How to fuse an optical splitter

Article Overview

Fusing an optical splitter involves precisely heating, twisting, and tapering two or more optical fibers to create a controlled light-splitting region.

Overview of the Fusing Process

A fused optical splitter, commonly a Fused Biconical Taper (FBT) splitter, works by physically joining fibers so that light from one fiber is distributed into multiple output fibers. This process is widely used in passive optical networks for small split ratios like 1x2, 1x4, or 2x2 .

Step-by-Step Process
o Preparation of Fibers:
o Strip the protective coating from the fibers to expose the bare glass cores.
o Clean the fibers thoroughly to remove any contaminants that could affect fusion .

o Alignment and Twisting:
o Place the fibers parallel to each other and twist them together if required.
o Precise alignment ensures that the light can couple efficiently between fibers during the fusion process .

o Heating and Fusing:
o Apply heat using a controlled flame, electric heater, or specialized fusion machine.
o The fibers are heated until the glass softens and begins to fuse together.
o During this stage, the fibers are stretched (tapered) to form a biconical shape, which determines the light coupling and split ratio .

o Controlling the Split Ratio:
o Adjust the length of the taper, the angle of twisting, and the stretching distance to achieve the desired power distribution between output fibers.
o Monitoring the optical power during fusion helps ensure the split ratio meets specifications .

o Encapsulation and Protection:
o Once fused, the tapered section is encapsulated in a protective casing to prevent mechanical damage and maintain performance.
o Proper packaging ensures stability, especially for outdoor or long-term applications .

Key Considerations

o Loss Minimization: Proper alignment and controlled heating reduce insertion loss and backreflection .

o Equipment: Specialized fiber fusion machines are recommended for precision and repeatability.
o Split Ratio Accuracy: Small variations in taper length or angle can significantly affect the output power distribution, so careful monitoring is essential .
o Environmental Protection: Differences in thermal expansion between the fiber and casing materials must be considered to prevent damage in outdoor environments . By following these steps, a reliable fused optical splitter can be created, suitable for small-scale passive optical networks or laboratory applications.

This technical note will describe how a fused optical fiber coupler works and how it is made. Once an understanding of this has been

As an expert in fiber optic technology at SDGI Cable, we highlight the importance of precision when designing an

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What is a Fiber Optic Splitter? Fiber optic splitter is a passive optical device used to distribute optical signals, which

Splitter loss refers to the optical power lost when a signal is divided into multiple channels.

An FBT (Fused Biconical Taper) splitter is made by fusing and tapering two or more optical

A polarizing beam splitter has the ability to split or divide an original incident beam of light into two linear polarizations. This ability is

This post provides a introduction to how does a fiber optic splitter work, and optical fiber splitter application in FTTH.

Fused couplers are used to split optical signals between two (or more) fibers or to combine optical signals from two (or more) fibers

It is an optical fiber tandem device with many input and output terminals, especially applicable to a passive optical network (EPON,

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Learn how fiber optic splitters work, types (PLC, FBT), and uses in FTTH/data centers. Understand signal splitting, key

GitHub Gist: star and fork AshwinD24"s gists by creating an account on GitHub.

Light, traveling through the core of a fiber optic cable, can be split by precisely fusing and tapering fibers together.

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