

CONSTRUCTION GUIDELINE**SEPARABLE CONNECTOR (ELBOW), 200 A, LOADBREAK****1. Scope**

This construction guideline identifies the material and tools required to install a 200 A, loadbreak, separable connector (elbow) on the end of a piece of primary cable.

Loadbreak elbows (with both phase-to-ground and phase-to-phase voltage ratings) have a white band with a centered black strip (see figure 4.1) secured to the cable entrance portion of the connector. Deadbreak elbows have no such special banding.

The material list includes all the parts necessary to complete an installation. Optional connector accessories and replacement parts are also identified. The material list has been organized to be cable specific.

Paper-insulated-lead-covered (PILC) cable and sector cable are outside the scope of this guideline.

Cable preparation work procedures and connector installation procedures are outside the scope of this guideline.

For cable technical data, refer to E6-1.0/NGE-70.

For general cable preparation procedures, refer to U5-2.81/NSP-290.

For cutback lengths and connector assembly and installation procedures, refer to the specific instructions that were provided with the connector.

For connector continuous, fault closing, and short-time current ratings and overload capability, refer to IEEE 386.

Loadbreak elbows are a subcategory of separable connectors, which is a subcategory of dead front cable accessories.

STANDARDS COORDINATOR

John Shipek

STANDARDS SUPERVISOR

John Barnett

UNIT DIRECTOR

Richard Kent

2. Application

A separable connector (elbow) is a fully insulated and shielded system for terminating and electrically connecting an insulated power cable to electrical apparatus, other power cables, or both, so designed that the electrical connection can be readily established or broken by engaging or separating the connector at the operating interface.

The separable connectors described in this construction guideline are intended for use on the following three-phase, 60 Hz systems:

- 26.4 kV, 4-wire, solidly-grounded, wye-connected
- 5 kV and below

Because of high fault duty, connectors rated 200 A continuous are not appropriate for network systems. Network systems should be constructed with connectors rated 600 A (or 900 A) continuous.

Connector is equipped with a capacitive test point.

This guideline may be used by engineers to design connector systems and create bills of material or by field crews when performing actual installations.

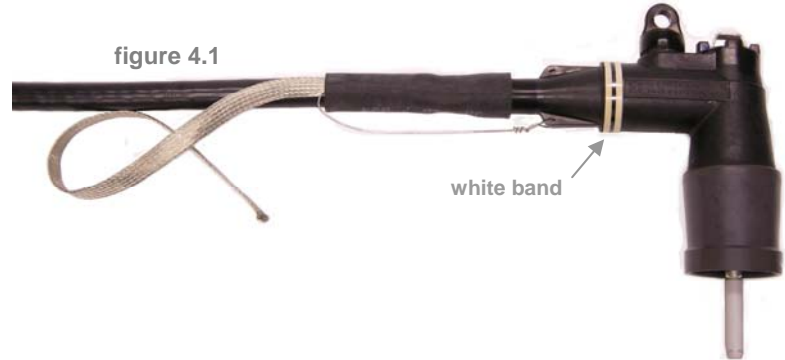
Only qualified electrical workers shall install and operate separable connector systems.

3. Separable Connector Technical Description:

voltage class	25 kV
common name	200 amp loadbreak elbow
Seattle City Light Material Standard	6864.05
manufacturer(s)	various
maximum voltage rating (ph-g)	15.2 kV RMS
maximum voltage rating (ph-g/ph-ph)	15.2/26.3 kV RMS
BIL	125 kV crest
continuous current rating	200 A RMS
short-time current rating	10 kA RMS, symmetrical
IEEE 386 interface	Figure 7

4. General Examples

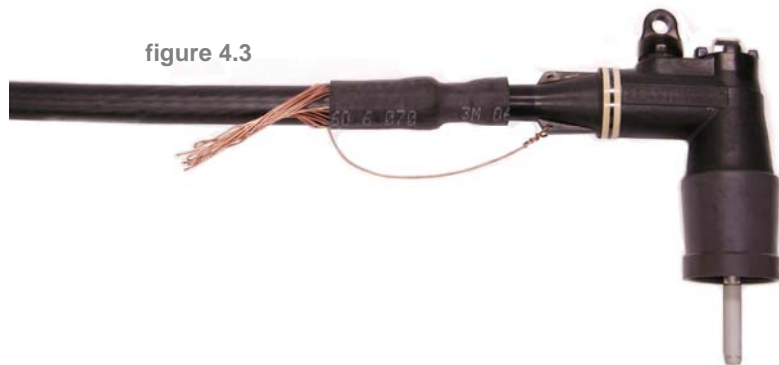
Example 4.1: 200 A loadbreak elbow installed on tape shielded type cable. Note, for this type of cable, a jacket seal and a metallic shield adapter kit is required.



Example 4.2: 200 A loadbreak elbow installed on bare, round wire, concentric neutral cable. Note, for this type of cable, neither a jacket seal or a metallic shield adapter kit is required.



Example 4.3: 200 A loadbreak elbow installed on jacketed, round wire, concentric neutral cable. Note, for this type of cable, a jacket seal is required, but a metallic shield adapter kit is not.



