

Sheath Removal and Mid-Span Access of Armored SST-Ribbon™ Gel-Free Cable

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1. General

1.1 This procedure describes installation and handling practices for Corning Cable Systems armored SST-Ribbon™ Gel-Free cables. Both conventional sheath removal and mid-span access procedures are outlined in this document.

1.2 The cable illustrated in this procedure is an armored cable manufactured with a central buffer tube. Two steel rods located beneath the sheath, along with the armor, provide tensile strength for the cable (Figure 1).

1.3 This issue has an updated logotype and minor text corrections.

2. Precautions

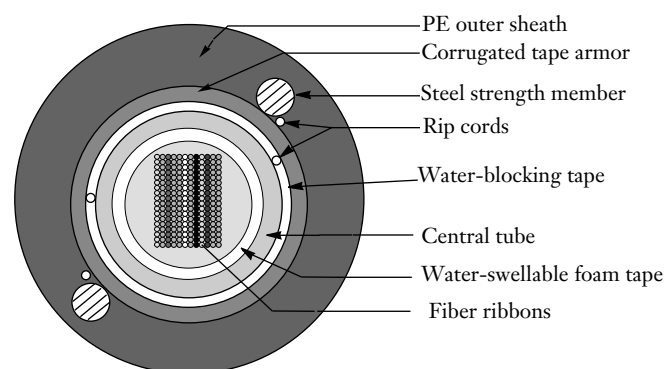
2.1 General Precautions



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



CAUTION: The wearing of *safety gloves* to protect your hands from accidental injury when using sharp-bladed tools or working near exposed steel 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.



Armored SST-Ribbon™ Gel-Free Cable

Figure 1

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.

2.3 Buffer Tube Handling Precautions



CAUTION: Central tubes are sensitive to excessive pulling, bending and crushing forces. Great care should be used when handling central tubes. 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.

3. Tools and Materials

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

- Utility knife with hook-blade *
- Scissors *
- Seam ripper*
- Vinyl tape *
- Cable tie tool and cable ties *
- Pliers
- Side cutters*
- Paper towels or cloth
- Tape measure *
- Permanent marking pen *
- Ideal® model 45-164 ($\frac{1}{4}$ to $\frac{9}{16}$ in O.D.) coaxial cable stripper
- Small slotted screwdriver *
- Number markers *
- Cable sheath knife
- Needle nose pliers
- Corning Cable Systems Universal Access Tool III (UAT III) and SRP-004-074.
- Ribbon Splitting Tool (RST-000) and SRP-004-098

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

Additional items required for grounding:

- 3M® grounding clips
- 10 mm wrench

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).

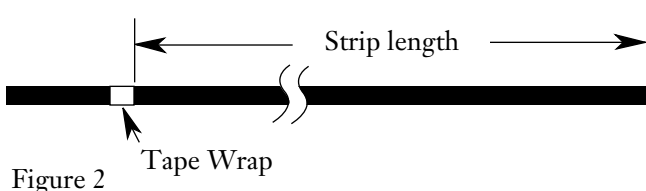


Figure 2

4.2 Taking care not to cut or flex the armor, use the hook blade knife to make a *shallow* ring cut through the black outer sheath at the tape mark (Figure 3).

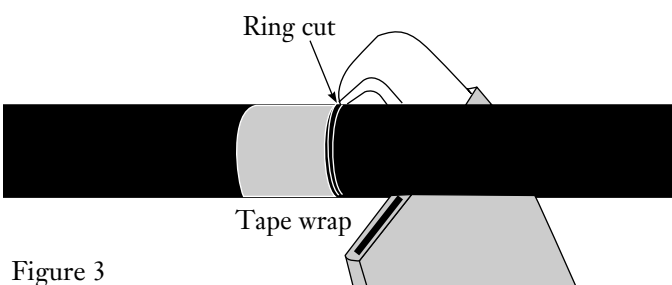


Figure 3

4.3 Starting at the end of the cable, use the cable sheath knife to shave off 15 cm (6 in.) of the outer sheath directly over the steel rods. Shave the sheath until both of the steel rods are visible (Figure 4).

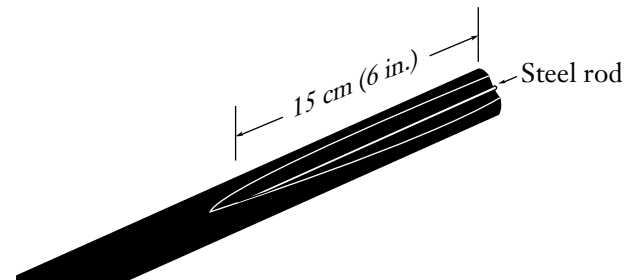


Figure 4

4.4 Using needle nose pliers, bend the steel rods away from the cable (Figure 5). **TAKE CARE TO AVOID ACCIDENTAL INJURY FROM CONTACT WITH THE ENDS OF THE RODS.**

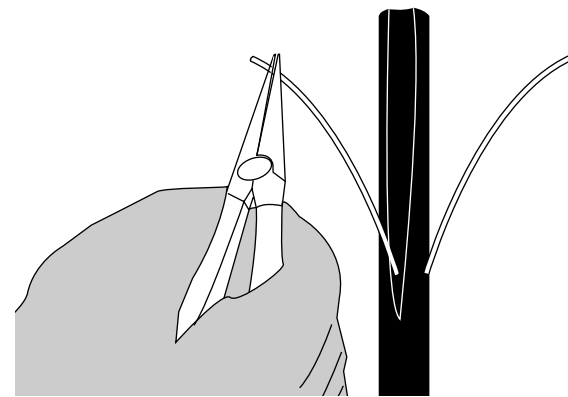


Figure 5

4.5 Locate the rip cord under each steel rod. The rip cord will be to the left or right of the steel rods.

4.6 Using the shaft of a screwdriver as a handle, pull one rip cord at a time through the sheath to the wrap of tape (Figure 6). *Be sure to pull the rip cord through the sheath on the same side of the steel rod as the cord is located.*

