

1. INTRODUCTION

These aviation-grade fiber optic harness assemblies (reference part number 1938371-1) are designed to be used in non-critical applications, such as aircraft entertainment systems. This instruction sheet is intended to provide support and guidance for handling and installing the fiber optic harness assemblies.

NOTE



All numerical values in this instruction sheet are in metric units [with U.S. customary units in brackets].

2. DESCRIPTION

Even though fiber harness assemblies are generally relatively rugged, they still require some special handling as compared to electrical harness assemblies. The following publications and instruction sheets apply to these fiber optic harness assemblies:

NOTE



If an apparent conflict should occur between any installation drawing or document and this instruction sheet, the installation drawing or document shall take precedence over this instruction sheet. Also, where any conflict occurs between this instruction sheet and the following publications or instruction sheets, this instruction sheet shall take precedence.

2.1. Aeronautical Radio, Inc. (ARINC)

ARINC 803, "Fiber Optic System Design Guidelines"

ARINC 806, "Fiber Optic Installation and Maintenance"

2.2. Tyco Electronics Corporation

408-10237: Cable Tie Installation for
Fiber Optic Harness Assemblies

408-10181: Lacing Simplex Aviation Fiber Optic Cable

3. SAFETY AND HANDLING

3.1. Safety Precautions

- Most optical transmissions over fiber optic cable use non-visible wavelengths. This light radiation can be hazardous to eyes.
- DO NOT look into the end of a fiber optic connector unless you are certain the fiber is not energized with laser light. If uncertain if the fiber is energized, use a non-direct method of viewing and use an approved fiber optic inspection device designed to prevent eye damage due to laser light.

ARINC is a trademark of Aeronautical Radio, Inc.

3.2. Handling

Use reasonable care when handling fiber optic cables and connectors to prevent damage and contamination. To prevent potential damage to the glass fiber within the fiber optic cable:

- DO NOT step on fiber optic cables
- DO NOT lay any heavy and/or sharp edged objects on fiber optic cables
- DO NOT drop or throw fiber optic cables on the floor
- DO NOT generate twists, kinks, or severe bends when un-spooling or un-reeling fiber optic cables
- for longer fiber runs (over 3.05 mm [10 ft] long) or cable assemblies with multiple legs, at least two installers should be present to provide assistance in un-spooling and routing of the fiber optic cable
- DO NOT push or pull on optical cables that do not move freely
- DO NOT route fiber optic cables around sharp bends

NOTE



See Paragraph 3.3 for detailed information regarding acceptable cable bend radii.

— the fiber optic connectors must be kept clean and free of scratches and other damage in order to insure assemblies perform to the intended optical performance

Guidelines to prevent potential damage to the connectors are:

1. Keep the protective covers on the connectors and coupling devices during routing and remove them only when ready to mate to the coupling device.
2. Avoid laying connectors on the floor or other areas where dust and other contamination can be accumulated.
3. Prior to installing the connectors in a coupling device:
 - a. ensure that the coupling device is free from contamination (see Section 5)
 - b. inspect, and clean if necessary, the connector end face (see Section 5)

3.3. Minimum Allowable Cable Bend Radius

— The recommended minimum bend radius for an individual 1.8-mm diameter fiber cable is 25.4 mm [1 in.]. However, if necessary, a bend radius of not less than 9 mm [.354 in.] can be used as long as the bend is carefully controlled. At no time should any section of a fiber cable have a bend radius under 9 mm [.354 in.].

— If individual fiber cables are routed together, the bend radius of each individual fiber should maintain the same minimum bend radius of 25.4 mm [1 in.].

— If multiple fiber cables are bundled together and then the bundle of cables are routed, the minimum bend radius of the bundle should be 5 times the diameter of the bundle.

4. TOOLS

The following tools are recommended for cleaning and inspecting the connector end faces and coupler device:

Connector end face cleaner:

- Reel Cleaner 1918803-1 or equivalent
- Card Cleaner 1918810-1 or equivalent

Coupler device cleaner:

- Stick Cleaner 1918808-1 (1.25-mm diameter tip) or equivalent

Inspection:

- 200× Microscope Kit 1754767-1 with 1.25mm Universal Adapter 1754765-1 or equivalent

5. INSTALLATION GUIDELINES

Follow these guidelines to help ensure that the installed fiber optic harness assemblies will perform optimally.

1. Two installers should be present for cable lengths over 3.05 m [10 ft].
2. DO NOT route fiber around tight bends. See Figure 1.
3. DO NOT allow twists or kinks in fiber optic cable. See Figure 1.
4. Before installing a cable tie or clamp, wrap the fiber optic cable with RL6000 SA Stretchtape silicone rubber tape using a minimum of 1 and 1/2 wraps (if using a clamp, continue wraps to build up the diameter to at least 3.17 mm [.125-in.] larger than the inside diameter of the clamp). See Figure 2. Wrap the tape with enough tension to

Unacceptable Bend Radius and Cable Not Protected from Sharp Edge



DO NOT Allow Twist in Fiber Optic Cable



DO NOT Allow Kink in Fiber Optic Cable



Figure 1

Protective Silicone Rubber Tape Under Cable Clamp

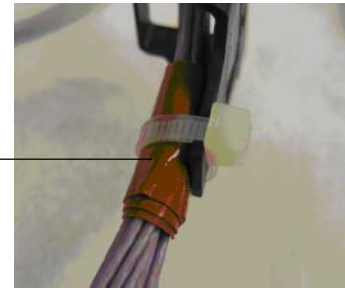


Figure 2

prevent it from sliding. The tape should extend from both sides of the clamp or cable tie by a minimum of 6.4 mm [.25 in.] to prevent the cable tie or clamp from coming into direct contact with the cable. A maximum of 53.4 N [12 lb-force] should be used when tightening the cable tie. Refer to 408-10237 for more detail on installing cable ties.

