



# 航天磁服务世界 SPACEMAGNETS SERVE THE WORLD



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航天磁服务世界 

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# 关于航天磁

湖南航天磁电有限责任公司创建于1995年8月，隶属于中国航天科工集团公司，是专门从事高档磁性材料与器件及相关设备研发、生产经营的军民融合型高新技术企业。公司现有注册资金24,698万元，资产总额65,779万元，净资产32,417万元，员工800余人。公司位于湖南省长沙市望城经济开发区航天新材料产业园。公司是湖南省高新技术、高新产品（双高）企业、湖南省电子信息制造业前十强和湖南省千亿材料产业集群重点骨干企业、湖南省节能环保示范企业。

公司产品涵盖高档永磁铁氧体电机磁体、扬声器磁体、稀土永磁、多极磁体、电机组件等多个门类，应用领域涉及汽车、节能家电、工业电机、电声、医疗、计算机、通讯以及航空航天等；产品品质广受客户信赖和赞誉，远销欧美、亚三十多个国家和地区，是国内领先的综合磁材产品生产经营企业。

公司拥有中国航天科工集团唯一的磁性材料研究所，也是湖南省磁性材料与器件工程技术研究中心的依托单位；拥有享受国务院政府特殊津贴专家、研究员级高级工程师、博

士、硕士等各级专业技术人员100余名，拥有专利近百项，科技创新和技术工艺保障能力雄厚。

公司目前的铁氧体电机磁体以FB6、FB9产品为主，掌握了高性能的FB12铁氧体生产工艺；环磁产品以Y30、Y35等高性能产品为主，具有极佳的产品一致性与品牌美誉度；烧结钕铁硼永磁性能一致性好、性能和尺寸精度高，可满足新能源汽车、2兆瓦以上大功率风力发电机等高要求电机的配套；粘结钕铁硼磁产品具有磁性能稳定、性能和尺寸精度高等特点；烧结钕磁体具有磁性能较高、居里温度高、温度系数小、抗腐蚀性强等特性。目前公司磁性材料产品的年产能可为铁氧体瓦磁15,000吨、铁氧体环磁12,000吨、烧结钕铁硼磁体2,000吨和粘结钕铁硼磁体100吨，还具电机磁路设计的能力，多极磁体、定子、转子与电机组件配套生产的能力。

公司以“创世界品牌，建百年磁电”为愿景，大力实施“军民融合、创新驱动、人才强企、质量制胜”战略，立志建设成国内一流的军民融合型新材料产业集团、高性能磁性材料与器件产业龙头企业，将“航天磁”打造成为世界知名品牌。



# About Spacemagnets

航天磁服务世界



Hunan Aerospace Magnet & Magneto Co., LTD, founded in August 1995, affiliated with China Aerospace Science and Industry Corporation(CASIC), is a military and civilian integration type high-tech enterprise specialized in high-grade magnetic materials, devices and related equipment research, production and operation. The company owns registered capital of 246.98 million RMB, the total assets of 657.79 million RMB, net assets of 324.17 million RMB and more than 800 employees. As a provincial key construction project, company is located in aerospace high-tech materials industrial park of Wangcheng economic development zone in Changsha of Hunan province. Meanwhile, Company is the high-tech enterprise in Hunan province, top ten of electronic and information manufacturing industry and the key leading enterprise of billions of material industrial cluster in Hunan province, the energy conservation and environmental protection demonstration enterprise in Hunan province.

Our products include high-grade motor permanent ferrite magnets, speaker ferrite magnets, permanent rare-earth magnets, multi-pole magnets, motor components and other multiple categories with application fields of automobile, energy-efficient appliances, industrial motors, medical treatments, computers, communications and aerospace, etc. With the good quality trusted and praised by customers, our products, widely exported to Europe, America and Asia more than 30 countries and regions, is a leading integrated magnetic products production and operation enterprise.

The company has the only magnetic material research institute of China Aerospace Science and Industry Corporation(CASIC) and is a supporting institution of magnetic materials and devices engineering technology research center in Hunan province. Owned over 100 professional and technical personnel of experts, researchers, senior engineer, doctor and master with special government allowances of the state council, our company, applied nearly 100 patents with 5 invention patents, has a strong scientific and technological innovation and technology supporting capability.

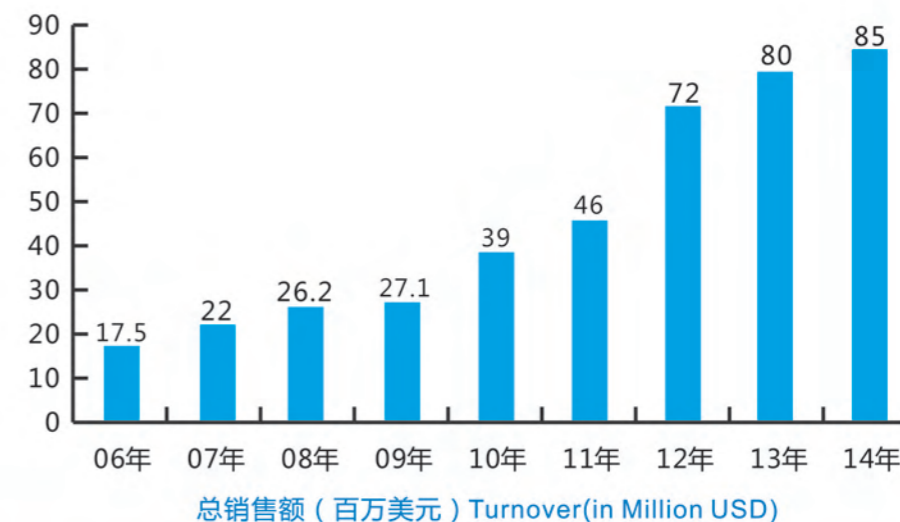
Currently, the motor ferrite magnets in our company is mainly based on FB6, FB9 products, mastered the FB12 high performance ferrite production technology. Ferrite magnets ring products such as Y30, Y35 with high-performance have the excellent product consistency and brand reputation. Permanent Sintered Nd-Fe-B magnets with good consistency, high performance and dimensional accuracy, can meet the high motor matching requirements of new energy vehicles and over 2 MW high-power wind turbine. Bonded Nd-Fe-B magnets products have the characters of reliable magnetic stability and performance and high dimensional precision, etc. Samarium cobalt magnets have the characters of high magnetic performance, high Curie temperature, small temperature coefficient, strong corrosion resistance. At present, our company has the production capability of ferrite magnets arc 15,000 tons, ferrite magnets ring 12,000 tons, sintered Nd-Fe-B magnets 2,000 tons and bonded Nd-Fe-B magnets 100 tons, also the capability of motor magnetic circuit design, multi-pole magnets, motor stator, rotor and motor components supporting production.

