Specifications and parameters of fiber optic logging cable



Overview

This Specification covers the design requirements and performance standard for the supply of optical fibre cable in the industry.

Key Takeaways

Fiber optic logging cables are engineered for harsh downhole environments, featuring robust multi-layer construction, high-temperature fibers, and mechanical protection to ensure reliable sensing and data transmission.

Cable Construction

Fiber optic logging cables typically use a tube-in-tube design, where the optical fibers are housed in a fiber-in-metal tube (FIMT) made of stainless steel or INCONEL®, providing hermetic sealing and protection against chemical ingress and microbending.

The FIM

T may contain a mix of single-mode and multimode fibers to support distributed temperature, acoustic, and strain sensing (DTS, DAS, DSS). Filling gels inside the FIMT enhance fiber protection, while an extruded polymer belt centralizes the FIMT within the outer tube and provides mechanical buffering. The outer tube serves as the primary pressure barrier and mechanical shield, capable of withstanding high pressures, elevated temperatures, mechanical shock, and corrosive fluids.

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Fiber Types and Temperature Ratings

Standard fibers are rated for 347°F (175°C), while high-temperature fibers can withstand up to 572°F (300°C) and are resistant to hydrogen degradation, making them suitable for thermal recovery operations such as SAGD wells. Fiber selection is tailored to project requirements, focusing on attenuation performance, bandwidth, and hydrogen resistance.

Mechanical and Deployment Considerations

Logging cables are designed for wireline or slickline deployment and may include additional mechanical protection layers to survive the stresses of wellbore insertion and retrieval. Tensile strength of alloy wires in the cable ranges from 270 to 330 KPSI, with zinc coatings to prevent corrosion. Weight bars or sinker bars are often used to overcome frictional forces during deployment.

Cables can be casing-mounted, tubing-mounted, or surface-laid, depending on the application.

Sensing Capabilities

A single optical fiber can provide temperature measurements every 0. 5 meters, producing detailed profiles along the production string and across the mudline if applicable. The fiber can be interrogated continuously or intermittently, enabling rapid diagnostics without interrupting production.

Fiber optic cables also support telemetry for point sensors such as pressure sensors and fiber Bragg gratings (FBGs),.

Applications

These cables are used in oil and gas wells, pipelines, LNG facilities, and industrial environments where monitoring temperature, strain, or acoustic energy is critical. Permanent installations may be cemented behind casing or strapped to production tubing, while logging cables are deployed temporarily for data acquisition. In summary, fiber optic logging cables combine robust mechanical design, high-performance fibers, and flexible deployment options to provide reliable sensing in extreme downhole conditions, supporting both real-time monitoring and long-term well analysis.

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Article Content

Recommendation ITU-T G.652 (08/2024)

This document outlines the specifications for a single-mode optical fiber and cable designed for use around the 1310 nm zero-dispersion wavelength, suitable for

FIBRE OPTIC CABLES GENERAL SPECIFICATIONS

FIBRE OPTIC CABLES GENERAL SPECIFICATIONS ... * All attenuation values are valid for cabled fibres ** Zero Water Peak

Encapsulated Cable

The cable adopts a multi-layer structure that combines high-strength steel armor and optical fiber transmission technology to ensure excellent mechanical performance and stable data

Specifications For Fiber Optic Networks

The Fiber Optic Association - Reference Guide Specifications For Fiber Optic Networks Per current standards and specs, maximum supportable distances and attenuation for optical fiber applications

Optical Fibre Cable Technical Specification

This Specification covers the design requirements and performance standard for the supply of optical fibre cable in the industry. YOFC ensures a stable quality control system for our cable products

Return loss

Return loss In telecommunications, return loss is a measure in relative terms of the power of the signal reflected by a discontinuity in a transmission line or optical fiber. This discontinuity can be caused by

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gpt4_vocab_list/o200k_base_vocab_list.txt at main

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Vocabulary list of GPT-4o (o200k_base) and GPT-4/GPT-3.5 (cl100k_base) tokenizers. Special tokens are excluded. - kaisugi/gpt4_vocab_list

Optical fiber logging cable Special cable

Optical fiber logging cable enables the transmission of detailed data over long distances, making it an essential component in oilfield service operations. Overall, the use of optical fiber

Production logging via coiled tubing fiber optic infrastructures (FSI ...

Production logging via coiled tubing fiber optic infrastructures (FSI) and its application in shale gas wells December 2019 Arabian Journal of Geosciences 12 (24):782 DOI: 10.1007/s12517

Fiber-Optic Technology Allows Real-Time Production Logging Well

It will also illustrate a multiwell logging campaign in the Marcellus shale, which highlights the benefits of fiber-optic technology as a suitable alternative to traditional production logging

Single-mode optical fiber

In fiber optics, a quadruply clad fiber is a single-mode optical fiber that has four claddings. Each cladding has a refractive index lower than that of the core.

An Armored Fiber Optic Logging Cable

An ultralow stretch armored cable containing 3 optical fibeRs and 8 electrical conductors has been developed for use in oil well logging operations. A mating cablehead termination, optical transmitter

Fiber Optic Cables Selection Guide: Types, Features, Applications ...

Fiber optic cables are composed of one or more transparent fibers enclosed in protective coverings and strength members. Fiber optic cables allow signals, such as light, to travel through without

Fiber-Optic Technology Reduces Production Logging ...

The new technique uses coiled tubing equipped with optical fibers to acquire real-time measurements from the downhole logging string. The advantages of this conveyance option include

Production logging via coiled tubing fiber optic ...

According to the optical fiber production profile testing technology with continuous tubing as the carrier, the main production layer and the bottom hole liquid condition can be found clearly

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The High-Temperature Resistant Well Logging Optical Cable

The range of cables includes metallic and dielectric cables that cover the fiber up to several hundred fibers. Resistant to high temperatures. Prevents loss of hydrogen in the optical cable. Excellent

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

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