

## 115 kV Angle Pole Top Assemblies

### 1. Scope

This standard provides the information necessary to construct the pole top assemblies for 115 kV single-circuit angle poles supporting 795 kcmil ACSR and 954 kcmil ACSR conductors on the 115 kV transmission system, with or without static wire.

Static wire is also known as overhead ground wire (OHGW).

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

<b>Grade of construction</b>	B
<b>Design criteria</b>	NESC Medium, No Uplift
<b>Pole class</b>	H1 or stronger
<b>Soil condition</b>	Average
<b>Allowable line angle</b>	5°-60°

For tangent (0°-5°) pole top assemblies, refer to SCL 1621.10.

For vertical deadend corner (35° or larger) pole top assemblies, refer to SCL 1621.30.

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 single-circuit, angle pole top assemblies on 115 kV transmission poles with 795 kcmil ACSR and 954 kcmil ACSR conductors.

115 kV angle pole tops are constructed in a vertical configuration only.

Vertical running angles are typically utilized to achieve a continuous run of equal tension conductor where a transmission deadend termination is not required or ideal for the location.

### 3. Requirements

115 kV angle pole tops assemblies are constructed in vertical configuration with either line post or line suspension insulators, with or without static wire.

Line post insulators are used for small-angle (5°-15°) installations.

Line suspension insulators are used for running-angle (15°-60°) installations.

For line post framing, the insulator shall not have any conductor uplift. Contact the SCL Design Engineer if conductor uplift is a concern.

For line suspension framing, the minimum allowable conductor to pole surface shall be 28 inches. Contact the SCL Design Engineer if clearance is a concern.





All line angles shall be constructed on the bi-sector.

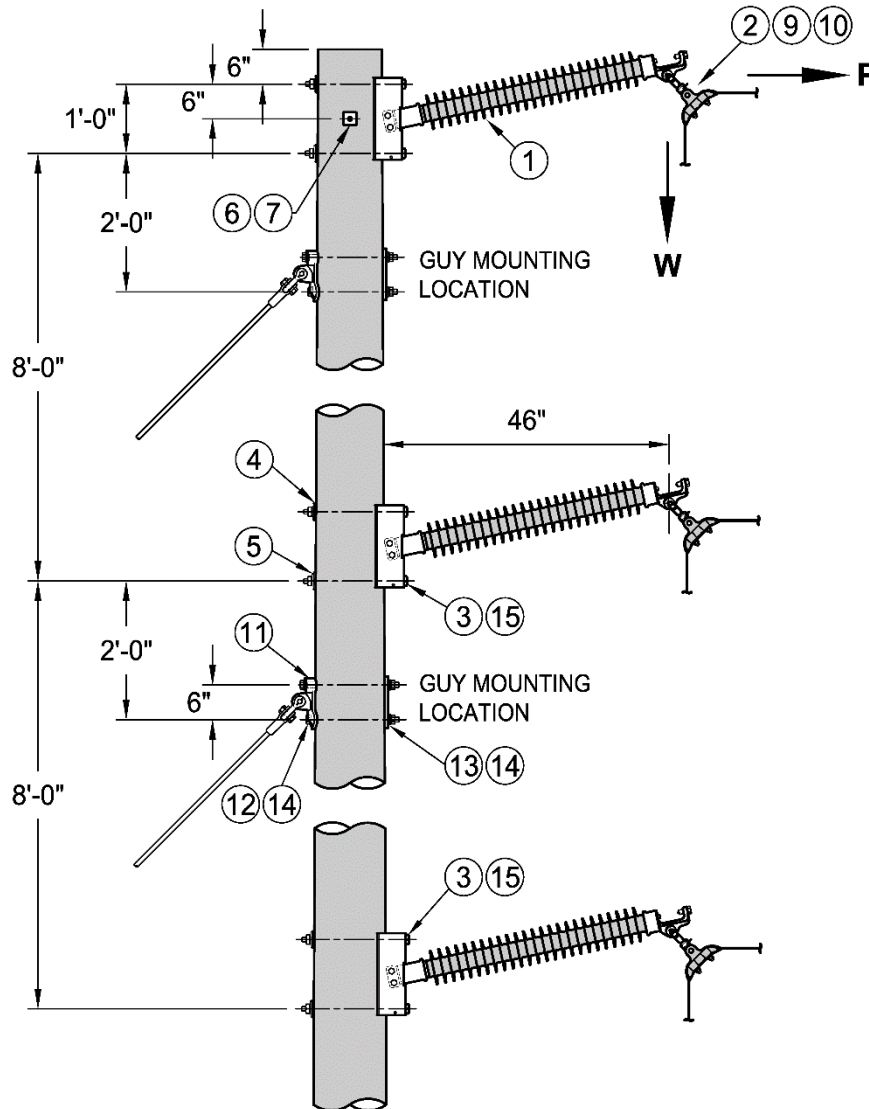
Pole top assemblies shall be constructed as shown in Table 3.