As the vision of "create world brand, built one hundred Spacemagnets", our company, with the strategy of "civil-military integration, innovation-driven, talent thriving enterprise, quality first", is willing to build a domestic first-class military and civilian integration type high and new material industry group and an industry leading enterprise of high performance magnetic materials and devices, finally to realize "Spacemagnets" as the world's famous brand.

# Spacemagnets Milestones

## 航天磁发展历程

市场销售表现  
Marketing Sales  
Performance



1968

湖南航天材料研究中心成立  
The Foundation of Material Research Center In Hunan Aerospace.

1970

开始从事航天军用材料的研究  
Begin to research materials for military industry of Aerospace.

1980

民用材料的研究与生产  
The research and production of civil industrial materials.

1995

湖南航天磁电有限责任公司成立  
The foundation of Hunan Aerospace Magnet and Magneto Co.,Ltd.

铁氧体磁体的研究与生产  
The research and production of ferrite magnet.

2006

粘结钕铁硼磁体的研究与生产  
The research and production of bonded Nd-Fe-B magnet.

2008

烧结钕铁硼磁体的研究与生产  
The research and production of sintered Nd-Fe-B magnet.

2014

钐钴磁体的研究与生产  
The research and production of Samarium Cobalt Magnet

2015

完成占地320亩的新航天工业园搬迁  
The relocation completion of a new aerospace industry park with 320 acres

# Products Introduction

## 产品介绍



# 1 铁氧体磁瓦 Ferrite Arc Magnets

## 工艺装备 Technique Equipment

- 航天磁电开发的永磁铁氧体磁瓦是以 $\text{SrO} \cdot n\text{Fe}_2\text{O}_3$ 为主组成结构的永磁体，磁性能达到FB6、FB9和FB12（TDK公司牌号）系列牌号性能，具有磁性能价格比高、化学性能稳定、耐高低温性能良好等特点，在汽车永磁电机、节能家电电机、工业控制电机、电动工具、磁力传动和传感器等领域得到广泛应用。

Our permanent magnetic ferrite arc consists mostly of  $\text{SrO} \cdot n\text{Fe}_2\text{O}_3$  permanent magnets, and the magnet performance can achieve the standard of FB6, FB9 and FB12 (TDK Model) series, which has the characters of high cost effective, stable chemical properties, good resistance of high and low temperature and good performance, etc. Meanwhile, it could be widely used in the fields of car permanent magnet motors, energy-efficient appliances motors, industrial control motors, electric tools, magnetic transmission and sensors, etc.

- 航天磁电是中国主要的永磁铁氧体磁瓦生产企业之一，具备年产高性能磁瓦1.5万吨的能力。近年来公司不断引进行业内最新自动化生产设备，同时持续改进提升工序间物流自动化水平，在投料、料浆含水量控制、料浆输送、成型、烧结、磨洗等工序实现了全自动操作，降低了人为因素影响，提高了产品的质量水平。











With an annual output of 15,000 tons of high-performance magnetic arc ability, our company is one of the major permanent magnetic ferrite arc production enterprises in China. In recent years, our company has continuously introduced the latest automatic production equipment in the industry, at the same time, logistics automation level has been continuous improved and promoted in processes. Meanwhile, automatic operation in feeding, slurry water content control, slurry conveying, molding, sintering, grinding and cleaning processes has been realized so as to reduce the artificial factors and improve the quality of the products.

- 航天磁电将在高性能原材料研发和生产线建设方面，全自动化生产，产品外观一致性方面继续加大投入，为客户提供更高性能、更高品质的产品。

Our company will continuously increase investment in high performance raw materials research and production line construction and full-automatic production and products appearance consistency to provide customers with products of high performance, quality and service.



# 产品及应用 Product & Application

<p>摇窗电机磁瓦 For power window motors</p>			<p>割草机、跑步机磁瓦 For lawn mowers and treadmills</p>
<p>起动电机磁瓦 For starter motors</p>			<p>冷却风扇电机磁瓦 For cooling fan motors</p>
<p>座椅电机磁瓦 For seat motors</p>			<p>空调电机磁瓦 For air conditioners</p>
<p>油泵电机磁瓦 For fuel pump motors</p>			<p>暖通/雨刮电机磁瓦 For HVAC/wiper motors</p>
<p>定子/机壳组件 Stator/Housing Assemblies</p>			<p>EPS电机磁瓦 For EPS motors</p>

			
摇窗电机 Power Window Motor	空调电机 Air Conditioner Motor	座椅电机 Seat Motor	油泵电机 Fuel Pump Motor
			
割草机 Lawn Mover	冷却风扇 Cooling Fan Motor	跑步机 Tread Mill	雨刮电机 Wiper Motor
			
ABS防抱死电机 ABS Antilock Motor	EPS电机 EPS Motor	助力电机 Assisted Motor	启动电机 Start Motor

## 磁性参数 Performance Characteristics

铁氧体性能牌号 Magnetic Properties Table of Ferrite magnets

牌号 Grade	航天磁牌号 Spacemagnets	HT Y35H-2	HTY40-1	HTY40	HTY40NS	HTY45	HTY45B	HTY48	Ht4553	Ht4639
性能 Properties	MMPA	C8	C10	C12						
	TDK			FB6B	FB6B	FB9H		FB9B	FB12H	
剩磁 Br (mT) (Gs)	典型值 (Type)	390 (3900)	405 (4050)	420 (4200)	425 (4250)	410 (4100)	430 (4300)	430 (4300)	450 (4500)	470 (4700)
	最小值 (min)	380 (3800)	400 (4000)	410 (4100)	415 (4150)	400 (4000)	420 (4200)	420 (4200)	440 (4400)	460 (4600)
矫顽力 Hcb (kA/m) (Oe)	典型值 (Type)	267 (3350)	267 (3350)	302 (3800)	295 (3700)	314 (3950)	314 (3950)	330 (4150)	330 (4150)	302 (3800)
	最小值 (min)	259 (3250)	259 (3250)	290 (3650)	283 (3550)	302 (3800)	302 (3800)	318 (4000)	318 (4000)	295 (3700)
内禀矫顽力 Hcj (kA/m) (Oe)	典型值 (Type)	275 (3450)	275 (3450)	318 (4000)	311 (3900)	398 (5000)	358 (4500)	398 (5000)	422 (5300)	322 (4050)
	最小值 (min)	267 (3350)	267 (3350)	307 (3850)	299 (3750)	386 (4850)	346 (4350)	386 (4850)	406 (5100)	310 (3900)
最大磁能 (BH)max (kJ/m <sup>3</sup> ) (MGOe)	典型值 (Type)	28.6 (3.6)	31 (3.9)	33.4 (4.2)	34.2 (4.3)	31.8 (4.0)	35.0 (4.4)	35.0 (4.4)	39 (4.9)	41.4 (5.2)
	最小值 (min)	27.1 (3.4)	30.2 (3.8)	31.8 (4.0)	32.6 (4.1)	30.2 (3.8)	33.4 (4.2)	33.4 (4.2)	37.4 (4.7)	39.7 (5)

