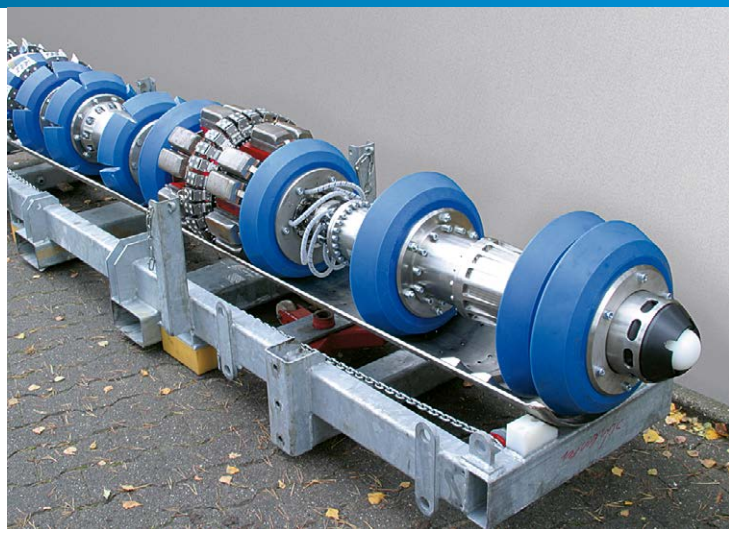
RoCombo MFL-A / UTWM Service

In-line Complementary Combined Metal Loss Detection and Sizing

Increased probability of detection (POD)

Increased probability of identification (POI)

Superior defect sizing accuracy



Metal loss and hidden steel flaws threaten the assets of operators during the entire lifecycle of a steel pipe. A precise integrity analysis with state-of-the-art NDT combinations increases the lifespan of assets, value of investment and safety of operation. ROSEN's RoCombo MFL-A/UTWM helps ensure that your high-value assets maintain structural integrity during their entire lifespan.

Solution

ROSEN understands and responds to customer needs concerning the protection of their investment in infrastructure as well as the requirements imposed by government organizations. The MFL/UTWM capabilities comprise off-the-shelf, ready-to-use as well as custom-made solutions for challenging applications. A worldwide service network will bring the advantages of RoCombo MFL-A/UTWM to most locations. The ROSEN experience assures highest quality, whenever and wherever needed.

RoCombo MFL-A/UTWM inspection tools are designed to apply high-level magnetization in combination with high-power ultrasonic waves in sizes ranging from 6" to 56".
The combination of two NDT applications unites the best both applications offer. The tool offers single strength and exploits synergies for our customers' benefit. Continuously improved technology and applications including NDT sensors and data evaluation software places ROSEN at the leading edge.

Benefits

- High-resolution tri-axial magnetic field analysis ensuring accurate and precise feature classification and sizing
- RSTRENG-compliant river bottom profile assessment by means of high-resolution quantitative wall thickness measurement
- Lifetime integrity management supported by full recording of the inspection raw data
- Characterization of contamination, e.g. debris, wax or paraffin, by means of sophisticated analysis of the A-scan data
- High-quality service with certified processes (API 1163), personnel qualification (ASNT), and equipment (CE, ATEX)

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
- XYZ – route mapping and strain assessment
- Multi-Diameter – pipelines with large diameter variations
- Offshore – long distance and high pressure
- Post-ILI – data alignment and combined evaluation
- Integrity Assessments – RBI, FFP, CGA
- NIMA – versatile asset integrity software suite

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
- Specifications are subject to change, depending on specific requirements or tool configurations

Technical Specifications

Standard Operating Specifications

Tool sizes available	6" - 56"
Pipeline product	Liquids
Product temperature range	Up to 65 °C (149 °F)
Maximum operating pressure	Up to 2.5 m/s (5.6 mph)
Operating speed range	Up to 3.0 m/s (6.7 mph)
Minimum pipeline bend radius	1.5D
Maximum operating time	Up to 400 hours
Maximum inspection length	800 km (497 miles)

Note: Please contact ROSEN for conditions outside of these specifications.

