SAMARIUM COBALT

General Information

SmCo magnets (Samarium Cobalt) have also a very strong magnetic field. They tend to resist demagnetization extremely well. Unlike Neodymium magnets, it is also very corrosion resistant. SmCo magnets can operate at higher temperatures up to 300°C and are widely used in applications in which higher operating temperature and higher corrosion and oxidation resistance are crucial. The temperature coefficient of remanence is usually less than ±0.05%.

Two common compositions of SmCo magnets are $SmCo_5$ and Sm_2Co_{17}. They can be sintered and bonded. Generally, the cost of SmCo magnets is higher than NdFeB magnets. But NdFeB magnets are stronger than SmCo magnets.

Material Information

- An alloy compose of $SmCo_5$/Sm_2Co_{17} produce by powder metallurgical method
- Extremely hard & brittle
- High demagnetization resistance
- Excellent anti-corrosion properties
- More expensive than NdFeB magnets because of limited raw material supply
- Outstanding thermal stability

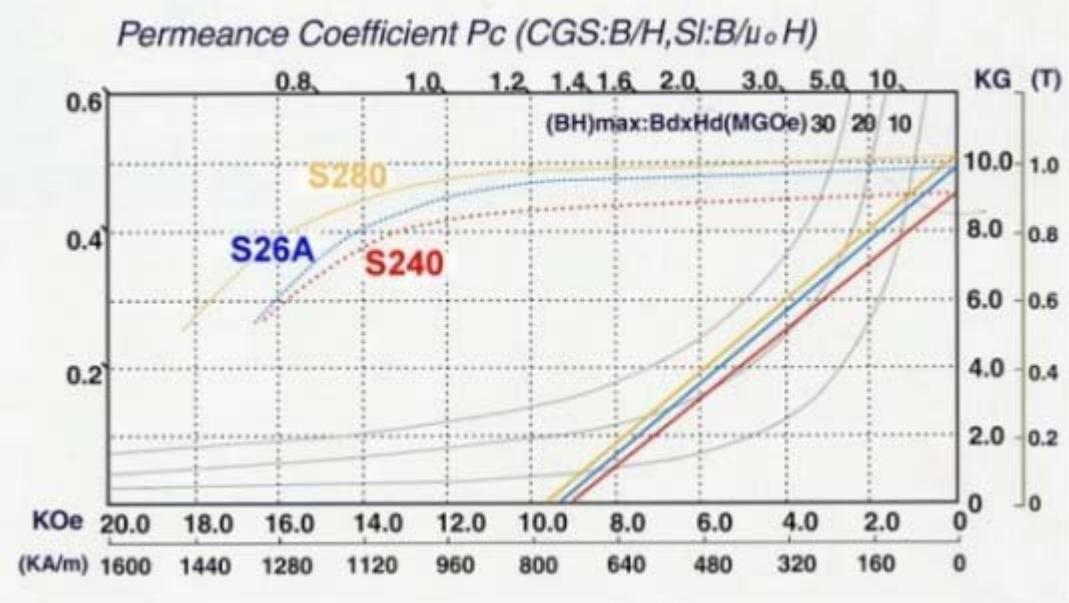
Typical Physical Properties

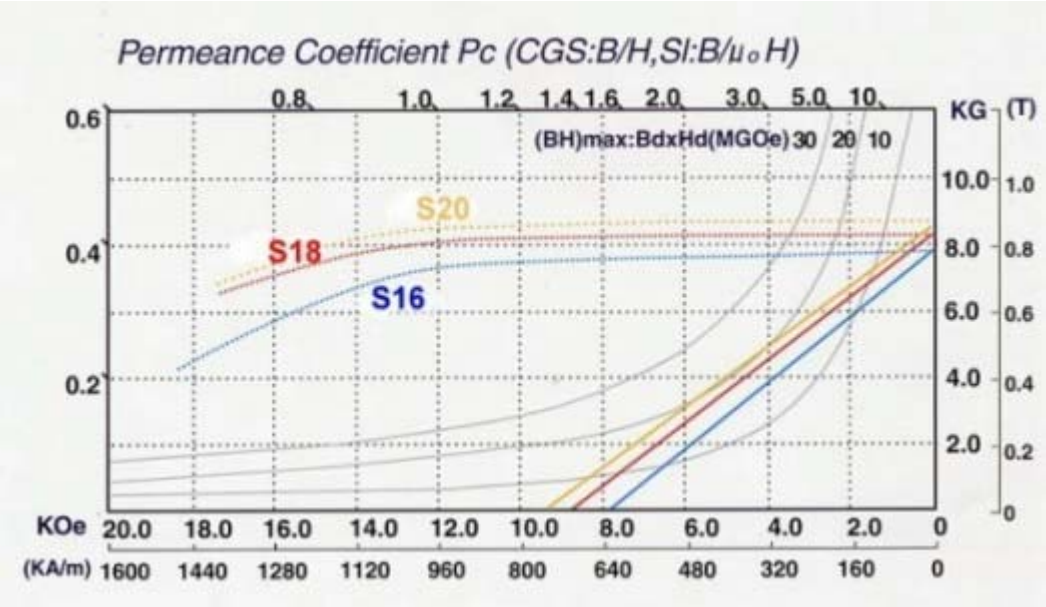
Curie Temperature (°C)	700-800
Maximum Operating Temperature (°C)	350
Resistivity (μ ohm.cm)	50-90
Hardness (Hv)	450-600
Density (g/cm^3)	8.0-8.5
Relative Recoil Permeability (μ_{rec})	1.10
Saturation Field Strength, kOe (kA/m)	37.5 (3000)
Temperature Coefficient of Br (%/°C)	-0.05 ~ -0.03
Temperature Coefficient of iHc (%/°C)	-0.25 ~ -0.19

