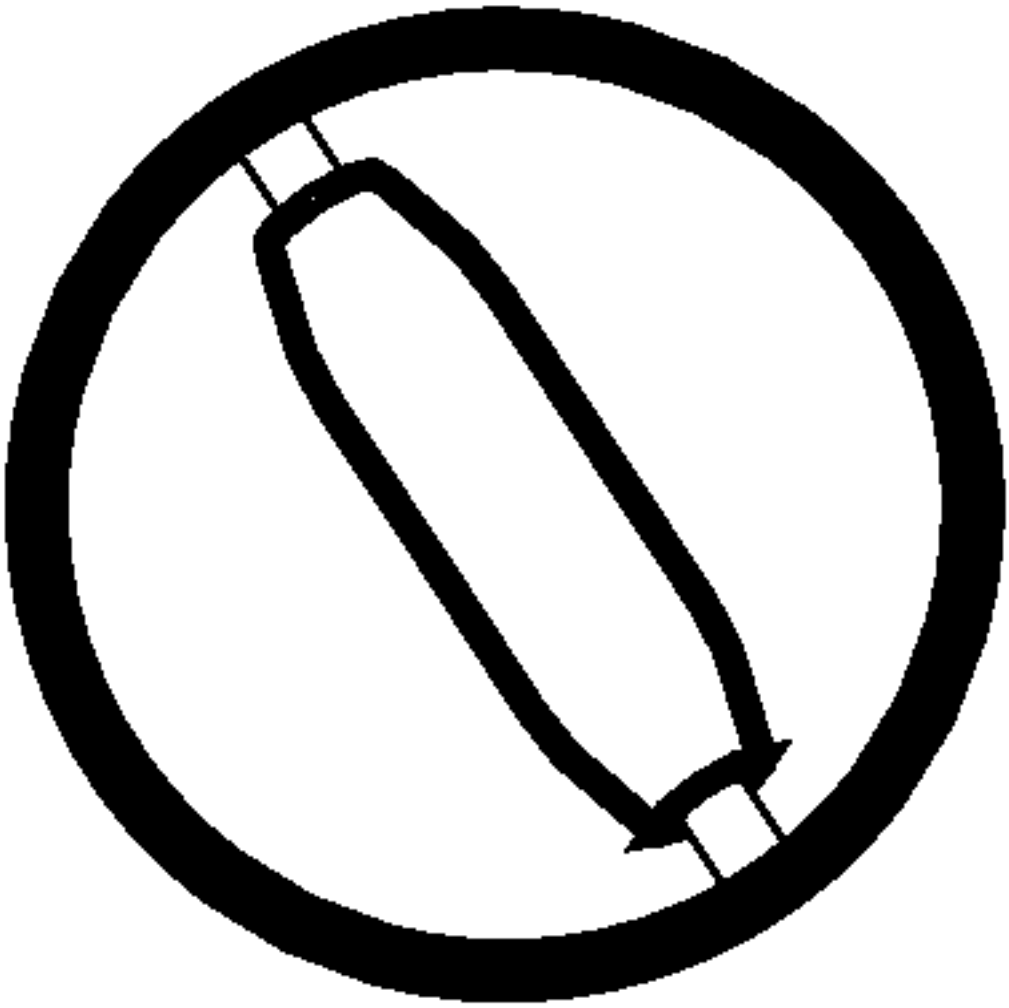
HVS-580D Series
5kV Class

1/C Splice for PILC-to-PILC, PILC-to-Poly or Poly-to-Poly Power Cable



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Electrical Products
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Fuquay-Varina, NC 27526

PII-55004, Rev AA
DCR C58724
PCN 493437-000
Effective Date: February 19, 1998

Kit Contents

All items are listed per phase.
As a minimum, the following items should be included in this kit:

2	Oil barrier tubes	2	Angle-cut strips stress relief material
1	Black/red dual wall tube	4-8	Long strips stress relief material (Depending on kit size)
1	Black rejacketing tube	1	Roll copper mesh
1	Copper braid	4	Strips red sealant (Depending on kit size)
2	Roll springs		
1	Installation instruction		
2	Ground connectors		
2	Strips copper tape		

