

## Indoor Applications Kit - 6 or 12-Fiber Buffer Tube Fan-Out (BTF) Assembly

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### 1. General

**1.1** This procedure describes how to install a Corning Cable Systems 6-fiber ("6 f") Buffer Tube Fan-Out (BTF) on 2.4 mm buffer tubes or a 12-fiber ("12-f") BTF on 3.0 mm buffer tubes for indoor applications. These kits (Corning Cable Systems p/n FAN-BTXX-YY) are rated for temperatures from 0 to +70°C.

**1.2** Fan-Outs branch the fibers from a buffer tube into individual fibers protected by 900 µm PVDF protective tubing (Figure 1). The fibers can then be connectorized according to hardware interface requirements. An assembly kit (TKT-FANBT-A) is available to assist in the installation of the BTF fan-outs.

**1.3** One BTF is required for each 6 or 12-fiber buffer tube being connectorized. This procedure describes how to assemble a BTF assembly with and without the BTF Assembly Platform (Corning Cable Systems part number 3202020-01, which is part of the TKT-FANBT-A kit). *Please read and understand this procedure completely before starting a BTF assembly.*

**1.4** Indoor application BTF kits are readily identified by their color-coded PVDF tubes. For instructions for outdoor application kits, please refer to SRP-000-088, *Outdoor Applications Kit - 6 or 12-Fiber Buffer Tube Fan-Out (BTF) Assembly.*

**1.5** This issue reflects newly introduced buffer tubes.

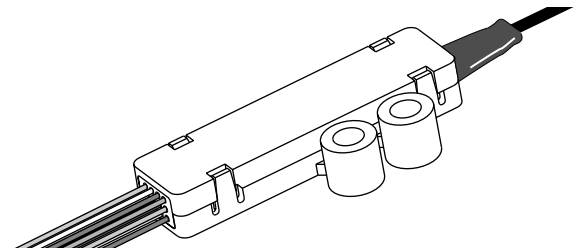


Figure 1

### 2. Precautions

#### 2.1 Safety Precautions



##### Safety Gloves

**WARNING:** Corning Cable Systems strongly recommends that you wear safety gloves to protect your hands from chemicals and accidental injury when handling sharp-bladed tools.



##### Safety Glasses

**WARNING:** Corning Cable Systems strongly recommends that you wear safety glasses to protect your eyes from accidental injury when handling chemicals and cutting fiber. Pieces of glass fiber are very sharp and can damage the cornea of the eye easily.

#### 2.2 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 physician. If contact with eyes, wash eyes for 15 minutes.

#### 2.3 Cable and Buffer Tube 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 or buffer tubes more sharply than their minimum recommended bend radius. Do not apply more pulling force to the cable than specified. Do not crush the cable or buffer tubes or allow them to kink. Doing so may cause damage that can alter the transmission characteristics of the cable — the cable may have to be replaced.

### 3. BTF Kit Contents

3.1 Each Corning Cable Systems BTF kit contains the following (Figure 2):

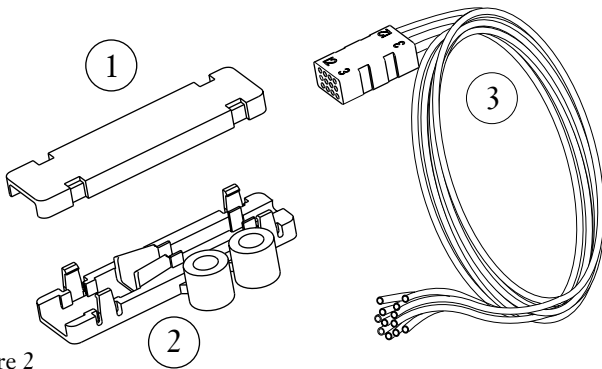


Figure 2

- 1) BTF top (1)
- 2) BTF bottom (2)
- 3) 6 f or 12 f 900  $\mu\text{m}$  color-coded assembly, 25, 36, 47, or 72 in. long (1)

### 4. Tools and Materials

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

- Electrical tape
- Lint free tissues
- Fiber-Clean® cleaning wipes if filling compound is present
- Clean rags
- Permanent marker
- Wire markers
- Buffer tube stripper
- BTF clamps (Corning Cable Systems p/n 3225001-01)
- Pliers

4.2 The optional Assembly Platform (p/n 3202020-01) has the following components (Figure 3):

- 1) Assembly platform
- 2) Buffer tube clips (2) (p/n 2104215-01)
- 3) Thumb screws (2) (p/n 2104214-01)

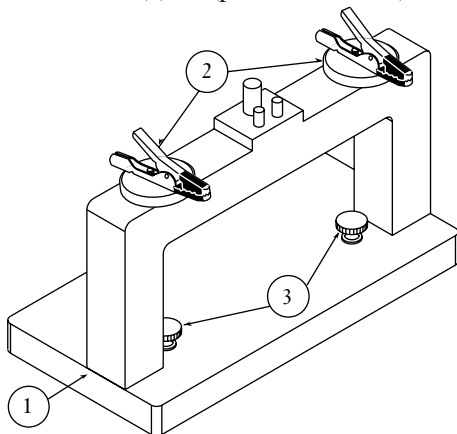


Figure 3

4.3 The BTF Assembly Platform can be configured for clamp-on use suitable for most manufacturers' termination hardware with two additional BTF clamps.

