

Installing a Wire Mesh Pulling Grip on Multifiber Tight-Buffered Fiber Optic Cables With and Without Interlocking Armor



1. General

1.1 This procedure provides instructions for installing a wire mesh pulling grip on Corning Cable Systems multifiber tight buffered fiber optic cables that are not connectorized. Examples of such cables include:

- MIC® cables
- Unitized MIC cables
- Fan-out cables

1.2 Refer to the appropriate cable specification sheet or catalog for the maximum tensile load rating of the cable to be installed.

1.3 This issue includes grip installation on cables with interlocking armor.

2. Precautions

2.1 General Precautions



Safety Glasses

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



Safety Gloves

WARNING: *The wearing of safety gloves to protect your hands from accidental injury when using sharp-bladed tools or handling grips is strongly recommended.*

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.*

3. Tools and Materials

3.1 The following tools and materials are required to complete this procedure:

- Kellems® pulling grip
- Side cutters (diagonal cutting pliers) *
- Measuring tape *
- Utility knife with hook blade * or cable knife
- Vinyl tape, 3/4 in (19.1 mm) *
- Friction tape, 3/4 in (19.1 mm)
- Gloves
- Scissors *
- Swivel, ball-bearing type
- Hex wrench or screwdriver (to fit swivel)*
- Utility knife with hook blade

*Items included in the M67-003 Tool Kit

4. Pulling Grip Selection and Installation on Cables Without Interlocking Armor

4.1 Prior to installation, the proper size grip must be chosen for the cable to be pulled.

Grip selection is based on the outside diameter of the cable (Figures 2 and 3).

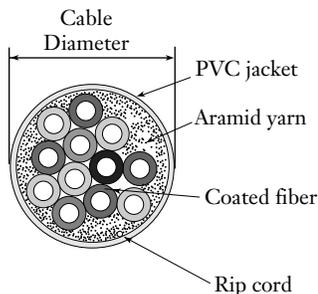


Figure 2 Non-unitized MIC Cable

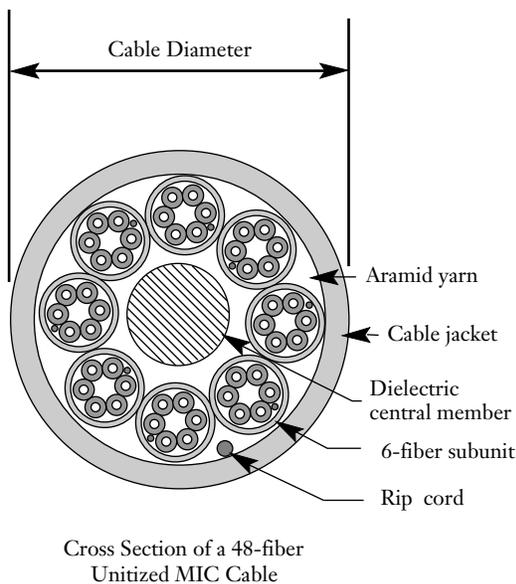


Figure 3

4.2 Generally speaking, use the smallest grip which will fit over the cable's outer jacket without excessive difficulty.

Measure the cable diameter and determine the proper grip by locating the diameter in Table 1.

Cable Diameter and Grip Size		
If cable diameter is in the range of...	Grip is Corning part number...	Kellems part number
2.5 - 5.6 mm (0.10 to 0.22 in.)	GRP-010	033-29-1182
5.3 - 9.0 mm (0.21 to 0.35 in.)	GRP-011	033-29-1182
9.1 - 12.2 mm (0.36 to 0.48 in.)	GRP-012	033-29-1184
12.3 - 15.5 mm (0.49 to 0.61 in.)	GRP-013	033-29-1185
15.6 - 18.5 mm (0.62 to 0.73 in.)	GRP-014	033-29-1186
18.6- 22.1 mm (0.74 to 0.87 in.)	GRP-015	033-29-1187
22.2 - 25.4 mm (0.88 to 1.0 in.)	GRP-016	033-29-1188

Table 1

4.3 Once the proper grip is obtained, inspect it for damage broken wires, bulges due to stress, rust, etc. Grasp the pulling eye in one hand (gloves are recommended) and smooth out the mesh with the other, tightening the wires. Figure 4 illustrates the technique, which is critical when reusing grips.

