

Sheath Removal and Mid-Span Access of Toneable and Armored SST-UltraRibbon™ Cables

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1. General

1.1 This procedure describes installation and handling practices for both Toneable and Armored SST-UltraRibbon™ fiber optic cables.

1.2 The cables illustrated in this procedure are manufactured with a single central tube. Four metallic rods embedded in the outer sheath provide tensile strength for both cables and toning capability for the toneable cable. Toneable cables, unlike armored cables, do not have armor or ripcords (Figure 1).

1.3 This issue includes additional information about matrix removal.

2. Precautions

2.1 General Precautions



WARNING: The wearing of **safety glasses** while performing this procedure is strongly recommended to protect the eyes from accidental injury when handling chemicals and cutting metallic rods or fiber. Pieces of glass fiber are very sharp and can cause damage to the cornea of the eye.

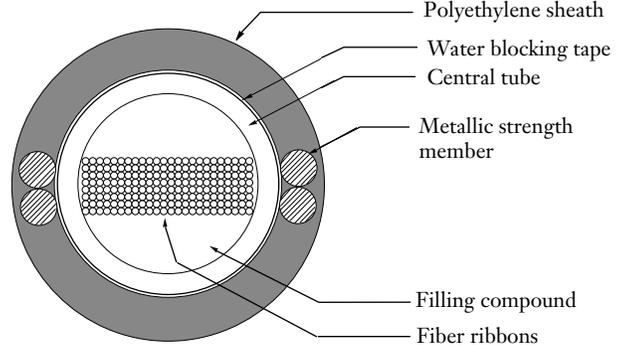
The wearing of **safety gloves** to protect the hands from accidental injury when using sharp-bladed tools or working near exposed rods from the sheath is strongly recommended. Use extreme care when the tool is open and its blades are exposed. Dispose of used blades properly.

2.2 Laser Precautions



WARNING: Laser light can damage your eyes. Laser light is invisible. Viewing it directly does not cause pain. The iris of the eye will not close involuntarily as when viewing a bright light. Consequently, serious damage to the retina of the eye is possible. Never look into the end of a fiber which may have a laser coupled to it. Should accidental eye exposure to laser light be suspected, arrange for an eye examination immediately.

Toneable SST-UltraRibbon Cable



Armored SST-UltraRibbon Cable

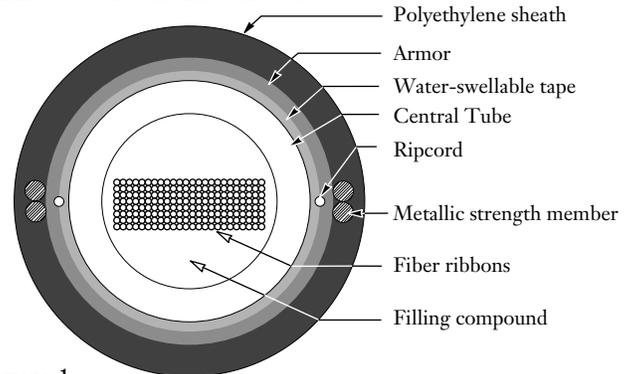


Figure 1

2.3 Central Tube Handling Precautions



CAUTION: The central tube is sensitive to excessive pulling, bending and crushing forces. Great care should be used when handling the central tube. Excessive bending will cause kinking which may damage the fibers inside.

2.4 Fiber Precautions



WARNING: Cleaved glass fibers are very sharp and can pierce the skin easily. Do not let cut pieces of fiber stick to your clothing or drop in the work area where they can cause injury later. Use tweezers to pick up cut or broken pieces of the glass fibers and place them on a loop of tape kept for that purpose alone. Good housekeeping is very important.

2.5 Filling Compound Remover



WARNING: Contains petroleum distillate. Harmful or fatal if swallowed. DO NOT INDUCE VOMITING. Call a physician immediately.

2.6 Cable Handling Precautions



CAUTION: Fiber optic cable is sensitive to excessive pulling, bending, and crushing forces. Refer to the cable specification sheet CLT-78 for the SST-UltraRibbon cable bend radius. Do not at any time exceed the minimum bend radius. Do not apply more pulling force to the cable than specified. Do not crush the cable or allow it to kink. Doing so may cause damage that can alter the transmission characteristics of the cable.

3. Tools and Materials

3.1 The following tools and materials are required for this procedure:

- Safety glasses
 - Safety gloves
 - Utility knife with hook-blade *
 - Scissors *
 - Filling compound remover *
 - Vinyl tape *
 - 1 1/8 in-capacity tubing cutter
 - Side cutters*
 - Paper towels or lint-free cloth
 - Tape measure *
 - Ideal® model 45-164 (1/4 to 9/16 in O.D.) coaxial cable stripper
 - Small slotted screwdriver *
 - Number markers *
 - Cable sheath knife or utility knife with straight blade*
 - Needle nose pliers
 - TKT-050 or TKT-060 Ribbon access kit
 - Corning Cable Systems Universal Access Tool II (UAT II) and SRP-004-069 (for mid-span access only)
- or
- Corning Cable Systems Universal Access Tool III (UAT III) and SRP-004-074 (for mid-span access only)
 - Ribbon Splitting Tool (RST-000)
 - Permanent marking pen
 - Grounding hardware (p/n UCN-GND-SC20 for toneable cables; per your company's practices for armored cables-alligator clips shown in this procedure)

* Items available in the M67-003 Fusion Splicer Tool Kit

4. Cable-end Sheath Removal

4.1 Determine the proper sheath removal length for the hardware being used. Mark a point at this distance from the end of the cable with a wrap of tape (Figure 2).

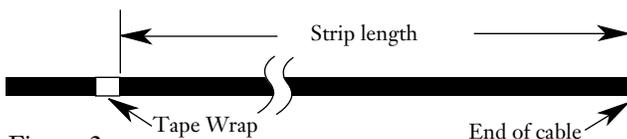


Figure 2

4.2 Starting at the the tape wrap, use a sheath knife or utility knife with a straight blade to shave off the sheath directly over the steel rods (Figure 3). Shave the outer sheath off both sets of rods for the entire strip length, as determined in step 4.1.

