



CIE India

Magnetic Products Presentation

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CIE India

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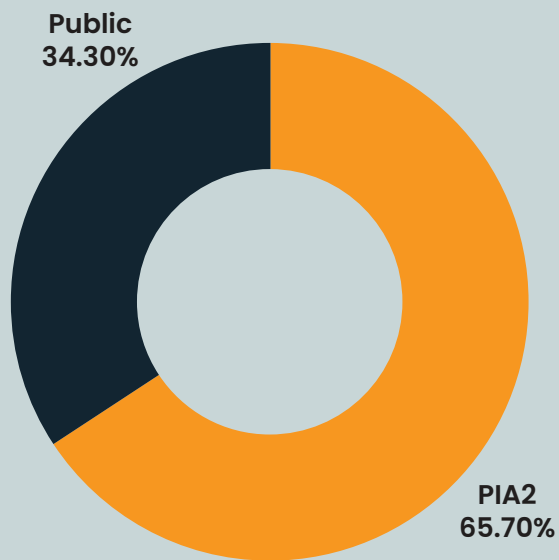


1 CIE India Overview

Who we are

CIE India is a subsidiary of CIE Automotive.

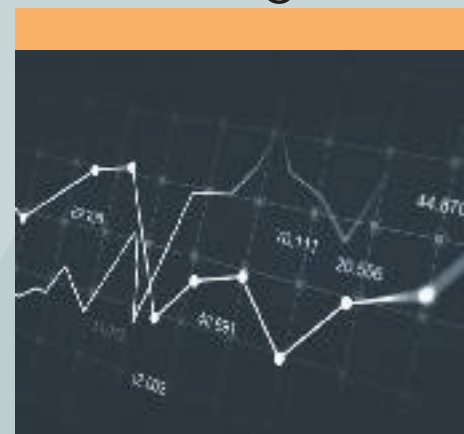
CIE India SHAREHOLDING



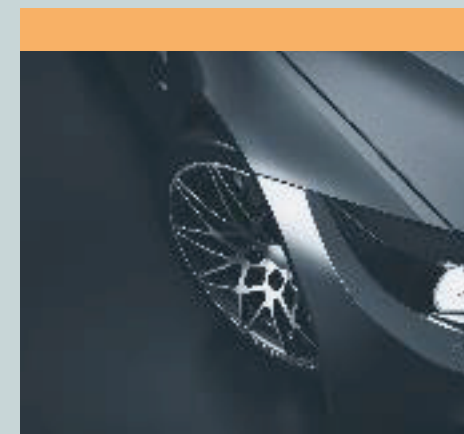
CIE India is listed on BSE and NSE in India.



33 plants and 13,000 + professionals, producing components in various countries and in various technologies.



- FORGING
- CASTING
- STAMPING
- MACHINING
- ALUMINIUM
- MAGNETS
- COMPOSITES



CIE India Global

Geographical distribution



CIE India Presence

Plant location



CIE India in Europe

Plant location

● CIE FORGING SPAIN AND LITHUANIA

- 3 Plants
- **Focused on Passenger Vehicles**

● METALCASTELLO (GEARS, ITALY)