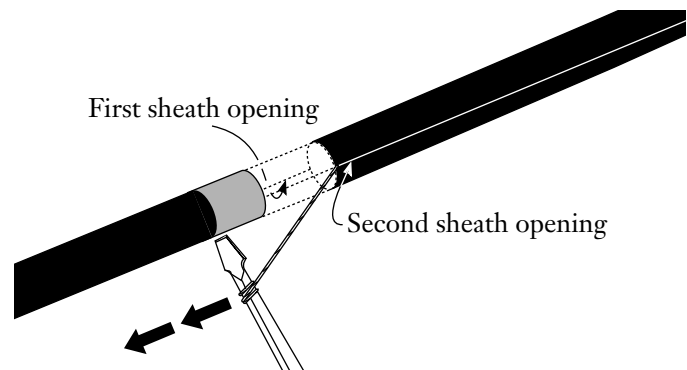


Figure 6

4.7 Cut the rip cords flush at the tape wrap with scissors.

4.8 Pull the steel rods out and away from the sheath through the openings made by the rip cords.

4.9 Use side cutters to cut the steel rods 12.7 cm (5 in.) from the tape wrap (Figure 7). Some hardware may require a greater length for proper strain relief. **ALWAYS WEAR SAFETY GLASSES WHEN CUTTING THE STEEL RODS.**

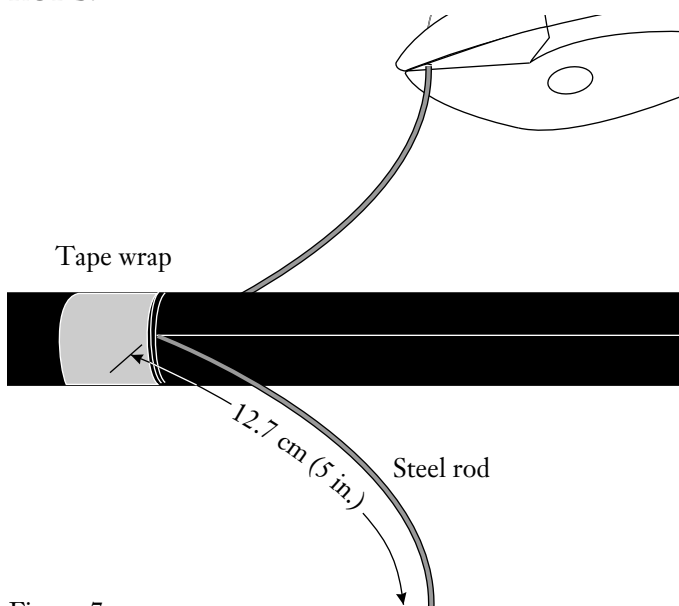


Figure 7

4.10 Use the hook blade knife to make a ring cut through the outer sheath 10 cm (4 in.) from the end of the cable (Figure 8).

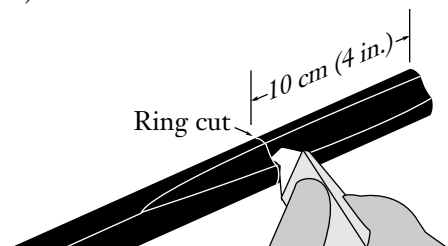


Figure 8

4.11 At the ring cut, carefully flex the cable to break the armor.

4.12 Slide the end section of sheath and armor off the cable and discard (Figure 9).

You may have to cut the water blocking tape at the ring cut in order for the sheath to slide off.

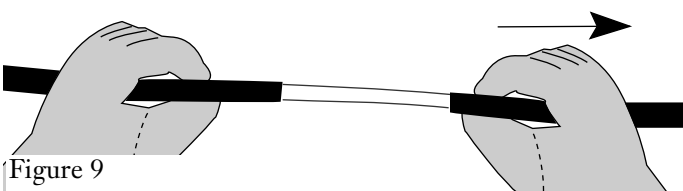


Figure 9

4.13 Locate the inner rip cords. Use the hook blade knife to make starting notches in the cable sheath for each rip cord (Figure 10).

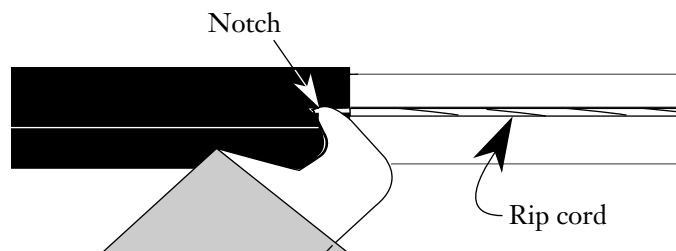


Figure 10

4.14 Using the shaft of a screwdriver as a handle, pull the rip cord through the armor and outer sheath to 5 cm (2 in.) past the tape wrap on the outer sheath (Figure 11). The extra 5 cm (2 in.) of split sheath will permit the ground clamp to slide easily under the armor in a later step.



Caution: Take care to avoid injury on the steel rods when pulling the rip cord.

