



MPO Connector Cleaning and Inspection Recommendation

General

This instruction sheet describes the recommended cleaning methods used during the cleanliness inspection of the different configuration of the MPO connectors.

Cleanliness of fiber optic connections is critical to the performance of optical communication networks. Contamination on a connector end face, even if only at the microscopic level, can create severe problems. Traditional single-mode fiber optic core diameters are approximately 9 microns. By comparison, a human hair is 80 microns or larger in diameter. Contamination that blocks the fiber core generates strong back reflections (Return Loss), and may affect attenuation (Insertion Loss). Loose contamination on the connector end face that may not block the core may move during de-mating, or may prevent physical glass-to-glass contact required for proper signal transmission. Rigid contamination trapped between connector end faces may permanently damage the fiber core(s). Dry contaminates are relatively simple to remove compared to oils and films which naturally occur with human contact, vapor condensation, and solvent evaporation. MPO connectors have different configurations, pinned and unpinned and are to be inspected when installed on a free cable or when located inside an adaptor (panel configuration or in a module). This document will provide recommendations for each configuration.

Remark: The entire surface of the MT ferrule should be inspected for contamination, including the pin area. Commscope recommends the use of Large Field of View, or Wide Field of View microscopes which can show the entire ferrule surface in one view. The images on page 3 of this document are produced by such a microscope.

List of cleaning consumables described in this document.

Reel cleaner 1 slot MPO/MTP Female connector	1918803-1
Reel cleaner MPO/MPO with pins	1918802-1
I.B.C. Cleaner MTP/MPO male and female connectors and inside adaptors	1918809-1
Cleaning sticks 2.5mm Sticklers Blue MCC-S25	n/a
Cleaning sticks 3.5mm Sticklers White MCC-XMT	n/a
Cleaning fluid Cleaning fluid for example Sticklers MCC-FCC03M BLUE	n/a
Orange TePe dental (pinhole) brush	n/a
Angled Pink Interprox dental (pinhole brush)	n/a

Note: CommScope does not offer some of the cleaning sticks. These products can be ordered via local distribution channels.

TRADEMARK INFORMATION

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STICKLERS is a trademark of Micro Care Corporation

 **PRECAUTIONS:**

- It is important that every fiber connector be inspected under magnification before a connection is made since many contaminants are too small to be seen by the naked eye.
- Pre-terminated modules and cartridges include factory polished, cleaned, and tested fiber optic connectors in bulkhead (mounted) adapters. Protective dust caps/covers are provided to minimize contamination during shipping, handling, and installation, but do not guarantee a clean connector. Connectors internal to the adapters are clean when purchased; however, exposure of the modules/cartridges to extremely dusty environments may allow end face contamination despite the dust caps/covers.
- Fiber optic cordage and jumper performance is sensitive to bending, pulling, and crushing. Minimum bend radii must be maintained during installation per the manufacturer's specification. Appropriate pulling socks must be used during installation and pulling forces shall not exceed manufacturer's recommendations. MPO terminated trunk cables may use ribbonized fiber optic cable, which has a preferential bend axis. Use caution to avoid kinking trunk cables.
- Care should be taken not to compromise the stability of racks during inspection and cleaning.
- Over-the-counter or "Drug Store" type isopropyl alcohol (IPA) is not high enough quality (91% minimum purity) for cleaning optical components. Even optical quality IPA can leave a residue on the fiber surface and will attract water and contamination as it dries. Commscope does NOT recommend the use of IPA.
- Components used to clean optical connectors should be lint and contaminant free. Do not touch any surface that will contact any connector end face, as cross-contamination of the end face is likely.
- The IBC MPO/MTP cleaner's clear adapter/cover and the cleaning tip are keyed much like MPO/MTP adapters and connectors. The IBC cleaner must be oriented correctly for the cleaning cloth to contact the connector end face.

