THE **POWER** OF WE

transformers & rectifiers (India) ltd

ISO 9001:2015 | ISO 14001:2015 | BS OHSAS 18001:2007

VISION

To consolidate our National and International presence as a leading manufacturer of Power, Furnace and Rectifier Transformers and maintain a leading position in the T & D industry.

MISSION

To emerge as a preferred solution provider for quality Transformers with a team of dedicated professionals and business associates who are ethical, value driven and create excellent customer relationships.

THE **POWER** OF WE

An initiative which was taken well over thirty years ago, inspired by self belief, driven by knowledge and empowered by a sustained vision stands truly endorsed today. Transformers & Rectifiers (India) Ltd. has positioned itself as one of the leading players in the T & D sector and functions with a fine sense of corporate values.

An innovative environment has helped to reengineer the way T & R approaches production, design, testing, quality and research while concurrently focusing on new geographies to make a global impact in an increasingly competitive T & D sector.

In recent years, T & R has forged strong alliances to upgrade the core production values of the company. The Power Utilities sector which identifies key partners to facilitate the commissioning of Ultra Mega Power Plants, find us keeping pace with the stringent quality benchmarks demanded by them.

In an increasingly competitive economic ecosystem, T & R leverages its presence through the Power of WE - A collective vision which powers our goals.

MILESTONES

1981-1993

Manufactured Transformers upto 66 kV Class

Consolidated leadership in Furnace Transformers with a domestic market share of 80%

1994-2000

Inaugurated new state-of-the-art facility for manufacturing upto 245 kV Class Transformers

2001-2005

First 7.5 MVA Series Reactor supplied to Fluor Daniel, UK, installed in Kazakhstan with a short-circuit withstanding capacity of 105 kA

First 100 MVA, 220 kV Power Transformer

Received PGCIL approval

Single Order of 36 Transformers of 110 kV Class Delta Connected for TNEB.

Single Order of 10 Transformers of 220 kV Class for GETCO

Prestigious Orders from NTPC & PGCIL

Developed and Manufactured 25/30 MVA, EAF Transformer for Azerbaijan

2006-2011

Successfully went Public with an over-subscription of 92 times

Established a World-class Manufacturing Facility with a capacity of 16000 MVA

Winner of The Best Supplier Award from GETCO for three consecutive years

Honoured with 'Valued Customer Award' by Central Power Research Institute (CPRI)

Awarded 'Star Export House' certificate by Govt. of India

Successfully executed 315 MVA, 400 kV Class Power Transformer

Successfully executed 1200 kV Class Auto Transformer for PGCIL Pilot Project

Received order for 20 nos. 500 MVA, 765 kV Class, Auto Transformers

Executed more than 750 nos. Transformers of 132 kV Class and above

2012-2015

Supplied 400kv Transformer to one of SEB

Successfully manufactured and tested 765kv class Transformer

Successfully tested and commissioned 1st Unit of 765 Kv Class of Transformers

Crossed Turnover of Rs. 700 Crs.

Successfully developed India's highest rating 75 MVA, 115 kV Green Transformer using natural ester fluid.

Entered into Technology License agreement with Fuji Electric Co. Ltd.

Received Order worth INR 400 Crore for Third Party Export

Approval of 400 KV BCT from PGCIL

Successful short circuit testing of 315 MVA, 400/220/33 kV 3 Phase auto transformers by KEMA Netherlands

2016-2019

Executed 200 numbers of various rating transformers ranging from 15 MVA, 66 kV to 500 MVA, 400 KV to GETCO

Successfully commissioned 1150 kV transformer at PGCIL

Successfully executed 232 numbers of solar inverter transformers for various solar farms

Supplied 2x500 MVA, 400 KV Auto Transformers for Karnataka's first highest rating installation

Developed and Manufactured 132 MVA EAF Transformer for Mexico & 70 MVA EAF Transformers for Iran

Exported highest rating Power Transformer of 250 MVA, 230KV to Russia

Successfully type tested OIP Bushing up to 145 KV

Successfully executed 80 numbers of GREEN Transformers using natural ester fluid

Developed and Manufactured 170 MVA EAF transformer for Gulf Countries

Moraiya Facility

A SNAPSHOT

Our establishment dates back to 1981, as a private firm manufacturing Transformers in the small to medium range.

