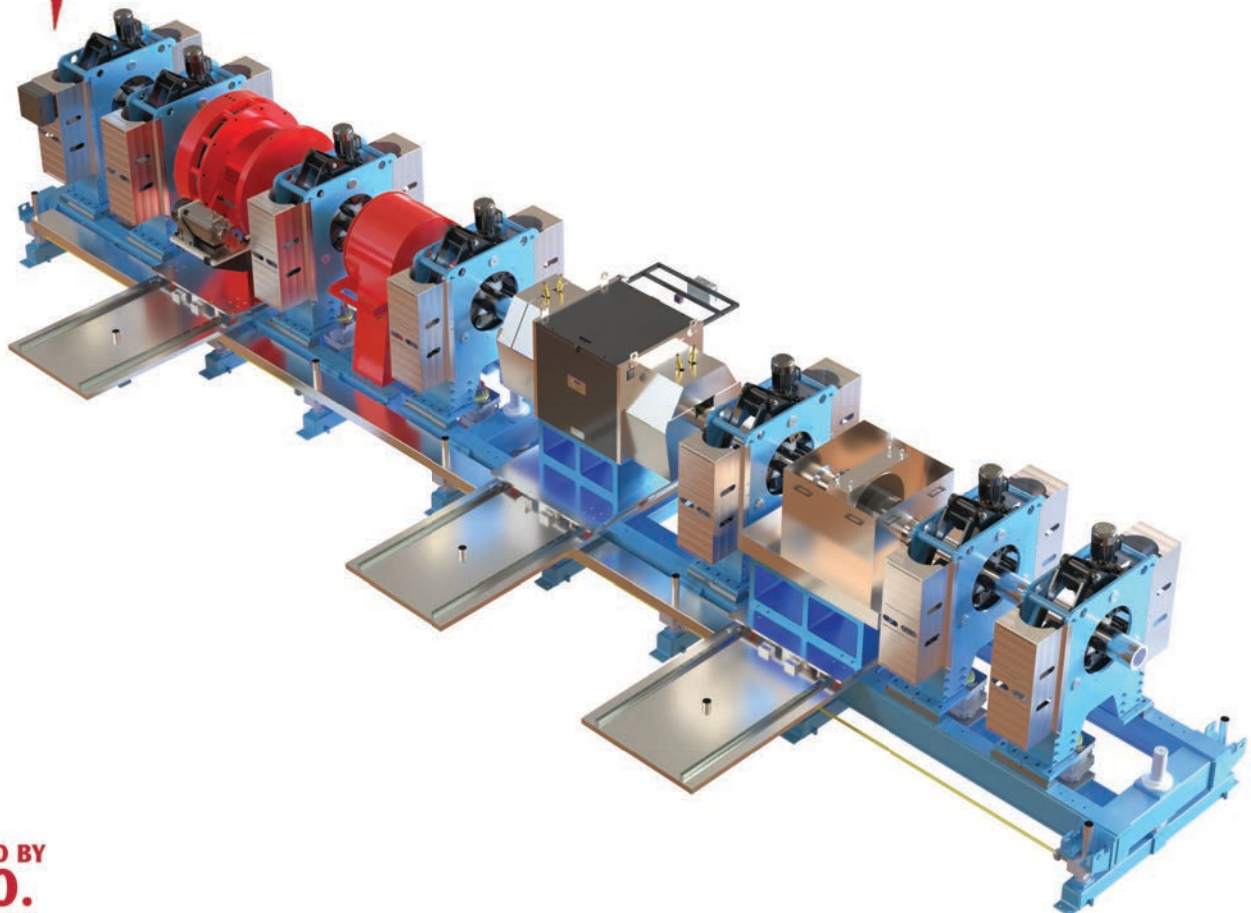


MAC[®] OCTGComplete

Multimodality, Full Volume Pipe Test System



PIONEERED BY
PITCO.
PROVIDED BY
MAC[®].

**One HMI, One Output, One Data Set.
One Solution to API 5L and 5CT Requirements.**

MAC[®] OCTGComplete.

