
Crossarms, Fiberglass

1. Scope

This standard covers the requirements for fiberglass crossarms. This standard applies to the following Seattle City Light (SCL) stock numbers:

<u>Stock No.</u>	<u>Description</u>
014643	Standard crossarm
014644	Wing arm

2. Application

Fiberglass crossarms are used to support insulators and conductors on tangent and angle poles in an overhead distribution system.

Fiberglass crossarms include a crossarm and mounting bracket. Support braces are not included.

There are two types of fiberglass tangent crossarms: one for a standard pole top and one for wing arm pole tops.

For deadend poles, use fiberglass deadend assemblies shown in SCL 5055.10.

3. Industry Standards

Crossarm components shall meet the applicable requirements of the latest revision of the following industry standards.

ASTM A36; Specification for Carbon Structural Steel ASTM A123; Specification for Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products

ASTM A153; Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware

ASTM A871; Standard Specification for High-Strength Low-Alloy Structural Steel Plate with Atmospheric Corrosion Resistance

ASTM D635; Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position

ASTM D2344; Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates

ASTM D2584; Standard Test Method for Ignition Loss of Cured Reinforced Resins

ASTM D3917; Standard Specification for Dimensional Tolerance of Thermosetting Glass-Reinforced Plastic Pultruded Shapes

ASTM D4385; Standard Practice for Classifying Visual Defects in Thermosetting Reinforced Plastic Pultruded Products

Standard Coordinator
Curtis Lu

Standards Engineering Supervisor
John Shipek

Division Director
Andrew Strong



ASTM D8910; Standard Test Methods for Determining the Full Section Flexural Modulus and Bending Strength of Fiber Reinforced Polymer Crossarms Assembled with Center Mount Brackets

ASTM E165; Practice for Liquid Penetrant Inspection Method

ASTM E709; Practice for Magnetic Particle Examination

ASTM G154; Standard Practice for Operating Fluorescent Ultraviolet (UV) Light Apparatus for Exposure of Nonmetallic Materials

ANSI O5.3; Solid Sawn-Wood Crossarms and Braces - Specifications and Dimensions

ASME B1.1; Unified Inch Screw Threads

AWS D1.1; Structural Welding Code—Steel

RUS 1724e-151; Mechanical Loading on Distribution Crossarms

RUS 1724e-200; Design Manual for High Voltage Transmission Lines

4. Requirements, General

4.1 Crossarm Material

Crossarm materials shall be composed of boron-free continuous glass fiber reinforcement per ASTM D578 and thermoset resin system. Crossarm material shall be self-extinguishing.

4.2 Crossarm Color

Crossarm exterior color shall be brown.

4.3 Protective Coating

Fiberglass crossarms shall be treated with UV-resistant coating to protect against UV degradation. Crossarms shall be tested for accelerated weathering and ultraviolet aging for 10,000 hours without any degradation of strength or modulus of elasticity (MOE), without deterioration of color, and shall show no visual evidence of exposed glass fibers or other reinforcements when tested in accordance with ASTM G154. UV coating shall have a minimum protective life expectancy of 40 years.

4.4 Hardware, Structural Steel and Accessories

All steel components shall be compliant with ASTM A36, A572, or A871 specifications. Only the grades of steel cited in the above ASTM specifications will be allowed unless approved by Seattle City Light Standards. Mounting bracket shall be made of 6061-T6 aluminum, hot-rolled steel, or welded structural steel. All hardware, including mounting bracket, bolts, washers, and nuts shall be hot-dipped galvanized in accordance with ASTM A153 and shall have a finger-free fit.

5. Requirements, Detailed

5.1 Dimensional Tolerances

Table 5.1. Dimensional Crossarm Tolerances

Length	±1/4 in
Height	±1/8 in
Hole spacing	±1/8 in
Hole diameter	±1/16 in

5.2 Dimensions and Pre-Drilled Hole Patterns

Standard fiberglass crossarms shall be 10 feet long and constructed with the hole patterns shown in figures 5.2a to 5.2c.

Wing arm fiberglass crossarms shall be 11 feet long and constructed with the hole patterns shown in figures 5.2d to 5.2f.

