



# HS Magnet

杭州红山磁性材料有限公司  
HANGZHOU HS MAGNETICS CO.,LTD

#### Magnet Manufacturer And Supplier

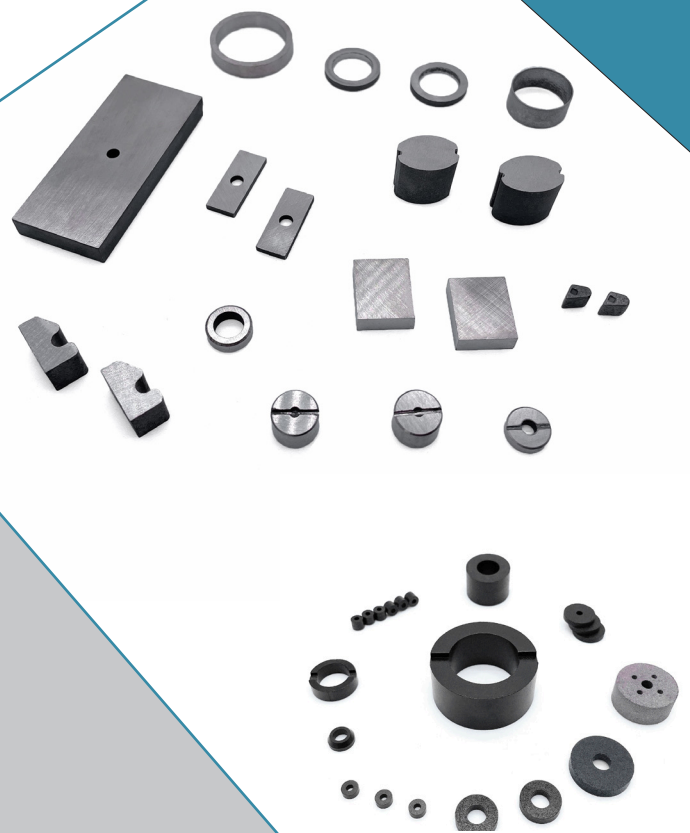
Hangzhou HS Magnetic Material Co., Ltd. was established in 2005, located in Xiaoshan District, Hangzhou, near Xiaoshan Airport. It is only 4 km away from the airport. The company covers an area of 20,000 square meters. The company mainly focuses on the research, development, production, and sales of permanent magnetic materials and related magnetic material applications.

#### Quality First

HS Magnet has been focusing on quality control and product quality improvement, we have passed the ISO9001:2015 quality system in 2006 and IATF 16949:2016 quality system in 2021.

#### Technical Support

HS Magnet has the R&D capability to assist customers with engineering development and customization of magnetic materials related to magnetic applications. This includes the selection of the right magnetic material for the specimen, very small or complex magnetic components and products, special performance requirements, etc.



# AlNiCo Magnet

## Introduction of AlNiCo Magnet

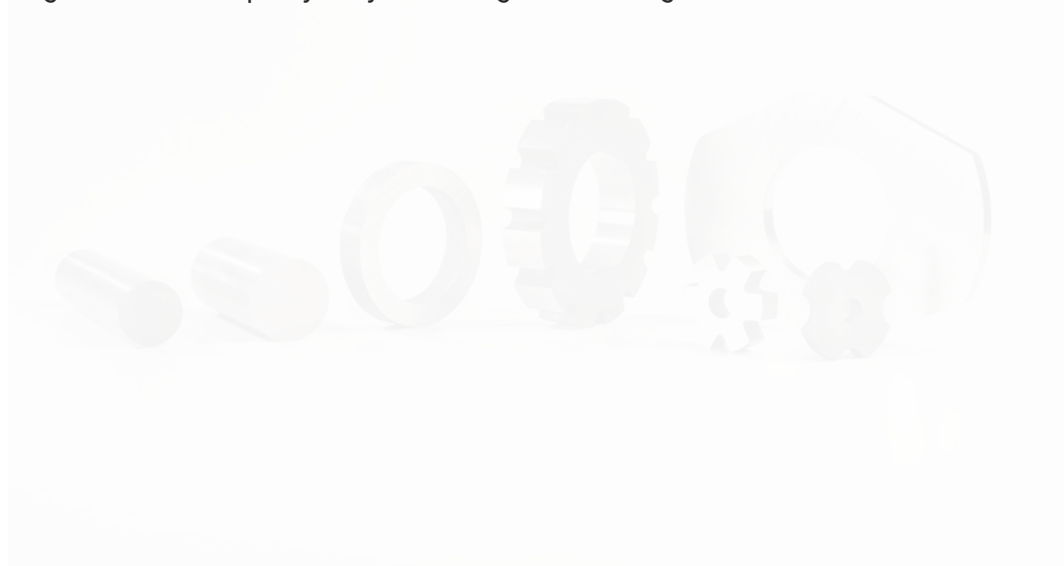
Alnico is one of the first permanent magnet materials developed, and is an alloy composed of aluminum, nickel, cobalt, iron and other trace metal element. Alnico permanent magnet material was successfully developed in the 1930s. At that time, it had the best magnetic properties and small temperature coefficient, thus it was used most and widely in permanent magnet motors. After the 1960s, with the introduction of ferrite permanent magnets and rare-earth permanent magnets, the application of Alnico magnets in the motor is gradually replaced, accounting for a declining trend.

According to different production processes, there are Sinter alnico and Cast alnico. Most of the products are round and square in shape. The casting process can be processed and produced into different sizes and shapes; compared with the casting process, the sintered product is limited to small sizes, and its produced blank has better dimensional tolerances than the cast product blank, and its magnetic properties are slightly lower than those of the cast product, but the machinability is better. Among the permanent magnet materials, cast Alnico permanent magnets have the lowest reversible temperature coefficient and can operate at temperatures up to 500 degrees Celsius or more. Alnico permanent magnets are widely used in various instrumentation and other applications.

The advantages of Alnico magnets are high remanence (up to 1.35T) and low temperature coefficient. At a temperature coefficient of  $-0.02\%/^{\circ}\text{C}$ , the maximum operating temperature can be around  $520^{\circ}\text{C}$ . The disadvantages are very low coercivity (usually less than  $160\text{kA/m}$ ) and non-linear demagnetization curve. Therefore Alnico magnets are easy to be magnetized and equally easy to demagnetize though.



**HS Magnet**



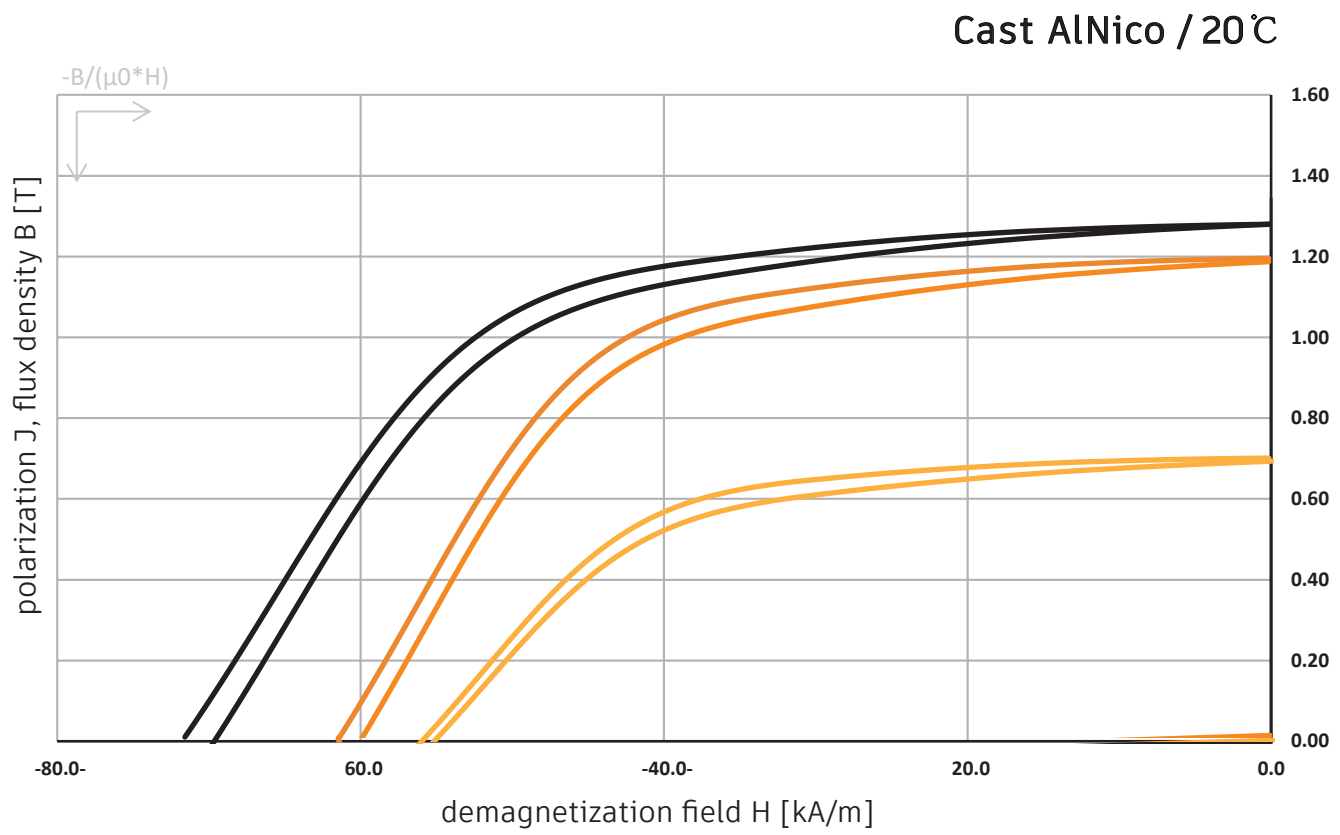
## Magnetic Properties of Cast AlNiCo Magnet

Grade	Remanence Br		Coercivity Hcb		Max. Energy Product (BH)max		Curie Temp °C	Max. Operating Temperature °C	MMPA Equivalent
	mT	Gs	kA/m	Oe	kJ/m <sup>3</sup>	MGOe			
LN10	600	6000	40	500	10	1.2	750	450	AlNiCo3
LNG10	600	6000	44	550	10	1.25	750	450	
LNG12	700	7000	44	550	12	1.5	750	450	AlNiCo2
LNG13	680	6800	48	600	13	1.63	800~850	450	
LNG16	800	8000	48	600	13	1.63	800~850	525	AlNiCo4
LNG18	900	9000	48	600	18	2.25	800~850	525	
LNG37	1200	12000	48	600	37	4.63	800~850	525	AlNiCo5
LNG40	1250	12500	48	600	40	5.0	800~850	525	
LNG44	1250	12500	52	650	44	5.5	800~850	525	
LNG48	1280	12800	56	700	48	6.0	800~850	525	AlNiCo5DG
LNG52	1300	13000	56	700	52	6.5	800~850	525	
LNG56	1300	13000	58	720	56	7.0	800~850	525	AlNiCo5-7
LNG60	1330	13300	60	750	60	7.5	800~850	525	
LNGT28	1000	10000	56	700	28	3.5	800~850	525	AlNiCo6
LNGT30	1000	11000	56	700	30	3.75	800~850	525	
LNGT18	580	5800	90	1130	18	2.25	800~850	555	AlNiCo8
LNGT32	800	8000	100	1250	32	4.0	800~850	555	
LNGT38	800	8000	110	1380	38	4.75	800~850	555	
LNGT44	850	8500	120	1500	44	5.5	800~850	555	
LNGT48	900	9000	120	1500	48	6.0	800~850	555	AlNiCo8HE
LNGT60	900	9000	110	1380	60	7.5	800~850	555	AlNiCo9
LNGT72	1050	10500	112	1400	72	9.0	800~850	555	
LNGT88	1080	10800	120	1500	80	10.0	800~850	555	
LNGT96	1150	11500	118	1480	96	12.0	800~850	555	
LNGT36J	700	7000	140	1750	36	4.5	800~850	555	AlNiCo8HC
LNGT48J	800	8000	145	1820	48	6.0	800~850	555	
LNGT52J	850	8500	140	1750	52	6.5	800~850	555	