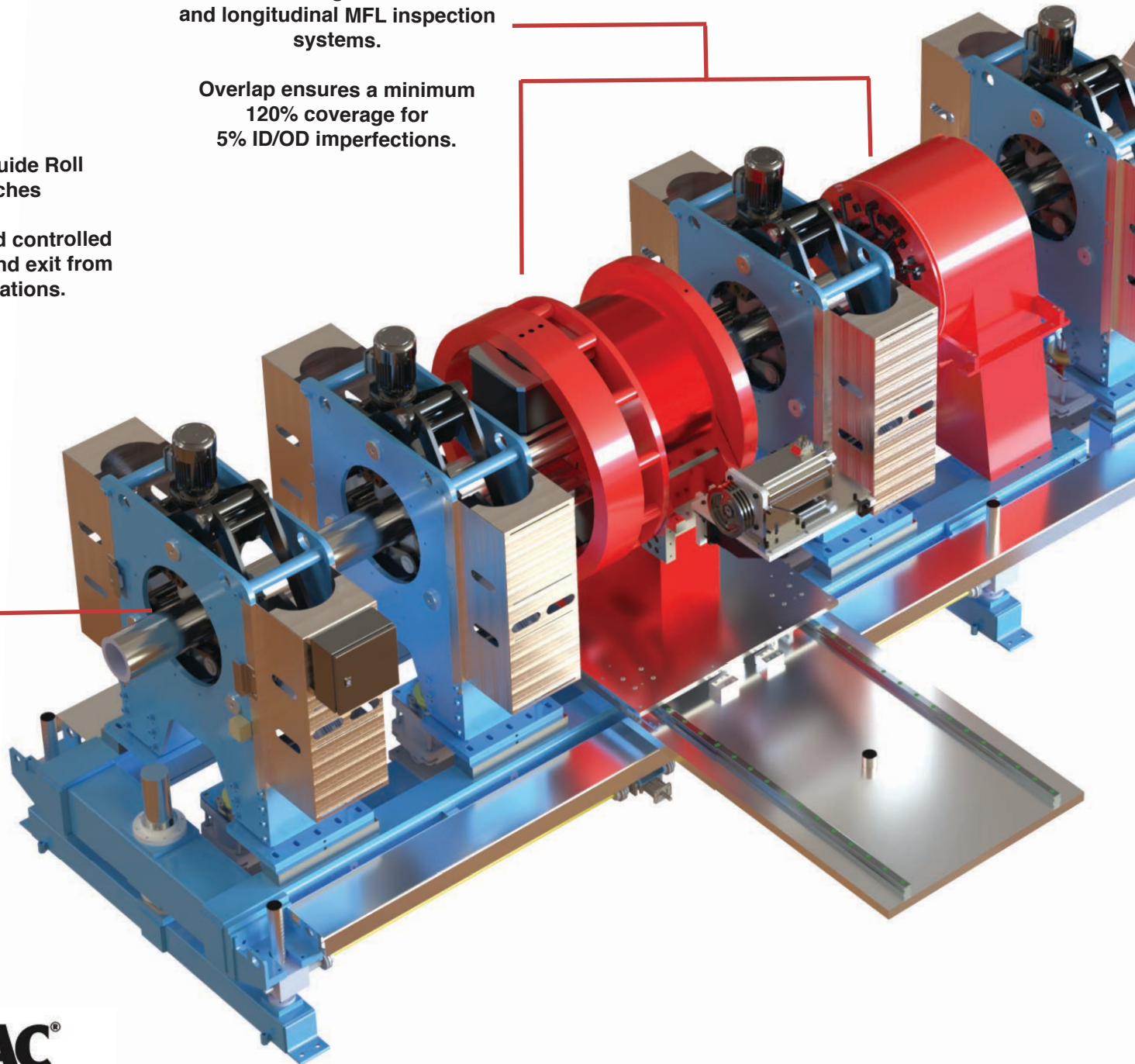
**A Single Pass, Multimodality NDT System for
Critical Applications in OCTG.**

PITCO LLC's Digi-Pro transverse
and longitudinal MFL inspection
systems.

