



## Installation of OFS AccuTube® 432/864 Fiber Cable Design in the Tyco 450D Splice Enclosure

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### 1. General

- 1.1 This document describes the cable prep and splicing procedure for OFS 432/864-fiber AccuTube® cable using a Tyco FOSC 450D Splice Closure.
- 1.2 The AccuTube® cable contains 432 fibers in 6 gel-filled 6.0mm tubes or 864 fibers in 6 gel-filled 7.2mm tubes that are bound around a central strength member. The AccuTube® buffer tubes are comprised of 12 12-fiber ribbons bonded together in a matrix material.
- 1.3 The Tyco FOSC 450 D6 fiber optic splice closure uses compressed gel cable seals to environmentally seal the cable splice point. The maximum splice capacity of the FOSC 450 D6 closure is 576 single or 1152 mass fusion splices. The maximum cable diameter should not to exceed 1-inch.

### 2. Precautions

- 2.1 The maximum rated cable load (MRCL) for AccuTube® cable design is 1000 pounds (4448N). This is the maximum tensile force that may be applied to the cable during short-term installation conditions. For long term conditions, the maximum recommended cable load is 333 pounds (1481N).
- 2.2 Cable minimum bend diameters are defined for both dynamic and static conditions. The dynamic condition applies to a cable that may be exposed to the MRCL (Maximum rated cable load). The static condition applies to a cable that is exposed only to low tension, e.g., an installed cable that is racked in a hand hole or manhole. The maximum recommended cable tension under static conditions is 333 pounds (1481 N).

2.3 Cable minimum bend diameters are summarized in Table 1. For static conditions, the minimum recommended bend diameter is 30 x cable outside diameter (OD) or 30 inches. For dynamic conditions, the minimum recommended bend diameter is 30 x OD or 30 inches. The minimum recommended storage-coil diameter is 30 x OD or 30 inches.

**Table 1 – Minimum Recommended Bend Diameters and Storage Coil Diameters for 864-Fiber AccuTube® Cable**

Minimum Bend Diameter		Minimum Storage Coil Diameter
Static Conditions	Dynamic Conditions	
30" (64 cm)	30" (86 cm)	30" (86 cm)

**Precaution:** The 6 gel filled buffer tubes are not rated for a minimum bend diameter due to buffer tube material. Therefore the buffer tubes cannot be stored in the closure. The buffer tubes must be removed except 9 inches from each cable end with an OFS Quick Split RT tool.

**3. Tyco FOSC 450D Splice Kit Components**

- Dome and clamp
- Base and O-ring
- Metal slack basket
- Gel end-piece
- Hook and loop fastener straps
- 4 Gel end-piece plugs
- 6 Cable strain relief holders and clips/6 hose clamps
- 6 Small strength member attachment brackets
- 2 large strength member attachment brackets
- 6 Bond clamps (3" long)
- 2 Braided grounding straps
- 12 small tie wraps
- 1/4" Nut driver to install hose clamps
- Transportation tubes/spiral wrap
- Ribbon buffer tube storage "sock"
- LBT (loose buffer tube) wrap
- Installation instructions

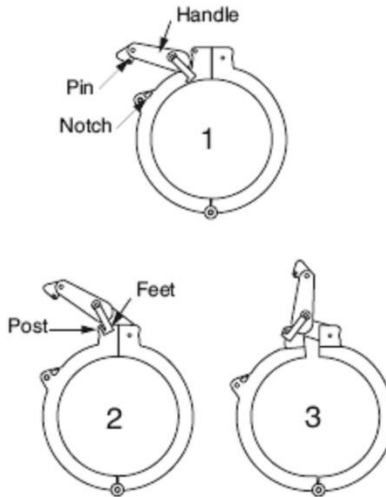
Other Accessory Kits:

- FOSC ACC D Tray 36, 48 or 72 (Extra tray kits)
- FOSC ACC D/Ribbon - 24
- FOSC 450 Cable Term kit (Replacement cable termination components)
- FOSC ACC D/Basket

