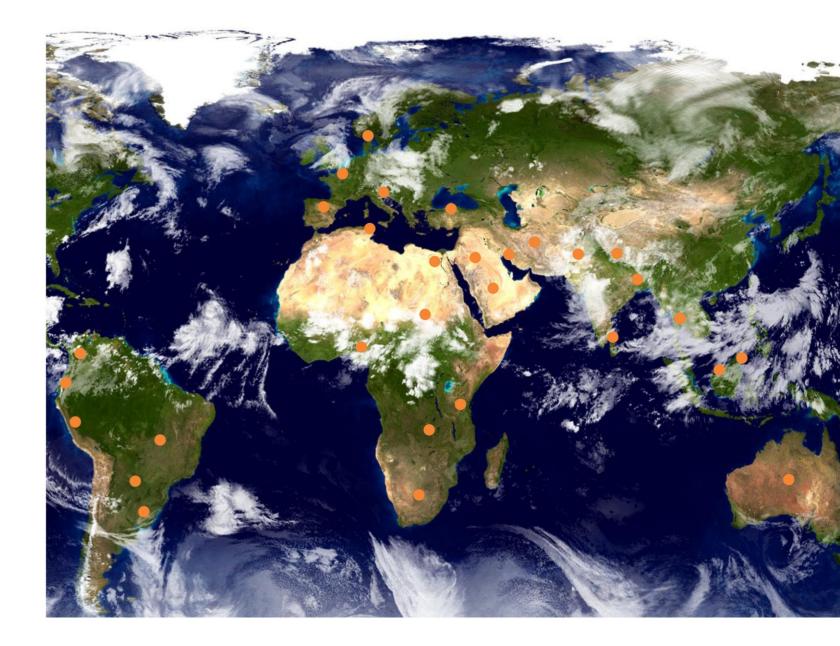


The name 'Vardhman' indicates:

Progress, Prosperity, Growth, Enhancement, Empowerment. Enrichment.....

Vardhman - The Most Relied Name In CRGO Products

...and our Products to the World.



Global Footprint: In 35 Countries

1.	Australia	8.	Ghana	15.	Muscat	22.	Peru	29.	Tanzania
2.	Bangladesh	9.	Indonesia	16.	Nepal	23.	Saudi Arabia	30.	Thailand
3.	Brazil	10.	Iran	17.	Netherland	24.	Sharjah	31.	Tunisia
4.	Colombia	11.	Iraq	18.	New Zealand	25.	South Africa	32.	Turkey
5.	Egypt	12.	Italy	19.	Nigeria	26.	Spain	33.	U.A.E
6.	Ecuador	13.	Kuwait	20.	Pakistan	27.	Sri Lanka	34.	Uruguay
7.	France	14.	Malaysia	21.	Paraguay	28.	Sudan	35.	Zambia

A Habit Called

Leadership:

Vardhman Stampings Pvt Ltd (VSPL) is India's fastest-growing Transformer Components manufacturing company, with rapidly expanding global footprints. It also is a prominent presence in the country's Transformer Industry.

Backed by state-of-the art technology, VSPL has capacity to manufacture **more than 50,000 MT per annum – the highest output in India.** And the company views the satisfied opinions and words-of-mouth of its **200-plus long-term, repeat customers** as its strongest promotional methodology.

Vardhman is a **Government of India-recognized Star Export House, and the country's most relied name in CRGO Products** – an evolved sum of its experience, expertise, and quality of enterprise.

Vardhman believes meeting customer expectations is its solemn duty, and this belief motivates the company to continuously improve on all fronts, and always give its best.

- ISO 9001:2008 (DNV, Netherlands)
- OHASAS 18001: 2007 (DNV, Netherlands)
- Government of India-recognized Star Export House

Product Range:

- Built Core
- Radiators
- Toroidal Core

- CRGO Slit Rolls
- Shunt Reactor
- Transformer Lamination

- Current Transformers
- Tank/Yoke Shunt
- Wound Core

A Constant Called

Change:

Carrying long tradition of excellence in business, Vardhman believes that continuous growth is the only way of life, and the company has been prospectively expanding their corporate horizons, banking on its varied experiences.

In 2013, Vardhman began a concerted drive to widen its presence globally, by starting export to 20 new strategic markets overseas. This took its overall span of export to more than 35 countries. And consequentially, it began enhancing its product range to meet worldwide requirements and market trends.

It has set up a new manufacturing plant in Thailand – Vardhman Trafo-Components (Thailand) Company Limited, to value-add the manufacturing capabilities of its state-of-the-tech factories in various strategic parts of India, and to better serve its customers in South East Asian countries.

Alongside this new, concentrated focus on overseas markets, Vardhman began trading transformer items other than CRGO products globally, and **established** a new single-window trading arm, VEL Elecsteel DMCC, in Dubai.

Areas of Activity:

- Engineering
- Packaging
- Transformer Components

- Metal Trading
- Pharmaceuticals



An Incubator for

Excellence:

LIST OF TESTING EQUIPMENT

Sr. No.	Description	Make
1	Single Sheet Tester	Dr. Brockhaus, Germany
2	Ring Core Tester	Dr. Brockhaus, Germany
3	Epstein Tester	Dr. Brockhaus, Germany
4	Franklin Tester	Dr. Brockhaus , Germany
5	Single Sheet Tester	Soken, Japan
6	Power Analyzer	Yokogawa WT-230, Japan
7	Particle Measuring System	Lasair, USA
8	Instrument Transformer Test Set	Source - Domestic
9	Standard CT (5 to 3000/5A, 0.05 Cl)	Source - Domestic
10	Current Source 3600A, 12 KVA	Source - Domestic
11	HV Tester – 5 KV	Source - Domestic
12	Resistance Meter (2 mohms – 20 kohms)	Source - Domestic
13	Stacking Factor Testing Machine	Source - Domestic

VARDHMAN - Dr. BROCKHAUS Magnetic Material Testing Laboratory



Single Sheet Tester Ring Core Tester



Franklin Tester



Epstein Tester

Other Testing Equipments



Power Analyzer



Digital Measuring Scale



Particle Measuring System

LIST OF MAJOR MACHINERY

Sr. No.	Description	Capacity	Nos
1	Slitting line	1000mm width	3 nos
2	Slitting line	1200mm width	2 nos
3	Cut to length line with punching and V notching	1000mm x 5500mm	2 nos
4	Cut to length line with punching and V notching	640mm x 5500mm	1 nos
5	Cut to length line with punching and V notching	400mm x 2500mm	4 nos
6	Cut to length line with punching and V notching	250mm x 2000mm	1 nos
7	Cut to length line	400mm x 2500mm	1 nos
8	Gap Wound core Machine	315mm x ∞	1 nos
9	Bell Type Furnace	1.5MT / 3MT	2 nos
10	Toroid Winding Machine - for CT's and PT's	ID: 150mm OD: 1000mm Height: 200mm	1 nos
11	Toroid Tapping - for CT's and PT's	ID: 150mm OD: 1000mm Height: 200mm	1 nos
12	Shunt Reactor Core Cutting Line	Upto 1100mm OD & 300mm Height	1 nos
13	Winding Machine for Toroidal Core	CT's / PT's and Metering Device	5 nos



CNC Slitting Line -1000 mm width



Cut to length Line - 1000 mm width



Cut to length Line -1000 mm width



Cut to length Line - 640 mm width



Cut to length Line - 400 mm width



Gap Wound Core Machine

A Tradition Called Innovation:

From inception, Vardhman was spearheaded by a spirit of innovation and thrust for excellence. And over the years, this translated into various accolades, accreditations and achievements.

Here is a quick glimpse:

Vardhman:

- Is certified OHASAS 18001:2007 by DNV, Netherlands the first and only Indian Lamination Processor to be so.
- Is approved in the 400 kV Class by PGCIL, and is joining the elite ranks of 765 kV Class-approved.
- Has received NTPC (National Thermal Power Corporation Limited) approval for processing Transformer Laminations up to 1000 mm width and 5500 mm length.
- Has Three-Star Rating in Six Sigma audit, which is maintained to date.
- Has a Government of India recognized Star Export House status.
- Has installed Dr. BROCKHAUS Quality Lab, comprising of FRANKLIN Tester, Single Sheet Tester, Ring Core Tester, etc.
- Has the highest number of CNC Lines (15) in India to process entire range of Lamination.
- · Has the most advanced technology and the highest production capacity in India.
- Has registered the highest quantity of export in Laminations for Power Transformers in India.
- Has exported Lamination for Power Transformers with highest ratings (20, 50, 63, 100 & 315 MVA), in India.

