Test 1: Duct System Performance

Build Equinox recommends performing the following "rough-in" duct test on supply and return ventilation ducts prior to installing air handlers or fresh air ventilation units.

The performance test consists of the following steps:

1) Connect fan with air flow measurement and pressure measurement sensors to the duct network (supply or return) to be tested
2) Switch the fan "on", and adjust fan speed (if speed adjustment is available) to desired level
3) Balance registers to desired air flow levels
    a. "Relative" air flow balancing can be used when the performance test air flow is different than design air flow. For example, if test air flow is 400cfm and design air flow is 200cfm, an outlet with a design air flow of 50cfm (25% of 200cfm) should have 100cfm (25% of 400cfm) for the performance test.
    b. Air flow direction for the test should be the same as operational air flow direction. Supply duct systems will have air blown into the supply trunk while return duct systems pull air through the duct network
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 ("H_2O)

       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 C value directly from air flow (cfm) and duct pressure ("H_2O) measurements
    d. If multiple fan air flow rate tests are conducted, average the C values
5) Figure 2 describes the performance of the duct system.
    a. C values greater than 1000 indicate good air flow performance for systems with ventilation air flow rates up to 300cfm.
    b. C values above 500 are reasonable for ventilation air flows of 150cfm or less.
    c. C values below 500 indicate restricted duct air flow capability with high fan power requirements for residential fresh air ventilation.

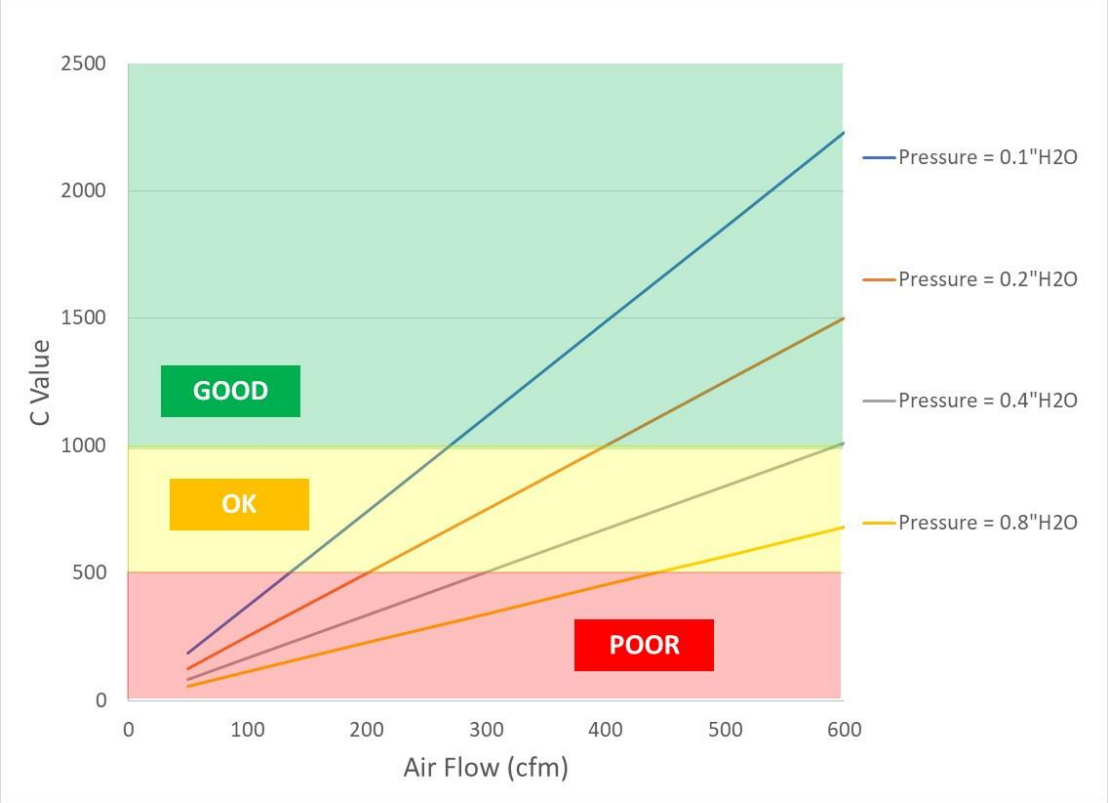

Figure 1 Duct system performance test C value plot based on air flow (cfm) and pressure ("H_2O).

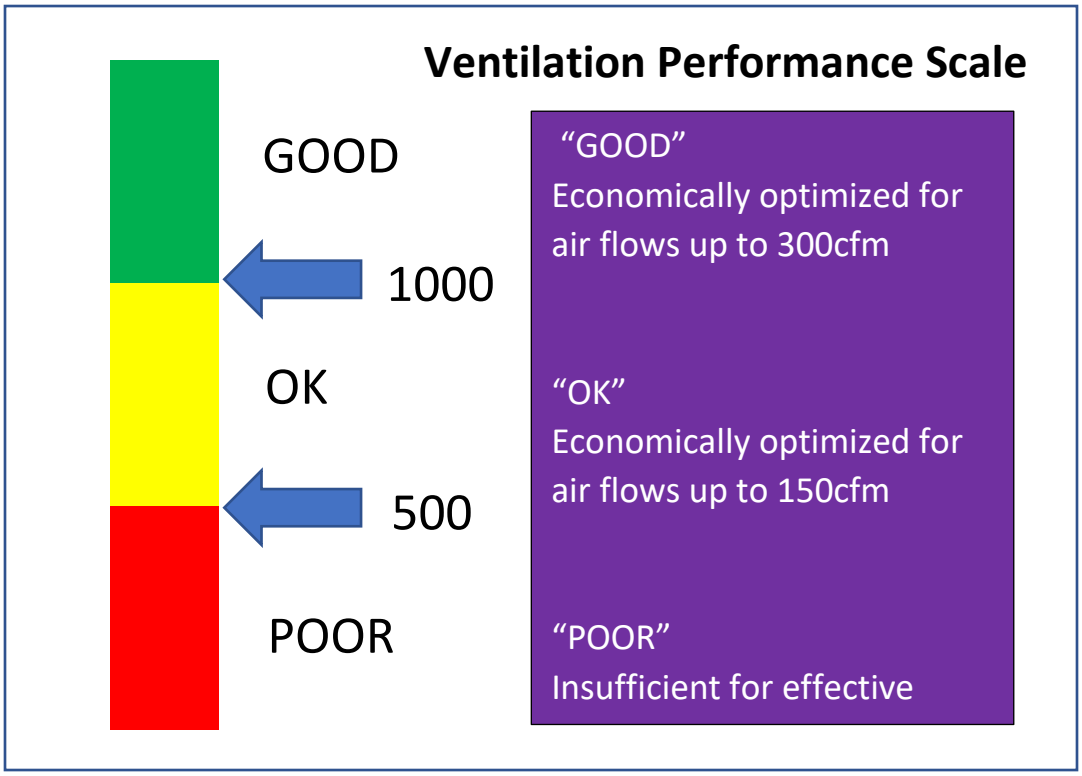

Figure 2 Duct performance test scale.