

Physical Properties of Permanent Magnet Materials

	Units	Cast Alnico	Sintered Alnico	Sintered Ferrite (Ceramic)	Samarium Cobalt (1:5)	Samarium Cobalt (2:17)	Sintered NdFeB	Bonded (Injection) NdFeB	Bonded (Compression) NdFeB	Bonded (Injection) Ferrite
Density	g/cm ³	7.3	6.9 – 7.3	4.8 – 5.0	8.4	8.4	7.5 – 7.9	4.5 – 5.5	5.6 – 6.0	2.6 – 3.6
Maximum Operating Temperature	°C	550	550	350	250	350	100 – 200	110	100 – 180	100 - 200
Temperature Coefficient B _r	%/°C	-0.025	-0.025	-0.18	-0.04	-0.03	-0.11	-0.10	-0.11	-0.20
Temperature Coefficient H _c	%/°C	0.01	0.01	0.40	-0.045	-0.18	-0.72	-0.40	-0.39	0.30
Coefficient of Thermal Expansion—DOM	10 ⁻⁶ /°C			8.0	13.0	12.0	-1.0			
Coefficient of Thermal Expansion//DOM	10 ⁻⁶ /°C	11 - 13	10 – 13	9.0 – 9.5	7.0	10.0	5.0	60 - 80	10 - 30	30 – 50
Bending Strength	MPa			55	120	90 – 150	180 - 270			
Compressive Strength	MPa		300 - 400	700	1000	650	850 - 1050		80 - 120	
Youngs Modulus	GPa		100 - 200	150	110	150	150 - 160		0.7 – 1.0	4.0 – 5.5
Tensile Strength	MPa		80 - 300					25 - 40	37	30 - 80
Flexural Strength	MPa						250	60 - 80		50 - 100
Curie Temperature	°C	960	750	450	800	720	330 - 350	300 - 470	300 - 470	450
Thermal Conductivity	W/(m •K)		10 - 200		10.0	12.0	9.0		2.0	
Vickers Hardness	HV		300 - 500		550	640	570 - 580			
Electrical Resistivity	μΩm	0.47 – 0.53	0.4 – 0.7		0.5 – 0.6	0.75 – 0.85	1.2 – 1.6	40 - 70	10 - 30	0.01
Specific Heat	J/Kg° C		350 - 500		370	390	440		400	25 - 200