Residential Air Leakage Testing and Mechanical Ventilation Verification

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Research Questions

This project is intended to answer the following four questions regarding the residential building air leakage testing and whole-house mechanical ventilation requirements in the 2016 Supplement 1 changes to the 5th Edition (2014) Florida Energy Conservation Code:

1) Is the new requirement to test residential air leakage being followed?
2) Are code-authorized testers providing the air leakage testing?
3) Are accurate air leakage rate test values being reported?
4) Is whole-house mechanical ventilation being installed in applicable cases[1]?

Background and Code Relevance to Florida

Florida HB 535 and SB 1602 and the resulting 2016 Supplement 1 to the 5th Edition (2014) Florida Building Code delayed implementation of two residential Energy Conservation Code provisions:

1) Energy Conservation Code Section R402.4.1.2 regarding mandatory building air leakage testing
2) Residential Code Section R303.4 regarding whole-house mechanical ventilation requirement "triggers."

The Supplement changed the Section R402.4.1.2 maximum building air leakage rate from 5 ACH50 (air changes per hour when tested with a blower door at a pressure of 50 Pascals) to 7 ACH50, and also made changes to the tester qualification requirements:

> **R402.4.1.2 Testing.** The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding ~~5~~ 7 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). ~~Where required by the *code official,*~~ Testing shall be conducted by either individuals as defined in Section 553.993(5) or (7), Florida Statutes or individuals licensed as set forth in Section 489.105(3)(f), (g), or (i) or an *approved*

[1] Due to project time and sample size limitations, it is possible that applicable cases requiring mechanical ventilation will not be identified.

third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

During testing: No change to the remaining text

Supplement 1 also added a new Energy Code section that stipulates that residential blower door testing becomes mandatory July 1, 2017:

> **R101.4.9 Blower door testing.** The mandatory blower door testing for residential buildings or dwelling units as contained in section R402.4.1.2 of the Florida Building Code, 5th Edition (2014) Energy Conservation, shall not take effect until July 1, 2017, and shall not apply to construction permitted before July 1, 2017.

In addition, Supplement 1 changed the Florida Residential Code's Section R303.4 whole-house mechanical ventilation requirement "trigger" from less than 5 ACH50 to less than 3 ACH50. So under Supplement 1, the maximum residential building air leakage rate is 7 ACH50, and if below 3 ACH50, whole-house mechanical ventilation is required.

Critical Research Need

This project will provide verification if the new residential air leakage testing and, as applicable, new whole-house mechanical ventilation requirements are being met in new Florida home construction. The project will try to identify any barriers to correctly fulfilling the code criteria. This verification is needed considering that these new code requirements will affect the vast majority of new homes built in Florida and there is no Code mechanism to have air leakage testing reports verified.

Proposed Research

A field research study is proposed to investigate adherence to the 2016 Supplement 1 residential air leakage testing and mechanical ventilation requirement changes to the 5th Edition (2014) Florida Energy Conservation Code. The study will be conducted in 30 homes around the state and include:

- Recruiting homes
- A review of each home's Energy Code compliance and building air leakage test report
- An air leakage rate (blower door) test of each home
- As applicable, inspection of each home's mechanical ventilation system.

A search for candidate homes will begin in October 2017. Air leakage testing will be conducted from February through April 2018.

Expected Outcome and Impact on the Code

The outcome of this research will be a report summarizing project activities and air leakage and mechanical ventilation findings. The report will provide the Florida Building Commission with valuable implementation feedback that will not otherwise be obtainable as these requirements are continued in the 6th Edition (2017) Florida Energy Conservation Code. Based on project results, recommendations will be made regarding if there is a need for additional air leakage testing Code training or if an ongoing verification mechanism such as sampling is warranted.

Budget

The estimated budget for completion of the project is $59,000.