- 1 Plant
- **Focused on Off-Highway & Agriculture**



Global Customer List

BAJAJ

KOBENSCHMIDT

BOSCH

MAHINDRA

CAT

MAN

DAIMLER

MARUTI

FIAT

NEXTEER

FORD

NIDEC

GKN

NTN

HERO

RENAULT

HYUNDAI

SAF

JLR – TATA

VOLKSWAGEN



2

Magnetic Products Division

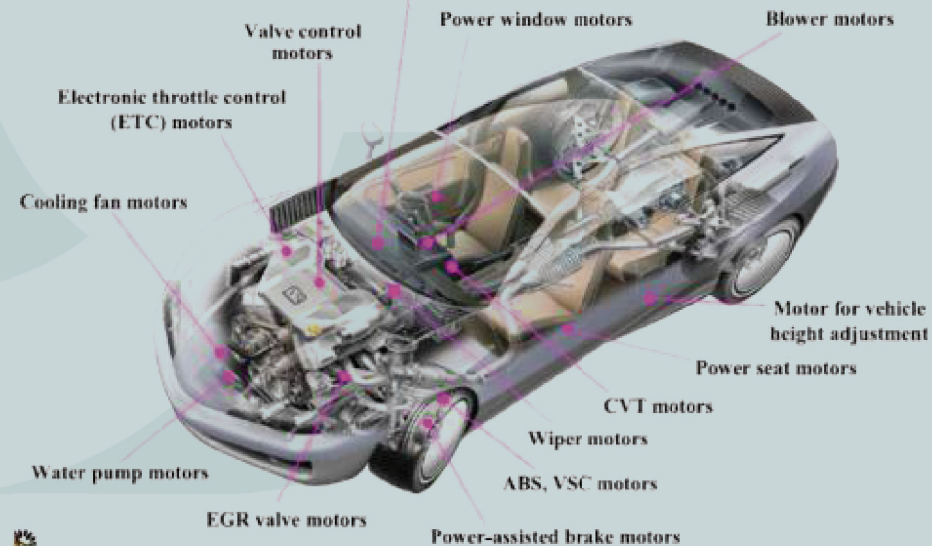
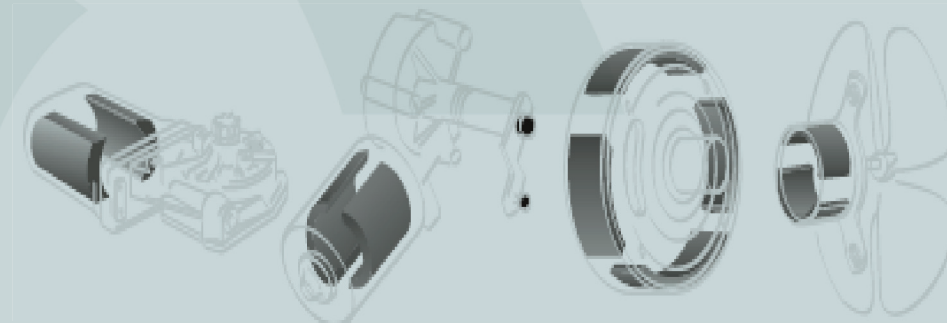
What CIE India Magnetics brings with it ...

1. 50 + years of experience in magnetic component manufacturing
2. Japanese technology absorbed, localized and developed for cost advantage
3. Reliability of supply through robust process & equipment technology
4. Single digit PPM consistency for export customers
5. Single Source for most of the customers
6. Small lot to big lot production capability for best investment efficient solution
7. Reach to cover all international locations for supply – providing local service & support

CIE India – Magnetic Products Division

Magnet

Application
Passenger Cars <ul style="list-style-type: none"> ➤ Starter motors ➤ Power Window motors ➤ HVAC/Blower motors ➤ Wiper motors ➤ Engine Cooling fan motors ➤ Sun Roof motors ➤ ETC/EGR motors ➤ Power steering
Two Wheelers <ul style="list-style-type: none"> ➤ Starter motors ➤ A/C Generators (Magnetos)