# 2 铁氧体磁环 Ferrite Ring Magnets

## 工艺装备 Technique Equipment

- 航天磁电是行业内少有的全部采用全自动电窑大规模批产永磁铁氧体磁环生产的企业，“航天磁”品牌Y30、Y35、Y40等磁环以磁性能高、一致性强的特性在电声行业具有较高的声誉，是北京天安门广场声柱扬声器磁体的供应单位。目前公司环磁事业部拥有全自动电窑生产线10条，具备年产高性能铁氧体喇叭磁环1.2万吨、微波炉磁环4000吨的能力。

Our company is one of the few production enterprises which totally adopt large-scale automatic electric kilns for batch production of permanent magnetic ferrite ring. "Aerospace Magnet" brand Y30, Y45 and Y40 magnetic ring is famous and reputable for its high magnetic performance and strong consistency in the acoustic industry, which is also the speaker magnet supplier for the column in Beijing's Tiananmen Square. At present, our company magnetic ring business division has 10 full-automatic electric kiln production lines, with an annual output of 12,000 tons of high-performance ferrite trumpet magnetic ring and 4,000 tons of microwave oven.

- 公司铁氧体磁环事业部拥有先进的管道送料系统、全自动永磁铁氧体液压机46台，双推板隧道电窑10条，双端面磨床15台，超声波清洗机6台。

With advanced ferrite magnet ring pipeline conveying system, the company has 46 sets of full-automatic permanent ferrite magnet hydraulic machines, 10 sets of double push board channel electric kilns, 15 sets of parallel surface grinding

- 近年来公司不断引进行业内最新自动化生产设备，在投料、料浆输送、成型、烧结、磨洗等工序实现了全自动操作，降低了人为因素影响，“航天磁”磁环产品的质量水平提升进入了新层次。

Recently, our company continuously brings in the latest industrial automatic production equipment, so the full-automatic operation in the processes of feeding, slurry conveying, molding, sintering, grinding and cleaning has been realized to reduce the artificial factors and improve the quality of "Aerospace Magnet" ring to a new level.





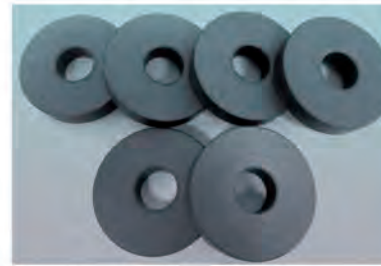
## 产品及应用 Product & Application



扬声器磁环  
Loudspeaker Magnet Ring



喇叭磁  
Trumpet Magnet



微波炉磁  
Microwave Magnet

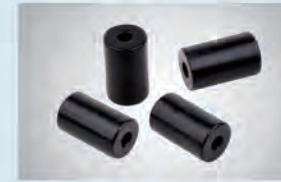
## 磁性参数

### Performance Characteristics

铁氧体性能牌号 Magnetic Properties Table of Ferrite magnets

牌号 Grade	航天磁牌号 Spacemagnets	HTY30	HTY35	HTY35B	HTY40B
	性能 Properties	MMPA	C5	C8	
	TDK				
剩磁 Br (mT) (Gs)	典型值 (Type)	395 (3950)	410 (4100)	410 (4100)	420 (4200)
	最小值 (min)	390 (3900)	405 (4050)	405 (4050)	415 (4150)
矫顽力 Hcb (kA/m) (Oe)	典型值 (Type)	199 (2500)	207 (2600)	227 (2850)	247 (3100)
	最小值 (min)	191 (2400)	199 (2500)	218 (2740)	239 (3000)
内禀矫顽力 Hcj (kA/m) (Oe)	典型值 (Type)	201 (2530)	209 (2630)	235 (2950)	249 (3130)
	最小值 (min)	193 (2430)	201 (2530)	227 (2850)	241 (3030)
最大磁能 (BH)max (kJ/m <sup>3</sup> ) (MGOe)	典型值 (Type)	29.8 (3.75)	31.8 (4)	31.8 (4)	33.4 (4.2)
	最小值 (min)	27.9 (3.5)	30.2 (3.8)	30.2 (3.8)	32.6 (4.1)

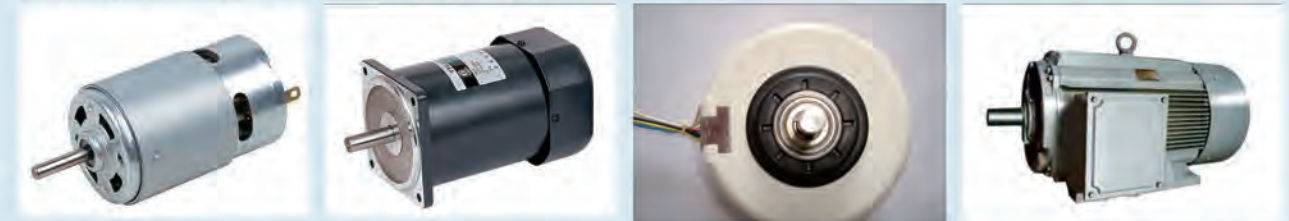
## 多级磁环 Multi-pole Magnetic Ring



使用多级磁环的直流无刷电机，有以下优点：使用寿命长、效率高、节能效果好、运行性能佳、应用环境条件宽、制造工艺简单方便、维护工作量少。  
Brushless DC motors with multi-pole magnetic ring have the following advantages: long service life, high efficiency, good energy saving effect, good running performance, broad application of environmental conditions, simple manufacturing process and less maintenance workload.

