

Three Myths of Fiber Cleaning

Here's what's not a myth: Keeping fiber clean is critical to the long-term reliability of a network.

By Jay Tourigny / *MicroCare Corporation*

The world's need for greater connectivity continues to grow. The demand is voracious and limitless. Broadband connectivity has become a crucial link in nearly every aspect of people's lives, including their jobs, medical care, entertainment and security.

This increased need for fast, unlimited service drives many network designers to rely on sophisticated fiber optic networks to meet current and future bandwidth requirements. Along with the need for greater capacity and higher speeds comes the need for absolute reliability so networks can provide consistent and uninterrupted service.

For modern optical networks to perform at their peak, fiber must be properly installed and maintained. This includes ensuring that all connections and splices are kept perfectly clean to avoid potential problems, such as insertion loss (weakened signal), back-reflection (signal diverted back to its source) or complete system shutdown. Maintaining the fiber network, especially the connections, is crucial to overall network reliability.

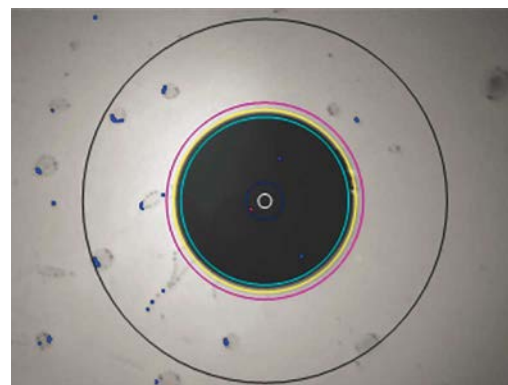
Despite the importance of cleanliness, some in the fiber industry are reluctant to recognize the need for thorough fiber cleaning as a critical factor in network performance. Some installation technicians and their managers are disinclined to spend resources, including time and money, to inspect and clean fiber connections. Some seasoned technicians who have long histories of working on older, slower networks are not convinced that modern, high-speed networks need more attention and care than older networks. They maintain that their legacy

practices are still adequate, and they often do not have the time, tools or budget to clean fiber. We refer to these long-held opinions as the "three myths of fiber cleaning."

MYTH 1: THERE IS NOTHING TO CLEAN.

When it comes to installing or maintaining fiber networks, there is always a need to clean. A major threat to an efficient, reliable fiber optic network is contamination of the fiber optic connector end faces and splices, also called optical interconnects. They are very vulnerable to a host of microcontaminants that can wreak havoc on optical signals. To ensure system performance and reliability, these contaminants must be removed from both sides of each end face every time a fiber is installed, tested or reconfigured.

Any contamination in the contact zone of mated end faces may interrupt the optical



End face contamination can include dust and oils.

signal. Dust particles are one of the most common contaminants and can originate from many sources, including dead skin, plant pollen, cardboard boxes and clothing lint. Although just microns in size, dust particles cause scratches and pitting on the end faces, resulting in insertion loss (weakened signal). Another typical contaminant is fingerprint oils. The oils contain salts that can create air gaps between the end faces and potentially cause back-reflection, signal attenuation or even a complete system shutdown.

Even brand-new fiber needs to be cleaned and tested to ensure contamination is removed. With fiber optics, new does not always mean clean. Jumpers and patch cords, even direct from the factory, are not guaranteed to be clean. Outgassed plasticizers or even plastic particles from the protective dust caps themselves can leave contamination behind and must be removed to ensure cleanliness.

MYTH 2: CLEANING TAKES TOO MUCH TIME AND MONEY.

With the increased need for connectivity and the growing number of fiber optic networks, many technicians feel pressure to work as quickly as possible and move on to the next installation. Combine that with the fact that many technicians are compensated based on the number of installations they can complete for the day, and the temptation to cut corners when cleaning can be high.

However, cleaning and inspecting a fiber end face takes only seconds. The minutes spent cleaning and inspecting fiber end faces far outweigh the hours spent if the technician has to return to troubleshoot, identify, repair and clean faulty splices and connectors.

In addition, cleaning labor costs are typically lower than repair costs. Cleaning takes only pennies, but a repair call could potentially cost hundreds of dollars when a connection fails. Dispatching a truck to the work site to rework a faulty splice because of contaminated connections and splicing typically costs much more – not to mention that customers are unhappy, and business may be lost. In most



Use fabric wipes to “wet-dry” clean end faces to prevent leaving lint behind.

instances, cleaning during installation is far less expensive than repairing after the fact.

MYTH 3: THERE IS NO NEED FOR SPECIAL TOOLS TO CLEAN.

The standard for inspection and cleaning of fiber optic connectors is the international IEC standard 61300-3-35. One of the best ways to meet this cleanliness standard is to use the right fiber optic cleaning tools engineered for fiber optic applications. Using better cleaning tools and procedures allows technicians to clean quickly and thoroughly, saving time and money. It also helps limit warranty claims and ensures a highly functioning, reliable network. Here are the basic tools every technician should have for effective and reliable cleaning of fiber optic connections.