**4. Closure Entry**

4.1 To remove the dome from the closure, release the clamp handle. Apply slight pressure to the side of the handle to disengage the locking tab. Hook the handle on the two posts and pull back until the clamp releases from the closure. Keep the O-ring, clamp, and dome clean and dry. (Figure 1)

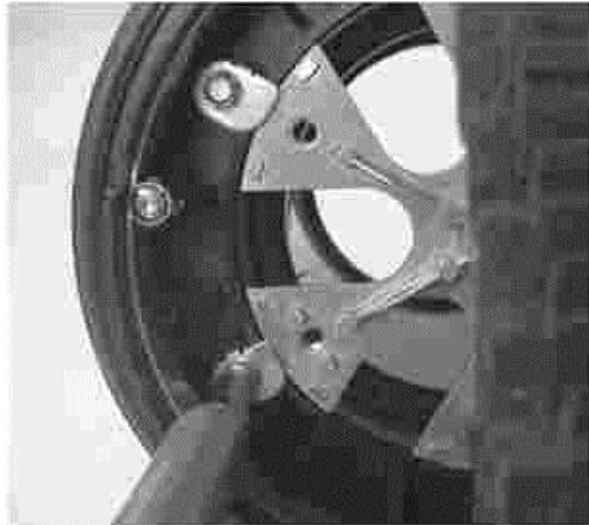
**IMPORTANT: Leave unused components and installation instructions in bag inside closure for future cable terminations. If these parts are lost, you will need to order the above 450 D cable kit to terminate future cables.**



**Figure 1 – Release the clamp handle to open the closure.**

## 5. Base Removal

5.1 Loosen the four bolts to remove the metal frame from the FOSC 450 closure base. (Figure 2).



**Figure 2 – Remove metal frame from closure base.**

5.2 Slide the base (narrow end first) up and out of the way, over all cables that are to be spliced.

## 6. Cable Preparation

Note: When using the standard tray to store ribbon splices, the ribbons must be routed to the slack basket first. Do not route ribbons directly to the tray unless they will be de-ribbonized for single fiber splicing.

Warning: Do not use a braided or stranded ground wire when installing a ground through a port on the FOSC 450 closures. Tyco Electronics requires that a bonded solid ground wire be used to prevent a leak path and make a proper seal.

**6.1** *Work gloves and safety glasses are recommended for use during the cable prep operation.*

**6.2** A cable prep length of 70 to 90 inches is recommended. Mark the cable at the desired prep length.

**6.3** Ring-cut the outer jacket at the desired prep length (Figure 3).



**Figure 3 – Ring cut the outer cable jacket.**

**6.4** Remove about 6 inches of the cable jacket at the cable end to expose the Kevlar and ripcords at the end of the cable (Figure 4).



**Figure 4 – Expose the Kevlar and rip cords.**

**6.5** Grip the ripcord with needle nose pliers and pull it through the outer jacket to the ring cut (Figure 5). Repeat for the second rip cord (if applicable).



**Figure 5 – Pull the ripcords through the outer jacket.**

**6.6** Flex the two sections of outer jacket at the ring cut to separate and remove from the cable (Figure 6).



**Figure 6 – Remove the outer jacket.**

**6.7** Cut the ripcords and Kevlar. Leave a few inches of ripcord in order for additional jacket removal (Figure 7).



**Figure 7 – Cut the rip cords and Kevlar.**

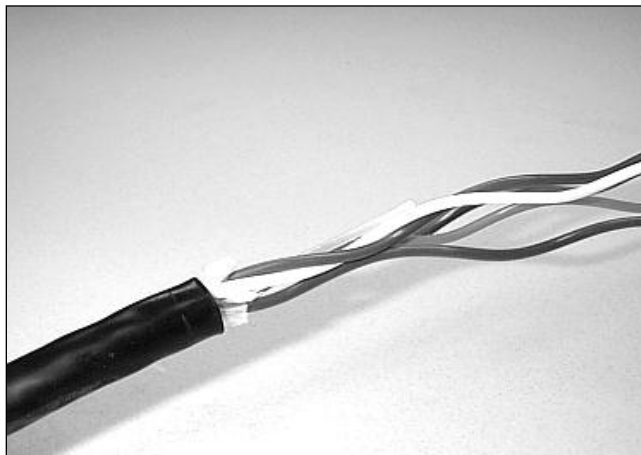
**6.8** For AccuTube® cables, use a seam ripper to cut the binder threads over the water blocking tape. Remove the binders

and water blocking tape and cut flush with the outer jacket. Use a seam ripper to cut and remove the second layer of binder threads over the stranded core buffer tubes (Figure 8).



