XAGA 1650
Installation Instructions

Buried Splice Closure

CONTENTS

1 GENERAL PRODUCT INFORMATION

This document provides information regarding the installation of TE Connectivity's XAGA 1650 buried splice closure system, which incorporates a reinforced heat-shrinkable wraparound sleeve coated internally with a hot-melt adhesive to provide a watertight seal to the cable jacket. The XAGA 1650 closure is intended for use on unpressurized polyolefin insulated-conductor filled cables in applications requiring splice encapsulation. The XAGA 1650 closure will accommodate 6 to 3600-pair cable splices.

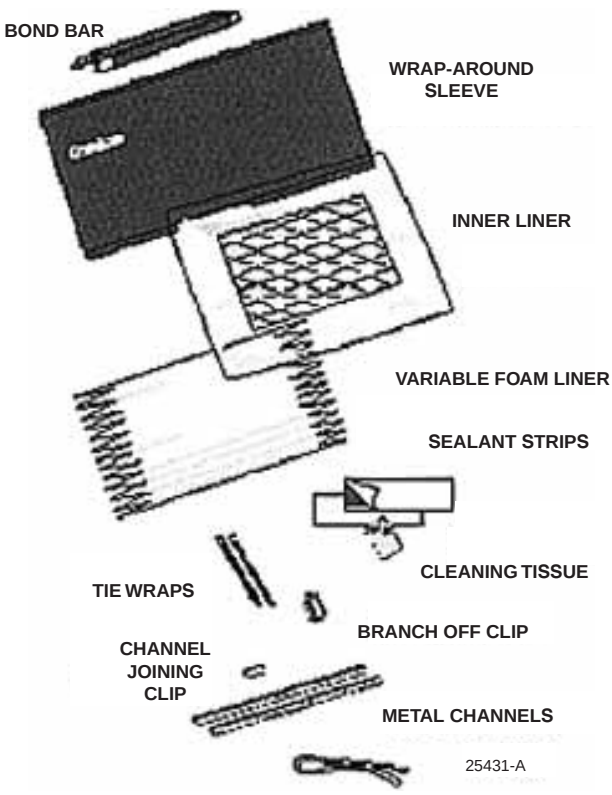
2 WARNINGS

1. Use extreme caution when handling an open-flame torch. Observe the torch manufacturer's and/or your company's approved safety procedures.
2. Provide adequate ventilation and avoid overheating the sleeve when installing.
3. The alcohol cleaning tissue in this kit is FLAMMABLE. Keep away from heat. sparks, and flame. Remove from work area before igniting open-flame or hot-air source.

3 GENERAL INSTALLATION NOTES

1. Protect existing plant, such as poles and other cables, from the torch flame. A Raychem AD-1460 fiberglass heat-shield pad may be used for this protection.
2. Use temporary bonding procedures where required.
3. The XAGA 1650 closure should be installed when the temperature in the work area is above O°F (-18°C).
4. Do not use the XAGA 1650 closure on pressurized plant or pulp cable.
5. Do not place the XAGA 1650 closure on a wet splice. Thoroughly dry the splice in accordance with your company-approved practices. Be sure that no water comes in contact with the splice during installation.
6. Use only company-approved connectors and bonding hardware.
7. Follow the encapsulant manufacturer's instructions for mixing and using the encapsulant.
8. Remove rocks and sharp objects from the backfill when burying the splice. Do not use creosote-treated material over or under the closure. The XAGA 1650 closure needs no permanent support attached.

4 KIT COMPONENTS



5 SIZE SELECTION CHART

Use Table 1 to select the appropriate size XAGA 1650 buried splice closure kit.

