

SC CONNECTOR KIT		FIBER OPTIC CABLE		
PART NUMBER		TRANSMISSION	MODE	SIZE AND TYPE
Restriction of Hazardous Substances (RoHS)				
Non-Compliant	Compliant			
--	6828099-[ ]	Simplex	Multimode	1.6- to 2.0-mm Tight-Jacketed Fiber
--	6828100-[ ]		Singlemode	
1828574-[ ]	--	Duplex	Multimode	
1828573-[ ]	--		Singlemode	

Figure 1

## 1. INTRODUCTION

Tight-jacketed fiber SC connector kits listed in Figure 1 are designed to be applied to fiber optic cable described in Figure 1. Read this material thoroughly before starting assembly.

**NOTE**  
All numerical values in this instruction sheet are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Figures are not drawn to scale.

Reasons for reissue of this instruction sheet are provided in Section 6, REVISION SUMMARY.

## 2. DESCRIPTION

The connector kits contain the components shown in Figure 1. The duplex clip (included with duplex connector kits) is used to join any two simplex connectors.

**NOTE**  
The protective cover should be kept on the connector subassembly until ready for assembly.

## 3. ASSEMBLY PROCEDURE

The following tools and materials are necessary for preparation, assembly, inspection, and maintenance of the connectors. Follow the operating instructions packaged with the tools and safety guidelines packaged with the materials.

### 3.1. Tools and Consumables

#### A. Tools

- Miller Strip Tool 1754708-1 or Fiber Optic Combination Strip Tool 1278947-1 (408-4577)
- Aramid Shears 1278637-1

- Cable Preparation Template 1828843-1
- SC Fiber Protector 502656-1
- Fiber Optic Sapphire Scribe Tool 504064-1 (408-4293)
- 1.6-2.4-mm Cable Die Set 1588175-1
- PRO-CRIMPER\* II Hand Tool Frame Assembly 58532-1 (408-4020)
- Heat Cure Oven Assembly 502134-1 (120 Vac) or 502134-2 (240 Vac) (408-9460)
- Oven Block Assembly 1457628-1
- If using epoxy, Epoxy Mixer 501202-1
- Fiber Optic Inspection Microscope (200×) 754767-1
- SC Polishing Bushing 502631-1
- Polishing Plate 501197-1
- Polishing Pad 501858-1 (green)
- SC Duplex Insertion Tool 492042-1
- heat gun
- compressed air

**B. Consumables**

- EPO-TEK 353-ND Epoxy 504035-1 or LOCTITE 648 anaerobic adhesive and LOCTITE 7649 activator (recommended)

**NOTE** Refer to Material Safety Data Sheet (MSDS) 125-6353 for characteristics, reactivity data, and handling of the epoxy.

- If using epoxy, Epoxy Applicator Kit 501473-3
- Alcohol pads or isopropyl alcohol and lint-free cloths
- 5-μm Polishing Film 228433-8 (light gray)
- 1-μm Polishing Film 503887-1 (green or lavender)
- 0.3-μm Polishing Film 228433-5 (white)

**3.2. Selection of Epoxy or Anaerobic Adhesive**

Choose the epoxy or anaerobic adhesive:

- The recommended epoxy is packaged in pre-measured bags. It will cure in an ambient room temperature of 22°C [71.6°F] in approximately 1 to 3 minutes.
- The recommended anaerobic adhesive is packaged in two bottles (adhesive and primer). It will cure between 115° and 120°C [239° and 257°F] in 15 minutes.

**3.3. Prepare the Cable**

**DANGER** To avoid personal injury, ALWAYS wear eye protection when working with optical fibers.

**DANGER** NEVER look into the end of a terminated or unterminated fiber. Laser radiation is invisible but can damage eye tissue. NEVER eat, drink, or smoke when working with fibers. This could lead to ingestion of glass particles.

**DANGER** BE VERY CAREFUL to dispose of fiber ends properly. The fibers create slivers that can easily puncture the skin and cause irritation.