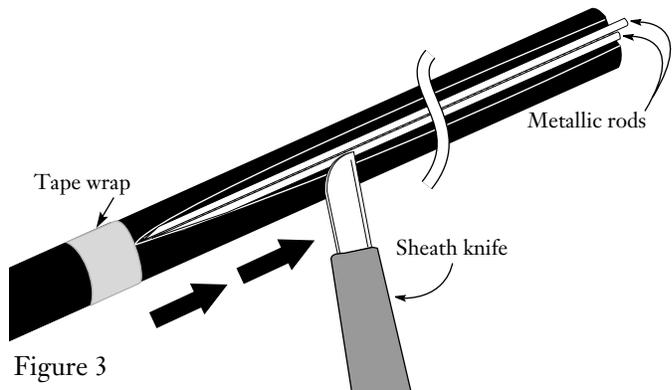


Figure 3

4.3 Using needle-nose pliers, separate the ends of the metallic rods from the cable.

4.4 Pull one metallic rod at a time through the sheath to the tape wrap (Figure 4).

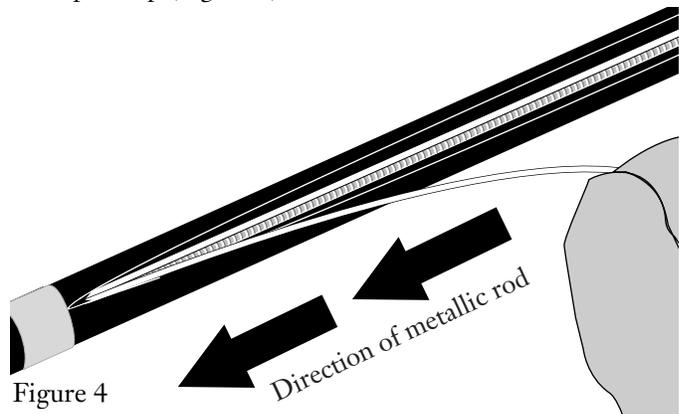


Figure 4

4.5 Use side cutters to cut the metallic rods to the length specified for the hardware being installed. If not specified, cut to 13 cm (5 in.) from the tape wrap (Figure 5). **ALWAYS WEAR SAFETY GLASSES WHEN CUTTING THE METALLIC RODS.**

Note: If you are installing Toneable SST-UltraRibbon cable, skip to step 4.12.

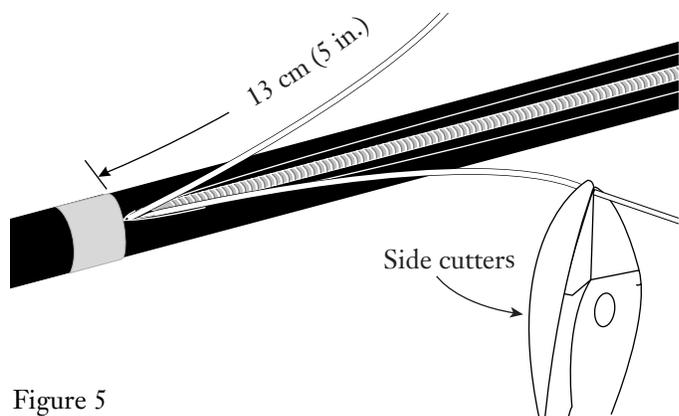


Figure 5

4.6 Taking care not to damage the central tube, use 1 1/8 inch capacity tubing cutter or a hook blade knife to make a shallow ring cut at a point 15 cm (6 in.) from the end of the cable (Figure 6).

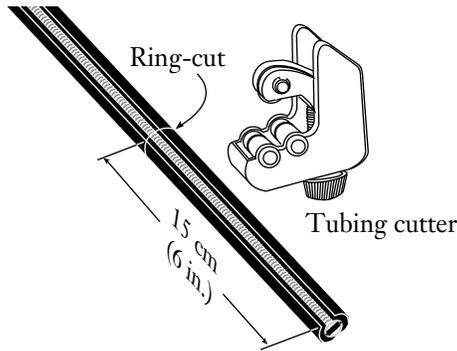


Figure 6

4.7 Gently bend the cable at the ring cut to break the armor. DO NOT exceed the minimum bend radius of the cable during this step (Figure 7).

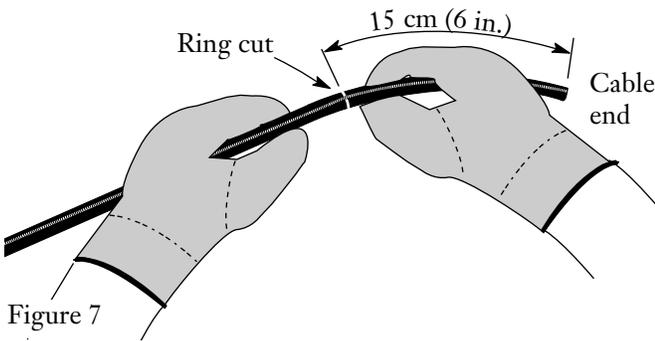


Figure 7

4.8 Position the blade of the hook blade knife under the armor at the ring cut. This will allow the blade to cut a slit through the sheath and armor to the end of the cable

Position the hook blade knife at a 45° angle to the cable to prevent the blade from slipping out of the sheath.

Slit the 15 cm (6 in.) section of cable sheath and armor by holding the arm which has the knife out straight and pulling the cable "through" the hook blade with the other hand (Figure 8).

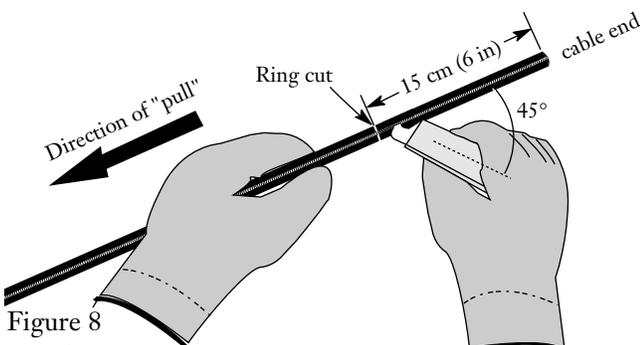


Figure 8

4.9 Remove the 15 cm (6 in.) section of outer sheath to access the red outer rip cords which lie atop the water-swappable tape

4.10 At the end of the cable use the hook blade to make small notches in the armor at the two points exposed by the removed metallic rods (Figure 9).

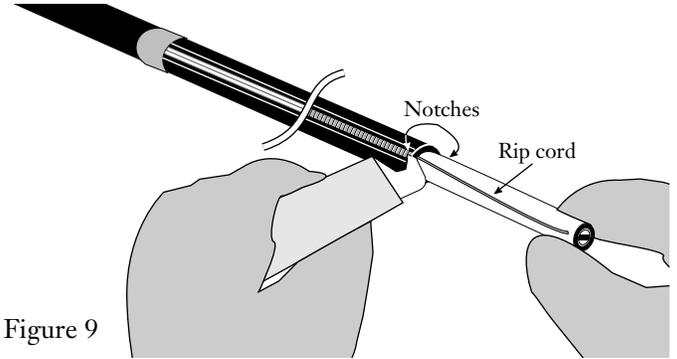


Figure 9

4.11 Using the shaft of a screwdriver as a handle, pull one ripcord at a time through the notches made in the armor. Continue to pull the ripcords through the armor until they are approximately 3.8 cm (1.5 in.) past the tape wrap (Figure 10).

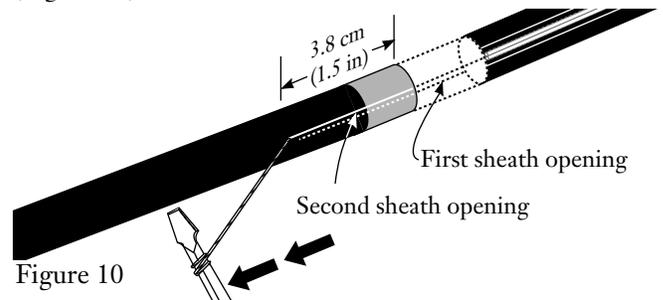


Figure 10

4.12 For both cable types, bend the metallic rods away from the cable to allow a ring cut to be made at the tape wrap. Use the hook blade knife or tube cutter to perform the ring cut (reference Figure 6). Starting at the end of the cable, peel back both sections of split outer sheath (and armor, for armored cables) to expose the central tube (Figure 11).

