

TPI **Telepak Industries** *Splice & Seal*TM

Forced Encapsulated Splice Procedures

The TPI Splice & Seal system can be used on all Filled or Air Core PIC cables, 26-22 AWG, either direct buried, aerial or underground, in various splice configurations.

TPI MATERIALS REQUIRED:

TPI-7XXX	SLEEVING MATERIAL
TPISS-1012	SEALANT STRIPS
TPISEM-XX	SPLICE ENVELOPE MATERIAL
TPIPT-87	PRESSURE TAPE
TPICT-14N	CABLE TIES NARROW
TPISRT-05	STRAIN RELIEF TAPE
TPIBC-02	BOND CLAMPS
TPIBS-30	INSULATED BOND STRAP
TPISW-10	SPACER WEB
TPICW-30	CLEAR WRAP
TPIF-10	FUNNEL
TPICT-XXW	CABLE TIES WIDE HEAVY DUTY
TPIET-15	END TAPE
TPIEC-05	EMERY CLOTH

Size and amount of materials required will vary with cable diameters and splice bundles.

Installation Steps:

1) Make sheath opening and place bond clamps.

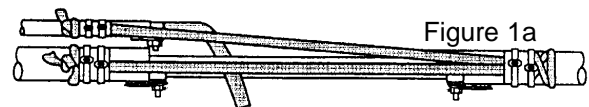
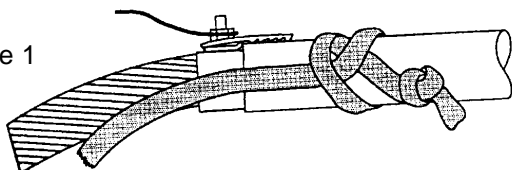
- Remove as much filling compound as possible
- Remove all dirt and grease from cable sheath 8 inches on each side of opening with approved cable cleaner or wipe. DO NOT card sheath.
- Complete splice.

NOTE: A 12 inch opening is recommended up to 200 pair, 300 pair and over require a 20 inch opening.

2) Place Strain Relief and Bond Strap

- Behind Bond Clamp, tie an overhand knot at one end of Strain Relief Tape. Tie second knot around cable; tighten tape around cable until knots come together.

Figure 1



STRAIN RELIEF INSTALLED

- Stretch Strain Relief tape across splice and repeat process on opposing cable.
- Ensure Strain Relief tape is taut across splice opening.
- With abrasive side down, tightly wrap 1 1/4 turns of Emery Cloth over Strain Relief tape, right in front of knot. Repeat on other end of cable, keeping Strain Relief tape taut across splice.
- Place 3 tight half-lapped layers of End Tape over Emery Cloth and two heavy duty Cable Ties over taped Emery Cloth. Use a cable tie tightening tool to install ties very tight. Cut and remove tails.

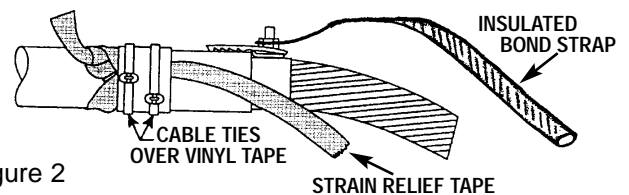
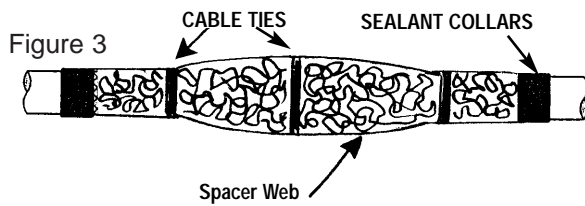


Figure 2

- Place Insulated/Braided Bond

3) Install Spacer Web

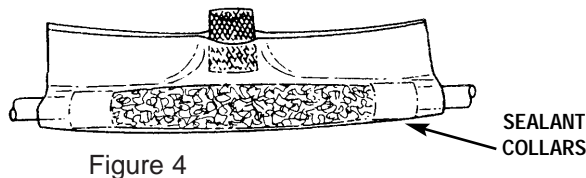
- a. Wrap a single layer of Spacer Web over entire splice bundle, covering all exposed conductors / connectors. Hold in place with narrow Cable Ties.