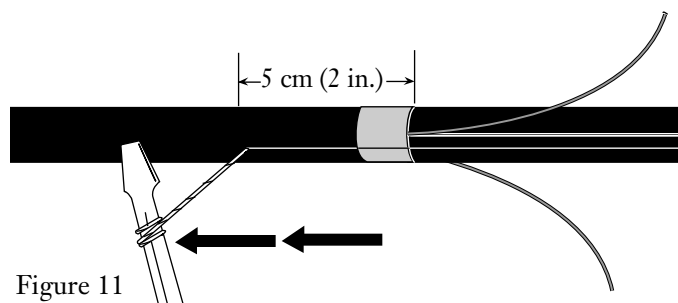


Figure 11

4.15 Cut the inner rip cord flush with the sheath with scissors.

4.16 Peel off the split sections of armor and sheath down to the wrap of tape.

4.17 Carefully flex the sections of armor and sheath and remove them. Side cutters may be helpful in removal (Figure 12).

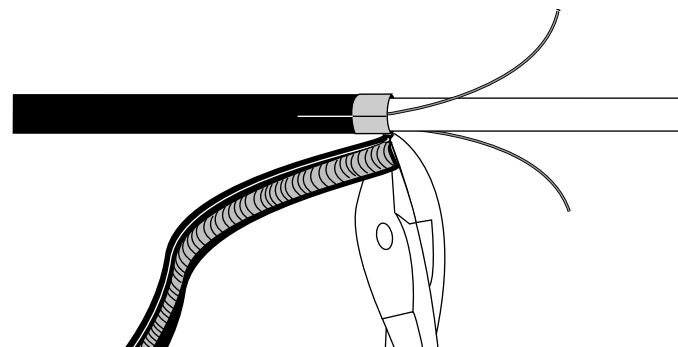


Figure 12

4.18 Cut away the water-blocking tape flush at the tape mark with scissors (Figure 13).

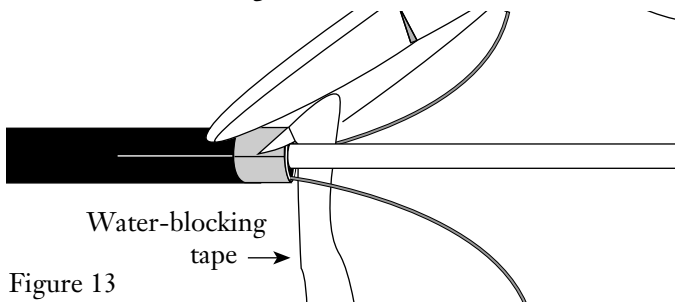


Figure 13

4.19 Remove the tape wrap from the end of the cable.

5. Grounding

5.1 To ground the armor, carefully pry up the armor and sheath so that the baseplate of the grounding clamp can be slid under the armor.

5.2 Slide the baseplate under the armor. Be careful not to damage the central tube. Place the top plate over the baseplate and tighten down with the 10 mm locknut (Figure 14). A few light taps on the top plate may help seat the teeth of the grounding clamp.

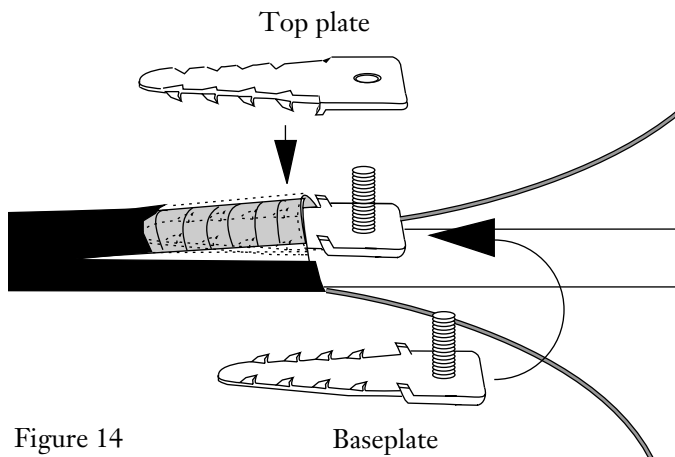


Figure 14

5.3 Place the grounding braid on top of the lock nut and secure with a second lock nut.

5.4 Cover the grounding clamp and split portion of the sheath with vinyl tape as shown in Figure 15.

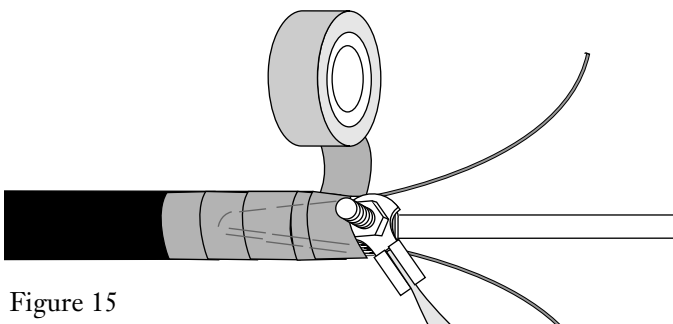


Figure 15

6. Accessing Cable End Central Tube

6.1 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 stripper, make sure that it is properly adjusted. Use a small slotted screwdriver to adjust *one* of the blades on the side of the central tube cutter so that it seats against the lower jaw but does not force the jaw open (Figure 16).

Leave the blades on the front and other side of the tool fully retracted so that they do not extend into the grooves of the lower jaw.

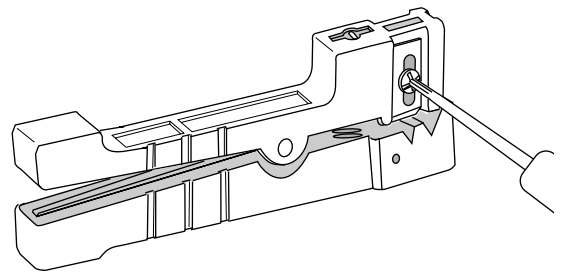


Figure 16

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:

- Open the tool by squeezing its handles together and place the stripper's blade on the central tube at the desired scoring point.
- Hold the central tube steady with one hand to prevent it from twisting.
- Use your other hand to rotate the tool around the central tube two to three complete turns to score it (Figure 17). Remove the tool from the central tube.

