ZITHA TECH SPECIALTY CABLES (Pty) Ltd

Introduction to OPGW Power Optical Cables



Overview

An optical ground wire (also known as an OPGW or, in the IEEE standard, an optical fiber composite overhead ground wire) is a type of cable that is used in overhead power lines. Such cable combines the functions of grounding and telecommunications. An OPGW cable contains a tubular structure with one or more optical fibers in it, surrounded by layers of steel and aluminum wire. The OPGW cable is run between the tops of high-voltage electricity pylons.

Key Takeaways

OPGW cables serve a dual role: they protect high-voltage power lines from lightning and faults while simultaneously enabling high-speed optical data transmission for power grid monitoring and communication.Dual Functionality

OPGW (Optical Fiber Composite Overhead Ground Wire) cables combine the functions of a conventional overhead ground wire and an optical fiber communication cable. Installed at the top of high-voltage transmission towers, the metallic portion of the cable provides a direct path to ground, shielding phase conductors from lightning strikes and electrical faults, which enhances the reliability and safety of power lines . Simultaneously, the embedded optical fibers allow high-speed data transmission, supporting real-time monitoring, control, and communication across the power grid .

Structural Design

© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved

An OPGW cable typically consists of a tubular core containing one or more optical fibers, surrounded by layers of steel and aluminum wires. This design ensures mechanical strength to withstand environmental stresses while protecting the optical fibers from electrical interference and lightning-induced surges . The optical fibers themselves are insulators, immune to electrical noise, and capable of long-distance, high-speed data transmission .

Applications in Power Systems
• Electrical Protection: OPGW cables act as ground wires, safely dissipating lightning strikes and fault currents to the earth, preventing damage to transmission lines .

• Data Transmission: The optical fibers carry telecommunication signals, including SCADA data, relay protection signals, and real-time monitoring information, enabling predictive maintenance and efficient grid operation .

• Telecommunication Services: Beyond utility use, OPGW fibers can be leased to third parties for high-speed internet or intercity communication, providing additional revenue streams .
Advantages
• High Reliability: Positioned atop transmission towers, OPGW cables are less prone to physical damage compared to buried cables .

• Cost Efficiency: Combining grounding and communication in a single cable reduces the need for separate installations .

• Adaptability: OPGW cables perform well under various weather conditions and are suitable for high-voltage lines above 110 kV . In summary, OPGW cables are a critical component of modern power transmission systems, integrating electrical safety with advanced communication capabilities, supporting smart grid operations, and enabling efficient monitoring and control of power networks .

Article Content

Optical ground wire

OverviewHistoryConstructionComparison with other methodsApplicationInstallationExternal links

An optical ground wire (also known as an OPGW or, in the IEEE standard, an optical fiber composite overhead ground wire) is a type of cable that is used in overhead power lines. Such cable combines the functions of grounding and telecommunications. An OPGW cable contains a tubular structure with one or more optical fibers in it, surrounded by layers of steel and aluminum wire. The OPGW cable is run between the tops of high-voltage electricity pylons. The conductive part of the cable serves to bond adjacent tow

Related Video Reference

© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

Contact Us

Continue your research online:

Website: https://zithatech.co.za
Technical inquiry: https://zithatech.co.za/contact.html

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved