

ECHOGRAPH-SNHF
Ultrasonic Inspection of ERW Pipes

KARL DEUTSCH

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Online Testing System for ERW-Pipes. The probe holders can be moved between the testing position and the calibration position. In the calibration position, a short pipe segment is used for the sensitivity setting of all probes.

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The production of ERW-pipes includes several steps of NDT. The usage of NDT has two major goals:

Early information about the welding procedure as a feedback for the production line and secondly, the final inspection of the finished pipe. Up to four ultrasonic systems are often encountered during the production process.

As a first step, a strip tester can be used. Linear or oscillating test traces of the probes are possible. Directly after welding, a first online weld test is carried out with ultrasound. It is

common to check for longitudinal defects only. Sometimes, an oscillating deburring check is added to verify the proper descarfing of the internal pipe wall.

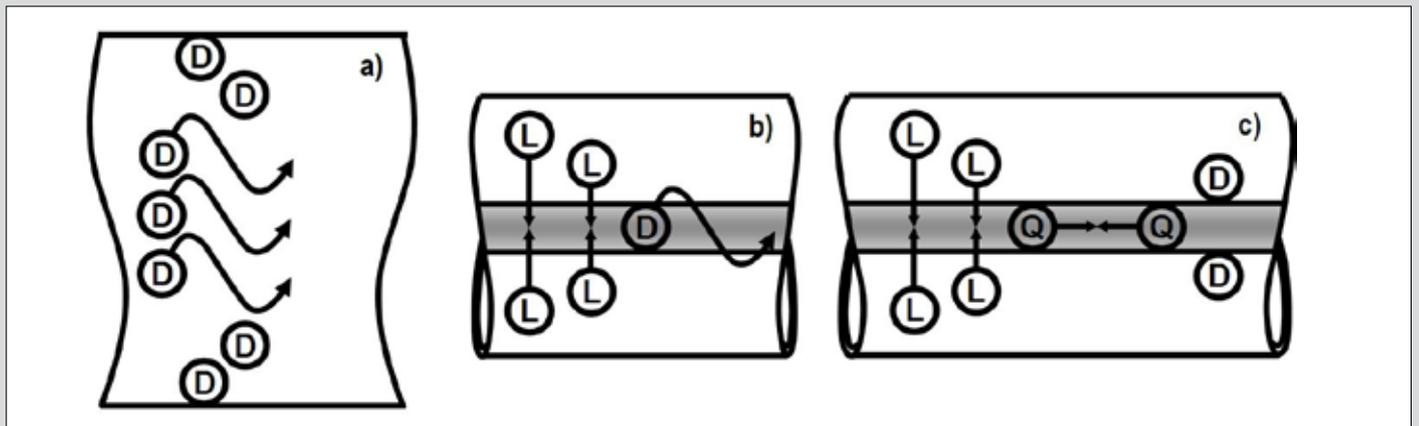
After pipe cutting, a final weld inspection is carried out (offline weld testing). A testing portal with moveable carriage is commonly used. The testing portal shows the advantage that the weld is inspected without pipe movement, thus avoiding vibrations which could degrade the test results. The pipe ends can be tested in the same testing system or in a separate setup.



Probe holders for online testing machine (transverse and longitudinal defects)



Probe holders with angular incidence for the detection of longitudinal defects. Stable ultrasonic coupling is achieved by water jet coupling (also called squirter technique). The incidence angle can be adjusted without steps for a perfect setting with respect to pipe diameter and wall thickness and without changing the probe.



Typical testing tasks for the ERW-pipe inspection.

- a) Strip inspection with edge probes and oscillating strip middle probes
- b) online weld test with 4 probes for longitudinal defect detection and an oscillating deburring check
- c) offline weld inspection with 4 probes for longitudinal defect detection, 2 on-bead probes for transverse defect detection and 2 probes for lamination testing in the heat-affected zone

