

# The Three Myths of Fiber Cleaning

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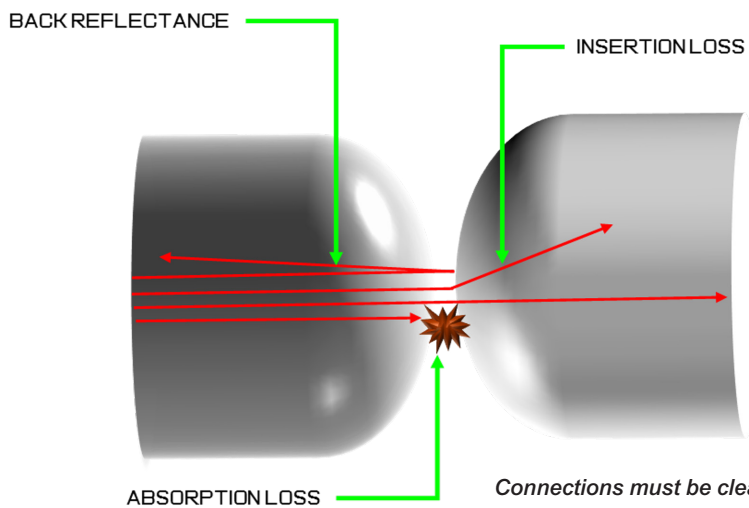
Broadband Communities

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

This increased need for fast, unlimited service is driving many network designers to rely even more on sophisticated fiber optic networks. Along with the need for greater capacity and higher speeds also comes the need for absolute reliability of the networks to provide consistent and uninterrupted service.

For modern optical networks to perform at their peak, it is imperative that the fiber network is 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 (the signal is diverted back to its source) or a complete system shut down. Maintaining the fiber network, especially the connections is crucial to the overall network reliability.

Despite this importance of cleanliness, there is still reluctance from some within the fiber industry to recognize the need for thorough fiber cleaning. They do not recognize cleaning as a critical factor in network performance. Some installation technicians are disinclined to spend resources, including time and money, to inspect and clean fiber connections. Some more seasoned technicians, with long histories of working on older, slower networks are not convinced that the modern, high speed networks need more attention and care than the older networks. They maintain that their legacy practices are still adequate. They also claim they often do not have the time, the tools or the budget to clean fiber. We refer to these long-held opinions as the "Three Myths of Fiber Cleaning".



*Connections must be clean to avoid insertion loss, back-reflection or a complete system shut down.*

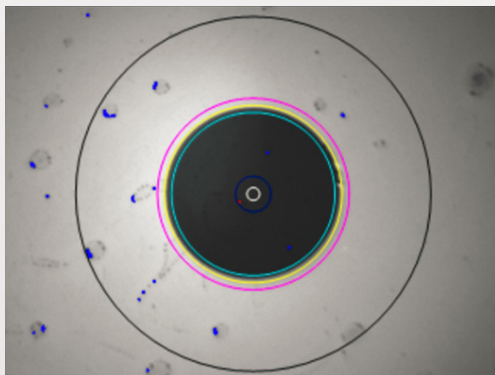
### MYTH 1: There Is Nothing To Clean

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





*Fingerprint oils contain salts that can create air gaps between the end-faces.*



*Even plastic particles from the protective dust caps leave contamination behind.*

Any contamination in the contact zone of mated end-faces may interrupt the optical 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. This often results in insertion loss (weakened signal). Another typical contaminant is fingerprint oils. The oils contain salts that create air gaps between the end-faces. This potentially causes back-reflection, (where the signal diverts back to its source), signal attenuation (volume loss) or even a complete system shut down.

Even brand-new fiber needs to be cleaned and tested to ensure the contamination is removed. When it comes to fiber optics, new does not always mean clean. Jumpers and patch cords, even those direct from the factory, do not guarantee cleanliness. Outgassed plasticizers, or even plastic particles from the protective dust caps themselves, leave contamination behind. They 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 are feeling the pressure to work as quickly as possible. To get the job done and move on to their next installation. Combined with the fact that many technicians are compensated based on the number of installations they can complete for the day, the temptation to cut corners when cleaning is high.

