



CIE India

Composites Presentation

2023

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CIE India

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CIE India

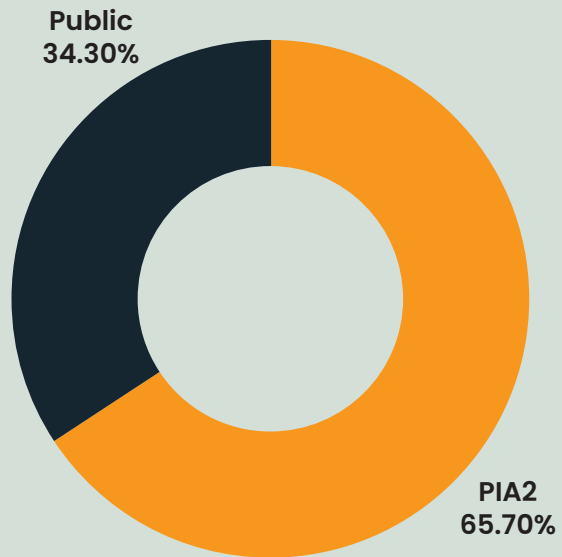
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CIE India Overview

Who we are

CIE India is a subsidiary of CIE Automotive.

CIE India SHAREHOLDING



CIE India is listed on BSE and NSE in India.



