



# Summary Sheet: MIL-PRF-29504/14 and /15 Termini Termination

## Placement of Terminus onto End of Fiber Optic Cable

Prepared by the Joint Fiber Optic Working Group (JFOWG).

Obtain latest version by referring to Web Site <https://fiberoptics.nswc.navy.mil/> and click on "Document Repository", then "Installation".

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Release 1: 13 August 2008

### Introduction.

This figure summarizes the method to be used by personnel for placing a M29504/14 and /15 termini onto the ends of fiber optic cable.

### WARNINGS

Wear safety glasses while handling bare fiber and dispensing epoxy.  
Wash hands after handling bare fiber.  
Avoid skin contact with cleaners, epoxy and bare fiber ends.  
Do not stare into end of a fiber until verifying not connected to a light source.

### CAUTIONS

Fiber that is stripped and bare is in its most vulnerable state.  
Mix epoxy slowly to minimize causing air bubbles.  
Avoid getting epoxy on side of ceramic ferrule or on spring.

### Cable preparation.

1. Determine required cable length.
2. Add to this cable length sufficient slack for two re-terminations (suggest 190 mm (7.5 in) additional slack for each termination).
3. Measure cable to required length with sufficient slack included.
4. Clean outer cable jacket.
5. Slide backshell parts onto cable.
6. Mark then strip back outer cable jacket 190 mm (7.5 in) from cable end.
7. Remove exposed central member and water blocking material.
8. Trim OFCC to length of dimension A + 32 in units of mm (or A + 1.25 in units of inches). Table for dimension A, along with figure for strip dimensions are on page 2.

### Install terminus on the fiber (assumes two part epoxy used).

1. Plug-in and turn on curing oven.
2. Verify curing oven temperature is 120 °C (248 °F).
3. Inspect terminus hole for blockage.
4. Remove divider and mix epoxy.
5. Install tip on syringe.
6. Squeeze epoxy into syringe and replace plunger.
7. Slide terminus, rear first, onto syringe tip.
8. Depress plunger and slowly inject epoxy until small bead is formed.
9. Withdraw syringe while maintaining pressure on plunger.
10. Wipe any epoxy off terminus exterior except at bead.
11. Install terminus onto end of fiber, gently rotating terminus around fiber until terminus is fully seated.
12. Feather Kevlar evenly around fiber.
13. Slide crimp sleeve over Kevlar and crimp onto rear of terminus.
14. Remove excess Kevlar.
15. Verify epoxy bead at fiber surface, but no other epoxy on terminus.
16. Insert terminus into a cure adapter.
17. Repeat for each fiber to be terminated.
18. Place curing adapter into curing oven.
19. Cure epoxy for cure time of 10 minutes minimum.
20. Turn off curing oven and remove curing adapters from oven.

### Polishing the fiber ends (Standard polish, domed ferrules).

1. Remove terminus from curing adapter.
2. Score and cleave fiber ends.
3. Clean glass plate, resilient pad, paper, puck before each polish step.
4. Air polish: Until fiber at top of bead (small epoxy layer left).

Polishing Steps for Standard Domed PC and Enhanced Domed PC Polishes				
Polish Step	Paper Grit Size	# of Figure 8's	Polishing Surface	Lubricant
Air Polish	5 micron Alumina	Until fiber at top of bead	Not Applicable	Not Applicable
1st Polish on Plate	5 micron Alumina	Until thin epoxy haze left	90 Durometer pad	None
2nd Polish on Plate	1 micron Alumina	Until no epoxy left	90 Durometer pad	None
3rd Polish on Plate	0.1 micron Diamond	20 figure 8's	90 Durometer pad	Distilled water
End of Standard Domed PC Polish (4th Polish for Enhanced Domed PC Polish Only)				
4th Polish on Plate	"ultra fine"	10 to 30 figure 8's	90 Durometer pad	Distilled water

### Fiber preparation.

1. Slide crimp sleeve onto OFCC.
2. Mark fiber stripping dimensions. Figure showing strip dimensions is on page 2.
  - a. Mark OFCC from end to 32 mm (1.25 in).
  - b. Mark buffer from end to 22 mm (0.87 in).
3. Strip cable (see stripping table and figure).
4. Mark Kevlar from Stripped off OFCC end to 3 mm (0.12 in).
5. Trim Kevlar to 3 mm (0.12 in).