用途：可以用于直流无刷电机，现有两种多级磁环可用：一种是铁氧体多级磁环，其表磁一般都在2000GS以下，价格便宜性价比高；另一种是粘结钕铁硼多级磁环，其表磁可达到2000GS以上，价格较高，性能较优。  
Application: multi-pole magnetic can be used in existed two different kinds of brushless DC motor: one is cheap cost-effective ferrite multi-pole magnetic ring with average surface magnet under 2000 GS; The other is bonded Nd-Fe-B multi-pole magnetic ring with higher price and better performance, but the surface magnet can reach more than 2000 GS.

### 产品及应用 Product & Application



### 部分铁氧体磁环规格尺寸和表面磁通密度一览表

#### Part Ferrite Magnet Ring Specification & Surface Magnetic Flux Density

序号 No.	规格及型号 Specification & Type	外径 OD	内径 ID	高度 Height	极数 Pole No.	表面磁通密度 (GS) Surface Flux Density
1	24*11.6*30	24	11.6	30	4	1300—2000
2	24*10*30	24	10	30	4	
3	36.2*18*25	36.2	18	25	4	
4	23*15*28	23	15	28	4	
5	44*33*33	44	33	33	4	
6	45*37*15.5	45	37	15.5	4	
7	37.5*18*30.5	37.5	18	30.5	6	
8	66*47.5*30.5	66	47.5	30.5	6	
9	37.7*16*(15-30)	37.7	16	15-30	6	
10	35.4*15*(12-28)	35.4	15	12-28	6	
11	23.4*11*(8-9.5)	23.4	11	8-9.5	8	
12	33*22*9.6	33	22	9.6	8	
13	25*13*12.6	25	13	12.6	8	
14	54*35*30	54	35	30	8	
15	53*25*24	53	25	24	8	
16	10.3*6*11.6	10.3	6	11.6	12	
17	16*9*14	16	9	14	16	
18	30*20*30	30	20	30	24	
19	25.5*17.5*20	25.5	17.5	20	24	



# 3 烧结钕铁硼 Sintered Nd-Fe-B



## 工艺装备 Technique Equipment

- 烧结钕铁硼磁体 (Nd-Fe-B) 是当今磁性能最优异的永磁体, 广泛应用在风力发电、混合动力汽车/纯电动汽车、电梯、节能家电、音响、工业节能电机、航空航天等领域。

Sintered Nd-Fe-B Magnets are the most excellent permanent magnets, which are widely used in wind power, hybrid/pure electric vehicles, elevators, energy-efficient appliances, audio, industrial energy-saving motor, aerospace and so on.

- 公司已掌握综合磁性能(BH)max (MGOe) + Hcj (kOe) ≥ 70的高性能烧结钕铁硼磁体制备技术, 批生产技术达到国内先进水平, 采用了包括组织可控的铸片工艺 (SC)、氢破碎工艺 (HD)、粒度分布可控的气流磨制粉技术 (JM)、氧含量控制技术、双合金技术、晶界扩散工艺技术等手段, 并掌握轻稀土镧铈添加技术, 降低了磁体的总稀土和重稀土添加量, 同时较大程度地提高了磁体的性能。

We have mastered integrated high-performance magnetic (BH) Max (MGOe) + Hcj (kOe) ≥ 70 production technology of sintered Nd-Fe-B magnet to meet the domestic advanced level, including controlled casting slice technology (SC), hydrogen crushing process (HD), controllable airflow grinding technology of powder particle size distribution (JM), oxygen content control technology, dual alloy technology, grain boundary diffusion technology, and light rare earth lanthanum cerium adding technology to reduce the total rare earth magnet and heavy rare earth added quantity, at the same time greatly to improve the performance of magnet.





## 产品及应用 Product & Application

### 产品 / Product

- ▶ 具有很高的磁性能 / Superior magnetic properties
- ▶ 很好的性能价格比 / Competitive cost to performance ratio
- ▶ 镀层可选择种类多 / Various plating types
- ▶ 可加工成各种形状 / Various shapes

### 应用 / Application

广泛应用航空、航天、汽车、电子、通讯、仪器仪表、医疗设备、风力发电等领域。

Sintered Nd-Fe-B magnets are widely used in aerospace, aircrafts, automobiles, electronics, communication, instrument, medical appliances and wind turbine, etc.

## 涂层性能 Coating Performance

涂层类型 Type	白锌 white Zn	彩锌 color Zn	镍 Ni	双层镍 Ni-Ni	镍铜镍 NiCuNi	环氧树脂 Epoxy
涂层厚度 ( $\beta$ m) Thickness	10-15	10-15	15-20	15-20	15-30	10-30
颜色 Color	白色 white	彩色 color	银白色 silver	银白色 silver	银白色 silver	黑色 black
中性盐雾试验 (Hr) NSS test	24	72	24	48	72	96

## 磁性参数 Performance Characteristics

烧结钕铁硼磁体 $20^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 下的磁性能

The properties of sintered Nd-Fe-B at temperature  $20^{\circ}\text{C} \pm 3^{\circ}\text{C}$

