

# Magnet assembly for motors.



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# 1. About CCmagnetics



 [www.ccmagnetics.com](http://www.ccmagnetics.com)

CCmagnetics is a website owned by Beijing Ciyunda Technology Co., Ltd. Beijing Ciyunda Technology Co., Ltd. was established in July 2010.

Our company is a well-known bonded NdFeB manufacturer worldwide and its major business consists of bonded magnets, hot-pressed magnets, and Magnet transmission assembly, which are mainly sold to developed countries and areas, such as Japan, Korea, America, Europe and Taiwan, etc.

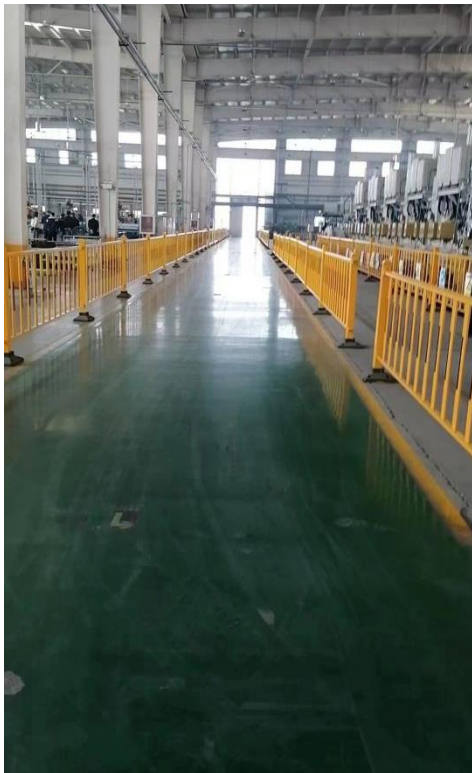
Main Products of CCmagnetics magnets:

1. Bonded NdFeB magnets & related assemblies;
2. Hot-pressed magnets & related assemblies;
3. Sintered magnets& related assemblies;
4. Magnet transmission assembly (magnetic gear & coupling);
5. Multistage ring magnets for magnetic encoders.

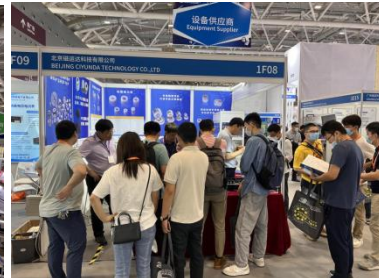
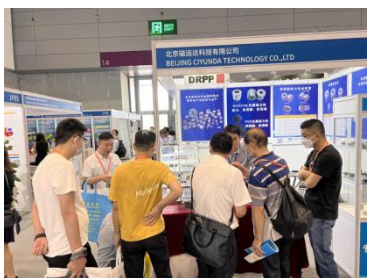
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## Production & Testing Equipment



## Offline Communication



## Product Application Areas



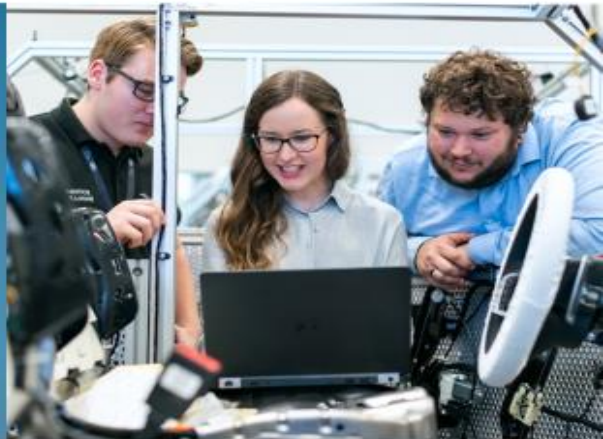
电机工具  
Power Tools



伺服电机  
Servo Motors



小型精密无刷电机  
Small-size Precise  
Brushless Motors



汽车电机  
Automotive Motors



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航空航天  
Aerospace Field



## 2. Hot-pressed NdFeB Magnet



**The hot-pressed NdFeB radiation ring is an anisotropic radiation ring formed by high-temperature compaction and extrusion deformation of rapidly quenched NdFeB magnetic powder.**



