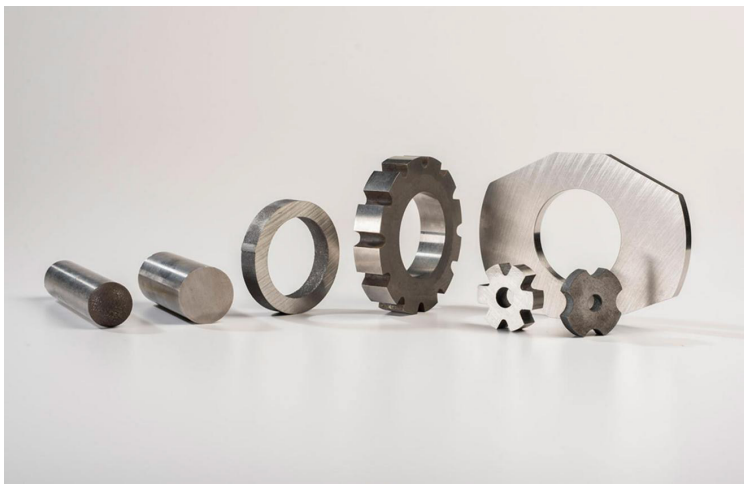
AlNiCo Magnet

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%/°C, the maximum operating temperature can be around 520°C. The disadvantages are very low coercivity (usually less than 160kA/m) and non-linear demagnetization curve. Therefore Alnico magnets are easy to be magnetized and equally easy to demagnetize though.

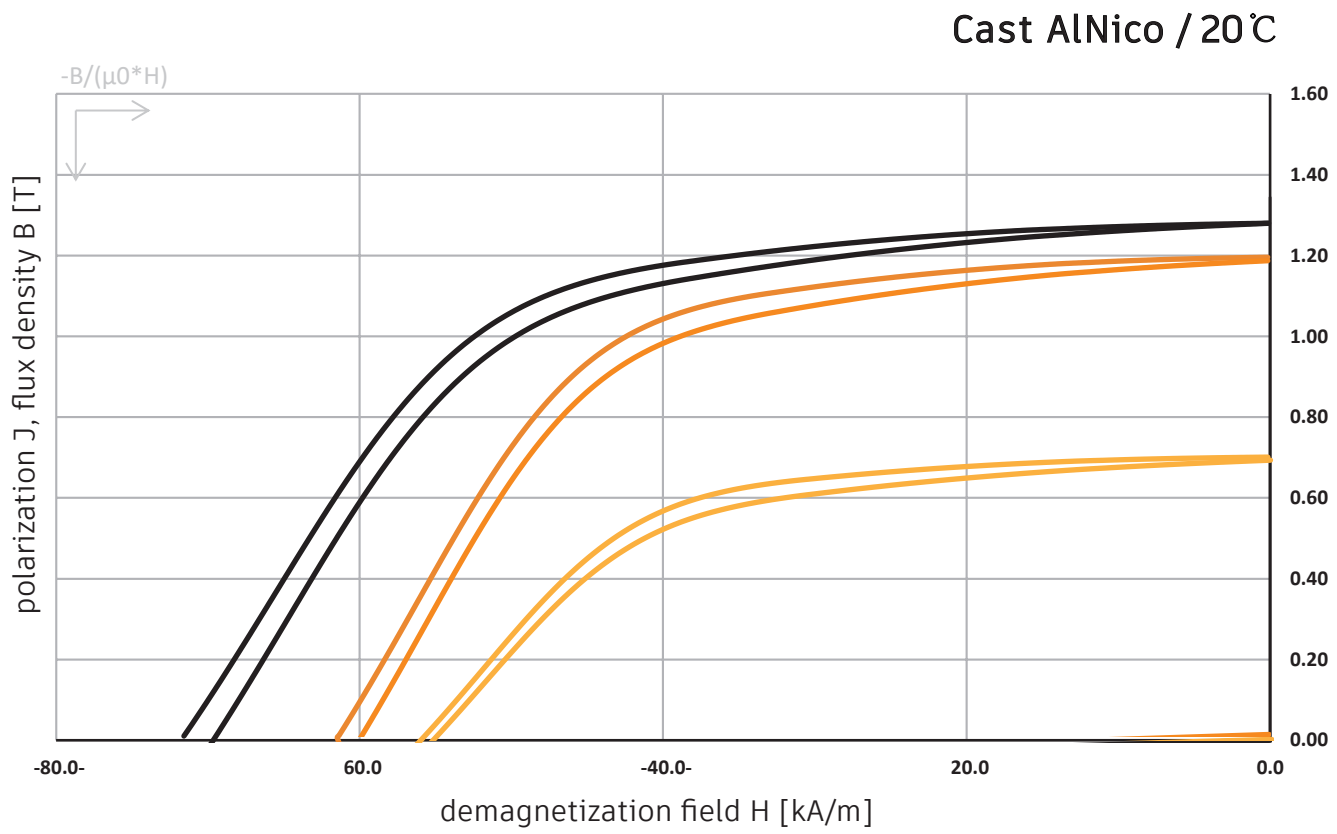
Magnetic Properties of Cast AlNiCo Magnet

