

Three-Phase Multi-Gain Deadend Pole Top Assemblies

1. Scope

This standard covers the information necessary to construct the pole top assemblies for three-phase deadend poles with multiple gains supporting #4 AWG copper, 397.5 and 954 kcmil ACSR and hardware. Installation instructions to connect the primary conductor to the pole are included.

Criteria for pole top assemblies covered under this standard include the following:

| | |
|------------------------------|-----------------|
| Grade of construction | B or C |
| Pole class | 1 or stronger |
| Pole length | 55 ft and 60 ft |
| Soil condition | Average |
| Allowable line angle | 0°–60° |

If a deadend is not required, refer to SCL 0123.21 and SCL 0123.23.

Composite, steel, laminated, and other non-wood poles are outside the scope of this standard.

2. Application

This standard provides direction to Seattle City Light (SCL) engineers, crews, and contractors for the installation of three-phase multi-gain deadend pole top assemblies on 26 kV distribution poles.

3. General Requirements

There are two configurations of three-phase multi-gain deadend pole tops: parallel deadend and perpendicular deadend. The configurations are constructed differently and the crossarms are located at different elevations.

Use Table 3 to determine which configuration is applicable.

Table 3. Lower Gain Configurations

| Configuration | Angle Between Crossarms | Pole Length (ft) | Figure |
|---------------|-------------------------|------------------|--------|
| Parallel | 0°–10° | 60 | 3a |
| Perpendicular | 10°–90° | 55 | 3b |

Two-phase deadend poles shall be constructed as three-phase deadend poles without the center phase.

The center phase line post insulator and jumper wire of the lower double deadend circuit shall be installed on the same side as the head pin (of the upper circuit) which is on the street side.





For single deadend poles, the crossarm gain plate shall be installed on the back side of the pole to oppose the conductor tension. See figures 3.2a and 3.2e.

For double-deadend poles, the crossarm gain plate shall be installed on the side of the pole opposite the larger conductor or greater conductor tension. See figures 3.2c and 3.2g.

Figure 3a. Parallel Deadend Configuration

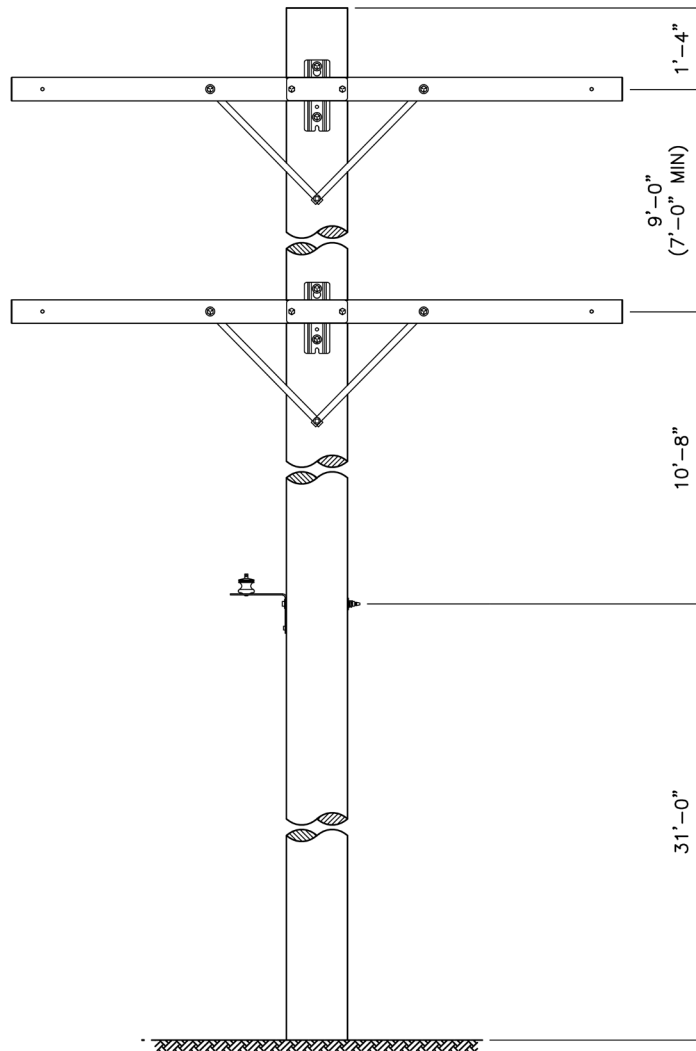
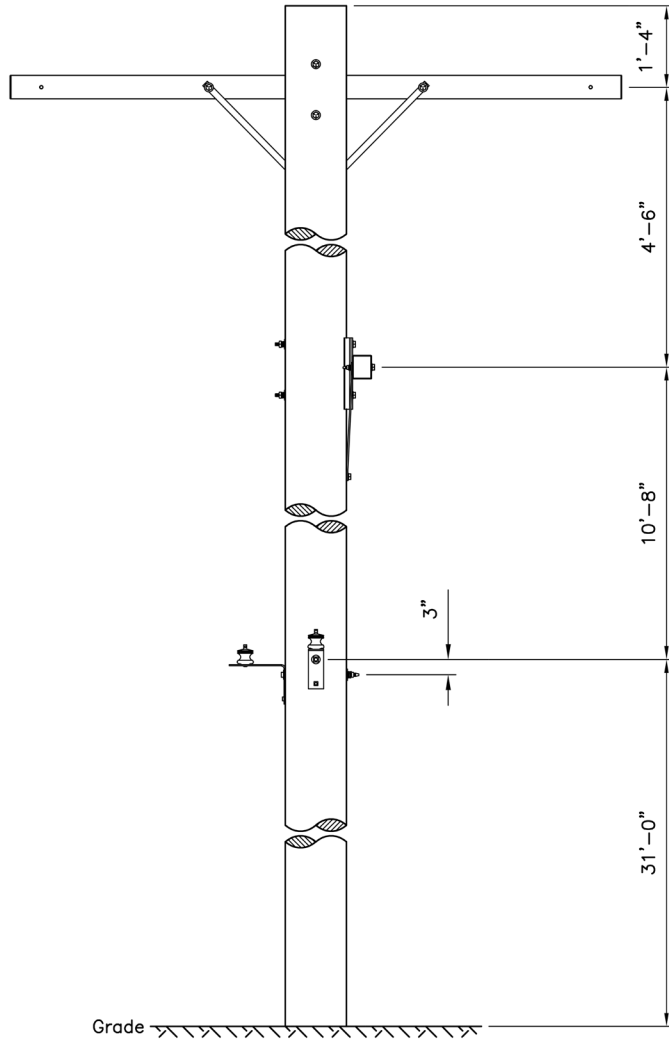


