3M™ Fibrlok™ II Angle Fiber Splice 2529-AS
3M™ Fibrlok™ 250 µm Angle Fiber Splice 2540-AS

Instructions

January 2009
78-8140-1580-2-C

Contents

Safety Precautions

Protective Eyewear

⚠ CAUTION

Safety glasses should be worn when handling chemicals and cleaving the optical fiber.

Chemical Precautions

⚠ WARNING

Storage, use and disposal of isopropyl alcohol should be per your company health, safety and environmental instructions. Refer to material safety data sheet for health hazards, safe handling, proper use and control measures.

⚠ CAUTION

Product contains phenylmethyl silicone (63148-58-3), hydrophobic silica (68611-44-9) and may cause minimal eye irritation. Avoid contact with eyes and wash hands before eating or smoking. Upon eye contact, immediately flush eyes with water while holding eyelids open and continue flushing for ten minutes. Contact a physician. Upon skin contact, wash with soap and water. Product Information: Material Safety Data Sheet or 3M Company, St. Paul MN, 55144-1000, (651) 733-1110 Operator 55

Bare Fiber Handling

⚠ CAUTION

Cleaved glass fibers are sharp and can pierce the skin. Use tweezers when handling shards and dispose of them properly per your company health and safety instructions.

Fiber/Cable Handling

⚠ CAUTION

Optical fiber can be damaged by excessive tensile, compressive and bending forces. Consult the manufacturers' specifications for proper handling instructions.

Laser Safety

⚠ CAUTION

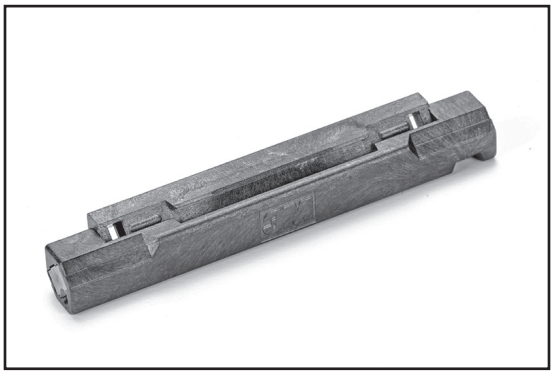
Take the proper precautions when working with optical fiber because invisible laser light may be present. The principal laser hazard when working with fiber optics is injury to the eye. Never look directly into the fiber or connector using the naked eye or a microscope.

1.0 Summary

1.1 3M™ Fibrlok™ II Angle Fiber Splice was designed for the splicing of any combination of 250 µm and 900 µm fibers while the 3M™ Fibrlok™ 250 µm Angle Fiber Splice specifically splices 250 µm fiber with a smaller form factor. The Fibrlok splices keyed, angle cleave fibers for excellent optical reflection performance. Each angle fiber splice has a green end cap to identify it as the angle splice version after installation.

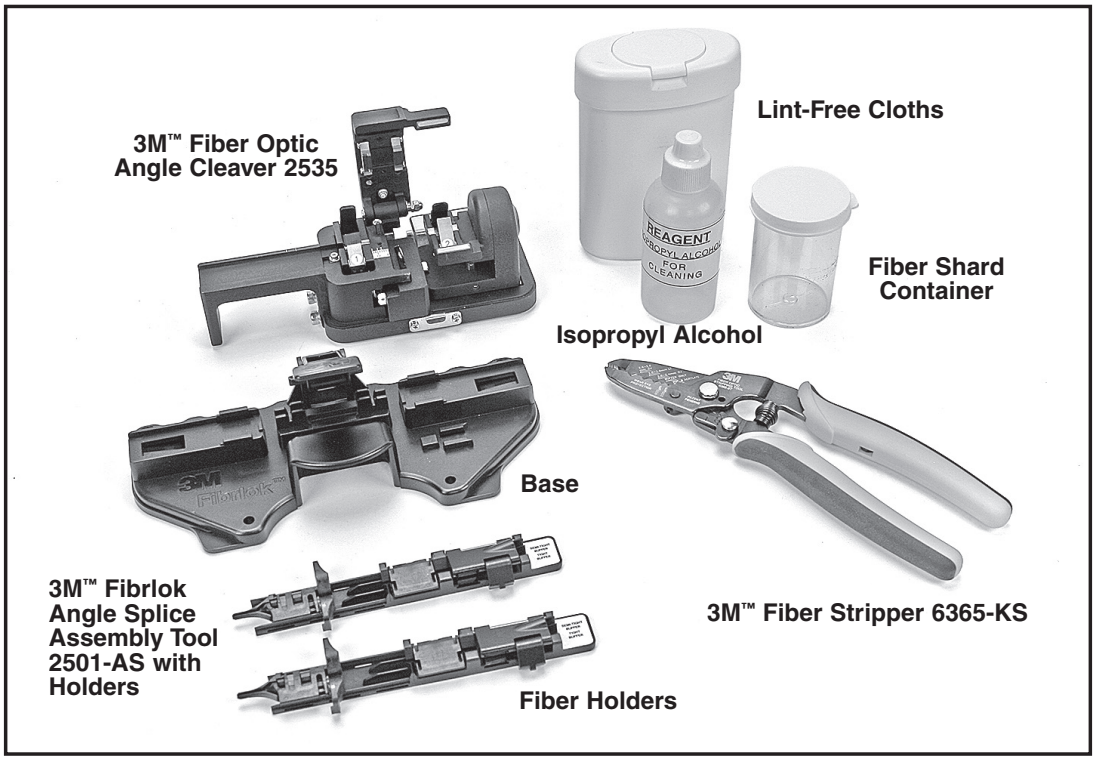
The following installation instructions shown in sections 2, 3 and 4 apply to both Fibrlok II and Fibrlok 250 µm. Both are installed with the same procedure and tools. Sections 5 and 6 are specifically for Fibrlok II 2529-AS. Section 5 relates to the repositioning of the fiber if a high splice loss is seen. This is possible only using Fibrlok II 2529-AS. Section 6 has recommendations for the management of 900 µm fiber in a splice tray.

