

Parameters of a Four-Core Single-Mode Fiber Optic Cable

Article Overview

A single-mode 4-core fiber optic cable typically features OS2 fibers with 8-10 μm core diameter, 125 μm cladding, low attenuation, and G.652.D compliance, designed for long-distance, high-speed optical transmission.

Fiber-Level Specifications

- o Core Diameter: 8-10 μm , optimized for single-mode operation to minimize modal dispersion .
- o Cladding Diameter: 125 μm , standard for single-mode fibers .
- o Mode Field Diameter (MFD): Approximately 9.2 μm at 1310 nm and 10.4 μm at 1550 nm .
- o Cut-off Wavelength: Below 1260 nm to ensure single-mode operation across the O-band (1310 nm) and C-band (1550 nm), .
- o Attenuation Coefficient: Typically ≤ 0.35 dB/km at 1310 nm and ≤ 0.22 dB/km at 1550 nm for OS2 fibers .
- o Chromatic Dispersion: Low dispersion in the 1310 nm window (~ 3.5 ps/nm.km) and controlled dispersion in the 1550 nm window (~ 17 ps/nm.km), supporting long-haul and metro applications .
- o Polarization Mode Dispersion (PMD): ≤ 0.1 ps/ $\sqrt{\text{km}}$ typical, ensuring minimal pulse broadening .
- o Bend Insensitivity: Some variants (e.g., G.657.A2) support tight bend radii for FTTH installations .
- o Material: Pure silica core with fluorine-doped cladding or proprietary coatings for durability and low nonlinearity .

Cable-Level Construction

- o Number of Fibers: 4 cores, suitable for FTTH, GPON, or small-scale backbone deployments .
- o Loose Tube: PBT loose tube filled with jelly compound to protect fibers from moisture and mechanical stress .
- o Strength Members: Multi-strand aramid yarn for tensile strength and impact resistance .
- o Outer Jacket: PE (polyethylene) or LSZH (low-smoke zero-halogen) for environmental protection .
- o Diameter: Typically 6-8 mm for round drop cables, depending on manufacturer .
- o Temperature Range: Operating: -40°C to $+70^{\circ}\text{C}$; Storage: -40°C to $+85^{\circ}\text{C}$.

Standards Compliance

- o ITU-T G.652.D: Ensures compatibility with DWDM systems and future-proof network upgrades .
- o IEC 60793-2-50: Optical fiber type B.1.1 for single-mode fibers .
- o Telcordia GR-20-CORE, ANSI/ICEA S-87-640: For mechanical and environmental reliability .

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Testing and Quality Assurance

- o OTDR Testing: Each cable is tested for splice loss, length, and fault detection .
- o Wavelength Testing: Performance verified at 1310, 1550, and 1625 nm .
- o Mechanical Tests: Tensile, crush, and bend tests to ensure durability under installation conditions .

Applications

- o FTTH/GPON Networks: Connecting end-users to optical networks .
- o Metro and Long-Haul Telecom: Backbone and interconnect links up to 100 km without regeneration .
- o Data Centers: High-speed interconnects supporting 400G/800G coherent optics .
- o CATV and Utility Networks: Reliable signal transmission in harsh environments . This combination of fiber and cable specifications ensures that a 4-core single-mode fiber optic cable provides high-speed, low-loss, and durable performance suitable for modern telecommunications and data networks.

Its main advantage is that a single cable can be used for 2 independent telecom operators. The optical fiber is made of high pure

This comprehensive guide explores Single-Mode Fiber Optic Cable, covering technical specifications, deployment

This cable has flame retardant and LSZH properties and is ideal for indoor installations The cable is water-blocked and well suited for

How to properly polish fiber optic connectors Fiber Optic Center, Inc., (FOC), is an international leader in distributing

What are the characteristics of single mode fiber optic cable? I often meet project managers who ask about single

Learn how fiber optic transmission distance varies between single mode vs. multimode fiber. Discover key factors

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Fiber Optic Patch Cables, Single Mode, OS2, Duplex Singlemode fiber optic patch cables are called 9/125. This indicates the glass

Parameters of a Four-Core Single-Mode Fiber Optic Cable

This guide covers everything you need to know about 4 core fiber, including its internal

This Recommendation describes a single-mode optical fibre and cable which has zero-dispersion wavelength around

Specifications are correct at time of printing and subject to change or alteration without notice.

OS1 single-mode fiber has a maximum transmission distance of 10 km, while OS2 can reach a maximum

*Cable using high property aramid yarn, increasing tension property, and fit for long distance use; *Cable

GL FIBER" ADSS cables offer a rapid and economical means for deploying optical fiber cables along existing aerial rights-of-way.

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It can be used in all cable constructions, including loose tube, tight buffered, ribbon, and central tube designs. It supports long haul,

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