What type of optical cable is used for optical fiber

Overview

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Key Takeaways

Fiber optic cables are primarily classified into single-mode (SMF) and multimode (MMF) cables, each designed for specific transmission distances and data rates.Single-Mode Fiber (SMF)

Single-mode fiber features a very thin core, typically 8–9 microns in diameter, which allows only one light signal (mode) to propagate. This design minimizes signal dispersion, making SMF ideal for long-distance communication, such as telecommunications and high-speed internet backbones. SMF cables can transmit data over tens of kilometers without significant signal loss and are commonly used with laser light sources. The most widely used single-mode fiber type for long-distance applications is OS2 .

Multimode Fiber (MMF)

Multimode fiber has a larger core, usually 50 or 62.5 microns, which allows multiple light signals to travel simultaneously. MMF is suitable for shorter distances, such as within buildings or data centers, and supports high-speed data transmission over hundreds of meters. Common multimode fiber types include OM3 and OM4, which are optimized for 10G, 40G, and 100G Ethernet applications . MMF typically uses LED or VCSEL light sources.

Construction and Components

Fiber optic cables consist of a core (glass or plastic) surrounded by a cladding layer with a lower refractive index to enable total internal reflection. The fibers are coated with protective layers, including acrylate polymer or polyimide, and encased in a buffer tube and outer jacket for mechanical protection. Some cables include multiple fibers in ribbons or bundles, with additional sheathing to prevent crosstalk and environmental damage .

Summary
• Single-mode fiber (SMF): Thin core, long-distance, minimal dispersion, OS2 standard.

• Multimode fiber (MMF): Larger core, short-distance, multiple modes, OM3/OM4 standards.

• Applications: SMF for telecom and long-haul networks; MMF for enterprise, data centers, and local networks. Choosing the right fiber optic cable depends on distance, bandwidth requirements, and network environment, with SMF preferred for long-range high-speed links and MMF for cost-effective, short-range connections .

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The buffer or jacket on patch cords is often color-coded to indicate the type of fiber used. The strain relief boot that protects the fiber from bending at a connector is color-coded to indicate the type of connection. Connectors with a plastic shell (such as SC connectors) typically use a color-coded shell. Standard color codings for jackets (or buffers) and boots (or connector shells) are shown below: Remark: It is also possible that a small part of a connector is additionally color-coded, e.g., the lever o

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