

## **ECHOGRAPH-STPS**

Ultrasonic Inspection of Bars

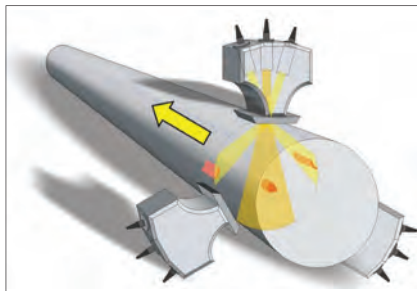
**KARL DEUTSCH**

# ECHOGRAPH-STPS

## Ultrasonic Inspection of Bars



**ECHOGRAPH-STPS bar testing system**



**Testing principle (9 probes):**  
**3 straight beam probes**  
**6 angle probes**

### Ultrasonic Inspection of Bars

KARL DEUTSCH has developed ultrasonic testing equipment since 1951 and shipped the first system for automated billet inspection in 1965. Many improvements on the ECHOGRAPH-electronics, the robust testing mechanics and the ultrasonic probes have led to our current state-of-the-art. KARL DEUTSCH maintains a strict quality management system according to DIN EN ISO 9001.

High throughput rate and in operation world-wide! Detection of internal flaws is carried out with straight beam probes. For bar diameters greater than 30 mm, surface-near flaws are detected by angle beam probes.

Key properties for the ECHOGRAPH-STPS bar inspection system are the high testing speed of up to 2 m/s and the simultaneous adjustment of the probe carriers producing short change-over times. The coupling of the ultrasound is achieved with guided water jets. The squitter probe holders for the water jet coupling allow test conditions comparable to immersion testing.

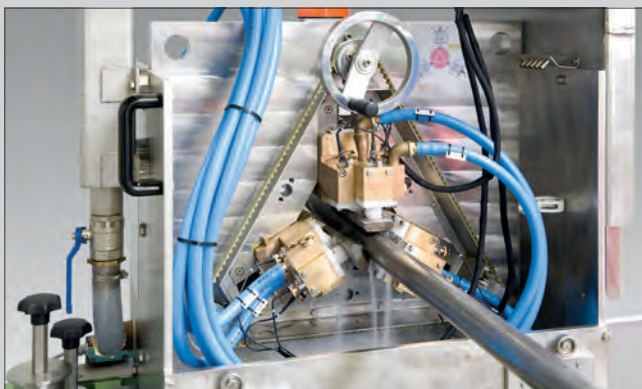
The inspection of the core region is carried out with three to five straight beam probes. All probe holders are equally positioned around the bar circumference. The probe holders are mechanically protected by guiding skirts usually made from hard metal. The skirts are also responsible for stable coupling and testing

conditions by guiding the probe holders along the bar surface. Unavoidable mechanical straightness tolerances of the bars are compensated for by the spring-loaded suspension of the probe holders.

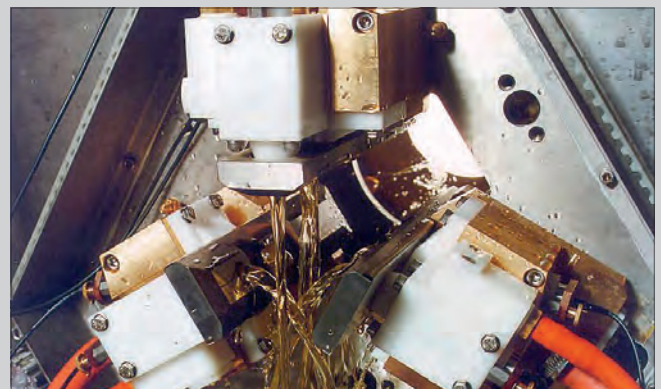
Additional probes inspect the surface-near region for bar diameters above 40 mm. An angled position of the probe with respect to the bar surface results in angular ultrasound transmission in the circumferential direction of the bar. Each probe holder contains one probe which transmits into the clockwise direction; a second probe transmits counter-clockwise.