- Do circular versus figure 8's.
5. Polish on plate, general (see table). Weight of hand on puck without exerting any further downward pressure on puck.
    - a. 1<sup>st</sup> polish on plate: Until only thin epoxy haze.
    - b. 2<sup>nd</sup> polish on plate: Until no epoxy left.
    - c. 3<sup>rd</sup> polish on plate: Specified # of figure 8's.

### Quality check.

1. Examine each terminus with FOVIS under 400X for scratches, pits, fractures.
2. If these defects, repeat 3<sup>rd</sup> polish on plate.
3. Re-terminate if necessary.



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Figure 1. Stripping Dimensions.

See table 1 or table 2, as applicable for dimension A. Dimension B = 10 mm (0.39 in). Dimension C = 22 mm (.087 in).

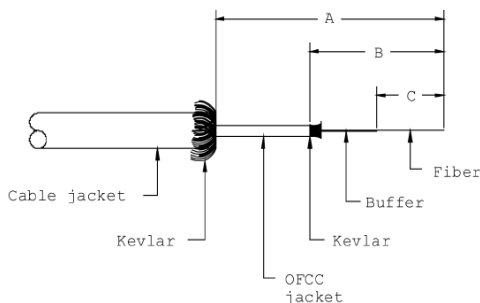


Table 1. Stripping dimension A for connectors with removable backshells.

The stripping dimensions in his table are used to install connectors with part numbers M28876/1, M28876/6 and M28876/11 (configured without insert retention nuts) and backshells with part numbers M28876/27, M28876/28 and M28876/29 onto fiber optic cables. Tolerance on dimension A is +/- 1 mm (+/- 0.04 in).

Connector Shell Size	Backshell Length	Stripping Dimension A in units of mm (in)		
		Backshell Orientation		
		Straight	45 <sup>0</sup>	90 <sup>0</sup>
13	Short	88 (3.46)	100 (3.94)	100 (3.94)
	Long	105 (4.13)	120 (4.72)	120 (4.72)
15	Short	105 (4.13)	101 (3.98)	101 (3.98)
	Long	130 (5.12)	126 (4.96)	126 (4.96)
23	Short			
	Long			

Table 2. Stripping dimension A for connectors with integral backshells.

The stripping dimensions in his table are used to install connectors manufactured by Delphi with part numbers M28876/2, M28876/3, M28876/4, M28876/7, M28876/8, M28876/9, M28876/12, M28876/13 and M28876/14 onto fiber optic cables. Connectors manufactured by Fiber Systems International with part numbers M28876/2, M28876/3, M28876/4, M28876/7, M28876/8, M28876/9, M28876/12, M28876/13 and M28876/14 are installed on fiber optic cables using strip dimensions in tale 1. Tolerance on dimension A is +/- 1 mm (+/- 0.04 in).

Connector Shell Size	Stripping Dimension A in units of mm (in)		
	Backshell Orientation		
	Straight	45 <sup>0</sup>	90 <sup>0</sup>
13	67 (2.64)	85 (3.35)	85 (3.35)
15	67 (2.64)	105 (4.13)	105 (4.13)
23	70 (2.75)	108 (4.25)	108 (4.25)

Stripping dimension A for connectors with insert retention nuts.

The stripping dimension A does not apply when connector receptacles are installed into equipment where the termination is accomplished with OFFC's (and not used with multiple fiber cable). This stripping dimension A does not apply to installing connectors with part numbers M28876/1 and M28876/11 configured with insert retention nuts onto OFCC's. Also, when the required length of the OFCC is measured, add sufficient cable slack to allow for at least two re-terminations. Suggest the use of 40 mm (1.6 in) of slack be allotted for one re-termination.