

MAGNETIC FLUX LEAKAGE TESTING WITH CIRCOFLUX



Alternating Field MFL method Application and basic function

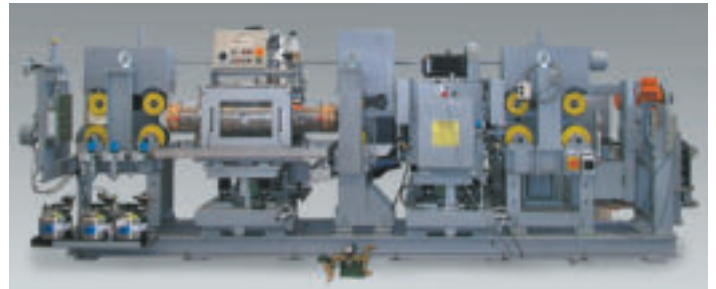
Economical aspects for testing with FOERSTER®

The European standard EN 10221 "Surface quality classes for hot-rolled bars and rods – Technical delivery conditions" recommends the Magnetic Flux Leakage method with scanning probes. The Alternating Field Magnetic Flux Leakage (MFL) is the most sensitive method to detect surface defects in hot-rolled ferrous bars. The detection of longitudinally oriented defects starts with a depth from 0.1 mm. There is one other advantage of the applied alternating current magnetization. No residual magnetism remains in the bar after testing and therefore eliminates the need of additional demagnetization. CIRCOFLUX testing is an absolute must to achieve good quality in the production of round ferrous rolled bars for forging purpose. It replaces subjective test methods like magnetic particle testing or the visual test. Typical field of applications are cold finishing lines for rolling mills. When combining various FOERSTER test instruments in one testing line in particular, but also when integrating test instruments of other manufacturers, the so-called Multi Test Blocks are the ideal solution. Tailored system solutions are developed with our customers in partnership.



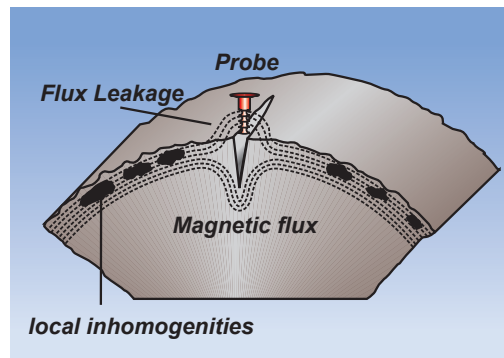
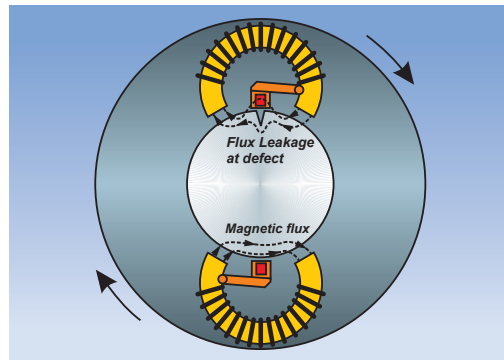
◀ CIRCOFLUX test equipment assures reliability and cost-efficiency.

Multi Test Block with CIRCOFLUX sensor system Ro 100



Alternating Field MFL method

The Alternating Field MFL probe rotates at high speed around the longitudinally moved test material and scans its surface helically. The rotating probe scans „punctiform“ only a small area of the material surface at any moment, i.e. when testing, it focuses on a very small part of the overall surface. Thus, even an extremely small material flaw represents a major disturbance with respect to this relatively small material surface area. One other advantage of the rotating probe method: Long drawn-out material flaws are indicated over their full length.



CIRCOFLUX DS – THE TOP-OF-THE-RANGE MODEL

CIRCOFLUX DS

All control and monitoring functions are combined in the Power cabinet together with a Siemens® PLC. The connection to the testing line is done with standardized Profibus. This concept allows flexible modifications.