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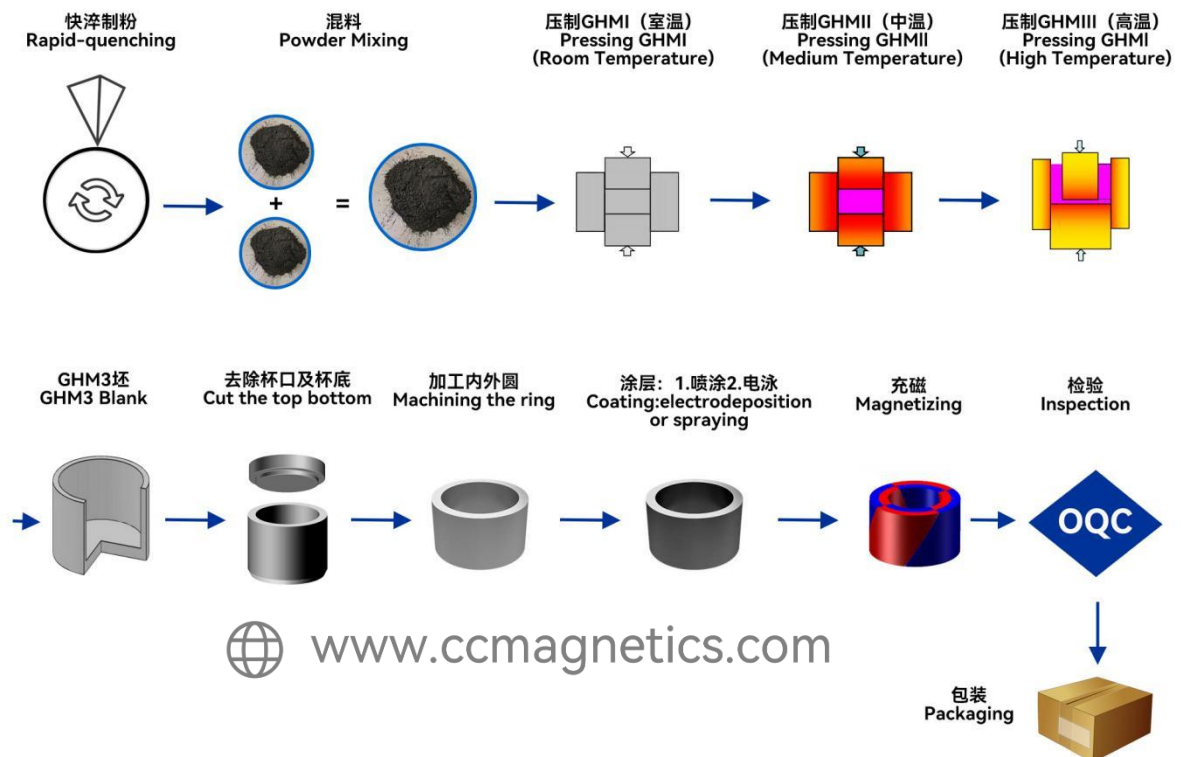
[Hot-pressed NdFeB magnets](#)'s characteristics as below:

1. High magnetic performance, with  $(BH)_{max}$  in magnet radial direction reaching  $342\text{kJ/m}^2$ .
2. The magnet ring is radially oriented with the uniform magnetic field, which can guarantee a silent motor operation and smooth torque output.
3. The magnet has high-temperature resistance, with the working temperature reaching  $180^\circ$ .
4. The magnetic pole number and skew angle of the magnet shall not be necessarily pre-designated at the pressing process, but changed by adjustment of the magnetization yoke, which can guarantee greater design freeness for customers.
5. The magnetic waveform of the magnet can be customized as a square wave or other special waveforms.
6. The magnet ring can eliminate the process of splicing into a circle. It can be magnetized for multi-poles, which gives motor assembly convenience.

7. The magnet is a Nano-crystalline structure with high density and ED coating with excellent corrosion resistance.

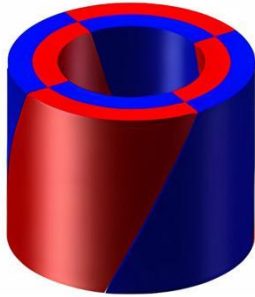
8. The magnet is mainly applied on many kinds of automotive motors, servo motors and brushless motors for power tools.

## Production Process

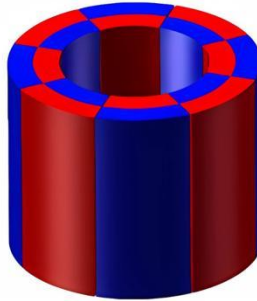


## Magnetization

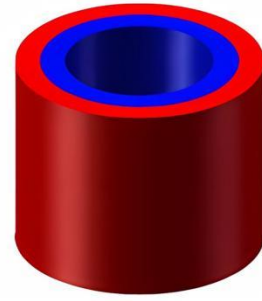
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多极斜充  
Skewed Magnetization

