EDDY-CURRENT TESTING
WITH DEFECTOMAT®
Economy aspects for testing with FOERSTER

Eddy-current testing is the worldwide standard when producing tubes, pipes, bars and wires. It is the only non-destructive test method which also allows 100% testing even at extremely high production speeds. Other advantages are the simple operating principle, the fact that parts are tested dry without physical contact and the automatic detection, marking, classification and sorting of the flawed material. Modern test systems allow uncompromising integration in the production process, including extensive documentation, as is indispensable for compliance with ISO 9000 ff and within the framework of product liability. So-called test sections of various designs guaranteeing optimum transport of the test material through the sensor system are available for establishing separate testing lines. The eddy-current method complies with the international Standards of ASTM, API, BS, AF, DIN, EN, ETTC, JIS, SEP and others. The DEFECTOMAT family from FOERSTER, a series of instruments which has been modernised constantly, has been a synonym for maximum reliability and continuity for many years now. The aim is to cooperate with our customers on a partnership basis by developing intelligent series products and individual system solutions.
THE DEFECTOMAT® FAMILY

... the right model for every application

DEFECTOMAT® ECM
The module for eddy-current testing with through-type coils reduced to the essentials. Extremely easy operating controls, unidimensional signal display as LED bar graph, Yes/No sorting. Easy integration in existing control cabinets. The testing line controller (PLC) also controls and forwards the results of the EC module for marking and sorting. Parameter setting via RS-232 interface is possible.

DEFECTOMAT® CI
Compact EC tester
The original compact eddy-current tester now with new technology. It is the successor of the globally successful DEFECTOMAT C and CP versions. One of the new features on offer is the fully optional 2-channel evaluation, which allows e.g. the simultaneous use of the differential and absolute channel, 2-frequency applications and simultaneous signal evaluation in the eddy-current and FERROMAT® channel.

DEFECTOMAT® DS
The top-of-the-range model for eddy-current testing with through-type coils. The instrument system, based on Windows®, allows convenient operation and uncompromising network integration. Modern touchscreen technology and application wizards simplify dialogue and prompt the operator reliably when making all instrument settings. The system utilises the power of Windows® in relation to networking capability and multi-tasking. Thus, FOERSTERnet allows access to the test-instrument from any number of computer workstations simultaneously even if the various users require different information, e.g. current test status, test result of the last tested job or a batch from last month for reasons relating to research.

The DEFECTOMAT® family
From the simple module with plain Yes/No results through to the multi-channel system with statistical evaluation programs. Circumferential or segmented through-type coils allowing maximum testing speed are always used. Typical fields of application are pipe and tube welding lines, drawing machines and finishing lines. Thin lamp wires with a diameter of a few micrometers and heat-exchanger tubes are also tested with DEFECTOMAT.
DEFECTOMAT DS – THE TOP-OF-THE-RANGE MODEL

DEFECTOTEST® DS 2000

This is the instrument concept for electromagnetic testing using digital technology which forms the platform of the DEFECTOMAT DS for multi-channel applications and allows adaptation to individual requirements. FOERSTERnet offers access to the DEFECTOMAT DS test instrument from any number of computers and allows uncompromising network integration in existing production and quality systems. Implementing the system on the basis of Windows® ensures easy integration and convenient operation and offers Active X interfaces to other Windows® programs. Application wizards prompt you interactively, allowing you to reliably achieve the right instrument setting. 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 and for research.

Production

The screen, designed as a touch screen, allows easy, prompted operation simply by touching the screen surface. A keyboard is available for text input. Real-time visualisation of the test sequence with original signal display provides a complete overview at all times.

DEFECTOMAT® DS – meets most stringent demands.
On tube and pipe welding lines, drawbenches, winders, rolling lines and finishing lines ....

Result of tested pieces, scope display, parameter list
ECONOMICAL SOLUTIONS FOR YOUR PRODUCTION

Statistics
Individual analysis of the test results with Microsoft® Office tools thanks to direct access to the result database.

Remote Servicing
Remote servicing / FOERSTERnet
Direct communication with the test instrument and interworking with other networks (LAN and WAN).

