

How to Measure Fiber Splicing in Communication Optical Cables

Article Overview

Fiber splicing is measured primarily using an Optical Time Domain Reflectometer (OTDR) and an Optical Power Meter with a Laser Light Source to evaluate splice loss, continuity, and overall link performance.

Key Methods for Measuring Fiber Splicing

1. Optical Time Domain Reflectometer (OTDR) Testing An OTDR is the most common tool for field measurement of fiber splices. It sends a light pulse down the fiber and measures backscattered light to detect events such as splices, connectors, and bends. The OTDR provides a trace showing:

- o Event B: Splice loss

- o Event C: Reflective events from mechanical splices or cracks

- o Event D: Fiber end points To ensure accurate measurements, a launch fiber (lead-in fiber) is used to eliminate the OTDR dead zone near the connector and allow precise evaluation of near-end splices. The OTDR should be set with the correct group index (e.g., 1.4670 for 1310 nm, 1.4675 for 1550 nm) to convert time-of-flight into distance accurately .

2. Optical Power Meter and Laser Light Source (OLTS) This method measures the total light loss across a fiber link. A laser light source is connected to one end of the fiber, and a power meter at the other end measures the received power. The difference between transmitted and received power indicates splice loss in decibels (dB). Calibration of the power meter is essential before testing, and measurements should be performed at both 1310 nm and 1550 nm wavelengths for standard single-mode fibers .

3. Pigtail Testing For short spans (15-30 meters from a distribution panel), a 1-km launch reel is used with the OTDR to measure connector loss, back reflection, and adjacent splice loss accurately. Long patch cords or improper adaptations can distort results, so proper test setup is critical .

Best Practices

- o Bi-directional Testing: Measure from both ends of the fiber to account for asymmetrical splice losses.

- o Record Keeping: Document all OTDR traces and power meter readings for future maintenance and verification.

- o Safety: Avoid direct eye exposure to laser or LED light, and handle fiber splinters carefully to prevent injury .

- o Cleanliness: Ensure fiber end faces are clean before splicing or testing to minimize insertion loss and reflection .

Summary

Measuring fiber splicing involves a combination of OTDR traces to locate and quantify splice events and

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power meter measurements to verify total link loss. Proper setup, calibration, and safety precautions are essential for accurate and reliable results. These methods ensure that splices meet network performance standards and maintain signal integrity across optical communication links .

Learn fiber optic cable splicing methods: fusion splice techniques and more. A practical guide to optic cable splicing

Using an optical time-domain reflectometer test instrument, these tests analyze the operation of fiber-optic cables and their

1 Testing Tier 2 testing involves the use of an optical time domain reflectometer (OTDR) to provide a trace (visual picture) of the

Because fiber uses light instead of electrical signals, even a slight misalignment can reduce performance. This

Lead-in fibers are useful to locate short distance faults and making loss/attenuation measurement in real time mode. This document

For measurement of these parameters, the common optical components, instruments, as well as fiber handling are briefed. Then, the

This page covers the basics of how to test fiber optic cable, the various methods and steps of the fiber testing process, and some of

This paper will provide a brief overview of the history of fiber-optic communications and types of fibers, and discuss handling,

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

Theory Fusion splicing is the most permanent and lowest loss method of connecting optic fibers. In essence, the two fibers are

While this guide provides a solid overview of fiber optic cable splicing, the successful execution of these methods

The Contractor tasked to perform testing or splicing on any fiber optic cable will follow these testing standards to fulfill their

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The portion of the optical power that does not pass through the splice and is radiated out of the fibre is referred to as

In this guide, we cover the basics of fiber optic splicing, how to perform splicing using two different methods, and finally some best

A practical guide to fiber optic splicing techniques, tools & best practices from Richesin Engineering field technicians. Fusion splicing,

Fiber splicing is a vital technique in cable maintenance. Knowing how to splice fiber optic cables is key for data communications with

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