

# **3M™ Crimplok™ + Connector** **8700-UPC & APC SM SC 900 μm**

## **Instructions**

# 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 and methanol-water solution 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.

## 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 manufactures' specifications for proper handling instructions.

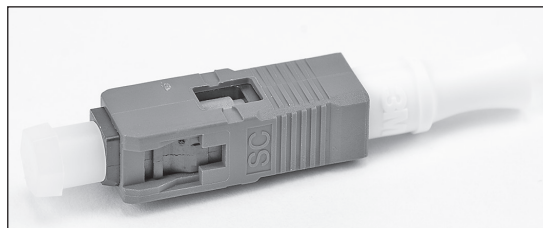
## Laser Safety

### 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 end of a fiber or connector using the naked eye, a view scope, or a microscope when connected to a laser source.

## 1.0 Overview

- 1.1 3M™ Crimplok™+ Connectors 8700-UPC & APC terminate 900  $\mu\text{m}$  single-mode fibers for excellent optical performance. For 250  $\mu\text{m}$ , increase coating diameter using 900  $\mu\text{m}$  furcation tubing.



3M™ Crimplok™+ Connectors 8700



- 1.2 Required tools, available in the 3M™ Crimplok+™ SC/UPC Kit 8765-UPC for the 8700-UPC and the 3M Crimplok+ SC/APC Kit 8765-SC/APC for the 8700-APC.
- |   |                                      |
|---|--------------------------------------|
| A. Cleaver  | H. Fiber snips                       |
| B. Protrusion setting tool 8765-PS/UPC for 8700-UPC, 8765-PS/APC for 8700-APC                                     | I. Tweezers                          |
| C. Nano-finisher 8765-NF/UPC for 8700-UPC, 8765-NF/APC for 8700-APC   | J. Water spray bottle, empty 8765-WB |
| D. 3M™ green lapping film for APC<br>3M™ white lapping film for UPC<br>(included with connectors and also in kit) | K. Alcohol bottle, empty VOL-0560R   |
| E. Cleaning swabs 8765-CS   | L. Cleaning brush                    |
| F. Lint-free wipes 8765-LFW   | M. Eye loupe, 10X                    |
| G. Fiber stripper   | N. Case                              |
|   | O. Work surface plate                |
|   | P. Shard container                   |
|   | Q. Instruction manual (not shown)    |

- 1.3 Additional materials needed
- De-ionized or distilled water for nano-finishing at above-freezing temperatures
  - 25% to 35% methanol by volume and 75% to 65% de-ionized or distilled water solution by volume for nano-finishing at below-freezing temperatures. DO NOT use ethanol or isopropyl alcohol for nano-finishing.
  - 99%-pure isopropyl alcohol (for cleaning only)

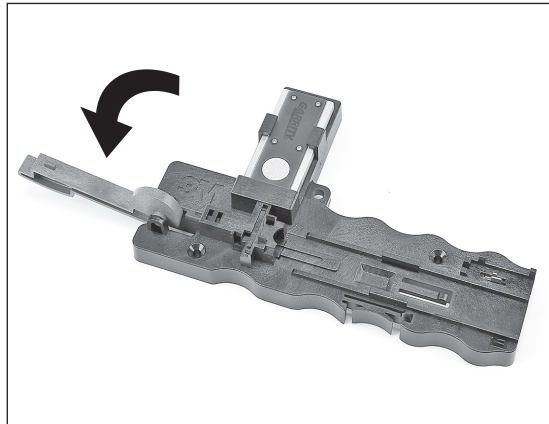
**Note:** *Carefully follow safety, health and environmental information given on product labels or the Material Safety Data Sheets for both the isopropyl alcohol and the methanol/water solution*

- 1.4 Recommended accessory:  
3M™ 200X View Scope 6365-VS. DO NOT use when connectors are illuminated by a laser source.

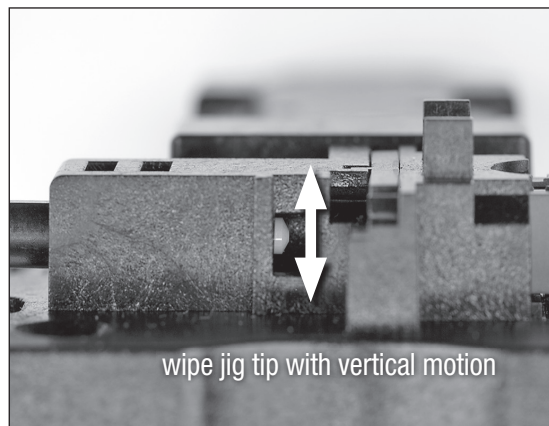
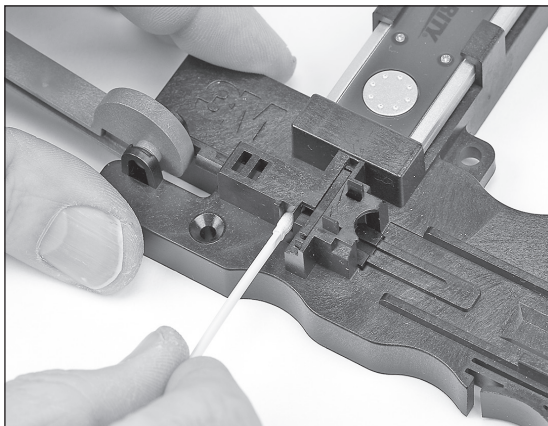


## 2.0 Connector and Protrusion Setting Tool Preparation

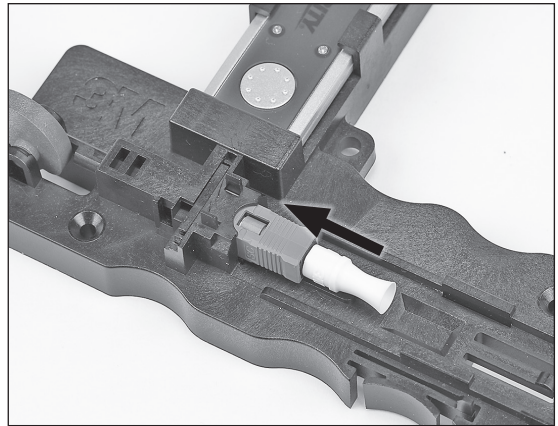
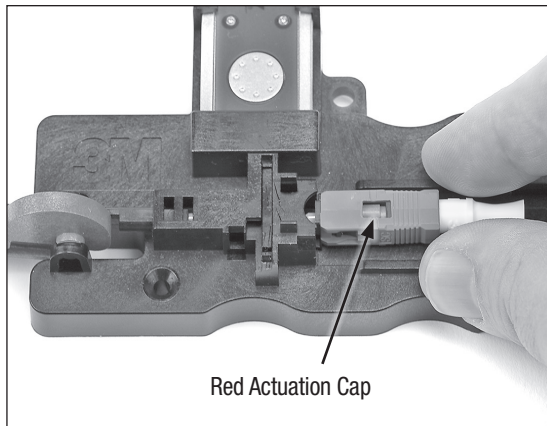
- 2.1 On the protrusion setting tool, move the actuator lever to the un-activated position as shown.