 **CAUTIONS:**

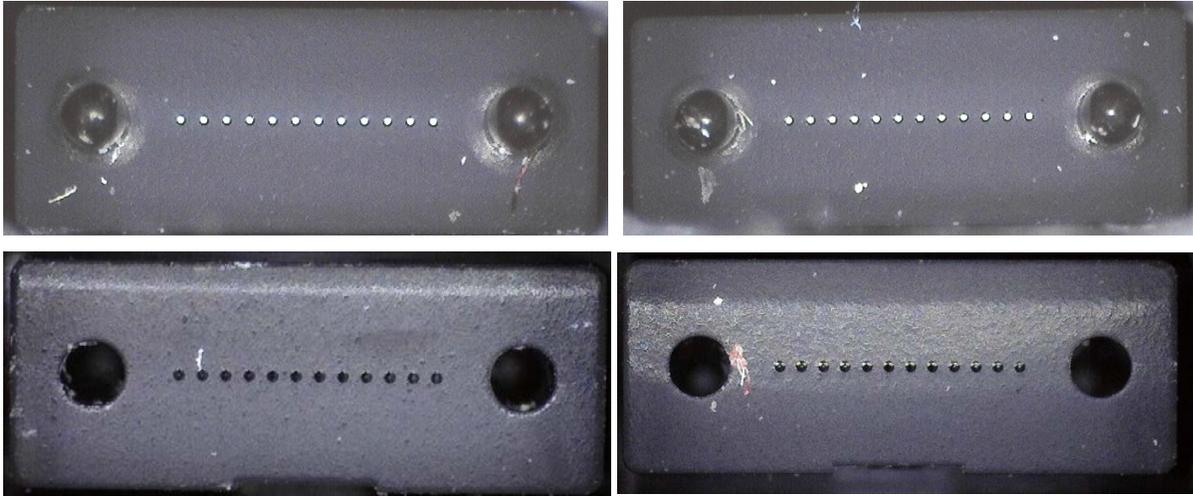
- Disconnected optical components may emit invisible optical radiation that can damage your eyes. Never look directly into an optical component that may have a laser coupled to it. Serious and permanent retinal damage is possible. If accidental exposure to laser radiation is suspected, consult a physician for an eye examination.
- Disconnected optical components may emit invisible optical radiation that can damage the inspection scope and monitor. Never plug the optical scope into an optical component that may have a laser coupled to it. Permanent equipment damage is possible.
- Wearing safety glasses during inspection and cleaning is recommended. Although standard safety glasses provide no protection from potential optical radiation, they offer protection from accidental airborne hardware and cleaning solvents.
- Laser safety glasses can protect from laser light across specific wavelengths. Laser safety glasses must meet federal and state regulations. Wear appropriate laser eye protection, if required, during inspection and cleaning.

Inspection before cleaning!

Before a connector is cleaned it should be inspected to determine if cleaning is required.

Dry cleaning of optical connectors will generally remove airborne contamination and should be attempted first. Wet cleaning is more aggressive (effective) than dry cleaning and will remove airborne contamination as well as light oil residue and films. The advantage of wet cleaning is that it does not cause static charge of the MPO ferrule. Static electricity is known to attract loose contaminants.

The figures below illustrate different types of MPO connector contamination



MPO Unpinned – Exposed End Face

END FACE CLEANING

Dry Cleaning (Optipop)

1. Remove the connector protection cap.
2. Inspect the connector end face with an inspection microscope to determine if cleaning is necessary.
3. Confirm that the Optipop cleaner used here is designed for unpinned MPO connectors.
4. Depress the lever on the OptiPop cleaner to expose the cleaning cloth.
5. Place the connector end face against the cleaning cloth, apply light pressure, and wipe the end face in the direction of the arrow. Do not allow the end face to contact the gray frame around the cleaning cloth. Take care to hold the flat surface of the connector end face flat against the cloth.
6. Inspect the connector end face again to see if cleaning action was effective.



Wet Cleaning (Optipop)

