



PHONE IN GROUP

2024

www.phoneingroup.com

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01

Group Overview

- Group Introduction
- Development History
- Service Locations

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Group Introduction

Phone In Group, originally established as LI RAY Company in 1983, has been dedicated to the magnetic materials industry. In 1990, the company began collaborating with manufacturers in mainland China for magnetic materials, and in 1999, Phone In Mag-Electronics Co., Ltd. was established. The Phone In Group has invested in and established factories in Dongguan, Suzhou, Xinyang, and Ningbo, China. In 2023, Phone In Mag-Electronics Co., Ltd. (BVI) established a branch in Taiwan and a factory in Vietnam, with the goal of becoming a publicly listed company.

Thanks to the efforts of all employees and the exceptional leadership of the company, Phone In Group has established production and sales bases in China, Taiwan, Vietnam, and San Francisco, expanding its global magnetic materials business comprehensively.

Phone In Group has developed into a supplier for world-class brands in smartphones, 3C products, wearable devices, new energy electric vehicles, and motor manufacturers. Its quality has reached world-class advanced standards, with a reputation for excellent quality, competitive pricing, fast delivery times, advanced magnetic performance, and processing research and development technology, as well as automated magnetic component assembly capabilities.

Group Overview

Establishment Date

December 1999

Global Employees

- 600 (China)
- 20 (Taiwan)
- 50 (Vietnam)
- 5 (USA)

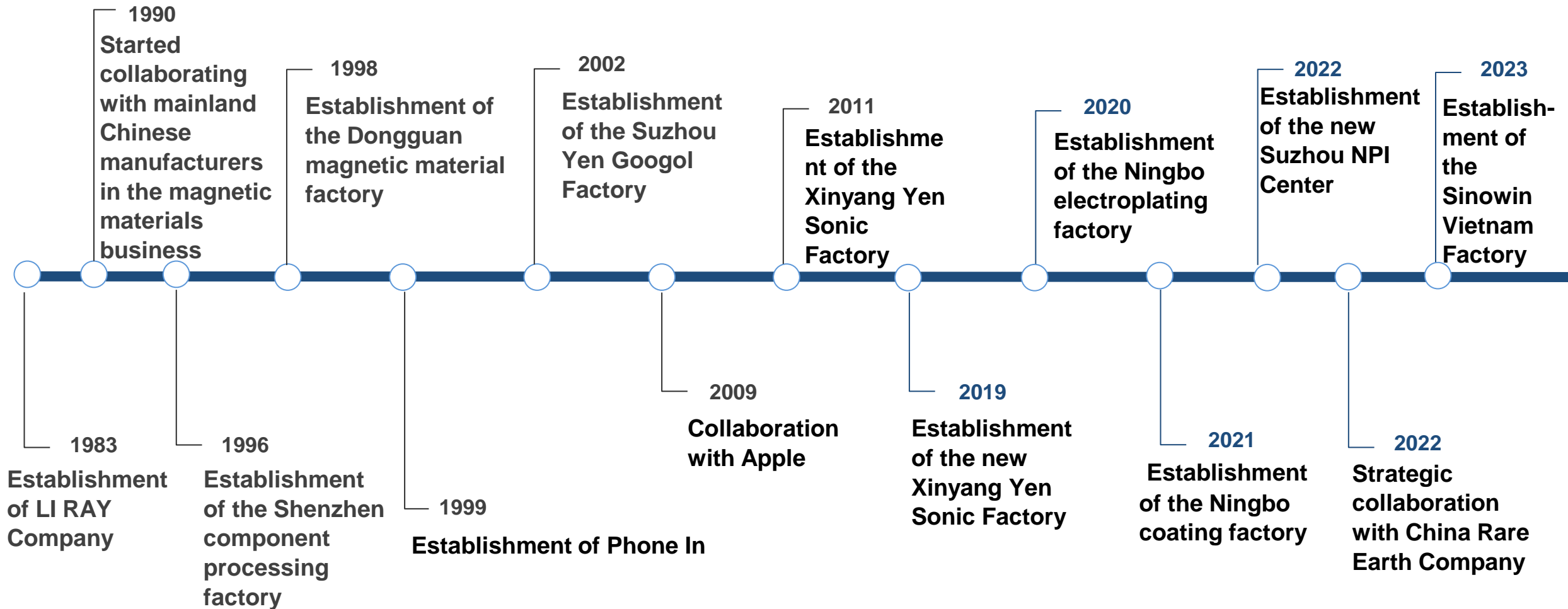
Factory Locations

- 4 Factories (Xinyang, Dongguan, Ningbo, Vietnam)
- 1 NPI Center (Suzhou)

Capital

\$30 Million USD

Development History



Locations



**Ningbo
Factory**



**Taipei
Head office**



**San Francisco
Office**



**Vietnam
Factory**



▲ Dongguan Branch



Xinyang Factory



**Suzhou
NPI
Center**



✦ **Vietnam**

Sinowin Industrial
(Vietnam) Co., Ltd.

✦ **USA**

San Francisco
Office

✦ **Taiwan**

Phone In Mag-Electronics Co., Ltd. Taiwan Branch

✦ **China**

Xinyang Yen Sonic Technology Co., Ltd.
(Xinyang Factory)

Xinyang Yen Sonic – Dongguan Branch
Suzhou Yen Googol Electronics Co., Ltd.
(NPI Center)

Phone In Mag-Electronics Co., Ltd.
(Ningbo Factory)

Xinyang Factory

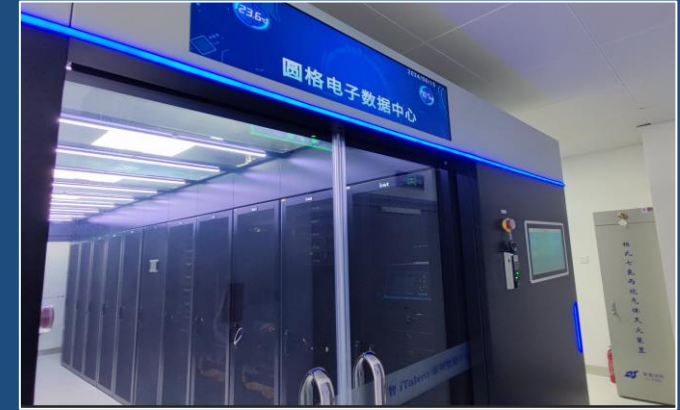
Certified by Apple and third-party SR Social Responsibility.
Certified with ISO 9001/14001, IATF 16949, UL ECVP 2809-2.



- **Address:** No. 6, G4 Connection Line, High-tech Industrial Development Zone, Xinyang City, Henan Province
- **Total Land Area:** 76,000 square meters
- **Total Building Area:** 57,000 square meters

Suzhou (NPI Center)

Magnetic Materials Research, Laboratory,
Big Data Center
Certified with ISO 9001/14001/45001



- **Address:** No. 1010, Xiugu Road, Xiangcheng District, Suzhou City, Jiangsu Province
- **Total Land Area:** 12,000 square meters
- **Total Building Area:** 45,000 square meters (7 floors)

Vietnam Factory

Sintering, Machining, Electroplating, Assembly
Certified with ISO 9001/14001/45001



- **Address:** B3 + B4 + B5 Area, Industrial Zone, Dinh Tram Town, Viet Yen District, Bac Giang Province, Vietnam
- **Total Land Area:** 8,000 square meters
- **Total Building Area:** 6,000 square meters

02

Product Development

- Sintered Nd-Fe-B Magnets
- Bonded Nd-Fe-B Magnets
- Hot-Pressed Nd-Fe-B Ring Magnets
- New Electroplating Plant
- New Coating Plant
- Green Energy and Environmental Protection

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Sintered Nd-Fe-B Magnets

Sintering Process:
N52/N54/N56/N54M/N52H/N45SH/
N48SH/N50SH/N52SH

GBD Process:
N40UH/N48UH/N50UH/N52UH/N48EH/
N50EH/N42AH/N45AH/N35TH/N38TH

Monthly Production Capacity:

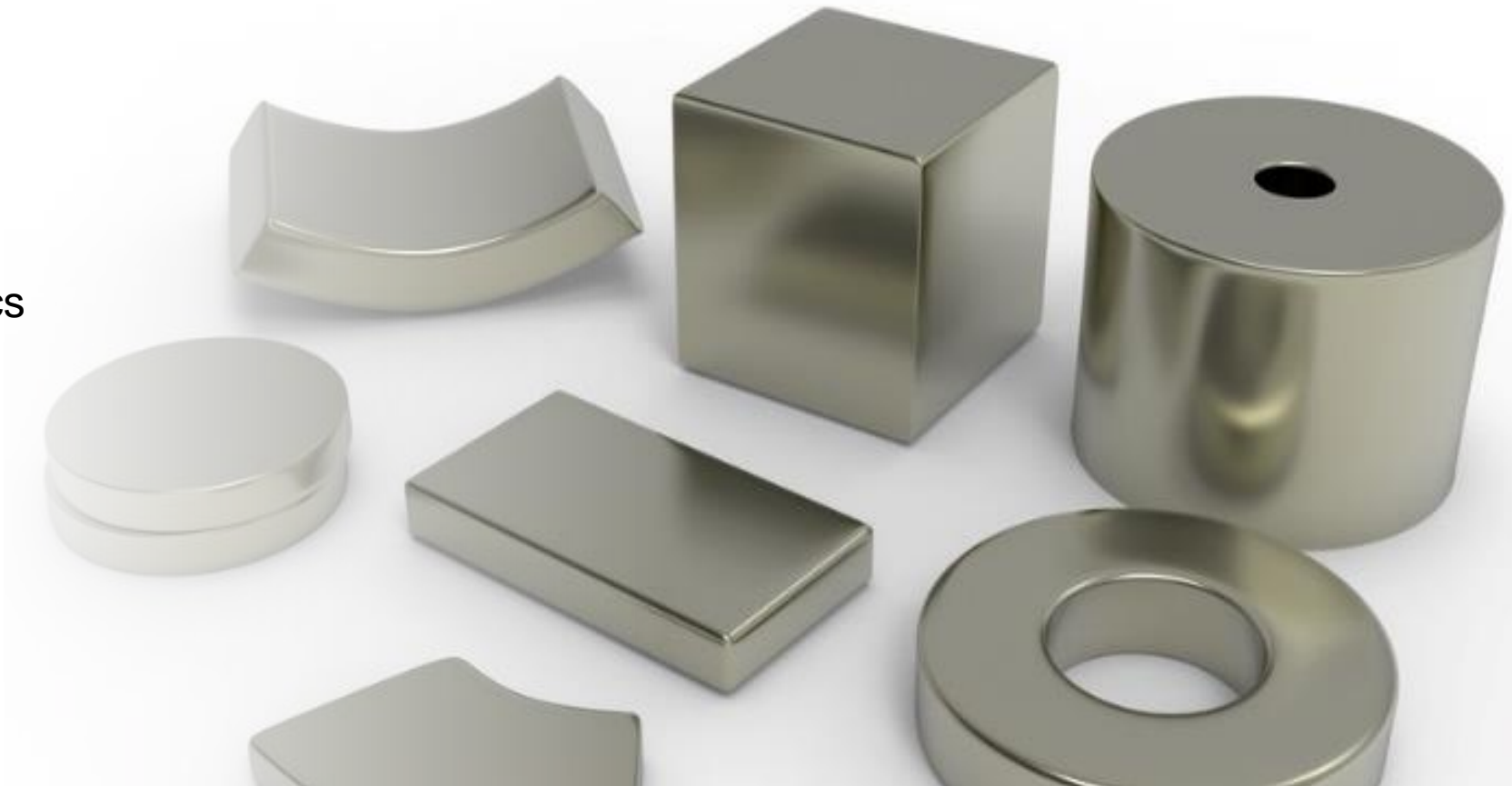
100,000,000

pcs

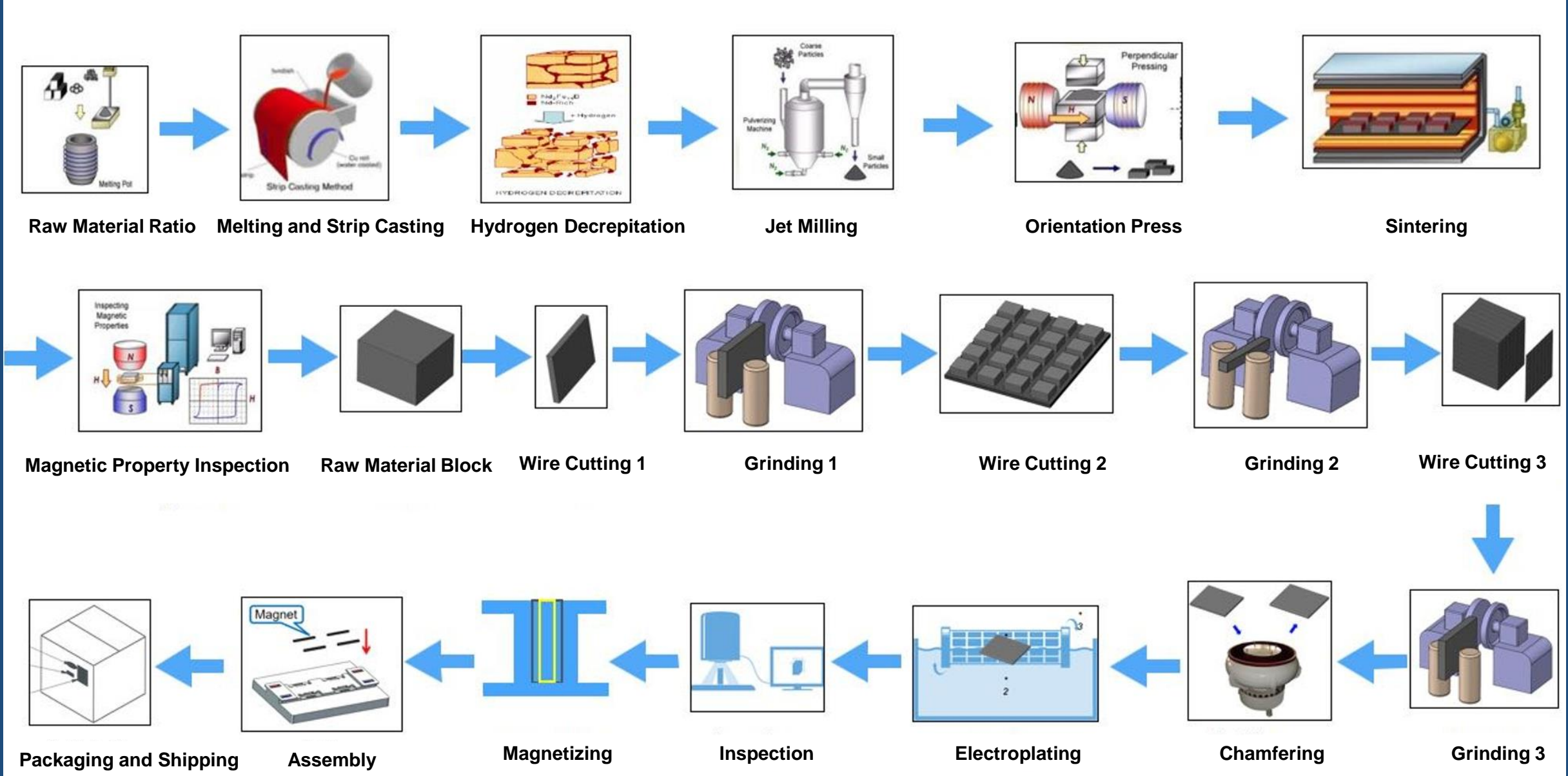
Annual Production Quantity:

1,600

tons



Sintered Nd-Fe-B Magnets Process : Sintering → Machining → Electroplating → Magnetizing → Assembly



Application Areas of Sintered Nd-Fe-B Magnets



**Smartphones
and Tablets**



Medical Equipment



Motors



**New Energy
Electric Vehicles**



**Smart
Watches**



Drones

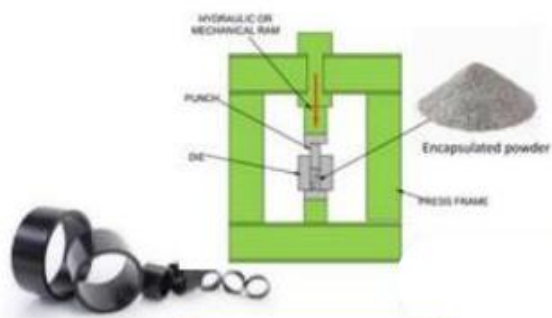


**Tools and
Precision
Machinery**

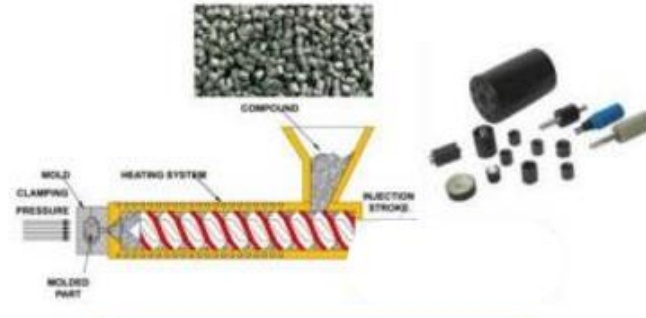


**3C Products
and Home
Appliances**

◆ Bonded Nd-Fe-B magnets



Molding



Injection molding



Calendaring

High degree of freedom in shape

High dimensional accuracy

High resistivity

High magnetization freedom



Compression Molding



Injection molding



Extrusion



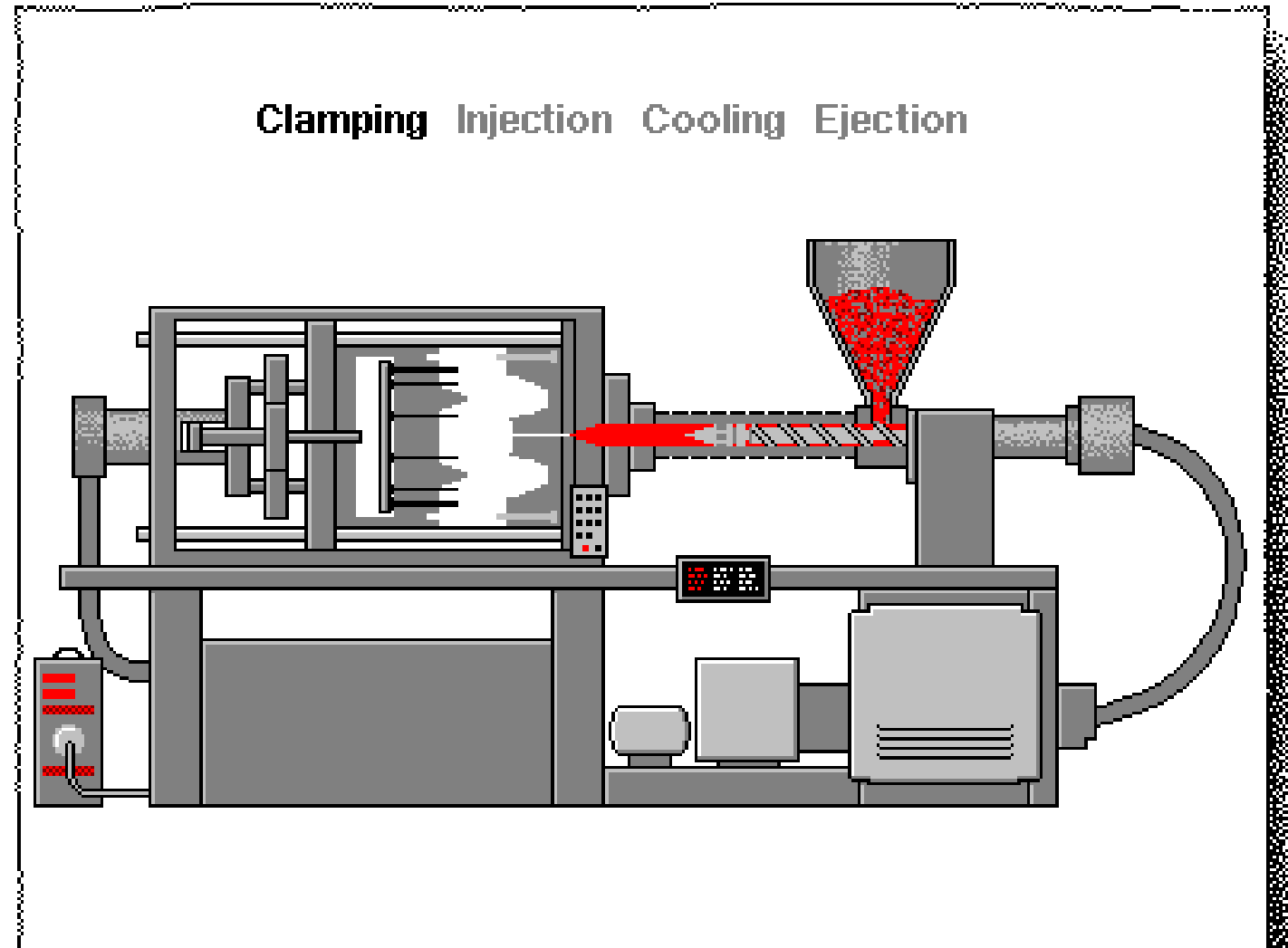
Calendering

Characteristic	Compression Molding	Injection molding	Extrusion	Calendering
Magnetic powder filling ratio (volume fraction)	70-85 (%)	50-70 (%)	60-80 (%)	50-70 (%)
Magnet porosity (volume fraction)	5-8 (%)	2-5 (%)	3-6 (%)	6-10 (%)
(BH) _{max} /(NdFeB as an example)	12-18 (MGOe)	4-15(MGOe)	10-11(MGOe)	6-8(MGOe)
Dimensional accuracy (taking Φ30mm as an example)	±0.03	±0.03	±0.03	±0.05
Shape complexity	Middle	High	High	Low
Temperature resistance	High	High	High	Low
Advantages	High magnetic properties	Integrated molding, strong impact resistance	Long size, complex cross-sectional shape	Long size, Strong impact resistance

