

## Overhead Single-Phase Transformer Installation

### 1. Scope

This standard covers the information necessary to install overhead single-phase transformers on the 26 kV primary distribution system. Installation instructions to connect the equipment to the wood pole are included, along with requirements for vertical spacing and hardware.

### 2. Application

This standard provides direction to Seattle City Light (SCL) engineers, crews, and contractors for the installation of overhead single-phase transformers on 26 kV wood distribution poles.

### 3. Requirements

#### 3.1 General

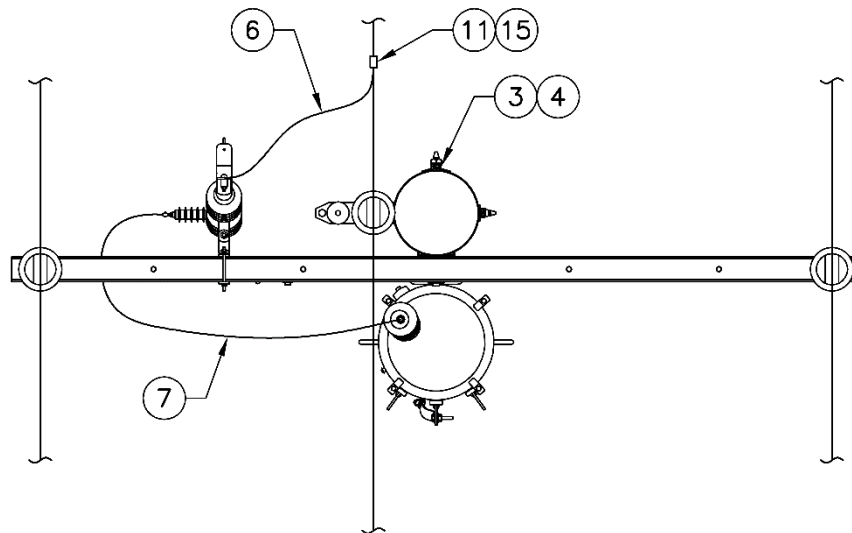
An overhead single-phase transformer with a crossarm shall be installed as shown in figures 3.1a, 3.1b, and 3.1c.

An overhead single-phase transformer without a crossarm shall be installed as shown in figures 3.1d, 3.1e, and 3.1f.

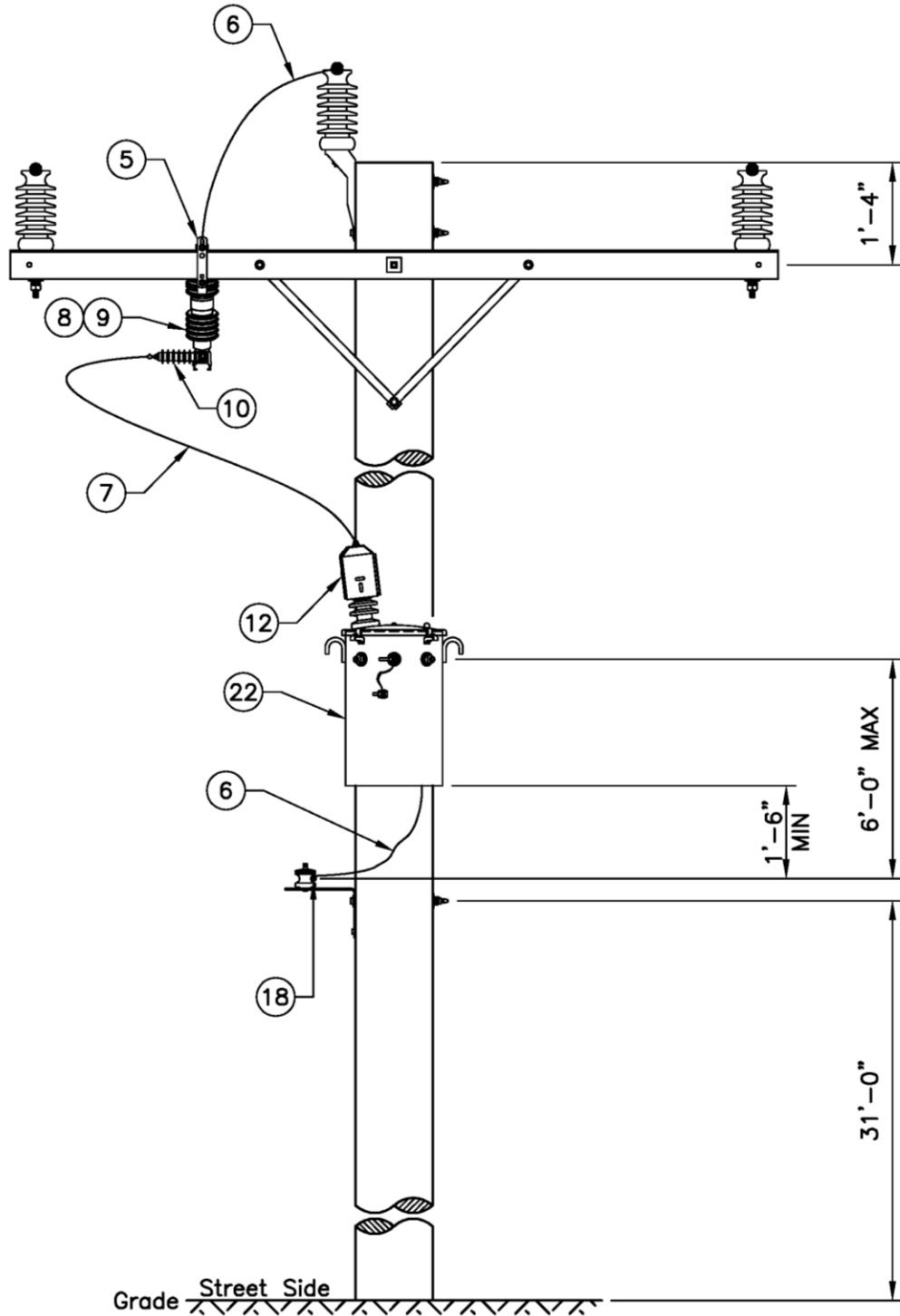
The secondary bushings shall be connected as shown in Figure 3.1h using the copper wire specified in Table 3.1.

