

Compressed Air Cleaning Issues for Fiber–Optic Connections

Document ID: 43780

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Introduction

You can trace the majority of measurement variation and repeatability problems in single mode and multimode fiber–optic connections to the cleanliness of the optical path. This issue particularly affects the available optical power and back reflectance performance.

Neither the laboratory compressed air nor the aerosol or CO2 compressed air tests have proven to be entirely successful to clean fiber–optic connections.

Note: Cisco does not recommend the use of any of the compressed air cleaning methods.

This document discusses some of the cleaning issues that you encounter when you use compressed air as a method to clean a fiber–optic device.

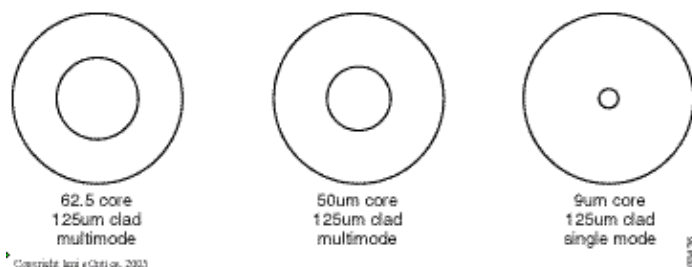
Review this document if you handle the installation, repair, or replacement of fiber–optic connections or products that have or use fiber–optic connections.

Contamination Issues

Susceptibility

All optical devices are susceptible to contamination from air borne particles, human body oils, and mating connector particles. The smaller the core size, the more severe is the problem. Typical telecommunications fiber core diameters range from 62.5 micrometers to approximately 9 micrometers.

Figure 1 Relative Core Sizes of Typical Telcom Fibers



Inspection

Whenever possible, inspect the fiber-optic connection (connectors, bulkheads, and component interfaces) with a microscope or other magnifying device. Always wear laser safety glasses when you work with any fiber-optic connections; and, always disconnect the laser component from the power source before you begin. Ensure that you:

- Disconnect cables at both ends.
- Pull all cards out of the chassis.
- Turn off all power to the component.

Neither the laboratory compressed air nor the aerosol or CO₂ compressed air tests have proven to be entirely successful to clean fiber-optic connections. Here are a few examples that show the possible results of the use of any kind of a compressed air solution to clean fiber-optic connections.

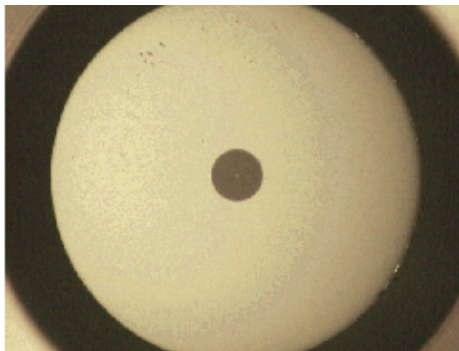
Note: Cisco does not recommend the use of any of the methods mentioned here.

Laboratory Compressed Air

You can sometimes use a filtered air system, free of oil and moisture, within a laboratory environment to remove debris and clean a fiber optic connection. However, unless you follow very strict cleaning procedures, air-driven contaminants can cause problems for fiber-optic connections.

Here is an example for the use of laboratory or house air spray:

Figure 2 Laboratory Air Spray



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Even though this was the cleanest tested process, airborne contaminants still prevented a completely clean ferrule.

Aerosol and CO₂ Compressed Air Products

Cisco recommends that you do not use any aerosol or CO₂ compressed air products to clean fiber-optic connections. Even pure, filtered CO₂ products have the potential to deposit moisture and propellant debris on critical optical surfaces.

This section contains some photos that show some of the problems that occur when you use compressed, moisture-free air from aerosol or CO₂-type compressed air cleaners. We used aerosol can products from different vendors to perform these tests. All the products left residue on the ferrule.

Here are the parameters for the test used to create these photos:

- We tested four different products, including aerosol can and CO2 can types.
- We cleaned the ferrule prior to each test.
- Each spray was over a 1 to 2-second period
- We used a quick spray into open air prior to each ferrule spray in order to remove any moisture buildup or propellants in the spray head.

Some of the tests deviated from the recommended usage guidelines that accompany each aerosol product. The deviation was an attempt to simulate possible field condition applications. However, when we followed strict product usage guidelines, the product performed at an acceptable level.

Note: Any deviation from the guidelines during the spray process tilted can, inverted can, or shaken can caused unacceptable contamination levels 100 percent of the time.



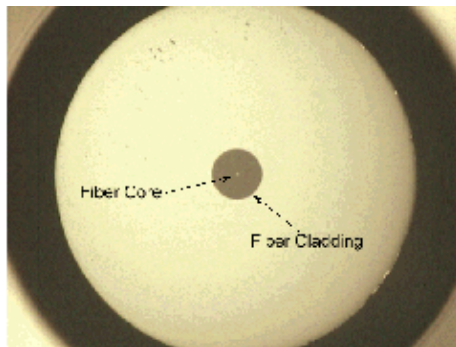
Caution: Cans that contain ethyl propylene hydrocarbon as a component of their air mixture did not pass any contamination test.