**Figure 8 – Cut and remove binder thread**

**6.9** Carefully unwrap the buffer tubes from one another and remove any remaining water blocking threads between the tubes and the central member (Figure 9).



**Figure 9 - Unwrap the buffer tubes.**

**6.8** Two sizes of strength member attachment brackets and lugs are provided in the closure kit. The larger strength member attachment brackets and lugs are used with 864-fiber AccuTube® cable. Utilize the middle prong for strength member attachment.

**6.10** Cut the central strength member as required for assembly to the strength member attachment bracket. Insert the strength member into the strength member lugs and tighten the screw (Figure 10).



**Figure 10 – Install strength member attachment bracket on cable.**

**6.11** Install the cable attachment bracket on the cable as shown in Figures 11 and 12. Install the hose clamp and tighten the cable attachment bracket. Don't over tighten the clamp to the point that it deforms. Use the 1/4" nut driver supplied in the closure kit to tighten the hose clamp

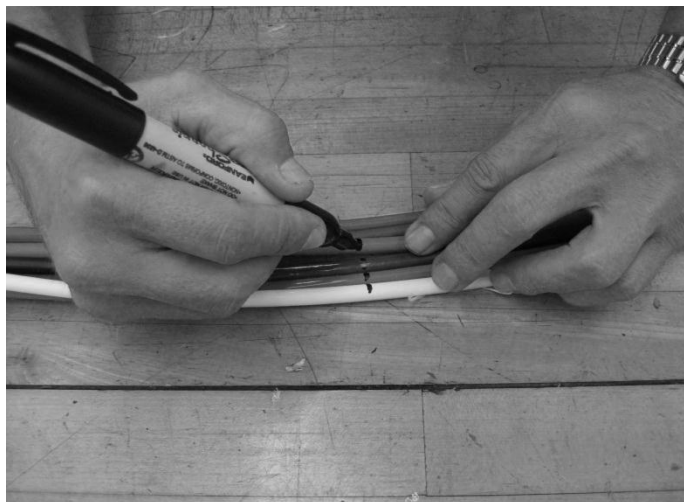


**Figure 11 – Install cable attachment bracket.**



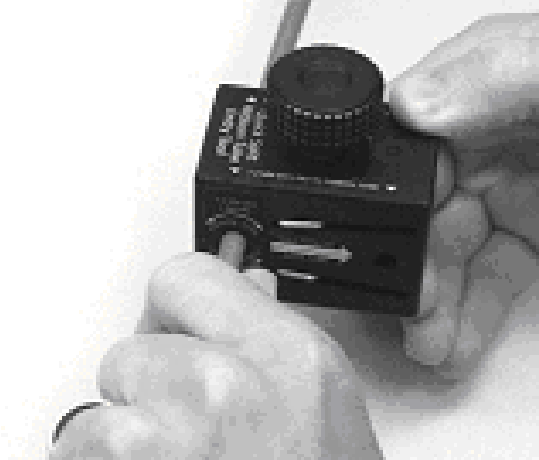
**Figure 12 – Install hose clamp on cable attachment bracket.**

- 6.12** Remove all but 9" of the buffer tubes. Mark the AccuTube and use an OFS Quick Split RT tool or razor knife to ring cut the tube (Figures 13 and 14). Flex the tube at the score mark to separate and remove each individual buffer tube (Figure 15).
- 6.13** AccuTube® cable is a gel-filled cable and requires the cable gel material to be removed with an approved cable gel remover.
- 6.14** Exercise caution when handling the fiber ribbons. Apply uniform pressure along the ribbon surface when cleaning the ribbons. **Caution: Excessive squeezing pressure and/or excessive twisting may cause ribbon splitting. Handle the ribbons with care!**