◆ Advantages of injection molded magnets

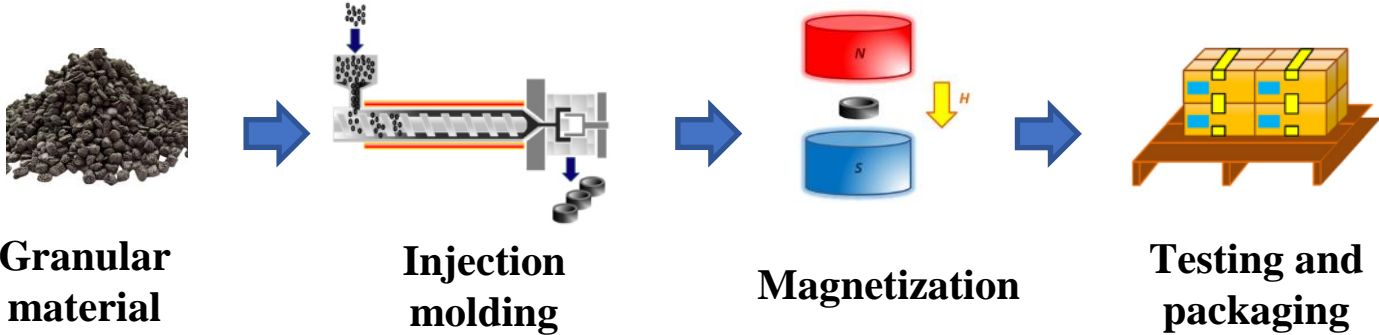
Advantages of injection molded magnets:

1. Short process flow;
2. High resistivity;
3. High shape freedom;
4. High magnetization freedom;
5. No surface treatment required;
6. Simplified engineering;
7. Strong impact resistance
(good toughness)

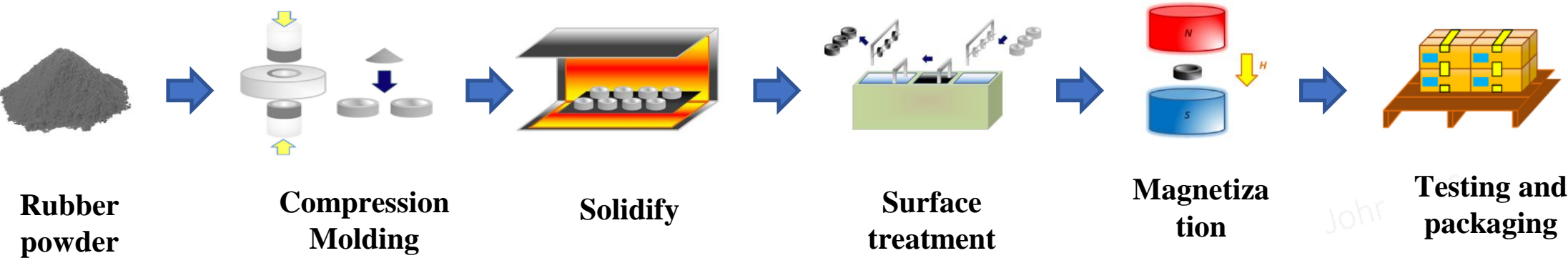


◆ Short process

Injection Molding Magnet Process



Molded magnet process flow



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◆ High shape freedom

Designability of magnetic ring shape

Designability of electromagnetic structures

$$\text{Output torque} = \text{electromagnetic torque} + \text{reluctance torque}$$

Electromagnetic torque /

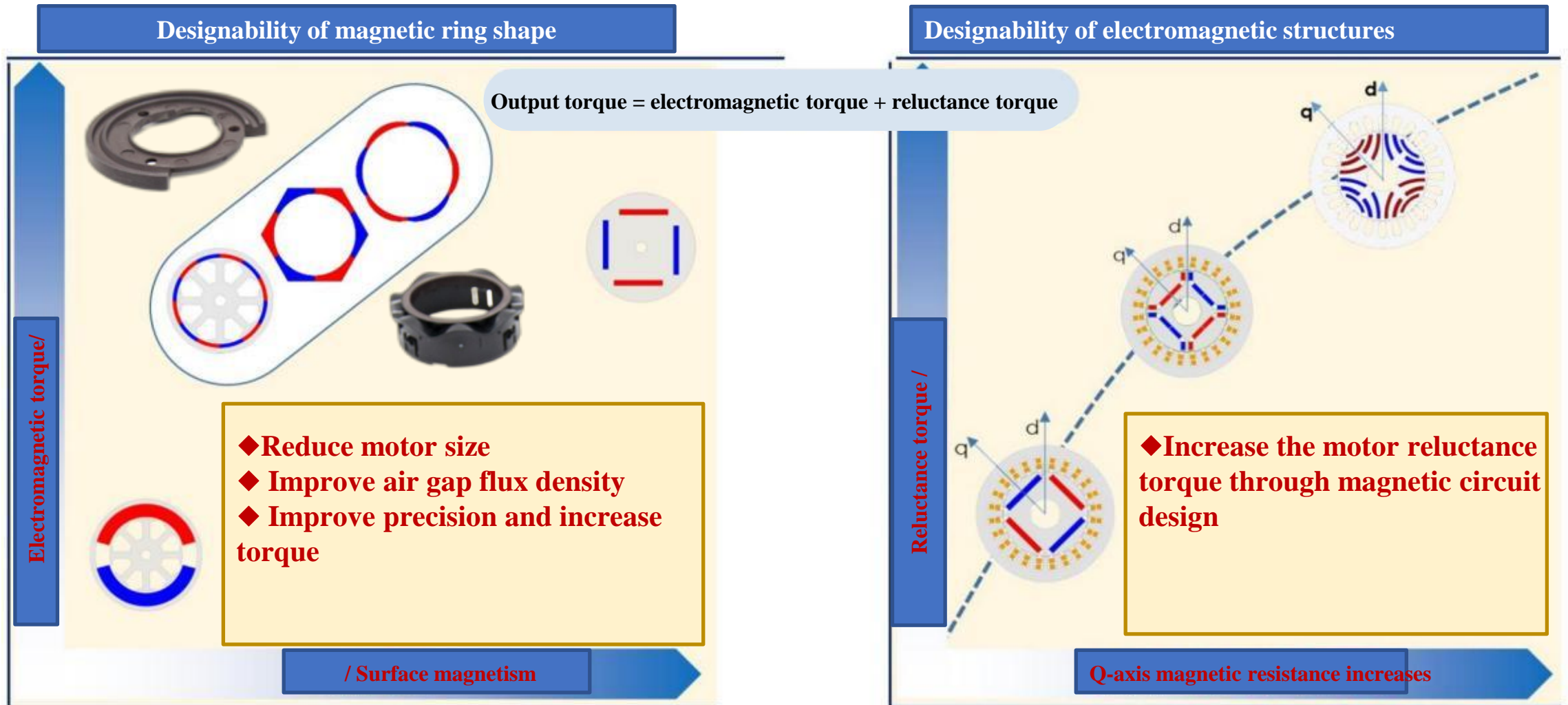
- ◆ Reduce motor size
- ◆ Improve air gap flux density
- ◆ Improve precision and increase torque

/ Surface magnetism

Reluctance torque /

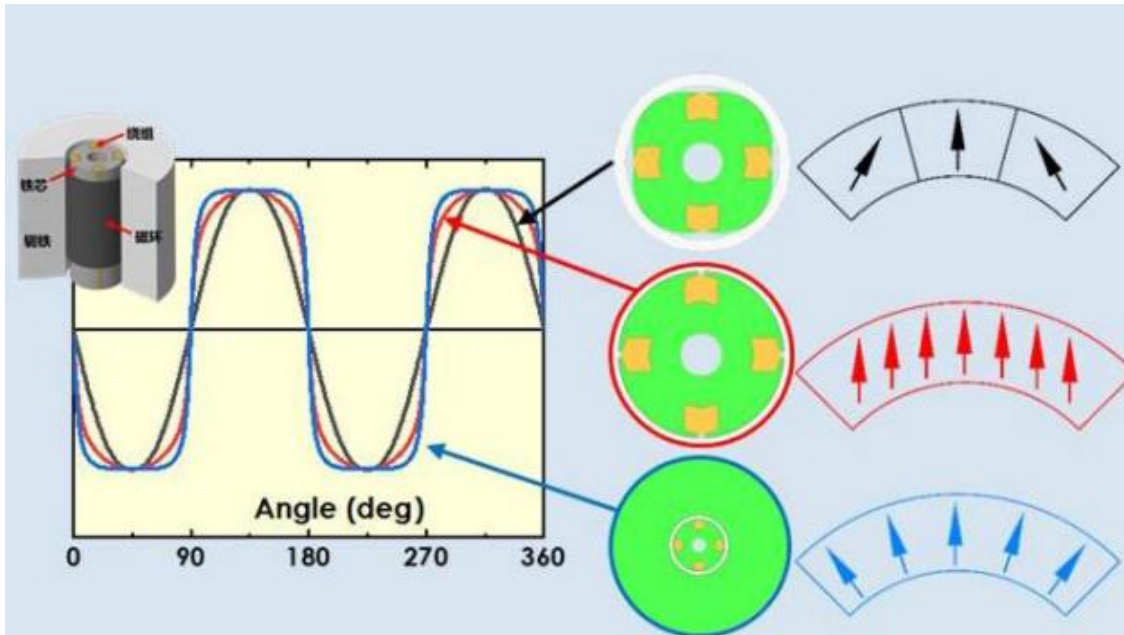
- ◆ Increase the motor reluctance torque through magnetic circuit design

