

Instructions for Cobalt Fiber-Optic Cable Termination Kits

Overview

This document details the procedure for terminating a waterproof fiber-optic cable with the Blue Trail Engineering Cobalt Fiber Cable Termination Kit. The cable to be terminated must have the following characteristics:

- outer diameter of 6.4 mm or less
- bondable jacket material (polyurethane is recommended)
- single-mode 9/125 micrometer fiber

The termination process should only be attempted by a technician proficient in fiber cleaving and polishing techniques, as well as epoxy potting techniques.

In addition to the Fiber Cable Termination Kit, you will need the Blue Trail Engineering Fiber Polishing Puck and Fiber Pressing Tool.

Many waterproof fiber cables are different from the cable shown in these instructions. For instance, cables may or may not have Kevlar fibers or metal armor. Therefore, this procedure may need to be altered depending on the particular cable that is being terminated.

The procedure shown does not include a method for positively connecting the Kevlar strength members in the cable to the body of the connector. Therefore, a strain relief device is required in cases where the cable will experience tensile loads.

Included materials

The Fiber Cable Termination Kit includes:

- qty. 1. Connector Shell
- qty. 1 Connector Insert with pre-installed SC fiber ferrule
- qty. 1 Locking Sleeve
- qty. 1 O-Ring
- qty. 1 Dust cap

Required tools and materials

The following tools and materials are used in this procedure:

- Blue Trail Engineering Fiber Polishing Puck and Fiber Pressing Tool
- fiber stripping tool for single-mode 9/125 micrometer fiber
- suitable fiber epoxy
- fiber polishing film and appropriate polishing surface

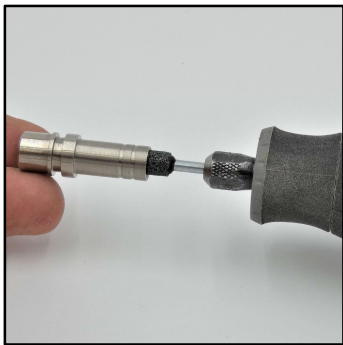


- fiber test equipment to verify proper performance (scope, light source, power meter)
- wire cutters
- Dremel tool or equivalent with 6mm (¼") diameter grinding bit
- drill press with vise
- syringe with needle (3 cc syringe with 16G, 30mm needle recommended)
- isopropyl alcohol
- acetone
- suitable epoxy adhesive*
- optional: Cobalt Series Cable Termination Mold

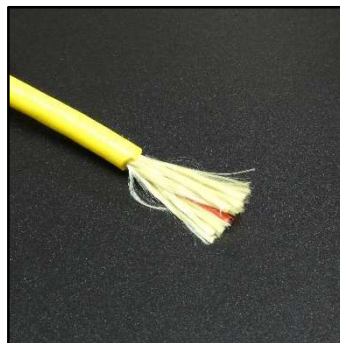
*Blue Trail Engineering has tested 3M DP-420 epoxy in this application. Other epoxies or potting materials may work, but it is the customer's responsibility to test them thoroughly in this application.

Procedure

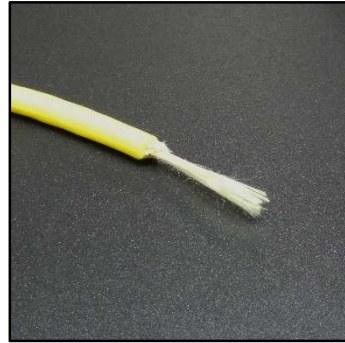
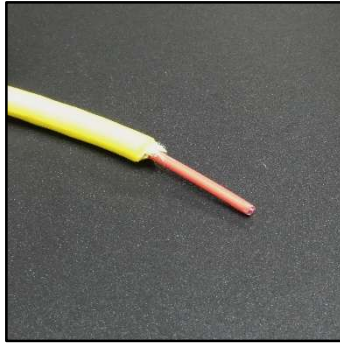
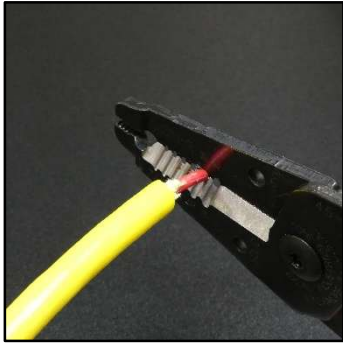
1. Use a 6 mm (¼") grinding bit in a Dremel tool to thoroughly abrade the inside of the Connector Shell where the cable will enter. When done, the inside of the Connector Shell should be visibly and thoroughly abraded. However, do not abrade the portion where the Connector Insert will go.