牌号 magnet grade	剩磁 Br		矫顽力 Hcb		内禀矫顽力 Hcj		最大磁能积 (BH)max		最高连续 工作温度 Tw	密度 $\rho$
	T	kGs	kA/m	kOe	kA/m	kOe	kJ/m <sup>3</sup>	MGOe	$^{\circ}\text{C}$	g/m <sup>3</sup>
N52	1.42-1.48	14.2-14.8	$\geq 836$	$\geq 10.5$	$\geq 876$	$\geq 11$	389-422	50-53	80	$\geq 7.5$
N50	1.40-1.45	14.0-14.5	$\geq 836$	$\geq 10.5$	$\geq 955$	$\geq 12$	374-406	47-51	80	$\geq 7.5$
N48	1.37-1.42	13.7-14.2	$\geq 836$	$\geq 10.5$	$\geq 955$	$\geq 12$	358-382	45-48	80	$\geq 7.5$
N45	1.32-1.37	13.2-13.7	$\geq 836$	$\geq 10.5$	$\geq 955$	$\geq 12$	342-358	43-45	80	$\geq 7.5$
N42	1.29-1.32	12.9-13.2	$\geq 836$	$\geq 10.5$	$\geq 955$	$\geq 12$	318-334	40-42	80	$\geq 7.5$
N40	1.26-1.29	12.6-12.9	$\geq 836$	$\geq 10.5$	$\geq 955$	$\geq 12$	303-318	38-40	80	$\geq 7.5$
N38	1.22-1.26	12.2-12.6	$\geq 859$	$\geq 10.8$	$\geq 955$	$\geq 12$	287-303	36-38	80	7.4-7.5
N35	1.17-1.21	11.7-12.1	$\geq 859$	$\geq 10.8$	$\geq 955$	$\geq 12$	263-279	33-36	80	7.4-7.5
N50M	1.39-1.45	13.9-14.5	$\geq 1050$	$\geq 13.2$	$\geq 1114$	$\geq 14$	374-406	49-51	100	$\geq 7.5$
N48M	1.37-1.42	13.7-14.2	$\geq 1018$	$\geq 12.8$	$\geq 1114$	$\geq 14$	366-390	46-49	100	$\geq 7.5$
N45M	1.32-1.38	13.2-13.8	$\geq 987$	$\geq 12.4$	$\geq 1114$	$\geq 14$	334-366	42-46	100	$\geq 7.5$
N42M	1.29-1.32	12.9-13.2	$\geq 955$	$\geq 12.0$	$\geq 1114$	$\geq 14$	318-334	40-42	100	$\geq 7.5$
N40M	1.26-1.29	12.6-12.9	$\geq 939$	$\geq 11.8$	$\geq 1114$	$\geq 14$	303-318	38-40	100	$\geq 7.5$
N38M	1.22-1.26	12.2-12.6	$\geq 916$	$\geq 11.5$	$\geq 1114$	$\geq 14$	287-303	36-38	100	$\geq 7.5$
N35M	1.17-1.21	11.7-12.1	$\geq 876$	$\geq 11.0$	$\geq 1114$	$\geq 14$	263-279	33-36	100	$\geq 7.5$
N48H	1.36-1.42	13.6-14.2	$\geq 1026$	$\geq 12.9$	$\geq 1273$	$\geq 16$	358-390	46-49	120	$\geq 7.5$
N45H	1.32-1.38	13.2-13.8	$\geq 987$	$\geq 12.4$	$\geq 1353$	$\geq 17$	334-366	42-46	120	$\geq 7.5$
N42H	1.29-1.32	12.9-13.2	$\geq 955$	$\geq 12.0$	$\geq 1353$	$\geq 17$	318-334	40-42	120	$\geq 7.5$
N40H	1.26-1.29	12.6-12.9	$\geq 939$	$\geq 11.8$	$\geq 1353$	$\geq 17$	303-318	38-40	120	$\geq 7.5$
N38H	1.22-1.26	12.2-12.6	$\geq 916$	$\geq 11.6$	$\geq 1353$	$\geq 17$	287-303	36-38	120	$\geq 7.5$
N35H	1.17-1.21	11.7-12.1	$\geq 875$	$\geq 11.0$	$\geq 1353$	$\geq 17$	263-279	33-36	120	$\geq 7.5$
N44SH	1.30-1.37	13.0-13.7	$\geq 995$	$\geq 12.5$	$\geq 1592$	$\geq 20$	326-358	42-45	150	$\geq 7.5$
N42SH	1.29-1.32	12.9-13.2	$\geq 963$	$\geq 12.1$	$\geq 1592$	$\geq 20$	318-334	40-42	150	$\geq 7.5$
N40SH	1.26-1.29	12.6-12.9	$\geq 931$	$\geq 11.7$	$\geq 1592$	$\geq 20$	303-318	38-40	150	$\geq 7.5$
N38SH	1.22-1.26	12.2-12.6	$\geq 899$	$\geq 11.3$	$\geq 1592$	$\geq 20$	287-303	36-38	150	$\geq 7.5$
N35SH	1.17-1.21	11.7-12.1	$\geq 876$	$\geq 11.0$	$\geq 1592$	$\geq 20$	263-279	33-36	150	$\geq 7.5$
N40UH	1.26-1.32	12.6-13.2	$\geq 939$	$\geq 11.8$	$\geq 1990$	$\geq 25$	302-334	38-42	180	$\geq 7.5$
N38UH	1.22-1.26	12.2-12.6	$\geq 915$	$\geq 11.5$	$\geq 1990$	$\geq 25$	287-303	36-38	180	$\geq 7.5$
N35UH	1.17-1.21	11.7-12.1	$\geq 875$	$\geq 11.0$	$\geq 1990$	$\geq 25$	263-279	33-36	180	$\geq 7.5$
N38EH	1.22-1.29	12.2-12.9	$\geq 907$	$\geq 11.4$	$\geq 2388$	$\geq 30$	287-318	36-40	200	$\geq 7.5$
N35EH	1.18-1.25	11.8-12.5	$\geq 875$	$\geq 11.0$	$\geq 2388$	$\geq 30$	263-295	33-36	200	$\geq 7.5$
N32AH	1.12-1.20	10.8-12.0	$\geq 860$	$\geq 10.8$	$\geq 2626$	$\geq 33$	247-279	31-35	220	$\geq 7.5$

# 4 粘结钕铁硼 Bonded Nd-Fe-B



## 工艺装备 Technique Equipment

- 粘结钕铁硼磁体是将磁粉和粘结剂均匀混合成干粉，在一定的压力下制成所需尺寸和形状的磁体压坯，并经固化、研磨光饰和表面涂装而制成。其具有可设计性强、磁性能较高、尺寸精度高、形状自由度大、经电泳涂层或一些特殊处理后其耐蚀性好、充磁方式多样化、磁极可充成多极、斜极等优点。其应用领域广泛，可用于计算机周边产品、办公自动化产品、打印机、数码产品、高档家用电器和汽车工业等的各种精密电机。

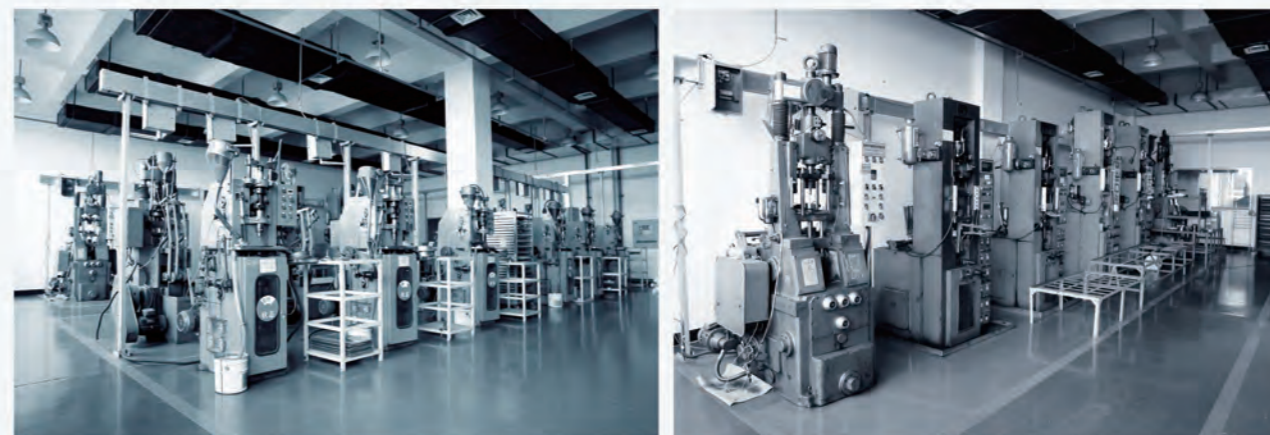
Bonded Nd-Fe-B magnets are made by magnet compaction mixed with magnetic powder and binder under a certain pressure into compact size and shape after solidifying, abrasive finishing and surface coating. It is characterized with strong design ability, high magnetic performance and dimensional accuracy and shape freedom, good corrosion resistance and multipolar magnetic poles, etc. after electrophoresis coating or some special treatment. It can be applied widely in all kinds of precision machines such as computer peripheral products, office automation products, printers, digital products, high-grade household electrical appliances and automotive industry, etc.

