



Power Transformers

*The Energising
Solution*



**Crompton
Greaves**
..... Since 1937



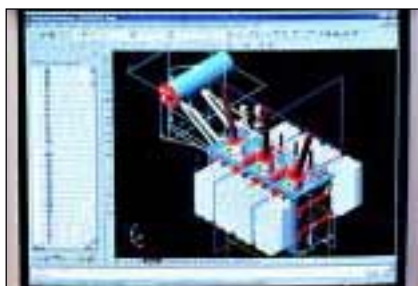
In 1942, Crompton Greaves commenced manufacturing Transformers and rolled out the first 400kV Transformer in 1978.

Over the years, Crompton Greaves have absorbed world class technologies from following collaborations.

- British Electric Transformers, UK for 245 kV in 1942.
- Brush Transformers, UK for 72.5 kV in 1968.
- Hawker Siddeley Power Transformers, UK for 245 kV in 1968.
- Westinghouse Electric Corp., USA and Canada for 500 kV in 1978.
- Honeywell, USA for Amorphous Core in 1999.
- ABB, Sweden for 3Ø Locomotive Transformer in 2000

Transformer Design Technology incorporates the following high-end tools and techniques for multi-physics analysis.

- 2D and 3D FEM analysis for electrostatic and electromagnetic distribution.
- MAGNET for electromagnetics.
- IDEAS and ANSYS for structural analysis and ANSYS for seismic analysis.
- Various simulation techniques.



Design Automation

The Transformers are manufactured in 4 modern Plants, ISO certified with total capacity of 18,500 MVA pa for 315 kVA to 450 MVA, upto 500 kV voltage class.



63 MVAR, 420kV Reactor

RANGE

Product	Range
Transformers	upto 450 MVA, 500 kV, 3 Ø upto 900 MVA, 500 kV, 1 Ø banks
Reactors, Shunt and Series	upto 80 MVAR, 500 kV
Amorphous Core Transformers	upto 2.5 MVA, 36 kV
Dry/Cast Resin/Resin Impregnated Transformers	upto 2.5 MVA, 36 kV
Unitised Substations	upto 2.0 MVA, 11kV



315 MVA, 420/220 kV Auto Transformer in 1984



µp based RTCC Panel for a bank of 4 x 1 Ø Transformers with auto switching of spare unit

APPLICATIONS

- Multi Winding, Auto and Generator
- Interconnecting
- Start-up
- Unit Auxiliary
- Step Down
- Track-Side
- Furnace
- Thyristor duty Transformers
- On board, Locomotive
- Distribution
- Earthing

SPECIAL FEATURES

- RTCC Panels with PLCs for SCADA compatibility.
- Fiber optics for direct hot spot measurement.
- Intelligent on-line monitoring systems.
- Nitrogen based fire protection systems.
- Sealed tanks to ANSI standards.
- Compliance to IEC, EN, AS, BS, ANSI, CSA standards and EU Norms.

POWER GENERATION SEGMENT



77/96/110 MVA, 11.5/115 kV, GSU Transformer at Rojana & Saha Co-Gen, Thailand

Crompton Greaves have executed multiple contracts with International EPC Contractors for their Power Plants world-over.

EPC Contractors	Highlights
Siemens PG	303 MVA, 10.5/230 kV Generator Transformer at G. TECH Paguthan CCPP, India in 1998.
ABB ALSTOM Power	1. 290 MVA, 16/230 kV Generator Transformer at NTPC Gandhar CCPP, India in 1994. 2. 87.5 MVA, 13.8/138 kV Generator Transformer at KING Mountain, Texas, USA in 2000.
ALSTOM Power	1. 137.5 MVA, 15/138.6 kV Generator Transformer at PDO, Oman in 1999. 2. 109 MVA, 13.8/230 kV Generator Transformer at BAYANO HEPP, Panama in 2001.
Stone & Webster	125 MVA, 13.8/230 kV Generator Transformer at North Duri Co-Gen, Indonesia in 1999.
Mitsubishi	144 MVA, 11/235 kV Generator Transformer at NTPC Auraiya CCPP, India in 1989.
Hyundai	1. 320 MVA, 16/230 kV Generator Transformer at AES Haripur CCPP, Bangladesh in 2000. 2. 240 MVA, 14.7/230 kV Generator Transformer at AES Meghnaghat CCPP, Bangladesh in 2001. 3. 120 MVA, 11-11/220 kV Generator Transformer with TANVIR BAVI 220 MW Barge Mounted Power Plant in 2000.
NEPCO	1. 110 MVA, 11.5/115 kV Generator Transformer at Saha Co-Gen, Thailand in 1999. 2. 110 MVA, 11.5/115 kV Generator Transformer at Rojana Co-Gen, Thailand in 1999. 3. 70 MVA, 11.5/132 kV Generator Transformer at FIFE Energy, England in 2000.
EL-PASO Energy	120 MVA, 13.8/345 kV Generator Transformers at 900 MW Macaè Merchant Power, Brazil in 1999.



