

Test 2: Duct Leakage

Build Equinox recommends the following rough-in duct *leakage* performance test for supply and return ventilation ducts. The leakage test procedure is the same as the performance test except that all duct outlets/inlets are sealed.

The leakage test consists of the following steps:

- 1) Tightly seal all duct inlets and outlets.
- 2) Connect fan with air flow measurement and pressure measurement sensors to the section of duct to be tested
- 3) Switch fan “on”, and adjust fan speed (if speed adjustment is available) to desired level
- 4) Record fan air flow and duct pressure
 - a. If fan speed variation is available, record 2 or 3 air flow and pressure levels

Calculate the “C” value as: $C = Q / DP^{0.57}$

Where DP = static pressure drop across duct length (“H₂O)

Q = air flow (cfm, cubic feet per minute)

C = duct system coefficient

- b. Note that pressure will be positive (fan discharge pressure) for supply ducts and pressure will be negative (fan inlet pressure) for return ducts. Use the absolute pressure reading (ignore the negative sign for return ducts)
 - c. Figure 1 can be used to determine the leakage C value directly from air flow (cfm) and duct pressure (“H₂O) measurements
 - a. If multiple fan air flow rate tests are conducted, average the C values
 - 5) Figure 2 describes the leakage of the duct system. C values less than 40 indicate well sealed ducts while C values greater than 60 indicate excessive air leakage.
 - a. The ratio of the duct leakage C value to the duct performance C value provides an estimate of the fraction of air leakage to desired duct air flow.
 - i. A duct performance C value of 1000 with a duct leakage C value of 50 has an air flow leakage fraction of $50/1000 = 0.05$, indicating 5% of the duct air flow is leaked (leakage air into return ducts, or leakage air loss from supply ducts)
 - ii. Note that leakage for ducts kept within the thermal envelope of a home are less serious (but still important) than ducts in unconditioned attics, crawl spaces or other spaces

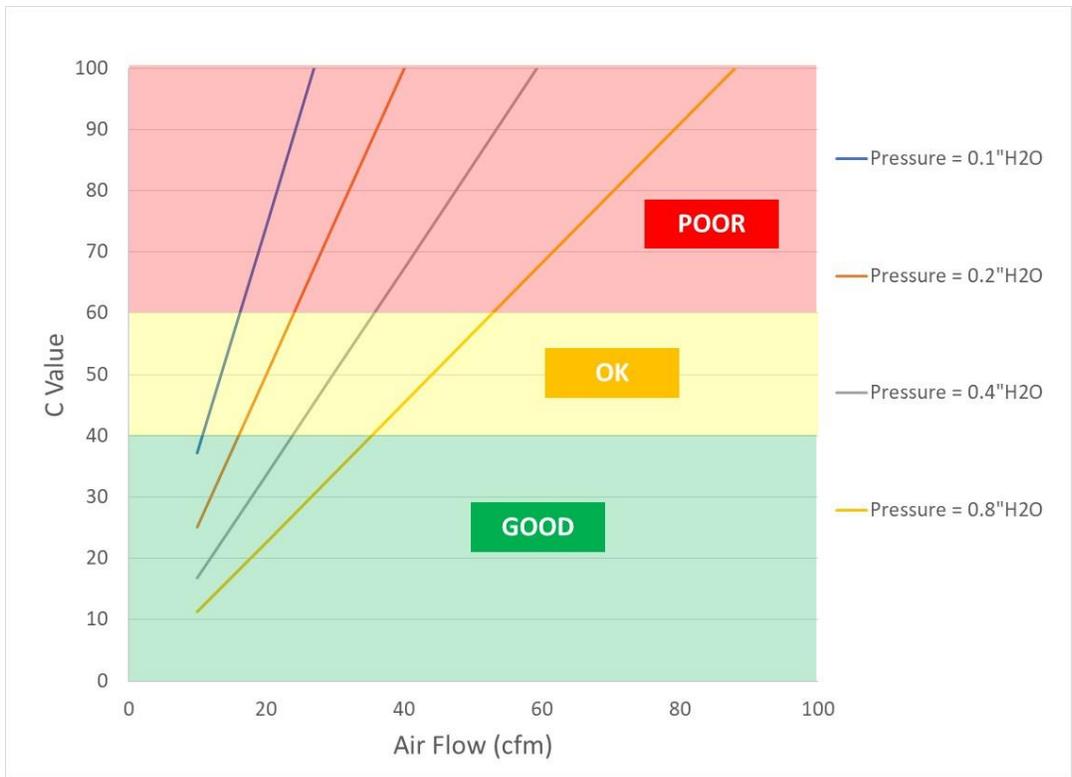


Figure 1 Duct leakage test C value plot based on air flow (cfm) and pressure ("H₂O).

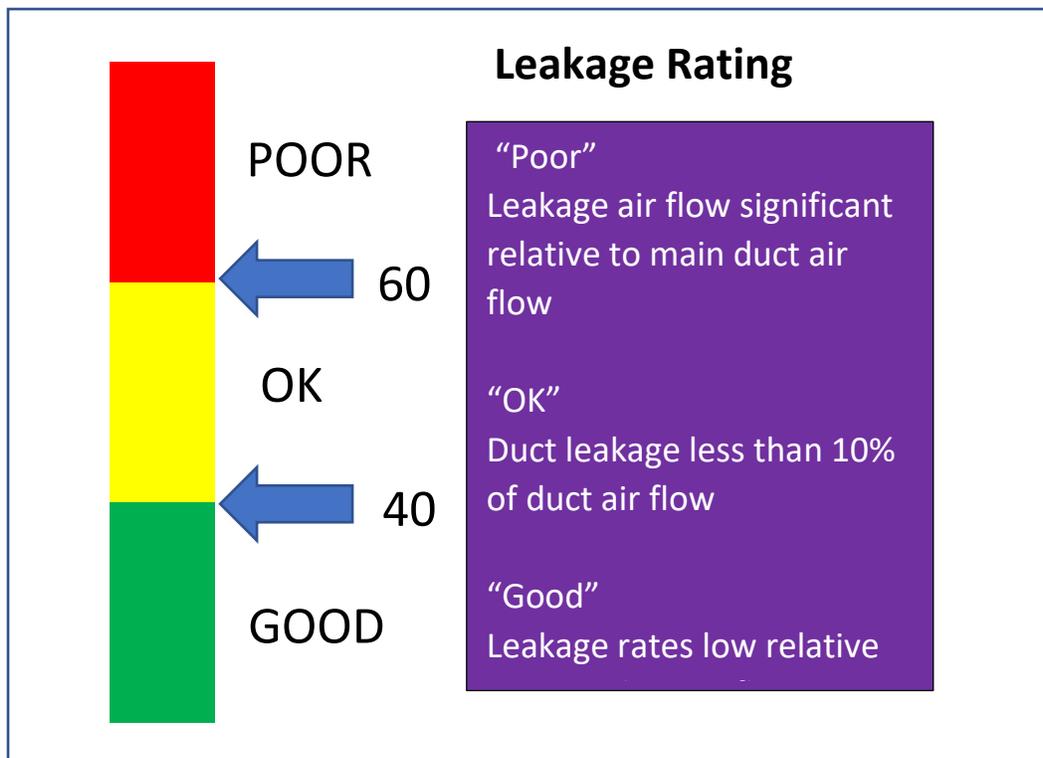


Figure 2 Duct leakage test scale.