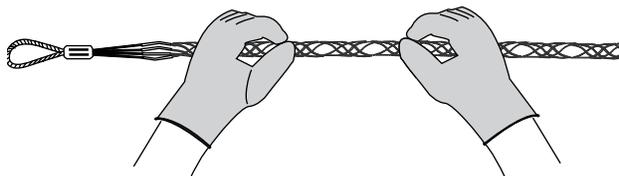


Figure 4

4.4 To ease installation, trim the end of the cable with side cutters to remove any protruding buffered fibers, yarn, or central member (Figure 5).

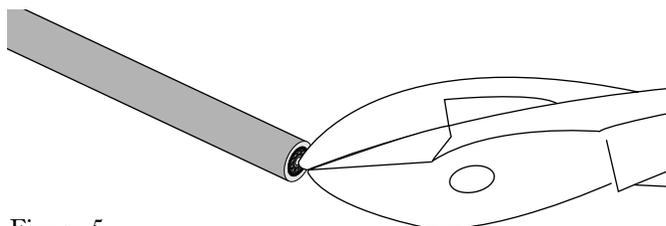


Figure 5

4.5 It is necessary to remove a section of outer jacket equal to half of the length of the mesh area of the grip.

Mark this distance from the end of the cable with a permanent marker (Figure 6).

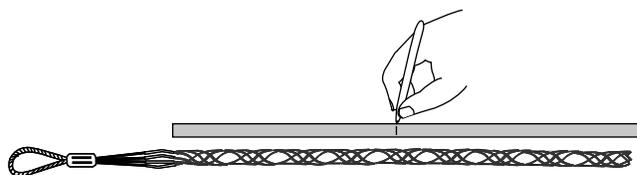


Figure 6

4.6 Use a pumping action to “walk” the grip over the cable by bringing your hands together and then relaxing them until the end of the grip is at least 7.5 cm (3 in.) beyond the mark made in step 4.5 (Figure 7).

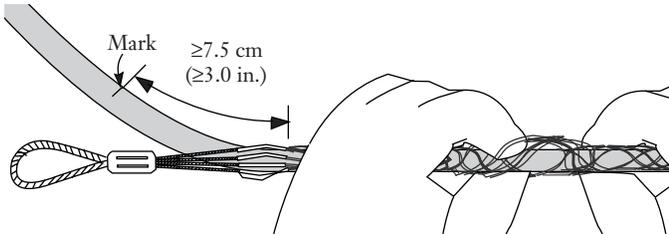


Figure 7

4.7 Follow the sheath removal procedure for the cable you are installing to remove the marked length of outer jacket (Figure 8).

For non-unitized cables, first remove 15 cm (6 in.) of jacket from the end of the cable. Tape the cable components together with vinyl electrical tape. Then remove the remaining jacket.

CAUTION: When making ring cuts with a hook blade or cable knife, do not cut all the way through the outer jacket - doing so may damage the sub units or other cable components which lie immediately below it.

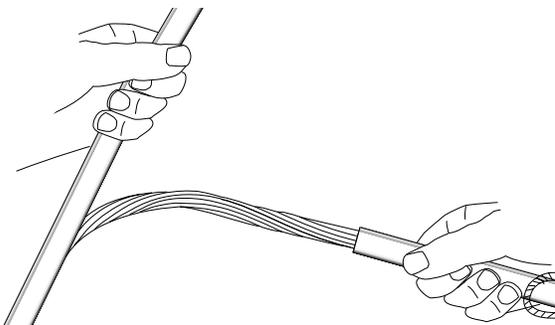


Figure 8

4.8 Beginning at the end of the outer jacket, wrap one layer of **friction** tape over the entire length of the exposed cable core. The friction tape should follow the direction of the sub-units or buffered fibers twists (Figure 9).

IMPORTANT: Do not use black electrical tape in place of friction tape. Electrical tape has a slick outer surface and could affect the pulling grip’s performance.

