

How to handle the fiber core of optical cable splicing



Overview

Strip the buffer tube and individual fibers with the right tool for each layer — never use a utility knife.

Key Takeaways

Proper handling of the fiber core is critical for a low-loss, high-quality splice, requiring careful stripping, cleaning, cleaving, alignment, and protection. Preparing the Fiber Core

- Strip the Cable and Coating: Use a cable stripper to remove the outer jacket and inner coating layers until the bare fiber core is exposed. Typically, strip 50-100 mm of the fiber, taking care not to apply excessive force that could damage the core .
- Clean the Fiber: Wipe the exposed fiber with an alcohol-soaked, lint-free cloth to remove any dust, oils, or debris. Contaminants on the fiber end face can cause high attenuation or splice failure .
- Insert a Protection Sleeve: Before cleaving, slide a fiber protection sleeve onto the fiber. This sleeve will protect the bare fiber after splicing and should be positioned before preparing the fiber end face .

Cleaving the Fiber

- Use a precision fiber cleaver to create a flat, mirror-like end face. The cleave must be perpendicular to the fiber axis with minimal angle deviation, as a poor cleave can lead to high signal loss or back reflection .

- Inspect the cleaved fiber under a microscope to ensure the surface is smooth and free of chips or cracks .

Splicing the Fiber

- Fusion Splicing: Align the two fiber cores in the fusion splicer's V-groove and use an electric arc to fuse them. This creates a permanent, continuous light path with minimal attenuation (~ 0.1 dB) and nearly zero back reflection .
- Mechanical Splicing: Align the fibers using a mechanical splice holder with index-matching gel. This method is faster and allows temporary connections but typically has slightly higher loss (~ 0.3 dB) than fusion splicing .

Post-Splice Protection

- Slide the protection sleeve over the splice and shrink it using a heat source if required. This ensures mechanical stability and protects the fiber from environmental stress .
- Avoid bending the fiber sharply; maintain a bending radius greater than 30 mm to prevent microbending losses .

Best Practices

- Always handle the fiber by the coated portion to avoid contamination or breakage.
- Dispose of fiber scraps immediately in designated containers to prevent injury .
- Keep all tools clean and calibrated, including cleavers and splicers, to maintain consistent splice quality . By following these steps, technicians can ensure that the fiber core is handled safely and that the resulting splice provides low-loss, reliable optical transmission suitable for long-term network performance .

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