Measuring forces. Providing solutions.

Magnetic field measurement to ensure function and quality.
Diverse applications.
Precise results.
From measuring magnetic fields to determining coercive field strength.

The DM Division offers equipment systems based on passive magnetometer technology. Dr. Friedrich Förster, the company’s founder, has developed the Förster-probes (fluxgates), which provide the basis for a wide spectrum of applications such as geomagnetic measurements or non-destructive testing of semi-finished metallic products and the resulting finished components.

INSTITUT DR. FOERSTER has worked for over 60 years to develop magnetic field measurement techniques and derive processes for non-destructive material testing. The DM division utilizes this unique expertise to produce highly-sensitive, precise magnetometers.

This measuring equipment is specifically developed for the measurement of magnetic parameters such as flux density, specific saturation, relative permeability, and coercive field strength. In addition to the development, manufacture, and sale of equipment, the internationally active company also offers comprehensive services such as training for future users, service, measurement equipment calibration, and contract measurement.

MAGNETOMAT®
The PC-supported equipment system enables high-resolution magnetic field measurement for the precise identification of the direction and magnitude of magnetic fields. Three-axis sensors are available for the spatial determination of magnetic fields and can be networked if required.

MAGNETOSCOP®
This easy-to-manage, portable device covers a wide spectrum of measurement applications based on an extensive range of probes. These include permeability measurements for feebly magnetic materials.

KOERZIMAT®
The KOERZIMAT® delivers reliable data for coercive field strength or weight-specific saturation magnetization on hard- or soft-magnetic components. Specifically configured device systems are available depending on the application area—from labs to series production.
Absolute magnetic neutrality is often a decisive factor in ensuring the usability and function of materials, components, and products. It is therefore essential to determine even the minimal presence of magnetic particles. The MAGNETOMAT® is a PC-supported system that measures even the smallest field strengths along up to 3 axes, enabling it to detect ferritic inclusions or adhesions.

Applications in research and production.

Wherever the metal manufacturing and processing industry requires the highest non-magnetic purity for its products, the MAGNETOMAT® HotSpot technique for magnetic residual field measurement is the most precise and reliable method. It is specifically applied to test semi-finished products (rods, pipes, sheet metals) and components for magnetic anomalies (“hot spots”).

The digital 3-axis sensors enable applications ranging from laboratory use with a single sensor to complex field and component measurements with a large number of networked sensors. Fluxgate probes transmit the measurement results to a conventional PC, where they are displayed by the MAGNETOMAT® software, saved, and documented according to job.

At home on oil rigs.

The petroleum and natural gas industries present some of the most challenging application areas for field strength measurements. The exceptional precision and reliability of the MAGNETOMAT® make it standard measuring equipment in these contexts. To avoid declinations during directional drilling, the collars on the drill pipe must exhibit only minimal magnetic properties. The specification API Spec 7 stipulates exact limits.

Applications:

- High-resolution magnetic field measurement in 1 to 3 axes
- Measurement of the relative permeability of materials in the range $\mu_r = 1$ to $2$
- Measuring the demagnetization status of workpieces
- Quality control for stainless steels
- Measurement of ferromagnetic particles / inclusions in materials, e.g. for non-ferrous-metal recycling
- Detection of material changes even at concealed locations, e.g. on gas turbines

MAGNETOMAT® technical features:

- Modular concept with digital 1-axis to 3-axis sensors
- Identical point of measurement for all three sensor axes
- Magnetic flux density measurement: absolute and as a gradient
- Measuring range $\pm 100 \mu T$; others on request
- High sensitivity of 0.1 nT
- CAN bus applications for sensor networks
- Interfaces for external triggering and data export
- Battery or AC operation
- Application-based software versions
Two applications, one instrument.

With a variety of measuring probes customized for specific applications, the MAGNETOSCOP® covers a wide range of applications. Different operating modes, data recording, and statistical functions assist users with their tasks.

The clearly arranged display visualizes measurement results as well as all relevant additional information.