To convert the platform for clamp-on use (Figure 4):

- a) Slide *one* vinyl handle off each BTF clamp.
- b) Remove the two brass thumb screws from the top of the platform.
- c) Press the clamps into the slots in the bottom of the platform. Align the holes in the clamp handles with the threaded holes in the platform.
- d) Secure each clamp with a thumb screw.

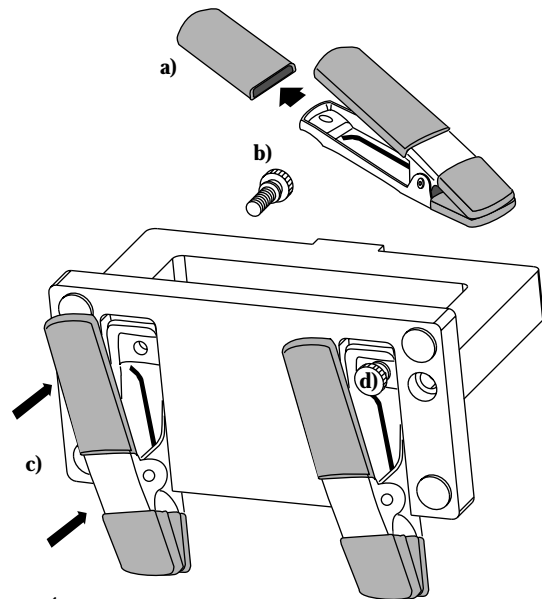


Figure 4

### 5. Cable Preparation



**CAUTION:** Read and understand the cable manufacturer's sheath removal instructions. Some cable stripping procedures may call for a slightly longer length at the end of the cable to allow for cable core (buffer tube) damage caused when accessing rip cords, etc. Be sure to add such length (typically 6 to 10 inches) to the strip length in step 5.2.

5.1 A BTF kit can be assembled any time after the cable sheath has been removed and the buffer tubes cleaned.

Installation factors such as the length of cable slack available, the location of the terminating hardware, and the question of storing buffer tube slack as opposed to cable slack, can dictate when and where you choose to mount the cable end and assemble the BTF.

Figure 5 illustrates three typical installation options:

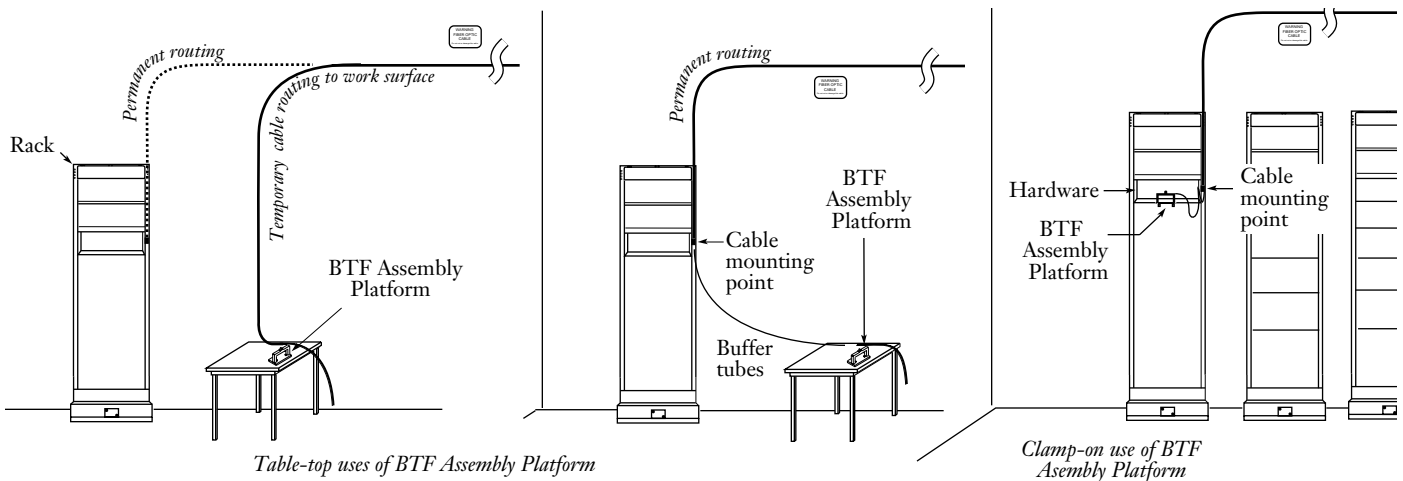


Figure 5

**Option 1**

- Prepare the cable end
- Route the cable end to a work surface
- Assemble the BTF
- Mount the cable on the hardware, route BTF and tubes inside hardware
- Install the BTF in the hardware

**Option 2**

- Prepare the cable end
- Mount the cable on the hardware
- Route the buffer tubes to a work surface
- Assemble the BTF
- Route BTF and tubes inside the hardware

**Option 3**

- Prepare the cable end
- Mount the cable on the hardware
- Assemble the BTF at the hardware
- Install the BTF in the hardware

**5.2** Determine the total strip length requirement for your installation. This length will be:

- the buffer tube length(s) required to route the tubes from the cable sheath attachment point to the planned location of the BTF body.

*plus*

- either 35 inches (for the 25-inch fiber assembly) or 57 inches (for the 47-inch fiber assembly).

*plus*

- (optional) any additional length called for in the cable stripping procedure as a safety factor.

*plus*

- (optional) the distance from the cable mounting point to a work surface if you are performing an Option 2 installation.