A strategic focus on manufacturing Furnace Transformers resulted in remarkable visbility for the company and a major share of this niche industry. In 1994, having upscaled to a closely held limited company, and harbouring an intent to diversify into the more challenging Power Transformer sector, a new production facility with 8000 MVA capacity was realised at Changodar, off Ahmedabad. Our new production facility in Moraiya ramped up our capability to manufacture Power and Distribution Transformers upto 1000 MVA in the 1200 kV Class and raising overall capacity upto 23200 MVA per annum. We are now a major supplier to utilities, multinationals, and are also empaneled with local and international consultants.

The Quality certifications of the company becomes an enabling facilitator in our sustained endeavour to mark our global presence. Our state of the art facilities spread over 68000 sq.mtrs houses manufacturing bays eases our effort to achieve these benchmarks and thereby realise international production standards. It also allows us to embed an enabling environment cued in to manufacture 1200 kV Transformers.

T & R currently exports to over twenty five countries including, Canada, United Kingdom and some leading Asian and African nations.

Our operations today, are driven by a team of management and technical professionals who bring years of experience in the design, development and production of a wide range of Transformers. The team is capable of delivering customised solutions and this has been instrumental in T & R occupying a niche position in the T & D industry.

WE

INFRASTRUCTURE

Currently, our facilities are located at Moraiya, Changodar & Odhav which are key industrial centres near Ahmedabad, Gujarat.

The Moraiya Facility - An impressivlely laid out production facility showcases international manufacturing standards, while augmenting our capability to manufacture 1200 kV Power Transformers in an environment which is highly automated, dust free and follows stringent testing and quality benchmarks.

The Changodar Facility - This unit functions as across an overall area of 25,000 sq.mtrs with a built up area of 6,500 sq.mtrs. It houses all the required facilities to design, manufacture and test transformers upto 160 MVA, 245 kV class.

The Odhav Facility - The first production facility, this unit is primarily engaged in the manufacture of Transformers of smaller ratings.

5 indigenously developed Vapour Phase Drying Chambers to process Transformers upto 1200 kV Class

WINDING

Dust free chamber for Vertical Winding Machines

WE

The Winding shops are dust free chambers with the capability to ensure reduced axial stresses in Short Circuit conditions and also to withstand impulse and over-voltages.

For Power Transformers, both low voltage and high voltage windings are executed, providing for highest resistance against short circuit forces. It is ensured that proper tension is given on the winding for rigidness.

There are 10 variable speed winding machines in the shop.

Dust free chamber for Horizontal Winding Machines

Vacuum Oven for Coil Pressing

Variable Speed Soft Start Vertical & Horizontal Winding Machines for Coils upto 3.5 mtrs & 25 tons