If the neutral wire is 4/0 AWG aluminum, install and connect a neutral stirrup as shown in Figure 3.1g.

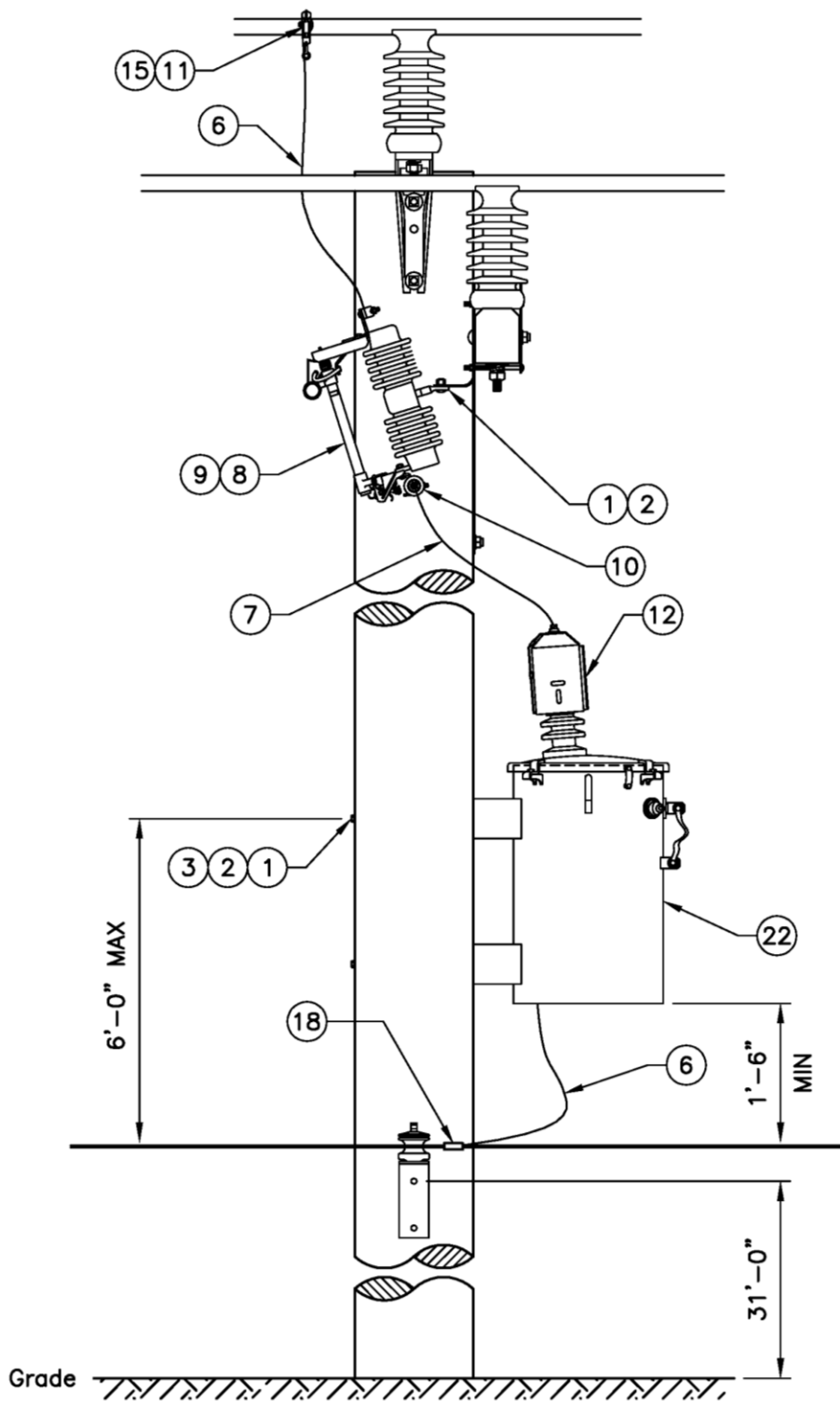
**Figure 3.1a Single-Phase Transformer Installation With Crossarm, Top View**