Table 1. Size Selection Chart

CLOSURE SIZE	SPLICE OPENING (INCHES)	MIN. CABLE DIA-METER* (INCHES)	MAX. CABLE DIA-METER (INCHES)	APPROX. CABLE RANGE** (PAIRS)	APPROX. AMT. OF ENCAPSULANT REQUIRED
S	12.0	0.35	1.10	6-25	500 grams
A	12.0	0.48	2.20	25-100	750 grams
A2	21.0	0.48	2.20	25-200	1,500 grams
AA	9.0	0.48	2.20	25-100	500 grams
B	12.0	1.10	3.75	100-300	2,250 grams
B2	21.0	1.10	3.75	200-400	3,000 grams
C2	21.0	1.85	5.30	600-900	5,000 grams
D2	24.0	2.00	7.10	900-2400	10,000 grams
A4	37.0	0.48	2.20	25-400	2,500 grams
B4	37.0	1.10	3.75	200-600	4,500 grams
C4	37.0	1.85	5.30	600-1800	9,000 grams
D4	37.0	2.00	7.10	900-3600	15,000 grams

* Cable range and encapsulant required will vary depending upon cable type, gauge, connector type, and splice configuration.
** If cable diameter is less than recommended, an End Plug Rod can be used asa shim to increase the effective diameter.

6 SPLICE PREPARATION

1. Clean the cable sheath with a clean rag and company-approved cleaning solution.
2. Use the inner-most holes on the supplied bond bar as a guide to mark the sheath, then make the appropriate sheath opening. Leave 1/2-inch of Mylar core wrap beyond each sheath opening. Refer to Figure 1.

Note: Do not use vinyl tape to protect the pairs.

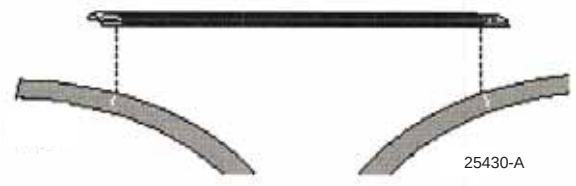


Figure 1

3. For dual-jacketed cable, leave 1 inch of the inner cable jacket and the Mylar core extending beyond the outer cable jacket.

4. Install an approved cable bond clamp (not supplied in the kit) and the supplied bond bar in the sheath opening.

Note: If the sheath must be tabbed, tape over the bottom of the clamp, but do not tape the edge of the shield or jacket. If not tabbing is required, do not tape the bond clamp.

5. Bond the branch cables to the main cable using an approved bond strap (not supplied in the kit). Cut off the excess bond stud and file away any remaining sharp edges.

6. Remove the Mylar binder markers, replacing them with loosely installed tie wrap binder markers.

7. Complete the splice work using approved connectors. Support the spliced groups with one or two loosely applied tie wraps.

8. To select the appropriate size XAGA 1650 splice closure, measure the diameter of the splice at its largest point. Also measure the cable to ensure that the minimum diameter requirement is fulfilled. (Refer to the Size Selection Chart on Page 2 for the proper kit size.)

Note: If the minimum cable diameter requirement is not met, use a TE 1-inch End Plug Rod and the supplied branch-off clip to shim the cable.

7 GENERAL INSTALLATION

1. Place 1-1/4 laps of sealant around each cable, butting the sealant against the end of the bonding hardware.

2. For branch ends, cut and fold two 2-inch strips of sealant. Press the branch cable sealant collar, then place one folded strip on each side of the branch area as shown. Compress the sealant to eliminate voids. Refer to Figure 2.

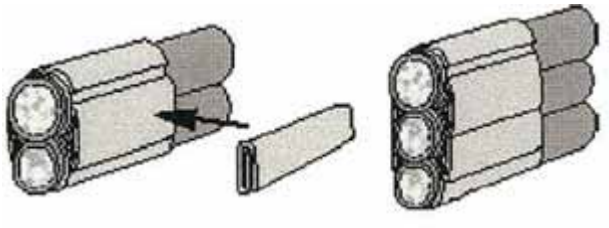


Figure 2

3. If an external ground wire is required, strip 12 inches of insulation from the ground wire (not supplied in the kit) and attach the ground wire eyelet to the bonding hardware. Press the ground wire into the sealant collar, and cover the wire with a second lap of sealant. The diameter of the sealant collar should not exceed the Maximum Splice Diameter as shown in the Size Selection Chart on Page 2.

4. Center the inner liner around the splice bundle and overlap the ends of the mesh at least 1/2-inch. Secure the mesh with the supplied tie wraps. Refer to Figure 3.

