

# How RESNET & IECC are adapting for Multifamily (or not)



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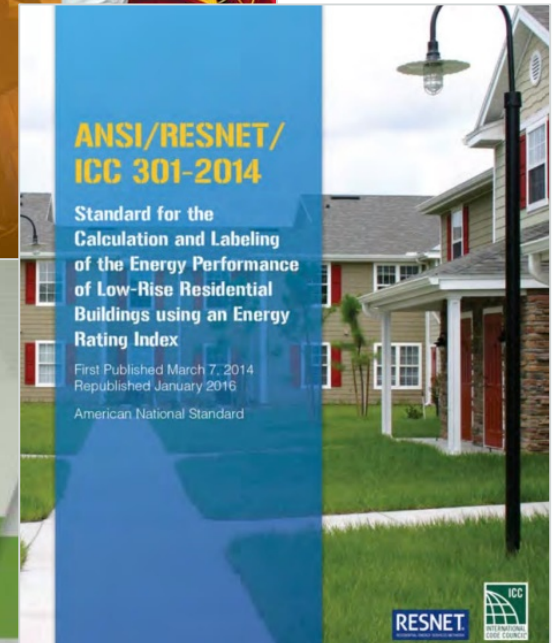
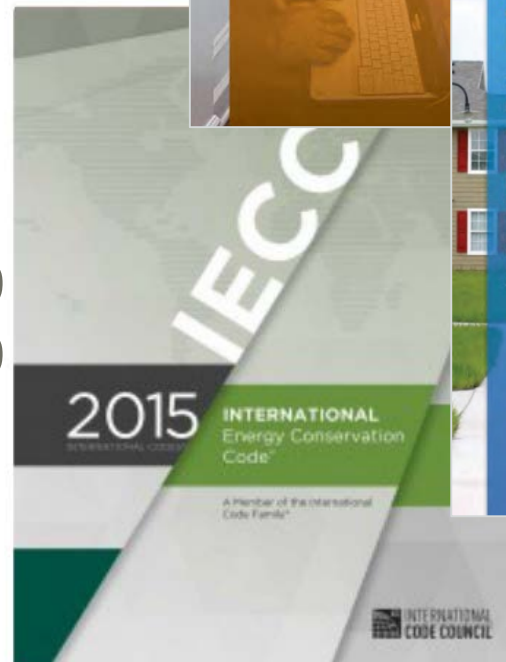
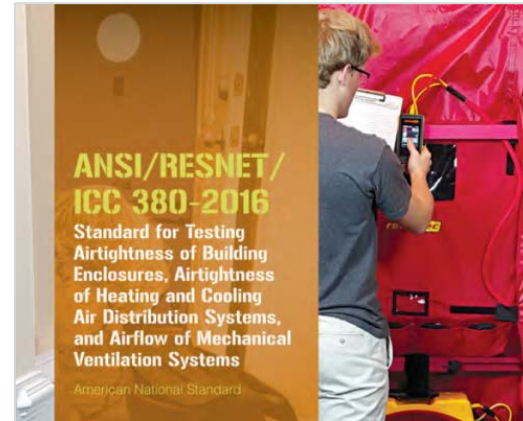
# MF Air Leakage Testing & Ratings

## Current Codes and Standards

- 2012 & 2015 IECC-Res
- 2012 & 2015 IECC-Comm
- ANSI/RESNET 301-2014
- ANSI/RESNET 380-2016

## What's changing

- 2018 & 2021 IECC-Res
- 2018 IECC-Comm
- ANSI/RESNET 301-2019
- ANSI/RESNET 380-2019





# What's in 2015 IECC-Residential?

## Air Leakage testing (~same in 2012)

**R402.4 Air leakage (Mandatory).** The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Sections R402.4.1 through R402.4.4.

**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 Zones 1 and 2, and three air changes per hour in Climate Zones 3 through 8**. Testing shall be conducted in accordance with ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals).

## What's not in there?

Specific language regarding MF, sampling of air leakage tests, guarded tests, or reference to the RESNET testing Standards.