Overlap ensures a minimum
120% coverage for
5% ID/OD imperfections.

Triple Guide Roll
Pinches

Guaranteed controlled
entrance and exit from
test stations.

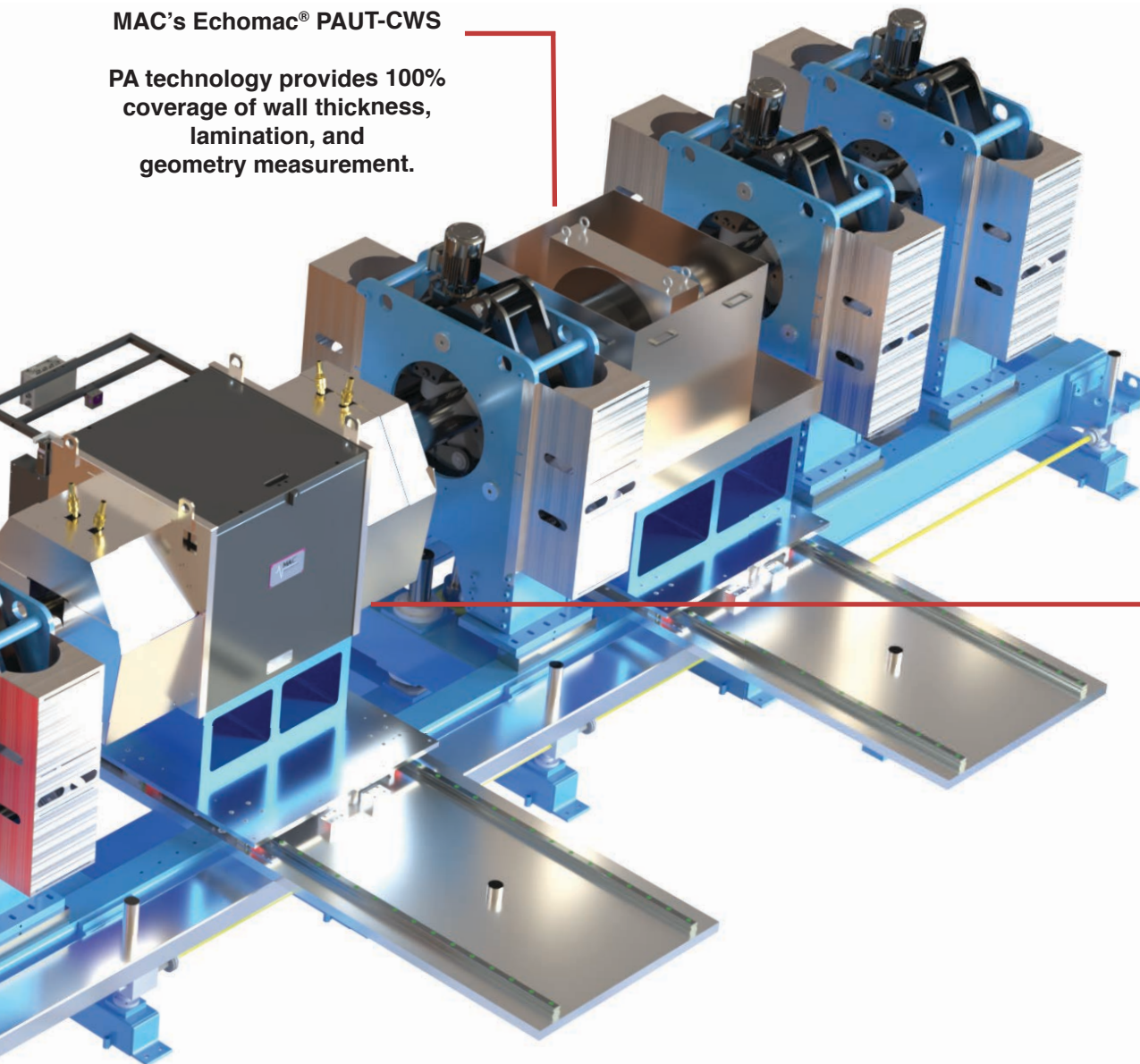


MAC's Echomac® PAUT-CWS

PA technology provides 100% coverage of wall thickness, lamination, and geometry measurement.

