CORNING

Guide for SST Indoor-Outdoor Drop™ Cable Assemblies

SRP 004-171, Issue 1

related literature |

SRP-004-102, *RPX® FlexNap™ Cable Mechanical Wedge Dead-end Instructions*
SRP-004-108, *Pulling Attachment Procedures for Single Fiber Cables*
SRP-005-066, *Access Tool for SST-Drop™ Cables (FDST-0000)*
SRP-006-111, *Optical Access Connector Cleaning Kit*

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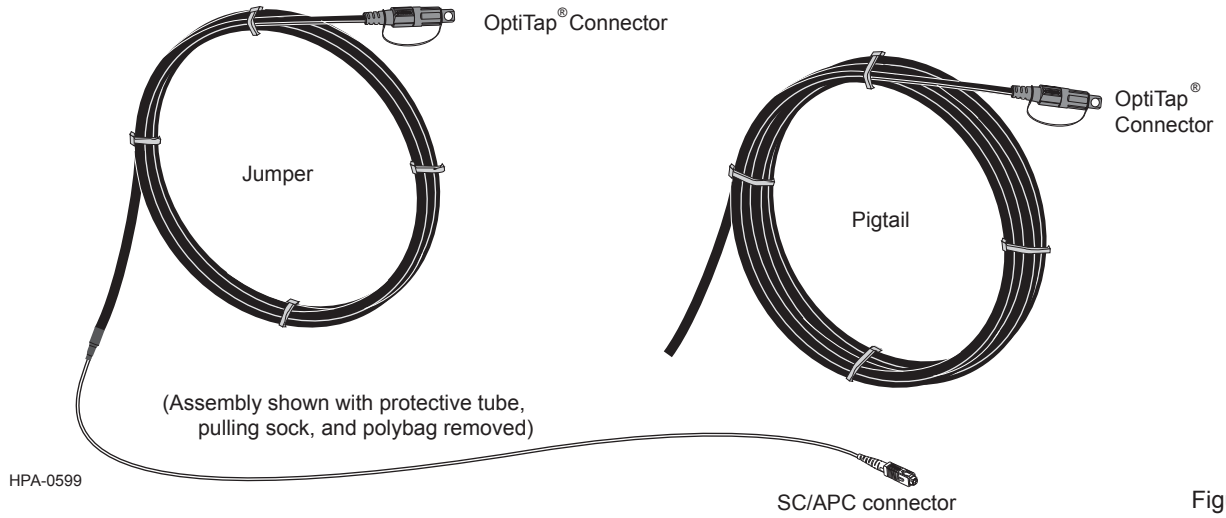


Figure 1

1. General

1.1 This procedure describes installation and handling of SST Indoor-Outdoor Drop cable assemblies. Both pre-connectorized *jumper* (an OptiTap® connector on one end and an SC/APC connector on the other) and *pigtail* (an OptiTap® connector on one end, unterminated cable on the other) versions are described in this document (Figure 1).

1.2 SST Indoor-Outdoor Drop cable assemblies cables contain a single, tight-buffered, ClearCurve™ single mode fiber surrounded by aramid yarns as strength members and a flame retardant PVC jacket.

Both jumpers and pigtails may be ordered with an optional toning wire which is jacketed outside of the standard optical cable envelope (Figure 2)

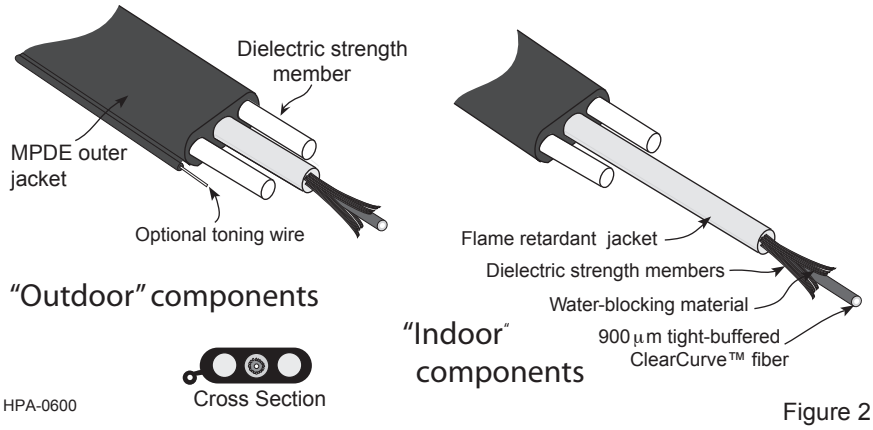


Figure 2

2. Precautions

2.1 Laser Handling Precautions

	WARNING: Never look directly into the end of a fiber or connector that may be carrying laser light. Laser light can be invisible and can damage your eyes. 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. Should accidental eye exposure to laser light be suspected, arrange for an eye examination immediately.

2.2 Safety Glasses

	CAUTION: Corning Cable Systems recommends the use of safety glasses (spectacles) for eye protection from accidental injury when handling chemicals, cables, or working with fiber. Pieces of glass fiber are very sharp and have the potential to damage the eye.

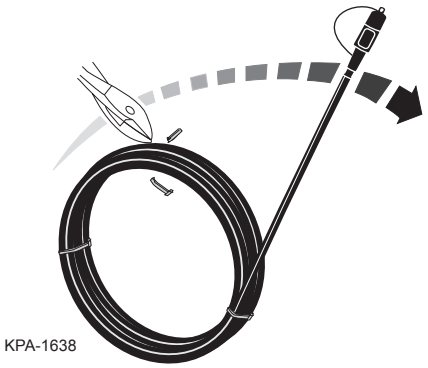
2.3 Safety Gloves

	CAUTION: The wearing of cut-resistant safety gloves to protect your hands from accidental injury when using sharp-bladed tools is strongly recommended. Cut away from your body to minimize the chance of accidental injury.

2.4 Cable Handling Precautions

	NOTE: Fiber optic cable assemblies are sensitive to excessive pulling, bending, and crushing forces. Do not bend the cable more sharply than its minimum recommended bend radius. Do not apply more than 50 lbf pulling force to the cable assembly. 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 assembly may have to be replaced.

⚠	**WARNING:** Unrestrained cable ends may cause personal injury or may damage the cable or connector if suddenly released from a coil of flat drop cable. Wear eye protection and use extreme care when releasing the energy stored in the cable coil.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3. Tools and Materials

3.1 The following tools and materials are required to complete the Jumper portion (Section 4) of this procedure:

- Side cutters (diagonal cutting pliers)
- Optical Access Connector Cleaning Kit (p/n TKT-OTAP-CLN-001)
- Pull line

3.2 The following tools and materials are required to complete the Pigtail portion (Section 5) of this procedure:

- Side cutters (diagonal cutting pliers)
- Optical Access Connector Cleaning Kit (TKT-OTAP-CLN-001)
- Tape measure
- SST-Drop Cable Access Tool (FDST-000)

  or

  Flat Drop Cable Jacket Stripper (p/n 3205036-01)
- Coaxial cable stripper (Ideal® catalog # 45-163) and a small screwdriver

  or

  Corning Cable Systems stripping tool for buffers (p/n 3206001-01)
- Dual hole fiber stripper (catalog number 2104502-01)
- Scissors
- Electrical tape
- Pull line
- Fiber Optic Dead-end clamp (p/n AB910)
- Cable knife (for cables with an optional toning wire)
- Cable ties

4. Jumper Placement and Access

4.1 For the outdoor duct or aerial stage of placing an SST Indoor-Outdoor Drop cable jumper, pull the grip which contains the interior-rated cable and SC/APC connector from the Multiport terminal towards the dwelling's Optical Network Terminal (ONT). To do so, attach a pull-line to the eye of the pulling grip (Figure 2).