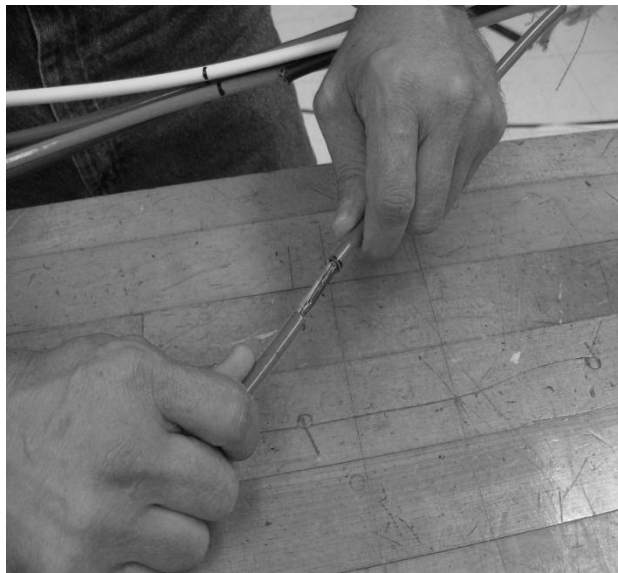


**Figure 13 – Mark the buffer tubes.**





**Figure 14 - Ring cut the buffer tubes.**



**Figure 15 – Remove each buffer tube.**

6.15 Slide the cable attachment bracket and cable into the appropriate slot of the closure until it locks in place (Figure 16). The bottom entry ports should be used for the two cables.

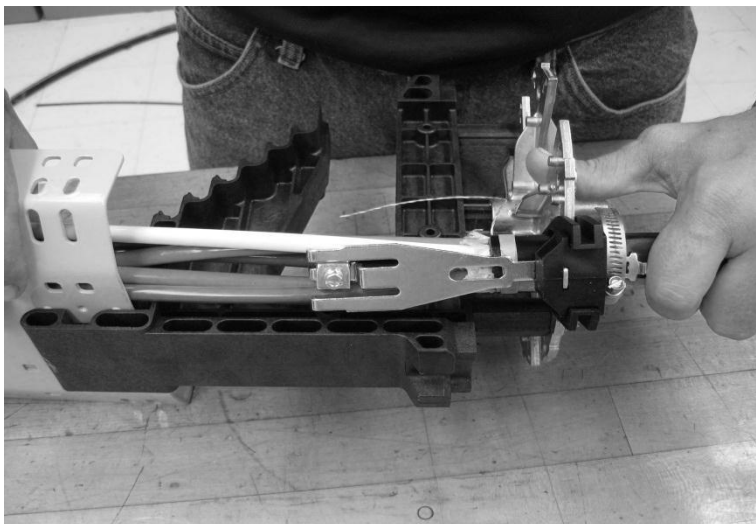


Figure 16 – Insert cable attachment bracket into bottom port of metal frame.

6.16 Fasten the buffer tubes to the storage basket (Figure 17). **Use care when positioning the buffer tubes in the storage basket. Excessive bending may kink the buffer tubes.** Repeat the cable and closure assembly for the 2<sup>nd</sup> cable.