A Continuum Called The **Future:**

The future of Vardhman is predicated on the commitment and capabilities of every one of its individual members. And the collective vision that powers their imagination, and fuels their endeavors everyday.

They must work towards a day and place beyond today, but THROUGH today.

In the coming decades, Vardhman will expand its founding philosophy of Global eminence seamlessly. It will **think beyond all frontiers, beyond limitations of the Present, beyond today's perceptions and prejudices, and challenge the future** – all the while, retaining respect for humankind everywhere.

Vardhman - The Most Relied Name In CRGO Products

To Draw Your Best Options in Superior Raw Materials:

Raw Materials:

VSPL is an authorized importer of Cold Rolled Grain Oriented (CRGO) Steel (the basic raw material for manufacturing Lamination and Wound Cores) from reputed overseas mills in various grades are imported in the form of mother coils. The company maintains extensive stocks of all grades, to meet the customer's qualitative and quantitative requirements.

The quality cycle at Vardhman begins with optimal quality Raw Material imported from mills around the world.

- A.K. STEEL
- ARCELOR MITTAL
- BAOSHAN IRON AND STEEL CO. LTD (BAO STEEL)
- JFE STEEL CORPORATION
- NOVOLIPETSK STEEL (NLMK)
- POSCO
- TATA STEEL (UK) LTD. (COGENT STEEL)
- THYSSENKRUPP
- VIZ STEEL
- WUHAN IRON AND STEEL CO. LTD (WISCO)



A Product Range Called The Best:

CRGO Slit Rolls:

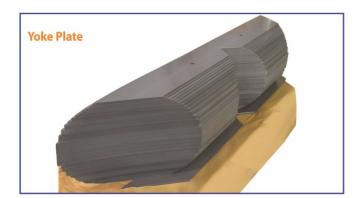
Range: 10 mm to 1000 mm width



C.R.G.O. Slit Rolls

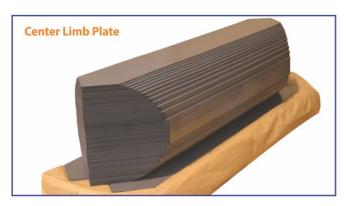
Transformer Laminations:

Range: Up to 1000 mm wide and 5500 mm long.



Custom-Made Product Solutions

- Reactor Core
- Locomotive Core
- Horizontal Step-Lap Core in 45° & 90° with option of 5/6/7 steps
- Vertical Step-Lap Core in 45° & 90° with option of 5/6/7 steps
- Over-Lap Core in 45° & 90°







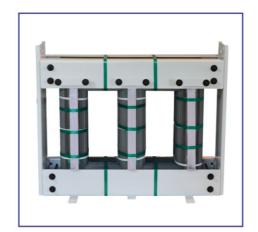


Built Core / Assembled Core:

Range: Up to 50 MVA



Cores for Cast Resin Transformers



Core for Oil Cooled Transformer



Vardhman - The Most Relied Name In CRGO Products

Radiators:

Range: Up to 520 mm width in thickness of 1.0 mm and 1.25 mm













Cooling Chart

Radiators:

- HeaderType Radiator
- · Hot-Dip Galvanized Radiator
- Goose-NeckType Radiator
- Special Design Radiator
- Offset Radiator

Technical Specification:

VSPL has an advance and Automatic Plant for manufacturing of Transformers, Radiators which is fully equipped to meet highest quality requirements of Radiators. It offers wide range of Radiators like Square Flange (detachable/Type F), T Joints, Double-entry headers etc in Width 226MM, 300MM, 375MM and 520MM & up to 4000MM long (Thickness 1.00MM & 1.25MM).

We can also supply Offset type Radiators in 520MM Width.

Painting:

The standard radiators are shot blast-cleaned and given two coats each of Red Oxide Zinc Chrome primer and Enamel finish paint (providing for a total dry film thickness of 70 to 100 micro-meters) on the outside, and one coat of heat-resistant varnish on the inside. Other external primer/finish coating such as Yellow Zinc Chromate primer, Zinc Rich primer, Micaceous Iron Oxide primer, Epoxy primer/finish, polyurethane finish, Spray Galvanized etc, can be provided, as required.