Note: If conditions require pulling towards the Multiport terminal, a pull-line can be attached to the pulling eye on the OptiTap connector.

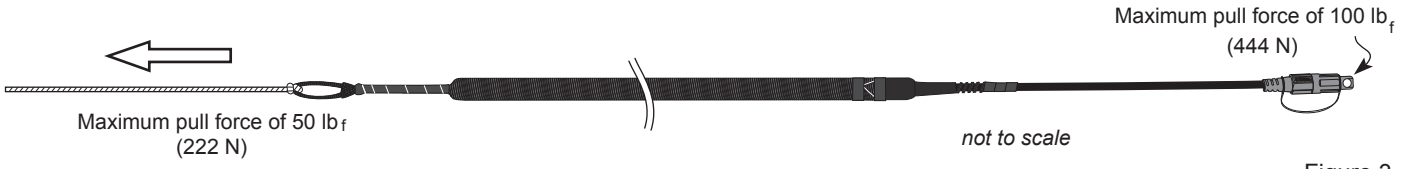

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Figure 3

Aerial Jumper Installations

Skip to Step 4.7 if your installation is a duct application.

4.2 Pull the jumper to the exterior of the dwelling, ensuring that you do not exceed 50 lb_f (222 Newtons) of force on the cable. Coil any excess of the outdoor portion of the cable at the Multiport terminal's pole.

4.3 NESC heavy loading conditions limit drop cable spans to 150 feet (46 m). Contact Corning Cable Systems for other applications. It is acceptable to use mid-span clamps on a messenger to support the drop cable where spans will exceed this length.

4.4 Slack loops may be added as required by local practices. To add slack loops, place one or more 12-inch (31 cm) diameter loops on the slack-end of the cable before routing the cable to the termination hardware. Secure the slack loops with cable ties.

4.5 Use a fiber optic dead-end clamp to secure the cable in aerial applications (Figure 4).

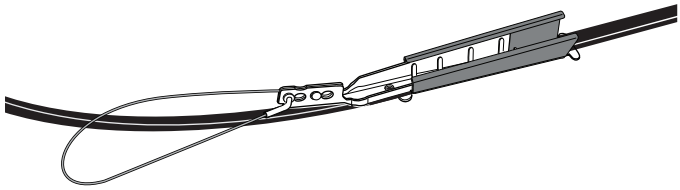

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Figure 4

CAUTION: Do not place drip loops in the cable during installation. Forming a drip loop in the cable will most likely exceed the bend radius or break the cable's strength members, causing fiber damage and attenuation.

Skip to Step 4.9 for installation instructions for both the OptiTap connector and the SC/APC connectorized indoor end of the cable.

Duct Jumper Installations

4.6 Pull the jumper through the duct to the dwelling, ensuring that you do not exceed 50 lb_f (222 Newtons) of force on the cable (Figure 5). Coil any excess of the outdoor portion of the cable in the handhole.

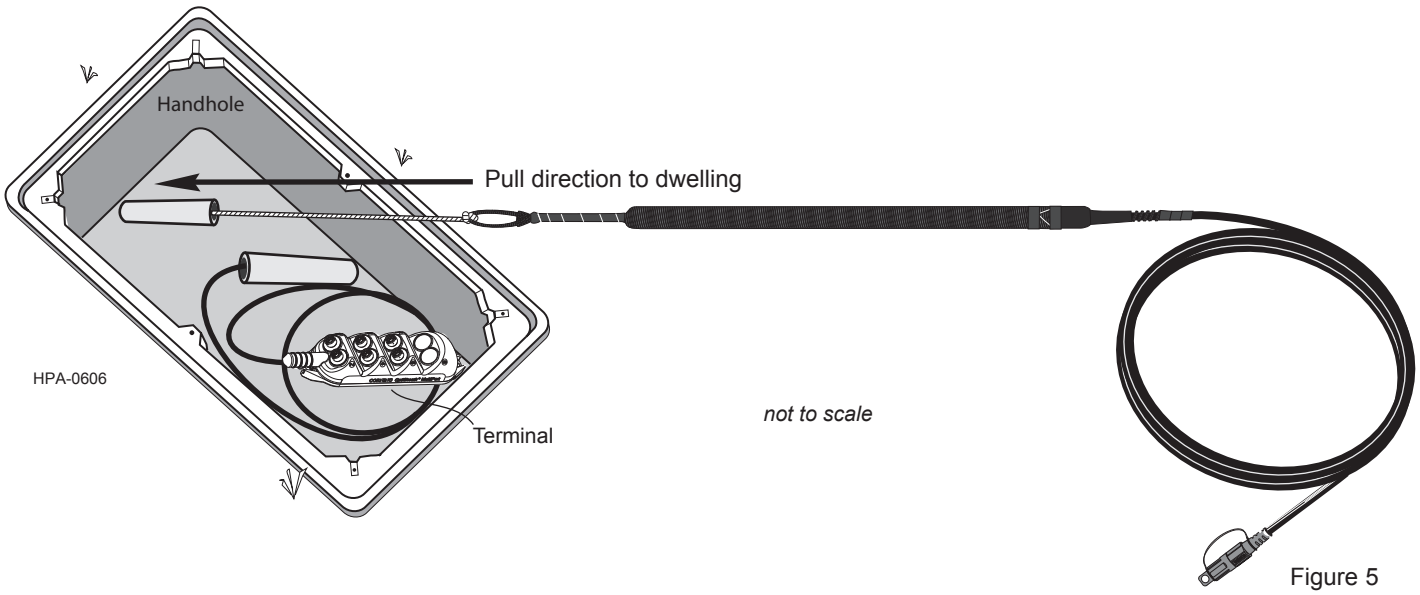


Figure 5

4.7 The sealed terminal in the handhole may be covered with mud or dirt due to normal ground water or flooding. Although these contaminants will not affect the performance of the unit, clean the unit before removing the unit's plugs to prevent contamination of the jumper's OptiTap connector end face:

IMP0RTANT: *Only use clean water to wash the outer housing. Do not use any type of solvent. When handling the terminal, support the terminal and its cable to prevent kinking the cable at the entrance of the terminal.*

Step 1: **Step 1:** Remove any cable ties or fasteners binding the terminal and its cable stub.

Step 2: **For light dirt and dust**, soak a clean rag or towel with clean water and gently clean the housing. Wipe dry with a clean, dry rag or towel. **For heavy, caked-on mud and dirt**, spray the terminal with low-pressure water such as a garden sprayer outside of the handhole. A soft-bristle brush may also be used to lightly scrub the housing to loosen the mud and dirt. Remove any remaining dirt with a water-soaked rag or towel and wipe dry with a clean rag or towel.

Step 3: Although the terminal should now be generally clean, there may still be dirt particles around the OptiTap adapter plugs. Therefore, before removing a plug, first turn the terminal so that the adapters face downward and then unscrew the selected plug. In this way, any stray dirt particles will fall to the ground instead of into the adapter.

4.8 If the jumper has an optional toning wire, untape its ends from the side of the cable and ground the wire in accordance with local codes, ordinances, and your company's practices. *For instructions on accessing additional toning wire, see Step 5.12 on page 10.*

For both Aerial and Duct Jumper Installations

4.9 Clean the OptiTap connector as described in SRP-006-111, *Optical Access Connector Cleaning Kit.*

4.10 Keeping the terminal's adapter facing down, install the OptiTap connector as follows (Figure 6):

Step 1: Align the arrow on the connector tang with the notch on the adapter while inserting the connector.

Step 2: Slide the connector's coupling nut into the adapter and screw the coupling nut hand tight.

