

ADDENDUM NO.2

From: **Tony Chartrand**
Subject: **Addendum No. 2**

Project No.: **309**
Issue Date: **1/31/2022**

Project Name: **Barlow To Parsons
Transmission Line**

These items part of Addendum No. 2 and this contract.

1. Estimated ship date for the 795 ACSS is 5/31.
2. Estimated ship date for the 69kV insulators is 4/22.
3. Estimated ship date for the steel poles is 6/30.
4. Work to take place north of pole #21 up to E 8th St is the removal of the 477 ACSR and topping of the poles down to distribution level.
5. The transmission conductor along Hannah Ave west of Hastings St will be lowered to distribution level up to pole #23 at the intersection of Hannah Ave and Steele St. A staking sheet detailing the construction has been attached.
6. P&P sheet 1 has been reissued with the previously noted typo on pole 9A corrected.
7. TM-RX1 is an extra unit that will not be used in this contract. You may place a dollar amount of 0 for it on your bid sheets.
8. The 69kV underground cable will come on (6) individual 108"x60"x56" (70.5" overall width) steel reels of approximately 2,100' each. These reels should weigh around 15,300 lbs each. The reels will be delivered to TCL&P's facility at 1131 Hastings St. TCL&P doesn't have equipment able to lift the reels, so no assistance will be available.
9. Installation instructions for the G&W underground cable termination have been attached to this addendum.
10. Contractor is able to choose any manufacturer for duct bank conduit spacers, but suggested part number is Wunpeeve 62626W30-3 made by Underground Devices, Inc.
11. TCL&P supplied steel pole will come with anchor bolts.

Signed: _____

Traverse City Light & Power

Location Data						Project Data						Conductor Data					
Owner:	Traverse City Light & Power					Project #:	022101001		Drawn By:	N. Osterdyk			Installed:				
Location:	Barlow - Parsons Transmission Line					Work Order #:			Checked By:	P. Eidson			Existing:	477 ACSR 3 PHASE W/ 1/2 NEUTRAL			
Twp:	27N	Rng:	R11W	Sec:	12	Substation:			Approved By:	C. Wolfe			Removed:				
Map:						Line Section:			Date Drafted:	10/22/2021			Primary & Neutral	477 ACSR, 1506 @ 60°F, R.S. 197'			
						Staked By:	J. Killmon		Joint Use:				Design Tension	60° F INITIAL			

Pole #	Status	Span	Line Angle	Pole H/C	Frame At	Primary				Misc Equip	Grounds	Guys/Anchor				Secondary / Service Conduit / Fiber			Other Remarks
						QTY	Unit	Conductor Sz	Transformer			QTY	Guys	Lead	QTY	Anchor	Unit	Span	
22	N	152		50-4		1	C1.51L	477			TM-9BW								1/2 NEUTRAL
22A	E	153		80-1		1	C1.51L	477											1/2 NEUTRAL, CUT 43' AGL
22B	N	155		50-4		1	C1.51L	477			TM-9BW								1/2 NEUTRAL
23	E	167	42	85-1		1	C5.71L	477				3	TG-21A	40, 33					1/2 NEUTRAL, CUT 55' AGL
						1	C5.72L	477											#2 ACSR NEUTRAL
24	E	73	47	80-1		2	C5.72L	477				3	TG-21A	45, 38	3				#2 NEUTRAL, CUT 55' AGL
24A	N	158		50-3		1	C1.52L	477			TM-9BW								#2 NEUTRAL
						1	A1.11A												
25	E	139		75-1		1	C1.51LA	477											#2 NEUTRAL, CUT 46' AGL
26	N	169		50-3		1	C1.52L	477			TM-9BW								#2 NEUTRAL
						1	A1.11A												