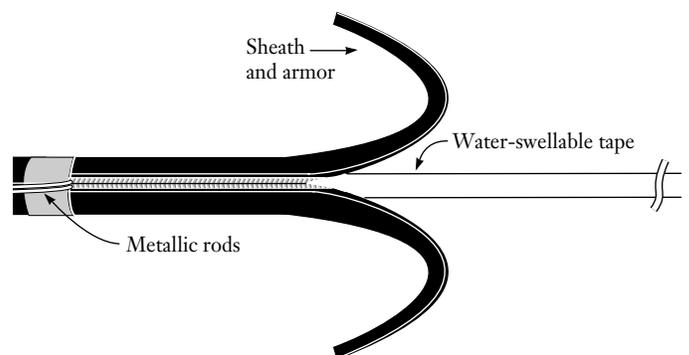


Figure 11

4.13 Carefully flex the sections of sheath and armor, if present, at the ring cut and remove them. Side cutters may be used to help remove the sections (Figure 12).

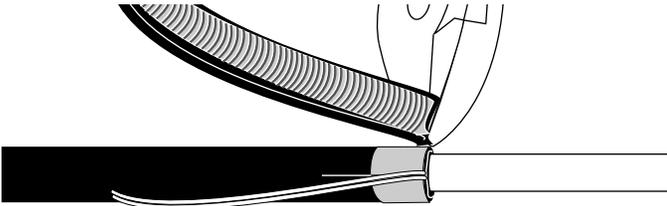


Figure 12

4.14 Using scissors, cut the water-swollable tape as close as possible to the end of the sheath and tape wrap (Figure 13).

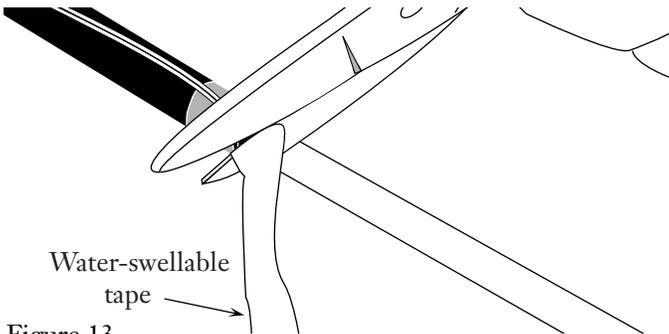


Figure 13

5. Grounding the Cables

5.1 Install the recommended grounding clamp and approved grounding braids or wires to the cable shield and wrap per your company's standard procedures.

Armored Cables

5.2 To ground the armor with an alligator clip:

- Carefully pry up the armor and sheath so the base plate of the grounding clamp can be inserted under the armor.
- Insert the base plate under the armor. Be careful not to damage the central tube. Place the top plate over the base plate and tighten the two pieces using a lock nut (Figure 14). A few light taps on the top plate may help seat the teeth into the armor.

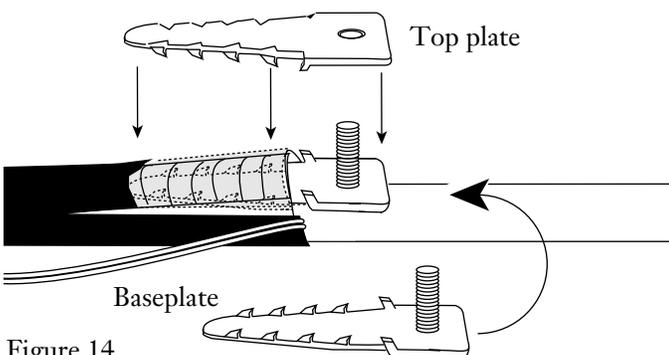


Figure 14

- Place the grounding braid on top of the lock nut and secure it using a second lock nut.
- Cover the grounding clamp and split portion of the sheath with vinyl tape (Figure 15).

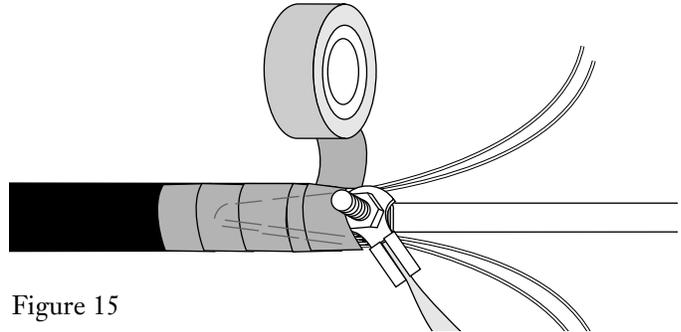


Figure 15

Toneable Cables

5.3 To ground the metallic rods with a 3M Scotchlok® 4460-D\FO Shield Bond connector:

- Position the blade of the hook blade knife under the sheath at the tape mark. Carefully slit the sheath and water-swollable tape approximately 2.5 cm (1 in.) past the tape wrap (Figure 16). *Do not cut into the central tube.*

Repeat this step on the other side of the cable to make a second slit.

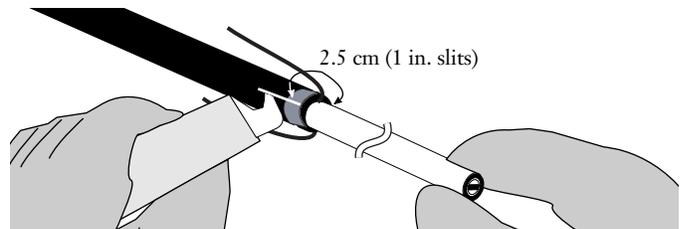


Figure 16

- Place the 3M Scotchlok 4460-D\FO Shield Bond base plate between the sheath and central tube (Figure 17).

The plastic tab from the kit can be placed between the base plate and the central tube, if desired.

- Install the support plate onto the threaded stud on the base plate (Figure 17).

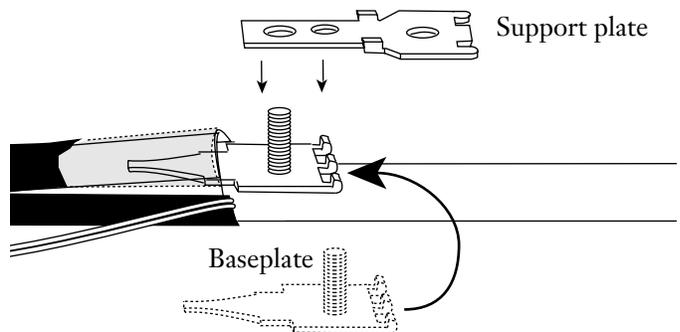


Figure 17

- d) Install the top plate over the support plate (Figure 18).
- e) Install the supplied nut onto the threaded stud. Tighten the nut down to drive the top plate into the cable sheath (Figure 18).

