

Pipeline Leak and Impact (Third Party Interference) Detection

Ensuring pipeline integrity, immediate leak detection, accurate leak location and risk mitigation with fiber optic sensing.

The FiberStrike solution for pipelines provides the capability to monitor the entire downstream process 24/7. Utilizing **Distributed Temperature Sensing (DTS)** and **Distributed Acoustic Sensing (DAS)** / **Distributed Vibration Sensing (DVS)** technologies, our pipeline monitoring solution is an integrated fusion of the newest sensing hardware and detection algorithms, plus intuitive interface software.

Utilizing a fiber optic cable as a sensor, our pipeline monitoring technologies provide continuous temperature and acoustic monitoring capabilities over hundreds of kilometers – all while minimizing false alarms and maximizing probability of detection (POD). The system detects and accurately locates changes in temperature, noise, vibration, and strain around a pipeline. These changes are caused by leaks or Third Party Interference (TPI) events such as pipeline theft or digging. Our solution detects even pinhole leaks and delivers alarms quickly while locating the event within a few meters.

The system can also capture events inside a pipeline such as Negative Pressure Waves (NPW), scrapers, pigs, liquid accumulations, slugs and flow constrictions caused by waxing or hydrate formation. By enabling the process control of active heating, pipeline flow assurance is maintained in



heated pipelines, which also optimizes energy usage. Continuous monitoring and real-time detection of issues inside a pipeline prevent severe damage to nature, assets, and personnel.

Distributed Temperature and Acoustic Sensing

Our hardware and software were built and designed to satisfy the most demanding customers and project applications. Our DAS and DTS technologies can be used separately or combined; each delivers unique benefits for pipeline leak detection and continuous monitoring. DTS detects pipeline leaks by recognizing and precisely localizing any hot or cold spot. It identifies thermal anomalies, such as the cooling effect of an escaping gas, or assists in the management of active heating processes, such as in a sulfur pipeline.



The FiberStrike DAS is an enhanced, **quantitative DAS (true phase-based) system** that enables quantitative measurement of the noise / vibration and strain amplitude over extended distances. This unique DAS technology provides significant improvements to the signal-to-noise ratio (SNR), as well as a longer sensing range. Additionally, DAS detects leaks using temperature changes (Distributed Temperature Gradient Sensing - DTGS) and negative pressure waves signatures. With this information, DAS also provides TPI monitoring to protect pipelines against theft and damage from digging or construction.

Our unique methods and algorithms are used in our alarm management technology called SmartAlarm. SmartAlarm detects small leaks even in cases where ambient conditions are changing and the leak itself does not generate a large temperature difference. Different algorithms are available and applied depending on the details of the site conditions. SmartAlarm can even raise alarms in case of local

events, which are often not detected by standard alarm parameters or instead would lead to false alarms from hypersensitive parameters.

The combination of both DTS and DAS provides optimal protection for pipelines both onshore and offshore, ensuring pipeline integrity in a variety of operational conditions: fluids, gases, lines operating in slack flow, and different multiphase flow regimes. Our DAS and DTS technologies are both recognized as an internal and external pipeline leak detection method according to API 1175 - Pipeline Leak Detection Program Management. External Pipeline Leak Detection Methods are an important part of the API 1175 Pipeline Leak Detection recommended best practices. Shell DEP (Design Engineering Practice) 31.40.00 – Pipeline Engineering also recommends that a combination of **internal and external leak detection methods** is considered to improve the leak size detection threshold, reducing the time to detect a leak and / or defining the leak location accurately.

SmartVision™

Our SmartVision suite shows the condition of your pipeline at a glance, controlled by an easy-to-use graphical user interface (GUI). It seamlessly integrates many technologies, such as DAS, DTS, CCTV and other sensors into a single platform. Pipeline layouts are mapped and color-coded to show the measured pipeline temperatures, as well as instantaneous changes in acoustic energy. Alarms are shown on the screen in an emergency situation, and the operator is directly informed about the location of the critical incident. Temperature graphics and hotspot tables are readily available, and sections of the cable route can be individually defined for flexible alarm levels and types. Our leak detection software complies with the recommendations of API 1130 CPM (Computational Pipeline Monitoring for Liquid Pipelines) for both CPM Acoustic and CPM Negative Pressure Wave (NPW) methods. FiberStrike CPM NPW software uses the input from DAS to analyze the wave propagation direction, calculate the wave speed and point of origin, determining if the NPW patterns are consistent with a pipeline leak.

As we develop our products from the research and manufacturing stages to the project commissioning and maintenance, we offer a completely integrated, end-to-end solution. Our team works together with you to select the right combination of technologies to fit your requirements. We also provide onsite services, hotline support, maintenance, and product training.