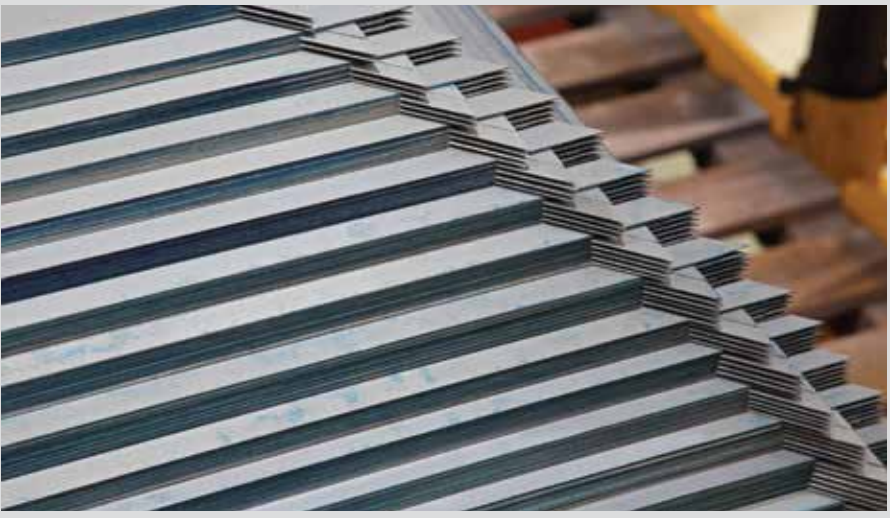
CORE & CORE COIL ASSEMBLY

Core Assembly Station

WE

We use high quality material to ensure optimum losses and efficient working of the Transformer. The supporting structures and clamping devices of the core contribute to the compactness of the design and also ensure low sound levels.

The optimum design of Core-Coil Assembly is achieved by considering the required technical particulars including cooling, size compactness and tapping arrangement. All leads and conductors are rigidly supported by special frames.



Dust free chamber for Core Coil Assembly

Assembly Facilities

- Core Assembly Comprises of 10 Turntables of varying capacities
- Mobile hydraulic power pack for coil pressing
- Isostatic presses for coil pressing and sizing
- Mobile Hydraulic power pack with multiple jacks to press all the coils simultaneously with control for individual phases

WE

TANKING

Tanking Pit

On removing the Core-Coil Assembly from the heating oven, it is thoroughly cleaned by pressurised dry air and then placed into the tank and bolted up. All necessary accessories and fittings such as bushings, valves, oil level indicator, pressure relief device, temperature indicator, tap changer etc. are fitted on to the tank body. High quality filtered transformer oil is then filled in the tank to completely immerse the assembly. Finally, connections of primary and secondary to the terminal bushings are made.

Tanking Facilities

- State-of-art oil handling system
- Up to 250 ton crane capacity
- 300 ton air castor for movement

The process of manufacturing quality transformers is critically dependent on testing of raw materials, components and the final assembled product. We are equipped with state of the art testing facilities to perform all routine and special tests.

Impulse generators of 1200 kVp & 2800 kVp for conducting Impulse Test of Transformers upto 1200 kV Class

Test Sources

- 3000 kW 50/60 Hz Generator
- 250 kV Transformer for High Voltage test
- 0-170 kV Source Transformer for losses measurement
- 1500 kW 200 Hz Generator
- 50 MVAr Capacitor Bank (provision to increase upto 100 MVAr)
- 800 kV Source Transformer

Testing Equipments

- 4000 Amps/170 kV Highly accurate loss measurement system (The most accurate system in the market today)
- Standard Capacitor 1000/√3 kV & Reactors loss measurement system
- Impulse voltage test system

