

## Solutions for safe and efficient pipeline management

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With increasing operational, security, environmental and legislative requirements for pipeline operators Krohne offers new solutions for pipeline management: Pipe Patrol is a comprehensive suite of software modules for long or short distance single and multiproduct pipelines for oil, gas, water, chemical or refined products, and offers monitoring and protection of pipelines in all operating conditions.

Pipe Patrol can be supplied in various configurations: eight modules cover leak detection, theft detection, stress monitoring, line break detection, tightness monitoring, batch tracking, pump monitoring and predictive modeling. To match the application, the modules can be used stand-alone or individually combined, and optionally complemented by a wide range of instrumentation, cyber security and field data acquisition systems. Based on over 30 years of experience in pipeline applications, the company also offers engineering, operation and maintenance services for pipeline management such as support during certification or post theft analysis. This modularity offers the pipeline operator to achieve best results and meet safety and legal requirements in line with the application and the available budget.

The leak detection module provides the unique Pipe Patrol E-RTTM based leak detection and localisation for liquids and gases which is applied on over 350 pipelines worldwide. It is complemented by the theft detection module that specialises on fast and reliable identification and localisation of unauthorised or illegal product discharges, and the tightness monitoring module to detect small or gradual leaks. To efficiently detect pipeline ruptures instantly the line break detection module can be applied. It uses a pipeline rupture pattern recognition for automatic emergency shutdown in case of a line break. The batch tracking module for batch and interface tracking in multi-product pipelines, and the stress monitoring module for evaluation and documentation of lifetime stress and remaining pipeline service life complement the operational modules. The predictive modeling module forecasts pipeline operation and identifies possible threats such as shortage in supply or pressure violations. Its offline simulation then can be used to find corrective measures as well as for planning of optimized operation in the future. In addition, the pump monitoring module enables predictive maintenance and higher system availability by monitoring essential mechanical, electrical, and hydrodynamic measurement values.