

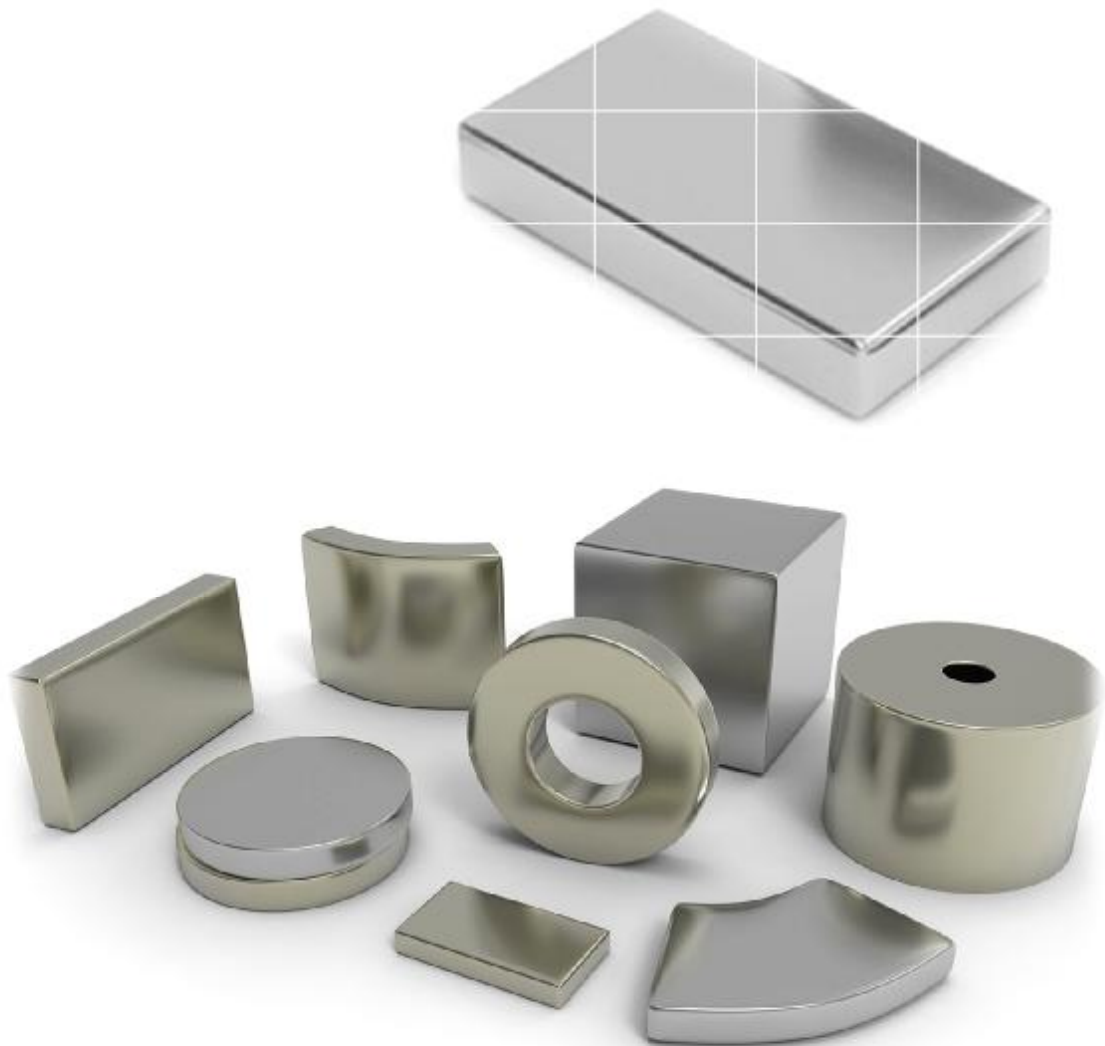


주식회사나노테크

영구자석 분야에서 30여 년간의 축적된 기술력을 바탕으로

고특성 영구자석을 설계 및 개발, 생산하여 고객감동을 실현하는 나노테크

Magnet Total Solution Provider



기업정보

- √ 회사명 : 주식회사 나노테크
- √ 대표자 : 대표이사 김갑용
- √ 주력제품 : 마그네트(소결,본드,플라스틱), 엔드밀, 인서트, 정밀 사출품

Magnet Total Solution Provider


주식회사 나노테크는 Magnet 분야의 우수한 연구진과 함께 연구개발과 제조를 병행하며 각종

Magnet 응용분야에 있어 **고객 맞춤형 솔루션**을 제공하는 **Magnet Total Solution Provider** 입니다.

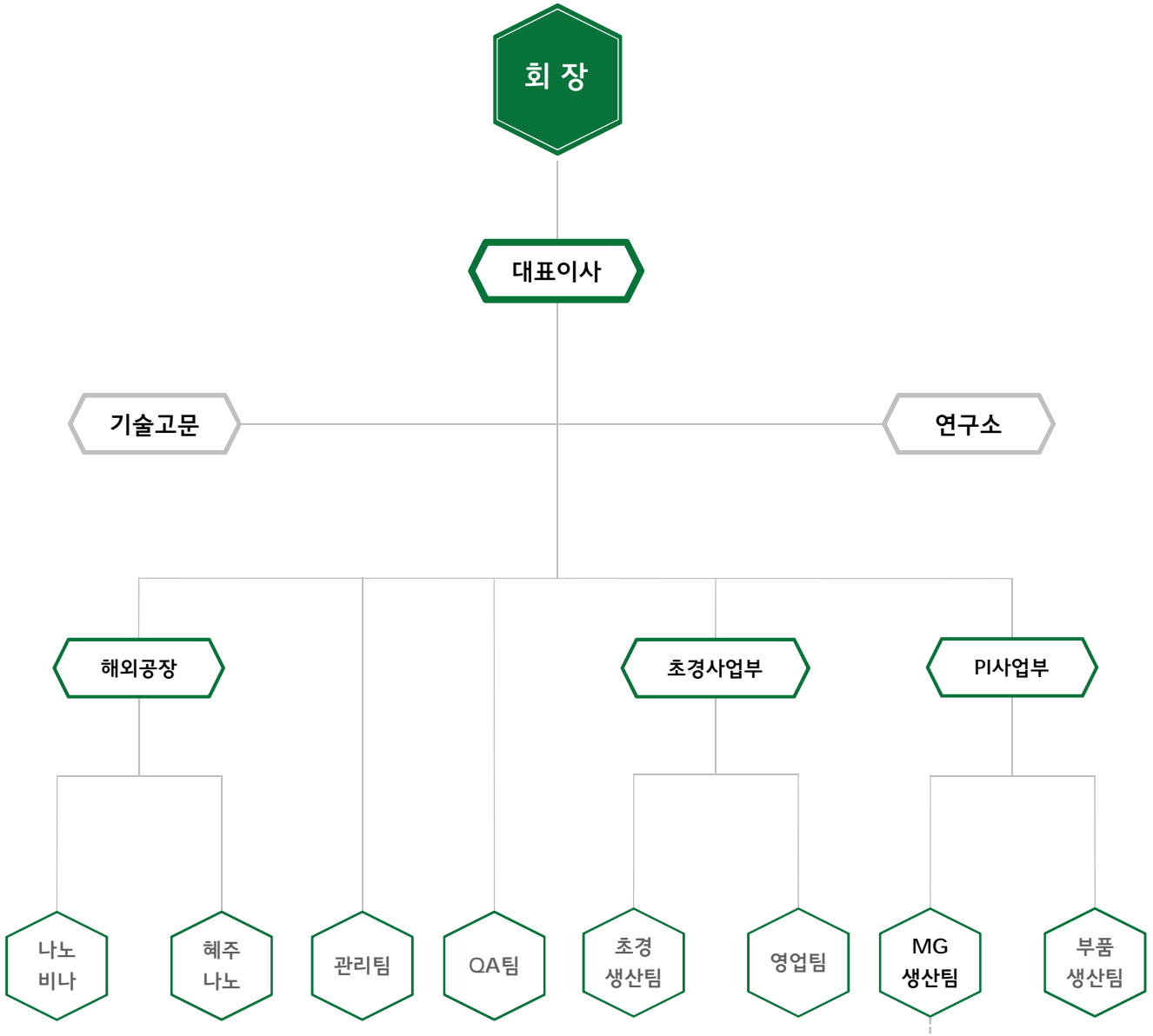
▶ 현재 주요 고객사는 **삼성전자 · LG전자 · 현대모비스** 등

20여개사 이상의 고객과 함께하고 있습니다.

주요연혁

- 1999. 09. 01 **주식회사 나노테크 설립**
- 2000. 04. 14 주식회사 나노테크 기업부설연구소 설립
- 2001. 03. 09 벤처기업 선정 (중소기업청)
- 2003. 03. 09 INNO-BIZ 기업 선정 (충북지방중소기업청)
- 2004. 07. 22 우수제조기술연구센터 선정 - 나노분말 (산업자원부)
- 2007. 02. 27 부품소재기술개발사업 선정 - 나노소재 (산업자원부)
- 2007. 10. 16 특허 등록 - 초미립팅스텐카바이드 코발트 복합분말 제조방법 (특허청)
- 2008. 01. 05 ISO 9001 : ISO 14001 인증 (시스템코리아인증원)
- 2008. 11. 30 300만불 수출의 탑 수상 - 제45회 무역의 날 (대통령)
- 2009. 08. 01 부품소재기술개발사업 선정 - 난삭재 (지식경제부)
- 2012. 09. 01 소재부품기술개발사업 선정 - 서멧트분말 (산업통상자원부)
- 2015. 02. 11 특허 등록 - 타이타늄 카바이드 분말의 제조방법 (특허청)
- 2015. 04. 17 상표 등록 -
- 2015. 07. 01 **복이공장 **
- 2015. 07. 01 지역강소기업 지정 (중소기업청)
- 2016. 08. 17 뿌리기업 선정 - 분말야금제품 제조 (국가뿌리산업진흥센터)
- 2016. 05. 01 소재부품기술개발사업 선정 - (W, Ti)C 분말 (산업통상자원부)
- 2016. 05. 25 글로벌 강소기업 지정 (중소기업청)
- 2016. 09. 22 **NT비나 공장 설립**
- 2016. 12. 26 특허 등록 - 탄질화티타늄 분말의 제조방법 (특허청)
- 2017. 05. 01 수출기업과제 선정 - 교환형 밀링공구 개발 (중소기업청)