- 2.2 Clean the tip of the protrusion setting jig using a lint free cleaning swab and alcohol. Reach through the window with the swab, and move the swap tip vertically to clean jig tip.

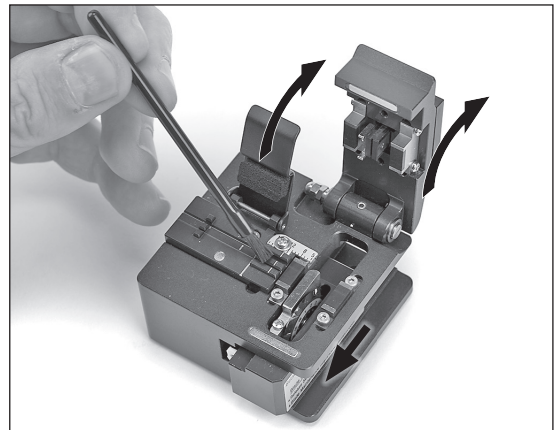


- 2.3 Remove the 3M™ Crimplok™+ Connector from the bag and remove the dust cap from the ferrule. Remove the lapping film disc from the bag and set it aside for later.
- 2.4 Insert the connector into the SC port with the red actuation cap facing upward. Ensure connector is fully seated in the port.



### 3.0 Fiber Stripping & Cleaving

- 3.1 Open both covers on the cleaver. Move the blade carriage to the front. Once per day, or whenever the cleaver gets dirty, clean the fiber groove, rubber pads and blade with the brush.

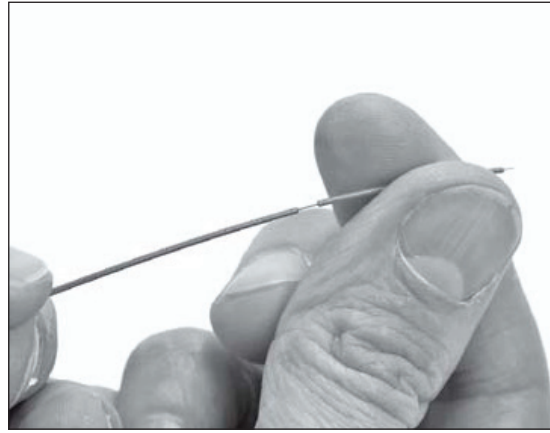


- 3.2 Holding the fiber stripper perpendicular to the fiber, strip enough buffer to allow the fiber to extend well beyond the second pad on the cleaver as shown in Section 3.7. (Strip length is  $40 \pm 5$  mm.)

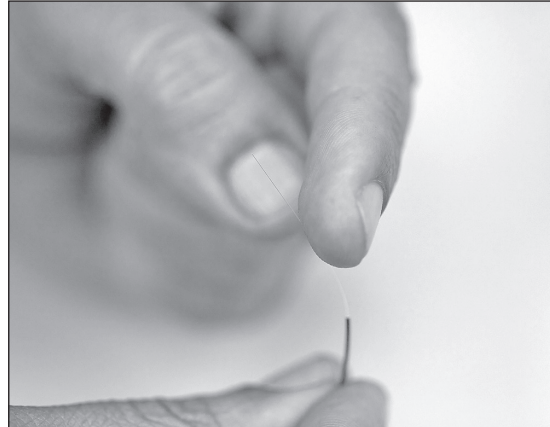




- 3.3 Determine if the fiber is tight or semi-tight buffer. If the 900  $\mu\text{m}$  slides easily from the fiber, it is semi-tight buffer fiber. If not, it is tight buffer. Make note for step 3.10.
- 3.4 For semi-tight buffer only, place a second fiber holder 300 mm (12 inches) from the end of the fiber. Latch the buffer clamp closed. (This will ensure a stable cleave length.)

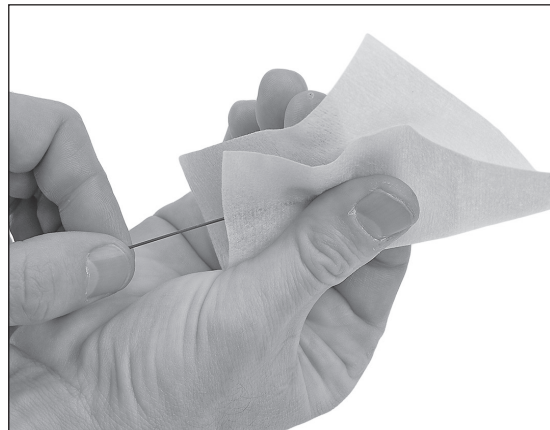


- 3.5 Test the stripped fiber for weak points by using your finger to slowly flick the fiber in multiple directions. Watch for the fiber to spring back to the straight position. If the fiber breaks, properly dispose of broken-off piece and re-strip the fiber.

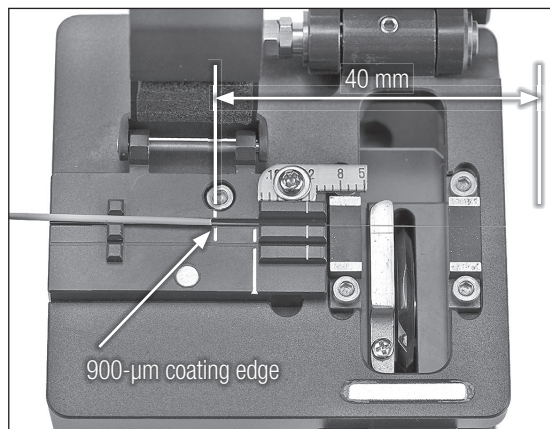


- 3.6 Thoroughly clean the stripped fiber with a lint-free wipe and alcohol.