Grade	Remanence Br		Coercivity Hcb		Max. Energy Product (BH)max		Curie Temp	Max.Operating Temperaturee	MMPA Equivalent
	mT	Gs	kA/m	Oe	kJ/m3	MGOe	°C	°C	
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
LNGT88	1100	11000	115	1450	88	11.0	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	

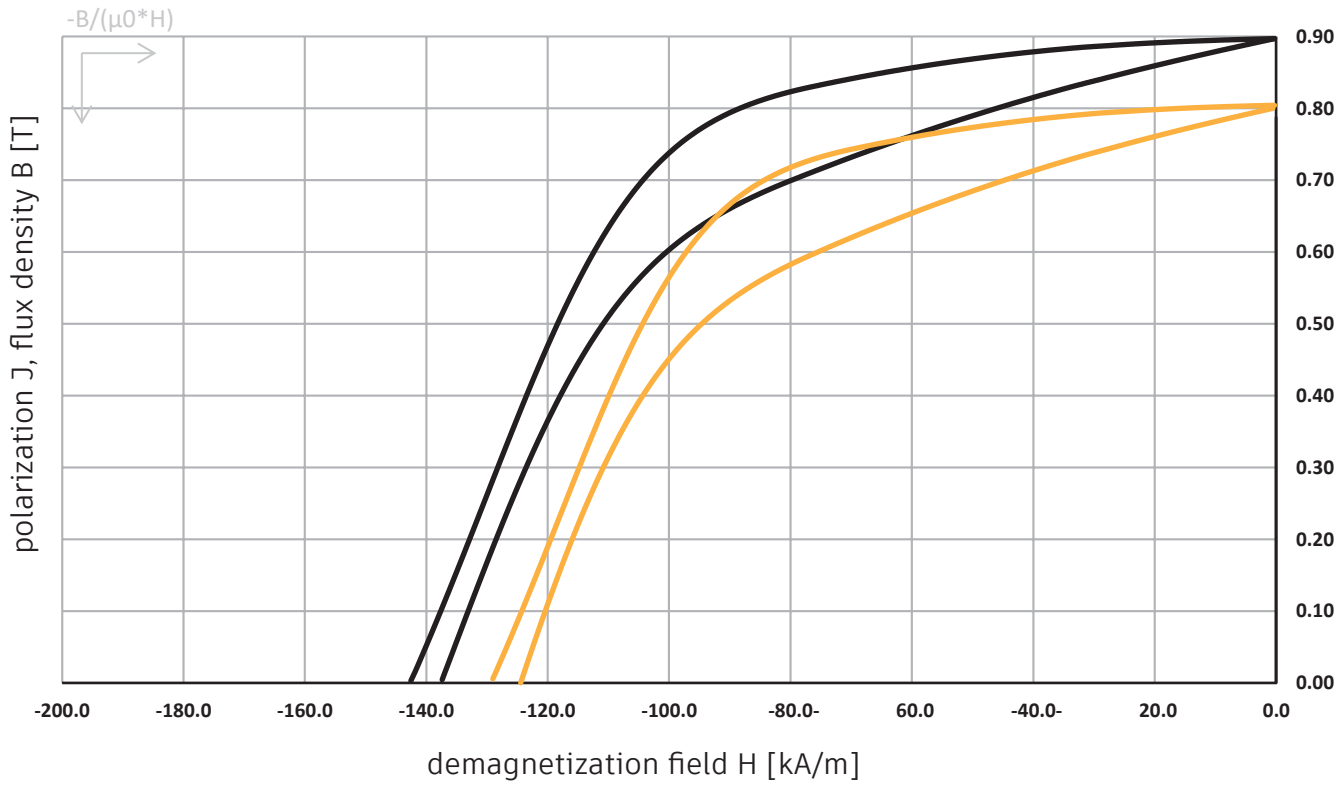
Magnetic Properties of Sintered AlNiCo Magnet