Figure 5.2a. Plan View Dimensions, Standard Arm

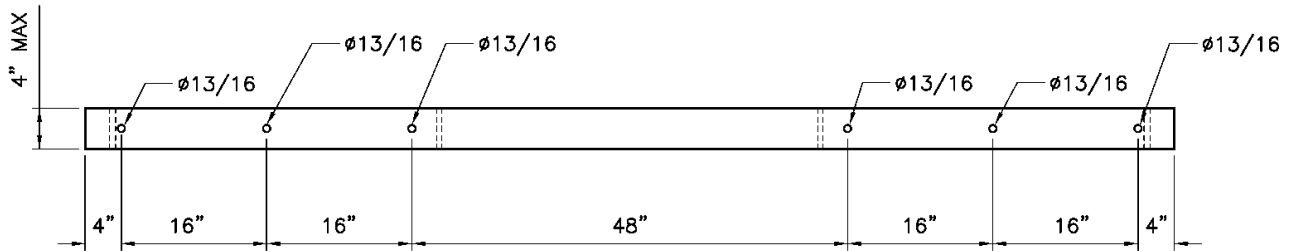


Figure 5.2b. Front View Dimensions, Standard Arm

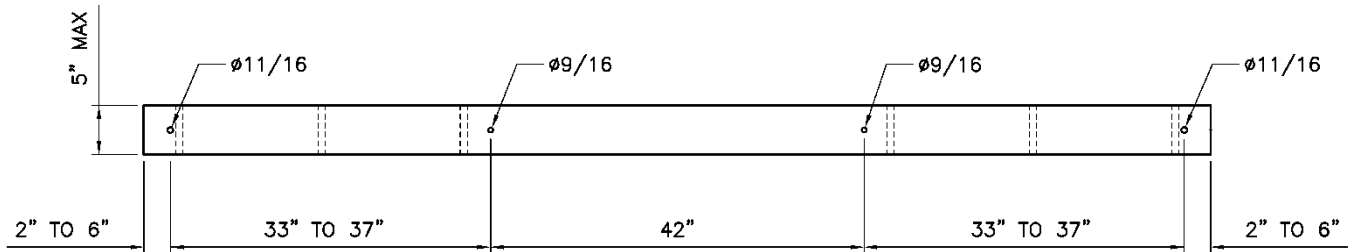


Figure 5.2c. End View Dimensions, Standard Arm

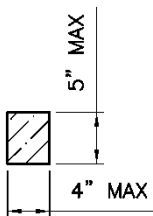


Figure 5.2d. Plan View Dimensions, Wing Arm

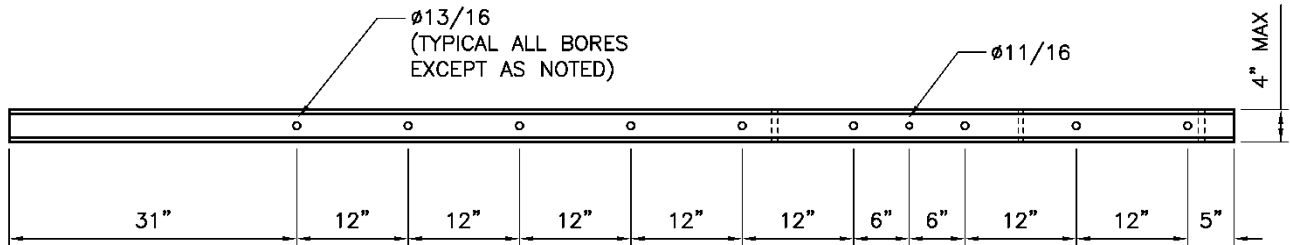


Figure 5.2e. Front View Dimensions, Wing Arm

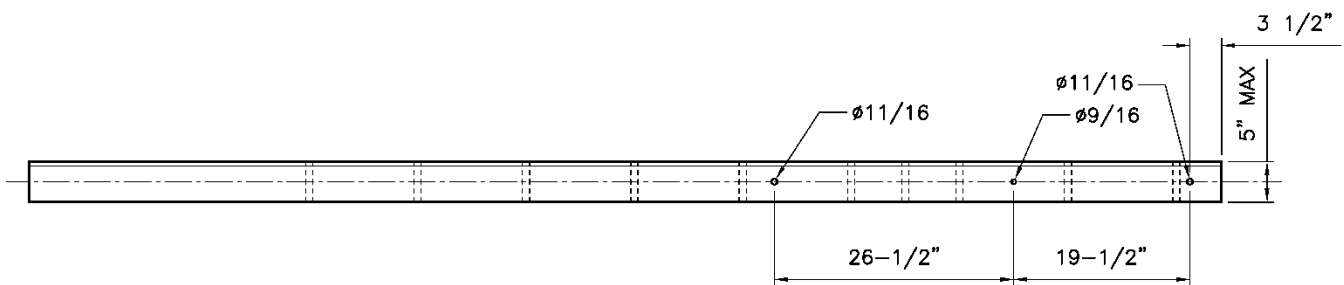
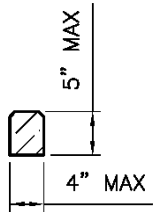