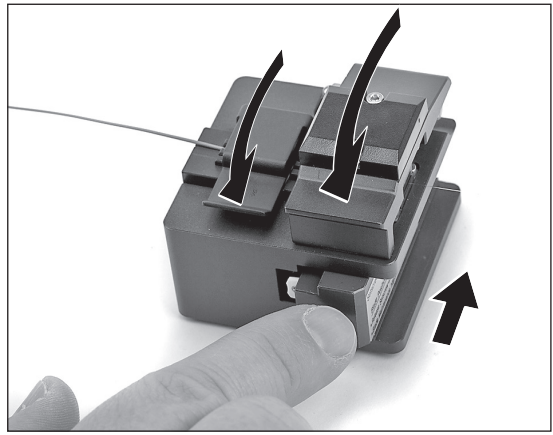
**Note:** *Carefully follow safety, health and environmental information given on the product label or the Material Safety Data Sheet for the isopropyl alcohol.*



- 3.7 Lay the 900  $\mu\text{m}$  fiber into the larger of the 2 tracks on the cleaver. Cleave it to 24 mm, by aligning the coating edge with the left-most line on the fiber track. (If you are using another cleaver model or one from the 3M™ No Polish Connector Kit, then mark it at 24 mm.)

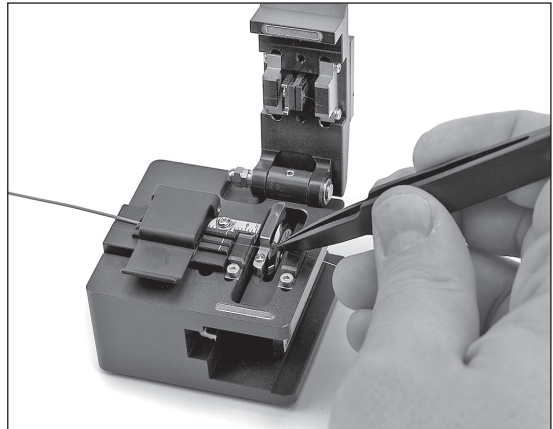


- 3.8 Close the left cover. Close the right cover. Push the shuttle forward to cleave the fiber.

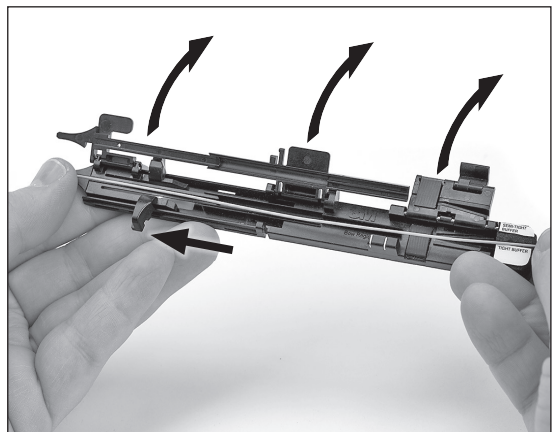


- 3.9 Open the right cover. Use a tweezers to carefully grab the glass shard. Discard it in the shard container.

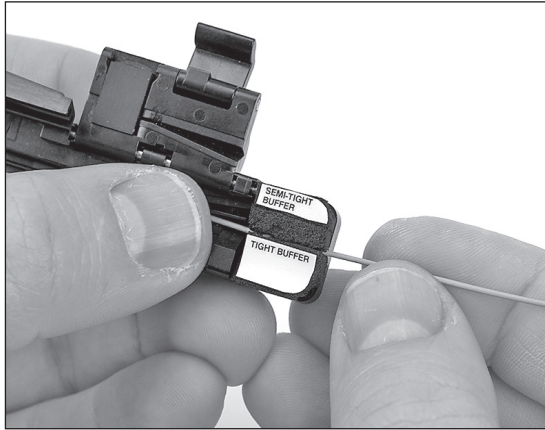
**CAUTION:** *The glass shard is sharp and can pierce the skin.*



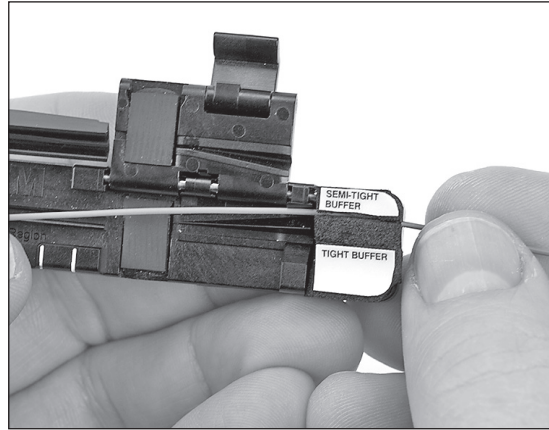
- 3.10 Open all 3 lids on the fiber holder. Slide the shuttle forward. Open the cleaver's left cover. Lay the fiber in the fiber holder.



- 3.11 Tuck the fiber in the foam. Lay the fiber in the track running through the center of the fiber holder. Use the “TIGHT BUFFER” or “SEMI-TIGHT BUFFER” slits as appropriate. Reference Section 3.3 to determine which fiber type.



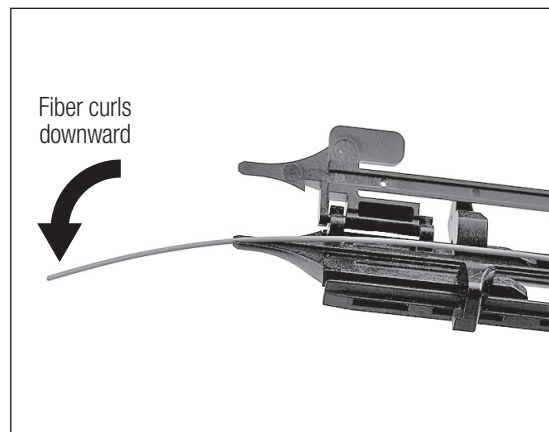
Tight Buffer



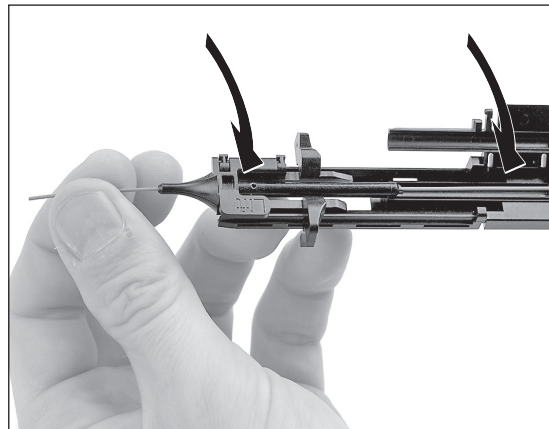
Semi-Tight Buffer

- 3.12 Rotate the fiber if necessary so that the fiber curl is directed downward in the fiber holder.

