

### Comparison of Transformer Technologies

Sl. No.	PARAMETERS	Oil Cooled	Epoxy Resin Cast	Mouldless Resin Encapsulated (MLRE)
1	Burnable Materials %	32 to 36%	7 to 11%	1.3 to 1.6%
2	Temperature Class	A / 105°C	F / 140°C	H / 165°C
3	Permitted Safe Temp. Rise	55°C	99°C	115°C
4	Smoke Emission % (Oil Cooled As base)	100% (Base)	30%	5%
5	Over Load Capacity/minutes from 70% base Load	120% / 180 Min	130% / 180 Min	135% / 180 Min
6	Maintenance cost / Year	100% (Base)	Negligible	Negligible
7	Resistance to Dusty & Corrosive atmosphere	Fair	Good	Good
8	Vacuum Pressure Impregnation	Not Always	Yes	Yes
9	Suitability for Out door Use	Yes	Yes	Yes
10	Thermal shock absorption capability	Good	Fair	Good
11	Short Circuit Withstand capability	Fair	Good	Good
12	Failure Rate	>15%	>3%	<1%
13	Partial Discharge	Negligible	Present	Negligible

### Some of our Esteemed Clients



Corporate Office, Gurgaon



Athal Plant



Jammu Plant



Gurgaon Plant



### Intra Vidyut Limited

(A Subsidiary of Sudhir Gensets Ltd.)

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Branch Offices : Amritsar | Jodhpur | Karnal | Kota | Ludhiana | Surat | Udaipur | Vadodara



**sudhir**  
Powering the Nation

### DRY & OIL TYPE TRANSFORMERS



> POWERGENERATION > DISTRIBUTION > ELECTRIFICATION

**Sudhir - Powering the Nation**

Sudhir is a name synonymous with Power. It stands tall in the Indian Power Generation Sector, providing complete turnkey Electrical solutions from GENERATION, DISTRIBUTION to ELECTRIFICATION. An Industry leader in the field of setting up Diesel base Captive Power Plants upto 20MW having its corporate office in Gurgaon & revenue of over INR 1000 Crs., it has leveraged its 23-year relationship with Cummins Ltd. to capture a majority market share. The Company has a wide blue-chip customer base and operates through multiple manufacturing facilities across India and focuses on Diesel & Gas Generators, HT & LT Switchboards, Transformers and Turnkey EPC contracts.

The product line includes the widest range of Diesel Gensets 15-3000 KVA with a fuel option of Gas, complete range of HT 11KV & 33KV Panels, LT Switchboards, Turnkey EPC contracts covering electrical and mechanical services of Generation, Distribution & Internal Electrification. Six ultra modern state of the art manufacturing plants strategically located in Silvassa, Athal, Jammu, Gurgaon & Bangalore help serve over 40,000 customers.

Now with the Acquisition of Intra Vidyut Ltd. our product range includes Dry & Oil type Distribution Transformers, which greatly complements our Business. With this strategic acquisition along with its expansion and diversification plan SGL is poised to become leader in complete power solutions in India.

**Sudhir at a Glance**

- Sudhir - A legacy of over 3 decades
- A Complete Power Solution Company
- Equity partners - Goldman Sachs & General Electric (GE)
- India's largest Generator set manufacturer over 10,000 MW installation base
- Pan India network of offices covering all major metros and cities
- Six state of the art manufacturing plants, one at Silvassa, one at Gurgaon & three at Jammu and one at Bangalore
- 24 hours customer assistance helpline to provide prompt service support



**Intra Vidyut Ltd. at a Glance**

- Transformers in operation in India and Abroad since 1969
- First company to manufacture Dry Type in India up to 5MVA, 22KV class
- A 13 year Technical Collaboration with M/S Mora Transformers AB of Sweden
- Pioneers in Mould-Less Resin Encapsulated type transformers
- Proven expertise in design for Special duty & Multi winding transformers for applications like variable speed drives, furnace duty & converter duty
- Type tested at CPRI
- ISO 9001:2000 accredited by UKAS
- Proven high product reliability
- Approved with all leading consultants & major supplies to steel plants & thermal power plants

**Product Range**

- Dry Type Transformers upto 4MVA, 11KV class
- Oil Type Transformers upto 20MVA, 33KV class
- Multi Tap Transformers upto 24taps
- Reactors & Chokes
- Converter Duty Transformers

**DRY TYPE TRANSFORMERS**

Transformers and Oil have always been synonymous with electric power. Conventional Oil type transformers use mineral base insulating oil as the medium for cooling and insulation.

However modern engineering & Safety trends demand more precaution in handling Electric Power, making conventional oil cooled transformers a potential fire risk, in locations where safety is of great importance. For these applications Dry type Transformer are the only solution!