# What's in 2018 IECC-Residential?

## Air Leakage testing

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### What's not in there?

Specific language regarding MF, sampling of air leakage tests, or guarded tests.

# A proposal for 2021 IECC-Residential



## Air Leakage testing

**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 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 380-2019, ASTM E 779, or ASTM E 1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals).

### Exception:

For dwelling units other than detached one-family dwellings, an air leakage rate not exceeding 0.3 cfm per ft<sup>2</sup> of the dwelling unit enclosure surface area shall be an accepted alternative in all Climate Zones. Testing shall be conducted in accordance with RESNET/ICC 380-2019, ASTM E779, or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals).



# What's in 2012 IECC-Commercial?

## Air Leakage testing

**C402.4 Air leakage (Mandatory).** The thermal envelope of buildings shall comply with Sections C402.4.1 through C402.4.8.

**C402.4.1 Air barriers.** A continuous air barrier....The air barrier shall comply with Sections C402.4.1.1 and C402.4.1.2.

C402.4.1.1 Air barrier construction.

C402.4.1.2 Air barrier compliance options. (Pick 1 of next 3)

C402.4.1.2.1 Materials.

C402.4.1.2.1 Assemblies.

C402.4.1.2.3 **Building Test.** The completed building shall be tested and the air leakage rate of the building envelope shall not exceed 0.40 cfm/ft<sup>2</sup> at a pressure differential of 0.3 inches water gauge in accordance with ASTM E 779 or an equivalent method approved by the code official.



# What's in 2015 IECC-Commercial?

## Air Leakage testing

**C402.5 Air leakage – thermal envelope (Mandatory).** The thermal envelope of buildings shall comply with Sections C402.5.1 through C402.5.8, or the building thermal envelope shall be tested in accordance with ASTM E 779 at a pressure differential of 0.3 inch water gauge (75 Pa) or an equivalent method approved by the code official and deemed to comply with the provisions of this section when the tested air leakage rate of the building thermal envelope is not greater than 0.40 cfm/ft<sup>2</sup>.

## C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS

**C406.1 Requirements.** Buildings shall comply with at least one of the following:.....*then they list six options related to HVAC, DHW, Renewable, Lighting, but **not infiltration***





# What's in 2018 IECC-Commercial?

## Air Leakage testing (~same as 2015)

**C402.5 Air leakage – thermal envelope (Mandatory).** The thermal envelope of buildings shall comply with Sections C402.5.1 through C402.5.8, or the building thermal envelope shall be tested in accordance with ASTM E 779 at a pressure differential of 0.3 inch water gauge (75 Pa) or an equivalent method approved by the code official and deemed to comply with the provisions of this section when the tested air leakage rate of the building thermal envelope is not greater than 0.40 cfm/ft<sup>2</sup>.





# What's in 2018 IECC-Commercial?

## Air Leakage testing

**C402.5 Air leakage – thermal envelope (Mandatory).** The thermal envelope of buildings shall comply with Sections C402.5.1 through C402.5.8, or the building thermal envelope shall be tested in accordance with ASTM E 779 at a pressure differential of 0.3 inch water gauge (75 Pa) or an equivalent method approved by the code official and deemed to comply with the provisions of this section when the tested air leakage rate of the building thermal envelope is not greater than 0.40 cfm/ft<sup>2</sup>.

## C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS

**C406.1 Requirements.** Buildings shall comply with at least one of the following:....*then they list eight options related to HVAC, DHW, Renewable, Lighting, Envelope, and one related to infiltration*



# What's in 2018 IECC-Commercial?

## Air Leakage testing

### C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS

**C406.1 Requirements.** Buildings shall comply with at least one of the following:....*then they list eight options related to HVAC, DHW, Renewable, Lighting, Envelope, and one related to infiltration*

**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/ft<sup>2</sup> 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.

Exception: for buildings over 250,000 ft<sup>2</sup>, you can test sections



# What's in RESNET Standards now?

## Air Leakage testing

**RESNET/ANSI/ICC 301-2014, with Addendum D:** “Envelope leakage shall be tested in accordance with requirements of Standard ANSI/RESNET/ICC 380-2016 or equivalent by an Approved Tester.”