기구조직



- Magnet 담당
 - 노승선 과장 ssno@nanoloy.co.kr / 010-2473-4102 / 070-4185-9447
 - 이동엽 주임 dylee@nanoloy.co.kr / 010-9353-7598 / 043-210-7073
- 팬모터 담당
 - 김용희 부장 yhkim2@nanoloy.co.kr / 010-7117-0536 / 043-210-7052
 - 정진필 계장 jpjung@nanoloy.co.kr / 010-5400-9452 / 043-210-7053

주요설비 보유현황

Vacuum melting & Strip casting



Hydrogen Decrepitation



Jet Milling



Pressing



Sintering & Annealing



Machining



Coating



※기타 설비

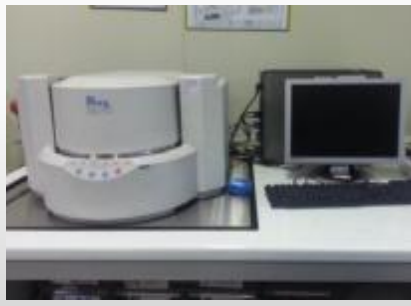
- √ 가공기 50여대
- √ 분말제조설비 10여대
- √ 분말프레스 성형기 20여대
- √ 자석 가공기 20여대
- √ 코팅2종Line 2Line

검사 및 측정설비 보유현황

SEM & EDX



XRF



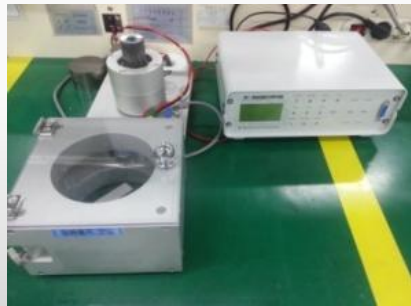
PSA



B-H Tracer



Flux Meter



Magnet Analyzer



High Temp. BH Analyzer



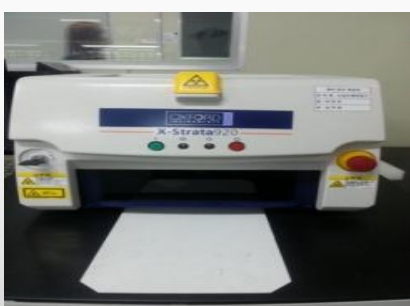
Oxygen Analyzer



X-ray detecting test



Thickness Gauge for Coating



PCT



SST



1 | Sintered NdFeB Magnet Nd소결자석

▶ 특징

- √ 희토류 Nd, Dy 및 Fe 등을 주원료로 한 자석으로 자력이 강하여 경량화, 소형화 용이함
- √ 기계적 강도가 우수하며 최대 에너지적이 높으므로 자기특성이 가장 강력함 (최대온도 약 240°C)

▶ 용도

- √ 모터(Linear, Servo, stepping, Coreless), 각종 센서류, 스피커, LCD패널 고정, 영구자석척 등



Main Mechanical & Physical Properties of Sintered NdFeB Magnet			
	Unit	Value	
Recoil Permeability	/	1.05	
Curie Temp.	°C	310-350	
Max. Working Temp.	°C	80-230	
Rever. Temp. Coeff. of Br	%/°C	-0.13 to -0.09	
Rever. Temp. Coeff. of Hcj	%/°C	-0.70 to -0.45	
Density	g/cm ³	7.4-7.6	
Vickers Hardness	Hv	560-600	
Elasticity Modulus	kN/mm ²	140-170	
Flexural Strength	kgf/mm ²	2500-3000	
Compressive Strength	kgf/mm ²	9000-10000	
Coeff. of Thermal Expansion	(C ⊥)	10 /°C	-2 to 0
	(C)	10 /°C	4-9
Specific Electric Resistance	10 ⁻⁶ Ω.m	1.3-1.6	
Specific Heat Capacity	J/(kg.°C)	350-500	
Thermal Conductivity	W/(m.°C)	5-15	

Comparison Table of Different Coating Types								
Suggested Environment Temperature	Coating Thickness	Salty Spray Test	Salty Spray Test	Pressure Cooker Test	Temperature & Humidity Test	Resistance of Weak Acid & Weak Alkali	Resistance of solvent	Comments
Phosphorization	< 80°C	< 1µm	Worse	Not Available	24Hours Very Poor	Very poor	Very poor	Protection for temporary storage and short term transportation.
Blue & White Zn	< 150°C	17-15µm	>24hours	Not Available	24Hours Very Poor	Poor	Poor	Poor protective capability, only for common environment
Rainbow Zn	< 150°C	7-15µm	>48hours	Not Available	48Hours Very Poor	Fair	Fair	With good protective capability for moisture, hot and industrial environment.
Ni	< 200°C	10-20µm	>24hours	Fair	Fair	Fair	Good	For general protection purpose and suitable for most kinds environment.
Ni+Ni	< 200°C	15-25µm	>48hours	Good	Good	Fair	Good	Better corrosion resistance than Ni coating, suitable for dew atmosphere and long time using.
Ni+Cu+Ni	< 200°C	15-25µm	>72hours	Very Good	Very Good	Fair	Good	BThe most popular coating type. Corrosion resistance is better than Ni+Ni coating.
Epoxy / Ni+Cu+Epoxy	< 130°C	15-25µm	>96hours	Not Available	Good	Very Good	Poor	Special for requirement of electric insulation& environment of strongly industrial corrosion.
Ni+Sn	< 150°C	15-25µm	>72hours	Not Available	Very Good	Fair	Good	Superior resistance to humid atmosphere even better than Ni+Cu+Ni
Spray Coated Al	< 200°C	5-10µm	>288hours	Not Available	Very Good	Fair	Good	Superior resistance to salt and humid atmosphere, suitable for coating big size & anomalous magnet
Ion Vapor Deposited Al	< 400°C	10-30µm	>288hours	Very Good	Very Good	Fair	Good	Same protecting role as spray coated Al. even coating layer with excellent adhesion on magnet.
Ni+Cu+Ni plus EVERLUBE	< 100°C	15-30µm	>120hours	Better than Ni+Cu+Ni	Very good About 500hours	Very Good	Better Than Epoxy	resistance to corrosion & wearing, good chemical stability, special for engineering usage.

Magnetic Property of Sintered NdFeB Magnet

Grade	Remanence		Coercivity				Max. Energy Product		Max Working Temp. L/D ≥ 0.7
	Br		Hc		Hcj		(BH)max		Tw
	T	kGs	kA/m	kOe	kA/m	kOe	kJ/m ³	MGOe	°C
N35	1.18~1.23	11.8~12.3	≥868	≥10.9	≥955	≥12	264~288	33~36	80
N38	1.23~1.26	12.3~12.6	≥899	≥11.3	≥955	≥12	288~312	36~39	80
N40	1.26~1.29	12.6~12.9	≥907	≥11.4	≥955	≥12	304~328	38~41	80
N42	1.29~1.33	12.9~13.3	≥915	≥11.5	≥955	≥12	320~344	40~43	80
N45	1.33~1.37	13.3~13.7	≥876	≥11.0	≥955	≥12	344~368	43~46	80
N48	1.37~1.41	13.7~14.1	≥836	≥10.5	≥876	≥11	368~392	46~49	80
N50	1.40~1.45	14.0~14.5	≥836	≥10.5	≥876	≥11	384~408	48~51	80
N52	1.43~1.48	14.3~14.8	≥836	≥10.5	≥876	≥11	400~424	50~53	80
N55	1.48~1.53	14.8~15.3	≥836	≥10.5	≥876	≥11	416~440	52~55	80
35M	1.18~1.23	11.8~12.3	≥868	≥10.9	≥1114	≥14	264~288	33~36	100
38M	1.23~1.26	12.3~12.6	≥899	≥11.3	≥1114	≥14	288~312	36~39	100
40M	1.26~1.29	12.6~12.9	≥923	≥11.6	≥1114	≥14	304~328	38~41	100
42M	1.29~1.33	12.9~13.3	≥955	≥12.0	≥1114	≥14	320~344	40~43	100
45M	1.33~1.37	13.3~13.7	≥995	≥12.5	≥1114	≥14	344~368	43~46	100
48M	1.37~1.41	13.7~14.1	≥1027	≥12.9	≥1114	≥14	368~392	46~49	100
50M	1.40~1.45	14.0~14.5	≥1033	≥13.0	≥1114	≥14	384~408	48~51	100
52M	1.43~1.48	14.3~14.8	≥1033	≥13.0	≥1114	≥14	400~424	50~53	100
33H	1.13~1.18	11.3~11.8	≥836	≥10.5	≥1353	≥17	248~272	31~34	120
35H	1.18~1.23	11.8~12.3	≥868	≥10.9	≥1353	≥17	264~288	33~36	120
38H	1.23~1.26	12.3~12.6	≥899	≥11.3	≥1353	≥17	288~312	36~39	120
40H	1.26~1.29	12.6~12.9	≥923	≥11.6	≥1353	≥17	304~328	38~41	120
42H	1.29~1.33	12.9~13.3	≥955	≥12.0	≥1353	≥17	320~344	40~43	120
45H	1.33~1.37	13.3~13.7	≥979	≥12.3	≥1353	≥17	344~368	43~46	120
48H	1.37~1.41	13.7~14.1	≥995	≥12.5	≥1353	≥17	368~392	46~49	120
50H	1.40~1.45	14.0~14.5	≥1020	≥12.8	≥1353	≥17	384~408	48~51	120
30SH	1.08~1.13	10.8~11.3	≥804	≥10.1	≥1592	≥20	224~248	28~31	150
33SH	1.13~1.18	11.3~11.8	≥844	≥10.6	≥1592	≥20	248~272	31~34	150
35SH	1.18~1.23	11.8~12.3	≥876	≥11.0	≥1592	≥20	264~288	33~36	150
38SH	1.23~1.26	12.3~12.6	≥907	≥11.4	≥1592	≥20	288~312	36~39	150
40SH	1.26~1.29	12.6~12.9	≥939	≥11.8	≥1592	≥20	304~328	38~41	150
42SH	1.29~1.33	12.9~13.3	≥987	≥12.4	≥1592	≥20	320~344	40~43	150
45SH	1.33~1.37	13.3~13.7	≥1003	≥12.6	≥1592	≥20	344~368	43~46	150
48SH	1.37~1.41	13.7~14.1	≥1025	≥12.9	≥1592	≥20	368~392	46~49	150
28UH	1.04~1.08	10.4~10.8	≥764	≥9.6	≥1990	≥25	208~232	26~29	180
30UH	1.08~1.13	10.8~11.3	≥812	≥10.2	≥1990	≥25	224~248	28~31	180
33UH	1.13~1.18	11.3~11.8	≥852	≥10.7	≥1990	≥25	248~272	31~34	180
35UH	1.18~1.23	11.8~12.3	≥860	≥10.8	≥1990	≥25	264~288	33~36	180
38UH	1.23~1.26	12.3~12.6	≥876	≥11.0	≥1990	≥25	288~312	36~39	180
40UH	1.26~1.29	12.6~12.9	≥899	≥11.3	≥1990	≥25	304~328	38~41	180
42UH	1.29~1.33	12.9~13.3	≥923	≥11.6	≥1990	≥25	320~344	40~43	180
28EH	1.04~1.08	10.4~10.8	≥780	≥9.8	≥2388	≥30	208~232	26~29	200
30EH	1.08~1.13	10.8~11.3	≥812	≥10.2	≥2388	≥30	224~248	28~31	200
33EH	1.13~1.18	11.3~11.8	≥836	≥10.5	≥2388	≥30	248~272	31~34	200
35EH	1.18~1.23	11.8~12.3	≥876	≥11.0	≥2388	≥30	264~288	33~36	200
38EH	1.23~1.26	12.3~12.6	≥899	≥11.3	≥2388	≥30	288~312	36~39	200
40EH	1.26~1.29	12.6~12.9	≥920	≥11.6	≥2388	≥30	304~328	38~41	200
28AH	1.04~1.08	10.4~10.8	≥780	≥9.8	≥2624	≥33	208~232	26~29	230
30AH	1.08~1.13	10.8~11.3	≥819	≥10.3	≥2624	≥33	224~248	28~31	230
33AH	1.13~1.18	11.3~11.8	≥843	≥10.6	≥2624	≥33	248~272	31~34	230

