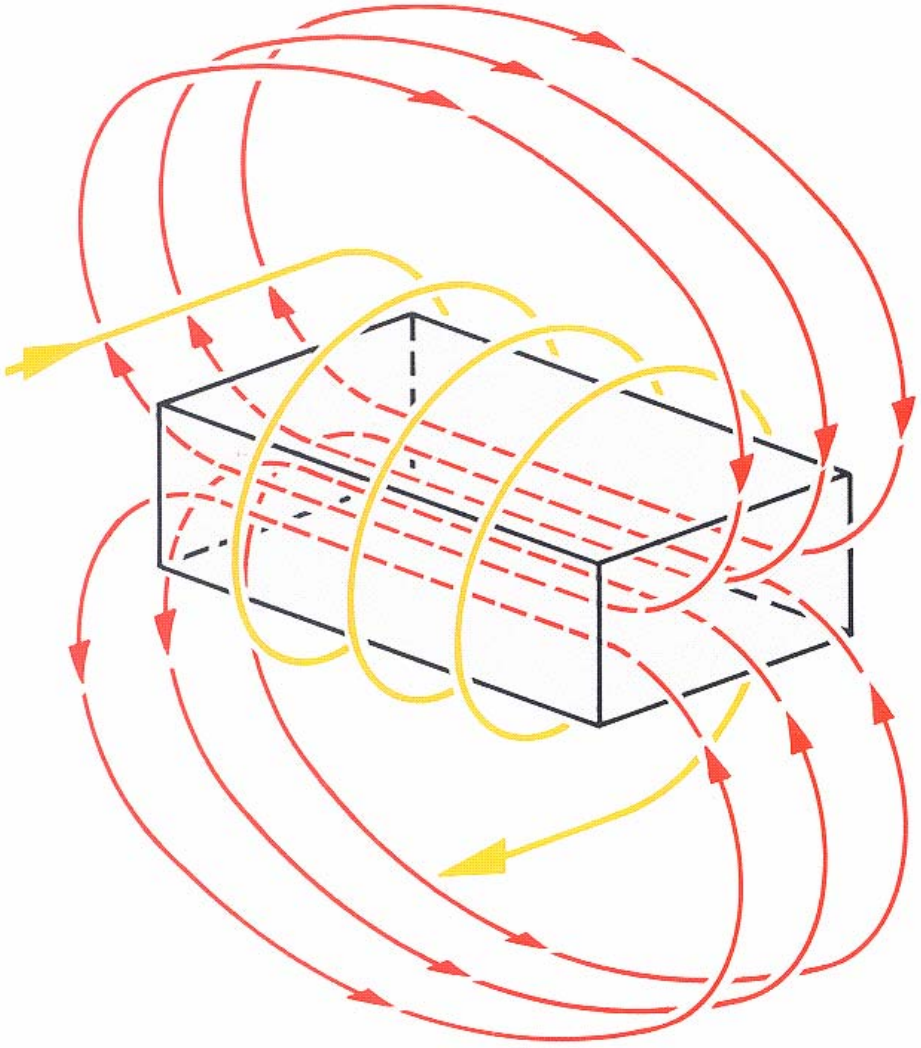
Design Considerations



For more information please contact:

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Initial Design Considerations

Prior to using magnetic modeling software, certain considerations must be given to the selection of the magnet material, the application, environment, and long term consequences. Once these have been considered, the magnet material data for most modeling tools can be imported directly into your software by visiting www.matweb.com and searching by MAGNETS OR ALLIANCE LLC

Magnet Environment

- ○ Immersed in a fluid – what type
- ○ Sealed enclosure
- ○ Subject to forces – acceleration, shock etc
- ○ Subject to radiation – what type, level and duration
- ○ Temperature extremes in use
- ○ Field strength at operating temperature
- ○ Demagnetization fields