Mark this strip length from the end of the cable with a wrap of tape (Figure 6).

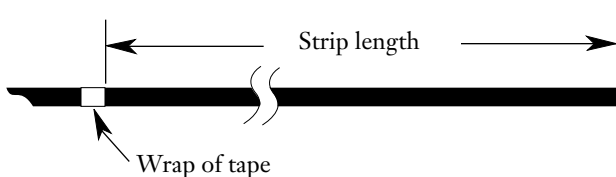


Figure 6

**5.3** Strip the cable in accordance with the cable manufacturer’s sheath removal instructions. Determine the cable central member and strength member yarn lengths needed to secure the cable from the instructions provided with the hardware (e.g. a LANscape® CCH® unit, WCH, etc.).

For sheath removal instructions, refer to the appropriate Corning Cable Systems SRP.

**5.4** If you are working with a grease or gel-filled water-blocked cable, use a Fiber-Clean wipe to remove any flooding compound from the buffer tubes.

**5.5** Depending on the kit being used, measure 35 or 57 inches of buffer tube from the end of the tubes. Mark each tube with the permanent marker at this location.

**To minimize the chance of breaking a fiber, perform the remaining steps in this procedure one buffer tube at a time.**

**Note:** Sections 6 and 7 assume that you have a BTF assembly platform. If you do not have a platform, skip to Section 8.

## 6. Buffer Tube Preparation with an Assembly Platform

**6.1** Secure the cable end to the work surface with tape (Figure 7) or secure it in the terminating hardware as shown in Figure 8.

Make sure that the marks you placed on the buffer tubes in step 5.5 can reach the BTF Assembly platform.

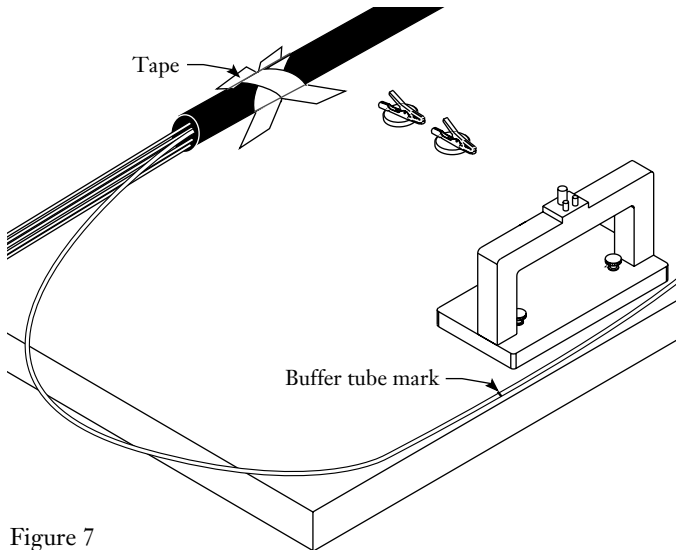


Figure 7

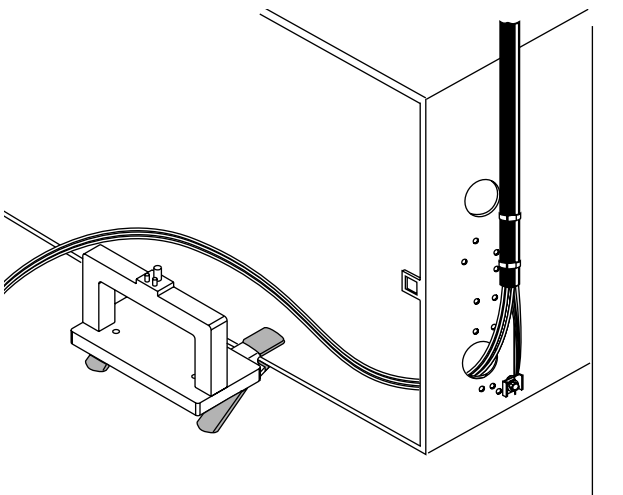


Figure 8

**6.2** Select the first buffer tube. Remove the buffer tube back to the mark made in step 5.5 with a buffer stripping tool as described in the tools instructions, SRP-005-005, *Corning Cable Systems Stripping Tool for Buffers*.

**6.3** Clip the buffer tube on the left side of the platform with about 2 inches protruding towards you (see Figure 9).

**6.4** If the buffer tube is Gel-free, carefully cut out the water block yarns and proceed to step 6.7. If filling compound is present, use a Fiber-Clean wipe to clean the fibers.

**6.5** Use a clean lint free tissue to thoroughly dry each fiber (Figure 9).

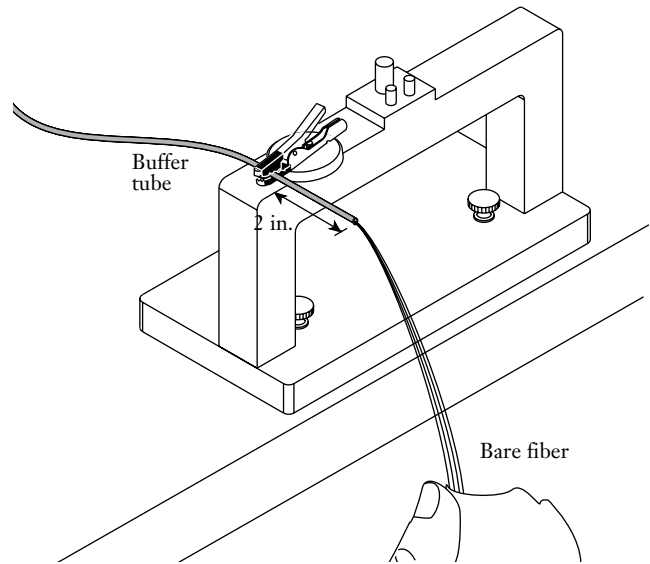


Figure 9

**6.6** Run a clean dry finger along each fiber to check for any filling compound or cleaner residue. If residue is present on the fiber, repeat steps 6.4 and 6.5.