Remark: Each above grade is re-classified into 4 sub-grades with different temperature characters and weight loss

Sub-Grades	Temperature Coefficient		Weight Loss g/cm ³
	α(Br)	β(Hcj)	
General	-0.12~-0.11%/°C	-0.70~-0.60%/°C	≤80
-L	-0.12~-0.10%/°C	-0.65~-0.55%/°C	≤5
-T	-0.11~-0.10%/°C	-0.60~-0.55%/°C	≤15
-LT	-0.10~-0.09%/°C	-0.55~-0.45%/°C	≤5

- Remark :
- 1) "-L" sub-grade means low weight loss, "-T" sub-grade mean better thermal stability, "-LT" sub-grade means low weight loss and better thermal stability.
 - 2) "-T" and "-LT" sub-grades are not available on "N" grade and "M" grade
 - 3) The test condition of weight loss: 121°C, humidity 95%, 2.6ATM, 168hours

2 | Radial Ring NdFeB Magnet Nd라디얼링자석

▶ 특징

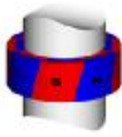
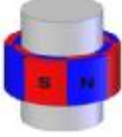
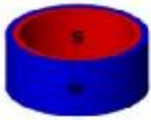
- √ Radial 이방성의 자장배열로 모터에 적용 시 C형(세그먼트) 대비 모터의 회전자(로터)에 대한 조립이 용이하여 제조비용이 절감되며, 조립정확도 또한 높아져 모터의 동적균형이 개선됨
- √ 라디얼 자석의 극수 및 파형 형태는 착자요크로 결정하므로 자유롭게 착자 가능

▶ 용도

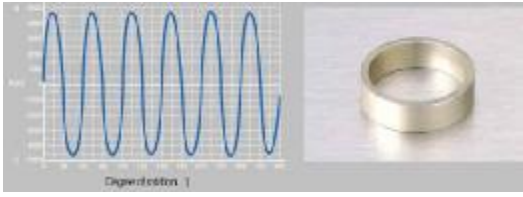
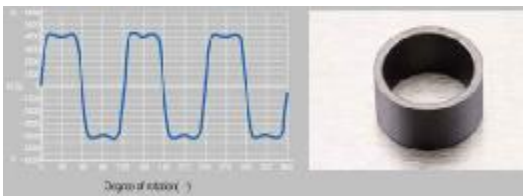
- √ Stepping, Coreless, Servo, Spindle 모터 및 각종 Actuator



착자의 종류

	Skewed Magnetization	Straight magnetization	Unipole magnetization
Feature			
Application	Servo motors EPS motors Magnetic Gear	Spindle motors Stepping motors Generators Coupling	Linear actuator Shaft motors Ref. compressor Speakers Mag. Bearings

Radial 극수 및 파형

Skewed Magnetization		Radial Ring Magnet With outer steel yoke
Straight magnetization		Radial Ring Magnet With inner steel yoke

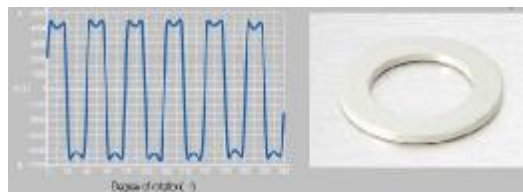
Magnetic Property of Radial Ring NdFeB Magnet by Sintering Process

Grade	Remanence		Coercivity				Max. Energy Product		Max Working Temp. L/D ≥ 0.7
	Br		Hc		Hcj		(BH)max		Tw
	T	kGs	kA/m	kOe	kA/m	kOe	kJ/m ³	MGOe	°C
N35	1.18~1.23	11.8~12.3	≥868	≥10.9	≥955	≥12	263~287	33~36	80
N38	1.23~1.26	12.3~12.6	≥899	≥11.3	≥955	≥12	287~311	36~39	80
N40	1.26~1.29	12.6~12.9	≥907	≥11.4	≥955	≥12	302~327	38~41	80
N42	1.29~1.33	12.9~13.3	≥915	≥11.5	≥955	≥12	318~342	40~43	80
35H	1.18~1.23	11.8~12.3	≥868	≥10.9	≥1353	≥17	263~287	33~36	120
38H	1.23~1.26	12.3~12.6	≥899	≥11.3	≥1353	≥17	287~311	36~39	120
40H	1.26~1.29	12.6~12.9	≥923	≥11.6	≥1353	≥17	304~327	38~41	120
42H	1.29~1.33	12.9~13.3	≥955	≥12.0	≥1353	≥17	318~342	40~43	120
35SH	1.18~1.23	11.8~12.3	≥876	≥11.0	≥1592	≥20	263~287	33~36	150
38SH	1.23~1.26	12.3~12.6	≥907	≥11.4	≥1592	≥20	287~311	36~39	150
40SH	1.26~1.29	12.6~12.9	≥939	≥11.8	≥1592	≥20	302~327	38~41	150
33UH	1.13~1.18	11.3~11.8	≥852	≥10.7	≥1990	≥25	247~271	31~34	180
35UH	1.18~1.23	11.8~12.3	≥860	≥10.8	≥1990	≥25	263~287	33~36	180

Magnetic Property of Radial Ring NdFeB Magnet by Hot-Pressing Process

Grade	Remanence		Coercivity				Max. Energy Product		Max Working Temp. L/D ≥ 0.7
	Br		Hc		Hcj		(BH)max		Tw
	T	kGs	kA/m	kOe	kA/m	kOe	kJ/m ³	MGOe	°C
N42	1.29~1.33	12.9~13.3	≥915	≥11.5	≥955	≥12	320~344	40~43	80
40H	1.26~1.29	12.6~12.9	≥923	≥11.6	≥1353	≥17	304~328	38~41	120
35SH	1.18~1.23	11.8~12.3	≥876	≥11.0	≥1592	≥20	264~288	33~36	150
33UH	1.13~1.18	11.3~11.8	≥852	≥10.7	≥1990	≥25	248~272	31~34	180

BLDC



Disket Magnet
With outer
Double steel yoke

3 | Multi polar anisotropic Magnet 극이방자석

▶ 특징

- √ 링 형태로 Segment타입보다 특성이 높은 Block타입의 자기 특성을 구현함
- √ 링 타입과 동일하게 Segment타입 대비 조립이 용이함
- √ 샤프트 일체형 공급으로 비용 절감

▶ 용도

- √ 소형 고풍성 / 고전력 모터, Stepping, Coreless, Servo, Spindle 모터 및 각종 Actuator



Alignment Method

8pole		4pole	

Fig. Molding Machine Image (Upper View)

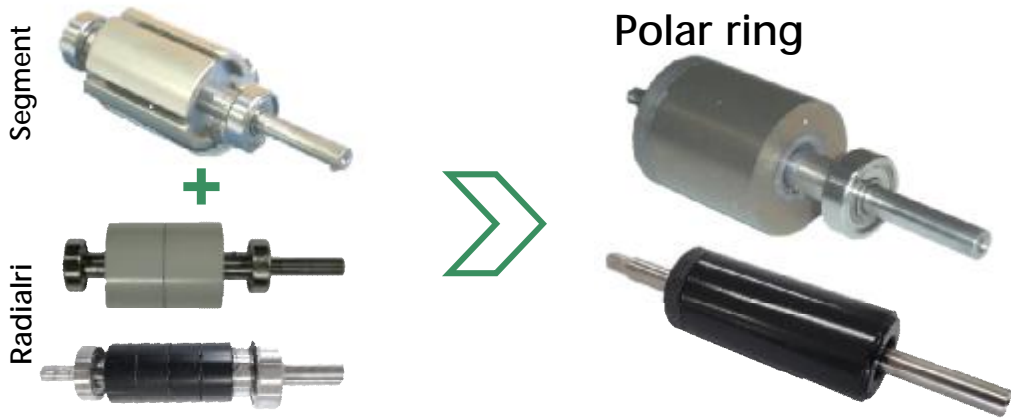
Magnetic Property of Multi polar - anisotropic Magnet