1. Slide the bend-limiting boot (small diameter end first) onto the cable. Then slide the crimp eyelet/heat shrink assembly (heat shrink end first) onto the cable. See Figure 2.
2. Using the strip tool and shears, strip the cable using the cable preparation template (dimensions are to scale), exposing the glass cladding. Refer to Figure 3.

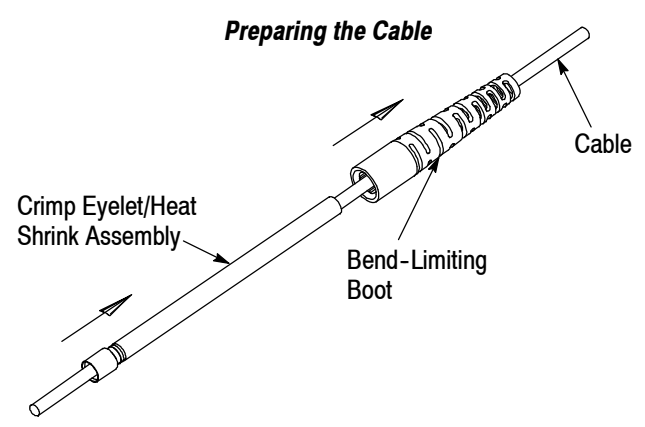


Figure 2

**Note:** Illustration Not to Scale  
Dimension are in millimeters.

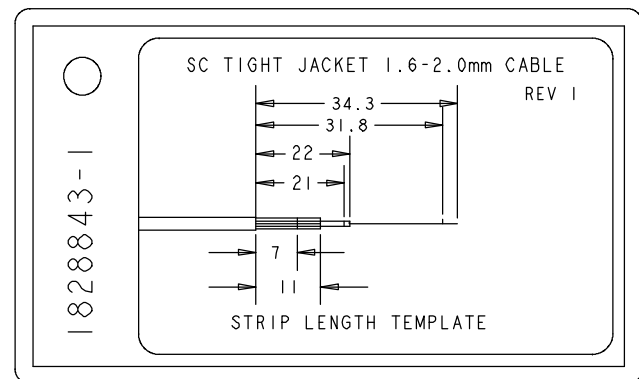


Figure 3

3. Using the alcohol pad or lint-free cloth dampened with alcohol, clean the glass cladding to remove any coating residue.



**CAUTION** NEVER clean any part of the fiber with a dry cloth.

4. If using the anaerobic adhesive, dip the fiber and buffer into the primer or apply the adhesive with the brush. Allow 30 seconds for the primer to dry.

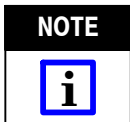


**NOTE** For optimum results, the primer must be applied properly and allowed to dry.

### 3.4. Prepare and Apply the Epoxy or Anaerobic Adhesive

#### A. Preparation of Epoxy

1. Remove the separating clip from the bag of epoxy and, using the epoxy mixer, mix the epoxy inside the bag thoroughly for 2 minutes.



**NOTE** When mixed properly, the epoxy should have a uniform, translucent, amber color.

2. Using the epoxy applicator kit, install the needle tip onto the epoxy applicator. Make sure that the tip is secure. Remove the plunger.

3. Cut the epoxy bag diagonally at one corner. Squeeze the epoxy into the back of the applicator. Re-assemble the plunger. Loosen, but do not remove, the cap. Hold the applicator vertically (with needle tip upward), and slowly push the plunger until the entrapped air escapes and a bead of epoxy appears at the tip. Remove the cap.

4. Using the alcohol pad or alcohol-dampened lint-free cloth, clean the tip of the applicator needle.

#### B. Preparation of Anaerobic Adhesive

1. Install the needles onto the two applicators, making sure they are secure.

2. Remove the plunger from one of the applicators, and load the adhesive into the back of the plunger. Re-install the plunger.

3. Holding the applicator vertically (with needle tip upward), allow the adhesive to drain away from the needle then slowly push the air out of the applicator until a bead of adhesive appears at the tip of the needle.

