



A Furukawa Company

Sheath Removal for End Prep and Mid-Span Access AccuTube® + Rollable Ribbon (RR) Cable

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1.0 General

1.1 This practice provides instructions for sheath removal and mid-span access of OFS AccuTube+ Rollable Ribbon optical fiber cables. It is intended for personnel with prior cable splicing experience. A working familiarity with cable access tools, splicing equipment, and splice closures is necessary as this guide does not cover all aspects of cable splicing.

1.2 AccuTube+ cables contain OFS Rollable Ribbon fiber in a traditional loose tube cable design. AccuTube+ cables are available in fiber counts from 432 to 3456 fibers.

2.0 Precautions

2.1 OFS optical fiber cables are designed to meet the rigors of aerial, direct buried and underground duct environments. However, care must be exercised during installation to ensure that the maximum rated cable load (MRCL) is not exceeded or that the minimum cable bend diameter is not violated.

2.2 Cable minimum bend diameters¹ are typically expressed as a multiple of the cable outside diameter (OD) under static and dynamic conditions. The static condition represents an installed cable that may be subjected to long-term residual load. The dynamic condition represents a cable during installation which may be subjected to the full tensile load rating of the cable. For AccuTube+ cable, the minimum bend diameter under both static and dynamic conditions is 30 × OD. See Tables 1 and 2 for further details.

2.3 Cable tensile load ratings are also specified for both static and dynamic conditions. The dynamic condition represents a cable during installation when it may be subjected to the maximum rated cable load (MRCL). The static condition represents an installed cable that may be subjected to a long-term residual load. The MRCL load for AccuTube+ optical fiber cable is 1000 pounds (4448 N) and the maximum long-term load is 333 pounds (1481 N).

¹ Some cable manufacturers specify minimum bend radius rather than minimum bend diameter. Minimum bend diameters can be converted to minimum bend radius by dividing the minimum bend diameter by two. For example, the minimum bend radii for AccuTube+ cable is 15 × cable OD for both static and dynamic conditions.

Table 1 - Maximum Cable Loads and Minimum Bend Diameters for AccuTube+ RR Dielectric Cables							
Fiber Count	Cable OD	Cable Weight lb./kft (kg/km)	Maximum Rated Cable Load	Maximum Long Term Load	Minimum Bend Diameters		
					Dynamic Condition	Static Condition	Storage Coils
432	0.66 in. (16.8mm)	126 (190)	1000 lb. (4448 N)	338 lb, (1481 N))	20 in. (50 cm)	20in. (50 cm)	20 in. (50 cm)
864	0.85 in. (21.6mm)	198 (295)	1000 lb. (4448 N)	338 lb. (1481 N)	26 in. (65 cm)	26 in. (65 cm)	26in. (65 cm)
1728	0.99 in. (25.1mm)	285 (423.5)	1000 lb. (4448 N)	338 lb. (1481 N)	30 in. (75 cm)	30 in. (75 cm)	30 in. (75 cm)
3456	1.38 in. (35 mm)	524 (778)	1000 lb. (4448 N)	1000 lb. (4448 N)	41 in. (1.05 m)	41 in. (1.05 m)	41 in. (1.05 m)

Table 2 - Maximum Cable Loads and Minimum Bend Diameters for AccuTube+ RR Armored Cables							
Fiber Count	Cable OD	Cable Weight lb./kft (kg/km)	Maximum Rated Cable Load	Maximum Long Term Load	Minimum Bend Diameters		
					Dynamic Condition	Static Condition	Storage Coils
432	0.72 in. (18.3mm)	NA	1000 lb. (4448 N)	338 lb. (1481 N))	22 in. (55 cm)	22 in. (55 cm)	22 in. (55 cm)
864	0.91 in. (23.1mm)	276 (412)	1000 lb. (4448 N)	338 lb. (1481 N)	27 in. (69 cm)	27 in. (69 cm)	27 in. (69 cm)
1728	1.05 in. (16.8mm)	366 (545.8)	1000 lb. (4448 N)	338 lb. (1481 N)	32 in. (50 cm)	32 in. (50 cm)	32 in. (50 cm)

2.4 Breakaway pulling swivels and/or calibrated pulling devices are recommended for use during cable installation to protect the cable from excessive installation forces. Cable lubricants are also recommended during cable installation. Contact OFS or a cable lubricant manufacturer for guidance on proper lubricants to be used with optical fiber cable.