2. Clean the inside of the Connector Shell with acetone and allow to dry.
3. Strip off about 25 mm of the outer jacket of the fiber cable.



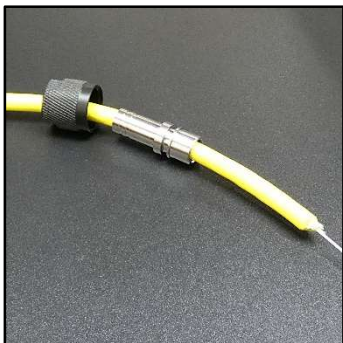
4. Cut the Kevlar strands flush with the end of the cable jacket and strip off the inner jacket.



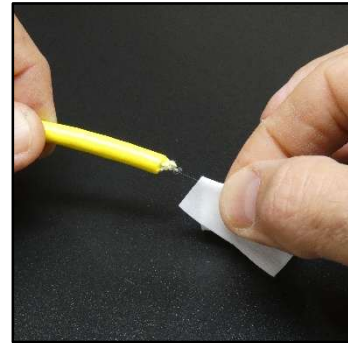
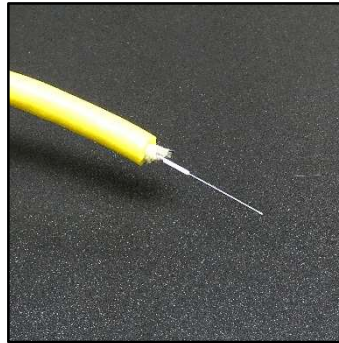
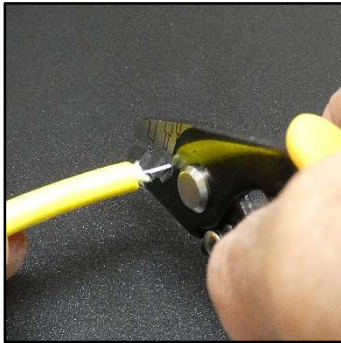
5. Cut the inner Kevlar strands 2-3 mm from the end of the cable jacket. If the cable has metal armor surrounding the fiber, pull it out, cut it, and allow it to retract back into the cable, leaving only the fiber.



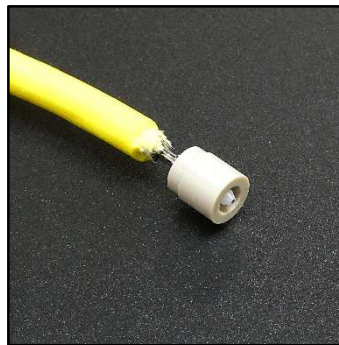
6. At this point, slide the Locking Sleeve onto the cable as shown below. Optional: if using a silicone Cable Termination Mold (not pictured below), slide it onto the cable now. Then slide the Connector Shell over the cable as shown. **VERY IMPORTANT: the Locking Sleeve and Connector Shell must be installed at this point in the process. They cannot be installed later.**



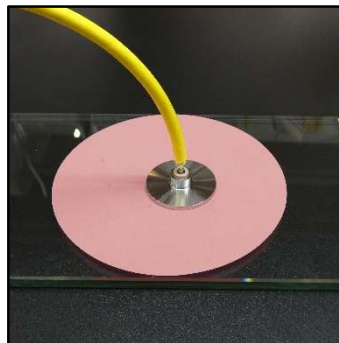
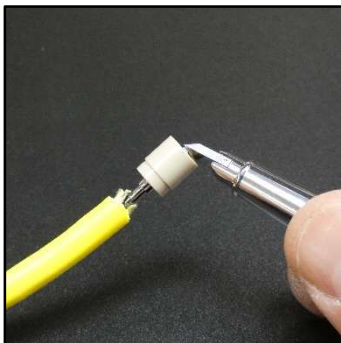
7. Strip the fiber coating until it protrudes only 6 mm from the end of the cable jacket. Strip the cladding and clean the fiber core with a lint-free wipe moistened with alcohol, being careful not to break the fiber.



