



ANSI/RESNET/ICC 380 – 2016: Standard for Testing Airtightness of Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems

Standard published February 4, 2016

WHY ANSI/RESNET/ICC 380 – 2016?

IECC Duct Leakage Requirements and Standard 380

Section R403.3.3 of the 2015 International Energy Conservation Code (IECC) requires ducts to be pressure tested at either rough-in or postconstruction with a pressure differential of 0.1 w.g. (25Pa) across the system and with all register boots taped and sealed.

Section R403.3.4 requires that the total leakage of the ducts when tested at rough-in must be less than or equal to 4cfm/ per 100 ft² of conditioned floor area when the air handler is installed at the time of the test and less than or equal to 3 cfm/per 100 ft² when an air handler is not installed.

Total leakage of the ducts when tested post construction must be less than or equal to 4cfm/per 100 ft² of conditioned floor area.

The 2015 IECC does not provide direction for meeting duct leakage requirements, which can lead to inconsistent results that are difficult to replicate. The methodology outlined in Standard 380 builds on the methodology already employed throughout the industry and provides the necessary guidance to meet the duct leakage testing requirements of the IECC in a clear and consistent manner.

IECC Building Envelope Requirements and Standard 380

Section R402.4 of the IECC requires the building thermal envelope of a residential building to be constructed and tested to limit air leakage to a rate less than three or five air changes per hour (ACH) depending on climate zone, as shown in Table 1.

Table 1. Air Leakage Rate in 2015 IECC

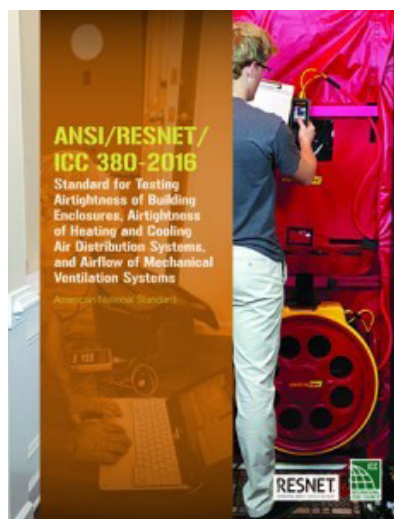
Climate Zone	2015 IECC Requirements
1 – 2	≤ 5 ACH @ 50 pascals
3 – 8	≤ 3 ACH @ 50 pascals

Standard 380 expands on the current testing methodology required by the IECC, ASTM E779-10, which requires multi-point testing under both pressurized and depressurized conditions, by allowing single point tests under one pressurization/depressurization condition. The Standard also includes correction factors to account for test bias and uncertainty.

WHAT IS ANSI/RESNET/ICC 380 – 2016?

ANSI/RESNET/ICC 380 – 2016¹ (Standard 380) is a nationally recognized standard that provides consistent and uniform methodologies for the measurement of building envelope tightness, airtightness of heating and cooling air ducts, and the air flow of mechanical ventilation systems.

Standard 380 builds on existing American National Standards to provide standard procedures for individuals evaluating the performance of residential buildings, such as home energy raters, energy auditors, and code officials. Applicable to both single family homes and multifamily dwelling units with separate duct and ventilation systems, Standard 380 can be used in determining compliance with codes and standards, in quality assurance and control, as building diagnostics, and to determine input to energy simulations and ratings.



¹ http://www.resnet.us/blog/wp-content/uploads/2016/01/ANSI-RESNET-ICC_380-2016_appvd-2-4-16_final-Publication-2-29-16.pdf



What testing procedures does Standard 380 include?

BUILDING ENVELOPE TESTING

Procedures for Measuring Airtightness of Building Enclosures

Standard 380 effectively details all necessary steps and precautions for performing air leakage tests on residential buildings, including:

- Required equipment
- House preparation procedure
- Equipment preparation procedure
- Airtightness test procedure
 - » One – point airtightness test
 - » Multiple – point airtightness test

Additionally, Standard 380 outlines how to apply the results of the building enclosure air leakage test to home energy ratings and to achieve compliance with building energy code air leakage limits.

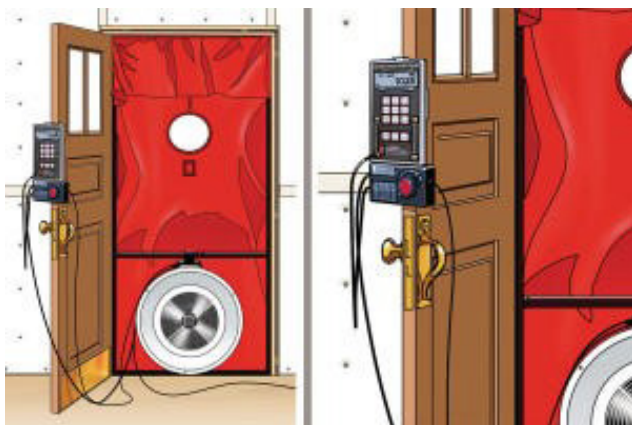


Photo credit: Harry Whitver, www.prosalesmagazine.com

DUCT LEAKAGE TESTING

Procedures for Measuring Airtightness of Duct Systems

Standard 380 effectively details all necessary steps and precautions for performing duct leakage tests, including:

- Required equipment
- House and duct system preparation procedure

- Equipment preparation procedure
- Airtightness test procedure
 - » Total duct leakage test
 - » Duct leakage to outside test

As with building envelope testing, Standard 380 outlines how to apply the results of the duct leakage test to compliance with the duct system leakage requirements of codes and standards, home energy ratings, energy audits, and predicting savings from retrofits. The Standard presents several alternative approaches for each measurement to allow flexibility in application of the standard and to achieve the best results based on the specifics of the house and HVAC system characteristics.

Results achieved through the duct testing procedures outlined in Standard 380 can be easily replicated by testing organizations and enforcement personnel.



Photo credit: Harry Whitver, www.ecobuildingpulse.com



MECHANICAL VENTILATION TESTING

Procedures for Measuring Airflow of Mechanical Ventilation Systems

Testing guidelines for measuring the volumetric airflow through a mechanical ventilation system, such as a whole-house ventilation system or a local mechanical exhaust system, are also outlined in Standard 380. The Standard effectively details all necessary steps and precautions for performing mechanical ventilation airflow testing, including:

- Procedures to measure the airflow of a mechanical ventilation system at an inlet terminal using a powered flow hood, airflow resistance device, or passive flow hood
- Procedures to measure the airflow of a mechanical ventilation system at an outlet terminal using a powered flow hood or bag inflation device
- Procedures to measure the airflow of a mechanical ventilation system mid-stream in the ventilation duct using an airflow measurement station or an integrated diagnostic tool.

ANSI/RESNET/ICC 380 – 2016 is available online at www.resnet.us.