**SUGGESTED TIP:** *With the shuttle forward, leave at least one finger width of buffer extending beyond the nozzle to help with next step.*

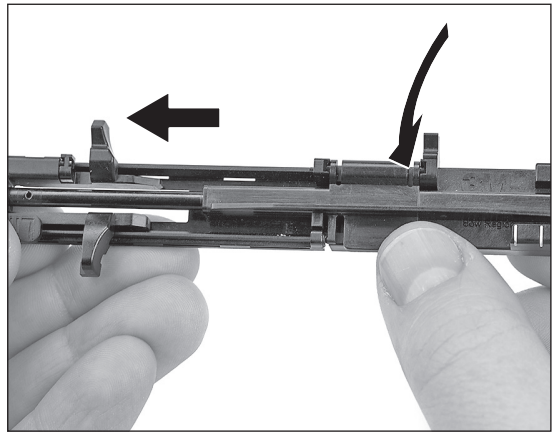


- 3.13 Pull the fiber straight. Close the front 2 lids.



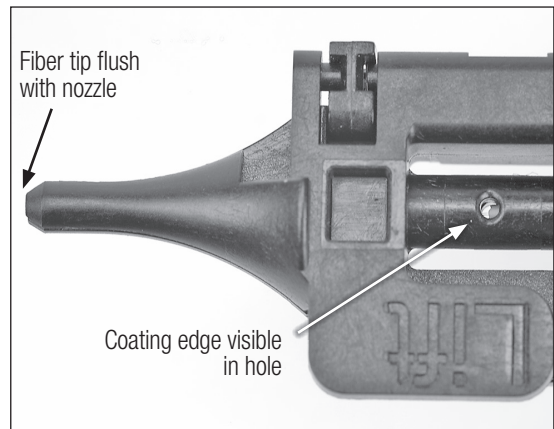


- 3.14 Snap the middle lid shut. Slide the shuttle forward until it stops.

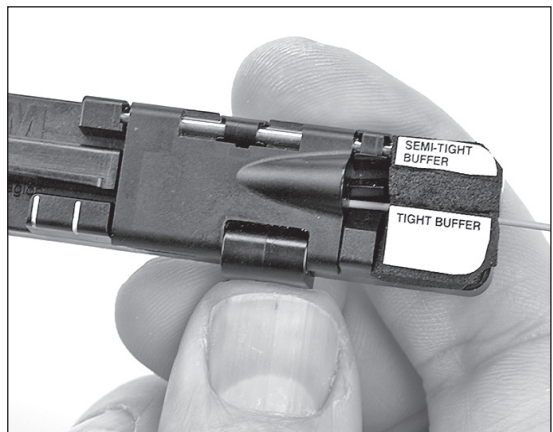


- 3.15 Position the fiber so the tip is within 1 mm of being flush with the end of the nozzle.

**Note:** *The 900  $\mu\text{m}$  coating edge can be seen through a hole in the shuttle. Viewing this is a good method to check that the cleave length is correct (24 mm).*



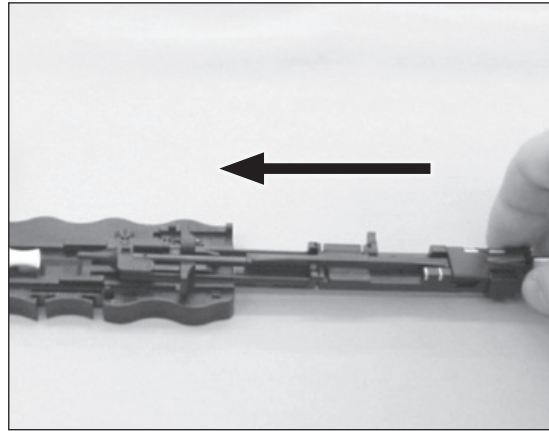
- 3.16 Close and latch the buffer clamp.



## 4.0 Fiber Insertion and Connector Activation

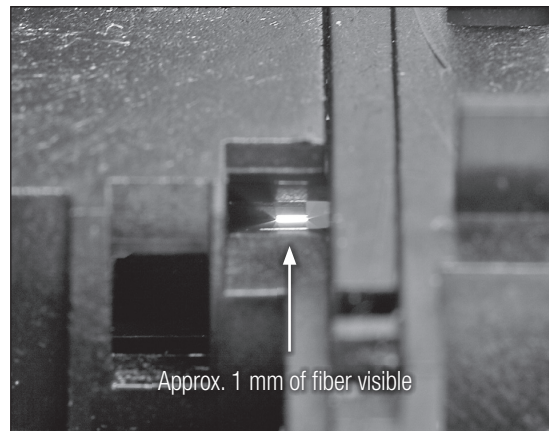
- 4.1 Insert the fiber holder (with cleaved fiber) into the guide track on the protrusion setting tool until it reaches its travel limit.

**Note:** Use care when advancing the fiber holder into the protrusion setting tool to avoid damaging the fiber. As the fiber holder advances toward the connector, the sliding fiber cover/buffer strain relief activation subassembly will bottom out in the tool, and the cleaved end of the fiber will thread through the connector. In addition, just prior to the fiber holder being fully inserted into the protrusion setting tool, the non-sliding fiber cover (the one generally in the middle of the fiber holder) will automatically pop up and the fiber will bow noticeably.



- 4.2 Verify that the cleaved end of the fiber extends beyond the tip of the connector ferrule. To do this, depress and hold the push button on the flashlight contained within the protrusion setting tool and visually confirm the presence of approximately 1 mm of fiber through the viewing window.

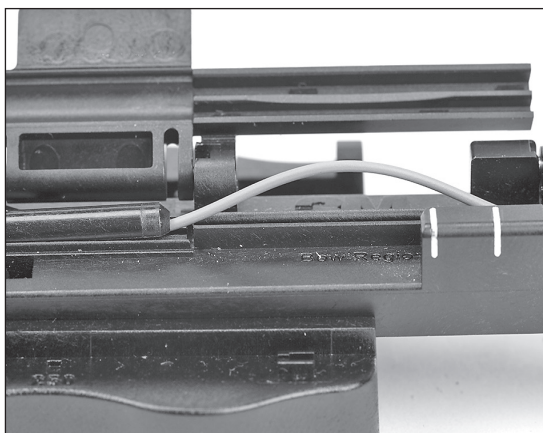
**Note:** If for some reason the fiber is not seen extending beyond the tip of the connector ferrule, withdraw the fiber holder (with cleaved fiber) from the protrusion setting tool and repeat as many of the preceding steps as deemed necessary.