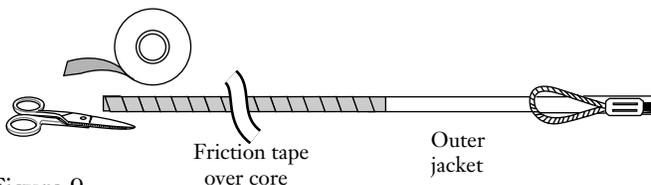


Figure 9

4.9 “Walk” the grip over the friction tape-covered cable core. Smooth the mesh back over the cable core, moving from the pulling eye to the cable jacket. Tug on the grip to tighten it against the core (Figure 10).



Figure 10

4.10 Starting at least 2.5 cm (1.0 in.) below the mesh on the cable jacket, wrap **vinyl** tape **TIGHTLY** to the top of the grip. The mesh’s imprint should show clearly through the tape (Figure 11).

The tape must be tight because it helps compress the mesh against the cable core.

Tug on the grip slightly to tighten it.



Figure 11

Note: When two or more vinyl tape layers are desired, always wrap the final, outside layer from the cable jacket to the pulling eye. This layers the tape like roofing shingles, so that it will not snag as it moves through a duct.

4.11 Connect the pulling eye to the appropriate ball bearing swivel and pulling tape (Figure 12). The grip installation is now ready for the cable pull.

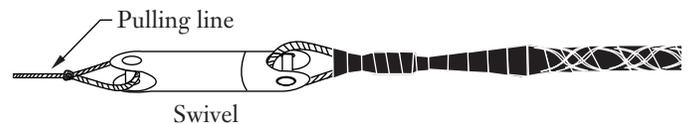


Figure 12

Grip Removal

4.12 After completion of the pull, cut the cable 91 cm (36 in.) behind the grip. Place a protective cap over the exposed cable end and tape in place to prevent water intrusion. Store the coiled splicing slack so that it is protected from damage.

5. Pulling Grip Selection and Installation on Cables With Interlocking Armor

5.1 Prior to installation, the proper size grip must be chosen for the cable to be pulled.

Grip selection is based on the outside diameter of the cable (Figure 13).

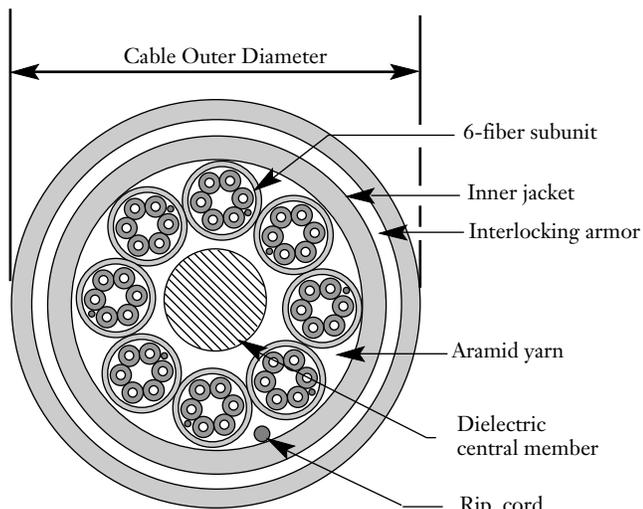


Figure 13

5.2 Generally speaking, use the smallest grip which will fit over the cable without excessive difficulty.

Measure the outer diameter and determine the proper grip by locating the diameter in Table 2.

Cable Outer Diameter and Grip Size		
If the cable diameter is in the range of...	Grip is Corning part number...	Kellems part number
2.5 - 5.6 mm (0.10 to 0.22 in.)	GRP-010	033-29-1182
5.3 - 9.0 mm (0.21 to 0.35 in.)	GRP-011	033-29-1182
9.1 - 12.2 mm (0.36 to 0.48 in.)	GRP-012	033-29-1184
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15.6 - 18.5 mm (0.62 to 0.73 in.)	GRP-014	033-29-1186
18.6 - 22.1 mm (0.74 to 0.87 in.)	GRP-015	033-29-1187
22.2 - 25.4 mm (0.88 to 1.0 in.)	GRP-016	033-29-1188

Table 2

5.3 Once the proper grip is obtained, inspect it for damage broken wires, bulges due to stress, rust, etc. Grasp the pulling eye in one hand (gloves are recommended) and smooth out the mesh with the other, tightening the wires.

Figure 14 illustrates the technique, which is critical when reusing grips.