MAC's 280mm UT Rotary

Multiple transducer elements can test for longitudinal, oblique, and transverse defects based on the customer requirements.



In strategic partnership with PITCO LLC and Arctic Pipe Inspection, Magnetic Analysis Corp. (MAC®) introduces a fully integrated, modular MAC OCTGComplete inspection system—purpose-built for OCTG manufacturers who demand precision, performance, and compliance to the strictest API standards.

MAC OCTGComplete integrates three proven NDT methods in a single streamlined system engineered to satisfy current and proposed API 5CT and API 5L requirements. Magnetic Flux Leakage (MFL) utilizes PITCO's Digi-Tech heads to identify volumetric defects with high sensitivity. Ultrasonic Testing (UT), driven by MAC's 280mm Echomac® rotary, detects internal and external discontinuities that are oriented in the longitudinal, transverse and oblique planes. The final inspection stage uses MAC's Echomac® PAUT-CWS system to measure wall thickness, laminations and pipe geometry. By combining MFL, Ultrasound and PA technology, the user achieves full volumetric coverage, utilizing two test methods, and provides the level of flaw discrimination and reliability expected for critical OCTG applications. All testing results are combined through the MultiCollector software, enabling synchronized, efficient data collection across the three testing systems resulting in an accumulated database for high level analysis. The result is a modular, high-throughput system that provides comprehensive inspection while streamlining workflow for today's OCTG production lines.

Best in Class OCTG MFL Inspection

Transverse Inspection:

The transverse inspection assembly features two encircling magnetic coils generating a strong longitudinal magnetic field, with an iris mounted between them and overlapping sensors ensuring at least 120% coverage. The transverse sensors use a quick-release, snap-in design for efficient changeover, with an iris controlling arm extension and actuating the hall element sensors into position on the pipe surface.

Transverse Inspection System - Maximum Operating Specifications

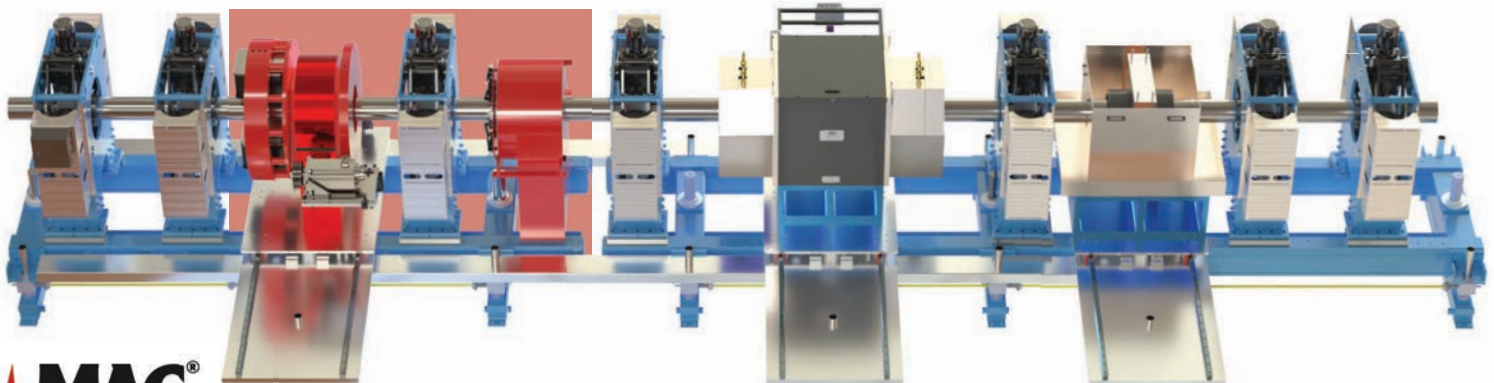
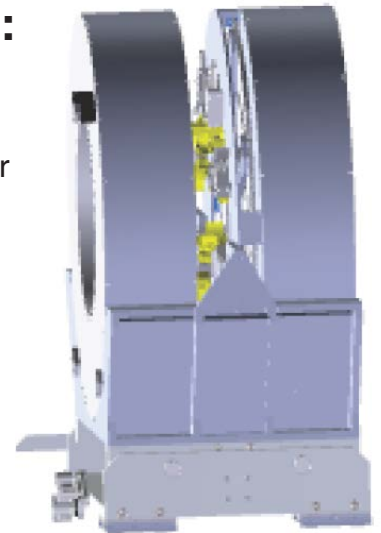
Inspection, Speeds	200 fpm maximum (1.0 mps)
Maximum Wall Thickness	0.545" (13.8mm) for 5% ID, 0.635" (15.88mm) for 10% ID
Coverage	120% minimum
Sensitivity	EDM notch 1.00" long (25.4mm) x 0.030" (0.76mm) wide x 5% of body wall - on the ID and OD surface

