

3M™ Splice Kit 5551-3/C-AC

5/8kV, 3-Conductor Splice Cable

For Splicing Shielded to Shielded Cable, or Shielded to Non-shielded Cable

Instructions



IEEE Std. No. 404

5kV Class, 75kV BIL

8kV Class, 95kV BIL

Kit Contents:

- 6 Copper Tape Strips
- 3 Scotch® Electrode Wraps 13
- 5 Rolls of Scotch® Rubber Mastic Tape 2228
(3-1" wide, 2-2" wide)
- 3 Cold Shrink Insulators
- 3 Rolls of Scotch® Electrical Semi-Conducting Tape 13
- 3 Rolls of Scotch® Linerless Rubber Splicing Tape 130C
- 3 Shielding Braid Sleeves
- 6 Small Constant Force Springs
- 1 Scotch® Electrical Grounding Braid 25
- 2 Large Constant Force Springs
- 1 Roll of Scotch® Vinyl Electrical Tape 33
- 1 3M™ Cleaning Kit CC-3 (3 cleaning pads)
- 1 Cold Shrink Jacket
- 2 15' Rolls of 3M™ Armorcast Structural Material
4560-15 (For Armored Cables)
- 1 Instruction Sheet

Components Needed: (not supplied in the standard kit)

Connectors (for primary conductors)

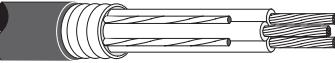
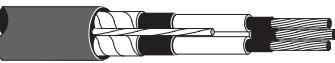
Ground Connectors (to connector ground wires)

Kit Selection Chart

NOTE: Final Determination Factor is cable insulation diameter.

Kit Number	Primary Insulation O.D. Range	Conductor Size Range O.D.	
		Copper	Aluminum
5551-3/C-AC	0.37"-0.78" (9.4-19.8 mm)	6-4/0	6-3/0

Table 1

 Three-Conductor Non-Armored, Nonshielded Cable	3M™ Splice Kit 5551-3/C-AC 5/8kV, 3-Conductor Splice Cable For Splicing Shielded to Shielded Cable, or Shielded to Non-shielded Cable
 Three-Conductor Armored, Nonshielded Cable	78-8126-5627-6-B
 Three-Conductor Non-Armored, Shielded Cable	CAUTION Working around energized systems may cause serious injury or death. Installation should be performed by personnel familiar with good safety practice in handling electrical equipment. De-energize and ground all electrical systems before installing product.
 Three-Conductor Armored, Shielded Cable	



1.0 Prepare Cables

- 1.1 Clean cable jackets by wiping with a clean, dry cloth for approximately 3 feet (1 meter) at each end.
- 1.2 Prepare cables using standard procedures, following the section below for each type of cable being used. Insulation removal distance is one-half the connector length.

Note: Copper tape strips are provided to secure the ends of the metallic shields.

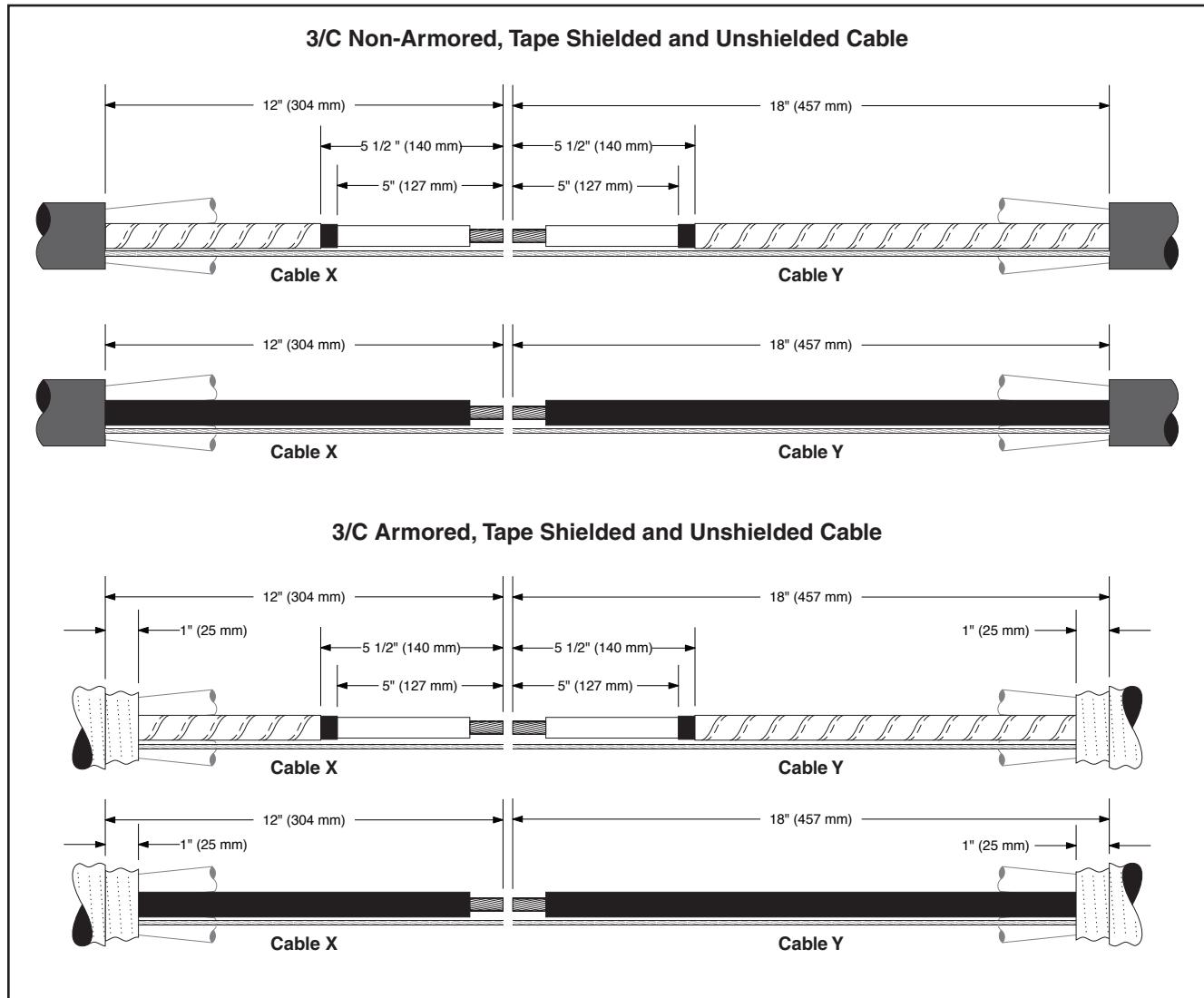


Figure 1

1.3 For Wire Shielded Cables:

- a. Remove cable jacket/armor as shown in (*Figure 1*).
- b. Wrap 2 full wraps Scotch® Electrical Semi-Conducting Tape 13 over ground wires 5 1/2" (140 mm) from cable end (*Figure 2*).
- c. Cut off ground wires to a length of 1 1/2" (38 mm) and fold back onto cable (*Figure 2*). Secure the ends with copper tape, if needed.
- d. Remove cable semi-con as shown in (*Figure 2*).
- e. Remove cable insulation from cable ends for a distance of 1/2 connector length (*Figure 2*).