The test mechanic is mounted on a height-adjustable test table. A horizontal support (sliding device) is mounted onto the test table which is used to move the test mechanics between test position (in-line) and calibration position (offline). Calibration and service work can then be carried out without interfering with the ongoing production.

The feeding and discharging of the bars is carried out by a roller conveyor which is supplied by the buyer. Also an automated sorting of the tested bars (good and bad sorting) is supplied by the buyer. Typically, the ultrasonic inspection system is combined with an eddy current or a strayflux testing system for the detection of surface defects. A common data protocol can be provided (option).



The STP-System works with three probe carriers (couplant wipers and protection housing of the system are dismantled in this picture). Each probe carrier holds one probe for normal incidence. Two angle beam probes can also be integrated in each probe carrier for detection of surface-near flaws.

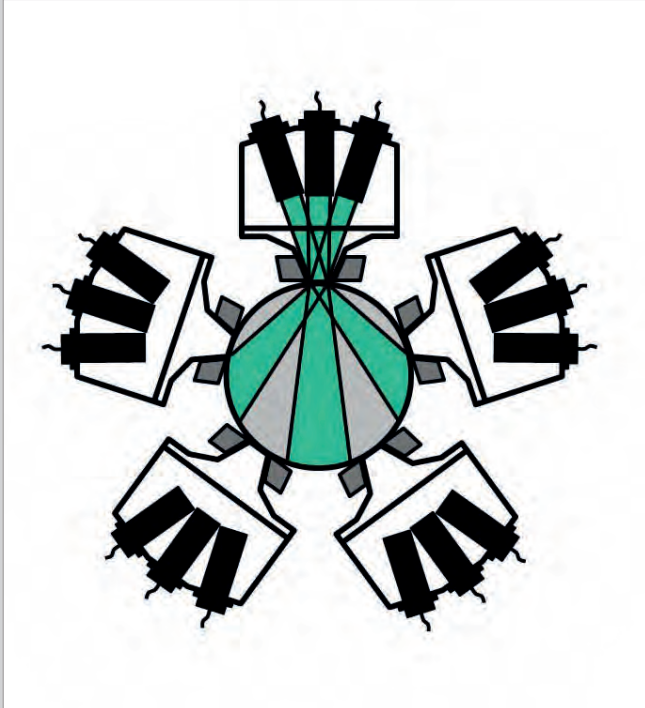


Detailed view of the probe carriers with water supply. The guidance on the bar surface is achieved with hardened skirts.