90 MVA, 11/132 kV GSU Transformer at TATA Power in India.



120 MVA, 13.8-13.8/345 kV Generator Transformers with 900 MW Macaè Merchant Power Plant, Brazil



320 MVA, 16/230 kV GSU Transformer with AES Haripur 450 MW Power Plant, Bangladesh

POWER TRANSMISSION AND DISTRIBUTION SEGMENT



240 MVA, 275/132 kV Auto Transformer with TNB, Malaysia

Crompton Greaves have executed contracts with International Utilities world-over.

Country and Utilities	Highlights
Malaysia (TNB)	12 x 240 MVA, 275/132 kV Auto Transformers 33 x 90 MVA, 132/33 kV Power Transformers 36 x 30 MVA, 132/11 kV Power Transformers
Vietnam (CPPMB, NPPMB, SPPMB & Pha Lia PPMB)	3 x 125 MVA, 220/110 kV Auto Transformers 1 x 63 MVA, 220/110 kV Auto Transformers 6 x 40 MVA, 110/23 kV Power Transformers 3 x 49 MVA, 220/6.6 kV Station Transformers 2 x 25 MVA, 110/23 kV Power Transformers
Sultanate of Oman (MEW & PDO)	55 x 20 MVA, 33/11 kV Power Transformers 5 x 45 MVA, 11/132 kV Power Transformers 5 x 125 MVA, 132/33 kV Power Transformers 3 x 63 MVA, 132/33 kV Power Transformers
Kingdom of Saudi Arabia (SCECO Central)	14 x 20 MVA, 33/11 kV Power Transformers 7 x 100 MVA, 132/33 kV Power Transformers 3 x 40 MVAR, 132 kV Shunt Reactors 2 x 36 MVA, 33/11 kV Power Transformers
Syria (PEDEEE & PEEGT)	52 x 30 MVA, 66/20 kV Power Transformers 10 x 125 MVA, 230/66 kV Power Transformers
Chile (Chilectra)	10 x 50 MVA, 110/12.5 kV Power Transformers 4 x 37.5 MVA, 110/23.5 kV Power Transformers 4 x 133 MVA, 220/110/34.5 kV Power Transformers
USA (Gainsville, Florida & others)	1 x 120 MVA, 13.8/138 kV Power Transformers 5 x 33 MVA, 38/13.8 kV Power Transformers 3 x 87.5 MVA, 13.8/138 kV Power Transformers 3 x 30 MVA, 13.8/138 kV Power Transformers
New Zealand (New Zealand & Ashburton Elec.)	8 x 10 MVA, 110/19 kV Power Transformers 7 x 30 MVA, 110/33 kV Power Transformers 5 x 15 MVA, 66/11 kV Power Transformers 1 x 25 MVA, 66/11 kV Power Transformers



20 MVA, 33/11 kV Power Transformer with PDO, Oman



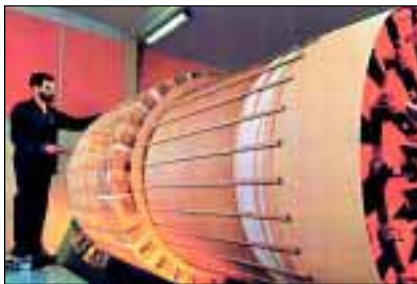
315 MVA, 400/220 kV Auto Transformer with NTPC, India



30 MVA, 110/33 kV Transformer with Ashburton, New Zealand



Core assembly of 250MVA Generator Transformer



Power Transformer Winding Process

MANUFACTURING

- Core building, winding, core-coil assembly and tanking are the critical manufacturing processes incorporating hi-tech machinery and equipment for quality outputs and high performance.
- The new high speed "GEORG" Machines for core slitting and cropping ensure stress-free laminations without burrs for fully aligned core building.
- The winding is done in positive pressure, dust free (max. 5 microns) airconditioned environment with great care by well experienced techno-craftmen on vertical or horizontal Winding Machines.
- The core-assembly is made rigid and stable with the help of Isostatic Press and assigned tightening. Automated VPD Plant dries it to less than 0.5% moisture content and tanking is done carefully in controlled environment.