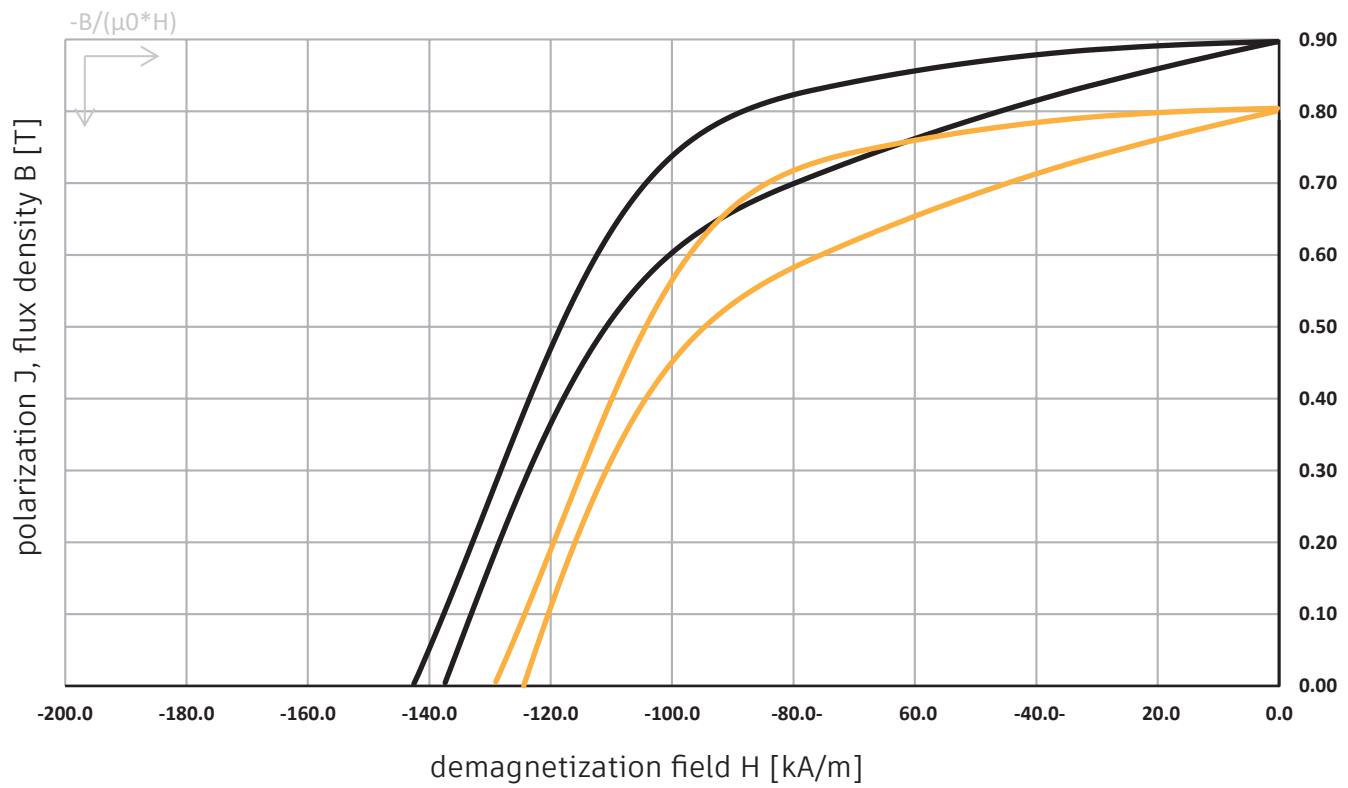
## Magnetic Properties of Sintered AlNiCo Magnet

Grade	Remanence Br		Coercivity Hcb		Max. Energy Product (BH)max		Curie Temp °C	Max. Operating Temperature °C	MMPA Equivalent
	mT	Gs	kA/m	Oe	kJ/m <sup>3</sup>	MGOe			
FLN8	500	5000	40	500	8	1.00	760	450	S.AlNiCo3
FLNG12	700	7000	48	600	12	1.50	810	450	S.AlNiCo2
FLNGT18	600	6000	90	1130	18	2.20	860	450	S.AlNiCo7
FLNG34	1200	12000	48	600	34	4.25	890	450	S.AlNiCo5
FLNGT28	1050	10500	56	700	28	3.50	850	450	S.AlNiCo6
FLNGT38	800	8000	120	1500	38	4.75	850	450	S.AlNiCo8
FLNGT42	880	8800	120	1500	42	5.25	820	450	S.AlNiCo8
FLNGT33J	700	7000	140	1750	33	4.13	850	450	S.AlNiCo8HC
FLNGT36J	700	7000	140	1750	36	4.50	850	450	S.AlNiCo8

# Demagnetization curve of Cast AlNiCo Magnets

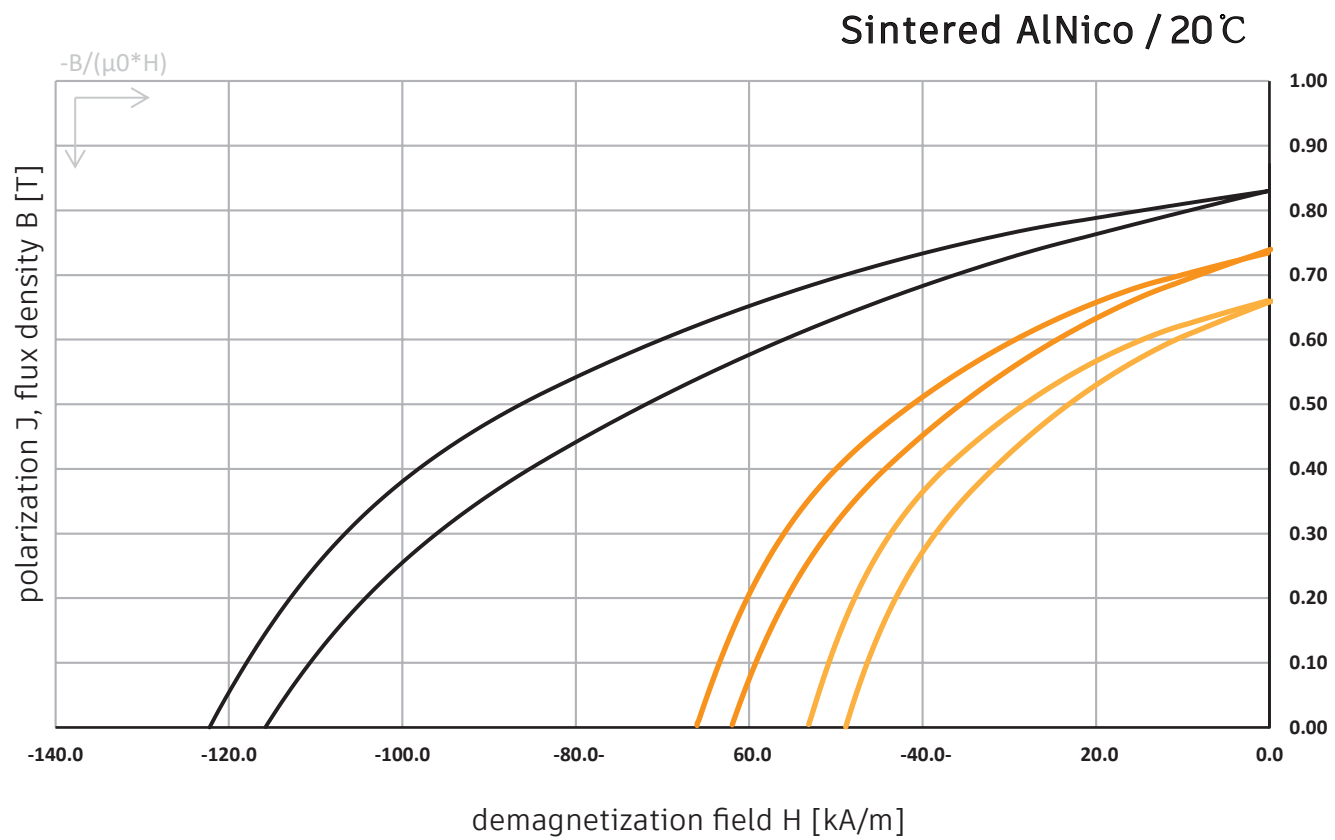


Material: **LNG37**      **LNG52**      **LNG12**

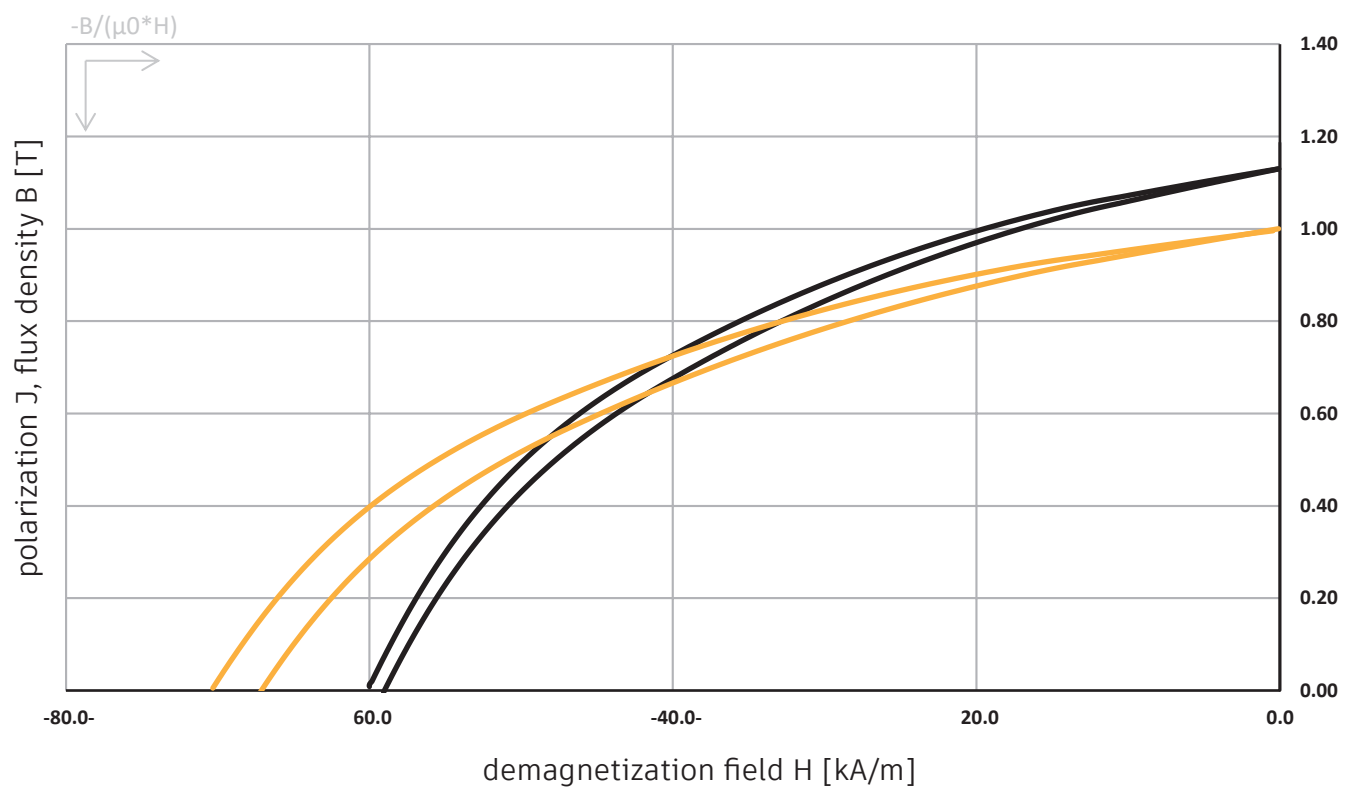


Material: **LNGT60**      **LNGT32**

# Demagnetization curve of Sintered AlNiCo Magnets



Material: **FLNG12**      **FLNG34**      **FLNGT28**



Material: **FLNG34**      **FLNGT28**

# NdFeB Magnet

## Introduction of NdFeB Magnet

NdFeB magnets, also known as neodymium magnets, are currently one of the most widely used permanent magnets. Neodymium magnets are divided into sintered neodymium magnets and bonded neodymium magnets. The commonly used neodymium magnets are made by sintering process. Compared with other permanent magnet materials, sintered neodymium magnets have outstanding advantages in magnetic properties. It has extremely high magnetic energy product, coercivity and remanence. At the same time, it has excellent mechanical properties so it is easy to process. These excellent properties make sintered NdFeB permanent magnets widely used in modern industry and electronic technology, especially suitable for high power and high magnetic field density scenarios. It is commonly used in industries such as permanent magnet motors, loudspeakers, magnetic separators, computer disk drives and magnetic resonance imaging equipment. The emergence of NdFeB magnets makes products tend to be lighter and miniaturized, injecting new impetus into the update and iteration of modern industrial products.

Bonded NdFeB magnets are magnets made by mixing NdFeB magnetic powder and binder through "compression molding" or "injection molding". Although its performance is not as high as that of sintered NdFeB, the bonded magnet has high dimensional accuracy and can be made into magnetic components with relatively complex shapes, and has the characteristics of one-time molding and multi-pole orientation. Bonded neodymium magnets have high mechanical strength and can be molded together with other supporting components during molding.



**HS Magnet**

### Bonded NdFeB FLOW CHART

1. Injection Molding: Mixing Pelleting  
Injection Molding Surface Gauss Inspection  
Inspection Magnetizing Magnetic Flux  
Inspection Packing.
2. Pressing Forming: Mixing Pressing Curing  
Surface Gauss Inspection Electrophoresis  
Inspection Magnetizing Magnetic Flux  
Inspection Packing.