4. Using the second applicator for the primer. With the plunger fully forward, draw a small amount (approximately 3 to 5 ml [.101-.169 oz]) of primer into the applicator.

### 3.5. Apply the Epoxy or Anaerobic Adhesive

1. Remove the protective cover from the connector subassembly.

2. If using epoxy, install the fiber protector onto the connector subassembly as shown in Figure 4.

3. Hold the connector subassembly in an upright position, and insert the tip of the needle into the rear body and support tube of the connector subassembly until the tip of the needle touches the base of the ferrule. Refer to Figure 5.

#### Installing the Fiber Protector (For Use with Epoxy Only)

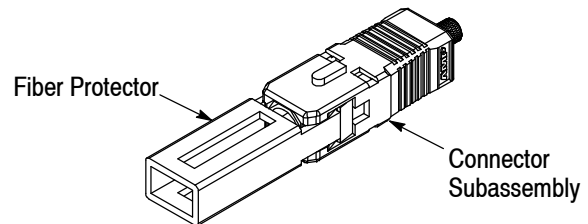


Figure 4

#### Applying Epoxy or Anaerobic Adhesive

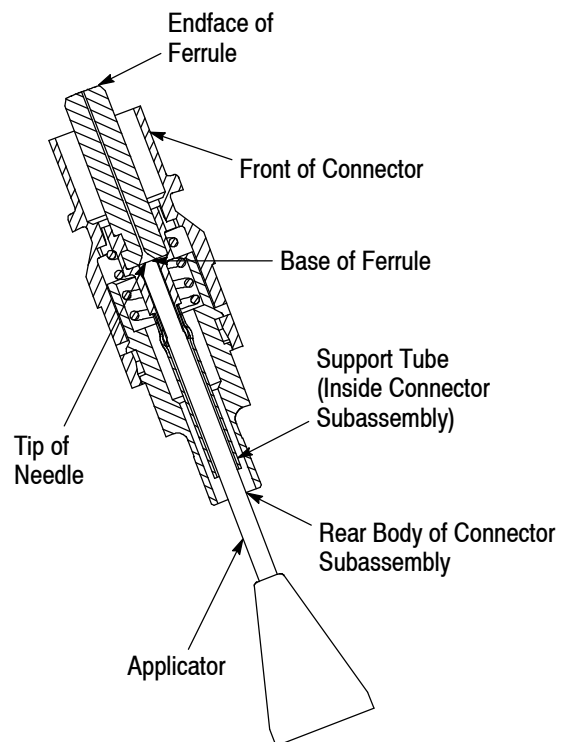


Figure 5

4. Keeping the tip of the needle against the base of the ferrule, *slowly* inject the epoxy or adhesive into the connector subassembly until a small bead of epoxy or adhesive exits from the endface of the ferrule. See Figure 5.

5. Withdraw the applicator slightly (approximately 1.0 [.04]), hold for one second, then retract the needle quickly *without* injecting any epoxy or adhesive into the connector subassembly.



*If too much epoxy or adhesive is injected, the connector subassembly will not function properly.*

### 3.6. Terminate the Fiber

1. Taking care not to break the fiber, insert the fiber into the rear body and support tube of the connector subassembly until the fiber buffer bottoms on the base of the ferrule. The end of the cable jacket should be just short of the rear body and the fiber should extend approximately 6.4 [.25] from the endface of the ferrule. See Figure 6, Detail A.



*DO NOT allow the cable strength members to enter the connector subassembly.*

2. Uniformly distribute the cable strength members around the rear body of the connector subassembly. See Figure 6, Detail B.

3. Slide the crimp eyelet/heat shrink assembly over the cable strength members until it bottoms on the connector subassembly. See Figure 6, Detail C.

4. Install the die into the hand tool frame. Position the crimp eyelet end of the crimp eyelet/heat shrink assembly into the crimping chamber of the die. Make sure that the connector subassembly is aligned with the edge of the die. Refer to Figure 6, Detail D.

