

## FAQ:

# Is natural ventilation permitted to meet outside air requirements for buildings with dwelling units?

### Background:

To ensure both adequate and consistent ventilation into dwelling units alongside energy efficient conditioning of any outside air brought into new buildings and structures containing dwelling units, the IBC, IRC, IMC and IECC contain new provisions applicable to “residential buildings.” These provisions between the codes work in tandem to restrict the use of previously permitted “natural ventilation” methods for *residential buildings*.

*Residential buildings* are defined within IECC Chapter 2 [RE] and include buildings that are designed and constructed within the scope of the IRC and low height multi-family dwellings that are designed and constructed within the scope of the IBC. *Residential buildings* are defined under IECC Chapter 2 [RE] as:

**RESIDENTIAL BUILDING.** For this code, includes detached one- and two-family dwellings and townhouses as well as *Group R-2, R-3 and R-4* buildings three stories or less in height above grade plane.

To ensure *residential buildings* are constructed in a manner that reduces unwanted air infiltration, IECC Section EC-R402.4.1.2 (locally amended) restricts the air leakage rate through the thermal envelope of the building to no more than five air changes per hour (ACH). Compliance with IECC Section EC-R402.4.1.2 is a “mandatory” provision regardless of the energy conservation “compliance method” chosen for the design. IECC Section EC-R402.4.1.2 (locally amended) reads:

**EC-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. 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).

\*\*\* Note: For buildings under the scope of the IRC, IRC Section N1102.4.1.2 contains the same text as the above listed IECC Section R-R402.4.1.2 \*\*\*

In addition to the above requirements IBC Section 1202.1 and IRC Section R303.4 require “mechanical ventilation” whenever a building or dwelling unit’s air leakage rate is less than 5 ACH – this is to ensure that “tight” construction practices, as mandated by current buildings codes, do not result in a lack of fresh air to dwelling unit occupants.

However, given that such 5 ACH rate is already a mandatory maximum air leakage rate for energy conservation purposes under the aforementioned IECC Section R-R402.4.1.2, for *residential buildings* the codes have now effectively prohibited “natural ventilation.” IBC Section 1202.1 and IRC Section R303.4 read:

**1202.1 General.** [...] Where the air infiltration rate in a *dwelling unit* is less than 5 air changes per hour where tested in accordance with Section R402.4.1.2 of the *International Energy Conservation Code – Residential Provisions*, the *dwelling unit* shall be ventilated by mechanical means in accordance with Section 403 of the *International Mechanical Code*

**R303.4 Mechanical ventilation.** Where the air infiltration rate of a *dwelling unit* is 5 air changes per hour or less where tested with a blower door at a pressure of 0.2 inch w.c (50 Pa) in accordance with Section N1102.4.1.2, the *dwelling unit* shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.

This results in a requirement that any building included within the definition of a *residential building* under IECC Chapter 2 [RE] must now include “whole-house mechanical ventilation” in accordance with either IMC Section 403 or IRC Section M1507.3. This is to ensure that adequate and predicible outside air is brought into such *residential buildings*. IMC Section 403 (Section 403.3.2 specifically) and IRC Section M1507.3 read:

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**403.3.2 Group R-2, R-3 and R-4 occupancies, three stories and less.** The design of local exhaust systems and ventilation systems for outdoor air in Group R-2, R-3 and R-4 occupancies three stories or less in height above grade shall comply with Section 403.3.2.1 through 403.3.2.5.

**M1507.3 Whole-house mechanical ventilation.** Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through 1507.3.3

### Answer:

No, for buildings that fall within the definition of a *residential building* per IECC Chapter 2 [RE], natural ventilation for the building or dwelling unit is not permitted and dedicated mechanical ventilation in accordance with IMC Section 403 or IRC Section M1507 must be provided. For buildings that do NOT fall within the definition of a *residential building* per IECC Chapter 2 [RE], natural ventilation is a permitted ventilation method.

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### Questions?

Call 311 or (215) 686-8686 (if outside Philadelphia) or submit a permit-related question online via <https://form.jotform.com/81494420572154>.

### Disclaimer:

This interpretation, policy or code application is intended to provide guidance to staff for consistency of review and is subject to change without notice. Application of this interpretation, policy or code application to specific projects may vary. There may be other ways to comply with the Code. If so, you are not required to use this method. You may want to investigate other options, or consult with a professional identifying an equally code compliant solution.

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