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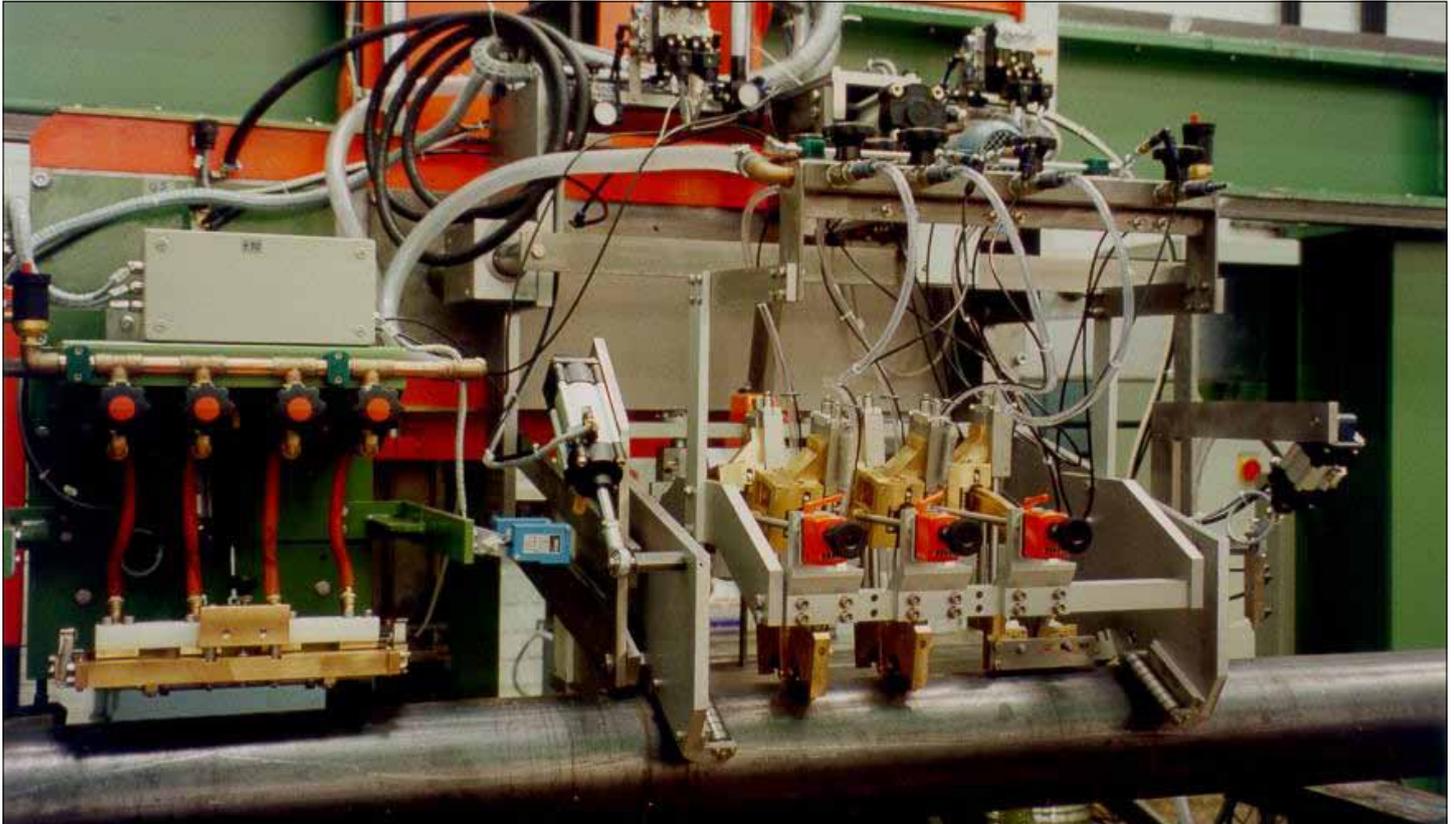
Testing portal (offline testing machine) during assembly at KARL DEUTSCH workshop



Testing Portal (Offline Testing Machine): Onsite operation with transverse conveyor for pipe feeding and linear discharging of the pipes. This machine was also equipped with two additional probe holders for the pipe end inspection.

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The inspection of the pipe body material can be carried out in the strip stage or on the finished pipe. For strip testing an ECHPGRAPH-BAPS testing system is employed (see separate brochure). For testing on the finished pipe, the offline weld testing portal can be extended by a second probe holder for the wall thickness measurement, the lamination detection and optionally the pipe end inspection (left probe holder in picture). In case of higher throughput requirements, a separate ECHOGRAPH-RPTR testing system can be used (see separate brochure).

Specimens

ERW-pipes (single or endless pipes)

Material	cold drawn
Diameter range (D)	up to 630 mm (to be discussed)
Wall thickness (s)	1 - 30 mm
Length	endless (online test) or 3 - 25 m (offline test)
Ovality	$\pm 0.5\%$ of D
Straightness deviation	max. 2 mm/m
Surface condition	as rolled, without loose scale
Temperature	max. 80 °C
Detectable flaws	longitudinal and transverse flaws, laminations in heat-affected zone

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