SEE SHT 6



SEE SHT 3



REV	DESCRIPTION	DATE

FINLEY
ENGINEERING

104 E 11TH STREET LAMAR, MO 64759
TEL:417-682-5531 EMAIL:FECINC.COM

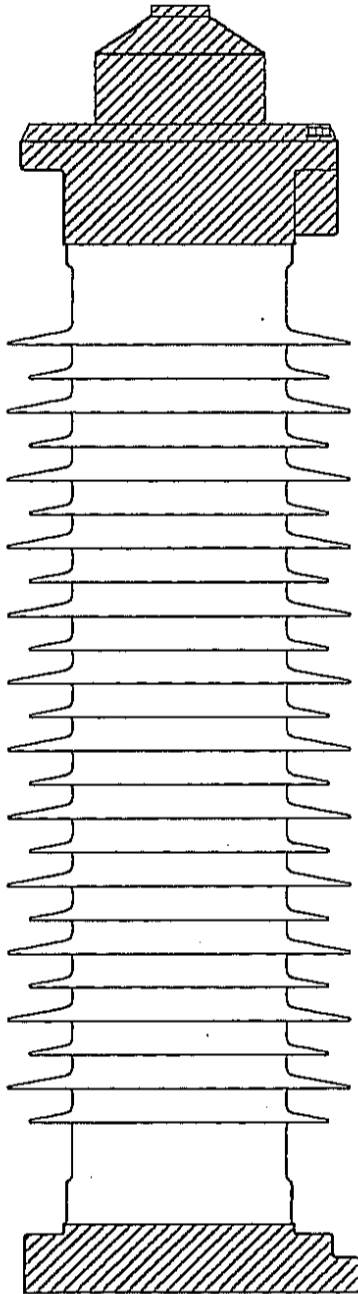
LEGEND	
DESCRIPTION	SYMBOL
INSTALL CONDUCTOR	=====
REMOVAL CONDUCTOR	=====
EXISTING CONDUCTOR	=====
INSTALL POLE	o
REMOVAL POLE	•
REMOVAL-INSTALL POLE	⊙
EXISTING POLE	•
OVERHEAD GUY	—▶—
ANCHOR	—>

STAKING SHEET 1 of 5

P9286-3

Installation Instructions

G&W ELECTRIC TRANSMISSION TERMINATION 69 kV
P9286-3 Model G



Product Description

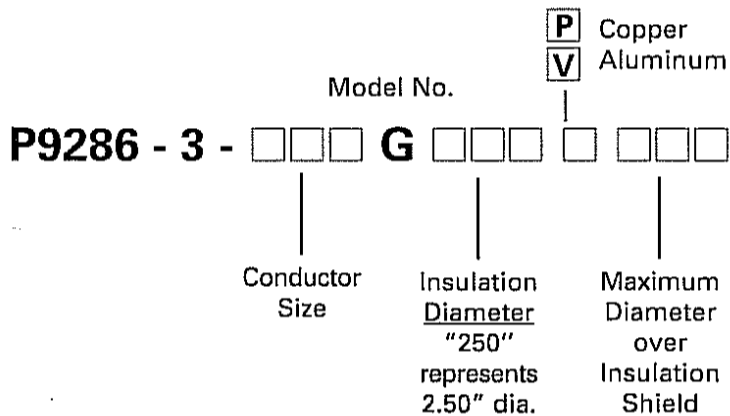
Meets IEEE Standard no. 48-1990 69kV
Class 1 Termination 350kV BIL

Table 1. Termination Information Chart

Housing Number	P9286-3	Max. Semiconductor Shield	3.3" [8.4 cm]
Max. Conductor Size	1000KCM	Leakage Distance	86.7" [220 cm]
Max. Insulation Dia.	2.8" [7.1 cm]	Dry Arcing Distance ...	25.96" [68.5 cm]
Min. Insulation Dia.	1.3" [3.3 cm]	Weight (Approx.)	72 lbs.

Standard Catalog Contents

- (1) Silicone Housing Assembly
- (a) Stress Cone Assembly
- (b) Compression Connector
- (c) Support Ring
- (d) Insulator Tubes
- (e) Compression Spring
- (f) Base Plate
- (g) O Ring
- (1) Silicone Grease
- (1) Silicone Oil
- (1) Instruction Sheet



A. Cable Preparation

1. Straighten cable to minimum length of 60 inches (152.0 cm) from the end. Secure cable to prevent slippage. Position and cut cable so that 35-5/8 inches (90.5 cm) extends above mounting surface. See **Figure 2, Page 4**.

Caution: Make a square even cut and avoid spreading the strands.

NOTE: If insulators will be installed between the structure and the mounting bracket consider the additional distance it will raise the mounting surface.

2. Remove cable jacket and metallic shielding system to expose approximately 12 inches (30.5 mm) of insulation shield from the cut cable end. See **Figure 3, Page 4**.

NOTE: If wire shield save for grounding connection. If metallic tape shield, cut off.

3. Measure from the cable end a distance of: 3-1/8 inches (8 cm) for aluminum cable or 2-3/8 inches (6 cm) for copper cable. Then carefully remove all the cable layers to expose the conductor. Avoid cutting or bending the conductor strands. See **Figure 4, Page 5**.
4. Insert compression connector onto conductor. See **Figure 5, Page 5**.

NOTE: If aluminum conductor, wire brush the exposed cable conductor properly before installing the compression connector. Insert the compression connector immediately after cleaning the aluminum conductor to limit the reforming of aluminum oxide on the conductor.

Caution: For aluminum connectors, remove any excess corrosion inhibitor. Twist connector in the direction of strands to facilitate the insertion.

5. Start the first crimp at the crimping limit mark on the connector barrel. Make as many crimps as possible, rotating 90° and with 1/8 inch (3 mm) separation between crimps. *Do not damage "O" ring gaskets.*

Caution: Do not double/overlap crimp. Use care to prevent conductor from cocking during pressing operation.

6. Remove flash and all sharp edges so that the connector barrel does not damage any internal parts during installation of the termination onto the cable.

