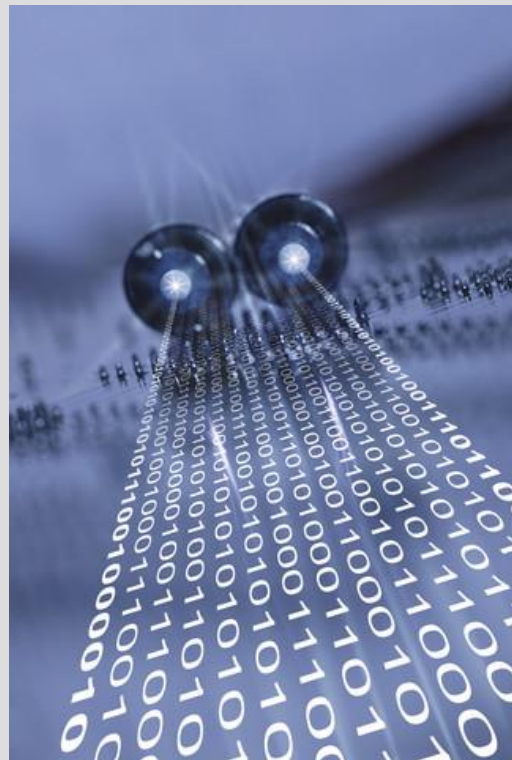




Product
Bulletin

High Temperature Thermal Monitoring Systems

Best In Class DTS
Solutions for SAGD
and Geothermal Wells



QOREX is pleased to offer distributed temperature sensor (DTS) systems built upon a platform of commercially available Raman DTS instruments, optical sensing cables, and components. DTS technology provides accurate temperature measurement every meter or so along a sensing fiber several kilometers in length. QOREX has the expertise and intimate knowledge of the supply chain to offer reliable, fit for purpose optical monitoring systems for the rigorous thermal and hydrogen conditions of downhole thermal recovery and geothermal wells.

QOREX brings one of industry's most experienced teams in downhole optical sensing, with an impressive track record in development and commercialization of fully integrated, systems-level fiber optic sensor products deployed in harsh environments- from high temperature, hydrogen-rich thermal recovery and deepwater oil and gas wells, to challenging nuclear radiation and hot geothermal well environments.



The growth of fiber optic sensors in oil and gas has spurred significant refinement and commercial availability of optical cables, instruments, and communication modules supporting these systems. Careful consideration of the deleterious effects of hydrogen however must be taken in system design- especially in more aggressive thermal environments where these effects are more severe. The failure of many legacy fiber optic systems in these environments has led to the development of hydrogen-tolerant sensing fibers and measurement compensation protocols that have proven effective in SAGD and other high temperature applications.

QOREX has been at the forefront of applying these high temperature solutions in the thermal recovery sector, and has access to optimized fibers and components to offer our customers the highest level of reliability and performance. Attention to installation details and compatibility of the system with well completion and operations assures prolonged, error-free monitoring and continuous delivery of high quality data.

QOREX Delivers DTS Systems Engineered for High Reliability, Performance, and Durability in the Intended Application

Custom DTS Solutions

- Harsh Environment Specialists
- Proven Experience and Track Record
- Intimate Knowledge of the Supply Chain
- Access to Key Components Optimized for Performance and Reliability
- Key Partners to Offer Fully Integrated Solution; Turn-Key to Data

System Specification

Measurement Distance	5km
Temperature Accuracy	0.8°C
Temperature Resolution	0.1°C
Nominal Update Rate	20-Minutes
Temperature Measurement Range	0-300°C
Minimum Spatial Resolution	1.0m
Instrument Operating Temperature	-10° to 60°C
Instrument Storage Temperature	-40° to 80°C
Maximum Steady State Power Draw	<40W
Measurement Mode	Single or Dual-Ended
Data Interface	RS-232, USB, Ethernet
Number of Channels	4
Optional Enclosure	NEMA 4

Configuration

QOREX works directly with client engineering staff to specify and design suitable sensing systems that meet particular customer requirements. Working with subcontractors, we manage the entire process from initial engineering design through installation, commissioning, and interface to customer IT and data management systems.

The system design for reliability features a passive quartz optical sensing fiber, with no moving parts, connected at surface to the active sensor interrogation and data acquisition module. The fiber is housed in a rugged armored sensing cable that withstands rigors of handling during installation and subsequent stress during well operations. The cable is terminated with a pressure seal at the wellhead, with a surface cable run to the instrumentation cabinet.

The system is easy to operate with no maintenance or field calibration after setup and configuration. An internal fiber reference assures high measurement repeatability over a wide operating temperature range over the life-time of the instrument. The processor features programmable single and dual-ended operating modes, fiber break detection and OTDR loss trace function reporting in dB. Programmable alarming functions with optional relay board. Internal data storage is easily expandable.

Features

- Reliable, Easy Operation
- Low Maintenance, No Calibration
- Ruggedized High Temperature Armored Optical Sensing Cable
- Operates On Pure Silica Core Fiber for Hydrogen Environments
- Optional NEMA 4 Enclosure
- Single or Dual Ended Operation
- Fiber Break Localization and Loss Trace Reported in dB
- Programmable Operating Modes and Alarming Functions
- Expandable Internal Data Storage

Sensing Cables

QOREX works closely with a leading downhole oil and gas cable manufacturer to offer steel tube and a wire-wrapped version sensing cables containing high temperature polymer coated optical sensing fiber. Design excess fiber length and other design features assures maintaining fiber in a low stress condition over thermal cycling and dynamic mechanical stress during well operations. Wire wrapped cable and extensions provide extra tensile and crush resistance for durability in the longer vertical deployment of uncased geothermal wells.

Cable	Application	Temp Rating	Features
LSZH Cable	Surface Cable	-50 to 85°C	Low Smoke/Zero Halogen Jacket
Steel Tube Cable	SAGD, CSS	300°C	Low-Profile ¼" Armor
Wire- Steel Tube Cable	Geothermal	300°C	Crush and Tensile Performance

Contact Information:

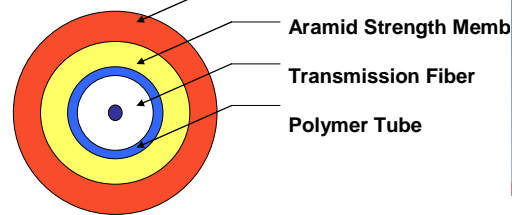
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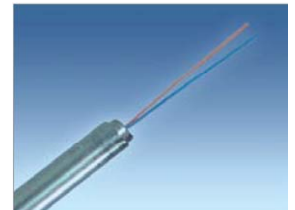
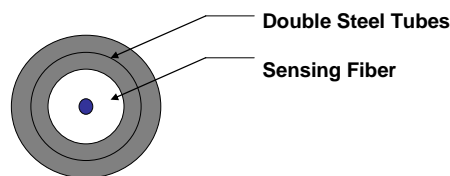
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