- 我司拥有数个半自动化制粉设备，效率高，成本低，质量稳定。

Our company has a number of semi-automatic pulverizing equipment with high efficiency, low cost and stable quality.

- 我司拥有国内领先的纯净水设备系统，为电泳工艺提供可靠保证。

Our company owns the domestic leading pure water equipment system, which could provide reliable guaranty for electrophoresis technology.





## 产品及应用 Product & Application

### 产品 / Product

- ▶ 尺寸精度高，径向尺寸无需二次加工
- ▶ 磁性能一致性好，易于大批量生产
- ▶ 耐腐蚀性好
- ▶ 磁性能的可选择范围宽，能在很大的范围内进行调整
- ▶ 充磁方式自由度大，可对磁体进行多极充磁
- ▶ Precise dimensions, no need of further machining on radial
- ▶ Good consistency of magnetic properties, easy for mass production
- ▶ Good corrosion resistance
- ▶ Very wide magnetic properties can be selected and adjusted
- ▶ Magnets can be multi-pole magnetized

### 应用 / Application

粘结磁体广泛应用于计算机周边产品、办公自动化产品、打印机、数码产品、高档家用电器和汽车工业等的各种精密马达及传感器等。如HDD、FDD、CD/DVD-ROM主轴马达，直线马达，振动马达，步进马达，伺服马达。

Bonded Nd-Fe-B magnets are most applicable in micro-motors used in computer and its peripheral apparatus, OA, digital product, high grade domestics appliances and automobiles, such as spindle motor for HDD, FDD, CD/DVD-ROM, linear motors, vibration motor, stepping motors, transducers etc.

## 磁性参数 Performance Characteristics

粘结钕铁硼磁体20°C±3°C下的磁性能表  
The properties of Bonded Nd-Fe-B at temperature 20°C±3°C

项目 Item		牌号 Grade	HT-N8	HT-N8L	HT-N8H	HT-N10	HT-N10H	HT-N10S	HT-N12	HT-N12S
剩磁 Residual Induction	Br	mT	600-650	600-650	600-650	650-700	620-680	700-750	700-750	750-800
		kGs	6.0-6.5	6.0-6.5	6.0-6.5	6.5-7.0	6.2-6.8	7.0-7.5	7.0-7.5	7.5-8.0
内禀矫顽力 Intrinsic Coercivity	Hci	kA/m	635-795	1035-1350	875-1115	635-795	915-1075	515-635	715-875	475-595
		kOe	8.0-10.0	13.0-17.0	11.0-14.0	8.0-10.0	11.5-13.5	6.5-8.0	9.0-11.0	6.0-7.5
矫顽力 Coercivity	Hcb	kA/m	360-440	400-480	400-480	400-480	400-480	360-440	440-520	400-480
		kOe	4.5-5.5	5.0-6.0	5.0-6.0	5.0-6.0	5.0-6.0	4.5-5.5	5.5-6.5	5.0-6.0
最大磁能积 Max. Energy Product	(BH) <sub>m</sub>	kJ/m <sup>3</sup>	60-68	60-68	60-68	68-80	68-80	76-84	80-95	84-95
		MGOe	7.5-8.5	7.5-8.5	7.5-8.5	8.5-10.0	8.5-10.0	9.5-10.5	10.0-12.0	10.5-12
Hk	Hk	kA/m	175-285	225-335	225-335	190-300	240-350	145-255	210-320	145-255
		kOe	2.2-3.6	2.8-4.2	2.8-4.2	2.4-3.8	3.0-4.4	1.8-3.2	2.6-4.0	1.8-3.2
饱和磁化场 Saturation Magnetizing Force	Hs	kA/m	≥1600	≥2000	≥1600	≥1600	≥1600	≥1600	≥1600	≥1600
		kOe	≥20	≥25	≥20	≥20	≥20	≥20	≥20	≥20
居里温度 Curie Temp.	Tc	°C	305	305	305	360	305	325	360	345
最高工作温度 Max. Working Temp.	Tw	°C	120-160	120-160	140-180	120-160	140-180	120-160	120-160	90-130
Br温度系数 Temp. Coefficient of Br (100°C)	α(Br)	%/°C	-0.12	-0.12	-0.13	-0.11	-0.13	-0.11	-0.11	-0.08
密度 Density	ρ	g/cm <sup>3</sup>	5.8-6.1	5.8-6.1	5.8-6.1	5.9-6.2	5.9-6.2	6.0-6.3	6.0-6.3	6.0-6.3

注 / Notes:

1. 磁性能参数为在室温 (23±3°C) 条件下测量的数据。
  2. 由于粘结磁体的性能分类繁多，以上只是主导牌号的性能。性能可以根据顾客的特殊要求进行调整。
  3. 产品的最大工作温度取决于磁路设计、产品的应用领域和几何形状尺寸。
1. The properties given above are typical date at room temperature(23±3°C).
  2. Because bonded magnets are so versatile ,this is just a dominant grade table. The magnetic properties can be adjusted to achieve customer's special request.
  3. The Max. working temperature is dependent upon the magnet design, specific application and geometry size.