3.0 Recommended Tools

- Cable sheath knife
- Scissors
- Cable shears
- Diagonal cutters
- Pliers
- Seam ripper
- Co-Axial cable tube cutter (ring cut of AccuTube+ 432- and 3456-fiber cables)
- Jonard MS-26 Large Mid Span Slitter tool (mid-span access of AccuTube+ 432 and 3456-fiber cables)
- OFS Quick Split RT tool (ring cut and mid-span access of AccuTube+ 864 and 1728-fiber cables)
- Electrical tape
- Tape measure
- Lint free wipes and Isopropyl Alcohol
- Gloves and safety glasses

Caution: Safety glasses should always be worn when working with optical fiber cable.

4.0 Ribbon Termination

4.1 OFS recommends the use of clear spiral tubing for transporting and protecting the Rollable Ribbons in the splice closure (Figure 1). The Rollable Ribbons should be terminated by injecting a one-inch (2.5 cm) long section of RTV silicone sealant into the end of the spiral transportation tube (Figure 2). For small diameter tubes, a disposable syringe is recommended for injecting the RTV. OFS recommends Momentive RTV 108 silicone rubber adhesive sealant for this application. The RTV sealant becomes tacky after about 30 minutes and reaches full cure in about 10 hrs. The RTV plug is recommended to prevent fiber movement in cold temperature environments.

4.2 Recommended Materials for Ribbon Termination

- Momentive RTV 108 Silicone Rubber Adhesive
- McMaster-Carr, plastic syringe with taper tip, part# 7510A661, or equivalent.
- Nelco HT 3/8-C clear spiral tubing



Figure 1 – Spiral tubing is recommended for use in the splice closure.

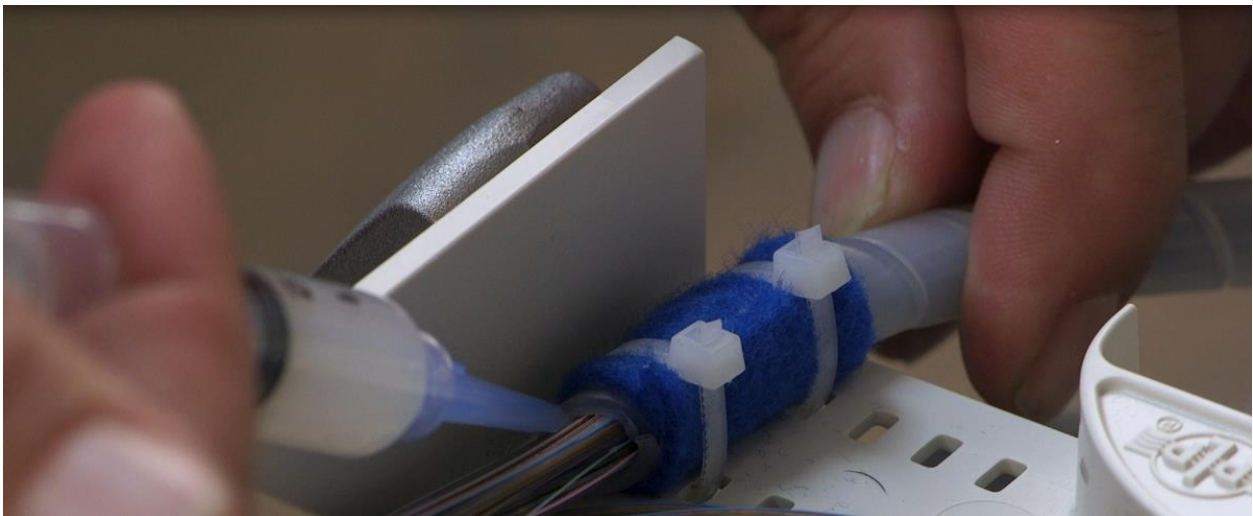


Figure 2 – Forming the buffer tube plug with RTV Silicone rubber adhesive.