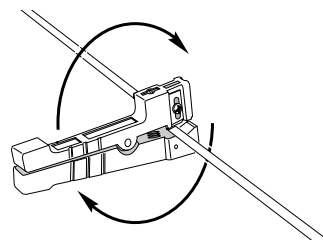


Figure 17

*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 may result.*

- d) Carefully flex the tube to break it at the score point. The break should be clean and free of rough edges (Figure 18).

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.

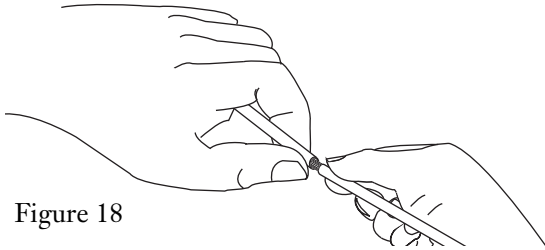


Figure 18

- e) Slide the severed tube off the fibers. USE CARE TO AVOID DAMAGING THE FIBERS.

- 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 (Figure 19). *The length of exposed central tube may vary depending on the hardware being used.*

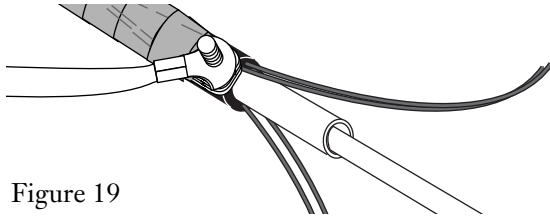


Figure 19

- 6.3** To remove the water-swappable tape from the ribbons:

- Find the overlap opening for the water-swappable tape.
- Carefully separate the water-swappable tape from the ribbons (see Figure 20).
- Use scissors to carefully cut the tape at the buffer tube, making sure not to cut any ribbons (Figure 20).

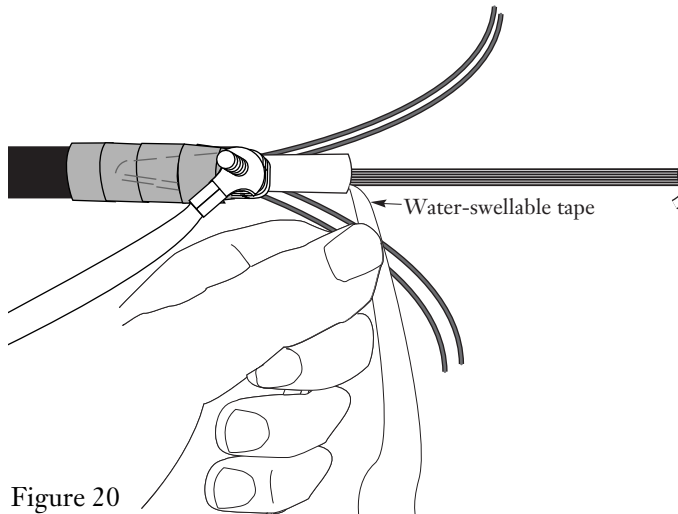


Figure 20

- 6.4** If necessary, wipe the ribbons with a dry, lint free cloth or tissue (Figure 21).

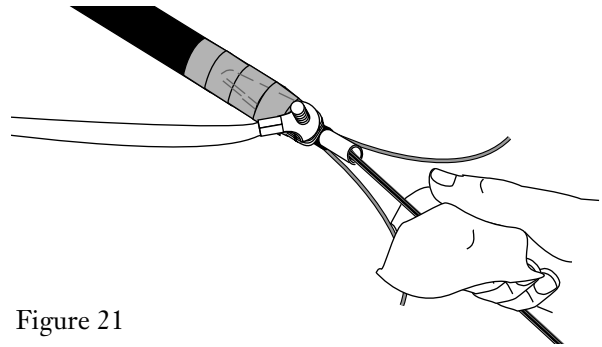


Figure 21

- 6.5** Route and secure the cable to the hardware being installed.

Accessing Ribbon Fibers

- 6.6** Secure the ribbons within the hardware in accordance with the hardware manufacturer's instructions.

- 6.7** If appropriate for your installation, divide the ribbon(s) using the RST-000 tool as described in SRP-004-098 (Figure 22).

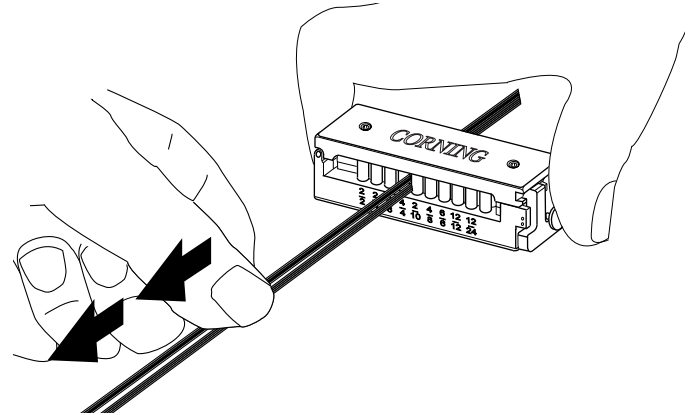


Figure 22

- 6.8** To access to individual fibers in a ribbon, refer to Section 8 in SRP-004-098, *Corning Cable Systems Ribbon Splitting Tool (RST-000) Instructions*.

- 6.9** Splice the fibers according to the system design plan.

- 6.10** Follow the closure or hardware manufacturer's instructions for central tube mounting and routing. Complete the hardware or closure assembly according to its manufacturer's instructions.