World Class Manufacturing Facility

Best Equipment from Across the Globe



Sintering Furnace from USA



Calcination Furnace from Germany



Grinding M/c made in Switzerland & China



Presses from Germany



Presses from India



Auto Chamfering Machines

Modern Press Lines



100/150 Tons press line



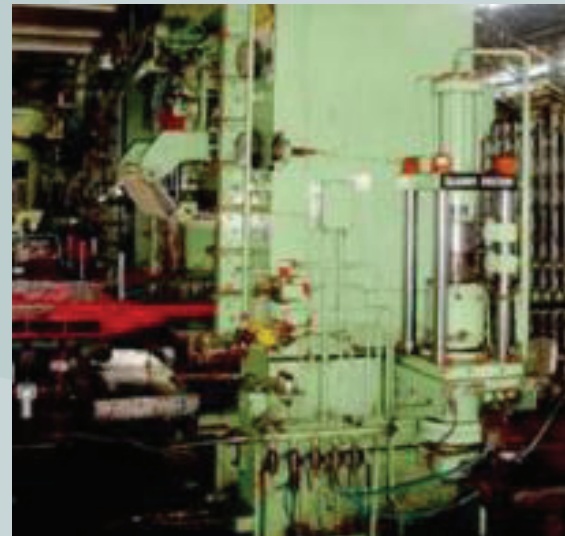
200/300 Tons press line



Material supply through pressurized closed system



Auto pick & place



Slurry injection system



PLC logic controllers for complete cycle

Tool Configuration to suit volume



150 Ton



200 Ton



300 Ton



6



20



9



32

- Expandable tool construction from 6 cavities to 32 cavities
- Long life wear resistant material
- Special material for good orientation

Sintering Kilns to suit volume



Electric Kiln



Gas Kiln



Logic controllers for total control of Sintering cycle

Form Grinding Lines



SPC checks

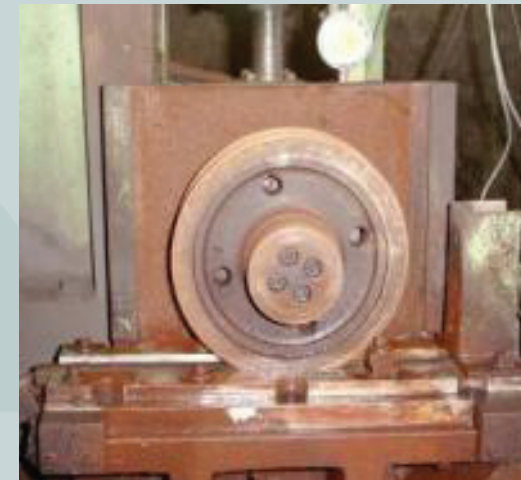
Prototype Set up



Two Cavity Pressing



Soft Tooling



Single Station Grinding



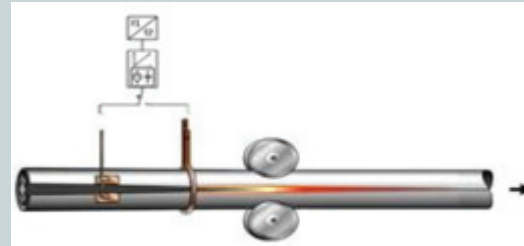
Low Cost Diamond Wheels

CIE India – Magnetic Products Division

Application

- Automotive Applications
- Lighting
- High Frequency Tube Welding
- Telecommunication Application
- Solar Energy
- Consumer Products
- Various catalogue products

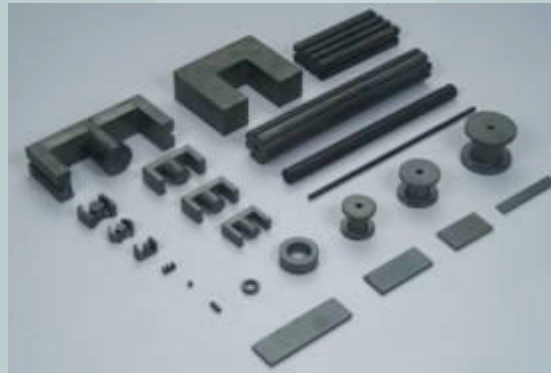
i.e. EE, EER, EFD, EP, Planar, RM, Large U/I cores, OWD Cores, Small Toroids and Impeder Cores.



