

**APPENDIX R3C**  
**Duct sealing. Duct air leakage test (Sections R403.3.2, Section R403.3.3)**  
**Sample Worksheet**

**R403.3.2 Sealing (Mandatory).** Ducts, air handlers, filter boxes, and building cavities used as ducts shall be sealed. Joints and seams shall comply with either the *International Mechanical Code* or *International Residential Code*, as applicable.

**Exception:** Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.

**R403.3.3 Duct leakage (Prescriptive) and duct testing (Mandatory).** Duct testing and duct leakage shall be verified by compliance with either Section R403.3.3.1 or R403.3.3.2. Duct testing shall be verified using one of the two following methods:

**R403.3.3.1 Total duct leakage.** Total duct leakage less than or equal to 5 cfm (12 L/min) per 100 square feet (9.29 m<sup>2</sup>) of conditioned floor area served by that system 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.

During testing:

1. Block, if present, ventilation air duct(s) connected to the conditioning system.
2. The duct air leakage testing equipment shall be attached to the largest return in the system or to the air handler.
3. The filter shall be removed and the air handler power shall be turned off.
4. Supply boots or registers and return boxes or grilles shall be taped, plugged, or otherwise sealed air tight.
5. The hose for measuring the 25 Pascals of pressure differential shall be inserted into the boot of the supply that is nominally closest to the air handler.
6. Specific instructions from the duct testing equipment manufacturer shall be followed to reach duct test pressure and measure duct air leakage.

**R403.3.3.2 Duct leakage to the outside.** Conduct the test using fan pressurization of distribution system and building at a fixed reference pressure for combined supply and return leaks. Duct leakage to the outside 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 served by that system when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, relative to the outside, including the manufacturer's air handler enclosure.

During testing:

1. Block, if present, the ventilation air duct(s) connected to the conditioning system.
2. The duct air leakage testing equipment shall be attached to the largest return in the system or to the air handler.
3. The filter shall be removed and the air handler power shall be turned off.
4. Supply boots or registers and return boxes or grilles shall be taped, plugged, or otherwise sealed air tight or as tight as possible.
5. The hose for measuring the 25 Pascals of pressure differential shall be inserted into the boot of the supply that is nominally closest to the air handler.
6. Open all interconnecting doors in the building, close dampers for fireplaces and other operable dampers.
7. Set up an envelope air moving/flow-regulating/flow measurement assembly, such as a blower door, following the manufacturer's prescribed procedure.
8. Specific instructions from the duct testing equipment manufacturer shall be followed to reach duct test pressure and measure duct air leakage used in combination with a blower door. Typical steps are as follows:
  - a. Depressurize the ductwork system to 25 Pa using the measurement hose in Step 5 above.
  - b. Depressurize the house to 25 Pa using an envelope air moving/flow-regulating/flow measurement assembly, such as a blower door.
  - c. Correct the duct pressure to measure 0 Pa of pressure differential between the house and the ductwork system.
  - d. Read the cfm of duct leakage using the procedures for the specific equipment being used. (Note that most automatically calculating pressure gauges cannot compute the CFM25 automatically with a duct-to-house difference in pressure of 0 Pa, so the gauge setting should be set to read cfm instead of CFM25).

Testing shall be performed and reported by the permit holder, a North Carolina licensed general contractor, a North Carolina licensed HVAC contractor, a North Carolina licensed home inspector, a *registered design professional*, a certified *BPI Envelope Professional* or a certified *HERS rater*. A single point depressurization, not temperature corrected, test is sufficient to comply with this provision, provided that the duct testing fan assembly(s) has been certified by the manufacturer to be capable of conducting tests in accordance with ASTM E1554—07.

The duct leakage information, including duct leakage test selected and result, tester name, date, and contact information, shall be included on the certificate described in Section 401.3.

For the Test Criteria, the report shall be produced in the following manner: perform the HVAC system air leakage test and record the CFM25. Calculate the total square feet of Conditioned Floor Area (CFA) served by that system. Multiply CFM25 by 100, divide the result by the CFA and record the result. If the result is less than or equal to 5 CFM25/100SF for the Total duct leakage test or less than or equal to 4 CFM25/100SF for the "Duct leakage to the outside" test, then the HVAC system air tightness is acceptable.

Complete one duct leakage report for each HVAC system serving the home:

Property Address: \_\_\_\_\_

Test Performed: Total duct leakage or Duct leakage to the outside **(circle one)**

HVAC System Number: \_\_\_\_\_ Describe area of home served: \_\_\_\_\_

CFM25 Total \_\_\_\_\_ Conditioned Floor Area (CFA) served by system: \_\_\_\_\_ s.f.

CFM25 × 100 divided by CFA = \_\_\_\_\_ CFM25/100SF (e.g. 100 CFM25 × 100/ 2,000 CFA = 5 CFM25/100SF)

Fan attachment location \_\_\_\_\_

Company Name \_\_\_\_\_

Contact Information: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Signature of Tester

\_\_\_\_\_  
Date

Permit Holder, NC Licensed General Contractor, NC Licensed HVAC Contractor, NC Licensed Home Inspector,  
*Registered Design Professional, Certified BPI Envelope Professional, or Certified HERS Rater*  
**(circle one)**