**Table 3. 115 kV Vertical Running Angle Pole Top Assemblies**

Conductor Size	Allowable Line Angle	Figure(s)
795 or 954 kcmil ACSR	5°–15°, without Static Wire	3a
795 or 954 kcmil ACSR	5°–15°, with Static Wire	3b, 3e
795 or 954 kcmil ACSR	15°–60°, without Static Wire	3c
795 or 954 kcmil ACSR	15°–60°, with Static Wire	3d, 3e

For grounding of static wire, see SCL 0462.10.

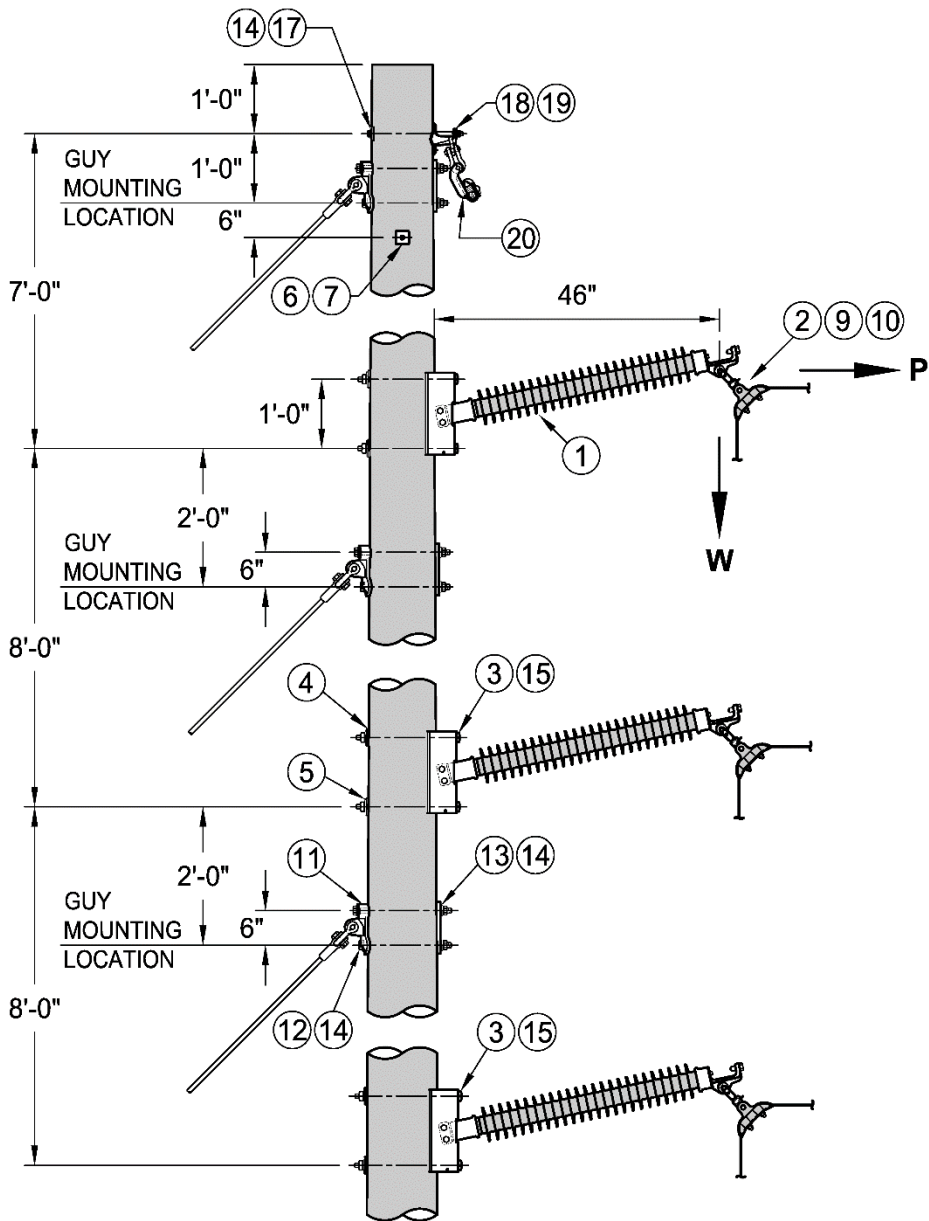
**Figure 3a. Line Post Angle Pole (5°–15°), without Static Wire**



