

## Article Overview

Single-mode dual-core optical fiber is ideal for long-distance, high-speed data transmission, supporting lengths well beyond 25 meters with minimal signal loss.

## Overview

A dual-core single-mode fiber (also called duplex fiber) contains two separate cores within a single cable, allowing simultaneous bi-directional communication between devices, effectively doubling data throughput compared to single-core fibers . Each core typically has a 9-micron diameter surrounded by a 125-micron cladding, optimized for low-loss, long-distance transmission . Single-mode fibers guide light in a single straight path, minimizing dispersion and enabling high-bandwidth communication over long distances .

## Performance and Distance

Single-mode fibers are designed for long-haul applications, easily supporting distances from tens of meters to several kilometers without repeaters . For lengths over 25 meters, signal attenuation is negligible, especially when using OS1 or OS2 rated fibers, which are optimized for indoor and outdoor environments, respectively . Typical attenuation values are 0.4 dB/km at 1310 nm and 0.3 dB/km at 1550 nm, ensuring high-quality transmission over extended runs .

## Applications

Dual-core single-mode fibers are commonly used in:

- o Data centers for inter-rack or server connections
- o Enterprise networks for campus backbones
- o Telecommunication systems for long-distance links
- o Video conferencing and high-speed workstations requiring simultaneous two-way communication

## Cable Options and Connectors

These fibers are available in patch cables ranging from 1 meter up to 30 meters or in bulk spools for custom installations . Common connector types include LC, SC, and ST, and cables can be plenum-rated, riser-rated, or outdoor-rated depending on installation requirements . They comply with ITU-T G.652.D standards, ensuring compatibility with most modern single-mode equipment .

## Key Advantages



# Single-mode dual-core optical fiber

- o High bandwidth and low signal loss over long distances
  - o Simultaneous bi-directional communication via dual cores
  - o Future-proofing for high-speed network upgrades
  - o Compatibility with standard 1310 nm and 1550 nm wavelengths
- For installations exceeding 25 meters, dual-core single-mode fiber provides a reliable, high-performance solution suitable for both indoor and outdoor network infrastructures.

When planning a fiber optic network, one key decision is choosing between single-fiber (BiDi) and dual-fiber optical transceivers. This

For each product design, items for OM1, OM3, OM4, OM5, and OS2 (Singlemode) items have been developed. Belden fiber

Our duplex 9/125 fiber cable has a two-fiber internal cord design that allows real-time communication between devices. These duplex

Singlemode - 9/125 Singlemode OS2 Fiber Cable is used for high speed fiber optic networking, excellent

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**Product Description** This 25 meter (~82 feet) fiber optic cable is terminated with LC (Lucent Connector) connectors on both ends. It is

Our Fiber Optic Cables are engineered for universal compatibility with a wide range of networking devices. Perfectly suited for

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While single-core fibers offer efficiency and simplicity for long-distance transmission, dual

## Single-mode dual-core optical fiber

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An optical fiber patching cabinet. The yellow cables are single-mode fibers; the orange and blue cables are

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