NOTE: DO NOT cut ties; fold over splice and tape down. Sharp edges could puncture encapsulant envelope.

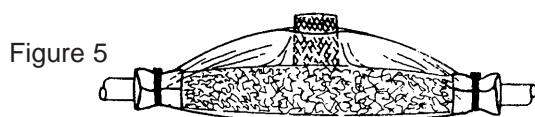
4) Install Splice Envelope Material

- a. Install a minimum 2-layer collar of Sealant Strips just outside Bond Clamps
- b. Cut Splice Envelope Material even with outer edges of Sealant Strips with enough envelope extending approximately 4 inches-6 inches above splice bundle and adhesive side facing splice
- c. The Splice Envelope Release Liner is perforated in three equal sections for ease of removal and installation. Peel back the center section first and tack liner to the very bottom of the splice bundle.
- d. Remove the remaining two pieces of liner and proceed to form the encapsulant pouch.



- e. Press adhesive sides together around collars leaving opening at the top for the funnel. (Figure 4)
- f. Install 2 Wide Cable Ties over each collar. Tighten to slightly compress Sealant, ensuring a leak proof envelope.
- g. Place Funnel for pouring encapsulant into the splice on the top of the envelope. Fill envelope with encapsulant 3/4 of the way up on splice bundle.

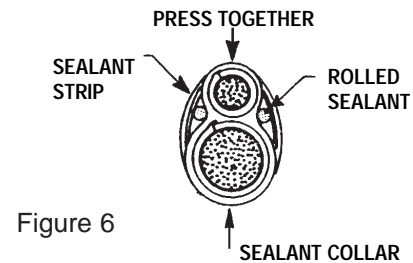
NOTE: Encapsulant must be massaged into all splice crevices. Carefully remove funnel and seal envelope. Cut and remove all excess envelope material.



NOTE: Splice envelope must be installed as tight as possible leaving no sag or belly to collect excess encapsulant. The bottom of the envelope must be parallel with the entrance cables.

4A) Install Splice Envelope for Branch Cable Installations

- a. Place corresponding layers of Sealant Strips just outside bond clamps, directly in line with main cables.
- b. Press collars together firmly.
- c. Cut and roll 2 inch Sealant Strips and press in between collars on each side.
- d. Wrap a single layer of Sealant around entire collar containing both branch collars.
- e. Squeeze and form sealant as circular as possible.



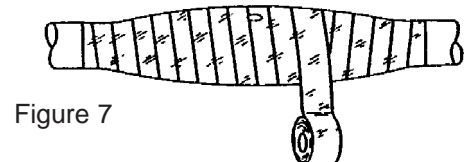
- f. Install Sealant Strip Material on single end and continue with step 4 b-h for the other end.

5) Install Clear Wrap

- a. Wrap at least 4 half-lapped layers of Clear Wrap over encapsulated splice bundle, increasing tension on each layer to keep encapsulant under continuous pressure.

CAUTION: Watch for leaks or seepage of encapsulant. If any is present, add additional Clear Wrap to stem any flow of compound from bundle. If air bubbles are present, puncture through Splice Envelope to release any trapped air, and seal with additional Clear Wrap.

- b. Over Clear Wrap, add one half-lapped layer of Pressure Tape. Pressure tape will hold compression of Clear Wrap until encapsulant is cured.
- c. Install Moisture/Vapor Barrier. Wrap one 1/4 inch - 1/2 inch lapped layer of aluminum tape or aluminum sheeting over entire wrap of pressure tape. Smooth aluminum along splice bundle using hammer handle or equivalent over entire barrier.



NOTE: Aluminum Sheetting is recommended for ease of installation.

6) Install TPIS Sleeving Material

- a. Just outside wrapped splice/inner collars, place a minimum 2-layers of Sealant Strips. Additional layers may be required depending on the actual diameter of the splice bundle. After installing the

collar, wrap a single half-lapped layer of Sealant Strip, starting just outside collar, extending up over collar and onto splice bundle at least two inches. Increase this distance as the diameter of the bundle increases.