**Notes:**

1. Maximum vertical weight (W) not to exceed 1515 lb.
2. Maximum horizontal pull (P) not to exceed 2000 lb.

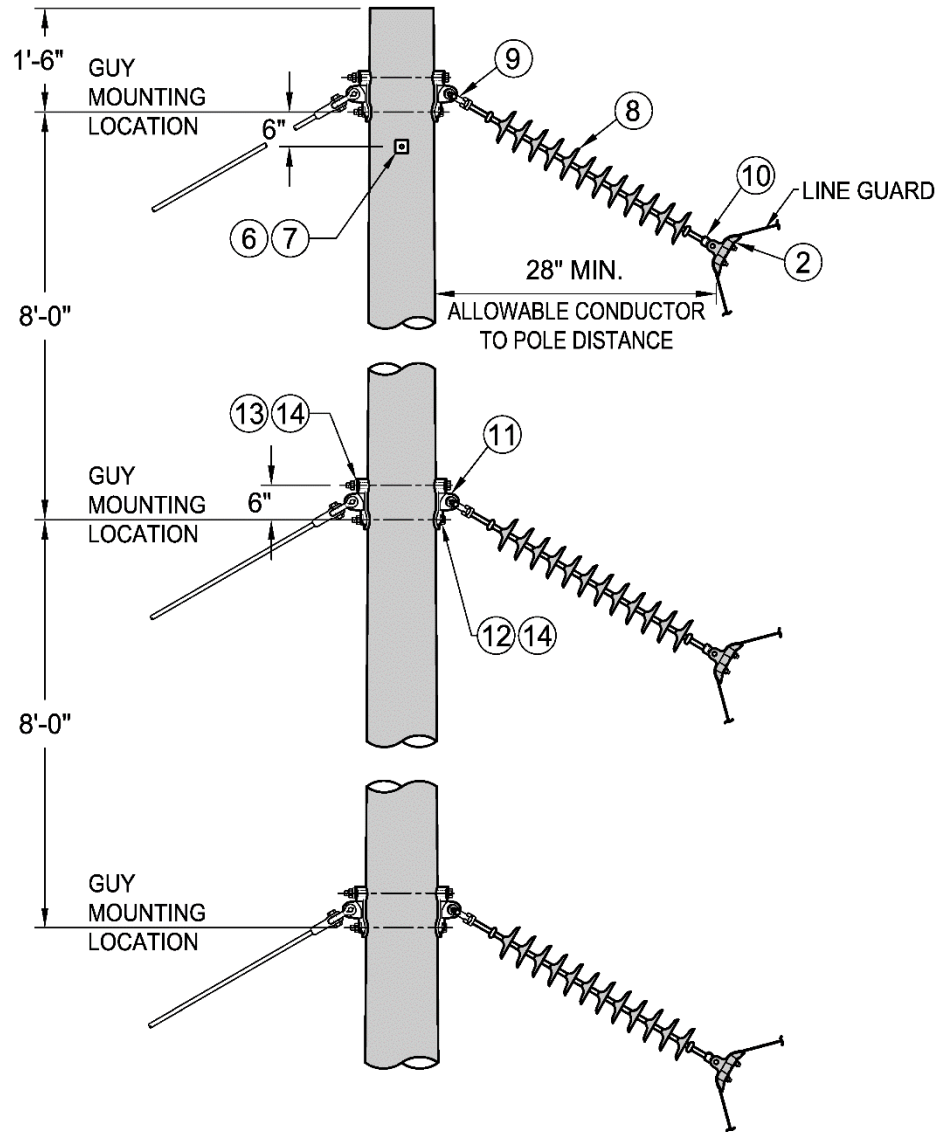
**Figure 3b. Line Post Angle Pole (5°–15°), with Static Wire**



