MAGNATEST TCL

Magneto-inductive microstructure testing of components critical for safety and operation

MAGNATEST TCL: Smart and efficient microstructure testing

Do you manufacture components that are critical for safety and operation? Then you know: even with a fully automated production process, material mix-ups and/or incorrect heat treatments sometimes happen. Not only can this lead to considerable financial losses in the production line, it might also cause real harm to the end user. With the MAGNATEST TCL, FOERSTER has developed a cost-effective but very efficient test system for 100% inspection. It can be used both in series production and for manual testing. The various sensors are automatically recognized via a data chip, thus eliminating tedious fine-tuning.

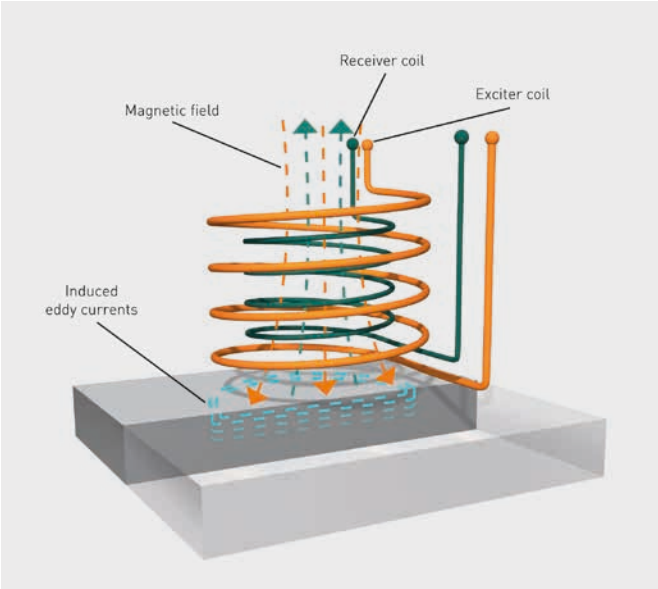
The benefits:

- **Magneto-inductive testing with fundamental and harmonic evaluation:** broad frequency range from 4 Hz to 20 MHz, continuously adjustable in 1 Hz steps.
- **100% control using non-destructive testing method:** ideal for all eddy current testing requirements.
- **State-of-the-art software with intuitive user interface:** support functions (wizard) ensure easy operation during parameterization.
- **Improved test quality:** short cable runs between the MAGNATEST TCL and the sensor system minimize interference.
- **Innovative probe recognition:** data chip automatically recognizes the probe, directly loading its settings.
- **Easy automation and line integration** via I/O interface.

Operating principle & fields of application

Magneto-inductive microstructure testing

To test for their material properties, the components are passed through an encircling test coil or are spot-checked at critical areas with customized probes. The test voltage recorded by the sensor is a result of the magnetic and electrical properties of the part under test. This voltage value is graphically displayed as a measurement point in the complex plane. Sorting limits are determined by recording several such values during calibration. The system compares the measurement points of the series test against the tolerance range and evaluates them. Defective components can then be sorted out automatically.



Highly versatile for efficient quality control

The MAGNATEST TCL is designed to carry out fully automated, non-destructive eddy current testing for 100% inspection in series production. In addition, it can be used for manual testing, e.g. in a laboratory for quality assurance.

Typically, the parts that are tested are relevant for safety systems and/or critical for functioning in various industrial sectors, including automotive, aerospace, rail, shipbuilding, power engineering, electronics, medical technology, and oil or gas.

The fields of application are as versatile as the components themselves. The only prerequisite for testing is that the material is electrically conductive.

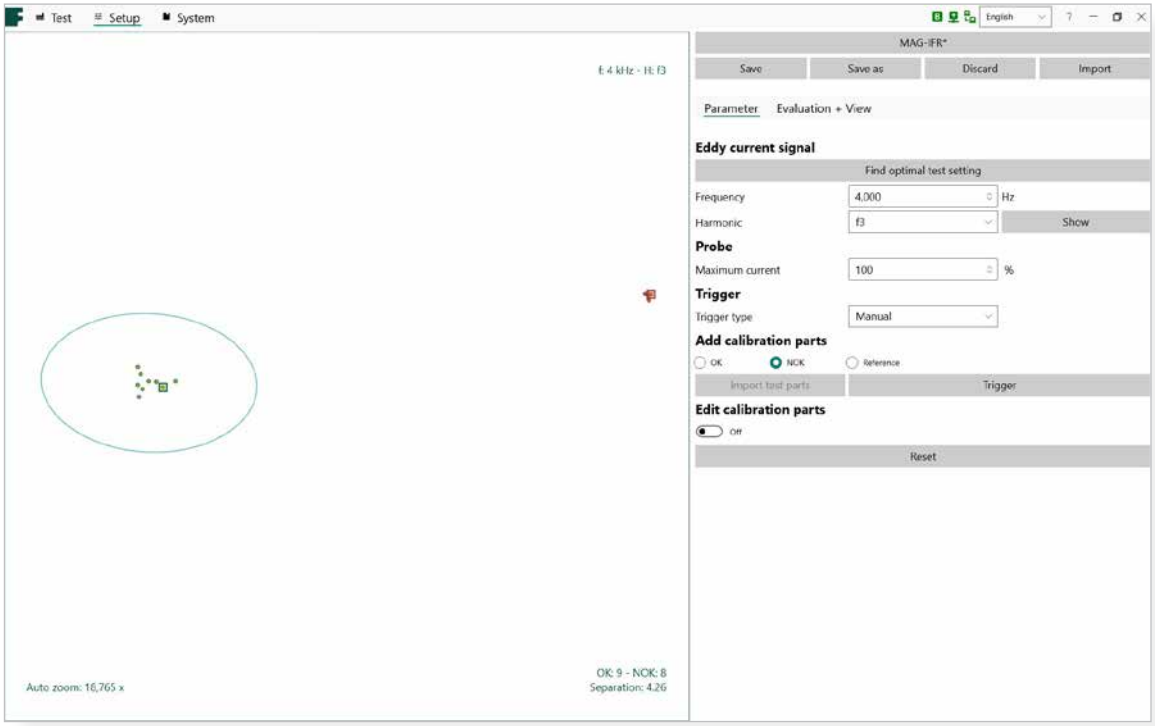
Typical testing tasks include:

- Detection of material mix-ups
- Alloy composition testing, inhomogeneity testing
- Microstructure testing: e.g. austenite, ferrite, pearlite, cementite, ledeburite, dendrites, etc.
- Testing of different heat-treatment states: hardening, tempering and annealing
- Hardness and strength testing (Young's modulus)
- Testing of case hardening and case hardening depths
- Monitoring of geometric properties: dimensional accuracy, machining condition
- Testing of coatings and surface treatments

Technical data

Product features	MAGNATEST TCL
Dimension & Weight	176 x 109 x 35 mm; 0.5 kg
Power supply	24 V, 1250 mA (AC adapter optional)
Permissible ambient temperatures	+5 °C to +40 °C (+41 °C to +104 °F)
Relative humidity	8% to 80%
IP	IP40
Frequency range	4 Hz to 20 MHz
Excitation	Mono-frequent
Evaluation	Fundamental (f1); Harmonics (f3 – f11)
Test resolution	Manual, external, auto
Sorting threshold	Circle, ellipse, rectangle, convex case
Throughput	Depending on test frequency, approx. 10 parts per second at 1 kHz

MAGNATEST TCL: Reliable and intuitive, with sophisticated features



Modular, compact and flexible

The MAGNATEST TCL test system consists of the test channel line (TCL) and a PC with testing software. For automated inspection, FOERSTER offers an industrial PC equipped with an interface module (digital I/O), which enables process-safe testing and stable interface communication at high throughput rates. Very short cycle times are made possible by fast inputs directly at the test channel.

All the constituent parts of the MAGNATEST TCL can be installed in an equipment cabinet. Alternatively, its compact design allows installation directly in the line. This significantly shortens the cable lengths required between the sensor system and the test channel and minimizes negative impacts on the test quality. The data stream is transmitted to the evaluation electronics via Ethernet. A (touch) screen and/or keyboard plus mouse is required for visualization and operation.

Optimized ease of use

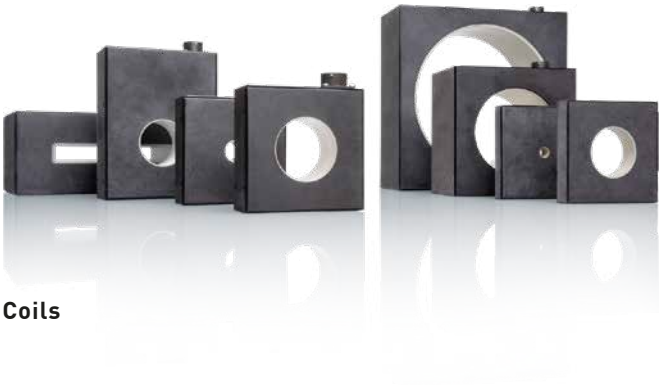
The modern software of the TCL test system is intuitive and optimized for touch operation. Embedded help screens are always available if questions come up. In addition, there is a wizard to support you in setting up the test parameters, but it is not mandatory to use it. In addition to a wide frequency range (4 Hz to 20 MHz), the MAGNATEST TCL features fundamental and harmonic evaluation. The test can be triggered manually, externally by the PLC, or automatically (internally). Password protection prevents outside intervention in the test.

In test mode, the results are displayed in the impedance plane and as a bar graph. Afterwards, the report function facilitates comprehensive documentation.

Robust sensors for precise test results

FOERSTER sensors for high-quality test results
FOERSTER, as a leading manufacturer of test coils, is always striving to bring its customers the newest and most innovative sensor solutions for optimum test results. We therefore offer a wide range of sensors for different shapes and diameters. Tried and tested through decades of use, the sensors provide reproducible test results for both quality control and process control. Depending on the test task and the complexity of the components, we can also develop application-specific sensor technology just for you.

Of course, all existing MAGNATEST sensors can be made compatible with the new MAGNATEST TCL by means of adapters. In addition, the new TCL sensor technology features automatic probe recognition, which loads all the relevant sensor data for optimum test settings via a data chip.



Coils

Probes

Shape adapted probes

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