Grade	Max. Energy Product	Remanence	Coercivity		Temperature Coefficient		Max. Working Temperature L/D≥0.7
	(BH)max.	Br	bHc	iHc	α (Br)	B(iHc)	Tw
	[MGOe]	[kG]	Min.[kOe]	Min.[kOe]	[%/°C]	[%/°C]	[Max.(°C)]
JH-44HP	42~40	13.3~13.0	12.5~12.0	16	-0.11	-0.54	120
JH-39SHP	38~36	12.6~12.3	12.0~11.5	16	-0.11	-0.55	150
JH-35UHP	34~32	12.1~11.7	11.5~11.0	25	-0.10	-0.47	180
JH-32EHP	31~29	11.5~11.1	11.0~10.5	30	-0.09	-0.45	200

Remark

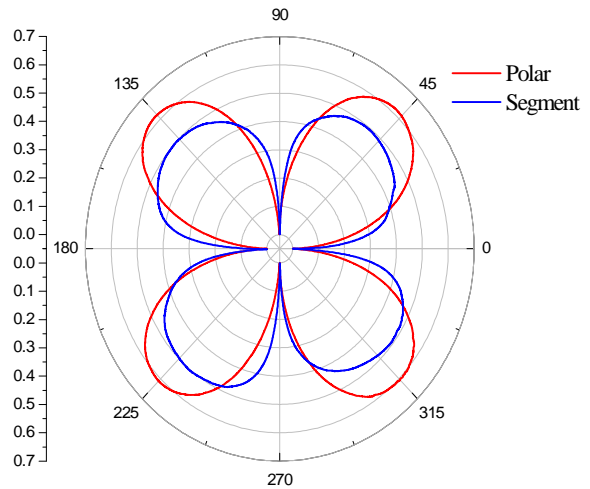
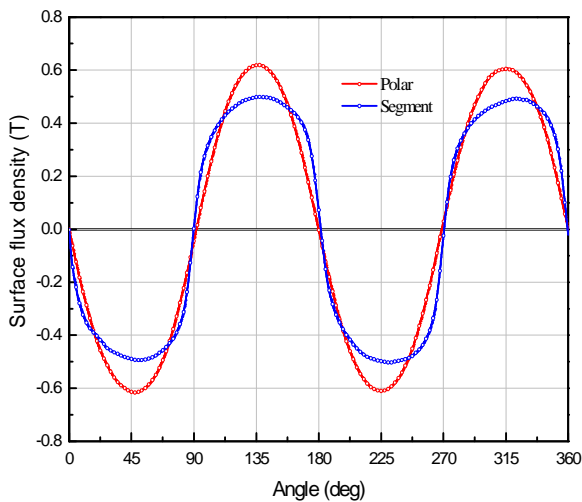
Forming : Compression

Polar alignment's Number: 4pole, 6pole, 8pole



표면자속밀도 (vs. Segment type)

- ▶ 4극 이방 자석은 같은 체적의 로터 내에서 일반적인 segment, 링타입의 자석보다 표면자속밀도가 높다.



4 | Compression Bonded NdFeB magnet Nd본드자석

▶ 특징

- √ 자석 Powder분말과 Plastic 섞어 압축, 성형한 자석
- √ 고유 보자력이 크고 열 안정성 및 부식특성이 높음 (최대온도 약 160°C)

▶ 용도

- √ 정밀Motor(Spindle, Stepping), Speaker, Buzzer, Sensor 등



Surface Treatment

The anti-corrosion ability of compression bonded NdFeB magnet is much better than sintered NdFeB magnet. It's surface still should be coated for protection purpose. The common surface treatments are as below table.

Coating Type	Coating Material	Applicable Condition & Feature
Electrophoresis	Epoxy Resin	1. The most popular treatment. Suitable for most compression NdFeB magnet. 2. Can withstand long time salty spray test, and temperature and humidity test. 3. Excellent ability of anti oils and solvents. 4. Smooth surface and beautiful looking.
Tumbling Spray	Epoxy Resin	1. Special for magnet with weight less than 1gram or with outside diameter less than 5 mm. 2. High coating efficiency. 3. Homogeneous coating layer. 4. Can withstand long time salty spray test, temperature and humidity test. 5. Excellent ability of anti oil and solvent.
Dipping	Rust Preventing Oil (2-Diethyl)	1. Special for magnet with small inside diameter. 2. High coating efficiency 3. Simple process 4. Offering excellent anti-rust capability
Impregnating	Propenoic Acid	1. Special for magnet will be used in surroundings of oils or solvents for long term. 2. Helpful to enhance physical strength of magnet.

Magnetic Property of Compression Bonded NdFeB Magnet

Material Grade		Unit	BNC-5	BNC-7	BNC-8	BNC-8L	BNC-8H	BNC-8SR	BNC-9H	BNC-10	BNC-11	BNC-12	BNC-12D	BNC-12L	BNC-13L	
Remanence	Br	kGs	4.0~5.0	5.0~6.0	6.0~6.8	6.0~6.8	6.0~6.6	6.2~6.8	6.5~7.0	6.8~7.3	7.0~7.5	7.2~7.7	7.2~7.7	7.6~8.1	7.8~8.3	
		mT	400~500	500~600	600~680	600~680	600~660	620~680	650~700	680~730	700~750	720~770	720~770	760~810	780~830	
Coercivity	Hc	kOe	3.0~4.0	4.0~5.0	4.5~5.5	5.0~6.0	5.0~6.0	5.0~6.0	5.0~6.0	5.0~6.0	5.0~6.0	5.5~6.5	5.5~6.5	5.5~6.5	5.0~6.0	5.0~6.0
		kA/m	240~320	320~400	360~440	400~480	400~480	400~480	400~480	400~480	400~480	440~520	440~520	440~520	400~480	400~480
	Hcj	kOe	7.0~9.0	7.0~9.0	8.0~10.0	8.0~10.0	13.0~17.0	10.0~14.0	11.0~14.0	8.0~10.0	8.0~10.0	9.0~10.0	9.0~11.0	9.0~11.0	6.0~8.0	6.0~8.0
		kA/m	560~720	560~720	640~800	640~680	1040~1360	800~1120	880~1360	640~800	640~800	720~800	720~880	480~640	480~640	
Max. Energy Product	(BH) _{max}	MGOe	4.0~6.0	6.0~7.5	7.5~9.0	8.0~9.0	8.0~9.0	8.5~9.5	9.0~10.0	9.5~10.5	10~11	11~12	11~12	11~12	11~13	
		kJ/m ³	32~48	48~60	60~72	64~72	64~72	68~76	72~80	76~84	80~88	88~96	88~96	88~96	88~104	
Recoil Permeability			1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
Temperature Coefficient	α(Br)	%/°C	-0.11	-0.11	-0.11	-0.11	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.12	-0.12	
Max. Working Temperature	T _w	°C	≤160	≤160	≤160	≤160	≤180	≤180	≤180	≤160	≤160	≤160	≤160	≤150	≤150	
Curie Temperature	T _c	°C	300	300	300	350	350	350	350	350	350	350	350	320	320	
Magnetizing Field Strength	H _s	kOe	>16	>20	>20	>20	>25	>20	>20	>20	>20	>20	>20	>20	>16	
		kA/m	>1280	>1600	>1600	>1600	>2000	>1600	>1600	>1600	>1600	>1600	>1600	>1600	>1280	

Other Physical Property of Compression Bonded NdFeB Magnet

Flexural Strength	Mpa	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0
Bending Modulus	MPa	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800
Thermal Expansion Coefficient	10 ⁻⁶ /°C	7~10	7~10	7~10	7~10	7~10	7~10	7~10	7~10	7~10	7~10	7~10	7~10	7~10	7~10
Hardness	Hv	80~120	80~120	80~120	80~120	80~120	80~120	80~120	80~120	80~120	80~120	80~120	80~120	80~120	80~120
Density	g/cm ³	5.0~5.5	5.5~5.8	5.8~6.0	5.8~6.1	5.8~6.1	5.8~6.1	5.8~6.1	5.8~6.1	5.8~6.1	6.0~6.3	6.0~6.3	6.0~6.3	6.0~6.3	6.1~6.4
Electric Resistivity	μΩ.m	30~60	30~60	30~60	30~60	30~60	30~60	30~60	30~60	30~60	30~60	30~60	30~60	30~60	30~60

5 | Injection Moulded NdFeB Magnet Nd사출자석

▶ 특징

- √ 사출자석 혹은 플라스틱 자석이라 불리며, 페라이트 사출자석에 비해 높은 자기특성
- √ 간단한 형상에서 다른 부품과 결합하는 등의 복잡한 형상까지 다양한 형태로 생산할 수 있음
- √ 다극착자가 용이하며 우수한 내식성, 기계적 특성을 가짐

▶ 용도

- √ 자동차용 모터 자석
- √ 냉장고, 에어컨, 세탁기, VTR등의 Fan-Motor용
- √ TAS(Torque & Angle Sensor)
- √ SAS(Steering Angle Sensor)
- √ Seat Slide Motor
- √ ACV(Air Control Value)
- √ EGR(Exhaust Gas Recirculation) Valve
- √ VSAV(Variable Swirl Control Actuator) Seat belt Sensor
- √ Robot Position Sensor
- √ 가전 산업용 Motor 용



Magnetic Property of Injection NdFeB Magnet

Material Grade			BNI-3	BNI-4	BNI-5	BNI-6	BNI-7	BNI-6SR	BNI-12	BNI-15
Used Binder			PA12	PA12	PA12	PA12	PA12	PPS	PA12	PA12
Anisotropy or Isotropy			Isotropy						Anisotropy	
Remanence	Br	kGs	3.5~4.5	4.0~5.0	4.5~5.5	5.0~6.0	5.5~6.5	5.0~6.0	7.0~8.0	7.8~8.5
		mT	350~450	400~500	450~550	500~600	550~650	500~600	700~800	780~850
Coercivity	Hc	kOe	2.5~3.5	3.0~4.0	3.5~4.5	4.0~5.0	4.0~5.0	4.0~5.0	5.6~6.3	6.7~7.2
		kA/m	200~280	240~320	280~360	320~400	320~400	320~400	445~500	530~575
	Hcj	kOe	6.0~8.5	7.0~9.0	8.0~10.0	8.0~10.0	8.0~10.0	11.0~14.0	11.5~12.5	14.5~15.5
		kA/m	480~680	560~720	640~800	640~800	640~800	880~1120	915~995	1155~1235
Max. Energy Product	(BH) max	MGOe	3.0~4.0	3.5~4.5	4.5~6.0	6.0~7.0	6.5~7.5	5.5~6.5	11.5~12.5	14.5~15.5
		kJ/m ³	24~32	28~36	36~48	48~56	52~60	44~52	92~100	116~124
Temperature Coeff.	α(Br)	%/°C	-0.12	-0.12	-0.12	-0.12	-0.12	-0.13	-0.13	-0.13
Max. Working Temp.	Tw	°C	120	120	120	120	120	180	120	120
Recoil Permeability	μrec	/	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2