5. Hold the connector subassembly in place, and actuate the tool. The strength members should be held in place.

6. Remove the assembly from the tool, and check that the crimp is straight and even, and centered on the crimp eyelet end.

### 3.7. Cure the Epoxy or Anaerobic Adhesive

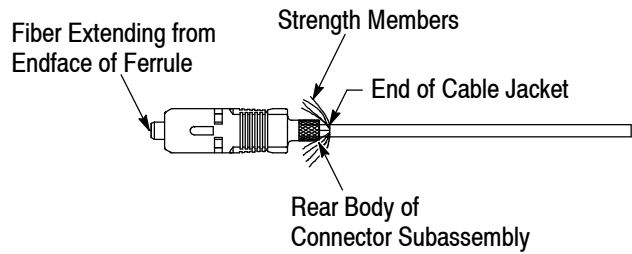
#### A. Epoxy



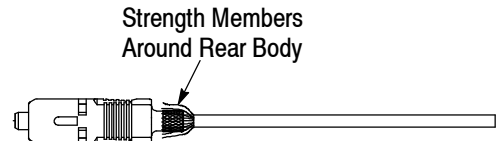
*Excess epoxy must be removed BEFORE CURING; otherwise, excess epoxy will be difficult to remove.*

#### Terminating the Fiber

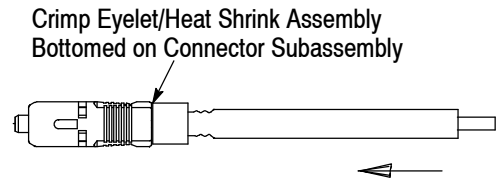
##### Detail A



##### Detail B



##### Detail C



##### Detail D

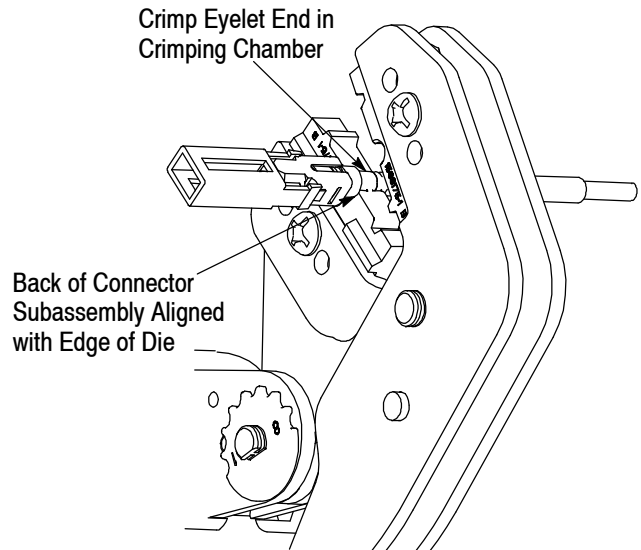


Figure 6

1. Place the connector subassembly in the heat cure oven according to the instructions packaged with the oven. Refer to Figure 7. Cure the epoxy between 115° and 120°C [239° and 257° F] for a minimum of 15 minutes.

This step will also shrink the heat shrink (of the crimp eyelet/heat shrink assembly) into place.



*\*To avoid damage to the assembly, DO NOT expose the assembly to excessive temperatures.*

2. After curing, grasp the cable, and *gently* lift the assembly out of the oven. The assembly will be HOT—allow sufficient time for the assembly to cool before proceeding.



