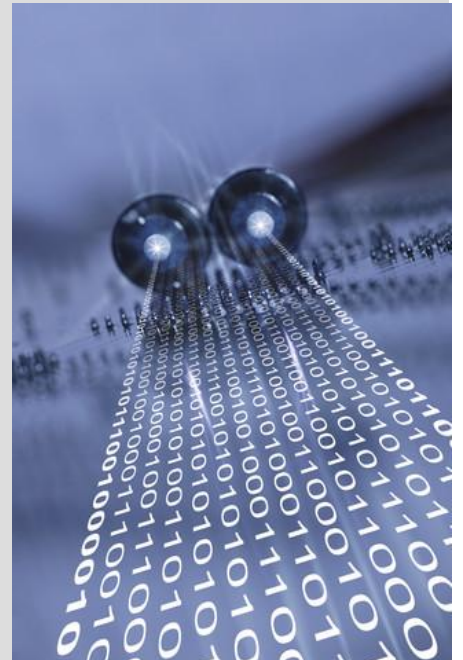




Product
Bulletin

HydroLight™ Downhole Sensing Cable System

High Temperature, Hydrogen
Tolerant Optical Sensing
Cable System for Downhole
DTS Systems



QOREX is pleased to introduce HydroLight™ Cable System that enables reliable, long term operation of Raman-type optical DTS systems in high temperature, hydrogen-rich environments that challenge these systems. HydroLight™ Cable System is designed, manufactured and tested by QOREX specifically for the rigorous conditions of downhole thermal recovery and geothermal wells. Completing the HydroLight™ solution is a unique DTS measurement algorithm capable of accurate compensation of not only hydrogen but other non-uniformly distributed error sources acting on the downhole sensor.

Packaged High Temperature DTS Cable System

Reliable operation of DTS systems in high temperature wells in excess of 200°C must overcome the challenges of maintaining optical transmission quality and mechanical reliability of optical sensing cables, calling for specialized materials, components, and sensing architectures. QOREX brings such solution in HydroLight™ Cable System- a passive optical sensing cabling system manufactured using proprietary processes and assembled parts designed for safe, reliable, and accurate operation of these sensors under extreme conditions. HydroLight™ Cable System is an armored downhole cable assembly consisting of two high temperature sensing fibers connected with a unique compact guided-wave fibre turnaround device, fully packaged, sealed, calibrated and ready for well installation.

Leading High Temperature, Hydrogen Tolerant Sensing Fibre

The QOREX team are recognized experts in hydrogen effects in optical fibres, and frequently called upon to provide testing and analysis of these fibres by operators and service companies alike. QOREX has worked with a leading specialty fibre supplier to source DTS sensing fibres with superior optical and mechanical properties, and resistance to hydrogen reaction and subsequent permanent hydrogen-induced attenuation. QOREX then applies proprietary post processing at its factory to impart greater reliability and performance of the downhole sensor.

Engineered Armored Cable

QOREX armored cable incorporates years of high temperature fibre optic engineering and application experience to offer a cable designed to maintain the DTS sensing fibres in a low strain condition over full operating conditions from surface installation to placement in the hottest wells. This cable design includes engineering features that go beyond competitive offerings in tolerances, process control, and a design interaction between internal cable components.

Compact Guided-Wave Fibre Turnaround Assembly

Dual or partial return DTS system configurations are required to compensate for measurement error due to transient hydrogen-induced differential fibre attenuation. HydroLight™ Cable System incorporates this architecture through a proprietary compact guided wave device (patent-pending) rated for continuous 300°C operation. The compact device packaging allows for low profile cable integration.

Proprietary DTS Measurement Algorithm

While many DTS instrument suppliers provide standard dual and partial-ended measurement protocols and slope-adjusting algorithms, QOREX implements a proprietary algorithm that is more effective in correcting non-uniform differential fibre attenuation from multiple sources in addition to hydrogen.

HydroLight™ DTS Cable Solution

- Engineered Design for High Mechanical & Optical Reliability
- Complete Low Profile Cable Assembly
- Proprietary DTS Measurement Compensation Algorithm
- Reliable, Error-Free Performance Under Extreme Conditions

HydroLight™

- DFA Compensation Algorithm
- Hydrogen Tolerant Fibre
- Low-Strain Cable Design and Processing
- Low Profile Guided Wave Turnaround

HydroLight™ Cable System Specification

Operating Temperature	0-300°C
Cable Outer Diameter	0.25"
Maximum Operating Tension	500 pounds
Minimum Bend Radius (Unsupported)	15 inch/38cm
Cold Storage Temperature	-40°C
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

DTS Sensing Solution

QOREX works directly with leading DTS instrument suppliers to offer HydroLight™ Cable System as a matched solution to these instruments. For customers this alleviates the ambiguity of selecting among the myriad of DTS fibres, cable, and instruments to offer a matched solution that integrates the downhole sensor and surface interrogation systems.

Final HydroLight™ assembly is sealed, pressure tested and then calibrated to traceable thermal references through the entire operating range. Calibration files are then downloaded directly into the instrument or transported and loaded into field units.

These instruments then operate using QOREX proprietary differential fibre attenuation (DFA) compensation algorithms that accommodates multiple DFA sources in addition to hydrogen, non-uniformly distributed along the sensing cable. This algorithm also helps maintain factory-to-field calibration and measurement accuracy of installed systems.

Reliability First and Foremost

HydroLight™ Cable System and major components have undergone comprehensive mechanical and optical reliability testing and hydrogen aging analysis. HydroLight™ comes with a standard warranty for material and manufacturing defects, and two-year warranty against hydrogen failure.

QOREX is the first to offer such hydrogen warranty for fibre optic systems to the upstream Oil & Gas industry.

HydroLight™ Solution

- Matched, seamless integration of the downhole sensor and surface interrogation systems
- Inherent reliability and performance of matched components
- Hydrogen Warranty
- Proprietary sensor calibration technology for improved factory to field performance
- Fiber and system diagnostic capability comes standard
- Data display and interface options
- Flexible operating modes and upgrades
- Reliable, simple operation with no field maintenance

Product Delivery

The company was formed in 2007 by partners with over 50-years combined fiber optic experience, with focused activity over the past 10-years in upstream Oil & Gas system design and installation, including the successful introduction of downhole products in the challenging thermal recovery sector. QOREX engineering and factory operations are housed in a modern, purpose-built facility with dedicated system integration and calibration laboratories.

QOREX is an independent systems engineering and integration firm, providing turn-key downhole monitoring systems. Working with subcontractors, we manage the entire process from initial engineering design through installation, commissioning, and interface to customer IT and data management systems. QOREX also offers HydroLight™ Cable System and matched interrogation units through regional channel partners, and a network of value-added resellers including OEM tool suppliers, independent installers, and oilfield services companies. This allows the customer to specify the HydroLight™ solution and have complete flexibility in how it is delivered and installed.

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