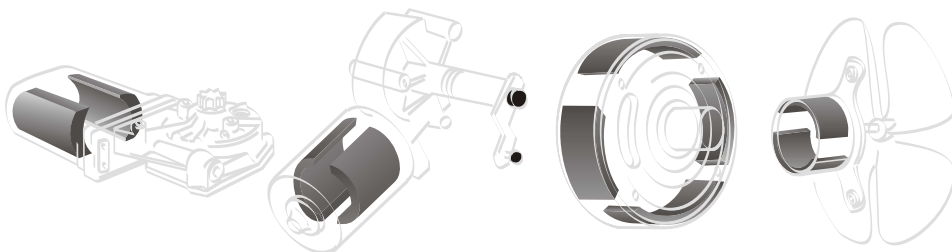


PRODUCT GUIDE

Hard Ferrite Magnets



About Hinoday



Mahindra Hinoday - The pioneers and leaders

Mahindra Hinoday pioneers the ferrite manufacturing process in India four decades ago and has continuously kept pace with the changing needs of the industry. Today as the largest manufacturer of ferrite, we offer the widest range of Hard & Soft ferrite products in the Indian sub-continent.

Leadership through Quality

An TS 16949:2008 Company

Ferrite manufacturing is highly technology intensive and involves in diverse fields like chemical, ceramic, metallurgical, mechanical, electrical & electronics engineering. Quality at our company is the outcome of continuous team effort backed by years of experience and expertise in ferrite technology, supported by the best of plant and equipment. Our quality management systems have been certified to conform to TS 16949:2008 standard. After all, most of the electronics & automotive giants in India depend on us for international quality ferrites.

A wide range of Soft & Hard Ferrites from a single reliable source.

We are fully geared to meet the ever changing and exacting demands of the rapidly growing electronics industry. The component industry traditionally being amongst the most competitive, our efforts are towards working with customers to develop new products and materials as well as improve process capability substantially, adding value to the customers. This product guide is intended to familiarise you with our range of products and help you choose the one best suited to your requirements. Of course we also would welcome your suggestion / feedback which would guide our development efforts for the future.



Ferrite Magnets for AC Generators (Flywheel Magnetos) in two and three wheelers



Ferrite Magnets for Non Automotive Applications like power tools, exhaust fans, traction motors, automatic door openers and a variety of industrial motors



Ferrite Magnets for Blower / Radiator Fan Motors



Ferrite Block Magnets in a wide range of 5gms to 2000gms

FERRITE MAGNETS

Wide Range, High Performance

Mahindra Hinoday today offers a wide range of ferrite magnets that meet the requirements of various applications in four wheelers and two wheelers.

Mahindra Hinoday ferrite magnets are used widely in India and abroad for **automotive applications like front and rear wipers, fan / blower motors, window winders, four and two-wheeler starters, flywheel magnetos etc.** Other than the automotive applications, Hinoday magnets are being increasingly used in **power tools, exhaust fans, traction motors, automatic door openers and a variety of industrial applications.**

Apart from the **broad spectrum of material grades** for meeting customer requirements in various fields, our manufacturing facilities have been designed to produce a wide range of shapes and sizes. In addition to arc segments, which vary from **as small as 25gms to as big as 350gms**, we also manufacture **slabs and cut slab magnets, starting from 5gms to 2000gms.**

MANUFACTURING FLEXIBILITY

The manufacturing set up at Mahindra Hinoday offers **flexibility in terms of quantities delivered per month.**

Our manufacturing facilities can cater to lot sizes **as small as 10k per month to over 1 Million per month, with high cost efficiency.**

ENHANCING CUSTOMER COMPETITIVENESS

We take continuous efforts in the areas of plant productivity and technology to achieve global standards of cost and quality, in turn, enhancing the competitiveness of our customers.