3M™ Fibrlok™ II Angle Fiber Splice 2529-AS

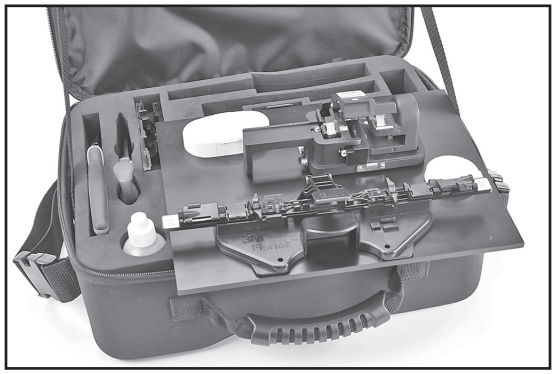


3M™ Fibrlok™ 250 µm Angle Fiber Splice 2540-AS

1.2 Required tools, which are available in the 3M™ Fiber Optic Angle Cleave Kit 2565



1.3 For situations where a suitable work area is not available, the case and plastic plate, which are included in the 3M™ Fiber Optic Angle Cleave Kit 2565, can create a work station. The case can be set on level ground, on a vehicle, or hung by the straps.

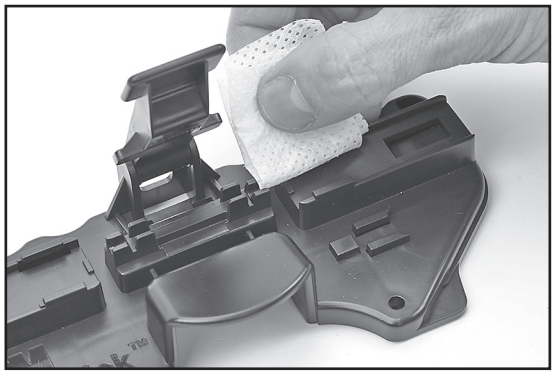


1.4 Add one full bottle (1.8 fl. oz./53 ml.) of 99% pure isopropyl alcohol into lint-free cloth container to pre-moisten wipes.

2.0 Splicing Set-up

2.1 Carefully clean both fiber holders with a lint-free cloth and alcohol.

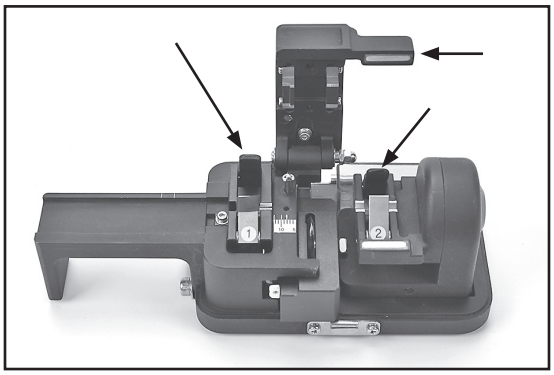
2.2 Clean both edges of the area where the splice is set in the tool.



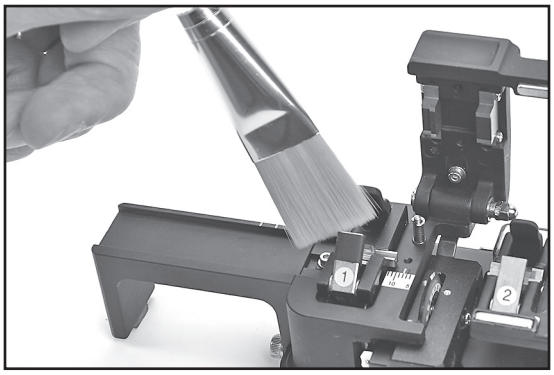
2.3 Remove the 3M™ Fibrlok™ Angle Splice from the package and identify that it is an angle splice by the green end cap. Place splice in the tool with the Fibrlok cap up.

3.0 Fiber Preparation

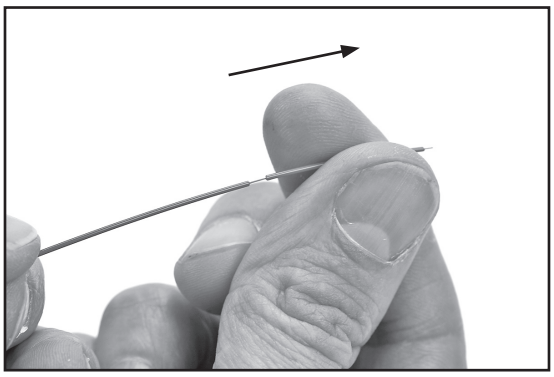
3.1 Open all three angle cleaver clamps and levers.



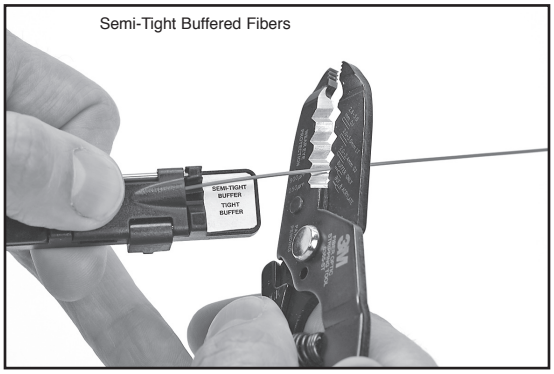
3.2 Carefully clean the cleaver clamps using a small brush.