# Magnetic Properties of Sintered NdFeB Magnet

Grade	Remanence Br		Coercivity Hcb		Intrinsic Coercive Force Hci	Max. Energy Product (BH)max		working Temperature °C	Density G/CM3	
	T	kGs	kA/m	kOe		kJ/m3	MGOe			
N30	1.08-1.13	10.8-11.3	≥798	≥10.0	≥955	≥12	223-247	28-31	80	≥7.5
N33	1.13-1.17	11.3-11.7	≥836	≥10.5	≥955	≥12	247-271	31-34	80	≥7.5
N35	1.17-1.22	11.7-12.2	≥868	≥10.9	≥955	≥12	263-287	33-36	80	≥7.5
N38	1.22-1.25	12.2-12.5	≥899	≥11.3	≥955	≥12	287-310	36-39	80	≥7.5
N40	1.25-1.28	12.5-12.8	≥907	≥11.4	≥955	≥12	302-326	38-41	80	≥7.5
N42	1.28-1.32	12.8-13.2	≥915	≥11.5	≥955	≥12	318-342	40-43	80	≥7.5
N45	1.32-1.38	13.2-13.8	≥923	≥11.6	≥955	≥12	342-366	43-46	80	≥7.5
N48	1.38-1.42	13.8-14.2	≥923	≥11.6	≥955	≥12	366-390	46-49	80	≥7.5
N50	1.40-1.45	14.0-14.5	≥796	≥10.0	≥876	≥11	382-406	48-51	80	≥7.5
N52	1.43-1.48	14.3-14.8	≥796	≥10.0	≥876	≥11	398-422	50-53	80	≥7.5
N55	1.46-1.52	14.6-15.2	≥796	≥10.0	≥876	≥11	414-430	52-54	80	≥7.5
N35M	1.17-1.22	11.7-12.2	≥868	≥10.9	≥1114	≥14	263-287	33-36	100	≥7.5
N38M	1.22-1.25	12.2-12.5	≥899	≥11.3	≥1114	≥14	287-310	36-39	100	≥7.5
N40M	1.25-1.28	12.5-12.8	≥923	≥11.6	≥1114	≥14	302-326	38-41	100	≥7.5
N42M	1.28-1.32	12.8-13.2	≥955	≥12.0	≥1114	≥14	318-342	40-43	100	≥7.5
N45M	1.32-1.38	13.2-13.8	≥995	≥12.5	≥1114	≥14	342-366	43-46	100	≥7.5
N48M	1.37-1.43	13.7-14.3	≥1027	≥12.9	≥1114	≥14	366-390	46-49	100	≥7.5
N50M	1.40-1.45	14.0-14.5	≥1033	≥13.0	≥1114	≥14	382-406	48-51	100	≥7.5
N52M	1.43-1.48	14.3-14.8	≥1050	≥13.2	≥1114	≥14	398-422	50-53	100	≥7.5
N54M	1.45-1.50	14.5-15.0	≥1051	≥13.2	≥1114	≥14	414-438	52-55	100	≥7.5
N35H	1.17-1.22	11.7-12.2	≥868	≥10.9	≥1353	≥17	263-287	33-36	120	≥7.5
N38H	1.22-1.25	12.2-12.5	≥899	≥11.3	≥1353	≥17	287-310	36-39	120	≥7.5
N40H	1.25-1.28	12.5-12.8	≥923	≥11.6	≥1353	≥17	302-326	38-41	120	≥7.5
N42H	1.28-1.32	12.8-13.2	≥955	≥12.0	≥1353	≥17	318-342	40-43	120	≥7.5
N45H	1.32-1.36	13.2-13.6	≥963	≥12.1	≥1353	≥17	342-366	43-46	120	≥7.5
N48H	1.37-1.43	13.7-14.3	≥995	≥12.5	≥1353	≥17	366-390	46-49	120	≥7.5
N50H	1.40-1.45	14.0-14.5	≥1011	≥12.7	≥1353	≥17	382-406	48-51	120	≥7.5
N52H	1.43-1.48	14.3-14.8	≥1027	≥12.9	≥1353	≥17	398-422	50-53	120	≥7.5
N33SH	1.14-1.18	11.4-11.8	≥852	≥10.7	≥1592	≥20	247-279	31-35	150	≥7.5
N35SH	1.17-1.22	11.7-12.2	≥876	≥11.0	≥1592	≥20	263-287	33-36	150	≥7.5
N38SH	1.22-1.25	12.2-12.5	≥907	≥11.4	≥1592	≥20	287-310	36-39	150	≥7.5
N40SH	1.25-1.28	12.5-12.8	≥939	≥11.8	≥1592	≥20	302-326	38-41	150	≥7.5
N42SH	1.28-1.32	12.8-13.2	≥987	≥12.4	≥1592	≥20	318-342	40-43	150	≥7.5
N45SH	1.32-1.38	13.2-13.8	≥1003	≥12.6	≥1592	≥20	342-366	43-46	150	≥7.5
N48SH	1.37-1.43	13.7-14.3	≥1027	≥12.9	≥1592	≥20	366-390	46-49	150	≥7.5
N50SH	1.40-1.45	14.0-14.5	≥1003	≥12.6	≥1592	≥20	382-406	48-51	150	≥7.5
N28UH	1.04-1.08	10.4-10.8	≥764	≥9.6	≥1990	≥25	207-231	26-29	180	≥7.5
N30UH	1.08-1.13	10.8-11.3	≥812	≥10.2	≥1990	≥25	223-247	28-31	180	≥7.5
N33UH	1.13-1.17	11.3-11.7	≥852	≥10.7	≥1990	≥25	247-271	31-34	180	≥7.5
N35UH	1.17-1.22	11.7-12.2	≥860	≥10.8	≥1990	≥25	263-287	33-36	180	≥7.5
N38UH	1.22-1.25	12.2-12.5	≥876	≥11.0	≥1990	≥25	287-310	36-39	180	≥7.5
N40UH	1.25-1.28	12.5-12.8	≥899	≥11.3	≥1990	≥25	302-326	38-41	180	≥7.5
N42UH	1.28-1.32	12.8-13.2	≥899	≥11.3	≥1990	≥25	318-342	40-43	180	≥7.5
N45UH	1.32-1.36	13.2-13.6	≥908	≥11.4	≥1990	≥25	342-366	43-46	180	≥7.5
N48UH	1.37-1.43	13.7-14.3	≥908	≥11.4	≥1990	≥25	366-390	46-49	180	≥7.5

## Magnetic Properties of Sintered NdFeB Magnet

Grade	Remanence Br		Coercivity Hcb		Intrinsic Coercive Force Hci	Max. Energy Product (BH)max		working Temperature °C	Density G/CM3	
	T	kGs	kA/m	kOe		kJ/m3	MGOe			
N28EH	1.04-1.08	10.4-10.8	≥780	≥9.8	≥2388	≥30	207-231	26-29	200	≥7.5
N30EH	1.08-1.13	10.8-11.3	≥812	≥10.2	≥2388	≥30	223-247	28-31	200	≥7.5
N33EH	1.13-1.17	11.3-11.7	≥836	≥10.5	≥2388	≥30	247-271	31-34	200	≥7.5
N35EH	1.17-1.22	11.7-12.2	≥876	≥11.0	≥2388	≥30	263-287	33-36	200	≥7.5
N38EH	1.22-1.25	12.2-12.5	≥899	≥11.3	≥2388	≥30	287-310	36-39	200	≥7.5
N40EH	1.25-1.28	12.5-12.8	≥899	≥11.3	≥2388	≥30	302-326	38-41	200	≥7.5
N42EH	1.28-1.32	12.8-13.2	≥899	≥11.3	≥2388	≥30	318-342	40-43	200	≥7.5
N45EH	1.32-1.36	13.2-13.6	≥899	≥11.3	≥2388	≥30	342-366	43-46	200	≥7.5
N28AH	1.04-1.08	10.4-10.8	≥787	≥9.9	≥2786	≥35	207-231	26-29	230	≥7.5
N30AH	1.08-1.13	10.8-11.3	≥819	≥10.3	≥2786	≥35	223-247	28-31	230	≥7.5
N33AH	1.13-1.17	11.3-11.7	≥843	≥10.6	≥2786	≥35	247-271	31-34	230	≥7.5
N35AH	1.17-1.22	11.7-12.2	≥876	≥11.0	≥2786	≥35	263-287	33-36	230	≥7.5
N38AH	1.22-1.25	12.2-12.5	≥899	≥11.3	≥2786	≥35	287-310	36-39	230	≥7.5
N40AH	1.26-1.31	12.6-13.1	≥939	≥11.8	≥2786	≥35	302-334	38-42	230	≥7.5
N42AH	1.29-1.35	12.9-13.5	≥955	≥12.0	≥2786	≥35	318-350	40-44	230	≥7.5

## Magnetic Properties of Diffusion NdFeB Magnet

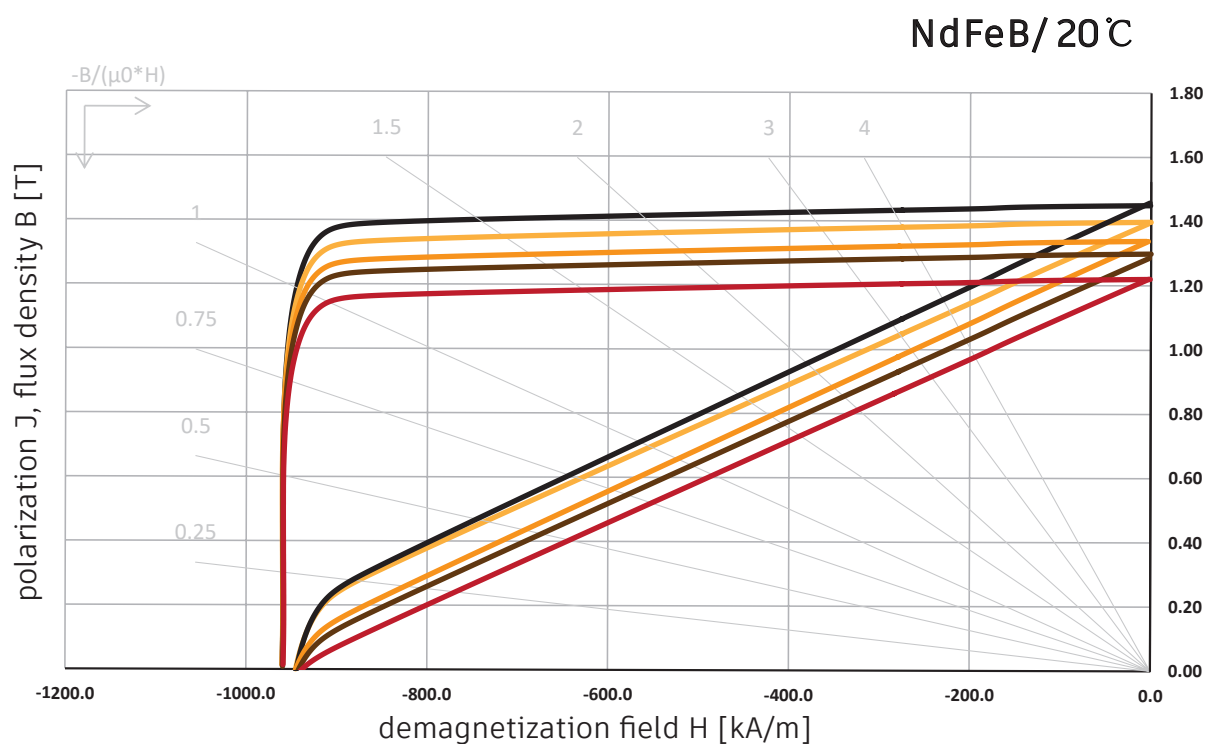
Grade	Remanence Br		Coercivity Hcb		Intrinsic Coercive Force Hci	Max. Energy Product (BH)max		working Temperature °C	Density G/CM3	
	T	kGs	kA/m	kOe		kJ/m3	MGOe			
G48SH	1.37-1.42	13.7-14.2	>1011	>13	>1592	>20	358-390	45-49	<150	≥7.5
G50SH	1.40-1.45	14.0-14.5	>1027	>13.2	>1592	>20	374-406	47-51	<150	≥7.5
G52SH	1.42-1.48	14.2-14.8	>1067	>13.4	>1592	>20	390-422	49-53	<150	≥7.5
G55SH	1.46-1.51	14.6-15.1	>1083	>13.6	>1592	>20	406-438	51-55	<150	≥7.5
G45UH	1.33-1.38	13.3-13.8	>978	>12.4	>1990	>25	334-366	42-46	<180	≥7.5
G48UH	1.37-1.42	13.7-14.2	>1027	>12.9	>1990	>25	358-390	45-49	<180	≥7.5
G50UH	1.40-1.45	14.0-14.5	>1051	>13.2	>1990	>25	374-406	47-51	<180	≥7.5
G52UH	1.42-1.48	14.2-14.8	>1067	>13.5	>1990	>25	390-422	49-53	<180	≥7.5
G54UH	1.46-1.51	14.6-15.1	>1075	>13.5	>1990	>25	406-438	51-55	<180	≥7.5
G40EH	1.26-1.31	12.6-13.1	>955	>12.0	>2388	>30	302-334	38-42	<200	≥7.5
G44EH	1.29-1.35	12.6-13.1	>971	>12.2	>2388	>30	318-350	40-44	<200	≥7.5
G46EH	1.33-1.38	12.6-13.1	>1011	>12.7	>2388	>30	334-366	42-46	<200	≥7.5
G48EH	1.37-1.42	12.6-13.1	>1027	>12.9	>2388	>30	358-390	45-49	<200	≥7.5
G50EH	1.40-1.45	12.6-13.1	>1051	>13.2	>2388	>30	374-406	47-51	<200	≥7.5



