

Sheath Removal of Armored and Non-Armored FREEDM[®] Riser-rated Fiber Optic Cables

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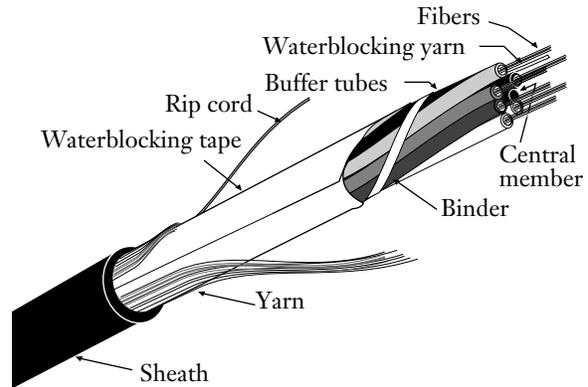


Figure 1

1. General

1.1 This procedure describes general sheath removal methods for armored and non-armored versions of Corning Cable Systems FREEDM cables.

1.2 FREEDM cable is a rugged fiber optic cable featuring buffer tubes and a dielectric central member protected by a UV-resistant sheath, water-blocking tape, and yarn (Figure 1). The cable is OFNR rated.

1.3 This issue reflects the introduction of Gel-free buffer tubes.

2. Precautions

2.1 General Precautions

CAUTION: *The wearing of **safety gloves** to protect your hands from accidental injury when using sharp-bladed tools is strongly recommended. Use extreme care when the utility knife's blade is exposed. Dispose of used blades properly.*

WARNING: *The wearing of **safety glasses** to protect the eyes from accidental injury is strongly recommended when cutting central members and fiber.*

2.2 Cable Handling Precautions

CAUTION: *Fiber optic cable is sensitive to excessive pulling, bending and crushing forces. Consult the cable specification sheet for the cable you are installing. Do not bend cable more sharply than the minimum recommended 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- the cable may have to be replaced.*

2.3 Chemical Precautions

Fiber-Clean Wipes
WARNING: *Contains hydrocarbons. Apply in rooms having normal room ventilation. For prolonged and/or repeated use, gloves are recommended. Avoid eye contact. Keep away from open flames and ignition sources. If ingested, do not induce vomiting. Consult a physician. If contact with eyes, wash eyes with water for 15 minutes.*

Sealing Paste or Tapes
CAUTION: *Sealing paste or sealing tapes required by some cable closures may have an adverse effect on PVC cable sheathes. Corning cable systems recommends the application of Mylar[®] polyester tape over the appropriate area of FREEDM Riser cable sheath prior to application of sealing paste or tape.*

3. Tools and Materials

3.1 This procedure requires the following tools:

- Utility knife with hook blade
- Scissors
- Diagonal cutting pliers
- Vinyl tape
- Seam ripper
- Tape measure
- Permanent marking pen
- Ideal® coaxial cable stripper
- Fiber-Clean® cleaning wipes if filling compound is present
- Lint-free tissues
- Small slotted screwdriver

All of the items above are contained in the Corning Cable Systems Sheath Removal Tool Kit (TKT-005), or in the Fusion Splicing Tool Kit (M67-003).

- Grounding hardware approved by your company

4. Cable Preparation

4.1 Refer to the documentation for the hardware in which you are installing the cable for the required sheath removal lengths.

4.2 Mark the cable at the appropriate distance from the cable end with a wrap of tape (Figure 2).

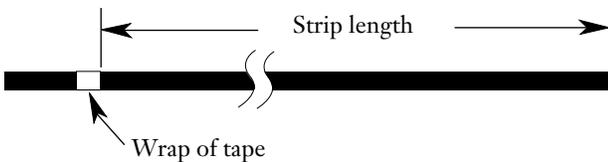


Figure 2

For armored FREEDM cables: position another wrap of tape 2.5 cm (1 in.) from "Position 1" for later placement of a grounding clip ("Position 1A" in Figure 3).

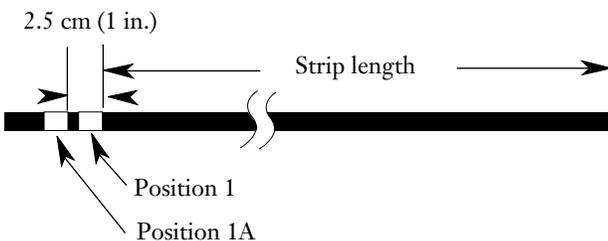


Figure 3

Note: If you are installing armored FREEDM cable, proceed to Section 5. For non-armored cables, skip to Section 6.