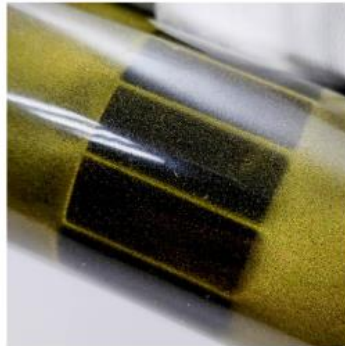


内外多极充  
Multi-pole Magnetization  
on O.D or I.D



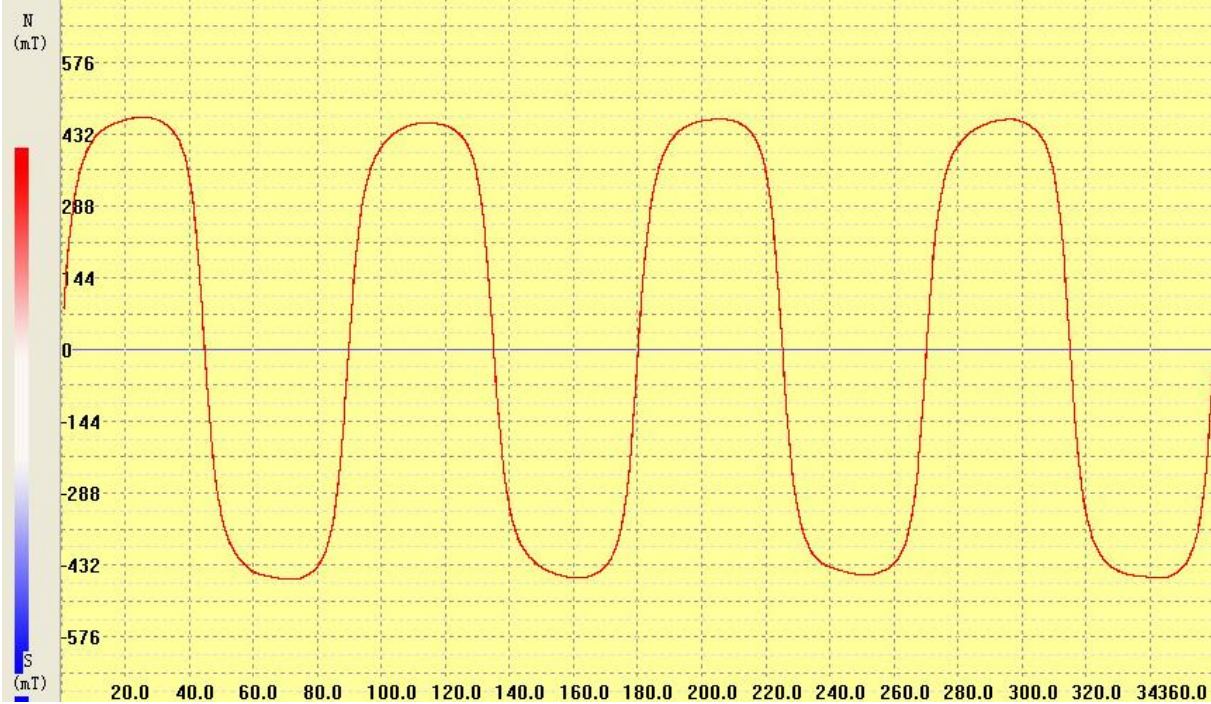
径向磁化  
Radially oriented  
Magnetization

## Sample of Magnetization



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### Applications of Hot-pressed NdFeB Magnet



Magnetic gears



Rotor magnets



Stator magnets

## Hot-pressed NdFeB Magnetic Properties

多级热压磁体参数 Multi-stage hot pressed magnets parameters									
Grade	Residual induction		Intrinsic Coercive		Coercive Force		Max.Energy Product		Operating
	Br		Hcj		Hcb		(BH)max		
	CGS(KG)	SI(T)	CGS(kOe)	SI(kA/m)	CGS(kOe)min	SI(kA/m)	CGS(MGOe)	SI(kJ/m3)	Temp.(°C)
MD-40M	12.6 ~ 13.3	1.26 ~ 1.33	11.1 ~ 12.5	885 ~ 995	13.0 ~ 16.0	1040 ~ 1280	38.0 ~ 42.0	300 ~ 335	100
MD-43M	12.9 ~ 13.6	1.29 ~ 1.36	11.4 ~ 12.7	910 ~ 1010	11.0 ~ 14.0	880 ~ 1120	40.0 ~ 44.0	320 ~ 350	100
MD-48M	13.8 ~ 14.4	1.38 ~ 1.44	10.5 ~ 12.5	835 ~ 995	10.0 ~ 13.5	800 ~ 1075	45.0 ~ 49.0	360 ~ 395	100
MD-35H	12.2-12.5	1.22-1.25	15.0-17.0	1200-1360	11.0-12.0	880-940	34.0-36.0	270-285	120
MD-38H	12.5-12.8	1.25-1.25	15.0-17.0	1200-1360	11.3-12.1	900-960	36.0-39.0	285-310	120
MD-40H	12.8-13.2	1.28-1.32	15.0-17.0	1200-1360	11.5-12.4	920-980	39.0-41.0	310-325	120
MD-42H	13.3-13.6	1.33-1.36	15.0-17.0	1200-1360	11.7-12.4	930-980	41.0-43.0	325-340	120
MD-45H	13.6-13.8	1.36-1.38	15.0-17.0	1200-1360	12.2-12.8	940-1020	43.0-45.0	342-358	120
MD-48H	13.8-14.0	1.38-1.40	15.0-17.0	1200-1360	12.8-13.3	1027-1059	46.0-48.0	367-383	120
MD-35SH	12.0-12.3	1.20-1.23	17.0-20.0	1360-1600	11.0-12.0	880-940	34.0-36.0	270-285	150
MD-38SH	12.3-12.6	1.23-1.26	17.0-20.0	1360-1600	11.2-12.2	885-970	37.0-39.0	295-310	150
MD-40SH	12.6-12.9	1.26-1.29	17.0-20.0	1360-1600	11.3-12.3	895-975	39.0-41.0	310-325	150
MD-42SH	12.9-13.2	1.29-1.32	17.0-20.0	1360-1600	12.0-12.4	955-985	40.0-42.0	326-342	150
MD-45SH	13.3-13.5	1.33-1.35	17.0-20.0	1360-1600	12.2-12.6	970-1020	43.0-45.0	342-358	150
MD-35UH	11.8-12.2	1.18-1.22	19.0-22.0	1520-1760	11.0-12.0	880-940	33.0-36.0	240-285	180
MD-38UH	12.2-12.5	1.22-1.25	19.0-22.1	1520-1761	11.4-12.0	908-955	36.0-38.0	287-303	180
MD-40UH	12.8-13.0	1.28-1.30	19.0-22.2	1520-1762	12.0-12.4	955-987	40.0-42.0	326-342	180

