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Single-mode 10 Gigabit fiber optic cable models



Overview

The plethora of fiber optic cable types can seem overwhelming, but choosing the right cable for the job is important.

Key Takeaways

For 10 Gigabit Ethernet over single-mode fiber, OS1 or OS2 fiber is typically used, with OS2 being the preferred choice for long-distance and future-proof deployments.Single-Mode Fiber Types

OS1 and OS2 are the two main types of single-mode fiber (SMF) used for 10GbE networks:

• OS1 Fiber: Tight-buffered design, primarily for indoor use. Suitable for short distances up to 10 km at 10GbE speeds. It has higher signal loss compared to OS2 and is cost-effective for short indoor runs .

• OS2 Fiber: Loose-tube design, optimized for outdoor and long-distance applications. Supports longer distances (up to 40 km for 10GbE) with lower attenuation, making it ideal for campus backbones, inter-building links, and future-proof networks .
10 Gigabit Ethernet Standards

For 10GbE over single-mode fiber, the 10GBASE-LR (Long Reach) standard is commonly used:

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• 10GBASE-LR: Designed for long-distance transmission up to 10 km using single-mode fiber. Compatible with both OS1 and OS2 fibers, though OS2 allows for better performance and lower signal loss over longer distances .

• Transceiver Compatibility: SFP+ transceivers such as 10GBASE-LR operate at 1310 nm and can work over either OS1 or OS2 fiber. The actual achievable distance depends on fiber characteristics and total link loss .
Recommendations
• Indoor short runs: OS1 fiber is sufficient for distances under 10 km and can reduce costs for office or data center interconnects .

• Outdoor or long-distance links: OS2 fiber is recommended for distances beyond 10 km, campus backbones, or when planning for future upgrades and higher-speed applications .

• Future-proofing: OS2 supports advanced technologies like CWDM/DWDM, making it suitable for scalable network deployments . In summary, OS2 single-mode fiber is generally the preferred choice for 10 Gigabit Ethernet, especially for long-distance, outdoor, or high-performance networks, while OS1 can be used for shorter indoor connections.

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Cisco SFP+ Active Optical Cables (Figure 4) are direct-attach fiber assemblies with SFP+

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