**Important:** Make sure that the fibers are clean and dry. Any residue left on the fiber will obstruct threading operations into the 900  $\mu\text{m}$  assembly tubes.

**6.7** Place the bottom of a BTF body on the pins of the assembly tool (Figure 10).

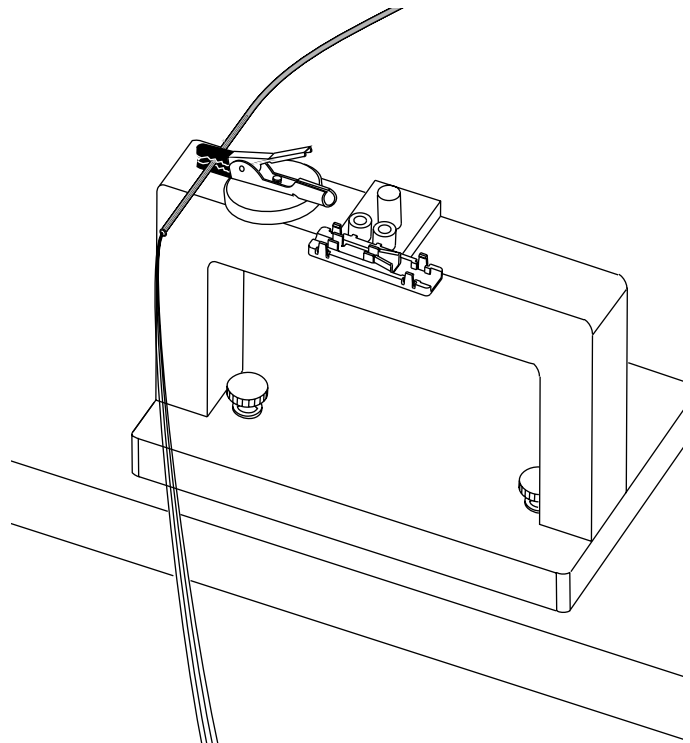


Figure 10

**6.8** Position the buffer tube so that its end is within the crimp tabs of the BTF bottom (Figure 11).

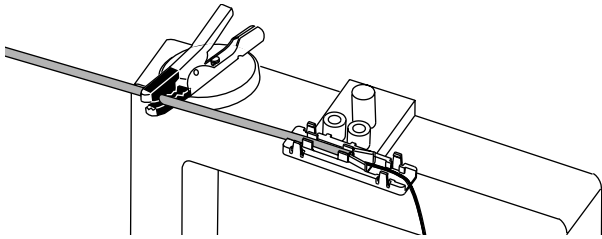


Figure 11

**CAUTION:** Do not deform or crush the buffer tube in the next step - doing so may cause bending in the fibers.

**6.9** Use pliers to gently bend the crimps tabs over the end of the buffer tube (Figure 12).

Check the crimp for effectiveness by *gently* pulling on and twisting the tube – the tube should not move.

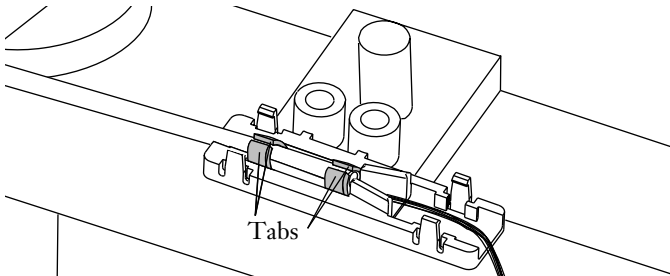


Figure 12

**6.10** Hang the 900 μm assembly vertically from the assembly platform with the other clip as shown in Figure 13. Note the number markings on the assembly's plastic housing.

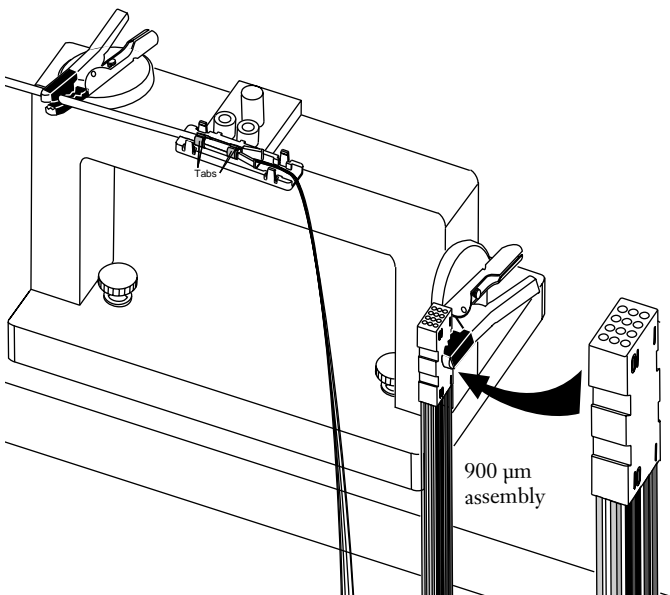


Figure 13

**Note:** If conditions prevent you from hanging the 900 μm assembly vertically, position the 900 μm assembly horizontally across a work surface, keeping the tubes as straight as possible (Figure 14).