Performance Specifications

Detection and Sizing Accuracy for Metal Loss in Body of Pipe with a Wall Thickness of 5 mm to 22 mm (0.2" to 0.87")

	General metal loss	Pitting	Pinhole[7]	Axial Grooving	Circumf. Grooving	Circumf. Slotting[8]
Depth at POD = 90%	0.1t[1]	0.1t[1]	1 mm (0.04")	0.1t[1]	0.1t[1]	0.15t[1]
Depth sizing accuracy at 90% certainty	±0.4 mm (±0.02")[2]	±0.4 mm (±0.02")[2]	±0.4 mm (±0.02")[2]	±0.4 mm (±0.02")[3]	±0.4 mm (±0.02")[2]	±0.4 mm (±0.02")[2]
Width sizing accuracy at 90% certainty	±8 mm (±0.31")	±8 mm (±0.31")[4]	±8 mm (±0.31")	±8 mm (±0.31")[4]	±8 mm (±0.31")[4]	±8 mm (±0.31")[5]
Length sizing accuracy at 90% certainty	±7 mm (±0.28")	±7 mm (±0.28")[6]	±7 mm (±0.28")	±7 mm (±0.28")[6]	±7 mm (±0.28")[6]	±7 mm (±0.28")[6]

[1] Or 1.0mm (0.04") for anomalies ≥ 20mm (0.79") in diameter, whichever value is smaller
[2] Or ±0.13t for anomalies < 20mm (0.79") in diameter and/or < 1.0mm (0.04") in depth, whichever value is smaller
[3] Or ±0.20t for anomalies < 20mm (0.79") in diameter and/or < 1.0mm (0.04") in depth, whichever value is smaller
[4] Or ±15.0mm (0.59") for anomalies < 20mm (0.79") in diameter and/or < 1.0mm (0.04") in depth
[5] Or ±19.0mm (0.75") for anomalies < 20mm (0.79") in diameter and/or < 1.0mm (0.04") in depth
[6] Or ±13.0mm (0.51") for anomalies < 20mm (0.79") in diameter and/or < 1.0mm (0.04") in depth
[7] For anomalies ≥ 20mm (0.79") in diameter
[8] Min(L,W)≥½A

Note: For more information, please refer to the detailed service performance specifications.

Other Features		
Detection of mid-wall features (e.g. laminations and inclusions)	Minimum diameter	10 mm (0.39")

Detection and Sizing Accuracy for Metal Loss in Body of Pipe with a Wall Thickness of 22 mm to 45 mm (0.87" to 1.77")

	General metal loss	Pitting	Pinhole[7]	Axial Grooving	Circumf. Grooving	Circumf. Slotting[8]
Depth at POD = 90%	0.1t[1]	0.1t[1]	1.5 mm (0.06")	0.1t[1]	0.1t[1]	0.15t[1]
Depth sizing accuracy at 90% certainty	±0.6 mm[2] (±0.02")	±0.6 mm2 (±0.02")	±0.6 mm2 (±0.02")	±0.6 mm2 (±0.02")	±0.6 mm2 (±0.02")	±0.6 mm2 (±0.02")
Width sizing accuracy at 90% certainty	±8 mm (±0.31")	±8 mm[4] (±0.31")	±8 mm (±0.31")	±8 mm[4] (±0.31")	±8 mm[4] (±0.31")	±8 mm[5] (±0.31")
Length sizing accuracy at 90% certainty	±7 mm (±0.28")	±7 mm[6] (±0.28")	±7 mm (±0.28")	±7 mm[6] (±0.28")	±7 mm[6] (±0.28")	±7 mm[6] (±0.28")

[1] Or 1.5mm (0.06") for anomalies ≥ 20mm (0.79") in diameter, whichever value is smaller
[2] Or ±0.13t for anomalies < 20mm (0.79") in diameter and/or < 1.5mm (0.06") in depth, whichever value is smaller
[3] Or ±0.20t for anomalies < 20mm (0.79") in diameter and/or < 1.5mm (0.06") in depth, whichever value is smaller
[4] Or ±15.0mm (0.59") for anomalies < 20mm (0.79") in diameter and/or < 1.5mm (0.06") in depth
[5] Or ±19.0mm (0.75") for anomalies < 20mm (0.79") in diameter and/or < 1.5mm (0.06") in depth
[6] Or ±13.0mm (0.51") for anomalies < 20mm (0.79") in diameter and/or < 1.5mm (0.06") in depth
[7] For anomalies ≥ 20mm (0.79") in diameter
[8] Min(L,W)≥½A

Other Features		
Detection of mid-wall features (e.g. laminations and inclusions)	Minimum diameter	10 mm (0.39")

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