Longitudinal Inspection:

The longitudinal inspection system consists of a rotating DC magnetic circuit and signal detection sensors. Through software and electronic advancements, the system will detect and repeat on oblique flaws, offer accurate ID/OD discrimination, and detect smaller flaws in "noisy" pipe.

Longitudinal Inspection System - Maximum Operating Specifications

Inspection, Speeds	200 fpm maximum (1.0 mps)
Maximum Wall Thickness	0.545" (13.8mm) for 5% ID, 0.635" (15.88mm) for 10% ID
Coverage	100% minimum
Sensitivity	EDM notch 1.00" long (25.4mm) x 0.030" (0.76mm) wide x 5% of body wall - on the ID and OD surface



What is MFL?

Magnetic Flux Leakage (MFL) is a non-destructive testing method used to detect ID, OD, and volumetric defects within the pipe wall. The process involves magnetizing the material—either through active or residual magnetization—so that any discontinuities, such as cracks or pits, cause the magnetic field to leak out of the material. Sensors positioned near the surface detect this flux leakage and convert it into electrical signals that can be analyzed to determine the location and severity of flaws.

MFL is commonly used in industries that require rigorous quality standards, including the oil and gas sector. In particular, MFL plays a key role in meeting the inspection requirements of API 5CT and API 5L—two critical standards that govern oil country tubular goods (OCTG) and pipeline steel. These standards call for reliable, repeatable inspection methods to ensure the structural integrity of materials exposed to high pressure, corrosive environments, and extreme temperatures. MFL testing, like the tests included in the MAC UT FX-280, enable OCTG producers to automate this inspection process and achieve consistent, high-throughput quality control.

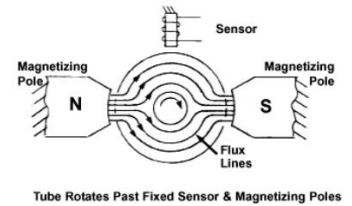
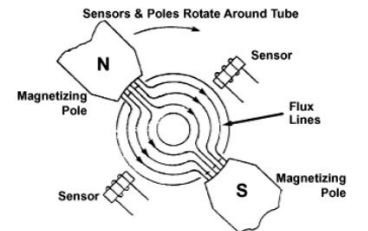


FIGURE 4



Streamlined Graphical Displays for Rapid, Accurate Pipe Defect Detection



Identify the Circumferential and Linear Location of Longitudinal Flaws, Detection of Multiple Flaws on the Same Pane, ID/OD Discrimination - All results in faster, more efficient prove-up and data analysis.

Engineered for High Speed Inspection.