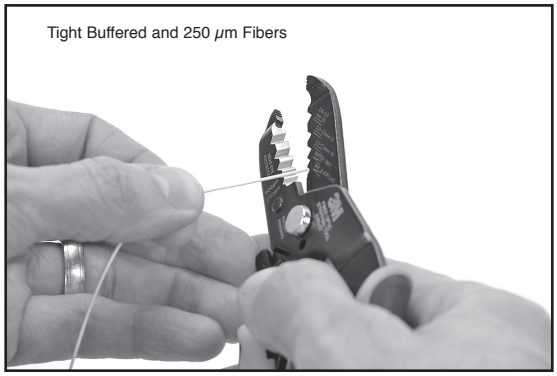
3.3 For 900 µm buffer fiber, cut the buffer. If the 900 µm slides easily from the fiber it is loose tube or semi-tight buffered fiber.



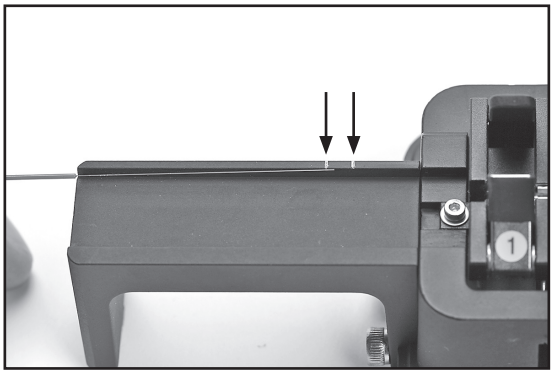
In this instance, use the fiber holders' clamp to prohibit the buffer from moving or stretching during the stripping process. Place the fiber into the fiber holder groove, labeled "semi-tight", with the fiber to be stripped protruding from the back of the holder. Close the clamp and proceed to strip and clean the fiber. Once complete, remove the fiber from the holder. If the 250 µm fiber still moves inside the 900 µm buffer after it is clamped in the "semi-tight" groove, then the connector must be installed on the 250 µm fiber. Strip at least eight inches (203 mm) of the 900 µm buffer and complete the installation.



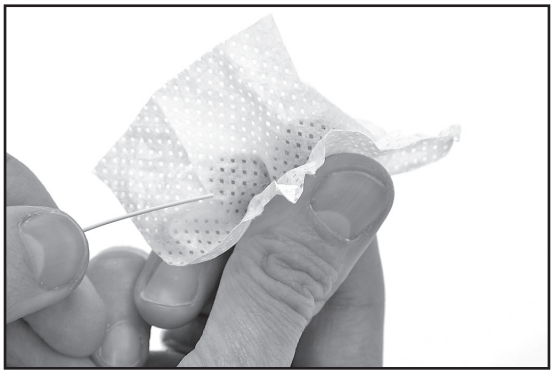
3.4 For all fibers, strip the 900 µm and 250 µm coatings exposing glass for 1.67" to 1.77" (42.5 mm to 45 mm).



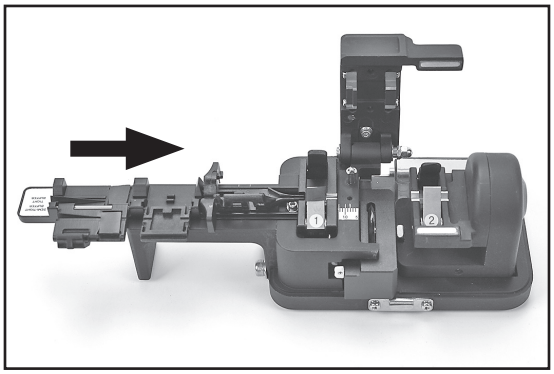
3.5 To verify the correct strip length, use the white marks on the left side of the cleaver. Align the coating edge to the left edge of the cleaver and the fiber tip should be between the two white lines.



3.6 Clean fiber with alcohol and lint-free cloth.

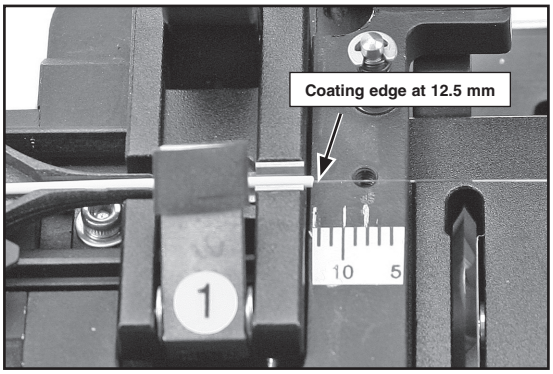


3.7 With the two covers and clamp open, place the assembly tool fiber holder onto the cleaver. Push the holder toward the cleaver blade until it stops.