High Frequency Welding



Telecom Applications



Induction Cook Top



Lighting



Laptop Chargers



Passive Keyless Entry

Quality Inspection Instruments – Investing in Quality

State of the art testing and measuring equipment used for Magnetic & Electrical parameter check at each manufacturing stage



3D Coordinate Measuring Machine



Hysteresis Loop Tracer



Universal Testing Machine



Robo
Graphic Measurement



3

PRODUCT
OFFERINGS

Products

A

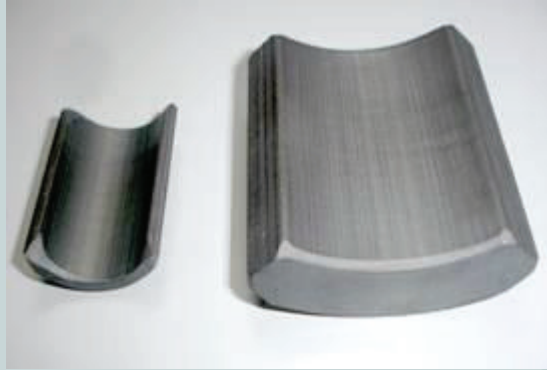


Products

B



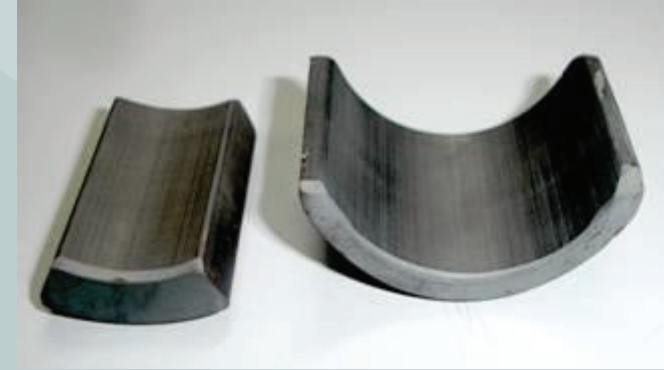
Magnet Variety: Product Range



Light to Heavy Weight



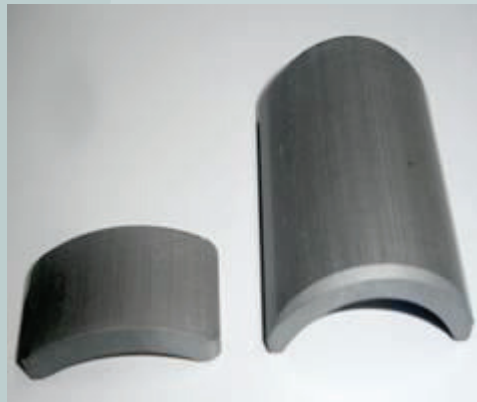
Thin to Thick



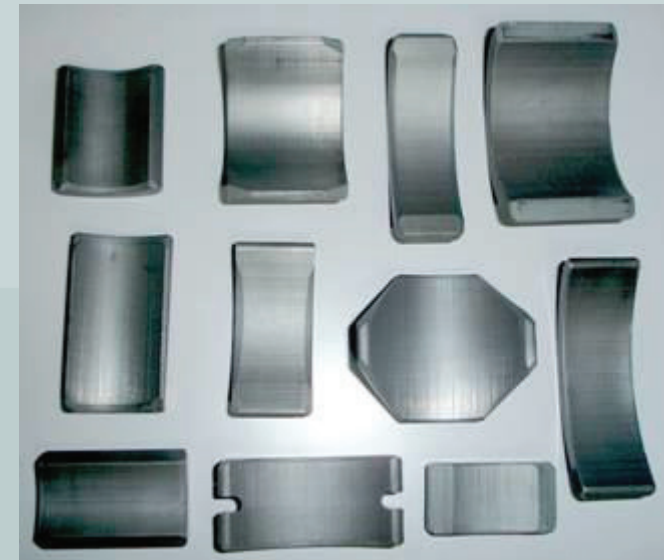
Flat to Deep Arc



Small to Wide Arc



Short to Long Arc



Variety of Foot Shapes

Magnet: Material Grades

Type: Wet Anisotropic Strontium Ferrite

Grade	Residual Flux Density		Coercive Force				Max Energy Product	
	Br		Hc / bHc / Hcb		iHc / jHc / Hcj		BHmax	
	kGauss	Tesla	kOersted	kA/m	kOersted	kA/m	MGOe	kJ/m ³
CS 2BA	4.15 - 4.25	0.415 - 0.425	2.2 - 2.6	175 - 207	2.2 - 2.8	175 - 223	4.15 - 4.45	33.03 - 35.42
CS 2BB	4.1 - 4.2	0.41 - 0.43	2.7 - 3.2	214 - 255	2.7 - 3.6	214 - 286	4.00 - 4.40	31.84 - 33.43
CS 2BD	3.7 - 4.0	0.37 - 0.40	3.10 min	246 min	3.4 - 3.9	270 - 311	3.20 - 3.80	25.47 - 30.25
CS 2BDH	3.8 - 4.1	0.38 - 0.41	3.15 min	251 min	3.5 min	278 min	3.60 - 4.10	28.66 - 32.66
CS 2BR	3.3 - 3.9	0.33 - 0.39	2.8 - 3.4	223 - 286	3.0 - 3.5	238 - 278	2.60 - 3.60	20.70 - 28.66
CS 2BE	3.6 - 4.0	0.36 - 0.4	3.3 - 3.8	262 - 303	3.9 min	310 min	3.00 - 3.80	23.88 - 30.25