NOTE: ALL MEASUREMENTS IN FOLLOWING STEPS ARE PERFORMED AFTER THE CONNECTOR IS INSTALLED AND ARE FROM THE END OF THE THREADED STUD. IT IS IMPORTANT THAT THE MEASUREMENTS ARE ACCURATE.

7. Measure 41 inches (111.7 cm) from end of connector, ring cut and remove jacket. See **Figure 5, Page 5**.
8. If a wire shield system, fold wires back over jacket. Do not cut wires as they will be required for the ground connection. If metallic tape system, cut to a minimum 41 inches (104.1 cm), (secure metallic shield with one and a half laps of vinyl tape) from end of compression connector retaining sufficient shield to make a ground connection. See **Figure 5, Page 5**.

NOTE: If heat shrink tubing will be used to seal cable jacket, slide over cable now.

9. Measure 35-3/4 in. (90.8 cm) from the end of the compression connector. Ring cut and remove the cable insulation shield (semi-con). See **Figure 6, Page 6**.
10. Once the insulation shield has been removed, chamfer and smooth the sharp edge of the insulation shield. See **Figure 7, Page 6**.

Caution: Do not nick or cut into insulation.

NOTE: MEASURE INSULATION AND INSULATION SHIELD DIAMETER. IF DIAMETERS OF PREPARED CABLE ARE LESS THAN SPECIFIED, DO NOT INSTALL THE TERMINATION.

See **Figure 1** for critical area.

Example: P9286-3-00G260P278

The three digits after the letter G represents the insulation diameter.

i.e. 260 = 2.60 inches (6.6 cm). The allowable tolerance is -.020 + .080 inches (-.051 + 0.2 cm). In this example if prepared insulation diameter ranges from 2.58 to 2.68 inches (6.6 to 6.8 cm), then the installation will be acceptable.

11. To ease cable insertion, taper insulation diameter with leading edge a minimum of 1/4 inches (6 mm) less than the insulation diameter and to a length of 2 to 4 inches (5.0 to 10.0 cm). See **Figure 7, Page 6**.
12. Remove all traces of semi-conducting material from the exposed insulation and smooth out the insulation by sequential use of 100, 150, and 220 grits of aluminum oxide cloth. Wipe the insulation with an approved solvent. It is important to wipe in the direction away from the connector.

Caution: Do not permit the solvent to contact the insulation shield material to avoid damage.

13. The grounding of the cable shielding system should be prepared at this time if clearance under the termination is limited. Prepare grounding per customer specifications. Completely seal jacket-shield-insulation interface to prevent moisture ingress.

