

# AlNiCo Magnets

AlNiCo magnets are composed of primarily aluminium, nickel, and cobalt, were developed in the 1940's.



This class of magnet remains a preferred material because of its excellent temperature stability, high magnetic flux density, and resistance to corrosion. Alnico magnets are manufactured through a casting or sintering process. The casting process allows for the magnet to be manufactured into intricate and complex shapes, which are not possible with other magnetic materials.



## Typical types and applications

Excellent temperature stability, high residual induction and relatively high energy characterises the Alnico materials, which are composed primarily of alloys of Aluminium, Nickel, and Cobalt. They are manufactured through either a casting or sintering process. Cast magnets may be manufactured in complex shapes, such as horseshoes etc. Sintered Alnico offer slightly lower magnetic properties but better mechanical characteristics than cast Alnico.



Cast Alnico 5 is the most commonly used of all the cast Alnico magnets. This material is used extensively in rotating machinery, meters, instruments, sensing devices, and holding applications, to name but a few.

Alnico is hard and brittle and cannot be machined or drilled. Holes are usually cored in at the foundry, and magnets are cast close to final size and then finished by grinding to close tolerances

Alnico has a low coercive force, and is easily demagnetized if not handled with care. For optimum performance of Alnico 5, the magnetic length should be approximately 5 times the pole diameter or equivalent diameter. For example, a 0.250" diameter magnet should be about 1.00" long.

Because of its higher coercivity, Alnico 8 may be used in shorter lengths and in disc shapes.



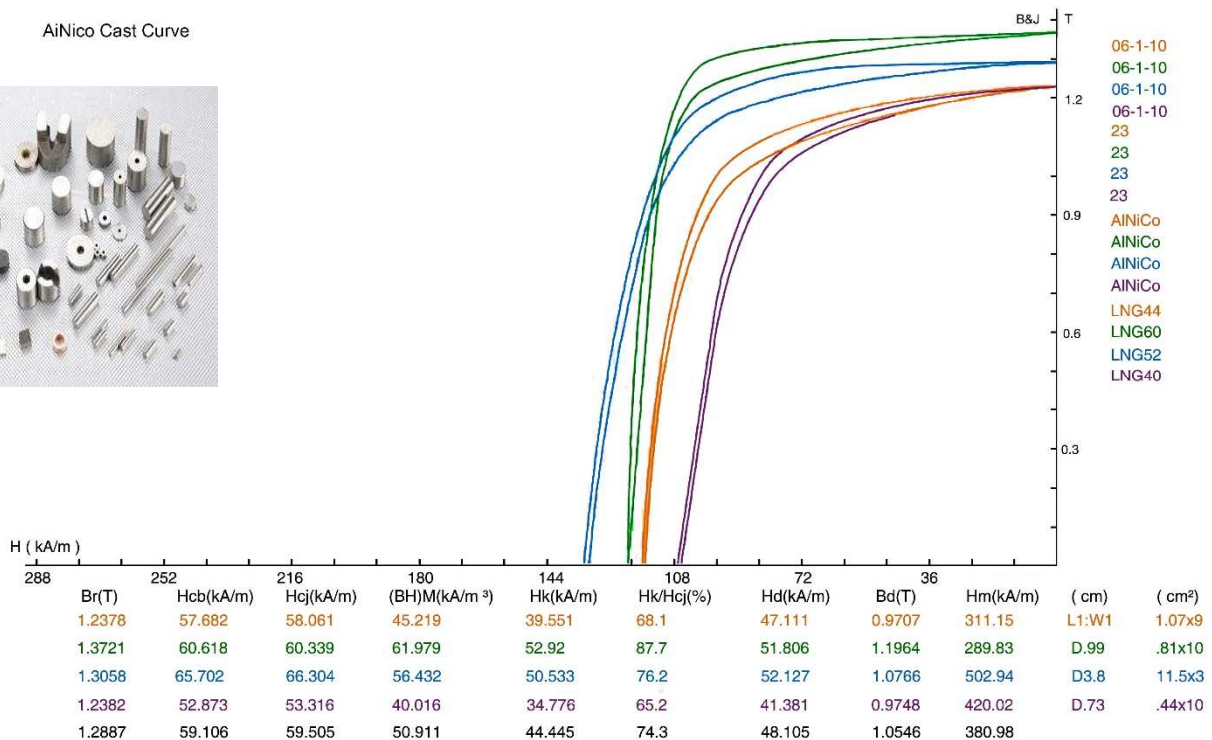
Magnetic Property Table for Cast AlNiCo

Material	Br	Hcb	(BH)max	$\alpha(Br)$	Temperature Coercivity Coefficient $\alpha(Hcj)$
	mT GS	kA/m Oe	kJ/m <sup>3</sup> MGOe	%K	%K
LN10	600/6000	40/500	10.00/1.20	-0.02	0.03
LNG12	700/7000	44/550	12.00/1.50	-0.02	0.03
LNG13	680/6800	48/600	13.00/1.63	-0.02	0.03
LNG18	900/9000	48/600	18.00/2.25	-0.02	0.03
LNG37	1200/12000	48/600	37.00/4.63	-0.02	0.03
LNG40	1250/12500	48/600	40.00/5.00	-0.02	0.03
LNG44	1250/12500	52/650	44.00/5.50	-0.02	0.03
LNG52	1300/13000	56/700	52.00/6.50	-0.02	0.03
LNG56	1300/13000	58/720	56.00/7.00	-0.02	0.03
LNG60	1330/13300	60/750	60.00/7.50	-0.02	0.03
LNGT18	580/5800	90/1130	18.00/2.25	-0.02	0.03
LNGT30	1100/11000	56/700	30.00/3.75	-0.02	0.03
LNGT32	800/8000	100/1250	32.00/4.00	-0.02	0.03
LNGT38	800/8000	110/1380	38.00/4.75	-0.02	0.03
LNGT44	850/8500	120/1500	44.00/5.50	-0.02	0.03
LNGT48	900/9000	120/1500	48.00/6.00	-0.02	0.03
LNGT60	950/9500	110/1380	60.00/7.50	-0.02	0.03
LNGT72	1050/10500	112/1400	72.00/9.00	-0.02	0.03
LNGT88	1100/11000	115/1450	88.00/11.00	-0.02	0.03
LNGT36J	700/7000	140/1750	36.00/4.50	-0.02	0.03
LNGT52J	900/9000	140/1750	52.00/6.50	-0.02	0.03

Note: Curie temperature and temperature coefficient are for reference only.

