

Item 4b, July 10 HVAC Board Meeting
(revision of IMC Table 603.4)

Although it's no doubt desirable to allow 30 gauge fittings and pipe for residential ductwork, I believe it is really unnecessary to present this as an issue to the State Legislature.

The issue can far more easily be resolved by the method suggested in the accompanying page from the 2012 IMC Commentary that specifically addresses the matter.

Basically, the suggestion offered is that code officials can approve duct metallic ducts that can be considered equivalent to flexible, nonmetallic ducts that meet UL Standard 181, since such flex ducts are code-approved for any residential installation.

I believe all Board members and DBS personnel would readily acknowledge the even 30 gauge metallic ducts is equal to, if not superior, to flex duct in the matters of fire resistance, corrosion/erosion resistance, mold growth and humidity resistance along with structural integrity.

As for the matter of whether or not local city or county jurisdictions will follow the same policy, many already do, and for any that insist on heavier gauge residential ducts, a State amendment to IMC Table 603.4 would not be binding upon them anyway, since they are allowed to be stricter than the State Statute.

dehumidification and excess energy losses. This section does not include prescriptive sizing requirements, but directs the user to the applicable industry standard, depending on whether the system to be sized is residential or commercial. It is important to note that the design objectives and criteria are significantly different for residential and commercial duct systems, making it critical to choose the proper industry standard for duct sizing. For example, ACCA Manual D limits the velocity in a residential duct system to 900 feet per minute (4.6 m/s). The velocity in a commercial duct system can be much higher. The designer must submit documentation that a system has been sized in an approved manner.

603.3 Duct classification. Ducts shall be classified based on the maximum operating pressure of the duct at pressures of positive or negative 0.5, 1.0, 2.0, 3.0, 4.0, 6.0 or 10.0 inches (1 inch w.c. = 248.7 Pa) of water column. The pressure classification of ducts shall equal or exceed the design pressure of the air distribution in which the ducts are utilized.

❖ The pressure classification of ducts must equal or exceed the static pressure of the air distribution system in which the ducts will be installed to reduce air leakage and the possibility of developing a structural failure in the air distribution ductwork. The classification is based on the maximum positive or negative operating pressure the duct is designed to withstand, ranging from 0.5 to 10 inches of water column (0.12 to 63 kPa). Excessive positive or negative pressures can cause a duct or plenum to rupture, deform or collapse.

The static pressure is established by the designer of the air distribution system and should be stated on the plans and specifications. Ducts that are identified as complying with UL 181 will be marked to indicate their positive or negative pressure classification and velocity rating. Ducts that are fabricated in the field may not be so marked.

Duct construction must conform to the requirements of SMACNA *HVAC Duct Construction Standards—Metal and Flexible*, or SMACNA *Fibrous Glass Duct Construction Standards*, which state duct thicknesses and bracing requirements based on static pressure requirements of the system and include pressure and velocity limits.

603.4 Metallic ducts. All metallic ducts shall be constructed as specified in the SMACNA *HVAC Duct Construction Standards—Metal and Flexible*.

Exception: Ducts installed within single dwelling units shall have a minimum thickness as specified in Table 603.4.

❖ Metallic ducts are usually constructed using galvanized sheet steel. Duct size is based on required airflow, system pressure, flow velocity and pressure losses caused by friction. Duct material thickness is determined by duct size, static pressure of the system, distance between supports and whether the duct is reinforced. Metallic ducts must be constructed with the minimum thicknesses specified in the SMACNA *HVAC Duct Construction Standards—Metal and Flexible*, which bases the minimum required duct thickness on the geometry of the duct, the material used and the major dimension of the duct (the diameter for round ducts, and the widest side for rectangular ducts). In addition to those parameters, the SMACNA standard also includes such necessary information as the design static pressure of the air distribution system and whether reinforcement is required for duct support.

⌈ Metallic rigid air ducts could be approved by the code official in accordance with Section 105.2 if the ducts have been shown to meet the requirements of UL 181 for a Class 0 or Class 1 rigid air duct (see commentary, Section 603.5). Although UL 181 is used primarily to evaluate nonmetallic duct materials, the use of the standard for evaluating metallic ductwork is not precluded by its scope. UL 181 tests samples of the duct to determine fire performance characteristics; corrosion and erosion resistance; leakage resistance; mold growth and humidity resistance; and structural integrity. Air ducts that conform to the requirements of UL 181 are identified by the manufacturer's or vendor's name, rated velocity and rated negative and positive pressures.

Metallic ducts must be constructed to comply with the requirements contained in SMACNA *HVAC Duct Construction Standards—Metal and Flexible*. Besides the minimum thicknesses of duct materials required, this standard contains information on duct reinforcement, joints, fittings, hangers and supports and other

**TABLE 603.4
DUCT CONSTRUCTION MINIMUM SHEET METAL THICKNESSES FOR SINGLE DWELLING UNITS**

DUCT SIZE	GALVANIZED		ALUMINUM MINIMUM THICKNESS (in.)
	Minimum thickness (in.)	Equivalent galvanized gage no.	
Round ducts and enclosed rectangular ducts			
14 inches or less	0.0157	28	0.0175
16 and 18 inches	0.0187	26	0.018
20 inches and over	0.0236	24	0.023
Exposed rectangular ducts			
14 inches or less	0.0157	28	0.0175
Over 14 inches ^a	0.0187	26	0.018

For SI: 1 inch = 25.4 mm, 1 inch water gage = 249 Pa.

a. For duct gages and reinforcement requirements at static pressures of 1/2-inch, 1-inch and 2-inch w.g., SMACNA *HVAC Duct Construction Standards*, Tables 2-1, 2-2 and 2-3, shall apply.