From the very beginning permanent magnets have played an important role in electrotechnics. Especially Alnico and Ferrite magnets have already been applied for years in loudspeakers, dynamos, motors and relays. Since the early seventies very powerful magnets have been produced on the basis of alloys from rare earth materials such as Samarium-Cobalt (SmCo) and Neodymium-Iron-Boron (NdFeB). Especially NdFeB magnets, at Goudsmit better known under the brand name Neoflux®, are applied in modern electronic applications. The number of magnets used in airbags, starting motors, ABS systems, tachometers and in combination with sensors, has strongly increased in the automotive industry.

Goudsmit Magnetic Supplies has been producing and supplying magnets and magnetic products already since 1959 and is NEN-EN-ISO 9001 certified. Goudsmit quality is guaranteed by a team of experienced and disciplined Qa engineers. They make use of the most advanced measuring systems such as the Permagraph, Helmholz coil, flux meters and CNC-controlled 3D measuring equipment. Apart from that Goudsmit also offers you good advice in the (re)design process of your product. This is done on the basis of consultancy and basically through 2d or 3d computer simulations. An extensive stock program and an efficient logistic system enable them to provide you with the right magnets in a timely manner. Flexibility, trust and know-how form the basis of Goudsmit’s success.
LIST OF CONCEPTS

ANISOTROPIC—ISOTROPIC
When some kind of magnetic material is pressed in a magnetic field this magnetic material is called preferentially-oriented and anisotropic. When this magnetic material is not pressed in a magnetic field, it is called isotropic. Later on isotropic magnetic material can be magnetised in all directions, anisotropic only in the preferential direction. The remanence (Br) of anisotropic magnetic material is (in preferential direction) about twice as high as the remanence of isotropic magnetic material (see figure 1).

B
See magnetic induction.

(BH)max
See maximum energy density.

Br
See remanence.

COERCIVITY, NORMAL HcB
The necessary field strength to make the magnetic induction in a magnetic material 0 (see demagnetisation curve). The “-”mark is usually left out in specifications. Units: A/m or Oe.

COERCIVITY, INTRINSIC HcJ
The necessary field strength to make the polarisation of a magnetic material 0 (see demagnetisation curve). The “-”mark is usually left out in specifications. Units: A/m or Oe.

CURIE TEMPERATURE
Temperature above which magnetism completely disappears. Units °C en K among others.

DEMAGNETISATION CURVE
(2nd quadrant of the hysteresis curve)
The demagnetisation curve of a kind of magnetic material is determined by putting the magnetic material in a closed system and by generating a magnetic field by means of coils first magnetising the material to saturation (+H) and then demagnetising (-H). During this process the polarisation of the magnetic material (J) is measured. The magnetic induction B in the magnet is calculated by means of the following formula:

\[ B = J + \mu_0 \cdot H \]

in which \( J \) = polarisation of material (share of material)
\( \mu_0 \cdot H \) = share of field

Goudsmit checks the dimensions of your magnet by using the very newest CNC measuring equipment.

Figure 1: demagnetisation curve of isotropic and anisotropic magnetic material.

Figure 2: demagnetisation curve.

Axially magnetised I&A
- speakers
- holding devices
- magnetic switches
- insert gas switches

Radially magnetised I
- holding magnets
- couplings (limited sizes available)

Magnetised through diameter I
- synchronous motors

Magnetised through height I&A
- holding devices
- magnetic switches
- clamping devices

Axially magnetised in segments with alternating poles I&A
- synchronous motors
- disc coupling

Multiple pole magnetised on inside surface picture shows 4-pole configuration I
- concentric ring
- couplings
- motors

Laterally magnetised in lines on surface I
- holding devices
- magnetic chokes
- pole distance

Radially magnetised I&A
- motors

Multiple pole magnetised on outer surface picture shows 4-pole configuration I
- dynamo
- motors
- concentric ring
- couplings

Laterally magnetised on surface picture shows 6-pole configuration I
- holding devices

Multiple pole magnetised on outside surface picture shows 4-pole configuration I
- dynamos
- motors
- concentric ring
- couplings