CONSTRUCTION GUIDELINE

Separable Connector (Elbow), 200 A, Loadbreak

5. Material List

Table 5.1

Stock Number	Rated Circuit Voltage, kV	Type	Size, AWG/kcmil	Shape	Shield Type	Required	Required	Replacement	Table 5.1 Notes
						Elbow Kit Stock No.	Additional Parts Stock No.	Compression Connector Stock No.	
1	2	3	4	5	6	7	8	9	10
613212	5	1/C	#6	compressed	tape				
613222	5	1/C	350	compressed	tape				
601025	5	1/C	500	class B	DW				
613522	15	3/C	#1	compressed	tape				
613523	15	3/C	#1	compressed	tape				
613520	15	3/C	2/0	compressed	tape				
613521	15	3/C	3/0	compressed	tape	<i>blank indicates</i>			
613526	15	3/C	3/0	compressed	tape	<i>not a stock item or not available</i>			
613530	15	3/C	350	compact	tape	<i>from any source</i>			
613531	15	3/C	500	sector	tape				f
010128	15	3/C	500	compact	tape				
613532	15	3/C	500	compact	tape				
623640	15	1/C	500	compact	tape				
012735	15	3-1/C	500	compressed	FS				
613533	15	3/C	750	sector	tape				f
613534	15	3/C	750	compact	tape				
623670	15	3-1/C	1000	compressed	FS				
623650	27	3-1/C+2N	#8	compressed	tape	686442	012662	686424	a b
602027	28	1/C	#1	class B	RW/CN				
613540	28	3/C+3G	#1	compressed	Tape	686445	012662	686417	b
602025	28	1/C+1N	1/0	solid	RW/CN	686445	NR	686417	e
012098	28	1/C+1N	1/0	solid	RW/CN	686445	012687	686417	d
602044	28	1/C	350	class B	RW/CN				
012099	28	1/C	350	compact	FS				
613613	28	1/C	350	compact	DW				
613543	28	3/C+3G	350	compact	tape				
012100	28	1/C	500	compact	FS				
613615	28	1/C	500	compact	DW				
613645	28	1/C	500	compressed	FS	<i>blank indicates</i>			
602119	28	1/C	750	compact	DW	<i>not a stock item or not available</i>			
613618	28	1/C	750	compact	DW	<i>from any source</i>			
974050	28	3/C	750	sector	tape				f
012101	28	1/C	750	compact	FS				
012102	28	1/C	1000	compact	FS				
613619	28	1/C	1000	compact	DW				
613655	28	1/C	1000	compressed	FS				
none	35	1/C	350	compressed	tape				
623660	35	1/C	750	compact	DW				
623655	35	1/C	1000	compact	tape				

NR = Not required

5. Material List, continued

Table 5.1 Notes:

Refer to Figures for information on what parts compose a Stock Number or kit.

Beginning in 1992, Cooper Power Systems loadbreak elbows were required by Seattle City Light to be specially marked with a blue-black-blue identification band. This requirement was dropped in 2007. Refer to Figure 5.1.



Figure 5.1

- a. Elbow kit Stock Number 623442 does not include a compression connector. This extra part, Stock Number 686424, must be called out for separately.
- b. Stock Number 012662 is a shield adapter kit that provides cable jacket-to-accessory sealing and grounding.
- d. Stock Number 012687 is a sealing kit for jacketed, round wire concentric neutral cable.
- e. A sealing/adaptor kit is not required when installing an elbow on bare, round wire concentric neutral cable.
- f. Separable connectors are not commercially available for sector cable. Connections must be hand taped.

Elbow kit (body, loadbreak probe, probe installation tool, and instruction sheet)

Stock No. **686442**



figure 5.2

Elbow kit (body, compression connector, loadbreak probe, probe installation tool, silicone lubricant, and instruction sheet)

Stock No. **686445**



figure 5.3

5. Material List, continued

Jacket sealing/shield adapter kit for tape shielded cable (cold shrink tube, mastic seal strips, 5/8-inch by 3/4-inch diameter constant force spring, preformed ground/bleeder wire, Scotch No. 13 semi-con tape, and instruction sheet)

Stock No. **012662**

figure 5.4



Jacket sealing kit for jacketed concentric neutral cable (cold shrink tube, mastic seal strips, and instruction sheet)

Stock No. **012687**

figure 5.5



Compression connector for #8 AWG stranded copper conductor, Kerite

Stock No. **686424**

figure 5.6



Compression connector for 1/0 AWG solid aluminum conductor

Stock No. **686417**

figure 5.7



6. Connector Accessories (Optional)

Elbow mud cover

Stock No. **686467**

figure 6



7. Replacement Parts

Contact probe for RTE, Cooper Power Systems, General Electric, and Elastimold elbows (installation tool and instructions)

Stock No. **686423**

figure 7



8. Tools

Information relating to tool type, die number, and number of crimps is provided with the connector.

9. References

386-2006; "Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600 V"; IEEE; 2006

6864.05; "Connector (Elbow) Separable, Insulated, Loadbreak, 200-Ampere"; *Material Standards*; SCL

B100-02024; *Components Master Catalog, 5 kV-35 kV Electrical Distribution Systems, Specifiers Guide*; Cooper Power Systems

E6-1.0/NGE-70; "Properties of Medium Voltage Cables"; *Construction Guidelines*; SCL

PG-CA-0506; *Cable Accessories for 5 kV-35 kV Distribution Systems, Product Selection Guide*; Elastimold

Shipek, John; SCL Standards Engineer, subject matter expert and originator of U5-15.05 (john.shipek@seattle.gov)

U5-2.81/NSP-290; "Primary Cable Preparation, General"; *Construction Guidelines*; SCL