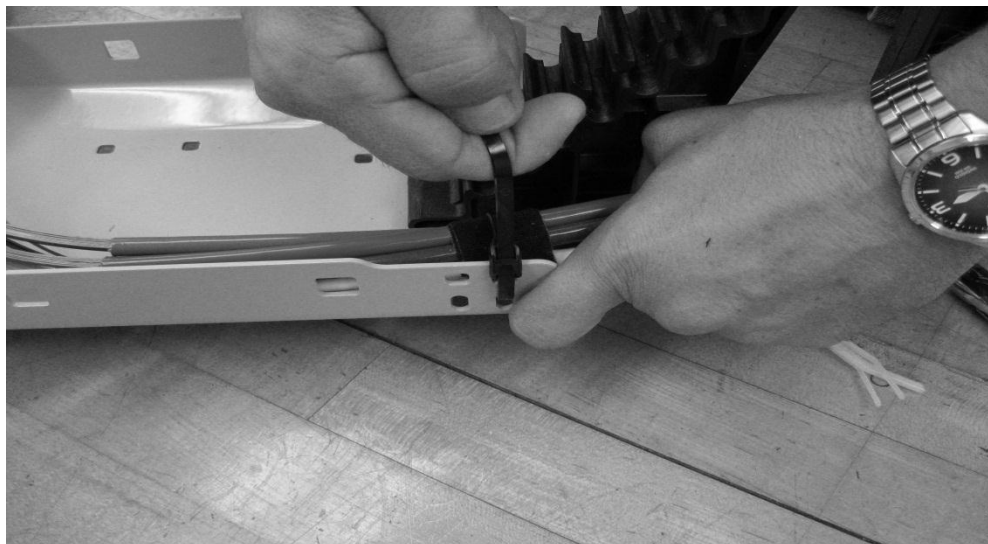


Figure 17 – Fasten each buffer tube to the storage basket.

## 7. Routing Ribbons to the Tray

- 7.1 Route the ribbons through the slack storage basket and up to the splice trays using ribbon transport tubes. **Note that the inside diameter of the transport tubing must be large enough to accommodate the ribbons without inducing macro-bends in the fibers or ribbons.** The amount of ribbon stored in the basket will depend on the overall length of cable that is prepped. Typically only 24" to 36" of ribbon is necessary for mass fusion splicing within the splice organizer tray. The remaining ribbon should be stored in the storage basket for future maintenance purposes. Typically OFS recommends 2 loops of ribbon within the storage basket.
- 7.2 Insert the 12-fiber subunits can into the transport tubing (Figure 18) and route to the appropriate splice tray. A maximum of twenty-four 12-fiber ribbons can be routed through the 3/8" inside diameter transport tubing. For example, ribbons 1-24 (from tubes blue & orange), 25-48 (tubes green & brown) and 49-72 (tubes slate & white) should be routed in 3 different transport tubes from the storage basket to each individual tray. OFS recommends a maximum of 24 ribbon splices per Tyco high profile ribbon tray or 3 splice trays for the 864 cable.. **Avoid sharp twisting and bending of the ribbon during handling and insertion into the transport tubing. Excessive ribbon twisting within the transport tubing may produce micro-bends and lead to increased attenuation.**

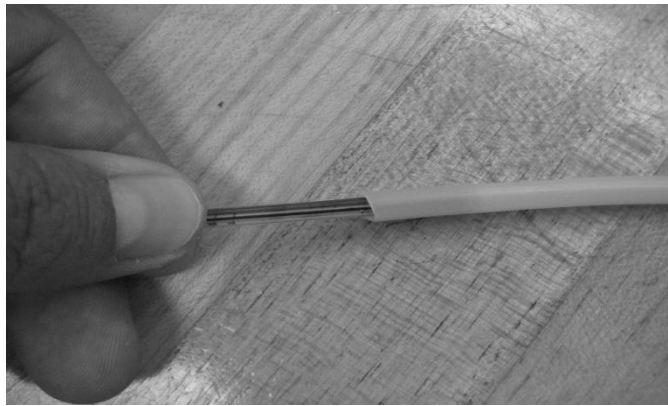


Figure 18 – Insert ribbons into transport tubing.

- 7.3 The transport tubes should be tied down to the storage basket with tie-wraps prior to routing around the tray holder and into the splice tray (Figure 19). **Repeat this step for all transport tubes.**



Figure 19 – Fasten transport tubes to storage basket.

7.4 The opposite end of the transport tubing should be tie wrapped to the splice tray (Figures 18 and 19). **Do not over tighten the tie wraps as this may create macro-bends and increased attenuation.** A small piece of felt tape should be placed around the transport tubing where it enters the splice tray. Repeat for all transport tubes and splice trays.

