Tech Article

The Dos & Don'ts of Cleaning Fiber Optic Termini

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Do thoroughly wash your hands before handling the fiber optic connectors and the cleaning.

For next generation optical networks to manage the enormous amount of data and high connectivity speeds demanded by the consumer, it is essential that a fiber network is properly installed and maintained. This means ensuring that all fiber and connections are perfectly clean. This avoids potential problems which could result in unreliable performance or a complete system shut down.

Due to the meticulous nature of maintaining a fiber optic network, it is critical that technicians know exactly how to correctly handle and clean termini end-faces. Even the smallest speck of dust left on a connector can prove detrimental to a network. However, because you cannot see the actual fiber end-face without an inspection scope, the cleaning process is not always obvious. It is therefore important to understand and implement proper fiber cleaning procedures to ensure the network's performance is reliable.

Technicians must use tools and fluids engineered specifically for cleaning fiber optics. And they must use them properly to ensure fiber optic cleaning success. There are specific dos and don'ts when it comes to the correct cleaning procedures. When cleaning end-faces, always remember to use the three-step process of inspect, clean, inspect.

STEP 1 Inspect

- Don't look directly at the laser-energized fiber optic termini with your eyes. And don't expose skin to direct or scattered radiation. Most laser and LED light sources used in fiber optics operate in the near-infrared and infrared wavelengths. While they are invisible to the eye, they can cause significant damage in the form of corneal, retinal, or skin burns. Only view the termini with equipment engineered to safely inspect fiber optic end-faces. Be safe and always treat all termini as though they are laser-energized.

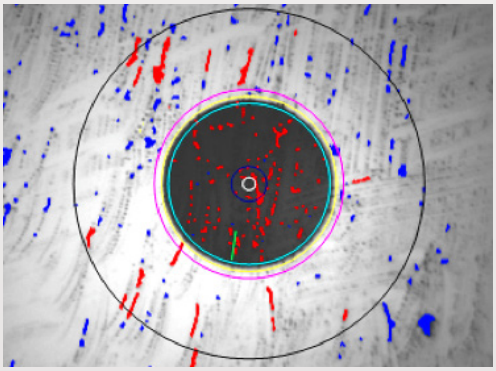
- Do learn what each type of contaminant looks like. It is important to know which contaminants you are working with in order to properly clean the fiber optic end-face.

- Contaminant comes in many forms and from many sources including fingerprint oils from the technician, lint from clothing, exhaust fumes and moisture from the atmosphere or simply dust. Dust particles are one of the most common contaminants and can originate from many sources, including dead skin, plant pollen and cardboard boxes.

- Do a thorough examination to find the type of contaminant(s) on the end-face. It might just be one particulate or a combination of dust, oil, and salts. Understand what you're facing in the beginning to successfully eliminate the source of contamination and reduce the number of cleaning rounds.

- Do determine which cleaning technique is appropriate for the contaminant and the fiber optic end-face. Do you need a wipe, a swab, or cleaning fluid? Know what you need in order to perform an efficient cleaning process. Consider purchasing a ready-to-use fiber optic cleaning kit that includes everything needed to clean the most commonly used connectors.

Don't wear gloves when working with wipes and swabs.



