



## THE GROWING POPULARITY OF MPO CONNECTORS: Importance of Cleaning for Optimal Performance



In the rapidly evolving landscape of data transmission, the multifibre push-on (MPO) connector has appeared as a revolutionary solution, streamlining the installation and management of high-density fibre networks. Since its introduction in the 1980's the MPO connector has transformed the landscape of high-density fibre networks by reducing network installation time by simplifying high fibre count cable connections. However, with these benefits came challenges. In particular, the size, material, and construction of the MPO connector makes it vulnerable to contamination, underscoring the critical importance of proper fibre end face cleaning practices during installation and maintenance to ensure the best fibre network performance, writes **Liam Taylor**, European Business Manager, Fibre Optics, at MicroCare UK Ltd

### MPO CONNECTORS: TIME EFFICIENCY

As data networks grappled with the growing size of fibre cables prompted by the escalating bandwidth demands in the 1990s, the MPO end face appeared as an excellent way to efficiently connect and disconnect those high-density cables. Previously, connecting and inspecting a 144-fibre count cable could take an entire day. The MPO connector revolutionised this process, shortening the completion time of the same task to just a few hours.

### THE CRITICAL NEED FOR CLEANING MPO CONNECTORS

As the MPO connector gained wider acceptance, the need to support its best performance through regular cleaning became clear. MPO connectors are vulnerable to a host of contaminants encountered during network installation. This includes dust, ambient moisture, clothing fibres and fingerprints. In any network, cleaning each fibre end face is crucial. However, this is especially true for MPO connectors with their larger surface areas, where the risk of contaminants moving from one fibre to another within

the same array increases significantly, making thorough MPO cleaning especially necessary.

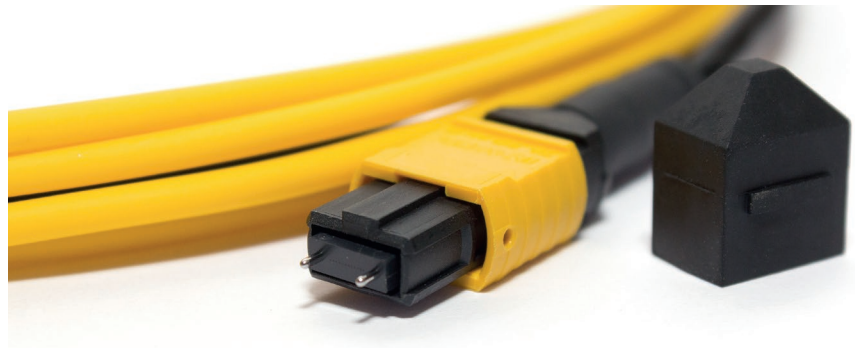
### THE STATIC THREAT

Electrostatic charges (ES) can accumulate on MPO end faces, attracting and holding dust particles. The dielectric nature of the MPO connectors and the glass fibres within them allows them to function as electrical insulators, holding static charges for extended periods. Additionally, the MPO's convex geometry, designed to reduce back reflection, concentrates static

charge at the contact region, worsening static concerns. The static charge can attract and trap dust, altering the light's index of refraction and causing insertion loss, weakening signals, and potentially leading to a network system shutdown.

### THE WET-TO-DRY CLEANING METHOD FOR MPO CONNECTORS

Traditional dry wiping to remove MPO end face contaminants easily generates static charge build-up and attracts airborne dust to the connector end faces, leading to even more contamination.



MPO connectors are vulnerable to dust, ambient moisture, clothing fibres and fingerprints.†

Wet-to-dry cleaning is an effective way to combat electrostatic buildup and remove dust contamination from charged MPO end faces. It involves using lint-free wipes or a specialised end face cleaning tool and a fibre optic-specific cleaning fluid.

### STATIC DISSIPATIVE CLEANING FLUID

Wet-to-dry cleaning using a specially engineered fluid with a low surface tension provides the static charge on the end face with a path to dissipate, making it easier to wipe away the contamination. To further reduce contamination risk, ensure the cleaning fluid is fast drying. This is particularly important as it helps to keep ambient moisture from being attracted to the fluid and makes the cleaning process quicker. In addition, make sure the cleaning fluid is contained in hermetically sealed packaging. This helps keep the fluid ultra-pure and prevents it from absorbing airborne contaminants such as microscopic dust particles, exhaust particles from traffic, or pollen from plants, all of which can degrade the cleaning fluid's effectiveness.