**Figure 3.1b Single-Phase Transformer Installation With Crossarm, Profile View**



**Figure 3.1c Single-Phase Transformer Installation With Crossarm, Side View**



**Figure 3.1d Single-Phase Transformer Installation, Without Crossarm, Top View**

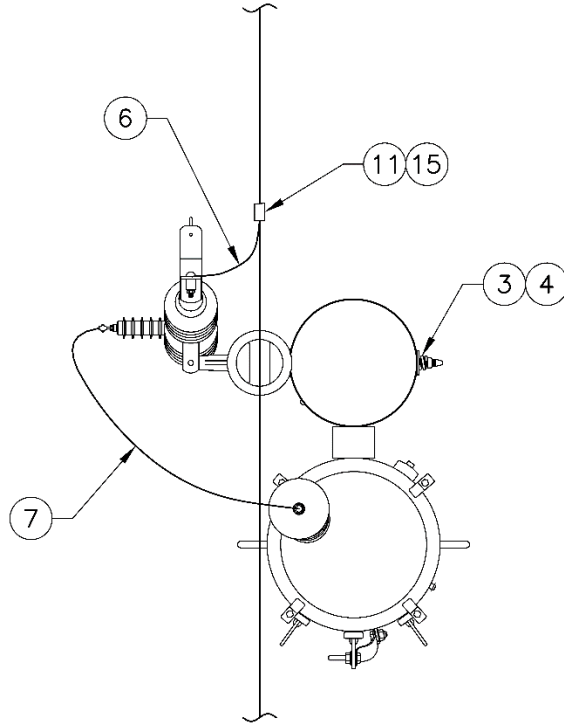
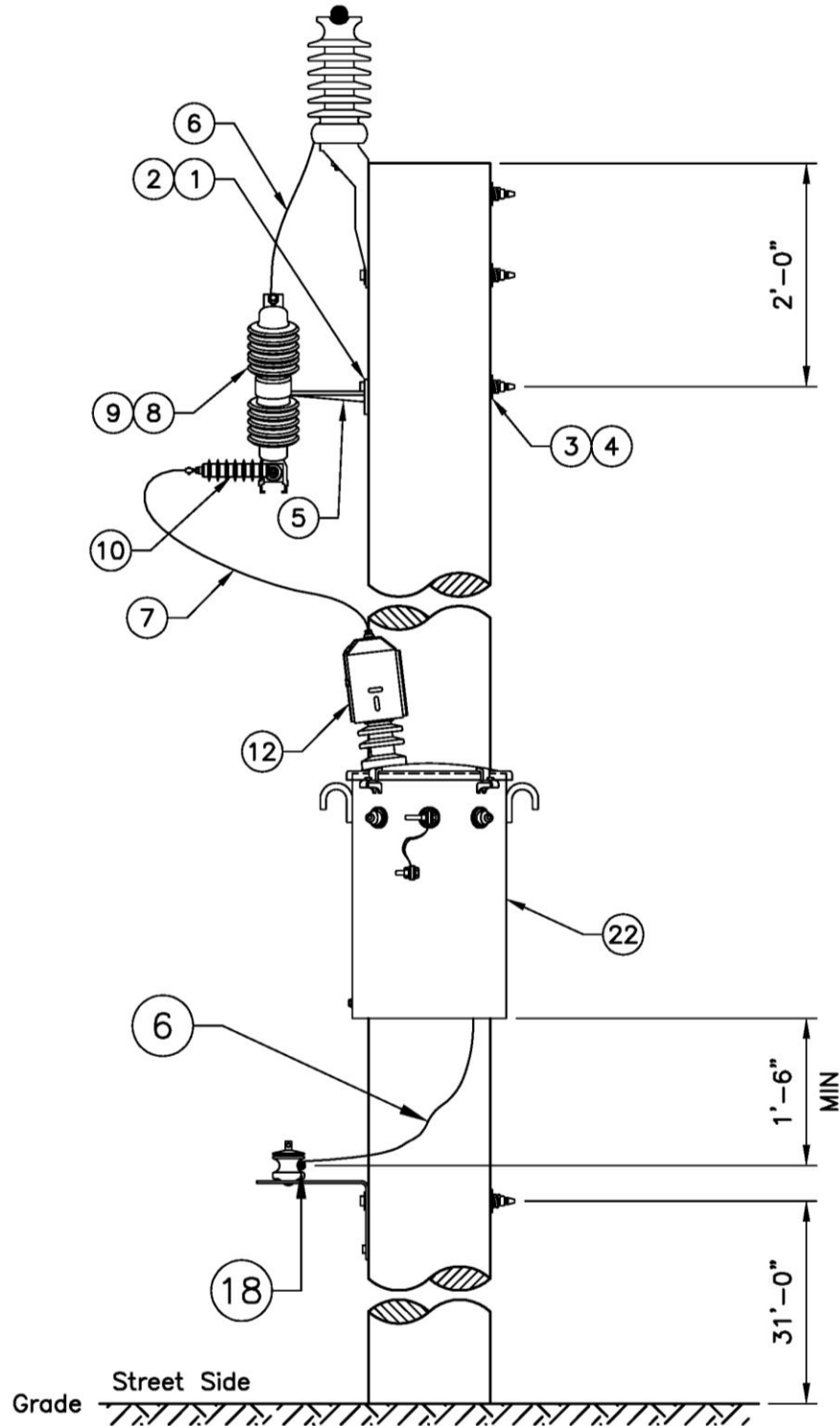
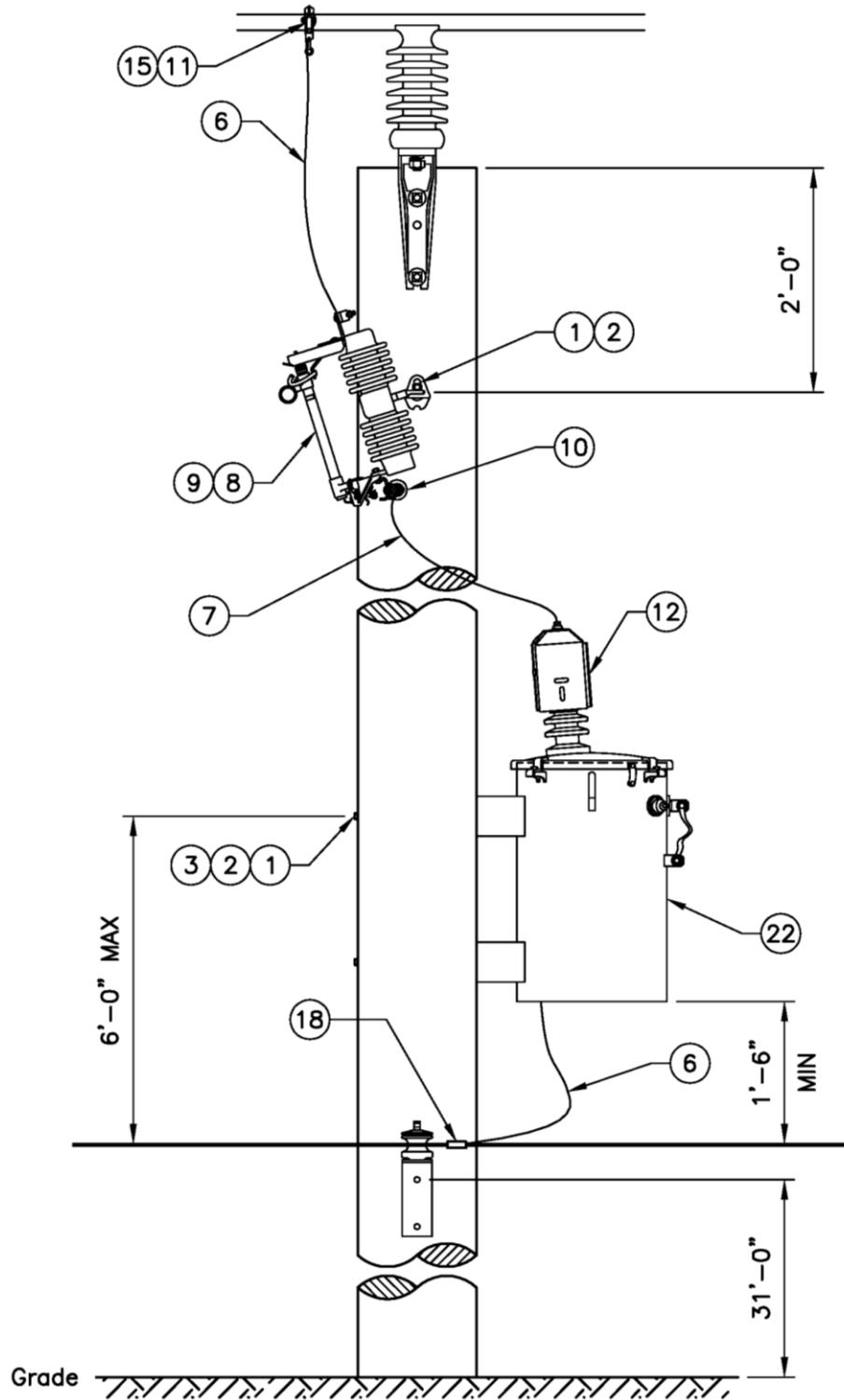