<p>Cast AlNiCo Magnet</p> <p>Good corrosion resistance</p> <p>Density ranging from 6.9/cm<sup>3</sup> to 7.39/cm<sup>3</sup>.</p> <p>A typical hardness of 50 Rockwell C,</p> <p>Machinable only by grinding;</p>	<p>Features of Cast AlNiCo:</p> <p>Vast range</p> <p>Complex Shapes and Sizes</p> <p>Economical,</p> <p>Ideal for High Temperature Applications up to 550°C.</p>
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AlNiCo Cast Curve



Applications:

- Automotive,
- Sensors and Instruments,
- Audio Apparatus,
- Electric Motors,
- Educational Equipment,
- Aerospace Equipment.

Magnetic Property Table Sintered AlNiCo

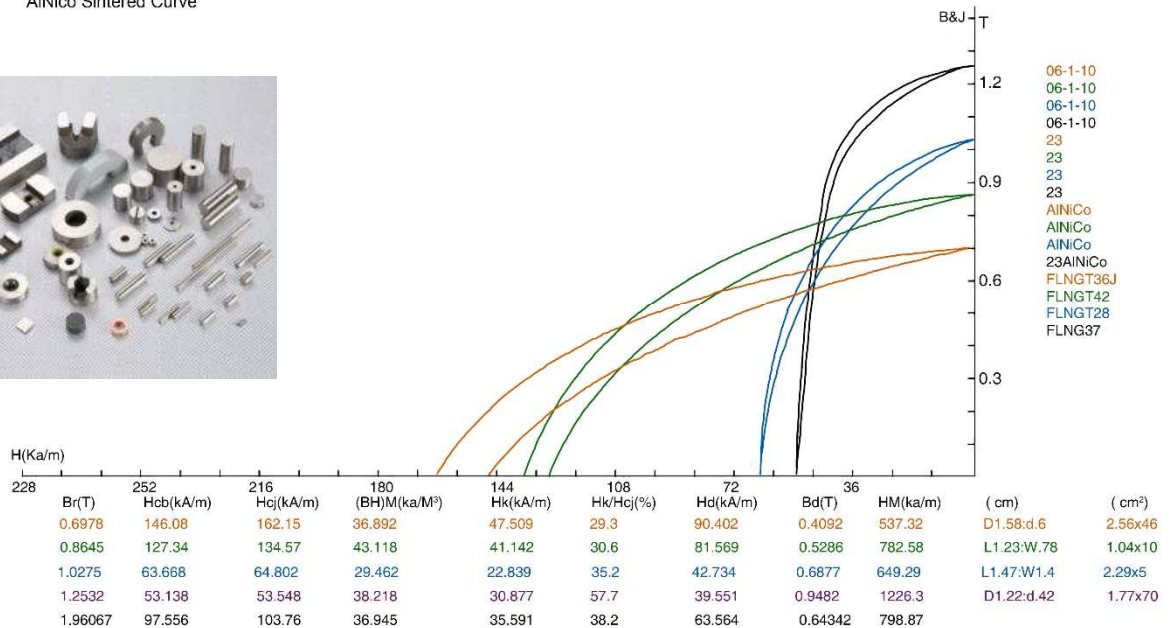
Material	Remanence Br	Coercivity Hcj	Maximum Energy Product (BH) max	Curie Temp. Tc	Operating Temp. Tw	Temperature Coefficient aBr
	mT Gs	kA/m Oe	kJ/m <sup>3</sup> MGOe	%°C	%°C	%/°C
FLN8	500/5000	40/500	9/1.13	760	450	-0.022
FLNG12	700/7000	48/600	12.4/1.55	810	450	-0.014
FLNGT18	600/6000	90/1130	18/2.20	860	450	-0.02
FLNG34	1200/12000	48/600	34/4.25	890	450	-0.016
FLNG37	1250/12500	48/600	37/4.62	890	450	-0.016
FLNGT28	1050/10500	60/600	28/3.50	850	450	-0.02
FLNGT38	800/8000	120/1500	38/4.75	850	450	-0.02
FLNGT42	880/8800	120/1500	42/5.25	820	450	-0.02
FLNGT33J	700/7000	140/1750	33/4.13	850	450	-0.025

Note: Curie temperature and temperature coefficient are for reference only.

AlNiCo Sintered Curve



AUTOMATIC HYSTERESIS GRAPH MODEL AMT-4 SJLYF



Features of Sintered AlNiCo:

- Manufactured by powder metallurgical process and sintered to produce near net shapes.
- Ideal for high temperature application up to 550°C.
- Good corrosion resistance
- Fine crystalline metallic structure, density ranging from 6.9g/cm<sup>3</sup>-7.39cm<sup>3</sup>
- A typical hardness of 50 Rockwell c only suitable for grinding, individual tailored products possible.

Applications:

Applied to various instruments communication control systems and sensors.