5. Sheath, Armor Removal, and Grounding of Armored FREEDM Cable

5.1 Using a hook blade knife, make a ring cut through the outer sheath of the cable at the tape mark at "Position 1." Use care to avoid damaging the inner sheath (Figure 4).

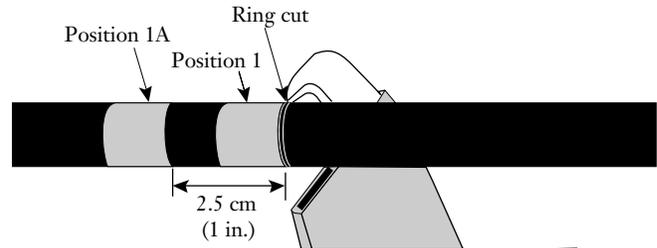


Figure 4

5.2 Gently flex the cable at the cut to break the armor. DO NOT violate the minimum bend radius of the cable during this step.

5.3 Use a hook blade to ring cut the outer sheath 15 cm (6 in) from the end of the cable.

5.4 Gently bend the cable at this second ring cut to break the armor (Figure 5). DO NOT violate the minimum bend radius of the cable during this step.

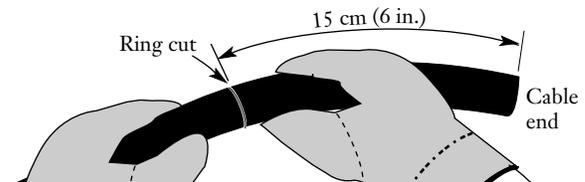


Figure 5

5.5 Position the blade of the hook blade knife at the ring cut so that it can travel down the cable between the armor and the inner sheath towards the cable end.

Hold the 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 6).

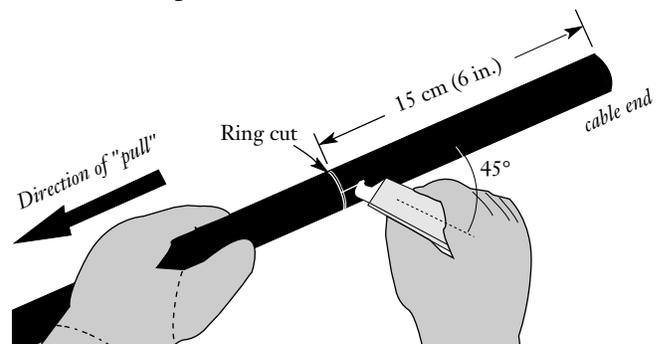


Figure 6

5.6 Peel the 15 cm (6 in.) section of sheath and armor from the end of the cable – use care during this step to avoid damaging the cable core (Figure 7).

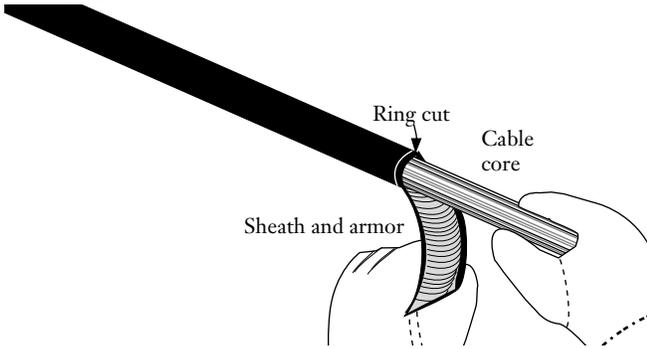


Figure 7

5.7 Break off the 15-cm section of sheath and armor at the ring cut

5.8 Locate the two rip cords. Using the hook blade, cut starting notches in the cable sheath (Figure 8).

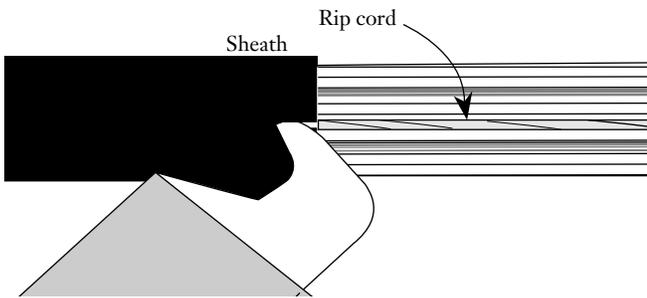


Figure 8

5.9 Wrap the rip cord around the shaft of a screwdriver, short section of scrap cable, or other object which can serve as a handle.

5.10 Pull the rip cord through the sheath to the tape mark at Position 1A to accommodate application of grounding hardware on the armor (Figure 9).

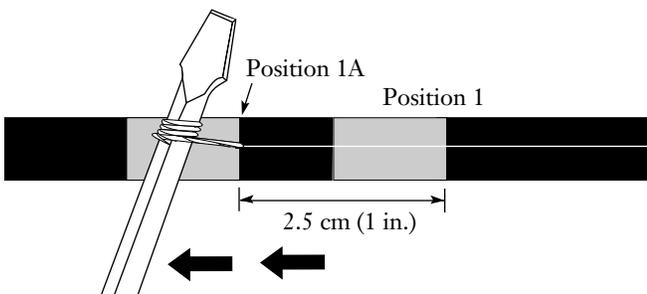


Figure 9

5.11 Repeat steps 5.9 and 5.10 with the remaining rip cord.

5.12 Cut the rip cords flush at the tape mark with scissors.

5.13 Starting at the end of the cable, pull (“banana peel”) the sheath and armor back over and away from the cable end, back to the Position 1 ring cut (Figure 10).

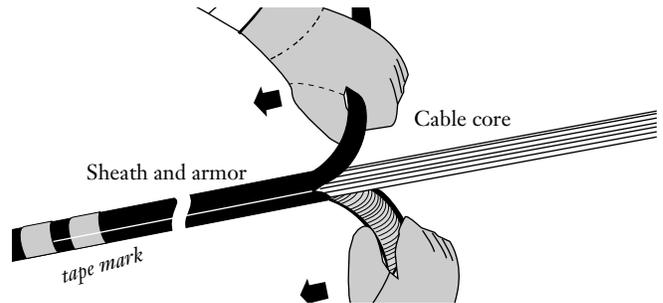


Figure 10

5.14 Break off the split sheath and armor at the Position 1 ring cut (Figure 11). Remove the tape wraps.

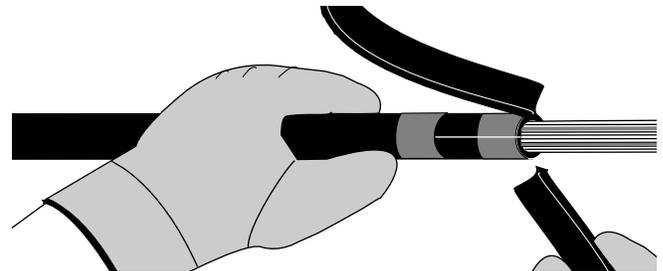


Figure 11

Grounding the Armor

5.15 Install the recommended grounding clamp and approved grounding braids or wires to the cable shield and wrap with vinyl tape.

5.16 To ground the armor with an alligator clip:

- Carefully pry up the armor and sheath so that the base plate of the grounding clamp can be slid under the armor.
- Slide the base plate under the armor. Be careful not to damage the buffer tubes. Place the top plate over the base plate and tighten down with its lock nut (Figure 12). A few light taps on the top plate may help seat the teeth of the grounding clamp.

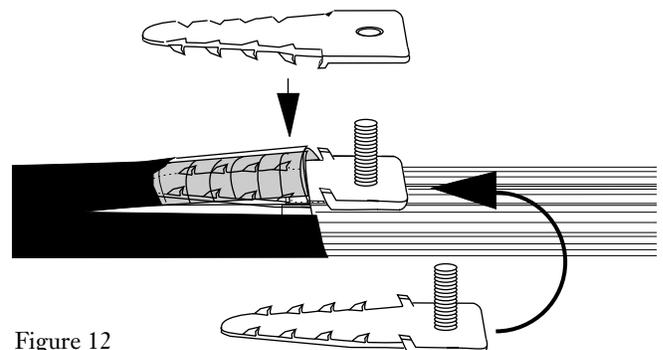


Figure 12

- c) Place the grounding braid on top of the lock nut and secure with a second lock nut.
- d) Cover the grounding clamp and split portion of the sheath with vinyl tape (Figure 13).

Skip to section 7.

