

Krautkramer Testing Machines

Full Body Ultrasonic Inspection of Tubes
with Rotating Probe System

GE Krautkramer ROT Series Rotaries for Linear Tube Transport

The requirements on OCTG pipe products have been constantly rising due to advanced exploration techniques like hydraulic fracturing or horizontal drilling. Seamless tubes (e. g. for risers or drill pipe) are usually tested for flaws on the outer and inner surface and for inside wall defects. As well wall thickness- and dimensional measurement (GEO) takes place. GE's rotary testing machines are the optimum solution to fulfill the required test task on small to medium diameter ranges, representing a compact solution that can be integrated directly into the production process. Beside seamless tubes, electrically-welded tubes (ERW) having flash-trimmed weld seams are also tested on rotation units if the later tube application specifies a corresponding test.



Krautkramer ROT 180 test mechanics



Test procedure

The tubes are transported to the testing machine via linear roller conveyors having speeds up to 120 m/min. The tests are normally carried out in single tube testing mode but it is also possible to test in continuous end-to-end testing mode to reduce the untested ends and to increase the productivity. Several triple or double roller drivers overtake the guidance and the constant transport of the tubes directly in front of and behind the rotation mechanics. Precisely guided by additional bushes in the ROT mechanics, the tubes are immersed in the rotating water jacket.

Ultrasonic properties

The test mechanic's rotor contains ultrasonic test modules which are equipped with probes for the required test specification and which are successively released for testing in order to obtain as short untested tube ends as possible. The probes are not in direct contact with the tube surface.

On request, the Krautkramer ROT can be equipped with phased array probes for improved POD of longitudinal flaws and gapless oblique flaw testing within a range of $\pm 15^\circ$ according to the tube's longitudinal axis. This provides testing for flaws typically occurring during the milling process with no compromises on test speed.

The new, fully parallel operating high-end ultrasonic test and evaluation electronics, type USIP|xx, processes all signals and carries out a separate evaluation according to flaw type and position. In order to avoid or to limit misinterpretations due to electrical interferences, a noise suppression takes place by means of a dynamic dual-threshold method prior to issuing the flaw result. Thanks to this noise suppression method, no test shot is lost, and every single pulse is evaluated. Test results can be stored, visualized in online stripcharts and/or submitted to a Level 2 network. An immediate marking of the defective areas at the output end of the guiding device and the subsequent sorting of the tubes can be implemented as well.



If required, additional Eddy Current inspection can be offered. Both the UT and EC equipment will be integrated into a single test bench, which offers minimum space requirements.

Test Electronics

High-end UT Electronics Platform USIP|xx

- WINDOWS 7, 64 bit operating system
- Max. 20kHz pulse repetition frequency in full parallel operation
- 20 bit amplitude per channel
- 5 gates including interface trigger gate, measurement resolution 2,5 ns
- Pre-defined and customizable digital filter
- Gigabit ethernet connection to Control PC
- Automatic sensitivity adjustment
- Extensive monitoring functions, self-tests and diagnostic supports
- Integrated geometry measurements (GEO) on request

Test Specifications

DIN EN 10246 -6, -7, -13, -14

EN ISO 10893 - 8, -10, -12

API 5 CT, API 5 L, API 5 D, API 5 C2

Other Specifications on Request



Technical Specifications

- Longitudinal and Transverse Flaw Test
- Oblique flaw test (fixed angle and/or $\pm 15^\circ$ gapless with PaintBrush algorithm)
- Lamination test
- Wall Thickness and Exentricity test
- Geometry Measurement (ID, OD, Ovality)

Typical Data of the Testing Machines

Krautkramer ROT	Typical Dia. [mm]	Typical Feeding Speed [m/min]
65	10-90	30-120
180	20-180	30-120
250	40-250	30-96
350	50-345	30-80

Typical features, detailed information on request

- Measuring accuracy for wall thickness measurement: ± 0.03 mm
- Measuring accuracy for geometry measurement: ± 0.05 mm
- Higher accuracy possible by means of averaging



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