Measurement of magnetic flux density:
- Magnetic flux density measurement: absolute and as a gradient
- Measuring the geomagnetic field and its anomalies
- Detecting magnetic interference fields
- Localizing magnetic inclusions in workpieces

Measuring relative permeability:
- Measurement of the relative permeability of materials in the range $\mu_r = 1$ to $2$
- Detecting non-magnetic material properties
- Quality control for stainless steels
- Detection of material changes even at concealed locations, e.g. on gas turbines
- In accordance with IEC 60404-15

MAGNETOSCOP® technical features:
- Handy, microprocessor-controlled
- Compact instrument with large-format display
- RS232 interface for data transmission
- CompactFlash disk for storing data and instrument settings, and for transferring to PC in txt-format
- Peak value detection and storage
- Adjustable thresholds for limits
- Optical and / or acoustical alarm signals
- Battery or AC operation

Magnetic field measurements are often indispensable in research and development, as well as in series production. The measurement of relative permeability is a frequently used evaluation method, for example in the selection of certain materials or when conducting safety checks on highly stressed components. As a compact, robust, and portable measuring instrument, the MAGNETOSCOP® is well-equipped for highly-sensitive detection in both areas.
In many metal processing fields, determining the saturation magnetization provides information on material composition and properties, and therefore material quality. Common applications for the KOERZIMAT® MS are the geometry-independent, weight- and volume-specific measurement of the magnetizable material portion in steels, as well as the binder in hard metals.

**Applications for MS measurement:**
- Determining the magnetic moment as well as the volume- and weight-specific saturation magnetization $\sigma_s$
- Measurement of magnetizable material portion
- Quality control for metal powders for magnet and hard metal production
- Monitoring of the subsequent sintering process
- Indirect measurement of carbon content, or free cobalt or nickel content in hard metals
- Determination of the martensite content in austenitic steels

**KOERZIMAT® MS technical features:**
- Resolution $2 \times 10^{-8} \text{Tm}^3 / \text{kg} \approx 0.1 \text{mg Co}$
- Very strong constant magnetic field of 1.15 T
- Compact construction using a Halbach array
- Measurement of large test piece masses up to 200 g
- Test inserts for defined positioning of the test pieces at the measuring location
- Pneumatic feed for large test pieces
- Withdrawal method in accordance with IEC 60404-14
- Software for the control of individual and series measurements
- Hard metal testing according to ASTM B886

The coercive field strength $H_C$ specifies the value of the magnetic field strength necessary to decrease the magnetization of ferromagnetic materials to zero. The PC-supported KOERZIMAT® HCJ measuring system enables the rapid, geometry-independent measurement of these variables. The coercive field strength correlates to a variety of mechanical material properties.

**Application for $H_C$ measurement:**
- Determining the structure of hard metals after the sintering process
- Checking electromechanical components in the electrical, automotive, and watch industries
- Monitoring the mechanical processing of components
- Monitoring the thermal treatment of steel

**KOERZIMAT® HCJ technical features:**
- Extremely large measuring range up to 100 kA/m
- Magnetization field strength up to 450 kA/m
- Measurement in open magnetic circuit acc. to IEC 60404-7
- Hard metal testing acc. to DIN ISO 3326 and ASTM B887
- Software for the control of individual and series measurements
- Convenient management and archiving of the parameter sets for different test pieces
- Database for recording measurement and job data
- Creation of customer-specific reports

**KOERZIMAT® HCJ Full component demagnetization.**
Coercive field strength as a quality feature.

**KOERZIMAT® MS Maximum component magnetization.**
Saturation magnetization as a quality feature.
KOERZIMAT® ROBOTIC
Automatically economical.
Fully automatic parts feed for increased productivity.

Part for part, with no interruptions. The KOERZIMAT® ROBOTIC measuring system is designed to perform fully automatic, unattended series measurements. Standardized sequences in combination with previously specified parameters ensure measurement results under constant conditions – part for part. A comprehensive documentation of measurement results permits the detailed analysis and quality assessment of test pieces.

Series measurements that still offer high variability. The test pieces are placed on trays and inserted into the commissioning station. A transponder integrated in the tray transmits the job data to the KOERZIMAT® ROBOTIC. This information is used to apply the appropriate test parameters for measurement, guaranteeing maximum flexibility for placing various specimens in the trays.