27 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

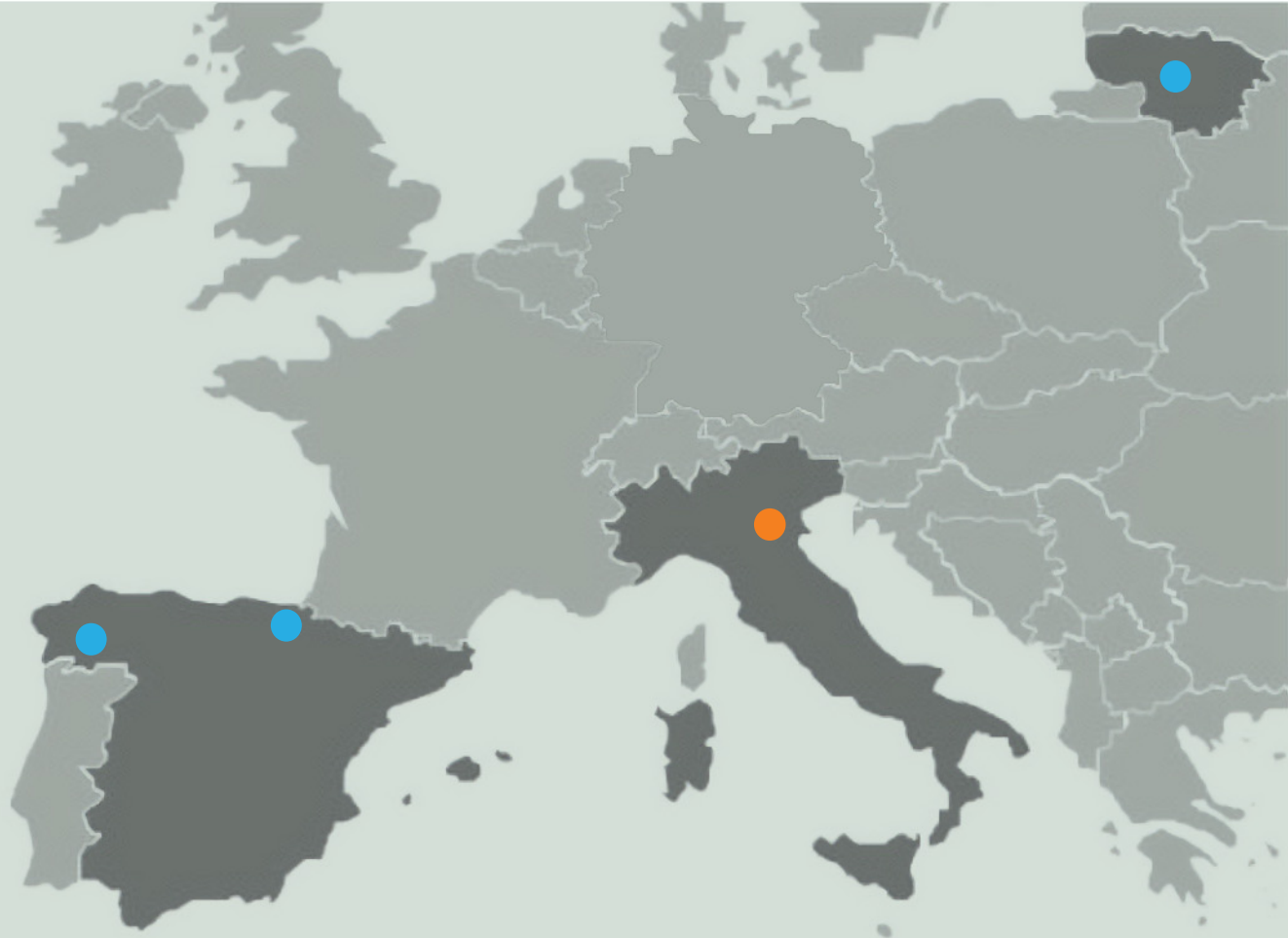


CIE India in Europe

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 Composites Division

CIE India Composites Overview

- Founded in 1982.
- Leading manufacturer in India for
Composite Materials
Composite Battery & Electric Boxes for Electric cars
Electrical Switch gear segment.
- Caters to Automotive, Electrical, Infrastructure, Alternate Energy and Defence segments.

PRODUCTS

COMPOUNDS: Sheet Moulding Compounds & Dough Moulding Compounds

COMPONENTS:

Automotive/ EV	: Battery Box, Front Fascia, Bumper, Centre Panel, Quarter Panel etc.
Farm Sector	: Fenders, Side Grills, Top Hood, Side Panels, Front Grill, Light Bezels etc.
Electrical	: MCB/ MCCB Covers, Control Panels Covers, VCB Covers, Barriers etc.
Infrastructure	: Distribution Boxes, Meter Boxes & Tank Panels.
HLU	: Bus Body Panels, CT & X-Ray Scanner Covers, Construction Equipment Hood etc.

PROCESSES

- | | | |
|--------------------------|----------------------|---------------------------|
| • Compound Manufacturing | • Injection Moulding | • Vacuum Infusion |
| • Compression Moulding | • Hand Lay Up | • Resin Transfer Moulding |

CIE India Composites Overview

LOCATION

PUNE

- Built Up Area: 6400 sq.m
- Engineering Services
- Compression Moulding Shop
- Prototyping Shop



MANUFACTURING CAPACITIES

- Compression Moulding: 13 Presses – 100T to 2000T
- Injection Moulding: 2 Presses – 200T and 250T
- SMC Compounding: 10000 Tons per annum
- DMC Compounding: 4000 Tons per annum
- HLU Moulding: Dedicated 1400 sq. m Shop Floor
- RTM Moulding: PlastechTT make 1 No.
- Prototyping: Vacuum Infusion Setup



Manufacturing Facilities

MOULDING SHOP AND EQUIPMENT

Compression Moulding Press – 2000T



Injection Moulding Press – 200T



Hand Lay Up Moulding Shop



Compression Moulding Shop



Manufacturing Facilities

Sheet Moulding Compound

- Glass Fibre reinforced Polyester based composites
- Primarily used in compression moulding, it can also be used in injection moulding.
- Manufactured by dispersing long strands of chopped glass fibre on a bath of thermoset resin (usually Unsaturated Polyester Resin).
- Product is in form of rolled sheets.



Dough Moulding Compound

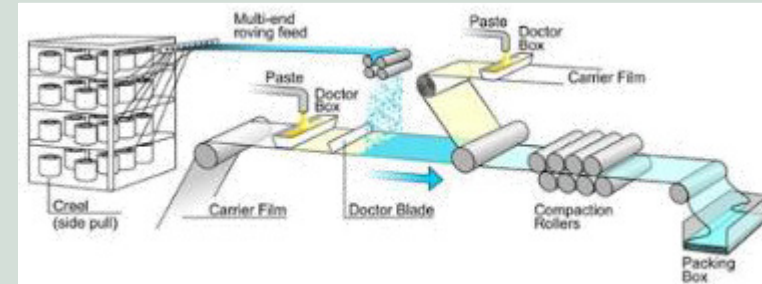
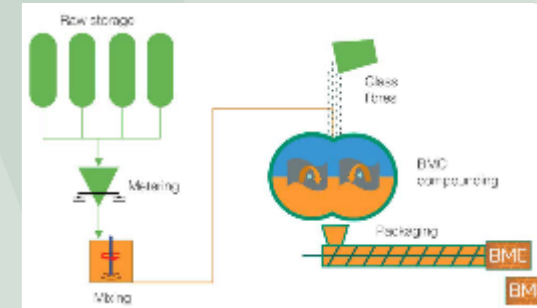
- Glass Fibre reinforced Polyester based composites
- Primarily used in injection / transfer / compression moulding.
- Manufactured by mixing glass fibre strands with thermoset resin mix usually with Unsaturated Polyester Resin.
- Product is in the form of a mass of dough.