Other Physical Property of Injection NdFeB Magnet

Tensile Strength	MPa	33~37	33~37	33~37	33~37	33~37	33~37	33~37	33~37
Flexural Strength	MPa	70~74	70~74	70~74	70~74	70~74	70~74	70~74	70~74
Young's Modulus	MPa	16000	16000	16000	16000	16000	25000	16000	16000
Hardness	HRM	70~80	70~80	70~80	70~80	70~80	100~110	70~80	70~80
Density	g/cm ³	4.5~5.0	4.5~5.0	4.5~5.0	4.7~5.2	4.7~5.2	4.9~5.4	4.9~5.4	4.9~5.4
Electric Resistivity	μΩ.m	130	130	130	130	130	130	130	130
Thermal Expansion Coefficient	10 ⁻⁶ /°C	25~30	25~30	25~30	25~30	25~30	10~15	25~30	25~30

6 | Sintered SmCo Magnet 사마륨소결자석

▶ 특징

- √ 희토류Sm와 Co, Fe을 주원료로 한 자석으로 Nd소결자석 다음의 자기특성
- √ 가장 높은 보자력을 가졌으며 높은 온도안정성, 내식성이 강하므로 표면처리 불필요
- √ 기계적 강도는 상대적으로 낮음으로 취급에 대한 주의가 필요

▶ 용도

- √ 스피커, 모터(Stepping, Coreless, Servo, 고속터빈), Sensor류, 게이지 등



Thermal Character					
	Material Type	Max. Working Temperature (°C)	Curie Temperature (°C)	Rev. Temperature Coefficient of Br (%/°C)	Rev. Temperature Coefficient of iHc (%/°C)
SmCo5	(SmPr)Co5	250	750	-0.050	-0.300
	SmCo5	250	750	-0.045	-0.280
	(SmGd)Co5	300	750	-0.015	-0.120
Sm2Co17	Sm2(CoFeCuZr)17	250 / 300 / 350	800	-0.030	-0.200
	(SmEr)2(CoTm)17	350	850	-0.015	-0.120

Other Physical Property of Sintered SmCo Magnet				
	Unit	SmCo5	Sm2Co17	
Density	g/cm ³	8.1~8.3	8.3~8.5	
Vickers Hardness	Hv	450~500	500~600	
Young's Modulus	10 ⁴ kg/mm ²	1.6	1.2	
Tensile Strength	kg/mm ²	4.1	3.6	
Deflection Strength	kg/mm ²	18	15	
Compressive Strength	kg/mm ²	102	82	
Coefficient of Thermal Expansion	⊥ to anisotropic direction	10 ⁻⁶ /°C	13	11
	// to anisotropic direction	10 ⁻⁶ /°C	6	8
Specific Electric Resistance	10 ⁻⁵ Ω.cm	5.3	8.6	
Specific Heat Capacity	J/(kg.K)	377	335	
Thermal Conductivity	W/(m.K)	13	12	

Magnetic Property of Sintered SmCo Magnet

Materials	Grades	Remanence		Coercive Force				Max. Energy Product		Max. Working Temp.	Curie Temp.	Temperature Coefficient	
		Br		Hcb		Hcj		(BH)max				Tw	Tc
		T	kGs	kA/m	kOe	kA/m	KOe	KJ/m ³	MGOe	℃	℃	%℃	%℃
(SmPr)Co ₅ SmCo ₅	SS-16	0.81~0.85	8.1~8.5	620~660	7.8~8.3	1195 ~1830	15 ~23	112~128	14~16	250	750	-0.05	-0.30
	SS-18	0.85~0.90	8.5~9.0	660~700	8.3~8.8			128~144	16~18				
	SS-20	0.90~0.94	9.0~9.4	676~725	8.5~9.1			144~160	18~20				
	SS-22	0.94~0.96	9.4~9.6	710~748	8.9~9.4			160~176	20~22				
	SS-24	0.96~1.00	9.6~10.0	730~770	9.2~9.7			176~192	22~24				
SmCo ₅	SS-16S	0.79~0.84	7.9~8.4	612~660	7.7~8.3	≥1830	≥23	120~136	15~17	250	750	-0.045	-0.28
	SS-18S	0.84~0.89	8.4~8.9	644~692	8.1~8.7			136~152	17~19				
	SS-20S	0.89~0.93	8.9~9.3	684~732	8.6~9.2			152~168	19~21				
	SS-22S	0.92~0.96	9.2~9.6	710~756	8.9~9.5			168~184	21~23				
	SS-24S	0.96~1.00	9.6~1.0	740~788	9.3~9.9			184~200	23~25				
(SmGd)Co ₅	SS-10LT	0.62~0.66	6.2~6.6	485~517	6.1~6.5	≥1830	≥23	72~88	9~11	300	750	-0.015	-0.12
Sm ₂ (CoFeCuZr) ₁₇	SS-24H	0.95~1.02	9.5~10.2	692~764	8.7~9.6	≥1990	≥25	176~192	22~24	350	800		
	SS-26H	1.02~1.05	10.2~10.5	748~796	9.4~10.0			192~208	24~26				
	SS-28H	1.03~1.08	10.3~10.8	756~812	9.5~10.2			208~224	26~28				
	SS-30H	1.08~1.10	10.8~11.0	788~835	9.9~10.5			224~240	28~30				
	SS-32H	1.10~1.13	11.0~11.3	812~860	10.2~10.8			240~256	30~32				
	SS-22	0.93~0.97	9.3~9.7	676~740	8.5~9.3	≥1430	≥18	160~184	20~23	300	800	-0.035	-0.20
	SS-24	0.95~1.02	9.5~10.2	692~764	8.7~9.6			176~192	22~24				
	SS-26	1.02~1.05	10.2~10.5	748~796	9.4~10.0			192~208	24~26				
	SS-28	1.03~1.08	10.3~10.8	756~812	9.5~10.2			208~224	26~28				
	SS-30	1.08~1.10	10.8~11.0	788~835	9.9~10.5			224~240	28~30				
	SS-32	1.10~1.13	11.0~11.3	812~860	10.2~10.8			240~256	30~32				
	SS-26M	1.02~1.05	10.2~10.5	676~780	8.5~9.8	955 ~1433	12 ~18	192~208	24~26	300	800	-0.035	-0.20
	SS-28M	1.05~1.08	10.5~10.8	676~796	8.5~10.0			208~224	26~28				
	SS-30M	1.08~1.10	10.8~11.0	676~835	8.5~10.5			224~240	28~30				
	SS-32M	1.10~1.13	11.0~11.3	676~852	8.5~10.7			240~256	30~32				
	SS-24L	0.95~1.02	9.5~10.2	541~716	6.8~9.0	636 ~955	8.0 ~12	176~192	22~24	250	800	-0.035	-0.20
SS-26L	1.02~1.05	10.2~10.5	541~748	6.8~9.4	192~208			24~26					
SS-28L	1.05~1.08	10.5~10.8	541~764	6.8~9.6	208~224			26~28					
SS-30L	1.08~1.15	10.8~11.5	541~796	6.8~10.0	224~240			28~30					
SS-32L	1.10~1.15	11.0~11.5	541~812	6.8~10.2	232~256			29~32					
(SmEr) ₂ (CoTm) ₁₇	SS-22LT	0.90~0.99	9.0~9.9	677~756	8.5~9.5	≥1195	≥15	159~183	20~23	350	850	-0.015	-0.12
	SS-24LT	0.92~1.02	9.2~10.2	677~756	8.5~9.5			175~199	22~25				

7 | Sintered Ferrite Magnet 페라이트소결자석

▶ 특징

- √ 산화철, Sr(스트로튬), Ba(바륨) 혼합자석
- √ 상대적으로 자기특성 낮으며 가격이 저렴
- √ 온도 안정성이 높고 표면처리 불필요하나 기계적 강도 낮음

▶ 용도

- √ 스피커, 모터(FA, OA, 가전용), 회전속도계, Lead switch, 시계용 무브먼트 등



Other Physical Property of Sintered Ferrite Magnet

Table 1	Reversible Temperature Coefficient α (Br)	Reversible Temperature Coefficient β (Hcj)	Curie Temperature	Suggested Working Range	Recoil Permeability	Density
Unit	%/°C	%/°C	°C	°C	μ_{rec}	g/cm ³
Value	-0.18	0.30	450	-40 ~ +250	1.05 ~ 1.10	4.9 ~ 5.1

Table 2	Compressive Strength	Tensile Strength	Flexural Strength	Elastic Modulus	Hardness	Poisson Ratio
Unit	kgf/mm ²	kgf/mm ²	kgf/mm ²	kgf/mm ²	Mohs	/
Value	>70	3 ~ 5	6 ~ 9	1.5 ~ 1.8x10 ⁴	7.00	0.28

Table 3	Electrical Resistivity	Specific Heat Capacity	Thermal Conductivity	Porosity	Coefficient of Thermal Expansion	
					⊥ to anisotropic direction	// to anisotropic direction
Unit	$\Omega \cdot m$	J/(kg.K)	W/(m.K)	/	10 ⁻⁶ cm/cm.°C	10 ⁻⁶ cm/cm.°C
Value	10000	800 ~ 850	3 ~ 5	5%	9 ~ 11	13 ~ 15