General Instructions

Suggested Installation Equipment (not supplied with kit)

- Cable preparation tools
- Raychem P63 cable preparation kit or cable manufacturer approved solvent
- Clean, lint-free cloths
- Non-conducting abrasive cloth, 120 grit or finer
- Electrician's tape
- Connector(s) and installation tools
- Raychem recommended torch

Recommended Raychem Torches

Install heat-shrinkable cable accessories with a "clean burning" torch, i.e., a propane torch that does not deposit conductive contaminants on the product.

Clean burning torches include the Raychem FH-2629 (uses refillable propane cylinders) and FH-2616A1 (uses disposable cylinder).

Safety Instructions

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

To avoid risk of accidental fire or explosion when using gas torches, always check all connections for leaks before igniting the torch and follow the torch manufacturer's safety instructions.

To minimize any effect of fumes produced during installation, always provide good ventilation of confined work spaces.

As Raychem has no control over field conditions which influence product installation, it is understood that the user must take this into account and apply his own experience and expertise when installing product.

Adjusting the Torch

Adjust regulator and torch as required to provide an overall 12- inch bushy flame. The FH-2629 will be all blue, the other torches will have a 3- to 4-inch yellow tip. Use the yellow tip for shrinking.

Regulator Pressure

FH-2616A1	Full pressure
FH-2629	15 psig

Cleaning the Cable

Use an approved solvent, such as the one supplied in the P63 Cable Prep Kit, to clean the cable. Be sure to follow the manufacturer's instructions. Failure to follow these instructions could lead to product failure.

Some newer solvents do not evaporate quickly and need to be removed with a clean, lint-free cloth. Failure to do so could change the volume resistivity of the substrate or leave a residue on the surface.

Please follow the manufacturer's instructions carefully.

General Shrinking Instructions

- Apply outer 3- to 4-inch tip of the flame to heat-shrinkable material with a rapid brushing motion.
- Keep flame moving to avoid scorching.
- Unless otherwise instructed, start shrinking tube at center, working flame around all sides of the tube to apply uniform heat.

To determine if a tube has completely recovered, look for the following, especially on the back and underside of the tube:

1. Uniform wall thickness.
2. Conformance to substrate.
3. No flat spots or chill marks.
4. Visible sealant flow if the tube is coated.

Note: When installing multiple tubes, make sure that the surface of the last tube is still warm before positioning and shrinking the next tube. If installed tube has cooled, re-heat the entire surface.

1. Product selection.
Check kit selection with cable diameter dimensions in Table 1.

2. Check ground braid.
Verify that ground braid(s) or bond wire have equivalent cross-section to cable metallic shield.

Raychem HVS-EG supplies ground braid, spring clamp and suggested modifications to make an external ground or shield interrupt.

Table 1

Kit	PILC/Poly Nominal Cable Range	Insulation Diameter Range	Max Lead Diameter	Connector Dimensions Length	Connector Dimensions Diameter
HVS-581D	#2-4/0	0.50-1.00”	1.05”	5.0”	0.90”
HVS-582D	4/0-500 kcmil	0.80-1.10”	1.30”	6.0”	1.40”
HVS-583D	500-1000 kcmil	1.00-1.50”	1.50”	8.0”	1.85”

3. Prepare cables

Choose the cable type (Choice 1-4) and follow the directions given. (See next page for PILC cable.)

***** Mark PILC cable, if unjacketed.

Table 2: PILC-to-Poly

Kit	PILC Jacket Cutback (A*)	Lead Sheath Cutback (B)	Poly Jacket Cutback (C)	Semi-con Cutback (D)
HVS-581D	11"	7.0"	9.0"	5.0"
HVS-582D	11-1/2"	7-1/2"	10"	6.0"
HVS-583D	12-1/2”	8-1/2”	11”	8.0”

CHOICE 1

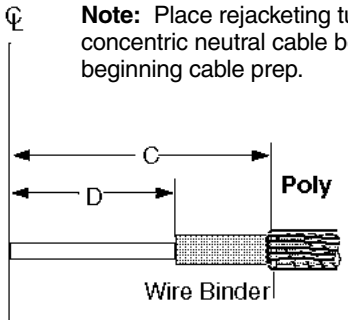
Concentric Neutral Cable

Refer to Table 2 and prepare the cables ends as shown. Place a wire binder at Dimension C and fold back neutral wires. If it is desirable to bring neutral wires over the splice, leave a longer length of wires prior to making the center line cut.