Ferrite Magnets for Wiper / Rear Wiper Motors



Ferrite Magnets in a Wide Size Range of 25gms to 350gms

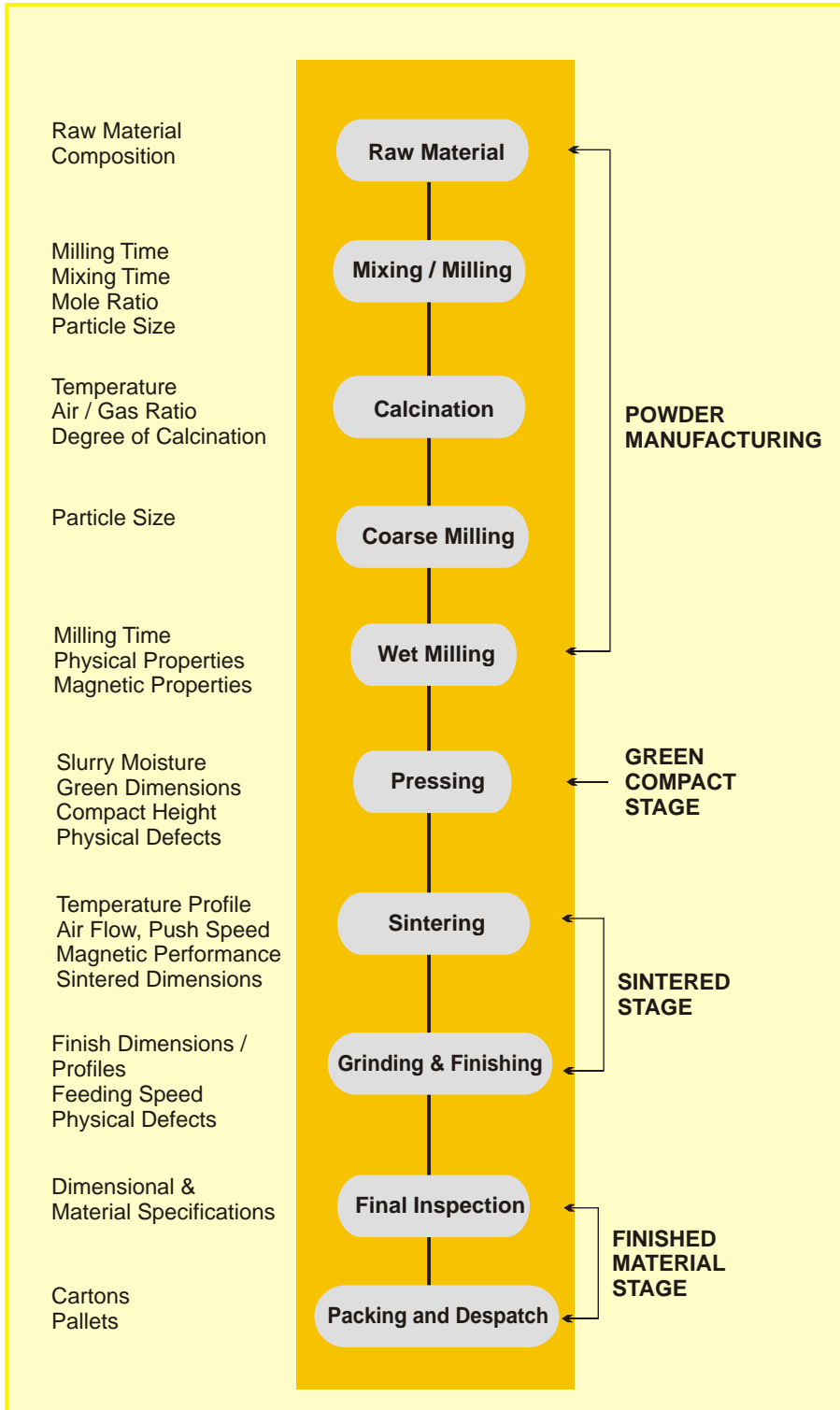


Ferrite Magnets for Window Lift Motors

Ferrite Magnets for Starter Motors in two, three and four wheelers



MANUFACTURING FACILITIES AND QUALITY PROCESS



200 and 300 T Hydraulic Presses with automatic pickup and retrieval.



Roller Hearth, Gas fired 75 metres long, world scale sintering kiln.