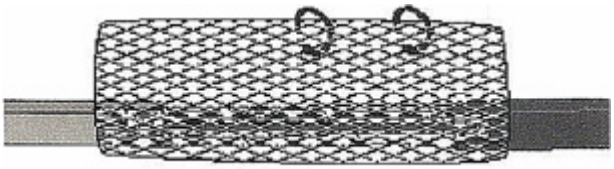


Figure 3

5. Leaving at least 1/2-inch of sealant collar exposed, pull the wrapper tight against the collar. Twist the edges of the wrapper several times and press the wrapper into the sealant collar.

6. Leaving l/2-inch of sealant collar exposed, secure the wrapper with two laps of tightly wrapped vinyl tape. Repeat Steps 5 and 6 for the other end of the splice opening. Refer to Figure 4.

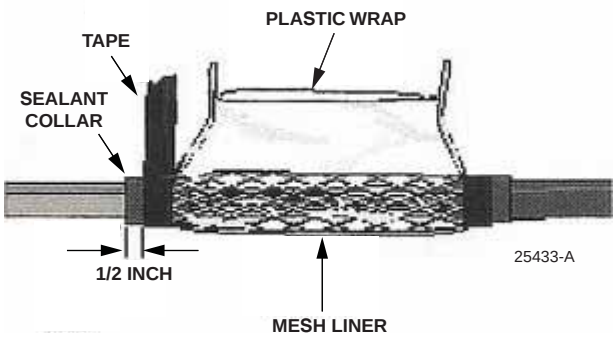


Figure 4

7. The approximate amount of encapsulant required for each size of the closure is indicated in the Size Selection Chart on Page 2. Mix the encapsulant according to the manufacturer's directions. Fill the splice to the top of the mesh liner.

Note: For larger splices, it may be necessary to pull the wrapper up against the splice to determine the proper encapsulant level.

8. Massage the splice bundle for about 1 minute, allowing the encapsulant to penetrate to the core of the splice.

9. Pull out the top comers of the wrapper and roll the wrapper down onto the top of the encapsulated splice bundle. Twist one end of the wrapper tightly against the sealant collar and secure it in place with vinyl tape, leaving 1/2-inch of the sealant collar exposed. Fold the excess wrapper back over the tape, and secure it in place with an additional wrap of vinyl tape. Refer to Figure 5.

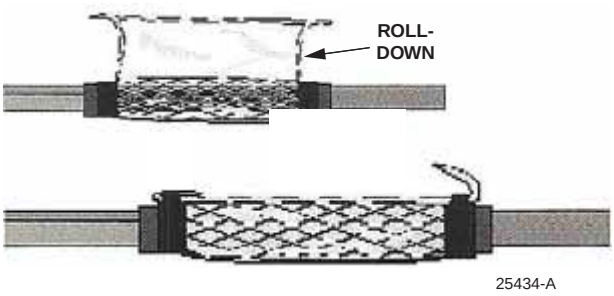


Figure 5

10. Force air out of the encapsulated bundle through the free end of the wrapper. Twist and tape the remaining end of the wrapper as in Step 9.

Note: If your company-approved practices require the use of DR tape or rubber bandage, proceed to Section 13. on Page 5. Otherwise, continue with Step 11.

11. Starting at one sealant collar, loosely wrap the encapsulated bundle with one half-lapped layer of 3-mil splice wrap. At the opposite sealant collar, twist 6 inches of the splice wrap to form a cord, and tightly wrap the cord around the sealant collar. Refer to Figure 6.

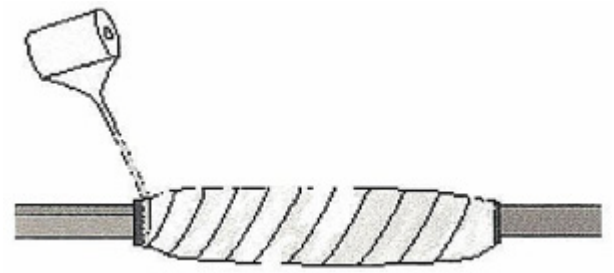


Figure 6

Note: Be sure to start and end the cord wrap on the sealant collar.

12. Working toward the other end of the splice bundle, repeat Step 11, creating a second loosely wrapped layer of splice wrap around the bundle.