Step 3: Mate the OptiTap connectors dust cap with the terminal's protective plug to keep both clean.

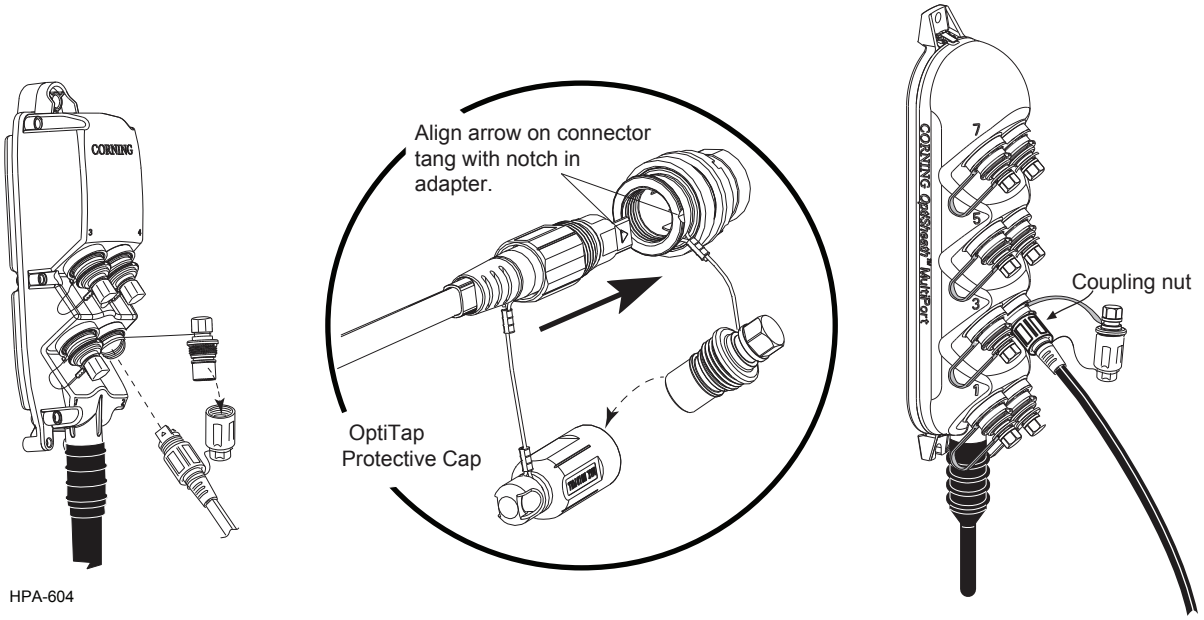


Figure 6

4.11 To access the demarcation point between the indoor and outdoor cable portions of the assembly at the dwelling:

Step 1: Remove the tape wraps which secure the ends of rip cords to the cable jacket (Figure 7).

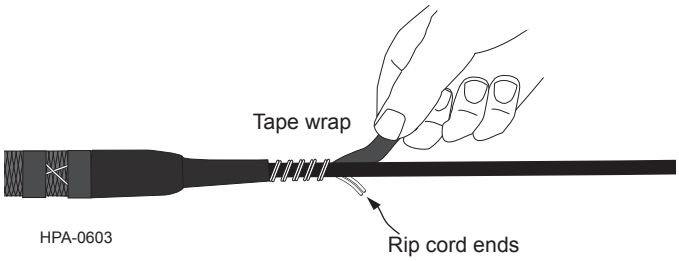


Figure 7

Step 2: Working with one rip cord at a time, pull the rip cords through the heat shrink to split it (Figure 8). The heat shrink has factory-installed starter notches to make this task easy.

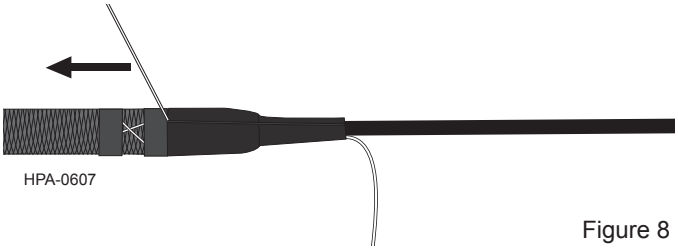


Figure 8

Step 3: Peel the split heat shink off the assembly (Figure 9).

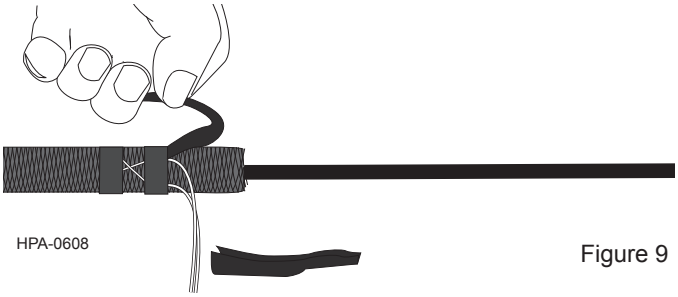


Figure 9

Step 4: Slide off the pulling grip to expose the indoor portion of the cable assembly and its polybag-protected SC/APC connector (Figure 10).

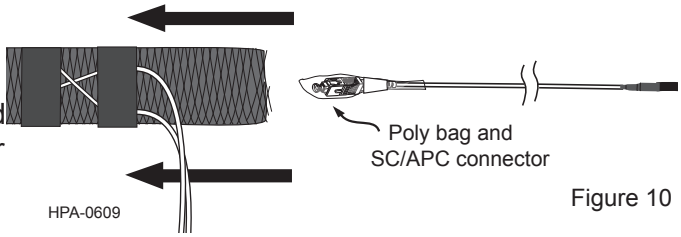


Figure 10

4.12 Secure the flat-profile, outdoor-end of the cable assembly into the selected termination hardware according to the hardware instructions.

4.13 Follow applicable building codes and your company's practices when routing the connectorized interior cable leg into the dwelling. Route the indoor end of the cable assembly to the Optical Network Terminal (ONT).

4.14 After reaching the ONT, (a) remove the tape wrap which secures the protective poly bag and (b) slide the bag off the SC/APC connector (Figure 11).

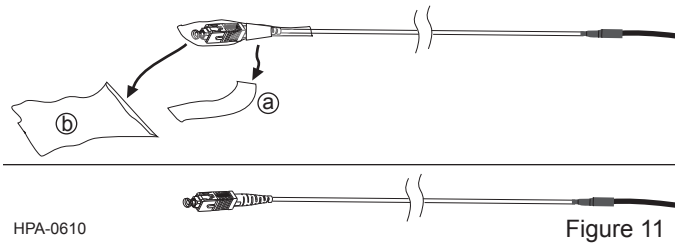


Figure 11

4.15 Access the Optical Network Terminal.

4.16 Inspect, and if necessary, clean, both the SC/APC and the SC/APC adapter in the ONT per your standard company practices.

4.17 Mate the connector into the adapter and secure any cable slack per the ONT's instructions.

5. Pigtail Placement and Cable End Access

5.1 For the outdoor duct or aerial stage of placing an SST Indoor-Outdoor Drop cable pigtail, either the bare cable end of the pigtail can be pulled from the terminal to the dwelling using a pull tape (Method 1) or the OptiTap connector end of the cable assembly can be pulled from the dwelling to the terminal (Method 2).