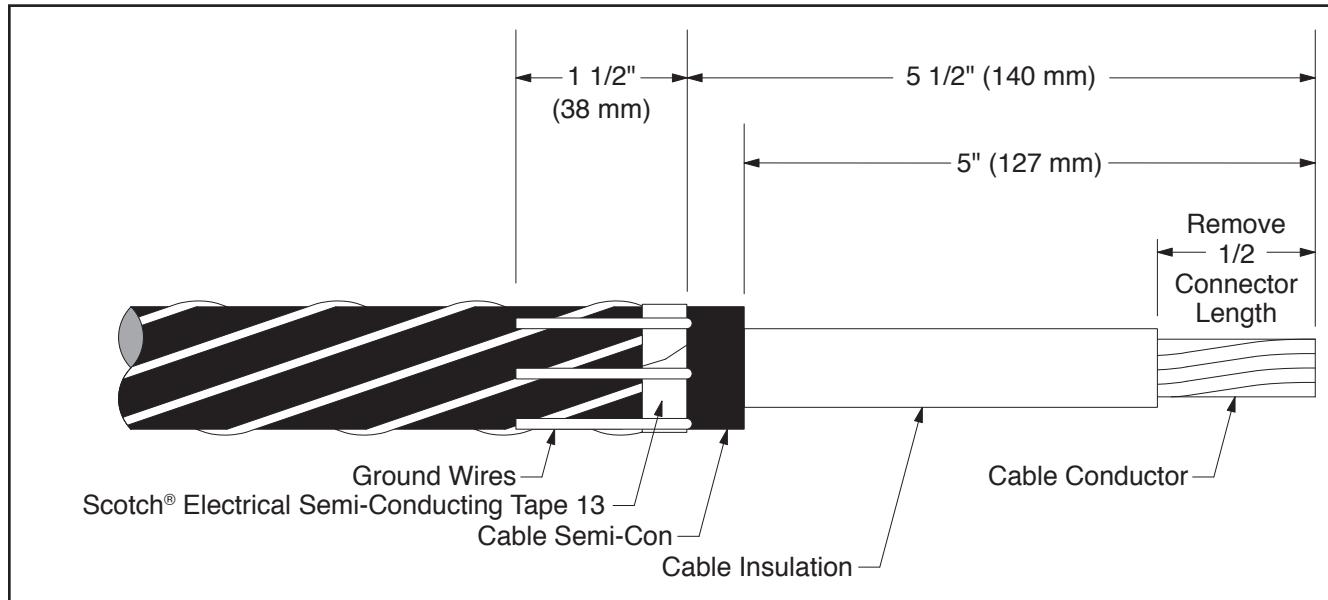


Figure 2

1.4 For UniShield® Cables

- a. Remove cable jacket/armor as shown in (*Figure 1*).
- b. Wrap a vinyl tape band around cable jacket at a point 5 1/2" (140 mm) from cable end and remove drain wires from semi-con jacket to the leading edge of applied vinyl tape band (*Figure 3*).

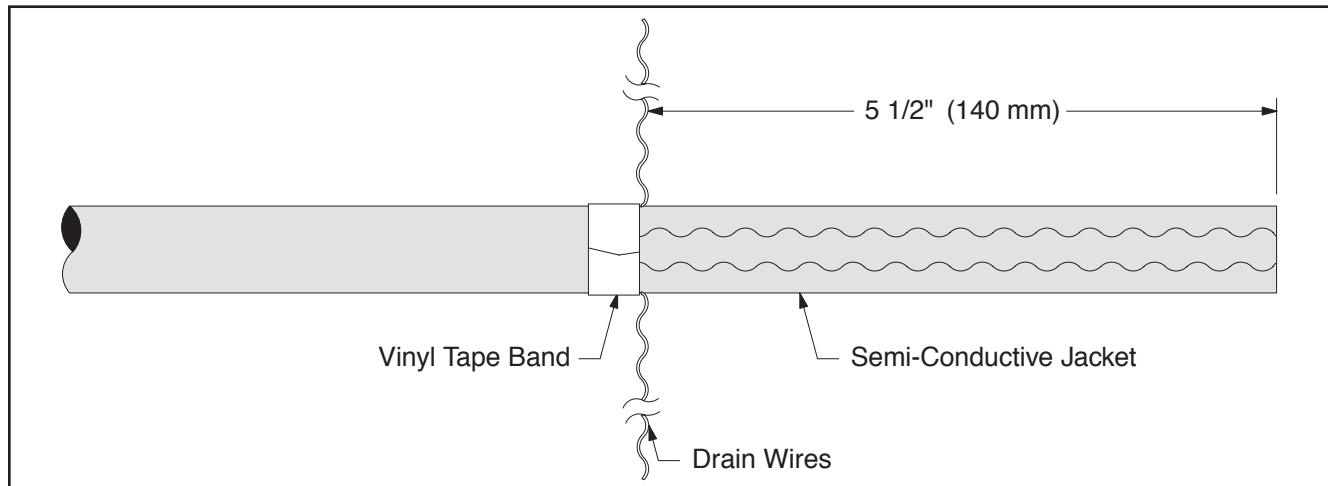


Figure 3

- c. Cut off shield drain wires to a length of 1 1/2" (38 mm) and fold back onto cable (*Figure 4*).
- d. Install hose clamp as shown in (*Figure 4*). On the side of the clamp closest to the cable end cur 80% through cable jacket.
- e. Remove jacket by pulling against hose clamp. **Do not bell semi-con jacket** (*Figure 4*).
NOTE: Jacket may separate into two layers. Remove both layers of black semi-con jacket.
- f. Remove hose clamp.
- g. Remove cable insulation from cable ends for a distance of 1/2 connector length (*Figure 4*).

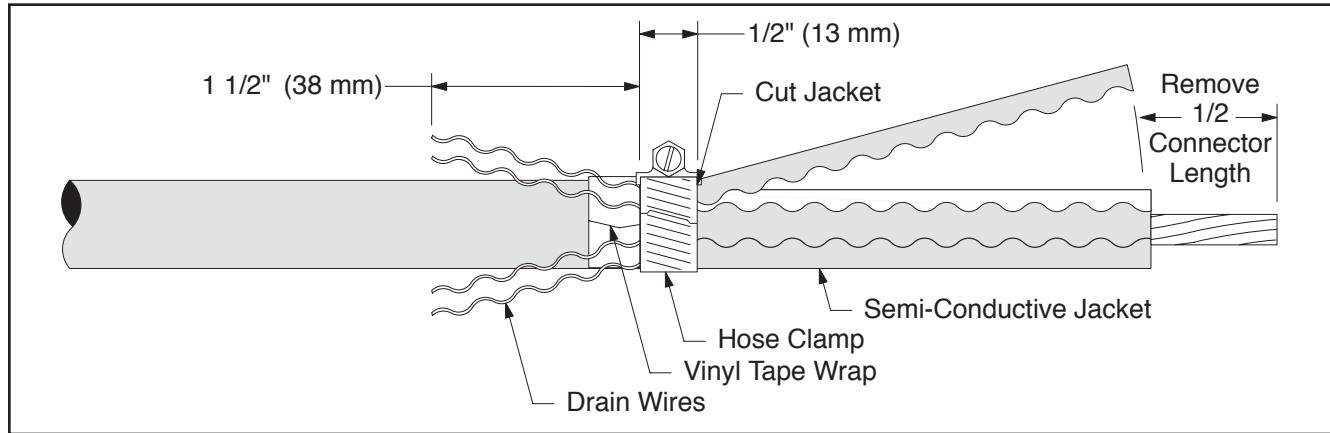


Figure 4

2.0 Splicing Shielded to Shielded Cable

- 2.1 Slide cold shrink insulation tubes onto Cable Y, one per conductor, loose core ends first, until the cable semi-con is visible (*Figure 5*).

NOTE: It may be necessary to unwind some of the excess core prior to putting on the cable. Do not unwind closer than 1/4" (6 mm) from insulation rubber.