Magnetic Properties of SmCo Magnets (Samarium Cobalt)

Material	Grade	Remanence		Coercivity		Intrinsic Coercivity		Max. Energy Product	
		Br(mT)	Br(kGs)	bHc(kA/m)	bHc(kOe)	iHc (kA/m)	iHc (kOe)	(BH)max (KJ/m^3)	(BH)max (MGOe)
$SmCo_5$	S16	750-800	7.5-8.0	557-637	7.0-8.0	1989	25	111-143	14-18
	S18	800-930	8.0-9.3	597-677	7.5-8.5	1432	18	127-159	16-20
	S20	850-980	8.5-9.8	597-677	7.5-8.5	1273	16	143-175	18-22
	S24	1000	10.0	680	8.5	1195	15	175-190	22-24
.	S180	900-1030	9.0-10.3	597-677	7.5-8.5	1194	15	127-159	16-20
	S22A	900-1030	9.0-10.3	613-693	7.7-8.7	1989	25	159-191	20-24
	S22B	900-1030	9.0-10.3	613-693	7.7-8.7	1432	18	159-191	20-24
	S240	980-1080	9.8-10.8	636-716	8.0-9.0	1432	18	175-207	22-26
Sm_2Co_{17}	S26A	1000-1130	10.0-11.3	676-756	8.5-9.5	1194	15	191-223	24-28
	S26B	1000-1130	10.0-11.3	676-756	8.5-9.5	796	10	191-223	24-28
	S280	1030-1130	10.3-11.3	716-796	9.0-10.0	1432	18	207-239	26-30
	S270	1000-1100	10.0-11.0	357-516	4.5-6.5	413	5.2	183-223	24-28
	S300	1100-1200	11.0-12.0	438-517	5.5-6.5	454	5.7	223-255	28-32

Typical Demagnetization Curves of SmCo Magnets
(Samarium Cobalt Magnets)





Dimension Range / Nominal Tolerance

Ring Magnet	Outer Diameter (mm)	Inner Diameter (mm)	Thickness (mm)
Maximum	100	80	50
Minimum	2.6	1.8	0.5
Tolerance	±0.1	±0.1	±0.1

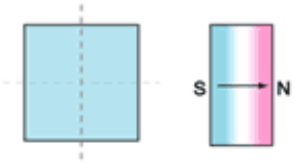
Block Magnet	Length (mm)	Width (mm)	Thickness (mm)
Maximum	100	80	50
Minimum	2.0	1.5	0.5
Tolerance	±0.1	±0.1	±0.1

Disc Magnet	Diameter (mm)	Thickness (mm)
Maximum	100	50
Minimum	1.2	0.5
Tolerance	±0.1	±0.1

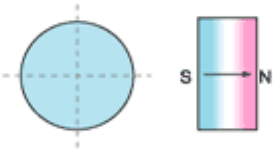
Segment & other irregular shapes can be manufactured according to customer's sample or blue print

Lifton Magnets supplies various kinds of sintered Samarium Cobalt (SmCo) magnets in specific sizes and shapes according to the customers' requirements. It allows also its customers to customize characteristics of their magnets. The shapes can be discs, rings, blocks, slabs, cylinders, tiles and other specific shapes.

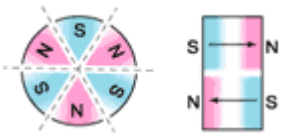
Magnetization Directions of SmCo Magnets



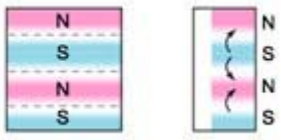
Oriented through thickness



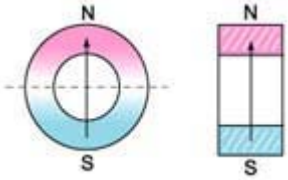
Axially oriented



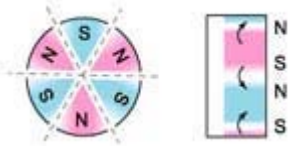
Axially oriented in segments**



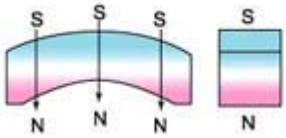
Oriented laterally
multipole on one face **



Oriented through diameter **



Multipole oriented
in segments on one face **



Diametrical oriented

** Spezial magnetization coil is needed

For information about Standard Magnets please see price lists