RoCombo MFL-A/MFL-C Service

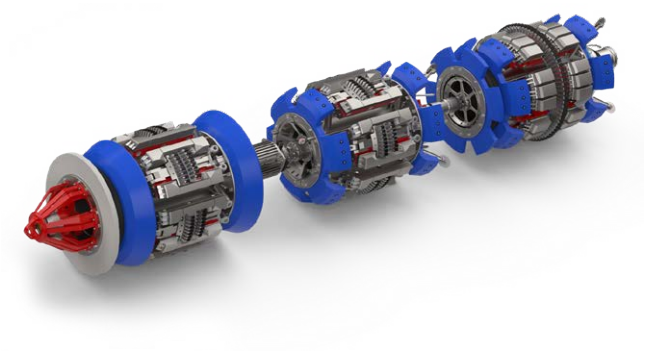
In-line Combined High-Resolution Metal Loss and Narrow Axial Anomaly Assessment

Detect pipeline corrosion before it impacts performance

Multiple sensor technologies to identify all metal loss threats

Assess the integrity of your onshore and offshore pipeline assets

Undetected and untreated corrosion within your pipeline assets will lead to performance loss and containment failure. Making in-line inspection (ILI) services a part of your integrated pipeline threat management strategy will help you manage this risk. Our RoCorr Service Suite is designed to detect, evaluate and locate metal loss due to corrosion and associated threats. This allows you to take remedial action before your pipeline integrity suffers. Drawing on the largest ILI tool fleet in the world, our RoCorr features multiple and flexible options to suit your inspection needs while minimizing impact on pipeline operations. This includes a wide range of sensors that incorporate leading technologies to address your pipeline threats. The data gathering is supported by our unique data analysis and reporting tools, delivered by a dedicated team of experts. RoCorr reduces your corrosion and metal loss threat risk.



Solution

Our magnetic flux leakage technology is the optimal choice for reliably identifying and characterizing external and internal metal loss. Magnetic flux leakage technology is especially suited for the detection of corrosion, erosion, gouging, lamination, pitting and other metal loss features. By combining our MFL-A and MFL-C technologies, we achieve improved performance specifications and can also assess axially oriented defects that are otherwise challenging for MFL-A, such as channeling, top-of-line corrosion (TOLC), gouging, narrow axial corrosion, and selective/preferential seam weld corrosion (SSWC).

- Suited for characterization of challenging metal loss features in liquid, multiphase and gas pipelines
- Wide range of proven tool configurations available
- Option to deploy Ultra resolution to further improve reliability of SSWC assessments
- High-quality certified processes, qualified personnel and equipment across the globe

Benefits

- Full recording of raw data for lifetime integrity management
- No need for coupling medium, so optimally suited for accurate inspection of gas and multiphase pipelines
- Ideally suited for identification and characterization of external and internal metal loss
- Reliable assessment of SSWC
- Precise evaluation of axially oriented corrosion anomalies, such as channeling, top-of-line corrosion (TOLC), gouging
- Precise characterization of long seams
- Proven tools deliver consistent data quality with a first run success rate of 95%
- Minimizing the impact of inspections on daily operations through:
  - Speed control units to maintain full production flow during inspection
  - Combined diagnostics solutions to reduce the number of inspection runs required by combining technologies in one ILI tool

ROSEN
empowered by technology

Service Options

All aspects from the inspection request to the final report are covered with the flexibility to choose from various service options.