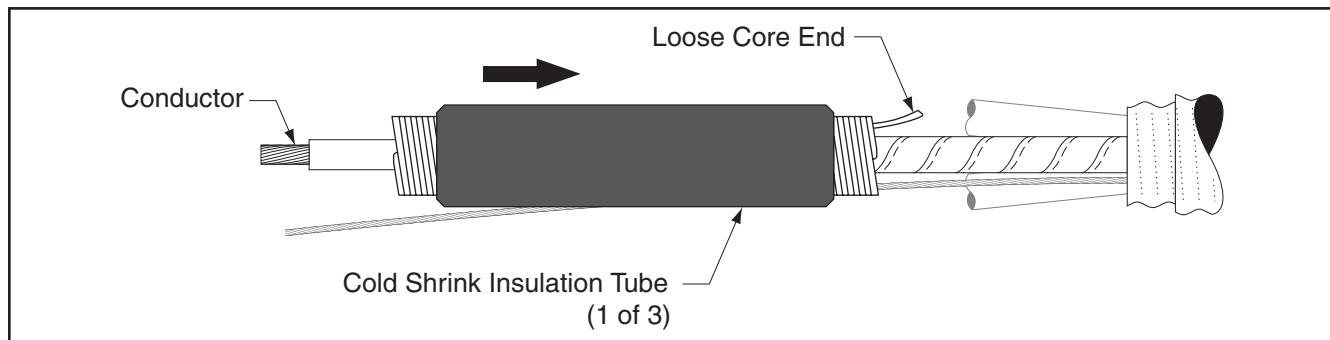


Figure 5

2.2 Slide the cold shrink jacketing tube onto Cable X as shown (Figure 6).

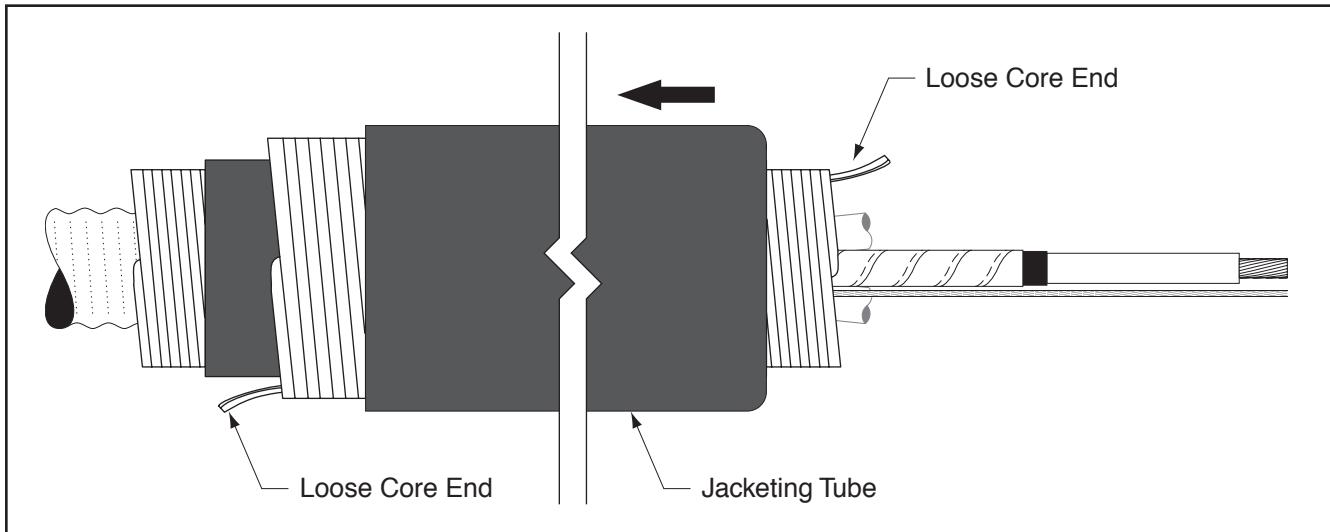


Figure 6

2.3 Slide the expanded shield sleeves onto Cable X, one per conductor, until the cable semi-con is visible (Figure 7).

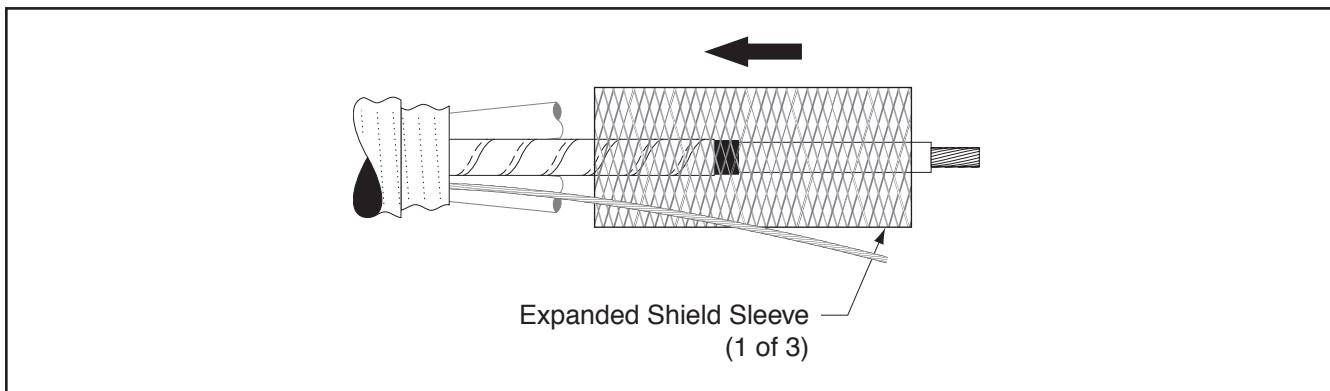


Figure 7

2.4 Install Connectors

- a. Install connector per manufacturer's directions. **Connector length must not exceed 3.3" (84 mm) for copper connectors, or 2.7" (69 mm) for aluminum connectors.**
- b. See pages 14 and 15 if 3M™ Scotchlok™ Connectors are used.
- c. If a gap greater than 1/8" (3 mm) exists between the connector and cable insulation, fill the gap with Scotch® Electrical Semi-Conducting Tape 13 (Figure 8). **Do not exceed height of the connector.**
- d. **For indent crimped connectors only:** Fill connector indents with 13 tape (Figure 8).

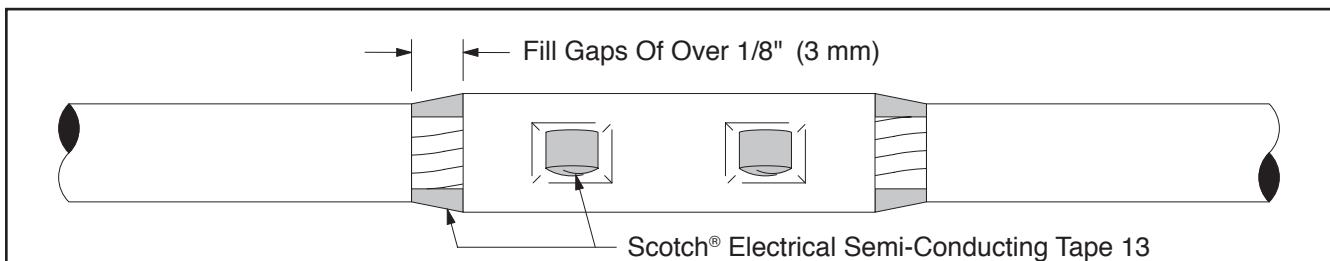


Figure 8

2.5 Apply Semi-Conductive Electrode Wrap

- a. Remove liner from Scotch® Electrode Wrap 13. Center Electrode Wrap (narrow end) over connector. Wrap around connector with sufficient tension to eliminate gapping and wrinkling. Continue wrapping until Electrode Wrap divides into two legs (Figure 9).

