

GENERAL

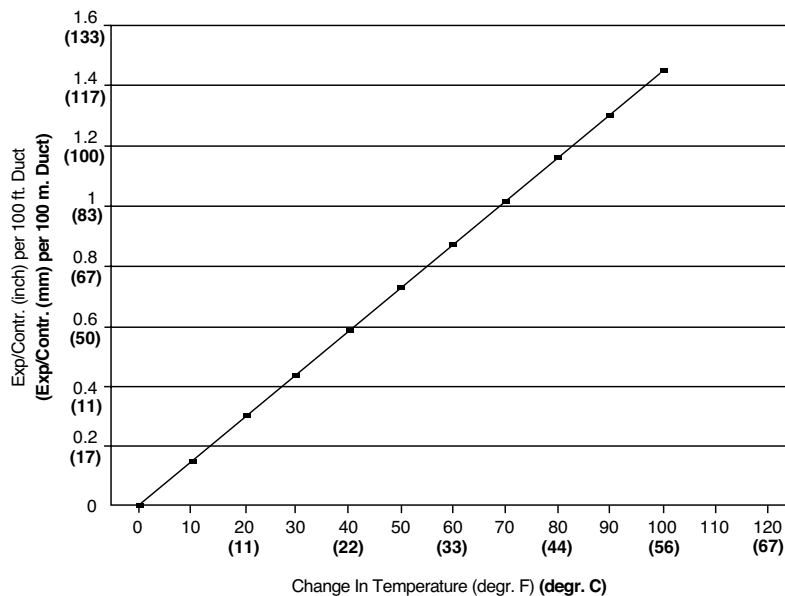
- Conduit shall be fiberglass reinforced epoxy as manufactured by Champion Fiberglass, Inc. using the filament winding process.
- Conduit, elbows and fittings shall be manufactured from the same resin/hardener/glass systems manufactured by the same filament wound system.
- Conduit shall be integral bell and spigot.
- Conduit, elbows and fittings are specified for use throughout a temperature range of -60°F **(-51°C)** to 250°F **(121°C)**.
- Resin systems shall be epoxy with no fillers.
- Glass used shall be E-type.

ELECTRICAL PROPERTIES

• Volume Resistivity	3.8 x 10 ¹⁴ ohm-cm	ASTM D 257
• Surface Resistivity	1.1 x 10 ¹⁴ ohms	ASTM D 257
• Dielectric Constant	3.5 (at 10 ³ cps)	ASTM D 150
• Dissipation Factor	0.005 (at 10 ³ cps)	ASTM D 150
• Dielectric Strength	500 volts/mil. (19.7 kv/mm)	ASTM D 149

PHYSICAL AND MECHANICAL PROPERTIES

• Tensile Strength (Axial)	11,000 psi (76 MPa)	ASTM D 2105
• Compressive Strength (Axial)	12,000 psi (83 MPa)	ASTM D 695
• Ultimate Elongation	2% psi (9.6 GPa)	ASTM D 2105
• Modulus of Elasticity (4" conduit)	1.4 X 10 ⁺⁶ psi (9.6 GPa)	ASTM D 2105
• Thermal Conductivity	2.0 BTU/(ft ²)(hr.)(°F/in) (0.3 W/mk)	ASTM D 5930-01
• Specific Gravity	1.9	ASTM D 792
• Glass Content	70% ± 5%	API SPEC 15 LR
• Water Absorption	Less than 1%	ASTM D 570
• Barcol Hardness	54 ± 2	ASTM D2583
• Flammability Above Ground Conduit	Conform to UL 1684 A	
• Coefficient of Thermal Expansion	1.2 x 10 ⁻⁵ in/in/°F (2.2 10⁻⁵ m/m/°C)	ASTM D 696



HEAT DISTORTION

The minimum heat distortion temperature shall be 230°F (**110°C**) when tested at 264 psi in accordance with ASTM D 648.

JOINT PULLOUT

A 12-inch length shall be cut from both the belled end and spigot end of a length of conduit. The two parts shall be assembled in accordance with Champion's instructions. The assembly shall be tested in accordance with ASTM D 2105 and shall meet the requirements of the table below.

Resistance Minimum Force - lbs (N)	
Nominal Size	Tight Lock Joints (Adhesive)
All	11,000 psi x (cross sectional area of conduit)

TOXICITY

CHAMPION HAZ DUCT conduit does not contain any compounds that can release halogens - bromine or chlorine - when burning.

Gases	Values (max P.P.M.)
Hydrogen Chloride	0
Hydrogen Bromide	0
Hydrogen Cyanide	<1
Hydrogen Sulphide	0
Ammonia	0
Aldehydes as HCHO	<10
Oxides of Nitrogen	<50
Carbon Dioxide	<12,500
Carbon Monoxide	<250

SURFACE FINISH

- Exterior Surface Normally less than 2,000 microinches (50.8 micron)
- Interior Surface Normally less than 125 microinches (3.2 micron)

COLOR

Standard color is black, using carbon black as pigment. Optional colors are gray, red, orange and blue.

Note: When ordering optional colors, the finished product may exhibit slight to extreme color variations.

WATER TIGHTNESS

There should be no evidence of water leakage through the joint when tested in accordance to UL 2515 and CSA C22.2 No. 2515. In order to achieve water tightness use CHAMPION MIX® or Epoxy Adhesive Kit for Tight Lock Joint. See page 22 of this catalog.

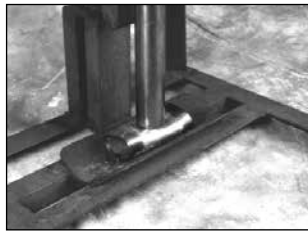
IMPACT RESISTANCE

The minimum impact resistance values for the conduit shall be as shown in the table below when tested in accordance with ASTM D2444.