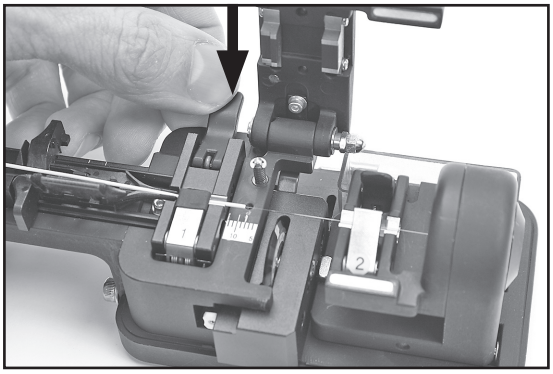


3.8 Place fiber in angle cleaver so that the coating edge is at 12.5 ± 0.5 mm.

Note: ***Make sure that the natural bow in the fiber is facing down and laying properly in the bottom of V-groove in both cleaver clamps 1 & 2.***

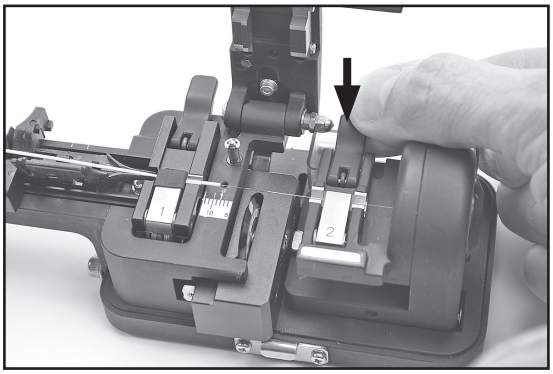


3.9 Close the cleaver clamp #1 first. This process sets the appropriate cleave length.

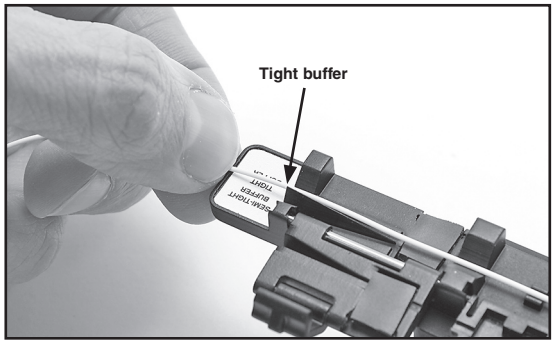


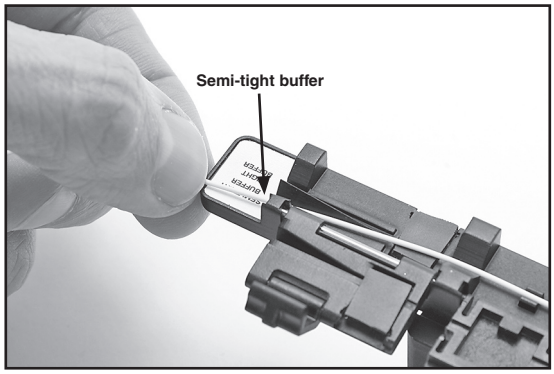
3.10 Close the cleaver clamp #2.

Note: ***Ensure there is no fiber bow between the two clamps. If there is a bow, open both clamps and repeat steps 3.9 and 3.10.***

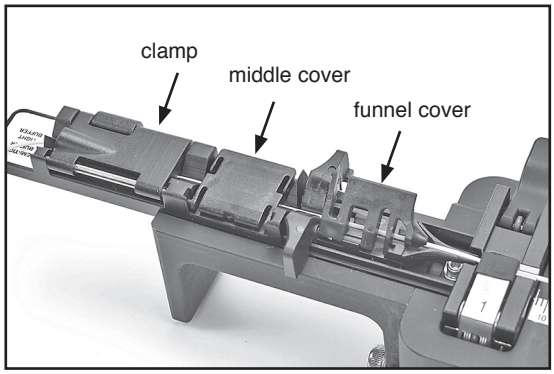


3.11 For 250 µm fiber and tight buffer 900 µm fiber, the fiber should be placed in the fiber holder tool groove which is labeled “Tight buffer”. For semi-tight buffer fiber, it should be placed in the groove labeled “Semi-tight buffer”. This provides the proper clamping force on the 900 µm buffer.

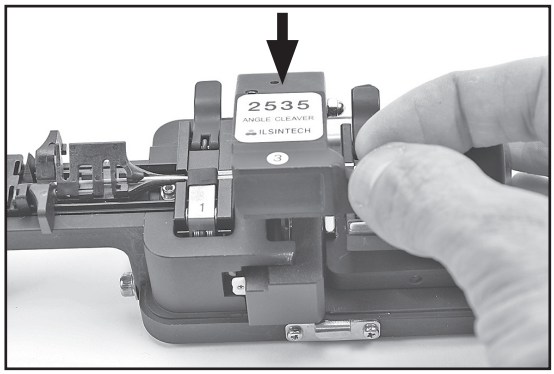




3.12 Close the two covers and the clamp on the fiber holder. The funnel cover will not close completely while in the cleaver. Do not force or cover can break.



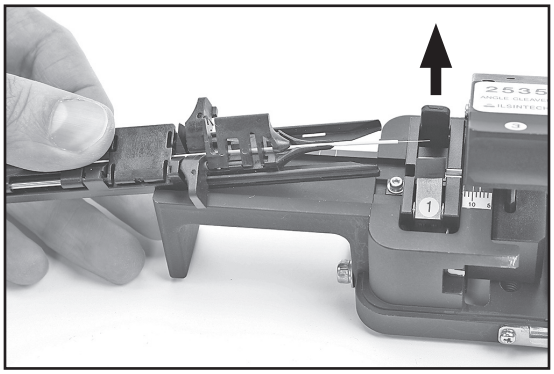
3.13 Depress cleave activation lever (#3) and hold it down until clamp #2 slide assembly has fully moved to the right, indicating that the angle cleave is complete.