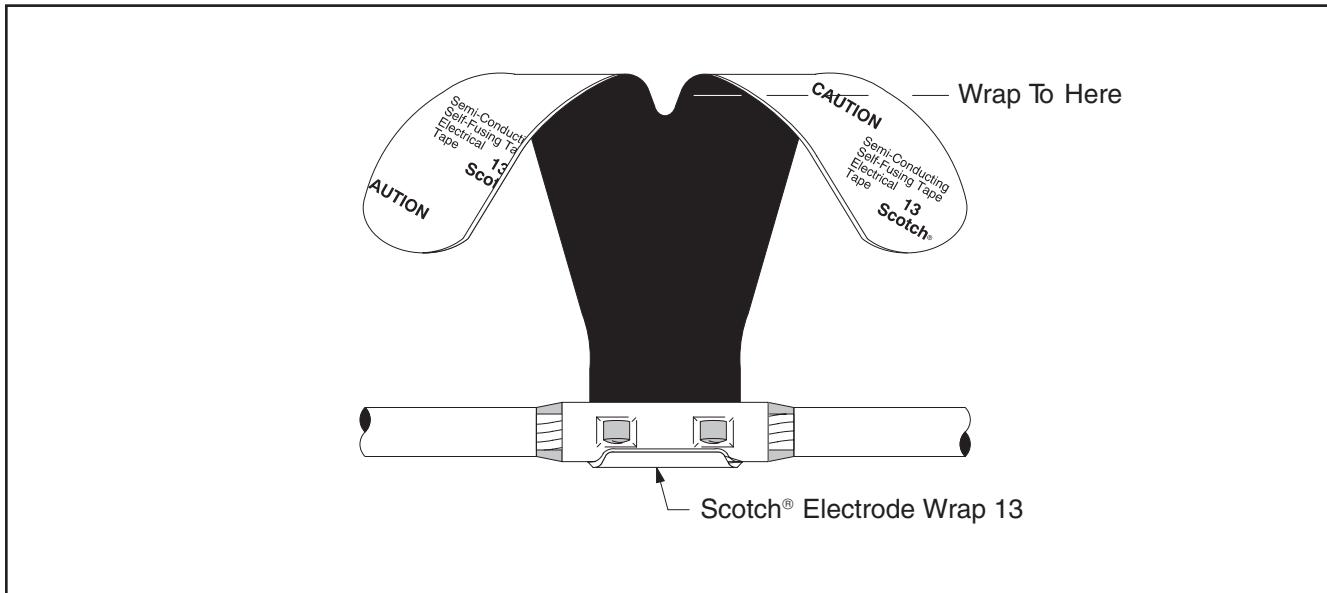


Figure 9

- b. Individually wrap each leg of Electrode Wrap over area at ends of connector and cable insulation. Apply with adequate tension so legs conform tightly onto cable insulation (Figure 10).

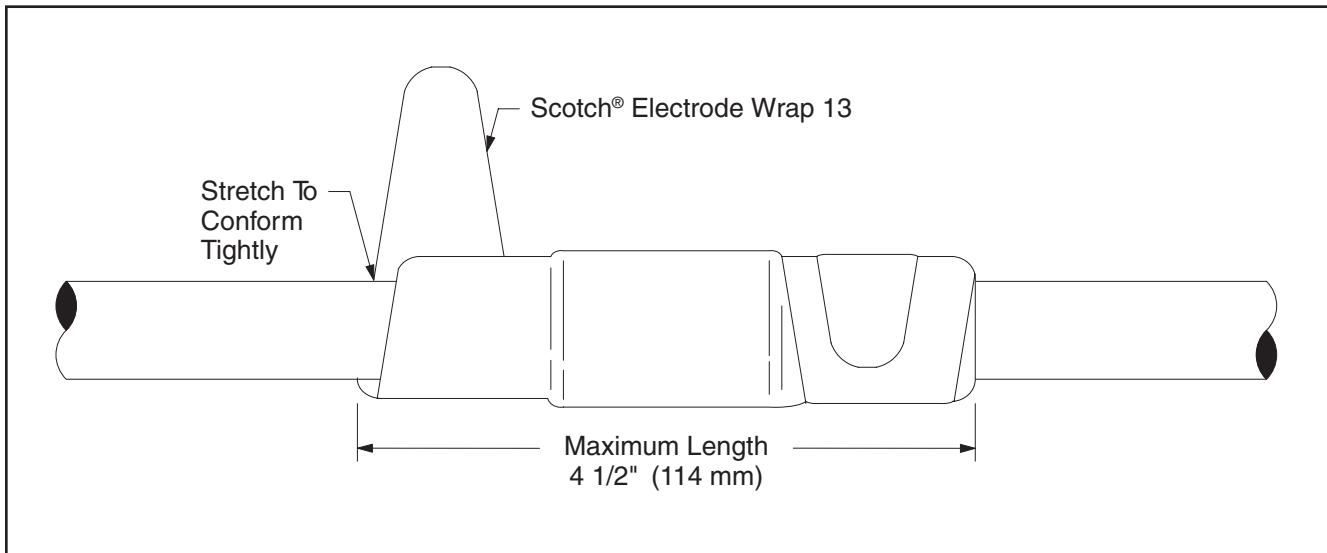
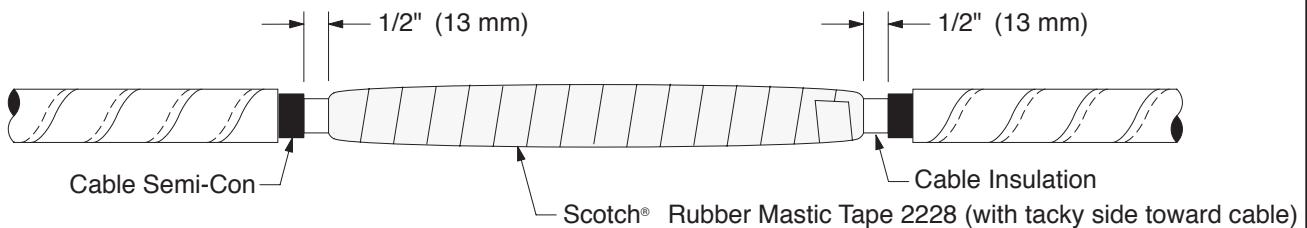


Figure 10

2.6 Apply Wrap Insulation

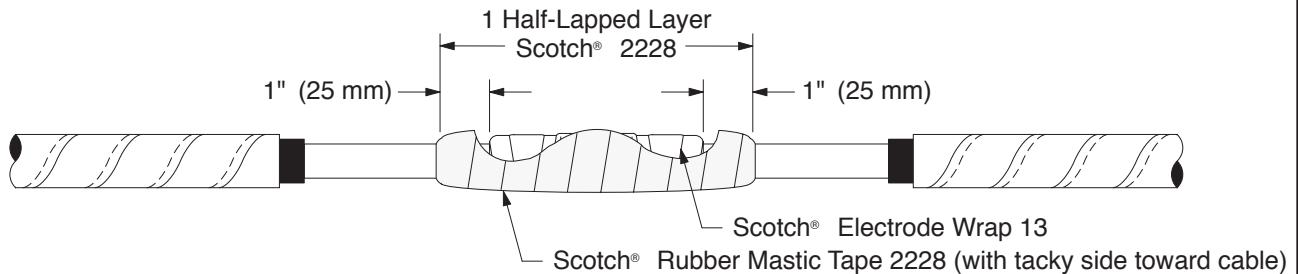
a. Apply 1" wide Scotch® Rubber Mastic Tape 2228 tacky side down toward cable (*Figure 11*).

FOR 6 AND 4 AWG CABLES



6 AND 4 AWG CABLE: Apply 1 half-lapped layer of Scotch® Rubber Mastic Tape 2228 over Scotch® Electrode Wrap 13, starting and ending 1/2" (13 mm) from cable semi-cons. Stretch Rubber Mastic sufficiently to conform.

FOR 2-4/0 AWG CABLES



2 AWG – 4/0 KCMIL CABLE: Apply 1 half-lapped layer of Scotch® Rubber Mastic Tape 2228 over Scotch® Electrode Wrap 13, starting and ending 1" (25 mm) from electrode wrap. Stretch rubber mastic sufficiently to conform.

Figure 11

2.7 Install Cold Shrink Insulators

- Slide cold shrink insulator short tube with tapered ends over connector area. Align end of insulator (not core) at dimension A, *Table 2* and (*Figure 12*).

Conductor Size (AWG or kcmil)	Dimension A	
	Copper Connector	Aluminum Connector
6, 4, 2, 1	1/2" (13 mm)	1/2" (13 mm)
1/0	1/2" (13 mm)	3/4" (19 mm)
2/0	3/4" (19 mm)	3/4" (19 mm)
3/0	1" (25 mm)	1" (25 mm)
4/0	1" (25 mm)	—

Table 2

- Remove core by unwinding counter-clockwise (*Figure 12*).