# Magnetic Properties of Bonded NdFeB Magnet

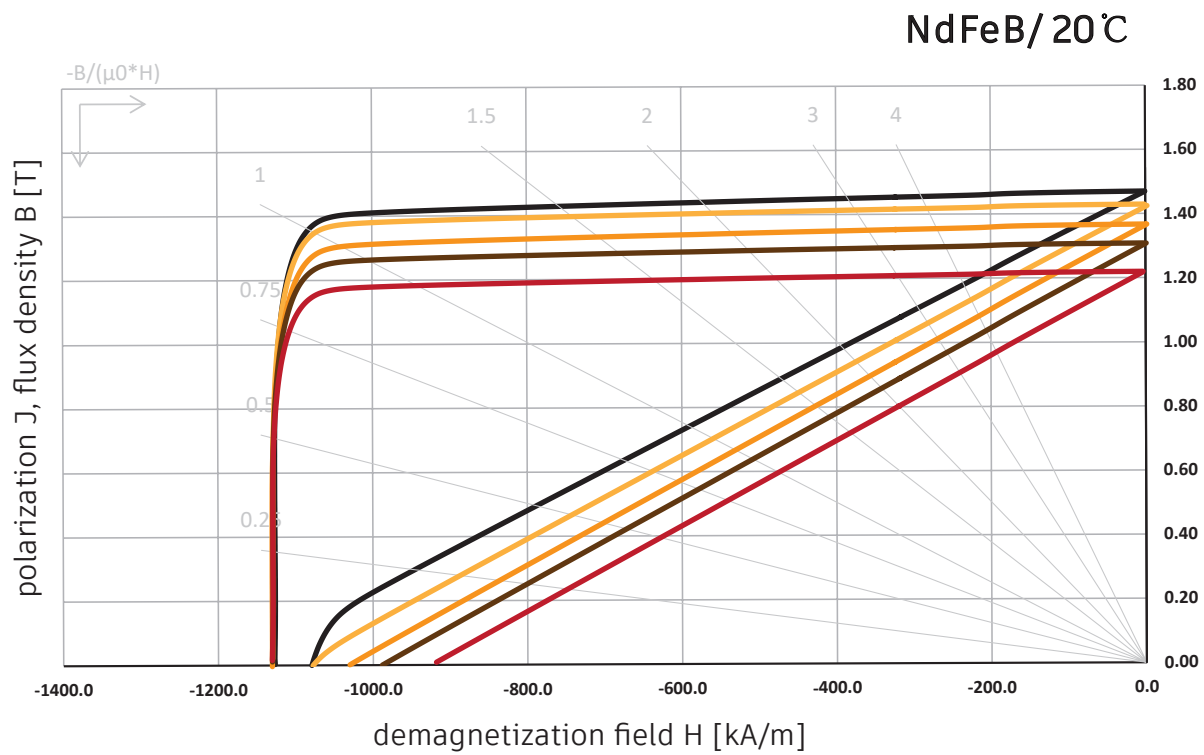
Item	Grade	BR		HCB		HCJ		(BH) MAX		Working Temperature °C	Density G/CM3	Temperature Average Reversible Temperature Coefficient
		T	KGS	KA/M	KOE	KA/M	KOE	KJ/M3	MGOE			
Compression Molding NdFeB Magnet	KBM-2	0.30~0.40	3.0~4.0	160~240	2.0~3.0	480~640	6.0~8.0	16~24	2.0~3.0	≤120	4.5~6.0	-0.12
	KBM-4	0.40~0.50	4.0~5.0	240~320	3.0~4.0	560~720	7.0~9.0	32~44	4.0~5.5	≤120	5.2~6.0	-0.11
	KBM-6	0.55~0.63	5.5~6.3	320~400	4.0~5.0	480~640	6.0~8.0	48~60	6.0~7.5	≤120	5.5~6.0	-0.11
	KBM-8	0.65~0.68	6.5~6.8	360~440	4.5~5.5	640~800	8.0~10.0	64~72	8.0~9.0	≤150	5.8~6.1	-0.1
	KBM-8H	0.60~0.65	6.0~6.5	400~480	5.0~6.0	1120~1280	14.0~16.0	60~68	7.5~8.5	≤160	5.8~6.2	-0.1
	KBM-8L	0.65~0.68	6.5~6.8	400~480	5.0~6.0	900~1120	11.0~14.0	64~72	8.0~9.0	≤160	5.8~6.2	-0.1
	KBM-9	0.60~0.68	6.0~6.8	400~480	5.0~6.0	640~800	8.0~10.0	68~72	8.5~9.0	≤150	5.8~6.2	-0.1
	KBM-10	0.68~0.73	6.8~7.3	400~480	5.0~6.0	640~800	8.0~10.0	76~84	9.5~10.5	≤150	5.8~6.2	-0.1
	KBM-12	0.71~0.75	7.1~7.5	440~520	5.5~6.5	720~800	9.0~10.0	84~96	10.5~12.0	≤150	5.8~6.2	-0.1
	Injection Molding NdFeB Magnet	KB1-3	0.25~0.35	2.5~3.5	160~240	2.0~3.0	480~640	6.0~8.0	12~24	1.5~3.0	≤120	3.9~4.4
KBI-4		0.35~0.45	3.5~4.5	240~320	3.0~4.0	560~720	7.0~9.0	24~36	3.0~4.5	≤120	4.2~4.9	-0.11
KB1-5		0.45~0.52	4.5~5.2	320~360	4.0~4.5	560~720	7.0~9.0	36~44	4.5~5.5	≤120	4.5~5.0	-0.11
KB1-5H (PPS)		0.48~0.52	4.8~5.2	400~480	5.0~6.0	880~1040	11.0~13.0	36~44	4.5~5.5	≤120	4.9~5.4	-0.11
KB1-6		0.50~0.55	5.0~5.5	320~440	4.0~5.5	640~800	8.0~10.0	44~52	5.5~6.5	≤120	4.7~5.1	-0.11
KBI-7		0.58~0.64	5.8~6.4	320~400	4.0~5.0	640~800	8.0~10.0	52~60	6.5~7.5	≤120	5.0~5.5	-0.11
KB1-8		0.64~0.74	6.4~7.44	400~480	5.0~6.0	640~800	8.0~10.0	68~76	8.5~9.5	≤120	5.5~5.9	-0.11