CS 2BF	3.6 - 3.9	0.36 - 0.39	3.3 - 3.8	262 - 303	4.8 min	381 min	3.00 - 3.60	23.88 - 28.66
CS 5B	4.2 - 4.3	0.42 - 0.43	2.7 - 3.0	214 - 239	2.7 - 3.1	214 - 247	4.20 - 4.40	33.43 - 35.02
CS 5D	4.0 - 4.1	0.4 - 0.41	3.2 - 3.7	254 - 297	3.4 - 3.8	270 - 303	3.80 - 4.00	30.25 - 31.84
CS 5E	3.9 - 4.0	0.39 - 0.40	3.5 - 3.9	278 - 311	3.9 - 4.2	310 - 334	3.60 - 4.00	28.66 - 31.84
CS 5F	3.8 - 3.9	0.38 - 0.39	3.5 - 3.8	278 - 303	4.4 - 4.8	350 - 380	3.40 - 3.80	27.06 - 30.25

Magnet: Material Grades

Type: Wet Anisotropic Strontium Ferrite

Grade	Residual Flux Density		Coercive Force				Max Energy Product	
	Br		Hc / bHc / Hcb		iHc / jHc / Hcj		BHmax	
	kGauss	Tesla	kOersted	kA/m	kOersted	kA/m	MGOe	kJ/m ³
CS 6B	4.2 - 4.3	0.42 - 0.43	2.9- 3.3	230 - 263	3.0 - 3.4	238 - 270	4.20 - 4.40	33.43 -35.02
CS 6D	4.1 - 4.2	0.41 - 0.42	3.2 - 3.7	254 - 295	3.4 - 3.8	270 - 303	4.00 - 4.20	31.84 - 33.43
CS 6E	4.0 - 4.1	0.40 - 0.41	3.5 - 3.9	278 - 310	3.9 - 4.2	310 - 334	3.80 - 4.20	30.25 -33.43
CS 6F	3.9 - 4.0	0.39 - 0.40	3.5 - 3.8	278 - 303	4.4 - 4.8	350 - 380	3.60 - 3.80	28.66 - 30.25
CS 6G	3.7 - 3.8	0.37 - 0.38	3.3 - 3.8	262 - 302	4.8 min	382 min	3.40 - 3.80	27.06 - 30.25
CS 8B	4.3 - 4.4	0.43 - 0.44	2.9 - 3.3	230 - 263	3.0 - 3.4	238 - 270	4.40 - 4.60	35.02 - 36.62
CS 8D	4.2 - 4.3	0.42 - 0.43	3.2 - 3.7	254 - 294	3.4 - 3.8	270 - 302	4.20 - 4.40	33.43 - 35.02
CS 8E	4.1 - 4.2	0.41 - 0.42	3.5 - 3.9	279 - 310	3.9 - 4.2	310 - 334	4.00 - 4.20	31.84 - 33.43
CS 9E*	4.25 - 4.35	0.425 - 0.435	3.75 - 3.85	298 - 306	4.15 - 4.25	330 - 338	4.40 - 4.60	35.02 - 36.62
CS 9G*	4.00 - 4.10	0.40 - 0.41	3.70 -3.85	294 - 306	4.80 - 5.00	382 - 398	3.90 - 4.10	31.04 - 32.64