Multispindle form grinding machine

Characteristics of Mahindra Hinoday Ferrite Magnets

Magnet Grade Name	Residual Flux Density		Coercive Force				Max. Energy Product		Material	Directional Properties
	Br		Hc / bHc / Hcb		iHc / jHc / Hcj		(BH)max			
	kGauss	Tesla	kOersted	kA/m	kOersted	kA/m	MGOe	kJ/cu.m.		
CB-1B	3.9 ~ 4.2	0.39 ~ 0.42	1.8 ~ 2.2	143 ~ 176	1.8 ~ 2.2	143 ~ 176	3.5 ~ 4.1	27.8 ~ 32.7	BaO.nFe2O3	Anisotropic
CB-1BB	3.8 ~ 4.1	0.38 ~ 0.41	2.2 ~ 2.6	175 ~ 207	1.8 ~ 2.2	143 ~ 176	3.4 ~ 4.0	27.0 ~ 31.9	BaO.nFe2O3	
CS-2A	4.1 ~ 4.35	0.41 ~ 0.435	2.7 ~ 3.2	214 ~ 255	1.8 ~ 2.2	143 ~ 176	4.0 ~ 4.4	31.8 ~ 35.1	SrO.nFe2O3	Anisotropic
CS-2B	3.7 ~ 4.0	0.37 ~ 0.4	3.1 min	246 min	3.4 ~ 3.9	270 ~ 311	3.2 ~ 3.8	25.4 ~ 30.3	SrO.nFe2O3	
CS-2D	3.8 ~ 4.1	0.38 ~ 0.41	3.15 min	250 min	3.5 min	278 min	3.6 ~ 4.1	28.5 ~ 32.5	SrO.nFe2O3	
CS-2E	3.6 ~ 4.0	0.36 ~ 0.4	3.3 ~ 3.8	262 ~ 303	3.9 min	310 min	3.0 ~ 3.8	23.8 ~ 30.3	SrO.nFe2O3	
CS-2F	3.6 ~ 3.9	0.36 ~ 0.39	3.3 ~ 3.8	262 ~ 303	4.8 min	381 min	3.0 ~ 3.6	23.8 ~ 28.7	SrO.nFe2O3	
CS-5B	4.2 ~ 4.4	0.42 ~ 0.44	2.7 ~ 3.0	214 ~ 239	2.7 ~ 3.1	214 ~ 247	4.15 ~ 4.6	33.0 ~ 36.7	SrO.nFe2O3	Anisotropic
CS-5D	4.0 ~ 4.2	0.4 ~ 0.42	3.2 ~ 3.7	254 ~ 297	3.4 min	270 min	3.8 ~ 4.2	30.2 ~ 33.4	SrO.nFe2O3	
CS-5E	3.9 ~ 4.1	0.39 ~ 0.41	3.5 ~ 4.0	278 ~ 318	3.9 min	310 min	3.6 ~ 4.0	28.6 ~ 31.9	SrO.nFe2O3	
CS-5F	3.8 ~ 4.0	0.38 ~ 0.4	3.4 ~ 3.9	270 ~ 310	4.3 min	342 min	3.4 ~ 3.8	27.0 ~ 30.3	SrO.nFe2O3	
CS-6B	4.2 ~ 4.4	0.42 ~ 0.44	2.9 ~ 3.3	230 ~ 263	3.0 ~ 3.4	238 ~ 270	4.15 ~ 4.6	33.0 ~ 36.7	SrO.nFe2O3	Anisotropic
CS-6D	4.1 ~ 4.3	0.41 ~ 0.43	3.1 ~ 3.6	246 ~ 286	3.4 min	270 min	4.0 ~ 4.4	31.8 ~ 35.0	SrO.nFe2O3	
CS-6E	4.0 ~ 4.2	0.4 ~ 0.42	3.5 ~ 4.0	278 ~ 318	3.9 min	310 min	3.8 ~ 4.2	30.2 ~ 33.4	SrO.nFe2O3	
CS-6F	3.9 ~ 4.1	0.39 ~ 0.41	3.4 ~ 3.9	270 ~ 310	4.3 min	342 min	3.6 ~ 4.0	28.5 ~ 31.8	SrO.nFe2O3	
CS-8D	4.2 ~ 4.4	0.42 ~ 0.44	3.2 ~ 3.7	254 ~ 294	3.4 min	270 min	4.2 ~ 4.6	33.4 ~ 36.6	SrO.nFe2O3	Anisotropic
CS-8E	4.1 ~ 4.3	0.41 ~ 0.43	3.6 ~ 4.1	286 ~ 326	3.9 min	310 min	4.0 ~ 4.4	31.8 ~ 35.0	SrO.nFe2O3	
CS-8F	4.0 ~ 4.2	0.40 ~ 0.42	3.5 ~ 4.0	278 ~ 318	4.3 min	342 min	3.8 ~ 4.2	30.2 ~ 33.4	SrO.nFe2O3	
CS-8G	3.9 ~ 4.1	0.39 ~ 0.41	3.4 ~ 3.9	270 ~ 310	4.8 min	382 min	3.6 ~ 4.0	28.6 ~ 31.8	SrO.nFe2O3	

The above properties are tested on a standard test sample. Actual properties may vary with respect to product size and shape.

- NOTES : 1) These characteristics can vary according to magnet size and shape.
 Assured characteristics are subject to consultation and agreement with customer.
 2) '*' iHc not specified as it is more or less matching with Hc

Glossary of Terms:

Anisotropic (oriented) Material is one that has better magnetic properties in a given direction.