说明:热压钕铁硼磁体可以制成环形,并在径向上磁化任意数量的磁极,包括斜极磁化。  
Description: Hot-pressed NdFeB magnets can be made into rings and magnetized for any number of poles in the radial direction, including oblique pole magnetization.

## Processing Size and Accuracy

尺寸 (mm) Size (mm)	最小 Min	最大 Max
内外径比 I.D/O.D ratio	0.7	0.9
高度 Height	0.5	50
外径 O.D	10	50

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加工公差 (mm) Machining Tolerance (mm)	外径 O.D	内径 I.D	高度 Height	同心度 Concentricity	圆度 Roundness
加工后 After Machining	±0.03	±0.03	±0.1	0.03	0.03
电镀后 After Plating	±0.04	±0.04	±0.05	0.05	0.03

### 3. Bonded NdFeB Magnet Assemblies



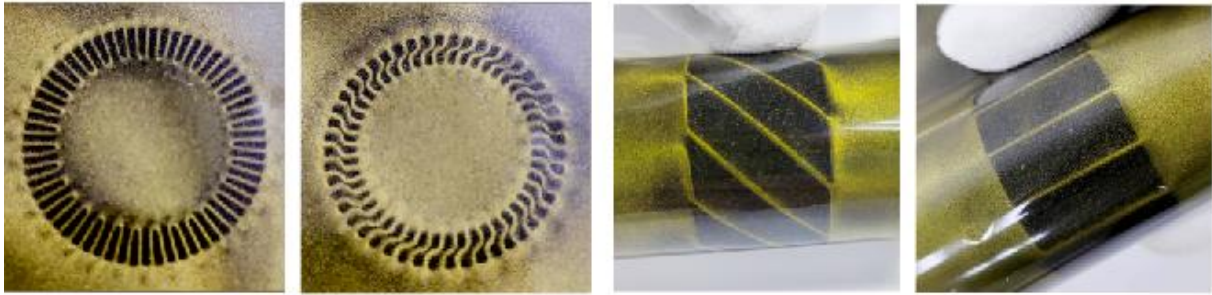
The bonded NdFeB magnet is produced by molding compression of the compound alloy powder mixed with epoxy resin. The characteristics are as follows:

1. Higher magnetic property: the magnetic property of bonded magnet is between sintered magnet and ferrite, with good magnetic property consistency and stability.
2. Freeness of product shape and high-precision dimension: the magnet shape and dimension are decided by the tooling, like ring, segment, block, etc., without further sintering and mechanical processing
3. Good corrosion resistance: after ED coating or through special surface treatment, the magnet can be workable under normal or unfavorable environmental conditions for a long period.
4. Diverse magnetization methods: mult-pole magnetization and skew angle magnetization are available, and the field distribution can be square, sinusoid, etc.
5. The bonded NdFeB magnet is suitable for mass production with high efficiency.