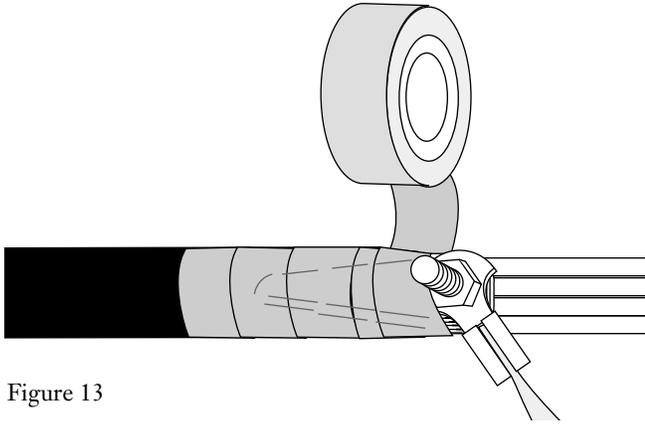


Figure 13

6. Standard FREEDM Cable Sheath Removal

6.1 Use the hook blade to carefully make a ring cut 15 cm (6 in.) from the end of the sheath (Figure 14) – Use care to avoid damaging the buffer tubes.

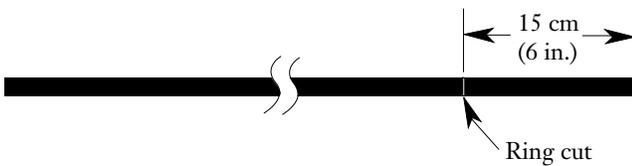


Figure 14

6.2 Slide the 15 cm (6 in.) section of outer sheath off the end of the cable – use care during this step to avoid damaging the buffer tubes (Figure 15).

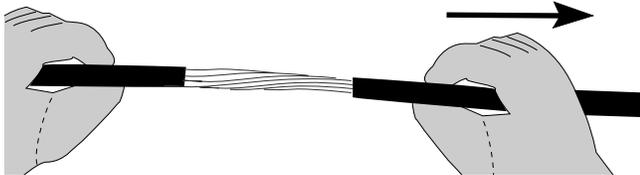


Figure 15

6.3 Locate and separate the rip cord from the yarn surrounding the cable core (Figure 16).

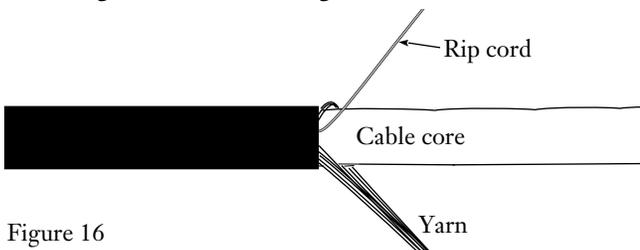


Figure 16

6.4 Wrap the rip cord around the shaft of a screwdriver, short section of scrap cable, or other object which can serve as a handle.