Figure 5.2f. End View Dimensions, Wing Arm



5.3 Figure Component List

Each crossarm shall consist of the following:

- Fiberglass crossarm beam with end caps
- Mount assembly, including crossarm attachment hardware

The crossarm box structure shall not compress or deform during hardware installation.

5.4 Strength Properties

Fiberglass crossarms shall meet or exceed the strength properties cited in Table 5.4.

Table 5.4. Standard Crossarm Strength Properties Ultimate Capacity Requirements

Longitudinal (lb/wire)	420
Vertical (lb/wire)	670
Transverse (lbf)	2050

Fiberglass crossarms shall meet or exceed ultimate moment capacity of equivalent wood arms for of each major axis (wood crossarm based on a Modulus of Rupture (MOR) of 7400 psi and Modulus of Elasticity (MOE) of 1.8x10⁶ psi) in accordance with ANSI O5.3.

Attachment points for pin-type insulators must meet the following transverse pin test requirements in accordance with ANSI O5.3:

- Transverse load shall be applied to a 1-3/8-in thread pin with a 2-1/4-in washer mounted on the fiberglass crossarm.
- Fiberglass member shall withstand transverse load up to 750 lb without crushing.
- Transverse load to be gradually increased to 1650 lb or ultimate, whichever comes first, and results shall be reported.

5.5 Deflection

Crossarms shall not exhibit a deflection of greater than 3/4" vertical for both the standard and wing arm as shown in figures 5.5a and 5.5b. Deflections shall be a result of independently applied loads as shown in Table 5.4.

Figure 5.5a. Standard Arm, Front View

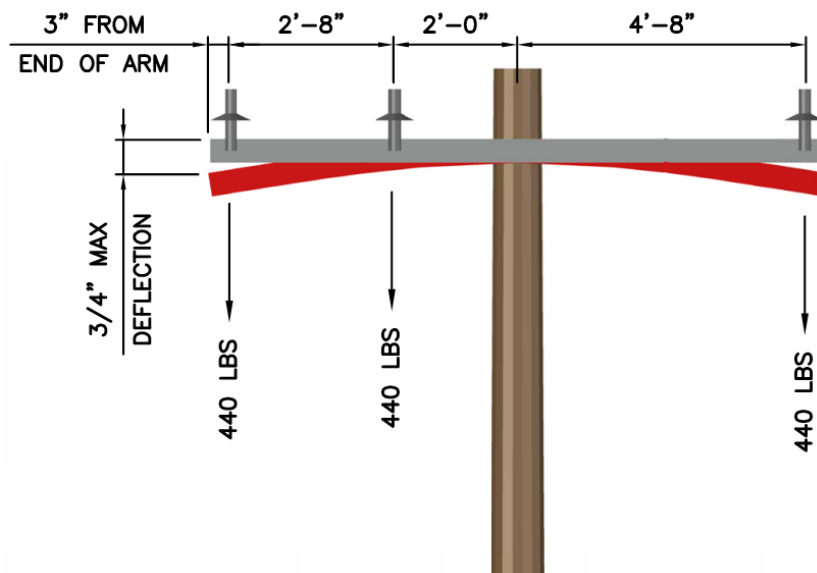
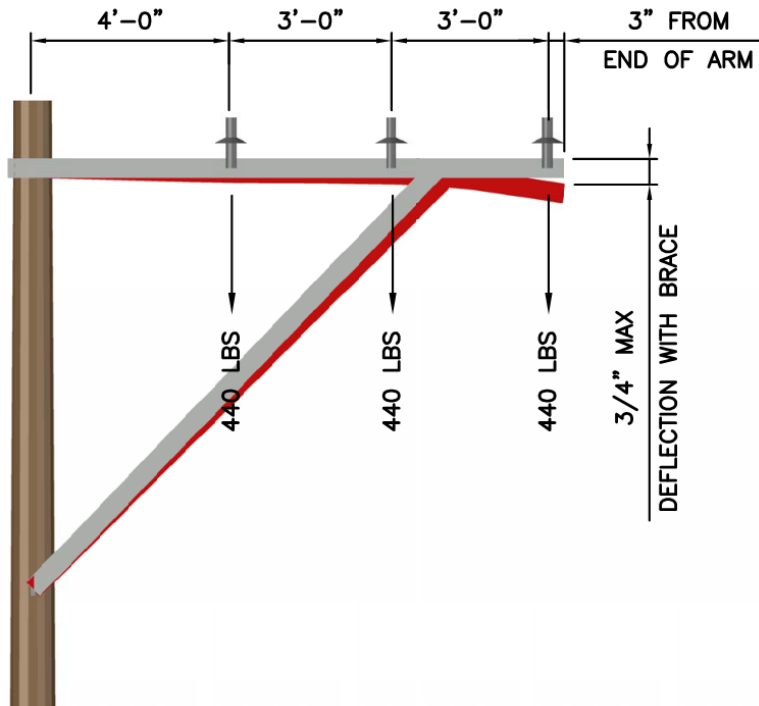


