COETZER OPTICAL SYSTEMS (Pty) Ltd

Optical cables contain many steel wires

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

Steel wires in optical cables serve as strength members and protective elements, supporting the fibers and ensuring durability under mechanical and environmental stress.Purpose of Steel Wires

Steel wires in optical cables are primarily used to provide mechanical strength and structural support. Optical fibers themselves are fragile and cannot withstand tension, bending, or environmental forces such as wind, ice, or accidental pulling. Steel components, such as messenger strands and lashing wires, carry the mechanical load, allowing the cable to maintain integrity while protecting the delicate fibers inside .

Types of Steel Components
• Messenger Strand: A stranded steel cable, often made of carbon steel with a zinc or zinc-aluminum coating, that supports the weight of aerial fiber cables. It typically consists of six wires wrapped around a central wire and is designed to resist corrosion and mechanical stress .

• Lashing Wire: Stainless steel wires, usually 0.038" to 0.045" in diameter, are used to bind the optical fibers to the messenger strand. These wires are annealed for ductility and selected for strength and corrosion resistance depending on the installation environment .

• Armoring in OPGW (Optical Ground Wire): In high-voltage overhead transmission lines, optical fibers are placed inside stainless steel tubes and stranded alongside aluminum-clad steel or aluminum alloy wires. This design allows the cable to function both as a grounding conductor and a telecommunication medium, while withstanding environmental stresses like wind, ice, and electrical faults .
Benefits of Steel in Optical Cables
• Mechanical Protection: Prevents fiber breakage during installation and operation.

• Tensile Strength: Supports long spans in aerial installations without sagging.

• Corrosion Resistance: Zinc or zinc-aluminum coatings and stainless steel grades ensure longevity in outdoor environments .

• Dual Functionality: In OPGW, steel wires allow the cable to serve as both a structural and electrical grounding element while carrying optical fibers .
Summary

While optical fibers transmit data, steel wires provide the necessary strength, durability, and environmental protection. Their inclusion is essential in aerial, armored, and high-fiber-count cables, ensuring that the fibers remain intact and functional over decades of service .

Article Content

Optical ground wire

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Does the optical cable contain steel wires

In conclusion, optical cables are not made of steel wire for their optical function, but steel is often incorporated to enhance structural

An Overview Of Optical Fiber Cable Structure And Components

Galvanized steel wires offer the highest tensile strength exceeding 150 Kpsi, to support long cable runs. Wires are stranded for

Aerial Fiber Deployment: Messenger Strand and Lashing Wire

The wire is annealed for high ductility with minimum strengths of 70 to 90 kpsi. The stainless steel grades provide varying strength

FAQ Guide to Fiber Optic Cable – Lightera

A fiber optic cable contains anywhere from one to several hundred optical fibers within a plastic casing. Fiber optic cable (or optical

What Is Fiber Optic Cable?

A fiber optic cable is a network cable that contains strands of glass fibers inside an insulated casing. They''re designed

Just the Technical Facts

A basic fiber optic system consists of a transmitting device, which generates the light signal; an optical fiber cable, which carries the

Optical fiber

An optical fiber, or optical fibre, is a flexible glass or plastic fiber that can transmit light from one end to the other. Such fibers are

How does fiber optics work?

A gastroscope is a thick fiber-optic cable consisting of many optical fibers. At the top end of a gastroscope, there is an

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An optical fiber cable, also known as a fiber optic cable, is an assembly similar to an electrical cable, but containing one or more

Engineering:Optical fiber cable

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Fibre Optic Cable

Fibre optic cable is defined as a type of cabling that transmits data as pulses of light, allowing for high-volume data transfer at high

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