Figure 3b. Perpendicular Deadend Configuration



3.1 Upper Circuit Requirements

The upper gain shall be constructed as shown in SCL 0123.05.

3.2 Lower Circuit Requirements

The lower gain shall be constructed as shown in Table 3.2 and in Figures 3.2a through 3.2h.

Table 3.2. Lower Gain Three-Phase Deadend Pole Assemblies

| Conductor Size | Deadend Type | Allowable Line Angle | Figures |
|----------------|--------------|----------------------|---------|
| #4 AWG | Single | – | 3c, 3d |
| #4 AWG | Double | 0°–60° | 3e, 3f |
| 397.5 kcmil | Single | – | 3g, 3h |
| 397.5 kcmil | Double | 0°–60° | 3i, 3j |
| 954 kcmil | Single | – | 3g, 3h |
| 954 kcmil | Double | 0°–60° | 3i, 3j |

The single deadend poles shall have crossarms perpendicular to the primary conductor.

Deadend poles shall be guyed according to the requirements of SCL 0199.01.

The highest communication attachment shall be located a minimum of 40 in below the secondary and neutral, and a minimum of 10 ft below the top of the transformer.

Figure 3.2a. #4 AWG Copper Single Deadend, Top View

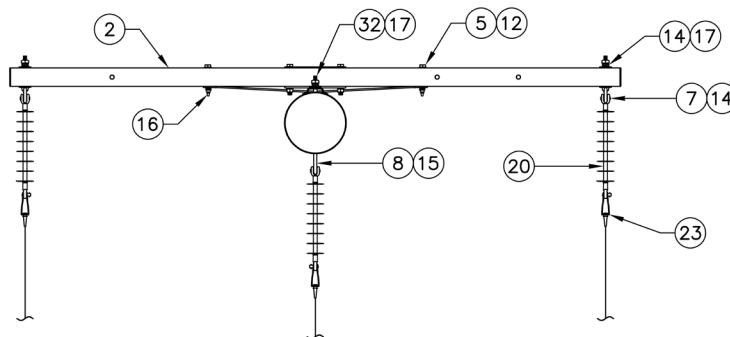


Figure 3.2b. #4 AWG Copper Single Deadend, Side View

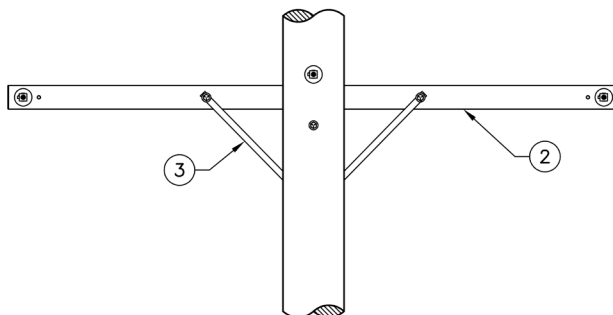


