



6400 SPRING STUEBNER ROAD. SPRING, TX. 77389

## Specification Epoxy Fiberglass Conduit Extra Heavy Wall "Bullet Resistant" (XW Conduit)

### I. References

A. When a standard or other referenced document referred to in this specification is superseded by an approved revision, the revision shall apply.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 conduit shall be fiberglass conduit, also known as Reinforced Thermosetting Resin Conduit (RTRC), manufactured using the **single circuit filament winding process**. Multi circuit windings are not allowed. The conduit shall have a winding angle as close as possible to 54.75 degrees. Winding mandrels shall be straight and true so as to produce a non-tapered conduit. Tapering is allowed at the belled end.

**Conduit shall be manufactured having non-tapered sections (except for integral belled ends).**

The resin system shall be epoxy based, with no fillers, using an anhydride curing agent. The fiberglass shall consist of continuous **E-glass Grade "A" roving**. All additives for increasing flame spread and lowering smoke density shall be halogen free, i.e. not contain chlorine or bromine.

Carbon black shall be used as ultra violet inhibitor to protect the conduit and fittings during storage and exposure to the outdoors. Conduit and elbows shall be black in color.

Curing shall be done using an oven and shall take place in two steps. The first curing zone shall bring the conduit slowly to the gel temperature. The second zone shall post-cure the conduit at no less than 350° F. The pipe has to be properly cured so that when measuring the glass transition temperature with a differential calorimeter the difference between the first measurement and the second shall not exceed 5° F.

The internal conduit and elbow walls shall be smooth and all fibers embedded in the epoxy.

All elbows shall meet the nominal radius + or - 2°. The wall thickness shall meet tolerance as shown below and the "Out of Rounds" as shown in NEMA TC 14.

All elbows shall have either straight ends or deep socket PVC couplings.

All conduits and elbows shall be durably and legibly marked in accordance to NEMA TC 14. In addition the following information shall be included:

NEMA TC 14

UL 2515 AG (Above Ground) and UL 2420 BG (Below Ground)

Manufacturer and Reseller (if the conduit was modified or bent other than by the manufacturer)

Date of Manufacturing of conduit and elbows

Elbows shall be marked with the angle and radius

All conduit, elbows and fittings shall be **manufactured in the U.S.A. and marked as such.**

### III. Listing

All 3/4" - 6" conduit and fittings shall be listed by Underwriters Laboratories (UL). All other sizes not recognized by UL.

### IV. Dimensions

All 2" - 6" and 10" & 12" conduits shall be manufactured in ID sizes. All other sizes to be IPS. The wall thickness shall be nominal of .250". The bell end shall have a depth of 3" + 1/2". No taper shall be allowed for the conduit straight sections.

Nominal Size	Nominal OD (in.)	Nominal OD (mm)	Nominal Min ID (in.)	Nominal Min ID (mm)	Nominal Wall Thickness (in.)	Nominal Wall Thickness (mm)
3/4" XW	1.410	36	.910	23	.25	6
1" XW	1.675	43	1.175	30	.25	6
1-1/4" XW	2.020	51	1.520	39	.25	6
1-1/2" XW	2.260	57	1.760	45	.25	6
2" XW	2.500	64	2.000	51	.25	6
2-1/2" XW	3.000	76	2.500	64	.25	6
Nominal Size	Nominal OD (in.)	Nominal OD (mm)	Nominal Min ID (in.)	Nominal Min ID (mm)	Nominal Wall Thickness (in.)	Nominal Wall Thickness (mm)
3" XW	3.500	89	3.000	76	.25	6
3-1/2" XW	4.000	102	3.500	89	.25	6
4" XW	4.500	114	4.000	102	.25	6
5" XW	5.500	140	5.000	127	.25	6
6" XW	6.500	165	6.000	152	.25	6
8" XW	8.900	226	8.400	213	.25	6

### V. Electrical Characteristics

Dielectric strength shall exceed 500 volts/mil when tested in accordance with ASTM D-149.

### VI. Mechanical Characteristics

The conduit shall have following mechanical strength when tested in accordance with referenced test method:

Tensile strength, ultimate 11,000 psi ASTM D2105

Coefficient of thermal expansion  $1.2 \times 10^{-5}$  in/in/ $^{\circ}$ F ASTM D696

Glass content 65-70% API 15LR

Water absorption 1% max ASTM D570

Impact resistance: ASTM D2444

Size: 2" >130 lbf

3" >140 lbf

4" >160 lbf

5" >200 lbf

6" >250 lbf

## **VII. Joining System**

The conduit shall be supplied with a bell on one end and a spigot on the other end. A two component epoxy adhesive shall be applied to the spigot end before joining the conduit together. The adhesive shall be supplied in 20 fl. oz. plastic cartridges. A plastic static mixer tip shall be attached to the cartridges. The adhesive shall be applied with an adhesive gun. The adhesive shall be available for two different ambient temperatures: 70°F and 40°F. The adhesive shall be supplied from the same manufacturer of the conduit and the fittings in order to retain the UL listing.

## **VIII. Fire Resistance and Flame Spread**

Conduit shall meet UL specifications of UL2420 (below ground) & UL2515 (above ground), i.e. the flame will extinguish within 15 seconds after each of 5 successive applications of a flame per the UL standard.

## **IX. 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. 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  
Aldehydes as HCHO < 10  
Oxides of Nitrogen < 50  
Carbon Dioxide < 12,500  
Carbon Monoxide < 250

## **X. Fittings and Accessories**

Fiberglass conduit fittings, elbows, and accessories shall be manufactured using one of two manufacturing procedures. The first method shall use the same process, methods, and components as used to manufacture the fiberglass conduit. The second method shall use the compression molding process, Sheet Molding Compound (SMC), for the manufacture of the finished component. The SMC material shall be a vinyl ester resin with +30% reinforcement of glass. The glass fibers should be approximately 1" in length. The SMC material shall be fire resistant to UL 2515 specifications and shall be halogen free. Plastic duct plugs shall be manufactured from PVC.

## **XI. Environmental**

Manufacturer shall have a current Certificate, issued by an independent and accredited company, of compliance with an **ISO 14001: Environmental Management Systems and Performance**.

## **XII. Quality Assurance Program**

Manufacturer shall have a current Certificate, issued by an independent and accredited company, of compliance with an **ISO 9001:2008 Quality Management System**.

Specification of XW Fiberglass Conduit, 0.250" Wall Thickness



# CERTIFICATE OF REGISTRATION

This is to certify that

## Champion Fiberglass Inc.

6400 Spring Stuebner Rd., Spring, Texas 77389 USA

operates a

## Quality Management System

which complies with the requirements of

## ISO 9001:2008

for the following scope of registration

**Manufacture of fiberglass conduit and fittings.**

Certificate No.:	CERT-0065909	Original Certification Date:	November 6, 2009
File No.:	1058413	Current Certification Date:	November 5, 2012
Issue Date:	September 28, 2012	Certificate Expiry Date:	November 4, 2015

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ISO 9001



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