Searching for fiber optic cable inside the well



Overview

Permanent fiber-optic cable Permanent downhole fiber-optic cables are critical infrastructure in wellbore monitoring systems, ensuring reliable transmissio.

Key Takeaways

Fiber optic cables can be permanently installed inside wells for monitoring and sensing, using specialized designs and deployment methods to withstand harsh downhole conditions.

Permanent Downhole Fiber Optic Cables

Permanent fiber optic cables are critical for wellbore monitoring systems, enabling distributed temperature, acoustic, and strain sensing (DTS, DAS, DSS) along the wellbore. These cables are typically cemented behind the casing or strapped to production tubing, allowing continuous monitoring of well conditions. The cables are designed with a fiber-in-metal tube (FIMT) configuration, where optical fibers are hermetically sealed in stainless steel or INCONEL tubes, often filled with protective gels to prevent microbending and chemical ingress.

The outer layers provide mechanical shielding, pressure resistance, and abrasion protection.

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Deployment Methods

Fiber optic cables can be deployed using specialized devices that allow the cable to be installed along the wellbore efficiently. Some systems use a fiber optic spool within a canister that can self-propel through the wellbore, connecting one end to a bridge plug and the other to surface equipment. This method reduces the risk of damage and allows deployment in both vertical and deviated wells.

Advanced sensors, such as Halliburton's FIBERSIGHT map sensors, can determine cable orientation immediately after casing deployment, eliminating the need for additional wireline mapping runs and reducing costs and risks.

Design Considerations

Downhole fiber optic cables are engineered to survive extreme conditions, including high pressure, elevated temperatures, mechanical shock, and corrosive fluids. Key design variables include: Number and type of optical fibers (single-mode or multimode)Metal tube thickness and material for pressure and corrosion resistanceOuter encapsulation for handling and abrasion protectionControlled prestressing to keep fibers strain-free during deployment Some subsea or high-pressure applications use loose-tube designs or additional armoring, such as aramid yarn or metallic layers, to further protect the fibers from strain and environmental stress.

Applications

Once installed, these fiber optic cables provide real-time data for: Temperature and pressure monitoringAcoustic sensing to detect flow or mechanical eventsStrain measurements for well integrityTelemetry to point sensors for enhanced reservoir management This data helps engineers optimize production, detect anomalies, and improve overall well performance. In summary, deploying fiber optic cables inside a well involves robust cable design, careful deployment methods, and advanced sensing technologies to ensure reliable, long-term monitoring in challenging downhole environments.

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Article Content

Permanent fiber-optic cable

Permanent downhole fiber-optic cables are critical infrastructure in wellbore monitoring systems, ensuring reliable transmission of data for applications such as distributed temperature, acoustic, and

Downhole Fiber Optic Cable | Fibercore

Fibercore offers a range of designs for downhole fiber optic cable to meet the specific requirements of your oil or gas well. These types of cables are permanently installed either cemented in behind the

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Each of the at least one fiber optic spool can comprising one or more fiber optic lines. Each of the one or more fiber optic lines can be coupled to a bridge plug at a first end and...

Distributed fiber optic temperature and strain sensing in cementing

In this study, we installed two fiber optic cables with different designs into a new well, a soft-flat cable and a stainless-steel cable, for distributed fiber optic sensing in cementing and water

WIRELINE ORIENTED PERFORATION IN DEEP GAS WELL

The well has been planned to perforate with a 2 7/8” HSD gun system, followed by Hydraulic Fracture Stimulation in 4 stages ensuring the integrity of the Fiber Optic Cable

Cable Installation Considerations for Structure Monitoring

Tight buffered and loose tube cables are the most common configurations used for organizing and protecting optical fibers inside the cable core. This helps keeping fiber attenuation low and ensures

Milestone 7.2.1 Report: Fiber Optic Installation, Well 16B

This report documents the successful installation of the FOGMORE fiber-optic cable in well 16B(78)-32 which occurred during the summer of 2023, in fulfillment of Milestone 7.2.1.

Real-time fiber-optic interpretation and analysis

real-time fiber-optic interpretation and analysis solutions deliver production intelligence across the full length of your wellbore. With automated edge processing, you gain instant visibility into flow

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Theory and Practice of a Flexible Fiber-Optic Cable in a ...

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SUBSEA FIBER OPTIC SYSTEMS MEET THE CHALLENGES OF

hore deployment of subsea systems shall be performed in multiple stages. This is why subsea smart systems use fiber optic sensors, cables and c ed either in the well or on seabed and topside data

Distributed Fiber Optic Sensing | OptaSense

OptaSense is a global leader in distributed fiber optic sensing (DFOS), providing advanced monitoring solutions that transform standard fiber optic cables into

Air Blown Fibre vs Traditional Fibre: Which Cabling Method Should

Introduction: Air Blown vs Traditional Fibre at a Glance If you''re planning a new network or expanding existing infrastructure, you''re facing a fundamental decision: should you deploy air

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If you''ve ever wondered how fiber broadband reaches millions of homes from a single central location, the answer lies in passive optical network technology. A passive optical network

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Fibre optic networks form the backbone of modern telecommunications, but how that fibre gets from point A to point B matters just as much as the fibre itself. Traditional methods involve

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