APEX® ADVANCED FIBER RETENTION SYSTEM (AFRS)

The Apex Advanced Fiber Retention System (AFRS) routes Loose Tube and Ribbon (Flat Matrix, SWR®, Tubed, Central Core) fibers in Apex Closures. The V-Clip reduces installation time and frustration associated with tie wraps. The Mesh Tubes in the kit are designed to protect ribbon fiber in the Apex Sealed Splice Closure.

Each individual kit **(Figure 1)** may include:

1. Mesh
2. V-Clips (4)
3. Mesh Housing (2)
4. Mesh Basket Adapter (3)
5. Mesh Inserts (4)
6. Retention Pads (sheet of 8)

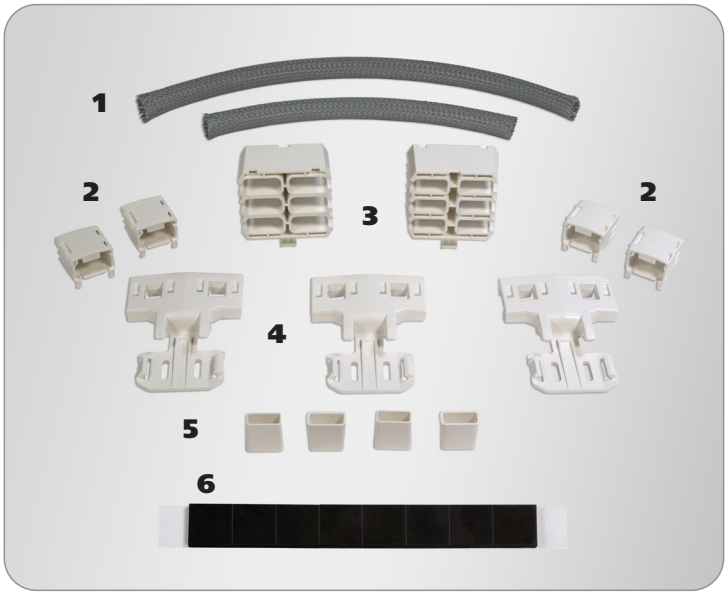


Figure 1

Ordering Information

DESCRIPTION	AFL NO.
Apex AFRS Kit 1 – Used for Ribbon Cable (Flat Matrix, SWR, Tubed, Central Core). Kit includes: Mesh Basket Adapter (2 ea.), Mesh Housing (2 ea.), Mesh Insert (24 ea.), V-Clips (12 ea.), and Clean Cut Gray Mesh (13 ft.).	AX-KIT-AFRSRBN
Apex AFRS Kit 2 – Used for Loose Tube Cable. Kit includes: V-Clip (24 ea.) and Retention Pads (6 sheets of 8 pads)	AX-KIT-AFRSLT
Apex AFRS Kit 3 – V-Clip bulk kit. Includes: V-Clips (120 ea.) and Mesh Inserts (120 ea.)	AX-KIT-AFRSVC-120
Apex AFRS Kit 4 – Mesh bulk kit. Includes: Clean Cut Gray Mesh (100 ft.)	AX-KIT-AFRSMESH-100FT
Apex AFRS Kit 5 – Mesh Housing bulk kit. Includes: Mesh Basket Adapter (10 ea.) and Mesh Housing (10 ea.)	AX-KIT-AFRSAH-10
Apex AFRS Kit 6 – Mesh Basket Adapter bulk kit. Includes: Mesh Basket Adapter (10 ea.)	AX-KIT-AFRSA-10

APEX® ADVANCED FIBER RETENTION SYSTEM (AFRS)

INSTALLING V-CLIPS ONTO APEX SPLICE TRAY

1. Confirm cover is secure on V-Clip. If not, cover is assembled by snapping the cover hinge onto the clip **(Figure 2)**.
2. Clips can be assembled onto Apex X-2 and X-2S splice trays in any one of four positions **(Figure 3)**.
3. Remove clear cover from Apex Splice Tray **(Figure 4)**.
4. Bring clip to splice tray at a 45-degree angle and align front two hooks of clip on top of splice tray **(Figure 5)**.
5. Rotate the clip downward to engage and secure the hooks to the splice tray **(Figure 5)**.
6. The same method will secure the clip to the Mesh Basket Adapter in one or two locations **(Figure 6)**.