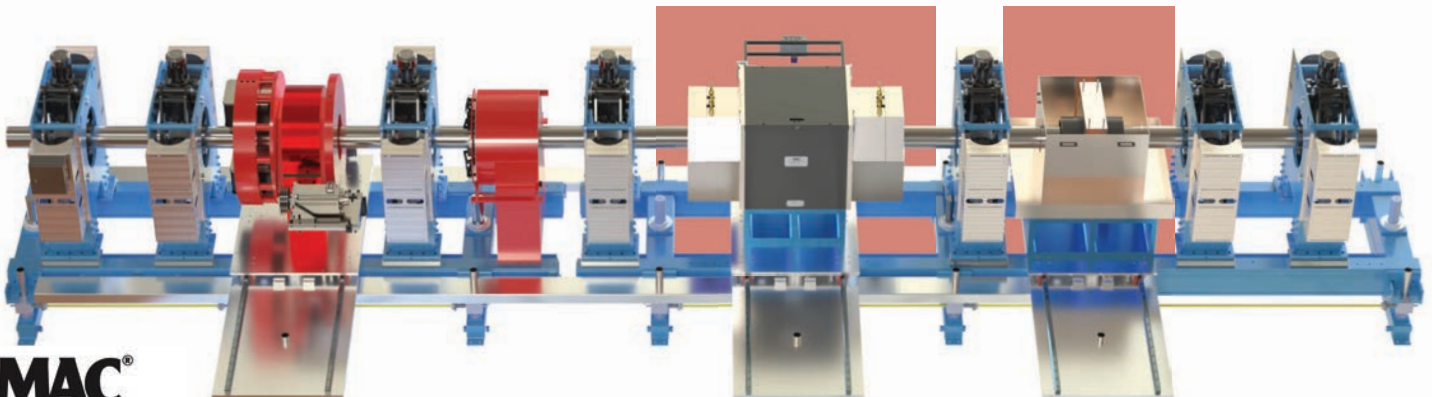
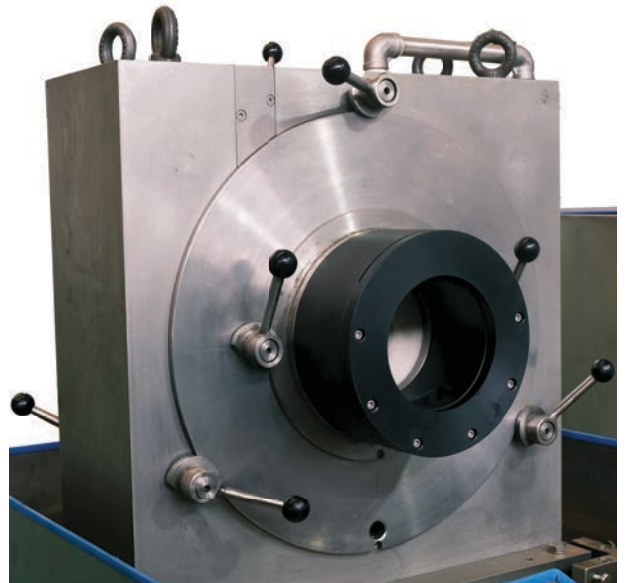
Verified High Defect Sensitivity.



Echomac® UT-280mm rotary has decades of proven performance in detecting longitudinal, oblique, and transverse flaws with 100% coverage.

Advanced UT inspection for precise geometric integrity.

With a compact test area the Echomac® PAUT-CWS (Captive Water System) test head provides highly accurate monitoring of wall thickness and geometry measurements, along with dependable detection of lamination defects for critical end-use applications.

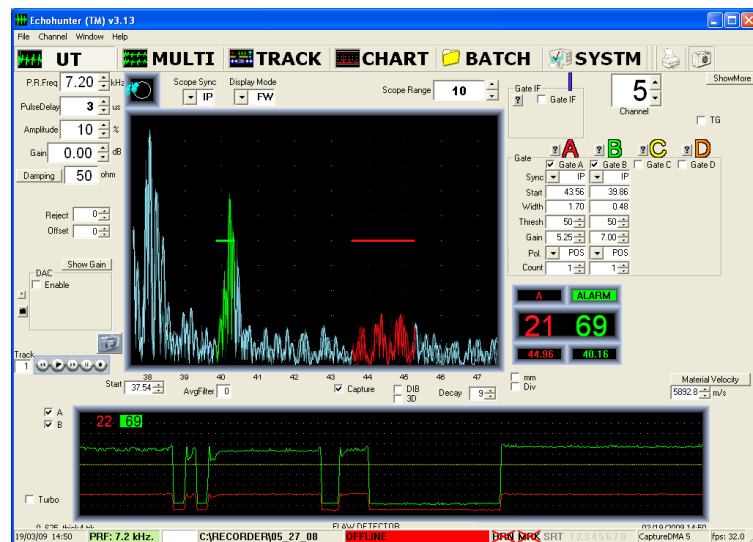


What is UT?

Ultrasonic testing (UT) is a widely accepted non-destructive method for detecting internal and surface flaws such as cracks, voids, and inclusions in metallic materials, including tubes and bars. It is also commonly used to measure wall thickness and outer diameter. UT operates by introducing high-frequency sound waves—typically in the range of 1 to 30 MHz—into the material using a transducer and a coupling medium such as water. Two primary techniques are employed: the through-transmission method, using separate transmitting and receiving transducers on opposite sides of the material, and the more commonly used pulse-echo method, where a single transducer both emits and receives the signal, enabling testing from one side only. Longitudinal waves are generally used for internal flaws, while shear waves, generated through angled incidence, are ideal for detecting surface or near-surface cracks, particularly on the inner and outer diameter of tubes. In high-volume production, rotary ultrasonic systems allow multiple transducers to rotate around the product, enabling 360-degree inspection and simultaneous flaw detection and wall thickness measurement.

Ultrasonic testing is recognized and required by several industry standards, including ASTM E213 for seamless metal tubes, ASTM E273 for weld seam evaluations, and ASTM E587 for bars and billets. It is also a key method for meeting the inspection requirements in API 5L (for pipeline transportation systems) and API 5CT (for casing and tubing in oil country applications), where accurate flaw detection and wall measurement are critical to ensuring structural integrity under extreme pressures and environmental conditions. Properly implemented, ultrasonic inspection provides a reliable and efficient solution for full-body, volumetric testing in demanding industrial applications.

A Complete System to Test, Analyze & Control the Inspection Operation.



- Set up multiple tests
- Shear waves for transverse, longitudinal surface and subsurface defects
- Compression waves to detect internal defects and measure wall thickness, OD and ID
- Store and recall an unlimited number of setups

An All in One Solution for OCTG from One Supplier.

System Benefits:

Diameter Range: 2 3/8" to 10 3/4"

Highest resolution and reproducibility

Shortest pipe untested ends for MFL <9"

