Materials used for laying optical cables

Overview

Use only cable/duct lubricants recommended by its blowing equipment manufacturer for optical fiber cable.

Key Takeaways

Ordinary optical cables are constructed from ultra-pure silica cores, protective coatings, buffer tubes, strength members, and outer jackets designed for environmental protection and mechanical stability.Core and Cladding

The core is the central part of the optical fiber that transmits light signals and is typically made from ultra-pure silica (SiO_2), sometimes doped with germanium to control the refractive index. Surrounding the core is the cladding, also made of silica, which has a slightly lower refractive index to reflect light back into the core, ensuring efficient signal transmission over long distances .

Coatings and Buffering

To protect the delicate glass fiber, a dual-layer UV-cured acrylate coating is applied. The soft primary coating cushions the fiber, while the hard secondary coating provides mechanical protection. For additional protection, fibers are often housed in buffer tubes, commonly made from PBT (Polybutylene Terephthalate) for rigidity and thermal stability or PP (Polypropylene) for low-temperature toughness and hydrolysis resistance .

Strength Members

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Optical cables include strength members to prevent fiber elongation and mechanical damage during installation. These can be made from aramid yarn (Kevlar), FRP rods, or steel wires, depending on whether the cable is all-dielectric or armored. Strength members provide tensile support for aerial or underground installations .

Outer Jacket

The outer jacket protects the cable from environmental factors such as moisture, UV radiation, and abrasion. Common materials include PVC (Polyvinyl Chloride) for cost-effective indoor use, LSZH (Low Smoke Zero Halogen) for fire safety, and TPU (Thermoplastic Polyurethane) for high flexibility and abrasion resistance in industrial or moving applications . Outdoor cables may also include water-blocking elements like gels or dry water-swellable tapes to prevent moisture ingress.

Additional Components

Some optical cables include metallic components for grounding or chemical protection, ribbon matrices for multi-fiber organization, and identification inks for fiber color coding. Specialized additives like glass flakes or borates may be used to enhance durability or environmental resistance .

Summary

In summary, ordinary optical cables are composed of:

• Core and cladding: ultra-pure silica with refractive index control

• Protective coatings: dual-layer acrylate

• Buffer tubes: PBT or PP

• Strength members: aramid, FRP, or steel

• Outer jacket: PVC, LSZH, or TPU

• Optional elements: water-blocking materials, metallic components, and identification markers Selecting the right combination of these materials ensures mechanical stability, environmental resistance, and long-term signal integrity for both indoor and outdoor installations .

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Cable Jackets Polyethylene (PE) is the material of choice for use as an aerial OSP cable jacket. The performance of raw PE can

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