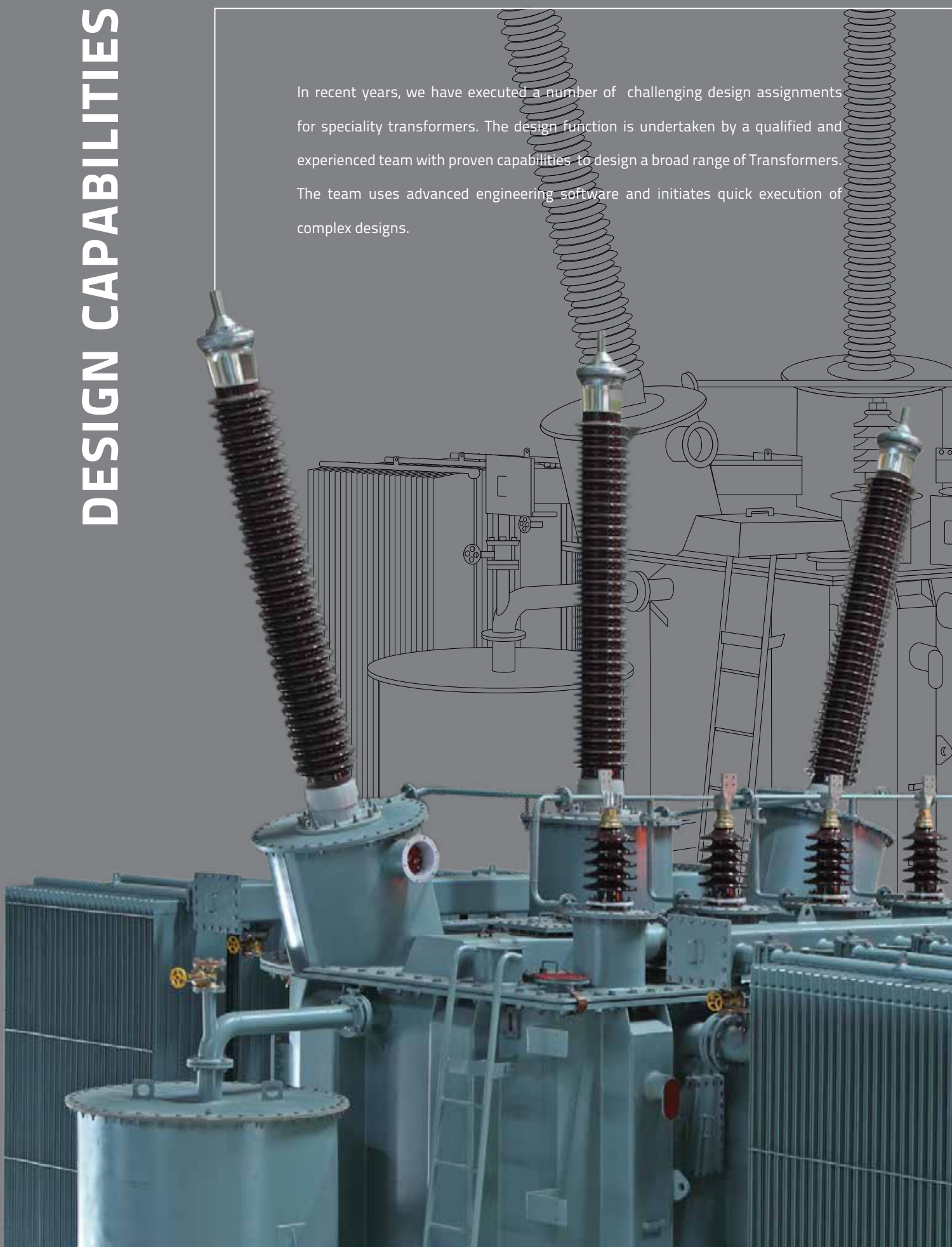
  (2800 kVp 280 kJ Impulse Generator, 2800 kVp Damped capacitive impulse voltage divider. Controlled chopping gaps. Parallel resonant system, Glaninger circuit

TESTING

WE

DESIGN CAPABILITIES

In recent years, we have executed a number of challenging design assignments for speciality transformers. The design function is undertaken by a qualified and experienced team with proven capabilities to design a broad range of Transformers. The team uses advanced engineering software and initiates quick execution of complex designs.