NOTE: *An occasional tug of the core strand while unwinding will aid in core removal.*

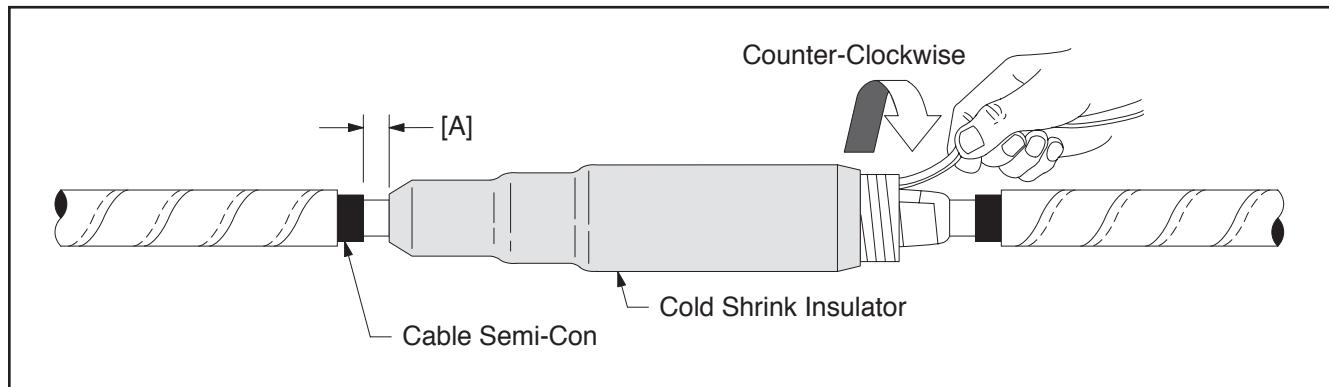


Figure 12

- For 8kv rating only, apply 2 half-lapped layers of stretched Scotch® Linerless Rubber Splicing Tape 130C over the cold shrink insulator between the end tapers (*Figure 13*).

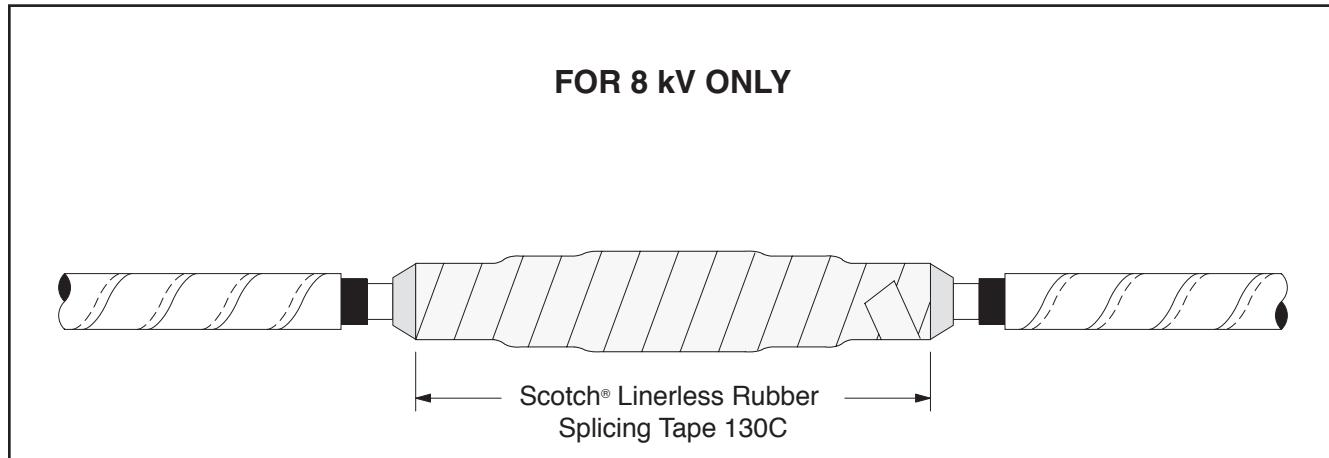


Figure 13

2.8 Install Insulation Shields

IMPORTANT: Do the following steps that pertain to either shielded-to-shielded or shielded-to-non-shielded cables.

For Shielded to Non-Shielded Cables

- a. Starting $1/4"$ (6 mm) from cable's metallic shielding (i.e., tape, wire or UniShield[®]), apply 2 half-lapped layers of Scotch[®] Electrical Semi-Conducting Tape 13 over the end of the cold shrink insulator for a total wrapped distance of $2\frac{1}{4}"$ (70 mm) (Figure 14).

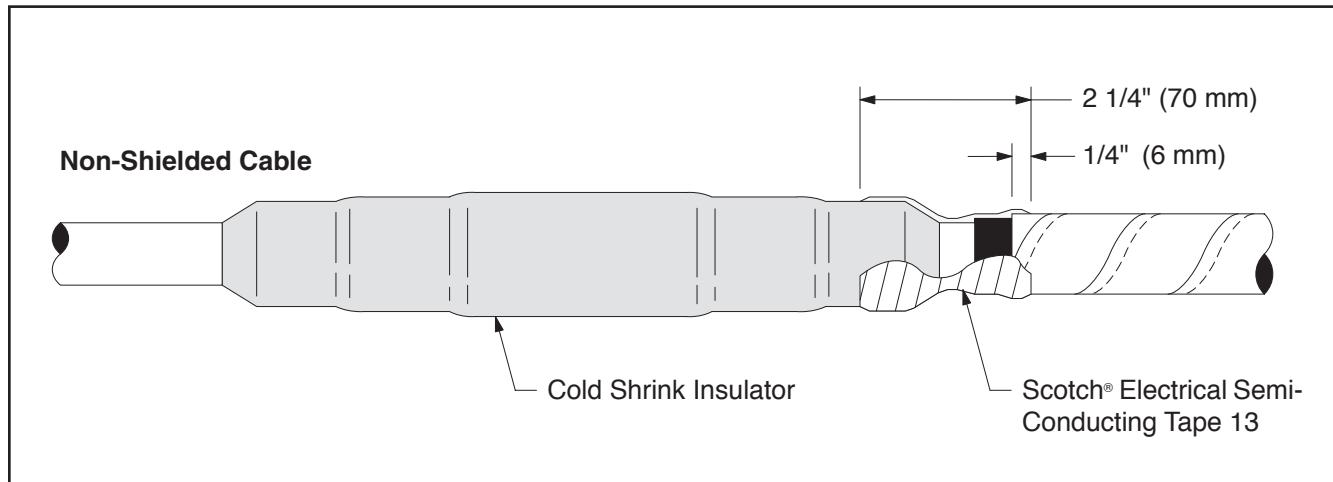


Figure 14

For Shielded to Shielded Cables

- b. Apply 1 half-lapped layer of Scotch[®] Electrical Semi-Conducting Tape 13 over insulation, starting and ending $1/4"$ -(6 mm) onto the cable's metallic shielding (Figure 15).

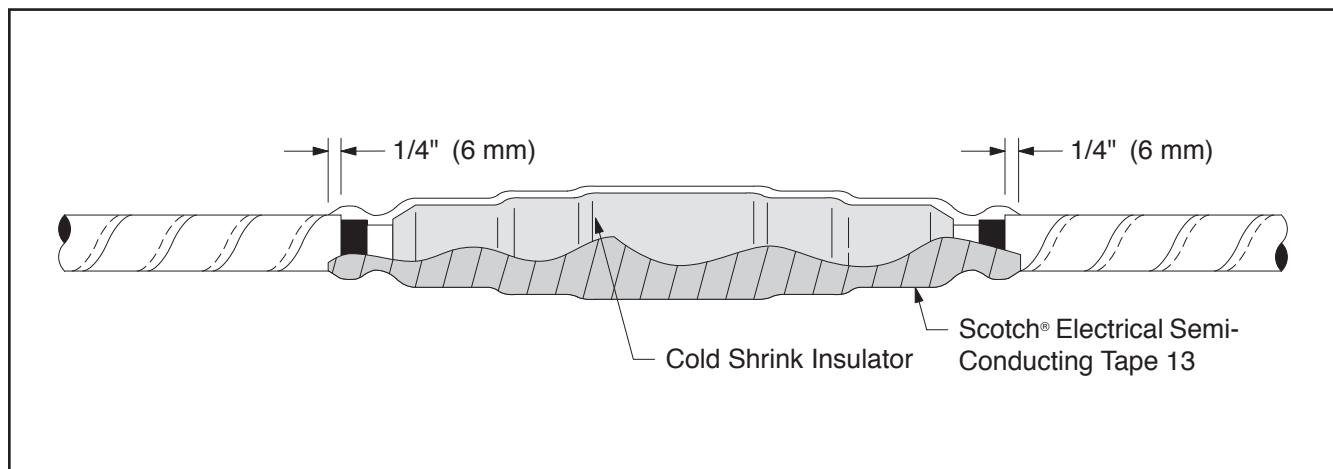


Figure 15

- c. Center shielding braid sleeve over Scotch® Electrical Semi-Conducting Tape 13.
- d. Install a constant force spring at one end; position spring over cable metallic shield. With thumb, hold coil in place over sleeve (the rolled up coil should be facing away from you). Pull coil around cable for one wrap only (*Figure 16*).