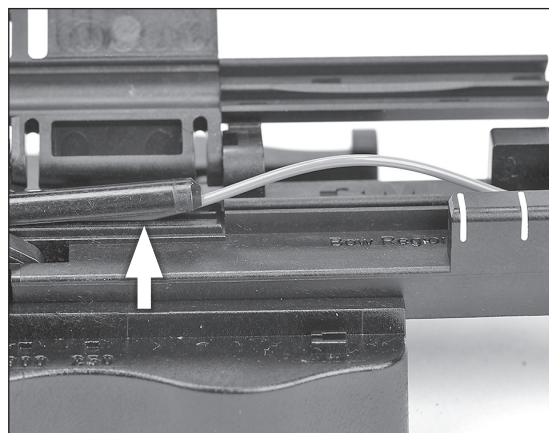
**Note:** There are many brands and types of 900  $\mu\text{m}$  coated fiber. For 3M™ Crimplok™+ Connectors, categorize the fiber as either soft or stiff coating.

- 4.3 For stiff-coated 900  $\mu\text{m}$  fiber, the fiber bow is so strong, it bends the front lid upward. At cold temperatures, some fiber coatings will become more stiff.

If fiber is visible underneath the front lid (as pictured on the right, below), then it is stiff-coated.

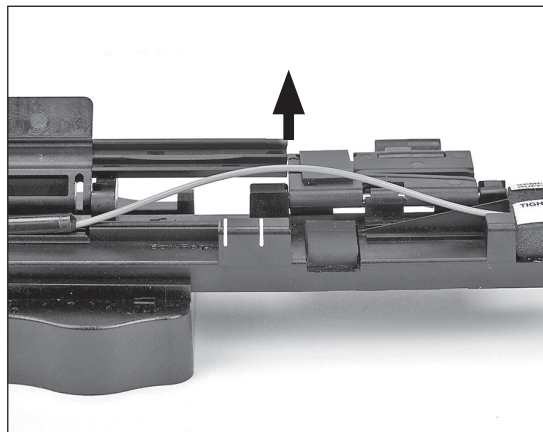


Soft coating



Stiff coating

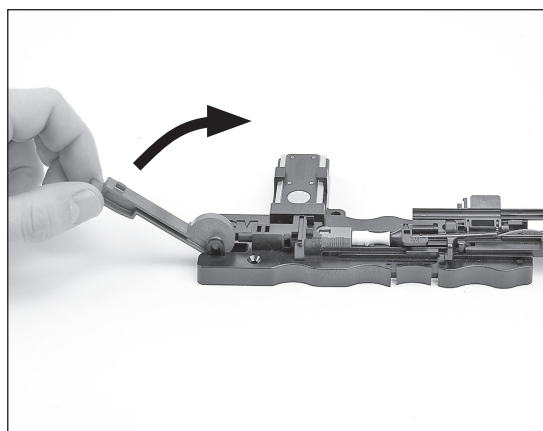
- 4.4 For stiff-coated fiber only, open the buffer clamp, which will lengthen the fiber bow. If the fiber slips through the foam and lays flat, then re-create the bow by hand.



For stiff coating only

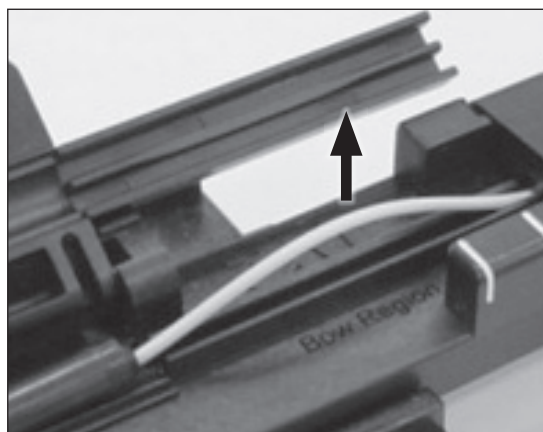
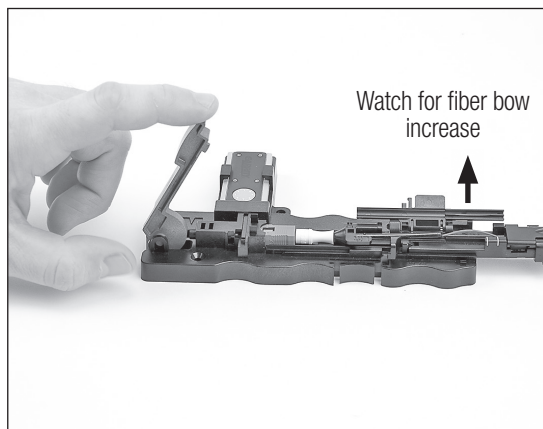
- 4.5 Rotate the activation lever on the protrusion setting tool 180° until the free end is positioned directly above the connector.

**Note:** Use caution to move the lever slowly to avoid damaging the fiber. Hold onto the lever, keeping it from springing forward on its own.

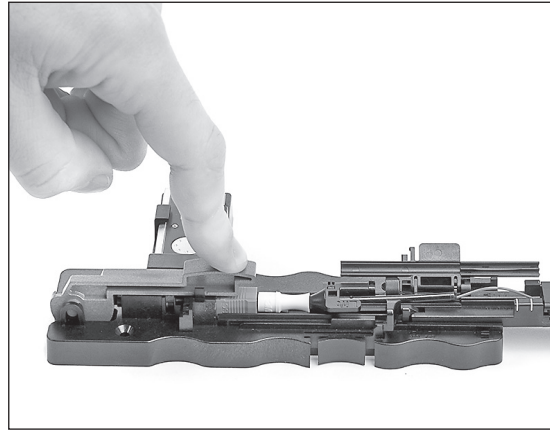


- 4.6 CRITICAL STEP: Watch for the fiber bow to increase slightly as the lever comes down. Do not proceed to the next step until seeing this.

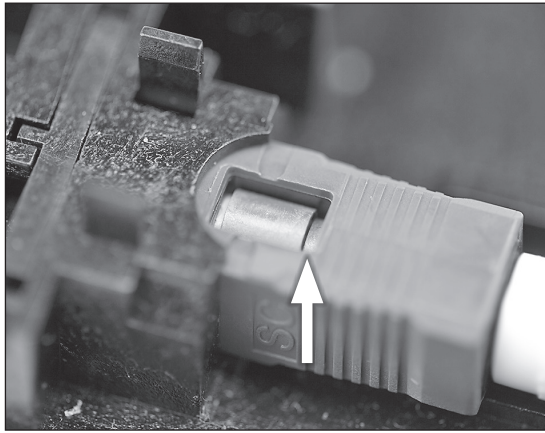
**Note:** The fiber bow increase is caused by the lever moving the jig tip which pushes the fiber backward.