Triad sensors of hall element, eddy current, and pc coil

OD/ID discrimination

*Cost reduction due to a complete inspection of MFL +UT by the
same test system*

Full body inspection in one pipe run

Detecting small signals in "noisy" pipe

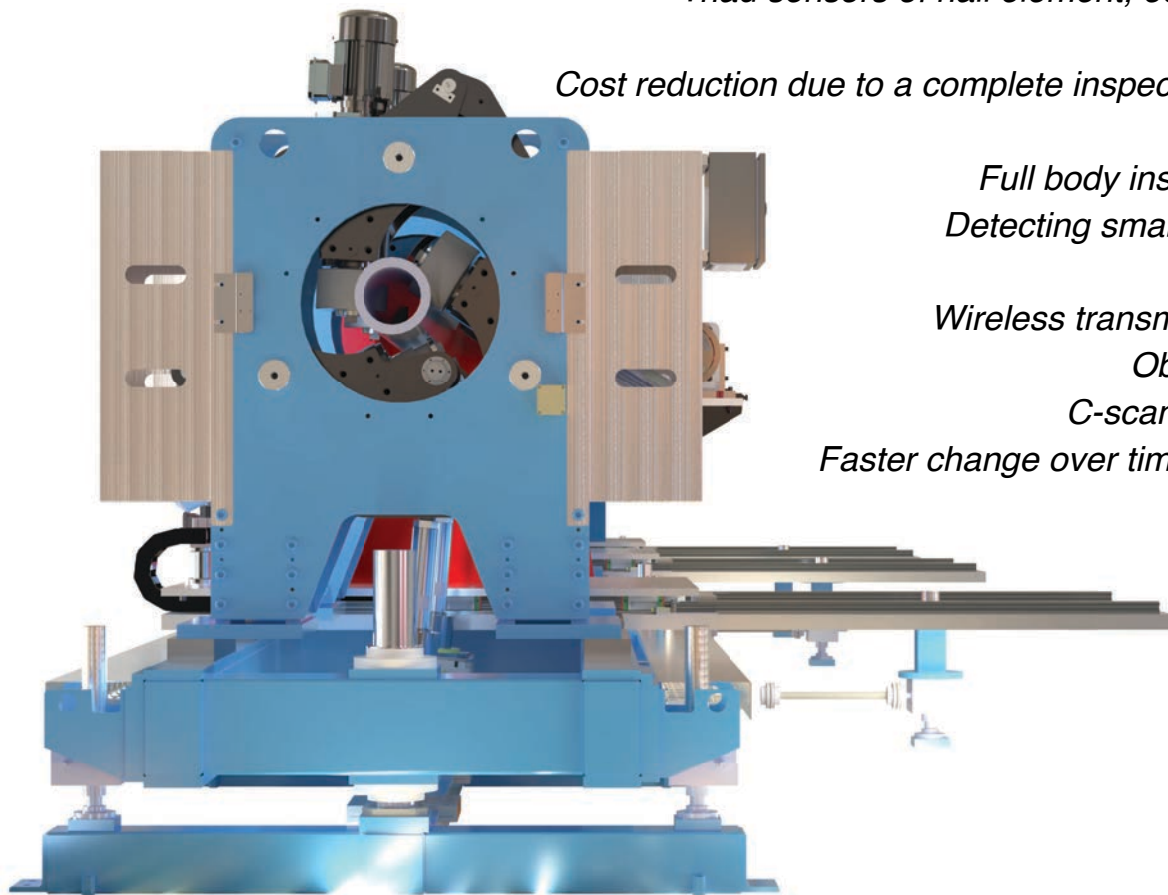
Robust data records

Wireless transmission of digital signals

Oblique-off-axis detection

C-scan type flaw presentation

Faster change over times including calibration



MAC[®]

More than just an NDT equipment manufacturer

Magnetic Analysis Corporation (MAC) is a global leader in non-destructive testing with over 95 years of experience. Pioneering the first U.S.-made electromagnetic flaw detection system, MAC has since become a trusted source for eddy current, flux leakage, ultrasonic, and phased array ultrasonic equipment used to test metal products worldwide. MAC offers a full range of test coils, transducer assemblies, drive mechanisms, benches, and automated controls, tailored for diverse applications in metal manufacturing. With headquarters in Elmsford, NY, additional facilities in Ohio and Sweden, and expert support across the globe, MAC ensures local service wherever customers operate. MAC systems are trusted worldwide to detect surface, subsurface, internal, and external defects, measure wall thickness and ovality, and evaluate material properties in tube, pipe, wire, and more.

Pitco LLC.

Serving the Oil and Gas Industry

An ASRC Industrial Company, Pitco, LLC has served the global NDE and OCTG community with cutting-edge MFL pipe inspection solutions since 1994. PITCO[™] offers a proprietary line of newly manufactured equipment, along with parts and service to support existing systems. Their mission is to deliver unmatched value and the most advanced MFL technology available. With superior software and electronics, PITCO's systems consistently outperform competitors in inspection quality. Backed by a strong commitment to customer support, PITCO ensures reliable service both during and after the sale.

Artic Testing and Inspection

Building the Future of Asset Integrity

An ASRC Industrial Company, Artic Pipe Inspection provides NDE/NDT testing and inspection services to the oil & gas industry. Offering inspection services to include full body MFL, ultrasonic and weld line inspection for mills and processors. Through its ATI company, inspection capabilities expand to midstream and downstream O&G, as well as renewables and infrastructure sectors in the Americas. Each service is tailored to project needs by subject matter experts and executed by certified technicians using advanced technology.



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