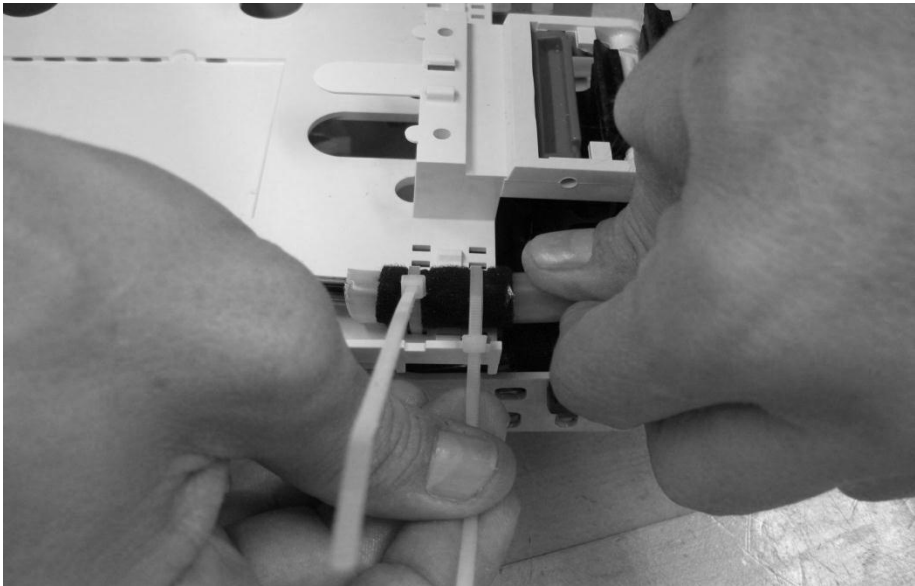


Figure 18 – Fasten transport tubes to splice tray.

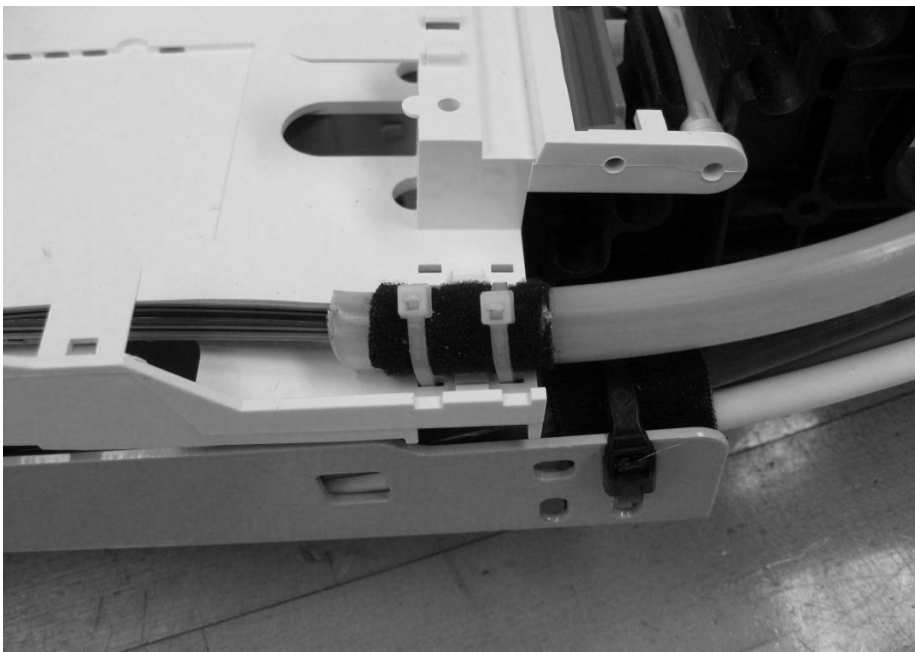


Figure 19 – Fasten transport tubes to splice tray.

7.5 The individual ribbons can now be routed into the appropriate splice holder in the splice tray. Figure 20 shows the recommended routing of the fibers within the splice tray. Note that each transport tube is labeled to identify the ribbon group.

