

## Schedule 80 PVC Conduit and Fittings



### 1. Scope

This material standard covers the requirements for Schedule 80 extruded rigid polyvinyl chloride (PVC) conduit.

The requirements for Schedule 40 PVC conduit and fittings are located in SCL 7015.05.

### 2. Application

Schedule 80 PVC conduit is used to construct smooth raceways for the pulling in of cable installed in a variety of applications.

Five-inch Iron Pipe Standard (IPS) size conduit is specified with both ends straight cut to minimize the gap at the conduit joints. Minimized gaps are less likely to catch debris during construction and lead to damaged cable.

Elbows are also known as bends. Large radius elbows are also known as sweeps.

The straight cut end of a section of conduit is also known as the spigot end.

Design engineers should be aware that different types of conduit have widely different physical properties that affect their application.

### 3. Industry Standards

Schedule 80 PVC conduit and fittings shall meet the requirements of the following industry standard:

**UL 651**; Standard for Schedule 40 and 80 Rigid PVC Conduit and Fittings, 7th Edition, October 4, 2005

Standard Coordinator  
Sunny Kim

A handwritten signature in black ink, appearing to read 'Sunny Kim'.

Standards Engineering Supervisor  
Brett Hanson

A handwritten signature in black ink, appearing to read 'Brett Hanson'.

Division Director  
Bob Risch

A handwritten signature in black ink, appearing to read 'Bob Risch'.

## 4. Detailed Requirements

### 4.1 General

Conduit shall be suitable for aboveground use indoors or outdoors exposed to sunlight and weather, and for underground use by direct burial or encasement in concrete.

Conduit dimensions shall conform to UL 651 and the IPS, where dimensions are based on outside diameters of iron pipe sizes.

Conduit color shall be medium to dark gray.

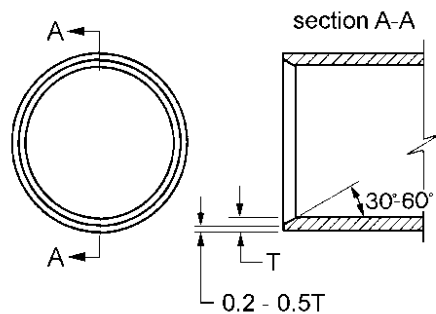
Conduit shall not have any features that can abrade or otherwise damage cable.

All straight-cut ends from conduit, reducers, and elbows with a diameter of 2 inches (IPS) and larger shall be chamfered according to Figure 4.1.

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

Dimensional information cited in Section 4.2 should be consistent with UL requirements and is provided for the convenience of Seattle City Light design engineers, construction crews, inspectors, and quality assurance personnel who do not have ready access to UL 651.

**Figure 4.1. Chamfer Detail**



### 4.2 Conduit

Conduit shall be certified by Underwriters Laboratories or one of the following Nationally Recognized Testing Laboratories (NRTLs) as meeting the minimum requirements of Standard UL 651:

- Canadian Standards Association (CSA)
- ETL
- NSF International

Conduit shall meet the requirements of Table 4.2a.

Five inch IPS size shall meet the requirements in Table 4.2b (straight cut, without couplings or adapters).

All other IPS sizes shall meet the requirements in Table 4.2b (one bell end).

**Table 4.2a. Conduit Performance Requirements**

| Description                             | UL 651 Section |
|-----------------------------------------|----------------|
| Tensile strength                        | 7              |
| Deflection under heat and load          | 8              |
| Extrusion process                       | 9              |
| Low-temperature handling                | 10             |
| Water absorption                        | 11             |
| Resistance to crushing                  | 12             |
| Resistance to impact                    | 13             |
| Flame                                   | 14             |
| Conduit for use with 90 degree C wire   | 17             |
| Resistance to specific reagents         | 18             |
| Sunlight resistance                     | 19             |
| Pipe stiffness                          | 20             |
| Pull-joint separation                   | 21             |
| Bending and pull-joint separation       | 22             |
| Joint water tightness                   | 23             |
| Elastomeric materials accelerated aging | 24             |
| Permanency of printing                  | 25             |