Diametrical magnetised I&A
- motors

I = isotropic
A = anisotropic
FLUX DENSITY
See magnetic induction

QUANTITIES AND UNITS
A few widely used quantities with their units most used:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Units</th>
<th>Relation between units</th>
</tr>
</thead>
<tbody>
<tr>
<td>B, magnetic induction</td>
<td>T (Tesla)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>G (Gauss)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 T = 10000 G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 kG = 0.1 T</td>
</tr>
<tr>
<td>B H, energy density</td>
<td>J/m³ (joule / meter³)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Goe (Gauss·Oersted)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>79.6 kJ/m³ = 1 MGOe</td>
</tr>
<tr>
<td>H, Magnetic field strength</td>
<td>A/m (Ampère/meter)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oe (Oersted)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>79.6 kA/m = 1 kOe</td>
</tr>
</tbody>
</table>

HcB
See coercivity, normal.

HcJ
See coercivity, intrinsic.

IRREVERSIBLE LOSS, RECOVERABLE
Permanent loss of magnetism due to too high temperatures for example. Only remagnetisation can restore the loss.

IRREVERSIBLE LOSS, IRRECOVERABLE
Permanent loss of magnetism due to too high temperature for example or oxidation. This loss is irrecoverable.

ISOTROPIC
See anisotropic.

J
See magnetic polarisation.

MAGNETIC INDUCTION, B
Magnetic ordering in a material as a result of a magnetic field (H) and/or magnetic material (J) or: The number of magnetic field lines per unit area. Units: Including T and G.

MAGNETIC POLARISATION, J
Share of material to the magnetic induction. Units including T and G.

MAGNETIC FIELD STRENGTH, H
Magnetic power resulting in magnetic induction.

MAXIMAL ENERGY DENSITY (BH)max
Biggest possible product of B and H on the demagnetisation curve (see demagnetisation curve). In general the following holds: the bigger the (BH)max of magnetic material, the smaller might be the volume. The “+” mark is usually left out in specifications. Units: kJ/m³ and MGOe. Example: The volume of a GSN35 magnet can be ±10 x smaller than the volume of a GSF33H magnet and still have the same application.

GENERAL PROPERTIES

<table>
<thead>
<tr>
<th></th>
<th>Ferrite</th>
<th>Plastic bonded ferrite</th>
<th>Neoflux®</th>
<th>Plastic bonded Neoflux®</th>
<th>SmCo</th>
<th>AlNico</th>
</tr>
</thead>
<tbody>
<tr>
<td>max. temperature of use 1w (°C)</td>
<td>225</td>
<td>120~150</td>
<td>80~230</td>
<td>160</td>
<td>250</td>
<td>450</td>
</tr>
<tr>
<td>Reversible temperature coefficients, αBr (%/°C)</td>
<td>-0.20</td>
<td>-0.2</td>
<td>-0.9~0.12</td>
<td>-0.08~0.12</td>
<td>-0.03~0.05</td>
<td>-0.03</td>
</tr>
<tr>
<td>Reversible temperature coefficients, αHcJ (%/°C)</td>
<td>+0.20</td>
<td>+0.50</td>
<td>+0.3</td>
<td>-0.45~0.85</td>
<td>-0.5</td>
<td>-0.3~0.5</td>
</tr>
<tr>
<td>Curie temperature Tc (°C)</td>
<td>460</td>
<td>450</td>
<td>310~380</td>
<td>320</td>
<td>700~800</td>
<td>850</td>
</tr>
<tr>
<td>Density (10³ x kg/m³)</td>
<td>4.5~5.1</td>
<td>3.3~3.7</td>
<td>7.4~7.6</td>
<td>5~6.5</td>
<td>8~8.5</td>
<td>7.3</td>
</tr>
</tbody>
</table>

Values only serve for comparing the kinds of material
* Mechanical stress: Due to the brittleness of the materials it is not advisable to subject magnets to mechanical stress
* Given magnetic properties for the materials are measured in accordance with the IEC/EN 5 standard, the magnetic properties mentioned in the tables cannot be achieved for all magnet forms and dimensions
**MAXIMAL APPLICATION TEMPERATURE**
Indication of the maximal temperature at which the magnetic material can be used with limited irreversible losses (see Working Point, Operating Line).

**PERMANENT MAGNET**
A magnet which completely or partially keeps its magnetism after being magnetised.

**PERMEABILITY**
The capacity of material to conduct magnetism. The permeability of vacuum ($\mu_0$) is $12.56 \times 10^{-6}$ T/(A/m) or 1 G/Oe.