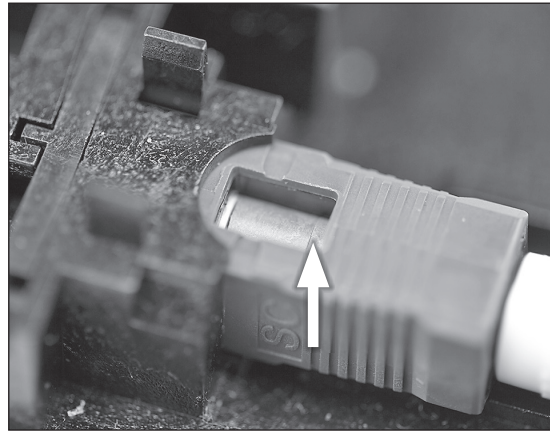
- 4.7 Press down firmly on the free end of the activation lever to activate the fiber crimping mechanism within the connector. An audible click may be heard.



**Note:** If you are not sure if the click was heard, and therefore not sure if the fiber is crimped, inspect the red cap surface. A raised surface indicates the fiber IS NOT crimped. A flush, even surface indicates the fiber IS crimped.



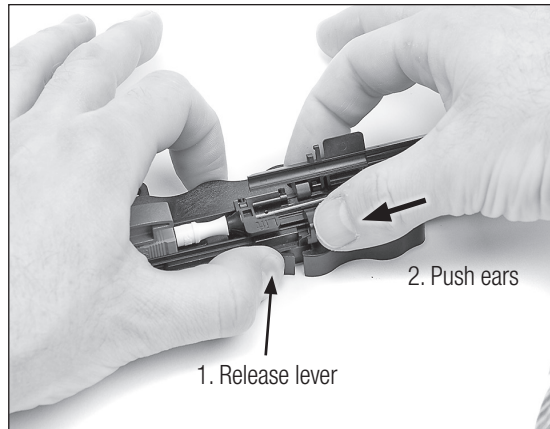
Not crimped



Crimped

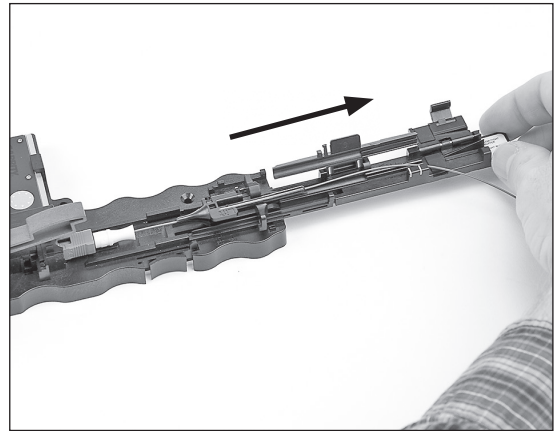
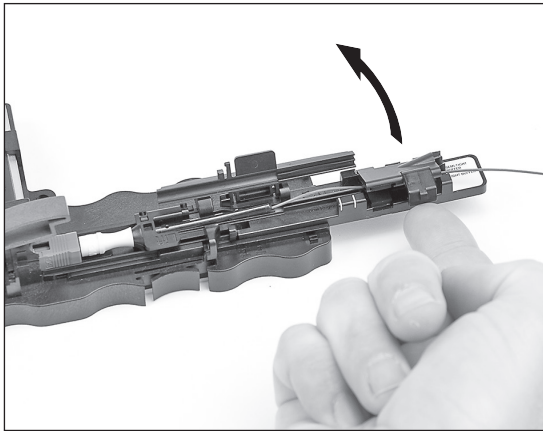
- 4.8 If you have the 3M™ 200X View Scope 6365-VS for end face inspection, skip this step (4.8) until after step 5.8, connector cleaning is complete. If you don't have the optional view scope accessory, activate the buffer strain relief within the connector using the shuttle on the fiber holder. While holding the entire tool in place, depress the release lever on the side of the protrusion setting tool base and push on the two ears of the shuttle (toward the connector) until it reaches its travel limit.

**Note:** There are no provisions to deactivate the 900  $\mu$ m buffer strain relief within the connector.

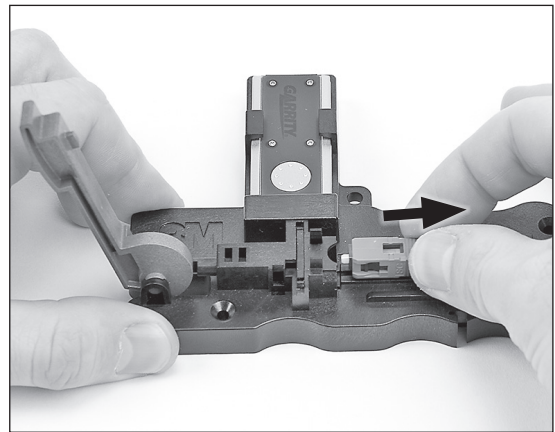




- 4.9 Open the covers and buffer clamp (if necessary) on the fiber holder. (For stiff-coated fiber, the buffer clamp was already opened.) Slide the fiber holder out of the guide track in the protrusion setting tool, leaving the connector and fiber behind.



- 4.10 Remove the connector from the port on the protrusion setting tool. Use care to protect the ferrule and fiber tips from damage.



## 5.0 Nano-finishing and Cleaning

- 5.1 Complete the installation process using the nano-finisher. Open the lid on the finisher by first depressing the latch. Apply a new finishing disc. For proper performance, only one finishing disc may be installed at a time. Use a new disc for each connector. Discs are provided in the connector package. Remove the adhesive-backed finishing disc from the protective liner, and place it onto the backup pad. Center the disc on the pad using the through hole and pin as visual references. Press the disc against the backup pad while taking care to keep it clean.