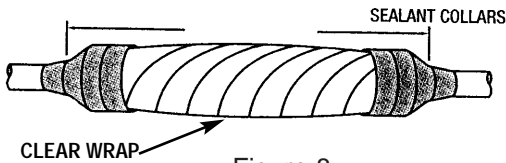


Figure 8

- b. Measure and cut a piece of Sleeving Material extending to outside edge of Sealant Collars and overlapping itself at least 1 1/2 inches.

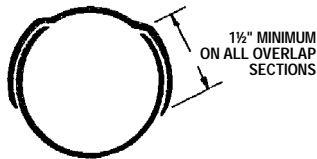


Figure 9

- c. Two pieces of Sleeving Material can be used still maintaining 1 1/2 inch overlap, see step 6A. This procedure will make a more appealing splice, causing less slack in the sleeving and not as much "bunch up."

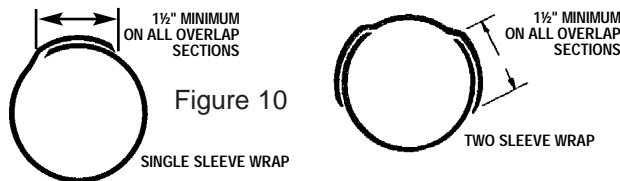


Figure 10

NOTE: More than one size may be used to complete an installation. The sleeves must overlap by at least 1-1/2 inches. (See figure 10)

- d. Install Sleeving keeping under tension while forming smoothly around splice bundle.
- e. Tape ends of Sleeving tightly with End Tape out onto cable sheath.
- f. Over Sleeving, place and hand tighten Wide Cable Ties, spaced to match circular marks on Sleeving or approximately 2 inches apart. Tighten to cause 1/8 inch to 1/4 inch compression of Sleeving. Trim off all Cable Ties.

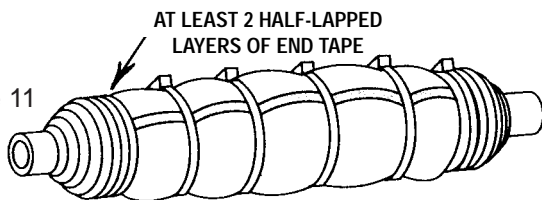


Figure 11

- g. End Tape can be applied to ends of Sleeving Material out onto cable sheath.
- h. Completed splices can be immediately direct buried and backfilled. Splice should be supported according to local practices.

NOTE: Increase size of Sealant Strip Collars proportional to the size of the overall splice bundle. This will aid in placing sleeving and reduce "buckling" of the sleeving material.

6A) Multiple Sleeve Installations, less "Buckling Effect" of Sleeving Material-Saddle Method

- a. Measure the largest circumference of the splice. The sleeve sizes must be selected so that the sleeve will overlap each other by at least 1-1/2 inches. With two sleeves, the combined Sleeving Material width should be 3 inches less than the largest circumference measurement.
- b. Measure the length of the wrapped area and add 6 inches. Cut the sleeves to this length. Clean sheath with approved wipe, or cleaner. DO NOT CARD.
- c. Remove release liner from the larger sleeve and center it over the wrapped area at the bottom of the splice. The sleeve must extend to the end of each Sealant Collar.
- d. In both steps 6 and 6A, Sleeving Material can be stretched to better conform to encapsulated splice bundle.

NOTE: When using this method on cable bends, place the first sleeve on the inner side of the bend.

- e. Tuck the sleeve to the splice along the centerline of the splice and around the largest circumference.
- f. Hold the center section of the sleeve beginning on either side of the point of the largest splice circumference; stretch the first edge out from the center and around the splice. Repeat on the other side. Press the sleeve firmly onto the splice. (See figure 10.)

Figure 12



- g. Remove release liner from second piece of Sleeving and center it over the wrapped area at the top of splice. Wrap it around the splice in the same manner as described in step 6.