If PILC to Poly cable, or PILC to PILC cable
Go to Choice 4, page 4.

If Poly to Poly cable,
Go to Step 9, page 5

Note: Place rejacketing tube over concentric neutral cable before beginning cable prep.



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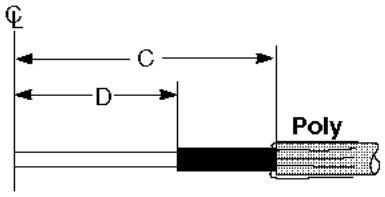
CHOICE 2

Drain Wire Shield Cable

Refer to Table 2 and prepare the cables as shown.

If PILC to Poly cable, or PILC to PILC cable
Go to Choice 4, page 4.

If Poly to Poly cable,
Go to Step 9, page 5



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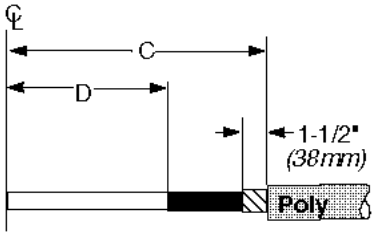
CHOICE 3

Metallic Tape Shield

Refer to Table 2 and prepare the cables as shown.

If PILC to Poly cable, or PILC to PILC cable
Go to Choice 4, page 4.

If Poly to Poly cable,
Go to Step 9, page 5



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CHOICE 4

PILC Cable

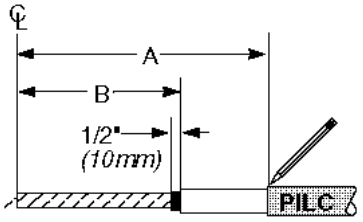
***Mark PILC cable if unjacketed.**

Table 2: PILC-to-Poly or PILC-to-PILC

Kit	PILC Jacket Cutback (A*)	Lead Sheath Cutback (B)	Poly Jacket Cutback (C)	Semi-con Cutback (D)
HVS-581D	11"	7.0"	9.0"	5.0"
HVS-582D	11-1/2"	7-1/2"	10"	6.0"
HVS-583D	12-1/2"	8-1/2"	11"	8.0"

Refer to Table 2 and prepare the PILC cable end(s) as shown.

Each PILC cable end should be prepared as shown in steps 4-8.



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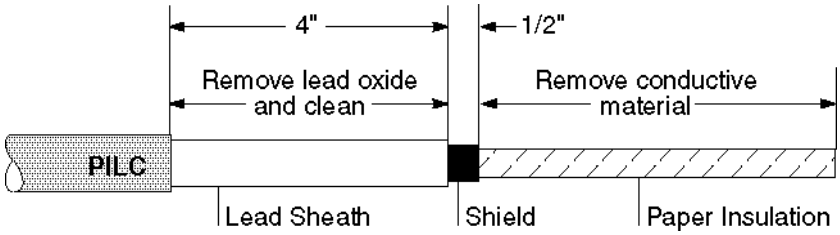
4. Prepare lead sheath and paper insulation.

Prior to removing lead sheath, remove lead oxide from the lead sheath and clean with oil-free solvent.

Remove conductive material from the paper insulation.

If PILC-to-PILC splice, repeat Steps 4-8 for second PILC cable.