Grade	Remanence Br		Coercivity Hcb		Max. Energy Product (BH)max		Curie Temp	Max.Operating Temperature	MMPA Equivalent
	mT	Gs	kA/m	Oe	kJ/m3	MGOe	°C	°C	
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

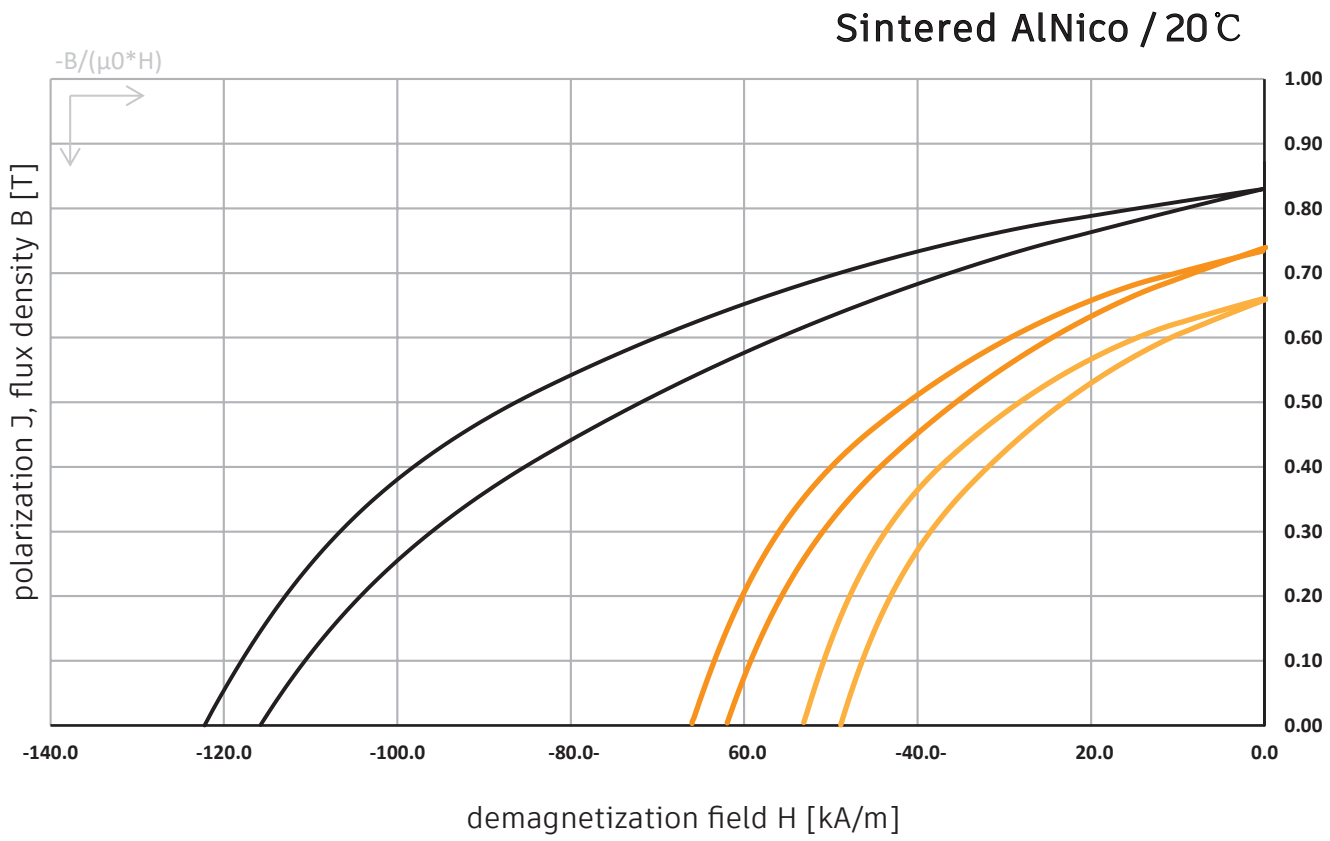


