What type of copper is used in rigid optical fiber cables



Overview

A complete guide to the raw materials of fiber optic cables—optical fibers, PBT tubes, FRP rods, aramid yarn, steel armoring, HDPE/LSZH jackets, and more.

Key Takeaways

Rigid optical fiber cables that include copper typically use high-purity, solid copper conductors or copper tubes for grounding, power delivery, or mechanical protection.

Role of Copper in Fiber Optic Cables

While standard fiber optic cables transmit data entirely via light and contain no metallic elements, rigid or hybrid fiber optic cables may incorporate copper for specific purposes: Grounding and electrical safety: Copper tubes or conductors provide a path to ground, protecting the cable and connected equipment from electrical faults or lightning strikes. Power delivery: In some hybrid cables, copper wires carry direct current to power remote devices such as wireless access points, IP cameras, or cellular base stations. Mechanical reinforcement: Copper tubes can act as solid barriers to protect fibers from water ingress or physical stress in outdoor or undersea installations.

Type of Copper Used

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The copper used in these applications is generally: High-purity, oxygen-free copper: Ensures excellent electrical conductivity and minimizes corrosion over time. Solid or stranded conductors: Solid copper is often used in rigid tubes for structural protection, while stranded copper may be used for flexibility in power-carrying conductors. Annealed copper: Provides ductility and reduces brittleness, which is important for cables that may be bent or twisted during installation.

Construction Considerations

In rigid fiber optic cables, copper elements are typically encased within protective layers to prevent corrosion and mechanical damage. These layers may include: Polyethylene or PVC jacketsWater-blocking gels or powdersKevlar or aramid yarn for tensile strength This ensures that the copper maintains its electrical and mechanical properties while the optical fibers remain isolated and protected.

Summary

In summary, rigid optical fiber cables use high-purity, solid or stranded copper conductors or tubes for grounding, power, and protection. The copper is carefully integrated with protective sheathing and water-blocking materials to maintain both the optical performance and the durability of the cable in demanding environments.

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