Fabric wipes: For the best cleaning wipes, choose one made from fabric. However, cleaning fiber end faces on a shirtsleeve is not an accepted practice. Cleaning with ordinary wipes, tissues or clothing will deposit even more contaminants to the end faces and spread them around. Instead,

opt for a clean, optical-grade, fabric wipe engineered for cleaning fiber. Fabric wipes are highly absorbent, allowing them to effectively wick the contamination away from the surface of the end face and not generate lint. The fabric wipes are also good, when used with a static-dissipative cleaning fluid, for “wet-dry” cleaning to help eliminate static during cleaning.

Remember to use just one wipe per end face. It is commendable that technicians want to save their companies money by reusing wipes to control costs or to protect the environment. However, reusing wipes runs the risk of cross-contaminating the network. Used wipes will most likely redeposit particulate or oils onto the end face.

Instead of reusing a large wipe, select smaller wipes that come packaged to keep them dry and clean until ready to use. This ensures that the wipes and the end faces remain perfectly clean every time, and network technicians can still reduce waste.

Optical-grade cleaning fluid: iNEMI, IPC, BICSI and other fiber industry organizations recommend “wet-dry” cleaning as the most effective method for cleaning fiber end

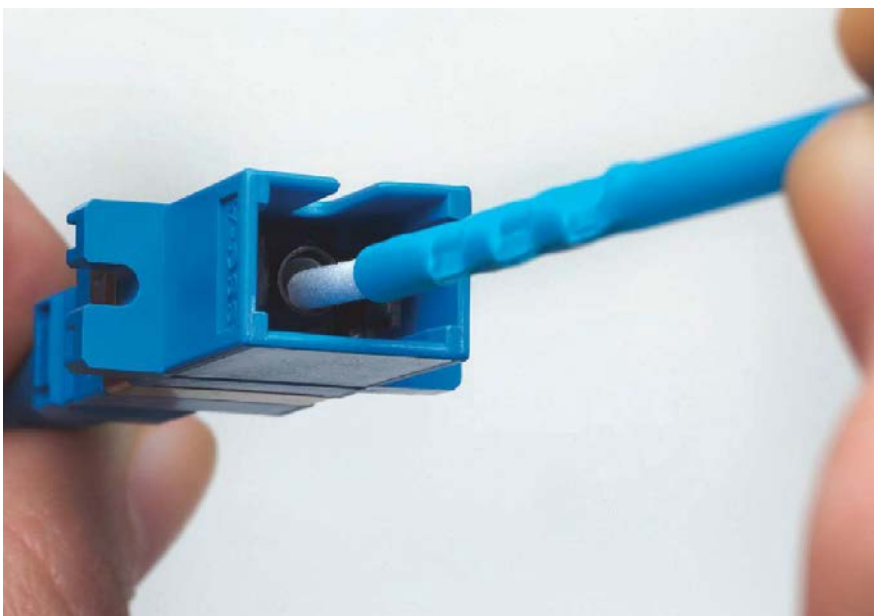


Specify an optical-grade, hermetically sealed cleaning fluid for best cleaning results.

faces. Water and isopropyl alcohol are traditional choices but are hard to buy in high-purity packaging and difficult to keep clean and uncontaminated during day-to-day operations. Instead, specify a pure optical-grade cleaning fluid for best results.

Optical-grade cleaning fluids are fast-drying, static-dissipative and sold

in hermetically sealed packaging. Fast drying time is especially important for cleaning fiber as it speeds cleaning time and keeps moisture from being attracted to the fluid, which minimizes contamination. A static-dissipative fluid also helps deflect impurities, especially dust from the surface being cleaned. Packaging a fluid in a hermetically



Use one cleaning stick per end face, and twist in one direction to prevent cross-contamination.

sealed dispenser protects the fluid from pollution and keeps it from spilling out if the dispenser tips over.

Because optical-grade cleaning fluids do not contain water, they will not freeze in cold outside-plant environments. They are also nonflammable, making them safe to store and nonhazardous for transport in service trucks.

Fabric-tipped cleaning sticks:

Cleaning sticks are typically used to clean bulkhead connectors. Technicians should choose a stick with a tip soft enough to not scratch the ceramic or composite ferrule end face. When working with cleaning sticks, they should first moisten the cleaning tip with a small amount of optical-grade cleaning fluid and rotate the stick in only one direction to avoid cross-contamination. Technicians should use just one stick per end face. They should remove each stick from the factory packaging when it is needed, keeping the others clean inside the package. Pulling out multiple sticks and leaving them lying around will make them vulnerable to contamination.

CONCLUSION

Reliable, trouble-free fiber optic networks are the key to an interconnected future. Cleaning is more than important – it is critical to the long-term reliability of any network. One of the biggest threats to fiber signals today is the contamination of end faces. By replacing the “three myths of fiber cleaning” with proven tools and procedures, network technicians can clean fiber connections quickly, affordably and effectively. When choosing cleaning fluids, tools and methods, seek the help of an experienced supplier that specializes in fiber cleaning to advise you on which tools and methods will work best for you. ❖

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