Aerosol Can

All aerosol can products deposited unacceptable levels of moisture and contaminants on the surface of the ferrule in most conditions. Here are some photos that illustrate the kinds of contamination that can occur with improper use of an aerosol product when you use them to clean fiber-optic connections.

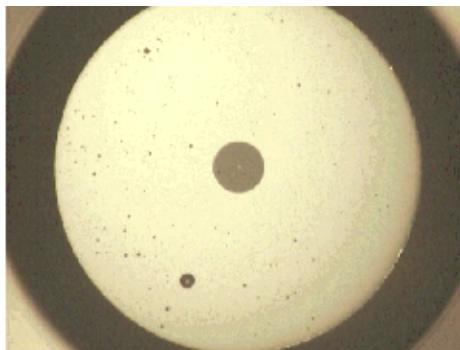
Note: Cisco does not recommend the use of any aerosol or CO2 product when you clean fiber-optic connector surfaces.

Figure 3 Cleaned for Aerosol Test: Baseline for the Aerosol Can Spray Test



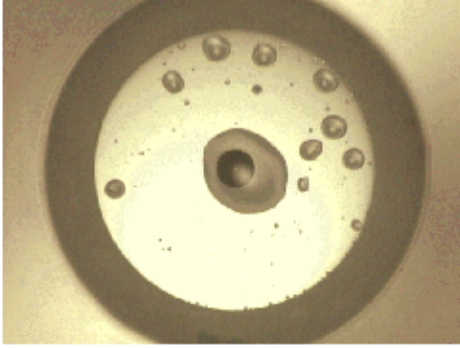
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Figure 4 Use of an Aerosol Can Product: Can Held Upright During Spray



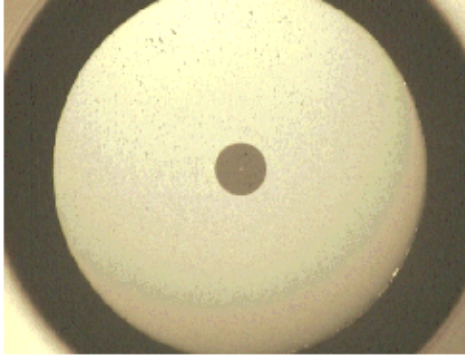
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Figure 5 Use of an Aerosol Can Product: Can inverted during spray



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Figure 6 Use of an Aerosol Can Product: Can shaken during spray



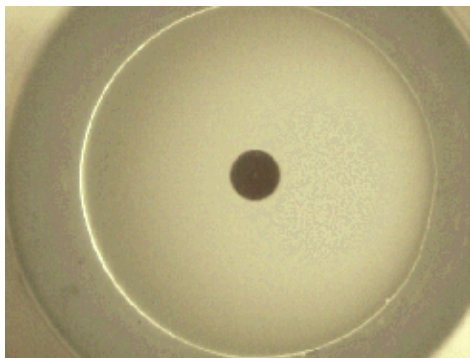
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CO2 Compressed Air Can

The photos in this section illustrate the kinds of contamination that can occur with improper use of a CO2 product when you use the product to clean fiber-optic connections.

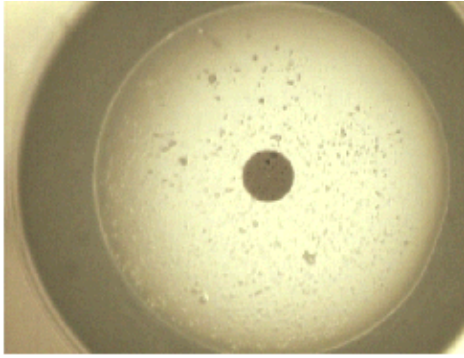
Note: Cisco does not recommend the use of any aerosol or CO2 can product when you clean fiber-optic connector surfaces.

Figure 7 CO2 Product: Baseline for the CO2 canned spray test



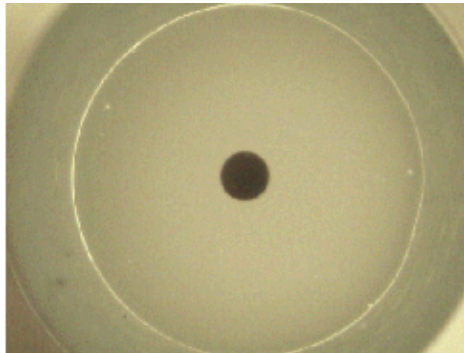
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Figure 8 Use of a CO2 Can Product: Can inverted during spray



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Figure 9 Use of a CO2 Can Product: Can shaken during spray



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Updated: Sep 19, 2006

Document ID: 43780
