

What to do about high loss during pigtail splicing



Overview

During the splicing process, OTDR should be used to test the splice loss of the splice point during splicing.

Key Takeaways

High loss during pigtail splicing is often caused by improper fiber preparation, misalignment, or incorrect fusion splicer calibration, and can be minimized through careful cleaning, precise cleaving, and proper arc calibration. Common Causes of High Loss

- **Improper Arc Calibration:** Fusion splicers require calibrated arc power to properly fuse fibers. Skipping arc calibration or using incorrect settings can cause micro-deformations or core mismatches, resulting in high splice loss even if the splice looks visually acceptable .
- **Fiber End Preparation:** Poorly cleaved or contaminated fiber ends increase insertion loss. The fiber end face must be flat, mirror-like, and free of burrs, with a cleave angle less than 1° .
- **Intrinsic Fiber Variations:** Differences in mode field diameter, numerical aperture, or core alignment between fibers can cause loss. Using fibers from the same batch reduces these intrinsic mismatches .

- **Extrinsic Factors:** Misalignment during splicing, angular misalignment, or contamination from dust and moisture can increase loss. Operating in a clean, controlled environment is critical .

Best Practices to Minimize Loss

- **Clean and Inspect Fibers:** Use lint-free wipes and 99% isopropyl alcohol to clean fibers before cleaving. Avoid touching the bare fiber with fingers .
- **High-Precision Cleaving:** Use a precision cleaver to achieve a perfect 90° cleave. Even small deviations can significantly increase loss .
- **Arc Calibration:** Perform an arc test before splicing to ensure the splicer's arc power is correct for the fiber type and environmental conditions. Recalibrate if electrodes are worn or if altitude, humidity, or temperature changes .
- **Use Quality Components:** Match pigtails and fibers from the same batch to minimize mode field diameter mismatch. Ensure connectors and polish types are compatible with the network requirements .
- **Controlled Environment:** Conduct splicing in a clean, dust-free, and dry environment. Avoid outdoor splicing in humid or dusty conditions .
- **Test and Re-Splice if Necessary:** Use an OTDR to measure splice loss. If the loss exceeds acceptable limits, re-splice up to 3–4 times to achieve optimal performance .

Summary

High loss during pigtail splicing is usually preventable by proper fiber preparation, precise cleaving, careful alignment, and correct fusion splicer calibration. Following these best practices ensures low-loss, reliable splices, which is especially critical in backbone and feeder networks where high loss can impact overall network performance and scalability .

Article Content

Optical Fiber Splice Loss and Methods to Reduce It

When splicing loss of multiple optical fibers are large, we can cut off a section of the fiber optic cable and reopen the

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This is the paradox of the fiber optic pigtail. It is the shortest cable in your network—typically 0.5 to 2 meters—yet it is

How to reduce fiber splicing loss

During the splicing process, OTDR should be used to test the splice loss of the splice point during splicing. Those

Measures to Reduce Loss of Optical Fiber Splicing

The splicing personnel should strictly follow the optical fiber splicing process flow chart, and during the splicing

Factors affecting fiber splice loss and how to reduce it

Fiber splice loss is caused by core mismatch, contamination, and misalignment. Reduce loss with proper cleaning,

101 Series: To Splice or Not to Splice

When it comes to troubleshooting splices, only an OTDR can tell you where a splice is located. But if you have a good

Is That Splice Really Good Enough? Improving Fiber Optic Splice

For product splicing of pig-tailed components, actual splice loss measurement is usually not possible since the free

Tutorial Passive Fiber Optics, Part 6: Fiber Joints

Another technique is fusion splicing, where the fibers are fused together, e.g. using an electrical arc. This leads to particularly low

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If the measured loss exceed the calculated loss by a significant amount (remembering the inherent uncertainty in all measurements),

October 2018 Fiber Splice-On Connectors

A splice-on connector is a type of discrete fiber optic connector that uses a fusion splice to terminate directly onto a field fiber in a

What Is It and How to Splice It

What Is It and How to Splice It Note: Fiber pigtails have female or male connectors. Female connectors could be mounted in a patch

How to Control Splicing Loss in Fusion Splicing for Reliable Networks

Control splicing loss in fusion splicing by optimizing alignment, cleaving, and cleaning for reliable, low-loss fiber optic

Guidelines On What Loss To Expect When Testing Fiber Optic Cables

Guidelines On What Loss To Expect When Testing Fiber Optic Cables To be able to judge whether a fiber optic cable plant is good,

Master a Perfect Inline Wire Splice Everytime

Master a Perfect Inline Wire Splice Everytime: In this instructable i will teach you how to make a perfect inline wire splice, every

What Is Fiber Optic Pigtail and How to Splice It?

Similarly, 4, 6, 8, 12, 24, 48 and more than 48 fibers fiber optic pigtails have their corresponding feature. Fiber Optic

Rise of the splice machines

The voice of the optical fiber termination market was clear. At the time, pigtail splicing was complicated and labor intensive, requiring

Comprehensive Fiber Optic Pigtail Wiki and Guidance

There is some loss and attenuation while building an optic fiber system. Correct fiber optic pigtail splicing will bring

Improving Connector Loss and Splice Loss OTDR Measurement

The effect of the backscatter level mismatch reverses the sign of the loss value reversing the measurement direction, allowing it to be

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