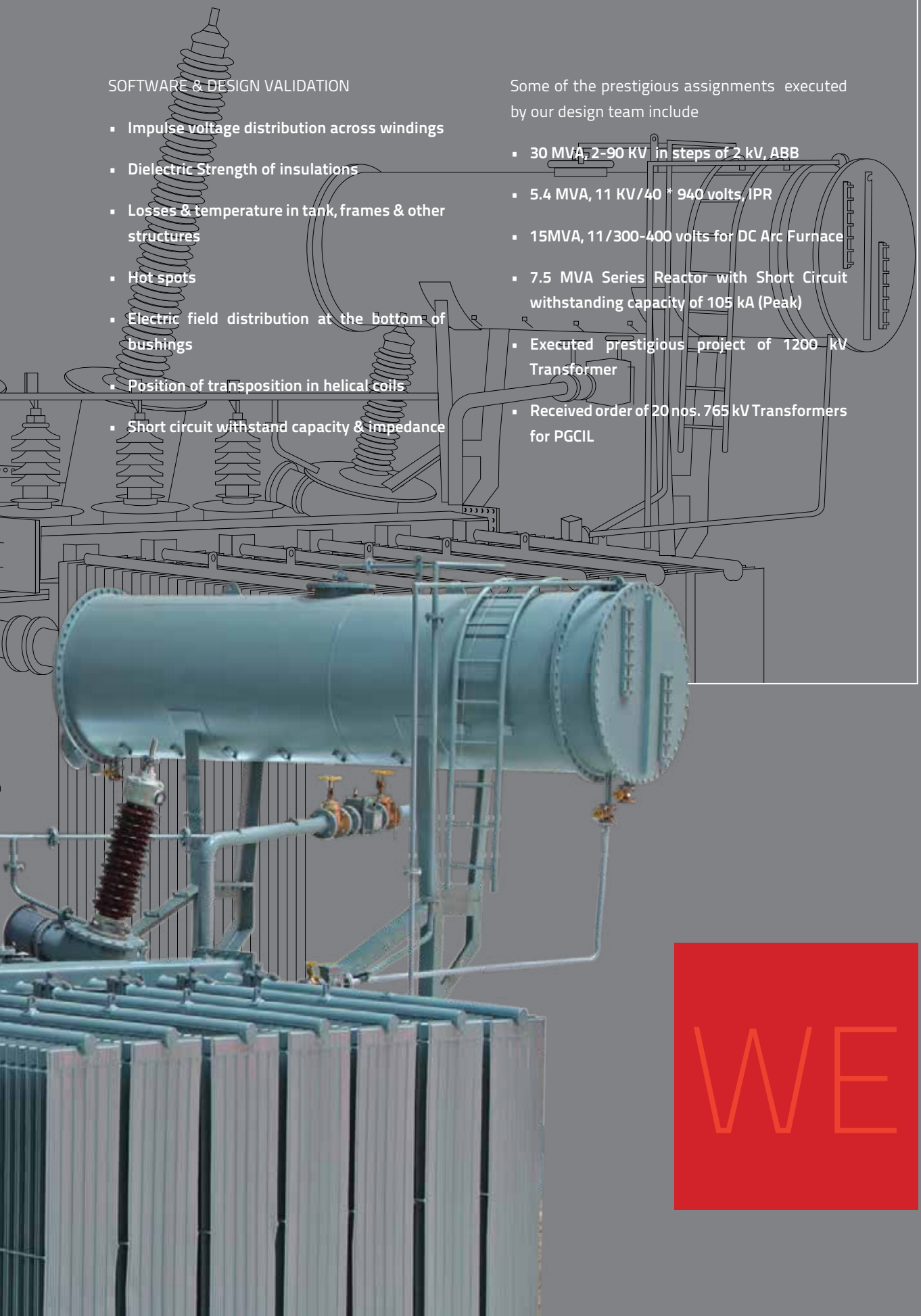


SOFTWARE & DESIGN VALIDATION

- **Impulse voltage distribution across windings**
- **Dielectric Strength of insulations**
- **Losses & temperature in tank, frames & other structures**
- **Hot spots**
- **Electric field distribution at the bottom of bushings**
- **Position of transposition in helical coils**
- **Short circuit withstand capacity & impedance**

Some of the prestigious assignments executed by our design team include

- **30 MVA, 2-90 KV in steps of 2 kV, ABB**
- **5.4 MVA, 11 KV/40 * 940 volts, IPR**
- **15MVA, 11/300-400 volts for DC Arc Furnace**
- **7.5 MVA Series Reactor with Short Circuit withstanding capacity of 105 kA (Peak)**
- **Executed prestigious project of 1200 kV Transformer**
- **Received order of 20 nos. 765 kV Transformers for PGCIL**