13. To remove trapped air, puncture the splice wrap and work the air out of the bundle through the puncture. Seal the hole with several layers of splice wrap.
14. Tightly wrap five layers of 3-mil splice wrap around the encapsulated bundle. If the splice wrap breaks, resume wrapping below the break.
15. If a leak occurs in the splice, wrap over the leak with more splice wrap. If a leak occurs at the sealant collar, create a cord of splice wrap and apply it at the sealant collar as directed in Step 11.
16. To use TE' End Plug Rod (EPR: available separately) as a shim, clean and scuff the entire surface of the EPR. tape it to the sealant collar, and treat it as a branch cable.

Note: When applying tape, start taping on the splice bundle, then place the liner's edge below the tape. Stretch the tape around the liner as you wrap the liner around the splice bundle. Apply two more wraps of tape to hold the liner in place, then wrap the liner fingers with tape as described in Step 20.

17. Center the variable foam liner over the splice bundle, wrap it tightly around the bundle, and secure it in place with vinyl tape.
18. For a long closure with one variable foam liner with vinyl tape as shown. Refer to Figure 7.
19. Tape over the fingers of the liner and any exposed sealant with vinyl tape. Do not extend the tape more than 1/4-inch onto the cable.

Note: For a closure with two variable foam liners, install the first liner at one sealant collar and tape its fingers in place. Install the second liner at the other sealant collar, and wrap the overlapping fingers in the center of the splice with the vinyl tape. Apply a strip of vinyl tape along the seams of the two liners.

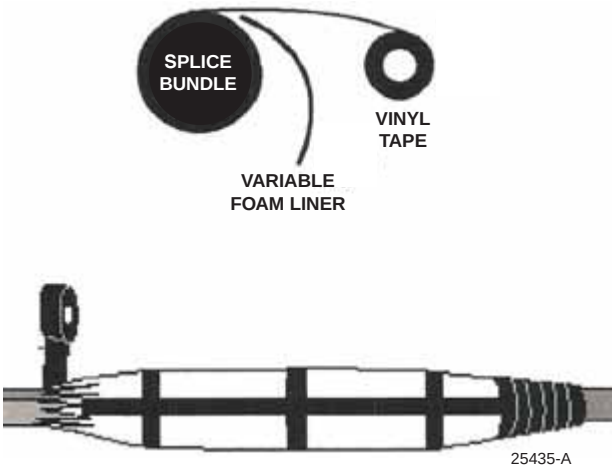


Figure 7

20. Clean about 10 inches of cable sheath on each side of the liner with the supplied cleaning tissue.
21. Circumferentially abrade 6 inches of cable sheath on each side of the liner with the supplied abrasive strip. Be sure that the entire circumference of the sheath is scuffed.
22. Center the wraparound sleeve over the splice and mark the cables at each end of the sleeve. Temporarily remove the sleeve and set it aside.
23. Wrap one lap of 4-inch aluminum tape around each cable 1 inch inboard of the mark on cables exiting the closure. Refer to Figure 8.

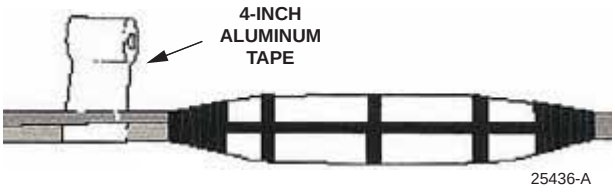


Figure 8

Note: If using a Cor D kit, place the aluminum tape 2 inches inboard of each on each cable.

24. Smooth the edges of the tape against the cable with a blunt instrument.

25. Observing the proper safety precautions and instructions. adjust the torch flame. Flame brush each abraded cable area for about 5 seconds.

Note: Use adequate ventilation and avoid overheating during installation. To prevent carbon deposits on the cable, do not reduce the flame during flame brushing.

26. If an external ground wire is used. cut a 1 inch by 3 inch adhesive strip from a Raychem ADP kit and place it under the ground wire. (ADP kits may be purchased separately.)

27. Remove the plastic backing from the wrap-around sleeve and center the sleeve over the splice, covering equal amounts of aluminum tape on each side of the sleeve.

Note: Be sure that you have flame brushed the cable jacket (see Step 25) before installing the sleeve.

28. Place the channel-joining clip in the center of the sleeve rail to hold the sleeve in place. Slide a channel over the rail from each end of the sleeve. The channels should equally cover the channel-joining clip. and should align evenly over the edges of the sleeve. Refer to Figure 9.

