# Fiberglass Fittings, Heavy-Wall, Four-Inch IPS

## 1. Scope

This standard covers the requirements for 4-inch IPS (iron pipe standard), heavy-wall, fiberglass fittings.

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.

This material standard applies to the following SCL stock numbers:

| Stock No. | Description |
|---|---|
| 013587 | Elbow, 5º x 144 in |
| 013588 | Elbow, 11-1/4º x 144 in |
| 013589 | Elbow, 15º x 144 in |
| 013590 | Elbow, 22-1/2º x 144 in |
| 013591 | Elbow, 45º x 144 in |
| 013592 | Elbow, 90º x 144 in |

## 2. Application

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

The intended application for large radius 4-in fiberglass elbows is to allow ease of cable pull around bends. The fiberglass elbows will have a deep socket PVC coupling attached at each ends. The PVC couplings enable a smooth transition between the fiberglass elbow and the PVC straight conduit in the duct system.

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When Champion Fiberglass was first obtaining its UL Listed certification, it had offered different wall choices: standard wall (SW), medium wall (MW) and heavy wall (HW). However, the wall names were not associated with a numerical thickness, 0.070 inches, 0.096 inches, or 0.110 inches respectively.

The Champion 4-in HW conduit, elbow and fittings have the same numerical wall thickness (0.096 in) as the Champion 5-in MW conduit or elbows that SCL also uses. Champion does not offer a medium wall option for the 4-in fiberglass conduit, elbow and fittings.

## 3. Detailed Requirements

### 3.1 General

Fittings shall be listed by UL 2515 (Underwriters Laboratories standard).

Fittings shall be heavy wall, type AG (above ground) as defined by UL 2515.

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 and 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 as a system that guarantees 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.

### 3.2 Fittings

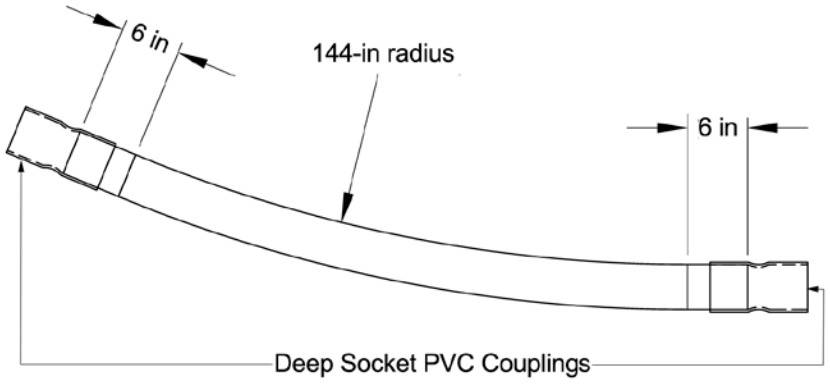
Fittings shall be appropriate and compatible for use with Schedule 40 PVC conduit.

Elbow angles shall be accurate to ± 2% of specified.

Elbow shall have a 6-in tangent on each end as shown in Figure 3.2.

A deep socket PVC coupling shall be permanently attached to each end of the elbow.

**Figure 3.2. 4-in Fiberglass Elbow with Deep Socket PVC Couplings**




| | |
|---|---|
| Trade size | 4 in (IPS) |
| Outside diameter | |
| Minimum | 4.490 in |
| Average | 4.512 in |
| Maximum | 4.540 in |
| Inside diameter, minimum | 4.320 in |
| Wall thickness, nominal | 0.096 in |
| UV stability | Meeting the requirements of UL 2515 |
| Fire resistance | Meeting the requirements of UL 2515 |

## 4. Marking

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

## 5. Testing

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

## 6. Packaging

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.

## 7. Shipping

45 degrees 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.

## 8. Issuance

EA

## 9. Approved Manufacturers

### 9.1 Products Approved for Purchase by Seattle City Light

**Table 9.1 Approved Products, Champion Fiberglass**

| Stock No. | Description | Item No. |
|---|---|---|
| 013587 | Elbow, 5º x 144 in | 40C-HW-CD05CR1442D |
| 013588 | Elbow, 11-1/4º x 144 in | 40C-HW-5CR1442D |
| 013589 | Elbow, 15º x 144 in | 40C-HW-15CR1442D |
| 013590 | Elbow, 22-1/2º x 144 in | 40C-HW-6CR1442D |
| 013591 | Elbow, 45º x 144 in | 40C-HW-8CR1442D |
| 013592 | Elbow, 90º x 144 in | 40C-HW-9CR1442D |

### 9.2 Products Approved for Purchase and Installation by Seattle City Light Contractors

All material items cited in Section 9.1.:

- Champion Fiberglass
- FRE Composites
- Raceway Technology.

## 10. References

**SCL Construction Standard 0222.02**; “Requirements for Duct Banks in the Public Right-of-Way”

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

**SCL Material Standard 7025.05**; “Fiberglass Conduit and Fitting, Standard Wall, Five-Inch IPS”

**SCL Material Standard 7015.05**; “Schedule 40 PVC Conduit and Fittings”

## 11. 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

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**www.championfiberglass.com**

**www.frecomposites.com**