**REMANENCE Br**
Magnetic induction in magnetic material when the field strength is zero ($H=0$) and after saturation (see demagnetisation curve). Units: Including T and G.

**REVERSIBLE LOSS**
Temporary loss of magnetism due to f.e. temperature change.

**TEMPERATURE COEFFICIENT (Br and HcJ)**
This indicates the reversible change (in percentage) of Br or HcJ in case of temperature change. The values depend on the kind of material, the quality and the temperature among other things.

**FREE POLES**
The field lines leaving the magnet go back to the magnet through the air (no ferromagnetic material).

**WORKING POINT / OPERATING LINE**
2 demagnetisation curves (only the normal curves) of random Neoflux® material are shown in figure 3. The working point (Bm, Hm) of a magnet is the point of intersection of the working line with the B-H curve. For magnets with free poles and without external magnetic field the angle of the working line with respect to the B axis depends on the relation between the length and diameter of the magnet; $L_1/D_1 > L_2/D_2$. Working line 1 is closer to the B axis than the working line 2.

---

Permanent magnets are also available in a steel pot (if desired with a rubber cuff); these kinds of magnets have one attraction area which makes them a lot stronger.

An advanced product such as a loudspeaker requests a dustproof magnet with the right magnetic and mechanical properties.

Our delivery program also includes electro magnets.

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Figure 3: Demagnetisation curves and working point for any given Neoflux® magnet.
NEOFLUX® (Nd-Fe-B) MAGNETS:

- Since 1986 Goudsmit has been selling NdFeB (Neodymium, Iron, Boron) magnets under the brand name Neoflux®.
- Neoflux® is the strongest available permanent magnet with a maximal energy product of more than 50 MGOe with an excellent coercivity.
- A favourable price-quality ratio combined with the best possible magnetic properties.
- Standard tolerances are ± 0.1 mm. If ground ± 0.05 mm. Tighter tolerances are available on request.
- Processing is possible with diamond tools provided they are well cooled, as grinding residue can spontaneously ignite in combination with oxygen.
- For the protection of corrosion Neoflux® magnets are provided with a coating which can consist of double Nickel, Nickel-Copper-Nickel, Zinc, Tin, Aluminium, Teflon or Epoxy, depending on the application.
- Neoflux® magnets are always anisotropic which means that they can only be magnetised in preferential direction, axially and diametrically.
- By using special coils Neoflux® can be magnetised in a multipole way.
- Neoflux® can be made in all kinds of shapes without additional tool costs; a clear drawing can avoid misunderstandings.
- These magnets are not only used in motors, loudspeakers, separators, MRI scanners, windmills, electronics but also in cars, often in combination with sensors.
- As Neoflux® magnets are mechanically spoken not as strong although very strong from a magnetic point of view, it is very important to handle them with great care.
- Temperature of use is maximum 80°C to 200°C, depending on the specification, dimensions and system design.
- The minimum dimension for a block magnet is 1 x 1 x 1 mm, whereas the maximum dimension for this type is 160 x 150 x 50 mm.
- The minimum dimension for a disc magnet is Ø 1.5 x 0.5 mm, whereas the maximum dimension for this type is Ø 150 x 50 mm.
- The minimum dimension for a ring magnet is Ø 3 x Ø 1 x 1 mm, whereas the maximum dimension for this type is Ø 150 x Ø* x 50 mm (* inside diameter in consultation).
### STABILISED NEOFLUX®:

2 mg/cm² mass loss after 2 days of PCT

<table>
<thead>
<tr>
<th>Quality</th>
<th>Remanence (Br)</th>
<th>“Normal coercivity (HcB)”</th>
<th>“Intrinsic coercivity (Hci)”</th>
<th>“Maximum energy density (BH)max”</th>
<th>Max. temperature of use *</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>KG</td>
<td>kA/m</td>
<td>kOe</td>
<td>kA/m</td>
<td>kOe</td>
</tr>
<tr>
<td>GSNS35</td>
<td>1.17</td>
<td>1.22</td>
<td>11.7</td>
<td>12.2</td>
<td>836</td>
</tr>
<tr>
<td>GSNS40</td>
<td>1.26</td>
<td>1.30</td>
<td>12.6</td>
<td>13.0</td>
<td>836</td>
</tr>
<tr>
<td>GSNS45</td>
<td>1.33</td>
<td>1.37</td>
<td>13.3</td>
<td>13.7</td>
<td>836</td>
</tr>
<tr>
<td>GSNS50</td>
<td>1.40</td>
<td>1.43</td>
<td>14.0</td>
<td>14.3</td>
<td>836</td>
</tr>
<tr>
<td>GSNS55</td>
<td>1.47</td>
<td>1.51</td>
<td>14.7</td>
<td>15.1</td>
<td>836</td>
</tr>
<tr>
<td>GSNS60</td>
<td>1.54</td>
<td>1.58</td>
<td>15.4</td>
<td>15.8</td>
<td>836</td>
</tr>
</tbody>
</table>

At maximum temperature of use a magnet with free poles is considered without the presence of an external magnetic field.

If the L/D ratio > 0.7 the irreversible loss is < 5%. We are always ready to give you advice!

### NEOFLUX® MAGNETS:

<table>
<thead>
<tr>
<th>Quality</th>
<th>Remanence (Br)</th>
<th>“Normal coercivity (HcB)”</th>
<th>“Intrinsic coercivity (Hci)”</th>
<th>“Maximum energy density (BH)max”</th>
<th>Max. temperatu re of use *</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>KG</td>
<td>kA/m</td>
<td>kOe</td>
<td>kA/m</td>
<td>kOe</td>
</tr>
<tr>
<td>GSNS4M</td>
<td>1.24</td>
<td>1.30</td>
<td>13.0</td>
<td>13.3</td>
<td>836</td>
</tr>
<tr>
<td>GSNS6M</td>
<td>1.37</td>
<td>1.43</td>
<td>14.0</td>
<td>14.3</td>
<td>836</td>
</tr>
<tr>
<td>GSNS8M</td>
<td>1.50</td>
<td>1.56</td>
<td>15.0</td>
<td>15.3</td>
<td>836</td>
</tr>
<tr>
<td>GSNS10M</td>
<td>1.63</td>
<td>1.70</td>
<td>16.3</td>
<td>16.7</td>
<td>836</td>
</tr>
<tr>
<td>GSNS12M</td>
<td>1.76</td>
<td>1.82</td>
<td>17.6</td>
<td>18.0</td>
<td>836</td>
</tr>
<tr>
<td>GSNS15M</td>
<td>2.00</td>
<td>2.06</td>
<td>19.0</td>
<td>19.6</td>
<td>836</td>
</tr>
</tbody>
</table>

Exception: (**) the irreversible loss for these materials is < 5% with L/C ratio > 0.447)

For the most actual specifications, dimensions, and curves we invite you to have a look at our website: www.goudsmitmagnets.com
SAMARIUM-COBALT MAGNETS:

- Next to Neoflux® magnets Samarium-Cobalt (SmCo) magnets also belong to the group of rare earth magnets.
- SmCo magnets have very good magnetic properties with a maximum energy product of 18 to 30 MGOe, a low temperature coefficient and high stability.
- The maximum temperature of use is 250°C depending on the specification, dimensions and system design.
- SmCo magnets are well resistant against oxidation and - as long as they are used under normal conditions - do not require a coating.
- SmCo magnets are often the best choice for applications in which durability is very important such as for high-quality electronic products, medical devices and in the automobile industry.
- The cost price of SmCo magnets, in comparison with Neoflux®, is a lot higher due to the high, unstable Cobalt prices.
- SmCo is very fragile.
- The minimum dimension for a block magnet is 2 x 2 x 1 mm, whereas the maximum dimension for this type is 120 x 52 x 52 mm.
- The minimum dimension for a disc magnet is Ø 2 x 1 mm, whereas the maximum dimension for this type is Ø 90 x 50 mm.
- The minimum dimension for a ring magnet is Ø 3 x Ø 1.5 x 1 mm, whereas the maximum dimension for this type is Ø 90 x Ø* x 50 mm (* inside diameter in consultation).