5.0 Sheath Removal for Single Jacket AccuTube+ Cable – End Prep/Butt Splice Applications

5.1 Single jacket AccuTube+ cable is manufactured using OFS 12 fiber Rollable Ribbons. AccuTube+ cables are available in fiber counts of 432, 864, 1728, and 3456 and contain 4.5 mm, 6.0 mm, 7.0, and 5.0 mm buffer tubes, respectively.

5.2 Consult the closure manufacturer instructions for the correct length of cable to be prepped.

5.3 Use a cable sheath knife to ring cut the cable jacket six inches from the end. (Figure 3). Make a horizontal cut along the cable jacket to the end of the cable.



Figure 3 -- Ring cut the cable 6 inches from the end.

5.4 Use the cable sheath knife to ring cut the cable at the length required for jacket removal. Lightly score the cable jacket rather than cut all the way through (Figure 4).



Figure 4 – Ring cut the cable at required length.

5.5 Gently flex the cable with a circular motion at the score mark. Be careful not to violate the minimum bend radius. The cable jacket will separate at score mark (Figure 5).



Figure 5 – Flex the cable to open the ring cut.

5.6 Remove the cable jacket from the end of the cable (Figure 6).



Figure 6 – Remove the 6 inch piece of outer jacket.

5.7 Pull the rip cord from the cable opening to the second ring cut in the cable (Figure 7). Remove the cable jacket.



Figure 7 – Pull the rip cord through the outer jacket.

5.8 Remove the aramid yarn from the end of the cable (Figure 8).

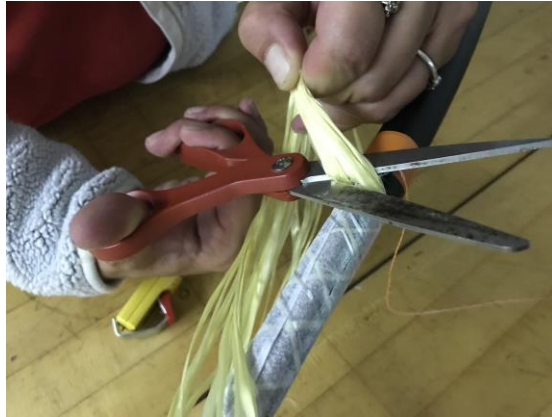


Figure 8 – Remove the aramid yarn.

5.9 Use a seam ripper or cable sheath knife and cut the binder threads along the cable opening (Figure 9).

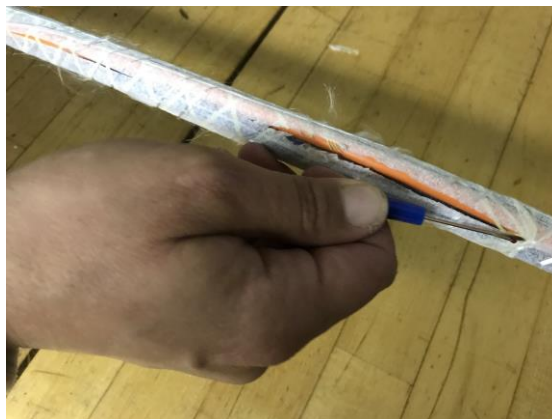


Figure 9 – Cut the binder threads with seam ripper or sheath knife.

5.10 Remove the binder threads and water blocking tape to expose the buffer tubes (Figure 10).



Figure 10 – Remove binder threads and water blocking tape.

5.11 Trim the central strength member as required for the closure assembly. (Figure 11)

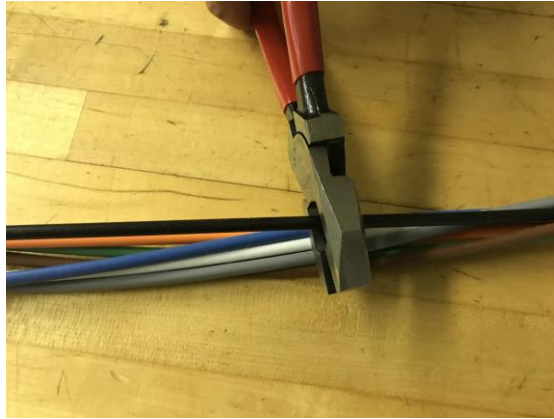


Figure 11 – Cut the central strength member at the required length.

5.12 Mark the buffer tubes and ring cut with the following tools. For the 432 and 3456 fiber cables use the Ideal Coaxial cutter #45-163 (Figure 12).



