magnetsales
and service limited

Ceramic Ferrite

Sintered Ferrite Magnets

Developed in the late 1950's Sintered Ferrite or Ceramic magnets are manufactured from a composite powder containing 80% Iron oxide and 20% Barium or Strontium oxide. This powder is die pressed into a component that is then sintered in a furnace at approximately 1200°C.

Ferrite suits a wide range of applications due to its low cost. It is readily available in blocks, rings and discs. Principal applications are DC motors, loudspeakers, reed switch operation, magnetic separator assemblies and general holding devices such as pot magnets. The un-magnetised blocks are machined using diamond cutting machines to match customers' exact specification.

Ferrite has an excellent resistance to demagnetisation and can be magnetised before or after assembly without danger of losing any performance. It can be used in operating temperatures ranging from -40°C to + 250°C. However it does have a poor temperature coefficient losing approximately 0.2% of remanence per degree C when heated above zero.

Sintered Ferrite will not corrode even in salt-water applications. It also has good chemical stability, with the only exceptions being concentrated acids such as hydro-chloric.
With mechanical properties similar to ceramics or porcelain, it means that only grinding techniques can be used to machine these products. Care is required during handling due to their brittle nature.

Sintered Ferrite Grades											
MSS GRADE	MMPA Grade	Residual Induction B_r		Coercive Force H_c		Intrinsic Coercive Force H_{ci}		Maximum Energy Product $(BH)_{max}$		Max. Operating Temp.*	
		Nominal		Nominal		Minimum		Nominal		Nominal	
		Gauss	mT	kOe	kA/m	kOe	kA/m	MGOe	kJ/m3	°C	°F
FER 1	Ceramic 1	2300	230	1.860	148	3.500	278	1.05	8.4	250°	482°
FER 2	Ceramic 5	3900	390	2.400	200	2.500	198	3.4	27.6	250°	482°
FER 3	Ceramic 8	3900	390	3.000	240	3.200	256	3.4	27.6	250°	482°

Note:
FER1 Isotropic FER2 & FER3 Anisotropic

* Max working temp for guide only – dependant on size and shape
Recoil Permeability Range 1.05-1.2
Typical 10,000 to 15,000 Oe Magnetisation Force required to Saturate

Other popular Ferrite Grades (China)								
Grade	Max. Energy Product		Remanence		Coercive Force		Intrinsic Coercive Force	
	$(BH)_{max}$		Br		Hcb		Hcj	
	KJ/m^3	MGOe	mT	KGs	KA/m	KOe	KA/m	KOe
Y10T	6.5-9.5	0.8-1.2	200-235	2.0-2.35	125-160	1.57-2.01	210-280	2.64-3.52
Y20	18.0-22.0	2.3-2.8	320-380	3.2-3.8	135-190	1.70-2.38	140-195	1.76-2.45
Y22H	20.0-24.0	2.5-3.0	310-360	3.1-3.6	220-250	2.77-3.14	280-320	3.52-4.02
Y23	20.0-25.5	2.5-3.2	320-370	3.2-3.7	170-190	2.14-2.38	190-230	2.39-2.89
Y25	22.5-28.0	2.8-3.5	360-400	3.6-4.0	135-170	1.70-2.14	140-200	1.76-2.51
Y26H	23.0-28.0	2.9-3.5	360-390	3.6-3.9	220-250	2.77-3.14	225-255	2.38-3.21
Y27H	25.0-29.0	3.1-3.7	370-400	3.7-4.0	205-250	2.58-3.14	210-255	2.64-3.21
Y30	26.0-30.0	3.3-3.8	370-400	3.7-4.0	175-210	2.20-2.64	180-220	2.26-2.77
Y30BH	27.0-30.0	3.4-3.7	380-390	3.8-3.9	223-235	2.80-2.95	231-245	2.90-3.08
Y30-1	27.0-32.0	3.4-4.0	380-400	3.8-4.0	230-275	2.89-3.46	235-290	2.95-3.65
Y20-2	28.5-32.5	3.5-4.0	395-415	3.95-4.15	275-300	3.46-3.77	310-335	3.90-4.21
Y32	30.0-33.5	3.8-4.2	400-420	4.0-4.2	160-190	2.01-2.38	165-195	2.07-2.45
Y33	31.5-35.0	4.0-4.4	410-430	4.1-4.3	220-250	2.77-3.14	225-255	2.83-3.21
Y35	30.0-32.0	3.8-4.0	400-410	4.0-4.1	175-195	2.20-2.45	180-200	2.26-2.51

Reversible Temperature Coefficient - Ceramic (Strontium Ferrite) Magnets		
Temperature Range (°C)	**Induction Br (α) (%)/°C**	**Intrinsic Coercivity Hci (β) (%)/°C**
20°C to 150°C	-0.2 to -0.3	0.2 to 0.5

Ceramic Magnets - Physical Properties		
Property	**Units**	**Value Ceramic (Strontium Ferrite)**
Vickers Hardness	Hv	~ 1160 (7 Mohs)
Density	g/cm^3	4.5 to 5.1
Curie Temp T_C	°C	450 to 460
Curie Temp T_F	°F	840 to 860
Specific Resistance	μΩ·Cm	$> 10^6$
Bending Strength	kN/mm^2	0.05 - 0.09
Tensile Strength	kN/mm^2	.02 to .05
Thermal Expansion (∥)	$°C^{-1}$	$+11.0$ to $+16.0 \times 10^{-6}$
Thermal Expansion (⊥)	$°C^{-1}$	$'+7.0$ to $+15.0 \times 10^{-6}$

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