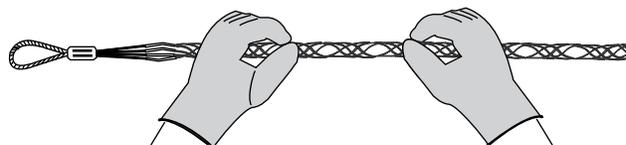


Figure 14

5.4 To ease installation, trim the end of the cable with side cutters to remove any protruding armor, buffered fibers, yarn, or central member (Figure 15).

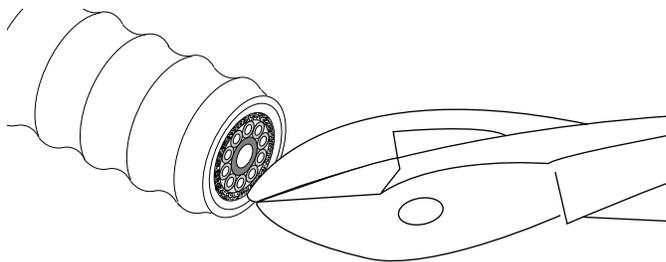


Figure 15

5.5 Table 3 and Figure 16 indicate the outer jacket strip length (A), exposed armor length (B), and exposed cable core length (C) required for each grip installation.

Mesh Length	A	B	C
45 cm) (18 in.)	50 cm (20 in.)	15 cm (6 in.)	35 cm (14 in.)
53 cm (21 in.)	48 cm (23 in.)	18 cm (7 in.)	40 cm (16 in.)
60 cm (24 in.)	65 cm (26 in.)	20 cm (8 in.)	45 cm (18 in.)
68 cm (27 in.)	75 cm (30 in.)	25 cm (10 in.)	50 cm (20 in.)
75 cm (30 in.)	83 cm (33 in.)	30 cm (12 in.)	53 cm (21 in.)

Table 3

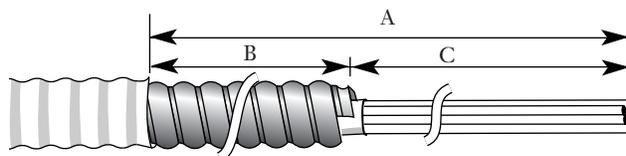
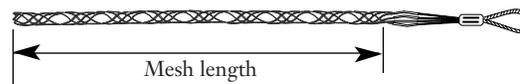


Figure 16

5.5 Measure and mark lengths A and C from the end of the cable on its outer jacket.

5.6 Use a pumping action to “walk” the grip over the cable by bringing your hands together and then relaxing them until the end of the grip is past mark A on the cable (Figure 17).

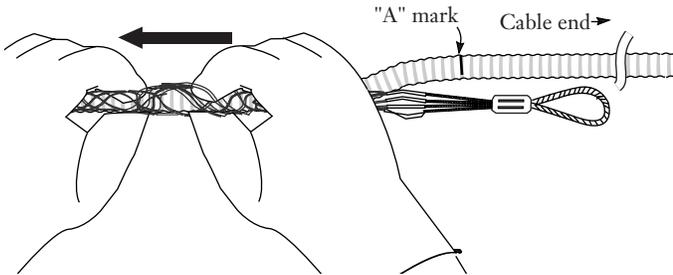


Figure 17

5.7 Using the hook blade knife, make a ring cut through the outer jacket at the C mark. Remove the outer jacket from this ring cut to the end of the cable to expose the interlocking armor (Figure 18).

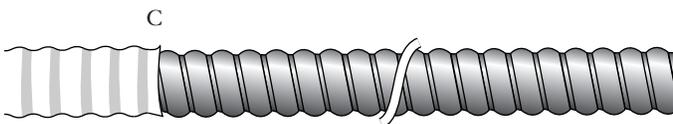


Figure 18

5.8 FIRMLY grip the cable on both sides of the C mark. While maintaining a firm grip, twist the cable in opposite directions to make the armor expand and the separate (Figure 19).