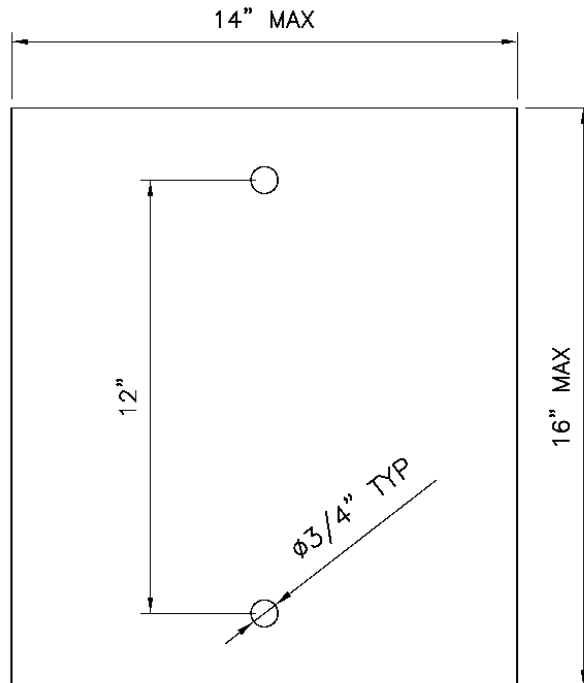
Figure 5.5b. Wing Arm, Front View



5.6 Mounting Bracket

The fiberglass crossarm mounting bracket shall be no larger than 14 in x 16 in with a minimum of two vertical 3/4-in mounting holes at 12 inches on center. See Figure 5.6.

Figure 5.6. Mounting Bracket Dimensions



6. Marking

Each crossarm shall be permanently and legibly marked with the following:

- Name or trademark of the manufacturer
- Year of manufacture
- Product serial number or identification number

Marking shall be placed in a location on the crossarm and of a size and font that is visible from the ground. Marking shall be non-metallic. Marking requirements shall also be detailed on the fabrication drawings.

7. Packaging

Crossarms shall be packaged in bundles of at least 25 where the shortest side of the bundle shall be no longer than 4 ft. Each crossarm bundle shall be marked legibly with the following information:

- Manufacturer identification number
- Gross weight
- Tare weight
- Net weight
- Date of manufacture
- Seattle City Light purchase order number
- Seattle City Light stock number

8. Shipping

Crossarms shall be delivered via an open-bed truck to allow for side unloading using a forklift.

9. Issuance

EA

10. Approved Manufacturers

Stock No.	Manufacturer	Arm Type	Catalog No.
014643	Alumaform	Standard	FTA20B-6-120-A-JFE
	Creative Pultrusions	Standard	HT6120300M0079
	Geotek PUPI	Standard	TB25001201003
014644	Alumaform	Wing	FAAB-132-JFF
	Creative Pultrusions	Wing	HT6132300M0078
	Geotek PUPI	Wing	AB20001322353

11. References

SCL Material Standard 5055.10; "Deadend Assemblies, Fiberglass"

12. Sources

National Electrical Safety Code (NESC), C2-2017 Edition; Institute of Electrical and Electronics Engineers (IEEE) Inc., New York, NY, 2016

Lu, Curtis, SCL Standards Engineer and Originator of 5055.05

Wang, Quan; SCL Standards Engineer and SME of 5055.05