

INSPECTION AND CLEANING PROCEDURE

For OCC's Fiber Optic Connections

Overview

This document outlines Optical Cable Corporation's recommended procedures for visual inspection and cleaning processes for fiber optic connections. It is important to note that inspection and cleaning are critical steps that **MUST** be performed before any fiber optic mating is completed; including pre-terminated assemblies from the factory in a sealed bag. Insuring that the fiber optic components are clean is a requirement for maintaining quality connections between fiber optic equipment.

Cleaning of the fiber optic interfaces is one of the most rudimentary and essential procedures for maintaining fiber optic systems. Any contamination in the fiber optic connection can cause failure of the component or complete failure of the entire system. This document was established by Optical Cable Corporation to assist hardware installers, service personnel, and field service technicians with proper instructions on inspection and cleaning techniques.

General Safety Precautions

Do

- Use caution while inspecting connectors in operating fiber optic links; if high power is present it can be very dangerous.
- Turn off all laser sources before optical components, bulkheads, or fiber connectors are inspected.
- Check the connector with a power meter to confirm there is no power present.
- Make sure that the fiber optic cable is disconnected on both ends.
- Wear the appropriate certified laser safety glasses when it is required in your work area.
- Inspect the connectors/adaptors before they are cleaned.
- Inspect and clean connectors before any connection is made.
- Plug or unplug connectors using the connector housing.
- Keep a clean protective cap on all unplugged fiber connectors.
- Store unused protective caps in a clean resealable container so that the possibility of dust transfer to the fiber is minimal to none.

Don't

- Connect to a fiberscope while the system lasers are powered.
- Use unfiltered focusing optics or handheld magnifiers to inspect fiber optic connectors.
- Reuse cleaning wipes and swabs; always dispose of properly.
- Look into a fiber endface while the system lasers are powered.
- Handle products without insuring they are properly grounded.
- Connect a fiber to a fiberscope while the system lasers are powered.
- Use alcohol/wet cleaning methods without a way to confirm that it does not leave residue on the fiber endface. Damage to the equipment may occur.
- Clean receptacles or bulkheads without a way to inspect them.
- Use unfiltered focusing optics or handheld magnifiers to inspect fiber optic connectors.
- Pull or twist forcefully on the fiber cable; unplug connectors using the connector housing.
- Handle or touch the endface of a fiber optic connector.
- Touch the clean section of a cleaning fabric, swab, or tissue.
- Touch any section of a swab or tissue where alcohol has been applied.
- Handle or touch the dispensing tip of an alcohol container.
- Reuse any cleaning products such as cleaning cassette reels, swabs or tissues.
- Use alcohol around a flammable environment, due to its flammable characteristics.

INSPECTION AND CLEANING PROCEDURE - CONTINUED

General Cleaning Procedure

This section describes the general connector cleaning process. The inspection technique is performed with the use of fiberscopes in order to view the endface. The fiberscope should at least offer 200X magnification and have the proper adapters needed for the connector types.

It is important to note that inspection and cleaning are critical steps that MUST be performed before any fiber optic mating is completed; including pre-terminated assemblies from the factory in a sealed bag.

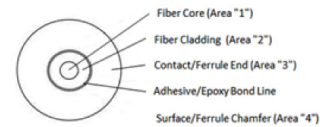
Complete the following steps:

1. Ensure that the laser source is not present.
2. Inspect the fiber component, bulkhead or connector with fiberscope of choice.
3. If the connector contains contaminates, clean it using a dry cleaning technique.
4. Inspect the connector.
5. If the connector still contains contaminates, retry the dry cleaning technique.
6. Inspect the connector.
7. If the connector is still unclean, clean it with using a wet cleaning* technique followed immediately with a dry cleaning technique to ensure that no residue remains on the endface.
8. Inspect the connector.
9. If contaminates still remain, repeat the procedure until the endface is clean.

*Note: Wet cleaning is highly discouraged for receptacles and bulkheads due to the fact that damage to the equipment can occur.

Typical View of Single Fiber Connector Endface/Visual Inspection Chart:

After the cleaning process perform another endface inspection using a 200x (400x MTP) magnification microscope. Contaminates and defects should be noted and classified by the defect type, size and severity. Utilizing the collected information the inspector should perform the proper action using the guidelines from table 1.



AREA/LOCATION	FIBER TYPE	CHIPS	CRACKS	PITS	SCRATCHES	CONTAMINATION	
						LOOSE	FIXED
Fiber Core (Area '1')	MM	Discard	Discard	Rework*	Rework*	Clean	Rework*
	SM	Discard	Discard	Rework*	Rework*	Clean	Rework*
	MPO/MTP	Discard	Discard	Rework*	Rework*	Clean	Rework*
Fiber Cladding (Area '2')	MM	Pass	Discard	Pass	Pass	Clean	Pass
	SM	Pass	Discard	Pass	Pass	Clean	Rework*
	MPO/MTP	Pass	Discard	Pass	Pass	Clean	Pass
Contact/Ferrule End (Area '3')	MM	Pass	N/A	Pass	Pass	Clean	Pass
	SM	Pass	N/A	Pass	Pass	Clean	Rework*
	MPO/MTP	Pass	N/A	Pass	Pass	Clean	Pass
Surface/Ferrule Chamfer (Area '4')	MM	N/A	N/A	N/A	N/A	Clean	Pass
	SM	N/A	N/A	N/A	N/A	Clean	Pass
	MPO/MTP	N/A	N/A	N/A	N/A	Clean	N/A

*Note: Only Applicable for field terminated connectors.

INSPECTION AND CLEANING PROCEDURE - CONTINUED

Best Practices/Summary

- Clean, resealable, airtight containers should be used to store cleaning tools and endcaps.
- Inspection and rework stations should remain as clean as possible to avoid the opportunity of connector contamination.
- Always utilize the dry cleaning method first, use the wet cleaning method as a last resort. This minimizes the risk of contamination due to the misuse of alcohol.
- Fiber adapters and connectors should never be allowed to contact areas that have a high risk of connector contamination.
- Optical Cable Corporation's adapters and connectors are distributed with plugs and dust caps installed. The caps and plugs should remain intact when the connectors are not in use to avoid damage and contamination. Never remove dust caps on connectors until the connection is going to be utilized.
- When a connector is removed from an adapter and it is found to be contaminated, it can also be determined that the mating connector is contaminated. Before the connectors are reconnected both the connector and adaptor must be cleaned and inspected.
- When re-mating a connector into an adapter make sure that the fiber endface does not touch the outside of the adapter, if unintended contact is made it could lead to contamination and damage.
- Use gun-type reel cleaners to clean adapters, and lint-free non woven pads/dry reel cleaners to clean connectors.
- Perform a final inspection on the connectors using the appropriate fiber microscope to ensure the fiber is clean before capping or reconnecting.

The following is Optical Cable Corporation's recommended list of equipment available for purchase for inspection and cleaning of fiber optic connections.

- Fiber Inspection and Cleaning Kit (P/N: FC-SCK)
- Fiber Optic Cleaner, LC-MU (P/N: FC-SCK-LC-125)
- Fiber Optic Cleaner, SC-FC-ST (P/N: FC-SCK-SC-250)



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