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, a 1.25 cm (0.5 in.) OD cable, $60 \times 1.25 \text{ cm} = 75 \text{ cm} + 105 \text{ cm} = 180 \text{ cm (72 in.)}$ 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 a buffer tube.

7.2 Prepare the tie-in (drop) cable according to 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 23).

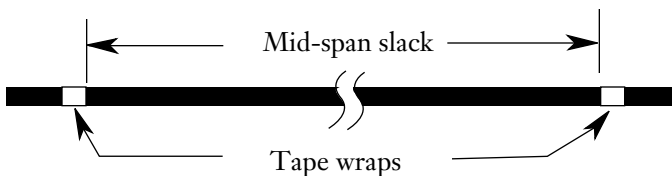


Figure 23

7.4 Taking care not to cut or flex the armor, use the hook blade knife to make a shallow ring cut through *only* the black outer sheath at both tape marks (Figure 24).

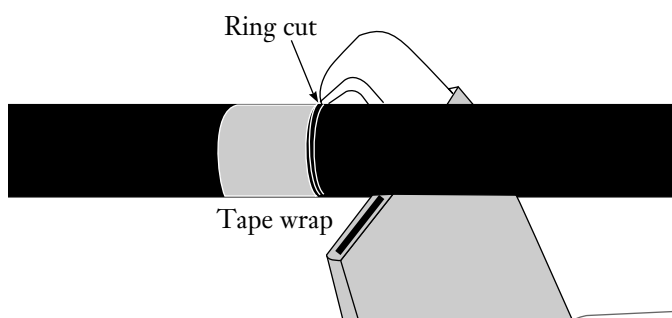


Figure 24

7.5 Starting at one tape mark, use the cable sheath knife to shave off 25 cm (10 in.) of outer sheath over both steel rods. Shave the sheath until both steel rods are visible (Figure 25).

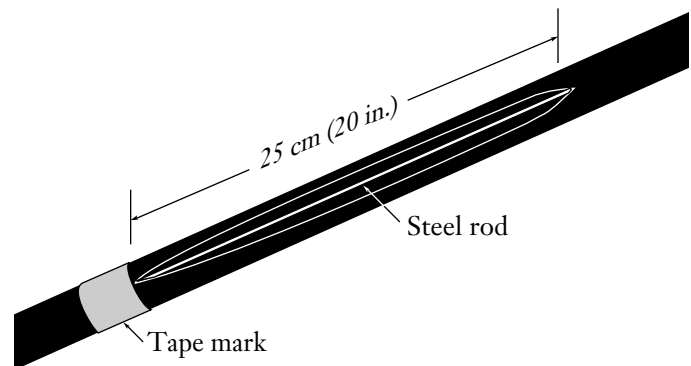


Figure 25

7.6 Using needle nose pliers, bend the embedded steel rods away from the cable sheath (Figure 26).

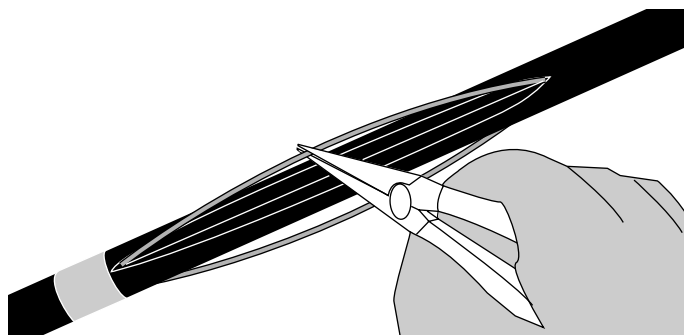


Figure 26



WARNING: Use extreme care in performing the remaining steps to avoid injury from the exposed steel rods. *The use of safety gloves and safety glasses is strongly recommended.* ALWAYS WEAR SAFETY GLASSES WHEN CUTTING THE STEEL RODS. Failure to do so may result in serious personal injury.

7.7 Use side cutters to cut the steel rods 12.7 cm (5 in.) from the tape wrap (Figure 27).

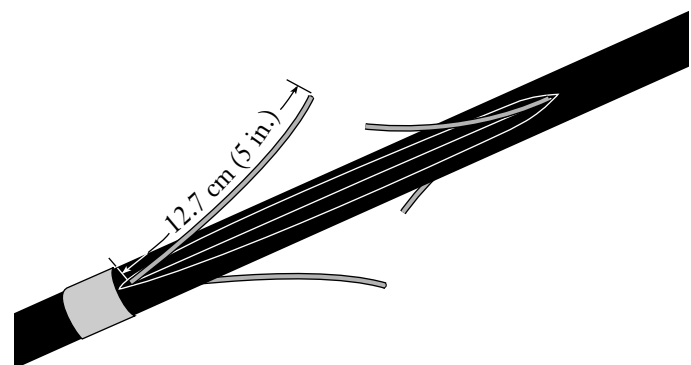


Figure 27

7.8 Locate the rip cords under the steel rods. Cut the outer rip cords near the tape mark (Figure 28).

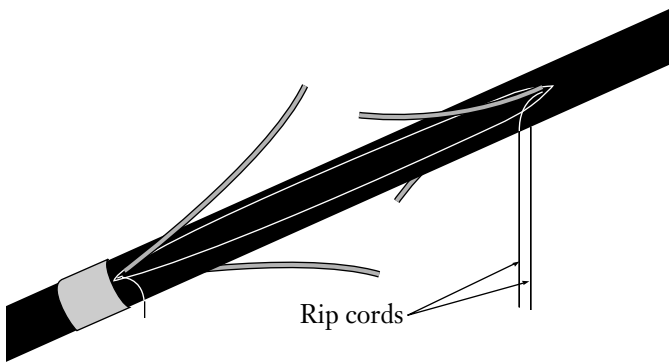


Figure 28

7.9 Using the shaft of a screwdriver as a handle, pull one rip cord at a time through the sheath to the opposite wrap of tape (Figure 29).

