COERCIGRAPH CM - 500

Coercimeter for soft magnetic samples

• Introduction

The COERCIGRAPH CM-500 is a fully automatic, computer-controlled measuring device for measuring the (quasi) static measurement of the coercive field strength of soft magnetic materials and components.

The COERCIGRAPH CM-500 meets all the requirements of the IEC 60404-7 Method B standard. Measurements can be carried out on bars, flat material and complex-shaped finished parts.

In addition to material testing, the measuring device is also suitable for process monitoring. On the way from the starting material to the finished part, the magnetic properties of the workpieces are changed by mechanical forming. Machining processes such as punching, eroding, water jet cutting, deep drawing, turning, milling, etc. influence the magnetic properties of a part. A blunt tool in the process can make the difference between an OK- and a NOK-part. These differences can be measured with the COERCIGRAPH. The system is also suitable for monitoring annealing processes.

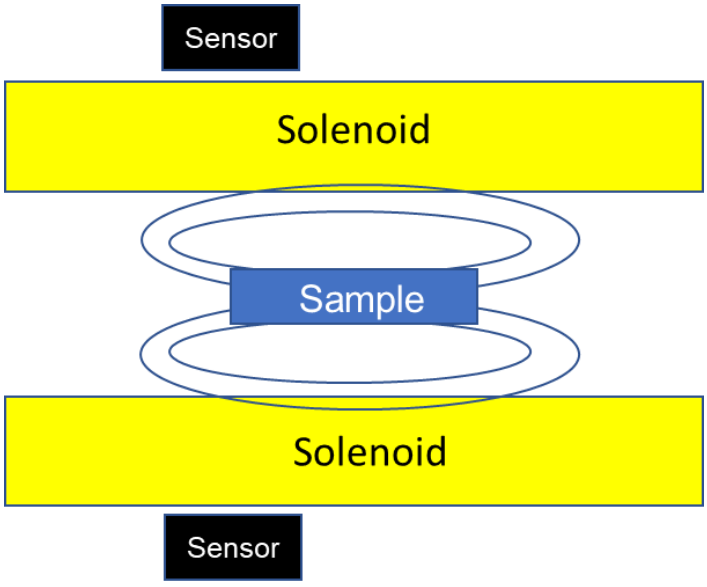
• Operation

To determine the coercivity, the sample to be measured is placed in a cylinder coil. A magnetic field is generated in the cylinder coil, which initially magnetizes the sample. The saturated sample is then demagnetized in a steadily increasing opposing field until the residual magnetism is zero. This field strength is determined as the coercive field strength.

The stray field of the sample and thus indirectly its polarization is measured using extremely sensitive fluxgate sensors. The measurement process is software-controlled.

The measurement takes place in the open magnetic circuit. This enables the measurement of parts with complex geometry, such as valve parts, small rotors, armatures, pole plates, splitters, etc.

The coercimeter has a detailed safety concept and uses various safety circuits, such as temperature monitoring of the solenoid and safety flaps.



Schematic setup of MC 500

Features

- Conforming to IEC 60404-7 Method B
- PC-controlled measuring system
- Geometry independent measurement
- Software for controlling single and serial measurements
- Setting of measurement parameters speed, amplitudes, demagnetization
- Database for recording measurement data and parameter sets
- Customized reports
- Automatic Adjustment of Fluxgates for stray field compensation
- Measurands: $+H_c$, $-H_c$ und H_c

Technical Data

- Magnetization field strength: up to 135 kA/m continously
- Measring field strength: up to 2kA/m
- Field homogeneity: ±0.5% in sample space L = ±92mm x D=40mm
- Field setting accuracy: better 0.1%
- Measurement uncertainty: 1% of measurand
- Measuring element: Fluxgate-sensors
- Sensitivity: 100mV/µT
- Resolution: 24 Bit
- Universal sample holder: L = 400mm
- Measurement duration: 10s to 300s
- H_{cJ}: 0 – 100 kA/m
- $\mu_r(H)$: 10 – 4000
- Magnetize and measure independently definable field ramps

- Freely selectable field or current limitation
- Control according to Max. *H*, or Max. current *I*