All testing, operation and evaluation functions are combined in the Electronics cabinet compliant to standard EN 61326-1 for electromagnetic compatibility. Hardware and software are uniform for all FOERSTER test equipment of DS family. This reduces costs for inventory for spare parts and minimizes training for operators.



Production

CIRCOFLUX DS – meets the most stringent demands. On cold finishing lines for rolling mills...

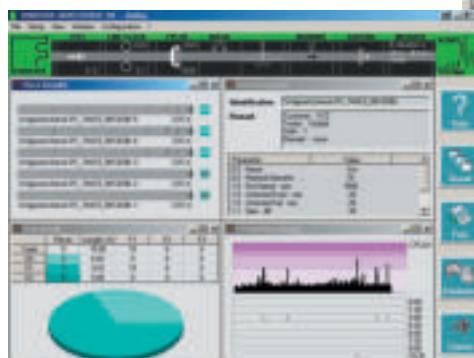
DEFECTOTEST® DS 2000

is the instrument concept for electromagnetic testing using digital technology. Implementing the system on basis of Windows® ensures convenient operation with modern touch screen technology and offers Active X interfaces to other Windows® programs. Automatic adjustment and compensation procedures guarantee reproducible testing. Integrated diagnostic functions ensure that the automatic test result is reliable. Archiving of all test results allows individual

result summaries for short and long-term documentation as well as for research. FOERSTERnet offers access to the CIRCOFLUX DS test instrument from any computer and allows network integration in existing production and quality systems.



▲ CIRCOFLUX DS test system consists of Power cabinet and Electronics cabinet



▲ Result of tested pieces, Scope display, Parameter list

ECONOMICAL SOLUTIONS FOR YOUR PRODUCTION



Shipping



Statistics



Remote Servicing

Production

The touch screen allows easy operation by simply touching the screen surface. A keyboard is available for text input. Real-time visualization of the test sequence supports the operator at anytime.

Shipment

Documented quality to ISO 9000 thanks to user-specific, automatic logging.

Statistics

Extensive documentation for each test piece and each flaw allow subsequent research and form the basis for product liability.

Remote servicing

Direct communication with the test instrument through connecting to other networks (LAN and WAN) allows remote servicing by qualified FOERSTER Support Center staff.