## Demagnetization curve of Sintered NdFeB Magnets

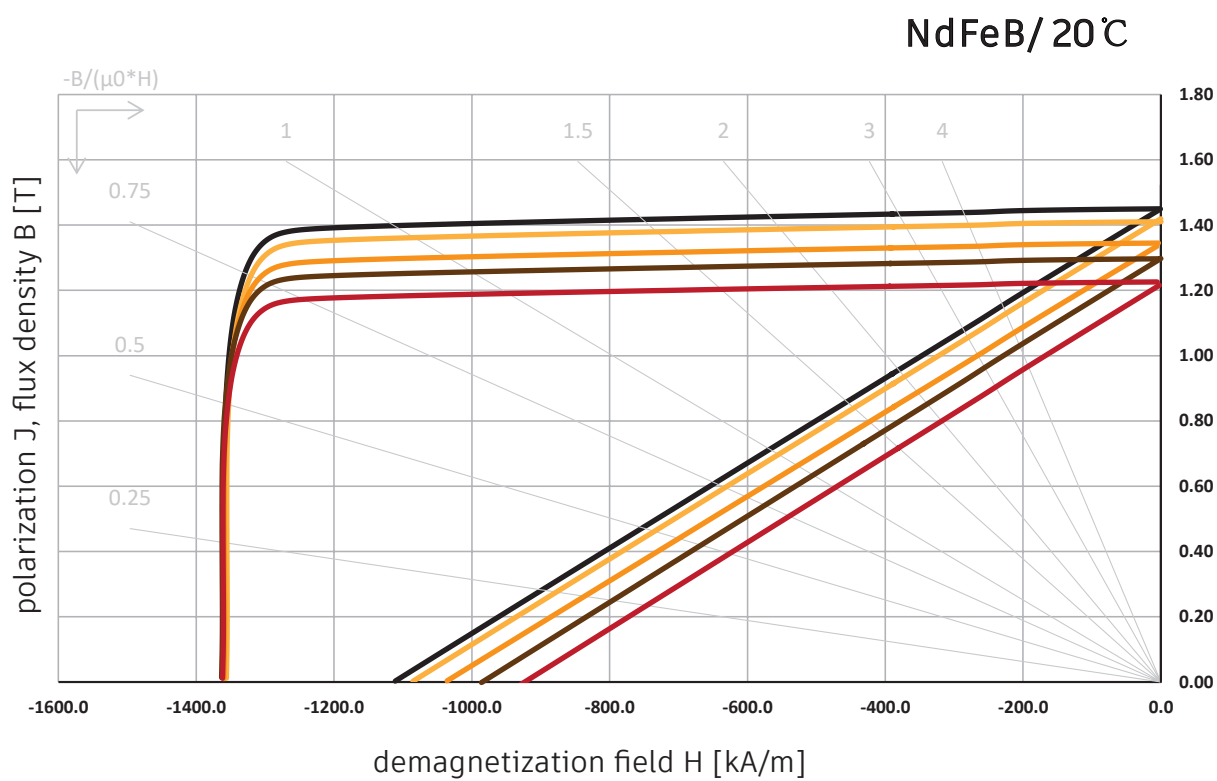


Material: **N52** **N48** **N42** **N40** **N35**

# Demagnetization curve of Sintered NdFeB Magnets

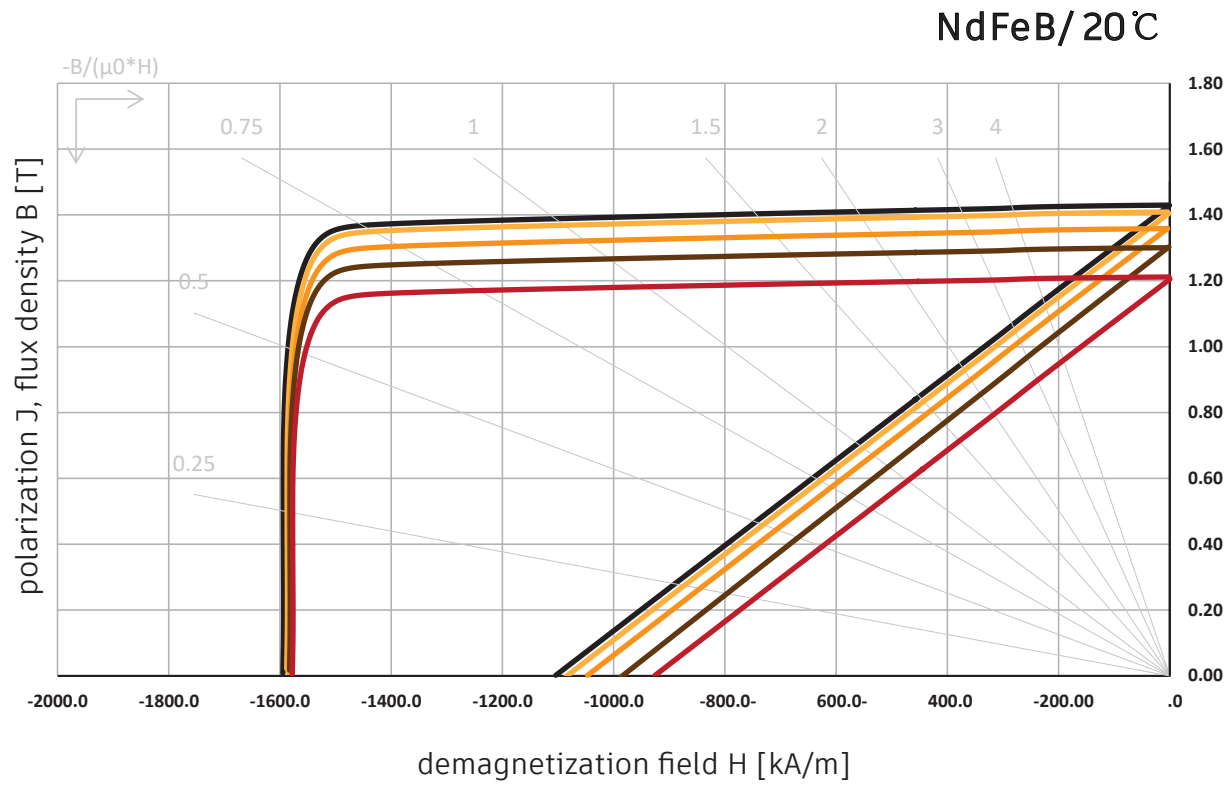


Material: **N54M** **N50M** **N45M** **N40M** **N35M**

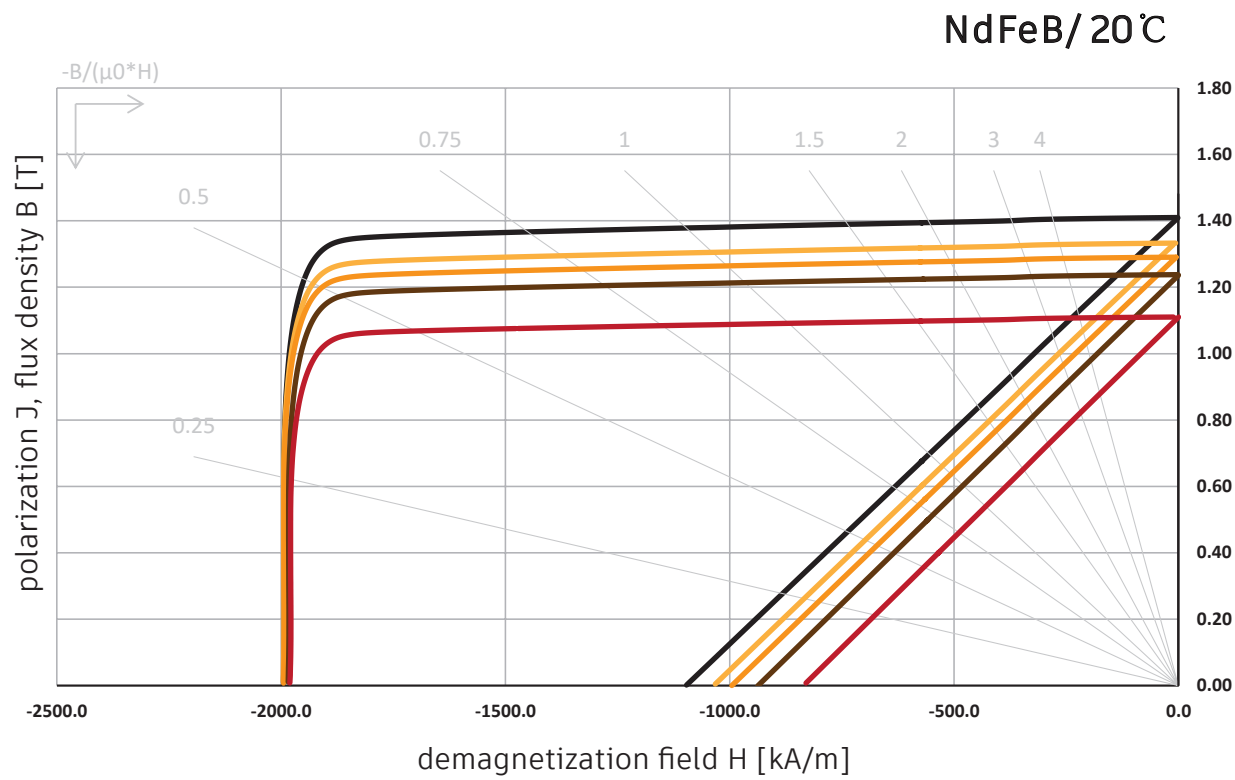


Material: **N52H** **N48H** **N44H** **N40H** **N35H**

# Demagnetization curve of Sintered NdFeB Magnets

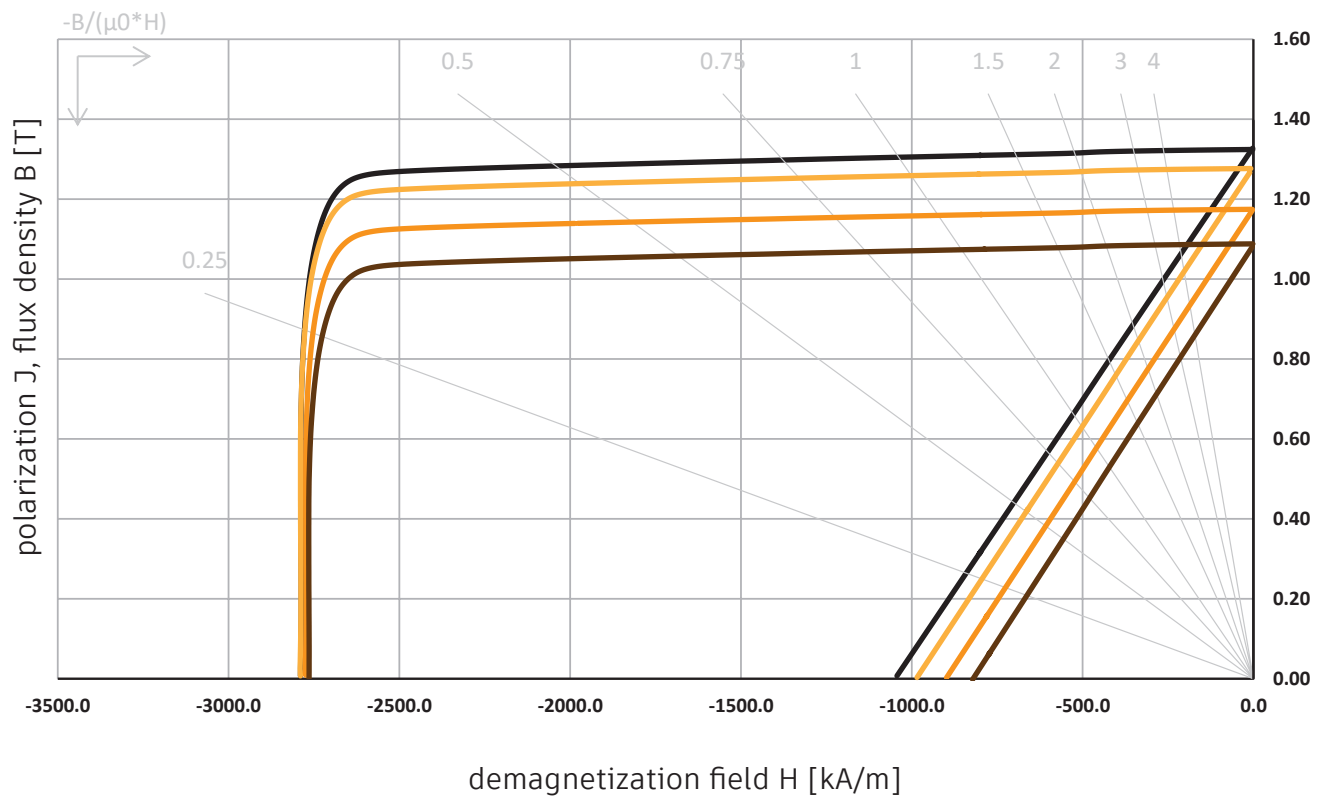
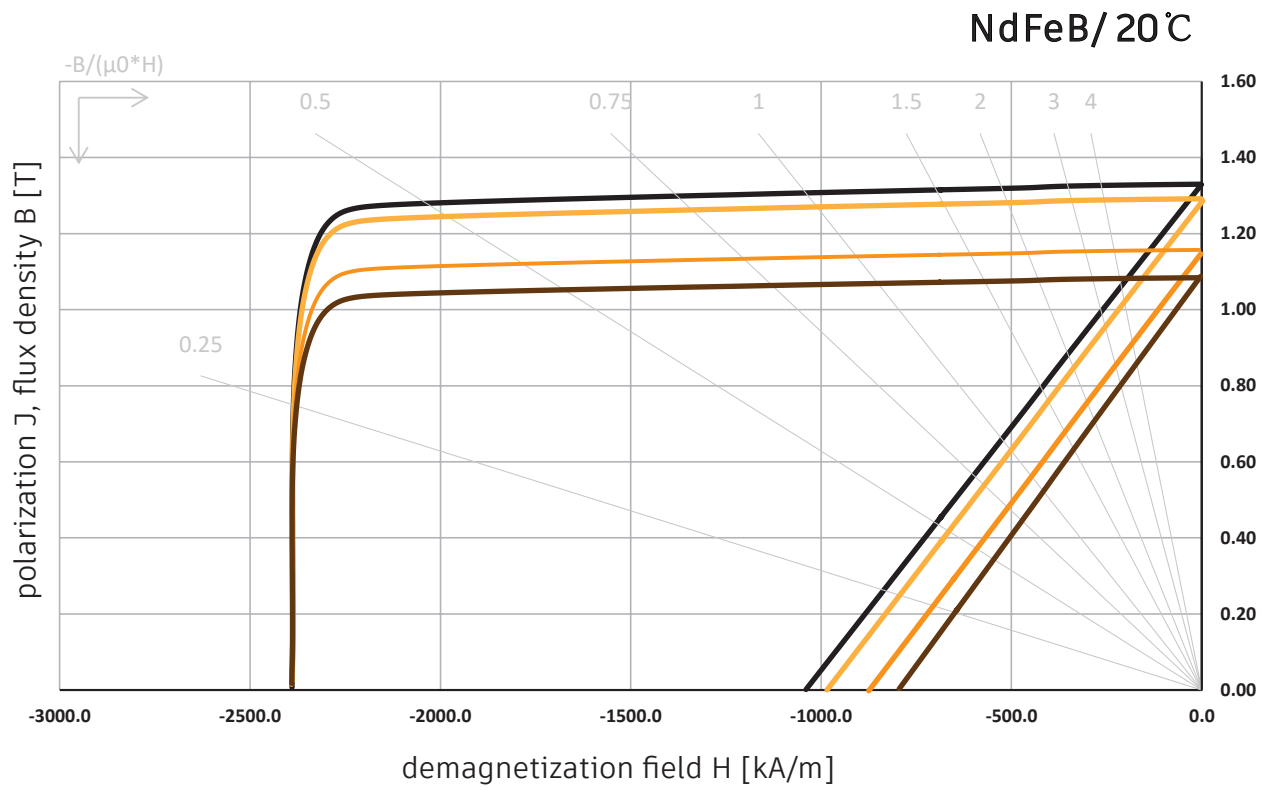


Material: **N50SH** **N48SH** **N42SH** **N40SH** **N35SH**



Material: **N48UH** **N42UH** **N40UH** **N35UH** **N30UH**

# Demagnetization curve of Sintered NdFeB Magnets



# Ferrite Magnet

## Introduction of Ferrite Magnet

Ferrite is a ceramic material composed of  $\text{Fe}_2\text{O}_3$ , BaO or SrO, which is a nonmetallic type permanent magnetic material. It's similar to other metal oxides, with high hardness and brittleness. Ferrite magnets can be classified into the isotropic type and anisotropic type. Its maximum operating temperature can reach 250 degrees Celsius and also has superior corrosion resistance.

Ferrite magnets can also be classified as "soft magnets" or "hard magnets" according to their low or high magnetic coercivity. The Ferrite magnet used in the iron core of transformers or electromagnets includes compounds of nickel, zinc, or manganese, which have low coercivity and are generally called Soft Ferrite; the Ferrite magnet used in permanent magnets is Hard Ferrite, which has higher coercivity and remanence after magnetization. Because of its high coercivity, hard ferrite is not easily demagnetized, which is also an important characteristic of permanent magnets. Hard ferrite can generate magnetic flux and also has a higher magnetic permeability. They are commonly used in various applications, such as fridge magnets, loudspeakers, motors and generators. In electric guitar pickups, magnetic pickups will also use Ferrite as its magnetic material, together with AlNiCo magnet.

Shape: disc, cylinder, block, ring, sphere, arc, trapezoid, etc.

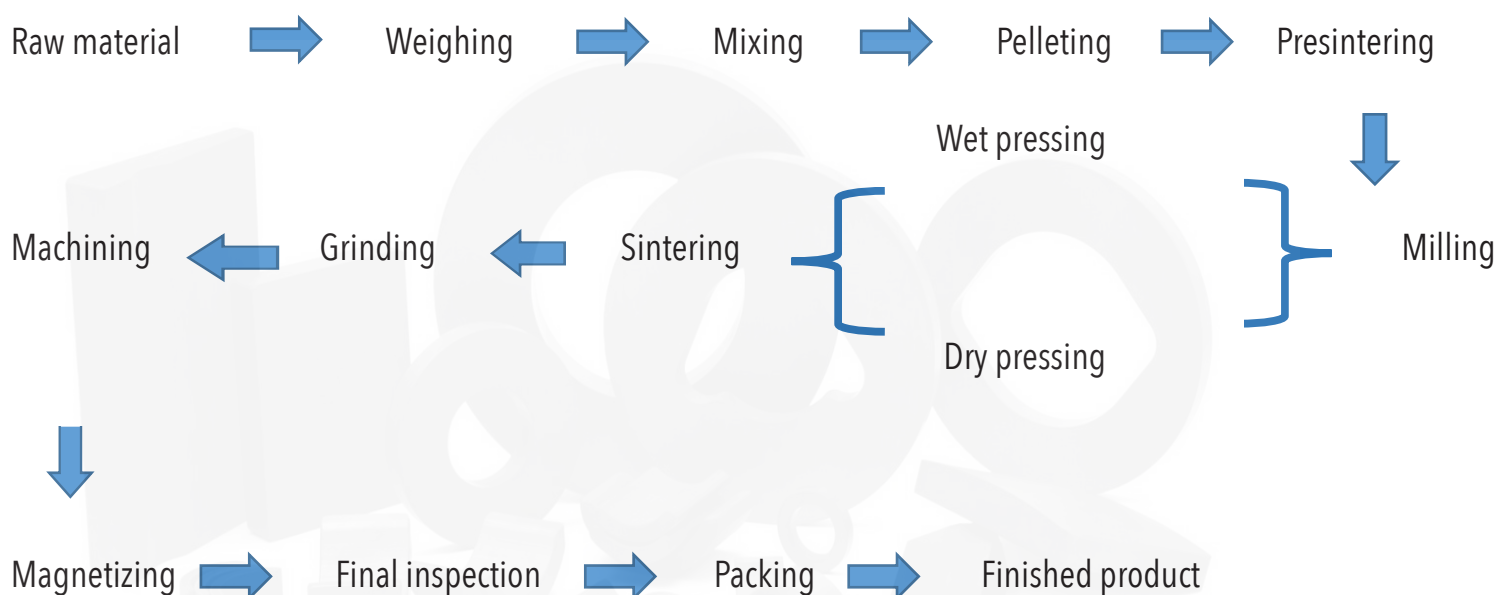
Application: fridge magnets, motors, loudspeakers, earphones, sensors, instruments, educational field, magnetic holding systems, etc.