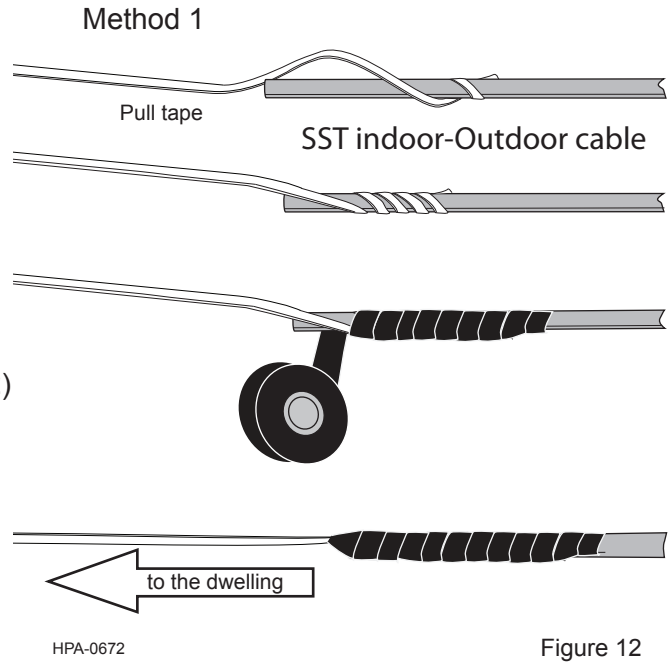


Figure 12

Method 1

5.2 To pull the bare-cable end of the pigtail, tightly wrap the free end of the pull tape around end of the cable and secure the pull tape in place with vinyl tape (Figure 12)

Skip to Step 5.10 if your installation is a duct application.

Method 2

5.3 To pull the OptiTap connector end of the pigtail, attach a pull-line to the eye of the OptiTap connector's dust cap (Figure 13).

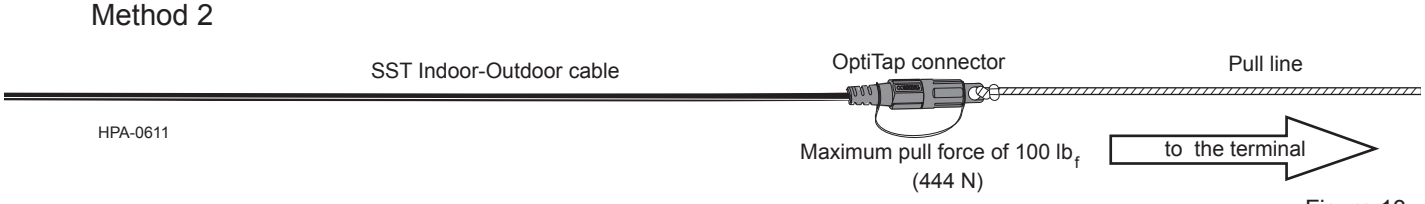


Figure 13

Skip to Step 5.10 if your installation is a duct application.

Aerial Pigtail Installations

5.4 Pull the pigtail into place:

If you are using **Method 1** with a pull tape to pull the bare cable-end of the pigtail from the terminal to the dwelling, the cable is rated to a tensile strength of 300 lb.

If you are using **Method 2** to and pulling the OptiTap connectorized end of the pigtail from the exterior of the dwelling to the Multiport terminal, ensure that you do not exceed 100 lb_f (444 Newtons) of pulling force.

5.5 NESC heavy loading conditions limit drop cable spans to 150 feet (46 m). Contact Corning Cable Systems for other applications. It is acceptable to use mid-span clamps on a messenger to support the drop cable where spans will exceed 150 feet (46 m).

5.6 Slack loops may be added as required by local practices. To add slack loops, place one or more 12-inch (30 cm) diameter loops on the slack-end of the cable before routing the cable to the termination hardware. Secure the slack loops with cable ties.

5.7 Use a fiber optic dead-end clamp (p/n AB910) to secure the cable in aerial applications (see Figure 4 on page 4).

CAUTION: Do not place drip loops in the cable during installation. Forming a drip loop in the cable will most likely exceed the bend radius or break the cable's strength members, causing fiber damage and attenuation.

5.8 Coil any required slack of the outdoor portion of the cable assembly at the Multiport terminal's pole.

5.9 Refer to Steps 4.9 - 4.10 for installation instructions for the OptiTap connector.

Skip to Step 5.13

Duct Pigtail Installations

5.10 The jumper may be pulled through the duct using either Method 1 or 2 (see Figure 14).

NOTE: Method 1, i.e., pulling the bare cable end of the pigtail, may be preferable as its tensile pull limits are determined by those of the cable (300 lb) and the pull line, rather than the 50 lb_f (222 Newtons) limit of the OptiTap connector components in Method 2.

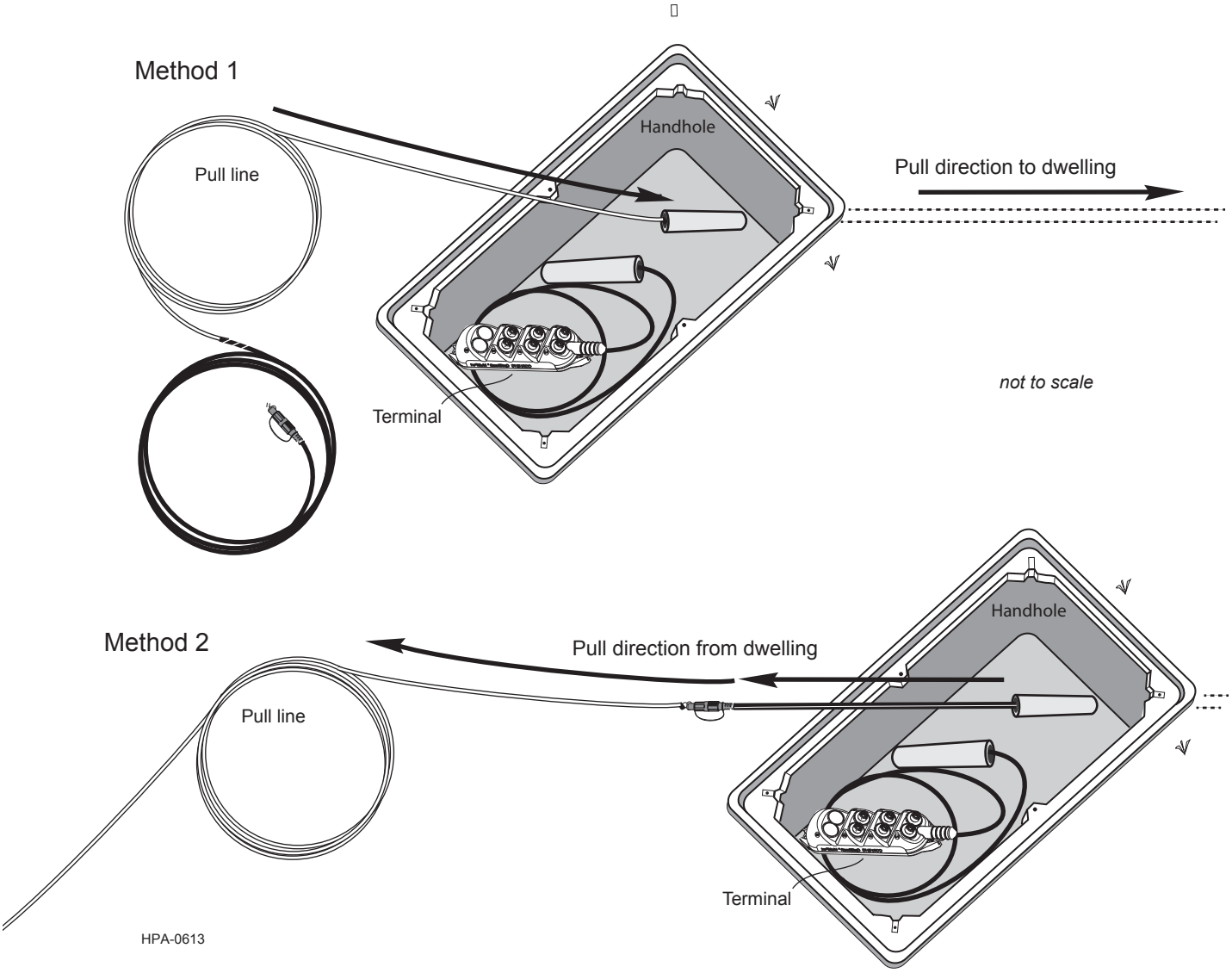


Figure 14

NOTE: The sealed terminal in the handhole may be covered with mud or dirt due to normal ground water or flooding. Although these contaminants will not affect the performance of the unit, clean the unit as described in Step 4.7 on page 5 before removing the unit's plugs to prevent contamination of the jumper's OptiTap connector end face.