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STEP 2 Clean

- Do clean in an enclosed area when possible. If there is a lot of dust and debris, wipe the outside of the mated pair before disconnecting to remove the heavy soil first.
- Do clean any inspection tools and the adapters used to inspect to prevent any cross-contamination. After performing those initial cleaning steps, then you are ready to clean the fiber connectors.
- Do thoroughly wash your hands before handling the fiber optic connectors and the cleaning supplies. Clean hands are less likely to transfer dirt and oils that can compromise the cleaning process.
- Don't apply a moisturizer or lotion to your hands prior to cleaning the termini. This attracts more contaminants and causes oils to transfer onto the cleaning wipe or swab, and potentially the end-face you are trying to clean.
- Don't wear gloves when working with wipes and swabs. While you may think that wearing gloves protects the cleaning materials from the oils in your skin, you will actually be adding more particulates. Gloves are a carrier of all kinds of microscopic contaminants. It's best to simply wash your hands prior to cleaning a connector.
- Don't wipe the end-face of the fiber optic on your shirt or other clothing. This is not an appropriate cleaning mechanism. It will only cause the end-face to be dirtier than when the cleaning process started.
- Do use an optical grade cleaning fluid that is ultra-pure, nonflammable, static-dissipating and residue-free. It should also be in a hermetically sealed (unrefillable) container to prevent cross-contamination and spilling.
- Do use high-quality wipes and swabs (or sticks) to prevent linting and cross-contamination of the fiber end-faces.
- Do throw away all wipes and swabs after each use. This ensures that the contaminants picked up by the cleaning materials won't end up back on the end-face.
- Do use the wet-dry cleaning method. Dampen a section of a lint-free cleaning wipe with a static-dissipative cleaning fluid. Then wipe the end-face, starting at the damp area. Move in one direction towards the dry area of the cleaning wipe. This removes the contamination and dissipates electro-static charges in one step.

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Determine which cleaning technique is appropriate for the contaminant and the fiber optic end-face.

STEP 3 Inspect

- Don't forget to repeat the inspection process. This is a critical step to make sure the fiber optic end-faces in the system will function reliably.
- Do make sure the end-faces are free of any contaminants before they are put into service. If you notice any contaminants left on the end-faces, repeat the cleaning process with a new wipe until it inspects as clean.
- Do perform routine inspections when installing new or servicing existing fiber optic connections. Clean connectors ensure the system runs correctly and all data transmits at optimal speed.
- Do it right the first time. Leaving contaminants on the end-faces can degrade the system performance or cause a complete shutdown. This results in costly and time-consuming rollbacks and system trouble shooting and repairs.

Manage the Steps Through Training

It is all very well having the right cleaning tools to hand, but if they are being used incorrectly and without proper training, they will be ineffective. Training is recommended for anybody who specifies, installs or repairs fiber optic systems. Technicians should be trained in 'best practice' cleaning procedures to future-proof each installation. Learning may need to be refreshed at regular intervals, and long-standing engineers may require re-educating to ensure everyone follows a Standard Operating Procedure (SOP) in cleaning and inspecting processes.

As a SOP, technicians should be working to the international standard IEC 61300-3-35 for inspection and cleaning fiber optic connectors. It includes a list of requirements for fiber optic connector end-face quality. The guideline highlights specific cleanliness grading criteria to measure pass or fail certification for the inspection of a fiber end-face before connection. Technicians should understand this standard and use it as a reference tool to ensure all cleaning undertaken is precise and thorough.

On-the-job training is one way to educate. However, it may not enable engineers to fully understand why they must follow certain cleaning and inspection processes. Classroom based training offers the time and the details required to properly install and repair fiber optic systems in both inside and outside plant operations. There are specialized companies offering detailed training in the correct steps of inspect, clean, inspect. They also cover more advanced topics including troubleshooting systems, planning for damage loss and maintaining necessary documentation about the fiber optic system.

Alternatively, there is remote and online training. Online learning is a powerful tool with which to improve the skills of a workforce. Implementing an effective e-learning program can help to enhance the levels of workplace skills which is critical to the success of modern networks.

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The fiber optic industry is constantly changing with new regulations, requirements and operating procedures. Any e-learning technology should have the flexibility to incorporate new updates and the latest industry guidelines, for example, any changes to the IEC 61300-3-35 standard.

By understanding proper cleaning procedures and improving skills and knowledge through training, technicians can confidently install and maintain fiber correctly, therefore increasing its reliability and ensuring networks run efficiently.

Find A Cleaning Partner

Taking extra care to inspect, clean, inspect both end-faces before mating will ensure the reliability and longevity of the fiber optic network. The cleaning procedures themselves are straightforward. If technicians take the extra few minutes and don't rush the process, the connections will have greater integrity over the life of the fiber optic system.

When choosing fiber optic cleaning fluids, tools and methods, technicians should seek the help of an experienced supplier that specializes in fiber optic cleaning tools and methods. They can recommend specific products engineered for their use, and provide expertise on how to use them properly.

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.

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