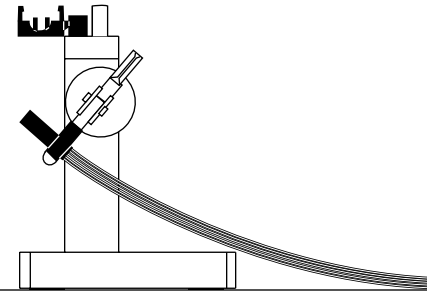


Figure 14

## 7. Threading the Fibers and Assembling a BTF with an Assembly Platform

**7.1** Separate and untangle the number 1 (blue) fiber back to the point it exits the buffer tube.

**7.2** Carefully thread about three inches of the first fiber into the #1 900 μm tube (Figure 15).

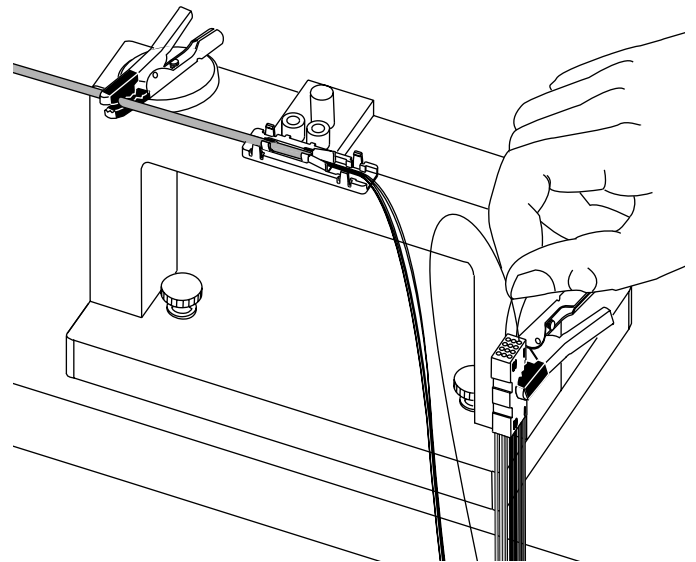


Figure 15

**7.3** Repeat steps 7.2 for the remaining fibers in sequential fiber order (i.e., blue, orange, green, brown, etc.). Work the threading process across the 900 μm tube assembly in the proper order (Figure 16).

*Do not let any of the fibers cross each other during this threading operation.*

| Top view |   |   |   |
|----------|---|---|---|
| 12       | 9 | 6 | 3 |
| 11       | 8 | 5 | 2 |
| 10       | 7 | 4 | 1 |

|           |            |
|-----------|------------|
| 1) Blue   | 7) Red     |
| 2) Orange | 8) Black   |
| 3) Green  | 9) Yellow  |
| 4) Brown  | 10) Violet |
| 5) Slate  | 11) Rose   |
| 6) White  | 12) Aqua   |

Figure 16

**7.4** After all of the fibers have been inserted into the tubes, gently push the fibers into the tubes as a group until the fiber ends protrude from the ends of the tubes.

**7.5** Carefully pull the fibers out of the tube ends to take up most of the excess length between the BTF body and the 900  $\mu\text{m}$  assembly.

*Leave a small fiber loop between the BTF body and the 900  $\mu\text{m}$  assembly to prevent fiber breakage during later steps in this procedure (Figure 17).*

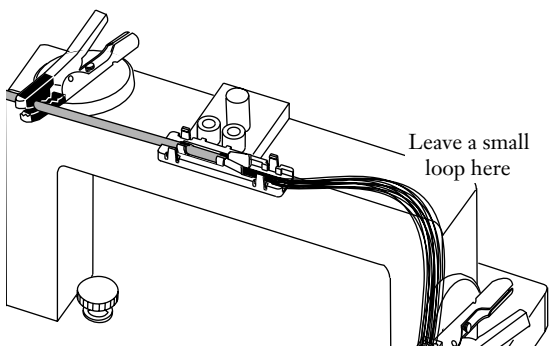


Figure 17

**7.6** Remove the clip holding the 900  $\mu\text{m}$  assembly.

**7.7** Carefully slide the assembly while gently pulling the bare fibers protruding from the 900  $\mu\text{m}$  tube ends until the assembly is above the fan-out body (Figure 18).

*At times the fibers will twist as a group when sliding the 900  $\mu\text{m}$  assembly towards the buffer tube. Rotate the 900  $\mu\text{m}$  assembly opposite the direction of twist until the fibers straighten out. Severe twists left in the fibers could exhibit long term micro-bending effects on the fiber performance and add loss.*