Production-integrated Alternating Field MFL test system CIRCOFLUX DS

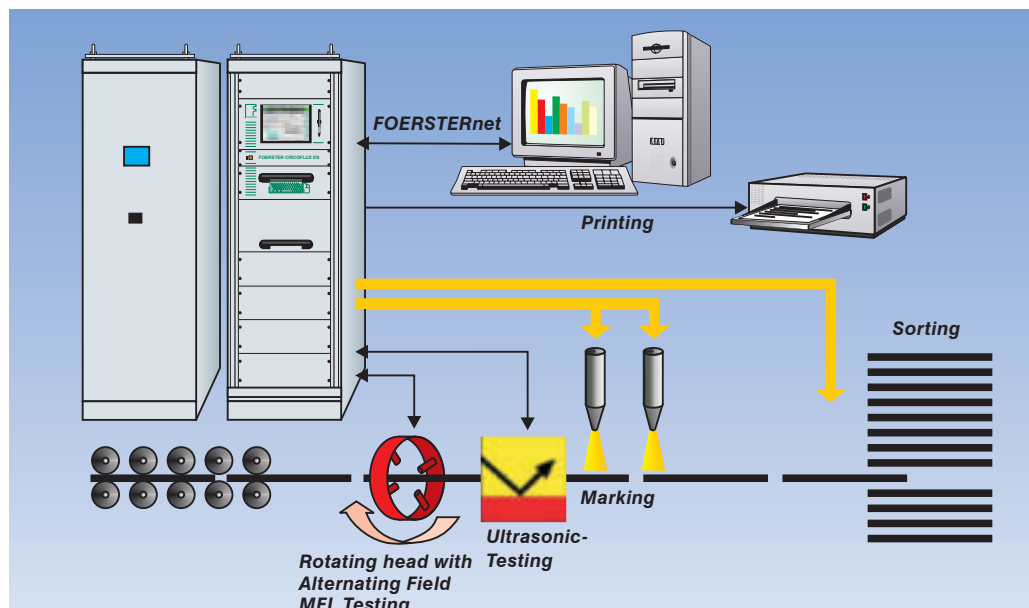
System technology

Alternating Field MFL test system with digital system technology for automatic, high-resolution, multi-channel flaw testing on hot-rolled bars and rods. Universal test system, which can be adapted to individual applications and requirements. Configurable test sequence programs simplify matching to production conditions. The surface test by CIRCOFLUX is often supplemented by an ultrasonic system to detect core defects or a MAGNATEST® to eliminate the possibility

of material mix, in a common testing line. The Instrumentation Software, an optional data management system, collects and

administers data from various test systems of a Multi Test Block. This allows a central setting procedure for all test systems and a

common display and logging of test results.



The Alternating Field MFL test system CIRCOFLUX DS in combination with an ultrasonic test instrument

SENSOR SYSTEMS

Compact, robust, long-life and easy-to-service

Sensor systems

Four rotating heads are available and ensure high reliability by long experience. All rotating heads have a central point to adjust to test material diameter. Modular test electronics today already ensure upcoming requirements for detection of very short material flaws and offer therefore a high protection of investment.

At very dirty environment it is possible to mount optionally a suction connection to conduct dirt and scales.

Rotating head Ro 75

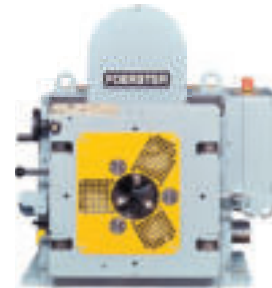
Compact: Designed for material diameter from 10 - 75 mm equipped either with inexpensive nozzles or roller guides. Maximum transportation speed of 2 m/s can be achieved at complete scanning.



Rotating head Ro 75

Rotating head Ro 100

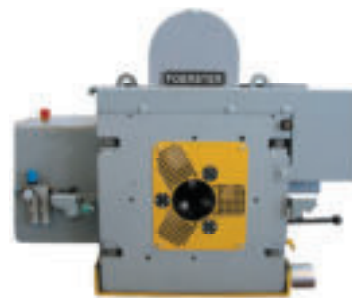
Successful: Two versions are available and designed for material diameter from either 10 - 100 mm or 15 - 105 mm. An optional automatic dimension adjustment ensures short changeover time. Maximum transportation speed of 3.75 m/s can be achieved at complete scanning.



Rotating head Ro 100

Rotating head Ro 130

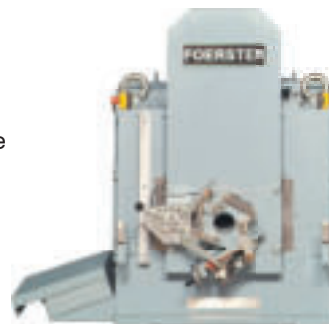
Modern: Designed for material diameter from 15 - 130 mm. Modern multiplexer technology allows gathering of sensor signals to reduce transmission paths. An optional automatic dimension adjustment ensures short changeover time. Maximum transportation speed of 4 m/s can be achieved at complete scanning.



Rotating head Ro 130 with optional automatic dimension adjustment

Rotating head Ro 180

Large: Designed for material diameter from 20 - 180 mm. A maximum transportation speed of 2.4 m/s can be achieved at complete scanning.



Rotating head Ro 180



Institut Dr. Foerster GmbH & Co. KG
Division TS Semi-finished Product Testing
In Laisen 70
72766 REUTLINGEN
GERMANY
Phone +49 7121 140-270
Fax +49 7121 140-459
ts@foerstergroup.de
www.foerstergroup.de