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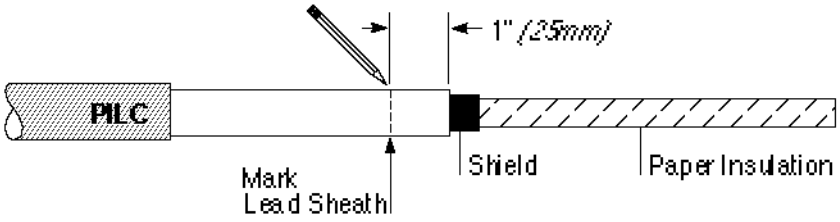
5. Mark lead sheath.



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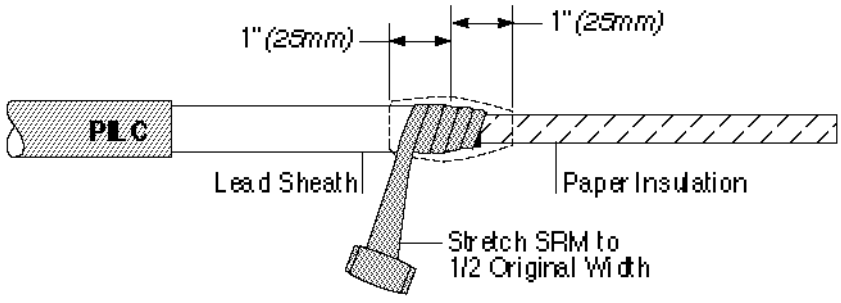
6. Apply Stress Relief Material (SRM) at lead sheath cutback.

Remove backing from one side of a *long strip* of SRM. Roll the SRM and remaining backing strip into a convenient size.

Remove the remaining backing strip and tightly wrap SRM around the shield. Continue wrapping to the mark on the lead sheath, then back across the shield onto the paper insulation as shown.

Note: Apply a maximum thickness of 1/8" *(3mm)* of SRM over the lead sheath to prevent excessive diameter build-up. Save the remaining SRM.



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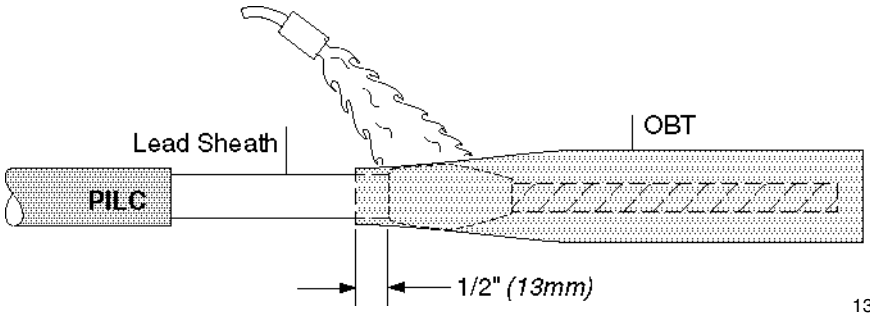
7. Position OBT; shrink in place.

Place the Oil Barrier Tube (OBT) over the cable as shown. Shrink in place starting at the SRM. Work around the tube with a smooth brushing motion.

Note: To achieve a smooth wrinkle-free installation, use a reduced flame to install the thin-walled OBT.



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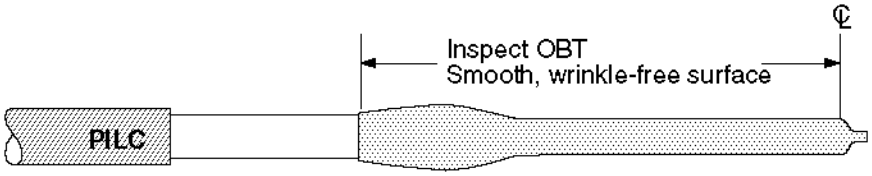
8. Inspect OBT.

The OBT should have a smooth, wrinkle-free surface after shrinking. Reheat to smooth any wrinkled areas. **If PILC to Poly splice, discard second OBT.**



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9. Remove insulation.

