

Article Overview

Fiber optic cables are classified by core size, mode type, wavelength, and international standards such as IEC, ITU-T, and TIA.

Core Classification by Mode and Diameter

Fiber optic cables are primarily classified into single-mode (SMF) and multimode (MMF) fibers:

- o Single-Mode Fiber (SMF): Has a small core diameter, typically 8-10 microns, allowing only one light mode to propagate. Common standards include ITU-T G.652 (low-loss, zero-dispersion at 1310 nm), G.655 (non-zero dispersion-shifted for DWDM), and G.657 (bend-insensitive fibers) for long-haul, metro, and access networks .
- o Multimode Fiber (MMF): Has a larger core diameter, typically 50 or 62.5 microns, supporting multiple light modes. MMF is classified by OM (Optical Multimode) ratings:
 - o OM1: 62.5 um core, 200 MHz.km bandwidth at 850 nm, max 3.5 dB/km attenuation .
 - o OM2: 50 um core, 500 MHz.km bandwidth at 850 nm, max 3.0 dB/km attenuation.
 - o OM3: 50 um core, 2000 MHz.km bandwidth at 850 nm, optimized for 10-40 Gbps.
 - o OM4: 50 um core, supports 40-100 Gbps over shorter distances, 850 nm wavelength .

Standards Governing Fiber Classification

Fiber optic core classification is defined and regulated by several international standards:

- o IEC 60793: Specifies optical fiber characteristics, including core/cladding dimensions, numerical aperture, and attenuation.
- o IEC 60794: Covers fiber optic cable construction and mechanical performance.
- o ITU-T Recommendations: G.652, G.655, G.657 define single-mode fiber types, dispersion, and wavelength performance.
- o TIA-568.3-E: Defines performance, transmission, and testing requirements for premises optical fiber cabling, including polarity and connectivity methods for duplex and array systems .
- o ISO/IEC 11801: Provides international guidance for structured cabling in commercial buildings.
- o Telcordia GR-20: Addresses reliability and environmental performance for outside plant fiber cables .

Key Considerations

- o Bandwidth and Attenuation: Core classification affects maximum transmission distance and data rate.
- o Wavelength Compatibility: Single-mode fibers are optimized for 1310 nm and 1550 nm, while multimode

Fiber Optic Cable Standard Classification

Core

fibers typically operate at 850 nm and 1300 nm.

- o Application: OM1/OM2 are suitable for legacy networks, OM3/OM4 for high-speed data centers, and single-mode fibers for long-haul and metro networks.
- o Polarity and Connectivity: Standards like TIA-568.3-E define fiber polarity methods (Methods A, B, C, U1, U2) to ensure proper transmitter-receiver alignment. In summary, fiber optic core classification combines physical core size, mode type, and standardized optical performance, guided by IEC, ITU-T, TIA, and ISO/IEC standards to ensure interoperability, reliability, and optimal network performance.

This fibre optic cable selection guide explains the differences between the different types and the commonly available construction

All multimode fibers utilizing the above nomenclature should be graded-index MMF and compliant with industry prevailing standards

Not sure which fiber optic cable you need? Compare single mode vs multi mode,

ITU-T has been active in the standardization of optical communications technology and the techniques for its optimal application

The fibre core is made from an acrylic (polymethyl methacrylate, or PMMA), while the optic sheath is made from a fluoride compound

With 2 billion kilometers of fiber optic cables installed around the globe, Corning continues to lead the industry in product quality and

Our comprehensive guide to types of fiber optic cables. Learn all about the differences between single mode and multimode cables,

Conclusion Understanding fiber optic cable types, fiber core sizes, and proper installation methods is

The core of step index multimode fiber is made completely of one type of optical material and the cladding

Color codes are used in fiber optics to identify fibers, cables and connectors. In the photos above, on the

How Many Types of Multimode Fiber? Identified by ISO 11801 standard, multimode fiber optic cables can be classified

Standards Updates for Optical Fiber: What You Need to Know Industry standards for optical fiber cables,

Fiber Optic Cable Standard Classification Core

components,

Multimode fiber is a staple of fiber-optic cable infrastructure in data centers and campus networks. The ISO/IEC 11801

This ultra-low-loss single-mode fiber with advanced bend capability for long haul terrestrial applications utilized in optical fiber cable

Don't worry, in this guide, we'll discuss in detail what the fiber optic core is and its role in

ITU Standards The ITU has defined a series of recommendations that describe the geometrical properties and transmissive

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