

ZG 033 Fiberglass Conduit

1. Scope

This material specification provides minimum requirements for fiberglass conduit and fiberglass conduit fittings. Fiberglass conduit can be laid in the trench as conduit, used as bridge attachment or placed on a pole as a riser. Primary, secondary, or communication conductors can be pulled into this conduit.

2. Applicable Documents

The latest revisions of the following documents in effect on the date of invitation to bid apply to the extent specified herein.

UL 2515, *Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings*

3. Definitions

Company. Refers to PacifiCorp, doing business as Pacific Power and Rocky Mountain Power.

4. Material Requirements

The fiberglass conduit shall be built to meet or exceed all requirements outlined in UL 2515 except as outlined in this specification. All manufacturers and subcontractors (if the conduit was modified from original manufacturer) must be able to provide appropriate documentation to verify that their product meets or exceeds UL 2515 and is UL-listed.

For conduit that falls outside UL 2515 for above-ground standards, manufacturer shall certify that the conduit is manufactured using UL 2515 and shall have other conduits manufactured with a current UL 2515 above-ground listing.

4.1. Dimensions

The conduit shall be manufactured to iron pipe size (IPS) dimensions Type AG for above-ground use as shown in Table 1.

Table I—Material Thickness and Variance (inches)

Nominal Size	IPS Conduit Size	Nominal Wall Thickness		Outside Diameter		Maximum Out-of-Roundness
		Min.	Max.	Min.	Max.	
2.0	2.0	0.090	0.105	2.365	2.460	0.040
3.0	3.0	0.090	0.105	3.490	3.580	0.040
4.0	4.0	0.090	0.105	4.470	4.560	0.040
6.0	6.0	0.110	0.125	6.570	6.680	0.060

4.2. Color

Conduit and elbows shall be gray, or black with three red stripes.

4.3. Markings

All conduits and elbows shall be durably and legibly marked in accordance with UL 2515, Section 6. The marking intervals shall not exceed 5 feet. Elbows shall have at least one of each marking. In addition, the following information shall be printed on the conduit, in lettering not less than inch high:

- Wall thickness (inches)
- UL 2515 listing label
- UL 2515 (required for electrical contractors)
- Manufacturer’s name
- Date of manufacturing
- Angle and radius marked on all elbows

If any of the preceding information cannot be printed on the conduit, consult the company engineering standards department before approval.

4.4. Elbows

All elbows shall meet nominal radius + or -3° as listed in Table 2. All elbows shall maintain a minimum of 85% of their original internal diameter as specified in UL 2515, Section 4.5.3.



Table 2—Elbow Radii

Diameter (inches)	Radii (inches)
2.0	24, 36
3.0	36, 48
4.0	36, 48
6.0	48, 60

All elbows shall have one PVC deep-socket coupler and one PVC stub coupler for transitioning to PVC conduit or pole risers. All PVC couplings shall be installed by the manufacturer using fiberglass epoxy. The depth of the deep-socket coupler for conduit diameter is shown in Table 3.

Table 3—Coupler Size and Socket Depth

Nominal IPS Size (inches)	Coupling Length (inches)	Minimum Socket Depth (inches)
2.0	8.0	3.25
3.0	8.0	3.25
4.0	8.0	3.75
6.0	12.0	5.00

4.5. Coefficient of Friction (COF)

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

The supplier shall provide a friction test report to the company at the time of approval showing that a dry fiberglass conduit tested with linear low-density polyethylene cable jacket has a dynamic COF of less than 0.25.

The manufacturer shall also state how frequently a COF test is run to assure quality.

Further, if the manufacturer changes process or raw material, the company shall be notified of the changes and provided updated information on the COF.

4.6. Elbow Burn-Through Test

The supplier shall provide information on burn-through tests performed on their elbows.

4.7. Quality Assurance Program for Elbows

The manufacturer shall develop and maintain an effective quality control system under written procedures which shall include material controls, test, and inspections throughout the manufacturing process, sufficient to assure that the conduit or elbow shipped meets the requirements of this specification. An ISO 9001 certification is preferred.

The manufacturer shall provide and maintain suitable and adequate facilities for inspection and testing. Inspection records and associated test data shall be made available for examination upon request. Quality assurance records shall be maintained by the supplier for a minimum of one year after shipment.

4.8. Conduit Joining

The company requires a gasketed joint on all fiberglass conduits. This gasketed joint shall provide the minimum pullout strength as specified in Table 4.

Table 4—Joint Pullout Strength

Connection Type	Pullout Strength (pounds)
Fiberglass to Fiberglass	500
Fiberglass to PVC	500

5. Delivery

The conduit shall be packaged and delivered in such a way that a forklift can remove the conduit from the side of the trailer.

6. Issuing Department

The engineering standards and grid modernization department of PacifiCorp published this material specification. This material specification shall be used and duplicated only in support of company projects.