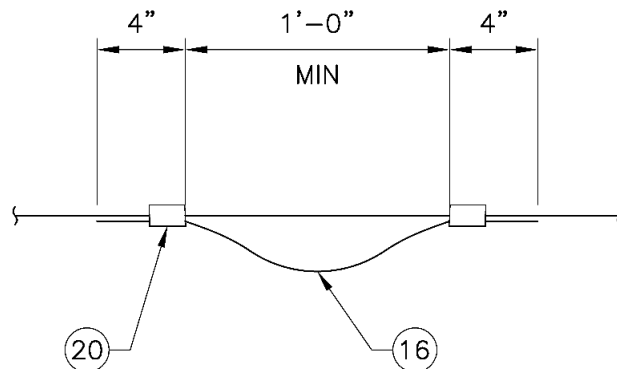
Figure 3.1e Single-Phase Transformer Installation, Without Crossarm, Profile View



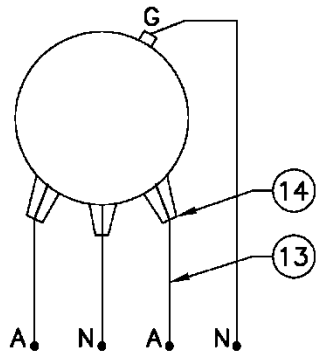
**Figure 3.1f Single-Phase Transformer Installation, Without Crossarm, Side View**



**Figure 3.1g Neutral Stirrup**



**Figure 3.1h Single-Phase Transformer Secondary Connection**



**Table 3.1. Single-Phase Transformer Secondary Wire Sizes (AWG/kcmil)**

kVA	120/240 V		240/480 V	
	A	N	A	N
25	#2	#2	-	-
50	4/0	2/0	#2	#2
75	350	4/0	2/0	#2
100	350	4/0	4/0	2/0
167	2-350	350	-	-

### 3.2 Avian Protection

A bird guard shall be installed as shown in SCL D15-1 on all transformers.

Additional avian protection shall be installed for all poles located in avian-sensitive areas as instructed in SCL 0072.01.

