

Sintered Samarium Cobalt Magnets (SmCo)

Sintex a/s supplies both sintered and polymer-bonded permanent magnets. All magnets are customised - or in other words - magnets are developed and manufactured on the basis of a customers sketch.

Material and production

SmCo magnets are produced by powder compaction followed by a sintering process.

Mainly because of the cobalt contents of the magnets, these types of magnets are a more expensive solution. They are for example much more expensive than sintered NdFeB magnets, which typically have the same magnetic strength.

Samarium cobalt magnets do not corrode easily but for medium to very corrosive environments, some kind of surface treatment or sealing is recommended.

Possibilities and advantages

Besides being especially qualified for extremely high temperatures – typically up to 250-350°C - samarium cobalt magnets have the following advantages:

- High magnetic strength (Same range as sint. NdFeB)
- High resistance to demagnetization
- Very high working temperature
- High temperature stability
- Good corrosion resistance

Magnetic properties

Name	Type	Remanens Br		Hcb		Hci	(BH) Max		Work. Temp.		Temp. Coeff.		Myr
		Typ.	Tol.	Typ.	Tol.	Min.	Typ.	Min.	Min.	Max.	of Br	of Hc	
		[T]	[T]	[kA/m]	[kA/m]	[kA/m]	[KJ/m³]	[KJ/m³]	[°C]	[°C]	[%/K]	[%/K]	
S985-350	SZ-175H Sm2Co17	0.985	0.035	732	95	1433	191	175	-100	350	-0.03	-0.19	1.07
S1040-350	Sm2Co17 180/160 w	1.040	0.060	750	50	1600	200	180	-100	350	-0.032	-0.19	1.10
S1035-350	SZ-200H Sm2Co17	1.035	0.015	796	48	1433	207	191	-100	350	-0.03	-0.19	1.03
S1065-350	SZ-220H Sm2Co17	1.065	0.015	796	40	1433	223	207	-100	350	-0.03	-0.19	1.06
S810-250	SC-120 SmCo5	0.810	0.030	560	0	1195	130	110	-100	250	-0.05	-0.28	1.15
S830-250	SC-130 SmCo5	0.830	0.030	575	0	1195	140	120	-100	250	-0.05	-0.28	1.15
S850-250	S-140 SmCo5	0.850	0.030	600	0	1195	145	130	-100	250	-0.05	-0.28	1.13
S880-250	SP-145 SmCo5	0.880	0.030	620	0	1195	151	140	-100	250	-0.05	-0.28	1.13
S930-250	SP-160 SmCo5	0.930	0.030	716	64	1195	175	151	-100	250	-0.05	-0.28	1.03
SLTC	LTc (YXG-22)	0.960	0.020	692	24	1194	175	167	-100	300	+0.005 (-50-20°C) +0.012 (20-100°C) +0.006 (100-200°C) - 0.025 (200-300°C)	-0.20	1.10

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Mechanical properties

Name	Type	Density	Vickers Hardness	Coeff. of thermal expansion	Electrical resistivity
		[g/cm ³]	[Hv]	[1/K]	[Ωcm]
S985-350	SP-160 SmCo5	8.40	500-600	8E-6 to 11E-6	7.5E-05
S1040-350	Sm2Co17180/160 w	8.30	500-600	8E-6 to 11E-6	7.5E-05
S1035-350	SZ-200H Sm2Co17	8.40	500-600	8E-6 to 11E-6	7.5E-05
S1065-350	SZ-220H Sm2Co17	8.40	500-600	8E-6 to 11E-6	7.5E-05
S810-250	SC-120 SmCo5	8.10	450-500	n.a.	n.a.
S830-250	SC-130 SmCo5	8.10	450-500	n.a.	n.a.
S850-250	SC-140 SmCo5	8.10	450-500	n.a.	n.a.
S880-250	SP-145 SmCo5	8.10	450-500	n.a.	n.a.
S930-250	SP-160 SmCo5	8.10	450-500	n.a.	n.a.
SLTC	LTc (YXG-22)	8.40	550	n.a.	n.a.

Characterising magnets

The most important properties to take into consideration for characterising the magnets are:

- Magnetic properties such as remanence Br, coercivity Hcb, intrinsic coercivity Hcj and max. energy product (B•H)max
- Dimensions and tolerances
- Force (for holding magnets), Torque (for motors), Field strength (for sensors)
- Minimum and maximum operating and working temperatures
- Area of application usage – e.g. aquatic environment
- Requirements concerning surface coating

Results

The magnetic and mechanical data shown in this data sheet are the result of tests and calculations done on untreated magnet blocks.

Before you use the information and results, you are encouraged to seek personal assistance and advice from the magnet specialists at Sintex a/s.

Please contact us for more information.

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