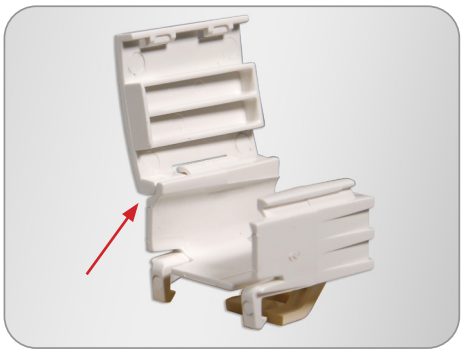


Figure 2

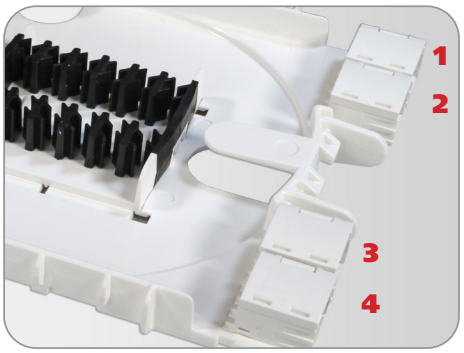


Figure 3

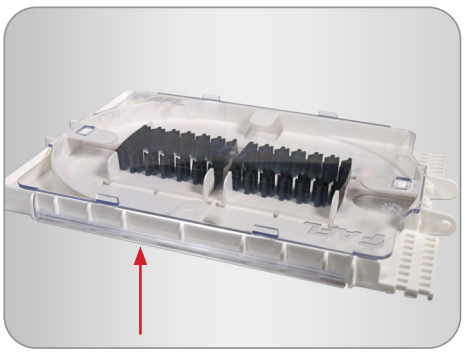


Figure 4

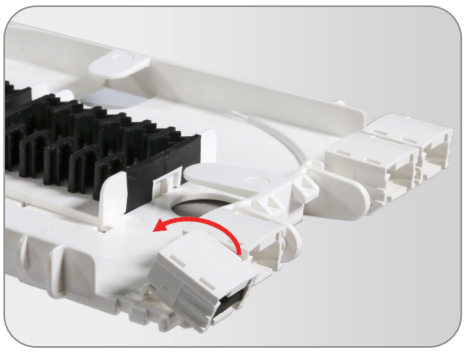


Figure 5

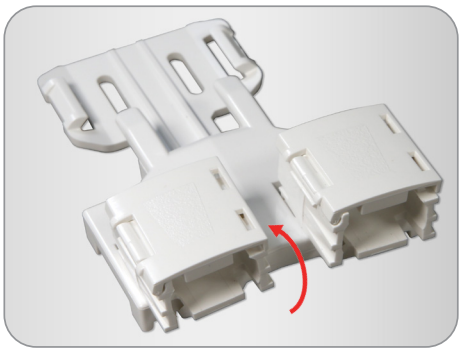


Figure 6

APEX® ADVANCED FIBER RETENTION SYSTEM (AFRS)

USING V-CLIPS WITH LOOSE TUBE CABLE

1. Fully open clip cover and ensure it is properly attached to the clip base. Snap cover back on clip if needed. Inspect that clip base is clean and free from contaminants **(Figure 7)**.
2. Remove one piece of Retention Pad. Starting at the outside edge, peel pad from backing toward center **(Figure 8)**.
3. Align it on the base of the clip and press onto base with adhesive side down **(Figure 9)**. Set one edge in place and then the second edge causing the pad center to raise and then compress the center to adhere to the bottom of the clip.
4. Ensure all buffer tubes are clean and free of contaminants.
5. Insert up to four buffer tubes (1.8 mm to 3.2 mm). The tubes must lay flat on the lower pad with the upper retention pad installed properly and the cover fully engaged when closed. Make sure the tube end does not extend beyond the inside curve of the splice tray as noted in the splice tray instructions.
6. Remove another Retention Pad and place it on top of the buffer tube, adhesive side down. Set one edge in place and then the second edge causing the center to raise. Compress the center to adhere to the buffer tubes.
7. Close and fully engage cover on clip latch. The pressure of the pads and tubes give the cover engagement to latch to the clip. **(Figure 10)**