*To avoid damage to the assembly, the assembly must be allowed to cool.*

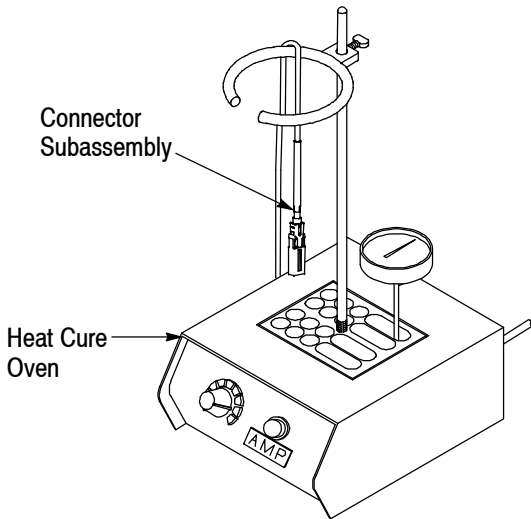


Figure 7

**B. Anaerobic Adhesive**

1. Using the applicator, dispense a drop of primer over the bead of the adhesive on the endface of the ferrule.
2. Allow the adhesive to cure at an ambient room temperature of 22°C [71.6°F] for approximately 1 to 3 minutes.



*For optimum results, the adhesive must be applied properly and allowed to cure.*

3. Using the heat gun, evenly heat the heat shrink of the crimp eyelet/heat shrink assembly until it shrinks into place. DO NOT overheat.



*Overheating can cause the fiber bending, breakage, or high insertion loss.*

**3.8. Cleave the Fiber**



*ALWAYS wear safety glasses when working with optical fibers. BE VERY CAREFUL to dispose of fiber ends properly. The fibers create slivers that easily puncture the skin and cause irritation.*

1. If used, carefully rotate the fiber protector to remove it from the connector subassembly.
2. Firmly support the connector assembly.
3. Place the blade of the scribe tool directly above the epoxy or adhesive. DO NOT allow the blade to make contact with the epoxy or adhesive. Refer to Figure 8.



*Allowing the blade to touch the epoxy or adhesive could damage, chip, or crack the cutting tip of the blade.*

4. Lightly draw the beveled edge of the blade across the fiber parallel to the tip of the ferrule. After scoring the fiber, pull it straight away from the ferrule. The fiber should shear cleanly at the scribed point.

**Cleaving the Fiber**

*After Scoring Fiber, Pull Fiber Straight Away*

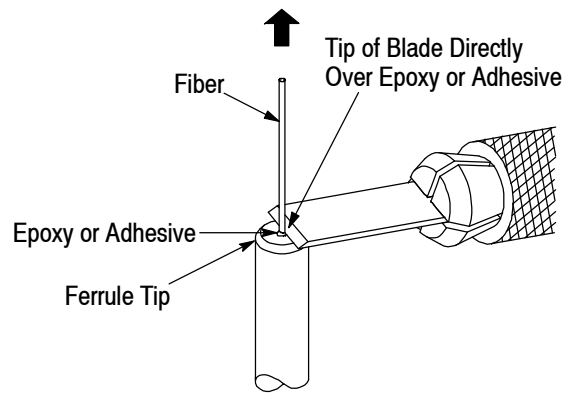


Figure 8

**3.9. Install the Bend-Limiting Boot**

Slide the bend-limiting boot over the cable until it is against the rear body of the connector subassembly. See Figure 9.

**3.10. Polish the Fiber** (Figure 10)

It is recommended polishing the fiber using a polishing machine. *Machine polishing produces the best results.* Polish the fiber according to the machine manufacturer's instructions.

If machine polishing is not possible, hand polish the fiber according to the following:



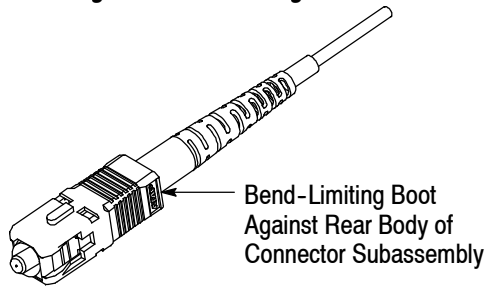
**Installing the Bend-Limiting Boot**

Figure 9

**NOTE**

For optimum results, keep the polishing films clean.

