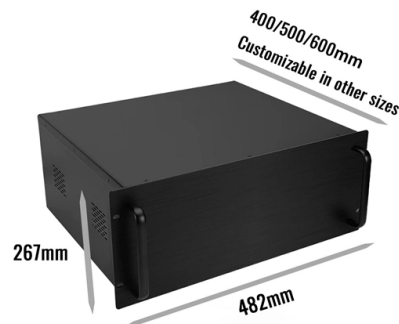


Selection of Long-Distance Optical Cables



AI Overview

Single-mode fiber (SMF) cables are the primary type used for long-distance optical transmission, with OS1 and OS2 subtypes optimized for indoor and outdoor applications. Single-Mode Fiber (SMF) Single-mode fiber cables are designed for long-distance, high-speed data transmission. They have a very small core diameter, typically 8–9 μm , which allows only a single light mode to propagate, minimizing signal dispersion and enabling transmission over many miles without significant loss.

Subtypes:

- OS1:** Tight-buffered cables mainly used indoors, suitable for distances up to about 6 miles, supporting up to 10 Gbps. They are more affordable and designed to handle environments with higher electrical interference.
- OS2:** Designed for outdoor and long-haul applications, capable of distances up to 125 miles and supporting throughput up to 100 Gbps. OS2 cables are more robust and expensive, optimized for minimal signal loss over extended distances.

Multimode Fiber (MMF) While multimode fiber has a larger core (50–62.5 μm) and can carry multiple light modes simultaneously, it is generally used for shorter distances due to modal dispersion. MMF is less suitable for long-distance applications but is common in data centers and LANs.

Cable Constructions for Long-Distance Use Long-distance optical cables are also categorized by their mechanical design to protect fibers in different environments:

- Tight-Buffered Cables:** Each fiber is coated individually, providing mechanical protection. Common for indoor installations.
- Loose-Tube Cables:** Fibers are housed in tubes filled with gel or water-blocking material, protecting them from environmental changes. Ideal for outdoor and long-haul deployments.
- Armored Cables:** Include an extra protective layer to withstand harsh conditions, such as underground or industrial environments.
- Ribbon Cables:** Contain multiple fibers arranged in parallel for high-density, long-distance applications.

Summary For long-distance optical transmission, single-mode fibers (OS1 and OS2) are the standard c...

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