Q-axis magnetic resistance increases



◆ High magnetization freedom

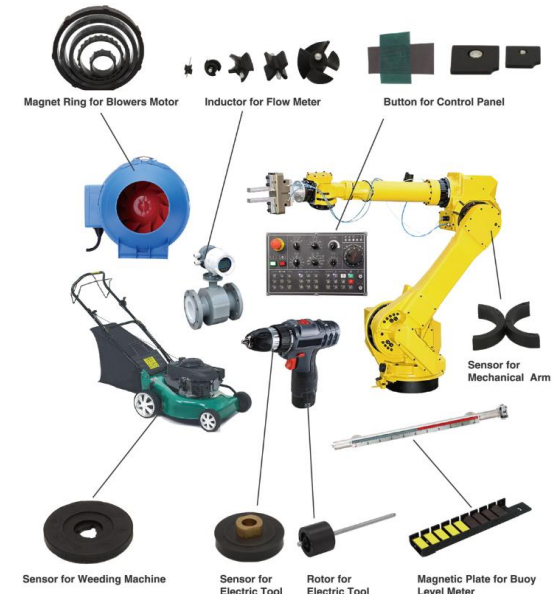
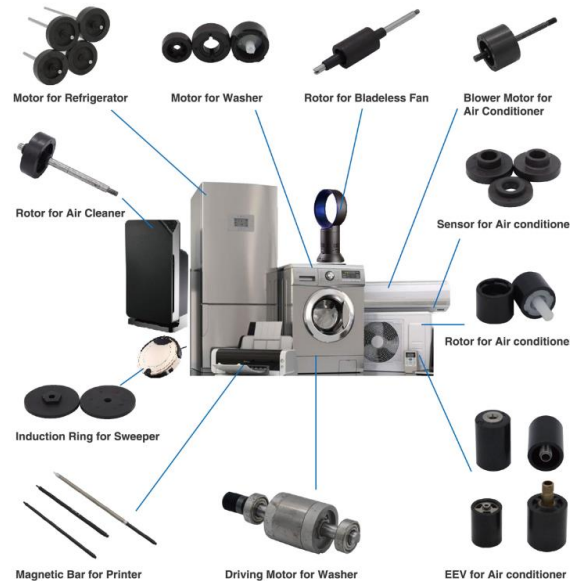
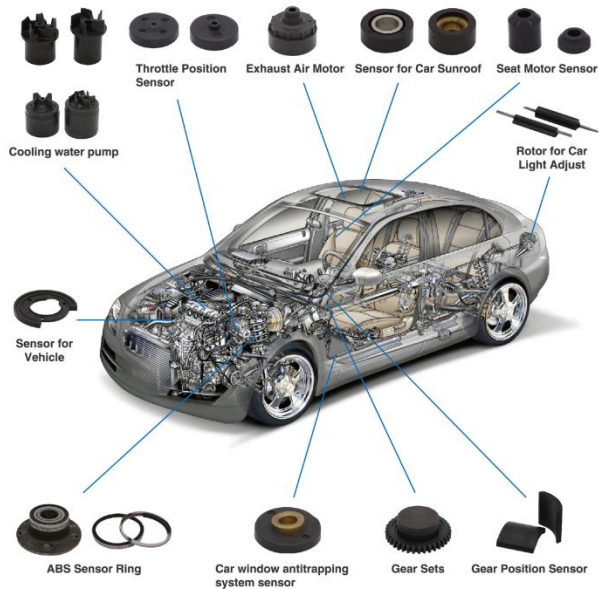
- The magnetic field waveform distribution on the surface of the magnetic ring can be customized according to the motor use requirements (**sine wave/square wave/saddle wave**)
- Reduce motor harmonic distribution, reduce motor operating noise, and improve motor operating efficiency



厚度方向/Thickness direction	轴向/Axial	轴向多极/Axial multi-pole	瓦型辐射/Tile type radiation
单面多极/Single-sided multi-pole	外径多极/Outer diameter multi-pole	单面扇形/Single-sided fan	瓦型径向/Wedge-shaped radial
径向辐射/Radial Radiation	两极径向/Polar Radial	海尔贝克/Halbach	

◆ No surface treatment required

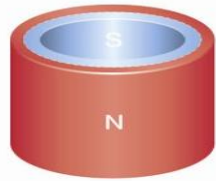
- Injection molded magnets have good chemical stability. After being immersed in acid, alkali, organic solvents, oils and water at room temperature for 10 days, the mass generally increases by only 0.2%~0.5%, and there is no abnormal change in magnetism and appearance.
- The quality, appearance and magnetic properties of injection molded magnets change very little after being tested at low temperature (-40 °C), high temperature (100 °C), thermal cycle, immersion, moisture resistance, weathering and salt spray.



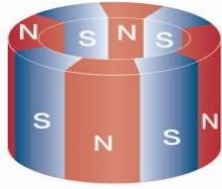
◆ Injection Molded Magnets Grade

Grade	Br/kGs	H_{cj}/kOe	(BH)_m/MGOe	T_w/°C
PIM-17	8.7-9.5	13.0-14.5	16.5-17.5	120~180
PIM-15	8.2-9.0	13.0-14.0	14.5-15.5	120~180
PIM-13	7.2-7.7	7.5-10.0	13.0-14.0	120~180
PIM-10	6.5-7.2	7.0-9.2	10.0-11.0	120~180
PIM-8	6.0-6.8	7.0-8.0	7.5-8.5	120~180

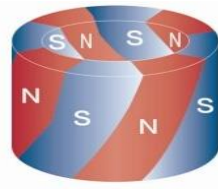
Hot-Pressed Nd-Fe-B Ring Magnets



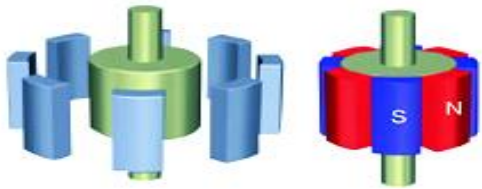
SINGLE
MAGNETIZATION



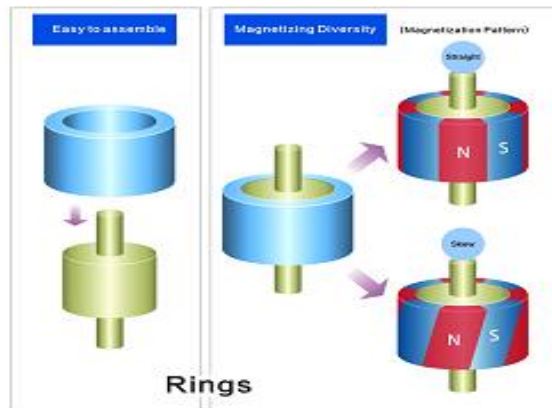
STRAIGHT
MAGNETIZATION



SKEW
MAGNETIZATION



Segments



Rings

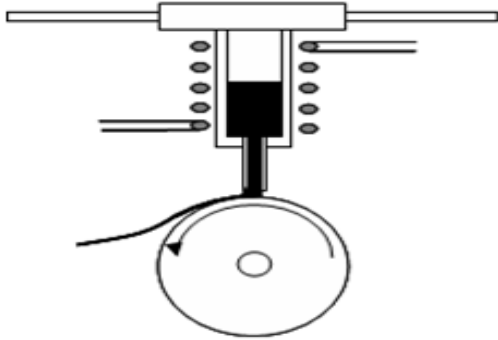
Radially Oriented Ring magnet can be multi-magnetized and uni-pole magnetized. Compare with traditional Arc magnet, our product advantage mainly as follows:

- 1-Assembling easier, no fall off problem and save cost of concerned assembling part,
- 2-Optimized the magnetic field and motor structure, improved the motor running property,
- 3-Can be magnetized in freely as union-pole, multi-pole or skewed.

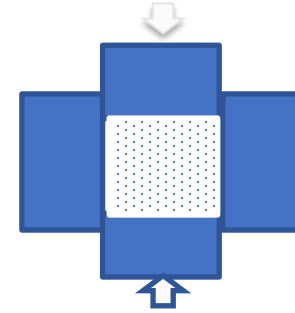
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Manufacture of Ring Magnets

Melt Spinning

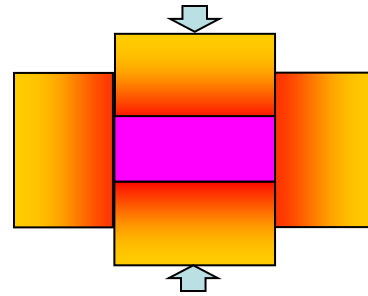


→ **Cold Pressing**



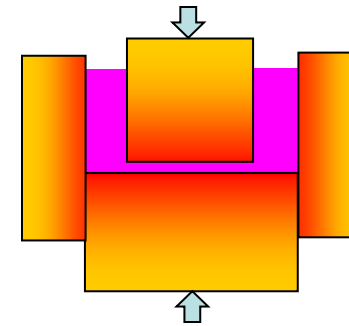
Room Temperature
Isotropic Magnets
 $D \sim 5.4\text{g/cm}^3$

↓ **Hot Pressing**



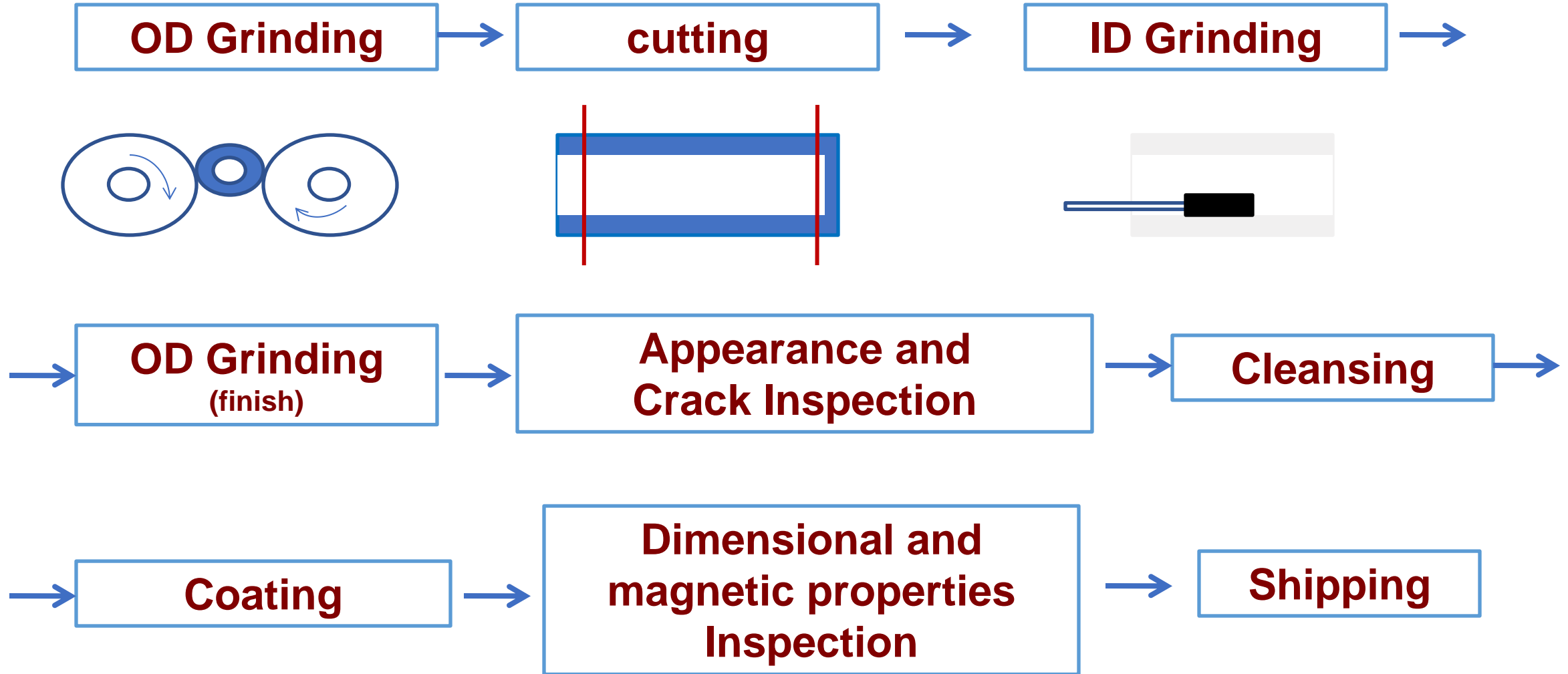
600~800°C
Isotropic Magnets
 $D = 7.6\text{g/cm}^3$