**HS Magnet**



## Manufacturing Process of Ferrite Magnet



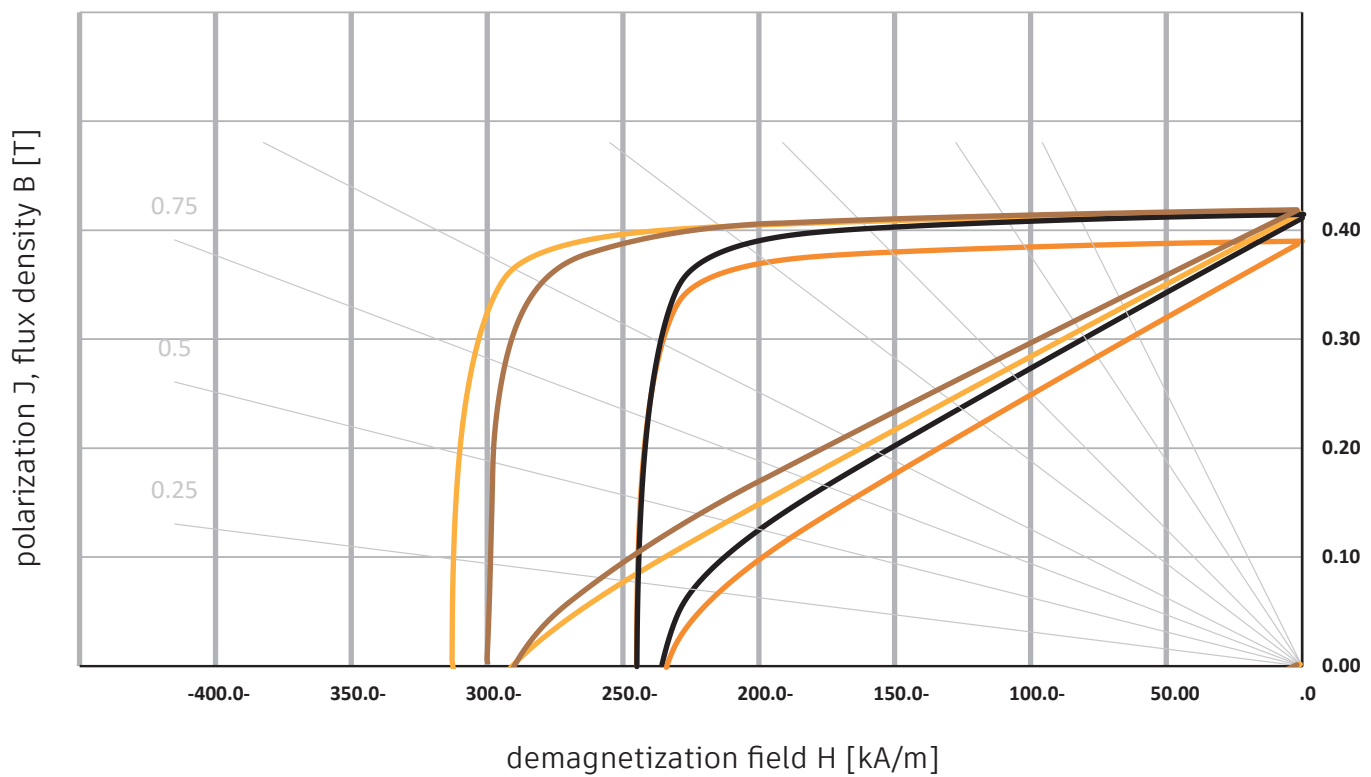
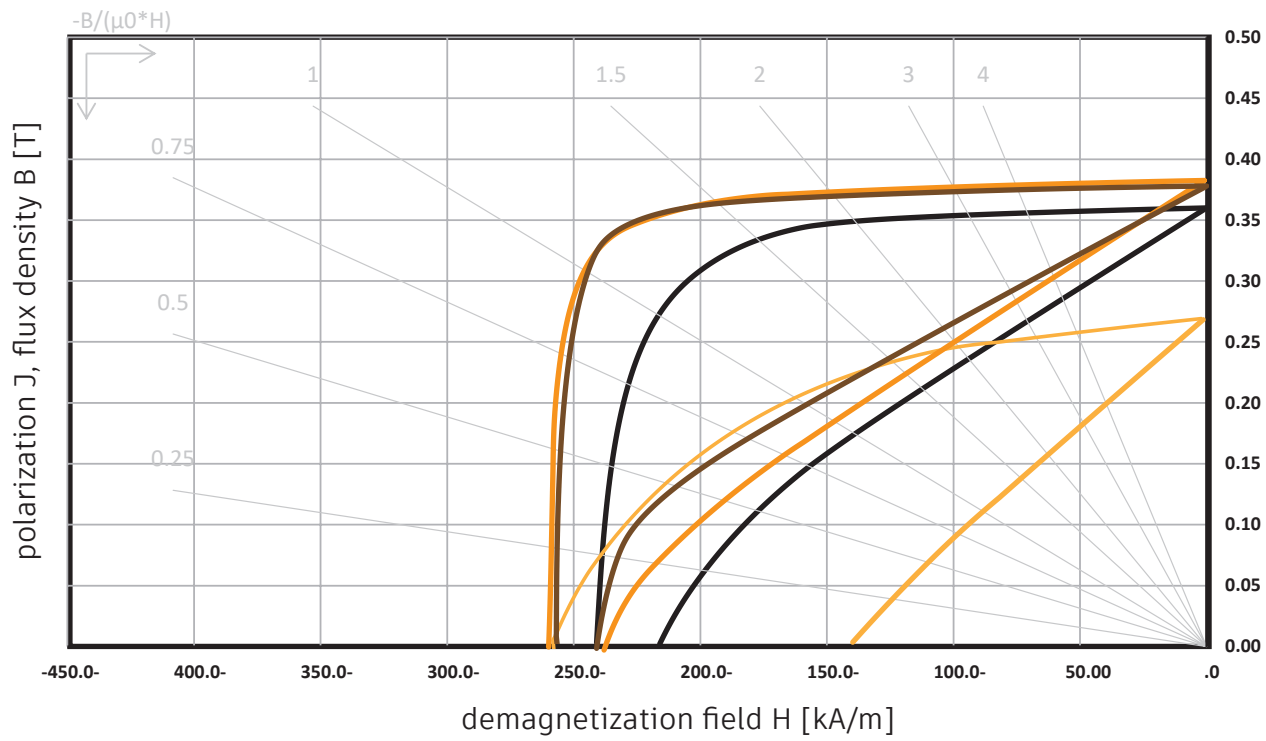
# Magnetic Properties of Ferrite Magnet

Grade	Remanence Br		Coercivity Hcb		Intrinsic kA/m	Coercive Force Hci		Max. Energy Product (BH) <sub>max</sub>	
	mT	Gs	kA/m	kOe		kOe	kJ/m <sup>3</sup>	MGOe	
Y8T	200-235	2.0-2.35	125-160	1.57-2.01	210-280	2.64-3.52	6.5-9.5	0.8-1.2	
Y10T	200-235	2.0-2.35	128-160	1.61-2.01	210-280	2.64-3.52	6.4-9.6	0.8-1.2	
Y20	320-380	3.2-3.8	135-190	1.70-2.39	140-195	1.76-2.45	18.0-22.0	2.3-2.8	
Y22H	310-360	3.1-3.6	220-250	2.76-3.14	280-230	3.52-4.02	20.0-24.0	2.5-3.0	
Y23	320-370	3.2-3.7	170-190	2.14-2.39	190-230	2.39-2.89	20.0-25.5	2.5-3.2	
Y25	360-400	3.6-4.0	135-170	1.70-2.14	140-200	1.76-2.51	22.5-28.0	2.8-3.5	
Y26H	360-390	3.6-3.9	220-250	2.76-3.14	225-255	2.83-3.20	23.0-28.0	2.9-3.5	
Y26H-1	360-390	3.6-3.9	200-250	2.51-3.14	318-350	2.83-3.20	23.0-28.0	2.9-3.5	
Y26H-2	360-380	3.6-3.8	263-288	3.30-3.62	318-350	4.00-4.40	24.0-28.0	3.0-3.5	
Y27H	370-400	3.7-4.0	205-250	2.58-3.14	210-255	2.64-3.20	25.0-29.0	3.1-3.6	
Y28	370-400	3.7-4.0	175-210	2.20-2.64	180-220	2.26-2.76	26.0-30.0	3.3-3.8	
Y28H-1	380-400	3.8-4.0	240-260	3.02-3.27	250-280	3.14-3.52	27.0-30.0	3.4-3.8	
Y28H-2	360-380	3.3-3.8	271-295	3.41-3.71	382-405	4.80-5.09	26.0-30.0	3.3-3.8	
Y30	370-400	3.7-4.0	175-210	2.20-2.64	180-220	2.26-2.76	26.0-30.0	3.3-3.8	
Y30BH	380-390	3.8-3.9	223-235	2.80-2.95	231-245	2.90-3.08	27.0-30.0	3.4-3.8	
Y30H-1	380-400	3.8-4.0	230-275	2.89-3.46	235-290	2.95-3.64	27.0-32.0	3.4-4.0	
Y30H-2	395-415	3.95-4.15	275-300	3.46-3.77	310-335	3.90-4.21	27.0-32.5	3.4-4.1	
Y32	400-420	4.0-4.2	160-190	2.01-2.39	165-195	2.07-2.45	30.0-33.5	3.8-4.2	
Y32H-1	400-420	4.0-4.2	190-230	2.39-2.89	230-250	2.89-3.14	31.5-35.0	4.0-4.4	
Y32H-2	400-440	4.0-4.4	224-240	2.81-3.02	230-250	2.89-3.14	31.0-34.0	3.9-4.3	
Y33	410-430	4.1-4.3	220-250	2.76-3.14	225-255	2.83-3.20	31.5-35.0	4.0-4.4	
Y33H	410-430	4.1-4.3	250-270	3.14-3.39	250-275	3.14-3.46	31.5-35.0	4.0-4.4	
Y34	420-440	4.2-4.4	200-230	2.51-2.89	205-235	2.58-2.95	32.5-36.0	4.1-4.5	
Y35	430-450	4.3-4.5	215-239	2.70-3.00	217-241	2.73-3.03	33.1-38.2	4.2-4.8	
Y36	430-450	4.3-4.5	247-271	3.10-3.41	250-274	3.14-3.44	35.1-38.3	4.4-4.8	
Y38	440-460	4.4-4.6	285-305	3.58-3.83	294-310	3.69-3.90	36.6-40.6	4.6-5.1	
Y40	440-460	4.4-4.6	330-354	3.58-3.83	294-310	4.27-4.52	37.5-41.8	4.7-5.3	



# Demagnetization curve of Ferrite Magnets

Ferrite anisotropic/ 20°C



# Samarium Cobalt Magnet

## Introduction of Samarium Cobalt Magnet

Samarium Cobalt Magnet appeared in the 1960s and are the first and second generation of rare-earth permanent magnets discovered,  $\text{SmCo}_5$  and  $\text{Sm}_2\text{Co}_{17}$  structures of rare-earth cobalt permanent magnets respectively. With high magnetic energy product and reliable coercivity, they have superior magnetic performance compared with the earlier discovered Alnico magnet and ferrite magnet, which made SmCo magnet materials much more popular.

Samarium cobalt magnet is a kind of permanent magnet made of samarium, cobalt and other elements with melting, crushing, pressing and sintering. Samarium cobalt magnets are known for their high magnetic strength and good temperature stability, it is usually slightly weaker than NdFeB magnets at room temperature, but at extreme temperatures, when NdFeB magnets fail to work, it can still provide very powerful magnetic performance. Since SmCo magnets are highly resistant to corrosion and oxidation, coatings are generally not required.

$\text{SmCo}_5$  is the first generation of rare-earth permanent magnets. Compared with the second generation  $\text{Sm}_2\text{Co}_{17}$ ,  $\text{SmCo}_5$  has a higher proportion of cobalt, so the cost is relatively higher, but the magnetic performance is worse, so in many applications, it has been replaced by  $\text{Sm}_2\text{Co}_{17}$ , and even the third generation of rare-earth permanent magnets NdFeB. However,  $\text{SmCo}_5$  is still used in some applications because of its excellent temperature performance and less brittle compared to  $\text{Sm}_2\text{Co}_{17}$ .

$\text{Sm}_2\text{Co}_{17}$  is the second generation of rare-earth permanent magnets, compared to Alnico and ferrite, the magnetic performance is much better, so after the discovery of rare-earth permanent magnets, Alnico and ferrite are replaced by rare-earth permanent magnets in many industrial applications.  $\text{Sm}_2\text{Co}_{17}$  is the material with high Curie temperature and working temperature among rare earth permanent magnets. Although it is surpassed by NdFeB, the third generation of rare earth permanent magnets, in terms of magnetic performance, and replaced by NdFeB in some applications,  $\text{Sm}_2\text{Co}_{17}$  is the best choice among high performance permanent magnet materials with high temperature resistance.  $\text{Sm}_2\text{Co}_{17}$  has a very important role in magnetic accessories such as aircraft motors, generators, transmissions, sensors, function converters, magnetic bearings, microwave function tubes, etc., which need to work reliably at high temperatures.



**HS Magnet**



SmCo magnets are mainly used in various industries such as aerospace, national defense, microwave devices, medical equipment, permanent magnet motors, etc.

Its main features are 1. Very good coercive force performance 2. Good temperature stability 3. Durability Corrosion and oxidation resistance