Research And Development

FORMULATION DESIGN AND DEVELOPMENT OF COMPOUNDS

- 30 + years experience in compounding.
- Highly capable and experienced R&D and Design team.
- Largest manufacturer of compounds (SMC/DMC) in India.
- UL Certified SMC/DMC Grades (from V0 1.5 mm).
- Capable of designing and manufacturing compounds with tailor made properties.
- Pigmented compounds with 50+ shades. Shade can be developed as per requirement/ RAL codes.
- Mechanical & Electrical testing facility.
- National & International Testing Standards followed.
- Tie-up with external laboratory for special properties.

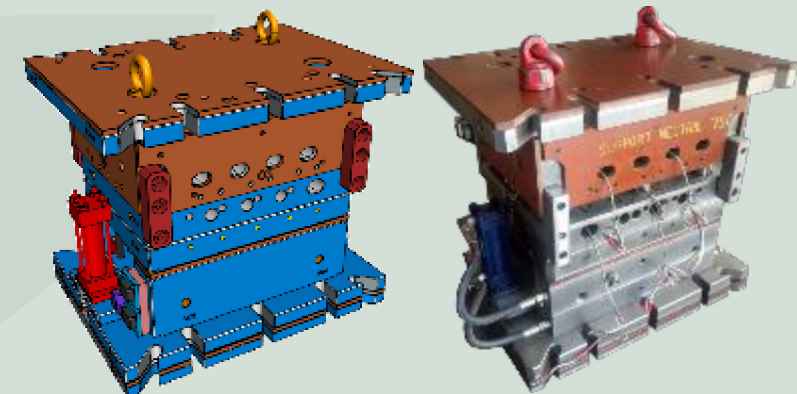
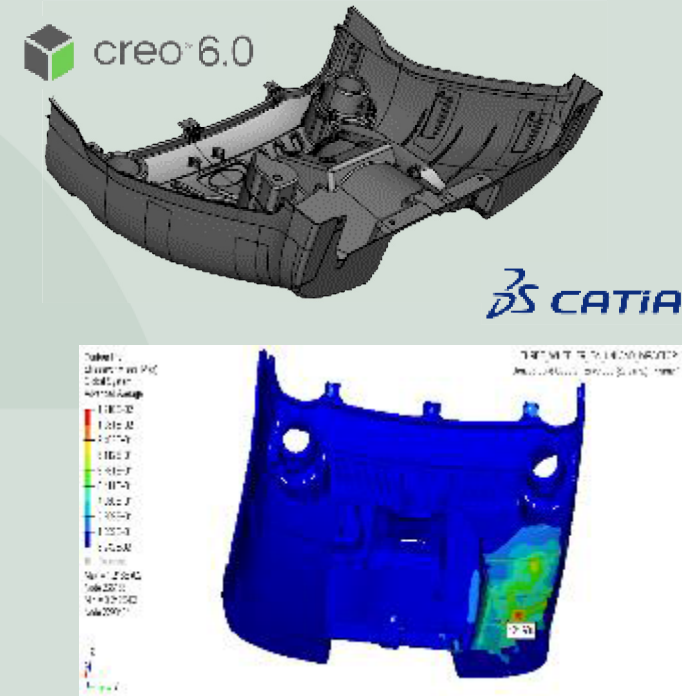


Sheet Moulding Compound (SMC)

Product And Process Engineering

DESIGN AND DEVELOPMENT OF COMPONENTS

- In-house design capability: experienced design engineers.
- State of the art design software used
 - PTC Creo Parametric 6
 - Dassault CATIA
- Support customer design team in B-side engineering and mounting strategy design for components.
- Virtual simulation of components.
- Product development capabilities – from concept to production.
- Process development capabilities.
- Ability to convert parts from other technology to composites technology.
- In-house tool design and development.
- Tool Room with a highly experienced team.



Laboratory And Testing Facility

GENERAL



Brookfield Viscometer



Oil Bath



Air Oven



Muffle Furnace



Laboratory Kneader



Karl Fischer Apparatus



Moisture Balance



Disperser



Reactivity Meter



Specific Gravity Balance



Spectrophotometer



Water Bath

Laboratory And Testing Facility

MECHANICAL AND THERMAL



Universal Testing Machine
For
Tensile Properties
Flexural Properties
Compressive Properties



Charpy Impact Tester



Izod Impact Tester



Heat Distortion Temperature Apparatus (HDT)