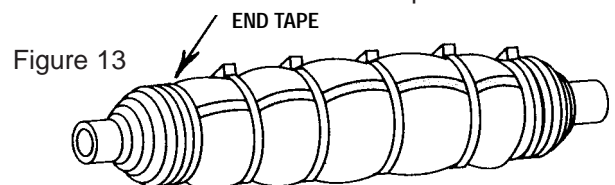


Figure 13

7) Re-Entry

- a) Remove all cable ties.
- b. Remove Sleeving by cutting and/or unwrapping. Ensure cut does not cause conductor damage or create gouges in the cable sheath.
- c. Discard Sleeving Material. DO NOT reuse.
- d. Remove all Sealant and tapes.

8) Guidelines for Estimating Sleeving Material Selection:

TPI Sleeving Material Descriptions:

TPI-7105	4.75" x 5'
TPI-7120	4.75" x 20'
TPI-7205	7.00" x 5'
TPI-7220	7.00" x 20'
TPI-7305	8.50" x 5'
TPI-7320	8.50" x 20'
TPI-7405	12.50" x 5'
TPI-7420	12.50" x 20'

NOTE: Sleeving must overlap itself, or additional piece of material, by 1.5 inches.

Single Sleeve Installation:

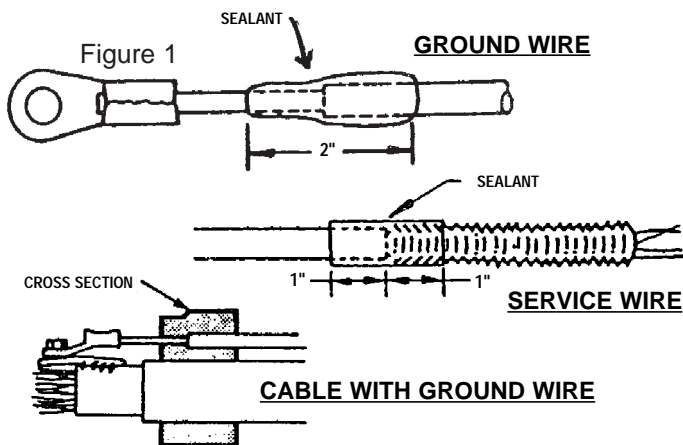
TPI PART #	MAXIMUM BUNDLE DIAMETER	BUNDLE CIRCUMFERENCE
TPI-71XX (4.75")	1.00"	3.25"
TPI-72XX (7.00")	1.75"	5.50"
TPI-73XX (8.50")	2.25"	7.00"
TPI-74XX (12.50")	3.50"	11.00"

Dual Sleeve Installation:

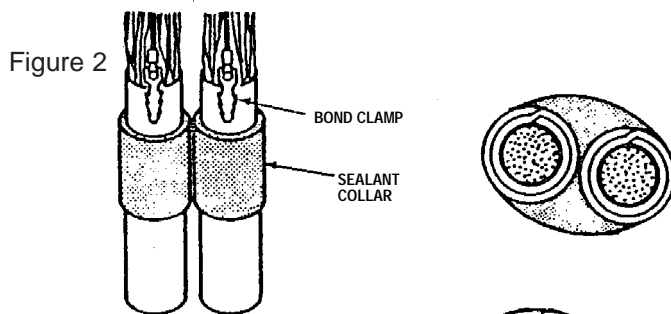
TPI PART #	MAXIMUM BUNDLE DIAMETER	BUNDLE CIRCUMFERENCE
(1) TPI-71XX (4.75")		
(1) TPI-74XX (12.50")	4.50"	14.25"
(1) TPI-72XX (7.00")		
(1) TPI-74XX (12.50")	5.25"	16.50"
(1) TPI-73XX (8.50")		
(1) TPI-74XX (12.50")	5.75"	18.00"
(2) TPI-74XX (12.50")	7.00"	22.00"
(3) TPI-74XX (12.50")	10.50"	33.00"

Butt/Vertical/Pedestal Splice

- 1) Install approved bonding/grounding hardware per local procedures.
- 2) Prepare any terminal stubs, service or ground wires per figure 1.