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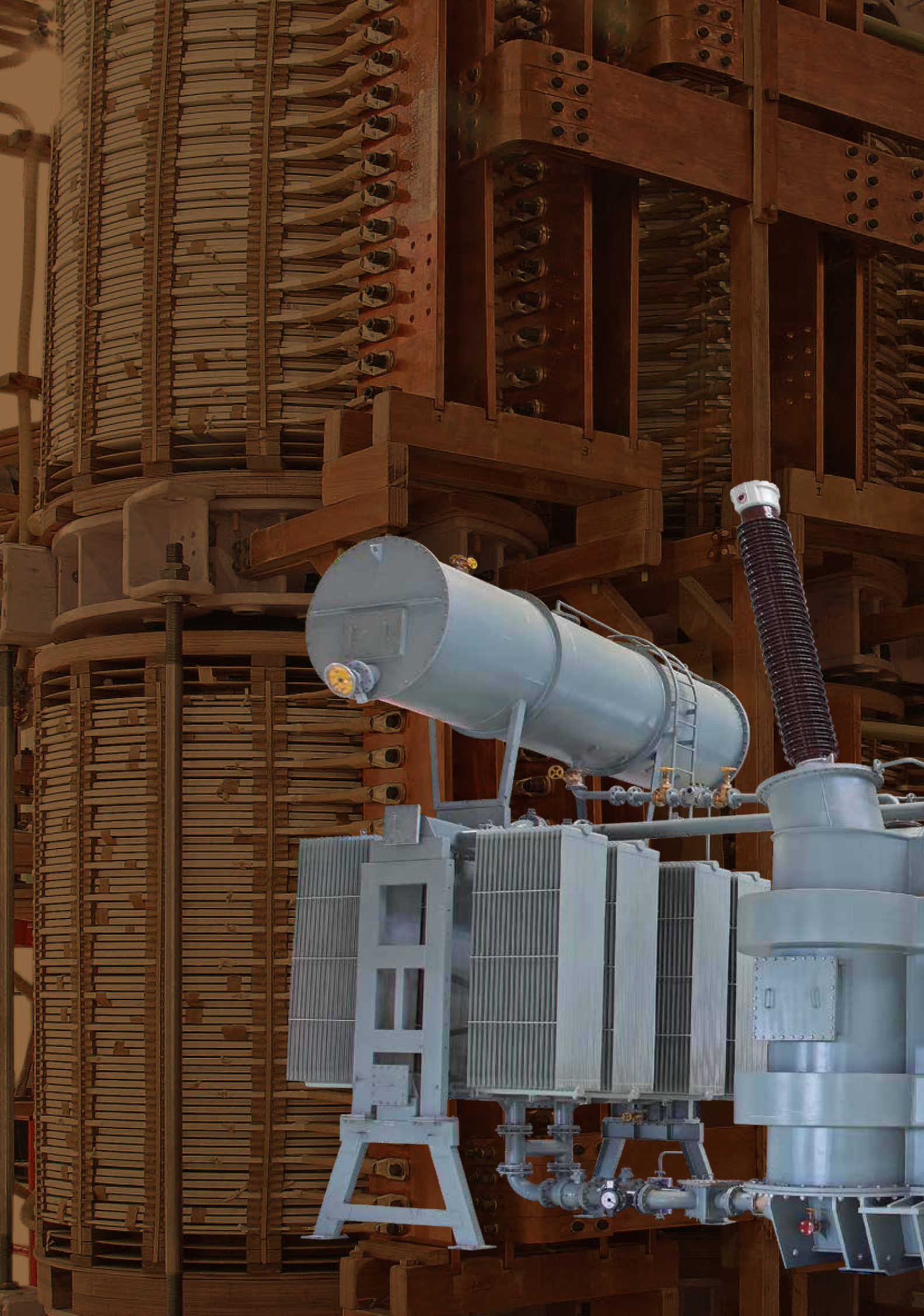