Figure 3.2c. Allowable Line Angle Range for #4 AWG Copper Double Deadend

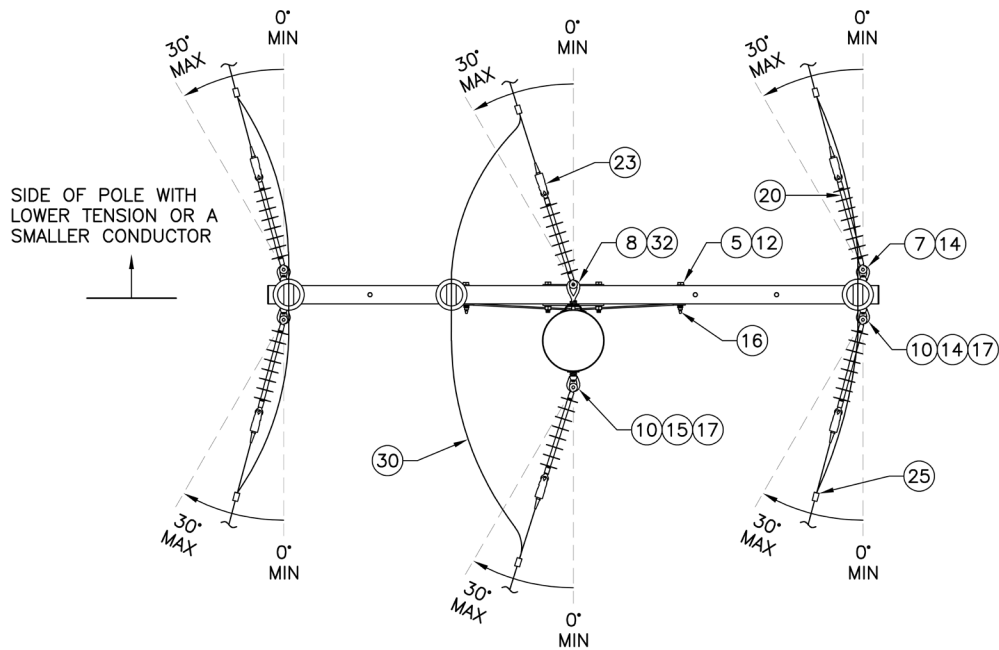


Figure 3.2d. #4 AWG Copper Double Deadend, Side View

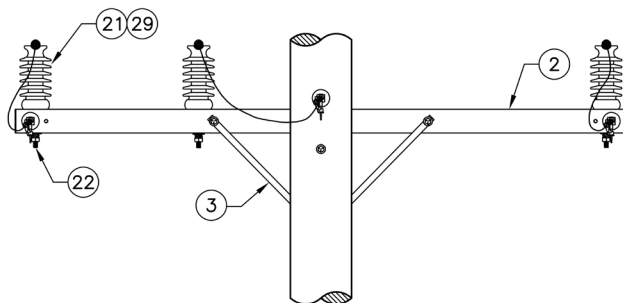


Figure 3.2e. 397.5 and 954 kcmil ACSR Single Deadend, Top View

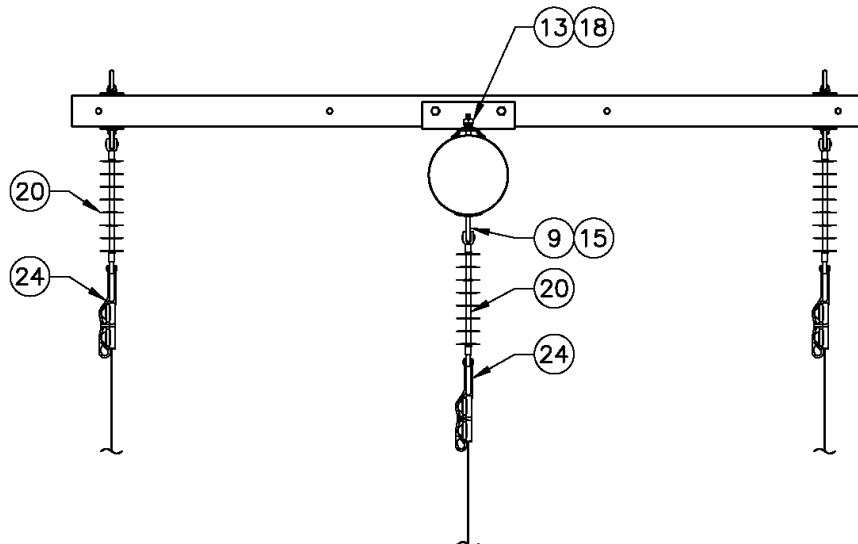


Figure 3.2f. 397.5 and 954 kcmil ACSR Single Deadend, Side View

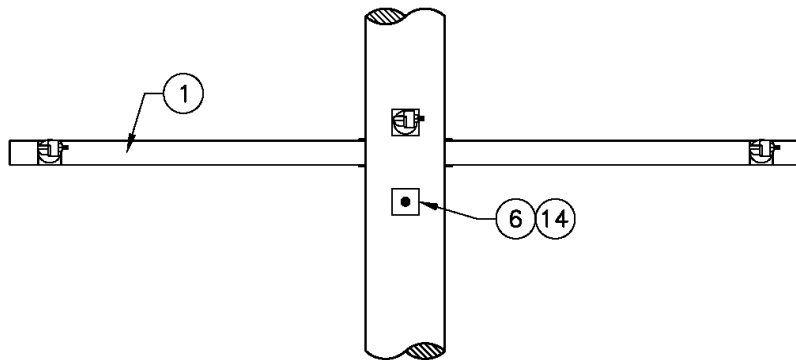


Figure 3.2g. Allowable Line Angle Range for 397.5 and 954 kcmil ACSR Double Deadend

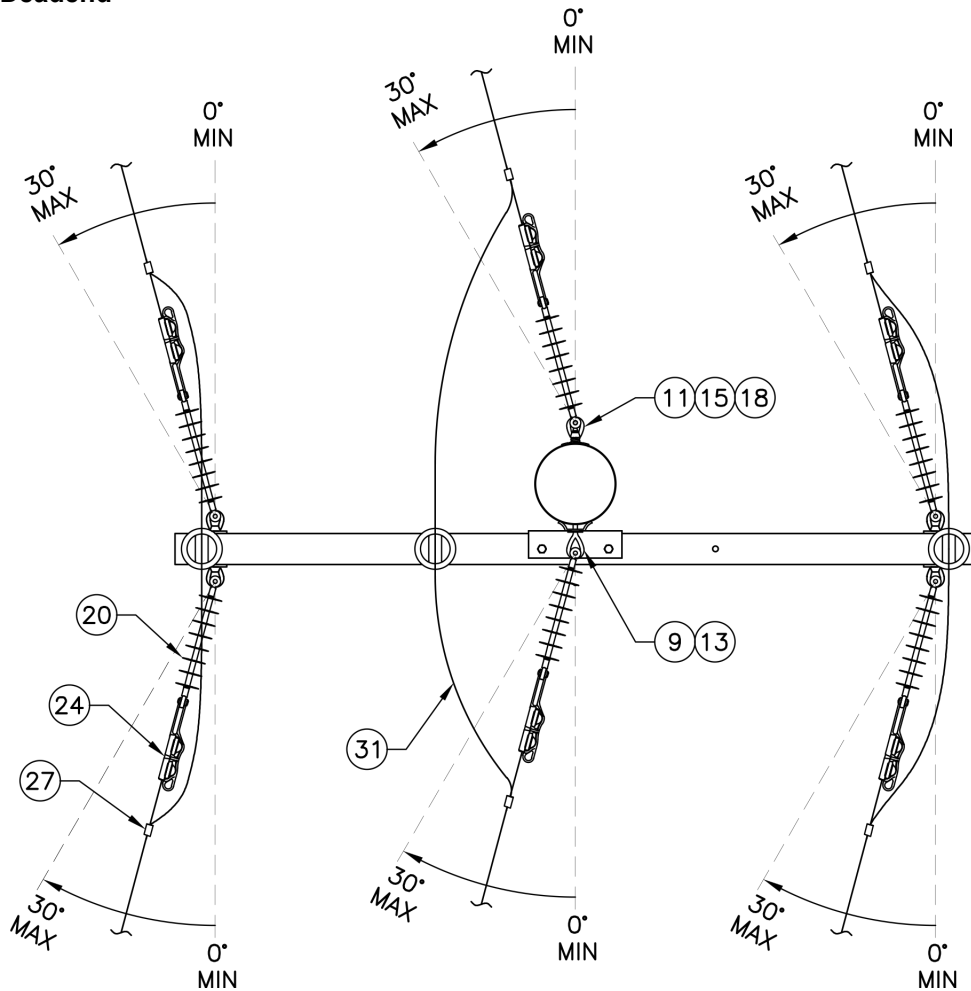
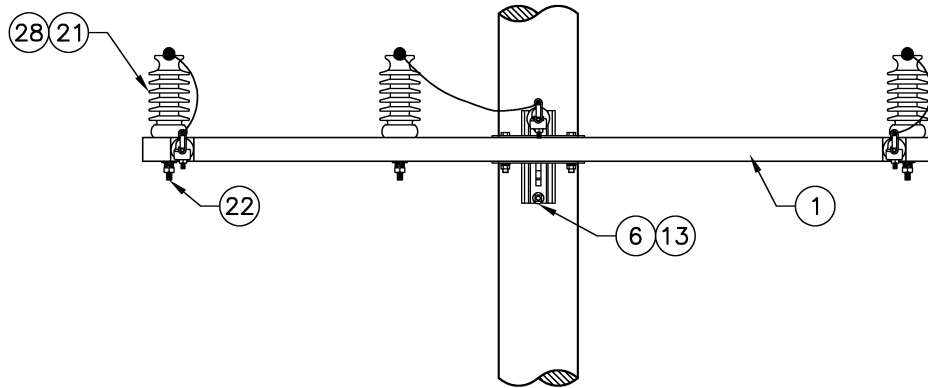