1. Level the fiber. Using a small piece of the 5- $\mu\text{m}$  polishing film, lightly polish the endface of the ferrule in a small circular motion to remove the fiber stub down to the level of the epoxy or adhesive and until the fiber stops leaving a trace on the film.
2. Install the connector subassembly onto the polishing bushing.
3. Place the polishing pad on the polishing plate. Place the 5- $\mu\text{m}$  polishing film on the polishing pad.

**CAUTION**

ALWAYS place the polishing bushing on a clean area of the polishing film. NEVER start polishing across a dirty area of the polishing film.

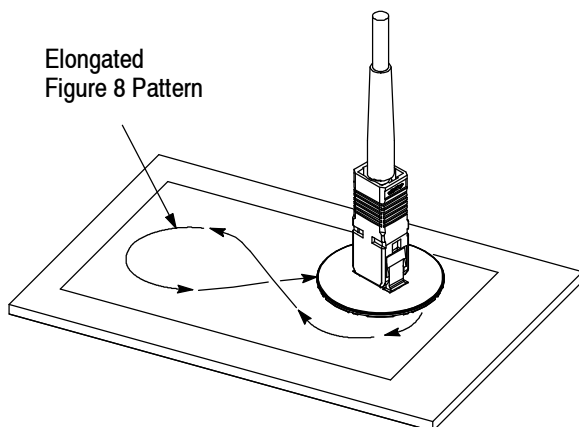
**Hand Polishing the Fiber**

Figure 10

4. Hold the assembly and, starting with very light pressure, polish the tip of the fiber in an elongated figure-8 pattern. Refer to Figure 10. A small

amount of the exposed fiber will be worn away, indicated by a narrow white trace on the film. As the fiber wears, the trace will widen and darken, indicating that the epoxy or adhesive is being removed. At this point, a slight downward pressure may be applied while polishing. Check the tip of the fiber often, and stop polishing when the epoxy or adhesive is a medium red-pink and about one-third of the size of the ferrule diameter.

**CAUTION**

It is essential that not all the epoxy or adhesive is removed when using the 5- $\mu\text{m}$  film. Check the tip of the fiber frequently.

5. Remove the 5- $\mu\text{m}$  polishing film from the polishing pad, and place the 1- $\mu\text{m}$  polishing film on the polishing pad. Polish the tip of the fiber for about 20 seconds.
6. Clean the endface of the ferrule and the polishing bushing with the alcohol pad or alcohol-dampened lint-free cloth.
7. Remove the 1- $\mu\text{m}$  polishing film from the polishing pad, and place the 0.3- $\mu\text{m}$  polishing film on the polishing pad. Using light pressure, polish the fiber until the epoxy or adhesive is gone. DO NOT overpolish.
8. Clean the endface of the ferrule and the polishing bushing using the alcohol pad or alcohol-dampened lint-free cloth. Remove the assembly from the polishing bushing.

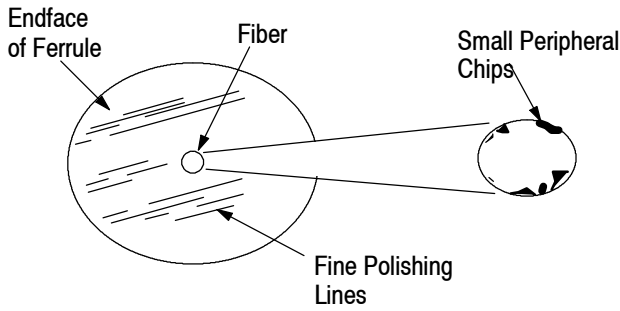
**3.11. Inspect the Fiber****DANGER**

Before inspecting the fiber, DISCONNECT the fiber from the power signal source. NEVER inspect or look into the end of a fiber when optical power is applied to the fiber. The infrared light used, although it cannot be seen, can cause injury to the eyes.

