

## **Duct Testing Calculator (New Construction)**

House address or lot #:	
Conditioned Floor Area:	
Duct tester location:	
Pressure tap location:	
Ring (if applicable):	Open <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>

### **At Rough-In or Post Construction**

Test Method	Standard <sup>1</sup>	Calculated Target	Test <sup>1</sup> CFM <sub>25</sub>
Air Handler Present (Leakage to Exterior or Total Leakage)	≤ 4 CFM <sub>25</sub> per 100 sf of CFA		
Air Handler <u>not</u> Present (Leakage to Exterior or Total Leakage)	≤ 3 CFM <sub>25</sub> per 100 sf of CFA		

1. Test CFM<sub>25</sub> must be equal to or less than the calculated target.

## **Air Leakage testing Calculator (Blower Door Test)**

Conditioned Floor Area:		Calculated Volume (cubic feet)
Ceiling Hieght (ft)		0
Standard	Tested CFM <sub>50</sub>	Calculated Test Result (ACH <sub>50</sub> )
≤5.0 ACH <sub>50</sub> (CFM <sub>50</sub> X 60 ÷ conditioned Volume)		

### *Glossary*

**Rough-In:** After installation of the complete air distribution system but before installation of insulation and sheet rock. Allows for access to all duct seams and connections for re-evaluation of seal integrity if standard is not met in intitial test.

**Post Construction:** At or near final inspection. The home must be complete enough to pressurize the home to 25 pa.

**Total Leakage:** Aggregation of the entire systems duct leakage in a duct test.

**Leakage to Exterior:** Aggregation of all duct system leaks to the exterior of the CFA in a duct test.

**Pascal (pa):** Unit of pressure

**CFA:** Conditioned floor area in square feet

**CFM<sub>25</sub>:** Cubic feet per minute of air leakage at 25 pascals of pressure

**CFM<sub>50</sub>:** Cubic feet per minute of air leakage at 50 pascals of pressure

**Conditioned Volume:** Volume of conditioned space (CFA X ceiling hieght)

**ACH<sub>50</sub>:** Air changes per hour at 50 pascals of pressure

## Duct Testing Code Language

**R403.2.2 Sealing (Mandatory).** Ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with either the *International Mechanical Code* or *International Residential Code*, as applicable.

**Exceptions:**

1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.
2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.
3. Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

Ducts shall be leak tested in accordance with WSU RS-33, using the maximum duct leakage rates specified. Duct tightness shall be verified by either of the following:

1. Postconstruction test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m<sup>2</sup>) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test. Leakage to outdoors shall be less than or equal to 4 cfm (133.3 L/min) per 100 square feet of conditioned floor area.
2. Rough-in test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m<sup>2</sup>) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure. All registers shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm (85 L/min) per 100 square feet (9.29 m<sup>2</sup>) of conditioned floor area.

**Exception:** The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope. Ducts located in crawl spaces do not qualify for this exception.

**R403.2.2.1 Sealed air handler.** Air handlers shall have a manufacturer's designation for an air leakage of no more than 2 percent of the design air flow rate when tested in accordance with ASHRAE 193.

## Air Leakage Testing Code Language

**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 air changes per hour. 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 an *approved* 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*. Once visual inspection has confirmed sealing (see Table R402.4.1.1), operable windows and doors manufactured by *small business* shall be permitted to be sealed off at the frame prior to the test. During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures;
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures;
3. Interior doors, if installed at the time of the test, shall be open, access hatches to conditioned crawl spaces and conditioned attics shall be open;
4. Exterior openings for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling systems, if installed at the time of the test, shall be turned off; and
6. Supply and return registers, if installed at the time of the test, shall be fully open. HVAC ducts supply and return registers shall not be sealed.