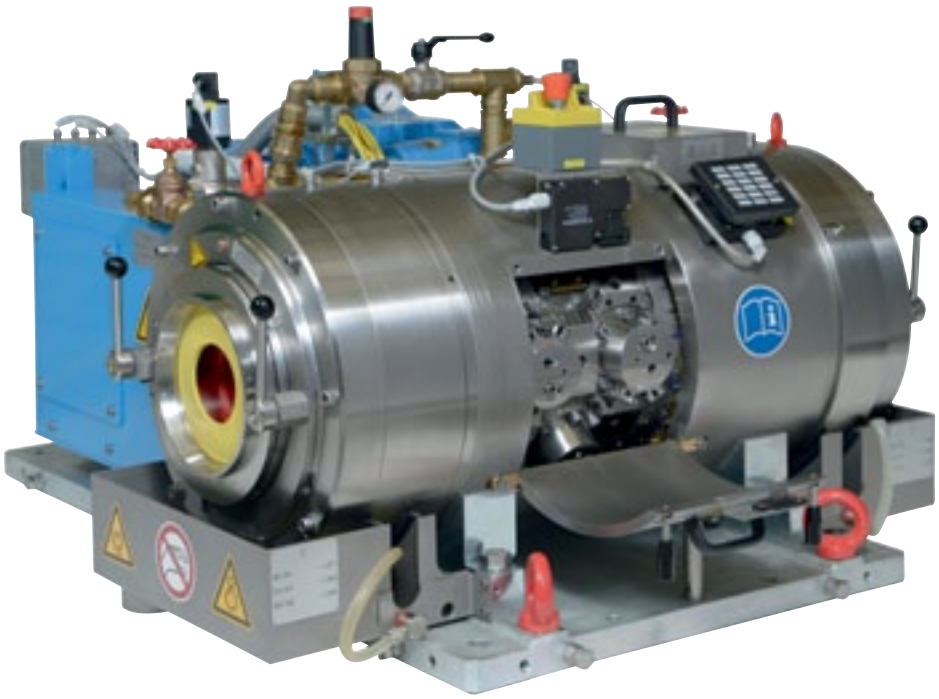
GE
Measurement & Control

Krautkramer Testing Machines Full Body Ultrasonic Inspection of Tubes with Rotating Probe System

Rotaries for Linear Tube Transport (ROT Series)

General

Seamless tubes are usually tested for flaws on the outer and inner surface, for inside wall defects (laminations) as well as a wall thickness- and dimensional measurement. Rotation testing machines are usually applied to fulfill the required test task on small to medium diameter ranges, but larger diameter ranges can be also inspected. Beside seamless tubes, electrically-welded tubes having flash-trimmed weld seams are also tested on rotation units if the later tube application specifies a corresponding test.



ROT 180 VIS

GE imagination at work

The tubes are transported to the testing machine via linear roller conveyors having speeds from about 30 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. The smaller the tube diameter, the more accurate the guidance of the tubes has to be during the test. Guided by additional guide bushes in the ROT mechanics, the tubes are immersed in the rotating water jacket. The test mechanic's rotor contains up to 6 (ROT 65/140), or 8 (ROT 180/250) or 10 (ROT 350/450) 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. Depending on the tube diameter and the wall thickness the distance between probe and tube surface can be optimized.

The ultrasonic coupling is effected via the rotating water jacket (water delay line). Different probe systems can be activated within the rotation mechanics, depending on the current test specification. The ultrasonic signals are transferred from the high-speed rotor to the stator via special slipring systems equipped with triple brush units. The proven, PCB-based and fully parallel operating ultrasonic test and evaluation electronics, type VIS, 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. Electronically stored single tube and production lot results complete an immediate marking of the defective areas at the output end of the guiding device and the subsequent sorting of the tubes.

Test Electronics

Modern PC Systems Electronics VIS

- User interface under WINDOWS
- Max. 20kHz pulse repetition frequency in full parallel operation
- VME bus controller
- Parameter storage
- Automatic sensitivity adjustment or check
- Extensive monitoring functions, self-tests and diagnostic supports
- State-of-the-art PC technology
- Integrated wall thickness and geometry measurements

Test Specifications
DIN EN 10246 –6, -7, -13, -14
EN ISO 10893 – 8, -10, -12
API 5 CT, API 5 L, API 5 D
Other Specifications on Request

Options

- Tube pre-wetting system
- Water circulation system
- Tube guiding and transport device

Technical Specifications

- Longitudinal Flaw Testing
- Transverse Flaw Testing
- Lamination Flaw Testing
- Wall Thickness and Geometry Measurement

Typical Data of the Testing Machines		
ROT	Typical Dia. [mm]	Typical Feeding Speed [m/min]
65	10-90	30-120
140	15-140	30-72
180	20-180	30-120
250	40-250	30-96
350	50-345	30-80
450	60-450	30-72

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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