Fiber Best Practice: Inspection and Cleaning

Introduction to fiber best practices

The Fiber Best Practice Series was designed by Fluke Networks to educate about important optical fiber best practices, including:

- *Fiber inspection and cleaning*
- *Loss-length (Tier 1) fiber certification*
- *Fiber plant characterization and troubleshooting (Tier 2 certification)*

This white paper details the best practice of fiber inspection and cleaning.

With 40 G/100 G infrastructure deployments in the datacenter quickly becoming reality, the shrinking loss budgets of optical fiber cabling due to increasing bandwidth demands mean that reliable and efficient initial installations are now more important than ever. To minimize costly installer/contractor callbacks, network technician troubleshooting time, and unnecessary network downtimes, fiber-handling best practices should always be followed.

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Why you should care

Among key sources of loss that can bring a fiber network down, dirty and damaged end-faces are the most frequent. In a Fluke Networks survey, dirty end-faces were found to be the #1 cause of fiber link failure for both installers and private network owners, failing links 85% of the time.

How it works

Fiber optic cabling carries pulses of light between transmitters and receivers. These pulses represent data being sent across the cable. In order for the data to be transmitted successfully, the light must arrive at the far end of the cable with enough power to be measured. Light loss between the ends of a fiber link comes from multiple sources such as the attenuation from the fiber itself, bends, and through adapter couplings where end-faces meet. When evaluating end-face conditions, there are two types of problems that can cause loss: contamination and damage.

Contamination comes in many forms from dust to oils to buffer gel (see Figure 1). Skin contact with the ferrule will immediately deposit an unacceptable amount of body oil on the end-face; lint, dust, and static-charged particles can easily make its way from the air and non-static materials such as clothing and towels.

Damage, another source of failures, appears as scratches, pits, cracks, or chips. These end-face surface defects are often the result of poor terminations or mated contamination.

What to do

Always inspect and clean fiber end-faces and ports prior to connection. Inspection of the end-face verifies that no contaminants are visible. While it is most important to remove any contamination over the fiber core, debris around the ferrule should also be cleaned away as they could shift towards the core as the fiber is mated. The cleaning process itself is simple and straightforward. All you need is a non-static wipe (for end-face cleaning) or swab (for port cleaning), along with a special solvent.

Cleaning procedures

- Dab the contaminated end-face (or port) with a solvent-dampened wipe (or swab). The solvent dissolves and removes contaminants that have dried and firmly affixed to the end-face without producing a static charge that can attract dust from the air. It also evaporates quickly, making it preferable to isopropyl alcohol which takes much longer to disappear and can leave a staining residue in the process.
- Rub the fiber end-face (or port) perpendicularly against a dry wipe several times.
- Re-inspect the fiber end-face (or port) with an optical microscope to ensure that all the debris has been removed; if contamination is still observed, repeat the process.

Additional fiber best practice resources

To download other Fiber Best Practice white papers and for additional resources, visit **www.flukenetworks.com/FiberBP**

Contact Fluke Networks: Phone **800-283-5853** (US/Canada) or **425-446-4519** (other locations). **Email: info@flukenetworks.com**.

Figure 1. Dirty fiber end-face as seen through a FiberInspector video microscope.

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