

5G Network Reliability: How Training & Tools Help

Author:

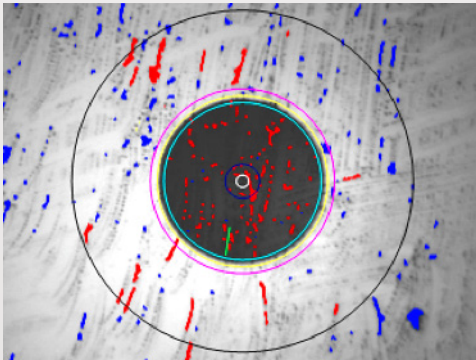
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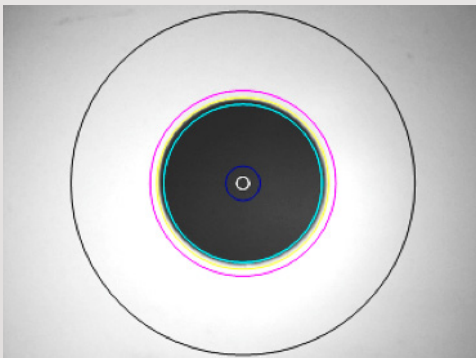
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End-face after cleaning is free from contamination.



5G wireless technology has started to infiltrate networks around the world. Estimates are that there will be 1.9 billion subscribers by 2024 and reaching 65 percent of the world’s population. This makes it the fastest generation rolled out on a global scale[1]. This new technology requires the extensive deployment of network infrastructure. It also requires the fiber optic cable which supports it.

To provide a faultless multi-gigabyte service which 5G promises, the fiber used in these networks need special care. Properly installing and perfectly cleaning the network supports successful 5G connectivity and seamless streaming. To ensure the fiber is installed and maintained correctly, it is important to address the need for the effective training of technicians. The deployment of 5G networks will only be successful if a skilled workforce is created who understands the importance of cleaning and the correct way in which to carry out the processes.

Train Technicians in Industry Standards

Contamination is a threat to optical networks. Cleaning fiber is an important task to help a network achieve its performance goals. Therefore, engineers must have training in ‘best practice’ cleaning procedures to future-proof each installation. Re-training may need to be carried out to eliminate any myths or misunderstandings of fiber cleaning. For instance, wiping a connector on a shirt sleeve or aimlessly blowing away dust from an end-face will not suffice. Each technician should be working to the same precise cleaning procedure. This ensures an exacting standard is consistently met.

An important standard which all technicians should be aware of is IEC 61300-3-35. It is the international standard for inspection and cleaning fiber optic connectors. IEC 61300-3-35 was developed to guide the fiber optic industry in determining what kind of contaminants could be on the ferrule end-face and how to clean them effectively.

IEC 61300-3-35

It defines contamination as a removable defect that negatively impacts the performance of mated connector pairs. A critical aspect all engineers should be educated in is how fundamental it is to inspect each end-face after cleaning and before mating to ensure any contaminant is removed. Failure to remove the pollutant will cause cross-contamination of the ferrule end-faces. This will disrupt the optical signal path. Furthermore, particulate debris in the contact zone can cause scratches and pits on both connector end-faces.

For this reason, Section 5.3 of IEC 61300-3-35 recommends installers first inspect the connector end-face. Then clean the end-face if necessary. And finally, re-inspect the ferrule before mating. The total inspection process, using a digital ferrule scope, takes less than five seconds for an accurate analysis. The cost of correctly cleaning and inspecting is less than 3% of the total installation cost of a new fiber network. The minutes spent cleaning and inspecting fiber end-faces will far outweigh the hours spent if the technician has to return to troubleshoot, identify, repair and clean faulty splices and connectors.

Go Back to School

The first step to understanding the IEC 61300-3-35 standards of efficient and effective fiber installation begins with training. Although some technicians train 'on the job', certified courses help ensure a standard operating procedure is applied every time, and gives engineers the competitive edge when it comes to installing new 5G fiber. There are a number of good, reputable training companies that offer training sessions in beginning to advanced skills. Some training classes can be attended solely online, however, it is important that technicians also attend on-location sessions to learn the "hands-on" skills needed.



Anybody who specifies, installs or repairs fiber optic systems requires training.

Anybody who specifies, installs or repairs fiber optic systems requires training. This includes electricians, IT technicians, and communications techs. With training, students can learn how to properly install and repair fiber optic systems in both inside and outside plant operations. This includes how to best use the special tools engineered to correctly strip, clean, splice and test the quality of the connections. Many training companies also cover more advanced topics including troubleshooting systems, budgeting for damage losses, how to keep records and maintaining necessary documentation about the fiber optic system.

Tools of the Trade

Although training is extremely important, so is using the correct tools for the job. One of the best ways to meet cleanliness standards like IEC 61300-3-35 is to use cleaning tools which have been engineered specifically for fiber optic applications. Better cleaning tools and procedures will enable technicians to clean quickly and thoroughly, saving both time and money.



Wet/dry cleaning helps eliminate electrostatic charges.

So, what are the essential 'tools of the trade'? Let's start with optical grade cleaning fluid. The easiest way to eliminate contamination caused by an electrostatic charge is through a wet-dry cleaning process. In addition, use an appropriate, non-alcohol based optical-grade cleaning fluid. Select a cleaning fluid that will not leave any residue, is static dissipating and comes in a hermetically-sealed container. The sealed container prevents cross-contamination and spills. Also ensure it is fast-drying and nonflammable.

Use fabric optical-grade cleaning wipes. Or use a single-use connector cleaning stick. Another option is a more advanced "clicker" type cleaner that provides hundreds of cleans before it must be replaced. Each type of cleaner fits a specific size connector used in the installation. Using the right cleaning stick or clicker ensures that it will remove oils and particulate contamination from the surface of the end-face. They will be soft enough not to scratch the ceramic or composite ferrule end-face and not generate lint.

Finally, make sure there is a sufficient tool to inspect the end-face. It is important to always inspect, clean and re-inspect the termini on both ends of a connector pair. Even brand new components which come from the factory need inspection and cleaning before installation. The inspection process helps to visually identify problems. For instance, permanent defects or any contamination that can interfere with, or damage, the surface of the optical termini.



Knowledge is Power

Training will cut future costs by reducing the problems caused by contaminated fiber connectors. By understanding proper cleaning procedures and improving skills and knowledge, technicians can confidently install and maintain 5G fiber and increase its reliability.

Be proactive. Assemble the correct tools required to install and maintain fiber. Also, provide technicians with the knowledge and training to ensure trouble-free fiber optic networks.



Specify a pure optical grade cleaning fluid for best success.



A clicker-type cleaner provides hundreds of cleans before it must be replaced.

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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