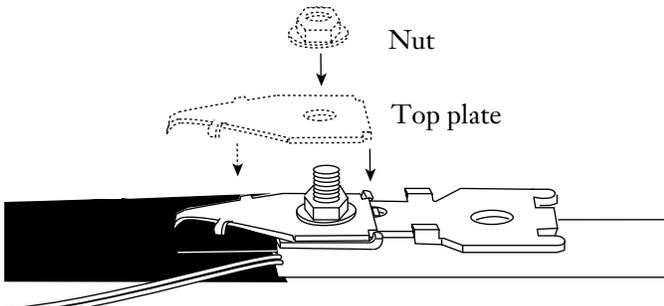
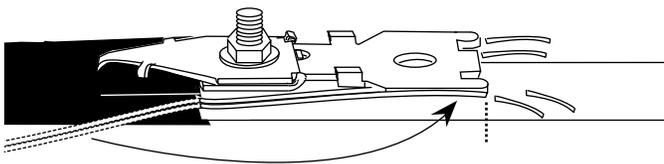


Figure 18

- f) Route the metallic rods to the end of the support plate and cut flush (Figure 19).



Route and cut flush all four rods

Figure 19

- g) Install the restraint cap by inserting its threaded stud through the support plate. Position the metallic rods between the restraint cap and support plate (Figure 20).

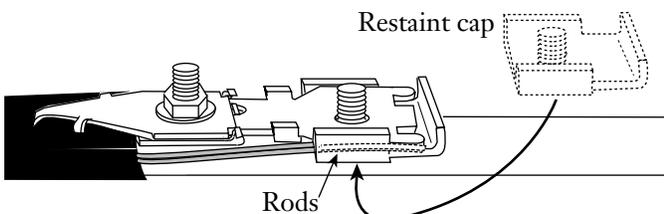


Figure 20

- h) Secure the restraint cap using the supplied nut (Figure 21).

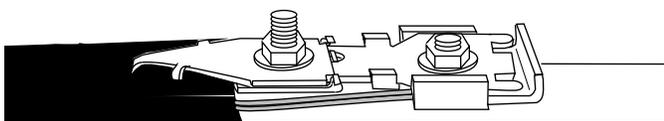


Figure 21

- i) Attach ground cable to the threaded stud on the base plate per your company's standard procedures. Secure using a second nut.
- j) Place the plastic cap over the assembly.

6. Accessing the Cable-end Central Tube

6.1 Determine the proper central tube removal length for the hardware being used. Use an Ideal model 45-164 coaxial cable stripper to remove the needed strip length of central tube in 60 cm (24 in.) increments. Scoring the circumference of the tube will enable you to make a clean break in the tube with minimal risk to the fibers inside.

Before using the coaxial stripper, make sure that it is properly adjusted. Use a small slotted screwdriver to adjust *one* of the blades so that it seats against the lower jaw but does not force the jaw open (Figure 22).

Leave the blades on the front and other side of the tool fully retracted to clear the lower jaw.

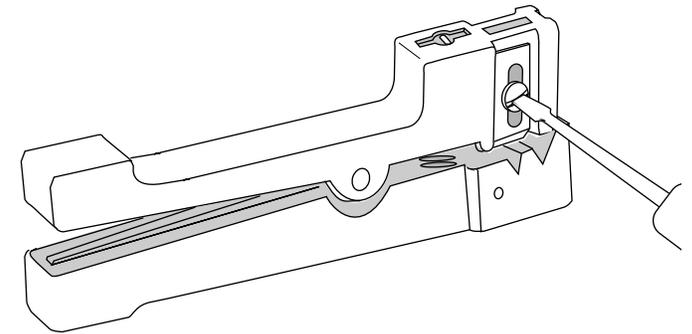


Figure 22

6.2 Use the last 2 to 3 inches (5 to 7.5 cm) at the end of the cable to determine the sharpness of the stripper's blade and how many turns of the tool will be required to score the tube. *To minimize damage to the fibers inside the tube, always use the tool to score the tube, not ring cut it.*

To score a central tube:

- a) Open the tool by squeezing its handles together and place the stripper's blade on the central tube at the desired scoring point.
- b) Use one hand to hold the central tube steady.
- c) Use the other hand to rotate the tool around the central tube two to three complete turns to score it (Figure 23). Remove the tool from the central tube.

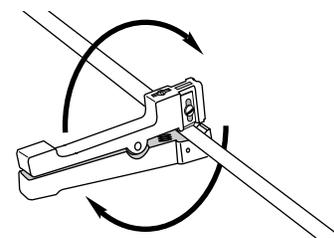


Figure 23

*If the stripper completely cuts through the tube during this trial step, move the tool to a new trial area at the end of the central tube and repeat a) through c) with **fewer** rotations in step c). If the blade cuts completely through the tube, damage to the fibers inside can result.*

- d) Carefully flex the tube to break it at the score point. The break should be clean and free of rough edges (Figure 24).

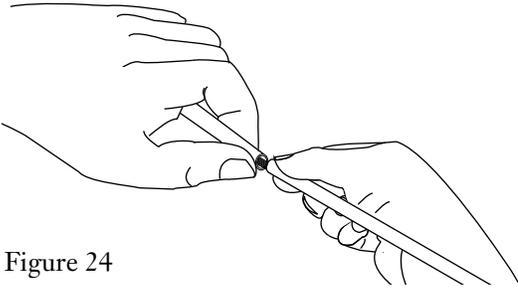


Figure 24

If the break is not clean, repeat the trial at a new location at the end of the tube with an additional rotation or two.

- e) Slide the severed tube off the fibers. **USE CARE TO AVOID DAMAGING THE RIBBONS.**
- f) Repeat these steps until the desired length of central tube is removed, leaving at least 2.5 cm (1 in.) of exposed central tube beyond the end of the sheath (see Figure 25).

The length of exposed central tube may vary depending on the hardware being used.

6.3 Use a lint free tissue or cloth to wipe the filling compound from each ribbon (Figure 25). Do not exceed the ribbon's minimum bend radius during the cleaning process (i.e. Do not wrap ribbon around fingers). If cleaner ribbons are desired, filling compound remover may be used as follows:

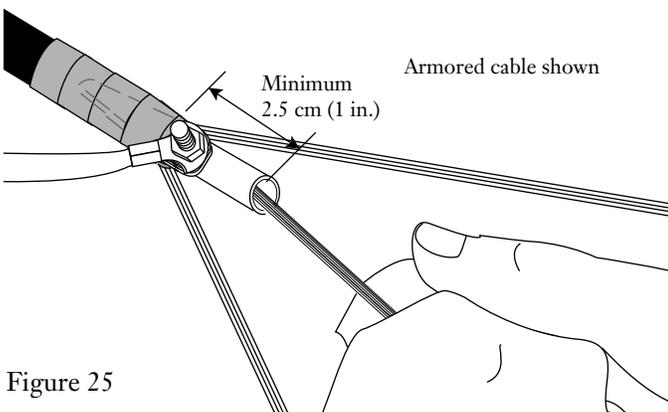


Figure 25

- a) Wipe off the majority of the filling compound with lint-free tissues or cloths using moderate pressure.
- b) Using a lint free tissue or cloth soaked in filling compound remover, wipe each ribbon with moderate pressure one or two times.
- c) Wipe off any remaining filling compound with lint-free tissue or cloths using moderate pressure.