- Cleaning – operational and pre-inspection
- Speed Control – inspection at high flow rates
- XYZ – route mapping and strain assessment
- Multi-Diameter – pipelines with varying diameter
- Offshore – long distance and high pressure
- Post-ILI – data alignment and combined evaluation
- Integrity Assessments – FFP, CGA
- NIMA – versatile asset integrity software suite
- Data Fusion – Get the most out of your data

Remarks and Features

- API 1163 compliant services
- CE and ATEX certification available
- Tailored solutions with different specifications upon request:
- multiple tool sizes or multi-diameter tools, higher pressure rating
- Contact ROSEN for more detailed information about the presented service
- Specifications are subject to change, depending on specific requirements or tool configurations

Technical Specifications

Standard Operating Specifications

Tool sizes available	20" - 42"
Pipeline product	Gas or liquids
Product temperature range	0 °C - 65 °C (14 °F - 149 °F)
Maximum operating pressure	15 MPa (2,175 psi) 25 MPa (3,625 psi) optional
Operating speed range	Up to 3 m/s (6.7 mph)
Product flow range*	Up to 9 m/s (20.1 mph)
Minimum pipeline bend radius	1.5D
Wall thickness range	4 - 25 mm (0.15" - 1.0")
Maximum operating time	400 hours
Maximum inspection length	800 km (500 miles)

* Fitted with optional speed control system
Note: Please contact ROSEN for conditions outside of these specifications.

Location and Orientation Capabilities

Axial position accuracy from reference marker 1 m on 1000 m (1 ft on 1000 ft) marker distance	1:1000
Axial position from closest weld	±0.1 m (±4")
Circumferential position accuracy	±5°

The axial positioning accuracy specified is given at 90 % certainty and is based on following conditions:

1. Distance between upstream (u/s) and downstream (d/s) marker/reference point < 2,000 m (6,500 ft.).
2. Actual aboveground distance to both u/s and d/s marker/reference points have been measured and correlated.
3. Marker points are placed correctly according to respective ROSEN marker specification.

Performance Specifications

	General metal loss	Pitting	Axial Grooving	Circumf. Grooving	Axial Slotting[1]	Circumf. Slotting[2]
Depth at POD = 90 %	0.1t	0.1t	0.1t	0.1t	0.15t	0.15t
Depth sizing accuracy at 80 % certainty	±0.1t	±0.1t	±0.1 t	±0.1t	±0.1t	±0.1t
Width sizing accuracy at 80 % certainty	±12 mm (0.47")	±9 mm (0.35")	±12 mm (0.47")	±12 mm (0.47")	±8 mm (0.31")	±15 mm (0.59")
Length sizing accuracy at 80 % certainty	±12 mm (0.47")	±9 mm (0.35")	±10 mm (0.39")	±10 mm (0.39")	±10 mm (0.39")	±10 mm (0.39")

Abbreviations: POD = Probability of Detection; t = wall thickness
[1)] Valid for axial slotting anomaly width ≥ 1 mm (0.039")
[2)] Valid for circumf. slotting anomaly width and length ≥ 0.5A

Metal Loss Feature Classification

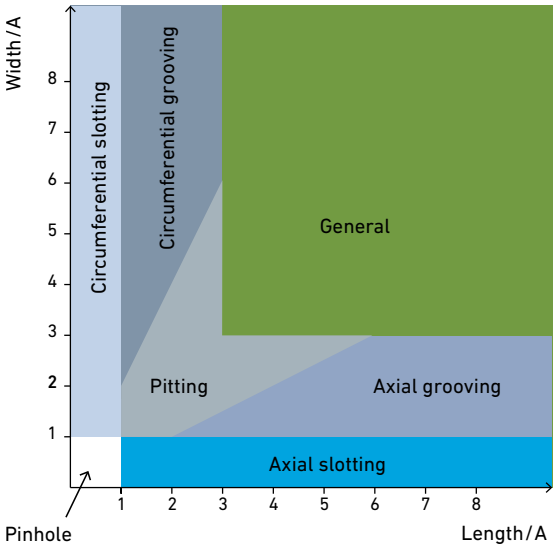
All reported metal loss features are classified according to the dimensions shown in the following Pipeline Operators' Forum (POF) specification graph.

A = wall thickness or 10 mm (0.39"), whichever value is greater

Wall Thickness Detection

±1 mm (± 0.04") or ±0.1t, whichever value is greater at 80 % certainty

t = wall thickness



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