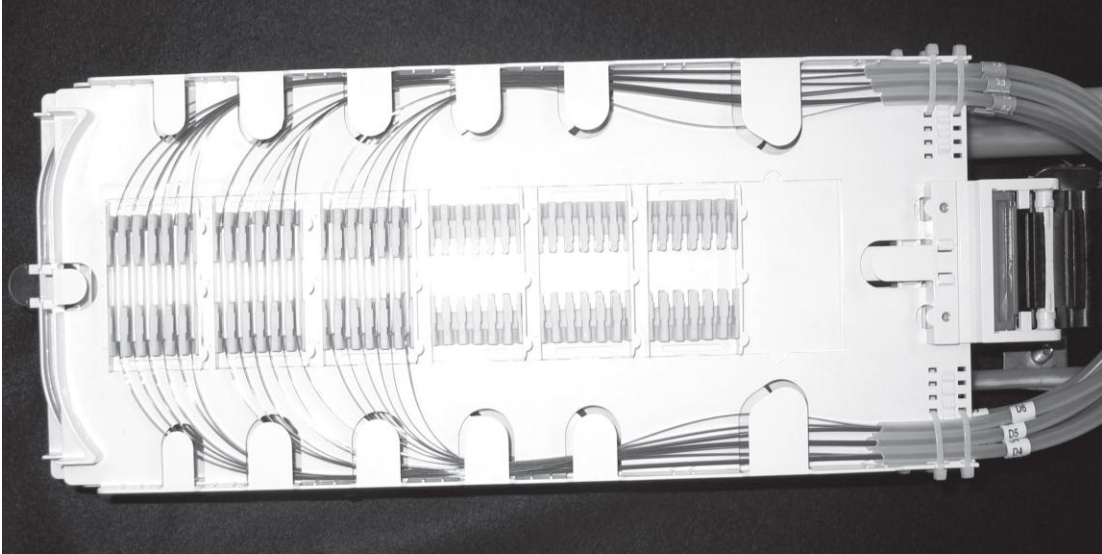


Figure 20 – Route ribbons into splice holders.

*Tip: It is helpful to arrange the ribbons in order or organize ribbons prior to inserting them into the transportation tube. This will improve organization on the tray.*

## 8. Gel End-Piece Installation

8.1 First, turn the “tail” of the gel end-piece counter-clockwise until it stops to ensure that the cable openings are in the open position. Squeeze the gel end-piece to open it. (Figure 21)

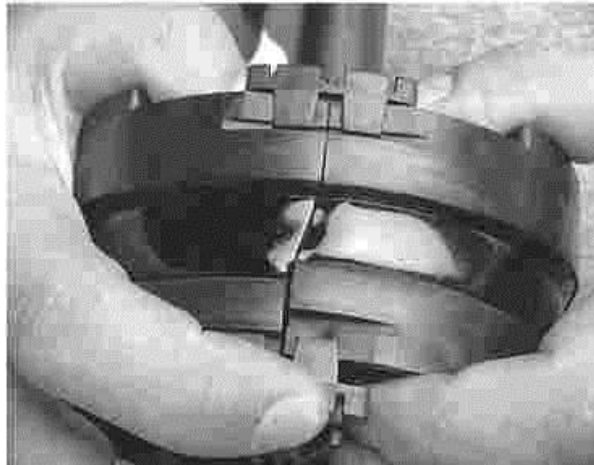
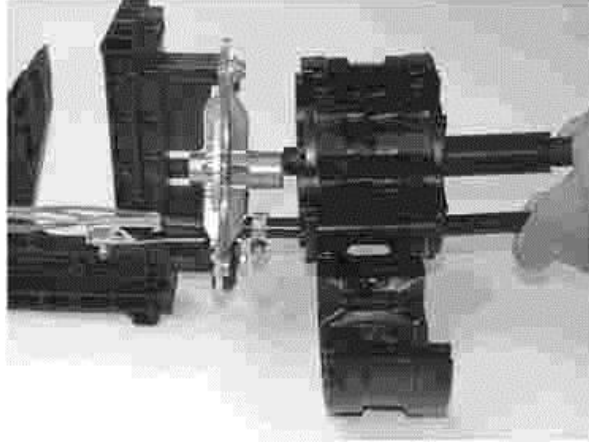


Figure 21 – Squeeze the gel end-piece to open it.