QC/Testing:

Routine pressure testing (under water) at 2 kg/cm2 for 30 minutes is carried out for all radiators. Type tests like 'hot-oil sweat' and 'vacuum' withstand tests are carried out periodically or against specific requests by the customer. We are fully equipped for testing of radiators as per IEEMA and DIN standards.

- · All instruments for dimension measurement
- Thickness tester
- Dry film thickness tester for paint, lacquer and galvanize.

Vardhman - The Most Relied Name In CRGO Products

18.08 9 906 931 970 4477 4477 497 5523 609 6650 689 7729 7729 741 634 662 691 620 661 40 562 2.30 2.43 2.79 2.48 2.64 555 576 597 9 522 537 560 397 483 502 461 428 446 366 45 40 278 295 310 324 339 356 357 382 396 410 227 240 252 267 279 279 292 318 328 340

11-12

Shunt Reactor

Range: Up to 400 MVAR - 1200 kV class.

- Low, Medium & High voltage shunt reactor cores up to 400 MVAR, 765 KV class as per customer specification.
- Radially stacked shunt reactor cores made of high quality CRGO.
- Separate cakes OR entire column.
- High Quality ceramic spacers to maintain gap between cakes.
- Guaranteed Stacking factor of 95 96%.
- High Quality Transparent Epoxy to produce cakes.



Reactor Cake with Ceramics



Stacked Reactor Column

Vardhman - The Most Relied Name In CRGO Products

Tank / Yoke Shunt

Range: Length - 100 to 8000 mm, Width - 50 to 500 mm, Thickness - 15 to 100 mm / Up to 1200 kV class

Tank Shunts / Flux Collectors:

A recent addition to the VSPL product line, Tank Shunts / Flux Collectors (made of CRGO Steel) are used mainly in large transformers.

Special Features:

- Special design reduces losses in large Power Transformers
- Reflects the leakage flux of Transformer windings
- Effectively controls structural stray losses
- Offers high permeable path to leakage flux, acts as a shield
- Offers higher efficiency compared to non-magnetic shields
- Enables almost-nil (negligible) losses, if designed with lower watts/kg from CRGO Steel

Edgewise Shunt vs Widthwise Shunt:

- The Silicon Steel sheets/strips are perpendicular to the tank wall and winding in Edgewise Shunt.
- Higher stacking factor & uniform distance from the tank wall as compared to widthwise shunts.
- $\bullet \quad \text{No non magnetic gaps in the edgewise shunt for incident flux.} \\$
- Leakage flux incident on thickness of sheets (edges) resulting in higher effective permeability of flux collector and negligible eddy losses for edgewise shunts.

Bespoke Shapes, Sizes & Designs:



315 MVA Tank Shunt



160 MVA Tank Shunt



315 MVA Yoke Shunt



200 MVA Yoke Shunt



120 MVAR Yoke Shunt



Wound Core

Range: From 1 kva to 1500 kva or Up to 315 mm width



- DUO Core
- Distributed Gap Core
- Diverging Distributed Gap Core
- E Core



Torroidal Core:



Inner Dia: 50 mm Outer Dia: 900 mm Height: Up to 150 mm

For CT'S/PT'S & Metering Devices

- Round/Donut Shape Core
- Rectangular Core
- Step Core

Bushing Type Current Transformers:

Rated Primary Current: 20 to 3500 A
Rated Secondary Current: 1A, 5A

Inner Dia: 100 mm

Outer Dia: Up to 1200 mm Height: Up to 150 mm



STANDARD TOLERANCE - Cut Core / Slit Rolls

On No	Ch ana stanistica	Accordance Limit / Oritoria
Sr. No.	Characteristics	Acceptance Limit / Criteria
1	Width (mm)	0 to 100 (+/-0.15)
		100 to 130 (+/-0.20)
		230 to 380 (+/-0.25)
		380 to 580 (+/-0.40)
		580 to above (+/-0.50)
2	Thickness (mm)	±0.03 mm
3	Edge Burrs (Micron)	Burrs Micron
	Thickness – mm	
	Up to .23	10
	.27 to .30	10
	.35	15
4	Length (mm)	Upto 350 (+0.00 / -0.30)
		350 to 1000 (+0.00 / -0.60)
		1000 to 2000 (+0.00 / -1.00)
		2000 and above (+0.00 / -2.00)
5	Edge Camber	For the material with a width greater than
		150 mm, edge camber shall not exceed
		0.9 mm for a length 2 meter
6	Wave Factor	For a material of width greater than 150mm
	(i.e. Deviation from flatness)	the deviation from flatness expressed as a
	, i	percentage shall not exceed 1.5%
7	Angle	+/- 5 Minutes
8	Stack Thickness of individual	+1 - 0 mm
	stack except centre step Unclamped	

QUALITY NORMS - RAW MATERIAL

Sr. No.	Tests	Acceptance Norms				
1	Bend Test or Brittleness Test	Min. 3 Bends				
		0-180° Bending of Sample				
		(Size: - 305 x 30mm)				
2	Stacking Factor Test	As per Diff. Thickness (mm)				
		0.23 – 95.5%				
		0.27 – 96.0%				
		0.30 – 96.0%				
		0.35 – 96.5%				
3	Surface Insulation Resistivity Test as per	Min. 10 Ohm/Cm ²				
	Franklin Test Method					
4	Core Loss Test	W/kg. at specific Flux Density for diff. Grades				
	(By Epstien Square Test Method)	from coils (At start and end of the coil)				
5	A/c Permeability Test	Min. 1.75T at 800 A/m & 50 Hz for conventional				
		G.O. Steel and Min. 1.85 T at 800 A/m & 50 Hz				
		For High Permeability G.O. Steel.				

Although we follow IS Standards, however our plant works at the most upgraded technology with far ahead stricter quality norms than above mentioned standards to ensure the best of customer's needs.

FLUX DENSITY V/S LOSSES @ 50 Hz

27ZDKH90/ 27TCH1DR 27HP90D	0.49	0.53	0.57	0.61	0.62	0.64	99'0	0.68	0.70	0.72	0.74	0.76	0.78	0.81	0.83	0.86	0.88	0.91	0.95	0.99	1.03	1.08	
23ZDKH85 / 23HP85D	0.45	0.48	0.52	0.56	0.57	0.59	0.61	0.62	0.64	99.0	0.68	0.71	0.73	0.76	0.78	0.81	0.84	0.88	0.92	0.96	0.95	1.08	ľ
23TCH0DR / 23HP80D	0.43	0.47	0.51	0.55	0.57	0.59	0.61	0.63	0.64	99.0	0.68	0.70	0.72	0.75	0.78	0.79	0.80	0.84	0.88	0.92	0.96	1.02	
30MOH 30HP105	0.58	0.63	0.67	0.72	0.73	0.76	0.78	08.0	0.82	0.85	0.87	06:0	0.92	0.95	0.98	1.02	1.05	1.09	1.14	1.20	1.27	1.36	
27MOH 27HP100	0.53	0.57	0.62	0.67	0.68	0.70	0.72	0.74	0.76	0.79	0.81	0.84	0.87	06:0	0.93	0.97	1.00	1.06	1.11	1.17	1.23	1.31	
23MOH 23HP95	0.50	0.54	0.58	0.62	0.63	0.65	29.0	69:0	0.71	0.73	0.75	0.78	08.0	0.83	0.86	0.89	0.93	0.97	1.03	1.09	1.16	1.25	
M6 35CG155	0.74	0.81	0.88	96.0	0.97	1.01	1.04	1.08	1.11	1.15	1.20	1.25	1.30	1.35	1.42	1.49	1.55	1.63	1.71	1.80	1.89	1.98	
M5 30CG120	0.62	0.67	0.72	0.78	0.79	0.82	0.84	0.87	06:0	0.93	96:0	0.99	1.03	1.06	1.11	1.15	1.20	1.27	1.34	1.41	1.50	1.59	
M4 27CG120	0.58	0.63	0.68	0.74	0.75	0.78	08.0	0.83	0.86	0.89	0.93	96.0	1.00	1.04	1.09	1.14	1.20	1.26	1.34	1.41	1.49	1.57	
M4 L 27CG110	0.56	09:0	99.0	0.71	0.72	0.75	0.77	08.0	0.82	0.85	0.88	0.91	0.95	0.98	1.02	1.06	1.10	1.16	1.21	1.27	1.33	1.39	
M3 23CG110	0.53	0.58	0.62	0.67	0.68	0.71	0.73	0.75	0.78	0.81	0.84	0.87	0.91	0.95	1.00	1.05	1.10	1.17	1.24	1.31	1.39	1.48	
Flux Density	1.30	1.35	1.40	1.45	1.46	1.48	1.50	1.52	1.54	1.56	1.58	1.60	1.62	1.64	1.66	1.68	1.70	1.72	1.74	1.76	1.78	1.80	