### LINT-FREE WIPES

To perform the wet-to-dry cleaning process with a lint-free wipe, fold the wipe in half and moisten it with the fibre optic cleaning fluid. Wipe the MPO end face in one motion, starting at the damp area of the wipe and moving towards the dry area. This process removes contamination and cuts electrostatic charge. Selecting a high-grade, lint-free fabric wipe is essential to avoid tearing and leaving debris behind. Lower-quality paper wipes generate high static charges, further trapping contaminants on the MPO end faces.

### SPECIALISED CLEANING TOOLS FOR MPO CONNECTORS

There are specialised tools for cleaning MPO connectors, including MPO click-to-clean tools, MPO cleaning cassettes and cleaning sticks. These tools are small and lightweight so are easily added to any fibre technician's tool kit and provide hundreds of cleans per device.

MPO click-to-clean tools include specially designed tips that allow them to clean connectors with or without guide pins (male or female). They can also be used when following the wet-to-dry cleaning process by touching the tip of the tool onto an optical grade wipe that has been dampened with high purity cleaning fluid. Cleaning fluid should not be applied directly to the tip of the tool as the aim is to not oversaturate the tip with fluid.

To use the click-to-clean tool, simply insert the tool into the MPO end face and push until the tool clicks. A single click is typically all that is needed to ensure

a clean and static-free MPO connector. With each click, the internal fabric cleaning ribbon advances, exposing a clean part of the ribbon for the next MPO end face cleaning, minimising the risk of end face cross-contamination.

MPO cassette cleaners are hand-held cleaning devices featuring a micro-woven cleaning ribbon that traps dust, dirt, and oil. There are separate tools for cleaning male (with guide pins) or female (without guide pins) MPO connectors.

Like the click-to-clean tools, MPO cleaning cassettes can be used for wet-to-dry end face cleaning by applying a small amount fluid to the fabric cleaning ribbon prior to application. The connector end face should then be pulled across the cleaning ribbon in one direction, from the wet-to-dry area, to remove the contaminants.

Before attempting to clean a new connector, the device's winding wheel should be turned for four clicks to expose a clean section of ribbon.

Cleaning sticks specifically engineered to clean MPO style end faces can also be used on female connectors and will clean the entire face, rather than just the core. Avoid products that are manufactured using fabric, foam or glue and look for high purity, self-sealing packaging to prevent contamination.

To clean, remove a single stick from its packaging, engage with the connector end face and rotate six to eight times. High-quality stick tips will flare out on contact and retract when pulled away, trapping contamination inside the tip. It is important to rotate in the same direction to prevent cross-contamination. For the most effective clean, sticks should be dampened with specialist fibre cleaning fluid before use. After use, fold the stick in half and dispose to prevent reusing a contaminated stick on the next end face.

### INSPECT-CLEAN-INSPECT

Regardless of the cleaning tool used—wipe, click-to-clean tool, cleaning cassette, or cleaning stick — it is important to remember to inspect, clean, and reinspect both ends of an MPO connector pair before mating to avoid cross-contaminating the end faces. Use a fibre inspection scope with an MPO probe tip to inspect the connectors. If necessary, clean and inspect the connector again until the MPO end face meets the IEC 61300-3-35 pass/fail cleaning criteria.

### CONCLUSION

In the rapidly advancing landscape of data transmission, the multifibre push-on (MPO) connector has revolutionised high-density fibre networks, supplying efficiencies in both time and effort for installers. While the MPO connector streamlines network installation, proper fibre end face cleaning practices become critical to ensure their best performance.

As MPO connectors face challenges such as contaminants and static threats, adopting the wet-to-dry cleaning method and using specialised cleaning tools becomes imperative. Whether using MPO click-to-clean tools, cleaning cassettes, or sticks, the Inspect-Clean-Inspect approach is vital to avoid cross-contamination.

Regardless of the chosen cleaning method—dry or wet—the goal stays the same: enabling high-quality transmission in optical fibre connections. Regular cleaning, combined with skilled connecting and meticulous maintenance practices, safeguards the integrity of high-density fibre optic systems, ensuring the seamless flow of information across networks amid the increasing demands of data transmission. 🌐



**Cassette Cleaner: Pull the end face across the cleaning ribbon in one direction to remove the contaminants**