CF-9012 CF-9012

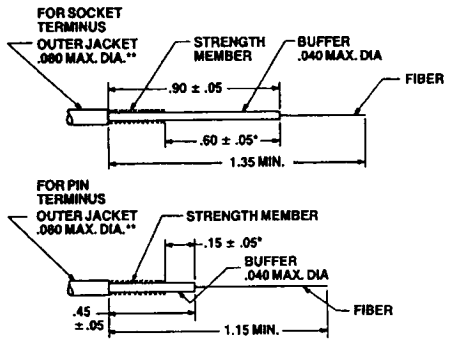
MIL-T-29504 Fiber Optic Termini
CF-198035-( ), CF-198036-( )
Cable Installation Instructions
For Physical Contact (PC) Terminations

WARNING NOTE:

Caution: Looking into fibers illuminated with laser light can cause eye damage. Follow safety procedures recommended by light source manufacturers.

Extreme care should be taken when handling glass fiber to avoid penetration of skin.

1. Ref. drawings CF-198035-CD and CF-198036-CD for identification and orientation of parts. Visually inspect cable for optical continuity.
2. Slide shrink tube back onto cable.
3. Strip cable to indicated dimensions.



* May be estimated if ends of strength member are frayed
** Consult factory for other O.D.'s.

4. Wipe off bare fiber with MEK or equivalent. Fiber surface must be clean and dry before bonding.
5. (Optional) Push fiber into terminus and remove to insure proper fiber hole size.
6. Prepare epoxy per manufacturer's instructions.
   Recommended Epoxy: 200°C Max Service Temp.; #353ND
   Suggested Source:
   Epoxy Technologies, Inc.
   P.O. Box 567
   Billerica, MA 01821
7. Fill syringe with epoxy.
8. Wipe bare fiber with epoxy. **Use epoxy sparingly** (should resemble dew on a spider web).
9. Add epoxy to outside of the rear end of terminus (.063 dia.) for approximately .150. This is to ensure bonding of the strength member to the terminus body. Carefully push stripped fiber into terminus until buffer is in contact with rear of ceramic. Outer jacket will be approximately .080 from rear of terminus. Bare fiber should be sticking out of front of terminus. There should be no epoxy on front face of the ceramic. If there is, additional polishing time may be required. Add epoxy to end of outer jacket of cable for approximately .150 to ensure sealing to shrink tube. Evenly distribute strength member over rear of terminus. Bring up shrink tube to position shown in reference drawing. (see step 1).
   Note: Neither shrink tube or strength members should be on .102 diameter.
10. Shrink tube using heat gun. Heat gun to generate between 300°-400° air flow temperature. Do not apply excessive heat to F.O. cable jacketing. Epoxy at rear of terminus will turn dark amber color at full cure. When this happens, remove heat immediately. Repeat for other fibers.
11. To cure the epoxy at the front of the terminus between fiber and ceramic, follow either of the approved procedures listed below:
    A. When using a heat gun. Heat gun to generate between 300 400°C air flow temperature. Insert end of ceramic and fiber into air flow for ten 1 second intervals.
    B. When using a step-cure oven. Step cure per the following cure schedule:

Temp. (°C)	Duration (minutes)
80	120
125	120
150	120

12. Scribe glass fiber approximately .010 above ceramic. Grasp fiber and pull slightly until fiber breaks.
13. Take a piece of 15 micron lapping film (approx. 8 X 3 inches long) and hold in hand so it has a slight concave radius to it. Complete 40 gentle strokes back and forth over termini to be polished. Use approximately a 4-inch stroke. This step will reduce the fiber length to the right amount for final polish. (Holding the lapping film on a radius ensures that the fiber length will not be polished flush with ceramic.) Repeat for other fibers.
14. Thoroughly clean termini.
15. The fully cured epoxied termini may be either hand polished or machine polished. Reference the following lists to determine which polishing fixture to use:

Hand Polishing

Termini P/N	Hand Polishing Fixture	Termini Capable of Polishing
CF-198035-( ) CF-198036-( )	11-12123	1

Machine Polishing

Using the Buehler Fibrmet* Optical Fiber Polisher and the Buehler Fibrscope* Portable Microscope.

Termini P/N	Buehler Fibrmet* Polishing Fixture P/N	Buehler Fibrscope* Adaptor Body P/N
CF-198035-( ) CF-198036-( )	11-12103	11-12104

After selecting the appropriate polishing fixture and adaptor, reference the Buehler Fibrmet* and Fibrscope* instructions for SMA type connectors to familiarize yourself with their operation. (For hand polishing go to step 28).

* Fibrmet and Fibrscope are registered trademarks of Buehler Ltd.

Amphenol Aerospace

AMPHENOL CORPORATION
Amphenol Aerospace
40-60 Delaware Avenue
Sidney, New York 13838-1395

Machine Polishing.