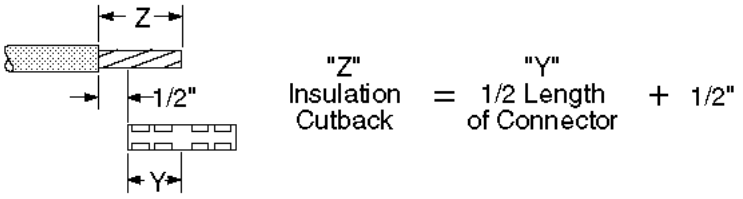
If PILC to Poly splice, make sure connector has a center oil stop.

Refer to Table 3 and cut back insulation as shown.

Note: For PILC cable, cut back the oil barrier tube and paper insulation to expose the conductor.

Table 3: Connector Dimensions

Kit	Max Length	Max Diameter
HVS-581D	5.0"	0.90"
HVS-582D	6.0"	1.40"
HVS-583D	8.0”	1.85”



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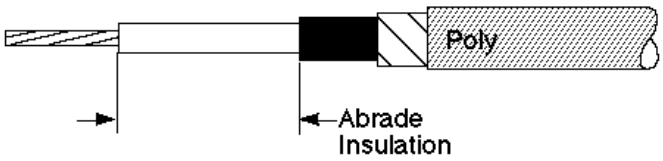
10. Poly cables only, abrade insulation.

Abrade the poly insulation, as necessary to remove imbedded semi-con, and clean.



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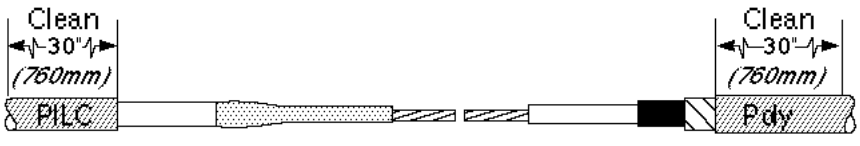
11. Clean cable jackets.

Clean the cable for the length of the tubes.



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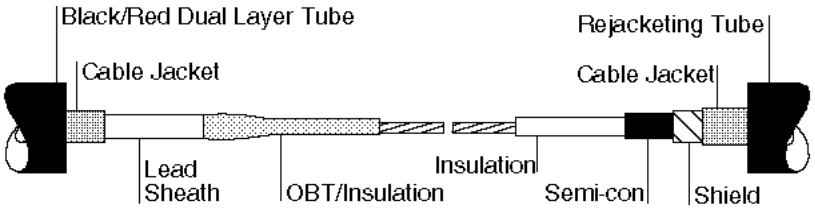
12. Place dual layer tube over one cable; rejacketing tube over the other.

Place nested tubes over cables as shown. Protect tubes from end of conductor as they are placed over cable end.

Note: A PILC to Poly tape shield splice is shown in this instruction as an example. Any cable combination discussed earlier can be used.



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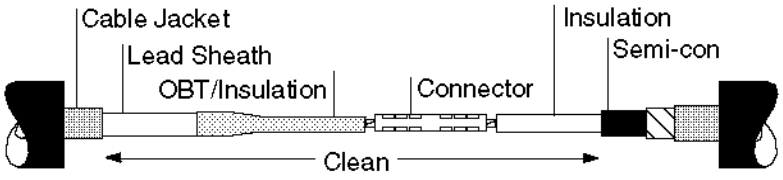
13. Install connector.

If soldering, protect OBT by wrapping it with cotton or glass fiber tape.

After installation, deburr connector.

Using an approved solvent, clean the cables as shown, paying particular attention to the OBT surface.



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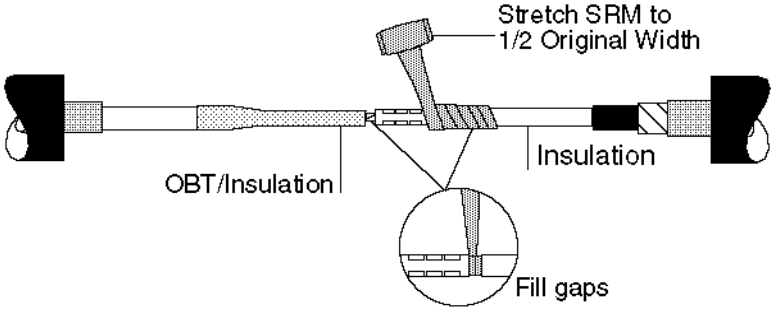
14. Apply SRM over connector.