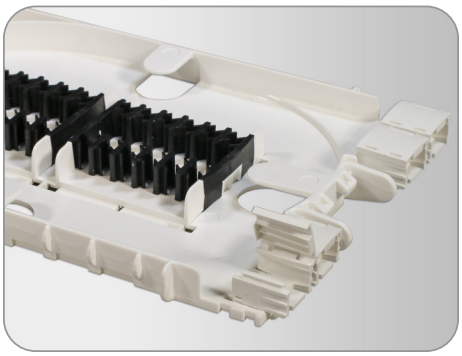
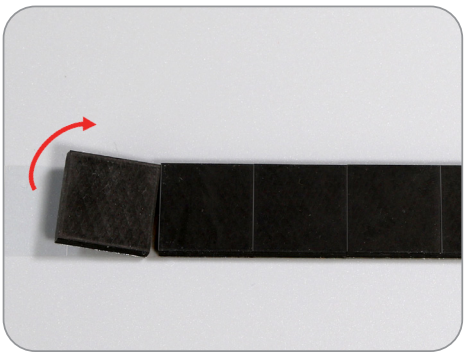


Figure 7



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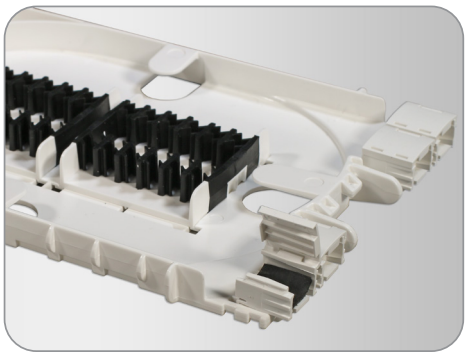


Figure 9

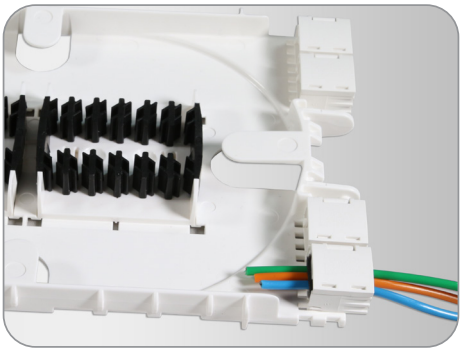


Figure 10

Completed Loose Tube Cable Installation

USING APEX AFRS SYSTEM WITH RIBBON CABLE

INSTALLING MESH BASKET ADAPTER

1. Install the empty Mesh Basket Adapter onto Apex basket by aligning with two strength ribs on the bottom of the basket. Snap Adapter into place and ensure it is locked and will not slide side to side **(Figure 11)**.
2. Install one empty Mesh Housing **(Figure 12)** or up to two V-Clips onto each Mesh Basket Adapter **(Figure 13)**.

(NOT NEEDED for Loose Tube Cable.)

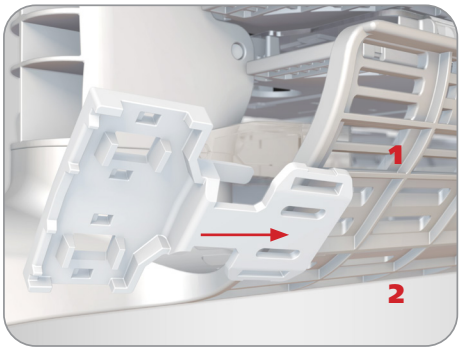


Figure 11

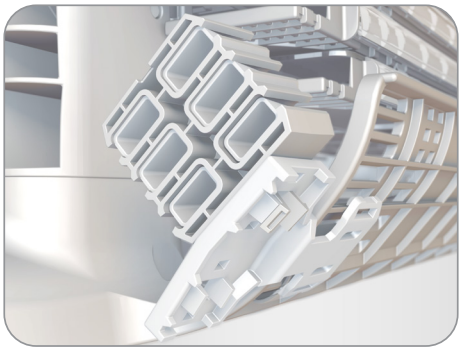


Figure 12

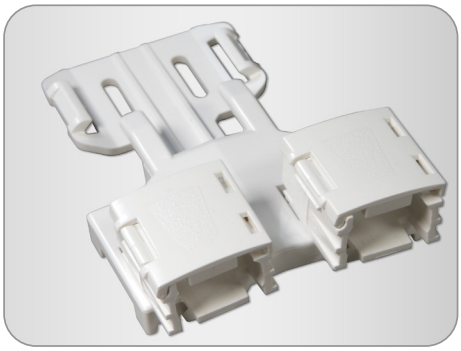


Figure 13

MESH APPLICATION FOR RIBBON OR BARE FIBER

1. For basket to tray protection, cut bulk mesh to at least 12-1/2" which will leave 1/2" beyond clip end as shown **(Figure 14)**. **NOTE:** Cutting mesh with 9" linemen pliers or snips, rather than shears, will produce the best results.