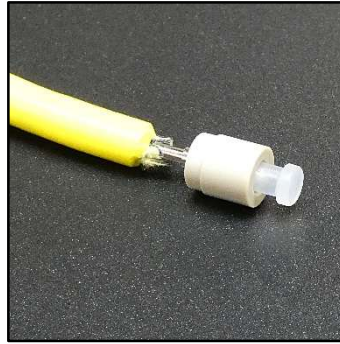
8. Test-fit the fiber into the Connector Insert, making sure that the fiber protrudes from the tip of the ferrule by at least a few millimeters. Inject fiber epoxy into the back side of the ferrule until a small bead comes out of the tip of the ferrule. Insert the fiber into the Connector Insert and allow the epoxy to cure.



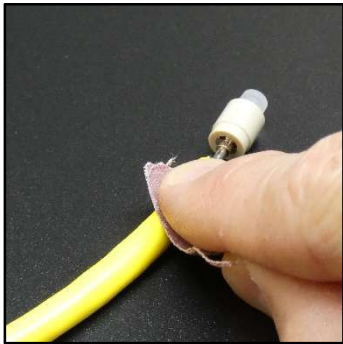
9. Cleave the fiber and polish it using the Fiber Polishing Puck, following standard polishing techniques. Note that the tip of the ferrule should protrude very slightly from the end of the Connector Insert to allow polishing. Clean using lint-free wipe and alcohol.



10. Use a fiber inspection scope to check the results. Once satisfied, install the Dust Cap on the ferrule to protect it.



11. Abrade the last 3 cm of the cable jacket with sandpaper and clean with a paper towel that has been slightly moistened with acetone to prepare it for potting. From this point on, be careful to keep this part of the cable jacket clean.



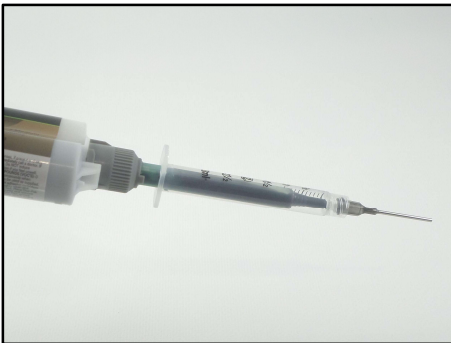
12. Slide the Connector Shell down the cable towards the Connector Insert and gently clamp the Connector Shell vertically in a vise. Place the Fiber Pressing Tool on top of the Connector Insert (keeping the Dust Cap in place). Using an arbor press or drill press, press the Connector Insert into the Connector Shell.



13. Remove the Fiber Pressing Tool and Dust Cap and verify that the ferrule protrudes a small amount from the end of the Connector Shell. Then replace the Dust Cap.



14. Prepare the epoxy for the potting operation. We recommend 3M DP420. It is helpful to warm up the epoxy slightly to ensure that it flows easily. It should be at least at room temperature, preferably slightly warmer.
15. Install a mixing tip on the epoxy cartridge (mixing tips greatly reduce the likelihood of getting bubbles in the epoxy). Discard the first 1-2 ml of epoxy that comes out of the mixing tip. Insert the mixing tip deep into the syringe and inject the epoxy or into the syringe. Try to fill the syringe without getting any air bubbles into the epoxy. Alternatively, the needle might fit directly on the mixing tip. In this case, you do not need a syringe.



16. Insert the syringe with needle deep into the Connector Shell. Inject the epoxy into the Connector Shell until the epoxy starts to come out the rear of the Connector Shell. Gently move the cable around inside the Connector Shell to ensure that both the outer surface of the cable jacket and the inner surface of the Connector Shell are fully wetted with epoxy. Continue injecting epoxy while withdrawing the needle from the Connector Shell. Avoid injecting any air bubbles into the Connector Shell.

If you are using a silicone Cable Termination Mold (below, right), carefully stretch it onto the end of the Connector Shell and inject the epoxy through the mold using a sharp needle.



17. Clean off the excess epoxy with a paper towel and acetone or alcohol.
18. Allow the epoxy to cure fully without disturbing the assembly.
19. Lubricate the O-ring and install it in the groove on the Connector Shell, making sure that the groove and the O-ring are free from lint, hair, or other contamination.