- 3) Prepare cable/wires. Strain Relief tape is not required in any Butt type splice.
- 4) Wrap two layers of TPISS-1012 Sealant Strips directly below bond clamps and press cables firmly together.



- 5) Cut and roll 2-inch straps of Sealant Strips. Align and press them into the crotches between wire, cable and Sealant Collars.

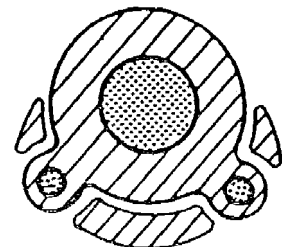


Figure 3

- 6) Where no service or ground wires enter splice, place one full wrap of sealant over cables, forming to keep as concentric as possible. Go to Step 11.

- 7) Addition of service or ground wire requires adding one full layer of sealant to form a collar for each wire. (See figure 4.)

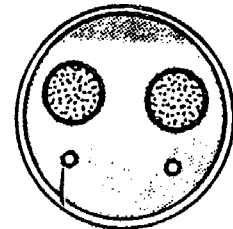


Figure 4

- 8) Arrange and align service wire drop collars and ground wire drop collars with main cable collars.
- 9) Fill in voids between and around the entire collar with rolled and folded pieces of sealant.

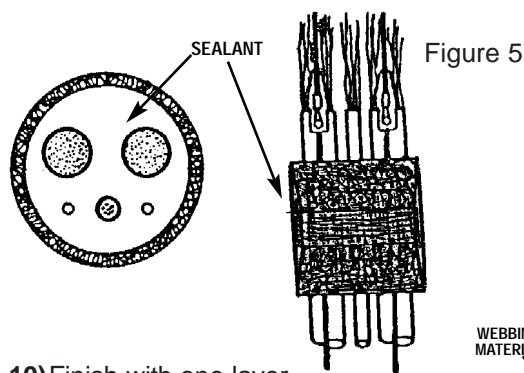


Figure 5

- 10) Finish with one layer of Sealant Strips over entire collar again, keeping collar as concentric as possible.

- 11) Place webbing TPISW-10 over splice bundle, on top of sealant collar

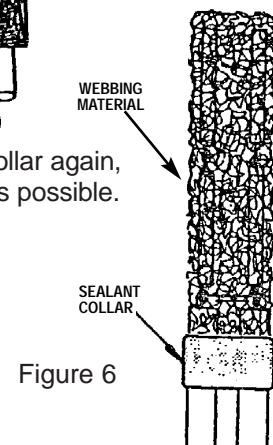
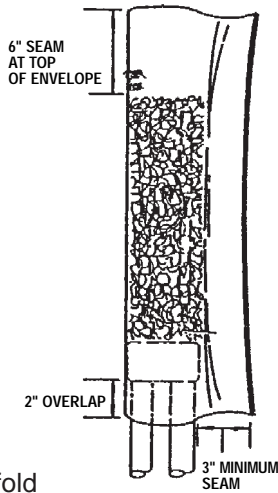


Figure 6

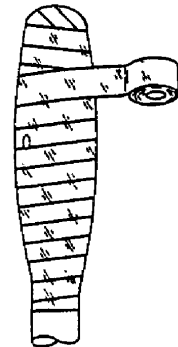
- 12) Install TPISEM-18 Envelope Material, allowing for a 6-inch seam at the top, a 2-inch overlap at the sealant collar, and at least a 3-inch seam along vertical side of splice.

Figure 7



- 13) Fill envelope with encapsulant to top of webbing.
- 14) Seal upper 6 inches of seam, fold in the corners and fold seam onto filled envelope. Hold seam in place while wrapping TPICW-30 Clear Wrap around and over the top until seams are secured and covered. Remove trapped air as described in Previous Practice.
- 15) Starting at collar, apply four half-lapped layers of Clear Wrap around entire splice area in a Z fashion and wrap each layer with increased tension.
- 16) Over Clear Wrap, add one half-lapped layer of Pressure Tape. Pressure tape will hold compression of Clear Wrap until encapsulant is cured.
- 17) Install Moisture/Vapor Barrier. Wrap one 1/4" - 1/2" lapped layer of aluminum tape or aluminum sheeting over entire wrap of pressure tape. Smooth aluminum along splice bundle using hammer handle or equivalent over entire barrier.