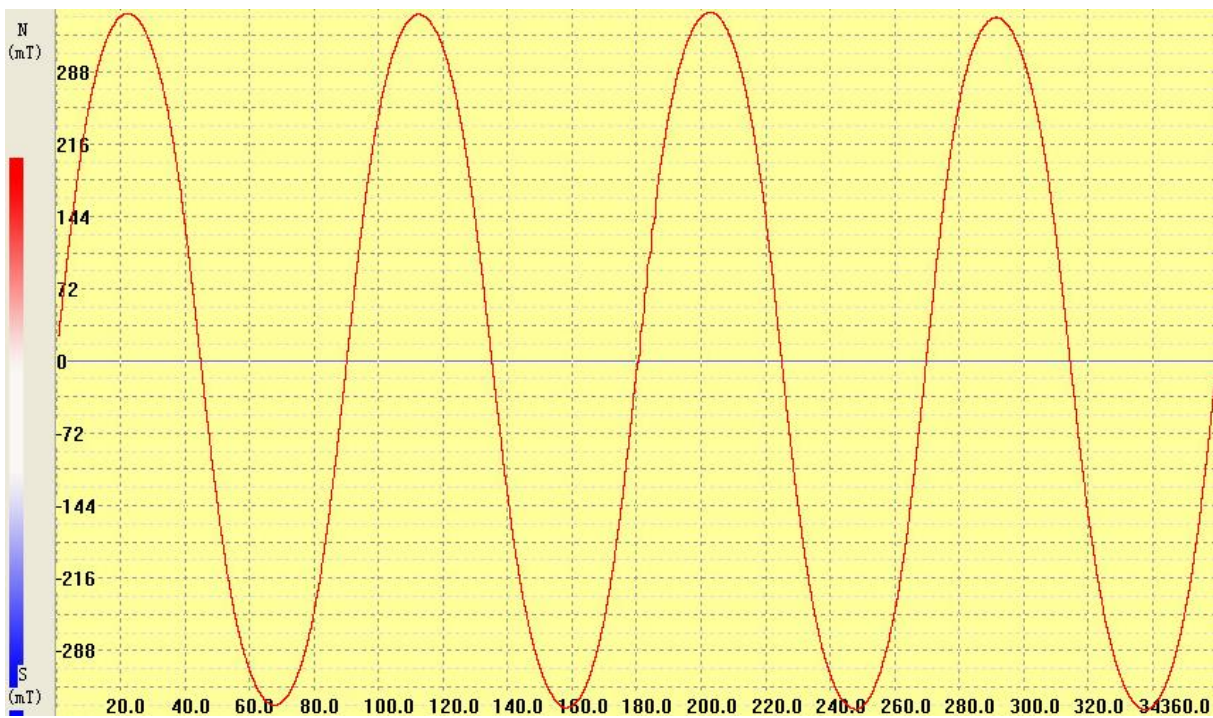
It is mainly used for all kinds of small and micro-motors, such as spindle motors, stepping motors, synchronous motors, DC motors, and brushless DC motors. It can replace parts of sintered magnets and finite ones, making motor assembling easier and more reliable, reducing costs, and improving efficiency.



## Examples of Magnetization



## Examples of Magnetization Waves [www.ccmagnetics.com](http://www.ccmagnetics.com)



## Applications of Bonded NdFeB Magnet



Magnetic couplings



Rotor magnets



Magnetic gears



## Bonded NdFeB Magnetic Properties

粘结钕铁硼环形磁体参数 Bonded NdFeB Ring Magnets Parameters												
Grade	Residual induction		Intrinsic Coercive		Coercive Force		Max.Energy Product		Tem. Coefficient	Tem. Coefficient	Curie	Operating
	Br		Hcj		Hcb		(BH)max					
	CGS(KG)	SI(T)	CGS(kOe)	SI(kA/m)	CGS(kOe) ) min	SI(kA/m)	CGS(MGOe)	SI(kJ/m3)	(Br)	(HCJ)	Temp. (°C)	Temp. (°C)
MQM-6	5.9-6.2	0.59-0.62	7.6-8.5	605-677	5	398	5.0-6.0	39.8-47.8	=-0.10%°C	=-0.40%°C	360	120
MQM-8	6.3-6.5	0.63-0.65	8.4-9.0	668-717	5.1	406	7.5-8.5	59.7-67.7	=-0.12%°C	=-0.42%°C	300	130
MQM-9	6.4-6.8	0.64-0.68	8.4-9.5	668-756	5.3	422	8.5-9.0	67.7-71.6	=-0.11%°C	=-0.39%°C	330	130
MQM-10	6.7-7.0	0.67-0.70	8.4-9.5	668-756	5.2	414	9.5-10	75.6-79.6	=-0.105%°C	=-0.40%°C	360	130
MQM-12	6.8-7.2	0.68-0.72	8.5-10	677-796	5.2	414	10.0-12.0	79.6-95.5	=-0.105%°C	=-0.40%°C	360	130
MQM-13	7.2-7.8	0.72-0.78	9.0-10	716-796	5.3	422	11.5-13.0	91.5-103.5	=-0.105%°C	=-0.40%°C	360	130
MQM-9ht	6.5-6.8	0.65-0.68	11.0-13.0	875-1035	5.0-5.5	398-438	9.0-9.5	71.6-75.6	=-0.10%°C	=-0.40%°C	420	150
MQM-8ht	6.3-6.5	0.63-0.65	12.0-14.0	955-1115	5.2-5.5	414-438	8.0-9.0	63.7-75.6	=-0.07%°C	=-0.40%°C	470	150
MQM-8L	6.3-6.5	0.63-0.65	7.6-8.5	605-677	5	398	7.5-8.5	59.7-67.7	=-0.12%°C	=-0.40%°C	280	120
MQM-10ht	6.7-7.0	0.67-0.70	11.0-13.0	875-1035	5.2-5.5	414-438	9.5-10.0	75.6-79.6	=-0.10%°C	=-0.40%°C	300	150
MQM-10L	7.2-7.6	0.72-0.76	7.0-8.0	557-637	5	398	9.5-11.0	75.6-87.6	=-0.12%°C	=-0.40%°C	280	120

### 4. Sintered NdFeB Magnets



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The magnetic material has a high coercivity force. Permanent magnetic material needs a strong external magnetic field when being magnetized, won't easily lose its magnetic properties after saturated magnetization, and can provide a stable magnetic field for exterior space.