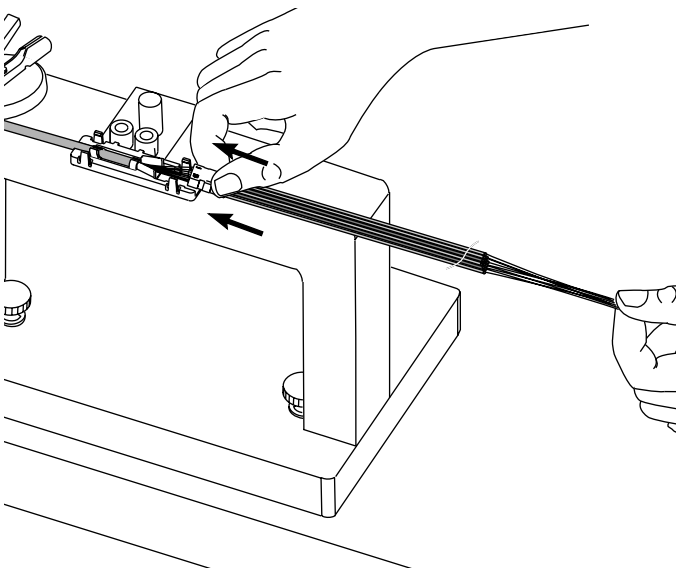


Figure 18

**7.8** Lower the insert section into the BTF body and press it into place (Figure 19).

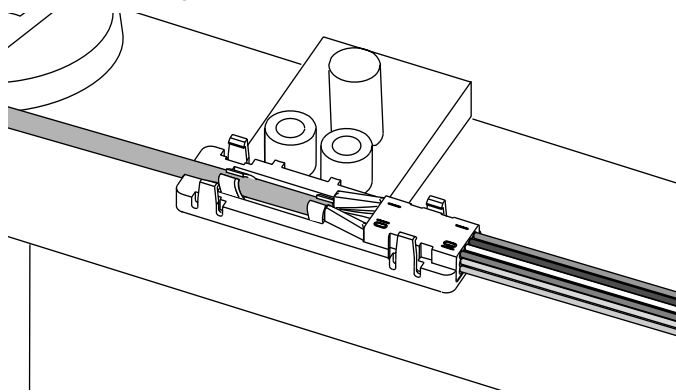


Figure 19

**7.9** Align the top of the BTF body with the bottom and hand press them together until the top snaps into place (Figure 20).

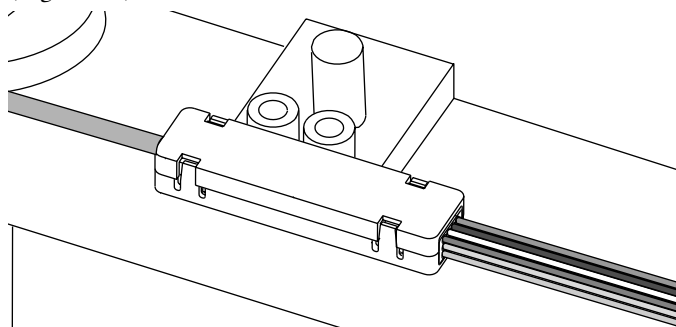


Figure 20

**7.10** Lift the BTF body and clamps directly upward to remove the body from the assembly platform.

**7.11** Separate another buffer tube and begin the assembly of the next BTF by repeating steps 6.2 through 7.10.

*Corning Cable Systems recommends working in sequential order to maintain installation organization.*

**7.12** After all of the BTF assemblies are complete, skip to Section 10, *Marking the BTF*.

## 8. Buffer Tube Preparation (without a Platform)

**8.1** Secure the cable end down to a work surface with tape so that the marks on the buffer tubes can reach the work surface edge (see Figure 21).

**8.2** Select the first buffer tube. Remove the buffer tube back to the mark made in step 5.5 with a buffer stripping tool as described in SRP-005-005, *Corning Cable Systems Stripping Tool for Buffers*.

**8.3** Tape down the buffer tube to receive the BTF so that 1-2 inches of tube overhang the work surface edge as shown in Figure 21.

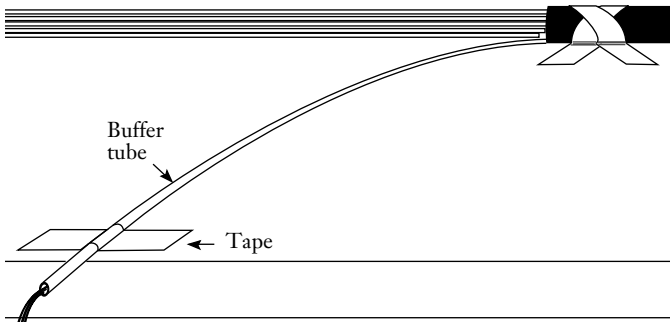


Figure 21

**8.4** If the buffer tube is Gel-free, carefully cut out the water block yarns and proceed to step 8.6 (Figure 22). Use a clean lint free tissue to thoroughly dry each fiber.

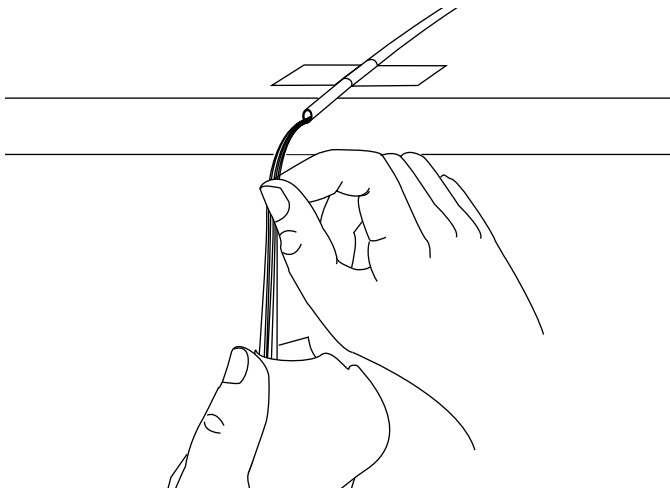


Figure 22

**8.5** Run a dry finger along each fiber to check for any filling compound residue. If residue is present on the fiber, repeat step 8.4.