**Table 4.2b. Conduit Dimensions, Straight (str)**

| Stock No. | Trade Size, IPS (in) | End #1 | End #2       | Outside Diameter, Minimum (in) | Outside Diameter, Average (in) | Outside Diameter, Maximum (in) | Inside Diameter, Minimum, Average (in) | Wall Thickness, Minimum (in) | Weight, Nominal (lb/ft) |
|-----------|----------------------|--------|--------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------------|------------------------------|-------------------------|
| 738740    | 1-1/2                | Bell   | Straight cut | 1.888                          | 1.900                          | 1.912                          | 1.446                                  | 0.200                        | 0.69                    |
| 738741    | 2                    | "      | "            | 2.363                          | 2.375                          | 2.387                          | 1.881                                  | 0.218                        | 0.96                    |
| 738742    | 2-1/2                | "      | "            | 2.860                          | 2.875                          | 2.890                          | 2.250                                  | 0.276                        | 1.50                    |
| 738743    | 3                    | "      | "            | 3.485                          | 3.500                          | 3.515                          | 2.820                                  | 0.300                        | 1.96                    |
| 738745    | 4                    | "      | "            | 4.450                          | 4.500                          | 4.550                          | 3.737                                  | 0.337                        | 2.86                    |
| 738746    | 5                    | "      | "            | 5.513                          | 5.563                          | 5.613                          | 4.713                                  | 0.375                        | 3.98                    |
| 010333    | 6                    | "      | "            | 6.575                          | 6.625                          | 6.675                          | 5.646                                  | 0.432                        | 5.47                    |

4.3 Elbows

Elbows shall have attributes as shown in Figure 4.3 and Tables 4.3.