Remove backing from one side of a *long strip* of SRM. Roll the SRM and remaining backing strip into a convenient size. Remove the remaining backing strip and tightly wrap the SRM around the connector and exposed conductor. Be sure to fill the gaps and low spots around the connector. Do not over-wrap the SRM. In most cases the SRM should only be slightly larger in O.D. compared to the cable insulation.

Continue to wrap SRM onto the solvent-cleaned OBT and insulation as shown.

Note: If connector diameter is larger than insulation diameter, apply two half-lapped layers of SRM over the entire connector. Discard any excess SRM (long strips).



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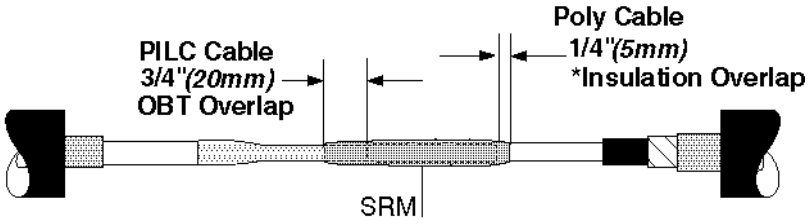

*If PILC-to-PILC, overlap OBT 3/4"

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15. Apply SRM at semi-con cutback.

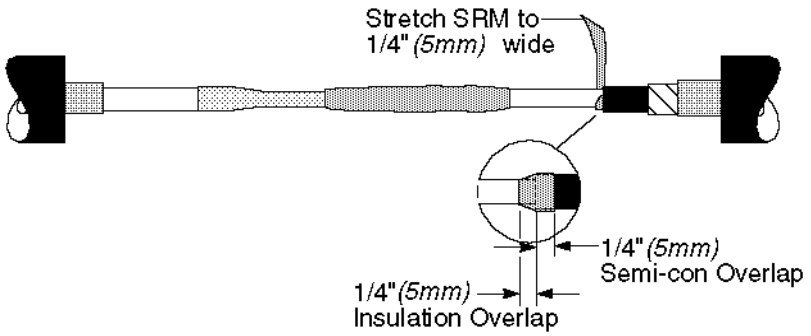
Choose the appropriate splice type (Choice 1-2) and follow the given directions.

CHOICE 1

If PILC-to-Poly or Poly-to-Poly Splice

Remove backings from the *short angle-cut piece* of SRM. Place tip of SRM at semi-con cutback and tightly wrap to fill semi-con step. Overlap semi-con and insulation as shown. Taper SRM down to meet insulation.

Go to Step 16, page 8.



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CHOICE 2

If PILC-to-PILC Splice

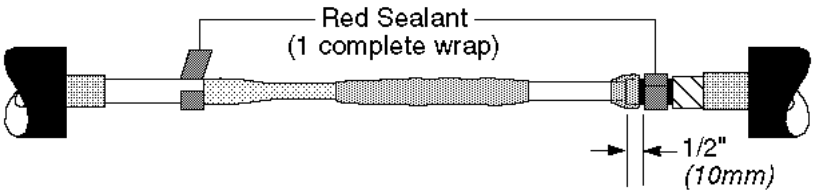
Discard angle-cut pieces of SRM.

Go to Step 16.

16. Apply red sealant.

A) Poly cable
Remove the backing from the red sealant and place one complete wrap onto the Poly cable semi-con as shown.

