

RIVO MULTITRADE OPTICAL SYSTEMS

Method for fabricating fusion-terminated fiber optic cold splices



Overview

The FOA Reference For Fiber Optics The termination process involves cleaving the fiber and attaching the connector with a built-in mechanical The FOA Refer.

Key Takeaways

Fusion-terminated fiber optic cold splices are fabricated by precisely cleaving, aligning, and joining fibers using a fusion splicer, followed by protective sleeving without heat-cured adhesives.Overview

A cold splice is a permanent optical connection made without the use of heat-cured epoxy or extensive polishing. Fusion-terminated cold splices combine the low-loss, low-reflectance benefits of fusion splicing with the convenience of pre-polished or pre-terminated connectors, enabling rapid field deployment and reliable performance .

Step-by-Step Fabrication Process

- Fiber Preparation
- Strip the protective coatings from the fiber ends to expose the bare glass.
- Clean the bare fibers with isopropyl alcohol to remove debris and contaminants.
- Cleave the fibers using a precision fiber cleaver to produce flat, perpendicular end faces. The quality of the cleave directly affects splice loss .



- Fiber Alignment
- Place the cleaved fibers into the fusion splicer. Modern splicers use optical core alignment (profile alignment) or LID (Local Injection and Detection) systems to automatically align the fiber cores for optimal light transmission .
- For ribbon fibers, multiple fibers can be aligned simultaneously using ribbon splicers.
- Fusion Splicing
- Initiate the fusion process, where an electric arc melts the fiber ends, forming a continuous glass filament. The splicer controls arc intensity and duration to minimize splice loss .
- The splicer software estimates splice loss and ensures proper alignment during the fusion process.
- Termination and Protection
- For cold splices, a splice-on connector or protective sleeve is applied immediately after fusion. Pre-polished ferrules or factory-prepared connectors eliminate the need for field polishing or adhesives .
- Heat-shrink sleeves or mechanical housings protect the splice from moisture, mechanical stress, and environmental hazards .
- Testing and Verification
- Measure insertion loss and return loss using an optical power meter or OTDR to ensure the splice meets performance specifications.
- Properly label and store the spliced fiber in trays or enclosures to prevent bending or stress.

Best Practices

- Always follow the manufacturer's instructions for the specific fusion splicer and connectors used.
- Maintain a clean work environment to prevent contamination of fiber ends.
- Use high-quality cleavers and splicing machines to ensure repeatable low-loss splices.
- For field applications, pre-polished splice-on connectors allow rapid deployment with minimal downtime .

Applications

Fusion-terminated cold splices are widely used in:

- Outside plant installations where environmental protection is critical.
- Data centers and enterprise networks for rapid deployment of custom fiber links.

- Repairs and MAC (Moves, Adds, Changes) operations to minimize downtime while maintaining high optical performance . By following these steps, technicians can achieve mechanically robust, low-loss fiber connections suitable for both singlemode and multimode fibers without the need for heat-cured adhesives or extensive polishing.

Article Content

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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

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