

Fiberglass Conduit and Fittings, Standard-Wall, Five-Inch IPS



1. Scope

This standard covers the requirements for 5-inch IPS (iron pipe standard), standard-wall, fiberglass conduit, fittings, and accessories. This collection of components may be considered a system.

The formal, industry name for fiberglass conduit is Aboveground Reinforced Thermosetting Resin Conduit (RTRC).

In 2013, the title of this standard was changed from "Fiberglass Conduit and Fittings, **Medium-Wall**, Five-Inch IPS" to "Fiberglass Conduit and Fittings, **Standard-Wall**, Five-Inch IPS". Wall thickness requirements remained unchanged.

In addition to identifying products that are approved for purchase and installed by Seattle City Light (SCL) personnel, this standard identifies products that may be purchased and installed by contractors working under Seattle City Light's direction.

Standard Coordinator
Sunny Kim

Handwritten signature of Sunny Kim in black ink.

Standards Engineering Supervisor
Brett Hanson

Handwritten signature of Brett Hanson in black ink.

Division Director
Bob Risch

Handwritten signature of Bob Risch in black ink.

This material standard applies to the following SCL stock numbers:

Stock No.	Description
012808	Conduit, 20 foot straight section
012809	Elbow, 90 degree x 60 in
012847	Elbow, 90 degree x 144 in
012848	Elbow, 11-1/4 degree x 144 in
013586	Elbow, 15 degree x 144 in
012849	Elbow, 22-1/2 degree x 144 in
012850	Elbow, 45 degree x 144 in
012814	Stop coupling
013358	Repair coupling
012815	End bell, socket type
013568	Elbow, 5 degree x 144 in
012817	Female terminal adapter
012818	Fiberglass end cap with gasket
012819	Adhesive gun
012820	Epoxy cartridge, 20 fl oz
012821	Adhesive kit
013314	Mixing tip, spare
013567	5-in IPS fiberglass to 5-in PVC adapter

The purpose of this standard is three-fold:

- Promote the standardization of material across URD and Network boundaries.
- Make available a family of fiberglass conduit and fittings that reduces engineering construction costs by guaranteeing high component quality, fit, and compatibility. Unlike PVC and steel, fiberglass conduit and fittings are not universally interchangeable between suppliers; to ensure component compatibility, the subject family must be considered a system and sole-sourced.
- Facilitate ordering by providing a cross-reference between SCL stock numbers, common applications, and the manufacturer's catalog numbers.

2. Application

Fiberglass conduit is an alternative to PVC conduit systems where the following (superior) attributes are required:

- Wide operating temperature range, -60 to +250 degrees F (-51 to +121 degrees C)
- Resistant to cable pull burn through
- Low relative coefficient of friction
- Shatter-proof
- Shape retention after impact.

Fiberglass conduit is an alternative to galvanized steel where the following (superior) attributes are required:

- Corrosion resistance
- Low relative unit cost
- Low relative unit weight
- Low relative coefficient of friction
- Non-conductive
- Shape retention after impact.

Five-inch fiberglass conduit systems are appropriate for riser pole, other above ground, and below ground (encased in concrete) applications.

For 5-in fiberglass conduit, one 20 fl oz adhesive cartridge, Stock No. 012820, will make about 20 joints.

Adhesive is required at:

- Joints where a field cut has been made and the interference joint is not available
- Joints between large sweep elbows and vertical risers
- All end bells.

Adhesive gun, Stock Number 012819, may be considered expendable and issued with each job.

Adhesive curing time is approximately one hour at an ambient temperature of 75 degrees F (29 degrees C). Cold weather adhesive is available from the manufacturer by special order.

Female terminal adapter, Stock Number 012817, is used for joining fiberglass conduit to galvanized rigid steel (GRS) conduit. Adapter has same threads as GRS.

Joining may be made easier by applying a lubricant, such as American Polywater or 3M Compound, on the Elastomeric gasket prior to inserting the spigot end into the belled end.

Joining a field cut with a belled end should be discouraged because of the sharp edge created; use a coupling instead.

For many years, Champion created catalog numbers and physically labeled their 5-in IPS, 0.096-inch thick wall conduit as Medium Wall (MW). In 2012, Underwriters Laboratories (UL) revised their standards and now Champion's 0.096-inch thick wall conduit is considered by UL and industry as Standard Wall (SD). In response, Champion elected to retain their existing catalog numbers and physically mark their products SW/MW.

Refer to SCL 9220.05, "Electric Power Cable and Conduit Selection" for the preferred electric power cable and conduit to be used in a given application.

3. Industry Standards

Five-inch fiberglass conduit and fittings shall meet the above ground (type AG) requirements of the following industry standards:

ASTM F512 – 93; Standard Specification for Smooth-Wall Poly (Vinyl Chloride (PVC) Conduit and Fittings for Underground Installation.

NEMA TC 14-2002; Standard for Reinforced Thermosetting Resin Conduit (RTRC) and Fittings

UL 2515; Standard for Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings, November 16, 2011

4. Detailed Requirements

4.1 General

Conduit and fittings shall be listed by UL 2515 (Underwriter's Laboratories standard).

Conduit and fittings shall be standard wall, type AG (above ground) as defined by UL 2515.

