

The Function of the Metal Sheath in Optical Cables



Overview

Depending on the material and construction, cable insulation can also be waterproof or water-repellent.

Key Takeaways

The metal sheath in optical cables primarily provides mechanical protection, moisture resistance, and environmental durability, ensuring the integrity and longevity of the optical fibers.

Mechanical Protection

A metal sheath acts as a robust armor around the optical cable core, shielding the delicate glass fibers from physical damage such as crushing, bending, or impact during installation and operation. This is especially important in harsh environments like underground, underwater, or industrial settings, where cables may be exposed to heavy loads, abrasion, or rodent attacks. The sheath can be made of steel or aluminum strips, often coated with plastic for additional protection.

Moisture and Environmental Resistance

Metal sheaths prevent water or moisture from entering the cable core, which could otherwise degrade the optical fibers and impair signal transmission. Some designs, like semi-hermetic bonded aluminum or steel sheaths, provide a barrier against humidity, chemical corrosion, and environmental contaminants. In addition, oil-filled or compound-filled cores can further prevent moisture spread if the sheath is breached.

Fire Resistance and Safety

In certain applications, metal sheaths enhance fire resistance. For example, mineral-insulated cables use a solid metal sheath with magnesium oxide insulation to maintain circuit integrity at temperatures exceeding 950°C, making them suitable for fire alarm systems and emergency power circuits . This ensures that optical communication or control systems remain operational during fire events.

Additional Benefits

- **Rodent and pest protection:** Metal sheaths can prevent damage from animals in tunnels or underground installations .
- **Durability in extreme conditions:** They provide resistance to UV radiation, chemical exposure, and mechanical stress, extending cable lifespan .
- **Structural support:** In armored cables, the metal sheath can also serve as a grounding path or contribute to overall cable rigidity . In summary, the metal sheath in optical cables is a critical component that protects the fibers from mechanical, environmental, and thermal hazards, ensuring reliable performance in demanding installation conditions. Its design and material selection depend on the specific application, such as direct burial, overhead, or industrial use .

Article Content

Composition of communication optical cable

In addition to providing mechanical protection for the cable core, the sheath mainly prevents moisture or water from

The Role of Aluminum Sheath in Optical Cables

The metallic sheath plays a key role in the design of High Voltage underground cable systems, as it must satisfy essential electrical

28 Selection_of_the_Correct_Optical_Cable

It provides a smooth, low friction surface for cable placement. The jacket must be made of a material that will allow the cable to

What is the purpose of metallic sheath in cable?

The metallic sheath provides a watertight barrier that prevents moisture ingress, a critical factor in maintaining cable

How Optical Cable Sheath Works — In One Simple Flow (2025)

Optical cable sheaths are essential components in modern telecommunications, providing protection and durability to

What Is a Cable Sheath and How Does It Work?

Although often overlooked, the sheath is an integral component of a cable's design. It is engineered to withstand the

Application Notes

Except for the most severe Outside Plant conditions, a single jacket, either metallic or dielectric armored cable will likely provide

Sheathing Types

Sometimes fiber optic cables are routed through and around machinery. A rule of thumb when specifying sheathing: if interlocked

Fiber-optic cable

Several layers of protective sheathing, depending on the application, are added to form the cable. Rigid fiber assemblies sometimes

Cable jacket | Cable sheath and cable insulation | Simply explained

Depending on the material and construction, cable insulation can also be waterproof or water-repellent. In addition, a cable sheath

Fiber optic cable outer sheath why important? What material?

fiber optic cable in general by the optical fiber core and cladding, coating, strengthening element, an outer sheath, outer sheath as

What is cable sheathing?

In the world of cable manufacturing, cable sheathing (also known as cable extrusion and cable jacketing) stands as a crucial process

The Engineering and Function of the Cable Outer Sheath

The outer sheath is the outermost protective jacket of a cable, acting as the primary defense mechanism for the

What Is The Purpose Of The Outer Sheath In An Optical Fibre?

What is the function of optical fiber? Optical fibers are used most often as a means to transmit light between the two

What is the purpose of metallic sheath in cable?

Introduction Metallic sheaths are essential components in the construction of cables used for electrical power

How To Choose Fiber Cable Outer Sheath Materials?

Choosing the appropriate outer sheath material for fiber optic cables is crucial for ensuring the cable's durability,

An Overview Of Optical Fiber Cable Structure And Components

An optical fiber cable is a complex structure designed to protect fragile glass fibers that transmit digital data using light signals. This

Fiber Optic Cable Construction

Cables suitable for outdoor, direct burial, and undersea applications usually take the form of groups of PCOF fibers

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