CRITICAL TEST FACILITIES

- Switching and lightning impulse test system.
- Partial discharge and radio interference measurement facilities.
- Noise level measurement.
- Temperature rise test plant.
- Dissolved gas analysis for oil.
- Harmonic measurement and analysis.
- Linerity test set for HV Reactors.
- Vibration test plant.



Impulse Generator

DISTRIBUTION TRANSFORMERS



Oil Filled Distribution Transformer

- Oil Cooled Transformers, 500 kVA to 10,000 kVA, upto 33kV.
- Dry Transformers upto 2500 kVA, 33kV (Cast Resin and Resin Impregnated).
- Amorphous Core Transformers.
- Unitised Substations.

SPECIAL TRANSFORMERS

- Arc and Induction Furnace Transformers upto 40 MVA, 33kV, up to 60 kA Current application.
- Trackside Transformers 31.5 MVA, 25 kV AC, single phase.



Unitised Substation

- Locomotive Transformers upto 5400 kVA, 25 kV AC.
- Thyristor Duty Transformers.
- Package Substations upto 2000 kVA.
- Earthing and Auxiliary Transformers.



Cast Resin Transformer

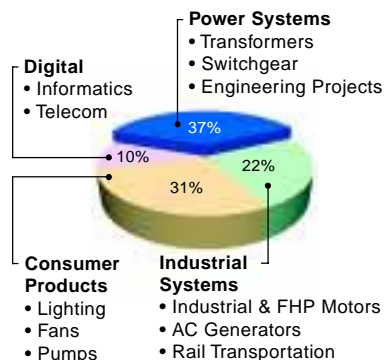
Expressions of Power

Crompton Greaves Limited, established in 1937, has witnessed over six decades of unparalleled growth to have current sales of over Rs. 16 Billion (US \$ 330 Millions). With an electrifying attitude, a fusion of experience and expertise in the field of applied energy, extensive R & D, advanced technology, dedicated workforce, superior



manufacturing skills, exacting standards of quality and diverse and distinctive competencies that converge, Crompton Greaves offers a comprehensive portfolio of products and services for Generation, Transmission, Distribution and Utilisation of power in various applications. Its presence is well established and widespread, notably in the Utilities, Industry, Agriculture, Transportation, Informatics, Telecommunication and Lifestyle Products.

Crompton Greaves operates through following Strategic Business Units, each completely responsible for focussed manufacturing, marketing and value creation in the respective operating segment.



The Transformers are detailed in this catalogue. A fully complimentary line of HV and EHV Switchgear is also offered with world-renowned collaborations.

- SF6 Gas Circuit Breakers upto 420 kV
- Vacuum Circuit Breakers upto 36 kV
- Lightning Arresters upto 420 kV
- Instrument Transformers upto 420 kV
- Indoor Switchgear upto 36 kV
- Capacitors and Capacitor Banks
- On Load Tap Changers upto 66 kV

Crompton Greaves promotes a high level of Research and Development activities to maintain a technological lead and competitive advantage. R & D operations are structured to initiate a techno-active response right through the company, getting research out of the labs in to

the products. Numerous awards and ISO 9000 certifications have accredited the exacting standards of quality management.

Today, Crompton Greaves International Operations are spread over all the continents in the world to become the largest from India in each segment of Transformers, Switchgear, L.V. Controlgear, Motors and AC Generators, Pumps and Fans.

As the new millennium consumers plug-in to a switched-on future, Crompton Greaves, a member of the B. M. Thapar Group and Invensys plc., will continue to play an electrodynamic role ... engineering the right solutions ... making a difference to life and thriving in an increasingly wired world.



CG House, Mumbai

Power Systems ■ Industrial Systems ■ Consumer Products ■ Informatics & Telecom



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