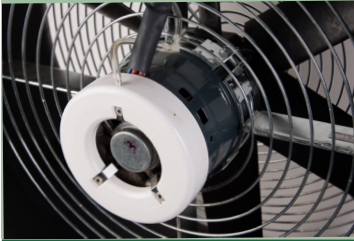




Residential Air Leakage (Blower Door) Testing for Florida Code Compliance

FACT SHEET



WARNING!

Due to the potential for combustion and other health and safety issues, blower door testing should only be conducted by trained, qualified individuals.

Infiltration is the uncontrolled inward air leakage through cracks and crevices in any building element and around windows and doors of a building caused by pressure differences across these elements due to factors such as wind, inside and outside

temperature differences (stack effect), and imbalance between supply and exhaust air systems.

To address the energy and indoor air quality impacts of air leakage in homes, the current Florida Building Code includes building air leakage testing requirements. Section R402.4.1.2 of the Energy Conservation volume of the Code stipulates maximum

leakage rates, how the test is to be conducted, who can conduct the testing, reporting requirements, and at what point in construction the test can be performed.

The maximum air leakage rate allowed in Florida (Climate Zones 1 and 2) is no greater than 7 air changes per hour at a pressure of 0.2 inch w.g., or 50 Pascals (also written as "7 ACH50").

Per the Florida Statutes referenced in Section R402.4.1.2, individuals qualified to provide air leakage testing include energy auditors, energy raters, Class A or B air-conditioning contractors and mechanical contractors, plus approved third parties. For the purposes of this code section, an approved third party is an individual approved by a code official to perform air leakage testing.

As illustrated below, air leakage tests are performed using a blower door, which includes the following components:

- Digital gauge
- Calibrated variable speed fan
- Adjustable frame and curtain
- Fan speed controller with cable
- Tubing

A blower door test can be performed at any time, but for Florida Code compliance, it is conducted before the Certificate of Occupancy (CO) is issued, after all piping, wiring and other penetrations of the building thermal envelope have been sealed.

Either a single- or multi-point blower door test can be conducted. A single point test only measures leakage at one house pressure (house with reference to outside) of approximately 50 Pascals, while a multi-point test measures leakage over a range of house pressures (from approximately 15 Pascals to 55 Pascals).

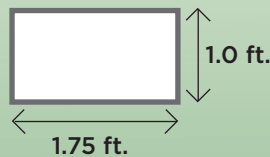
The tester conducts the blower door test and records the house pressure, fan ring used for the test and fan pressure. This data is then used to calculate an airflow rate in cubic feet per minute (CFM50).



Photo: Retrotec

Test results are reported on a form that includes space to record the house's CFM50 measurement, conditioned volume, ACH50 leakage rate (calculated from the CFM50 measurement) and Pass/Fail status, and an area for the tester to provide their name, company, qualification and signature. Blank Envelope Leakage Test

The CFM50 leakage value is proportional to the number and size of cracks and gaps in the building's thermal envelope and can provide an estimate of the combined area of the holes in the envelope. This equivalent hole size is approximated, in square inches, by multiplying the CFM50 result by a 0.13 conversion factor. For example, a home with a measured CFM50 of 1,940 has an equivalent hole size of $1,940 \times 0.13 = 252.2$ square inches, or 1.75 square feet.



Report forms are available through Florida Building Commission approved Energy Code calculation software products. Some Florida building departments require their own version of the form.

You may notice that the test form shown provides a place to indicate whether the house is complying with the Florida Energy Conservation Code via the Prescriptive, Performance or Energy Rating Index (ERI) method, and also includes a field to enter the ACH50 from the

Performance or ERI compliance form.

For the Performance and ERI compliance methods, using an ACH50 value lower than the code maximum of 7 for the code compliance calculation will help a house pass the code. But since code credit is received for ACH50 values less than 7, if a lower value is entered for compliance, the blower door test must show that the house's leakage is at or below that lower value (rather than 7). By providing fields to indicate

the ACH50 used for compliance, test forms provide project-specific air leakage verification guidance.

For example, if the proposed air leakage was entered on the compliance form as 5 ACH50 but was tested as 6.26, it would fail because 6.26 ACH50 exceeds 5 ACH50. If instead the proposed air leakage on the compliance form was 7 ACH50, then 6.26 ACH50 would pass.

If a house's ACH50 is less than 3, Florida Code requires whole-house mechanical ventilation to be provided.

For more information on whole-house mechanical ventilation see the U.S. Department of Energy article: <https://basf.pnnl.gov/resource-guides/whole-building-delivered-ventilation#quicktabs-guides=0>.

The image shows a sample of the 'Envelope Leakage Test Report (Blower Door Test)' form. The form is titled 'Envelope Leakage Test Report (Blower Door Test)' and 'Residential Prescriptive, Performance or ERI Method Compliance 2017 Florida Building Code, Energy Conservation, 6th Edition'. It includes sections for 'Job Information' (Jurisdiction, Builder, Address, City, State, Zip, Permit #, Community, Unit, Lot), 'Air Leakage Test Results' (Prescriptive Method, Performance or ERI Method), a calculation for ACH(50) using CFM(50) and Building Volume, 'Testing' instructions, and 'Testing Company' information (Company Name, Signature of Tester, Printed Name of Tester, License/Certification #, Date of Test, Issuing Authority). There are checkboxes for 'PASS' and 'FAIL' and a note that 'When ACH(50) is less than 3, Mechanical Ventilation installation must be verified by building department.' There are also radio buttons for 'Method for calculating building volume: Retrieved from architectural plans, Code software calculated, Field measured and calculated.'

Disclaimer: This piece is intended to give the reader only general factual information current at the time of publication. This piece is not a substitute for professional advice and should not be used for guidance or decisions related to a specific design or construction project. This piece is not intended to reflect the opinion of any of the entities, agencies or organizations identified in the materials and if any opinions appear are those of the individual author and should not be relied upon in any event.

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