Silicon Core Tube Optical Cable Laying Process



Overview

The silicon core tube for the optical cable comprises an outer tube, a mixed support, a movable support, a middle layer and a silicon core tube body, wherein the fixed support is...

Key Takeaways

Silicon core tubes provide low-friction, durable conduits for optical cables, enabling efficient installation and repeated cable extraction without damage.

Composition and Structure

Silicon core tubes are typically made with a high-density polyethylene (HDPE) outer and middle layer and a silicone-based inner layer that acts as a solid lubricant. The inner silicone layer significantly reduces friction, allowing optical cables to be pulled or blown through long distances with minimal resistance. The preferred material composition includes HDPE (95–100%), silicone (2.

5–3. 5%), active silicone oil (5–8%), dimethyl silicone oil (6–10%), initiating agents (0. 5–1.

5%), and antioxidants (1. 5–2. 5%),.

This combination ensures heat resistance, durability, and repeated cable extraction capability.

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Manufacturing Process

The tubes are produced using a three-layer co-extrusion process, where HDPE and silicone are heated and extruded simultaneously through independent extruders. A precise metering system ensures uniform layer thickness and adhesion, preventing peeling or uneven lubrication. The silicone layer forms a permanent, low-friction inner surface that remains effective throughout the tube's lifespan.

Advantages for Cable Laying

Low Friction: The silicone inner layer has a friction coefficient as low as 0. 142, reducing labor intensity and allowing cables to be pulled or blown efficiently. Durability: The HDPE outer layers provide mechanical strength, weather resistance, and pressure resistance, protecting the cable from external damage.

Reusability: Cables can be repeatedly extracted and reinserted without damaging the tube or the cable. Ease of Installation: Tubes can rotate within the outer casing, simplifying cable insertion and reducing construction time and costs.

Installation Methods

Silicon core tubes are commonly used in pipeline (underground) installations. Optical cables can be laid using air-blown techniques, where compressed air suspends the cable inside the tube, allowing it to travel long distances efficiently. Tubes are often installed in urban pipelines, long-distance wild pipelines, or microduct systems along highways and railways.

Typical tube diameters range from 32mm to 40mm, with section lengths around 980 meters for long-distance pipelines.

Practical Considerations

Ensure proper alignment and minimal bends to maintain low friction. Use compatible cable blowing machines to optimize air flow and cable transport. Regular inspection of tube integrity is recommended to prevent blockages or damage during repeated cable insertions.

Silicon core tubes represent a modern, efficient solution for optical cable deployment, combining material science and engineering precision to improve installation speed, reduce labor, and extend the operational life of optical networks.

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Optical Fibre Manufacturing Process

The optical fibre is cooled in a helium cooling tube and coated with dual layers of ultraviolet radiation cured acrylate resin, which provide protection against mechanical damage and moisture ingress.

Fiber optic communication cable laying method: overhead, direct

Air blown cable laying is the process of blowing compressed air into a silicon core tube, causing the fiber optic cable to be suspended in the tube along with the high-speed airflow.

Handbook Optical fibres, cables and systems

Both core and cladding use silica as the basic material, the difference in the refractive indexes is realized by doping the core or the cladding or both. Dopants such as GeO2 and P2O5 increase the refractive

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Explore the optical cable manufacturing process. Learn about raw materials, fiber drawing, cabling, and quality control in modern optical cable

Fiber Optic Cable Manufacturing Process: How They Are Made

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Installation of Optical Fiber Cable by Blowing/Jetting

Standard optical fiber cables (like uni-tube, multi-tube, unarmored & armored), microduct cables, and micro-ducts can be installed by using this method. It is possible to install microduct cable using

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Outdoor optical cable laying methods and requirements

There are three common laying methods for outdoor optical cables, namely: pipeline laying, direct burial laying and overhead laying. The following is a detailed explanation of the laying

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This document discusses techniques for trenching and laying optical fiber ducts. It describes excavating trenches to a nominal depth of 165cm and laying permanently lubricated HDPE ducts in the trenches.

OFC Laying Practices and Guidelines | PDF | Rope | Optical Fiber

This document provides guidelines for laying optical fibre cables, including detailed surveying the cable route, soil categorization, recommended pipe types for cable protection,

The FOA Reference For Fiber Optics

Documentation of the cable plant is a necessary part of the design and installation process for a fiber optic network that is often overlooked. Documenting the installation properly during the planning

Fiber Optic Cable Production

Fiber Optic Cable Sheathing The sheathing process is where you apply the final touch to your loose tube fiber optic cable. Mechanical properties for different

A Step-by-Step Guide to Fiber Optic Cable Installation

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This beginner-friendly guide will walk you through the step-by-step process of fiber optic cable installation for each method, highlighting best

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