



Specification ID Phenolic Conduit

I. References

When a standard or other referenced document referred to in this specification is superseded by an approved revision, the revision shall apply.

II. Manufacturing

The phenolic fiberglass conduit shall be manufactured by applying single circuit winding. Conduit shall be wound on steel mandrels at a helix winding angle to the longitudinal axis appropriate to produce conduit that meets the physical requirements of this specification. Mandrels shall be straight and true so as to produce a non-tapered conduit. Tapering is allowed at the belled end. The resin system shall be phenol based. The fiberglass shall consist of continuous E-glass roving. All conduits shall be natural colored dark reddish.

The conduit shall be free from all defects including indentations, delamination, pinholes, foreign inclusions, and resin-starved areas. The conduit shall be round. The bore of the conduit shall be smooth and uniform. All conduit ends shall be cut at right angles to the axis of the conduit. Conduit shall be supplied with either an integral wound bell or adhered coupling on one end and a machined spigot on the other end.

The conduit shall not be manufactured with a condensation reaction of phenol and formaldehyde. This is so that there is no residual formaldehyde or any corrosive by-product.

III. Dimensions

All conduits from 3/4" – 8" shall conform to the following table. Dimensions are nominal. Nominal wall thickness shall be as noted.

Nominal Size	Nominal OD (in.)	Nominal OD (mm)	Nominal Min ID (in.)	Nominal Min ID (mm)	Nominal Wall Thickness (in.)	Nominal Wall Thickness (mm)
2" SW	2.140	54	2.000	51	.070	2
2-1/2" SW	2.640	67	2.500	64	.070	2
3" SW	3.140	80	3.000	76	.070	2
3-1/2" SW	3.640	92	3.500	89	.070	2
4" SW	4.140	105	4.000	101	.070	2
4" HW	4.192	106	4.000	101	.096	2



Nominal Size	Nominal OD (in.)	Nominal OD (mm)	Nominal Min ID (in.)	Nominal Min ID (mm)	Nominal Wall Thickness (in.)	Nominal Wall Thickness (mm)
4-1/2" SW	4.640	118	4.500	114	.070	2
4-1/2" HW	4.692	119	4.500	114	.096	2
5" MW	5.192	131	5.000	127	.096	2
5" HW	5.220	132	5.000	127	.110	3
6" MW	6.192	157	6.000	157	.096	2
6" HW	6.220	158	6.000	157	.110	3
8" MW	8.220	209	8.000	209	.110	3
8" HW	8.250	210	8.000	209	.125	3

IV. Characteristics

Property	Value	Testing Method
Temperature Range	-60°F to +1850°F	ASTM E119 (1850°F 2 hours)
Vertical Flame Test FT4	passed	CSA 22.2
Surface Flammability	<2	ASTM E162
Tunnel Test, Flame Spread	<1	ASTM E84
Tunnel Test, Smoke Density	<1	ASTM E84
Tensile strength, ultimate	7,000 psi	ASTM D2105
Dielectric Strength	150 volts/mil	ASTM D149
Smoke Density, $D_{S4 \text{ min}}$	<1	ASTM E662
Smoke Density, D_{max} flaming	<30	ASTM E662
Smoke Density, D_{max} non-flaming	<20	ASTM E662
Water Absorption	<1.0%	ASTM D570
Coefficient of Thermal Expansion	0.51×10^{-5} in/in/°F	ASTM D696
Specific Gravity	1.70-1.75	ASTM D792
Barcol Hardness	68-72	ASTM D2583
Glass Content	65-75%	API 15LR
Modulus of Elasticity	$1.2 \times 10^{+6}$ psi	ASTM D2105

V. Adhesive System

A one part alumina based high temperature adhesive shall be applied to the spigot end for joining the conduits or for joining a conduit and a fitting together. Apply a thin layer (5-15 mils) to the spigot end using a brush, spatula, or dispenser. Adhesive will bond at ambient temperatures. Higher strength will develop if the bond is heated to 200°F.



VI. Toxicity

The conduit shall not contain any compounds that can release halogens, i.e. chlorine, bromine, fluorine, and iodine, in more than trace amounts when burning. The following shall be the maximum values when tested in accordance to ASTM E-800:

Gases	Values (max p.p.m.)
Hydrogen Chloride	0
Hydrogen Bromide	0
Hydrogen Cyanide	< 1
Hydrogen Sulfide	0
Ammonia	0
Oxides of Nitrogen	< 5
Carbon Dioxide	< 10,500
Carbon Monoxide	< 350

VII. Fittings

All elbows and fittings shall be manufactured from the same process, methods and chemicals as the conduit, or by using a phenol based compression molding process (Sheet Molding Compound) or by using machined and heat resistant coated epoxy based fiberglass.

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