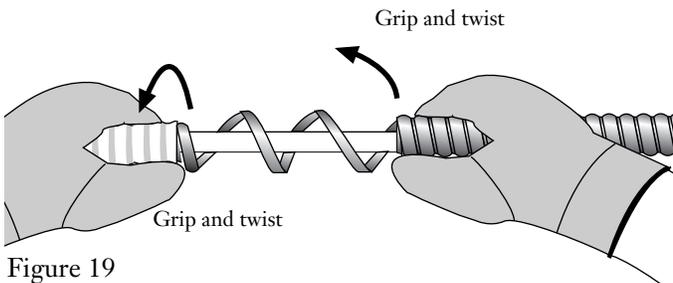


Figure 19

5.9 Using the side cutters, cut the armor across the narrow separated band. Remove the armor and outer sheath from the free end of the cable by sliding it off (Figure 20).

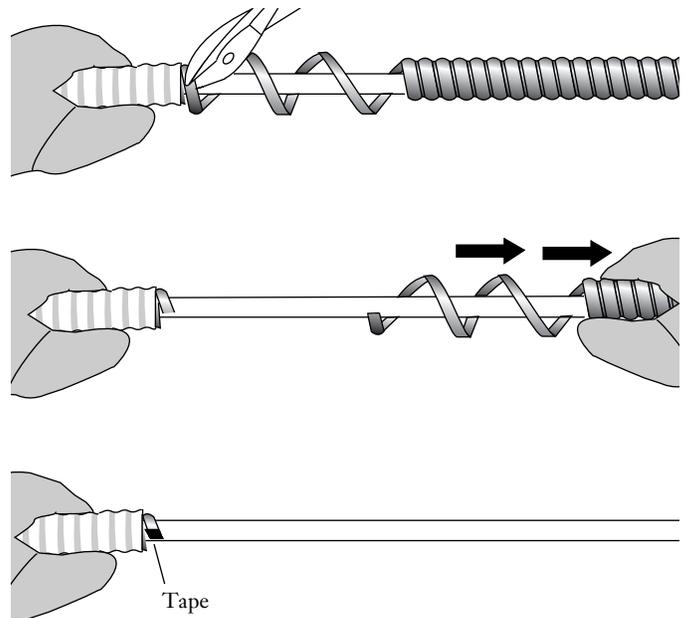


Figure 20

5.10 Ring cut the inner jacket at the end of the exposed armor and 15 cm (6 in.) from the end of the cable (Figure 21). Use care to avoid damaging the aramid yarn strength elements under the jacket.

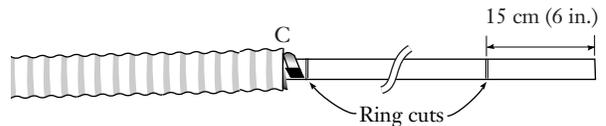


Figure 21

5.11 Position the blade of the hook blade knife at the 15 cm ring cut so that it can travel down the cable between the jacket and the cable core towards the cable end.

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

Slit the 15 cm (6 in.) section of inner jacket by holding the arm which has the knife out straight and pulling the cable “through” the hook blade with your other hand (Figure 22).

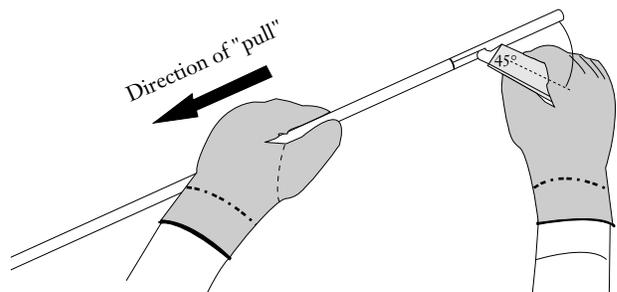


Figure 22

 **CAUTION:** There will be a sharp edge where the interlocking armor was cut. To minimize the chance of injury, cover the exposed edge with a wrap of vinyl tape.

5.12 Remove the 15 cm section of jacket to expose the rip cords

5.13 Carefully separate the rip cords from the aramid yarn and other components of the cable core. Place a wrap of tape around the cable core to hold these components in place (Figure 23).