# Magnetic Properties of SmCo Magnets

Item	Grade	BR		HCB		HCJ		(BH) MAX		Working Temperature °C	Density G/CM3
		T	KGS	KA/M	KOE	KA/M	KOE	KJ/M3	MGOE		
SM1C05	HMS-16	0.77-0.85	7.7-8.5	613-660	7.7-8.3	1194-1400	15.0-17.6	110-127	14-16	250	8.3
	HMS-18	0.81-0.90	8.1-9.0	637-700	8.0-8.8	1194-1400	15.0-17.6	127-143	16-18	250	8.3
	HMS-20	0.85-0.94	8.5-9.4	637-725	8.0-9.1	1194-1400	15.0-17.6	150-167	19-20	250	8.3
	HMS-22	0.89-0.96	8.9-9.6	661-748	8.3-9.4	1194-1400	15.0-17.6	160-175	20-22	250	8.3
	HMS-24	0.96-1.00	9.6-10.0	730-770	9.2-9.7	1194-1400	15.0-17.6	175-190	22-24	250	8.3
	HMS-16S	0.77-0.84	7.7-8.4	613-660	7.7-8.3	1592-1650	20.0-20.7	118-135	15-17	250	8.3
	HMS-18S	0.81-0.89	8.1-8.9	637-700	8.0-8.8	1592-1650	20.0-20.7	135-151	17-19	250	8.3
	HMS-20S	0.85-0.93	8.5-9.3	637-732	8.0-9.2	1592-1650	20.0-20.7	150-167	19-21	250	8.3
	HMS-22S	0.89-0.96	8.9-9.6	661-756	8.3-9.5	1592-1650	20.0-20.7	167-183	21-23	250	8.3
	HMS-24S	0.96-1.00	9.6-10.0	740-788	9.3-9.9	1830-1900	23.0-23.8	183-199	23-25	250	8.3
SM2C017	HMSG-22	0.90-0.97	9.0-9.7	644-740	8.0-9.3	1194-1400	15.0-17.6	159-183	20-23	300	8.4
	HMSG-24	0.92-1.02	9.2-10.2	661-764	8.3-9.6	1194-1400	15.0-17.6	175-191	22-24	300	8.4
	HMSG-26	1.00-1.05	10.0-10.5	677-796	8.5-10.0	1194-1400	15.0-17.6	191-207	24-26	300	8.4
	HMSG-28	1.03-1.08	10.3-10.8	677-812	8.5-10.2	1194-1400	15.0-17.6	207-220	26-28	300	8.4
	HMSG-30	1.07-1.10	10.7-11.0	700-828	8.8-10.4	1194-1400	15.0-17.6	220-240	28-30	300	8.4
	HMSG-32	1.09-1.13	10.9-11.3	755-850	9.5-10.7	1194-1400	15.0-17.6	230-255	29-32	300	8.4
	HMSG-35	1.16-1.18	11.6-11.8	868-888	10.9-11.2	1433-1450	18.0-18.2	255-267	32-34	300	8.4
	HMSG-24H	0.92-1.02	9.2-10.2	661-764	8.3-9.6	1990-2000	25.0-25.1	175-191	22-24	350	8.4
	HMSG-26H	1.00-1.05	10.0-10.5	677-796	8.5-10.0	1990-2000	25.0-25.1	191-207	24-26	350	8.4
	HMSG-28H	1.03-1.08	10.3-10.8	677-812	8.5-10.2	1990-2000	25.0-25.1	207-220	26-28	350	8.4
	HMSG-30H	1.07-1.10	10.7-11.0	700-828	8.8-10.4	1990-2000	25.0-25.1	220-240	28-30	350	8.4
	HMSG-32H	1.09-1.13	10.9-11.3	755-858	9.5-10.8	1990-2000	25.0-25.1	230-255	29-32	350	8.4
	HMSG-33H	1.12-1.16	11.2-11.6	845-890	10.6-11.2	1990-2000	25.0-25.1	240-260	30-33	350	8.4
	HMSG-26M	1.02-1.05	10.2-10.5	676-780	8.5-9.8	995-1100	12.0-13.8	191-207	24-26	300	8.4
	HMSG-28M	1.03-1.08	10.3-10.8	676-796	8.5-10.0	995-1100	12.0-13.8	207-220	26-28	300	8.4
	HMSG-30M	1.08-1.10	10.8-11.0	676-835	8.5-10.5	995-1100	12.0-13.8	220-240	28-30	300	8.4
	HMSG-32M	1.10-1.13	11.0-11.3	676-852	8.5-10.7	995-1100	12.0-13.8	230-255	29-32	300	8.4
	HMSG-24L	0.95-1.02	9.5-10.2	541-716	6.8-9.0	636-830	8.0-10.4	175-191	22-24	250	8.4
	HMSG-26L	1.02-1.05	10.2-10.5	541-748	6.8-9.4	636-850	8.0-10.6	191-207	24-26	250	8.4
	HMSG-28L	1.03-1.08	10.3-10.8	541-764	6.8-9.6	636-880	8.0-11.1	207-220	26-28	250	8.4
HMSG-30L	1.08-1.15	10.8-11.5	541-796	6.8-10.0	636-900	8.0-11.3	220-240	28-30	250	8.4	
HMSG-32L	1.10-1.15	11.0-11.5	541-812	6.8-10.2	636-950	8.0-11.9	230-255	29-32	250	8.4	

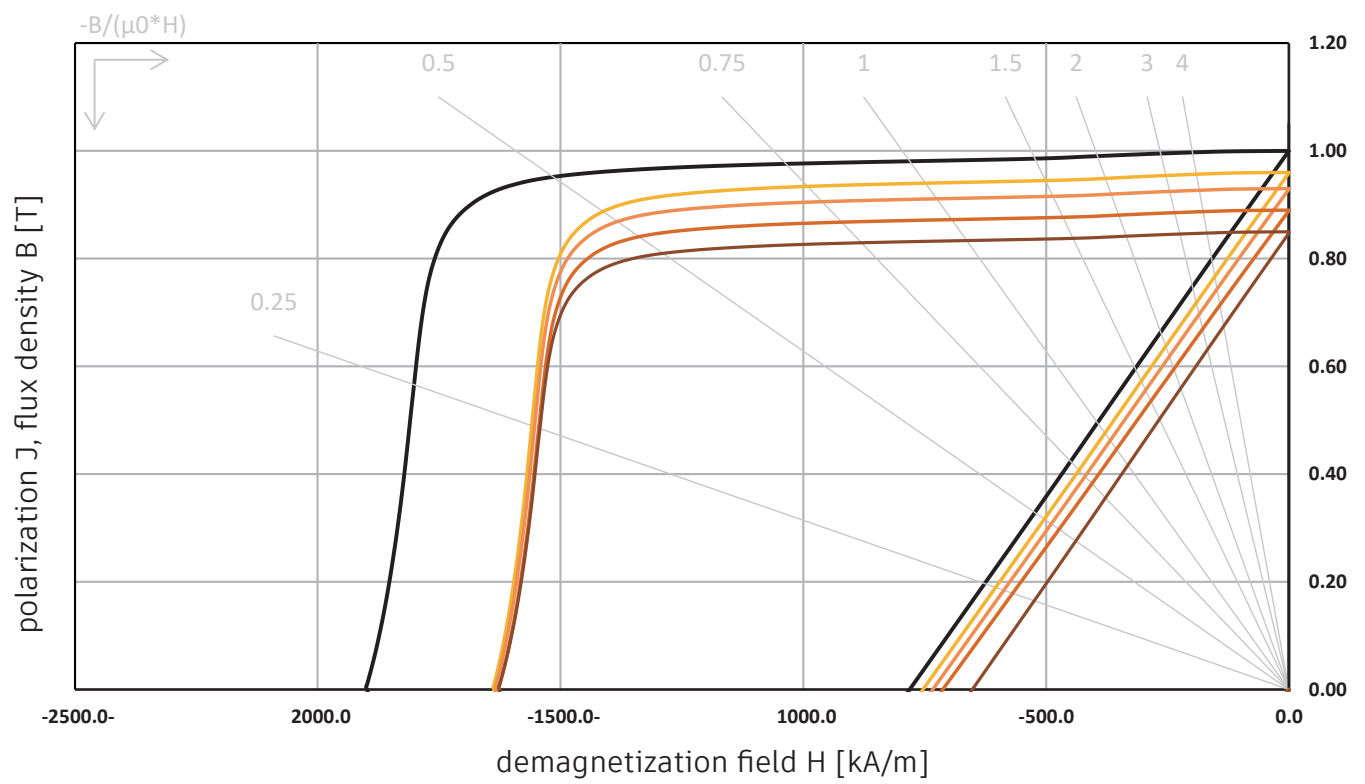
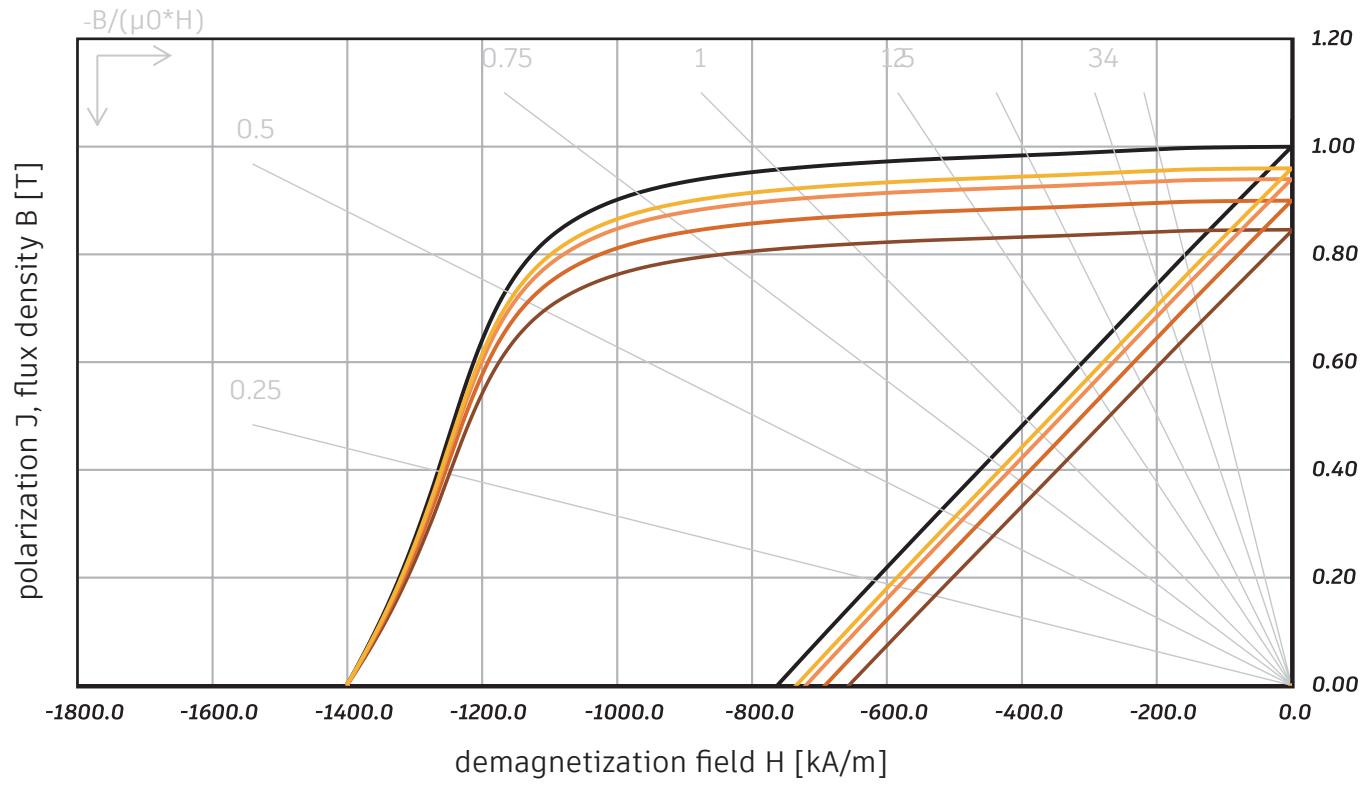
## Comparison of SmCo Magnets Grades

	HS	BOMATEC	DURAMAG	DEXTERMAG	thyssenkrupp
SM1C05	HMS-16	BMSG-16	SC-1615		
	HMS-18	BMS-18			
	HMS-20	BMS-20		S1818	
	HMS-22	BMS-22		S2215	SM2C017 160/120
	HMS-24	BMS-24	SC-2416	S2415	SM2C017 180/160
	HMS-16S	BMS-16S			
	HMS-18S	BMS-18S	SC-1819		
	HMS-20S	BMS-20S	SC-2019	S1820	
	HMS-22S	BMS-22S	SC-2219	S2020	SM1C05 170/160
	HMS-24S	BMS-24S		S2220	
SM2C017	HMSG-22	BMSG-22			
	HMSG-24	BMSG-24			
	HMSG-26	BMSG-26			
	HMSG-28	BMSG-28			
	HMSG-30	BMSG-30		S2616	SM2C017 225/160
	HMSG-32	BMSG-32	SC-3018	S2816	
	HMSG-35	BMSG-35	SC-3215	S3215	
	HMSG-24H	HMSG-24H	SC-2228	S2225	SM2C017 190/200
	HMSG-26H	BMSG-26H	SC-2428	S2425	
	HMSG-28H	BMSG-28H	SC-2618	S2625	
	HMSG-30H	BMSG-30H	SC-2826	S2815	SM2C017 225/160
	HMSG-32H	BMSG-32H			
	HMSG-33H	BMSG-33H			
	HMSG-26M	BMSG-26M			
	HMSG-28M	BMSG-28M		S2610	
	HMSG-30M	BMSG-30M			
	HMSG-32M	BMSG-32M		S3010	
	HMSG-24L	BMSG-24L			
	HMSG-26L	BMSG-26L			
	HMSG-28L	BMSG-28L			
HMSG-30L	BMSG-30L				
HMSG-32L	BMSG-32L		S3012		