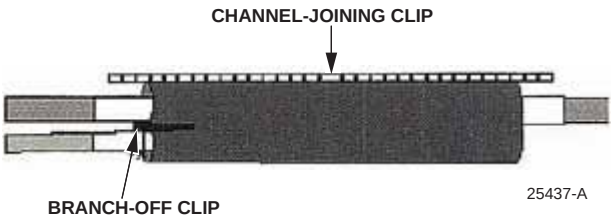


Figure 9

Note: If the channels fit very tightly and will not slide over the rail or over the clip, make sure that the sleeve's flap is not pinched between the rails. Then push the sleeve up from the bottom and down on the top while sliding the channels toward the middle of the sleeve. Refer to Figure 10.

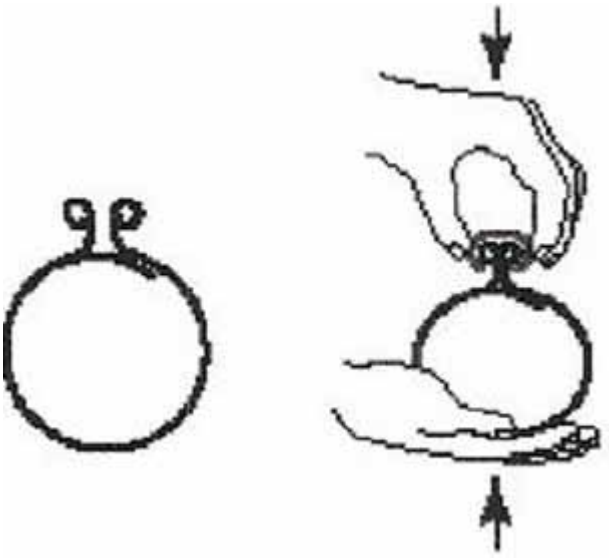


Figure 10

29. After making sure that the sleeve is centered properly. install the branch-off clip over the sleeve between the main cable and the branch cable.

30. Secure the branch cable to the main cable with aluminum tape or a tie wrap so that the cables are parallel.

31. Adjust the torch flame and preheat both sides of the channel evenly until both sides begin to shrink. Keep the torch moving at all times. To heat the channel uniformly. move the flame in a zig-zag motion along both sides of the channel and along the length of the sleeve Refer to Figure 11.

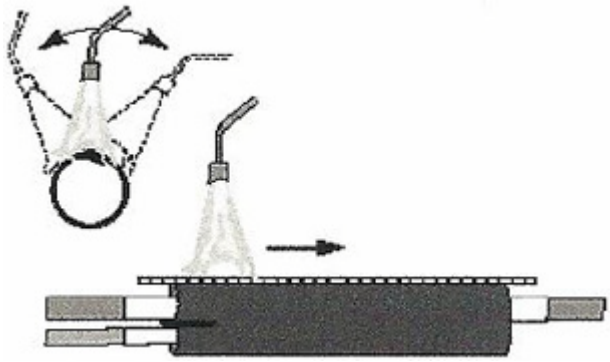


Figure 11

Note: Use adequate ventilation and avoid overheating during installation.

32. Start shrinking at the center of the sleeve. completely shrinking the sleeve as you work toward the ends. Refer to Figure 12 and Figure 13.

Figure 12

Figure 13

Note: If obstructions or wind make this method impossible, start shrinking the sleeve at one end and shrink the sleeve completely as you work toward the opposite end. Do not shrink the sleeve from the ends toward the center.

33. Continue heating the sleeve until it is completely shrunk and the heat-sensitive paint has converted to black. Continue heating the channel for an additional 5 to 10 seconds per foot.

Note: Do not attempt to convert the heat-sensitive paint directly beneath the branch-off clip.

Note: If the sleeve is damaged at the end, it is still functional. The sleeve will not split, and its performance will not be adversely affected.

34. While the sleeve is still hot. lightly press the channel into the sleeve with a blunt object at each end of the closure.

35. The closure is correctly installed when:

    a. It is completely shrunk, and

    a. All heat-sensitive paint is converted to black, and

    a. A continuous white line appears under the entire length of the channel, and

    a. Adhesive flow appears at both ends of the closure and around the branch-off clip.