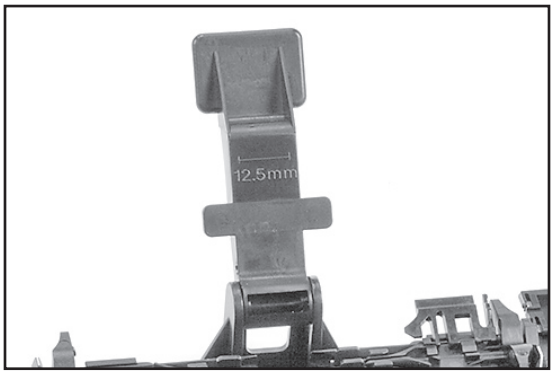
Note: If fiber does not break immediately upon activation, or it breaks so that the cleave length is not 12.5 mm, then open clamps and carefully clean the cleaver clamps with a brush and alcohol-soaked lint-free cloth. Cut exposed fiber and strip, clean and cleave again. If issues persist, rotate cleaver blade to the next position using the supplied wrenches and try again.

3.14 Open cleaver clamp #1 and remove fiber holder and fiber from cleaver.

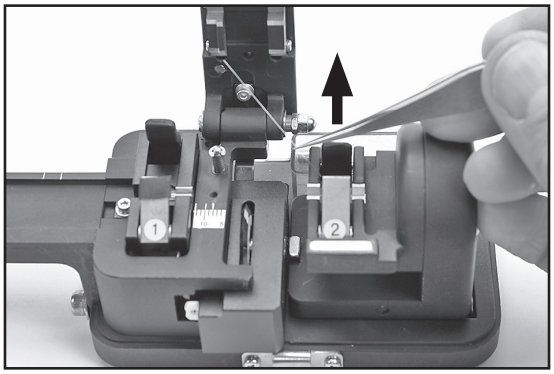
Note: Do not open activation lever after cleaving until fiber holder and fiber have been removed.



3.15 Verify the 12.5 mm cleave length again by using the length gauge on the assembly base. The 12.5 mm cleave length is measured from the end of the 900 µm buffer to the end of the cleaved fiber. On semi-tight buffer fiber, the 250 µm coating may protrude 1 mm past the 900 µm semi-tight buffer. Re-strip, clean and cleave the fiber if necessary to meet length requirements.

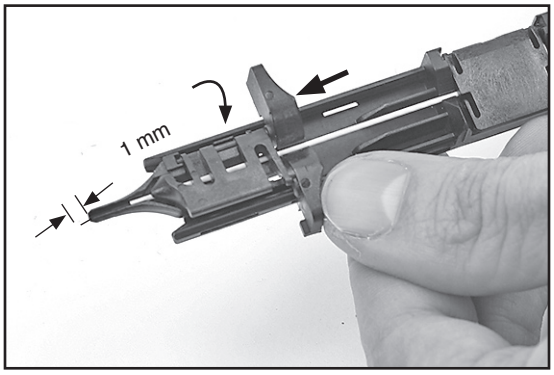


3.16 Open activation lever #3 and clamp #2 of angle cleaver. Dispose of fiber shard per company practice.

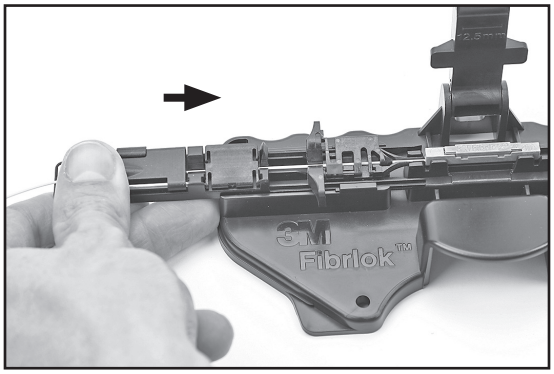


4.0 Splice Assembly

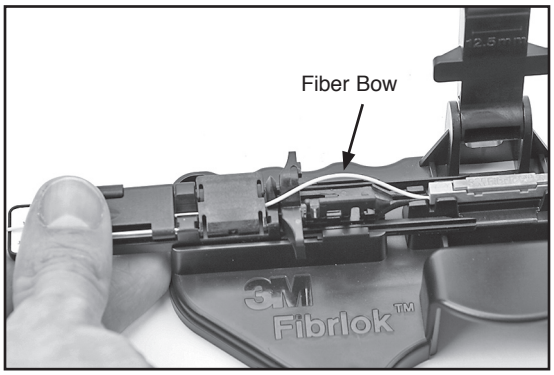
4.1 Slide the fiber holder's guide funnel fully forward and close the funnel cover. An audible click can be heard. Check for proper cleave length again by inspecting the amount of fiber protruding beyond the funnel end of the holder. The amount of exposed fiber should be from 0 to 1 mm (0.04").



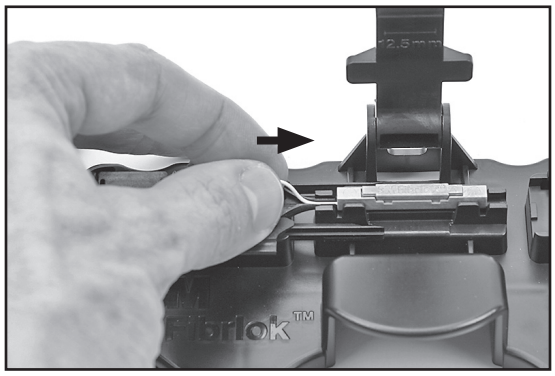
4.2 Place the fiber holder into the assembly tool base and push the holder to 3M™ Fibrlok™ Splice opening. Check the fiber alignment to ensure the fiber tip will enter the splice smoothly.