**Mould-Less Resin Encapsulated - MLRE Dry Type Transformer**

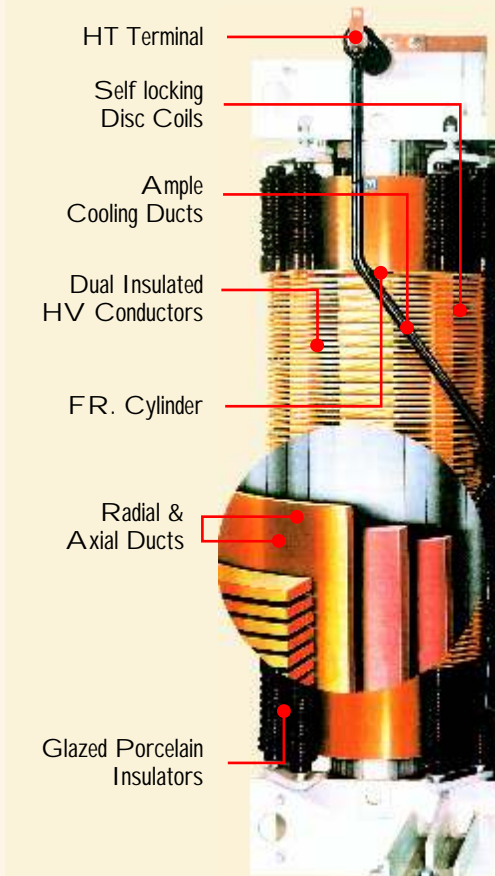


HV & LV wound coils are separated by means of fiber glass cylinders & supported on the frame by special porcelain supports. HV coils are made in disc form, using enameled & fiberglass covered copper strips. All conductors are treated with Polyesteramide resin during covering stage to achieve inter-turn dielectric strength of 6-8KV & eliminating trapped mechanical forces during the thermal operating cycle.

LV coils are made from fiberglass covered copper strips & wound in helical form. Both coils are assembled in jigs, pre compressed, dried & encapsulated under vacuum pressure, use of mould is totally avoided. MLRE technique of resin all around the exposed surfaces of coils acts as protective covering to the insulated conductors & does not prevent heat dissipation.

**Salient Features of MLRE Dry Type Transformers**

- Maintenance free
- No trapped mechanical forces, improving the thermal operation
- Maximum heat dissipation
- Higher resistance to Short circuit forces using Disc wound coils having self-locking property
- No Partial Discharge, as max voltage appearing at any part of the winding is limited to the turn to turn
- Maximum creepage available in coils
- Better monitoring of hot spot temperature
- Least amount of combustible materials
- Does not emit toxic and blinding smoke in the event of a fire



**OIL TYPE TRANSFORMERS**

**Optimum Design**

Each unit is tuned for optimum efficiency while operating between 45% and 65% of full load (which is the average loading) by delicate proportioning of core and winding losses.

By using CRGO silicon steel mitted cores and paper enamel covered conductors the units are made compact, resulting in lower losses, better regulation and longer life.

Careful design of the core and tank reduces noise level to the minimum. The clamping method adopted helps to keep the optimum properties of the grain-oriented silicon steel, without reducing their mechanical stability.



**Constructional Features**

Winding on HT side are provided with sufficient end-turn reinforcement for extra strength. Windings are pre shrunk and impregnated under vacuum with hot dry Transformer oil before assembly to ensure their proper functioning.

Radial as well as axial clearances and cooling ducts provided for the coils add to the safety and uniform cooling of the windings and limbs.

Windings are designed to withstand sufficient thermal, dynamic and electrical stresses induced during operation as well as under short circuit conditions.

Each tank is pressure tested and the exterior surface coated with primer and 2 coats of weather-proof paint, the shade being dark grey 1110. 6 of IS-5/1980. The interior is given anti-corrosive protection with oil resistant varnish.

Transformers are supplied with first filling of insulating oil conforming to IS-335/1980.

**Customized Solutions**

Voltage regulation is provided with winding tapplings as per customer's specifications generally at +/- 2.5% and +/- 5% of input voltage. As a standard, Tap changing is effected by means of externally hand-operated 'OFF CIRCUIT' tap-changing switch.

On-Load tap changers (OLTC) with variety of steps to offer optimum control can be offered. All tap-changing switches have indicators and locking device. Special Multi tapping transformers are also in the product range, besides the special duty transformers.

**Quality Assurance**

Every transformer undergoes a series of tests throughout the manufacturing process, right from raw material stage to final stage. All routine tests are carried out at our works as per IS 11171, IEC 726 and other International Specifications. Type tests for impulse withstand short Circuit strength, etc have been conducted on representative ratings and voltage classes, at approved national test houses. The ISO certificate has also been revalidated recently.