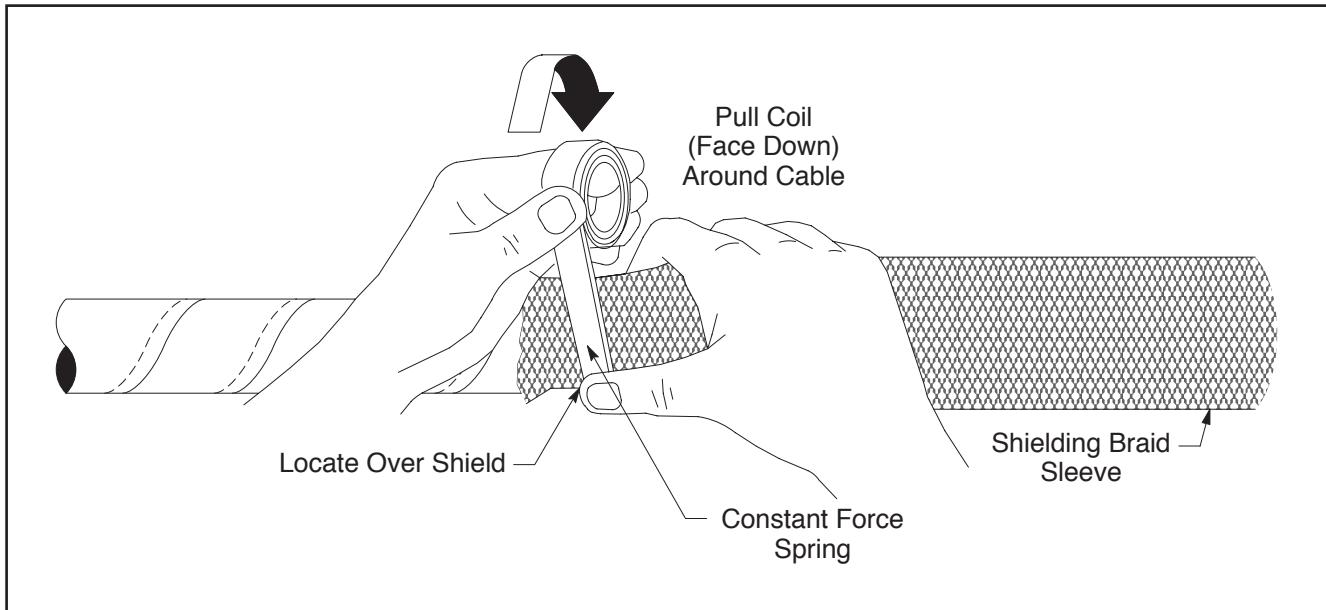


Figure 16

- e. Fold ends of sleeve wires back over the single wrap of coil, then continue applying coil, allowing it to wrap around the wires and itself (*Figure 17*).

NOTE: Cinch (tighten) coil after final wrap.

- f. Using hand to pull on loose end of shielding braid sleeve, pull so sleeve snugs firmly against splice. Secure it into position with second constant force spring applied in the same manner as the first (*Figure 17*).
- g. Overwrap constant force spring and ends of folded back shielding braid sleeve with a layer of Scotch® Electrical Semi-Conducting Tape 13 or vinyl electrical tape (*Figure 17*).

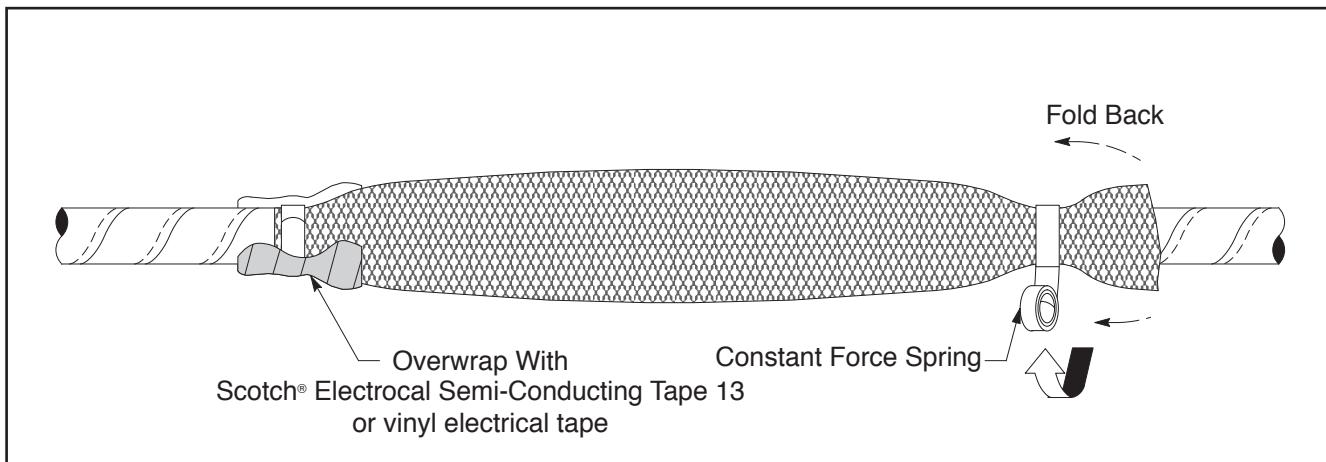


Figure 17

2.9 Connect ground wires using an appropriate connector (Figure 18).

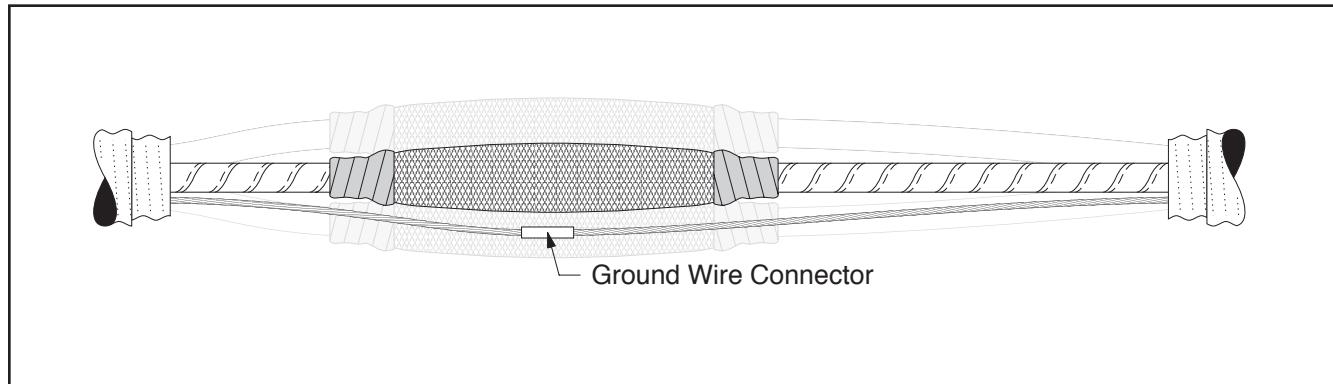


Figure 18

2.10 Install Ground Braid for Armor Continuity (Armored Cable Only)

- Wrap an end of the Scotch® Electrical Grounding Braid 25 around the exposed armor on Cable X. Fold braid at a 90° angle, extending toward the splice opening. Secure end of braid with a large constant force spring (Figure 19).