## Example of Products

### Arc Magnets



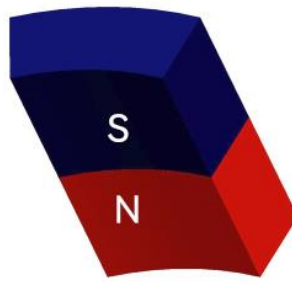
- Product plating: nickel, copper, nickel, zinc, chromium, gold, electrophoresis, etc.
- Product specifications: min-size 1mm\*0.5mm\*0.2mm, maximum 240mm\*240mm\*45mm
- Optional magnetizing direction:



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周长磁化  
Chord Magnetized Arc.

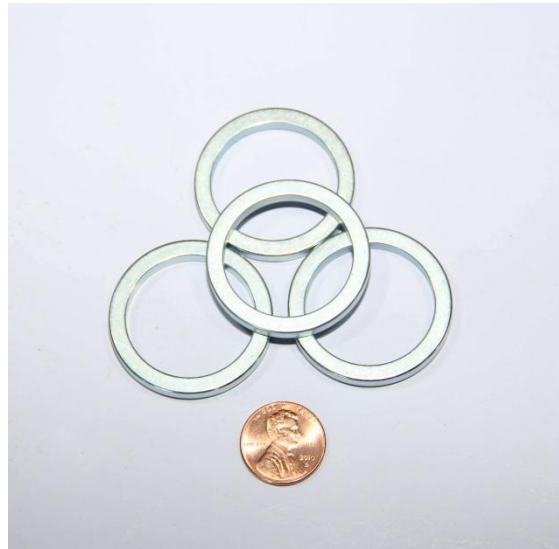


磁化厚度  
Axially Magnetized Arc.

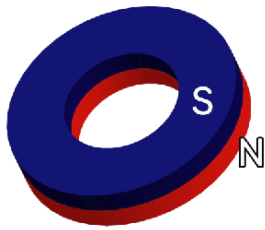


径向磁化  
Diametrically Magnetized Arc.

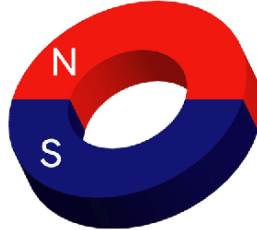
### Ring Magnets



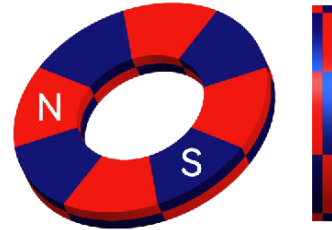
- Product plating: nickel, copper, nickel, zinc, chromium, gold, electrophoresis, etc.
- Product specifications: minimum D3mm\*D1mm\*2mm, maximum: D240mm\*D230\*45mm
- Optional magnetizing direction:



轴向磁化  
Axially Magnetized

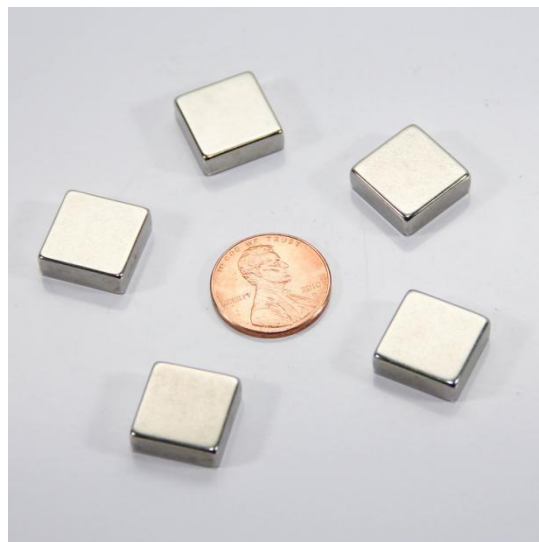


径向磁化  
Diametrically Magnetized

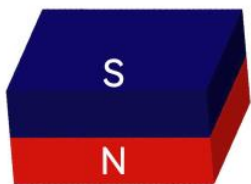


多极轴向  
Multi Axially Magnetized

## Block Magnets



- Product plating: nickel, copper, nickel, zinc, chromium, gold, electrophoresis, etc.
- Product specifications: minimum 1mm\*0.5mm\*0.2mm, maximum 240mm\*240mm\*45mm
- Optional magnetizing direction:



磁化厚度  
Magnetized Through Thickness



磁化长度  
Magnetized Through The Width



磁化高度  
Magnetized Through The Length

## Disk Magnets



- Product plating: nickel, copper, nickel, zinc, chromium, gold, electrophoresis, etc.
- Product specifications: minimum D1.5mm\*0.3mm, maximum D240mm\*45mm
- Optional magnetizing direction:

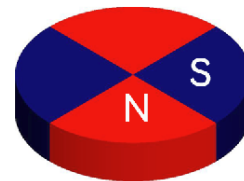
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轴向磁化  
Axially Magnetized

