

APPENDIX 3

SAMPLE WORKSHEETS FOR RESIDENTIAL AIR AND DUCT LEAKAGE TESTING

APPENDIX 3A Air sealing: Visual inspection option (Section 402.4.2.1) Sample Worksheet

402.4.2 Air sealing. Building envelope air tightness shall be demonstrated by Section 402.4.2.1 or 402.4.2.2.

402.4.2.1 Visual inspection option. Building envelope tightness shall be considered acceptable when items providing insulation enclosure in Section 402.2.12 and air sealing in Section 402.4.1 are addressed and when the items listed in Table 402.4.2, applicable to the method of construction, are certified by the by the builder, permit holder or registered design professional via the certificate in Appendix 1.1.

**TABLE 402.4.2
AIR BARRIER INSPECTION**

| COMPONENT | CRITERIA |
|---|--|
| Ceiling/attic | Sealants or gaskets provide a continuous air barrier system joining the top plate of framed walls with either the ceiling drywall or the top edge of wall drywall to prevent air leakage. Top plate penetrations are sealed. For ceiling finishes that are not air barrier systems such as tongue-and-groove planks, air barrier systems,(for example, taped house wrap), shall be used above the finish Note: It is acceptable that sealants or gaskets applied as part of the application of the drywall will not be observable by the code official |
| Walls | Sill plate is gasketed or sealed to subfloor or slab. |
| Windows and doors | Space between window and exterior door jambs and framing is sealed. |
| Floors (including above-garage and cantilevered floors) | Air barrier system is installed at any exposed edge of insulation. |
| Penetrations | Utility penetrations through the building thermal envelope, including those for plumbing, electrical wiring, ductwork, security and fire alarm wiring, and control wiring, shall be sealed. |
| Garage separation | Air sealing is provided between the garage and conditioned spaces. An air barrier system shall be installed between the ceiling system above the garage and the ceiling system of interior spaces. |
| Duct boots | Sealing HVAC register boots and return boxes to subfloor or drywall. |
| Recessed lighting | Recessed light fixtures are air tight, IC rated, and sealed to drywall. Exception—fixtures not penetrating the building envelope. |

Property Address:

402.4.2.1 Visual inspection option

The inspection information including tester name, date, and contact shall be included on the certificate described in Section 401.3.

Signature

Date

APPENDIX 3B
Air sealing: Testing option (Section 402.4.2.2)
Sample Worksheet

402.4.2 Air sealing. Building envelope air tightness shall be demonstrated by Section 402.4.2.1 or 402.4.2.2.

402.4.2.2 Testing option. Building envelope tightness shall be considered acceptable when items providing insulation enclosure in Section 402.2.12 and air sealing in Section 402.4.1 are addressed and when tested air leakage is less than or equal to one of the two following performance measurements:

1. 0.30 CFM50/Square Foot of Surface Area (SFSA) or
2. Five (5) air changes per hour (ACH50)

When tested with a blower door fan assembly, at a pressure of 33.5 psf (50 Pa). A single point depressurization, not temperature corrected, test is sufficient to comply with this provision, provided that the blower door fan assembly has been certified by the manufacturer to be capable of conducting tests in accordance with ASTM E 779-03. Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation and combustion appliances. Testing shall be reported by the permit holder, a NC licensed general contractor, a NC licensed HVAC contractor, a NC licensed Home Inspector, a registered design professional, a *certified BPI Envelope Professional* or a *certified HERS rater*.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed;
2. Dampers shall be closed, but not sealed, including exhaust, backdraft, and flue dampers;
3. Interior doors shall be open;
4. Exterior openings for continuous ventilation systems, air intake ducted to the return side of the conditioning system, and energy or heat recovery ventilators shall be closed and sealed;
5. Heating and cooling system(s) shall be turned off; and
6. Supply and return registers shall not be sealed.

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

For Test Criteria 1 above, the report shall be produced in the following manner: Perform the blower door test and record the *CFM50* _____. Calculate the total square feet of surface area for the building thermal envelope, all floors, ceilings, and walls (this includes windows and doors) and record the area _____. Divide *CFM50* by the total square feet and record the result below. If the result is less than or equal to [**0.30 CFM50/SFSA**] the envelope tightness is acceptable; or

For Test Criteria 2 above, the report shall be produced in the following manner: Perform a blower door test and record the *CFM50* _____. Multiply the *CFM50* by 60 minutes to create *CFHour50* and record _____. Then calculate the total conditioned volume of the home and record _____. Divide the *CFHour50* by the total volume and record the result below. If the result is less than or equal to [**5 ACH50**] the envelope tightness is acceptable.

Property Address: _____

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)

APPENDIX 3C
Duct sealing: Duct air leakage test (Section 403.2.2)
Sample Worksheet

N1103.2.2 Sealing. All ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed. Joints and seams shall comply with Section 603 of the *NC Mechanical Code*.

Duct tightness shall be verified as follows:

Total duct leakage less than or equal to 6 CFM (18 L/min) per 100 ft² (9.29 m²) 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, the ventilation air duct 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.
3. Supply boots or registers and return boxes or grilles shall be taped, plugged, or otherwise sealed air tight.
4. 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.
5. Specific instructions from the duct testing equipment manufacturer shall be followed to reach duct test pressure and measure duct air leakage.

Testing shall be performed and reported by the permit holder, a NC licensed general contractor, a NC licensed HVAC contractor, a NC 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 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 result, tester name, date, company 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 [6 CFM25/100 SF] the HVAC system air tightness is acceptable.

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

Property Address: _____

HVAC System Number: _____ Describe area of home served: _____

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

CFM25 x 100 divided by CFA = _____ CFM25/100SF (e.g. 100 CFM25 x 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)