These results were measured in Vardhman-Dr. Brockhaus Magnetic Material Testing Laboratory (one of the few such labs in the Industry). Today, much to our pride, they are widely adopted and followed as industry standards.

Values are for reference only. Above values are **watts/kg** @ **50 Hz**.

FLUX DENSITY V/S LOSSES @ 60 Hz

27ZDKH90/ 27TCH1DR 27HP90D	0.65	0.71	0.76	0.82	0.83	0.85	0.88	06:0	0.93	0.95	0.98	1.00	1.04	1.07	1.10	1.14	1.17	1.21	1.26	1.31	1.36	1.43
23ZDKH85 / 23HP85D	0.59	0.63	0.69	0.74	0.75	0.77	0.79	0.82	0.84	0.87	0.90	0.92	0.95	0.98	1.02	1.05	1.09	1.14	1.19	1.24	1.30	1.38
23TCH0DR / 23HP80D	0.57	0.62	0.67	0.72	0.73	0.75	0.77	08.0	0.82	0.85	0.87	06:0	0.93	0.96	0.99	1.02	1.05	1.09	1.13	1.18	1.25	1.29
30MOH 30HP105	0.77	0.83	0.89	96.0	0.98	1.01	1.04	1.07	1.10	1.13	1.16	1.20	1.23	1.27	1.31	1.35	1.39	1.44	1.50	1.57	1.66	1.77
27MOH 27HP100	0.70	0.76	0.82	0.88	06:0	0.93	0.95	0.98	1.01	1.04	1.08	1.11	1.15	1.19	1.23	1.27	1.32	1.38	1.44	1.52	1.60	1.69
23MOH 23HP95	0.63	89.0	0.74	0.79	08.0	0.83	0.85	0.88	06.0	0.93	96.0	0.99	1.03	1.06	1.10	1.14	1.18	1.24	1.31	1.39	1.49	1.60
M6 35CG155	0.93	1.00	1.08	1.17	1.18	1.22	1.26	1.30	1.34	1.37	1.42	1.46	1.51	1.56	1.61	1.67	1.73	1.79	1.87	1.95	2.03	2.12
M5 30CG120	0.82	0.89	96:0	1.03	1.04	1.07	1.10	1.14	1.17	1.21	1.25	1.29	1.33	1.37	1.43	1.48	1.55	1.62	1.71	1.79	1.90	2.01
M4 27CG120	0.77	0.83	06:0	0.98	1.00	1.03	1.06	1.10	1.14	1.18	1.22	1.26	1.31	1.36	1.42	1.49	1.56	1.64	1.73	1.82	1.92	2.02
M4 L 27CG110	0.72	0.78	0.85	0.92	0.93	0.97	1.00	1.03	1.06	1.10	1.14	1.18	1.22	1.27	1.31	1.37	1.42	1.48	1.55	1.62	1.69	1.77
M3 23CG110	0.70	0.75	0.81	0.87	0.89	0.91	0.94	0.97	1.00	1.04	1.08	1.12	1.17	1.22	1.28	1.35	1.42	1.50	1.59	1.69	1.78	1.89
Flux Density	1.30	1.35	1.40	1.45	1.46	1.48	1.50	1.52	1.54	1.56	1.58	1.60	1.62	1.64	1.66	1.68	1.70	1.72	1.74	1.76	1.78	1.80

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www.vspl.co.in



Vardhman Stampings Pvt. Ltd.

The Most Relied Name in CRGO Products

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