5.11 Install the OptiTap connector in the Multiport terminal as described in Steps 4.9 - 4.10.

5.12 If the jumper has an optional toning wire, untape its end from the side of the cable and ground the handhole end of the wire in accordance with local codes, ordinances, and your company's practices.

Pigtail Cable Transition

5.13 If local standards or practices require it, once the pigtail has been placed between the dwelling and the Multiport terminal, the pigtail must have its “outdoor” cable components removed at the transition point before its “indoor” cable component can be run to the Optical Network Terminal inside the dwelling

Both aerial and duct pigtail applications are shown in Figure 15.

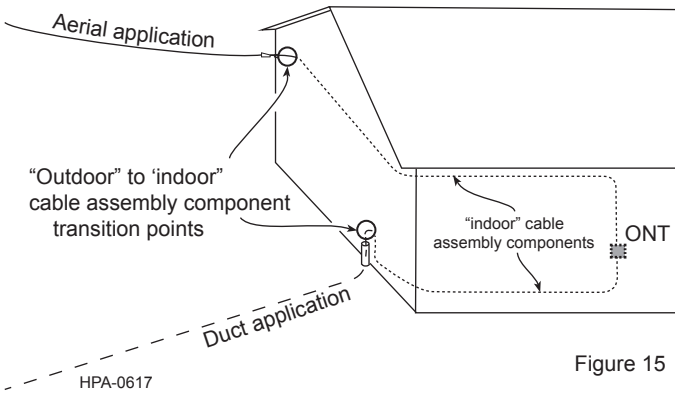


Figure 15

5.14 To begin the transition process:

Step 1: Determine the required length from your respective outdoor-to-indoor transition point to the interior’s Optical Network Terminal. *Include any slack needed for securing the cable assembly and the strip length specified for the connector you will be installing.*

Step 2: Measure and mark that length, plus 12 inches (30 cm), on the MDPE outer jacket from the transition point towards the bare end of the cable (Figure 16a).

Step 3: Use side cutters to cut the cable to length (Figure 16b).

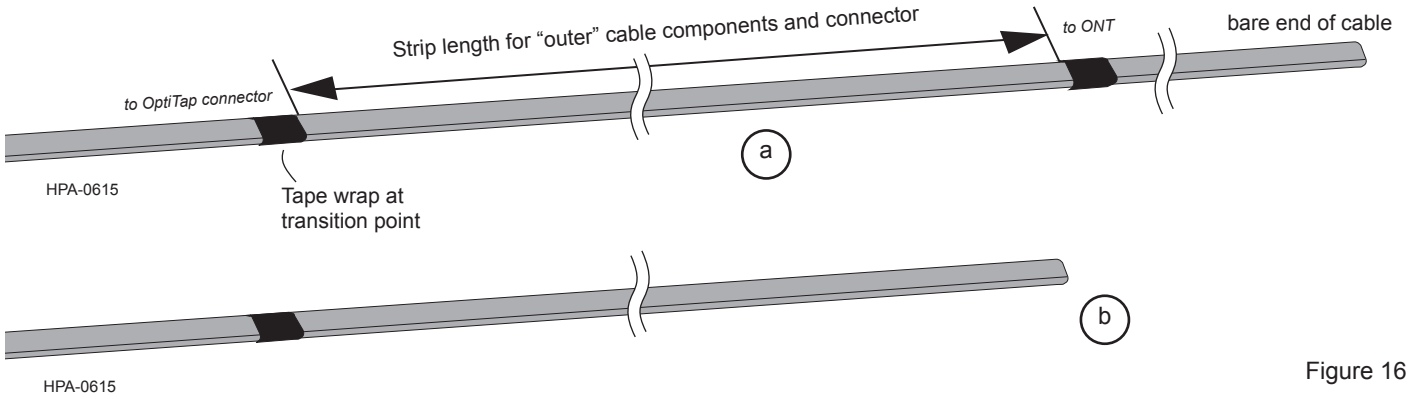


Figure 16

Skip to step 5.16 if your cable assembly does not have a toning wire.

5.15 To prepare a cable assembly with a toning wire for a transition point:

a. Determine how much wire is needed for grounding outside of the transition point/hardware. Measure and mark this second length on the wire’s MDPE outer jacket (Figure 17).

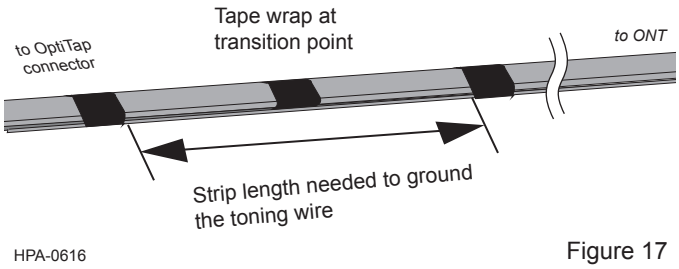


Figure 17

b. Move the transition point tape wrap so that the toning wire jacket is accessible.

c. Holding the cable in one gloved hand with the toning wire facing up, use a cable knife to separate the toning wire between the wraps applied in Step a. - only light pressure is needed to cut the web. Cut with the blade tilted toward the cable to minimize the left-over web material on the cable (Figure 18).

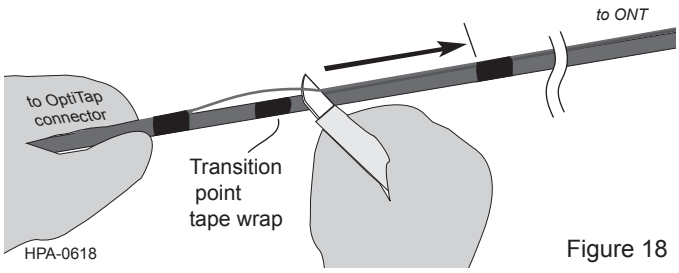


Figure 18

d. Use side cutters to cut the toning wire at the tape wrap at ONT-end of the cable assembly and fold the wire back over itself (Figure 19).

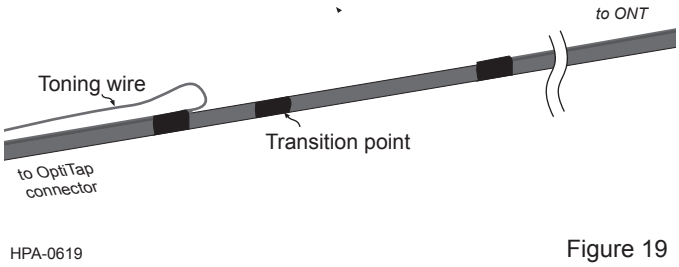


Figure 19

e. Remove the outer tape wrap at the cut made in Step d and use the cable knife to separate the remaining toning wire to the bare end of the cable (Figure 20).

