

**MAGNETO-INDUCTIVE  
TESTING WITH MAGNATEST  
D-HZP/DH-HZP**

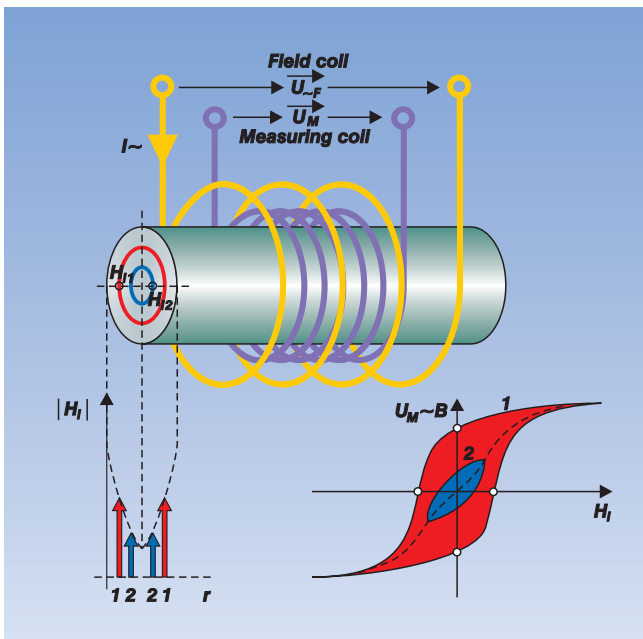


# MAGNETO-INDUCTIVE METHOD FOR SEMI-FINISHED PRODUCT TESTING

## Mode of operation

The MAGNATEST® is a test instrument for non-destructive testing of metallic materials for their different magnetic and/or electrical properties on the base of magneto-inductive method. The part under test is exposed to a magnetic

influenced by technological parameters like hardness, alloy content and grain structure a determination of those parameters is particularly sensitive to the magnetic properties. Choosing the appropriate excitation frequency and amplitude



▲ Scheme to magneto-inductive method.

field. Eddy currents are induced within the electrically conductive material. Additionally the part is magnetized as far as ferromagnetic material is to be tested. The voltage induced in the receiver winding depends on the electrical conductivity (electrical property) as well as on the shape and size of the hysteresis curve (magnetic property). Since the hysteresis curve itself is strongly

allows selective observation of core and surface characteristics (skin effect).

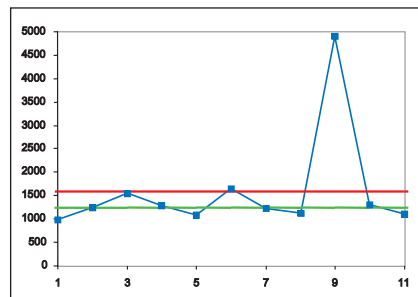
### Application

In the manufacturing process of tubes, bars, wire, billets etc. the MAGNATEST D-HZP with serial multi-frequency testing and especially the MAGNATEST DH-HZP with simultaneous multi-frequency testing described below is used for grade and heat treatment verification.

### Simultaneous clearly faster than serial

Basically the multi-frequency testing increases the reliability of the test result. The simultaneous multi-frequency testing of MAGNATEST DH-HZP offers in contrary to serial multi-frequency testing

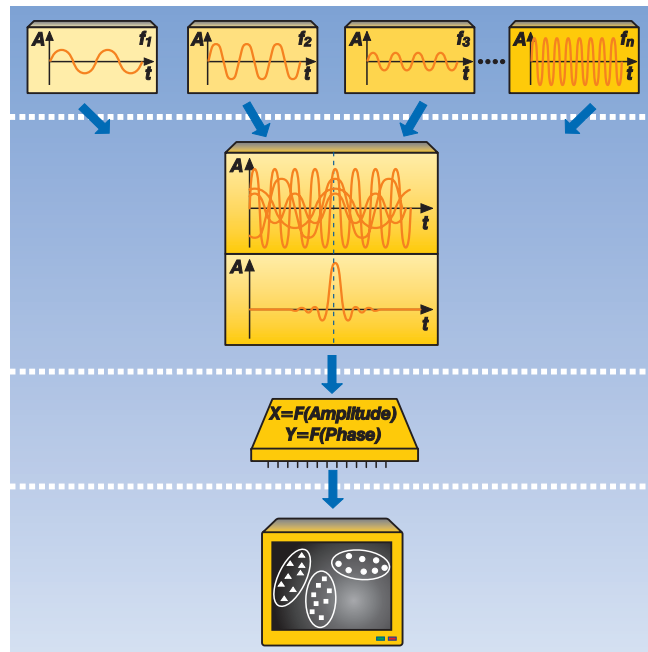
technique allows special evaluation algorithms, as the median calculation, see figure. By this mean the test reliability increases as well. The excitation signal is automatically optimized by selecting lower and upper limit values of the frequency band. It contains concurrently



▲ Result display: the Median calculation suppresses measured outliers in a better way than the mean value and is more significant.

important advantages. Especially regarding to high speeds in automatic lines a higher number of measured values along one tube/bar are possible. The overall result is then based on higher number of values. Additionally modern, fast computer

several test frequencies and only the lowest one determines the excitation time and consequently the test speed. All other higher frequent signal components do not lead to an increase of excitation period and consequently test speed.



▲ Generation of a simultaneous multi-frequency signal excitation.

# INTEGRATION IN TESTING LINES



With courtesy of Edelstahlwerke Südwestfalen Siegen, Germany.



## Integration

The MAGNATEST DH-HZP is easy to integrate in testing lines and complete FOERSTER Flaw Testers DEFECTOMAT®, CIRCOGRAPH®, ROTOMAT®, TRANSOMAT® or CIRCOFLUX®.

The **Instrumentation Software** – a Data Management Tool from FOERSTER – combines the various testing systems. This enables a central setting and a summarized display of test results for evaluation and documentation.

## Features of MAGNATEST D-HZP / DH-HZP

- Processor controlled test system
- Single-coil absolute operating mode, therefore no compensation coil required
- Constant excitation current; therefore defined magnetic field over the whole test
- High output current amplitude is possible for a high sensitivity of the magnetic properties by selecting the shape and size of the hysteresis loop
- Multi-frequency testing for better reliability
- Simultaneous multi-frequency testing for highest test speed (with option DH-HZP)
- Statistically calculated sorting gates according to the number of calibration pieces
- Activation of a dynamic calibration mode
- Activation of a trend tracing during test mode
- Simple operator interface thanks to application specific function keys and high-resolution TFT color display
- Standard interfaces for peripheral devices (keyboard, mouse, printer, USB, network, etc.)



## Sensors

All test coils of the MAGNATEST S system can be used. Round and rectangular coils are available.



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