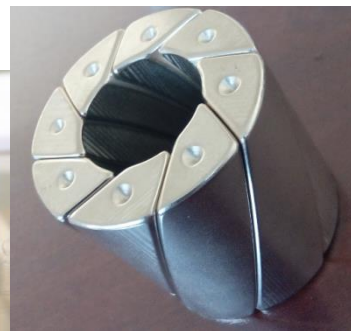
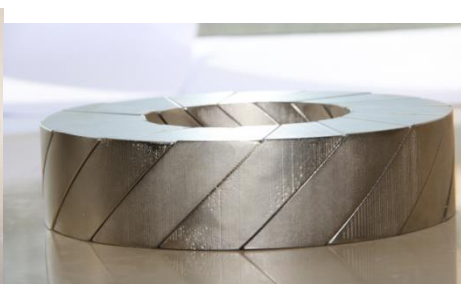


径向磁化  
Diametrically Magnetized



多极轴向  
Multi Axially Magnetized

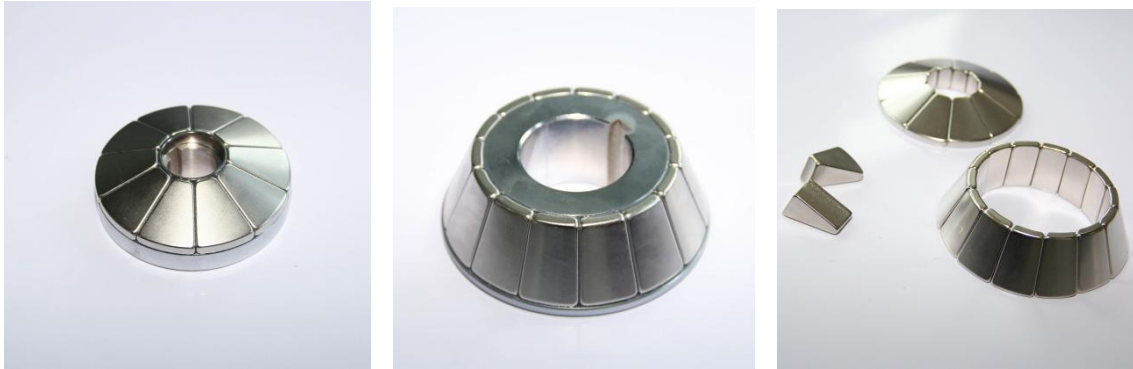
## Arc Segment Magnets for Motor



- Product plating: nickel, copper, nickel, zinc, chromium, gold, electrophoresis, etc.
- Product specifications: minimum 1mm\*0.5mm\*0.2mm, maximum 240mm\*240mm\*45mm
- Magnetization direction: optional.



## Arc Magnets for Motor



- Product plating: nickel, copper, nickel, zinc, chromium, gold, electrophoresis, etc.
- Product specifications: minimum 1mm\*0.5mm\*0.2mm, maximum 240mm\*240mm\*45mm
- Magnetization direction: optional.

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## Specially Shaped Magnet



- Product plating: nickel, copper, nickel, zinc, chromium, gold, electrophoresis, etc.
- Product Specifications: Optional.
- Magnetization direction: optional.

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# Sintered NdFeB Magnetic Properties