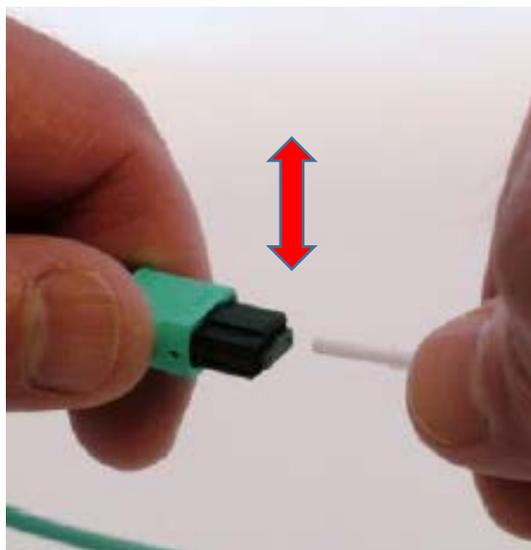
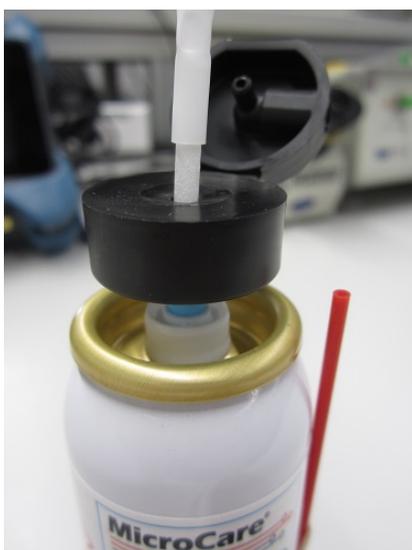
1. Remove the connector protection cap.
2. Inspect the connector end face with an inspection microscope to determine if cleaning is necessary.
3. Depress the lever on the OptiPop cleaner to expose the cleaning cloth.
4. Place the tube from the FPF cleaning fluid on the tape of the Optipop and gently spray some cleaning fluid on the tape, moisten the tap till it almost reaches the grey frame.
5. Place the connector end face against the wet cleaning cloth, apply light pressure, and wipe the end face in the direction of the arrow. Do not allow the end face to contact the gray frame around the cleaning cloth. Take care to hold the flat surface of the connector end face flat against the cloth.
6. Depress the lever on the OptiPop cleaner to expose a dry piece of the cleaning cloth and repeat the wiping action but now on the clean dry cloth.
7. Inspect the connector end face again to see if cleaning action was effective.



MPO Unpinned – Exposed End Face

Alternative Wet Cleaning (MMC-XMT cleaning stick)

1. Remove the connector protection cap.
2. Tilt the fiber connector cleaner can back slightly, depress the pump, and fill the can's dispensing "well."
3. Dip a 3.5mm MCC-XMT cleaning stick tip into the well to dampen the tip with cleaning fluid. Lightly tap the center portion of the cleaning stick to remove excess fluid from the tip. Do not contact the tip.
4. Using the damp tip, apply light pressure to the connector end face and wipe the end face in a direction perpendicular to the fiber array. Repeat step 4 with the dry tip.
5. Discard the cleaning sticks.
6. Inspect the connector end face with the inspection microscope.



PINHOLE CLEANING

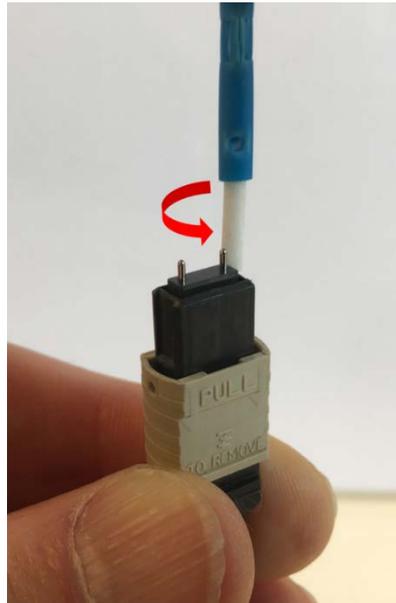
1. Cleaning the pinholes on MPO connectors is the last resort for trouble-shooting a high loss connection, and only applicable for experienced personnel.
2. Wet the orange TePe dental (pinhole) brush with MicroCare FCC2 or alcohol and insert the brush into the pinhole while turning the brush 90 degrees. The brush will bottom-out at the pin clamp before the handle reaches the ferrule end-face. Make sure you do not allow the FCC2 to dry on the brush before using. If it does, apply more FCC2 and proceed with the cleaning.
3. With the brush bottomed-out in the pinhole, rotate the handle back and forth at least three times (180 degrees in each direction).
4. Pull the brush out of the hole while rotating 90 degrees and then inspect the pinhole with a scope. With the scope at 50x magnification, inspect the leading edge of the pinhole for debris. Then focus down the pinhole (at least to the inner step diameter) for any other contamination.
5. Discard the brush.