16. For machine polishing Amphenol size 16 ceramic termini, follow these instructions.
17. Bring the lobe of the cam to the vertical position by switching the Fibrmet* on and off.
18. Install a 90 durometer rubber pad approx. .090 inch thick on left platen. (pad thickness may vary, dependent on polishing machine). Then intall a 1 micron silicon carbide disc on the pad.
19. With the arm in the lock pin position, insert the terminus to be polished into the polishing fixture and secure.
20. Loosen the lock ring and rotate the arm counter clockwise to the left platen. Turn the adjustment collar in or out until the terminus just touches the surface of the disc. The terminus should make only a light mark on the disc.
21. Tighten the lock ring against the adjustment collar.
22. Make a final adjustment by moving both the lock ring and the adjustment collar so that the terminus just touches the abrasive disc.
23. Polish terminus until an optically and physically acceptable fiber end has been produced, approximately 10 seconds. (See Figure 1). If a small amount of epoxy is on the polished surface, continue polishing until no epoxy can be seen with the naked eye. Inspect end of the optical fiber for desired finish by examining it with the Fibrscope* portable microscope and/or interferometer. Repeat polishing if required. This step is intended to form the ceramic ferrule to a radiused tip.
24. Replace the 1 micron silicon carbide polishing disc on the left platen with a .3 micron aluminum oxide polishing disc (90 durometer pad must be left on platen).
25. Polish terminus until an optically acceptable fiber end has been produced, approximately 60 seconds. (See Figure 1) Inspect end of the optical fiber for desired finish by examining it with the Fiberscope* protable microscope and/or interferometer. Repeat polishing if required.
26. Thoroughly clean termini and fixtures.
27. After polishing has been done, go to step 33 of these instructions.

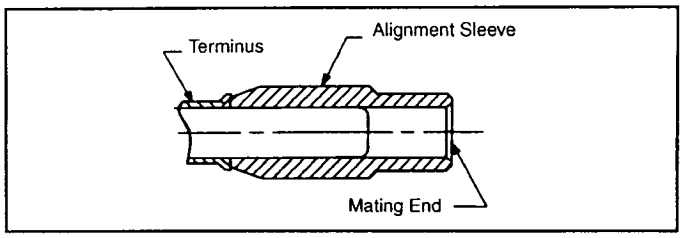
Hand Polishing

28. Determine which termini are to be polished first. Use appropriate terminus holder (labeled pin or socket) on bottom polishing plate.
29. Install terminus in bottom fixture, then screw on top fixture, captivating terminus.
30. Using a figure-8 motion of approx. 6 inches, polish terminus on 1 micron (silicon carbide) lapping film backed by a 90 durometer rubber pad; do approximately 30 figure 8's. Thoroughly clean terminus.

    (Optional) Inspect end of the optical fiber for desired finish and physical characteristics using a microscope and/or interferometer (See Figure 1). This step is intended to form the ferrule to a radiused tip. Repeat for other termini.
31. Thoroughly clean fixture. Continue polishing terminus using 0.3 micron (aluminuim oxide) lapping film backed by a 90 durometer rubber pad, do approximately 25 figure 8's. Throughly clean terminus. Inspect end of the optical fiber for desired finish using a microscope and/or interferometer (See Figure 1). Repeat for other termini.
32. Throughly clean termini and fixture. Push on protection cap, when supplied. Cap must be removed before inserting termini into connector.
33. For socket terminus only:

    Before installing protection cap push alignment sleeve onto socket terminus until fully seated. Note orientation of alignment sleeve in illustration above.

*Fibrmet and Fibrscope are registered trademarks of Buehler Ltd.



34. Push termini into connector until fully seated. Care should be taken not to exceed minimum bend radius of buffered fiber. If desired, insertion tool M81969/14-03 may be used to aid assembly. For removal of termini, use extraction half of supplied tool.

Recommended Equipment: Hand Polishing

- Razor blade and/or exacto knife
- MEK
- ISO Propanol
- Epoxy, as required
- 1 syringe
- Polishing fixture: 11-12123 (hand polish)
- 15 micron & .3 micron aluminum oxide lapping film
- 1 micron silicon carbide lapping film
- 90 durometer rubber pad, ¼ inch thick
- Microscope, 100 power or greater
- Cotton swaps
- Small scissors
- Cutting pliers
- Wire strippers or hot tweezers, depending on cable type
- .014 no nik wire strippers or equivalent
- Hot air gun (air flow temp 300-400°C)
- Fiber scriber

Recommended Equipment: Machine Polishing

- Buehler Fibrmet* Optical Fiber Polisher or equivalent
- Buehler Fibrscope* portable microscope or equivalent
- 15 micron aluminum oxide lapping film
- 4 inch dia. PSA backed .3 micron aluminum oxide polishing discs
- 4 inch dia. PSA backed 1 micron silicon carbide polishing discs
- 4 inch dia. PSA backed 90 durometer, .090 inch thick, rubber pad
- Polishing fixture: 11-12103 or equivalent
- Fibrscope* adaptor: 11-12104 or equivalent
- Razor blade and/or exacto knife
- MEK
- ISO Propanol
- Epoxy, as required
- Syringe
- Cotton swabs
- Small scissors
- Cutting pliers
- Wire strippers or hot tweezers, depending on cable type
- No nik wire strippers
- Hot air gun
- Fiber Scriber

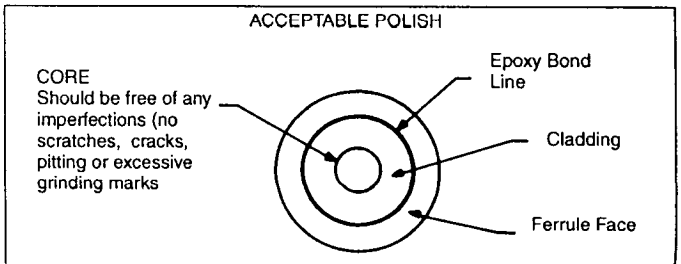


Figure 1