Magnetic Property of Sintered Ferrite Magnet

Grade	Remanence Br		Coercivity Hc/Hcb		Intrinsic Coercivity Hcj/iHc		Max. Energy Product (BH)max	
	mT	Gs	kA/m	Oe	kA/m	Oe	kJ/m ³	MGOe
SFI-1A	200~235	2000~2350	135~159	1700~2000	211~251	2650~3150	7.2~8.8	0.9~1.1
SFD-2A	340~360	3400~3600	215~239	2700~3000	235~267	2950~3350	20.8~24.0	2.6~3.0
SFD-2C	350~338	3500~3800	227~251	2850~3150	235~267	2950~3350	24.0~27.2	3.0~3.4
SFD-2D	365~395	3650~3950	231~255	2900~3200	239~271	3000~3400	26.4~29.6	3.3~3.7
SFD-2E	375~400	3750~4000	251~275	3150~3450	263~287	3300~3600	28.0~31.2	3.5~3.9
SFW-3A	360~380	3600~3800	143~167	1800~2100	151~175	1900~2200	24.0~26.4	3.0~3.3
SFW-3B	380~400	3800~4000	167~191	2100~2400	175~199	2200~2500	25.6~28.0	3.2~3.5
SFW-3C	380~400	3800~4000	191~215	2400~2700	199~223	2500~2800	26.4~28.8	3.3~3.6
SFW-4A	380~400	3800~4000	251~275	3150~3450	259~283	3250~3550	27.2~30.4	3.4~3.8
SFW-4B	385~405	3850~4050	227~251	2850~3150	235~259	2950~3250	27.2~30.4	3.4~3.8
SFW-4C	390~410	3900~4100	215~239	2700~3000	223~247	2800~3100	28.0~30.4	3.5~3.8
SFW-4D	390~410	3900~4100	251~275	3150~3450	259~283	3250~3550	28.8~31.2	3.6~3.9
SFW-5A	360~380	3600~3800	263~287	3300~3600	311~335	3900~4200	24.8~28.0	3.1~3.5
SFW-5B	330~360	3300~3600	259~283	3250~3550	331~355	4150~4450	24.0~26.4	3.0~3.3
SFW-5X	400~420	4000~4200	243~267	3050~3350	251~275	3150~3450	30.4~33.6	3.8~4.2
SFW-5XH	395~415	3950~4150	263~287	3300~3600	271~295	3400~3700	30.4~32.8	3.8~4.1
SFW-5N	420~440	4200~4400	215~239	2700~3000	219~243	2750~3050	32.8~36.0	4.1~4.5
SFW-5H	380~400	3800~4000	275~299	3450~3750	303~327	3800~4100	28.0~31.2	3.5~3.9
SFW-5E	355~375	3550~3750	267~291	3350~3650	354~378	4450~4750	24.8~27.2	3.1~3.4
SFW-6X	405~425	4050~4250	271~295	3400~3700	279~303	3500~3800	31.2~34.4	3.9~4.3
SFW-6E	370~390	3700~3900	279~303	3500~3800	382~406	4800~5100	25.6~28.8	3.2~3.6
SFW-6B	410~430	4000~4200	291~315	3650~3950	306~330	3850~4150	32.0~35.2	4.0~4.4
SFW-6H	390~410	3900~4100	291~315	3650~3950	346~370	4350~4650	29.6~32.0	3.7~4.0
SFW-6N	430~450	4300~4500	247~271	3100~3400	251~275	3150~3450	35.2~38.4	4.4~4.8
SFW-7BE	410~430	4100~4300	302~326	3800~4100	382~406	4800~5100	32.8~36.0	4.1~4.5
SFW-7NH	430~450	4300~4500	315~339	3950~4250	338~362	4250~4550	36.0~39.2	4.5~4.9
SFW-7X	440~460	4400~4600	259~283	3250~3550	271~295	3400~3700	36.0~39.2	4.5~4.9

Remark:
 Grades of "SFI" series are made by dry isotropic process
 Grades of "SFD" series are made by dry anisotropic process
 Grades of "SFW" series are made by wet anisotropic process

8 | AlNiCo Magnet 알리코자석

▶ 특징

- √ Al, Ni, Co, Fe를 주성분으로 온도 안정성이 가장 높음
- √ 높은 자속밀도에 비해 보자력이 약함
- √ 취성은 낮고 경도는 높음

▶ 용도

- √ 스피커
- √ 마이크 폰
- √ 전화기
- √ 마이크로모터 (Micromotor)
- √ 측정 장비(전압계, 전류계, 속도계, 적산전력계)
- √ CRT(음극선관)
- √ Magnetron
- √ 각종 Lifting Magnet
- √ Separator
- √ Filter
- √ 방산용 통신장비
- √ CT
- √ MRI



Typical Magnetic Properties of Cast AlNiCo Magnet												
Grade	Remanence		Coercive Force		Max Energy Product		Curie Temp.	Max. Working Temp.	Rever. Temp. Coeff.		Remark	
	Br		Hc		(BH)max		Tc	Tw	α(Br)	β(Hc)	Equivalent	
	mT	Gs	kA/m	Oe	kJ/m ³	MGOe	°C	°C	%/°C	%/°C		
LN9	690	900	37	465	10	1.25	810	450	-0.03	-0.02	AlNiCo1	Isotropic
LN10	600	6000	40	500	9.5	1.2	810	450	-0.03	-0.02	AlNiCo3	
LNG12	700	7000	45	565	12	1.5	810	450	-0.03	0.02	AlNiCo2	
LNG13	680	6800	48	600	12	1.5	810	450	-0.03	0.02	AlNiCo2	
LNG16	800	8000	53	665	16	2	860	525	-0.02	0.02	AlNiCo4	
LNG18	900	9000	48	600	18	2.25	860	525	-0.02	0.02	AlNiCo4	
LNGT18	580	5800	90	1130	18	2.2	860	550	-0.025	0.02	AlNiCo8	
LNG34	1200	12000	44	550	35	4.4	860	525	-0.02	0.02	AlNiCo5C	
LNG37	1200	12000	48	600	37	4.65	860	525	-0.02	0.02	AlNiCo5	Anisotropic
LNG40	1250	12500	48	600	40	5	860	525	-0.02	0.02	AlNiCo5	
LNG44	1250	12500	52	650	44	5.5	860	525	-0.02	0.02	AlNiCo5	
LNG52	1300	13000	55	690	52	6.5	860	525	-0.02	0.02	AlNiCo5DG	
LNG56	1300	13000	58	730	56	7	860	525	-0.02	0.02	AlNiCo5-7	
LNG60	1330	13300	60	750	60	7.5	860	525	-0.02	0.02	AlNiCo5-7	
LNGT28	1050	10500	56	700	28	3.5	860	525	-0.025	0.03	AlNiCo6	
LNGT30	1100	11000	56	700	30	3.75	860	525	-0.025	0.02	AlNiCo6	
LNGT32	800	8000	100	1260	34	4.25	860	550	-0.025	0.02	AlNiCo8	
LNGT38	820	8200	110	1380	38	4.75	860	550	-0.025	0.02	AlNiCo8	
LNGT44	850	8500	120	1510	44	5.5	860	550	-0.025	0.02	AlNiCo8	
LNGT48	900	9000	120	1510	48	6	860	550	-0.025	0.02	AlNiCo8	
LNGT60	950	9500	110	1380	60	7.5	860	550	-0.025	0.02	AlNiCo9	
LNGT72	1050	10500	112	1410	72	9	860	550	-0.025	0.02	AlNiCo9	
LNGT88	1100	11000	115	1445	88	11	860	550	-0.025	0.02	AlNiCo9	
LNGT36J	700	7000	140	1760	36	4.5	860	550	-0.025	0.02	AlNiCo8HC	
LNGT52J	900	9000	140	1760	52	6.5	860	550	-0.025	0.02	AlNiCo8HC	

Typical Magnetic Properties of Sintered AlNiCo Magnet												
Grade	Remanence		Coercive Force		Max Energy Product		Curie Temp.	Max. Working Temp.	Rever. Temp. Coeff.		Remark	
	Br		Hc		(BH)max		Tc	Tw	α(Br)	β(Hc)	Equivalent	
	mT	Gs	kA/m	Oe	kJ/m ³	MGOe	°C	°C	%/°C	%/°C		
FLN8	550	5500	40	500	9	1.13	760	450	-0.02	-0.02	S.AINiCo3	Isotropic
FLNG12	700	7000	45	565	12.4	1.55	810	450	-0.014	0.02	S.AINiCo2	
FLNGT18	600	6000	95	1200	18	2.2	860	550	-0.02	0.02	S.AINiCo8	
FLNG34	1100	11000	50	630	34	4.25	860	525	-0.016	0.02	S.AINiCo5	Anisotropic
FLNG37	1250	12500	50	630	37	4.62	860	525	-0.016	0.02	S.AINiCo5	
FLNGT28	1000	10000	60	750	28	3.5	860	525	-0.02	0.03	S.AINiCo6	
FLNGT38	800	8000	120	1540	38	4.75	860	550	-0.02	0.02	S.AINiCo8	
FLNGT42	880	8800	120	1510	42	5.25	860	550	-0.02	0.02	S.AINiCo8	
FLNGT33J	680	6300	140	1760	33	4.1	860	550	-0.025	0.02	S.AINiCo8HC	
FLNGT38J	730	7300	150	1880	38	4.75	860	550	-0.025	0.02	S.AINiCo8HC	

Remark: All the data listed in the table are measured as per standard IEC60404-5:1995

Other Physical Character of AlNiCo Magnets										
Grade	Density	Tensile Strength	Transverse Modulus of Rupture	Hardness	Specific Electric Resistance (at 25°C)	Specific Heat	Specific Thermal Conductivity	Coefficient Of Thermal Expansion	Saturation Field Strength	
	g/cm ³	N/mm ²	N/mm ²	HRC	μΩ.cm	J/(kg.k)	W/m.k	10 ⁻⁶ /k	kA/M	
Cast AlNiCo	6.9-7.3	20-160	50-310	45-55	45-75	350-450	10-100	13-14	180-750	
Sintered AlNiCo	6.8-7.0	350-450	380-690	45-50	50-70	350-450	10-100	11-13	180-750	

9 | Injection Moulded SmCo Magnet 사마륨사출자석

▶ 특징

- √ 간단한 형상에서 다른 부품과 결합하는 등의 복잡한 형상까지 다양한 형태로 생산가능
- √ 다극착자가 용이하며 우수한 내식성 / 페라이트 사출자석에 비해 높은 자기특성