Soft Ferrites: Material Grades

Magnetic Characteristics of Soft Ferrites

Property	Symbol	Unit	Test condition	MSB-7C	HP400	HP-380	HP-300	HPT-450	HPT-400	HB-040	HM-030	HM-040	HM-045	GQ5C	HM-060	HM-070	HM-100**	HT-08	HT-020	HT-35	HR-4	HR-4B	HQ-023
Initial permeability ($\pm 25\%$)	μ_i	----	10kHz, 0.1mT, 25°C	2400	2200	2200	2200	2400	3000	3800	3000	4000	4500	5000	6000	7000	10000	800	2000	3400	1200	2000	2300
Flux density (min)	B_s	mT	1200A/m, 25°C	500	500	490	510	510	500	550	480	470	470	450	400	400	430	430	470	510	440	500	420
			1200A/m, 100°C	380	400	390	420	410	390	435	330	330	330	300	240	240	240	320	330	390	350	400	290
Relative loss factor (max)	$\tan\delta/\mu_i$	10^{-6}	0.25mT, 10kHz, 25°C	2	3	2	3		2		3	3	3	3	5	5	3	10	6	3	4	3	4
Relative loss factor (max)			0.25mT, 100kHz, 25°C	5	8	3	4		3	4	6	10	10	15	40	60	20	10	10	10	10	4	5
Coercive Field (max)	H_c	A/m	10KHz, 25°C	10	4	11	11	8	10	15	15	3	3	3	5	4	4	20	14	10	10	10	25
Hysteris material Coefficient (max)	η_B	$10^{-6}/mT$	25°C	1.2	1.2	1	1	1.1	1.2	0.3	0.3	0.8	1	0.8	0.6	0.5	0.2		2	1	-1	1.34	
Curie Temperature (min)	T_c	°C	----	220	210	210	210	200	220	205	180	170	170	140	130	120	120	190	170	200	240	210	170
Density (min)	d	kg/m ³	25°C	4800	4850	4850	4850	4850	4800	4900	4900	4900	4900	4900	4900	4900	4900	4850	4850	4800	4800	4800	4700
Temperature Coeff. of permeability (max)	α_F	$10^{-6}/°C$	-40 to 85°C	4	4	4	4	2.5	1.5	1.2	1.2	3	2.5	3	2	2	2	± 3	± 0.4	2	8	13	3
Resistivity (min)	ρ	Ωm	25°C	5	5	5	8	3	7	2	1	1	1	1	0.6	0.5	0.5	10	1	1	4	4	



4
Recognition

Quality System Certifications



IATF 16949 Certificate



ISO 14001 Certificate

CIE India in India

Evolution

**OUR FOCUS
IS TO
KEEP GROWING
AT
HIGH PACE IN
INDIA
IN
COMING YEARS**

- Investment Capacity
- Organic Growth
- Greenfields & Acquisitions
- CIE Technology Transfer to India
- New Products introduction
- Increasing Exports
- Engineering Co-Development
- Global Automotive Market State-of-the-Art Technology
- Global Platform support



CIE India

THANK YOU