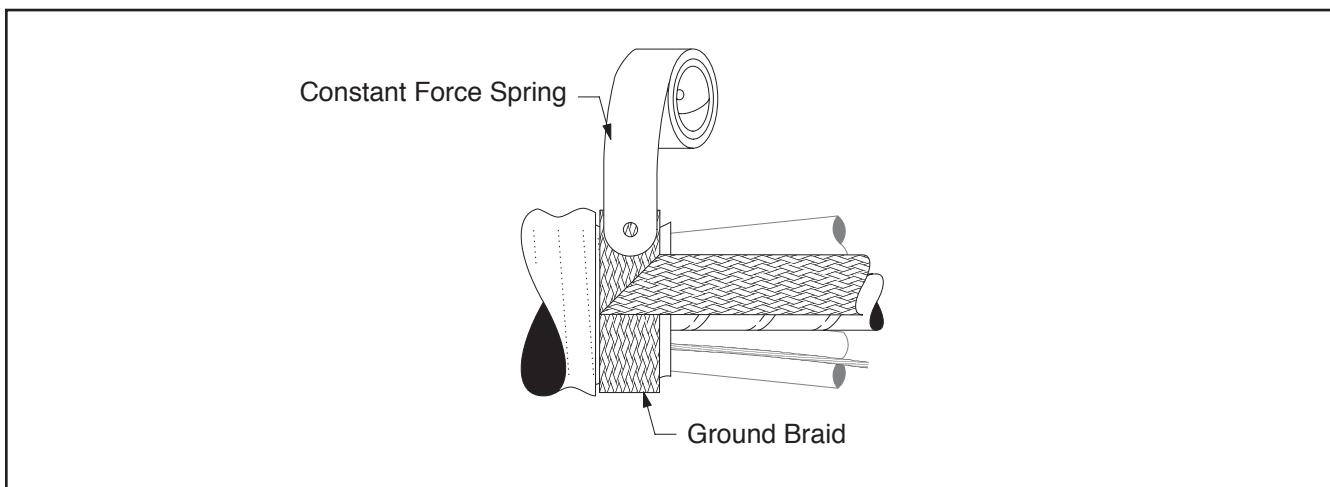


Figure 19

- Spiral wrap the braid around the splice to Cable Y. Single wrap the braid around the exposed armor using the same 90° fold as above. Secure with a large constant force spring (Figure 20).

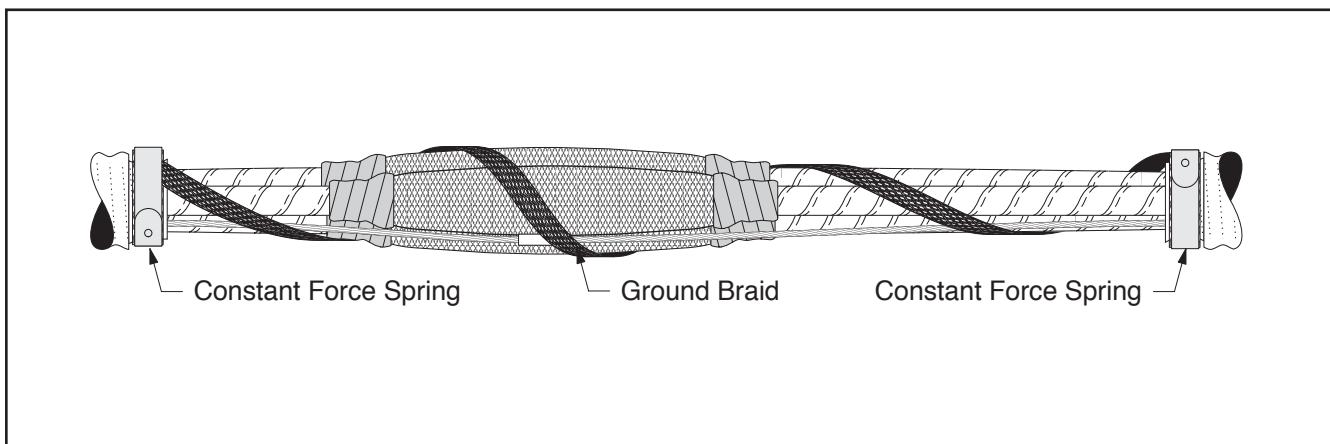


Figure 20

c. Cover constant force springs and edge of armor with one half-lapped layer of Scotch® Electrical Semi-Conducting Tape 13 or Scotch® Vinyl Electrical Tape 33 (*Figure 21*).

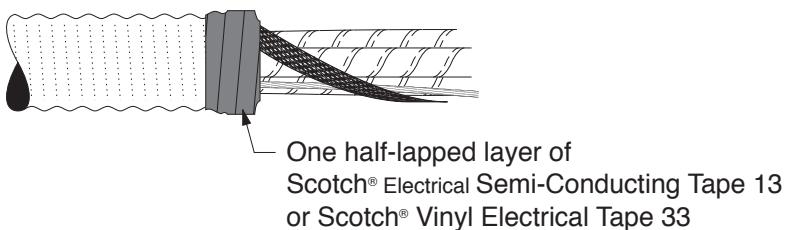


Figure 21

3.0 Install Jacket

3.1 Apply one roll of slightly stretched 2" wide rubber mastic around each cable jacket/armor end, tacky side toward cable jacket. Stretch and tear off the end of the rubber mastic as shown in (*Figure 22*). Do not half-lap the rubber mastic.

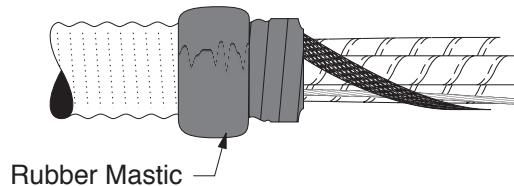


Figure 22

3.2 Begin to install the cold shrink jacketing tube by completely covering the rubber mastic, slowly pulling and unwinding the inner core counterclockwise towards the open splice area. The outer core should remain relatively stationary while unwinding the inner core. If the outer core begins to move towards the first mastic seal, gently pull the outer core and jacketing toward the second mastic seal (*Figure 23*).

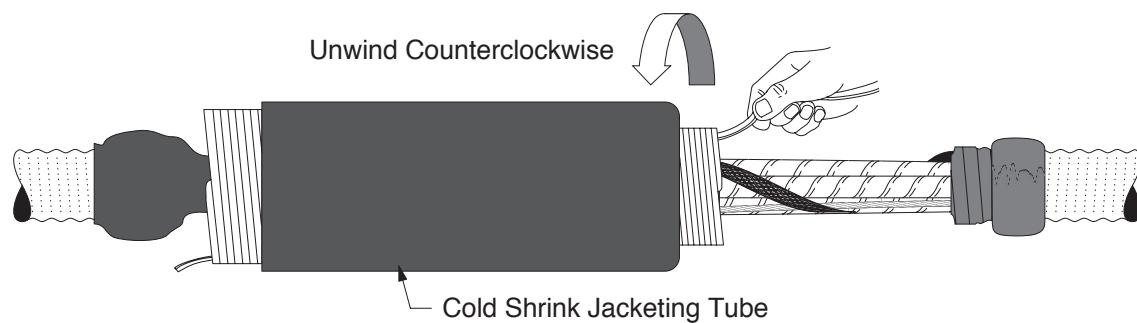


Figure 23

3.3 Continue to install the cold shrink jacket over the rubber mastic on Cable Y by slowly pulling and unwinding the outer core counterclockwise. This portion of the cold shrink tube installs differently than typical cold shrink products in that as the tube shrinks, the end rolls under. The tube may need an occasional push to keep it moving toward the second mastic seal (*Figure 24*).

