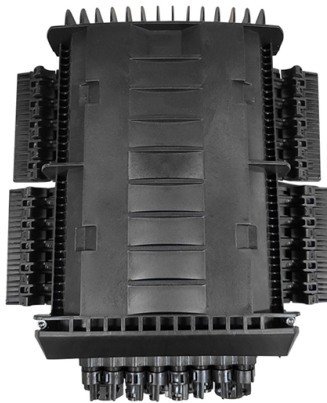


Technical Requirements for the Quality of Communication Optical Cables



AI Overview

High-quality communication optical cables must meet strict standards for optical performance, mechanical robustness, and environmental resilience to ensure reliable signal transmission.

Optical Performance Requirements

Attenuation and Signal Loss: Optical cables must maintain low attenuation to minimize signal loss over distance. Single-mode fibers, such as ITU-T G.652, are optimized for low loss at 1310 nm, while G.655 fibers are designed for dense wavelength division multiplexing (DWDM) with controlled dispersion to reduce nonlinear effects. Attenuation is influenced by fiber material, wavelength, and environmental conditions, and standards provide guidelines for acceptable limits.

Chromatic and Polarization Mode Dispersion: Chromatic dispersion affects pulse broadening and limits transmission speed. ITU-T G.65x series specifies dispersion characteristics for different fiber types, while polarization mode dispersion must be controlled to maintain high-speed data integrity.

Connector and Splice Loss: Patch cords, jumpers, and connectors introduce additional loss. IEC 61300 series defines testing for insertion loss and return loss to ensure minimal signal degradation at connection points.

Mechanical and Environmental Requirements

Bending Stiffness and Flexibility: Optical cables must resist deformation during installation and operation. prEN IEC 60794-1-117:2025 specifies bending stiffness tests, including three-point bend, cantilever bend, and buckling bend, to ensure cables maintain performance under stress.

Mechanical Strength: Cables are tested for tensile strength, crush resistance, and impact tolerance according to IEC 60794 and Telcordia GR-20 standards to ensure durability during handling and deployment.

Environmental Resistance: Optical cables must withstand temperature variations, moisture, UV exposure, and chemical influences....

Article Content

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Recommendation ITU-T G Suppl. 47 (03/2025)

Supplement 47 to ITU-T G-series Recommendations provides information on the general transmission characteristics of single-mode optical fibres and cables specified in the ITU-T G.65x-series of

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