

**WAC 51-11C-40327 Section C403.2.8—Duct and plenum insulation and sealing.**

**C403.2.8 Duct and plenum insulation and sealing.**

**C403.2.8.1** Ducts, shafts and plenums conveying outdoor air from the exterior of the building to the mechanical system shall meet all air leakage and building envelope insulation requirements of Section C402, plus building envelope vapor control requirements from the *International Building Code*, extending continuously from the building exterior to an automatic shutoff damper or heating or cooling equipment. For the purposes of building envelope insulation requirements, duct surfaces shall meet the requirements for metal framed walls per Table C402.1.4. Duct surfaces included as part of the building envelope shall not be used in the calculation of maximum glazing area as described in Section C402.4.1.

EXCEPTIONS: 1. Outside air ducts serving individual supply air units with less than 2,800 cfm of total supply air capacity, provided these are insulated to R-7.  
2. Unheated equipment rooms with combustion air louvers, provided they are isolated from conditioned space at sides, top and bottom of the room with R-11 nominal insulation.

**C403.2.8.2** All other supply and return air ducts and plenums shall be insulated with a minimum of R-6 insulation where located in unconditioned spaces and where located outside the building with a minimum of R-8 insulation in Climate Zone 4 and R-12 insulation in Climate Zone 5. Where located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by minimum insulation value as required for exterior walls by Section C402.1.3.

EXCEPTIONS: 1. Where located within equipment.  
2. Where the design temperature difference between the interior and exterior of the duct or plenum does not exceed 15°F (8°C).

Where located within conditioned space, supply ducts which convey supply air at temperatures less than 55°F or greater than 105°F shall be insulated with a minimum of R-3.3 insulation.

EXCEPTION: Ductwork exposed to view within a zone that serves that zone is not required to be insulated.

All ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with Section 603.9 of the *International Mechanical Code*.

**C403.2.8.3 Duct construction.** Ductwork shall be constructed and erected in accordance with the *International Mechanical Code*.

**C403.2.8.3.1 Low-pressure duct systems.** All longitudinal and transverse joints, seams and connections of supply and return ducts operating at a static pressure less than or equal to 2 inches water gauge (w.g.) (500 Pa) shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus embedded-fabric systems or tapes installed in accordance with the manufacturer's installation instructions. Pressure classifications specific to the duct system shall be clearly indicated on the construction documents in accordance with the *International Mechanical Code*.

EXCEPTION: Continuously welded and locking-type longitudinal joints and seams on ducts operating at static pressures less than 2 inches water gauge (w.g.) (500 Pa) pressure classification.

**C403.2.8.3.2 Medium-pressure duct systems.** All ducts and plenums designed to operate at a static pressure greater than 2 inches water gauge (w.g.) (500 Pa) but less than 3 inches w.g. (750 Pa) shall be insulated and sealed in accordance with Section C403.2.7. Pressure classifications specific to the duct system shall be clearly indicated on the construction documents in accordance with the *International Mechanical Code*.

**C403.2.8.3.3 High-pressure duct systems.** Ducts designed to operate at static pressures in excess of 3 inches water gauge (w.g.) (750 Pa) shall be insulated and sealed in accordance with Section C403.2.8. In addition, ducts and plenums shall be leak-tested in accordance with the SMACNA *HVAC Air Duct Leakage Test Manual* and shown to have a rate of air leakage (*CL*) less than or equal to 4.0 as determined in accordance with Equation 4-9.

**(Equation 4-9)**

$$CL = F/P^{0.65}$$

Where:

*F* = The measured leakage rate in cfm per 100 square feet of duct surface.

*P* = The static pressure of the test.

Documentation shall be furnished by the designer demonstrating that representative sections totaling at least 25 percent of the duct area have been tested and that all tested sections meet the requirements of this section.

[Statutory Authority: RCW 19.27A.025, 19.27A.160, and 19.27.074. WSR 16-03-072, § 51-11C-40327, filed 1/19/16, effective 7/1/16. Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, § 51-11C-40327, filed 2/1/13, effective 7/1/13.]