→ **Hot backward extrusion**



700~900°C
Anisotropic Magnets
 $D = 7.6\text{g/cm}^3$

Manufacturing of Ring Magnets



Dimensions and tolerances

Dimensions (mm)	min	max
Inner diameter/Outer diameter (ID/OD)	0.7	0.9
Hight	0.5	50
Diameter	10	60
Optimum Diameter	20	40

Tolerances (mm)	OD	ID	H	concentricity	roundness
Machined magnets	±0.03	±0.03	±0.1	0.03	0.03
Coated magnets	±0.04	±0.04	±0.05	0.05	0.03

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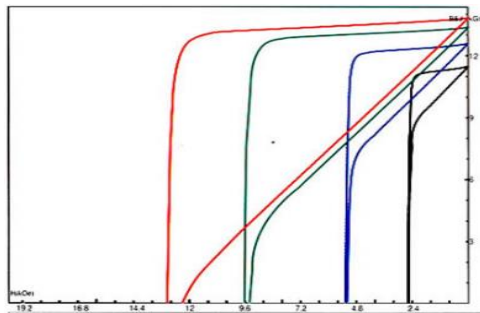
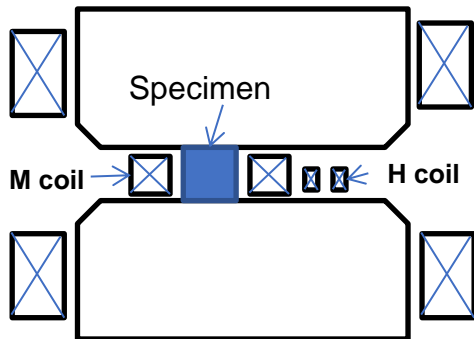
Magnetic Properties of Ring Magnets

Grade	Br		Hcb		Hcj		(BH)max	
	T	(kGs)	(kA/m)	(kOe)	(kA/m)	(kOe)	kJ/cm ³	MGOe
50M	1.4~1.45	14~14.5	≥1043	≥13.1	≥1114	≥14	374~406	47~51
45M	1.33~1.37	13.3~13.7	954~1058	12.0~13.1	≥1273	≥16	318~366	40~46
42M	1.29~1.32	12.9~13.2	939~1034	11.8~13.0	≥1273	≥16	302~342	38~43
48H	1.35~1.4	13.5~14.0	1042~1114	13.1~13.6	≥1432	≥18	342~366	43~46
45H	1.32~1.35	13.2~13.5	954~1042	12.5~13.1	≥1432	≥18	318~342	40~43
42H	1.29~1.32	12.9~13.2	931~1010	12.2~13.1	≥1432	≥18	286~326	36~41
40H	1.26~1.29	12.6~12.9	931~1010	11.7~12.7	≥1432	≥18	286~318	36~40
38H	1.22~1.26	12.2~12.6	907~986	11.4~12.4	≥1432	≥18	278~310	35~39
45SH	1.32~1.35	12.9~13.3	954~1042	12.5~13.1	≥1592	≥20	318~342	41~44
42SH	1.29~1.32	12.9~13.2	962~1042	12.2~13.1	≥1592	≥20	302~326	38~41
40SH	1.26~1.29	12.6~12.9	939~1010	11.8~12.7	≥1592	≥20	286~318	36~40
38SH	1.22~1.26	12.2~12.6	923~986	11.6~12.4	≥1592	≥20	278~310	35~39
35SH	1.18~1.23	11.8~12.3	891~962	11.2~12.1	≥1592	≥20	246~286	31~36
38UH	1.22~1.26	12.2~12.6	907~986	11.4~12.4	≥1989	≥25	278~318	35~40
35UH	1.18~1.23	11.8~12.3	891~962	11.2~12.1	≥1989	≥25	246~286	31~36

Magnetic Properties Testing

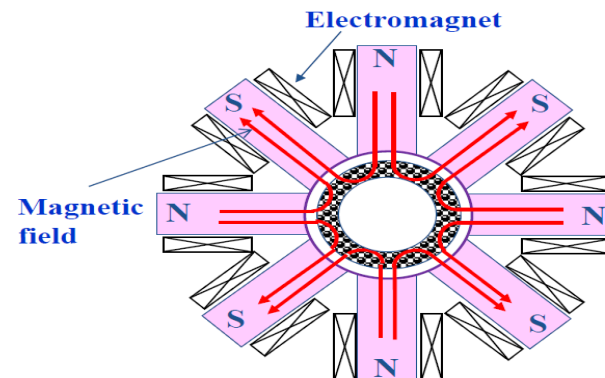
B-H Curve 1 piece/lot

1. A few rectangular specimens are cut from a ring magnet.
2. Fully magnetized by pulse field.
3. Measure by B-H tracer.



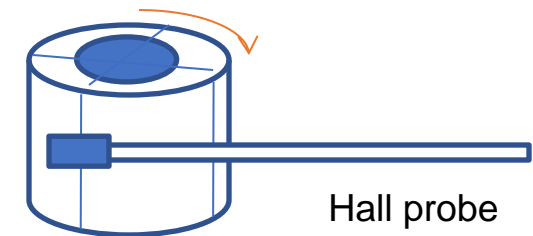
Magnetic Flux 2~20 pieces/lot

1. Machined ring magnets are magnetized in a multi-pole magnetizing fixture.
2. Measured flux in the fixture by a flux meter.

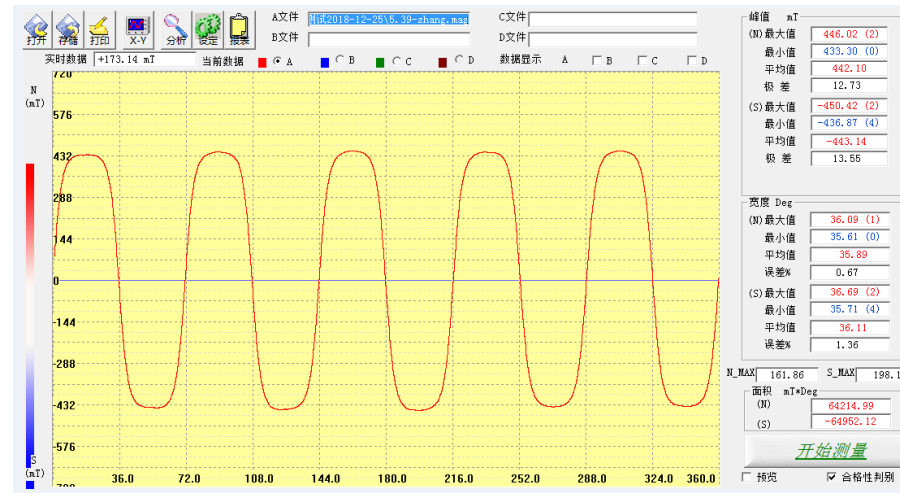


Surface Flux Density 2~20 pieces/lot

1. Machined ring magnets are magnetized in a multi-pole magnetizing fixture.
2. Measured by gauss meter.



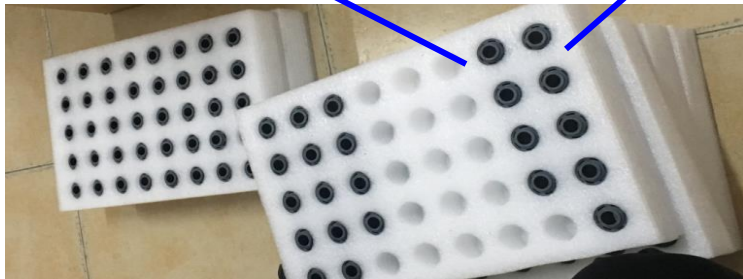
Application - Servo motor 40,60,80



For servo motor, our hot-pressed ring are now replacing sintered radial ring, because of better performance.

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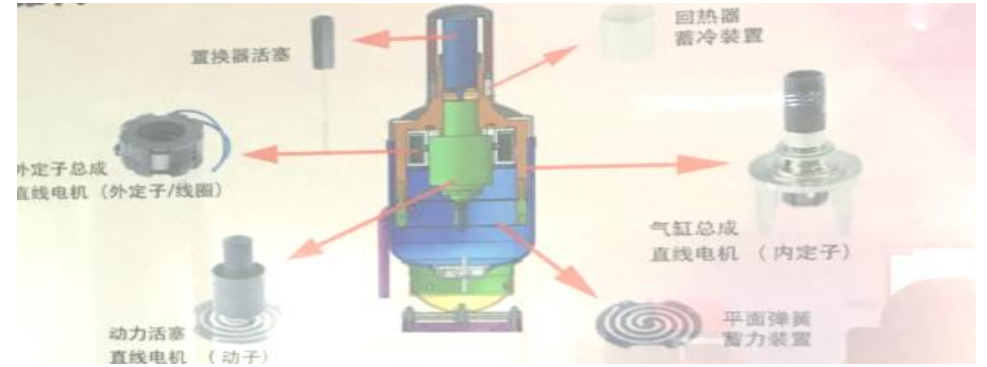
Application - Thin-wall thickness