### 4. Construction Notes

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 Lists**

**Table 5a. Single-Phase 120/240 V Transformer With Crossarm**

Fig	Compatible Unit	ID	Quantity					
3.1b	Single-phase transformer 25 kVA - 120/240 V	XY1C-25-240BW						
3.1b	Single-phase transformer 50 kVA - 120/240 V	XY1C-50-240BW						
3.1b	Single-phase transformer 75 kVA - 120/240 V	XY1C-75-240BW						
3.1b	Single-phase transformer 100 kVA - 120/240 V	XY1C-100-240BW						
3.1b	Single-phase transformer 167 kVA - 120/240 V	XY1C-167-240BW						
<b>#</b>	<b>Material Description</b>	<b>ID</b>	<b>↓</b>	<b>↓</b>	<b>↓</b>	<b>↓</b>	<b>↓</b>	<b>↓</b>
1	Bolt, machine, galvanized, 5/8" x 14"	780846	2	2	2	2	2	2
2	Washer, flat, round, 5/8"	585030	2	2	2	2	2	2
3	Washer, square, flat, 2-1/4" x 2-1/4"	585135	2	2	2	2	2	2
4	Washer, coil spring lock, 5/8"	584261	2	2	2	2	2	2
5	Bracket, crossarm	682097	1	1	1	1	1	1
6	Wire, #4 AWG Cu, bare	610208	20	20	20	20	20	20
7	Wire, #4 AWG Cu, soft drawn, poly insulated, ft	611442	8	8	8	8	8	8
8	Cutout, 27 kV, polymer	013739	1	1	1	1	1	1
9	Fuse link, 3T rated	683706	-	-	-	-	-	1
9	Fuse link, 6K rated	683708	-	-	-	1	-	-
9	Fuse link, 10K rated	683710	-	1	1	-	-	-
9	Fuse link, 15K rated	683711	1	-	-	-	-	-
10	Fuse, fault limiter, size 12K	684920	-	1	1	1	1	1
10	Fuse, fault limiter, size B	684902	1	-	-	-	-	-
11	Clamp, hot line tap, 2/0 - #8	580725	1	1	1	1	1	1
12	Bird guard	580776	1	1	1	1	1	1
13	Wire, #2 AWG Cu, soft drawn, poly insulated, ft	613730	-	-	-	-	-	45
13	Wire, #2/0 AWG Cu, soft drawn, poly insulated, ft	613733	-	-	-	15	-	-
13	Wire, #4/0 AWG Cu, soft drawn, poly insulated, ft	613735	-	15	15	30	-	-
13	Wire, 350 kcmil Cu, soft drawn, poly insulated, ft	613738	75	30	30	-	-	-
14	Bolted terminal, #1/0 solid to 500 AWG	676120	5	3	-	-	-	-
15	Stirrup, bolted 397.5 to 954 kcmil ACSR	580678	1	1	1	1	1	1
16	#2 Cu bare	610434	2	2	2	2	2	2
18	Split bolt tap	668867	1	2	2	2	2	2
19	2 bolt tap 2/0	669379	-	-	-	1	-	-
19	2 bolt tap 4/0	669380	-	1	1	-	-	-
19	2 bolt tap 350	669381	1	-	-	-	-	-
20	Wedge connector 2/0 - 2/0	013610	2	2	2	2	2	2
21	Tape, electrical, vinyl	736655	1	1	1	1	1	1
23	Connector bar 2/0	684912	1	1	1	1	1	1
24	Blue shell	013629	2	2	2	2	2	2