<table>
<thead>
<tr>
<th>Quality</th>
<th>Remanence (Br)</th>
<th>“Normal coercivity (HcB)”</th>
<th>“Intrinsic coercivity (HcI)”</th>
<th>“Maximum energy density ((BH)max)”</th>
<th>Max. temperature of use *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T</td>
<td>KG</td>
<td>kA/m</td>
<td>kOe</td>
<td>kA/m</td>
</tr>
<tr>
<td>GSS20</td>
<td>0.92</td>
<td>0.94</td>
<td>9.2</td>
<td>9.4</td>
<td>653</td>
</tr>
<tr>
<td>GSS23</td>
<td>0.95</td>
<td>0.98</td>
<td>9.5</td>
<td>9.8</td>
<td>637</td>
</tr>
<tr>
<td>GSS27</td>
<td>1.05</td>
<td>1.07</td>
<td>10.5</td>
<td>10.7</td>
<td>756</td>
</tr>
<tr>
<td>GSS29</td>
<td>1.08</td>
<td>1.09</td>
<td>10.8</td>
<td>10.9</td>
<td>780</td>
</tr>
</tbody>
</table>

For the most actual specifications, dimensions and curves we invite you to have a look at our website: www.goudsmitmagnets.com
PLASTIC-BONDED FERRITE MAGNETS:

- Plastic-bonded magnets can be manufactured by pressing or injection-moulding using basic materials consisting of ferrite, Neoflux® or Samarium-Cobalt. It is mixed with a thermoplastic material such as polyamide.
- The advantage of this material is that it can be pressed or injection-moulded in very capricious shapes, with strict tolerances of ± 0.05 mm without finishing.
- Although plastic-bonded Neoflux® magnets have a greater resistance to corrosion than sintered Neoflux®, it is advisable to apply a coating to them.
- Thanks to the isotropy, this material can be magnetised in various directions (see page 3).

### Plastic-Bonded Neoflux® Magnets

<table>
<thead>
<tr>
<th>Quality</th>
<th>Remanence (Br)</th>
<th>“Normal coercivity (HcB)”</th>
<th>“Intrinsic coercivity (HcI)”</th>
<th>“Maximum energy density ((BH)max)”</th>
<th>Max. temperature of use *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T (kG)</td>
<td>KG (kA/m)</td>
<td>kOe (kJ/m²)</td>
<td>MGOe (°C)</td>
<td></td>
</tr>
<tr>
<td>GSNB-4</td>
<td>0.35</td>
<td>0.4</td>
<td>3.5</td>
<td>4.0</td>
<td>150</td>
</tr>
<tr>
<td>GSNB-6</td>
<td>0.5</td>
<td>0.5</td>
<td>5.0</td>
<td>5.5</td>
<td>150</td>
</tr>
<tr>
<td>GSNB-8</td>
<td>0.6</td>
<td>0.6</td>
<td>6.0</td>
<td>6.3</td>
<td>150</td>
</tr>
<tr>
<td>GSNB-BH</td>
<td>0.56</td>
<td>0.6</td>
<td>5.6</td>
<td>6.1</td>
<td>150</td>
</tr>
<tr>
<td>GSNB-10</td>
<td>0.68</td>
<td>0.7</td>
<td>6.8</td>
<td>7.0</td>
<td>150</td>
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<tr>
<td>GSNB-12</td>
<td>0.7</td>
<td>0.7</td>
<td>7.0</td>
<td>7.5</td>
<td>150</td>
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<tr>
<td>GSNB-12D</td>
<td>0.7</td>
<td>0.7</td>
<td>7.0</td>
<td>7.5</td>
<td>150</td>
</tr>
</tbody>
</table>

For the most actual specifications, dimensions and curves we invite you to have a look at our website: www.goudsmitmagnets.com
ALNICO MAGNETS:

- Alnico magnets are made of Aluminium, Nickel, Cobalt and Iron and have already been applied since 1930. Sometimes a few other elements such as copper, titanium and niobium are added.
- Alnico magnets have a maximum energy product of 1 to ± 9 MGOe and do not require coating when used under normal conditions.
- The maximum temperature of use is 450°C depending on the specification, dimensions and system design.
- Most of the Alnico magnets are caste and in this process the alloy, which is liquid, is poured into sand moulds at very high temperature.
- Some of these magnets are pressed and sintered.
- Casting Alnico can happen in complex forms, such as horseshoes for example.
- Sintered Alnico has slightly lower magnetic properties however they have better mechanical properties than caste alnico, with very small casting amounts during the casting process.
- Standard tolerance for ground alnico is ±0.1 mm, depending on the size and shape.
- It is important (watch out!) that the length/diameter ratio is kept, this will prevent demagnetisation.
- The minimum dimension for a block magnet is 2 x 2 x 2 mm, whereas the maximum dimension for this type is 100 x 100 x 100 mm.
- The minimum dimension for a disc magnet is Ø 1 x 2 mm, whereas the maximum dimension for this type is Ø 100 x 100 mm.
- The minimum dimension for a ring magnet is Ø 5 x Ø 3.5 x 1 mm, whereas the maximum dimension for this type is Ø 200 x Ø* x 50 mm (* inside diameter in consultation).