KOERZIMAT® ROBOTIC features:
- Handling system for fully automatic series measurement of ferromagnetic test pieces
- Mobile system designed as a rolling laboratory table
- Large-capacity magazine for fully automatic, unattended series measurement over a long period
- Continuous tray change possible
- Test piece identification via the transponder
- Data interface for linking to the customer host
- Possibility to integrate existing KOERZIMAT® components at customer site

Extremely precise monitoring of ferromagnetic component properties can be achieved by measuring the saturation magnetization $\sigma_s$ and coercive field strength $H_C$. The KOERZIMAT® ROBOTIC makes these processes highly cost-effective.

Measuring system stations and components:
- Commissioning station with two tray stack magazines and tray conveyor belt
- Magnetic gripper with x/y linear drive
- KOERZIMAT® measuring module
- KOERZIMAT® coil
- KOERZIMAT® saturation magnet
- Precision balance
- KOERZIMAT® manipulator
- PC workstation for controlling the measuring program and administering the data
- PLC control panel with display
Measurement and corporate results have a common denominator: they need to be accurate. For economical reasons or when highly complex measurements are required, companies often decide to hire specialized service providers. As internationally recognized experts in the field of magnetic field measurement, we employ our know-how and support companies with contract measurement work.

Here’s to positive collaboration.
Our services are completely geared to your requirements. They range from the measurement and evaluation of individual test pieces to series measurements. We conduct measurements on our own premises under certified lab conditions. We can also assist you with parts sampling and qualification processes for your production. Please contact us with your specific requirements.

Contract measurement services:
- Coercive field strength
- Saturation magnetization
- Density measurement
- Relative magnetic permeability
- Residual magnetic field

Applied standards:
- EN 10330
- IEC 60404-7
- IEC 60404-14
- IEC 60404-15
- DIN ISO 3326
- DIN ISO 3369
- ASTM B886
- ASTM B887
- In the near future: ASTM A342

Service/maintenance/calibration.
Based on reference values.
From a single source – directly from the manufacturer.

Measuring equipment provides accurate and generally comparable data when it uses reference values. FOERSTER equipment is calibrated prior to delivery. However, regular recalibration is necessary to preserve the quality of measurement results. Maintenance and service ensure the proper function and constant availability of the equipment.

Regular recalibration for quality assurance.
Our measuring equipment, probes, and comparative measurement standards are calibrated based on the national standards of the German metrology institute (Physikalisch Technische Bundesanstalt, PTB). Our calibration services cover the inspection of equipment for proper function – without added costs for our customers. Any required repairs are only conducted following consultation and a cost estimate.

Service and maintenance.
Regular, qualified maintenance substantially increases the service life of your measuring system. FOERSTER offers maintenance and service on site or at our premises.
The full benefits of an investment in FOERSTER measuring systems can only be experienced once users have been instructed in all functions and possibilities. We therefore offer ongoing comprehensive training for the handling and use of our equipment.

Expertise that pays off.
We convey our know-how about the efficient use of equipment and systems in our training center or at the customer’s site on request. The full program covers the instruction and training of users and training of service personnel. FOERSTER seminars are structured into basic and advanced courses. In all cases, our emphasis is on the rapid and practical application of acquired knowledge. Our well-designed didactic units therefore combine theoretical knowledge with practical exercises.

Acquiring knowledge. Working efficiently.
Seminars and courses for increasing the value of your measuring systems.

Company principles.
We live our values.
Business success, social responsibility, cooperation.

As a third-generation family business, FOERSTER has always demonstrated the entrepreneurial vision that is responsible for the company’s current position in the area of magnetic field measurement. This successful development is fundamentally intertwined with the awareness that only responsible actions can expand our market position and secure jobs in the long term. The main foundation for these achievements is developing cutting-edge technology and top quality products.

To ensure its long term success, FOERSTER offers its highly qualified employees a professionally inspiring working environment that is steeped in social responsibility. We have an additional commitment to our ongoing global cooperation with customers, suppliers, and scientists, with the objective of mastering future technological challenges.
Sales and service offices

- FOERSTER TECOM, s.r.o.
  Czech Republic
- FOERSTER FRANCE SAS
  France
- FOERSTER UK Ltd.
  Great Britain
- FOERSTER ITALIA SRL
  Italy
- FOERSTER RUSSLAND CJSC
  Russia
- FOERSTER JAPAN Ltd.
  Japan
- FOERSTER INSTRUMENTS Inc.
  USA
- NDT INSTRUMENTS Pte. Ltd.
  Singapore