After injection molding



Magnetization



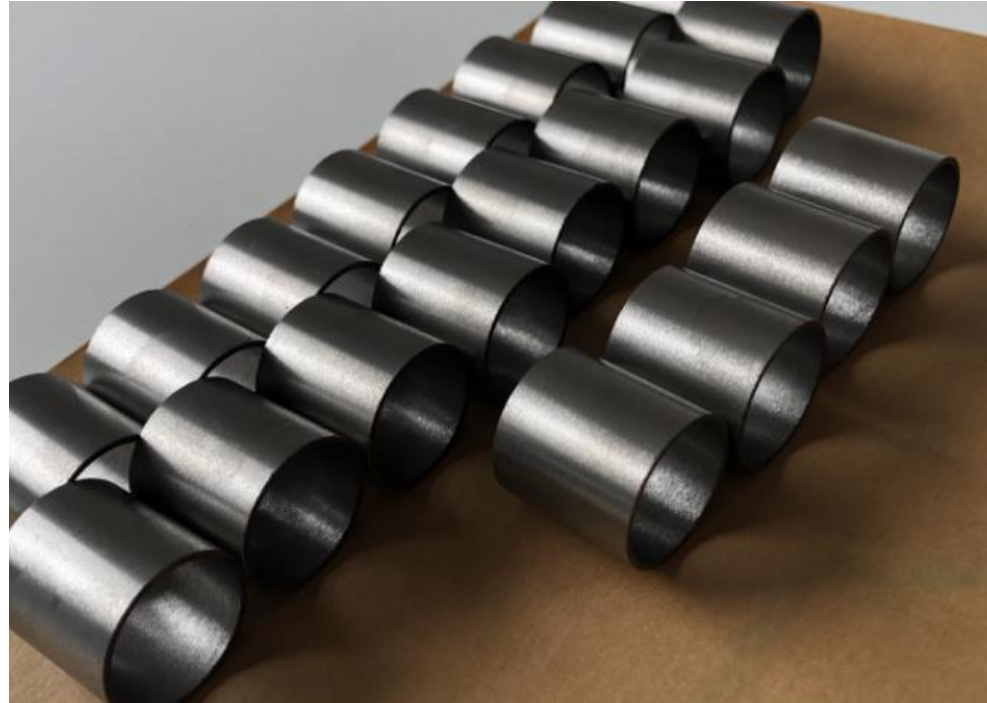
Application: compressor



Vaccine and portable refrigeration

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To replace Bonded ring



OD20*ID18*20, 40H, passivation

Thin-walled rings can be fabricated by hot pressing to replace bonded magnets, because of better magnetic performance.

1106

New Electroplating Factory



Electroplating Factory Production Line



Production Line



Plasma Emission Spectrometer

New Coating Factory

Epoxy resin enhances the corrosion resistance and insulation of magnets.

Phone In Group has independently developed an automated epoxy resin coating process, achieving automated loading and unloading, and a digitally controlled production process. This ensures quality, reduces manpower, lowers costs, and successfully establishes core technology standards that meet Japanese industry benchmarks.



Coating Machine

System Certifications

ISO 9001

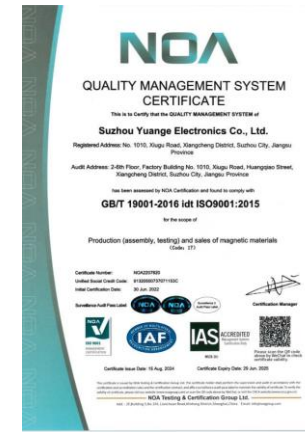
ISO 14001

ISO 45001

IATF 16949

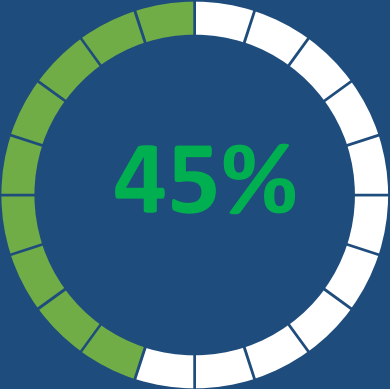
RoHS 2.0 / REACH ready

UL ECVP 2809-2

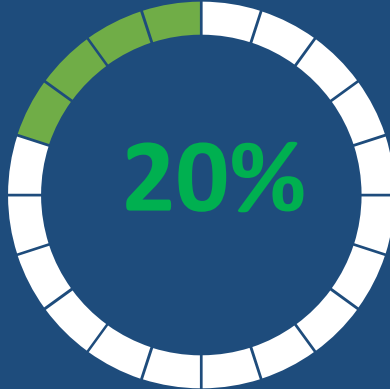


Green Manufacturing

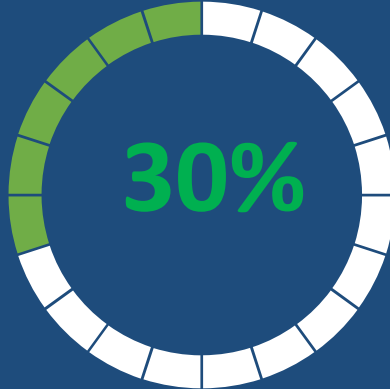
Beyond 100% REE, Phone In Group does more in Green Manufacturing



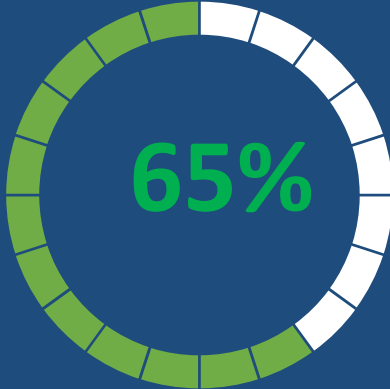
925,750 kWh



-93,600 Nm³



-3,420T



-240T

100% of available area covered with solar panels. Solar power generation increased to 45% of total capacity in 2023.

Reduced natural gas usage by 20%. Insulation layer installed for heat collection and reuse.

30% recovery of electroplating wastewater. Collaborating with local government.

Reduced pollution emissions by 65%. In 2023, using recycled rare earths reduced the mining of rare earth ores by approximately 240 tons.

03

Manufacturing

- Machining Equipment
- Laser Cutting Process
- Magnetic Material Testing Equipment
- Automated Production Equipment
- Automated Inspection Equipment

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Newly Built Magnetic Material Machining Production Workshop

In SINOWIN - the machining workshop has a total of 26 pieces of equipment installed, including multi-wire cutting machine operation area, double-sided grinding machine operation area, centerless grinding machine operation area, special-shaped grinding machine operation area, hole drilling operation area, automatic chamfering and deburring operation area, and automatic double-work station glue removal operation area.



Automatic Grinding Machine



Multi-Wire Saw



Multi-Wire Cutting Operation Area



2-station high-speed
multi-wire cutting machine 1 set



2-station high-speed
multi-wire cutting machine 1 set



Small 3-station multi-wire
cutting machine 2 sets



Horizontal 2-station tile
multi-wire cutting machine 1 set



◀ Double-Sided Grinding
Operation Area

IP

Centerless Grinding ▶
Operation Area



Double-sided grinding machine 1 set



Double-sided grinding machine 2 sets



Centerless grinding machine

Special-Shaped Grinding Operation Area



Special-shaped double station
grinding machine 2 sets



Special-shaped single station
grinding machine 6 sets



Vertical double end grinding
machine 1 set



Automatic edging machine 1 set



Automatic hole machine 2 sets



Automatic edging machine 1 set



Knife sharpener 1 set



Angle automatic grinding machine 2 sets



Angle Grinding Operation Area



Dual Station Glue Removal Operation Area

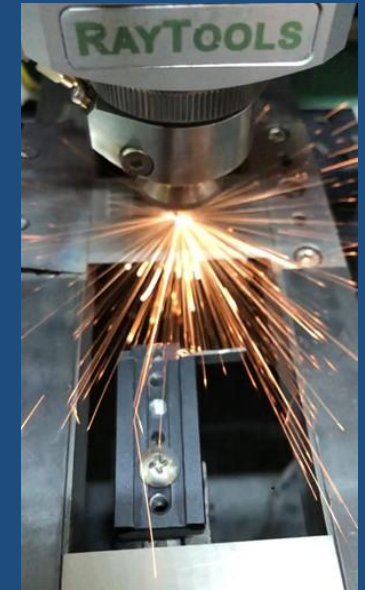
A vertical blue banner containing text and a logo. At the top, the text "Angle Grinding Operation Area" is written in white, with a white triangle pointing left. In the center is the "IP" logo, where the "I" is black and the "P" is blue. At the bottom, the text "Dual Station Glue Removal Operation Area" is written in white, with a white triangle pointing right.

Dual station glue remover 1 set



Laser-Cut Machining

Phone In has applied over 30 years of experience in magnet manufacturing to develop and introduce laser cutting technology with simplifies the machining process. This method optimizes recycled material utilization as well as reduces overall carbon emissions. Laser cutting is applicable to various magnet specifications

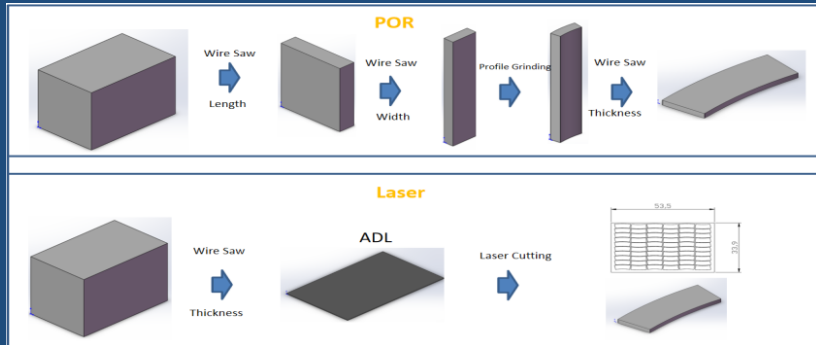


Creating a new chapter of environment protection, high efficiency, clean workshop and stable manufacture.

John 110

Comprehensive Capacity Comparison

	POR	Laser
Block Size (mm)	53.5*33.9*42.1	
Output/ block (pcs)	4,050	4,800
M'tl Utilization	44.7%	59.0%
Ramp Process L/T	3 weeks	2 weeks



Note :

1. Shortening cycle time of product manufacturing.
2. Reduction of operators at the same Q'ty.
3. Improved material utilization.
4. High environmental cleanliness.
5. Simple waste recycling.