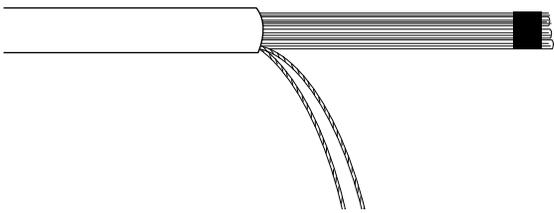


Figure 23

5.14 To remove the remaining exposed inner jacket:

- a) Carefully cut starting notches in the inner jacket with a hook blade.
- b) Wrap a rip cord around the shaft of a screw-driver, short section of scrap cable, or other object which can serve as a handle.
- c) Pull the rip cord through the jacket to the ring cut (Figure 24). Cut the rip cord flush at the ring cut.
- d) Repeat this step with the other rip cord. Peel off the cable jacket.

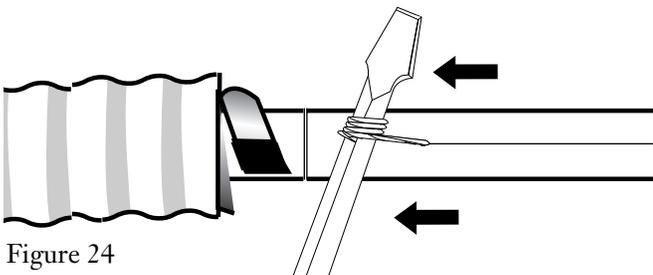


Figure 24

5.15 Remove the jacket from the interlocking armor back to the A mark (Figure 25).

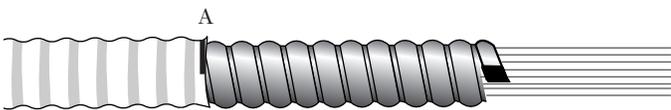


Figure 25

5.16 Place a wrap of friction tape over the exposed armor and over the entire length of the exposed cable core (Figure 26).

Note: Do not apply any friction tape over the outer jacket- the grip will not slide over the cable.

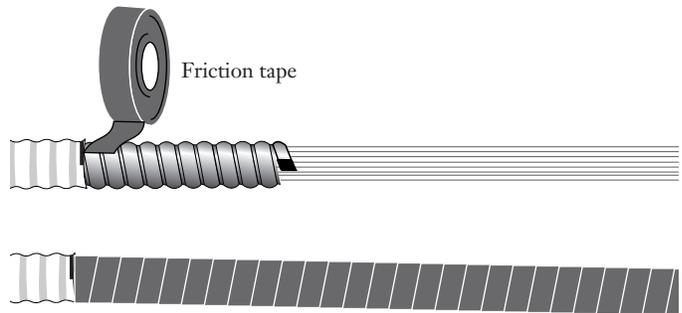


Figure 26

5.17 "Walk" the grip over the friction tape-covered cable core until the cable end is in the middle of the grip basket (Figure 27).

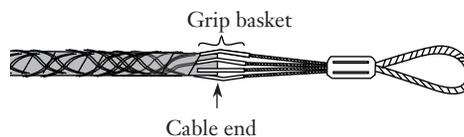


Figure 27

5.18 Smooth the mesh back over the cable core, moving from the pulling eye to the cable jacket. Tug on the grip to tighten it against the core (Figure 28).



Figure 28

5.19 Starting at least 2.5 cm (1.0 in.) below the mesh on the cable jacket, wrap **vinyl** tape TIGHTLY to the top of the grip. The mesh's imprint should show clearly through the tape (Figure 29).

The tape must be tight because it helps compress the mesh against the cable core.

Tug on the grip slightly to tighten it.

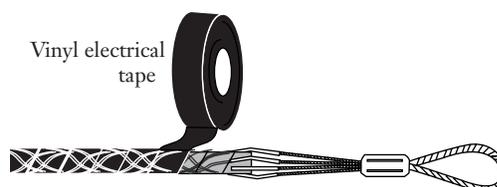


Figure 29

Note: *When two or more vinyl tape layers are desired, always wrap the final, outside layer from the cable jacket to the pulling eye. This layers the tape like roofing shingles, so that it will not snag as it moves through a duct.*

5.20 Connect the pulling eye to the appropriate ball bearing swivel and pulling tape (Figure 30). The grip installation is now ready for the cable placement.



Figure 30

Grip Removal

5.21 After completion of the pull, cut the cable 91 cm (36 in.) behind the grip. Place a protective cap over the exposed cable end and tape in place to prevent water intrusion. Store the coiled splicing slack so that it is protected from damage.

*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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