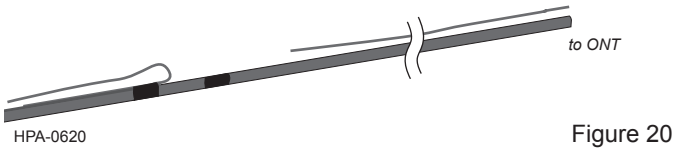


Figure 20

Accessing and Placing the Indoor Component of the Pigtail

5.16 There are two different tool-dependent methods for accessing the indoor optical component of a SST Indoor-Outdoor Drop cable pigtail. Method A describes the use of the Flat Drop Cable Jacket Stripper (p/n 3205036-01); Method B, the SST-Drop Cable Access Tool (FDST-000).

Method A - Flat Drop Cable Jacket Stripper

Step 1: Holding the cable in one hand with the narrow width facing up, use the flat drop cable jacket stripper to cut the jacket away from the end of the cable to expose the dielectric strength member (Figure 21). It is acceptable to cut slightly into the strength member during this process, but avoid cutting through it.

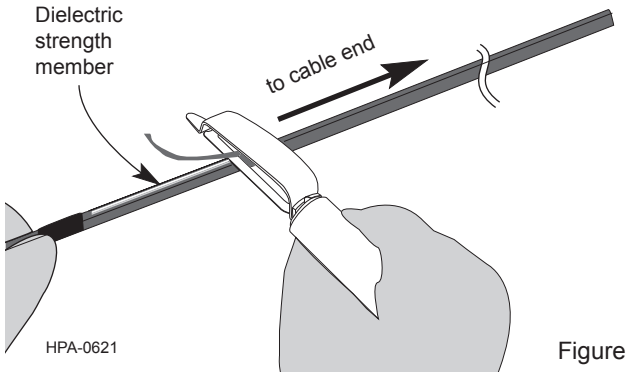


Figure 21

Step 2: Flip the cable over and repeat Step 1 on the other narrow width and strength member.

Step 3: With both of the narrow sides of the jacket removed, peel back the remaining two jacket sections from the indoor cable component and the strength members (Figure 22).

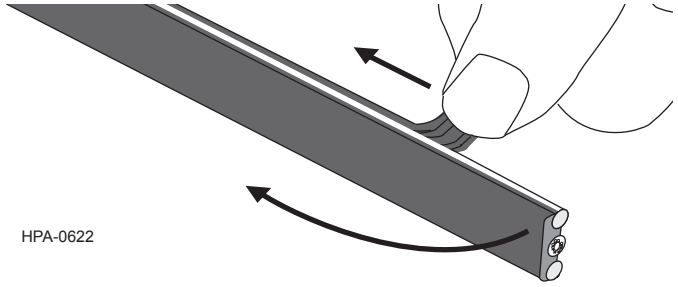


Figure 23

Step 4: Using the diagonal cutter, cut off the jacket that has been peeled back to the transition mark. Also clip the dielectric strength members to the desired length (Figure 23). Use care to avoid damaging the indoor component.

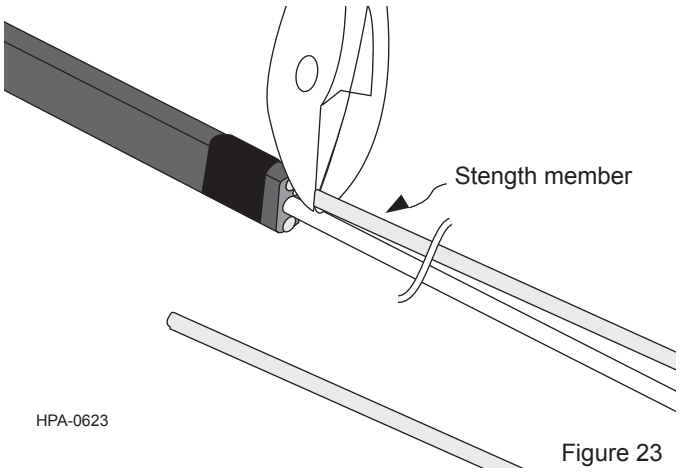


Figure 23

Skip to Step 5.19.

Method B - SST-Drop Cable Access Tool

Step 1: Open the tool and insert the cable so that the transition point tape wrap is just behind the blades. Close the tool (Figure 24).

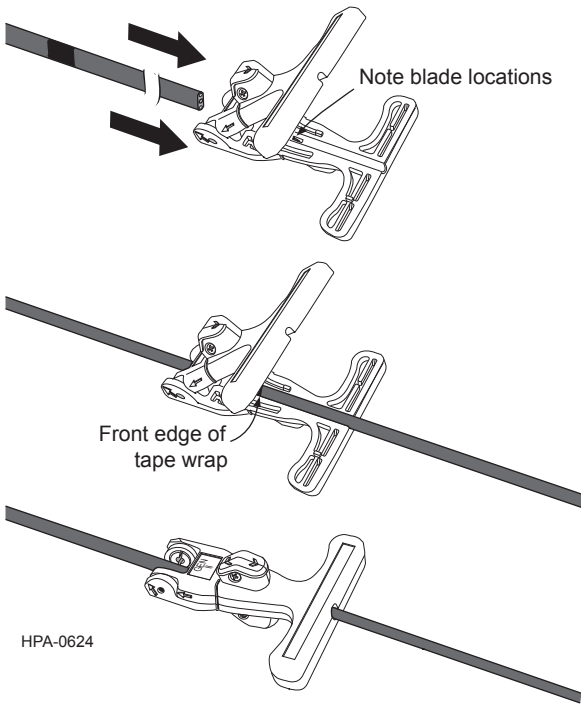


Figure 24

Step 2: Firmly hold the cable with one hand and use your other had to pull the tool along the cable until the tool is clear of the end of the cable (Figure 25).

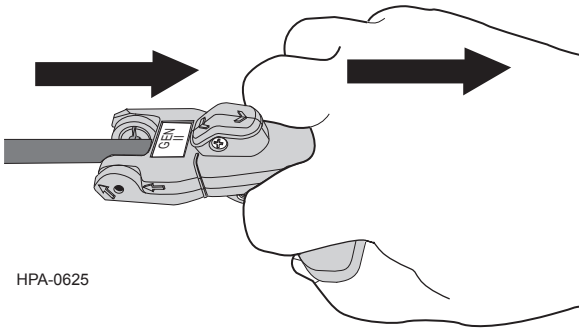


Figure 25

Step 3:

Step 4: Peel back the remaining jacket sections from the indoor cable component and the strength members (Figure 26).

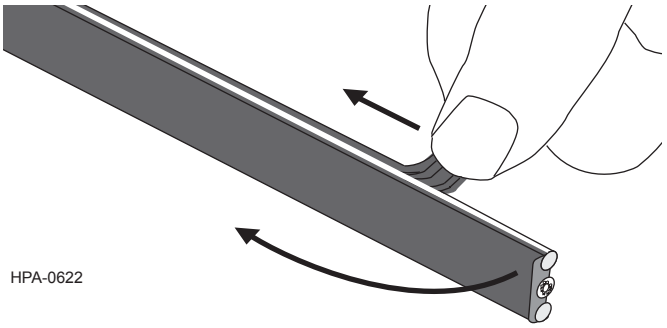


Figure 26

Step 5: Use scissors or side cutters to remove the split sections of the outer jacket and to cut the strength members as flush as possible to the cable jacket . Use care to avoid damaging the indoor component (Figure 27).