Figure 12 – Use the Ideal Co-axial cutter for 432 and 3456 fiber cables.

Use the OFS Quick Split RT for the 864 fiber cable (6.0 mm opening) and the 1728 fiber cable (7.2 mm opening). See Figure 13.



Figure 13 – Use the OFS Quick Split RT for 864 and 1728 fiber cables.

5.13 Score and snap the tubes to expose the fibers and remove the tube by pulling towards the end. (Figure 14)

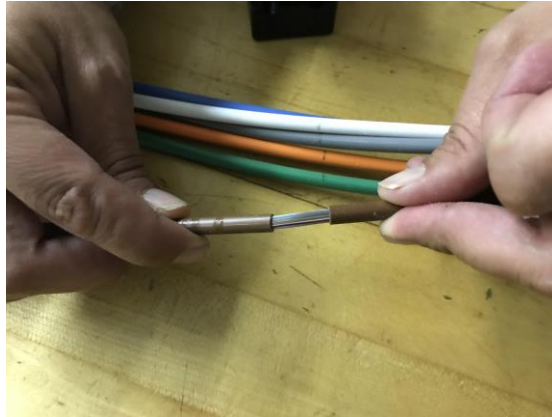


Figure 14 – Score and snap the tube and remove from the fibers.

6.0 Sheath Removal for Single Jacket AccuTube+ Cables – Mid Span/Express Applications

6.1 Measure and ring cut the section of cable jacket that will be installed in the closure. Measure a 10 inch window in the center of the jacket opening and ring cut with a sheath knife. Make a longitude cut through the cable jacket and remove (Figure 15).



Figure 15 – Open a 10 inch window in the middle of the cable.

6.2 Cut the rip cord in half and pull it through the outer jacket in both directions to the ring cuts on each side of the jacket opening (Figure 16).



Figure 16 – Pull the rip cord through both sides of the jacket opening.

6.3 Cut the aramid yarn at each end of the cable opening and remove (Figure 17).



Figure 17 – Cut and remove the aramid yarn from the cable opening.

6.4 Use a seam ripper or cable sheath knife and cut the binder threads along the cable opening (Figure 18).



Figure 18 – Cut the binder threads.

6.5 Remove the binder threads and water blocking tape to expose the buffer tubes (Figure 19).



Figure 19 – Remove binder threads and water blocking tape.

6.6 Unwind the buffer tubes from the strength member (Figure 20).



Figure 20 – Unwind the buffer tubes from the strength member.

6.7 Trim the central strength member as required for securing to the closure (Figure 21).

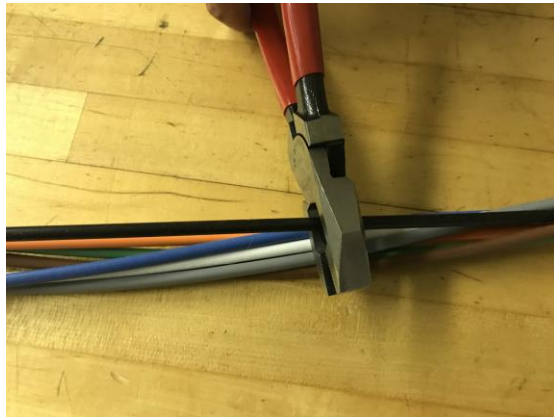


Figure 21 – Cut the central strength member at the required length.

6.8 Mark the buffer tubes as required for removal. Split and ring cut the tubes as follows.

For the 432 and 3456-fiber cables, use the Jonard MS-26 Large Mid-Span Slitter tool to first slit the tube (Figure 22). Use the Ideal Coaxial cutter #45-163 to ring cut the tube after splitting (Figure 23).

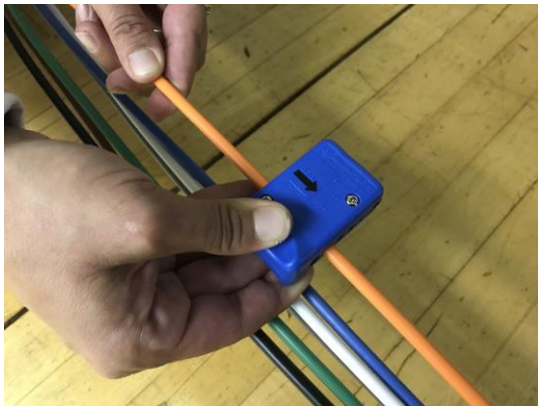


Figure 22 – Jonard MS-26 tube slitter.