Thermal Properties

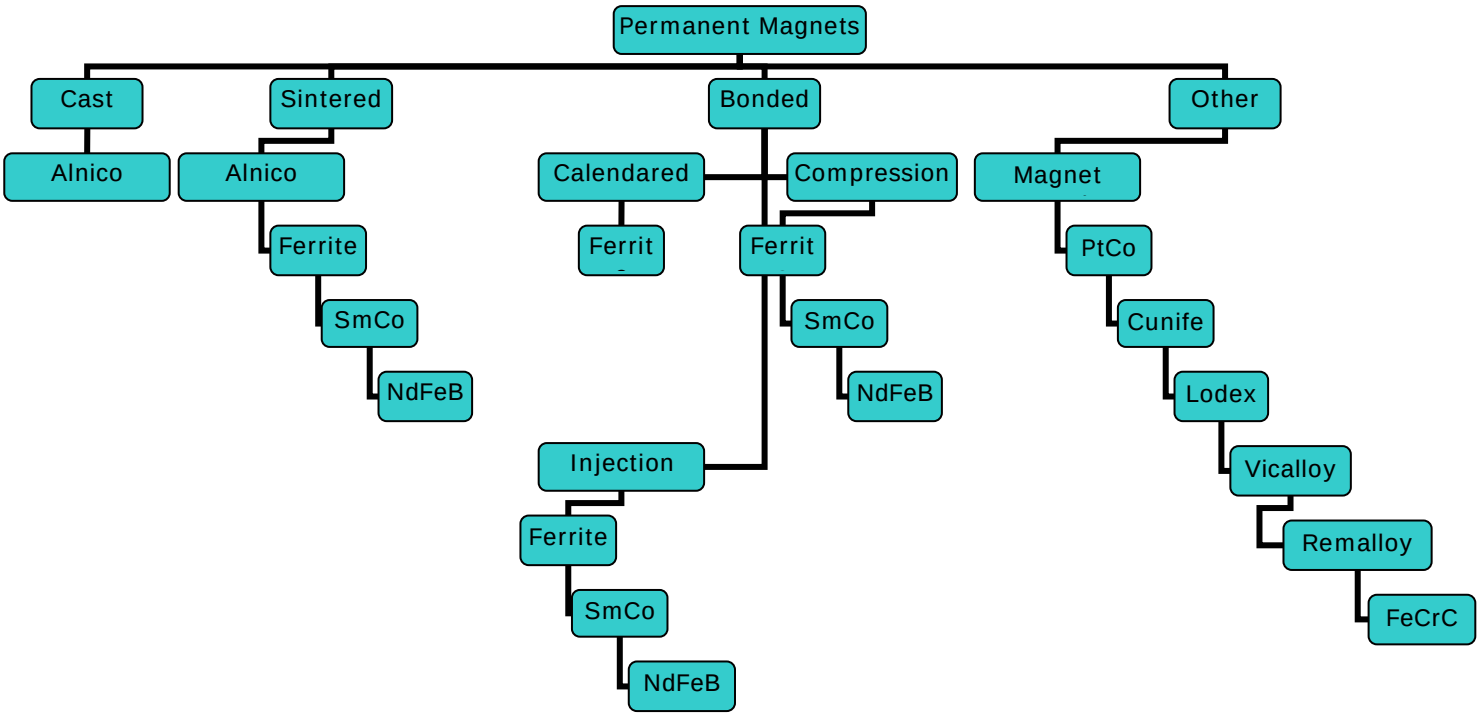
- ○ Reversible temperature coefficient of residual induction – αBr
- ○ Reversible temperature coefficient of coercive force – βHc
- ○ Reversible temperature coefficient of intrinsic coercive force
- ○ Curie temperature
- ○ Maximum service temperature

Selection Based on Required Properties

- ○ Residual induction - Br
- ○ Coercive force - Hc
- ○ Intrinsic coercive force - Hci
- ○ Maximum Energy Density – (BH)max
- ○ Recoil permeability - μrec
- ○ Hk Value of Hc at 0.9Br
- ○ Magnetic flux Φ at required air gap

Selection of Magnet Material

- Shape and required dimensions
- Injection and Compression Bonded or Sintered (fully dense)
- Orientation (Anisotropic) or non-oriented (Isotropic)



Application and Production Line Factors

- **Non-Coated, Coated, or Plated:**
  - Coating Material:
    1. **Epoxy**
    2. **Nickel**
    3. **Ni-Cu-Ni**
    4. **Zinc**
    5. **Paralene**
  - Method of coating
  - Coating thickness
  - Color or luster

- **Magnetized or Not Magnetized:**

- Working Surface
- Magnetic Pattern
- Number of Poles
- Pole Pitch
- Magnetized inside or out of assembly
- Type of Equipment Needed

Specifications That May Be Include In Your Drawing

- **Dimensional Data**
  - Tolerances (do they apply before or after coating or plating)
  - Parallelism
  - Squareness
  - Concentricity
  - Surface finish
  - If plated, radiuses on edges
  - Acceptable Chips, Cracks, Burrs

- **Magnetic Properties** (British or SI, ie. Gauss or Tesla) **with tolerances**
- **Grade of Selected Magnet** (ie. N-35SH for NdFeB)
- **Coating or Plating Specifications** (ie. Ni, Ni-Cu-Ni, Zn, E-coat)
- **Direction of Orientation** (drawn as an arrow through the dimension)
- **Magnetized** (# of poles) **or Supplied Not Magnetized**
- **Markings for North or South poles**
- **For NdFeB grades add: "Must be Licensed"**

You may find standard recommendations (ex. allowable amount of chipping, magnetic tolerances, etc.) in the MMPA 0100-00 guide. For a free copy of the publication (courtesy of Int'l Magnetics Assoc), and other design guides, please call 219-548-3799 or visit the Alliance website at **www.allianceorg.com/design**

Additional Items That May or May Not Be Needed

- Conform to certain standards like MMPA 0100-00
- Humidity testing requirements
- Conform to European Union directive 2002/95/EC (RoHS)
- Certificate of Origin
- Material Certifications
- Material Safety Data Sheet (MSDS)
- Testing method for magnetized parts
- If molded, gate and injector pin locations
- Packing Specifications

Please let us know if you have any questions or require assistance with any part of this publication

Material properties and other design information can be found on our web site: www.Allianceorg.com

References:
Sura Magnets AB- Guide to Magnet Design, Guide to Magnet Materials, information from web site www.suramagnets.com. Sura Magnets is a bonded magnet producer in Soderkoping Sweden
MMPA- MMPA 01-100 Guide to Magnetic Properties and the MMPA Design Guide