Figure 8



NOTE: Aluminum Sheeting is recommended for ease of installation.

- 18) Install Sleeving Material to extend from bottom edge of Sealant Collar to 4 to 6 inches above top of splice, (enough to fold back down on splice bundle.)

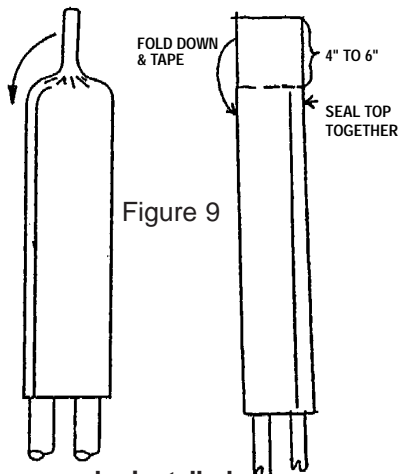


Figure 9

NOTE: A vented (unencapsulated) closure can be installed by eliminating step 13 and adding a vent pipe prepared as a service or ground wire. (See Figure 1.)

Pull-out Sheath Repair (Aerial PIC Cable Plant Rehab)

- 1) Complete cable repairs and extend bond into a closure ground.
- 2) Clean sheath 8 inches beyond opening using an approved cleaner or wipe provided in kit. **DO NOT card sheath.** If installing on self-support cable (figure 8 type) ensure the webbing material between cable and strand is removed flush with the outside of cable sheath.
- 3) Wrap exposed wire and bond with Clear Wrap, extending into closure housing or frame at least 2 to 3 inches.
- 4) Place 2 layers of Sealant Strip Material on the cable, just behind end of the Clear Wrap.

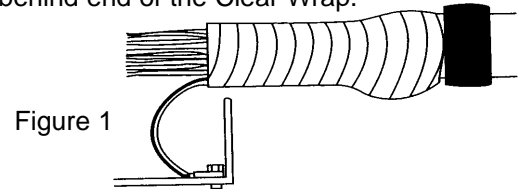
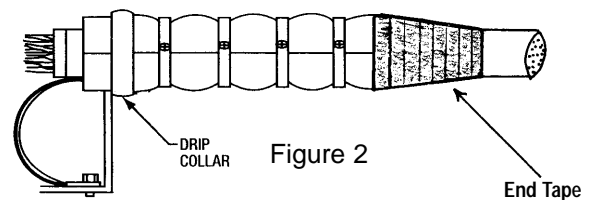


Figure 1

- 5) Measure and cut a piece of TPIS Sleeving Material. Extending 1/2 inch beyond Sealant Strip on outside and a sufficient amount to reach into closure covering all Clear Wrap and overlapping itself at least 1-1/4 inch.
- 6) Install Sleeving, keeping under tension while forming smoothly around exposed cable core.
- 7) Over Sleeving, place and hand tighten Wide Cable Tie (included with Sleeving Material) spaced to match circular marks on Sleeving, approximately 2 inches apart. Wrap ties in the same direction as the Sleeving was installed. Using a cable-tie tightening tool, cinch up ties slightly compressing Sleeving 1/8 inch. Trim all ends.
- 8) Using End Tape, tape end of Sleeving tightly down onto cable sheath.
- 9) Complete Pull-out repair by installing a drip collar over Sleeving following local policy.



- 10) Reinstall closure or terminal cover.

NOTES:

Remember!
There is no job so important
that we cannot take the time
to perform our work
SAFELY!

WARRANTY: Telepak Industries (TPI) sells its products knowing the user will evaluate and determine the suitability for the intended application. You assume all risks and liability associated with such use. All Telepak Industries cable products are warranted to be free from all defects in material and workmanship at the time of sale. Our obligation under this warranty is limited to, at our option, to replace or reimburse for any product proved defective within 2 years from the date of delivery. Proof of purchase is required.

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