B. Termination Installation

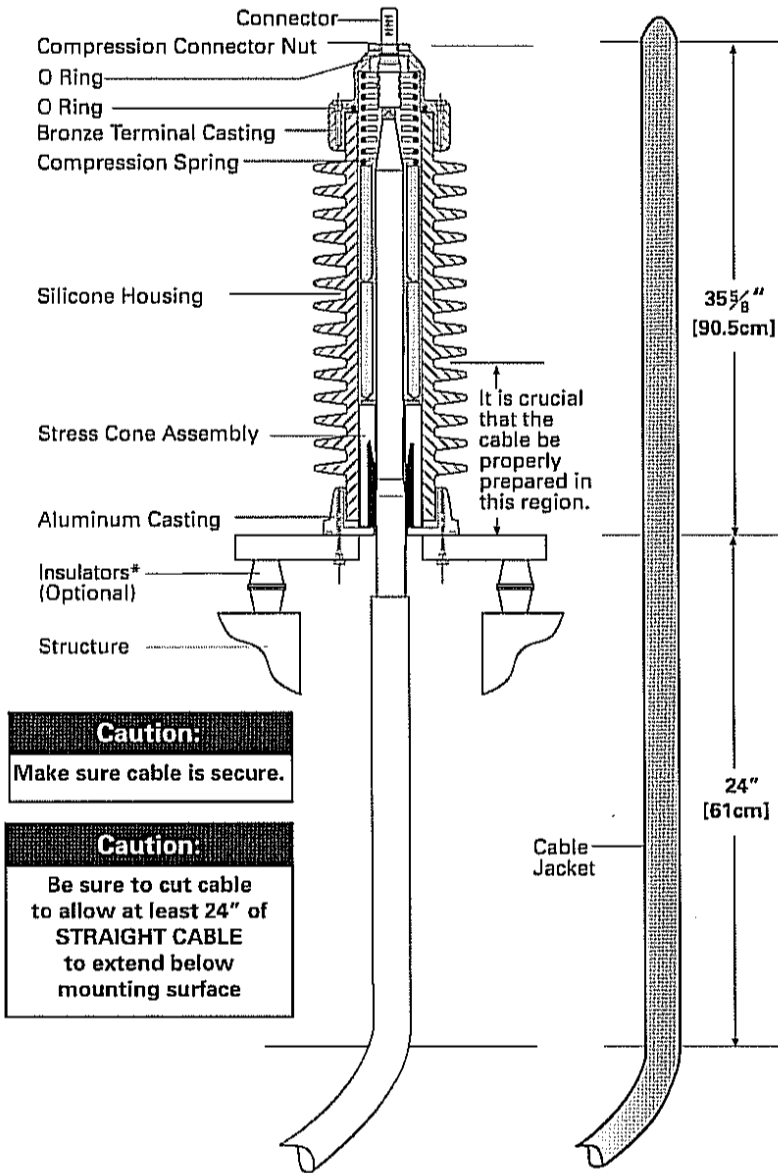
14. Support cable from below mounting position so that top of connector stud extends 39-3/4 inch (100.9 cm) above reference mounting surface, support should be strong and secure enough to withstand terminal load and prevent cable slippage while lowering termination over cable.
15. Remove termination from shipping container.
16. If provided, remove mounting bracket from the structure and attach to the base of the termination to facilitate installation.
17. The termination is supplied from the factory with approximately 2 inch (5.0 cm) gap between the bronze termination casting and bronze housing casting. While holding down the bronze termination casting, carefully disengage (evenly) the three long screws to obtain a 2-1/4 inch (5.7 cm) gap between the two bronze castings. The bronze termination casting must stay held in place by the three screws.
18. Use proper equipment to lift termination into a vertical position above the cable, being careful not to damage the silicone housing. (Use a suitably strong material that will not damage housing such as ropes or slings with a spreader under one of the top casting.)
19. Use plastic gloves (supplied) to spread a light film of silicone compound (supplied) over the first 10 inches (25.0 cm) to 12 inches (30.0 cm) of the cable insulation. Lower termination onto the cable applying silicone compound ahead of the termination until the termination has been lowered to seat on the mounting surface. Rotate the termination back and forth as it is lowered over the cable to break the seal and ease installation. This where the mounting of the bracket to the termination allows for a convenient hand hold during installation. If the fit is tight and it is difficult to lower the termination on the cable, apply a thin coat of silicone oil OVER the silicone grease to increase lubricity.
20. Secure the base mounting bracket to either the structure or insulators.
21. Disengage the three long compression screws at the bronze termination casting completely. Hold down the bronze termination casting and carefully disengage one compression screw at a time. Lift off and remove the termination casting, compression spring and shield can. Top of the compression connector should now extend approximately 7-3/4 inches (20.0 cm) above bronze housing casting.

Caution: Exercise care during complete disengagement of screws to avoid sudden disengagement of the bronze termination casting due to possible residual spring force on the casting.

22. Make sure that the "O" rings on connector and on bronze termination casting are **UNDAMAGED, CLEAN, WELL LUBRICATED** with silicone oil or silicone compound and properly seated.
23. Thoroughly lubricate "O" ring groove of the bronze termination casting with silicone compound and install the "O" ring in the casting groove.
24. Pour the silicone fluid (supplied) into the termination gradually. Permit large bubbles to dissipate. Complete the filling of the termination with the silicone fluid level with the bronze casting.
25. Install the spring shield can, the compression spring and the bronze termination casting back in their respective positions. Connector should be projecting out through the hole at the top of the casting.
26. Install the connector nut and turn the nut down until it touches the bronze termination casting.
27. Position the 3 long compression screws and the lock washers. Hold down the bronze termination casting so that the compression screws can be engaged into the tapped holes in the bronze housing casting.
28. Tighten the three compression screws evenly. Concurrently tighten the connector nut as well. Torque all bolts and nuts until tight. Continue the tightening process until the bronze termination casting is seated on the bronze housing casting and the connector extends 2-7/8 inches (7.3 cm) above the top machined surface of the bronze termination casting. Make sure the connector nut is tightened.

Caution: Cable shield and bottom casting of termination must be solidly interconnected. If the cable shielding system is to be insulated from ground, insulate termination from ground.

29. Wipe clean all excess silicone oil and grease from the cable. It is normal for some silicone grease to ooze from the bottom of the termination for a few weeks depending upon the ambient. Caution: Do not pinch "O" ring.



Caution:
Make sure cable is secure.

Caution:
Be sure to cut cable to allow at least 24" of STRAIGHT CABLE to extend below mounting surface