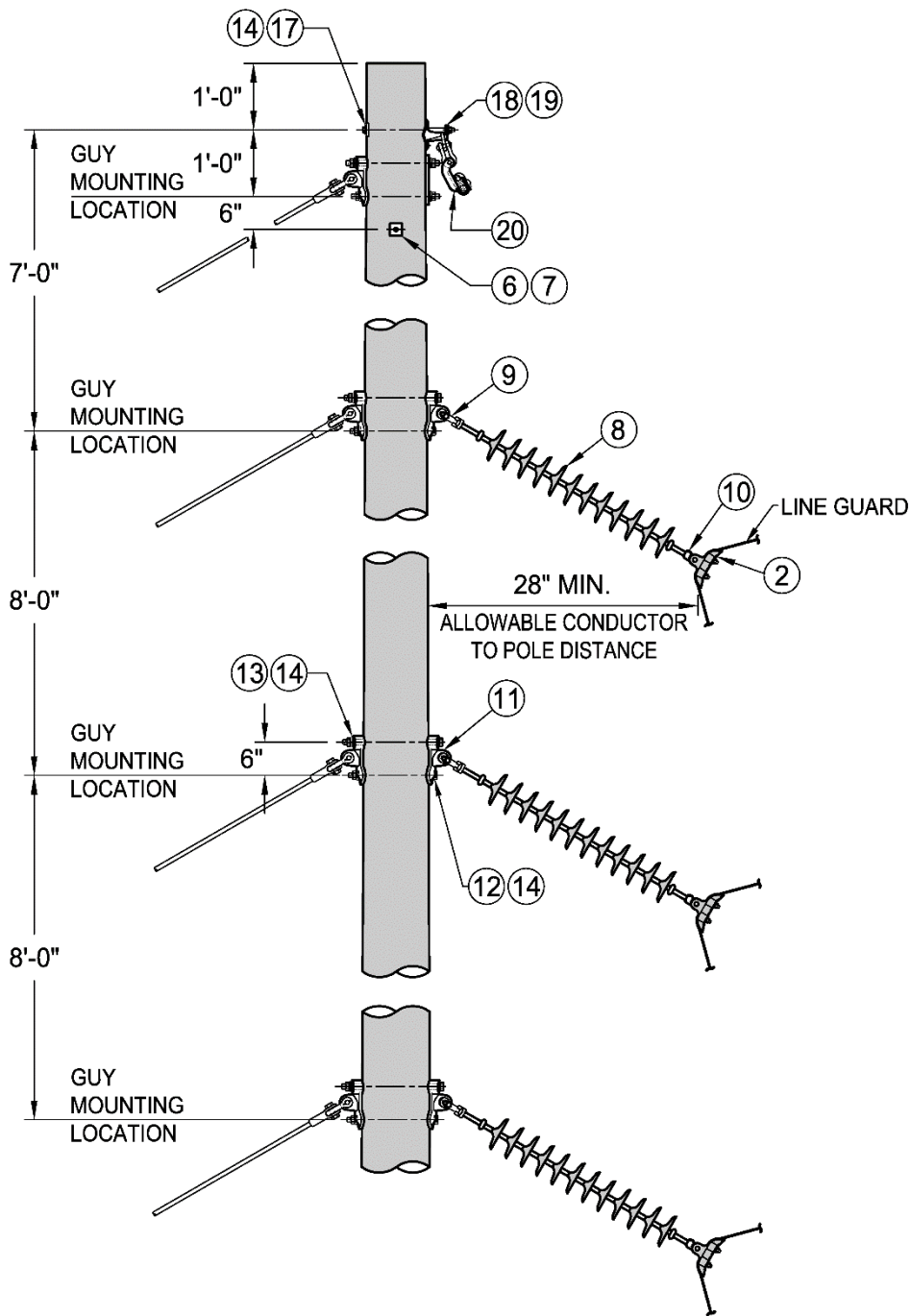
**Notes:**

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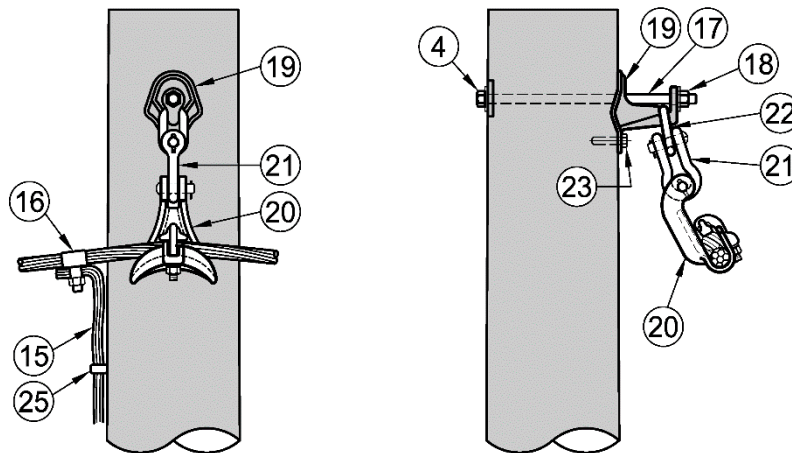
**Figure 3c. Line Suspension Angle Pole (15°–60°), without Static Wire**



**Figure 3d. Line Suspension Angle Pole (15°–60°), with Static Wire**



**Figure 3e. Line Suspension Static Wire Angle Framing Details**



#### 4. Construction Notes

Guy mounting locations are shown in figures 3a–3d. Guying calculations are required to determine guying requirements. The SCL Design Engineer will specify the sizes and number of down guys based on conductor design tension, line angle, and down guy lead length. See SCL 0199.01 for guying instructions.