B) PILC cable
Wrap one complete wrap of red sealant onto cleaned lead sheath with sealant butting the end of the OBT as shown



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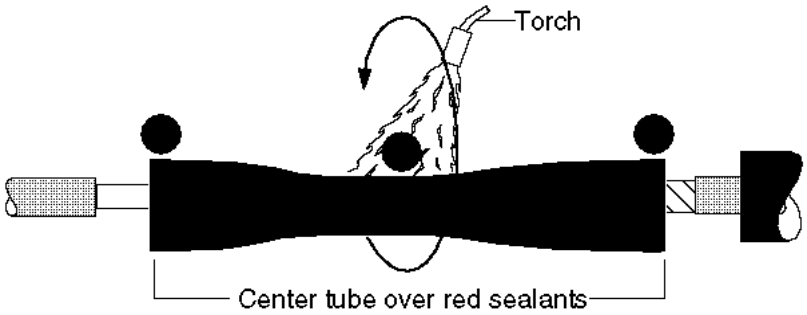
17. Position black/red dual layer tube; shrink in place.

Center tube over splice as shown. Begin shrinking at center of tube (1), working torch with a smooth, brushing motion around the tube. After center portion shrinks, work torch as before toward one end (2), then to the opposite end (3). Apply sufficient heat to ensure softening of the SRM, indicated by a smooth surface profile.

Note: Do not point the flame directly at the cable semi-con layer.



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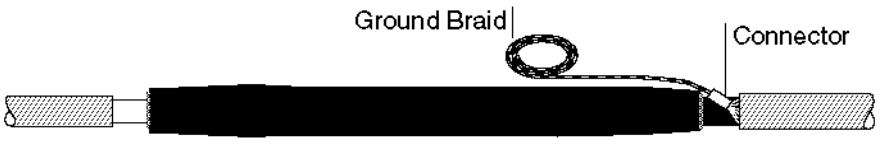
19. Install ground.

Choose the appropriate cable type (Choice 1-4) and follow the directions given.

CHOICE 1

If Drain Wire Shield Cable

Pigtail the shield wires and crimp on to the ground braid using the connector provided.



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Lay braid across splice tube and solder ground braid to lead sheath of the PILC cable. Deburr the connection, cut off excess braid and trim pigtailed wires.

Discard spring clamp and foil tape.

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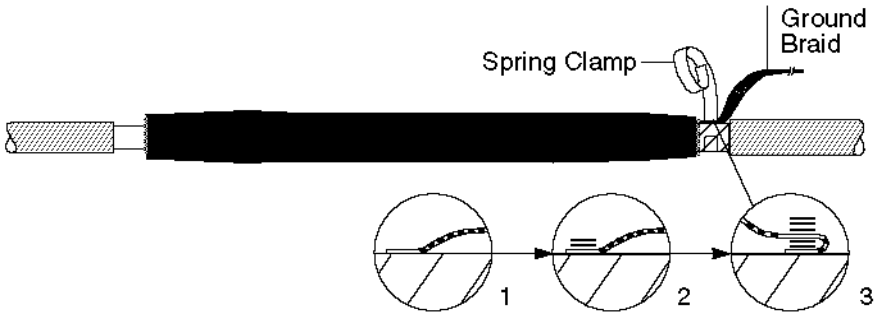
Go to Step 19, page 9.

CHOICE 2

If Metallic Tape Shield Cable

(1) Flare one end of the ground braid and place it onto the metallic tape, butted up to the red sealant.
(2) Attach the braid to the shield by placing two wraps of the spring clamp over the braid. (3) Fold the braid back over the spring clamp wraps. Continue to wrap the remaining clamp over the braid. Tighten clamp by twisting it in the direction it is wrapped and secure with copper foil tape provided.



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Lay the braid across the splice tubes and solder to the lead sheath of the PILC cable. Deburr the connection and cut off excess braid.

Discard connector.

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Go to Step 19, page 9.

CHOICE 3

If PILC to PILC Cable

Solder ground braid onto lead sheath. Lay the braid across the splice tubes and solder to the lead sheath of the other cable. Deburr the connection and cut off excess braid.

Discard spring clamp, connector, and foil tape.

Go to Step 19.

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CHOICE 4

If Concentric Neutral Cable

Apply two layers of red sealant onto the extruded dielectric cable semi-con at the neutral wire whip-back position.

