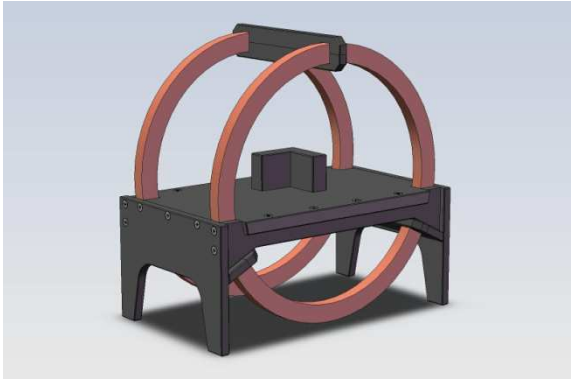
TriM – Measurement of the Magnetic Moment M_m

In most applications permanent magnets shall provide a specific magnetic flux (e. g. in electric machines) or a specific spatial field distribution (e. g. sensors). The decisive factor is the magnetic moment M_m and not only the remanent induction of the magnet.



TriM stands for *m*easurement of the *m*agnetic *m*oment and allows the fast and cost-effective determination of M_m as well as further characteristic values. The measuring system is offered including Helmholtz coils, Fluxmeter and user-friendly software.

Fields of application

- Precise rating of series deliveries by the calculation of the working point polarization J_r' from the volume according to equation (1)
- Measurement of magnets with bent or untreated pole faces or broken edges (M_m is calculated from the volume via weight and specific density)
- Calibration of Permagraph measurements of high energy density magnets (SmCo, NdFeB)
- Precise calculation of the remanent induction B_r via the permanent permeability μ_p
- Calculation of the grade of saturation after magnetization (Has the magnet been fully magnetized? Has the magnet been partially demagnetized?)
- Rating of the coercivity H_{cJ} of the magnetic material after exposure to different temperatures in the sheared condition

Description of the device

The magnetic moment can be calculated from the working point polarization J_r' and the volume V of the permanent magnet:

$$M_m = J_r' * V / \mu_{\hat{o}} \quad (1)$$

Our device TriM determines M_m in a Helmholtz coil in combination with a Fluxmeter. The magnetized magnet is placed in the center with the magnetization direction parallel to the coil axis. Taking off the magnet or rotating the magnet by 180° excites a flux change $\Delta\Phi$ which induces a voltage u(t) = - dΦ/dt in the coils. The Fluxmeter integrates the flux change independent of the rate of change.

The magnetic moment is calculated from the measured flux change $\Delta\Phi$ multiplied with the Helmholtz constant k_H [cm], which depends on the number of turns and the winding geometry.

$$M_m \sim k_H * \Delta\Phi / \mu_o \quad (2)$$

The precise measurement of the magnetic moment allows the evaluation of the quality of permanent magnets without time consuming and expensive measuring technology like vibration magnetometers or a Permagraph.

About us

SEKELS GmbH develops, produces and trades technical products which are mostly related with magnetism. With a team of about 20 employees, more than half of them being physicists or engineers, SEKELS presently serves more than 500 customers worldwide.

As an expert distributor of German VACUUMSCHMELZE GmbH & Co. KG we are offering an in-depth knowledge of their product lines and the applications, are available for technical consultation and provide the fast availability of samples and series deliveries through comprehensive stock keeping and worldwide logistics.

SEKELS develops, designs and produces customer-specific laminations and core packages, magnetic shielding and shielding systems, inductive components and magnet systems - from prototyping to series deliveries.

All parts, components and systems are either produced in Germany, or with quality partners in Eastern Europe based on our technical specifications. We are DIN EN ISO 9001:2008 certified and familiar will the relevant norms and standards.

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