Anchor selection is specified by the design engineer based on line loading, soil class, and holding strength requirements.

Bolt lengths will vary depending on installation height and thickness of the pole line hardware. Bolts should be of the required length to fit the pole diameter at each point of installation. Bolts specified in the material list (Section 5) are sized appropriately for most installation points. No more than two inches of bolt thread should be exposed after installation. Crews are encouraged to have a small supply of shorter lengths on hand for instances in which bolt length is excessive.

Install double coil spring washers on the threaded end of machine bolts.

Contact the SCL Design Engineer for concerns regarding the following:

- Poor soil conditions
- Avian and wildlife
- Salt spray
- Clearances

The static wire framing assembly is intended for Alumoweld 7-#6 AWG or 7/16-in Aluminum-covered 20M wire.

**5. Material List**

**Table 5. Materials for 115 kV Angle Pole Top Assemblies**

Fig	Compatible Unit	ID	Quantity			
3a	Line Post Angle, Without Static Wire (5°–15°)	TBD				
3b,3e	115 KV Line Post Angle, With Static Wire (5°–15°)	TBD				
3c	115 KV Line Post Angle, Without Static Wire (15°–60°)	TBD				
3d, 3e	115 KV Line Suspension Angle, With Static Wire (15°–60°)	TBD				
#	Material Description	ID				
1	Insulator, horizontal post, polymer, curved base, 115 kV	690189	–	–	3	3
2	Clamp, suspension, aluminum (1.25" – 1.82")	695155	3	3	3	3
3	Bolt, machine, galvanized, sq. head, 3/4" x 22"	780846	–	–	6	6
4	Washer, square curved, 4" x 4", (5/8" to 7/8")	548775	1	–	7	6
5	Washer, double coil lock, helical, 3/4"	548267	–	–	6	6
6	Bolt, machine, galvanized, 5/8" x 18"	780848	1	1	1	1
7	Washer, square flat, galvanized, 5/8", 2-1/4"	585135	1	1	7	7
8	Insulator, suspension, polymer, 115 kV	690237	3	3	–	–
9	Fitting, Y-clevis ball	695525	3	3	3	3
10	Fitting, socket eye	696020	3	3	3	3
11	Plate, pole eye, 7/8" or 1"	565199	6	6	–	–
12	Bolt, machine, galvanized square head, 7/8", 22"	012643	6	6	–	–
13	Washer, double coil lock, helical, 7/8"	012651	6	6	–	–
14	Washer, round flat, 7/8", 2-1/4"	585040	12	12	–	–
15	Washer, round flat, galvanized, 3/4"	585035	–	–	6	6
16	Two-bolt tap, 2/0	669379	1	–	1	–
17	Bolt, machine, galvanized, 5/8" x 20"	780849	1	–	1	–
18	Washer, double coil lock, 5/8"	584261	1	–	1	–
19	Bracket, ground wire	565005	1	–	1	–
20	Clamp, suspension, static wire	695016	1	–	1	–
21	Shackles, anchor, round pin	696603	1	–	1	–
22	Chain links	696195	1	–	1	–
23	Lag bolt, 1/2" x 2"	785261	1	–	1	–

## 6. References

- SCL Construction Guideline D16-4**; Clearances from Structures and Ground”
  - SCL Construction Standard 0462.10**; Grounding Electrodes for Overhead Ground Wire”
  - SCL Construction Standard 0199.01**; “Guy Installation”
  - SCL Design Standard 1621.10**; “115 kV Tangent Pole Top Assemblies”
  - SCL Design Standard 1621.30**; “115 kV Deadend Pole Top Assemblies”
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## 7. Sources

- Allen, Skip**; SCL Field Operations Supervisor and subject matter expert for 1621.20 (skip.allen@seattle.gov)
- Caddy, Tom**; SCL Field Operations Supervisor and subject matter expert for 1621.20 (tom.caddy@seattle.gov)
- Lin, Jimmy**; SCL Engineer and subject matter expert for 1621.20 (jimmy.lin@seattle.gov)
- National Electrical Safety Code (NESC); C2-2012 Edition**; Institute of Electrical and Electronics Engineers (IEEE) Inc., New York, NY, 2011
- Neuansourinh, Ponet**; SCL Standards Engineer, originator, and subject matter expert for 1621.20 (ponet.neuansourinh@seattle.gov)