Figure 23 – Ideal Coaxial cutter #45-163.

For the 864 and 1728-fiber cables, use the OFS Quick Split RT tool to first slit then ring cut the tubes (Figure 24 & 25).

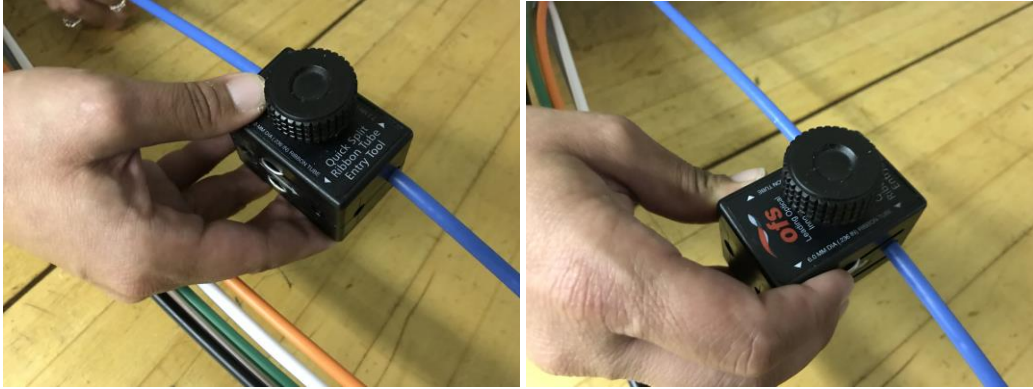


Figure 24 & 25 – Use the OFS Quick Split RT tool for the 864 and 1728-fiber cables.

6.9 Remove the split tubes from the fiber (Figure 26). Install the spiral transportation tubing and complete the closure assembly as required.



Figure 26 – Remove the tubes from the fibers.

7.0 Armor Tape Removal for Single Jacket AccuTube+ Cables – End Prep/Mid Span Splice Applications

7.1 Remove six inches of the outer cable jacket for end prep, or ten inches of outer cable jacket for a mid-span entry, as shown in Sections 5 and 6 (Figure 27).



Figure 27 – Remove the outer jacket to expose the armor tape.

7.2 Score the armor tape at the required length for installing the bonding hardware. Two ripcords are provided to separate the armor tape into two pieces. Pull the ripcords through the armor tape to the score mark. Remove to expose the buffer tubes (Figure 28). Ground the armor tape as required by local policy or codes.

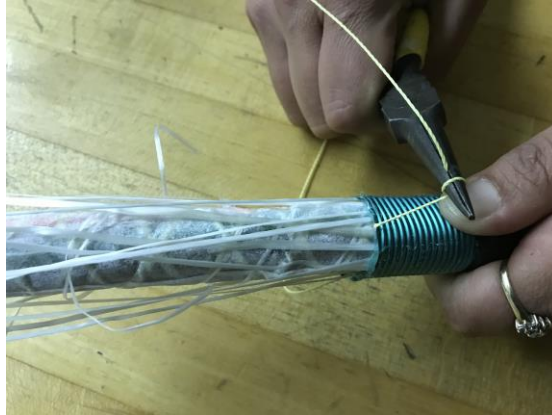


Figure 28 – Pull the ripcords through both sides of the armor tape.

7.3 Install the spiral transportation tubing and complete the closure assembly as required.

8.0 Additional Resources

- OFS IP-031A, *Use & Care of OFS Quick Split RT Tool*
- OFS IP-089, *Fusion Splicing Recommendations for OFS Rollable Ribbon Using the Fitel S123 M12 Fusion Splicer*
- AccuTube+ cable prep, rollable ribbon splicing, and closure assembly videos can be found on our YouTube channel at: <https://www.youtube.com/user/OFSoptics>

For additional information please contact your sales representative. You can also visit our website at www.ofsoptics.com or call 1-888-FIBER-HELP (1-888-342-3743) from inside the USA or 1-770-798-5555 from outside the USA.

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