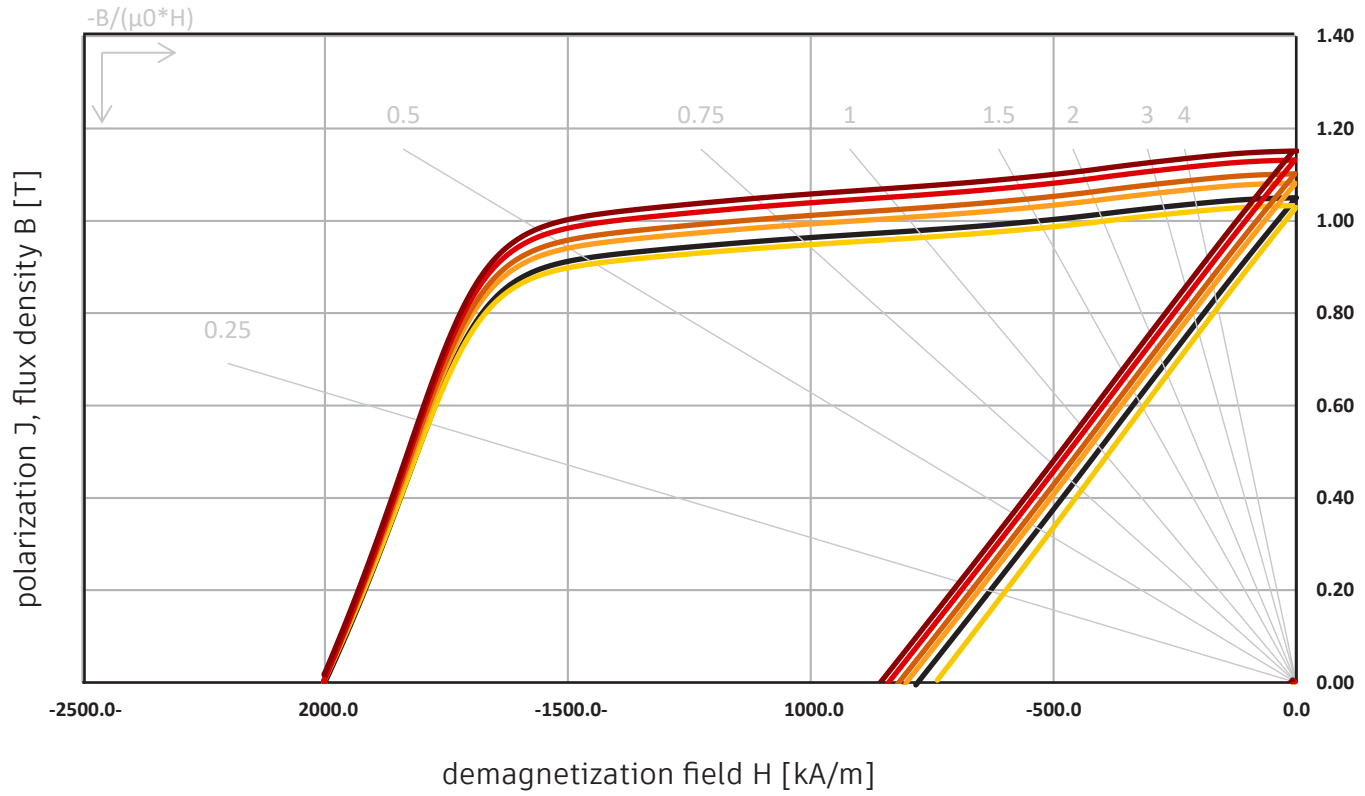
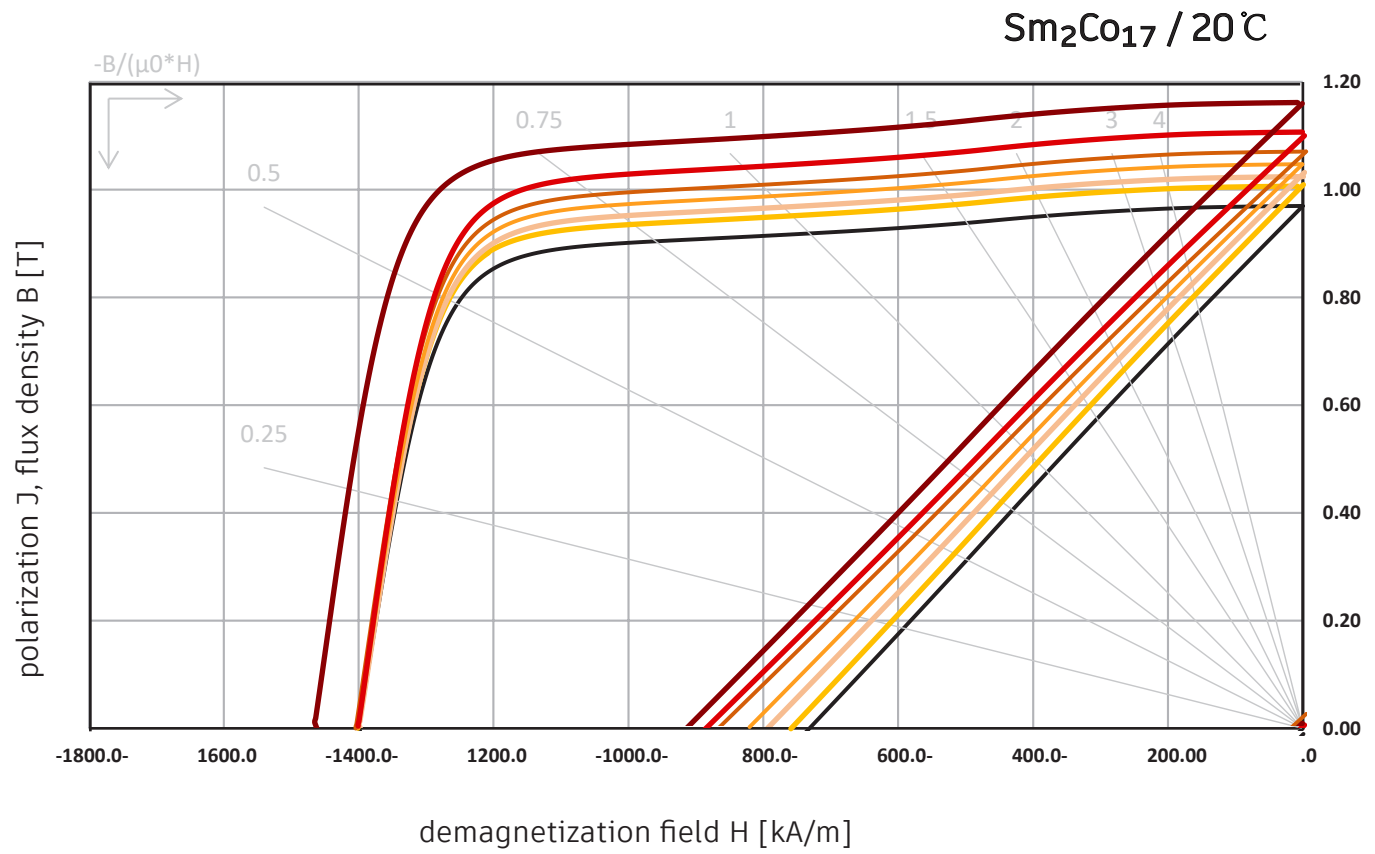


# Demagnetization curve of SmCo<sub>5</sub> Magnets

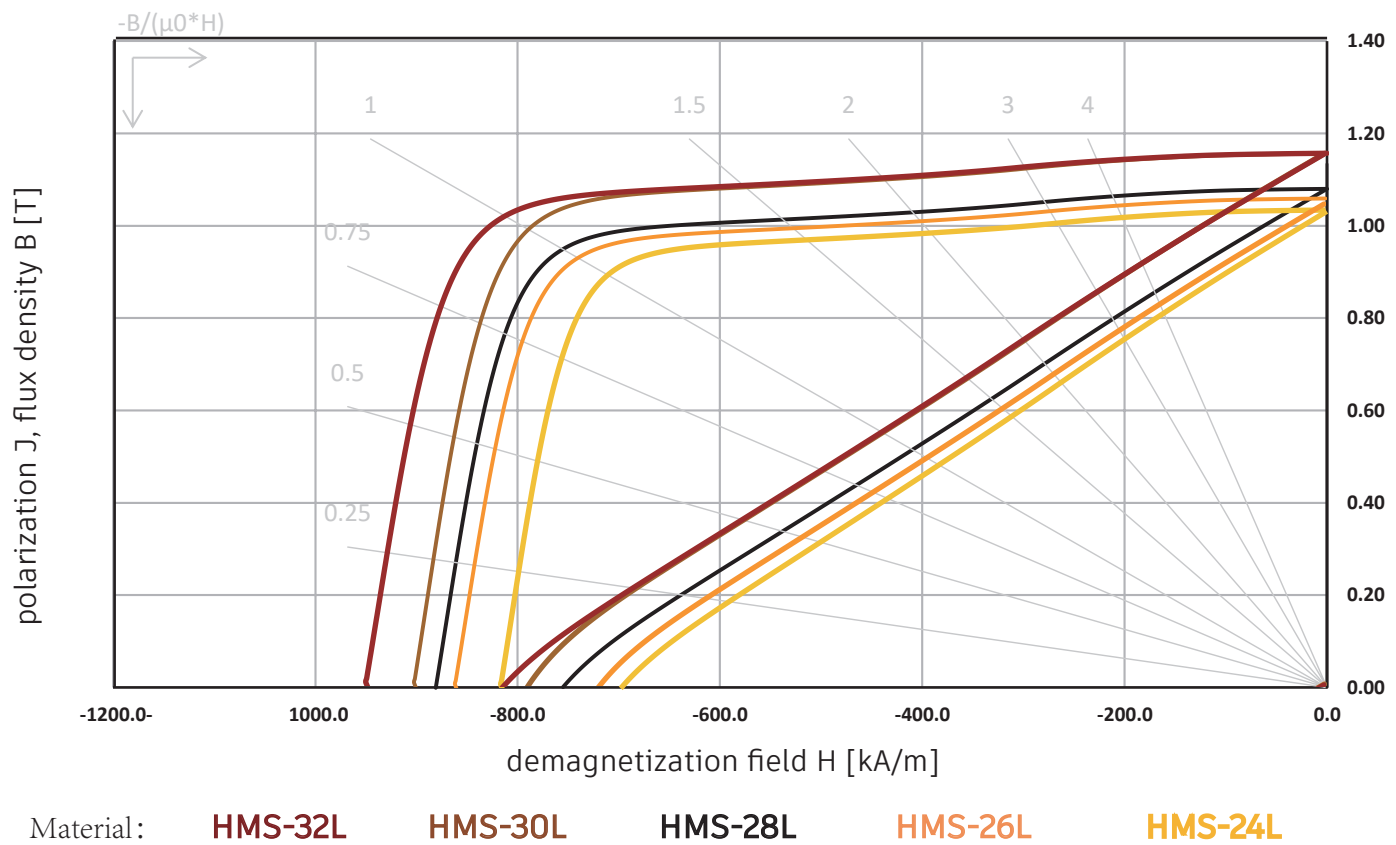
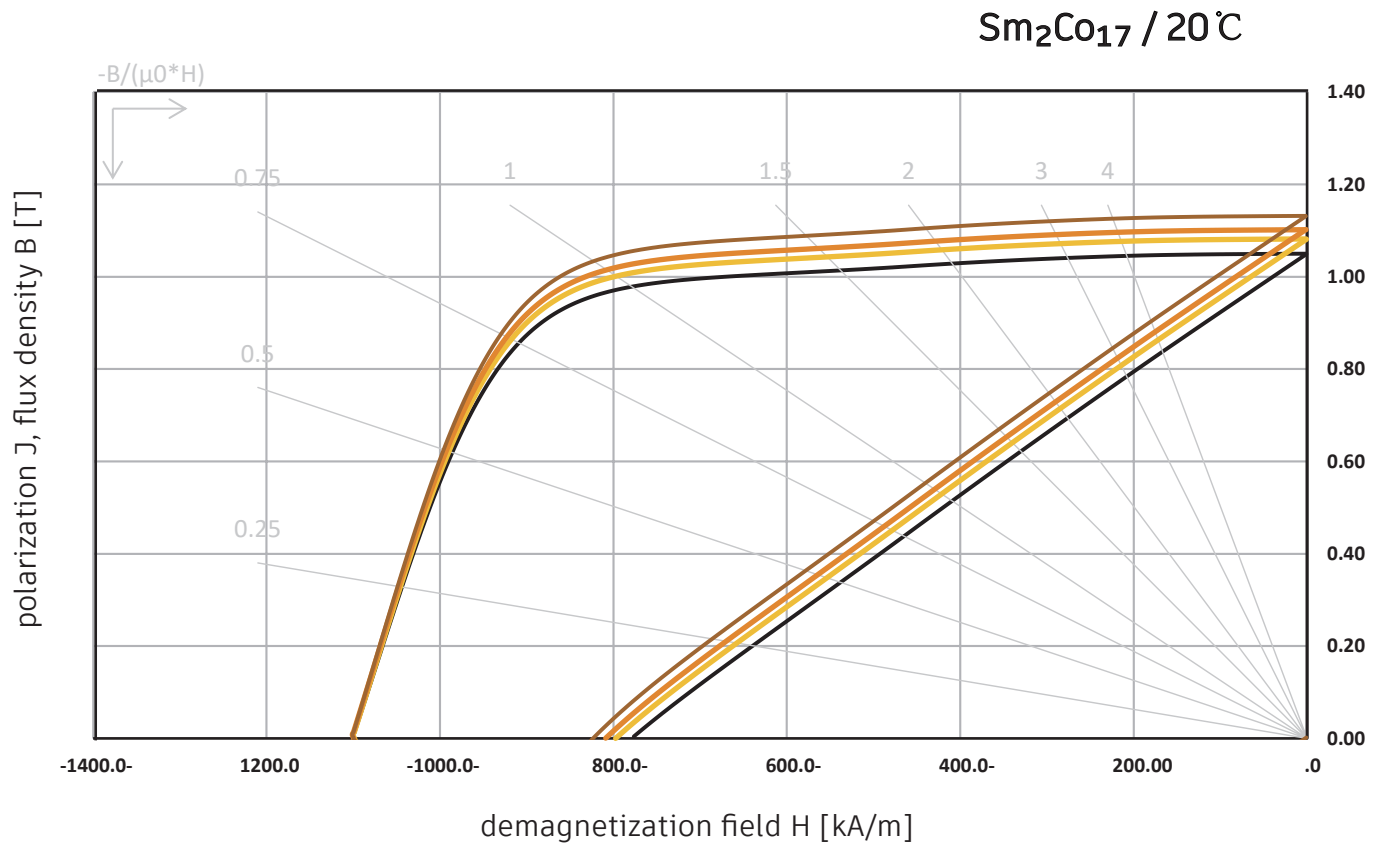
SmCo<sub>5</sub> / 20°C



# Demagnetization curve of Sm<sub>2</sub>Co<sub>17</sub>Magnets



# Demagnetization curve of Sm<sub>2</sub>Co<sub>17</sub> Magnets



# Magnetic application

## Introduction of Magnetic application

Magnetic applications include pot magnets, magnetic hooks, fishing magnets, rubber coated magnets, magnetic tools, office magnets, magnetic toys, magnetic couplings, magnetic lifter, etc. Through the characteristics of small size and large power of magnetic materials, it can be matched with various shapes to achieve different application methods, bringing convenience to people's daily life.



**HS Magnet**