Conduit and fitting dimensions shall conform to the Iron Pipe Standard (IPS), where dimensions are based on outside diameters of iron pipe sizes.

Resin system shall be epoxy with no fillers. Glass shall be E-type.

Conduit and fittings shall be manufactured from the same resin/hardener/glass systems manufactured by the same filament wound system.

Conduit and fittings shall be halogen-free as defined by UL 2515.

Conduit, fittings, and accessories shall be designed and manufactured to be a system intended to guarantee complete interchangeability and compatibility between components.

Manufacturer shall inform Seattle City Light in writing of all design changes that could affect the product's understood or published capabilities or attributes.

4.2 Conduit

Trade size	5 in (IPS)
Outside diameter	
Minimum	5.544 in
Average	5.572 in
Maximum	5.606 in
Inside diameter, minimum	5.380 in
Wall thickness, nominal	0.096 in
Length	20 ft
Weight per foot, nominal	1.20 lb
Joining system	Gasket joint (triple seal) consisting of an integral bell and spigot. Bell end shall have a triple seal gasket in addition to the interference joint.
Pull-out strength	
Triple-seal gasket with interference joint	2,000 lb
Triple-seal gasket without interference joint (after field cut)	500 lb
UV stability	Meeting the requirements of UL 2515
Fire resistance	Meeting the requirements of UL 2515

Conduit shall be manufactured having non-tapered sections (except for belled ends) to allow for field cutting and joining.

4.3 Fittings

Fittings, consisting of couplers and elbows, shall be appropriate and compatible for use with the conduit specified in this standard.

Elbow angles shall be accurate to $\pm 2\%$ of specified.

Female terminal adapter shall have straight threads.

4.4 Accessories

Accessory components, consisting of two-part adhesives, adhesive guns, stir sticks, and abrading supplies, shall be appropriate and compatible for use with the conduit and fittings specified in this standard.

Adhesive curing time shall be approximately one hour at an ambient temperature of 75 degrees F (29 degrees C).

Adhesive shall be suitable for bonding fiberglass and PVC together.

5. Marking

Each conduit section and fitting shall be marked according to the requirements of UL 2515, Section 6.

6. Testing

Conduit test data that establishes compliance with the requirements of UL 2515 and this standard shall be provided upon request.

7. Packaging

Standard crate dimensions shall be approximately 4 ft by 4 ft by 20 ft.

Each crate shall be legibly marked with the following information:

- Manufacturer's identification
- Product description
- Seattle City Light's purchase order number
- Seattle City Light's stock number.

8. Shipping

Conduits and 45-degree or larger elbows shall be delivered on enclosed, covered, or flatbed trucks with side-load capability.

Because Washington State law requires a 10-in minimum side board when driving a forklift or pallet jack onto the bed of a truck or trailer, most flatbed trucks or trailers must be side-loaded to ease off-loading.

9. Issuance

Conduit: FT
 Fittings: EA
 Accessories: EA

10. Approved Manufacturers

10.1 Products Approved for Purchase by Seattle City Light

Table 10.1. Approved Products, Champion Fiberglass

Stock No.	Description	Item No.
012808	Conduit, 20-ft straight section	50C-MW-20-G
012809	Elbow, 90° x 60 in	50C-MW-94-P
012847	Elbow, 90° x 144 in	50C-MW-9CR144P
012848	Elbow, 11-1/4° x 144 in	50C-MW-5CR144P
012849	Elbow, 22-1/2° x 144 in	50C-MW-6CR144P
012850	Elbow, 45° x 144 in	50C-MW-8CR144P
012814	Stop coupling	50C-MW-40
013358	Repair coupling	50C-MW-42
012815	End bell, socket type	50C-MW-29
012817	Female terminal adapter	50C-MW-32-SCL
012818	Fiberglass end cap with gasket	50C-MW-23-G
012819	Adhesive gun	CM-AG
012820	Epoxy cartridge, 20 fl oz, 70° F	CM-600
012821	Adhesive kit; includes can of base adhesive, can of hardener, stir sticks, sand paper, and instructions; 70° F	CF-1070
013314	Mixing tip, spare for use with epoxy cartridge Stock No. 012820	CMMT-30
013567	5-in IPS fiberglass to 5-in PVC adapter	50C-MW-27-5PVC
013568	Elbow, 5° x 144 in	50C-MW- CD05CR144P
013586	Elbow, 15° x 144 in	50C-MW-15CR144P

10.2 Products Approved for Purchase and Installation by Seattle City Light Contractors

All material items cited in Section 10.1.:

- Champion Fiberglass
- FRE Composites

Fiberglass elbows:

- Raceway Technology

11. References

SCL Design Standard 9220.05; “Electric Power Cable and Conduit Selection”

12. Sources

Bulletin No. TCB 2-2000; “NEMA Guidelines for the Selection and Installation of Underground Nonmetallic Duct”; National Electrical Manufacturers Association

CD-0807; Champion Duct Fiberglass Conduit product catalog;
Champion Fiberglass; 2003

“**Gasket Joint Installation Recommendations**”; Champion Fiberglass

“**Instructions for Installing Champion Duct Below Ground (Encased in Concrete and Direct Buried)**”; Champion Fiberglass

Shipek, John; SCL Standards Engineer, subject matter expert and originator of 7025.05

www.championfiberglass.com

www.frecomposites.com