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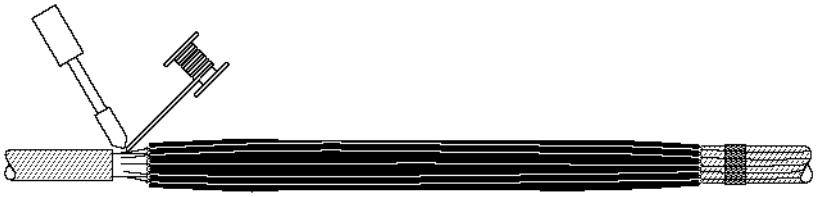
Lay the evenly spaced neutral wires across the splice and solder to the lead sheath of the PILC cable. Deburr the connection and cut off excess neutral wires.



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Press the neutral wires into the previously applied sealant and apply two further layers of sealant over the wires and sealant.

Discard spring clamp, connector, foil tape, and ground braid.

Go to Step 19.

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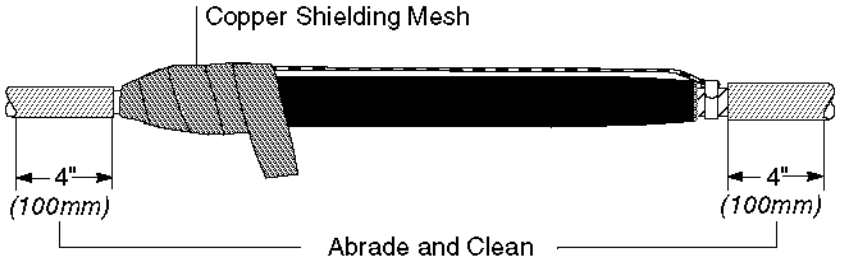
19. Install the shielding mesh.

Wrap a half-lapped layer of the copper mesh across the entire splice from the PILC cable lead sheath to the opposite cable jacket (or red sealant in the case of concentric neutral cable) and tie off.

Abrade and solvent clean cable jacket (or lead sheath) as shown to provide an approved surface.



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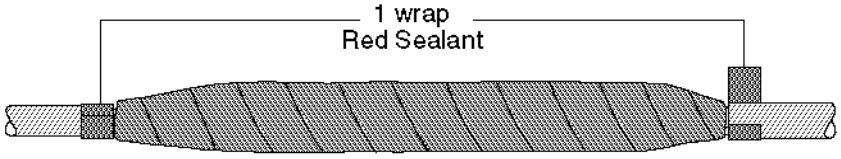
20. Apply red sealant.

Remove release paper from red sealant and place one full wrap at cable jacket cutbacks as shown.



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21. Position rejacketing tube.

Remove or tape over all sharp points to prevent puncture of rejacketing tube.

Center tube over splice.

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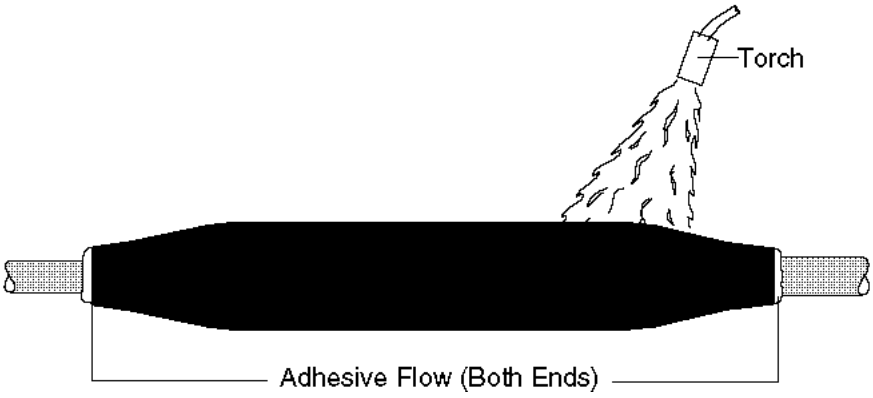
22. Shrink rejacketing tube.

Begin shrinking at the center of the tube and work toward each end.

This completes the splice.

Note: Allow to cool before moving or placing in service.



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