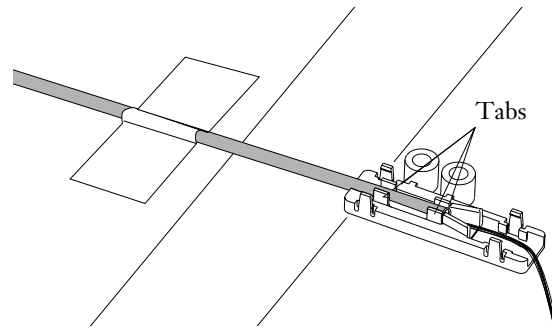
**Important:** Make sure that the fibers are clean and dry. Any residue left on the fiber will obstruct threading operations into the 900 μm assembly pieces.

**8.6** Place the crimp tabs of the bottom piece of a BTF on the end of the buffer tube. Press the tab with pliers to secure the BTF bottom to the end of the tube (Figure 23).

Use caution not to crush the tube. Crimp only until the tube begins to deform. Spaces between the ends of the crimp tabs are normal for most applications.

Check the crimp for effectiveness by pulling on and twisting the tube – the tube should not move when 5 pounds of tension are applied.

Figure 23



**9. Threading the Fibers (without a Platform)**

**9.1** Approximately 2 inches (5 cm) off to either side of the tube and BTF bottom, use strapping tape to secure the plastic section of the 900 μm assembly to the table’s edge as shown in Figure 24.

**Note:** The plastic section 900 μm assembly has color-coded legs and corresponding numbers on its plastic housing. The number 1, or blue tube should be on the right front corner of the assembly.

**9.2** Separate and untangle the number 1 (blue) fiber back to the point it exits the buffer tube.

**9.3** Carefully thread about three inches of the first fiber into the #1 900 μm tube (Figure 24).

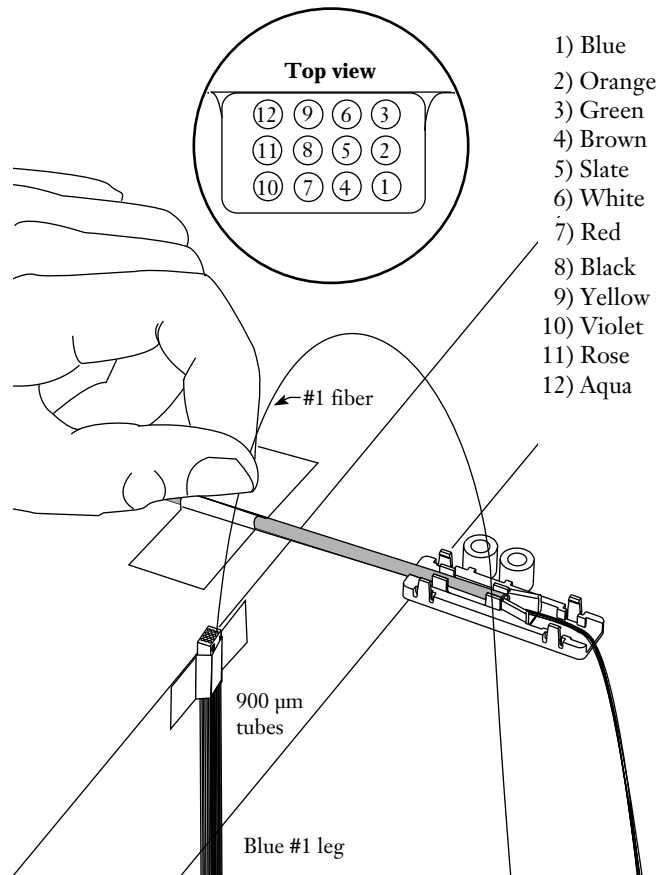


Figure 24

**9.4** Repeat steps 9.2 and 9.3 for the remaining fibers in sequential fiber order (i.e., orange, green, brown, etc.). Work the threading process across the 900  $\mu\text{m}$  tube assembly in the proper order.

*Do not let any of the fibers cross each other during this threading operation.*

**9.5** After all of the fibers have been inserted into the 900  $\mu\text{m}$  tubes, gently push the fibers into the tubes as a group until the fiber ends protrude from the ends of the tubes.

**9.6** Carefully pull the fibers out of the tube ends to take up most of the excess length between the BTF body and the 900  $\mu\text{m}$  assembly.

*Leave a small fiber loop between the BTF body and the 900  $\mu\text{m}$  assembly to prevent fiber breakage during later steps in this procedure (Figure 25).*

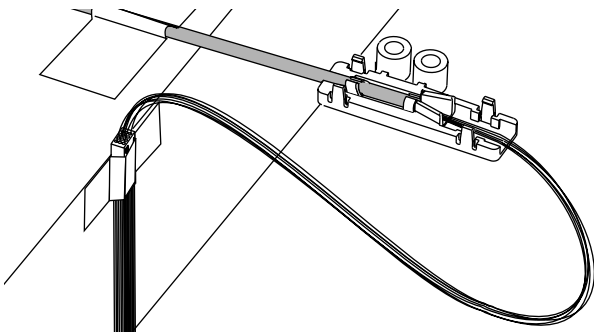


Figure 25

**9.7** Untape the 900  $\mu\text{m}$  assembly from the table edge. Carefully slide the assembly while gently pulling the bare fibers protruding from the 900  $\mu\text{m}$  tube ends until the assembly is above the fan-out body (Figure 26).