8.2 Position the gel end-piece against the spacer on the metal frame. Position the cables and snap the gel end piece closed. (Figure 22). **Note: If gel end piece collects dirt, it should be washed off with water only.**



**Figure 22 – Install gel end-piece.**

**8.3 Important:** Insert one port plug in each unused port. (Figure 23)



**Figure 23 – Insert plugs into unused cable ports.**

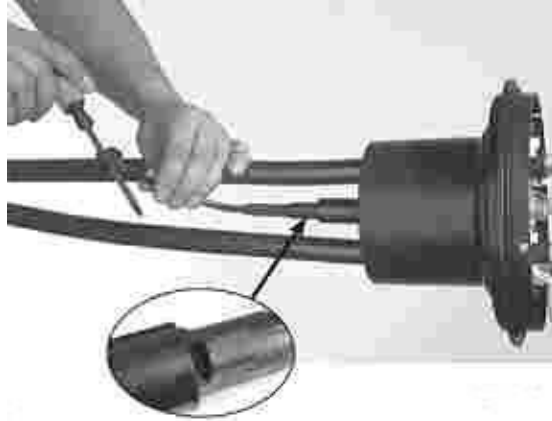
**8.4** Slide the base up and over the gel end-piece. The arrow on the base must be at the top of the closure.

**8.5** Inside the base, loosen and turn the four metal clips to secure the base to the metal bracket then tighten the clips securely. Make sure the arrow is on top of the base.

**8.6** Pull the gel end-piece “tail” away from the closure to seat the gel end-piece to the end of the base. Turn the “tail” clockwise until it dead ends at the physical stop to seal cables and plugs. (Figure 24)

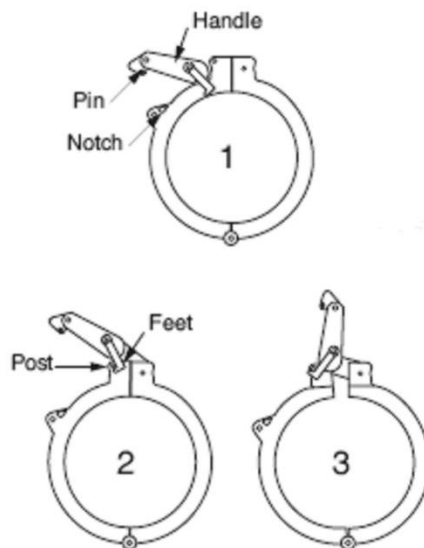
***WARNING: Do not use drill to turn gel end piece tail as this will damage gel end piece.***

***IMPORTANT: Make sure the rubber seal is in the correct position.***



**Figure 24**

- 8.7** Place a large tie wrap around all the cables near the end of the tail.
- 8.8** Once the splicing is complete, wrap hook and loop fastener straps around the splice trays and basket.
- 8.9** If desiccant is to be used (optional - not supplied) install 150 grams of desiccant on top of the uppermost splice tray. Secure trays and desiccant in place with hook and loop fastener strap.
- 8.10** Place all unused cable termination hardware in bag in closure to be used for future cable terminations.
- 8.11** Mount dome onto base, aligning arrow on base with arrow on dome.
- 8.12** Install clamp around dome/base interface. Position feet of handle in front of the two posts and push down on the handle to pull the two halves of the clamp together. (Figure 25)



**Figure 25 – Install clamp onto closure.**

- 8.13** Continue to push handle down until the small pin on the handle snaps into the triangular hole in the clamp.
- 8.14** A security lock or tie wrap may be inserted through the round holes in the handle and clamp to lock the closure.

**8.15** Flash test the closure to 5 psi. Thoroughly soap seals to check for integrity. After flash testing, bleed all pressure from the closure through the valve.

***If you have any questions or need additional information, please contact OFS at 888-FIBER-HELP (888-342-3743).***