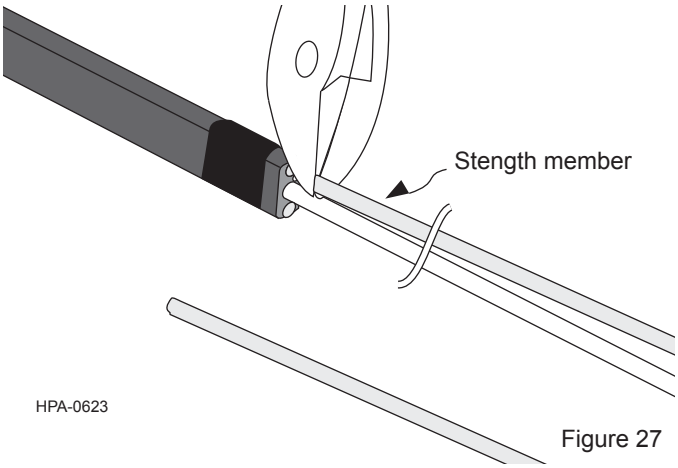


Figure 27

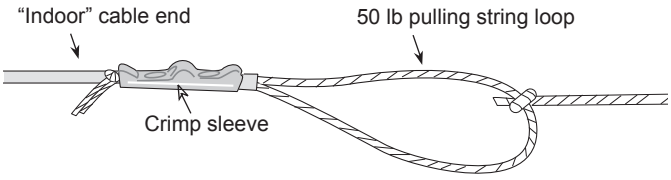
5.17 Secure the outdoor component of the cable (and ground the toning wire, if present) at the transition point as dictated by local codes and your company's standard practices.

Placing the Indoor Cable Component

5.18 The 2.9 mm diameter indoor component of the SST Indoor-Outdoor Drop cable pigtail has an outer diameter of 2.9 mm O.D. and has a single mode (ClearCurve) fiber surrounded by aramid yarns as strength members and a flame retardant PVC jacket.

If one were to pull only the jacket, the yarns can separate and the jacket will stretch and relax which causes bunching of the yarns and fiber inside the cable. When the fiber is bunched in this manner, the cable may be rendered inoperable due to high attenuation. This section describes a way to safely install the cable at higher tensile loads ensuring the jacket does not separate from the yarn strength members.

NOTE: If the dwelling has microduct in place, the indoor component of pigtail can be pulled into place using the microduct's pre-installed 50 lb pulling line secured to cable with a crimp band (Figure 28). For further details, please see SRP 004-108, *Pulling Attachment Procedures for Single Fiber Cables.*



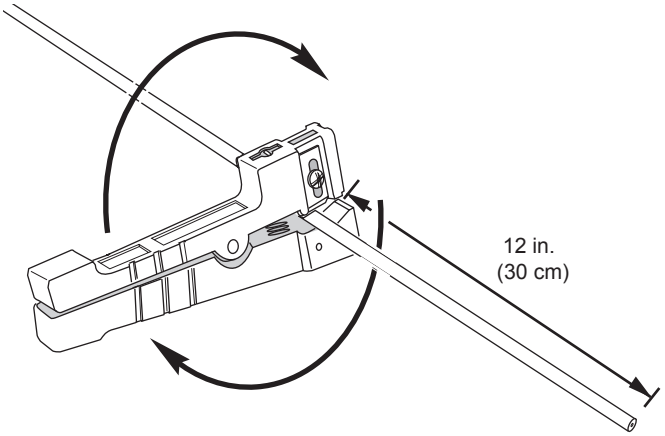
HPA-0614

Figure 28

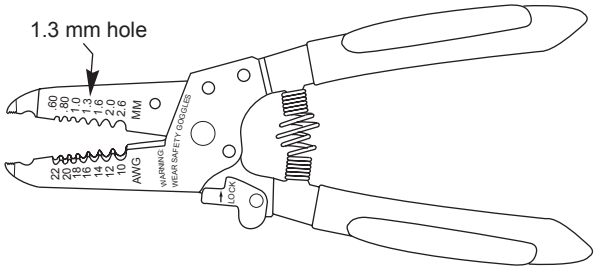
Pulling Line Placement

5.19 To attach a pulling line to the indoor cable component:

Step 1: Measure and mark 12 inches (30 cm) from the end of the cable.



Step 2: Use either a coaxial cable stripper or the 1.3 mm hole of a buffer stripping tool to score the outer jacket at the 12-inch (30 cm) mark (Figure 29).

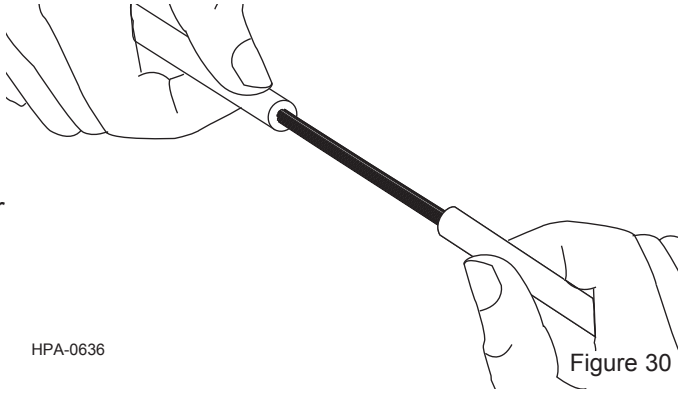


HPA-0627

Figure 29

Step 3: Bend the jacket at the score point to separate the jacket into two pieces. This may take more than one bend.

Step 4: Massage the jacket along the length to separate the dielectric strength members (yarns) and fiber from the jacket. As you pull, you will feel and hear the jacket separate from the yarns. Remove the 12 inch.(30 cm) of jacket to expose the yarns and fiber (Figure 30).



HPA-0636

Figure 30

Step 5: Cut the exposed fiber at the jacket end, leaving only the yarns (Figure 31).

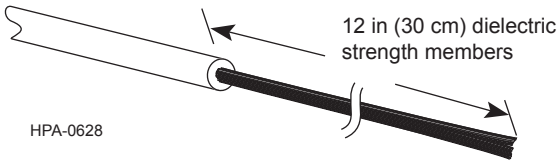


Figure 31

Step 6: Securely tie the aramid yarns to the pulling line. Example knots may be the square knot (shown in Figure 32), or a fisherman's knot.

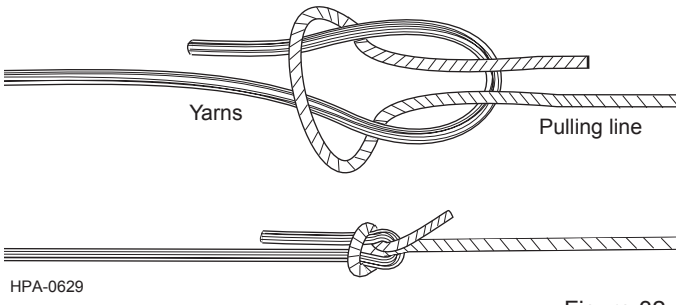


Figure 32

Step 7: Starting on the cable jacket, wrap the exposed yarns and knot in electrical tape. Doing so will help to protect the yarns during pulling (Figure 33).

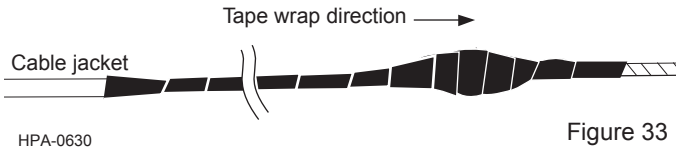


Figure 33

Step 8: Pull the cable and do not exceed recommended 50 lb_f (220 N) short-term tensile strength and 0.2 in (5 mm) bend radius (see specification sheet). Also, avoid pulling the cable over/across sharp or rough surfaces.

Installation via Hand Pulling

5.20 The following section describes how to install the indoor cable component via hand pulling:

Step 1: Loop approximately 12 inches (30 cm) of the cable in the shape of an "S" forming three sections, approximately 4 inches (10 cm) long. (Figure 34).