PIN CLEANING

Wet Cleaning: (MMC-S25 cleaning stick)

1. Remove the connector protection cap.
2. Tilt the fiber connector cleaner can back slightly, depress the pump, and fill the can's dispensing "well."
3. Dip a 2.5mm MCC-S25 cleaning stick tip into the well to dampen the tip with cleaning fluid. Lightly tap the center portion of the cleaning stick to remove excess fluid from the tip. Do not contact the tip.
4. Using the damp tip, clean the pins by holding the tip parallel to the pins such that the tip end contacts the ferrule and wipe the cylindrical surface of the pins.
5. Rotate the tip around the pins while the damp tip touches the pin and the ferrule surface
6. Repeat step 4 and 5 with the dry tip.
7. Discard the cleaning sticks.
8. Inspect the pin and pin area of the connector end face with the very wide field of view microscope.



MPO Pinned – Exposed End Face

END FACE CLEANING

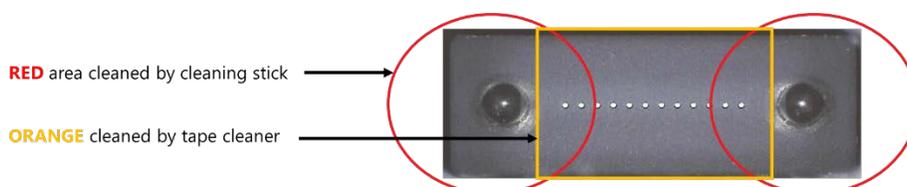
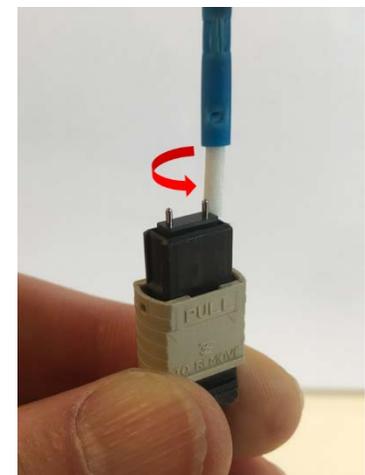
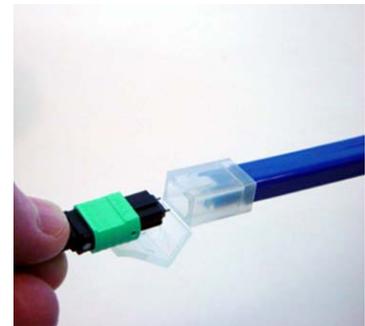
Dry Cleaning (Optipop + cleaning stick)

1. Remove the connector protection cap.
2. Inspect the end face if cleaning is necessary.
3. Confirm that the Optipop cleaner used here is designed for pinned MPO connectors.
4. Depress the lever on the OptiPop cleaner to expose the cleaning cloth. Place the connector end face against the cleaning cloth, apply light pressure, and wipe the end face in the direction of the arrow. Do not allow the end face to contact the gray frame around the cleaning cloth. Take care to hold the flat surface of the connector end face flat against the cloth.
5. Inspect the connector end face with the inspection microscope.



Alternate Dry Cleaning (IBC + cleaning stick)

1. Remove the connector dust cap.
2. Open the hinged adapter cover on the IBC cleaner, exposing the cleaning cloth.
3. Insert the connector into the clear IBC adapter such that the end face contacts the cleaning cloth. Apply light pressure and rotate the IBC cloth with the indexing wheel approximately 1/4 turn.
4. Since the tape in the IBC cleaner does not cover the ferrule surface completely we have to clean the pin area with the MMC-S25 cleaning sticks.
5. Rotate the tip around the pins while the damp tip touches the 1st pin and the ferrule surface. Do the same to the 2nd pin.
6. Discard the cleaning stick.
7. Inspect the connector end face with the inspection microscope.