▶ 용도

- √ 자동차용 모터 자석
- √ TAS(Torque & Angle Sensor)
- √ SAS(Steering Angle Sensor)
- √ Seat Slide Motor
- √ ACV(Air Control Value)
- √ EGR(Exhaust Gas Recirculation) Valve
- √ VSAV(Variable Swirl Control Actuator) Seat belt Sensor
- √ Robot Position Sensor
- √ 가전 산업용 Motor 용



Magnetic Property of Injection SmCo Magnet

Material Grade			BSI-3	BSI-7	BSI-7A	BSI-9	BSI-6
Used Binder			PA12	PA12	PA12	PA12	PPS
Anisotropy or Isotropy			Isotropy		Anisotropy		
Remanence	Br	kGs	3.0~4.0	5.5~6.8	5.7~6.0	6.2~6.5	5.0~5.5
		mT	300~400	550~680	570~600	620~650	500~550
Coercivity	Hc	kOe	2.5~3.5	4.2~5.8	4.1~4.6	4.8~5.2	4.1~4.3
		kA/m	200~280	334~462	330~470	380~415	325~345
	Hcj	kOe	9.0~15.0	9.0~15.0	8.5~11.0	8.5~11.0	8.5~11.0
		kA/m	716~1194	716~1194	675~875	675~875	675~875
Max. Energy Product	(BH)max	MGOe	2.5~3.5	6.0~8.0	6.5~7.5	8.5~9.5	5.5~6.5
		kJ/m ³	20~28	48~64	52~60	68~76	44~52
Temperature Coefficient	$\alpha(Br)$	%/°C	-0.04	-0.04	-0.04	-0.04	-0.04
Max. Working Temperature	T _w	°C	120	120	120	120	180
Recoil Permeability	μ_{rec}	/	1.1	1.1	1.1	1.1	1.1

Other Physical Property of Injection SmCo Magnet

Tensile Strength	MPa	33~37	33~37	33~37	33~37	33~37
Flexural Strength	MPa	70~74	70~74	70~74	70~74	70~74
Young's Modulus	MPa	16000	16000	16000	16000	25000
Hardness	HRM	70~80	70~80	100~110	70~80	100~110
Density	g/cm ³	4.0~5.0	5.0~6.0	5.0~6.0	5.0~6.0	5.0~6.0
Electric Resistivity	$\mu\Omega \cdot m$	130	130	130	130	130
Thermal Expansion Coefficient	10 ⁻⁶ /°C	25~30	25~30	25~30	25~30	10~15

10 | Injection Moulded Ferrite Magnet 페라이트사출자석

▶ 특징

- √ Ferrite 분말과 Plastic Resin 을 혼합하여 만든 자석
- √ 다른 부품과 결합하는 등의 복잡한 형상까지 다양한 형태로 생산 가능
- √ 다극착자가 용이하며 비교적 낮은 가격, 우수한 내식성으로 표면처리 불필요
- √ 온도 안정성 낮음

▶ 용도

- √ 냉장고, 에어컨, 세탁기, VTR등의 Fan-Motor용
- √ 각종 센서 및 게이지



Magnetic Property of Injection Ferrite Magnet

Magnetic Property of Injection Ferrite Magnet														
Material Grade		Unit	BFI02A	BFI12A	BFI15A	BFI16A	BFI06B	BFI10B	BFI12B	BFI13B	BFI14B	BFI15B	BFI16B	BFI13C
Binder			PA12					PA6					PPS	
Isotropy or Anisotropy			Isotropy	Anisotropy			Isotropy	Anisotropy			Aniso.			
Remanence	Br	kGs	1.05 ~1.25	2.40 ~2.60	2.55 ~2.75	2.75 ~2.95	1.75 ~1.95	2.35 ~2.55	2.4 ~2.6	2.45 ~2.65	2.6 ~2.8	2.65 ~2.85	2.75 ~2.95	2.5 ~2.7
		mT	105 ~125	240 ~260	255 ~275	275 ~295	175 ~195	235 ~255	240 ~260	245 ~265	260 ~280	265 ~285	275 ~295	250 ~270
Coercivity	Hc	kOe	0.9 ~1.1	2.25 ~2.45	2.3 ~2.5	2.35 ~2.55	1.5 ~1.7	2.0 ~2.2	2.2 ~2.4	2.25 ~2.45	2.3 ~2.5	2.35 ~2.55	2.4 ~2.6	2.15 ~2.35
		kA/m	72 ~88	179 ~195	183 ~199	187 ~203	119 ~135	159 ~175	175 ~191	179 ~195	183 ~199	187 ~203	191 ~207	171 ~187
	Hcj	kOe	2.45 ~2.65	2.7 ~2.9	2.9 ~3.1	2.9 ~3.1	2.8 ~3.0	2.75 ~2.95	2.7 ~2.9	2.8 ~3.0	2.9 ~3.1	2.9 ~3.1	2.85 ~3.05	2.75 ~2.95
		kA/m	195 ~211	215 ~231	231 ~247	231 ~247	223 ~239	219 ~235	215 ~231	223 ~239	231 ~247	231 ~247	227 ~243	219 ~235
Max. Energy Product	(BH)max	MGOe	0.15 ~0.45	1.4 ~1.7	1.7 ~2.0	1.9 ~2.2	0.65 ~0.95	1.3 ~1.6	1.4 ~1.7	1.5 ~1.8	1.6 ~1.9	1.75 ~2.05	1.9 ~2.2	1.50 ~1.80
		kJ/m ³	1.2 ~3.6	11.2 ~13.6	13.6 ~16.0	15.2 ~17.6	5.2 ~7.6	10.4 ~12.8	11.2 ~13.6	12.0 ~14.4	12.8 ~15.2	14.0 ~16.4	15.2 ~17.6	12.0 ~14.4
Temperature Coefficient	α (Br)	%/°C	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19
	β (Hcj)	%/°C	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30

Other Physical Property of Injection Ferrite Magnet

Tensile strength	MPa	40	40	40	35	N.A.	60	60	50	50	45	40	40
Density	g/cm ³	2.9	3.5	3.6	3.7	3.2	3.4	3.4	3.5	3.5	3.6	3.7	3.6
Hardness	Shore D	80 ~90	80 ~90	80 ~90	80 ~90	80 ~90	80 ~90	80 ~90	80 ~90	80 ~90	80 ~90	80 ~90	80 ~90
Working Temperature Range	°C	-40 ~100	-40 ~100	-40 ~100	-40 ~100	-40 ~120	-40 ~120	-40 ~120	-40 ~120	-40 ~120	-40 ~120	-40 ~120	-40 ~200
Curie Temperature	°C	450	450	450	450	450	450	450	450	450	450	450	450
Melting Flow Rate (270°Cx5kg)	g/10min.	200	50	N.A.	N.A.	N.A.	120	120	110	110	110	100	40
Molding Shrinkage Coefficient	%	0.7	0.5	0.5	0.5	N.A.	0.6	0.6	0.6	0.6	0.5	0.5	0.4

11 | Flexible NdFeB Magnet

Nd 러버

▶ 특징

- √ 페라이트 러버 자석의 연성 및 탄성은 물론 Nd자석의 높은 자기특성을 포함
- √ 필요 자력세기에 따라 이방성, 등방성으로 구분
- √ 기존 페라이트 러버 자석의 부족한 특성 보완

▶ 용도

- √ 중소형 모터 및 평면스피커용



Magnetic Property of Flexible NdFeB Magnet

Material Grade			BNF2	BNF3	BNF4	BNF5	BNF2T	BNF3T	BNF4T	BNF5T	BNF6T	BNF7T	BNF8T
Binder			NBR										
Remanence	Br	kGs	2.5 ~3.5	3.5 ~4.5	4.5 ~5.5	5.5 ~6.5	2.5 ~3.5	3.3 ~4.3	3.8 ~4.8	4.3 ~5.3	4.8 ~5.8	5.3 ~6.3	5.7 ~6.7
		mT	250~ 350	350~ 450	450~ 550	550~ 650	250~ 350	330~ 430	380~ 480	430~ 530	480~ 580	530~ 630	570~ 670
Coercivity	Hc	kOe	1.5 ~2.5	2.1 ~3.5	2.5 ~3.5	2.5 ~3.5	1.5 ~2.5	2.1 ~3.1	2.7 ~3.7	3.2 ~4.2	3.7 ~4.7	4.3 ~5.3	4.5 ~5.5
		kA/m	120~ 200	170~ 250	200~ 280	200~ 280	120~ 200	170~ 250	210~ 300	250~ 340	290~ 380	340~ 420	350~ 440
	Hcj	kOe	2.0 ~4.0	3.5 ~5.5	4.5 ~5.5	4.5 ~5.5	2.0 ~4.0	4.8 ~6.8	6.8 ~8.8	7.8 ~9.8	8.0 ~10.0	8.5 ~11.0	8.5 ~11.0
		kA/m	150~ 320	280~ 440	350~ 440	350~ 440	150~ 320	380~ 540	540~ 700	620~ 780	630~ 800	670~ 880	670~ 880
Max. Energy Product	(BH) max	MGOe	1.5 ~2.5	2.5 ~3.5	3.5 ~4.5	4.5 ~5.5	1.5 ~2.5	2.5 ~3.5	3.5 ~4.5	4.5 ~5.5	5.5 ~6.5	6.5 ~7.5	7.5 ~8.5
		kJ/M ³	15 ~20	20 ~28	28 ~36	36 ~44	15 ~20	20 ~28	28 ~36	36 ~44	4 4~52	52 ~60	60 ~68
Temp. Coefficient	α(Br)	%/°C	-0.16	-0.16	-0.17	-0.17	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11
Max. Working Temp.	Tmax	°C	100	100	100	100	120	120	120	120	120	120	120

Other Physical Property of Flexible NdFeB Magnet

Density	g/cm ³	3.5 ~4.1	4.1 ~4.7	4.5 ~5.1	4.9 ~5.5	3.3 ~3.9	4.0 ~4.6	4.4 ~5.0	4.7 ~5.3	4.7 ~5.3	4.8 ~5.4	5.1 ~5.7
Tensile Strength	Mpa	> 3										
Elongation	%	30~80										
Hardness	Shore D	30~80 adjustable according to customer's request										
Weight Reduction By Heat	%	< 1.0										