Material: LNG37 LNG52 LNG12

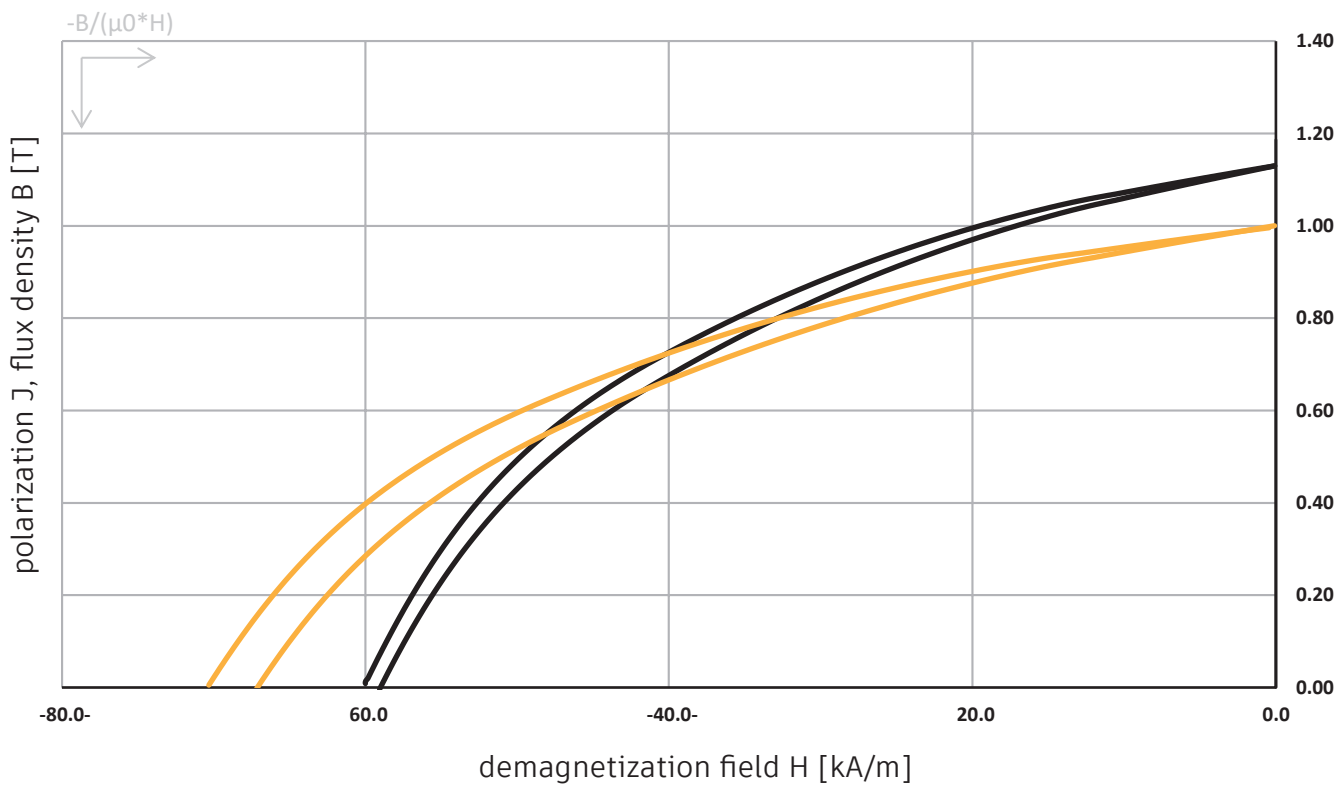


Material: LNGT60 LNGT32

Demagnetization curve of Sintered **AlNiCo** Magnets



Material: FLNG12 FLNG34 FLNGT28



Material: FLNG34 FLNGT28