6.5 Pull the rip cord through the sheath to the wrap of tape (Figure 17). Cut the rip cord flush at the tape mark.

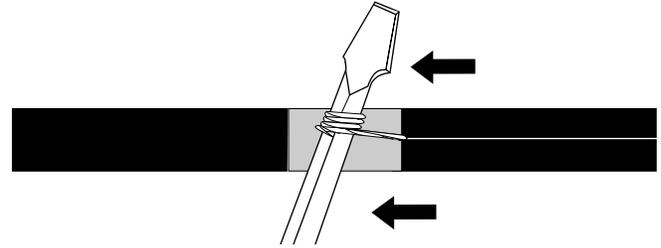


Figure 17

6.6 Carefully separate the sheath from the yarn-covered cable core back to the tape mark (Figure 18).

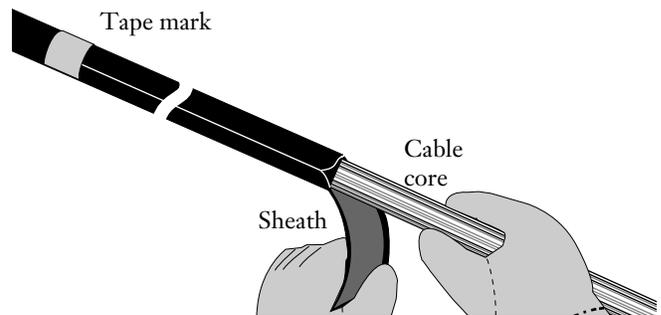


Figure 18

6.7 Trim off the sheath at the tape mark with side cutters (Figure 19) or scissors.

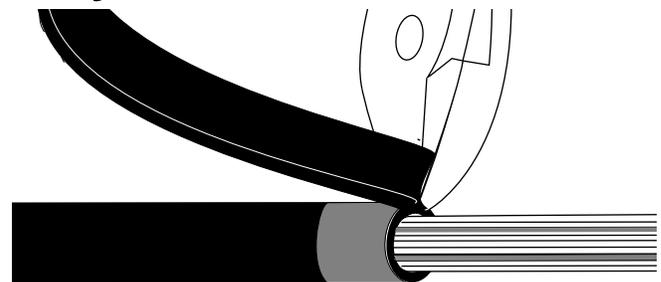


Figure 19

7. Accessing the Cable Core

7.1 Starting near the tape mark, pull the yarn away from the cable core until the core is exposed for a length of 15 cm (6 in.) (Figure 20).

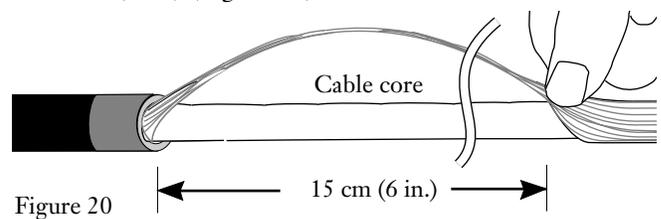


Figure 20

7.2 Cut the yarn at the 15 cm point with a pair of scissors (Figure 21). Fold the 15 cm length of yarn back out of the way.

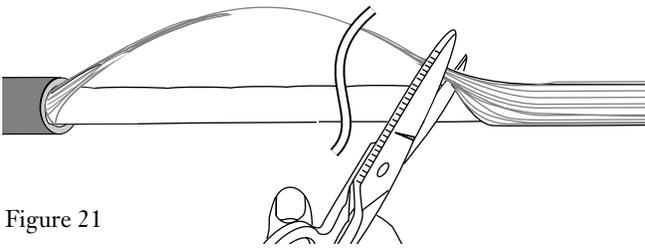


Figure 21

7.3 Starting at the cut point, slide the yarn off the end of the cable (Figure 22). The yarn will bunch up, but will slide to the end of the cable.

USE CARE TO PREVENT ANY DAMAGE TO THE BUFFER TUBES.

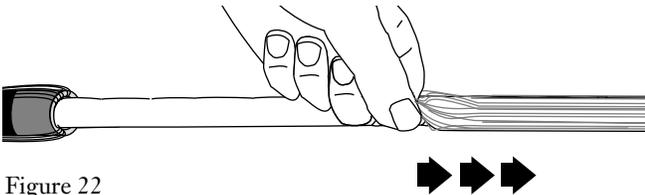


Figure 22

7.4 Separate the waterblocking tape from the cable core (Figure 23). Use scissors to cut the waterblocking tape flush with the end of the cable sheath.

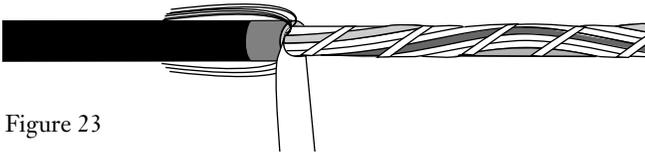


Figure 23

Note: If you are working with a cable that has additional layers of tape underneath the waterblocking tape, continue to step 7.5. If your cable does not contain additional layers of tape, skip to step 7.7.

7.5 Working near the end of the cable sheath, use the seam ripper to carefully slit the middle layer of tape at a point where the tape overlaps (Figure 24).

USE EXTREME CAUTION TO PREVENT BUFFER TUBE DAMAGE.

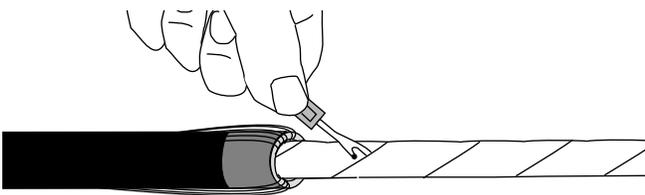


Figure 24

7.6 Tear the middle layer of tape at the point where you slit it so that it is completely severed at the end of the cable sheath. Slide the tape off the end of the cable (Figure 25).