Figure 14

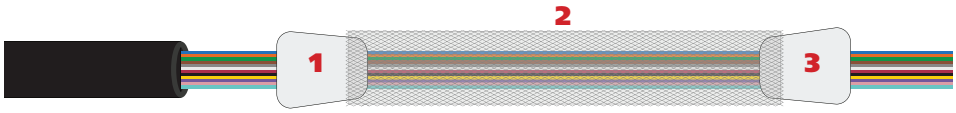


Figure 15

2. Place Retention Insert #1 **(Figure 15)** over the fiber with the tapered end toward mesh. **NOTE:** Placing a small piece of tape around the tip of the fiber group may help in the process.
3. Insert fiber through mesh tube that has been cut to length #2 **(Figure 15)**.
4. Flex mesh end and slide mesh tube #2 **(Figure 15)** a few inches over the Retention Insert #1 **(Figure 15)** with the narrow, tapered end pointed toward the mesh cut end **(Figure 16)**. **NOTE:** Hard matrix ribbon will be inserted on edge entering the splice tray as shown.

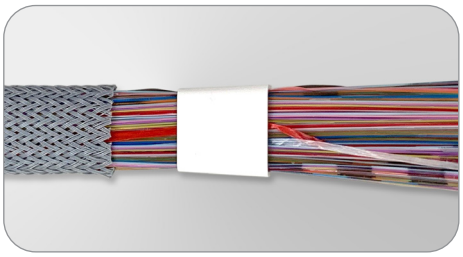


Figure 16

APEX® ADVANCED FIBER RETENTION SYSTEM (AFRS)

MESH APPLICATION FOR RIBBON OR BARE FIBER (cont.)

5. Place Retention Insert #3 over the fiber in the opposite direction with the tapered end toward mesh **(Figure 15)**.
6. Flex mesh end and push Mesh Retention Insert #3 into the tube. Be careful not to damage fiber inside the mesh. Slide mesh a few inches over Retention Insert **(Figure 17)**.

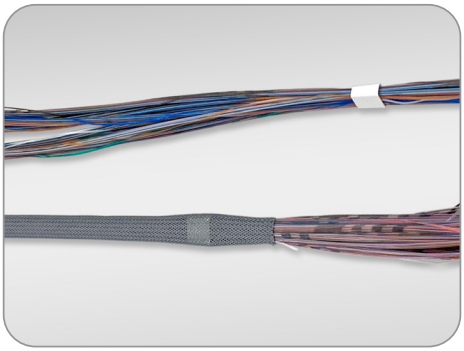


Figure 17

Figure 18 — textured V-Clip cover indicates direction for the insert
(image highlighted to show texture)

7. Secure Splice Tray Clip and work mesh toward basket to remove twisting **(Figure 18)**.
8. Fully open Splice Tray clip cover and ensure it is properly attached to the clip base. Snap cover hinge back on clip if needed. Inspect that clip base is clean and free from contaminants. (See Figure 2 on page 2.) **NOTE:** The V-Clip is textured to show the correct orientation of the insert in the V-Clip. Image highlighted to enhance texture **(Figure 18)**.
9. Lay mesh into open clip about 2" behind cut and slowly pull insert into the clip. **NOTE:** Pinch the end of the mesh to prevent the Mesh Retention Insert from sliding out of the mesh when installing in clip or housing.
10. Ensure mesh fits snug and close cover when using V-Clip to partially engage insert.
11. Once cover is closed, fully engage insert by pulling mesh gently and allow non-frayed mesh on clip to secure mesh in the clip (**Figure 19**).
12. Pull mesh to fully engage retention insert with at least 1/2" exposed beyond clip (**Figure 20**).