CAUTION: *If filling compound remover or other solvents are used to clean the ribbons, wipe away excess solvent with a clean, dry tissue or cloth. NEVER ALLOW OPTICAL FIBERS TO SOAK IN SOLVENTS FOR EXTENDED PERIODS OF TIME – DAMAGE TO THE FIBER COATING CAN OCCUR.*

6.4 Route and secure the SST-UltraRibbon cable to the hardware being installed. Ground the metallic rods and armor per your company's standard practices. Secure the ribbons within the hardware in accordance with the hardware manufacturer's instructions.

Skip to Section 8, Ribbon Splitting and Accessing Fibers in SST-UltraRibbon Cables

7. Mid-span Access of the Cable

7.1 This mid-span access procedure is dependent upon sufficient slack cable for access. The minimum amount of cable slack is determined as follows:

- Slack needed = $60 \times \text{cable diameter} + 105 \text{ cm (42 in.)}$:
for example, for a 1.25 cm (0.5 in.) OD cable,
 $60 \times 1.25 \text{ cm} = 75 \text{ cm} + 105 \text{ cm} = 180 \text{ (72 in.)}$ of slack
- Add any necessary additional slack needed to reach the splicing workstation from a pole or manhole.

IMPORTANT: *Please read and understand this procedure before attempting to access the central tube.*

7.2 Prepare the tie-in (drop) cable according to its manufacturer's instructions. Set the cable aside in a secure place.

7.3 Determine the amount of slack needed. Place a wrap of tape at each end of the cable sheath that is to be removed (Figure 26).

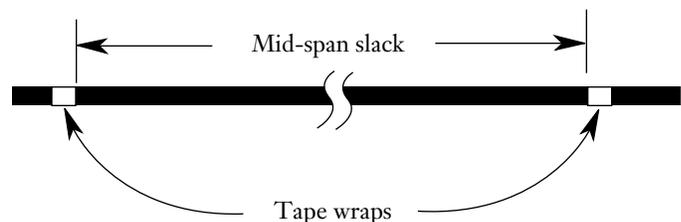


Figure 26

7.4 Using a cable knife, shave off the sheath over each set of metallic rods between the tape wraps. Shave off the sheath until the metallic rods on both sides of the cable are completely visible (Figure 27).

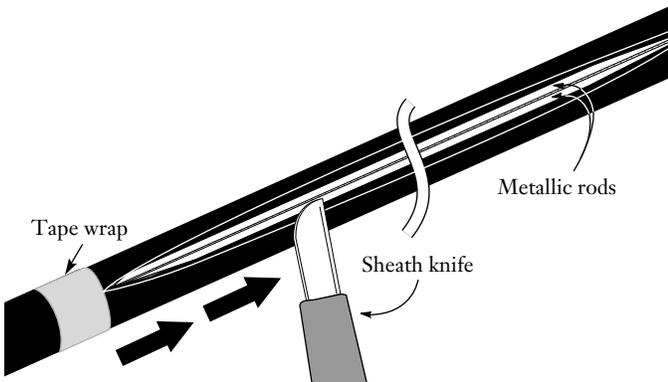


Figure 27

7.5 Using the cable knife again, separate the two metallic rods from the jacket on both sides of the cable (Figure 28). Use caution when inserting the cable knife under the rods to avoid damaging the central tube.

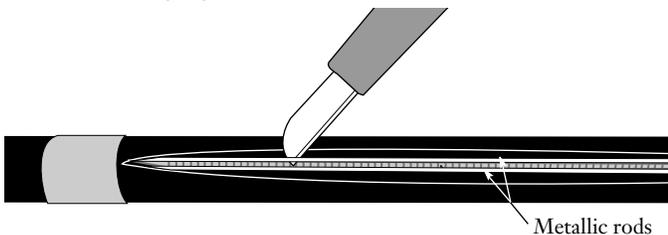


Figure 28

7.6 From each tape wrap, measure the length of each metallic rod as specified by the hardware. Use side cutters to cut all metallic rods to their specified lengths. If the hardware does not specify a length, cut each set of metallic rods 12.7 cm (5 in.) from both tape wraps (Figure 29).

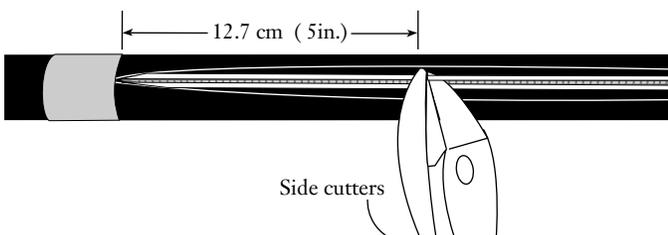


Figure 29

7.7 Bend the metallic rods away from the cable to allow a ring cut to be made at both tape marks.

7.8 Make an additional ring cut at a point approximately 15 cm (6 in.) from either tape mark. Use the hook blade, a utility knife with a straight blade, or tube cutter for the ring cuts (Figure 30).

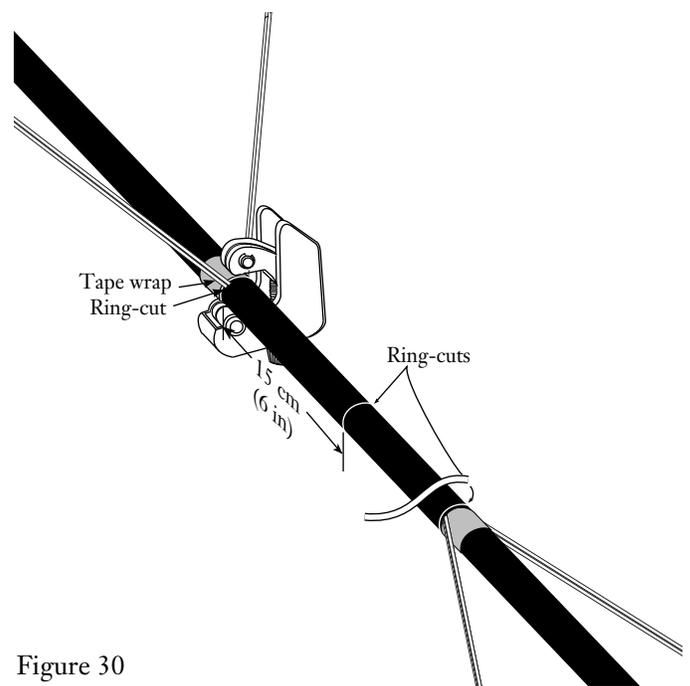


Figure 30

7.9 Position the blade of the hook blade knife under the armor, or sheath of toneable cables, at the tape mark ring cut that is closest to the 15 cm (6 in.) ring cut. This will allow the hook blade to cut a slit through the armor/sheath and water-swellaable tape towards the 15 cm (6 in.) ring cut.

Hold the hook blade knife at a 45° angle to the cable to prevent the blade from slipping out of the sheath.

Slit the 15 cm (6 in.) section of cable sheath and armor by holding the arm which has the knife out straight and pulling the cable "through" the hook blade with your other hand (Figure 31).