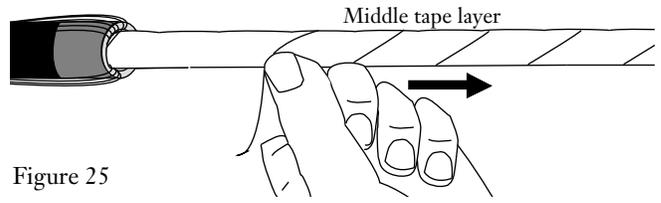


Figure 25

7.7 Separate the inner layer of waterblocking tape from the cable core (see Figure 23). Use scissors to cut the water-blocking tape flush with the end of the cable sheath.

7.8 Use the seam ripper every 5 cm (2 in.) to cut the binding tape(s) that secures the buffer tubes to the dielectric central member. **USE EXTREME CAUTION** to prevent buffer tube damage (Figure 26).

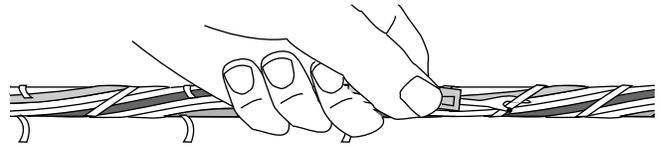


Figure 26

7.9 Starting at the tape mark, slide the binder tape off the end of the cable. **USE CARE TO PREVENT ANY DAMAGE TO THE BUFFER TUBES.**

7.10 Separate the buffer tubes as follows:

- a) Working from the end of the cable back to the tape mark, carefully unwind the buffer tubes from around the central member of the cable (Figure 27). Use the buffer tube switchback points to assist in unwinding. Be careful not to excessively bend or kink any of the buffer tubes.

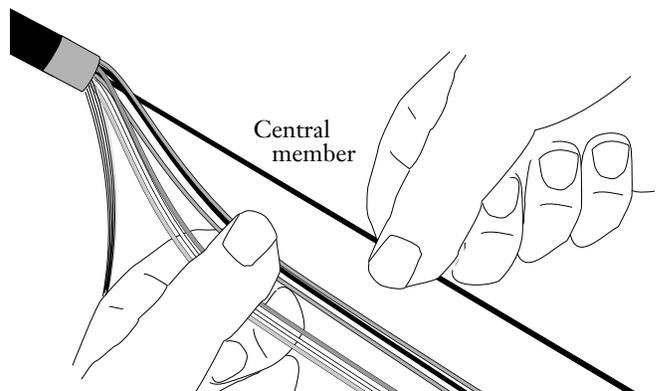


Figure 27

- b) Examine each buffer tube for damage.

If you find any damaged tubes, report the damage to your supervisor. Do not cut out a damaged section or continue the installation with damaged fibers.

- c) Using scissors, cut the waterblocking yarn flush with the end of the cable sheath.

Note: The central member length called for in this procedure should be adequate for most hardware. **During cable sheath removal, the central member is intentionally cut long for ease of installation into various types of hardware. The central member should be trimmed during its installation into the hardware strain relief. For hardware located in an outside plant environment, the exposed central member length should not exceed 6.5 cm (2.6 in) from the edge of the cable sheath. Always verify the central member length your installation requires before cutting.**



CAUTION: Use extreme care when cutting or stripping coating from central members to prevent damage to the buffer tubes. **WEAR EYE PROTECTION WHENEVER YOU CUT A CENTRAL MEMBER.** Hold the portion of the central member which will be cut from the cable to prevent it from causing injuries.

- 7.11** Use side cutters to cut the central member to a length of 15 cm (6.0 in.) (Figure 28).

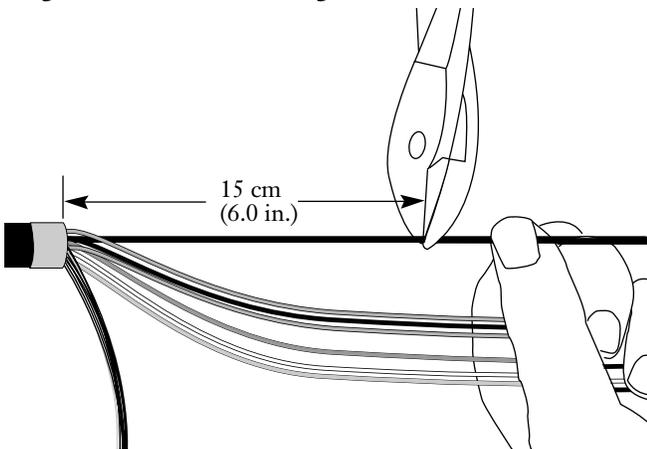


Figure 28

7.12 Route and secure the FREEDM Riser cable to the hardware being installed. Install the cable according to the closure or hardware instructions. Secure the buffer tubes within the hardware in accordance with the hardware manufacturer's instructions.