	POR			Laser cutting		
	Product Q'ty(pcs)	C/T (pcs/sec)	OP/Day	Product Q'ty(pcs)	C/T (pcs/sec)	OP/Day
Wire-saw- Length	1	12	2	-	-	-
Polish- Length	1	2	2	-	-	-
Wire-saw- Width	1	0.92	2	-	-	-
Polish- Width	1	0.31	2	-	-	-
Profile Grinding	1	0.9	3	-	-	-
Wire-saw- Thickness	1	0.08	2	1	4.24	2
ADL- Thickness	1	0.06	1	1	1.25	1
Laser	-	-	-	1	0.9	1
Total		16.27	14		6.39	4

Magnetic Material Testing Equipment



One dimensional
flux meter



Magnetic declination
measuring tester



JQS gauss test
machine



Automated Production Equipment

Modular Automated Assembly Line



Fully Automated Intelligent Assembly Line

Automated Production Equipment



Automatic glue
removal machine



AGV smart truck



Any Feeder Machine



Automatic glue
removal machine



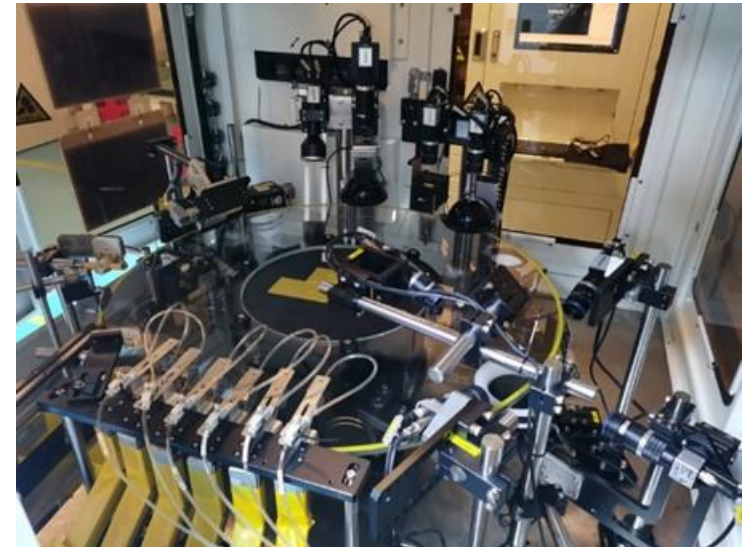
Automated Inspection Equipment



▲
AOI magnet inspection machine



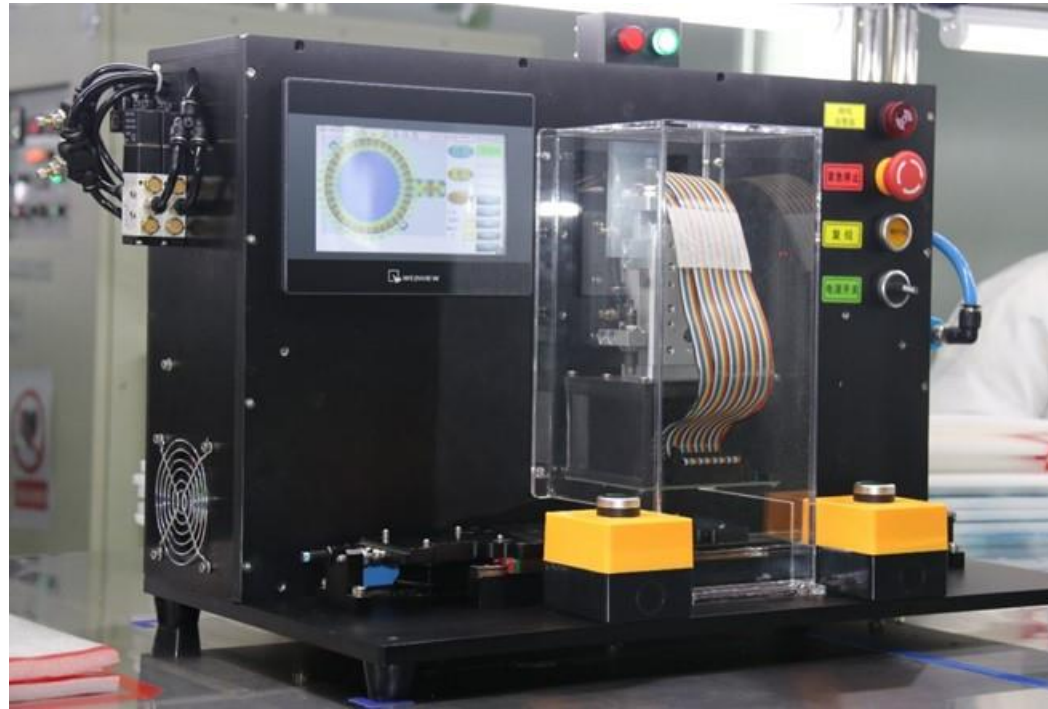
▲
Automated
sorting equipment



▲
AOI with 3D Profile
Scanning Datum Machine

Automated Inspection Equipment

Top of the line
production equipment



◀ Polarity detection
equipment



◀ Visual laser
engraving
machine



◀ Flashing test
machine

04

Customer Service

- Design and Manufacturing Services
- Core Values
- Excellent Customers

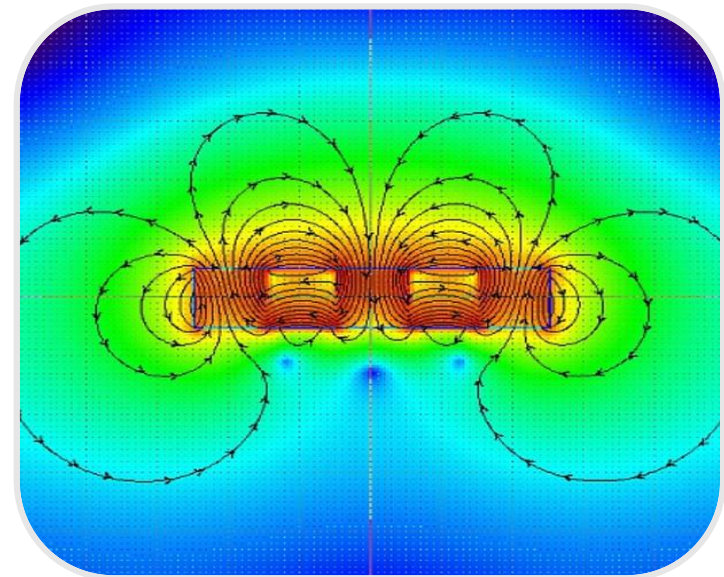
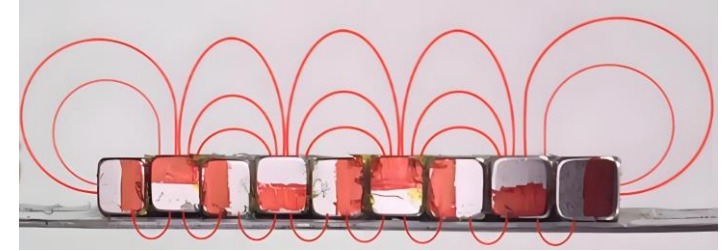
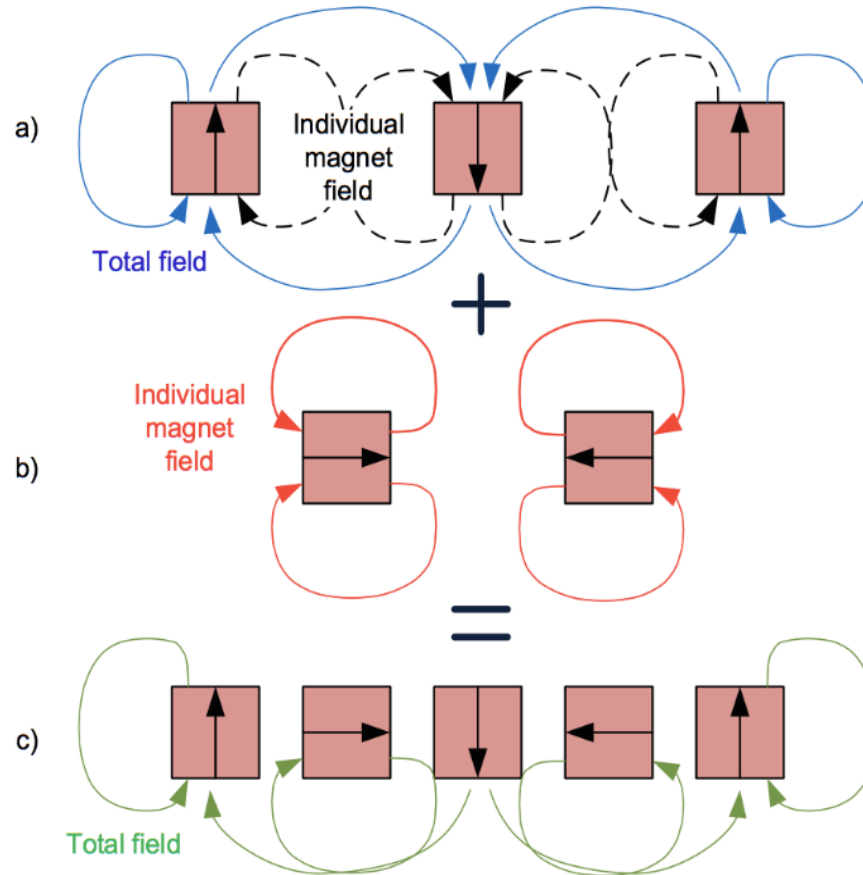
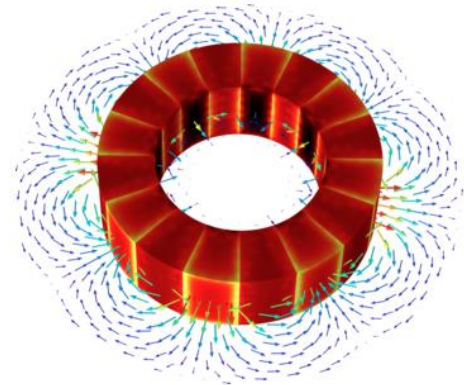
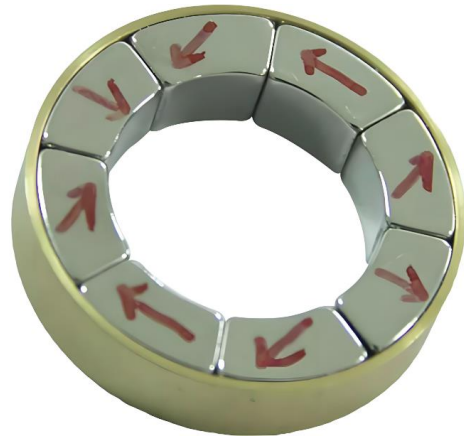
John 1106

Design and Manufacturing Services



- High-precision and performance magnets, precision control of non-magnetic areas
- Flux value, Gauss value, tension value simulations and systems analysis
- Magnetic assembly hardware post processing
- Customized multi-pole magnetization solutions
- Halbach Array magnetization and assembly