4.3 Insert the fiber into the splice SLOWLY. The fiber tip should NOT contact the outside entrance cone of the splice. If it does, the fiber must be stripped, cleaned and cleaved again per section 3. When fully inserted the front cover should open and the fiber should have a slight bow. The middle cover may not open.



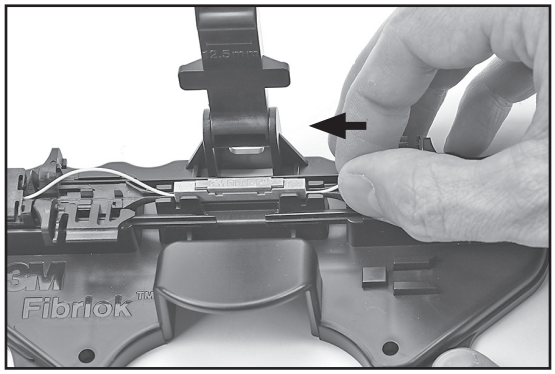
4.4 Grip the fiber near the splice and continue inserting the fiber to ensure it is fully seated in the splice.



4.5 Follow steps in all of section 3 *Fiber Preparation* and section 4.1 to 4.3 of *Splice Assembly* for preparing and inserting the second fiber into the 3M™ Fibrlok™ Splice.

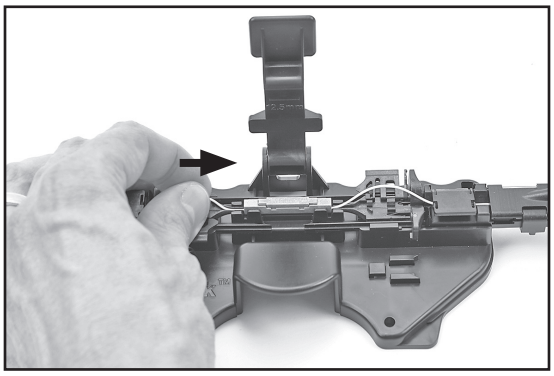
4.6 For the second fiber, grip the fiber near the splice and continue to insert until it is fully seated in the splice. Watch for the first fiber bow to increase. This occurs when the end face of the second fiber contacts the first fiber and pushes the first fiber slightly back out of the splice.

Note: Check that the first and second fiber holders stay fully end-stopped against the splice when inserting fibers and adjusting for equal bow height.



Note: Do not pull on either of the fibers following establishment of the bows in the first and second fibers. The fiber ends must be held together by the compressive forces induced by the bows to produce a low loss splice.

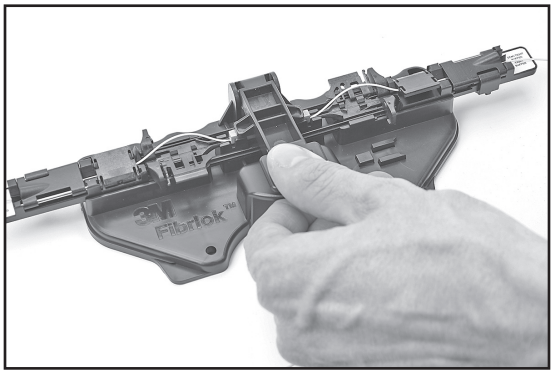
4.7 Slowly push back fiber one to have equal bow height with fiber two.



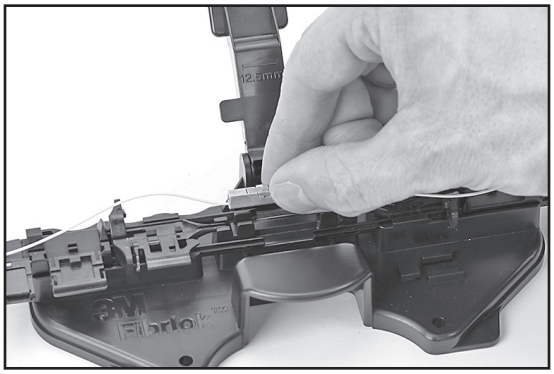
If fiber bows are NOT observed to move as described, repeat steps 4.4 – 4.6 of *Splice Assembly* but do NOT fully remove fibers from the splice. If bow movement is still not observed, remove fibers, strip, clean and re-cleave, checking for proper cleave length. Re-splice per splicing procedure using a new splice.

Do not attempt to "tune" or optimize the splice as this may result in higher splice loss. The 3M™ Fibrlok™ Splice is not designed to be "tuned". Fiber alignment does not occur until the splice is activated.

4.8 Press the lever to activate the splice. A click will be heard when the splice is actuated.



4.9 Open the fiber holder clamps and covers and remove the Fibrlok splice from the assembly tool by pulling on the splice. Do not pull on the fibers.



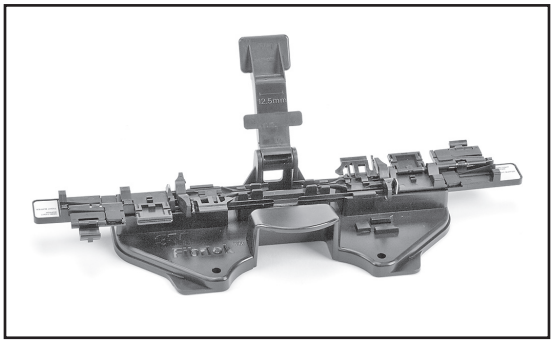
5.0 Fiber Repositioning for 3M™ Fibrlok™ II Angle Fiber Splice 2529-AS

5.1 If high loss is observed after a splice has been actuated, it is possible that the fiber ends are separated. In this case, lift the splice cap and reposition fiber ends, as instructed below.