5. Leave the connector and coupler device protective caps in place until just prior to mating the connector with the coupler device. See Figure 3.

6. Inspect the ceramic coupling sleeve inside the coupler device (magnification is not necessary). See Figure 4. If any dust or other contaminant is visible, clean each side of the coupler device.

Stretchtape is a trademark of Kirkhill-TA Co.

*Leave Connector and Coupler Device Protective Caps
In Place Until Mating*

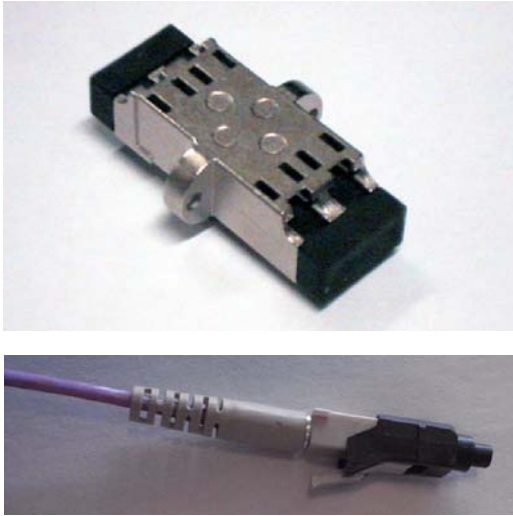


Figure 3

*Inspect Ceramic Coupling Sleeve
For Dust or Other Contamination*

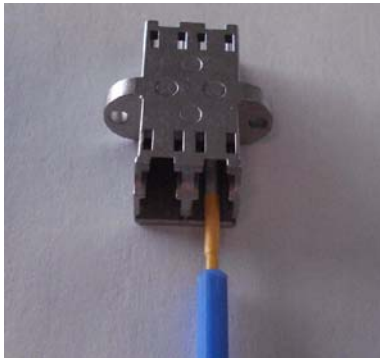


Figure 4

7. Inspect the fiber end face using the microscope to verify that no damage or contamination exists. See Figure 5 for inspection microscope kit. Refer to Section 6, INSPECTION, for acceptable and non-acceptable fiber end face conditions.

8. If necessary, clean the fiber end face using the cleaner. Refer to Figure 6.



Figure 5

*Clean Fiber End Face
(Card Cleaner 1918810-1 Shown)*



Figure 6

Connector and Coupler Device Connected



Figure 7

9. After all connectors and coupler devices are clean, install the connector into the coupler device until there is a discernible physical, and possible audible, “click”. If the connector is properly engaged, it will not pull back from a slight pull on the connector or cable.

6. INSPECTION

The two conditions of a fiber end face that can prevent the connector from properly transmitting optical signals are (refer to Figure 8):

1—damage, especially in the area of glass where the light is transmitted, can prevent optimal optical performance and can also damage the mated connector

Damage cannot be repaired easily on-site and the fiber should not be used.

2—contamination (dust, dirt, oils, or other contaminants) can prevent optimal optical performance and/or could cause damage to the optical interface

Contamination can be cleaned according to Section 5, then the fiber can be used.

Refer to Figure 9 for acceptable and unacceptable fiber end face conditions (views are from the same fiber end face).

Conditions of Fiber End Face That Prevent Properly Transmitted Optical Signals

Damage



Contamination

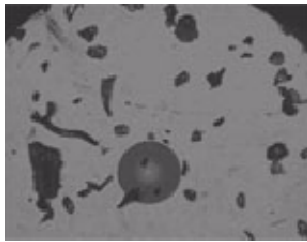
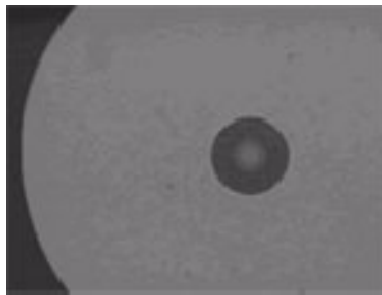


Figure 8

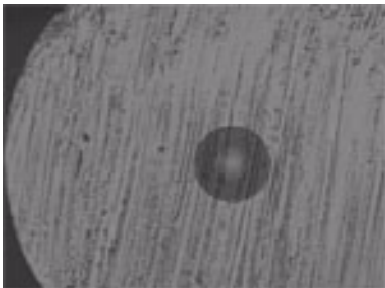
7. REVISION SUMMARY

- Initial release of instruction sheet

Acceptable Fiber End Face Condition**Unacceptable Fiber End Face Conditions**

These Conditions Could Affect Optical Performance and/or Damage Fiber End Face

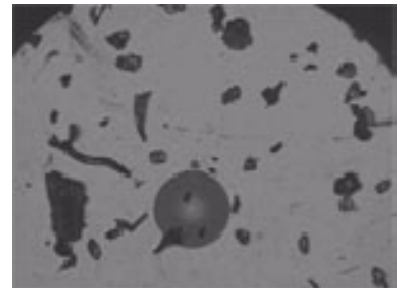
Contaminated With Finger Oils



Small Particulate



Multiple Particulate



Large Fibrous Particulate

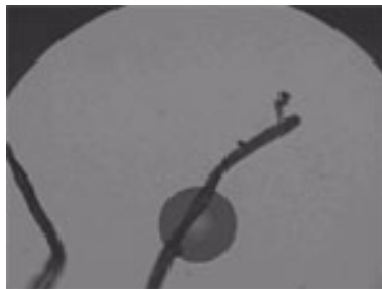


Figure 9