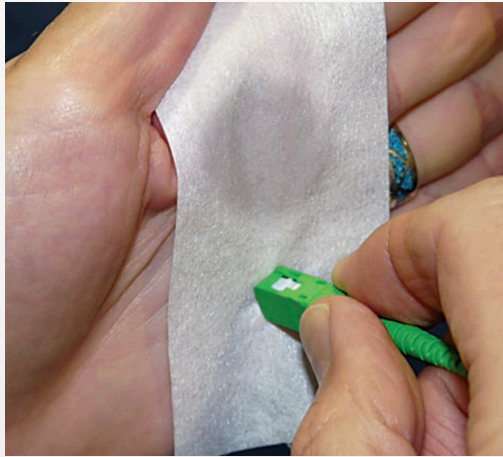
However, it only takes a matter of seconds to clean and inspect a fiber end-face. If a technician has the right tools and training, cleaning and inspecting a cable end-face takes as little as 30-40 seconds. For example, if a technician is repairing a 512-fiber cable, it will take about 30 minutes to clean it. The minutes spent cleaning and inspecting fiber end-faces far outweighs the time wasted for a callback. Think of 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 a repair cost. It takes only pennies to clean, but a repair call could potentially cost hundreds of dollars when a connection fails. Dispatching a truck back out to the work site to rework a faulty splice due to contaminated connections typically costs much more. Not to mention unhappy customers and lost business. In most instances, it is far less expensive to clean during installation than to repair.

### **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. Tools specifically engineered for fiber optic applications. Better cleaning tools and procedures allow technicians to clean quickly and thoroughly, saving time and money. It also helps limit warranty claims and ensures a highly functioning and reliable network. Here are the basic tools that every technician should have for effective and reliable cleaning of fiber optic connections.





*iNEMI, IPC and BICSI recommend “wet/dry” cleaning as the most effective way to eliminate static.*



*Specify a pure optical grade cleaning fluid for best success.*

## **Fabric Wipes:**

Wipes are an essential tool for successful cleaning. 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 to effectively wick the contamination away from the surface of the end-face while not generating 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 company money by reusing wipes to control costs or to protect the environment. However, by reusing wipes, they run the risk of cross contaminating the network. Used wipes will most likely redeposit particulate or oils back onto the end-face.

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

## **Optical Grade Cleaning Fluid:**

iNEMI, IPC and BICSI and other fiber industry organizations recommend “wet/dry” cleaning as the most effective method for cleaning fiber end-faces. Water and IPA (Isopropyl Alcohol) are traditional choices, but are hard to buy in high purity packaging. They are also difficult to keep clean and uncontaminated during day-to-day operations. Instead, specify a pure optical grade cleaning fluid for best success.

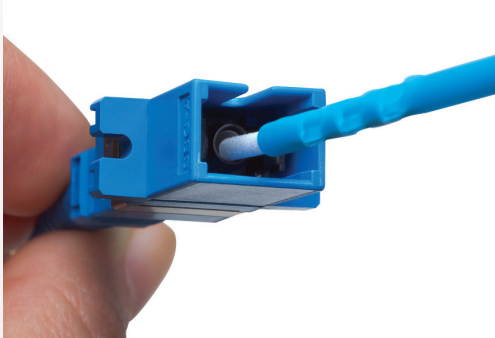
Optical grade cleaning fluids are fast-drying, static dissipative and sold in hermetically sealed packaging. Fast drying time is especially important for cleaning fiber. Its speeds cleaning time and keeps moisture from being attracted to the fluid which minimizes contamination. A static-dissipative fluid also helps deflect impurities, especially dust from the surface being cleaned. Choosing a fluid that is packaged in a hermetically sealed dispenser not only protects the fluid from pollution, but also serves a practical purpose in that it won't spill out if the dispenser tips over.

In addition, optical grade cleaning fluids do not contain water. They will not freeze when working in cold, outside plant environments. They are also nonflammable, making them safer to store and nonhazardous for transport in service trucks.

## **Fabric-Tipped Cleaning Sticks:**

Cleaning sticks are typically clean bulkhead connectors. Technicians should choose a stick with a tip soft enough to not to 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 then rotate the stick in only one direction to avoid cross-contamination. Technicians should use just one stick per end-face. Also, they should remove each stick out of the factory packaging one at a time as they use them. This keeps the others clean inside the package. Pulling out multiple sticks and leaving them lying around will make them vulnerable to contamination.





Use just one stick per end-face.

## Conclusion:

Reliable, trouble-free fiber optic networks are the key to an interconnected future. Cleaning is not only important, it is critical to the long-term reliability of any network. One of the biggest threats to fiber signals today is the contamination to the 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.

## About the Author:

*Jay Tourigny is Senior Vice President at MicroCare which offers precision cleaning, lubricating and debinding solutions. He has been in the industry more than 30 years and holds a BS from The Massachusetts College of Liberal Arts. Tourigny holds numerous U.S. patents for cleaning-related products that are used on a daily basis in medical, fiber optic and precision cleaning applications. For more information, visit [microcare.com](http://microcare.com).*



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