**Table 5b. Single-Phase 120/240 V Transformer Without Crossarm**

Fig	Compatible Unit	ID	Quantity				
3.1d	Single-phase transformer 25 kVA - 120/240 V	XY1-25-240BW					
3.1d	Single-phase transformer 50 kVA - 120/240 V	XY1-50-240BW					
3.1d	Single-phase transformer 75 kVA - 120/240 V	XY1-75-240BW					
3.1d	Single-phase transformer 100 kVA - 120/240 V	XY1-100-240BW					
3.1d	Single-phase transformer 167 kVA - 120/240 V	XY1-167-240BW					
#	Material Description	ID	3	3	3	3	3
1	Bolt, machine, galvanized, 5/8" x 14"	780846	3	3	3	3	3
2	Washer, flat, round, 5/8"	585030	3	3	3	3	3
3	Washer, square, flat, 2-1/4" x 2-1/4"	585135	3	3	3	3	3
4	Washer, coil spring lock, 5/8"	584261	3	3	3	3	3
5	Bracket, cutout mounting, pole	563222	1	1	1	1	1
6	Wire, #4 AWG Cu, bare	610208	40	40	40	40	40
7	Wire, #4 AWG Cu, soft drawn, poly insulated, ft	611442	8	8	8	8	8
8	Cutout, 27 kV, polymer	013739	1	1	1	1	1
9	Fuse link, 3T rated	683706	-	-	-	-	1
9	Fuse link, 6K rated	683708	-	-	-	1	-
9	Fuse link, 10K rated	683710	-	1	1	-	-
9	Fuse link, 15K rated	683711	1	-	-	-	-
10	Fuse, fault limiter, size 12K	684920	-	1	1	1	1
10	Fuse, fault limiter, size B	684902	1	-	-	-	-
11	Clamp, hot line tap, 2/0 - #8	580725	1	1	1	1	1
12	Bird guard	580776	1	1	1	1	1
13	Wire, #2 AWG Cu, soft drawn, poly insulated, ft	613730	-	-	-	-	45
13	Wire, #2/0 AWG Cu, soft drawn, poly insulated, ft	613733	-	-	-	15	-
13	Wire, #4/0 AWG Cu, soft drawn, poly insulated, ft	613735	-	15	15	30	-
13	Wire, 350 kcmil Cu, soft drawn, poly insulated, ft	613738	75	30	30	-	-
14	Bolted terminal, #1/0 solid to 500 AWG	676120	5	3	-	-	-
15	Stirrup, bolted 397.5 to 954 kcmil ACSR	580678	1	1	1	1	1
16	#2 Cu bare	610434	2	2	2	2	2
18	Split bolt tap	668867	1	2	2	2	2
19	2-bolt tap 2/0	669379	-	-	-	1	-
19	2-bolt tap 4/0	669380	-	1	1	-	-
19	2-bolt tap 350	669381	2	-	-	-	-
20	Wedge connector 2/0 - 2/0	013610	2	2	2	2	2
21	Tape, electrical, vinyl	736655	1	1	1	1	1
24	Blue shell	013629	2	2	2	2	2

**Table 5c. Single-Phase 120/240 V Transformer**

Fig	Compatible Unit	ID	Quantity				
3.1b, 3.1d	Single-phase transformer 25 kVA - 120/240 V	XY1-25-240					
3.1b, 3.1d	Single- phase transformer 50 kVA - 120/240 V	XY1-50-240					
3.1b, 3.1d	Single- phase transformer 75 kVA - 120/240 V	XY1-75-240					
3.1b, 3.1d	Single- phase transformer 100 kVA - 120/240 V	XY1-100-240					
3.1b, 3.1d	Single- phase transformer 167 kVA - 120/240 V	XY1-167-240					
#	Material Description	ID					
22	25 kVA transformer, 120/240 V	355122	-	-	-	-	1
22	50 kVA transformer, 120/240 V	355132	-	-	-	1	-
22	75 kVA transformer, 120/240 V	355134	-	-	1	-	-
22	100 kVA transformer, 120/240 V	355136	-	1	-	-	-
22	167 kVA transformer, 120/240 V	355142	1	-	-	-	-

**Table 5d. Single-Phase 240/480 V Transformer Without Crossarm**

Fig	Compatible Unit	ID	Quantity		
3.1b	Single-phase transformer 50 kVA - 240/480 V	XY1C-50-480BW			
3.1b	Single-phase transformer 75 kVA - 240/480 V	XY1C-75-480BW			
3.1b	Single-phase transformer 100 kVA - 240/480 V	XY1C-100-480BW			
#	Material Description	ID	▼	▼	▼
1	Bolt, machine, galvanized, 5/8" x 14"	780846	2	2	2
2	Washer, flat, round, 5/8"	585030	2	2	2
3	Washer, square, flat, 2-1/4" x 2-1/4"	585135	2	2	2
4	Washer, coil spring lock, 5/8"	584261	2	2	2
5	Bracket, crossarm	682097	1	1	1
6	Wire, #4 AWG Cu, bare	610208	40	40	40
7	Wire, #4 AWG Cu, soft drawn, poly insulated, ft	611442	8	8	8
8	Cutout, 27 kV, polymer	013739	1	1	1
9	Fuse link, 6K rated	683708	–	–	1
9	Fuse link, 10K rated	683710	1	1	–
10	Fuse, fault limiter, size 12K	684920	1	1	1
11	Clamp, hot line tap, 2/0 - #8	580725	1	1	1
12	Bird guard	580776	1	1	1
13	Wire, #2 AWG Cu, soft drawn, poly insulated, ft	613730	–	15	45
13	Wire, #2/0 AWG Cu, soft drawn, poly insulated, ft	613733	15	30	–
13	Wire, #4/0 AWG Cu, soft drawn, poly insulated, ft	613735	30	–	–
14	Bolted terminal, #1/0 solid to 500 AWG	676120	3	–	–
15	Stirrup, bolted 397.5 to 954 kcmil ACSR	580678	1	1	1
16	#2 Cu bare	610434	2	2	2
18	Split bolt tap	668867	1	2	2
29	2-bolt tap 2/0	669379	1	–	–
20	Wedge connector 2/0 – 2/0	013610	2	2	2
21	Tape, electrical, vinyl	736655	1	1	1
23	Connector bar, 2/0	684912	1	1	1
24	Blue shell	013629	2	2	2