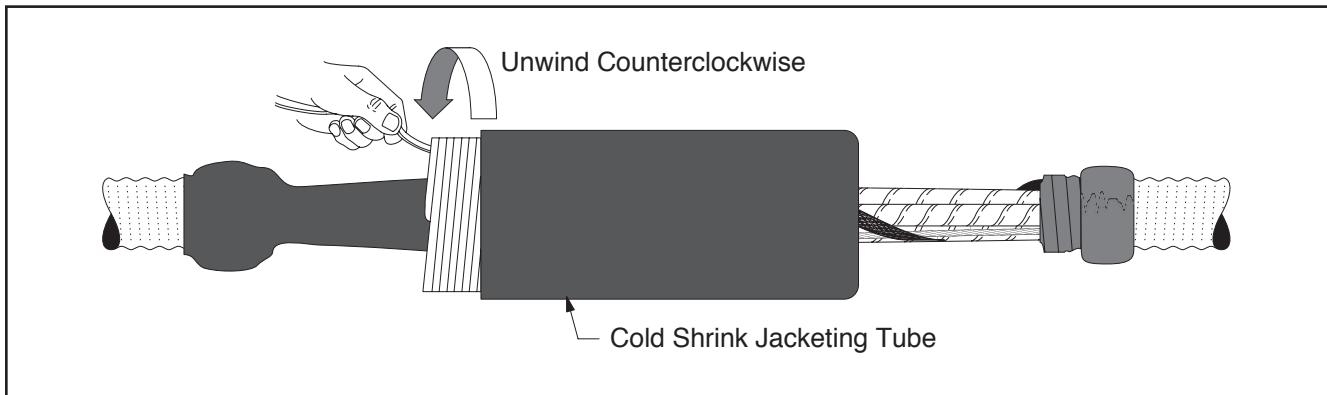


Figure 24

Finished splice (*Figure 25*).

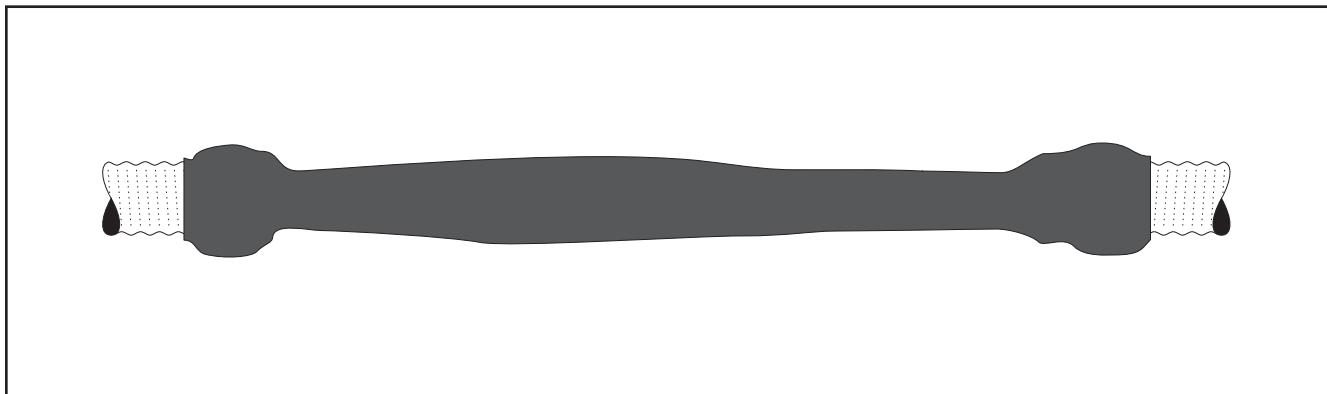


Figure 25

3.4 For armored cables or additional impact protection:

3M™ Armorcast Structural Material is included in the kit and requires approximately two rolls to provide protection equal to that of cable armor.

Overwrap the entire splice with a minimum of two half-lapped layers of Armorcast wrap. Protective rubber gloves (supplied with Armorcast) must be worn to keep resin off hands. Tear open the top end of the foil Armorcast material container and fill foil half full with water.

Squeeze the container four or five times allowing the water to penetrate the roll. Pour out the water, remove the roll from the container and immediately apply to the splice area. Bind the final wrap with vinyl tape.

Tooling Index

Copper Connectors

Splice Kit No.	Cable Size	3M™ Scotchlok™ Copper Connector Number	Length inches (mm)	CRIMPING TOOL/DIE SETS (NO. OF CRIMPS/END)				
				Burdry Corporation		Thomas & Betts Corporation		Square D. Co. Anderson Div
	MD6	MY29	Y34A	Y35, Y39, Y45*, Y46*	TBM 5	TBM 8	TBM 15	VC6-3, VC6-FT**
5551-3/C	6	10001	1.75 (44,4)	—	6AWG (1)	—	U5CRT (1)	Blue (1)
	4	10002	W161 (1)	4AWG (1)	A4CR (1)	U4CRT (1)	Grey (1)	Blue (1)
	2	10003	W162 (2)	2AWG (1)	A2CR (1)	U2CRT (2)	Brown (1)	Grey (1)
	1	10004	1.88 (47,6)	—	1AWG (1)	A1CR (1)	U1CRT (2)	Brown (1)
2/0	10005	W163 (2)	1/0 (1)	A25R (1)	U25RT (1)	Pink (2)	Pink (2)	Universal (1)
	10006	2.00 (50,8)	W241 (2)	2/0 (1)	A26R (1)	U26RT (2)	Black (2)	42 (2)
	11006	3.13 (79,4)	W241 (3)	2/0 (2)	A26R (2)	U26RT (3)	Black (3)	Universal (2)
	2/0	10007	2.13 (54,0)	W243 (2)	3/0 (1)	A27R (1)	Black (2)	45 (1)
3/0	11007	3.13 (79,4)	W243 (3)	3/0 (2)	A27R (2)	U27RT (2)	Black (3)	45 (2)
	4/0	10008	2.13 (54,0)	BG (3)	4/0 (1)	A28R (2)	Orange (2)	Universal (1)
			BG (4)	4/0 (2)	A28R (3)	U28RT (2)	Orange (3)	Universal (2)
					A28R (3)	U28RT (3)	Purple (2)	54H (2)
							Purple (3)	54H (3)
								Universal (3)

*Y45 and Y46 accept all Y35 dies ("U" Series). For Y45 use PT6515 adapter. For Y46 use PUADP adapter.

**Anderson VC6-3 and VC6-FT require no die set.

Tooling Index

Copper/Aluminum Connectors

78-8126-5627-6-B

Splice Kit No.	Cable Size	3M™ Scotchlok™ Aluminum Connector Number	Length inches (mm)	CRIMPING TOOL/DIE SETS (NO. OF CRIMPS/END)								
				Burndy Corporation			Thomas & Betts Corporation			Square D. Co. Anderson Div	ITT Blackburn Co.	Kearney Nat'l Inc.
MD6	MY29	Y34A	Y35, Y39, Y45*, Y46*	Y1000**	TBM 5	TBM 8	TBM 15	VC6-3, VC6-FT**	OD58	Type O		
6	20001	1.62 (41,1)	W161 (1)	6AWG (1)	A6CABT (1)	U6CABT (1)	Universal (1)	Grey (1)	29 (1)	Universal (1)	BY19 (3)	J (3)
4	20002	1.88 (47,8)	W162 (3)	4AWG (1)	A4CAB (1)	U4CABT (1)	Universal (1)	Green (2)	37 (1)	Universal (1)	BY53 (3)	P (3)
2	20003	2.00 (50,8)	W163 (3)	2AWG (1)	A2CAB (1)	U2CABT (1)	Universal (1)	Pink (2)	42H (2)	Universal (1)	BY23 (3)	1/2 (3)
5551-3/C	1	2.00 (50,8)	W163 (3)	1AWG (1)	A1CAR (1)	U1CART (1)	Universal (1)	Gold (2)	45 (1)	Universal (1)	BY23 (3)	1/2 (3)
1/0	20005	2.12 (53,8)	W241 (2)	1/0 (1)	A25AR (1)	U25ART (1)	Universal (1)	Tan (2)	50 (1)	Universal (1)	BY25 (3)	5/8-1 (3)
2/0	20006	2.31 (58,7)	BG (4)	2/0 (1)	A26AR (2)	U26ART (2)	Universal (1)	Olive (2)	54H (2)	Universal (2)	BY31C (3)	5/8-1 (3)
3/0	20007	2.62 (66,5)	W166 (4)	3/0 (1)	A27AR (2)	U27ART (2)	Universal (1)	Ruby (2)	60 (2)	Universal (2)	—	737 (3)

*Y45 and Y46 accept all Y35 dies ("U" Series). For Y45 use P10515 adapter. For Y46 use PUADP adapter.

**Anderson VC6-3 and VC6-FT and Burndy Y1000 require no die set.

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