<table>
<thead>
<tr>
<th>Quality</th>
<th>Remanence [Br]</th>
<th>&quot;Normal coercivity (HcB)&quot;</th>
<th>&quot;Intrinsic coercivity (Hcj)&quot;</th>
<th>&quot;Maximum energy density ([BH]max)&quot;</th>
<th>Max. temperature of use °C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T Min.</td>
<td>KG Min.</td>
<td>kA/m Min.</td>
<td>kOe Min.</td>
<td>kA/m Min.</td>
</tr>
<tr>
<td>GSA5A</td>
<td>1.20</td>
<td>12.0</td>
<td>48</td>
<td>0.600</td>
<td>49</td>
</tr>
<tr>
<td>GSA5B</td>
<td>1.25</td>
<td>12.5</td>
<td>55</td>
<td>0.69</td>
<td>57</td>
</tr>
<tr>
<td>GSA6</td>
<td>1.30</td>
<td>13.0</td>
<td>56</td>
<td>0.70</td>
<td>58</td>
</tr>
<tr>
<td>GSAB</td>
<td>0.80</td>
<td>8.0</td>
<td>110</td>
<td>1.380</td>
<td>111</td>
</tr>
<tr>
<td>GSA5A</td>
<td>1.10</td>
<td>11.0</td>
<td>48</td>
<td>0.60</td>
<td>51</td>
</tr>
<tr>
<td>GSA5B</td>
<td>1.00</td>
<td>10.0</td>
<td>56</td>
<td>0.70</td>
<td>57</td>
</tr>
</tbody>
</table>

For the most actual specifications, dimensions and curves we invite you to have a look at our website: www.goudsmitmagnets.com
FERRITE MAGNETS (CERAMIC MAGNETS):

- Ferrite or ceramic magnets are still the most widely used magnets with a maximum energy product of 1 to ± 4.3 MGOe.
- Due to the environmental requirements which are becoming more stringent barium ferrite has been replaced by strontium ferrite during the last years.
- Ferrite is the cheapest magnetic material and has a high corrosion resistance making coating unnecessary.
- This magnetic material is hard and fragile and must be processed with diamond, preferably when it is not in a magnetic state.
- Because it might shrink during the sinter process a tolerance of ± 2 % should be taken into account when determining the dimensions. If grinded ± 0.1 mm.
- Tighter tolerance is available on request.
- Ferrite magnets can be supplied both isotropically as anisotropically and are used in the most divergent products such as loudspeakers, magnetrons, measuring devices, toys, engines, reed contacts etc.
- The maximum temperature of use is 225°C depending on the specification, dimensions and system design.
- For specifications: See the table below. For magnetisation possibilities: see page 3.
- The minimum dimension for block magnets is 2 x 2 x 2 mm, whereas the maximum dimension for this type is 270 x 90 x 25.4 mm.
- The minimum dimension for disc magnets is Ø 2 x 1 mm, whereas the maximum dimension for this type is Ø 156 x 25.
- The minimum dimension for ring magnets is 8 x 2.5 x 3 mm, whereas the maximum dimension for this type is Ø 256 x Ø* x 25 mm (* inside diameter in consultation).

<table>
<thead>
<tr>
<th>Quality</th>
<th>Remanence ((Br)</th>
<th>“Normal coercivity (HcB)”</th>
<th>“Intrinsic coercivity (HcJ)”</th>
<th>“Maximum energy density ((Br)max)”</th>
<th>Max. temperature of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSFD-10</td>
<td>0.21</td>
<td>0.23</td>
<td>2.1</td>
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<td>GSFD-25</td>
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