36. For double armored cables, bond and ground the outer shield outside the closure using company-approved methods and materials.

Note: Do not move the splice until the sleeve is cool to the touch.

8 GENERAL INSTALLATION USING DR TAPE AND RUBBER BANDAGE

1. Prepare the splice as directed in Section 6, and perform Section 7, Steps 1 through 10.

2. (OPTIONAL) Secure a tie wrap over the vinyl tape at each end of the splice bundle. Wrap the end of the tie wrap around the cable and tape it in place.

3. As directed in Section 7, Steps 11 through 15. wrap the encapsulated splice with two loosely applied half-lapped layers of 1.5-mil splice wrap, followed by three tightly wrapped layers (if using DR tape) or with two loosely applied halflapped layers of 3-mil splice wrap and five tightly wrapped layers (if using rubber bandage.)

Note: If a leak occurs at the sealant collars, use additional tie wraps to stop the leak.

4. If using DR tape: Apply one tightly-wrapped layer of halflapped DR tape, beginning at the center of the splice bundle and working toward one sealant collar. Repeat the taping from the center to the opposite sealant collar. Refer to Figure 14.

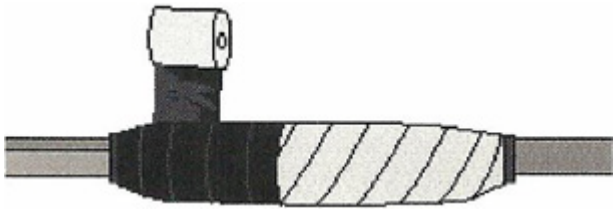


Figure 14

If using rubber bandage: Starting at the center of the splice, tightly wrap two half-lapped layers of bandage towards one sealant collar, continue across the splice to opposite sealant collar, and end the wrap in the center. Keeping the bandage taut after completing the wraps, tape over the bandage and around the bundle with a figure-8 wrap of vinyl tape to keep the bandage from unraveling, or tie off the bandage with a knot.

5. Perform Steps 16 through 36 of Section 7 to complete the splice.

9 SCREENED CABLE SPLICING

1. Prepare the splice as directed in Section 6.
2. Loosely wrap perforated aluminum foil around one group of conductors and secure it in place with a tie wrap. Refer to Figure 15.

Figure 15

3. Perform all steps in Section 7 to complete the splice.

10 VERTICAL PLACEMENT

1. 1. Prepare the splice opening as directed in Section 6. Perform Section 7, Steps 1 and 2 to create sealant collars at each end of the splice bundle.
2. Center the inner liner around the splice bundle and overlap the ends of the mesh at least 1/2 inch. Secure the mesh with the supplied tie wraps.
3. Leaving at least 1/2-inch of sealant collar exposed, pull the wrapper tight against the bottom collar. Twist the edges of the wrapper several times and press the wrapper into the sealant collar.
4. Leaving 1/2-inch of the bottom sealant collar exposed, secure the wrapper with two laps of tightly wrapped vinyl tape.
5. Roll the edges of the wrapper onto the splice bundle. forming a cylinder. Tape the cylinder in place at the top and the center to prevent it from unrolling.
6. Twist the bottom end of the wrapper tightly against the sealant collar and secure it in place with vinyl tape, leaving 1/2-inch of the sealant collar exposed. Fold the excess wrapper back over the tape, and secure it in place with an additional wrap of vinyl tape.
7. Starting at the bottom sealant collar. loosely wrap the splice bundle with two half-lapped layers of 3-mil splice wrap. (Be sure to leave a gap at the top so that encapsulant can be poured in.)
8. The approximate amount of encapsulant required for each size of the closure is indicated in theSize Selection Chart on Page 2. Mix the encapsulant according to the manufacturer's directions. Fill the splice to the top of the mesh liner.
9. Massage the splice bundle for about one minute. allowing the encapsulant to penetrate to the core of the splice.
10. Twist the top end of the wrapper tightly against the sealant collar and secure it in place with vinyl tape, leaving 1/2-inch of the sealant collar exposed. Fold the excess wrapper back over the tape. and secure it in place with an additional wrap of vinyl tape.
11. Starting at the top sealant collar. loosely wrap the splice bundle with two half-lapped layers

of 3-mil splice wrap. At the top sealant collar, twist 6 inches of the splice wrap to form a cord, and tightly wrap the cord around the sealant collar.