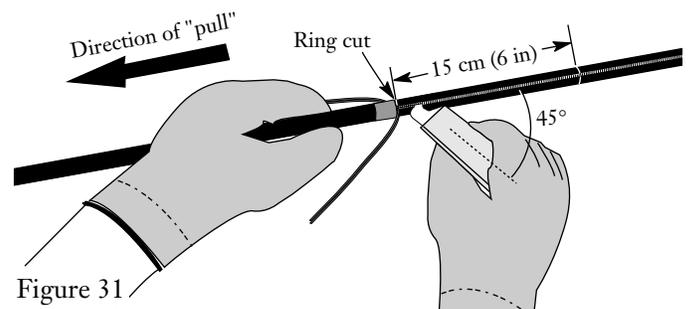


Figure 31

7.10 Starting at the same tape mark, repeat steps 7.8-7.9 on the opposite side of the cable (180°) to make a second 15 cm (6 in.) slit.

7.11 Remove the two 15 cm (6 in.) sections of outer sheath.

If you are installing Toneable SST-UltraRibbon cable, skip to step 7.15.

For armored cables, carefully cut both rip cords 7.6 cm (3 in.) from the end of the tape mark using scissors (Figure 32).

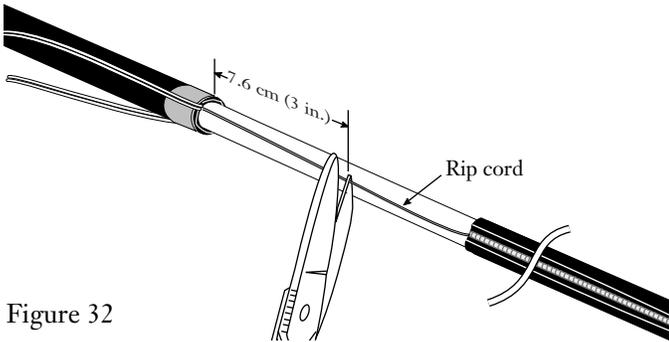


Figure 32

7.12 Make a small starting cut for each of the four rip cords through the outer sheath and armor using the hook blade (Figure 33).

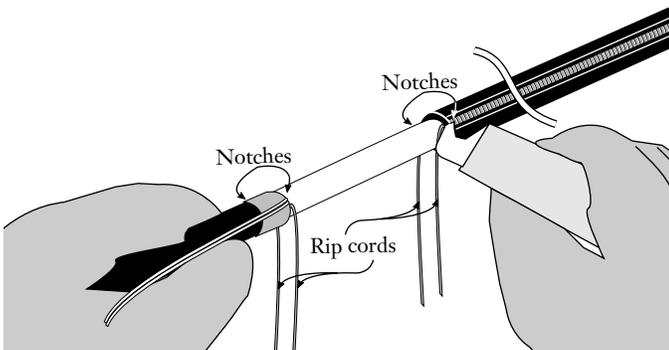


Figure 33.

7.13 Using the shaft of a screwdriver as a handle, pull the two rip cords, one at a time, through the tape, sheath, and armor to a point approximately 3.8 cm (1.5 in.) past the tape mark (Figure 34).

Cut both rip cords flush with the cable sheath. (The extra 3.8 cm (1.5 in.) of split sheath will permit the ground clamp to slide easily under the armor in a later step.)

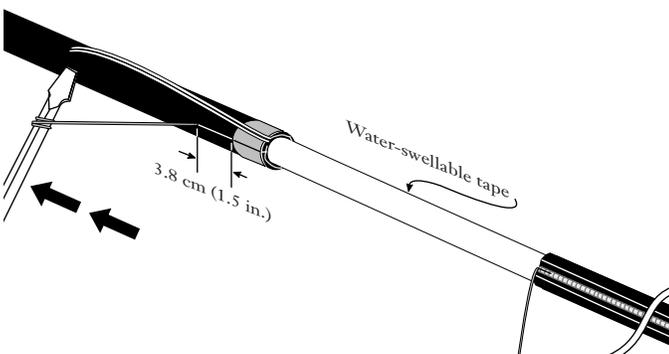


Figure 34

7.14 Again, using the shaft of the screwdriver as a handle, pull the two remaining rip cords, one at a time, through the exposed armor, tape, and sheath to a point approximately 3.8 cm (1.5 in.) past the tape mark (Figure 35). Cut both rip cords flush with the cable sheath.

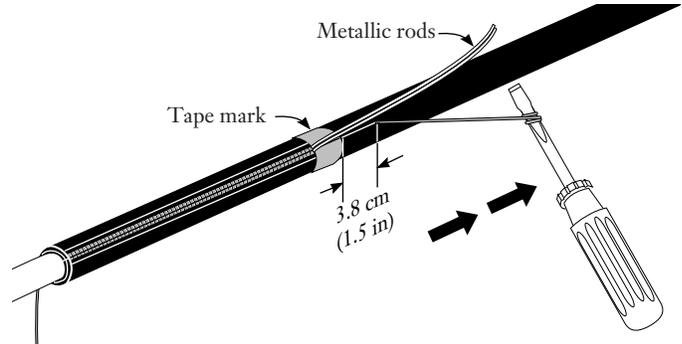


Figure 35

7.15 Carefully flex the sections of sheath/sheath and armor and remove them. Side cutters may be helpful in removal (Figure 36).

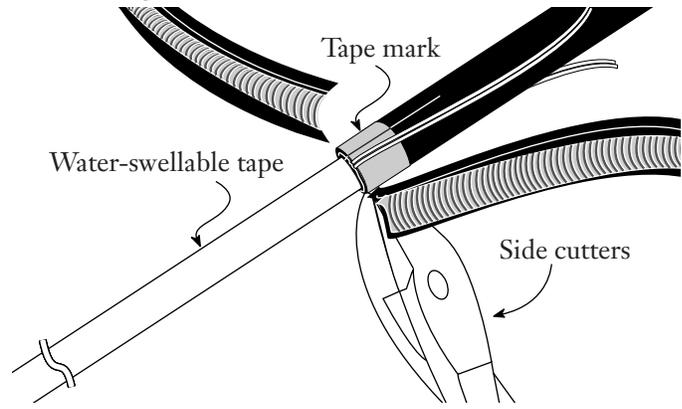


Figure 36

7.16 To reveal the central tube, cut away the water-swappable tape flush at both tape marks using scissors (Figure 37).

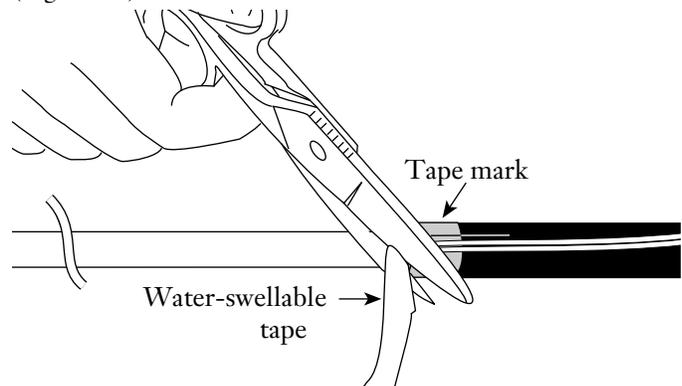


Figure 37

7.17 Refer to section 5 for grounding instructions at both tape marks.

7.18 Corning Cable Systems Universal Access Tool II and III are designed to access the fibers of single-tube cables in a mid-span location where slack is present (see Figure 38).