Figure 1

Figure 2

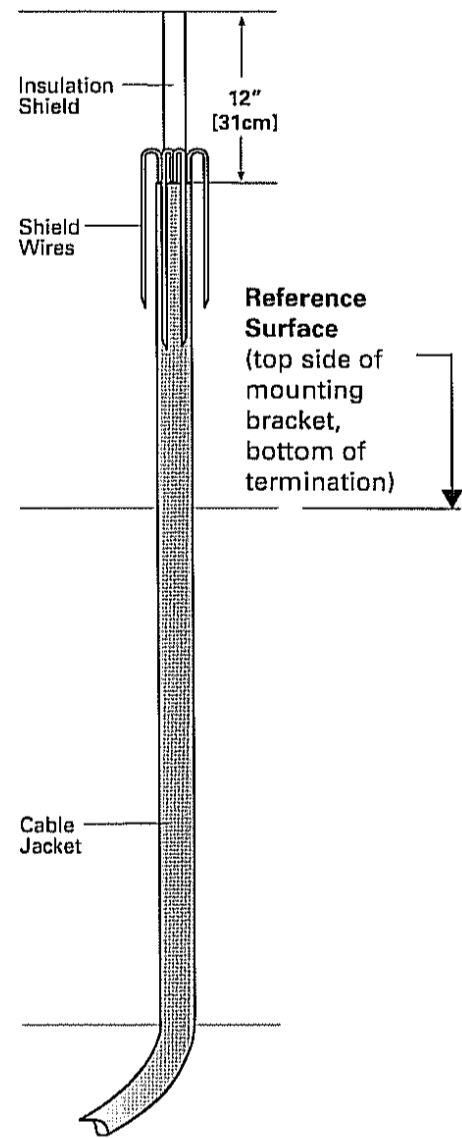


Figure 3

*Insulators will raise reference surface.
Add 2 - 5/8" [6.7 cm] in length.

Step 1

A. Straighten cable to dimensions shown.

Step 2

A. Cut cable jacket to expose 12" [30.5 cm] of the insulation shield. Pull back shield wires.

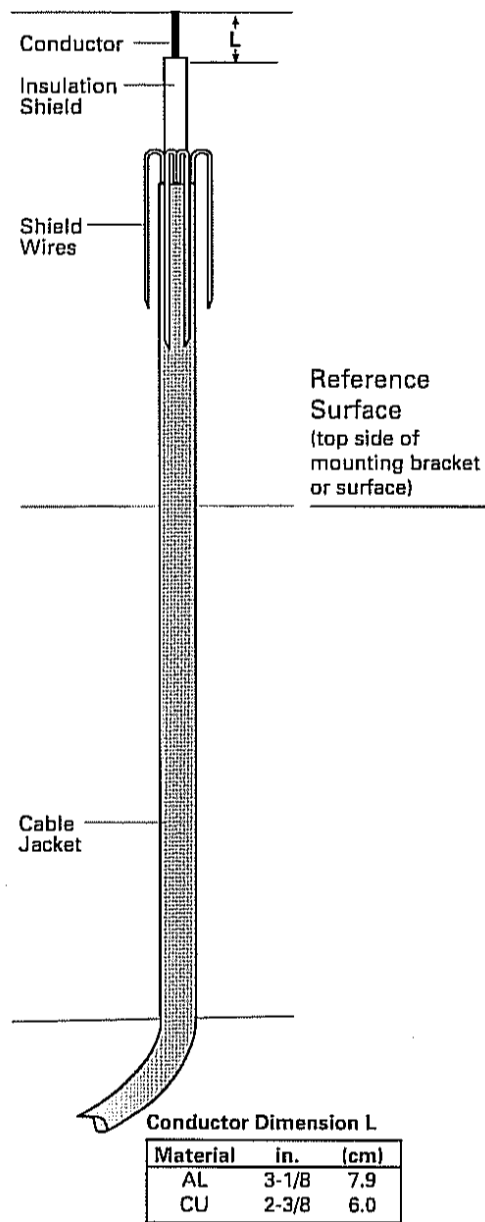
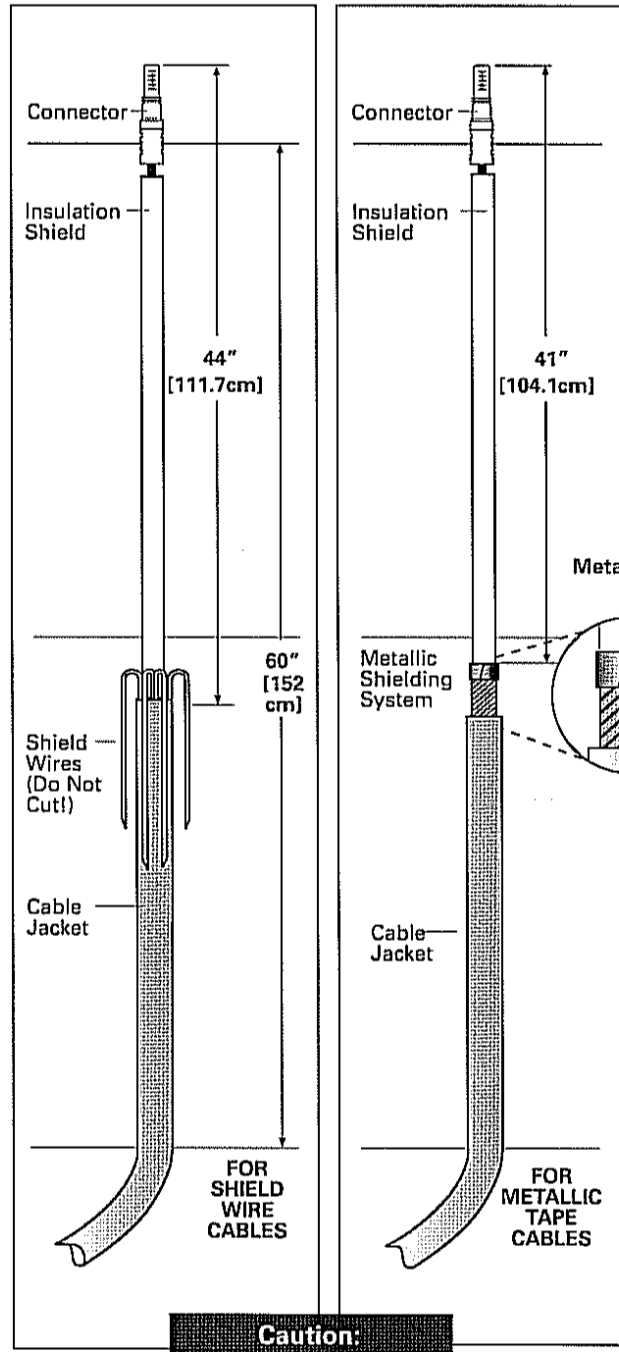