**RESNET/ANSI/ICC 380-2016:** “The procedure for measuring the airtightness of building enclosures is also applicable to dwelling units in multifamily buildings.”

## What's not in there?

A compartmentalization test procedure and clear statement whether whole building tests or guarded tests can be used.



# What's in RESNET Guidelines now?

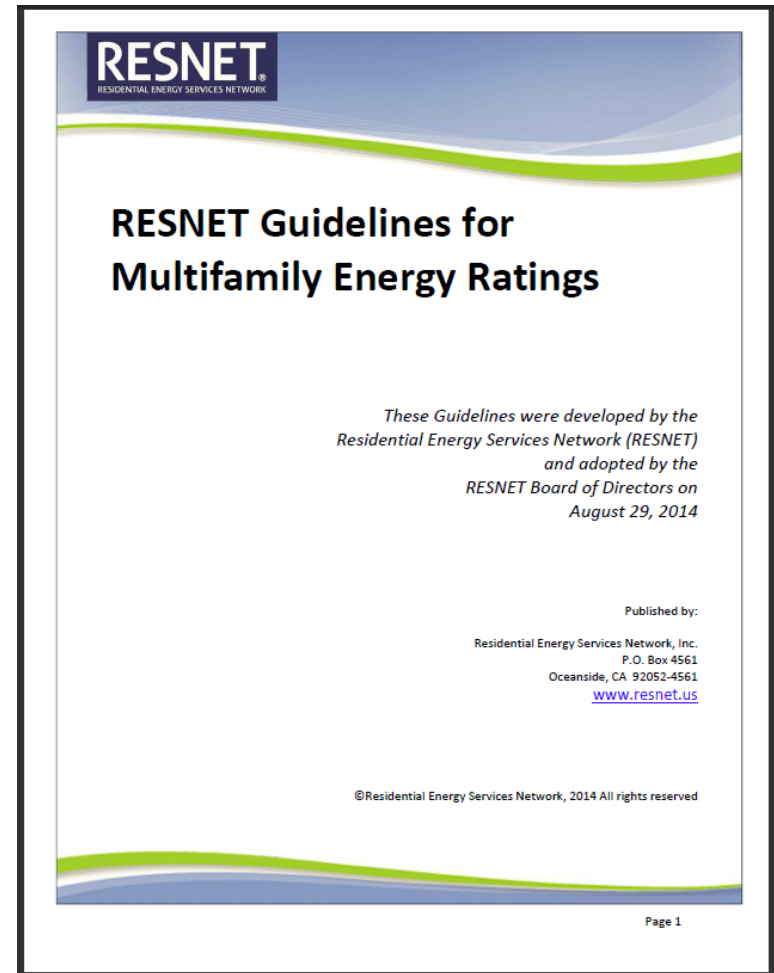
## Air Leakage testing

**Compartmentalization, guarded test, and a full building blower door test procedures**

-The Guidelines state: “The whole-building leakage results shall not be used or extrapolated to represent leakage in the individual dwelling unit HERS Ratings.”

-Hard to enforce “Guidelines”

**Reminder:** As of December 2016, a HERS Rating on a multifamily BUILDING is not permitted; rating has to be on the DWELLING UNIT





# What's in RESNET Standards in 2019?

## Air Leakage testing

### **3<sup>rd</sup> draft of RESNET/ANSI/ICC 380-2019 (not published yet):**

-two blower door test procedures, one specific for DETACHED dwelling units and one for ATTACHED dwelling units; no whole building test or guarded test options; 140 cfm50 added if door doesn't have a good door sweep or threshold.

### **2<sup>nd</sup> draft of RESNET/ANSI/ICC 301-2019 (not published yet):**

**Table 4.2.2(1):** In accordance with Standard ANSI/RESNET/ICC 380-2019, obtain airtightness test results for:

- Building enclosure (for Detached Dwelling Units)
- Compartmentalization Boundary (for Attached Dwelling Units).