For further information about these tools, refer to the manual provided with the tool, SRP-004-069, *Universal Access Tool II Operating Instructions* or SRP-004-074, *Universal Access Tool III Operating Instructions*.

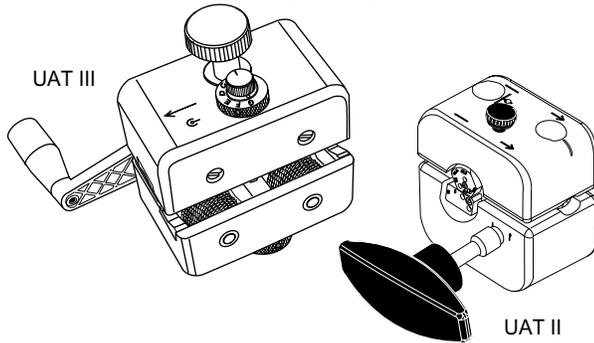


Figure 38

Note: The UAT II is capable of accessing the fibers in high fiber count (> 432-f) SST-UltraRibbon cables; however, it is not optimized for use on the polyethylene buffer tubes associated with these cables.

7.19 Place marks 12.7 cm (5 in.) from the end of each side of the exposed section of central tube with a permanent marking pen (Figure 39). These access starting and ending mark locations will vary depending on the hardware being utilized.

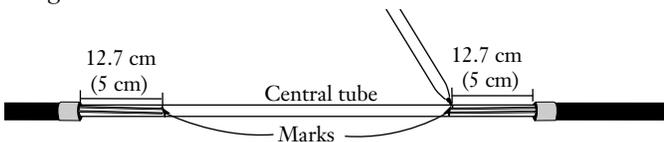


Figure 39

Note: Depending upon the type of closure being used, assembly may be easier if you install cable mounting hardware and sealants at this time.

7.20 Follow the UAT II or UAT III instructions to access the ribbons. After using the UAT and Ideal tool on the central tube, the end result will look like Figure 40.

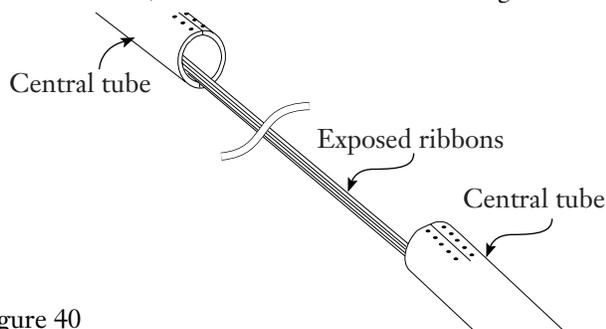


Figure 40

7.21 Use a lint free tissue or cloth to wipe the filling compound from each ribbon. *Do not* exceed the ribbon's minimum bend radius during cleaning (i.e. *Do not* wrap the ribbon around a finger). If cleaner ribbons are desired, filling compound remover may be used as follows:



CAUTION: If filling compound remover or other solvents are used to clean the ribbons, wipe away excess solvent with a clean, dry tissue or cloth. NEVER ALLOW OPTICAL FIBERS TO SOAK IN SOLVENTS FOR EXTENDED PERIODS OF TIME—DAMAGE TO THE FIBER COATING CAN OCCUR.

- Wipe off the majority of the filling compound with lint-free tissues or cloths using moderate pressure.
- Use a lint free tissue or cloth soaked in filling compound remover to wipe each ribbon with moderate pressure one or two times.
- Wipe off any remaining filling compound with lint-free tissue or cloths using moderate pressure.

7.22 Route and secure the SST-UltraRibbon cable to the hardware being installed. Secure the ribbons within the hardware in accordance with the hardware manufacturer's instructions.

7.23 Ground the armor and metallic rods at both exposed locations per your company's normal practices. See Section 5, *Grounding the Cables*, for grounding procedures.

8. Ribbon Splitting and Fiber Accessing

Splitting the End of a 24- or 36-Fiber Ribbon

8.1 24- and 36- fiber ribbons can be manually split into two and three 12-fiber sections at their ends, respectively.

For best results, do not use scissors or cable cutters to cut the ribbon prior to hand splitting.



CAUTION: Wear safety glasses and be sure to point the breaking section away from your eyes since glass particles may fly out during the break.

- a) Snap the end of the ribbon, bending the ribbon flat against itself to get a clean break (Figure 41).

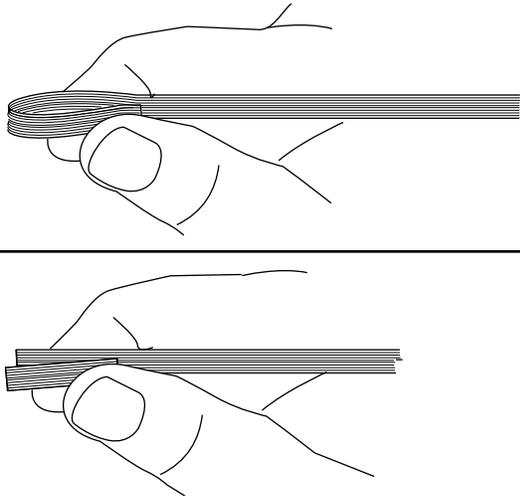


Figure 41

- b) Grasp the end of the ribbon with the thumb and forefinger of each hand.

For 24-f ribbons: make sure the thumb of each hand completely covers a 12-f section.

For 36-f ribbons: make sure the thumb of one hand completely covers a 24-f section, the other a 12-f section. Separate the resulting 24-fiber section as described above.

- c) Pull the two sections apart in opposite directions (Figure 42).

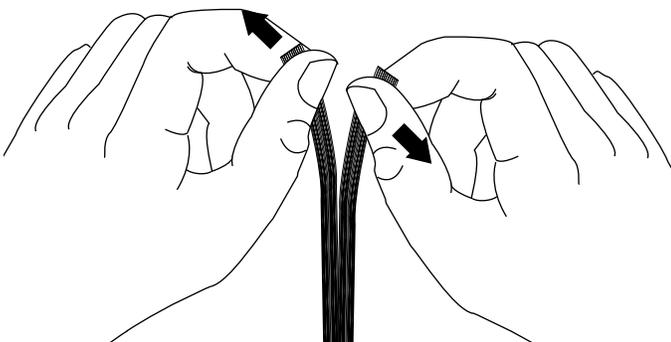


Figure 42

8.2 Corning Cable Systems recommends the use of its Ribbon Splitting Tool (p/n RST-000) for both mid-span and end-of-ribbon applications.

The RST-000 has nine positions which accommodate ribbons from 4 to 36 fibers, as indicated by the sum of the stacked numbers on the tool (e.g., 2/2 = 4-f, 12/12= 24-f, 12/24=36-f – see Figure 43).

Refer to SRP-004-098 for complete instructions for the tool.

8.3 There may be some overhanging ribbon matrix material along the edge of the 12-fiber ribbon after the larger 24-fiber or 36-fiber ribbon is separated into 12-fiber ribbon sub-units. This overhanging ribbon matrix material or “overhang” generally measures less than one fiber width and does not typically pose a problem with thermal stripping, cleaving or mass-fusion splicing of the ribbon.