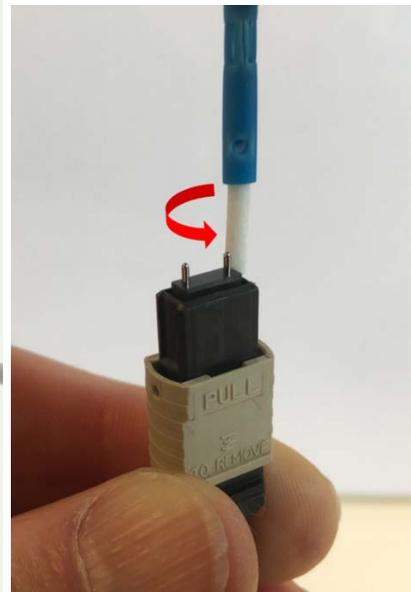
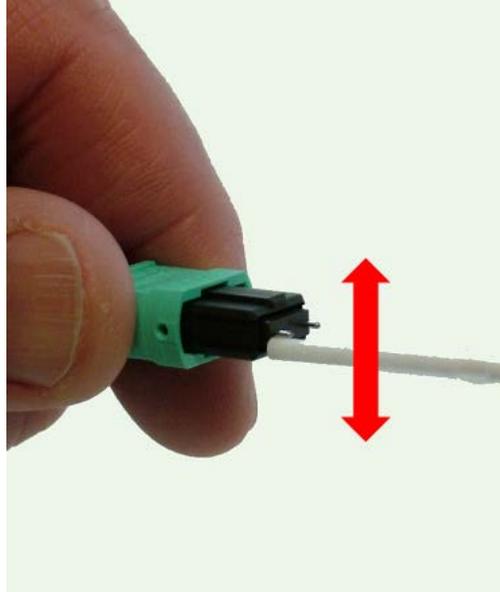


MPO Pinned – Exposed End Face

END FACE CLEANING

Alternate Wet Cleaning (2.5mm + 3.5mm cleaning sticks)

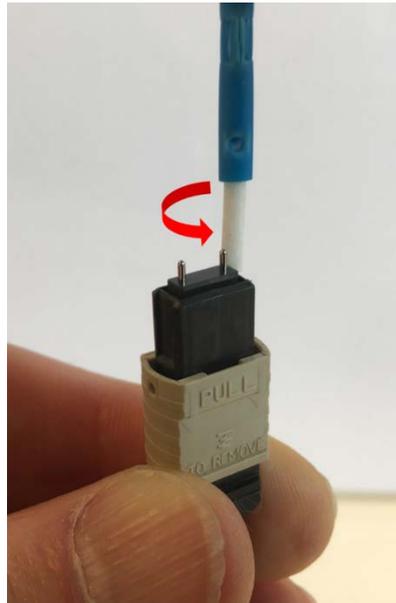
1. Remove the connector protection cap.
2. Tilt the fiber connector cleaner can back slightly, depress the pump, and fill the can's dispensing "well."
3. Dip a 2.5mm MCC-S25 cleaning stick tip into the well to dampen the tip with cleaning fluid. Lightly tap the center portion of the cleaning stick to remove excess fluid from the tip. Do not contact the tip.
4. Using the damp tip, clean the pins by holding the tip parallel to the pins such that the tip end contacts the ferrule and wipe the cylindrical surface of the pins. Rotate the tip around the pins while the damp tip touches the pin and the ferrule surface.
5. Dip a 3.5mm MCC-XMT cleaning stick into the well to dampen the tip with cleaning fluid. Lightly tap the center portion of the cleaning stick to remove excess fluid from the tip. Do not contact the tip.
6. Using the damp tip, apply light pressure to the connector end face and wipe the end face in a direction perpendicular to the fiber array.
7. Repeat step 3 and 5 with dry tips.
8. Discard the cleaning sticks.
9. Inspect the connector end face with the inspection microscope.



MPO Pinned – Exposed End Face

PIN CLEANING (MMC-S25 Cleaning Stick)

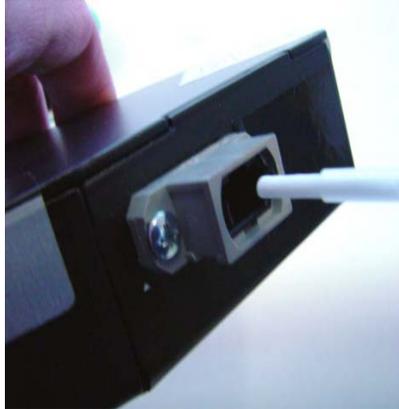
1. Remove the connector protection cap.
2. Tilt the fiber connector cleaner can back slightly, depress the pump, and fill the can's dispensing "well."
3. Dip a 2.5mm MCC-S25 cleaning stick tip into the well to dampen the tip with cleaning fluid. Lightly tap the center portion of the cleaning stick to remove excess fluid from the tip. Do not contact the tip.
4. Using the damp tip, clean the pins by holding the tip parallel to the pins such that the tip end contacts the ferrule and wipe the cylindrical surface of the pins.
5. Rotate the tip around the pins while the damp tip touches the pin and the ferrule surface
6. Repeat step 4 and 5 with the dry tip.
7. Discard the cleaning sticks.
8. Inspect the pin and pin area of the connector end face with the very wide field of view microscope.