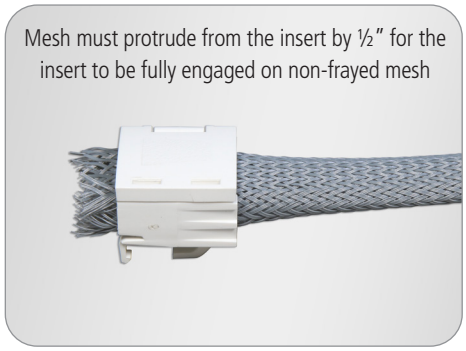


Figure 19

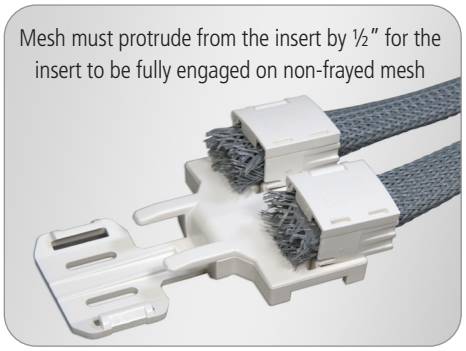


Figure 20

APEX® ADVANCED FIBER RETENTION SYSTEM (AFRS)

USING MESH BASKET ADAPTER WITH MESH HOUSING

A. **For Basket to Tray** – Insert Housing onto Basket Tab with the tapered end pointing away from the Basket as shown **(Figure 21)**. The two indentations (circled) pointing toward basket allows retention from basket to tray.

B. **For Mesh Around Basket to Tray** – Insert Housing onto Basket Tab with the tapered end pointing toward the Basket as shown **(Figure 22)**. The one indentation (circled) pointing toward basket allows retention from sheath to basket. Then, from the sheath, wrap mesh tubes around basket and then up to the tray.

1. Cut mesh to length, leaving at least 1/2" beyond the clip for retention **(Figure 23)**.
2. Insert fiber through mesh tube **(Figure 24)**. **NOTE:** Refer to steps 2-6 in Mesh Application for Ribbon or Bare Fiber section on pages 4 and 5.
3. Slide fiber-filled mesh into housing from the bottom up and alternating sides as shown **(Figure 25)**. Secure Splice tray clip and work mesh towards basket to remove twisting. For V-clips on Mesh Basket adapter, use the same procedure as V clips on splice tray.
4. For installation into Mesh Housing on Mesh Adapter Bracket, place the insert and non-frayed mesh into the clip by slightly pulling the mesh away from the basket until it is fully engaged **(Figures 25 and 26)**.

