

Two types of optical cables for power collection lines



Overview

Just as copper cables use pulses of electricity to carry signals across a copy wire, Fiber Optic cable uses pulses of light.

Key Takeaways

The two main types of optical cables used in power collection lines are OPGW (Optical Power Ground Wire) and OPPC (Optical Power Phase Conductor). OPGW (Optical Power Ground Wire)

OPGW is a composite cable that combines optical fibers with a ground wire used for lightning protection on power transmission lines . Key features include:

- **Dual Function:** Provides lightning protection for high-voltage lines and enables high-speed data transmission through embedded optical fibers.
- **Structure:** Optical fibers are housed in a sealed metal tube at the cable core, surrounded by steel strength members and aluminum conductors.
- **Applications:** Commonly used on high-voltage lines (110kV, 220kV, 500kV) and new transmission lines where power outages must be minimized.
- **Installation:** Typically installed on towers or poles as the topmost wire. Maintenance requires experienced utility personnel, and splicing is done on the ground in protective enclosures.

- Advantages: High mechanical strength, resistance to electrical interference, and suitability for long spans and high-voltage environments.

OPPC (Optical Power Phase Conductor)

OPPC integrates optical fibers directly into the phase conductors of the power line . Key characteristics include:

- Dual Function: Transmits electrical power while simultaneously carrying optical signals for communication or monitoring.
- Structure: Optical fibers are embedded within the conductor, often in a central tube, surrounded by aluminum or other conductive materials.
- Applications: Used where communication capacity is needed along the phase conductors, often in medium- to high-voltage lines.
- Installation: Mounted in the same position as standard phase conductors, requiring careful handling to avoid damage to both the electrical and optical components.
- Advantages: Efficient use of existing conductors for communication, immunity of optical fibers to electrical interference, and suitability for long-distance transmission.

Summary

Both OPGW and OPPC allow utilities to integrate communication capabilities directly into power transmission infrastructure. OPGW is primarily a ground wire with optical fibers, ideal for lightning protection and high-voltage lines, while OPPC embeds fibers in phase conductors, enabling simultaneous power transmission and data communication. Both types typically use singlemode fibers for long-distance links and require specialized installation and maintenance procedures .

Article Content

Differences Between Fiber Optic Cables for Transmission Lines

Installation MethodType of Protective SheathDifference of DesignTemperature RatingTransmission PerformanceOne of the main differences between OPGW and ADSS fiber optic cables is the way they are installed. OPGW fiber optic cable is installed on overhead transmission lines, while ADSS fiber optic cable is installed on the side of transmission towers. This means that OPGW fiber optic cable is subject to different environmental factors and physical stress...See more on kvcable HOC

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