Figure 4.3. Elbow Attributes

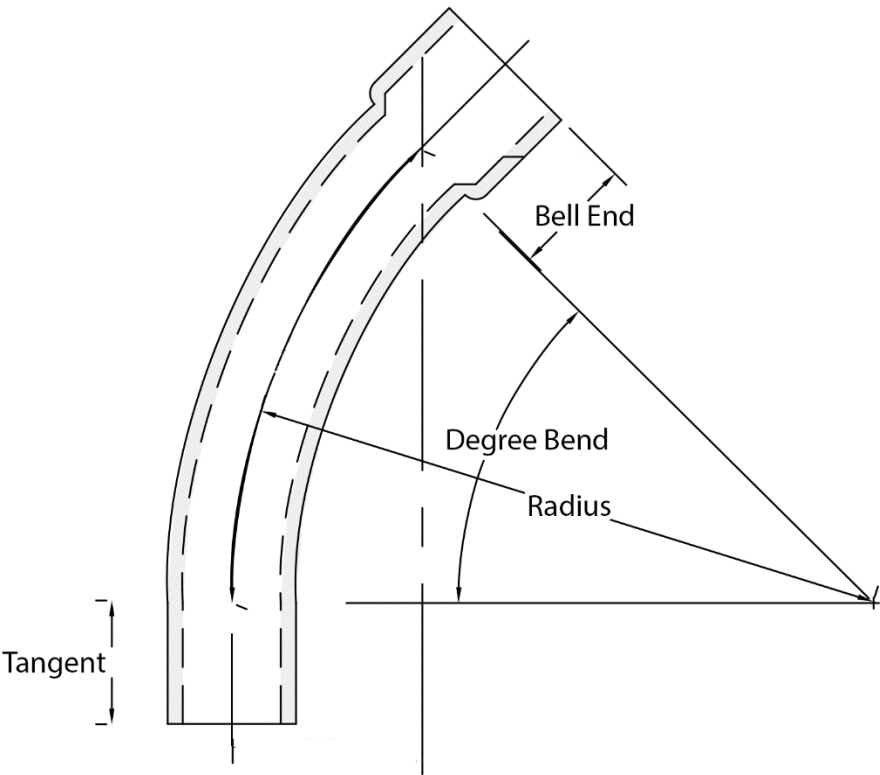


Table 4.3. Elbow dimensions, 24-in Radius

| Stock No. | Trade Size,<br>IPS (in) | Degree Bend | End #1 | End #2       | Radius (in) | Tangent (in) |
|-----------|-------------------------|-------------|--------|--------------|-------------|--------------|
| 013647    | 2                       | 22-1/2      | Bell   | Straight cut | 24          | 3            |
| 013650    | 3                       | 22-1/2      | "      | "            | 24          | 3-1/4        |
| 013648    | 2                       | 45          | "      | "            | 24          | 2            |
| 013651    | 3                       | 45          | "      | "            | 24          | 3-1/8        |
| 013649    | 2                       | 90          | "      | "            | 24          | 2            |
| 013652    | 3                       | 90          | "      | "            | 24          | 3-1/8        |



22-1/2-degree elbow



45-degree elbow



90-degree elbow

4.4 Fittings

Long sleeve female adapter shall have a minimum bell depth of 4 in.

**Table 4.4 Fittings, Long Sleeve, Female (F) to Slip (S)**

| Stock No. | Trade Size,<br>IPS (in) | Description                   | Ends  | Overall Nominal<br>Length (in) |
|-----------|-------------------------|-------------------------------|-------|--------------------------------|
| 014578    | 4                       | Long sleeve<br>female adapter | S x F | 7-1/2                          |
| 014579    | 5                       | "                             | "     | 9-1/2                          |



5. Marking

Each conduit section shall be marked according to the requirements of UL 651, Section 25.

The outer surface of each conduit section shall be marked with the following minimum information:

- Trade size
- Schedule Number or equivalent information
- Manufacturer name or symbol
- Date (or period) of manufacture
- UL or NRTL mark

6. Testing

Conduit test data that establishes compliance with the requirements of UL 651 and this material standard shall be provided upon request.

7. Packaging

Straight conduit shall be furnished in 10-ft sections, unless specified otherwise on the purchase order.

Master bundles shall be secured with at least two bands of steel or UV-resistant plastic strapping.

Each master bundle of straight conduit shall be legibly marked with the following information:

- Manufacturer identification
- Product description
- Seattle City Light purchase order number
- Seattle City Light stock number
- Gross, net, and tare weight

8. Shipping

Conduit may be delivered on enclosed, covered, or flatbed trucks. If conduit is delivered on a flatbed truck, conduit shall be side-loaded.

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

Elbows: EA

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## 10. Approved Manufacturers

### Conduit Straight Sections

Cantex (Mitsubishi Corp.)  
Cresline NW  
Heritage Plastics Inc. (Atkore Int'l)  
IPEX  
JM Eagle  
Prime Conduit (Mitsubishi Corp.)  
Ridgeline Pipe Mfg. (Atkore Int'l)  
NAPCO (formerly Royal Pipe Systems)

### Elbows

Cantex (Mitsubishi Corp.)  
Heritage Plastics Inc. (Atkore Int'l)  
Scepter (IPEX)  
JM Eagle  
Kraloy (IPEX)  
Raceways Technology & Mfg.  
Ridgeline Pipe Mfg. (Atkore Int'l)  
Carlton (ABB)  
NAPCO (formerly Royal Pipe Systems)

### Long Sleeve Female Adapter

Raceways Technology & Mfg.

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## 11. References

**SCL Material Standard 7015.05**; "Schedule 40 PVC and Fittings"

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## 12. Sources

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

**SCL Material Standard 7345.2** (canceled), "Conduit and Fittings, EPC 40 and EPC 80 Rigid Polyvinyl Chloride"

**Shipek, John**; SCL Standards Supervisor and originator of 7020.05