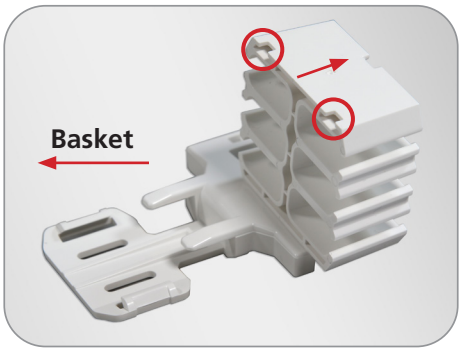


Figure 21 – Tapered End Pointing Away from Basket

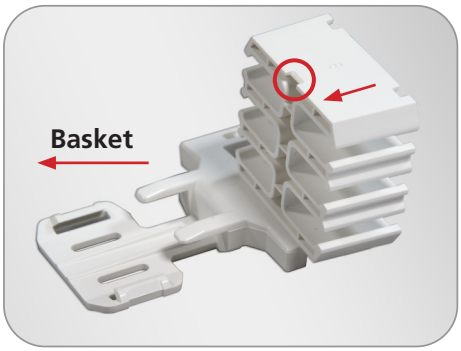


Figure 22 – Tapered End Pointing Toward Basket

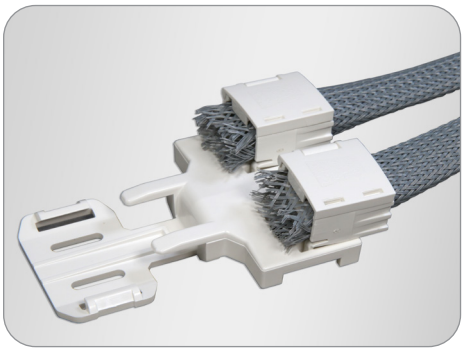


Figure 23

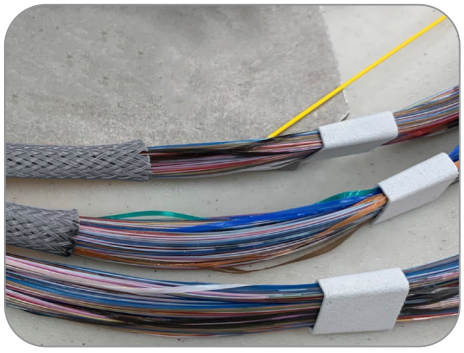


Figure 24

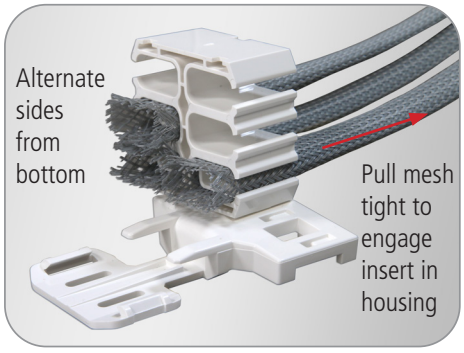


Figure 25

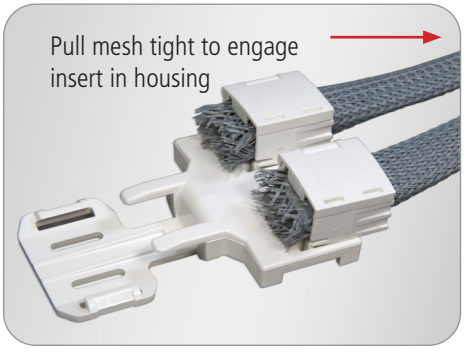
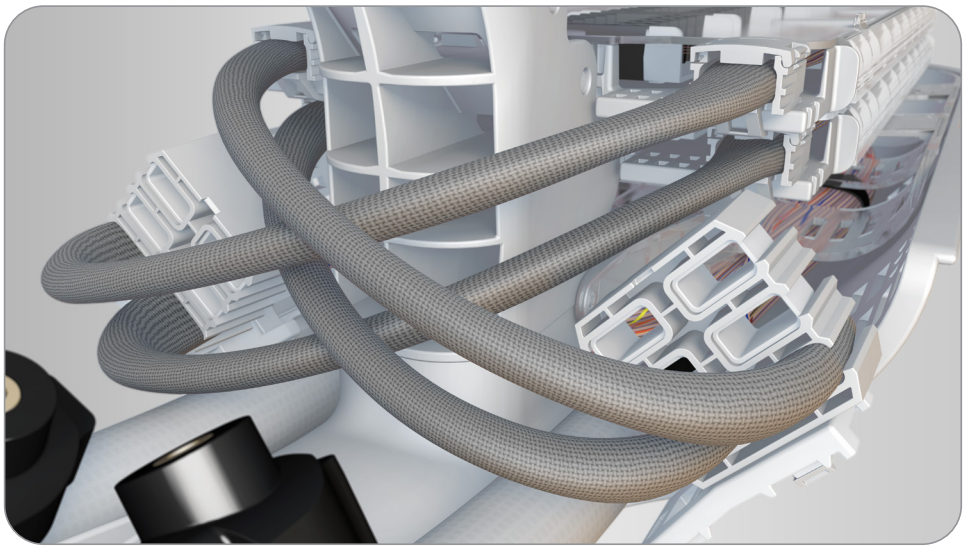


Figure 26

APEX® ADVANCED FIBER RETENTION SYSTEM (AFRS)

USING MESH BASKET ADAPTER WITH MESH HOUSING (cont.)

5. Follow instructions for V-Clip for Mesh Tubes.



Completed Ribbon Fiber Installation

SECURING TUBED RIBBON AT BASKET ENTRANCE

1. Prepare and install mesh prior to stripping cable and installing Cable Attachment Unit/Strain Relief.
2. For Apex X-2, mark fiber tube at 90" and cut mesh at 41". For Apex X-2S, mark fiber tube at 66" and cut the mesh at 32".
3. Slide mesh onto tube, compress the mesh before cutting the tube. The tube should be cut at 11" from sheath to secure to basket after installation of mesh **(Figure 27)**.
4. For Apex X-2, remove 49" of tube. For Apex X-2S, remove 34" of tube **(Figure 28)**.

