

## Duct Testing in New Residential Construction - Code Notes

[2009 IECC]

### Background

Many studies have shown that visual inspection of duct seals in residences is not enough. Code now requires a pressure test. Pressure testing ducts as required by the 2009 IECC is far superior to visual inspection and will definitively confirm that duct leakage is kept to a low level. Building Energy Codes Program experts estimate that pressure testing ducts in new residential construction will reduce energy consumption in new homes by up to 10% on average and potentially much more in some homes.

### Requirements

Section 403.2.2 of the 2009 IECC states that the sealing of ducts must be verified by a duct pressure test. This test involves using a fan to force air into the duct system and measuring how much air leaks out through cracks and holes (the registers are taped closed for the test). A duct pressure test is not required if the air handler and all ducts are located inside the building thermal envelope. The requirements for how to seal ducts are given in Section M1601.3 of the International Residential Code, and apply regardless of the location of the ducts.

The code allows considerable flexibility in the required test. It can be conducted by anyone, including the installer or a third party. It can be done either after rough-in of the ducts or at the completion of construction (i.e., after drywall has been installed and finished). There are separate requirements for testing at rough-in, depending on whether the air handler has been installed at the time of the test. The post-construction test can measure either the "total leakage" of the ducts or the "leakage to outdoors" (the fraction of the total that leaks outside the conditioned space).

The allowable leakage rates are expressed in terms of airflow (cubic feet per minute or CFM) per 100 ft<sup>2</sup> of conditioned floor area, when duct registers or boots are taped/sealed and the duct system is pressurized to 25 Pascals (0.1 inches w.c.). Maximum leakage rates for the various testing options are as follows:

Testing Option	Maximum CFM per 100 ft <sup>2</sup> @25 Pascals
At rough-in, air handler not installed	4
At rough-in, air handler installed	6
Post-construction, leakage to outdoors	8
Post-construction, total leakage	12

The drawbacks of rough-in testing include less accuracy as leaks in the boot assembly cannot be fully measured because drywall is not yet installed. Also, it is only possible to measure total leakage whereas leakage specifically to the outdoors can be measured when the house is completed.

### Plan Review

No action is required at plan review.

### Field Inspection

The builder shall provide data confirming that leakage rates are equal to or less than the rates specified in Section 403.2.2 of the IECC 2009. Testing is not required if all ducts and the air handler are inside the building thermal envelope. Code officials shall perform a visual inspection of ducts to confirm proper sealing in all buildings.



## Code Citations\*

### IECC 2009, 403.2.2 Sealing

Requires that all ducts, air handlers, filter boxes, and building cavities used as ducts be sealed. Joints and seams shall comply with Section M1601.4.1 of the International Residential Code. Duct tightness shall be verified by either a postconstruction test or rough-in test.

## More Information

For more information, please see the [Duct Testing Frequently Asked Questions](#) article.

For information on why duct testing is important, see PG&E's Tech Brief at [www.pge.com/includes/docs/pdfs/mybusiness/energysavingsrebates/rebatesincentives/duct\\_testing.pdf](http://www.pge.com/includes/docs/pdfs/mybusiness/energysavingsrebates/rebatesincentives/duct_testing.pdf).

For information on efficient duct systems see the ENERGY STAR® write up at [www.energystar.gov/ia/new\\_homes/features/DuctSystems\\_062906.pdf](http://www.energystar.gov/ia/new_homes/features/DuctSystems_062906.pdf).

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2009 ICC Reference and link

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**PNNL-SA-67476 2009-08-21 11:34:28.0**