1. Using the fiber optic inspection microscope kit, inspect the endface of the ferrule and fiber according to the following criteria (refer to Figure 11):
  - Make sure that all epoxy or adhesive is removed from the ferrule. Use a sharp blade to remove epoxy or adhesive from the chamfered edge of the ferrule. DO NOT touch the fiber.
  - Dirt may be mistaken for small pits. If dirt is evident, clean with the alcohol pad or alcohol-dampened lint-free cloth, then dry.
  - Fine polishing lines are acceptable.
  - Small peripheral chips at the outer rim of the fiber are acceptable.
  - Large chips in the center of the fiber are unacceptable, and the fiber must be re-terminated.

**Inspecting the Fiber**

**Acceptable**



**Unacceptable**

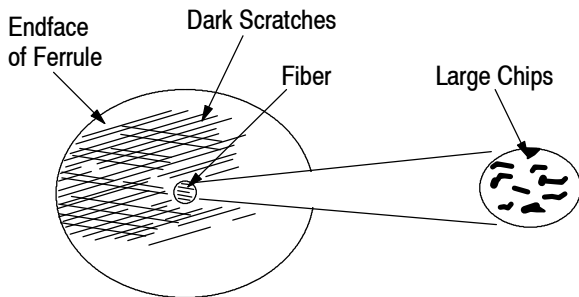


Figure 11

2. If not installing the connector immediately, install the protective cover onto connector subassembly to prevent contamination to the endface of the ferrule.

**3.12. Install the Duplex Clip**

1. Place a connector subassembly in each pocket of one half of the duplex clip. See Figure 12.
2. Place the other half of the duplex clip over the connector subassemblies, and snap the halves of the duplex clip together.

**Installing the Duplex Clip**

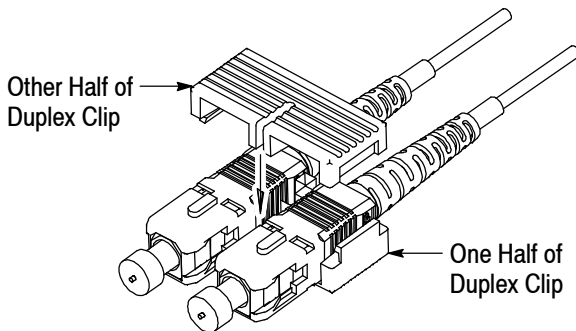


Figure 12

**4. CLEANING PROCEDURE**

**4.1. Connector**



To avoid personal injury, compressed air used for cleaning must be reduced to less than 207 kPa [30 psi], and effective chip guarding and personal protective equipment (including eye protection) must be used.

1. Wipe completely around the ferrule with an alcohol pad or lint-free cloth dampened with isopropyl alcohol. Then wipe completely around the ferrule using a dry lint-free cloth.
2. Place the dry lint-free cloth on a smooth, flat surface. Holding the connector perpendicular with the surface, wipe the endface of the ferrule across the cloth.
3. Blow compressed air across the endface of the ferrule.
4. Using the microscope, examine the endface of the ferrule for debris. If debris is present, repeat Steps 1 through 3.

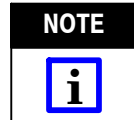


This is the final step prior to connector installation. DO NOT wipe the ferrule or allow it to touch anything before mating the connector.

5. Mate the connector to the receptacle. If the attenuation is too high, unmate both connectors (if applicable), repeat Steps 1 through 4, and clean the receptacle according to Paragraph 4.2.

**4.2. Receptacle**

1. Blow compressed air through the receptacle.



If both connectors are mated, blow compressed air into the open end of the receptacle.

2. Re-mate the connector(s) to the receptacle, and repeat Paragraph 4.1. If attenuation is still too high, repeat the maintenance procedure (Paragraphs 4.1 and 4.2).

**5. REPLACEMENT AND REPAIR**

Kit components are not repairable. Replace any damaged components. DO NOT re-use terminated connector subassemblies or crimp eyelet/heat shrink assemblies by removing the cable.

**6. REVISION SUMMARY**

Revisions to this instruction sheet include:

- Updated document to corporate requirements
- Deleted/switched part numbers in Figure 1.