WE

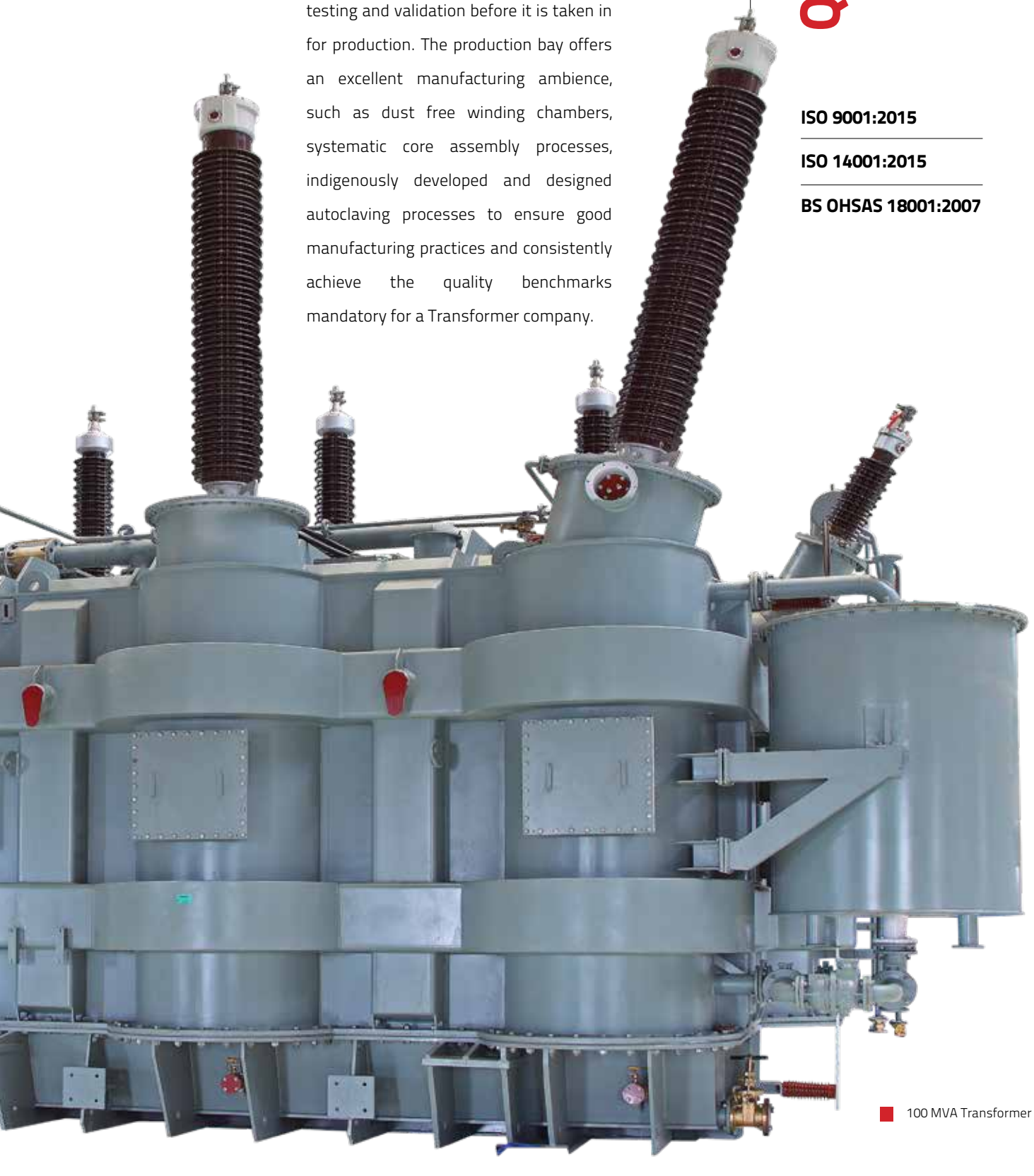
QUALITY

Quality is central to the performance and longevity of a Transformer. At T&R, the focus on quality begins with identification of raw materials, regular inspection, testing and validation before it is taken in for production. The production bay offers an excellent manufacturing ambience, such as dust free winding chambers, systematic core assembly processes, indigenously developed and designed autoclaving processes to ensure good manufacturing practices and consistently achieve the quality benchmarks mandatory for a Transformer company.