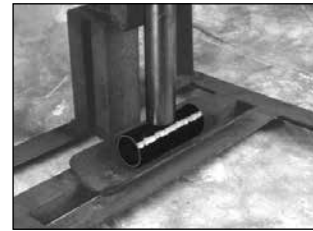
Nominal Size	At 73.4°F (23°C)	At 32°F (0°C)
	Impact Resistance lbs. ft. (Nm) XW	Impact Resistance lbs. ft. (Nm) XW
¾	150 (202)	150 (202)
1	400 (540)	400 (540)
1¼	400 (540)	400 (540)
1½	500 (675)	500 (675)
2	550 (742)	550 (742)
2½	600 (810)	600 (810)
3	700 (945)	700 (945)
3½	850 (1,150)	850 (1,150)
4	1,000 (1,350)	1,000 (1,350)
5	1,200 (1,620)	1,200 (1,620)
6	1,300 (1,755)	1,300 (1,755)



For high impact situations as well as during cold weather, PVC can shatter and/or flatten.



For high impact, steel conduit will collapse and can pinch the cable. This will make repair of damaged conduit more difficult.

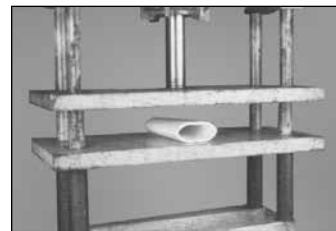


X-wall conduit has the highest impact value of all conduit materials available. If impacted, it will flex back close to its original diameter. SW, MW and HW will also flex back similarly after impact. They will not shatter.

STIFFNESS

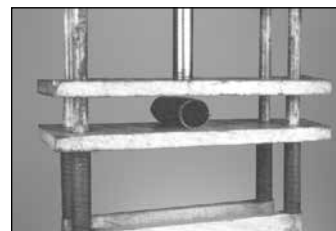
The minimum conduit stiffness at five percent deflection for all sizes of conduit shall not be less than the values given in table below when tested in accordance with ASTM D2412.

Pipe Stiffness (PS) = (F/ΔY)		
Nominal Size	At 73.4°F (23°C)	At 32°F (0°C)
	lbf/in ² (MPa) XW	lbf/in ² (MPa) XW
¾	2,500 (17.5)	2,500 (17.5)
1	2,400 (16.8)	2,400 (16.8)
1¼	2,100 (14.7)	2,100 (14.7)
1½	2,000 (14)	2,000 (14)
2	1,300 (9.0)	1,300 (9.0)
2½	800 (5.6)	800 (5.6)
3	600 (4.1)	600 (4.1)
3½	450 (3.1)	450 (3.1)
4	250 (1.7)	250 (1.7)
5	180 (1.2)	180 (1.2)
6	150 (1.0)	150 (1.0)



PVC CONDUIT

PVC conduit will stay compressed if it is crushed. (Same for steel conduit.)



FIBERGLASS CONDUIT

Champion Haz Duct conduit will flex back to almost its original shape after crushing.

WIRE FILL

Maximum allowable percentage wire fill per Table 1, Chapter 9, National Electric Code 2008

XW Sizes							
Trade Size	Internal Diameter in (mm)	Total Area sq in (sq mm)	Percent of cross section of conduit & tubing for conductors				
			1 conductor		2 conductors		Over 2 conductors
			53% fill		31% fill		40% fill
			sq in (sq mm)	sq in (sq mm)	sq in (sq mm)	sq in (sq mm)	
¾ (19)	0.910 (23)	0.650 (419)	0.345 (222)	0.202 (130)	0.260 (168)		
1 (25)	1.175 (30)	1.084 (697)	0.575 (369)	0.336 (216)	0.434 (279)		
1¼ (32)	1.520 (39)	1.815 (1170)	0.962 (620)	0.563 (363)	0.726 (468)		
1½ (38)	1.760 (45)	2.433 (1569)	1.289 (832)	0.754 (486)	0.973 (628)		
2 (51)	2.000 (51)	3.142 (2027)	1.665 (1074)	0.974 (628)	1.257 (811)		
2½ (64)	2.500 (64)	4.909 (3167)	2.602 (1679)	1.522 (982)	1.964 (1267)		
3 (76)	3.000 (76)	7.069 (4560)	3.747 (2417)	2.191 (1414)	2.828 (1824)		
3½ (89)	3.500 (89)	9.621 (6207)	5.099 (3290)	2.983 (1924)	3.848 (2483)		
4 (102)	4.000 (102)	12.566 (8107)	6.660 (4297)	3.895 (2513)	5.026 (3243)		
5 (127)	5.000 (127)	19.635 (12668)	10.407 (6714)	6.087 (3927)	7.854 (5067)		
6 (152)	6.000 (152)	28.274 (18241)	14.985 (9668)	8.765 (5655)	11.3010 (7296)		

COEFFICIENT OF FRICTION

The following data for static coefficient of friction is for dry conduit and non-lubricated cable at a temperature of 72° F [22° C].

Cable Material	Conduit Material					
	Epoxy Fiberglass Conduit	PVC Conduit	Steel Conduit	Aluminum Conduit	Concrete Conduit	Polyethylene Conduit
PVC	.38	.90	.55	.25	.95	1.90
XLP (Cross-linked Polyethylene)	.23	.90	.75	1.50	.75	2.00
LDPE (Polyethylene)	.25	.50	.50	.62	.60	1.70
Neoprene	.53	2.60	1.60	.26	1.35	3.30
Concentric Neutral	.16	--	--	--	--	--
Tech (Armored) Cable	.16	2.60	1.60	.26	1.35	3.30