For Attached Dwelling Units with airtightness test results  $\leq 0.30$  cfm50 per ft<sup>2</sup> of Compartmentalization Boundary, the test results shall be multiplied by reduction factor Aext.



# Multifamily Ratings



# What's in 2015 & 2018 IECC?

## Energy Rating Index (ERI)

2015 IECC, ERI path (R406) introduced but sans Standard to calculate it. Listed specific ERI targets, based on Climate Zone.

| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
|----|----|----|----|----|----|----|----|
| 52 | 52 | 51 | 54 | 55 | 54 | 53 | 53 |

2018 IECC, ERI path (R406) adds reference to 301-2014, with ventilation modification, on-site power text & changes ERI targets.

| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
|----|----|----|----|----|----|----|----|
| 57 | 57 | 57 | 62 | 61 | 61 | 58 | 58 |

## What's not in there?

MF-specific ERI targets, building vs unit ERI's, and sampling





# What's in RESNET Standards now?

## HERS Index vs Energy Rating Index

### RESNET's Proprietary Standard

**RESNET Mortgage Industry National Home Energy Rating Standards (MINHERS), “Home Energy Rating Index (HERS)”**

References RESNET/ANSI/ICC 301-2014 and 380-2016

### Non-Proprietary Standard

**RESNET/ANSI/ICC 301-2014: “Energy Rating Index (ERI)”**

2018 IECC references RESNET/ANSI/ICC 301-2014, w/Add A&B

Due to ventilation modification, ERI may not = HERS Index, but software \*should\* handle it.

## What's not in there?

MF-specific guidance and still limited to 3 stories and less

# What's in RESNET/ANSI/ICC 301-2019



## Energy Rating Index for Multifamily

### 2<sup>nd</sup> draft of RESNET/ANSI/ICC 301-2019 (not published yet):

- Updated to address Multifamily Systems & Scenarios
  - Central heating, cooling, ventilation, DHW, solar PV, shared laundry, duct leakage to outside alternative, compartmentalization de-rate factor, etc
- Scope greatly expanded (no building height restriction!)
- ERI MUST be done on a dwelling/sleeping unit, not building, but provides a way to calculate a “building” level ERI.
- Like other standards (ASHRAE 62.2 or 90.1), 2019 also incorporates ALL the addenda/interpretations that were approved to 301-2014, like LED lighting & size adjustment factor, and HOPEFULLY Appendix A & B on Insulation Grading & Inspections

### What's not in there?

MF sampling, central DHW recirc system losses, and much more



# What impact will all this have?

## MF Energy Ratings & HERS Ratings

### 2021 IECC

- In January, RESNET will propose that the 2021 IECC instead reference 301-2019 and 380-2019, which were revised significantly to better address multifamily

### RESNET Mortgage Industry National Home Energy Rating Standards (MINHERS)

- Once 301- and 380-2019 are published, RESNET will adopt & then transition from optional in 2019 to required in 2020, likely starting with permits issued July 2020 and later.

### ENERGY STAR's New Multifamily Program

- Will also allow HERS Index to be used in any height building



# Key Takeaways

## MF Air Leakage testing & Ratings

- Current residential codes that affect MF  $\leq 3$  stories, like 2012 and 2015 IECC, and even 2018 IECC, have retained the 3/5 ACH50 test requirements, at the building or dwelling unit level, with no guidance on whether sampling or guarded tests are allowed or prohibited. **Questions? Ask your local code official!**
  - Groups have been actively trying to get IECC to consider approaches that specifically address MF, with little success so far.
- Current commercial codes that affect MF  $> 3$  stories (2012, 2015, 2018 IECC) don't have a MANDATORY air leakage TEST requirement (since there are alternate compliance options available). If chosen, they are BUILDING tests, not unit tests, allowance increases based on surface area, not volume.
- RESNET/ANSI/ICC 301 and 380-2019 will provide specific guidance on how we test and rate units in multifamily buildings.



Questions?