ISO 9001:2015

ISO 14001:2015

BS OHSAS 18001:2007



100 MVA Transformer

PRODUCT RANGE

Power Transformer upto 1000 MVA, 1200 kV Class

Generator Transformer

Power Transformer

Interconnecting Transformer

Unit Auxiliary Transformer

Station Auxiliary Transformer

Rectifier Transformer upto 160 kA DC

6 Pulse Transformer (IPT)

12/24 Pulse Transformer (IPT & Double Deck Construction)

12/24 Pulse Transformer (Bridge Connection)

OUR TRANSFORMERS CATER TO THE MOST RESPECTED ENERGY AND POWER UTILITIES ACROSS THE GLOBE

WE

Furnace Transformer upto 120 kA

Arc Furnace Transformer
Submerged Arc Furnace Transformer
Ladle Furnace Transformer
Induction Furnace Transformer
DC Arc Furnace Transformer

Distribution Transformer

Ratings above 315 kVA, 11 kV/0.4 kV

Specialty Transformer

Locomotive Traction Transformer
Series & Shunt Reactors upto 765 kV
Mobile Sub-station Transformer
Earthing Transformer & Reactor
Converter Duty Transformer
Solar Application Transformer

GLOBAL PRESENCE

EUROPE

- United Kingdom
- Belgium
- Italy

AMERICAS

- Canada
- Puerto Rico
- Uruguay
- Ecuador
- Colombia
- Mexico

AFRICA

- South Africa
- Congo
- Ethiopia
- Kenya
- Tanzania
- Zambia
- Ghana
- Nigeria
- Zimbabwe
- Lesotho

OCEANIA

- Australia
- Fiji

ASIA

- India
- Bangladesh
- Nepal
- Bhutan
- Sri Lanka
- Indonesia
- Philippines
- Saudi Arabia
- UAE
- Oman
- Kazakhstan
- Azerbaijan
- Iran

WE

In our effort to establish our presence in the American, European, African and Asian markets, many of our customers have paid relevant attention to logistic details. We are located on a major National Highway of India, and linked by road, rail and air with Mumbai, a principal business city of India. Mumbai is also a major port of India. On the west, we are linked to the Kandla port, which is one India's busiest ports. Ahmedabad also has a busy international airport and is connected to leading European and American destinations.

INSTALLED OVER

10000

TRANSFORMERS GLOBALLY

INTERNATIONAL CUSTOMERS

- CONCO, RSA
- Active Power Project, RSA
- PREPA, USA
- MGB Electric, Canada
- PDT, UK
- UTE, Uruguay
- NEA, Nepal
- PHCN, Nigeria
- TCN, Nigeria
- MBH Power, Ghana
- MGB, Canada

and many more...

DOMESTIC CUSTOMERS

- National Thermal Power Corporation, INDIA
- GETCO, Vadodara
- Power Grid Corporation, INDIA
- Tamilnadu Electricity Board, Chennai
- Rajasthan Electricity Board, Jaipur
- Torrent Power Ltd., Ahmedabad
- Institute For Plasma Research, Gandhinagar
- Maharashtra State Electricity, Mumbai
- NEG Micon India Private Ltd., Chennai
- Suzlon Energy Ltd., Pune
- ABB, INDIA
- ADANI Enterprises Ltd., Ahmedabad

and many more...

FUTURE

Our growing international base as well as consolidation of our marketing operations in India, presents fresh challenges to us. In the next few years, we will strategically enhance our recognition as manufacturers of speciality transformers. There is also an intent to work towards newer quality benchmarks which will improve our international base. We intend to

- Expand our total installed capacity to 60,000 MVA
- Enhance the manufacturing capacity of Changodar unit
- Exclusively utilize Moraiya plant for 400 kV and above range
- Further backward Integration by adding up
  - > Bushing manufacturing facility
  - > Kitting centers for Insulation
  - > Full Fledged fabrication plant
- Acquire transformer manufacturing companies in the rapidly growing markets

WE

AWARDS

Winner of the

BEST EQUIPMENT SUPPLIER AWARD

SINCE LAST 5 YEARS

from GETCO

(Gujarat Energy Transmission Corp. Ltd.)

one of the leading utilities of India.

AWARDED

Forbes Asia 200 Best Under A Billion

SEPTEMBER 2010

VALUED CUSTOMER AWARD

from CPRI

transformers & rectifiers (India) ltd

ISO 9001:2015 | ISO 14001:2015 | BS OHSAS 18001:2007

Registered Office/Plant

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