Design Considerations

Initial Design Considerations

When choosing a magnet material for your application, a number of considerations must be taken in to account. These considerations include but not limited to: the environment the magnet will be in as well as the operating temperature it will be subject to. Other considerations include the required magnetic strength tolerance, the physical robustness required and if the magnet will be magnetized it situ. Once these parameters are look at a clear material choose should emerge.

-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
-Magnetized or Not Magnetized
    -Working Surface
    -Magnetic Pattern
    -Number of Poles
    -Pole Pitch
    -Magnetized inside or out of assembly
    -Type of Equipment Needed
    -Markings for North or South poles

Specifications That May Be Included 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 or NdFeB)
-Coating or Plating Specifications (ie. Ni, Ni-Cu-Ni, Zn, E-coat)
-Direction of Orientation (drawn as an arrow through the dimensions)
-Magnetized (# of poles) or Supplied Not Magnetized
-Markings for North or South poles
-For NdFeB grades add: “Must be Licensed”