

RIVO MULTITRADE OPTICAL SYSTEMS

How to make an optical fiber fusion splice



Overview

In this tutorial, we will show you how to fusion splice two fiber optic strands together in an easy 12 step process.

Key Takeaways

Fusion splicing joins two optical fibers permanently using heat, creating a low-loss, high-performance connection. Tools and Equipment Needed

- Fusion splicer: Aligns and fuses fiber ends using an electric arc.
- Fiber cleaver: Produces a flat, precise end on the fiber.
- Stripping tools: Remove the protective coating without damaging the glass core.
- Cleaning materials: Isopropyl alcohol (IPA) and lint-free wipes.
- Splice protection sleeves: Protect the fused joint.
- Safety gear: High-rated goggles, cut-resistant gloves, and anti-static wrist straps ().

Step-by-Step Fusion Splicing Process

- Prepare the Fiber
- Strip 3-5 cm of the outer jacket and carefully remove the fiber coating (typically 250µm for single-mode fibers) without bending or twisting the fiber ().
- Clean the exposed fiber with an IPA-soaked swab to remove oils and debris. Avoid touching the glass surface.

- Cleave the Fiber
- Use a precision cleaver to create a flat, mirror-like end on each fiber.
- Inspect under a microscope to ensure the cleave is smooth and perpendicular; a poor cleave can cause high signal loss or splice failure ().
- Load Fibers into the Splicer
- Open the fusion splicer's windshields and place each fiber into the V-groove clamps.
- Close the covers gently, ensuring fibers rest naturally without forcing them into place ().
- Align and Fuse
- The splicer uses cameras and motors to align the fiber cores precisely.
- An electric arc melts the fiber ends, fusing them into a continuous optical path.
- The splicer may automatically inspect the splice for faults and measure loss ().
- Protect the Splice
- Slide a splice protection sleeve over the fused joint.
- Heat-shrink or otherwise secure the sleeve to prevent mechanical damage and maintain long-term reliability ().

Safety and Best Practices

- Fusion arcs reach temperatures over 5,000°C; always wear protective goggles and gloves ().
- Dispose of fiber shards immediately in a sealed container to prevent injury.
- Maintain a clean, static-free workspace; use anti-static mats or wrist straps to protect the splicer electronics ().
- Follow manufacturer recommendations for consumables and splicer settings to minimize splice loss and failure rates ().

Tips for High-Quality Splices

- Ensure fibers are straight and free of tension during handling.
- Maintain a bending radius greater than 30 mm to avoid microbends.
- Regularly clean and calibrate the cleaver and splicer to maintain precision.
- Inspect each splice under a microscope or using the splicer's imaging system to verify quality (). By following these steps and safety measures, you can achieve low-loss, durable fiber optic splices suitable for telecom, data centers, and other high-speed communication networks.

Article Content

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What is Splicing of Optical fibers? Definition, Fusion and Mechanical ...

The figure below shows the fusion splicing of the optical fiber: By making use of fusion splicing technique, the splice generated

Fiber Splices - mechanical splicing, fusion splicing, insertion loss ...

Mechanical and fusion splicing are methods of joining fibers such that an efficient transfer of light from one fiber to the other one is

Splicing Fiber Optic Cables | A Beginner's Guide

A fusion splicer is a machine that aligns and then splices two or more fiber optic cables together using an electric arc, creating a

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