# 5 钐钴磁体 Samarium Cobalt Magnet



## 工艺装备 Technique Equipment

- 公司研发的烧结钐钴磁体 ( $\text{Sm}_2\text{Co}_{17}$ ) 具有磁性能较高、居里温度高、温度系数小、抗腐蚀性强等特性，在高温环境能够保持足够高的稳定的磁性能，是高温应用（如航空、航天、军工等方面）的最佳选择。  
Our sintered ( $\text{Sm}_2\text{Co}_{17}$ ) samarium cobalt magnet has the characters of high magnetic performance, high Curie temperature, small temperature coefficient, strong corrosion resistance, strong and stable magnetic performance in high temperature, etc. which is the best choice in high temperature applications such as aviation, aerospace, military industry and so on.
- 公司已掌握了高磁能积和耐高温烧结钐钴材料的关键技术，可以批量生产XGS28H、XGS30H、XGS400-23等钐钴永磁材料。产品可应用于卫星、导弹、飞机等航空航天领域，以及行波管、速调管、磁控管、高精度加速度计电子领域。  
We has mastered the key technology of high magnetic energy product and high temperature sintered samarium cobalt material, which could produce the samarium cobalt permanent magnet materials of XGS28H, XGS30H and XGS400-23 in batches. Our products can be applied to satellite, missile, aircraft and aerospace fields, as well as the traveling wave tube, klystron, magnetron, high precision accelerometer electronics field.



## 产品及应用 Product & Application



## 磁性参数 Performance Characteristics

牌号 magnet grade	剩磁 Br		矫顽力 Hcb		内禀矫顽力 Hcj		最大磁能积 (BH)max		最高连续 工作温度 Tw	密度 ρ
	T	kGs	kA/m	kOe	kA/m	kOe	kJ/m <sup>3</sup>	MGOe	°C	g/m <sup>3</sup>
XGS30H	1.08-1.1	10.8-11	788-835	9.9-10.5	≥1900	≥25	220-240	28-30	350	8.4
XGS28H	1.03-1.08	10.3-10.8	756-812	9.5-10.2	≥1900	≥25	207-220	26-28	350	8.4
XGS26H	1.02-1.05	10.2-10.5	748-796	9.4-10	≥1900	≥25	191-207	24-26	350	8.4
XGS30	1.08-1.1	10.8-11	788-835	9.9-10.5	≥1433	≥18	220-240	28-30	300	8.4
XGS28	1.03-1.08	10.3-10.8	756-812	9.5-10.2	≥1433	≥18	207-220	26-28	300	8.4
XGS26	1.02-1.05	10.2-10.5	748-796	9.4-10	≥1433	≥18	191-207	24-26	300	8.4
XGS400-23	0.98-1.02	9.8-10.2	≥750	≥9.4	≥1900	≥25	183-199	23-25	400	8.4

# R&D and Quality System

## 技术质量体系

### 技术体系 R&D System

公司拥有完备的技术研发体系，公司是湖南省磁性材料与器件工程技术研究中心及长沙市磁性材料工艺技术研究单位，下设永磁铁氧体研究室、稀土永磁研究室、新材料研究室、智能制造研究室、磁性材料应用研究室、模具工装研究室、材料检测中心、科技管理处八个部门，拥有完备的技术开发体系和较强的科研能力，拥有一支包含博士、硕士在内的有丰富经验的专业技术人才队伍，研究涵盖磁性材料、机械、电机、表面处理、自动控制和3D打印等磁性材料研究相关领域，在磁性材料及器件开发领域取得了大量研究成果。

Our company owns a complete technology research and development system, which is also the supporting enterprise of Hunan Magnetic Material & Device Engineering Technology Research Center and Magnetic Material Processing Technology Research Center. This center consists of eight departments which are permanent ferrite magnet research office, rare-earth permanent magnet research office, new material research office, intelligent manufacturing research office, magnetic material application research office, tooling & grinding research office, magnetic material testing center and science & technology management office. Our company also has a complete technology development system, a strong scientific research ability and a professional and technical personnel team including rich experienced doctors and masters, covering magnetic material research related fields of magnetic material, mechanism, motors, surface processing, automation control and 3D printing, etc. Meanwhile, we have acquired a large number of research achievement in the magnetic material and device development field.



## 主要科研成果 Main Scientific Research Achievement

### 永磁铁氧体 | Permanent Ferrite Magnet

- ▶ FB9H, FB9B, FB12H和FB12B高性能永磁铁氧体  
FB9H, FB9B, FB12H and FB12B high performance permanent ferrite magnet
- ▶ 无稀土添加高性能铁氧体瓦磁  
High performance ferrite magnet arc without rare-earth adding
- ▶ 微波磁控管用高性能永磁铁氧体磁环  
Microwave magnetron with high performance permanent magnetic ferrite ring

### 烧结钕钴 | Sintered Samarium Cobalt Magnet

- ▶ 微波隔离器用XGS28H烧结钕钴永磁磁钢  
Microwave isolation for XGS28H sintered samarium cobalt permanent magnet
- ▶ 耐400°C高温烧结钕钴永磁磁钢  
Resistance to 400 °C high temperature sintered samarium cobalt permanent magnet

### 烧结钕铁硼 | Sintered Nd-Fe-B

- ▶ 兆瓦级风力发电机用高性能稀土磁体  
Megawatt wind turbine with high-performance rare-earth magnet
- ▶ 双合金工艺技术制备高性能S-Nd-Fe-B磁体  
High performance S-Nd-Fe-B magnet production with dual alloy technology
- ▶ N40UH和N45UH烧结钕铁硼永磁材料  
N40UH and N45UH sintered Nd-Fe-B permanent magnetic material

### 粘结钕铁硼 | Bonded Nd-Fe-B

- ▶ N11高性能微孔型粘结钕铁硼磁体  
N11 high performance micro groove bonded Nd-Fe-B magnet
- ▶ 大尺寸、高密度粘结钕铁硼磁体  
Large size, high density bonded Nd-Fe-B magnet



## 质量方针 Quality Policy

质量是“航天磁”的生命，通过预防、控制和改进为顾客提供满意的产品和服务，创“航天磁”品牌。

Quality is the Life of Spacemagnets. Based on preventing, controlling and improving, we aspire to supply our customer with satisfied products & services and perfect the brand of Spacemagnets.

## 质量体系 Quality System



## 体系认证 System Certification

公司已先后通过ISO9001, ISO14001及TS16949等质量控制体系认证，能够为客户提供优质的产品及服务。

A complete quality control system has been established with ISO9001, ISO14001 and TS16949 certifications successively, so our company could provide high quality products and services for our customers.