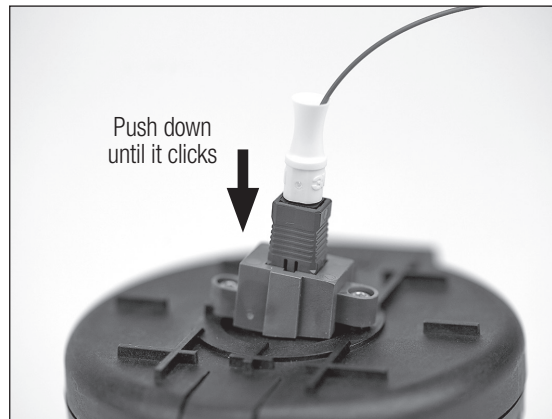
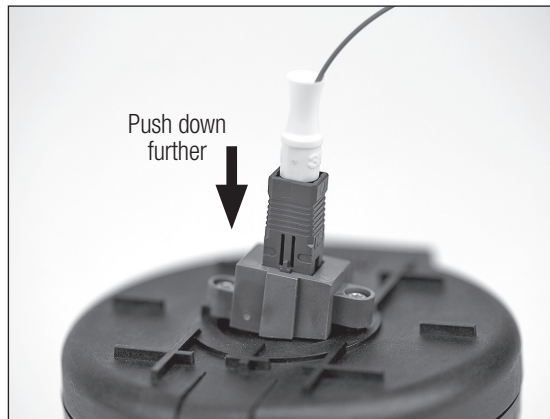


- 5.2 Wet the top surface of the finishing disc with 2 squirts of de-ionized water using the spray bottle provided. Avoid using excessive amounts of water. Close the lid fully and ensure the latch is engaged.

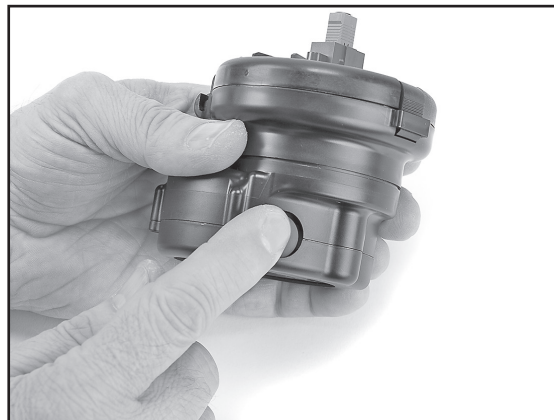
**Note:** *Wetting the disc surface is important because it carries off glass particles that have been removed. Failure to wet the disc results in poor connector performance.*



- 5.3 Insert the connector into the port on the finisher lid making certain it is fully engaged. Push until a click is heard.



- 5.4 Depress the release button on the side of the finisher. The button will stay depressed until the finishing sequence is complete. It pops back up automatically. Allow this to happen by keeping clear of the button during the sequence.



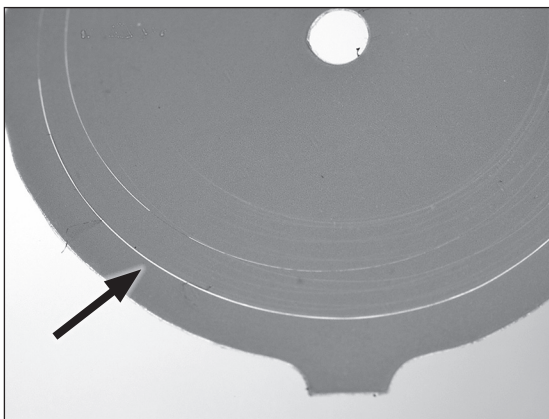
- 5.5 Rotate the input knob one full turn with a single continuous motion. The finisher automatically stops the input knob after one full turn.

- 5.6 Remove the connector from the port on the finisher lid.

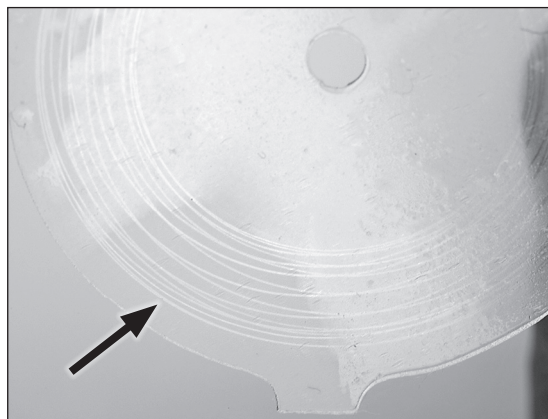
**Note:** *The nano-finisher is best stored dry – inside and out. Open the lid as shown in step 5.1, and allow to dry.*



- 5.7 Remove the lapping film. Inspect the lapping film for fiber tracks. If the film has tracks, dispose of it. If not, restart at step 5.1.

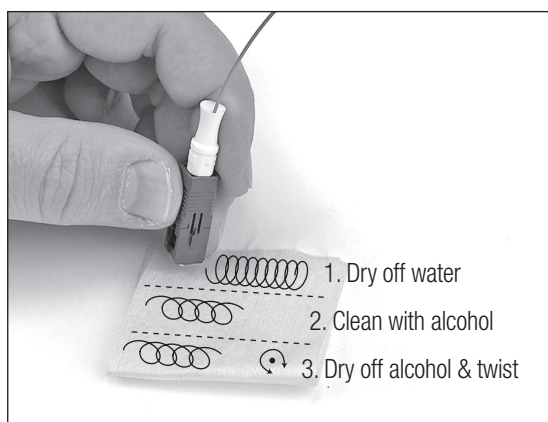


APC



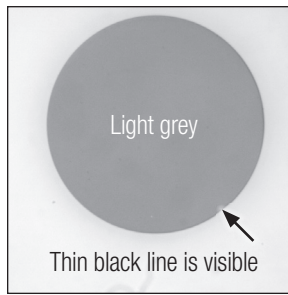
UPC

- 5.8 Dry the connector using a new lint-free wipe. Do not use the same wipe used for stripping fiber. Fold the wipe to provide cushion. For APC, tilt the connector so the ferrule tip is in full contact with the wipe. For UPC, hold the connector perpendicular to the wipe. Press the ferrule tip into the wipe slightly and move the tip in a circular motion. After the connector has been dried, add 1 or 2 drops of alcohol to a clean area of the wipe. Do not mix water and alcohol on the wipe. If too much alcohol soaks the wipe, just use the edge of the alcohol-wetted area. Clean the connector by moving the tip in a small circular motion. Then dry the connector with a spot on the wipe that has not been used yet, and is not contaminated with water or alcohol. Use a small circular motion. Finish with a twisting motion.

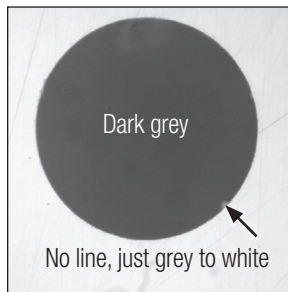


- 5.9 Before the network has a laser light source feeding your connector, inspect the fiber end face with 3M™ 200X View Scope 6365-VS if you have one. If the fiber end face looks acceptable per photos to the right, then re-insert the connector into the protrusion setter and activate the buffer clamp per step 4.8. If the connector needs rework, proceed to Section 6.0.