Note: Be sure to start and end the cord wrap on the sealant collar.

12. Tightly wrap five layers of 3-mil splice wrap around the encapsulated bundle. If the splice wrap breaks. resume wrapping below the break.

Note: If your company-approved practices require the use of DR tape. refer to Section 8. Otherwise. continue with Step 13.

13. Center the variable foam liner over the splice bundle, wrap it tightly around the bundle, and secure it in place with vinyl tape. Continue with the installation as in Section 7, Steps 18 through 36.

Note: Wrap aluminum tape around the channel protruding from the bottom of the sleeve and the cable to hold the wraparound sleeve in place.

Note: Shrink the bottom of the closure first and work toward the top.

11 BUTT SPLICING

1. Prepare the splice as directed in Section 6. Perform Section 7, Steps 1 and 2 to create a sealant collar at the bottom of the splice bundle. Refer to Figure 16.
2. Place the inner liner and pour the encapsulant as directed in Section 10, Steps 2 through 9.
3. Twist the top of the wrapper and secure it with a tie wrap.
4. Trim the tie wrap, then fold over the twisted end of the wrapper and tuck it into the top of the inner liner.
5. Place five layers of 3-mil splice wrap over the top of the inner liner. Refer to Figure 17.

Figure 16

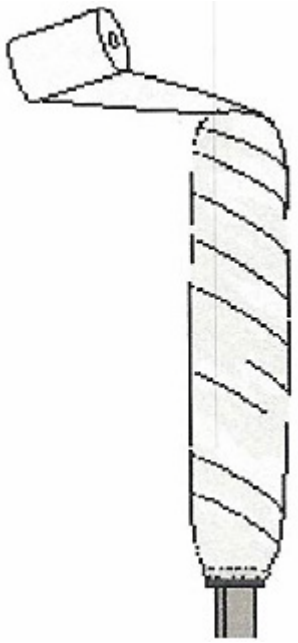


Figure 17

6. Tightly wrap five half-lapped layers of splice wrap around the splice bundle. If the splice wrap breaks. resume wrapping below the break.
7. Align the fingers of the variable foam liner with the bottom edge of the sealant collar. Tape the fingers and any exposed sealant with vinyl tape.
8. Use an EPR (see Table 2) to plug the open end of the variable foam liner and closure. Clean and scuff the entire surface of the EPR.

Table 2. EPR Selection

CLOSURE SIZE	EPM SIZE
XAGA 1650 S A, A2, AA	EPR-1
XAGA 1650 B, B2, B4, C2	EPR-2
C4, D2, D4	

9. Wrap one lap of sealant around one end of the EPR. Place the EPR into the variable foam liner so that the fingers meet the top edge of the sealant collar. Tape the fingers and any exposed sealant with vinyl tape. Refer to Figure 18.

Figure 18

10. Continue with the installation as in Section 7. Steps 18 through 36.

Note: Wrap aluminum tape around the channel protruding from the bottom of the sleeve and the cable to hold the wrap around sleeve in place. Refer to Figure 19.

Note: Shrink the bottom of the closure first and work toward the top.

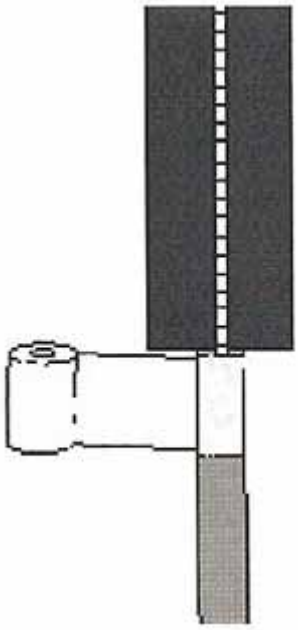


Figure 19

12 SERVICE WIRE TERMINAL

1. Prepare the splice as directed in Section 6, Steps 1 through 5. Do not trim off the excess bond stud at this time.
2. Prepare the service wires by removing 14-1/2 inch of the outer sheath. Remove all but 1 inch of the exposed terneplate. Remove all but 1/2 inch of the exposed mylar.
3. The XAGA splice closure system will accommodate up to eight service wires. Determine the number of service wires to be used and distribute an equal number to each side of the splice opening. Trim shield

connectors (supplied separately) as shown according to the number and type of service wires to be bonded. Refer to Figure 20.