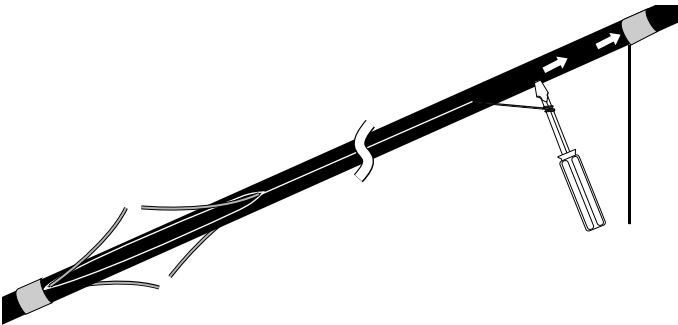


Figure 29

7.10 Cut the rip cords flush at the tape wrap with scissors.

7.11 Pull the steel rods out and away from the sheath through the openings made by the rip cords.

7.12 Cut the steel rods 13 cm (5 in.) from the tape wrap (Figure 30). **ALWAYS WEAR SAFETY GLASSES WHEN CUTTING THE STEEL RODS.**

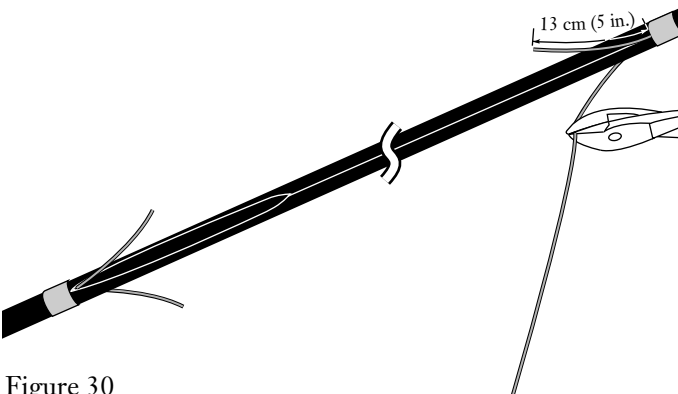


Figure 30

7.13 Use the hook blade knife to make a ring cut through the black outer sheath 15 cm (6 in.) from the other tape mark (Figure 31).

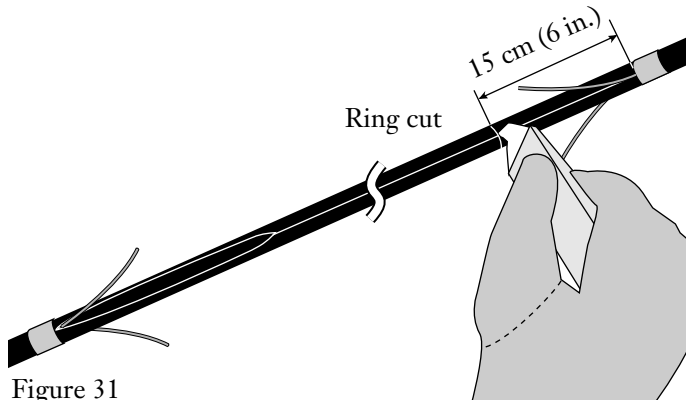


Figure 31

7.14 At the ring cut made in step 7.13, carefully flex the cable to break the armor. *Do not violate the minimum bend radius of the cable during this step.*

7.15 Position the blade of the knife in the new ring cut so that it can travel down the cable between the armor and the buffer tube towards the ring cut at the tape mark.

Hold the knife at a 45° angle to the cable to prevent the blade from slipping out of the sheath. TAKE CARE TO AVOID ACCIDENTAL INJURY FROM CONTACT WITH THE ENDS OF THE RODS.

Slit the armor and outer jacket of the cable 5 cm (2 in.) past the tape mark by holding the arm which has the knife out straight and pulling the cable "through" the hook blade with your other hand (Figure 32).

The extra 5 cm (2 in.) of split sheath will permit the ground clamp to fit easily under the armor in a later step.