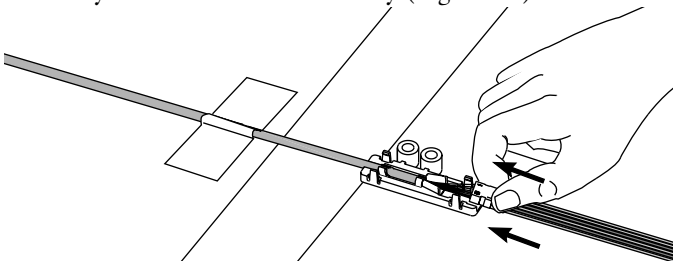


Figure 26

*At times the fibers will twist as a group when sliding the 900  $\mu\text{m}$  assembly towards the buffer tube. Rotate the 900  $\mu\text{m}$  assembly opposite the direction of twist until the fibers straighten out. Severe twists left in the fibers could exhibit long term micro-bending effects on the fiber performance and add loss.*

**Note:** *Because buffer tubes are semi-rigid, they require careful handling to compensate for the tubes' "memory" and "springy" nature. Buffer tubes will tend to quickly return to their original position after handling. Whenever you use tape to anchor the tubes down, use care to control the tubes when removing the tape.*

**9.8** Lower the insert section into the BTF body and press it into place (Figure 27).

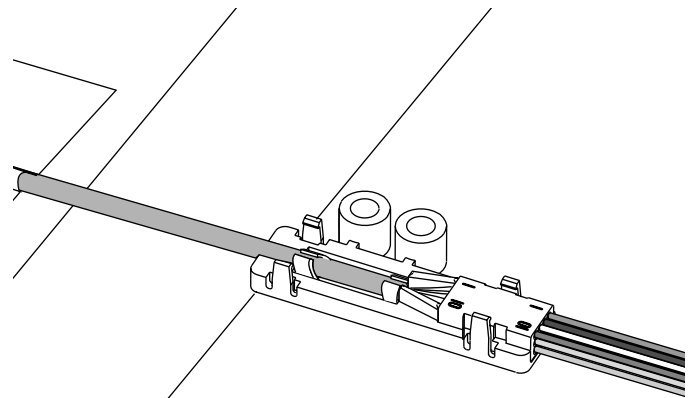


Figure 27

**9.9** Align the top of the BTF body with the bottom and hand press them together until the top snaps into place (Figure 28).

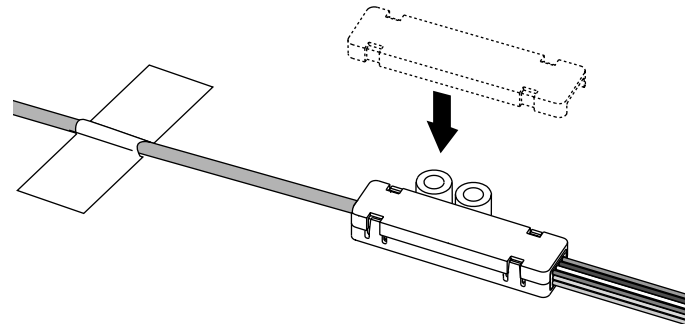


Figure 28

**9.10** Remove the tape from the buffer tube.

**9.11** Separate another buffer tube and assemble the of the next BTF by repeating steps 8.2 through 9.10.

*Corning Cable Systems recommends working with the tubes in sequential order to maintain installation organization.*

## 10. Marking the BTF

**10.1** To aid in the identification and maintenance of the fan-out assemblies, use numbered wire markers to individually identify each BTF with respect to its buffer tube number if the buffer tubes are not easily distinguished (Figure 29).

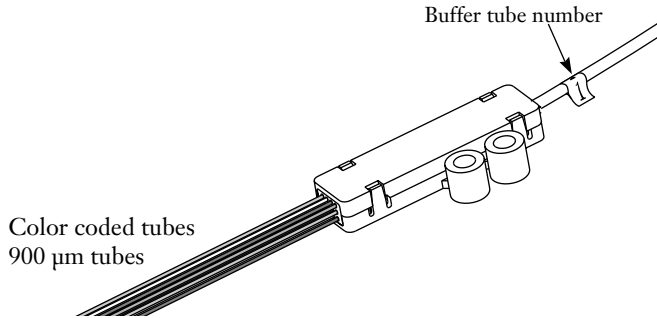


Figure 29

## 11. Fiber Termination

**11.1** Trim the excess fiber lengths to a length of 2 inches (5 cm) from the end of the 900  $\mu$ m tubing.

**11.2** Terminate each fiber, working one BTF assembly at a time, following the instructions provided with the connectors.

**11.3** Test the connectors in accordance with standard test procedures or any recommended test procedures supplied by the connector vendor.

## 12. BTF Installation into Hardware

**12.1** The BTF can be either bolted or taped into pieces of hardware. Refer to the instructions provided with the hardware being used to determine the best method.

**12.2** To route the BTF assembly into the hardware:

- a) Hold the BTF body while grasping the buffer tube just outside the assembly.
- b) Carefully guide the BTF assembly into place, taking care to prevent the buffer tube from kinking at the entrance to the BTF body.

*Special Note:  
Fiber Optic  
Training  
Programs*



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