MPO Pinned – Bulkhead Adapter Installed (Modules)

DRY CLEANING (IBC + MCC-S25 cleaning stick)

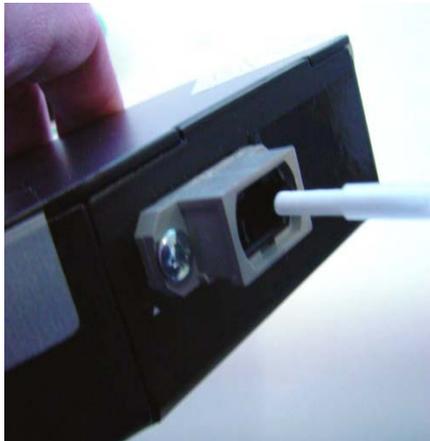
1. Remove the adapter protection cap.
2. Inspect if the connector and /or pins need to be cleaned.
3. Remove the clear adapter/cover on the IBC cleaner, exposing the cleaning cloth.
4. Insert the IBC into the bulkhead MPO adapter such that the end face contacts the cleaning cloth. Apply light pressure and rotate the IBC cloth with the indexing wheel approximately 1/4 turn. Remove the IBC cleaner.
5. Clean the pins by holding the tip of the parallel to the pins such that the tip end contacts the ferrule and wipe the cylindrical surface of the pins.
6. Rotate the tip around the pins while the tip touches the pin and the ferrule surface.
7. Discard the cleaning sticks.
8. Inspect the connector end face with the inspection microscope and see if the cleaning action was effective.



MPO Pinned – Bulkhead Adapter Installed (Modules)

Wet Cleaning (MCC-S25 cleaning stick)

1. Remove the adapter dust cap.
2. Inspect to see if cleaning is necessary.
3. Tilt the fiber connector cleaner can back slightly, depress the pump, and fill the can's dispensing "well."
4. Dip a MMC S-25 cleaning stick tip into the well to dampen the tip with cleaning fluid. Lightly tap the center portion of the cleaning stick to remove excess fluid from the tip. Do not contact the tip.
5. Insert the damp tip into the adapter and clean the pins by holding the tip parallel to the pins such that the tip end contacts the ferrule. Wipe the cylindrical surface of the pins.
6. Using the damp tip, apply light pressure to the connector end face and wipe the end face in a direction perpendicular to the fiber array.
7. Repeat steps 5 and 6 with a dry stick.
8. Discard the cleaning sticks.
9. Inspect the connector end face with the inspection microscope to see if cleaning action was effective.



MPO Pinned – Bulkhead Adapter Installed (Modules)

Guide Pin Bore Cleaning

Note: Cleaning the pinholes on MPO connectors is the last resort for trouble-shooting a high loss connection, and should only be applied by experienced personnel.

1. Remove the protection cap from the MPO adaptor of the module.
2. Inspect the connector with 50x inspection scope (e.g. Dino-Lite brand AM4815ZTL handheld digital microscope or equivalent). If there are contaminants around/inside the pinholes, they may need to be cleaned according to the following procedure.
3. The pink 0.4mm dental brusher, as described for cleaning MPO unpinned cable connectors, cannot be used to clean the pinholes of the MT ferrules inside modules. The shaft is too short and the fingers block the view on the ferrule end face. The angled orange (brand Interprox) should be used .
4. Wet the pink dental (pinhole) brush with MicroCare FCC2 connector cleaner or equivalent cleaning solution and insert the brush into the pinhole (be careful not to damage the fibre end faces). The brush will bottom-out before the handle reaches the ferrule end-face.
5. Pull the brush out of the hole and then inspect the pinhole with the inspection scope. Inspect the leading edge of the pinhole for debris. Then focus down the pinhole (at least to the inner step diameter) for any remaining contamination. If additional cleaning is needed, verify that the cleaning solution has not dried on the brush. If it has, apply more solution and proceed with the cleaning.
6. With the brush bottomed-out in the pinhole, rotate the handle back and forth at least three times (180 degrees in each direction).
7. Verify if the cleaning was successful.
8. Discard the used dental brush.



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