Reliability

	Heat Resistant	Cold Resistant	Moisture Resistant	Motor Oil Resistant	Salty Water	Thermal Shock
Test Condition	100°C*72h	-40°Cx72h	60°Cx90%RHx72h	23°Cx72h	23°Cx5%*x24h	-40°C~85°Cx1hx24rounds/circle
Result	Good	Excellent	Good	Good	Good	Good

12 | Flexible Ferrite Magnet 페라이트 러버

▶ 특징

- √ 연성 및 탄성이 뛰어나며 다양한 형상 가공이 용이함
- √ 형상에 따라 Sheet-Type, Roll-Type 등이 있으며 필요한 폭, 길이, 두께로 생산 가능

▶ 용도

- √ 광고용 판촉물, Display용 DY 및 ITC 보정용, OA 기기 센서, 냉장고 Door 등



Chemical Property of Flexible Ferrite Magnet									
	Hydraulic Oil	Alcohol	Weak Alkali	Detergent	30%Benzene+70%Gasoline	Organic Acid	Inorganic Acid	Ketones, Aether	Diluter
NBR Binder	Excellent	Excellent	Excellent	Excellent	Bad	Bad	Bad	Bad	Bad
CPE Binder	Fair	Good	Good	Good	Bad	Bad	Bad	Bad	Bad

*Test condition of all are at 23°C for 72hours

Reliability of Flexible Ferrite Magnet							
	Normal Water	Salty Water	Burn Resistance	Heat-Resistance	Cold-Resistance	Wet-Resistance	Thermal Shock Resistance
Test Condition	60°Cx72h	23°C x 5% x 72h	UL94	100°Cx72h	-40°Cx72h	60°C x 90%RH x 72h	-40°C~85°C x 1h x 24rounds/circle
NBR Binder	Excellent	Good	Fail	Excellent	Excellent	Excellent	Excellent
CPE Binder	Excellent	Good	V-0	Good	Excellent	Good	Good

Comparison Table of Flexible Ferrite Magnet With Different Binder										
	Remanence	Intrinsic Coercivity	Flexibility	Physical Stability	Magnetic Stability	Anti Corrosion	Working Temperature	Producing Feasibility	Anti-Shock of Temperature	Cost
NBR Binder	Fair	High	Fair	Fair	Excellent	Excellent	-40 ~ +100 °C	Fair	Excellent	High
CPE Binder	High	Fair	Good	Good	Good	Fair	-40 ~ +85 °C	Good	Good	Fair

Magnetic Property of Flexible Ferrite Magnet

Magnetic Property of Flexible Ferrite Magnet													
Material Grade		Unit	BFF8	BFF9	BFF11	BFF12	BFF13A	BFF13B	BFF13H	BFF14	BFF13NA	BFF13NB	BFF13NH
Binder			CPE									NBR	Halogen Free NBR
Remanence	Br	kGs	1.75 ~2.00	2.00 ~2.20	2.20 ~2.45	2.40 ~2.55	2.40 ~2.60	2.50 ~2.70	2.50 ~2.70	2.55 ~2.75	2.40 ~2.60	2.40 ~2.60	2.45 ~2.65
		mT	175~200	200~220	220~245	240~260	250~270	250~270	255~275	255~275	240~260	240~260	240~265
Coercivity	Hc	kOe	1.35 ~1.90	1.60 ~1.90	1.70 ~2.10	1.95 ~2.20	2.15 ~2.45	2.10 ~2.40	2.10 ~2.40	2.10 ~2.40	2.15 ~2.45	2.15 ~2.50	2.10 ~2.40
		kA/m	107~151	127~151	135~167	155~175	171~195	167~191	167~191	167~191	171~195	171~199	167~195
	Hcj	kOe	1.75 ~2.40	2.00 ~2.70	2.30 ~2.80	2.20 ~2.70	2.80 ~3.50	2.30 ~2.60	2.60 ~3.00	2.30 ~2.60	2.80 ~3.50	2.80 ~3.80	2.70 ~3.50
		kA/m	193~191	159~215	183~223	175~215	223~279	183~207	207~239	183~207	223~279	223~303	215~279
Max. Energy Product	(BH) max	MGOe	0.75~1.06	0.95~1.20	1.20~1.50	1.40~1.55	1.45~1.65	1.50~1.75	1.50~1.75	1.55~1.75	1.45~1.65	1.45~1.65	1.50~1.70
		kJ/m ³	6.0~8.5	7.60~9.6	9.6~1.20	11.2~12.4	11.6~13.2	12.0~14.0	12.0~14.0	12.4~14.0	11.6~13.2	11.6~13.2	12.0~13.6
Temp. Coefficient	α (Br)	%/°C	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18
	β (Hcj)	%/°C	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30

Other Physical Property of Flexible Ferrite Magnet

Tensile strength	MPa	>3.5	>3.5	>3.5	>3.5	>3.5	>3.5	>3.5	>3.5	>3.5	>2.5	>2.5	>2.5
Elongation	%	>30	>30	>30	>30	>30	>30	>30	>30	>30	>20	>20	>20
Hardness	Shore D	30~50	30~50	30~50	30~50	30~50	30~50	30~50	45~65	30~50	30~45	30~50	30~50
Density	g/cm ³	3.50 ~3.65	3.50 ~3.65	3.55 ~3.70	3.60 ~3.75	3.65 ~3.80	3.60 ~3.80	3.60 ~3.80	3.60 ~3.80	3.65 ~3.80	3.50 ~3.70	3.50 ~3.70	3.50 ~3.70
Weight Reduction By Heat	%	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Curie Temperature	°C	450	450	450	450	450	450	450	450	450	450	450	450
Suggested Working Temp. Range	°C	-40~85	-40~85	-40~85	-40~85	-40~85	-40~85	-40~85	-40~85	-40~85	-40~100	-40~100	-40~100

13 | Magnet gear 마그넷 기어

▶ 특징

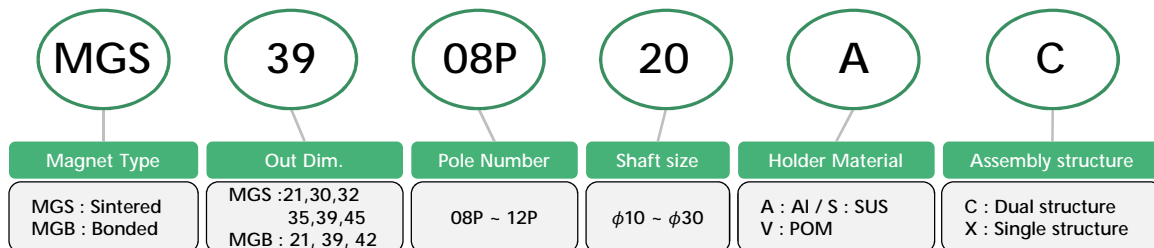
- √ 톱니가 없는 자석기어로 자력의 인력전달을 이용한 비접촉식 기어
- √ 비접촉방식으로 '발열 / 소음 / 마모 / 분진 / 진동'의 문제점 해소
- √ 다양한 체결 방식으로 제작가능
- √ 극수 조절로 세밀한 동력제어 및 진동 · 백레쉬 최소화 가능

▶ 용도

- √ Display, LCD, PDP, 유기EL, LED, PCB 등의 클린룸 생산라인 이동컨베이어용 기어
- √ 특수 세정기, 건조 설비라인



MaGear Model name Grant Standard



Magnet Gear - MGS / MGB Series				
Model Name	Torque (gap : 1mm)	Pole Number	Shaft	Application
Ultrahigh Property MGS4510P - ## AC	11	10	요청치수	Large Roller Conveyer
MGS4510P - ## AX	8	10		G7 ~ G11 Conveyer
MGS3908P - ## AC	8	8		G6 ~ G11 Conveyer
MGS3910P - ## AC	6.7	10		
MGS3912P - ## AC	6.0	12		
MGS3508P - ## AC	6	8		G5 ~ G11 Conveyer
MGS3508P - ## AX	4	8		G5 ~ G8 Conveyer
MGS3512P - ## AC	4.5	12		
MGS3208P - ## AC	4.1	8		
MGS3210P - ## AC	3.1	10		G5 ~ G8 Distribution Conveyer
MGS3208P - ## VC	4.1	8		
MGS3010P - ## AX	1.2	10		Small Distribution Conveyer PCB Line
MGS2106P - ## AX	1.1	6		
MGS2108P - ## AX	0.9	8		
MGB3908P - ## VX (Sleeve type)	5.1 ~ 5.5	8		G6 ~ G11 Distribution Conveyer
(Nd Bonded magnet) MGB3908P-20AX (Al Holder type)	4.5	8		G4 ~ G11 Conveyer

Nd Sintered & Bonded Magnet PHYSICAL PROPERTIES				
Description	Density (g/cm ³)	Breaking Strength	Vickers Hardness (Hv)	Flexural Strength (kgf/mm ²)
Sintered	7.5 ~ 7.6	◎	600	25
Bonded	5.5 ~ 6.0	△	-	5.3

Ex) Compressive breaking strength Test : 95kg (Test SPL - Nd Sintered Magnet φ30)

ANTICORROSION					
Description	Coating	Coating Surface Hardness	SST Salt Spray Test (35°C, NaCl 5wt%)	PCT Pressure Cooker Test (2atm, 125°C)	Anticorro sion
Sintered Magnet	Ni	Better	◎	◎	Better
	Epoxy	Poor	○	○	Good
Bonded Magnet	Epoxy (Only)	Poor	△	△	Poor



■ 소재지

- 본사 : 충북 청주시 청원구 오창읍 두릉유리로 836-18 / 초경환봉 · PL-M/G 생산 및 연구소
- 청주공장 : 청주시 흥덕구 산단로 180 / 영구자석 생산 및 연구소
- 석화공장 : 청주시 흥덕구 강내면 강내석화길 21-47 / 엔드밀 · 인서트 생산
- 북이공장 : 청주시 청원구 북이면 충청대로 1249 / 인서트 · 정밀사출품 생산
- 나노비나 : PLOT 12, KHAI QUANG INDUSTRY PARK, VINH YEN CITY, VINH PHUC PROVINCE

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