Figure 3.2h. 397.5 and 954 kcmil ACSR Double Deadend, Side View



4. Construction Notes

The larger conductor should be installed as the top circuit.

If poor soil is found in the field, contact the SCL Design Engineer.

If there are avian and wildlife concerns, contact the SCL Design Engineer.

If there are salt spray concerns, contact the SCL Design Engineer.

5. Material List

Table 5. Materials for the Lower Gain of Three-Phase Multi-Gain Deadend Pole Top Assemblies

| Fig | Compatible Unit | ID | Quantity | | | | | |
|-----|--|----------------|----------|---|---|---|---|---|
| 3c | Three-phase #4 AWG copper single deadend lower gain pole top assembly | PLT#4-3DEMG | | | | | | |
| 3e | Three-phase #4 AWG copper double deadend lower gain pole top assembly | PLT#4-3DDE60MG | | | | | | |
| 3g | Three-phase 397.5 kcmil ACSR single deadend lower gain pole top assembly | PLT397-DEMG | | | | | | |
| 3i | Three-phase 397.5 kcmil ACSR double deadend lower gain pole top assembly | PLT397-DDE60MG | | | | | | |
| 3g | Three-phase 954 kcmil ACSR single deadend lower gain pole top assembly | PLT954-DEMG | | | | | | |
| 3i | Three-phase 954 kcmil ACSR double deadend lower gain pole top assembly | PLT954-DDE60MG | | | | | | |
| # | Material Description | ID | | | | | | |
| 1 | Crossarm, fiberglass, deadend, 10' | 013636 | 1 | 1 | 1 | 1 | - | - |
| 2 | Crossarm, fiberglass, tangent | 014643 | - | - | - | - | 1 | 1 |
| 3 | Crossarm, brace, flat, 32" | 563005 | - | - | - | - | 2 | 2 |
| 4 | Bolt, machine, galv., 5/8" x 14" | 780846 | - | - | - | - | 1 | 1 |
| 5 | Bolt, machine, galvanized, 1/2" x 6" | 780806 | - | - | - | - | 2 | 2 |
| 6 | Bolt, machine, galvanized, 3/4" x 14" | 780876 | 1 | 1 | 1 | 1 | - | - |
| 7 | Bolt, oval eye, galvanized, 5/8" x 6" | 561106 | - | - | - | - | 2 | 2 |
| 8 | Bolt, oval eye, galvanized, 5/8" x 16" | 561116 | - | - | - | - | 2 | 2 |
| 9 | Bolt, oval eye, galvanized, 3/4" x 14" | 561214 | 1 | 1 | 1 | 1 | - | - |
| 10 | Nut, oval eye, 5/8" | 565252 | - | - | - | - | 3 | - |
| 11 | Nut, oval eye, 3/4" | 565254 | 1 | - | 1 | - | - | - |
| 12 | Washer, round, flat, 1/2" | 585025 | - | - | - | - | 2 | 2 |
| 13 | Washer, round, flat, 3/4" | 585035 | 2 | 2 | 2 | 2 | - | - |
| 14 | Washer, square, flat, 2-1/4" x 2-1/4" | 585135 | - | - | - | - | 5 | 6 |
| 15 | Washer, square, curved, 4" x 4" | 584775 | 2 | 2 | 2 | 2 | 1 | 2 |
| 16 | Washer, spring lock, 1/2" | 584257 | - | - | - | - | 2 | 2 |
| 17 | Washer, spring lock, 5/8" | 584261 | - | - | - | - | 4 | 4 |
| 18 | Washer, spring lock, 3/4" | 584267 | 2 | 2 | 2 | 2 | - | - |
| 19 | Lag screw, 1/2" x 4" | 785261 | - | - | - | - | 1 | 1 |
| 20 | Insulator, deadend, polymer, 20" | 690233 | 6 | 3 | 6 | 3 | 6 | 3 |
| 21 | Insulator, vertical line post, 34.5 kV, tie-top | 014304 | - | - | 3 | - | 3 | - |
| 21 | Insulator, vertical line post, 34.5 kV, clamp-top | 014517 | 3 | - | - | - | - | - |
| 22 | Stud, long, 3/4" x 7-1/2" | 696828 | 3 | - | 3 | - | 3 | - |
| 23 | Deadend, automatic, feed-through, #4 AWG Cu | 581332 | - | - | - | - | 6 | 3 |
| 24 | Clamp, deadend, straight line, for ACSR and AAC, #3/0-477 | 694292 | - | - | 6 | 3 | - | - |

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| # | Material Description | ID | | | | | | | |
|----|---|--------|----|---|----|---|----|---|---|
| 24 | Clamp, deadend, straight line, for ACSR and AAC, 397–954 | 694294 | 6 | 3 | – | – | – | – | – |
| 25 | Clamp, hot line tap, 2/0, #8 | 580725 | – | – | – | – | 6 | – | – |
| 27 | Connector, Ampact, 397–397 | 651101 | – | – | 6 | – | – | – | – |
| 27 | Connector, Al, 954–954 | 013624 | 6 | – | – | – | – | – | – |
| 28 | Insulator tie, top, 397.5, 0.756"–0.855" | 658979 | – | – | 3 | – | – | – | – |
| 29 | Wire, solid bare copper, dead-soft-annealed, insulator tie, #6 AWG (ft) | 610210 | – | – | – | – | 18 | – | – |
| 30 | Wire, solid bare copper, dead-soft-annealed, jumper, #4 AWG (ft) | 610208 | – | – | – | – | 30 | – | – |
| 31 | Wire, bare, AAC, jumper, 397.5, Canna (ft) | 600113 | – | – | 30 | – | – | – | – |
| 31 | Wire, bare, AAC, jumper, 954, Goldenrod (ft) | 600126 | 30 | – | – | – | – | – | – |
| 32 | Washer, round, flat, 5/8" | 585030 | – | – | – | – | 2 | 2 | – |

6. References

SCL Construction Standard 0123.21; “Three-Phase Multi-Gain Tangent Pole Top Assemblies”

SCL Construction Standard 0123.23; “Three-Phase Multi-Gain Angle Pole Top Assemblies”

SCL Construction Standard 0199.01; “Requirements for Guying and Anchoring”

7. Sources

National Electrical Safety Code (NESC), C2–2012 Edition; Institute of Electrical and Electronics Engineers (IEEE) Inc., New York, NY, 2011

Hall, Alan; SCL Engineer and subject matter expert for 0123.25

Lu, Curtis; SCL Standards Engineer and originator of 0123.25

SCL Construction Guideline D2-1 (canceled); “Standard Spacing of Arms”