CONCEPTS

For a better understanding of the technical specifications, listed below are a number of simple explanations of technical terms relative to magnetic engineering.

AIR GAP

The gap formed in the space between the poles of the magnets or of the magnetic systems and the ferrous object attracted. The smaller the air gap, the greater the magnetic force.

ANISOTROPIC

Throughout the production process of anisotropic magnets the material is exposed to a strong magnetic field. Therefore in the material higher magnetic values occur in the magnetic field direction than in the direction perpendicular to it.

B (MAGNETIC INDUCTION)

Magnetic properties in a ferrous material that are caused by an external magnetic field. In the MKS-system the unit used to measure the amount of magnetic induction is (milli) Tesla. Previously in the CGS-system Gauss was used (1G = 0.1 mT).

BARIUM (CARBONATE)

In the production of ceramic magnetic materials barium carbonate is added to iron oxide. During the sintering process these substances together form Barium ferrite ($BaO_6Fe_2O_3$). Barium is an element belonging to the 2A group (alkaline-earth metals) of the periodic system and takes atom number 56.

BH MAX (ENERGY DENSITY)

The highest possible product of B and H on the demagnetization curve (BH max.), respecting the magnetic induction and the magnetic-field intensity. This is measured in joules per cubic meter (kJ/m^3).

CURIE TEMPERATURE

At this temperature permanent magnetic materials lose their magnetization. Most materials can be re-magnetized after being brought back to normal temperatures.

DEMAGNETIZATION

Process to reduce the flux within a permanent magnet to either a set limit or to zero. Can occur through exposure to high DC or AC magnetic fields, or by heating to temperatures near to or above the Curie temperature.

DENSITY

Specific weight or density measured in g/cm^3 or kg/dm^3.

FLUX DENSITY

The density of the magnetic flux lines measured in mT or in G.

GAUSS

Unit from the old CGS-system previously used to measure for instance magnetic flux density (G). In the new system the milli Tesla (1mT = 10 G) is currently used.

H

The field intensity in kA/m (see also under Normal coercivity).

HYSTERESIS GRAPH

Graph showing the curve of the magnetic induction as a function of the magnetic-field intensity.

ISOTROPIC

The same magnetic properties in all directions.

J

Magnetic polarization.

The magnetization of magnetic material under a specific field intensity.

MAGNETIC FLUX

The system of (imaginable) magnetic flux lines passing through a defined part of the magnet. Flux is measured in units of Weber (Wb).

MAGNETIZATION

The application of magnetic properties to a magnetic object by applying an external magnetic field. The time necessary for the application of these properties is very short and one strong impulse is sufficient.

MAGNETIC CIRCUIT

The combination of permanent magnets, pole plate, air gap and leakage field, also known as the magnet system (or part of).

MAGNETIC POLE

The point on the magnet where the magnetic flux lines leave the magnet.

MAXWELL

Unit of magnetic flux. This occurs in the same unit system as the Gauss unit (see under Gauss).

NORMAL COERCIVITY

The negative field intensity in which magnetization of a material that has previously been magnetized up until saturation point is zero. In the MKS-system this is measured in kA/m (kilo ampere per meter). Previously in the old CGS-system, this was measured in Oe (oersted): 1 kg/m = 12.5 Oe.

OERSTED

Unit of magnetic field-intensity. This occurs in the same unit system as the Gauss unit (see under Gauss).

OPERATING TEMPERATURE

The environmental temperature to which the magnet or the magnet system can be exposed and which has a minimum (min.), a maximum (max.) and a typical (typ.) value. This typical value is applied to standard measurements concerning magnets and magnet systems and is listed in the specifications.

PERMEABILITY

The general term to express the relationship between magnetic flux density and applied magnet field strength, ie. the instantaneous value of B/H.

REMANENCE

The intersection of the hysteresis curve with the y-axis (B-axis).

STRONTIUM

In the production of ceramic magnetic materials strontium carbonate is added to iron oxide. During the sintering process these materials form together strontium ferrite ($BaO_6Fe_2O_3$). Strontium is an element belonging to the 2A group (alkaline-earth metals) of the periodic system and takes atom number 38.

TEMPERATURE COEFFICIENT

The extent of dependence of the remanence and the Normal coercivity as a result of temperature changes.

TESLA

The unit of magnetic induction in the MKS-system. 1T = 10.000 G

WEBER

The unit of magnetic flux. This occurs in the same unit system (MKS) as the Tesla unit (see under Tesla).

WORKING POINT

The point on the demagnetization curve that specifies the values of the flux density B and the field intensity H in the working state. In principle applies: the longer the magnet remains in the magnetization direction, the closer the energy point finds itself to B. The energy point approaches B through a closed magnetic circuit.

WORKING TEMPERATURE

See operating temperature