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New Turnkey Phased Array Ultrasonic Solution for Evaluating ERW Welded Tube November 2020

Magnetic Analysis Corp.'s Echomac® Phased Array system offers mechanical, OCTG and automotive tube manufacturers a high performance, automated solution to detect longitudinal weld zone defects and/or monitor weld profiles, with minimal operator interaction. Installation can be on-line in the hot zone after the welder, for profile and flaw detection at temperatures up to 252 F (122 C) or in a lower temperature area (below 140 F (60 C) for flaw detection after forming and shaping. The system is available for sale or by taking advantage of MAC's unique leasing option.

Phased Array electronic transducer scanning ensures the entire weld zone is covered while sequentially monitoring scarf, evaluating laminar defects, or detecting longitudinal OD/ID defects, typical of the welding process, including lack of fusion, hook cracks, and misalignment of the parent material. All this is accomplished using the same phased array transducer without the need for mechanical movement or operator adjustment to realign the system with the weld location.

Live feedback on the quality of the weld and seam trim tool is provided and no averaging or AGC is used for processing the data. B-scan and C-scan views result in real time images of the weld profile and defects, quickly alerting the operator to any issues with the scarfing process. The PA system is preprogrammed with the delay laws and ultrasonic setting for each pipe diameter. Programmed thresholds show a go/no-go image. An integrated strip chart records the test for a permanent record allowing the operator to review data post-test. Once test settings have been saved, minimal operator intervention is needed allowing high productivity.

The system consists of a phased array electronically controlled transducer test head which is held and positioned by a 5-axis robot. The robot can be preprogrammed to move to the weld line test position, a calibration position, or quickly retract to safety when integrated signals from the mill's PLC indicate open welds, cut outs and other conditions that could cause damage. The robot's small footprint allows the customer to select the exact part of the process to be monitored ensuring the highest possible yield on production pipes. The test head provides coupling (usually mill coolant) and houses a single phased array transducer which follows the surface of the tube and can handle an approximate 2" range of tube diameters using wear shoes that MAC customizes for the exact tube OD being tested. The test head has quick-disconnect latches for replacing the wear shoe in a minimum time for fast changeovers and high throughput. During operation the robot's concentric position remains constant with respect to the tube and requires no adjustment when changing the test shoes. For weld mills with a large diameter range, multiple test heads and arrays can be supplied to support an entire range from 2" up to 12" diameter and wall thickness ranging from 0.12" to 0.68".

Designed to meet many global standards, the system can detect N10 and N5, ID and OD longitudinal notches as well as monitor the weld trim tool. Profile resolution is 0.015" (0.381mm). Where a second mode of NDT is required, the Echomac® Phased Array ERW system can be supplied with MAC's MultiMac® eddy current or Rotoflux® magnetic flux leakage testers.



Magnetic Analysis Corp.'s Turnkey Phased Array Ultrasonic System for Inspecting ERW Tube