**Table 5e. Single-Phase 240/480 V Transformer With Crossarm**

Fig	Compatible Unit	ID	Quantity		
3.1e	Single-phase transformer 50 kVA - 240/480 V	XY1-50-480BW			
3.1e	Single- phase transformer 75kVA - 240/480 V	XY1-75-480BW			
3.1e	Single- phase transformer 100kVA - 240/480 V	XY1-100-480BW			
#	Material Description	ID	▼	▼	▼
1	Bolt, machine, galvanized, 5/8" x 14"	780846	3	3	3
2	Washer, flat, round, 5/8"	585030	3	3	3
3	Washer, square, flat, 2-1/4" x 2-1/4"	585135	3	3	3
4	Washer, coil spring lock, 5/8"	584261	3	3	3
5	Bracket, cutout mounting	563222	1	1	1
6	Wire, #4 AWG Cu, bare	610208	20	20	20
7	Wire, #4 AWG Cu, soft drawn, poly insulated, ft	611442	8	8	8
8	Cutout, 27 kV, polymer	013739	1	1	1
9	Fuse link, 6K rated	683708	–	–	1
9	Fuse link, 10K rated	683710	1	1	–
10	Fuse, fault limiter, size 12K	684920	1	1	1
11	Clamp, hot line tap, 2/0 - #8	580725	1	1	1
12	Bird guard	580776	1	1	1
13	Wire, #2 AWG Cu, soft drawn, poly insulated, ft	613730	–	15	45
13	Wire, #2/0 AWG Cu, soft drawn, poly insulated, ft	613733	15	30	–
13	Wire, #4/0 AWG Cu, soft drawn, poly insulated, ft	613735	30	–	–
14	Bolted terminal, #1/0 solid to 500 AWG	676120	3	–	–
15	Stirrup, bolted 397.5 to 954 kcmil ACSR	580678	1	1	1
16	#2 Cu bare	610434	2	2	2
18	Split bolt tap	668867	1	2	2
29	2-bolt tap 2/0	669379	1	–	–
20	Wedge connector 2/0 – 2/0	013610	2	2	2
21	Tape, electrical, vinyl	736655	1	1	1
24	Blue shell	013629	2	2	2

**Table 5f. Single-Phase 240/480 V Transformer List**

Fig	Compatible Unit	ID	Quantity		
3.1b, 3.1e	Single-phase transformer 50 kVA - 240/480 V	XY1-50-480			
3.1b, 3.1e	Single- phase transformer 75kVA - 240/480 V	XY1-75-480			
3.1b, 3.1e	Single- phase transformer 100kVA - 240/480 V	XY1-100-480			
#	Material Description	ID			
22	50 kVA transformer, 240/480 V	355332	-	-	1
22	75 kVA transformer, 240/480 V	355334	-	1	-
22	100 kVA transformer, 240/480 V	355336	1	-	-

**6. References**

- SCL Standard D15-1;** "Bird Guard Installation"
- SCL Standard 0072.01;** "Wildlife Protection, Small Birds and Animals"

**7. Sources**

- Hall, Alan;** SCL Electrical Engineer and subject matter expert for 0125.01 (alan.hall@seattle.gov)
- Hanson, Brett;** SCL Standards Engineer and subject matter expert for 0125.01 (brett.hanson@seattle.gov)
- Lu, Curtis;** SCL Standards Engineer and originator of 0125.01 (curtis.lu@seattle.gov)
- SCL D10-3.1** (canceled); "Transformer Installation, Single Phase, 15/26 kV"