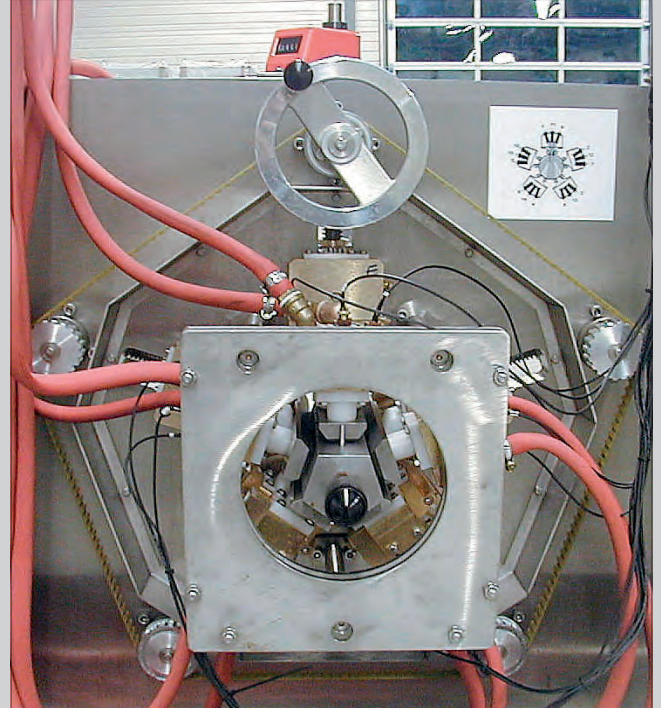


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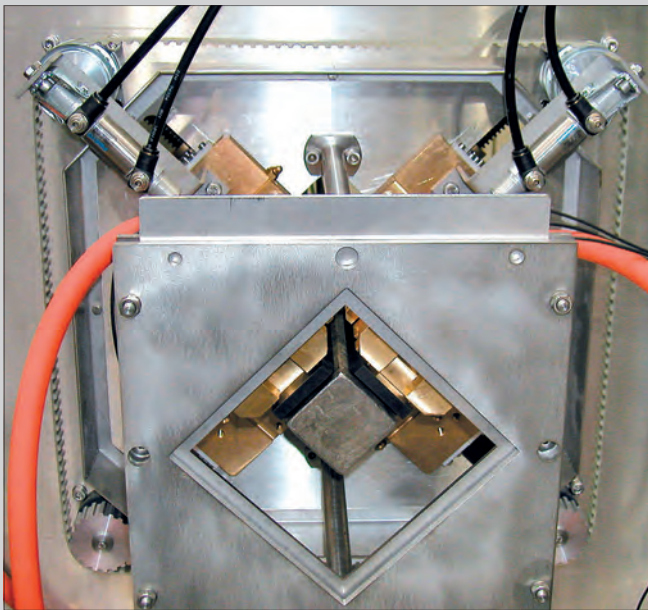
## Ultrasonic Inspection of Bars



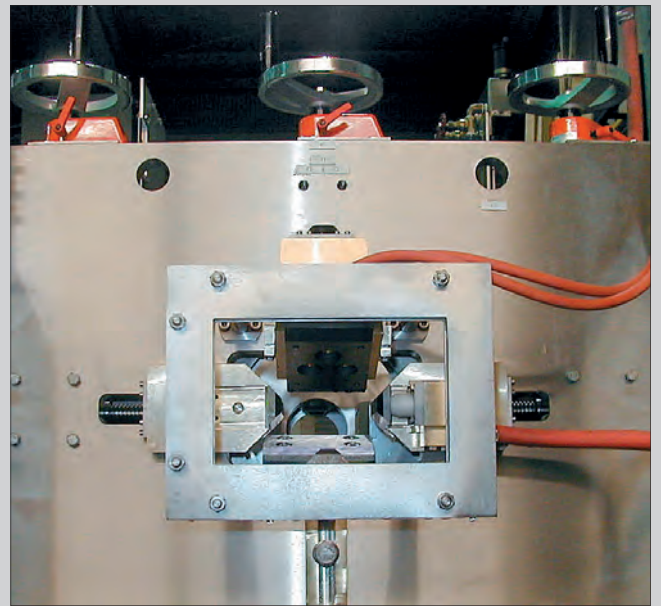
Optional probe configuration with 15 probes  
a) 5 straight beam probes  
b) 10 angle beam probes



Test mechanic with 15 probes for round bars (currently equipped with pentagonal calibration block)



Test mechanic with 4 probes for quadratic profiles



Test mechanic with 3 dual-element probes for flat profiles

# ECHOGRAPH-STPS

## Ultrasonic Inspection of Bars



Bar testing system with water filter unit, test table and operator panel

### Specimens

Round or hexagonal bars

Material	continuous cast, ingots
Processing stage	rolled, drawn, extruded, turned or grinded
Diameter range (D)	8 to 130 mm
Length	min 2.5 m
Ovality	max. 2% of D
Straightness deviation	max. 2 mm/m
Surface condition	rolled or better
Temperature	max. 60 °C
Slab ends	machined, no burr
Detectable flaws	internal flaws 0.8 - 2 mm FBH (dependent on diameter)

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