduce an equivalent test metric for the points associated with Reduced Air Infiltration when testing dwelling/sleeping units.
Recommendation	<p>Approve as modified.</p> <p>Modification: See word file "2022-03-17_CEPI-58-21_MOD1_REVISIED_03_15_2022_Mtg_edits.docx"</p>
Vote	Approve as modified: 18 – 0 – 4 (CNV)
Recommendation Date	3/17/22
Next Step	<p>To Subcommittee _____</p> <p>To Advisory Group _____</p> <p>To Consensus Committee _____ X _____</p>
Consensus Committee	

Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

CEPI-58-21 (modification replaces version in the monograph)

IECC®: C402.5.2, C406.9

Proponents:

Mark Lyles, representing New Buildings Institute (markl@newbuildings.org); Gayathri Vijayakumar, representing Steven Winter Associates, Inc. (gvijayakumar@swinter.com); Diana Burk, representing New Buildings Institute (diana@newbuildings.org)

2021 International Energy Conservation Code

Revise as follows:

CHAPTER 2 [CE] DEFINITIONS

TESTING UNIT ENCLOSURE AREA. The area sum of all the boundary surfaces that define the dwelling unit, sleeping unit or ~~occupiable~~-conditioned *enclosed space* including top/ceiling, bottom/floor and all side walls. This does not include interior partition walls within the dwelling unit, sleeping unit, or ~~occupiable~~ conditioned *enclosed space*. Wall height shall be measured from the finished floor of the conditioned space to the finished floor or roof/ceiling air barrier above.

C402.5 Air leakage—thermal envelope.

C402.5.1.2 Air barrier compliance. A continuous air barrier for the opaque building envelope shall comply with the following:

1. Buildings or portions of buildings, including Group R-2 and I-1 occupancies, shall meet the provisions of Section C402.5.2.

Exception: Buildings in Climate Zones 2B, 3C and 5C.

2. Buildings or portions of buildings other than Group R-2 and I-1 occupancies shall meet the provisions of Section C402.5.3.

Exceptions:

1. Buildings in Climate Zones 2B, 3B, 3C and 5C.
 2. Buildings larger than 5,000 square feet (464.5 m²) floor area in Climate Zones 0B, 1, 2A, 4B and 4C.
 3. Buildings between 5,000 square feet (464.5 m²) and 50,000 square feet (4645 m²) floor area in Climate Zones 0A, 3A and 5B.
3. Buildings or portions of buildings that do not complete air barrier testing shall meet the provisions of Section C402.5.1.3 or C402.5.1.4 in addition to Section C402.5.1.5.

C402.5.2 Dwelling and sleeping unit enclosure testing.

The *building thermal envelope* shall be tested in accordance with ASTM E779, ANSI/RESNET/ICC 380, ASTM E1827 or an equivalent method approved by the *code official*. The measured air leakage shall not exceed 0.30 cfm/ft² (1.5 L/s × m²) of the *testing unit enclosure area* at a pressure differential of 0.2 inch water gauge (50 Pa). Where multiple *dwelling units* or *sleeping units* or other *enclosed spaces* are contained within one *building thermal envelope*, each shall be considered an individual testing unit, and the building air leakage shall be the weighted average of all tested unit results, weighted by the enclosure area of each tested unit. Units shall be tested without simultaneously testing adjacent units and shall be separately tested as follows:

1. Where buildings have fewer than eight total dwelling or sleeping units, each unit shall be tested.
2. For buildings with eight or more dwelling or sleeping units, the greater of seven units or 20 percent of the units in the building shall be tested, including a top floor unit, a ground floor unit and a unit with the largest *testing unit enclosure area*. For each tested unit that exceeds the maximum air leakage rate, an additional two units shall be tested, including a mixture of unit types and locations.
3. Enclosed spaces with not less than one exterior wall in the building thermal envelope shall be tested in accordance with C402.5.3.

Exception: Corridors, stairwells, and enclosed spaces having a conditioned floor area not greater than 1,500 ft² shall be permitted to comply with Section C402.5.1.5 and either Section C402.5.1.3 or C402.5.1.4.

C402.5.3 Building thermal envelope testing. The *building thermal envelope* shall be tested in accordance with ASTM E779, ANSI/RESNET/ICC 380, ASTM E3158 or ASTM E1827 or an equivalent method approved by the *code official*. The measured air leakage shall not exceed 0.40 cfm/ft² (2.0 L/s × m²) of the *building thermal envelope area* at a pressure differential of 0.3 inch water gauge (75 Pa). Alternatively, portions of the building shall be tested and the measured air leakages shall be area weighted by the surface areas of the building envelope in each portion. The weighted average test results shall not exceed the whole building leakage limit. In the alternative approach, the following portions of the building shall be tested:

1. The entire envelope area of all stories that have any spaces directly under a roof.
2. The entire envelope area of all stories that have a building entrance, exposed floor, or loading dock, or are below grade.
3. Representative above-grade sections of the building totaling at least 25 percent of the wall area enclosing the remaining conditioned space.

C406.9 Reduced air infiltration. Air infiltration shall be verified by whole-building pressurization testing conducted in accordance with ASTM E779 or ASTM E1827 by an independent third party. The measured air-leakage rate of the building envelope shall not exceed 0.25 cfm/ft² (2.0 L/s × m²) under a pressure differential of 0.3 inches water column (75 Pa), with the calculated surface area being the sum of the above- and below-grade building envelope. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to the code official and the building owner.

Exception: Buildings tested in accordance with C402.5.2 where the weighted average of all tested unit results is not greater than 0.20 cfm/ft² (1.0 L/s × m²) at a pressure differential of 0.2 inch water gauge (50 Pa).

Updated Reason Statement: (Justification for 0.20 cfm50/ft² in C406.9)

The following text is extracted from the rationale submitted to ASHRAE 62.2 in support of an Addendum to require 0.20 cfm50/ft² as their dwelling unit air leakage threshold. That [Addendum e to 62.2-2019](#) was approved on April 30, 2021.

How does this 0.20 compare to ACH50 and residential code requirements?

While a simple conversion to ACH50 is not possible, for most apartments, from 500 ft² to 2500 ft² in floor area, this 0.20 cfm50/ft² corresponds to ~ 4 ACH50 to 5 ACH50, depending on the floorplan and ceiling height, which is similar to values that have already been required by the IECC-R for low-rise multifamily since the 2012 IECC. It has therefore already been established through the Residential code that these values are cost-effective. CEPI-58 simply is trying to ensure that multifamily under the commercial code have equal access to the points associated with Reduced Air Infiltration.

Supporting data from tested units

Since 2011, the ENERGY STAR Multifamily High Rise program has required dwelling units to achieve compartmentalization rates of 0.3 cfm50/sf or less. Based on 2,181 units that were tested since 2013 to demonstrate compliance with that threshold, 725 (33%) were able to achieve 0.20 cfm50/sf or lower, while initially only targeting the 0.3. The mean was 0.23 cfm50/sf and the median was 0.22 cfm50/sf. This demonstrates that 0.2 is an achievable threshold, with sometimes no additional cost over achieving the code requirement (0.30 cfm50/ft²).