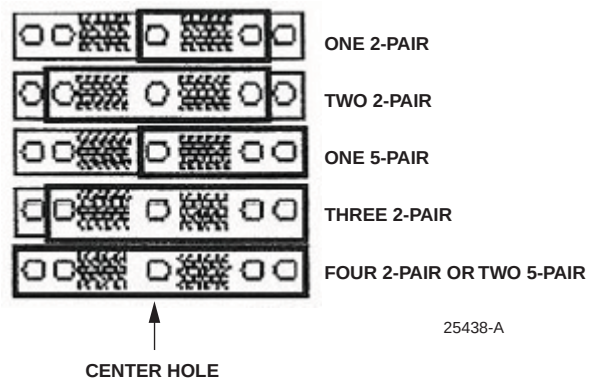


Figure 20

4. Place the shield connector's center hole on the bond clamp stud with the perforated points facing outward.
5. Place the exposed metal shield of the service wire onto the shield connector. Fold the connector over and secure it with a washer and nut. The service wire jacket should end 1/4-inch from the edge of the shield connector. Refer to Figure 21.

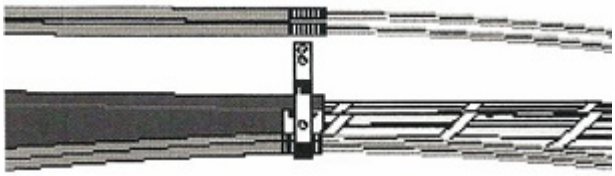


Figure 21

6. Complete the wire work as described in Section 6. Steps 6 and 7. Remove excess bond studs and file away any sharp edges.
7. Clean the cable with a dry cloth. Wrap one lap of sealant around the cable. The sealant should be at least 1/4-inch from the edge of the service wire jacket.
8. Press one service wire into the first lap of sealant. Wrap the sealant over the first service wire, then under the second service wire. Continue over-and-under wrapping on all service wires. Place a final layer of sealant over all service wires.
9. Compress the sealant to form a collar. Continue installing the closure as directed in Section 7, Steps 4 through 36. Treat the service wires as branch cables, using one branch-off clip for every two service wires.

Note: Extra branch-off clips can be ordered separately.

13 REMOVAL

1. Observing the proper safety precautions and instructions, adjust the torch flame. Heat one end of the closure from the transition area (the area where the “belly” of the splice begins to decrease) to the end of the sleeve. Use a blunt object to determine if the sleeve and adhesive have softened. Continue heating until the entire area is thoroughly heated and soft. If a branch clip has been used, separate the cables and remove the clip with pliers. Refer to Figure 22.

Figure 22

Note: Provide adequate ventilation when re-heating.

2. Use a sheath knife to cut the channel away from the heated end of the sleeve up to the transition area. Apply additional heat as necessary to make the sleeve pull apart at the cut.

3. Grab the channel with pliers and pull the channel and sleeve away from the splice, exposing the liner's fingers. Remove the aluminum flap of the sleeve with pliers, pulling it toward the body of the splice. Reheat the aluminum flap it necessary.
4. Repeat steps 1 through 3 for the opposite end of the sleeve.
5. Use a sheath knife to cut through the variable foam liner as you would to remove a cable sheath. Remove the sleeve and the variable foam liner. Cover the adhesive remaining on the cable to keep it clean. (Fig. 23)

Figure 23

Note: It is not necessary to remove the old adhesive from the cable.

6. Remove the splice wrap from the splice bundle. Locate and remove the tie wraps which hold the inner mesh liner in place.
7. Remove the inner mesh liner from the splice bundle. Remove encapsulant to reveal wire work.
8. To replace the closure, a new XAGA 1650 kit is required. Follow the instructions in Sections 6 and 7 of this practice.

Note: If the sealant collar and the adhesive which remains on the cable are clean it is not necessary to clean the cable jacket again when replacing the closure. The adhesive from the new closure will bond to the existing adhesive.