

City of Fort Collins Residential Air Tightness Testing Protocol,

***New Buildings or Attached and Detached Single Family Dwellings***

**Approved Testers**

Test results will only be accepted from individuals that hold any of the following certifications: RESNET Rater or RFI, BPI Building Analyst or BPI IDL, or other building performance professional approved by the Building Official.

**Building or dwelling unit air leakage testing code reference**

2021 International Energy Conservation Code (IECC) as amended by the City of Fort Collins. Section **R402.4.1.2 Testing**. Testing is required for all residential energy code compliance paths and for all residential buildings and dwelling units.

**Testing protocol**

* A multi-point air tightness test shall be conducted based on the ANSI/Residential Energy Services Network [(ANSI/RESNET)/ICC 380](https://www.resnet.us/wp-content/uploads/ANSIRESNETICC_380-2019_vf1.24.19_cover%5E0TOC-2.pdf) or [RESNET Standard 800](https://www.resnet.us/wp-content/uploads/Chapter-Eight-22RESNET-Standard-for-Performance-Testing-and-Work-Scope-Enclosure-and-Air-Distribution-Leakage-Testing22.pdf), Section 802, Procedures for Building Enclosure Air Tightness Testing.
* The multi-point airtightness test shall be conducted per in section 4.4.2 Multi-Point Airtightness Test of (ANSI/RESNET)/ICC 380 *or* section 802.6 Procedure for Conducting a Multi-Point Airtightness Test of RESNET Standard Chapter 8.

**Compliance requirement**

The building or dwelling unit air change rate shall not exceed 3.0 ACH50 *or* 0.16 CFM per square foot (sq ft) of *dwelling unit enclosure area* when tested at a 50 Pascal (Pa) test pressure.

**Submittal requirement**

Output from the blower door testing / analysis software showing, at a minimum, the following information:

* Building address
* Date of test
* Test technician\* and company conducting the test
* Building volume (cubic feet) and/or sq ft of dwelling unit enclosure area that encloses the building thermal envelope as defined within the IECC.
* Building leakage rate at 50 Pa test pressure (corrected CFM50)
* Percent uncertainty in the corrected CFM50, at the 95% confidence level (+/- 5%)\*\*
* Building air change rate at 50 Pa test pressure (ACH50 = CFM50 x 60/volume) *or* (CFM50 / sq ft dwelling unit enclosure area)

\*The tester must be identified on the software report. This info may be handwritten on the report.

\*\*If uncertainty exceeds this limit, use Section 802.8.1 of RESNET Standard 800 to calculate an adjusted CFM50 and adjust the ACH50 result. This may be handwritten on the report.

**Note**

An example of measurement software meeting the requirements above is TECTITE, published by ‘The Energy Conservatory’. TEC software options are available at [www.energyconservatory.com](http://www.energyconservatory.com).

**Attached garage isolation**

Isolation testing of attached garages from adjoining conditioned areas shall be verified in accordance with the following:

**Testing protocol**

* Set up the building in accordance with the testing protocol for building or dwelling unit air leakage above.
* Garage doors to the exterior shall be closed.
* Place a pressure tap in the garage and close the door between house and garage, without crimping the sensing tube (recommendation: use rigid metal tube where it passes through doorway).
* Adjust the blower door fan speed such that the building interior is depressurized to -50 Pa with respect to (WRT) the outdoors.
* Measure the house pressure (Pa) WRT the garage.

***NOTE:*** Where tested pressure falls below -45 Pa the tester may proceed with “Open a Door” test below.

**Testing Protocol – Open a Door**

* Follow the above “Testing Protocol” again and note the Pa WRT garage.
* Using the tables below, locate and note the “multiplier” that corresponds to the Pa WRT garage from above. *Ex: if the house Pa WRT garage is 36 the multiplier will be 0.96.*
* Note the house CFM50 with door from house to garage closed.
* Open the door from house to garage and return the building to -50 Pa WRT outdoors making note of the house CFM50 with door from house to garage open.
* Subtract the CFM50 with door from house to garage closed from the CFM50 with door to garage open.
* Multiply the difference between the two CFM50 numbers by the “multiplier” from step two.
* If the result is less than or equal to 100 CFM the house WRT garage passes.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Pa WRT garage (step 1 above) | Multiplier |  | Pa WRT garage (step 1 above) | Multiplier |  | Pa WRT garage (step 1 above) | Multiplier |
| 44 | 0.37 | 34 | 1.17 | 24 | 3.04 |
| 43 | 0.43 | 33 | 1.29 | 23 | 3.36 |
| 42 | 0.49 | 32 | 1.42 | 22 | 3.73 |
| 41 | 0.56 | 31 | 1.56 | 21 | 4.14 |
| 40 | 0.63 | 30 | 1.71 | 20 | 4.61 |
| 39 | 0.70 | 29 | 1.88 | 19 | 5.15 |
| 38 | 0.78 | 28 | 2.07 | 18 | 5.77 |
| 37 | 0.87 | 27 | 2.27 | 17 | 6.50 |
| 36 | 0.96 | 26 | 2.50 | 16 | 7.36 |
| 35 | 1.06 | 25 | 2.76 | 15 | 8.38 |

**Compliance and submittal requirement**

The house pressure with respect to the garage shall be in the range of -45 to -50 Pa, or the Open a Door test shall be less than or equal to 100 CFM. Record the test result on the report using “House pressure WRT garage = \_X\_ Pa”. ‘X’ being the pressure measurement. Or record the Open a Door test result using “Open a Door = \_X\_CFM”. ‘X’ being the CFM measurement. This may be recorded within the *‘Comments’* section of TECTITE. *Example below.*

**Rooms containing fuel-burning appliances isolation**

Where open combustion air ducts provide combustion air to open combustion fuel-burning appliances, the appliances and combustion air opening shall be located outside the building thermal envelope or enclosed in a room that is isolated from inside the thermal envelope.

**Testing protocol**

* Set up the building in accordance with the protocol for whole-house air leakage, above.
* Place a pressure tap in the mechanical room and close the door between house and mechanical room, without crimping the sensing tube (recommendation: use rigid metal tube where it passes through doorway).
* Adjust the blower door fan speed to so that the building interior is depressurized to -50 Pascals with respect to the outdoors.
* Measure the house pressure with respect to the mechanical room.

**Compliance and submittal requirement**

The house pressure with respect to the mechanical room shall be in the range of -45 to -50 Pa.

Record the test result on the report using “House pressure WRT mechanical room = \_X\_ Pa”. ‘X’ being the pressure measurement. This may be recorded within the *‘Comments’* section of TECTITE. *Example below.* Natural draft appliances must also pass a Combustion Safety Test.

*Example:*