UT-R, UT-MC, and UT-Octopus

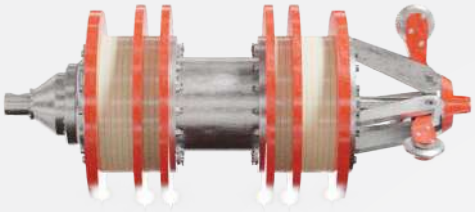
High-Resolution Metal Loss and Geometric Assessment In-line Inspection

Dexon Technology PLC is a technology company providing in-line inspection and asset integrity management services globally. Currently employing 500 staff worldwide and operating throughout Europe, Asia, The Middle East, and The Americas. Located on Thailand's Eastern seaboard, Dexon's headquarters houses extensive in-line inspection testing and research and development facilities. Inspection tools are developed in-house from initial inspection technique research through to testing and implementation. Tool customization is also offered to address individual client inspection requirements and the inspection of "unpiggable" or challenging pipelines. Innovation is at the core of Dexon's philosophy, continuously pushing the limits of what is possible and driving the industry forward.

Dexon's ultrasonic (UT) metal loss in-line inspection (ILI) fleets provide versatile high-resolution metal loss and geometric assessment capabilities. Dexon's onsite ILI testing facility includes pump-through test lines in a variety of lengths and diameters for the verification and testing of inspection capabilities. Clients are welcome to visit Dexon's RD&E department and test facilities in Thailand for technology demonstrations and inspection verification.

UT Metal Loss In-Line Inspection

Dexon's ultrasonic metal loss ILI fleets utilize ultrasonic technology to offer comprehensive anomaly detection and sizing capabilities. Advanced ultrasonic sensors provide direct wall thickness data for the precise measurement of metal loss anomalies to ± 0.3 mm of remaining wall thickness with axial and circumferential resolutions of up to 1 mm. Inspection parameters such as tool speed, distance, and sampling resolution are dependent on individual tools and client inspection requirements.



UT-R (Ultrasonic Rotary)

Dexon's Ultrasonic Rotary (UT-R) in-line inspection fleet uses a single transducer and a rotating reflector to direct the ultrasonic inspection beam around the circumference of the pipe in a helictical pattern. Allowing for higher sampling resolution by controlling inspection speeds. Recommended for pipelines of up to 10 km with a maximum tool speed of 5 m/min. Capturing ultra-high wall thickness and ovality inspection measurements.

UT-MC (Ultrasonic Multi-Channel) Ring

Dexon's Ultrasonic Multi-Channel Ring (UT-MC Ring) in-line inspection fleet offers high-resolution, high-speed, long-length inspection capabilities. Covering a wide range of materials, including both metallic and non-metallic pipelines. Rows of sensors around the circumference of the tool body record up to 20,000 measurements per second with sampling densities of up to 1,000,000 samples per square meter. The UT-MC offers detection and sizing of internal and external metal loss, ovality deformation, lamination, and corrosion. Tools are available from 3" up to 64" with larger custom-built tool options available.

UT-MC (Ultrasonic Multi-Channel) Octopus

Dexon's Ultrasonic Multi-Channel Octopus (UT-MC Octopus) fleet offers the same detection and sizing capabilities as the UT-MC Ring, with the addition of inspection in heavy crude oil and other specialty products with increased attenuation. Inspection capabilities are achieved via the use of arms that raise the transducers close to the pipe wall decreasing the time of flight of the signal and reducing signal noise. Providing clear inspection data in heavier products.

Key Inspection Capabilities

Reliability: Specially designed, fabricated, and rigorously tested to fulfill a variety of inspection requirements across a range of applications including pipe materials, products, and detection capabilities.

Metal Loss: Providing up to 1,000,000 direct wall thickness measurements per m^2, generating accurate detection and sizing of internal and external metal loss anomalies.

Geometric Assessment: Internal radius (IR) measurements provide a detailed assessment of pipeline ovality. Affecting not only asset integrity but also operational efficiency due to changes in flow dynamics.

Pipeline Feature Identification: Increased accuracy of anomaly positioning is achieved by weld and feature identification as well as providing operators with accurate, up-to-date as-built construction records.

Minimal disruption to operating schedules: Inspection parameters can be customized to suit operating conditions reducing the effect on operations.

Flexibility: Customizable tool set-up is available for the inspection of challenging pipeline configurations and operating conditions.

Defect Detection Verification and Inspection Parameters

Ultrasonic inspection data provides direct measurement of defects including defect size, location, remaining wall thickness, and metal loss percentage. Data is used to accurately determine pipeline condition and provide calculated estimated repair factor (ERF) figures of each individual defect, ensuring asset integrity.