## Properties

Grade	Br		Hcb		Hcj		(BH) Max		Tw
	mT	kGs	kA/m	kOe	kA/m	kOe	kJ/m <sup>3</sup>	MGOe	°C
N35	1170-1220	11.7-12.2	> 868	> 10.9	> 955	> 12	263-287	33-36	< 80
N38	1220-1250	12.2-12.5	> 899	> 11.3	> 955	> 12	287-310	36-39	< 80
N40	1250-1280	12.5-12.8	> 907	> 11.4	> 955	> 12	302-326	38-41	< 80
N42	1280-1320	12.8-13.2	> 915	> 11.5	> 955	> 12	318-342	40-43	< 80
N48	1380-1420	13.8-14.2	> 923	> 11.6	> 955	> 12	366-390	46-49	< 80
N50	1400-1450	14.0-14.5	> 796	> 10.0	> 876	> 11	382-406	48-51	< 80
N52	1430-1480	14.3-14.8	> 796	> 10.0	> 876	> 11	398-422	50-53	< 80
35M	1170-1220	11.7-12.2	> 868	> 10.9	> 1114	> 14	263-287	33-36	< 100
38M	1220-1250	12.2-12.5	> 899	> 11.3	> 1114	> 14	287-310	36-39	< 100
40M	1250-1280	12.5-12.8	> 923	> 11.6	> 1114	> 14	302-326	38-41	< 100
42M	1280-1320	12.8-13.2	> 955	> 12.0	> 1114	> 14	318-342	40-43	< 100
48M	1360-1430	13.6-14.3	> 1027	> 12.9	> 1114	> 14	366-390	46-49	< 100
50M	1400-1450	14.0-14.5	> 1033	> 13.0	> 1114	> 14	382-406	48-51	< 100
33H	1130-1170	11.3-11.7	> 836	> 10.5	> 1353	> 17	247-271	31-34	< 120
35H	1170-1220	11.7-12.2	> 868	> 10.9	> 1353	> 17	263-287	33-36	< 120
38H	1220-1250	12.2-12.5	> 899	> 11.3	> 1353	> 17	287-310	36-39	< 120
40H	1250-1280	12.5-12.8	> 923	> 11.6	> 1353	> 17	302-326	38-41	< 120
42H	1280-1320	12.8-13.2	> 955	> 12.0	> 1353	> 17	318-342	40-43	< 120
45H	1300-1360	13.0-13.6	> 963	> 12.1	> 1353	> 17	326-358	43-46	< 120
48H	1370-1430	13.7-14.3	> 995	> 12.5	> 1353	> 17	366-390	46-49	< 120
30SH	1080-1130	10.8-11.3	> 804	> 10.1	> 1592	> 20	223-247	28-31	< 150
33SH	1130-1170	11.3-11.7	> 844	> 10.6	> 1592	> 20	247-271	31-34	< 150
35SH	1170-1220	11.7-12.2	> 876	> 11.0	> 1592	> 20	263-287	33-36	< 150
38SH	1220-1250	12.2-12.5	> 907	> 11.4	> 1592	> 20	287-310	36-39	< 150
40SH	1240-1280	12.5-12.8	> 939	> 11.8	> 1592	> 20	302-326	38-41	< 150
42SH	1280-1320	12.8-13.2	> 987	> 12.4	> 1592	> 20	318-342	40-43	< 150
45SH	1320-1380	13.2-13.8	> 1003	> 12.6	> 1592	> 20	342-366	43-46	< 150
28UH	1020-1080	10.2-10.8	> 764	> 9.6	> 1990	> 25	207-231	26-29	< 180
30UH	1080-1130	10.8-11.3	> 812	> 10.2	> 1990	> 25	223-247	28-31	< 180
33UH	1130-1170	11.3-11.7	> 852	> 10.7	> 1990	> 25	247-271	31-34	< 180
35UH	1180-1220	11.8-12.2	> 860	> 10.8	> 1990	> 25	263-287	33-36	< 180
38UH	1220-1250	12.2-12.5	> 876	> 11.0	> 1990	> 25	287-310	36-39	< 180
40UH	1250-1280	12.5-12.8	> 899	> 11.3	> 1990	> 25	302-326	38-41	< 180
28EH	1040-1090	10.4-10.9	> 780	> 9.8	> 2388	> 30	207-231	26-29	< 200
30EH	1080-1130	10.8-11.3	> 812	> 10.2	> 2388	> 30	223-247	28-31	< 200
33EH	1130-1170	11.3-11.7	> 836	> 10.5	> 2388	> 30	247-271	31-34	< 200
35EH	1170-1220	11.7-12.2	> 876	> 11.0	> 2388	> 30	263-287	33-36	< 200
38EH	1220-1250	12.2-12.5	> 899	> 11.3	> 2388	> 30	287-310	36-39	< 200
28AH	1040-1090	10.4-10.9	> 787	> 9.9	> 2624	> 33	207-231	26-29	< 230
30AH	1080-1130	10.8-11.3	> 819	> 10.3	> 2624	> 33	223-247	28-31	< 230
33AH	1130-1170	11.3-11.7	> 843	> 10.6	> 2624	> 33	247-271	31-34	< 230

## Physical Properties

一般物理性能 Physical properties			
参数	Parameter	单位Unit	标称值Standard Data
居里温度(Tc)	Curie Temperature	°C	310~380
最高工作温度(Tw)	Maxx mm Operating Temperature	°C	80~230
维氏硬度	Hardness	Hv	620
电阻率(P)	Electrical Resistivity	Ω.cm	1.8*10 <sup>-2</sup> ~2.0x10 <sup>-2</sup>
密度(D)	Density	g/cm <sup>3</sup>	7.45~7.65
回复磁导率(Hrec)	Recoil Permeability		1.02~1.05
剩磁温度系数(Q)	Temp.Coefficient of Br	%/°C	-0.11~-0.12
内禀矫顽力温度系数(m)	Temp.Coefficient of Hci	%/°C	-0.5~-0.6
饱和磁化	Saturation Field Strength	KOe KA/m	30-40 2400-3200
抗拉强度	Tensile Strength	Mpa	80
比热容	Specfic Heat	Kj.kg.°C	0.502
杨氏模量	Young".Modulus	N/m <sup>2</sup>	0.16*10 <sup>11</sup>
泊松比率	Possi on".Ratio		0.24
热膨胀系数	Coeff.of Thermal Expansion	/°C	4x10 <sup>-6</sup>
热导率	Thermal Conductivity	W/m.k	8.9551
压缩系数	Compressibility	m <sup>2</sup> /N	9.8*10 <sup>-11</sup>
抗压强度	Compressive strength	Mpa	1050
热膨胀系数(c/)	Coefficient of thermalexpansion	10 <sup>-6</sup> /k	6.5
热膨胀系数(c	Coefficient of thermal ex pansion	10 <sup>-6</sup> /k	-1.5
抗弯强度	Be rding Strength	Mpa	295~345
弹性模量	Modulus of El as it i city	N/mm <sup>2</sup>	1.6x10 <sup>3</sup>
断裂韧性	fracture toughness	Mpa.m	2.5--5

## 5. Touch Us:

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