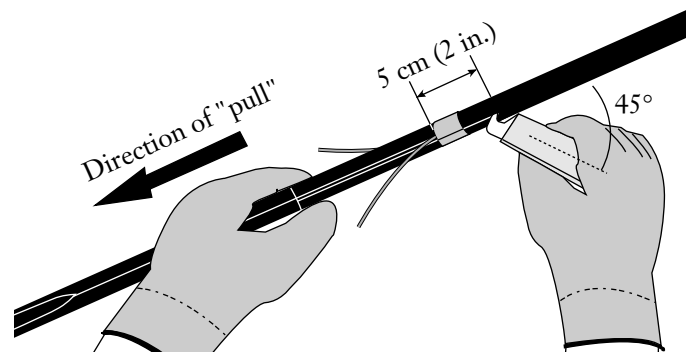


Figure 32

7.16 Repeat step 7.15 on the opposite side of the cable (180°) to make a second 15 cm (6 in.) slit.

7.17 Remove the two split sections of sheath and armor. Side cutters may be helpful in removal (Figure 33).

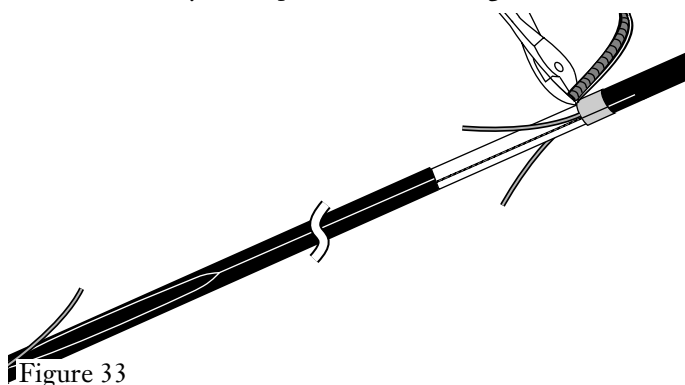


Figure 33

7.18 Cut the two inner rip cords near the tape mark.

7.19 Using the shaft of a screwdriver as a handle, pull one rip cord at a time through the sheath and armor 5 cm (2 in.) past the opposite wrap of tape on the outer sheath (Figure 34). (The extra 5 cm (2 in.) of split sheath will permit the ground clamp to fit easily under the armor in a later step).

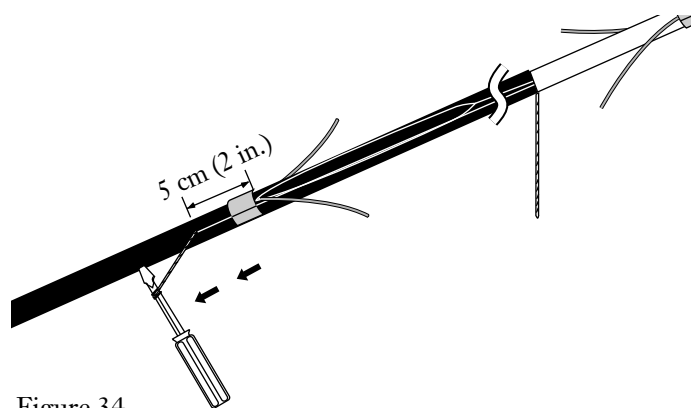


Figure 34

7.20 Cut the rip cords flush with the sheath with scissors.

7.21 Carefully peel off the split sections of armor and sheath down to the tape mark.

7.22 Carefully flex the sections of armor and sheath and remove them. Side cutters may be helpful in removal (Figure 35).

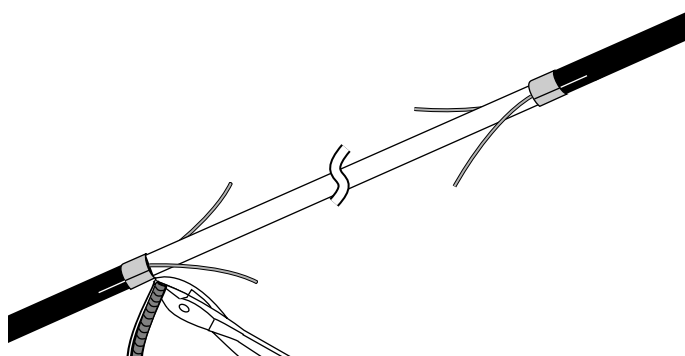


Figure 35

7.23 Cut away the water-blocking tape flush at the tape marks with scissors (Figure 36).

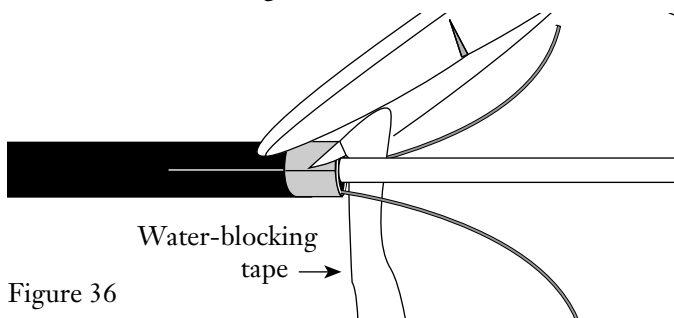


Figure 36

7.24 Ground the armor by apply grounding clips on both exposed ends as described in section 5 (Figure 37).

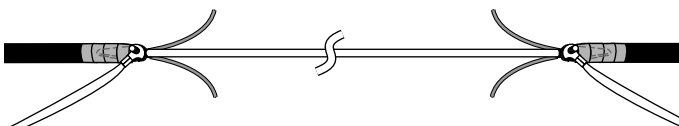


Figure 37

7.25 The Corning Cable Systems Universal Access Tool III is designed to access the fibers of a single-tube cable in a mid-span location where slack is present (Figure 38).

Use the UAT-3 to remove the buffer tube in accordance with the the manual provided with the tool, SRP-004-074, *Universal Access Tool III Operating Instructions*.

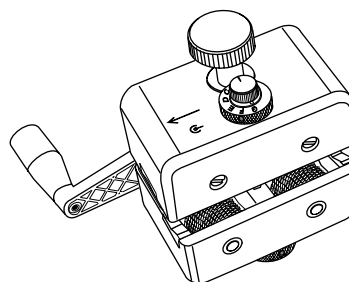


Figure 38

7.26 Place a mark 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). *This length may vary depending on the hardware being used.*

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

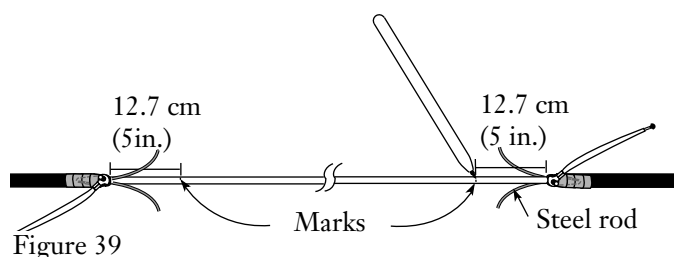


Figure 39

7.27 Follow the UAT instructions for accessing the ribbons. After using the UAT III the final result should resemble (Figure 40).