Dexon's metal loss ILI fleet is able to accurately detect, locate, and quantify a full range of metal loss anomalies, geometric defects, and pipeline feature identification including:

Metal loss anomalies:
- Pitting
- General corrosion (internal and external)
- Corrosion clusters
- Pinholes

Geometric deformation assessment:
- Dents
- Dents with metal loss
- Ovality
- Bulging
- Pipe expansion
- Buckling
- Wrinkling

Pipeline feature detection and identification:
- Off takes
- Flanges
- Valves
- Tees
- Girth, spiral, and circumferential weld identification
- Pipeline supports

Reporting and Deliverables

Dexon's in-line inspection Data Analysis and Reporting (DAR) department provides three-tiered reporting compliant to Pipeline Operators Forum (POF) 100 2021 recommendations. Inspection data reporting is fully customizable including multiple export formats allowing for immediate integration into existing pipeline integrity management systems (PIMS). While 3D graphic representation of inspection data is available for incorporation into graphical information systems (GIS). Inspection report criteria can also be tailored to individual client inspection requirements with standard reporting including the following:

Operations Report

The operations report summarizes important operation information including:
- Comprehensive overview of inspection operations
- Data quality assessment to ensure successful evaluation of the pipeline

Preliminary Report

Preliminary reporting summarizes the most important anomalies or those requiring immediate attention.

The preliminary report includes:
- Metal loss anomalies ≥ 50% of wall thickness
- Dents, cracks, and pressure sentenced features outside immediate response tolerance

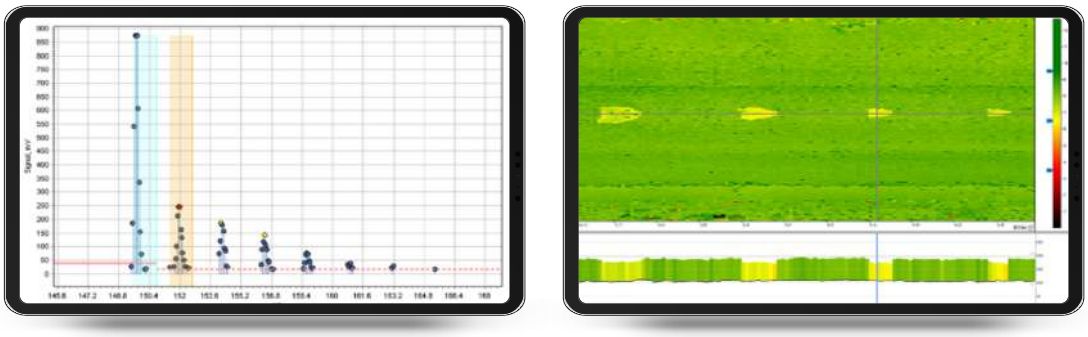
Final Report

The final report details all the findings in the pipeline during the analysis process including:
- Detailed analysis of all detected anomalies above an agreed reporting tolerance
- Pipeline Tally, List of Anomalies, List of Clusters and List of Components
- Any predetermined custom list in multiple output formats

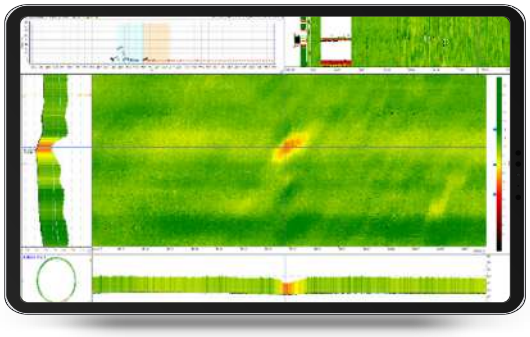
Ultrasonic Metal Loss In-line Inspection Data

Dexon's ultrasonic metal loss inspection reporting contains all wall loss information with accurate remaining thickness measurements.

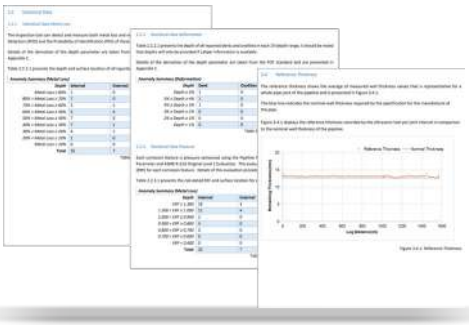
The direct measurement assessment method enables exact measurement inputs to be provided for FFS assessments including ASME B31.G, API 579.



Ultrasonic test yard inspection data showing 4 man-made defects used for inspection verification runs.



Ultrasonic metal loss inspection data showing a metal loss defect in A-Scan, B-Scan, and C-Scan inspection data.



Example ultrasonic metal loss reporting.

Bespoke Solutions

At Dexon, we pride ourselves on helping clients and understanding their needs. Drawing on the world-leading expertise of our state-of-the-art research development and engineering facility, Dexon provides clients with rapid, dynamic inspection solutions to fulfill any inspection requirement. Accordingly, Dexon has formed collaborations with various major oil and gas companies producing various innovative and unique technology solutions. Contact an inspection engineer today about securing the integrity of your assets.

Talk to an inspection engineer today.

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