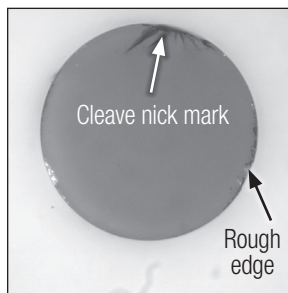
**Caution reminder: Never look directly into the end of a fiber or connector when connected to a laser light source using the naked eye or a microscope.**



Thin black line is visible  
Ideal clean fiber end face

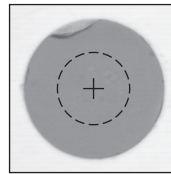


No line, just grey to white  
Fiber is missing, go to step 6.1

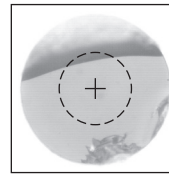


Cleave nick mark  
Rough edge  
Not polished, restart at step 5.1

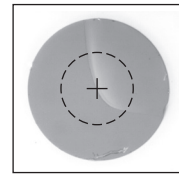
Chips or cracks inside the 1/2 diameter circle are not allowed.



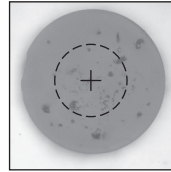
Acceptable chip



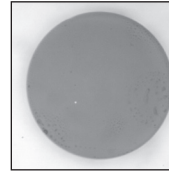
Unacceptable chip,  
needs rework



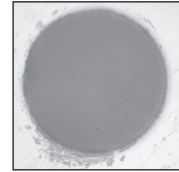
Unacceptable crack,  
needs rework



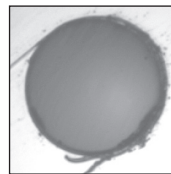
Dirty, clean full  
diameter



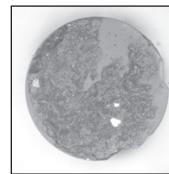
Alcohol on fiber, re-dry



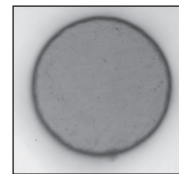
Alcohol on ferrule,  
re-dry



Thread caught, re-  
clean with a twist



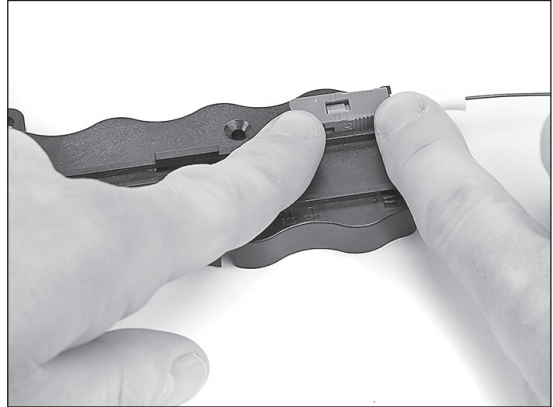
UPC only photo: forgot  
to spray water, needs  
rework



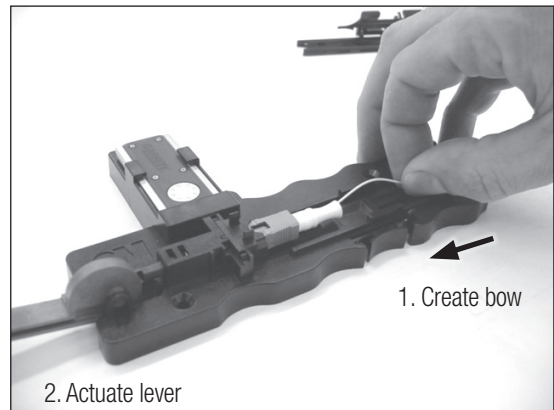
Forgot to use lapping  
film, needs rework

## 6.0 Connector Reusability

- 6.1 Should it become necessary to separate the connector and fiber, e.g. to reset the fiber protrusion, the activation cap within the connector can be deactivated. This is accomplished by first removing the connector from the port on the protrusion setting tool. Place the connector atop the deactivation station on the tool base, with the red activation cap face up, and press firmly downward. This action releases the gripping mechanism within the connector. Limit the number of times a given connector is reused to one.

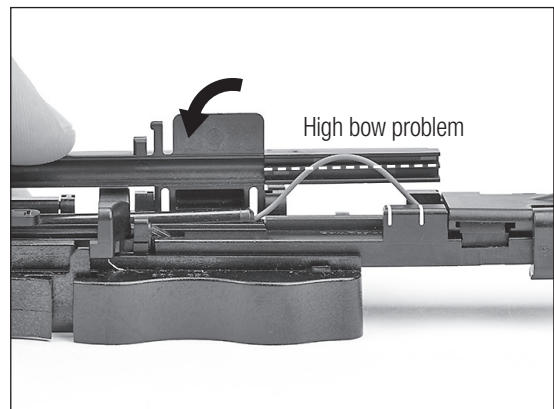


- 6.2 To correct large, deep imperfections on the fiber face, restart at step 2.0. Replace the lapping film disc for each re-use of the connector.
- 6.3 To correct small, shallow imperfections, such as small chips, reinsert the connector in the protrusion setter. Hold the fiber with your fingers and create a bow in the fiber. The bow length should be approximately as shown in Step 4.3 for soft coating, and approximately as shown in Step 4.4 for stiff coating. Hold the fiber bow and begin completing Steps 4.5 through 5.8. Use a new piece of lapping film per Step 5.1.



## 7.0 Troubleshooting

- 7.1 If the fiber is not visible with the flashlight in step 4.2, and bow increase is not seen in step 4.6, check the bow height by tilting the middle door on the fiber holder to the vertical position, as shown in the photo to the right. If the fiber bow is taller than the rib in the center of the middle door, marked with a dotted line in the photo to the right, then the fiber bow is too high. This is true for both soft-coated and stiff-coated fiber. The fiber has hit a snag inside the connector. Remove the fiber and fiber holder from the protrusion setter. Open the latch on the fiber holder's buffer clamp. Re-adjust the fiber so that fiber curl is downward as shown in step 3.12. Attempt inserting the fiber into the connector again per section 4.0. If a high bow occurs again, re-strip the fiber and re-cleave per section 3.0. If the same high bow problem occurs again, mark the connector as defective and get a new connector.



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