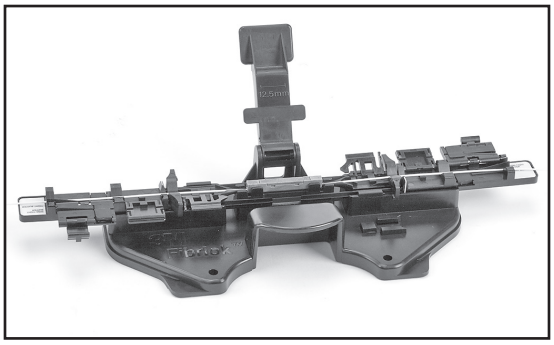
Note: If the splice has been in service, place the splice back into the tool. Insert the fiber holders into the tool and push them towards the splice. Recreate fiber bows on both sides of the splice and close the fiber clamps to maintain the angled cleaved fiber keying.

Note: Do not completely remove fiber from Fibrlok splices.

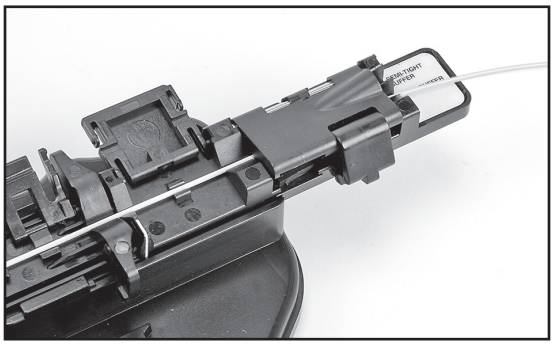
5.2 Place the two fiber holders into Fibrlok assembly tool base and open the guide funnel, middle covers and the back clamp on the fiber holder.



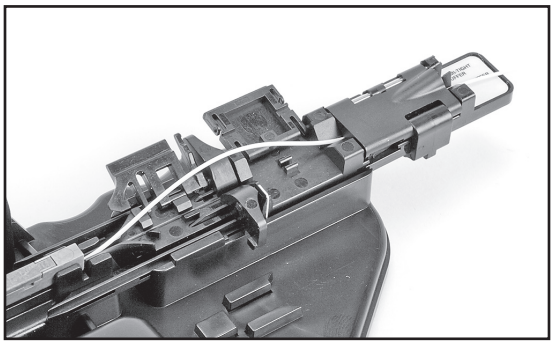
5.3 Insert Fibrlok into the tool and lay the fibers in the appropriate channels so there is no twist in the fibers. Ensure the fiber holders are fully inserted into the tool.



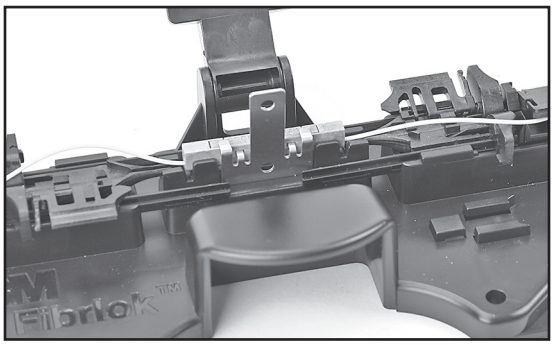
5.4 Lightly close the fiber clamp on the holder so the fiber can move under the clamp.



5.5 Create a fiber bow and then fully clamp the fiber. Repeat with the second fiber. Ensure second bow is the same size as first bow.

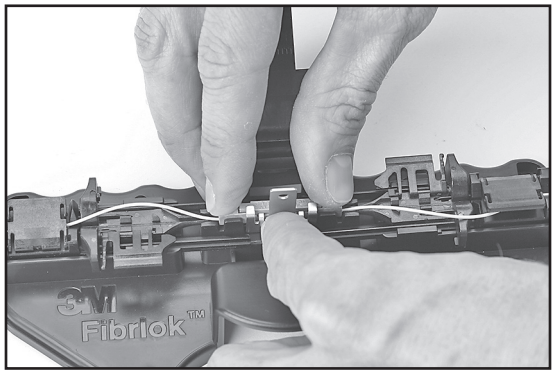


5.6 While the splice is in the splice holding cradle, insert the short prongs of the 3M™ Fibrlok™ II Splice cap lifter into the two holes on the side of the splice. The cap lifter will be at an angle to the splice. The long prongs will be resting against the top of the splice cap.

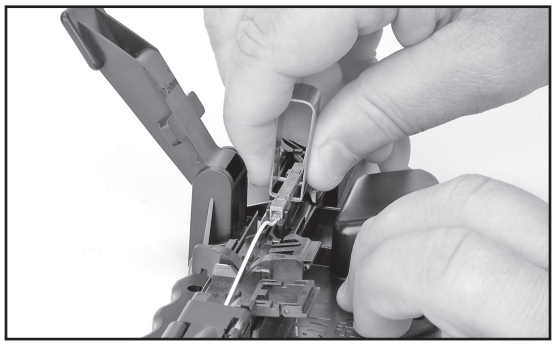


5.7 Slide the bottom of the cap lifter inward until it is in a vertical position, lifting the splice slightly out of the cradle.

5.8 Hold the cap lifter in place with one hand and push down on the ends of the splice with the other hand. This action should reseat the splice into the holding cradle and lift the cap at the same time.



5.5 Repeat fiber centering and splice actuation (See steps 4.6 – 4.8.) Open the fiber holder clamps and remove splice from tool. If after two attempts an acceptable splice loss is not obtained, remove fiber, strip, clean and re-cleave. Resplice using a new splice.