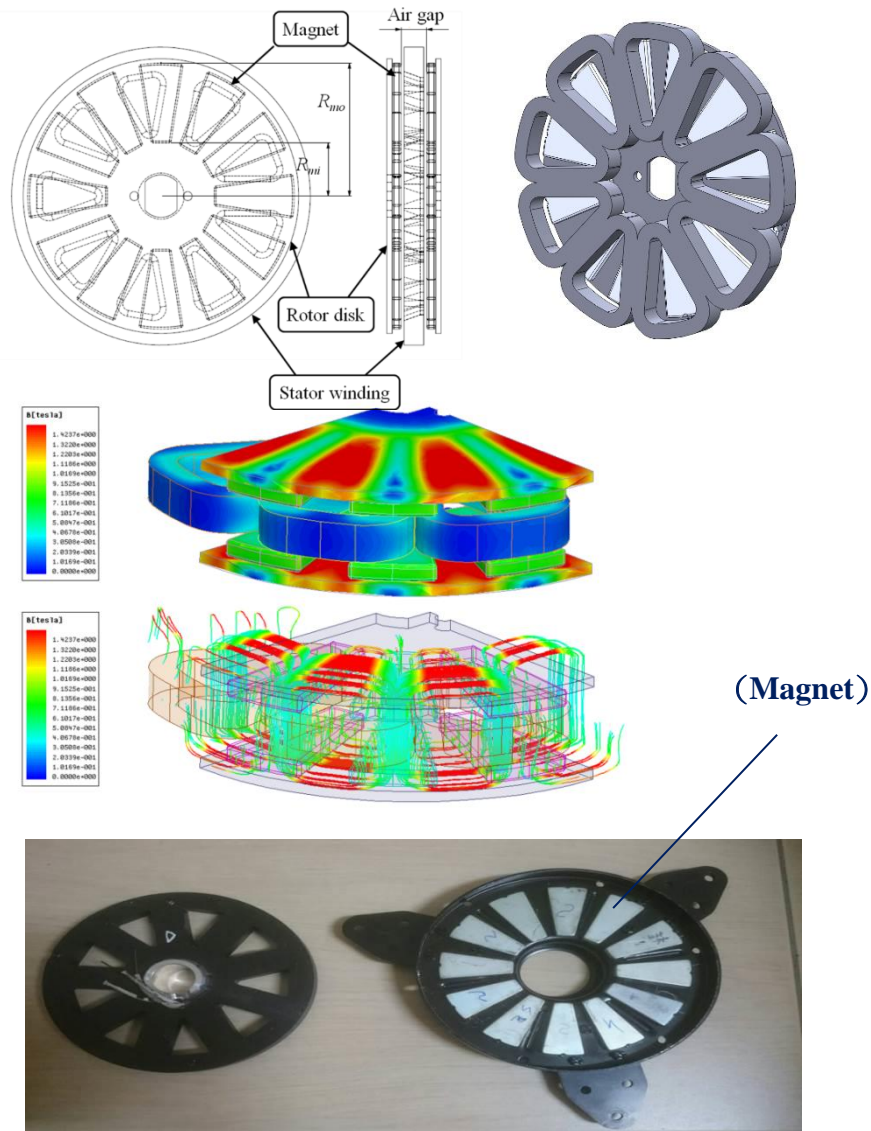
Halbach Array Magnet Assembly and Production Services



The Halbach Array is a type of magnetic structure that is an engineering approximation of an ideal configuration. Its goals are to maximize the output field, minimize weight, and reduce leakage. It is particularly applied in new energy vehicle motors and other devices. In 3C products, it is especially used in high-end wireless charging magnetic absorption module assemblies.

The high-performance, ultra-thin Halbach Array magnetic components are integrated into these applications.

Motor/Generator Design and Simulation Analysis Services



Customized Magnet Design and Manufacturing

Design magnet size, shape, and model to meet design requirements and reduce costs. Provide high-performance magnetic designs tailored for specific applications to ensure optimal efficiency and performance in motors/generators.

Magnet Testing and Verification Services

- Provide magnetic performance testing services to ensure compliance with design requirements and standards.
- Conduct magnet life testing and durability analysis to assist in improving product quality.

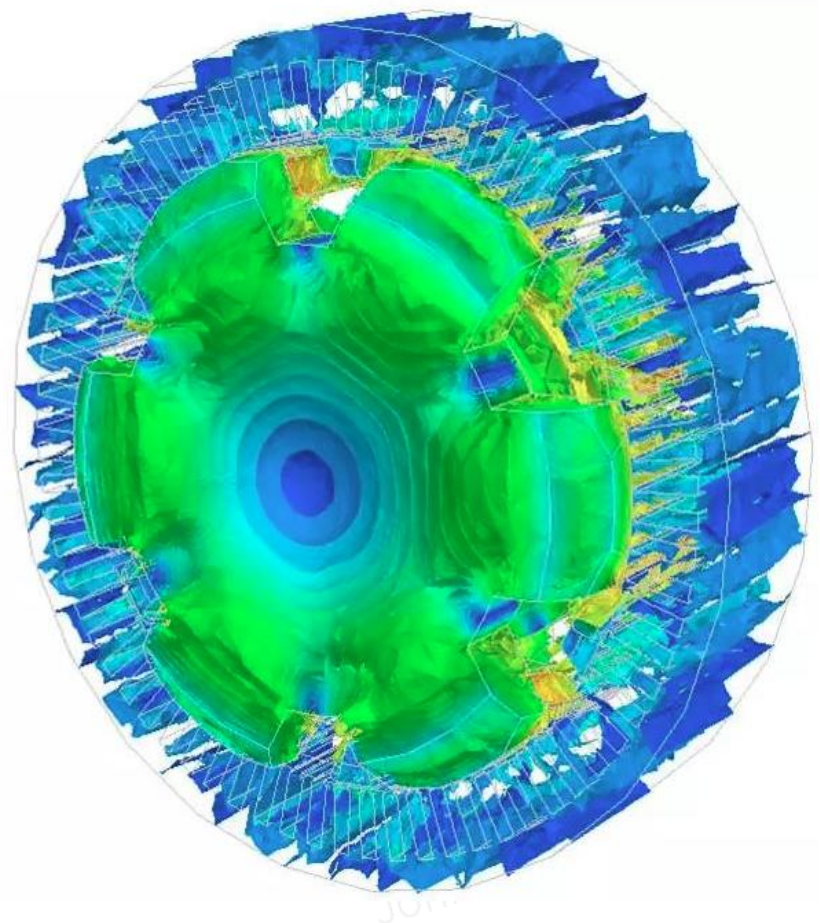
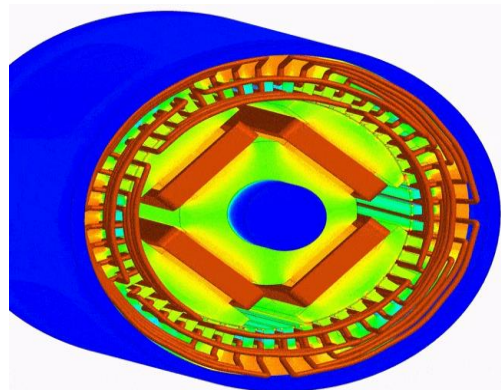
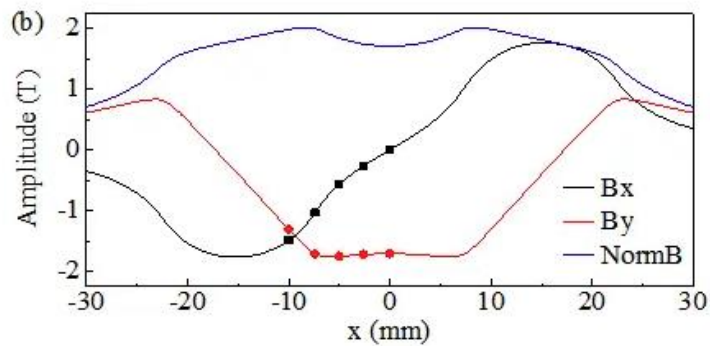
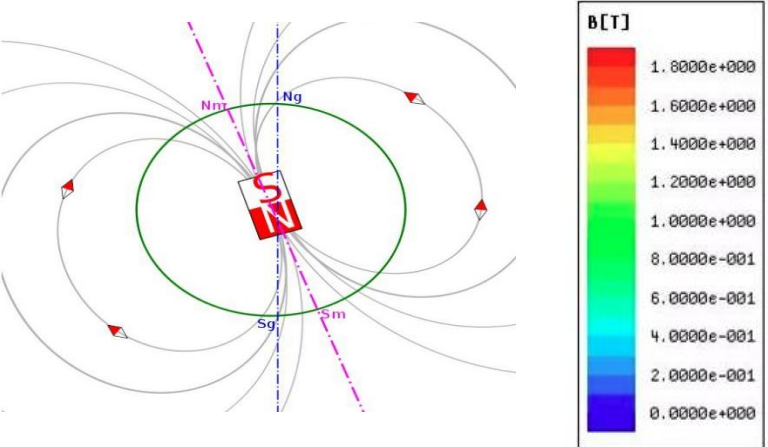
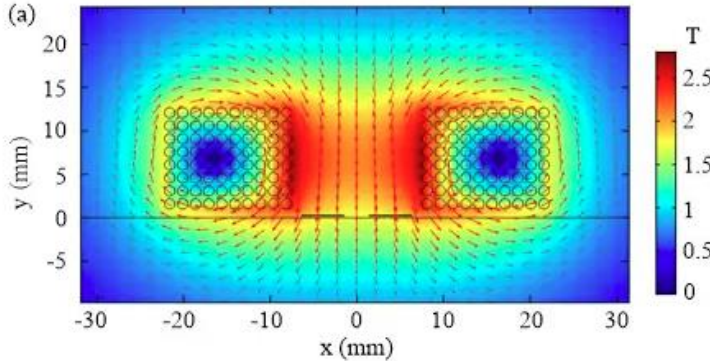
Motor Design Simulation and Optimization

- Numerical simulation services for motor/generator design to ensure optimal magnetic circuit design and magnetic field distribution for key performance indicators.
- Electromagnetic, thermal, and mechanical performance analysis to ensure design stability and efficiency.
- Optimize existing motor designs to enhance performance, reduce losses, and extend motor lifespan.

Technical Consultation and Solution Development

- Professional consulting for magnetic material applications to help solve technical design challenges.
- Co-develop new motor technologies focusing on high-performance and high-density magnet applications.

Motor/Magnetic Circuit Design and Magnetic Field Simulation Services



Phone In Group Corporate Culture



◆ Management Philosophy:

- ★ Humanization
- ★ Refinement
- ★ Service-oriented

◆ Corporate Vision:

To provide customers with more immersive magnetic application solutions and products for smart terminal devices.

◆ Corporate Mission:

To develop advanced magnetic material technologies and solutions that create value for customers.

◆ Core Values:

- ★ Focus on Needs
- ★ Create Value
- ★ Bear Responsibility
- ★ Innovate and Share

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Excellent Customers



FOXCONN



Amphenol



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Meta

PEGATRON

Goertek



Thank you!



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