If desired, this overhang can be removed or minimized for the length of ribbon that will be placed into the handler for the mass-fusion splicer. Remove the overhang by using a lint-free tissue or cloth soaked with filling compound remover or isopropyl alcohol to rub the edge of the ribbon with the overhang; Rub in one direction toward the ribbon’s free end along the ribbon’s long axis as shown in Figure 43.

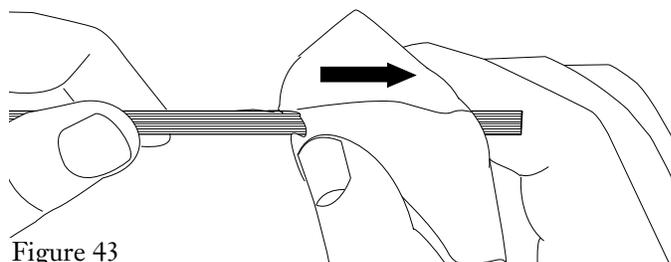


Figure 43

Mid-span Access of Ribbons

8.4 If appropriate for your installation, divide the ribbon(s) using the RST-000 tool and the instructions in Section 6 of SRP-004-098 (Figure 44).

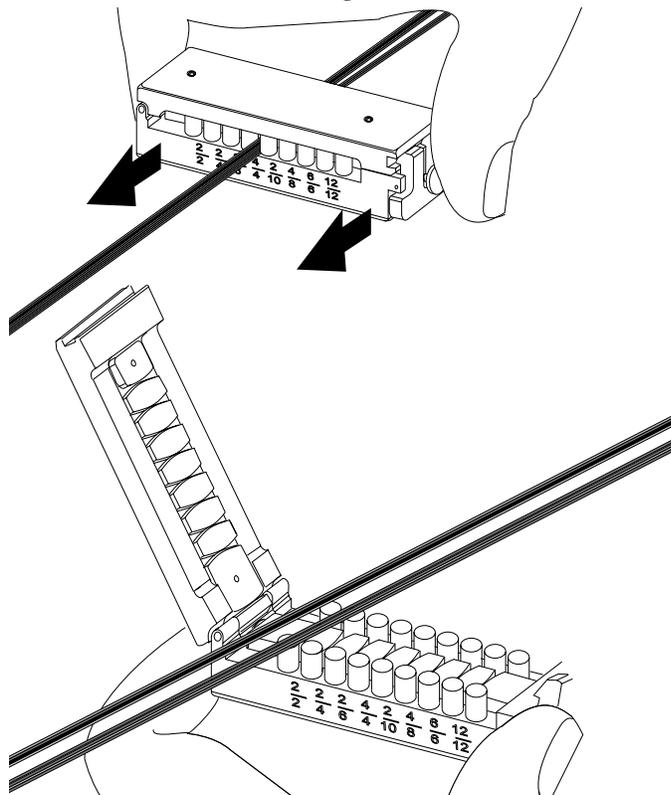


Figure 44

8.5 Determine the end of the accessed fiber(s) or ribbon to be cut by checking the system design splice plan and the feet/ meter marks printed on the cable sheath before cutting any fibers.

As shown in Figure 45, typically you will cut the fiber ribbon at the end opposite the desired point of origin.

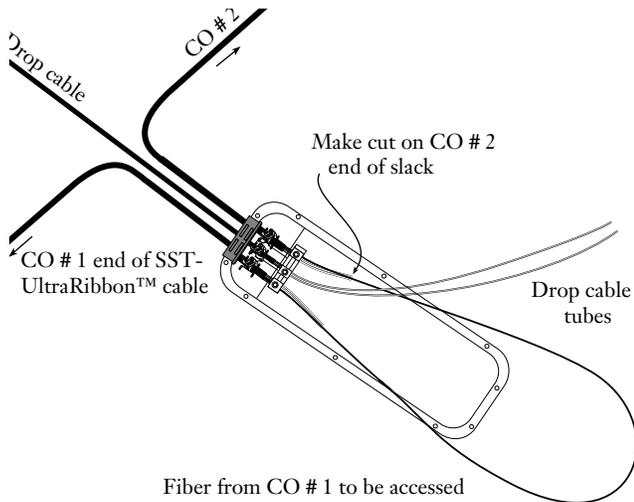


Figure 45

If an entire ribbon or section of divided ribbon can be cut, access the individual fibers by following Section 4 of SRP-004-048, *Accessing Individual Fibers in Corning Cable Systems Ribbon Fiber Optic Cables with the TKT-050 Kit*.

If individual fibers are to be accessed, follow either the **mechanical** process described in SRP-004-076, *Accessing Individual Fibers in Corning Cable Systems Optical Fiber Ribbons Using the TKT-060 Kit*, or the **chemical** process described in SRP-004-048.

8.6 Using scissors, cut the fiber(s) (or ribbon) to be accessed as close as possible to the end of the central tube (Figure 46) **USE EXTREME CARE TO CUT ONLY THE FIBER(S) TO BE ACCESSED.**

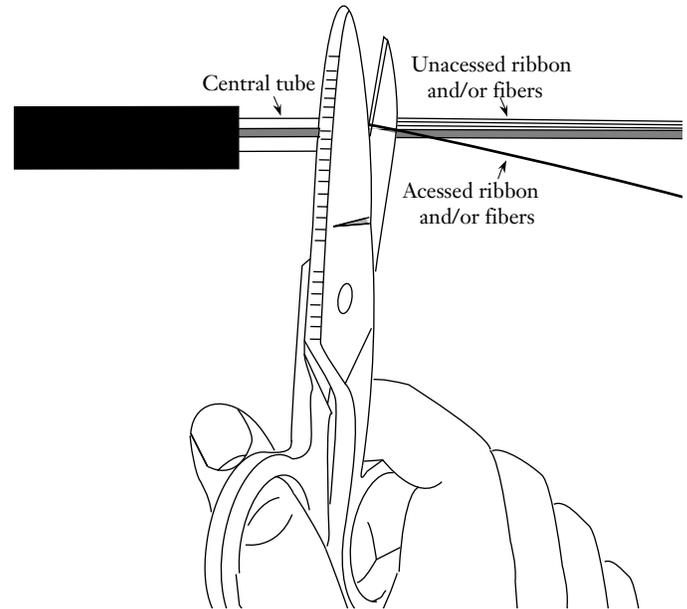


Figure 46

8.7 There may be some overhanging ribbon matrix material along the edge of the 12-fiber ribbon after the larger 24-fiber or 36-fiber ribbon is separated into 12-fiber ribbon sub-units. This this overhang can be removed or minimized by following the procedure in step 8.3.

8.8 Follow the closure or hardware manufacturer's instructions for central tube mounting and routing. Splice the fibers or ribbons according to the system design plan.

8.9 Complete the hardware or closure assembly according to its manufacturer's instructions.

*Special Note:
Fiber Optic
Training
Programs*



Corning Cable Systems offers comprehensive, integrated training programs. Courses are structured for: Telephony, CATV, LAN, Intelligent Transportation Systems and Power Utilities.

For information on Engineering Services Training call: 800-743-2671.

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