Laboratory And Testing Facility

ELECTRICAL



Arc Resistance Tester



Tracking Index Tester



Programmable Dielectric Strength Tester
up to 50 KV



Insulation Resistance Tester
Range 50k to 1G Ohm



High Voltage Tester
Range upto 4KV



Surface & Volume Resistivity Tester
Range 10^9 to 10^{16} Ohm/Ohm-cm

Composites In Electrical Industry

ELECTRICAL APPLICATIONS

- SMC & DMC are used in electrical applications due to excellent electrical insulation properties, higher fire protection level, good mechanical and thermal resistivity with cost performance.
- Flexibility of getting wide range of electrical and mechanical properties.
- Can be designed for dissipation of static electricity also – a property between metal and traditional composite. Useful in applications like Explosion Proof Enclosures for the mining industry.
- Pioneer in designing formulations.

APPLICATIONS

- Low and Medium Voltage Energy Systems
- Fuses and Switchgear
- Cabinets and Junction Boxes
- Motor and Anchor Insulation
- Encapsulation of Wiring and Electronic Circuits
- Electrical Components with reduced Surface Resistivity
- Lamp Housing



DMC MCB
Covers



Explosion Proof
Enclosure

Composites In Electrical Industry

UL APPROVED GRADES : SMC AND DMC

	Characteristic	Method	Unit	SMC 405	SMC 405	SMC 405	DMC 615	DMC 606	DMC 655
	Glass Percentage	-	-	20	25	30	16 - 18	16	24 - 26
Physical Properties	Specific Gravity	ASTM D 792	-	1.75 - 1.85	1.75 - 1.85	1.75 - 1.85	1.80 - 1.90	1.75 - 1.90	1.80 - 1.95
	Moulding Shrinkage(Avg)	ASTM D 995	in/in	0.0015	0.0015	0.0010	0.0015	0.0013	0.0010
	Water Absorption (max)	ASTM D 570	%	0.20	0.20	0.20	0.30	0.25	0.20
	* Limiting Oxygen Index (Avg)	ASTM D-2863	%	30	30	30	35	30	35
	Heat Deflection Temp. @ 264 psi (Avg)	ASTM D 648	° F	400	400	500	400	360	400
	Flammability	UL 94	Score	V0 (2.5 mm)	V0 (2.5 mm)	V0 (2.5 mm)	V0 (1.6-2.0 mm)	V0 (1.6 mm)	V0 (1.6 mm)
Mechanical Properties	Flexural Strength (Avg)	ASTM D 790	Psi	18500	23500	25600	12500	12090	14225
	Tensile Strength (Avg)	ASTM D 638	Psi	10000	10700	12000	5000	5690	6400
	Izod Impact Strength (Avg)	ASTM D 256	Ft.lb / Inch	6	10	18	3.5	4.0	7.0
	Compressive Strength (Avg)	ASTM D 695	Psi	22000	25500	28500	21335	21335	25602
Electrical Properties	Arc Resistance (min)	ASTM D 495	Seconds	180	180	180	185	180	180
	Tracking Index (min)	ASTM D 2303	minutes	1000	1000	1000	1000	1000	1000
	Volume Resistivity (Avg)	ASTM D 257	Log ₁₀ ohm-cm	14	14	14	14	12	13
	Surface Resistivity (Avg)	ASTM D 257	Log ₁₀ ohms	12	12	12	12	11	12
	Dielectric Strength in oil @ 90°C (Avg)	ASTM D-149	VPM	350	350	381	350	305	350

Composites In Infrastructure Industry

DISTRIBUTION AND METER BOX



Product Code	Length	Breadth	Depth
Electra 105	296	196	102
Electra 140	390	225	140
Electra 160	252	251	160
Electra 190	417	306	193
Electra 200	322	270	202
Electra 200H	450	375	200
Electra 210	417	306	210
Electra 260	845	344	260
Electra 440	440	250	130+105
Electra 500	503	305	235
Electra 570	570	300	230
Electra 900x350	900	350	250
Electra 900x450	900	450	260

- Excellent insulating property, heat resistance, weatherability
- No toxic emission in the event of fire, halogen free material
- Protection against fire, dust and water
- Free from rusting, maintenance, denting
- Good resistance to thermal shocks & corrosive atmosphere
- Specially designed concealed hinges, locking facility and lids that make them free from tampering and pilferage
- Not prone to theft – cannot be sold in open market
- Available in grey/ off white/ cream white colours



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Products

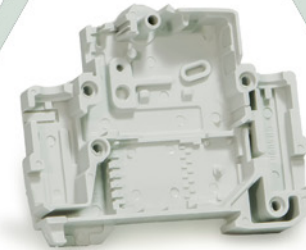
Products

Automotive



Products

Others



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