# Which type of optical cable is best to buy

## Overview

Fiber Optic Cable Types: A Complete GuideHere's everything you need to know about the various fiber optic cable types, what makes Fiber Optic Cables: Digit.

## Key Takeaways

Single-mode fiber (OS2) is best for long-distance, high-bandwidth applications, while multimode fiber (OM3/OM4) is ideal for shorter-range, high-speed networks.Core Fiber Types

Single-Mode Fiber (SMF / OS2):

• Features a very thin core (8–9µm) that carries a single light signal.

• Ideal for long-distance transmission (up to 40 km or more) with minimal signal loss.

• Commonly used in telecommunications, long-haul networks, and high-bandwidth backbones.

• Offers superior performance for high-speed data over extended distances ( ).
Multimode Fiber (MMF / OM3, OM4, OM5):

• Larger core (50–62.5µm) allows multiple light signals simultaneously.

• Best for shorter distances (up to 400–550 meters for 10G/40G/100G networks).

• Cost-effective for data centers, enterprise LANs, and indoor cabling.

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• OM4 extends reach beyond OM3, supporting higher-speed applications ( ).
Cable Construction Types
• Loose Tube: Designed for outdoor use; fibers are protected in a gel-filled tube, resistant to moisture and temperature changes.

• Tight-Buffered: Common for indoor installations; easier to handle and terminate, suitable for patch panels and short runs ( ).
Environmental Considerations
• Indoor Jackets: PVC (standard), LSZH (low smoke, zero halogen), or plenum-rated for fire safety.

• Outdoor Jackets: UV-resistant, waterproof, and rodent-protected; armored options available for harsh environments.

• Specialized Cables: ADSS (All-Dielectric Self-Supporting) for power lines, OPGW (Optical Ground Wire) for high-voltage towers ( ).
Connector Types
• SC, LC, ST: Common for single or duplex connections.

• MTP/MPO: Multi-fiber connectors for high-density data center applications.

• PC, UPC, APC: Polishing types affecting return loss; APC offers the highest signal quality ( ).
Simplex vs. Duplex
• Simplex: Single fiber strand, used for one-way transmission or BiDi transceivers.

• Duplex: Two fibers for full-duplex communication; standard for most networking applications ( ).
Recommendations
• Long-distance, high-bandwidth networks: Single-mode OS2 fiber with APC connectors.

• Data centers or short-range high-speed networks: Multimode OM4 fiber with LC or MTP/MPO connectors.

• Outdoor or harsh environments: Loose tube or armored cables with UV-resistant jackets.

• Indoor, fire-sensitive areas: LSZH or plenum-rated tight-buffered cables. Choosing the best optical cable depends on distance, bandwidth requirements, installation environment, and connector compatibility. For most enterprise and telecom applications, single-mode fiber dominates long-haul networks, while multimode fiber is preferred for cost-effective, high-speed short-range deployments.

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