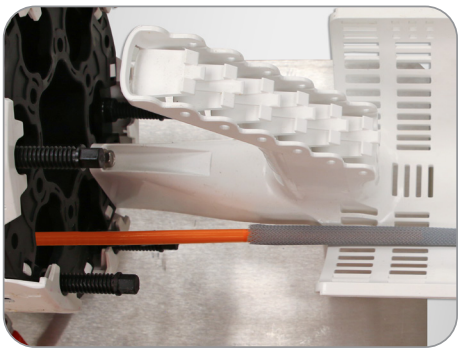


Figure 27

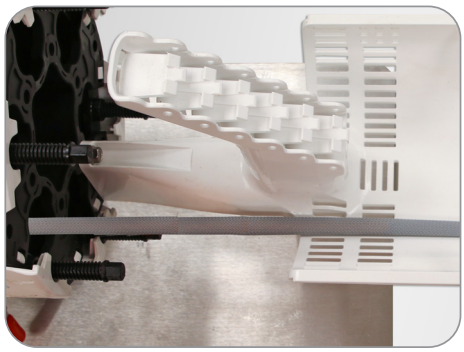


Figure 28

APEX® ADVANCED FIBER RETENTION SYSTEM (AFRS)

SECURING TUBED RIBBON AT BASKET ENTRANCE (cont.)

5. Clean and prepare fiber for installation.
6. Attach mesh to splice tray clip **(Figure 29)**.
7. Clean tube and secure mesh onto ribbon tube with electrical tape **(Figure 30)**.

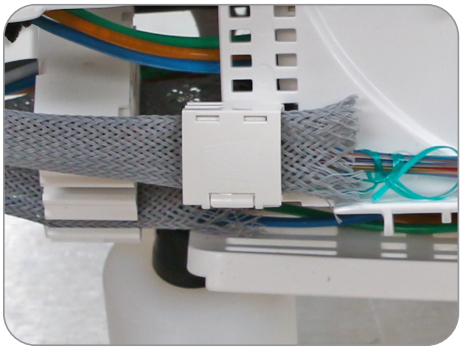


Figure 29

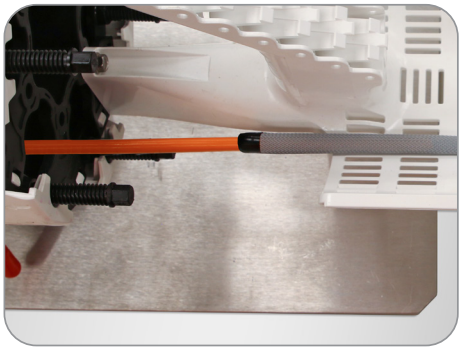
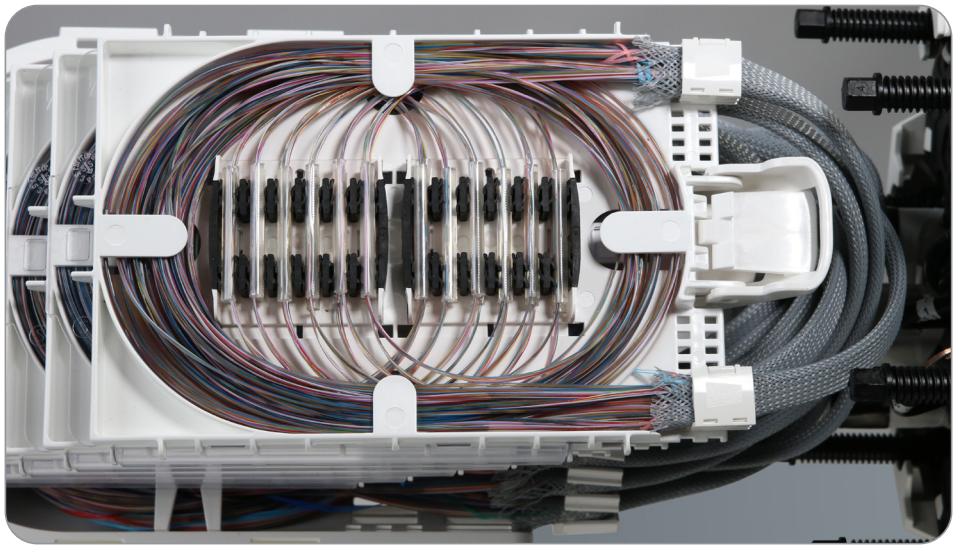


Figure 30



Completed SpiderWeb Ribbon® Fiber Installation