7.13 Measure and mark the required lengths of buffer tube to be removed.

8. Accessing the Optical Fibers

8.1 Use an Ideal coaxial cable stripper to score the buffer tubes. 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 screwdriver to adjust *one* of the blades on the side of the buffer tube cutter so that it seats against the lower jaw but does not force the jaw open (Figure 29). 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.

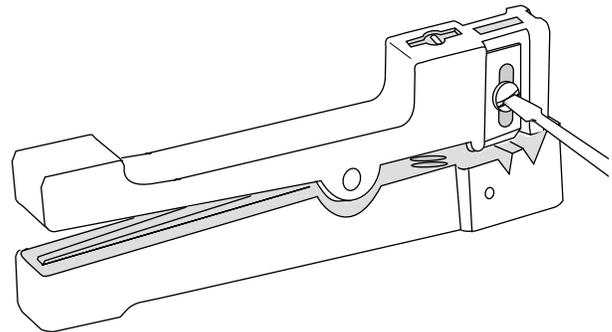


Figure 29

8.2 Use the last 2 to 3 inches (5 to 7.5 cm) at the end of the cable end 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 buffer tube:

- Open the tool by squeezing its handles together and place the stripper's blade on the buffer tube at the desired scoring point.
- Hold the buffer tube steady with one hand to prevent it from twisting.
- Use your other hand to rotate the tool around the buffer tube two to three complete turns to score it (Figure 30). Remove the tool from the buffer tube.

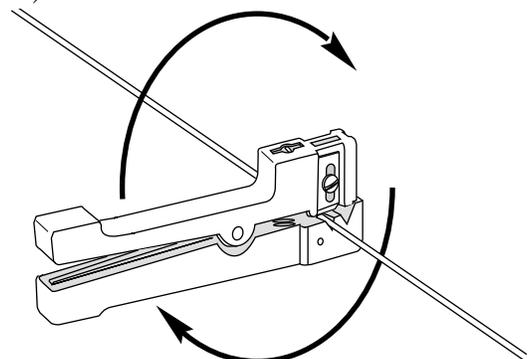


Figure 30

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 buffer 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 31).

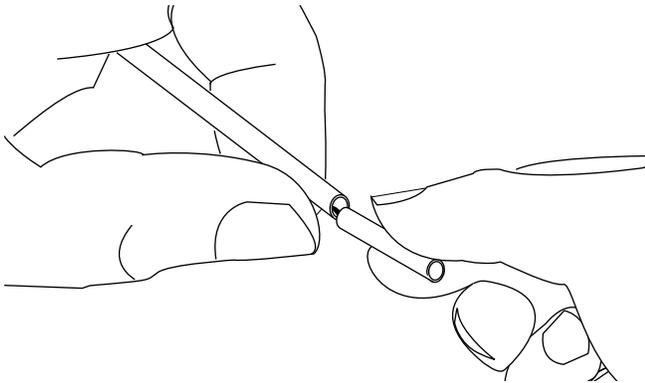


Figure 31

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 section of buffer tube off of the fibers. USE CARE TO AVOID DAMAGING THE FIBERS.

8.3 Once you have determined the number of rotations needed to score the tube, place the tool at the actual score point and carefully repeat steps 8.2 a) through e).



CAUTION: When filling compound remover or other solvents are used to clean the fibers, 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.

8.4 If the buffer tube is Gel-free, carefully cut out the water block yarns and proceed to step 9.1. If filling compound is present, use a Fiber-Clean wipe to clean the fibers. Use a dry tissue for final cleaning.

9. Hardware Placement

9.1 Route and secure the cable into the selected termination or splice hardware, following all hardware instructions and procedures. BE EXTREMELY CAREFUL NOT TO DAMAGE THE EXPOSED FIBERS DURING THIS STEP.

9.2 Terminate or splice the individual fibers according to the appropriate procedures.

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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