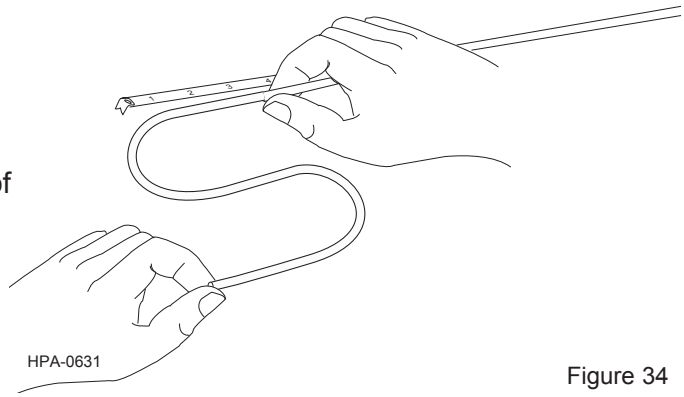


Figure 34

Step 2: Tightly bind the three sections together using electrical tape (Figure 35). The end of the cable should rest on the top the other two sections. In this manner, the size is minimized and the cable will fit through a standard 0.5-inch (12.7 mm) opening.

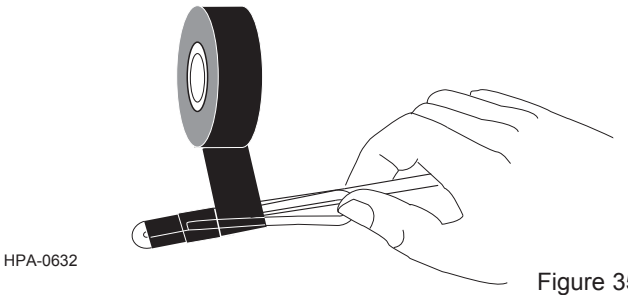

HPA-0632

Figure 35

Step 3: Continue to tightly wrap the cable with electrical tape until all over-lapping pieces are covered (Figure 36).

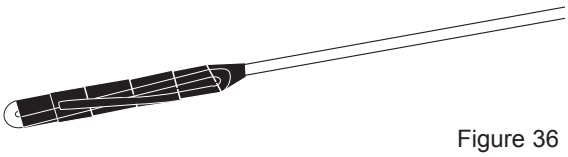

HPA-0633

Figure 36

Step 4: Pull the cable to the ONT while holding the electrical tape (Figure 37) - do not exceed recommended tension and bend radius (see the cable's specification sheet).

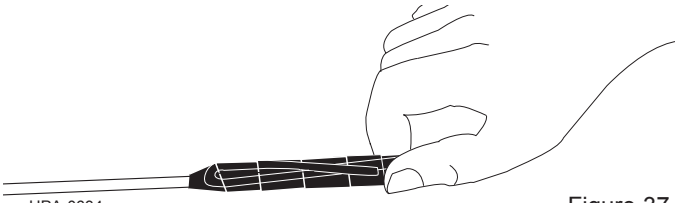
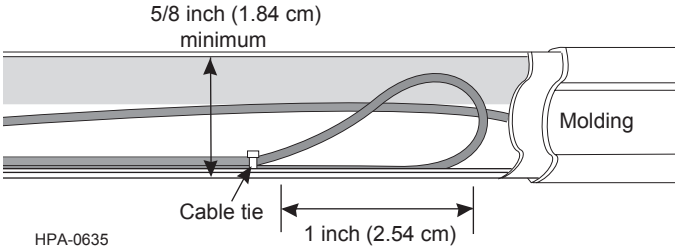

HPA-0634

Figure 37

Slack Storage

5.21 When storing slack behind a molding, Corning recommends the molding to have a minimum width of 5/8 inch (1.84 cm).

a. When storing the indoor cable component by looping the cables back, ensure a minimum of 1 inch (2.54 cm) is between the loop and point where the cables meet and the first cable tie is placed (Figure 38).



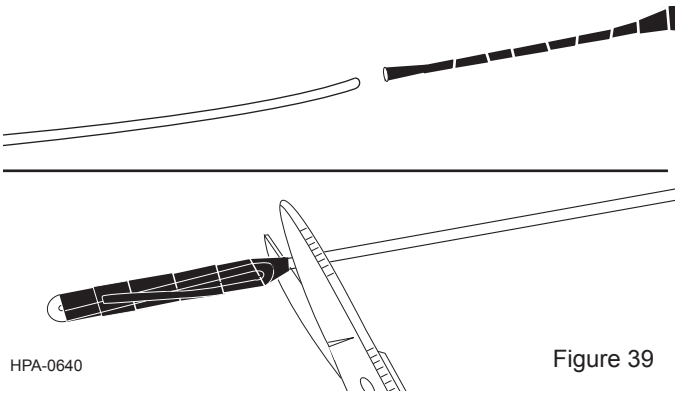
HPA-0635

Figure 38

b. If the cable has been stored in a damp or wet environment, cut off 12 inches (30 cm) of the cable prior to termination or splicing.

5.22 The following steps describe how to access the pigtail's fiber:

Step 1: Cut off the tape-wrapped end of the cable (Figure 39).



HPA-0640

Figure 39

Step 2: Determine the fiber and strength member lengths required for the connector you are installing. Measure and mark this length from the end of the cable (Figure 40).

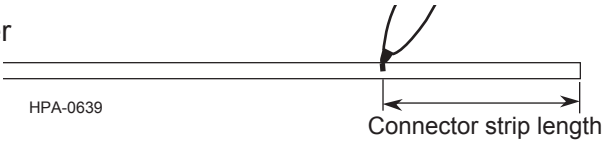


Figure 40

Step 3: Use an Ideal tool or the 1.3 mm hole of a stripping tool for buffers to score the jacket at the strip length mark (Figure 41).

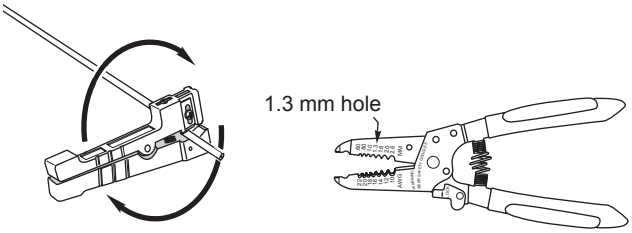


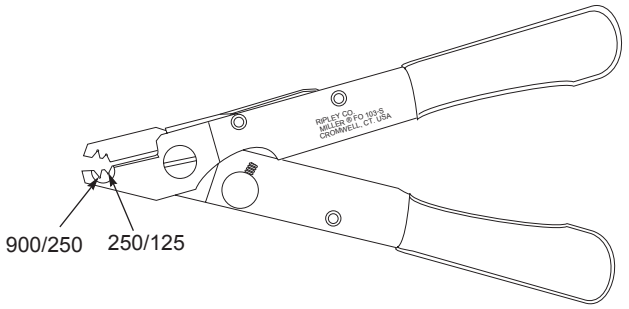
Figure 41

Step 4: Bend the sheath at the score to separate the jacket into two pieces. This may take more than one bend.

Step 5: Massage the jacket along the strip length and pull it off the strength member yarns and fiber.

Step 6: Cut the strength member yarns at the appropriate length for the connector.

Step 7: Remove the fiber coating length per your connector's instructions with a dual hole fiber stripper (Figure 42). Full instructions for the tool are provided in SRP-005-057).



HPA-0637

Figure 42

Step 8: Complete the connector assembly according to its instructions and route the now connectorized pigtail into the ONT.

Corning Cable Systems LLC • PO Box 489 • Hickory, NC 28603-0489 USA
1-800-743-2671 • FAX +1-828-325-5060 • International +1-828-901-5000 • http://www.corning.com/cablesystems