DEFECTOMAT DS
production-integrated eddy-current test system

System technology
Eddy-current test system with digital technology for automatic, high-resolution, multi-channel flaw testing on wires, bars, tubes and pipes made of ferromagnetic and austenitic steels or non-ferrous metals. Universal test system which can be adapted to individual applications and requirements. Multi-channel capability means testing with several test frequencies or with different sensor systems which may also be at different locations. Configurable test sequence programs for piece testing, continuous testing and testing with subsequent cropping simplify matching to production conditions. Extensive test documentation for each part and each flaw allow subsequent research and form the basis for product liability. Continuous monitoring of operational safety and reliability is a foregone conclusion.

The DEFECTOMAT DS eddy-current test system on a tube/pipe welding line with two sensor systems.
Compact instrument
DEFECTOMAT® CI

**State-of-the-art data communication**
- State-of-the-art computer technology
- Full network integration
- Remote control of the settings
- Takeover of the result data
- Periphery diversity with USB port for memory stick, modem, printer, mouse, keyboard (also wireless), CD burner, portable hard disk, card reader etc.
- Data export and import using a memory stick

**XML log structure for every tested part and every order can be displayed by standardized format using Internet Explorer**

**Optimum technical performance**
- Optional, full 2-channel evaluation Diff/Abs, Diff/Diff, Diff/Ferromat
- 12 test frequencies from 1 to 1000 kHz
- Filter tracking according to the test speed
- Point exact, location-precise marking
- Sector signal evaluation with 2 trigger thresholds
- Analog output

**Intuitive operation**
- Quick and easy with "turn and push"
- Password-protected operating level
- Easy to read colour screen
- Visualisation of test sequence
- Constant display of the most important test parameters
- Unlimited settings archive
- Stored sensor list with features

**Availability and service**
- Sensor monitoring based on the noise level
- Recognition of cable break and short-circuit
- Remote service via telephone, modem or Internet Log-in
- Logged calibration including sensor
- Simple replacement of the predecessor model through pin-compatible line and sensor connections

**Integratable module DEFECTOMAT® ECM**

- Module for eddy-current testing with through-type coils, reduced to essentials
- Different fixed-frequency modules are available
- Multi-frequency modules are available as options
- Extremely easy-to-use operating controls
- Unidimensional signal display in the form of LED bar graph
- Yes/No sorting
- Enhanced operating convenience and result display by PC connection in conjunction with the eddyWin software package
- Easy integration in existing control cabinets

- The module can be adapted to more extensive requirements using further components as phase adjuster, absolute channel, power amplifier, oscilloscope, RS-232 interface for remote parameter setting
- Adapters store configuration data for fast conversion

**ECM in a tube or pipe welding machine**

**CI on the production line**
Sensor system P

Permanent magnetisation may be adequate for small cross sections or for austenitic materials. P 12 for material up to 12 mm and P 40 for material up to 40 mm diameter.

Sensor system H

Coil holders H 40 and H 90 are available for circumferential testing of non-ferrous metals in the diameter range 0.2 to 90 mm. Diameter-adapted guides with a somewhat smaller diameter protect the coil.

Sensor system M

Magnetising yokes (M 40, M 90, M 140, M 170, and M 240) are available for testing ferromagnetic material. In general, circumferential coils are used. Size-adapted steel nozzles which simultaneously protect the coil are used for magnetisation. Segment coils can also be used. If magnetisation is performed during eddy-current testing, it is generally necessary to demagnetise the test pieces again after testing. Demagnetisers EMAG M and F which are integrated directly in the testing line are available for this purpose. Solid material can be magnetised and demagnetised up to moderate cross-sections (diameter approx. 60 mm).

Sensor system S

Segment coil holders with electromagnetic yoke LSM 180 and with permanent magnetisation LSP 180 are offered for partial testing with partial longitudinal magnetisation. Special versions are available for sizes greater than 180 mm. Coil holders SH 180 are available for testing non-ferromagnetic materials. The height of all sensor systems S can be adjusted by means of a stand.

Sensor system FD

A fine-wire sensor system is used for testing tungsten and molybdenum wire for the lamp industry in the diameter range 0.1 to 2 mm. Special-purpose, small coils with differential and absolute winding and nozzles in addition to guide elements are adapted to this application.

Sensor system T 60

A rugged sensor system matched to the rough conditions, including guide elements, has been developed for use on hot-rolling lines (at temperatures up to 1,200 °C and rolling speeds up to 150 m/s). Water-cooled coils and guides for material with diameters ranging from 5 to 60 mm are available. Special guide elements steady the wire.