Residual Flux Density (Br) is the magnetic induction corresponding to zero magnetizing force in a magnetic material after it is saturated in a closed circuit. It is also called 'Remanence' or 'Residual Induction'. It is measured in Tesla or Weber/sq. m. in SI & Gauss or Maxwell/sq. cm. in c.g.s. system.

Coercive force (Hc) is the demagnetizing force required to reduce the residual flux density, Br, of a material to zero in a magnetic field after it is magnetized to saturation. This is measured in A/m in SI & Oersted in c.g.s. system. The other symbols used to denote the same are bHc, Hcb.

Intrinsic Coercive Force (iHc) is the demagnetizing force required to reduce the intrinsic induction or polarization of a material to zero in a magnetic field after it is magnetized to saturation. This is also measured in A/m in SI & Oersted in c.g.s. system.

Maximum Energy Product (BH)max indicates the maximum energy a magnetic material can supply to an external magnetic circuit when operating at the maximum energy point with corresponding Bd & Hd. It represents the point of optimum utilization of the magnet material. It is measured in terms of Joules/cu. m. in SI system & megagauss-oersted in c.g.s. system.

Magnetic Flux (Ø) is a contrived but measurable concept that has evolved to describe the "flow" of magnetic field. That is, when the magnetic induction, B, is uniformly distributed & is normal to the area, A, then the flux is, $\text{Ø} = B \cdot A$

Unit Conversion Information

Item	SI System		CGS System		CGS-SI Conversion
	Symbol	Unit	Symbol	Unit	
MAGNETIC FLUX	Wb (f) Vs	weber (volt-second)	f	maxwell	$f \text{ (CGS)} \times 10^{-8} = f \text{ (SI)}$
MAGNETIC FLUX DENSITY Of MAGNETIC INDUCTION	T Wb/m ² Vs/m	tesla webers per squaremetre	B f/cm ²	gauss maxwells per square centimetre	$B \text{ (CGS)} \times 10^{-4} = T \text{ (SI)}$
MAGNETIC SCALAR POTENTIAL Of MAGNETOMOTIVE FORCE	A (t) At	ampere (turn) ampere turns	MMF H.cm	magnetomotive force gilbert	$\text{MMF (CGS)} \times 0.796 = \text{At (SI)}$
MAGNETIC INTENSITY of MAGNETISING (DEMAGNETISING) FORCE	A/m At/m	ampere / metre ampere-turn/metre	H MMF/cm	oersted gilbert/cm	$H \text{ (CGS)} \times 79.6 = A/m \text{ (SI)}$
MAGNETIC ENERGY Of ENERGY PRODUCT	TA/m J/m ³	joule joule per cubic metre	BH (E) G.Oe/cm ³	Erg gauss-oersteds per cubic cm	$\text{BH(CGS)} \times (7.96 \times 10^{-3}) = \text{J/m}^3 \text{ (SI)}$

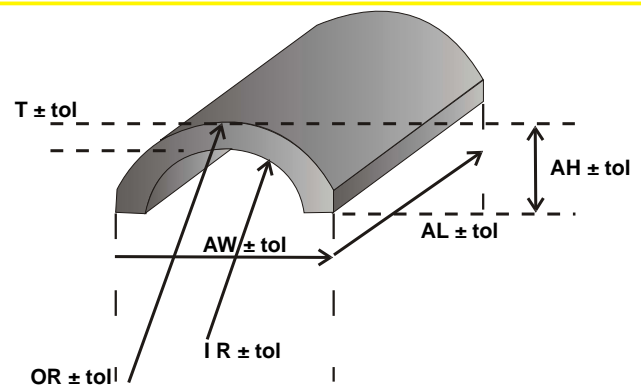
Item	Unit	Characteristic value
Specific heat	J/KgK	630~840
Thermal conductivity	W/mK	~5.8
Linear Expansion Coefficient	Anisotropic	1 /K
	Anisotropic right angle	1 /K
Electrical resistance	W ·m	>10 ²
Knuckle resistance	Kgf/mm ²	5~10
Recoil permeability	μ rec	1.0~1.1
Temperature coefficient	Δ Br/Br	%/K
	Δ Hc/Hc	%/K
Curie point	K	723~733

Physical Properties of Anisotropic Ferrites

design@directions@vsnl.com

Please specify the following while ordering:

- Shape, dimensions and tolerance
- Magnetic specifications
- Quantity (one time or repeating order)
- Application / End use of the Magnet
- Direction of Magnetisation
- Magnet acceptance inspection method
- Magnetisation requirements (magnetised) / (demagnetised)
- Other requirements



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