## 市场分布 Marketing Distribution

### 销售区域 Sales Regions

中国大陆各省份 / 美国 / 英国 / 法国 / 加拿大 / 德国 / 俄罗斯 / 瑞典 / 芬兰 / 荷兰 / 西班牙 / 波兰 / 土耳其 / 以色列 / 意大利 / 日本 / 印度 / 韩国 / 新加坡 / 泰国 / 马来西亚 / 香港 / 台湾等

### Sales Regions

Domestic Provinces, America, United Kingdom, France, Canada, Germany, Russia, Sweden, Finland, Netherland, Poland, Turkey, Iran, Israel, Italy, Japan, India, Korea, Singapore, Thailand, Malaysia, Hongkong, Taiwan, etc.

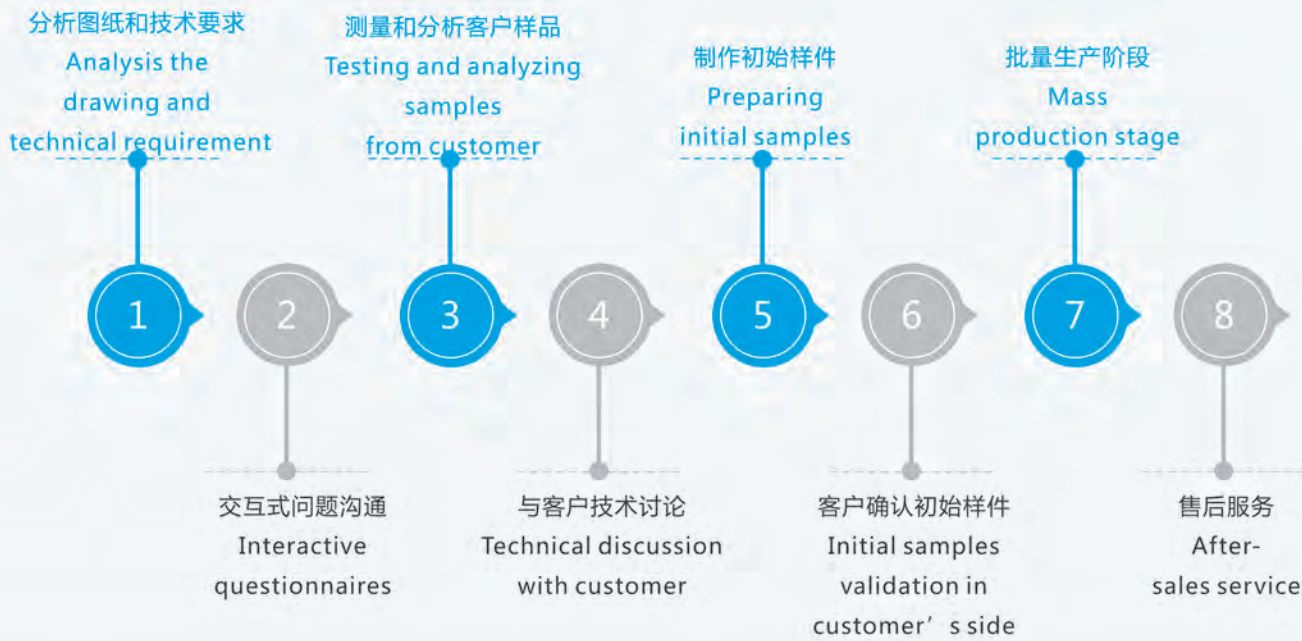


代表客户：三星，Valeo, Delphi, Emerson, TI Automotive, Nidec, 美的

Typical Customer: SAMSUNG, Valeo, Delphi, Emerson, TI Automotive, Nidec, Midea.

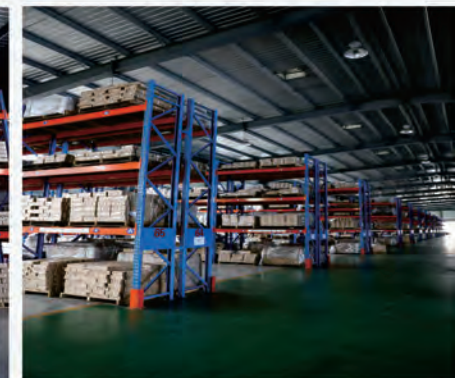
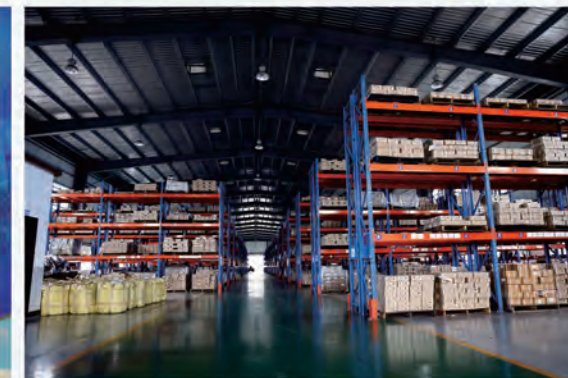


## 业务开发程序 Business Development Procedure



## 服务理念 Service Spirits

快速反应、高效行动; Response quickly and efficiently to customer's request.  
精益生产, 按期交货; Organize production carefully and delivery on time.  
携手客户, 共同开发; Work together with customer for new projects.  
帮助客户, 用好磁材; Give customer necessary training so that magnets are used perfectly.  
物流精细管理, 满足客户要求。 Good logistics management to satisfy customer.

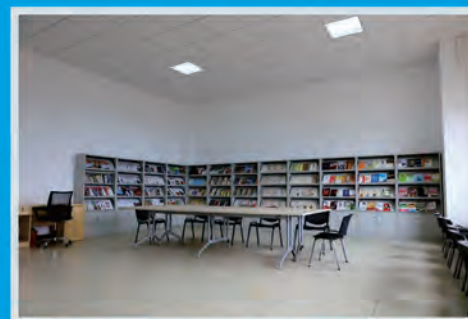


## 员工关爱 Staff Care

公司一直秉承以人为本的理念, 关心员工身体与身心健康, 重视团队建设, 实现了员工个人与公司的共同发展。  
The company has been always adhering to people-oriented concept, taking care of people's physical and mental health and focusing on the team construction to achieve the mutual development of individual and company.



职工宿舍 Staff Dormitory



职工阅览室 Staff Reading Room



职工活动中心 Staff Activity Center



职工餐厅 Staff Restaurant

## 分支机构 Outside Office

长沙总部  
电话: 0086-0731-88448208 / 88448207  
传真: 0086-0731-88448186  
邮箱: business@spacemagnets.com  
Changsha Headquarter  
Tel: 0086-0731-88448208 / 88448207  
Fax: 0086-0731-88448186  
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东莞办事处  
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Dongguan Office  
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