Note: If there is difficulty using the cap lifter, a second cap lifter is packaged with the 3M™ Fibrlok™ Angle Splice Assembly Tool 2501-AS that can be used to pull the cap up.

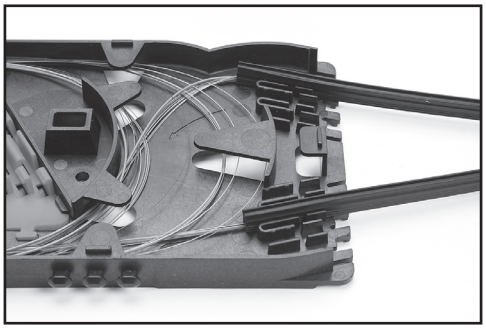
6.0 Fiber Organization and Splice Storage

6.1 When storing fiber slack in a splice tray, the spliced fiber ends will twist one full turn for each full loop of fiber being stored. This rotation places stress on the fibers. This rotational stress makes fiber organization more difficult and may affect fiber/splice performance, particularly in 900 µm coated fibers. The stiffness of the 900 µm fiber does not distribute this stress in the same manner as 250 µm coated fiber.

Note: The following procedure must be followed when splicing 900 µm coated fibers and will improve fiber organization when splicing all fiber types.

6.2 Secure the buffer tubes of the fibers to be spliced to the tray so that the fibers are free to rotate through the point of attachment.

6.3 Select the first two fibers to be spliced and lay them into the tray. Trim the two fibers to be spliced so they are the right length for splicing plus approximately 1.75 inches (45 mm) for fiber end preparation.

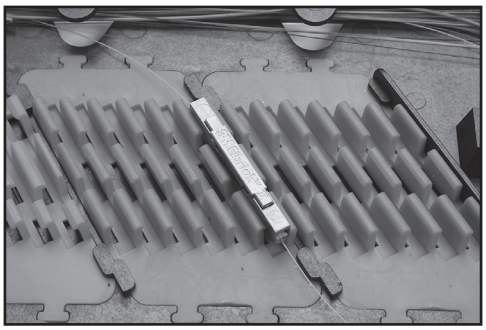


6.4 Place the splice assembly tool close to or on top of the splice tray. Match the orientation of the tool to that of the splice holder or tray whenever possible.

6.5 Remove the minimum amount of fiber required for fiber preparation and splicing. Remove less than one loop if possible.

6.6 Prepare fibers and complete splice as described in Sections 3 and 4.

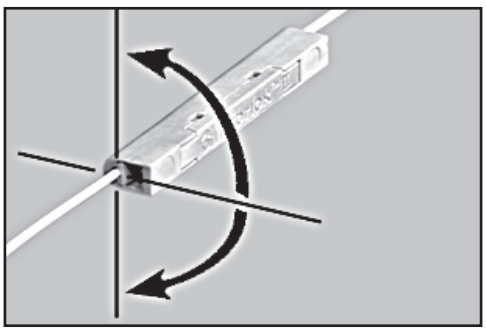
6.7 Carefully lay the splice on top of the holder without securing the splice into the holder.



Note: In order to minimize torsion on the fiber, perform the following:

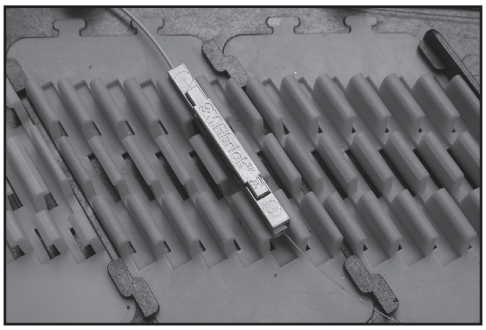
6.8 For 250 to 250 µm and 900 to 900 µm splices:

a. Store the shorter of the two fibers in the tray.
b. Observe how the splice lays in its relaxed state. Rotate the splice through the smallest possible angle to install it in the tray.
c. Store the second fiber.



6.9 For 250 to 900 µm splices:

a. Store the 900 µm fiber first.
b. Grasping the splice by the 900 µm fiber, observe how the splice lays in its relaxed state. Rotate the splice through the smallest possible angle to install it in the tray.
c. Store the 250 µm fiber.



3M™ Fibrlok™ Splices, Kit and Tool Descriptions

Product Number	Description	Packaging
2529-AS	Fibrlok™ II Angle Fiber Splice	60/package
2540-AS	Fibrlok™ 250 µm Angle Fiber Splice	60/package
2501-AS	Fibrlok™ Angle Splice Assembly Tool	1/package
2565	Fiber Optic Angle Cleave Kit	1/package
2535	Fiber Optic Angle Cleaver	1/package

3M™ Fiber Optic Angle Cleave 2565 Kit Contents

Product Number	Description
2535	Fiber Optic Angle Cleaver with brush, tweezers, maintenance tools and spare rubber pads
2501-AS	Fibrlok™ Angle Splice Assembly Tool
8865-AT	No Polish Connector Assembly Tool
6365-ST	Fiber Stripping Tool
6365-KS	Kevlar Snips
	Lint-Free Cloths, Cleaning Alcohol Bottle, Work Plate, Fiber Shard Container
8800-APC/AS	No Polish Connector SM SC/APC Angle Splice, 250/900 µm (2 ea.)
2529-AS	Fibrlok™ II Angle Fiber Splice (6 ea.)
2540-AS	Fibrlok™ 250 µm Angle Fiber Splice (5 ea.)

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