Figure 4



Caution:
Do Not Damage O Rings

Figure 5

Step 3

A. Cut insulation shield to expose the conductor material. For cables with aluminum conductor expose 3-1/8" [7.9 cm]. For cables with copper conductor expose 2-3/8" [6.0 cm].

Step 4

A. Install the connector.
B. For cables with shield wires: measure 43" [109.0 cm] from the top of the connector, ring cut and remove jacket. Save shield wires for grounding.

C. For cables with metallic shield: measure 43" [109.0cm] from the top of the connector, ring cut and remove jacket. Measure 40" [101.6cm] from the top of connector, and carefully cut metallic tape shield. Remaining shield will be used for grounding.

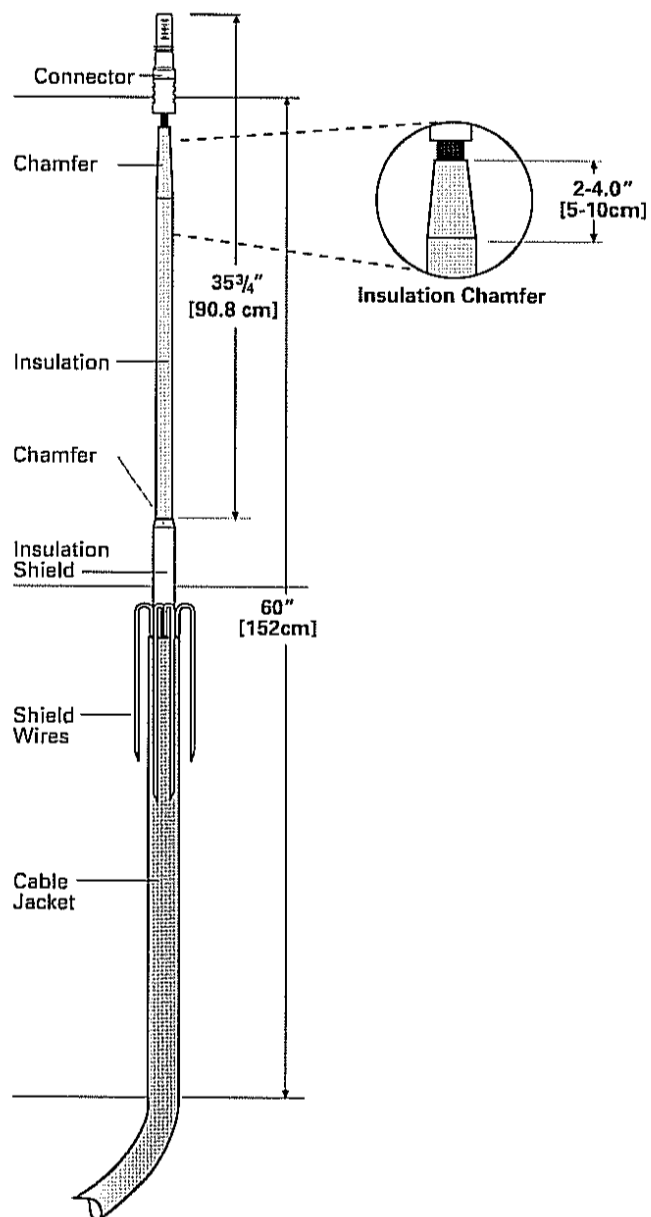
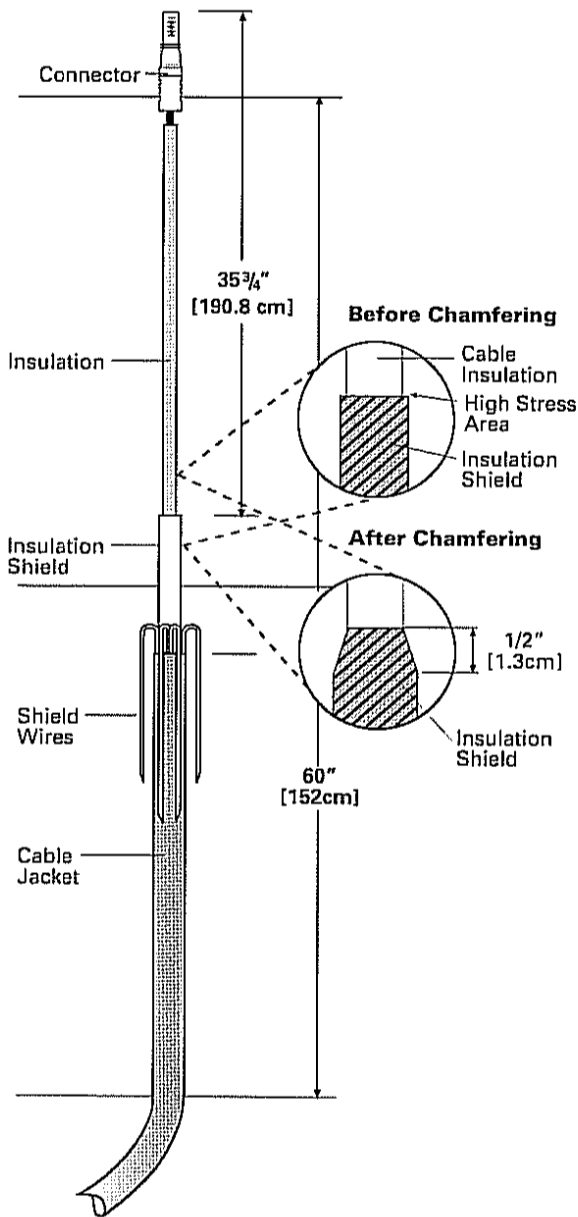
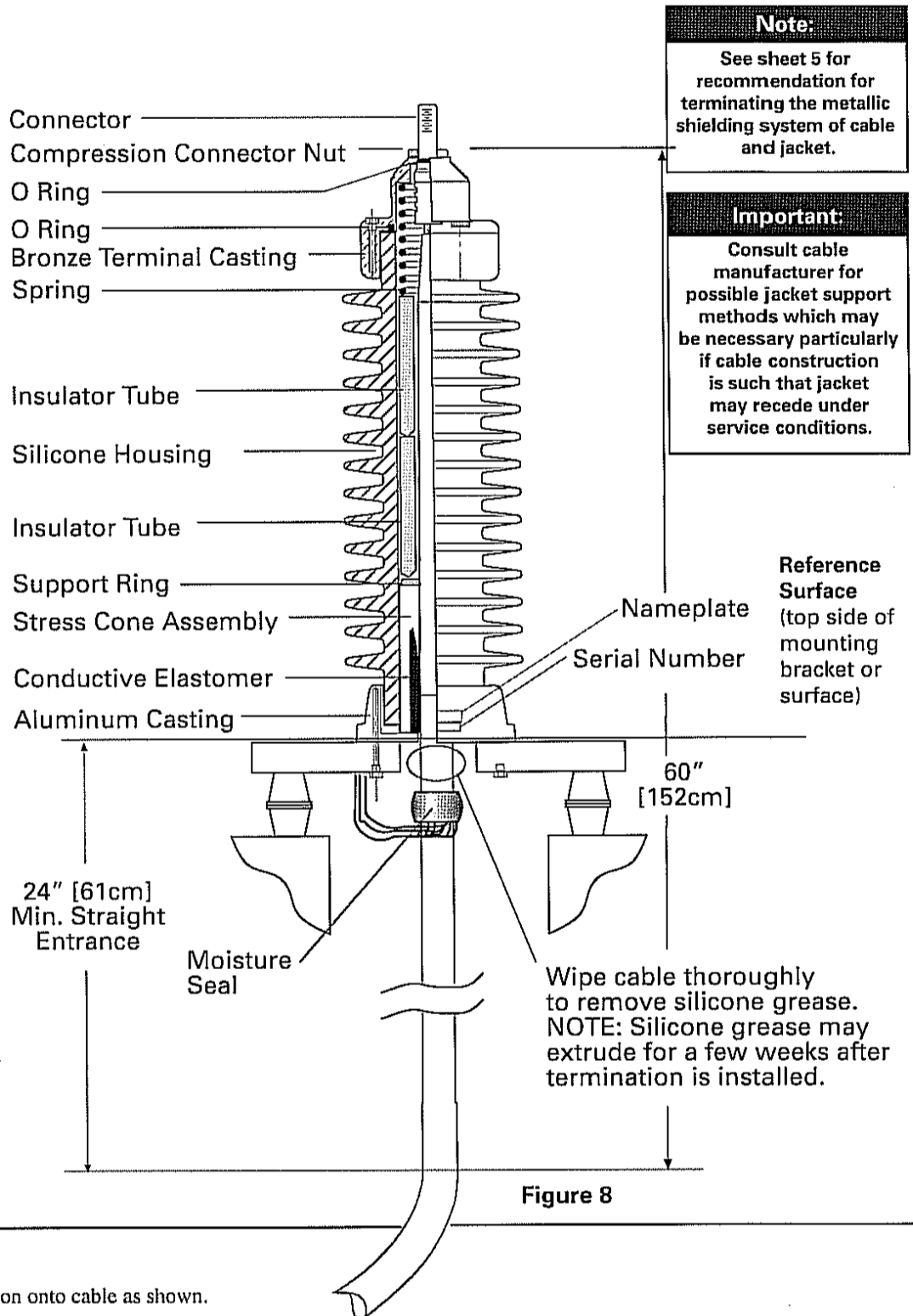