The entire measuring setup of the COERCIGRAPH CM - 500 consists of:

- MC 500
- Equipment cabinet
- Amplifier
- Computer
- Software
- Software

Features of *REMA* – Software for REMAGRAPH®

- Flexible, user friendly operation using menus, function keys, shortcut keys or icons
- Extensive help file, context sensitive help
- Convenient input of measuring parameters
- Saving and opening of parameters and measuring data
- Multiple measurements can be simultaneously open for easy comparison
- Existing measurements can serve as templates for new measurements
- Automatic calculation of measuring results
- Automatic saving of measured data, parameters and results (e.g. under a test name or number)
- Saving of a group of associate measurements into a single file
- Export of measuring data, parameters and results to text files or to Microsoft Excel® files
- Export of parameters and results to text databases or SQL databases, a database viewer is integrated in the software
- Print preview for measuring diagrams with curves, parameters and results
- Output of measuring diagrams to a printer or pdf writer (printer and pdf writer not included)
- Copying of measuring diagrams and result lists via the Windows® clipboard
- Saving measuring diagrams as pictures (bmp, gif, jpeg, png) for easy distribution
- Various possibilities for customer specific output design like selection of curves, calculated results, units, measuring parameters, user-definable information texts, company logo, etc.
- User-definable limit classifiers for all results (out of range results are shown in red or boldface)
- Display of multiple curves in one diagram including results
- Optional display of averaged results of multiple measurements
- Different output diagram layouts can be saved for easy switching between different outputs
- Selectable units for magnetic quantities, temperatures, specimen dimensions and other parameters
- Full support of SI and CGS units in software and output, changing units is possible at any time
- Simultaneous display of results in mixed SI and CGS units can be configured by the user
- The number of significant digits to be displayed for results can be selected by the user
- Creating of result lists for multiple measurements incl. possibility of saving, copying and printing
- Program menu access can be restricted for selected users (password protection)
- Microsoft Windows® 10 / 11 compatible

• Parameter

- Default parameters minimize the number of necessary inputs
- Automatic identification of measuring coils and coil data
- Calculation of the magnetic path length of rings and rectangular cores
- Input of room and specimen temperatures in °C, °F or K
- Input of the measurement and specimen identification data in predefined or user-defined text lines
- Extensive parameters verification to avoid illegal or inconsistent settings

Measurement

- Adjustable demagnetization parameters (amplitude, frequency, duration)
- Excitation to a desired excitation level for the magnetizing current *I*, or field strength *H*
- Measurement with constant speed (d*I*/d*t* = konst.)
- Series measurement feature: allows automatically running a sequence of different measurements on the same specimen, for example different excitations or different measuring conditions
- Automatic room temperature recording with optional room temperature sensor

Evaluation

- Maximum field strength H_{max}
- Normal coercivity H_{cB}
- Output of specimen and measurement parameters and calculated results to ASCII text files, Microsoft Excel® worksheets (xlsx) or Microsoft Excel® xml spreadsheets
- Output of specimen and measurement parameters and calculated results to databases

Services

Taking into Operation and Training – at the Premises of MAGNET-PHYSIK

Training in the operation and software of the computer controlled REMAGRAPH®.

The training takes 1 day and is included in the standard packages. The customer bears all costs in connection with the journey, stay, accommodation, etc.

Taking into Operation and Training – at the Premises of the Customer

Training in the operation and software of the computer controlled REMAGRAPH®.

The training takes 1 day and is at the customer's expenses. Additionally the customer bears the costs for our employee in connection with the journey (incl. expenses for travelling hours), stay, accommodation, etc.

Due to continuous product improvements, specifications are subject to change without notice.

MAGNET-PHYSIK Dr. Steingroever GmbH
Emil-Hoffmann-Straße 3, 50996 Cologne, Germany
Phone: +49 2236 3919-0 ▪ Fax: +49 2236 3919-19
info@magnet-physik.de
www.magnet-physik.de

MAGNET-PHYSICS Inc.
6330 East 75th Street, Suite 224, Indianapolis, IN 46250, USA
Phone: +1 317 577 8700 ▪ Fax: +1 317 578 2510
info@magnet-physics.com
www.magnet-physics.com

