



**SPECIAL PROVISIONS
FOR
FIBERGLASS CONDUIT ATTACHED TO STRUCTURE**

**Scott County
IM-NHS-074-1(200)5--03-82**

**Effective Date
July 21, 2020**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150532.01 DESCRIPTION.

The special provision covers the ITS, private utility, arch power, roadway lighting, and aesthetic lighting fiberglass conduit attached to structure as identified in the plans.

150532.02 MANUFACTURING.

- A.** 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.
- B.** 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.
- C.** 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.
- D.** 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 must 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.
- E.** The internal conduit and elbow walls shall be smooth, and all fibers embedded in the epoxy.
- F.** All elbows shall meet the nominal radius ± 2 degrees. The wall thickness shall meet tolerance as shown below and the "Out of Rounds" as shown in NEMA TC 14.

- G. All elbows shall have straight ends.
- H. 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)
 - 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
- I. All conduit, elbows and fittings shall be manufactured in the USA and marked as such.

150532.03 DIMENSIONS.

- A. All 2 inch to 3 inch conduits shall be manufactured in ID sizes. All other conduit sizes to be IPS. The wall thickness shall be nominal of 0.250 inches. The bell end shall have a depth of 3 1/2 inches. No taper shall be allowed for the conduit straight sections.
- B. Conduit shall be manufactured having non-tapered sections (except for integral belled ends).

150532.04 ELECTRICAL CHARACTERISTICS.

Dielectric strength shall exceed 500 volts per mil when tested in accordance with ASTM

150532.05 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 1.2×10^{-5} in/in/°F ASTM D696
- Glass content 65-70% API 15LR
- Water absorption 1% max ASTM D570
- Impact resistance: ASTM D2444
 - Size 2" 140 ft.lbs.
 - 4" 160 ft.lbs.
 - 5" 200 ft.lbs.
 - 6" 250 ft.lbs.
 - 8" 275 ft.lbs.

150532.06 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.

150532.07 JOINING SYSTEM.

The conduit shall be supplied with an integral wound bell on one end and a machined end 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 fluid ounce plastic cartridges. A plastic static mixer tip shall be attached to the cartridges and 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 fittings in order to retain the UL listing.

150532.08 FIRE RESISTANCE AND FLAME SPREAD.

Conduit shall meet specification UL 2420 (below ground) and UL 2515 (above ground), i.e. the flame shall extinguish within 15 seconds after each of five successive applications of flame per the UL standard.

150532.09 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

150532.10 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 inch 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.

150532.11 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.

150532.12 METHOD OF MEASUREMENT.

Linear feet as shown in the contract documents.

150532.13 BASIS OF PAYMENT.

Payment is full compensation for materials, equipment, and installation of Conduit, Furnish and Install, Fiberglass Conduit, Attached to Structure, 3 Inch; Conduit, Furnish and Install, Fiberglass Conduit, Attached to Structure, 2 Inch; Conduit, Furnish and Install, Fiberglass Conduit, Attached to Structure, 2 Inch (Private Utility); and Conduit, Furnish and Install, Fiberglass Conduit, Attached to Structure, 1 Inch.