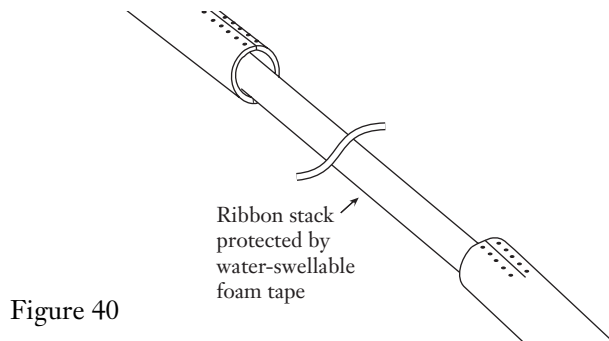


Figure 40

7.28 To remove the water-swellaable tape from the ribbons:

- Find the overlap opening for the water-swellaable tape.
- Carefully separate the water-swellaable tape from the ribbons (see Figure 41).
- Use scissors to carefully cut the tape at the buffer tube ends, making sure not to cut any ribbons (Figure 41).

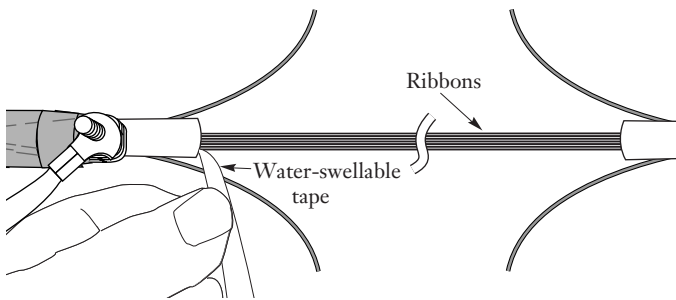


Figure 41

7.29 If necessary, wipe the ribbons with a dry, lint free cloth or tissue.

Accessing Ribbon Fibers

7.30 If appropriate for your installation, divide the ribbon(s) using the Ribbon Splitting Tool (RST-000) (Figure 42).

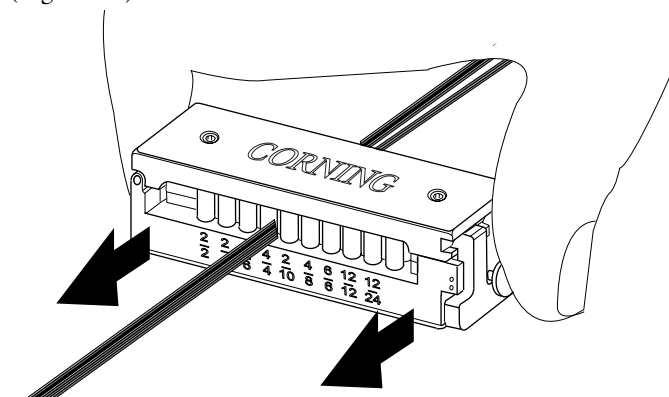


Figure 42

7.31 If an entire ribbon or section of divided ribbon can be cut at the mid-span point, refer to Section 7 in SRP-004-098, *Corning Cable Systems Ribbon Splitting Tool (RST-000) Instructions*. If individual fibers are to be accessed at the mid-span-point, follow Section 8 of the same procedure, SRP-004-098.

7.32 Determine the end of the accessed fiber(s) 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 43, typically the fiber ribbon is cut at the end opposite the desired point of origin.

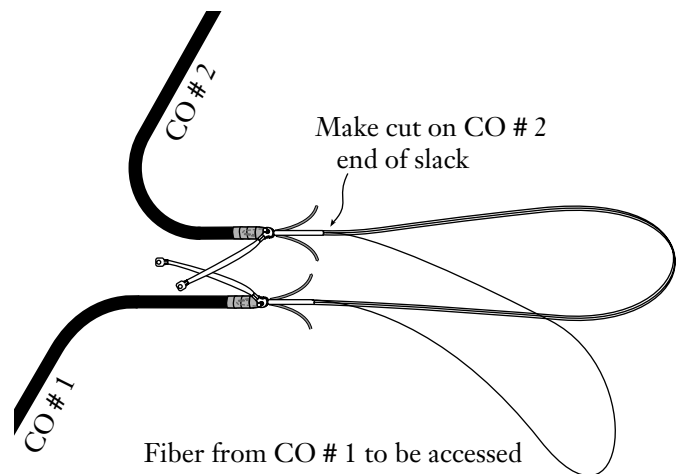


Figure 43

7.33 Using scissors, cut the fiber(s) to be accessed as close as possible to the appropriate end of the central tube (Figure 44). **USE EXTREME CARE TO CUT ONLY THE FIBER(S) TO BE ACCESSED.**

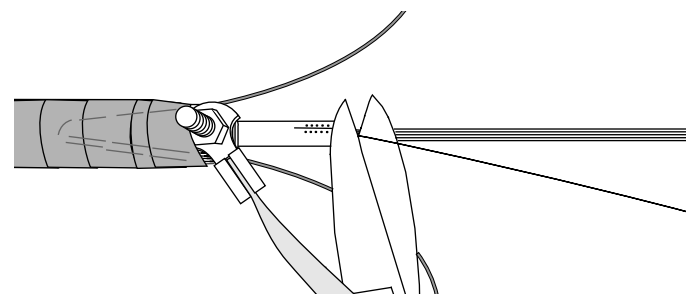


Figure 44

7.34 Follow the closure or hardware manufacturer's instructions for central tube mounting and routing.

7.35 Splice the fibers or according to the system design plan.

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

*Special Note:
Fiber Optic
Training
Programs*

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