Figure 6

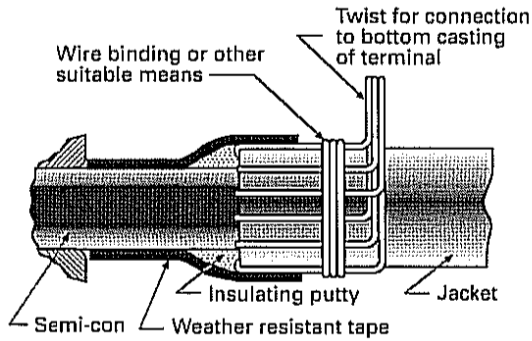
Figure 7

Step 5

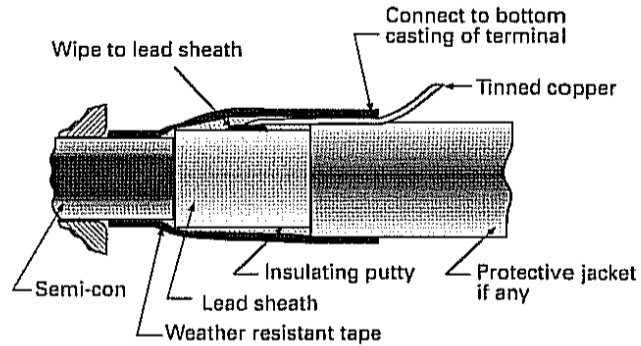
- A. Measuring from the connector end remove 35-3/4" [90.8 cm] of the insulation shield to expose the insulation material.
- B. Chamfer the insulation and insulation shield as shown.



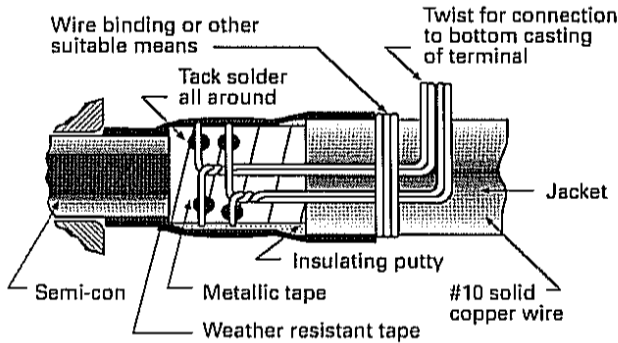
Grounding Options



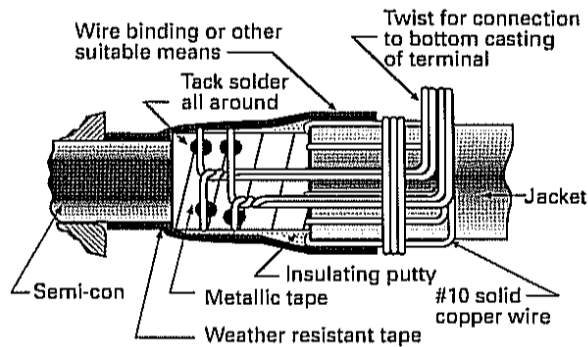
Concentric



Lead Sheath



Metal Tape



Metal Tape/Concentric

Safety

When installing electrical power system accessories, failure to follow applicable personal safety requirements and written installation instructions could result in serious or fatal injuries.

Cable Preparation

It is important that good cable preparation methods and procedures are employed to assure long term reliable service of the system. It is especially important that care must be exercised when exposing the insulation shield (semi-conducting layer) and insulation layer to avoid any damage such as cuts. Damage to the exposed insulation shield (semi-conducting layer) or insulation may lead to product failure.

Cable Cleaning

Use a non-toxic solvent compatible with cable material. Consult cable manufacturer for insulation cleaning solvent recommendations. Failure to follow these instructions could lead to product failure.

Important Notice

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