

**TMC**  
**TRANSFORMERS**



**DRY TYPE  
TRANSFORMERS**

## DRY TYPE TRANSFORMERS



### Application

As electrical loads and the cost of energy increase, there is a greater need to place transformers close to the electrical centre of the distribution systems. This reduces long runs of expensive feeder conductor, minimises distribution losses, and allows better voltage regulation.

Dry-type transformers use air as their main cooling medium and have neither the liquid leakage hazard nor the associated maintenance and potential flammability problems inherent in liquid filled units. **TMC** dry type power transformers are designed, manufactured and tested in accordance with the latest issue of IEC and Australian standards according to customer specifications.

Modern non-hygroscopic insulation materials permit the use of ventilated dry type transformers in most environments found in commercial, industrial and mining applications.

**TMC** dry type transformers with protection rating up to IP66.

Dry type power transformers can be installed as core/coil assemblies within switchgear enclosures, or as separate units in their own cubicles.

**TMC** engineers are ready to advise on the design and application of all products. A continuous program of research and development provides a constant flow of improvements in design, materials and performance.

Customer satisfaction is ensured by rigorous compliance with the quality assurance program.



## DESIGN AND CONSTRUCTION FEATURES

### Core

The core used in **TMC** Dry Type transformers is manufactured from prime quality, low loss, grain oriented ferro-silicon steel laminations, individually coated with high temperature, inorganic insulation.

The structure consists of vertical columns interconnected with fully mitred joints at the yokes.

The core construction can be either the common three-leg construction or the five-leg construction. The five-leg core has the important advantage of being lower in overall height, and structurally superior.

Resin impregnated glass bandages strap the core and ensure low noise levels.

The completed core is treated with a high temperature, electrically stable coating, to prevent corrosion in service.

Where the transformer is fitted into a tank for underground or mobile substation use, the core is securely braced for the longitudinal impact due to connection of towing equipment.

### Windings

Circular concentric windings are used because this shape results in the highest short circuit strength and provides excellent cooling performance.

Conductor materials may be either aluminium or copper.

The low voltage winding is wound using foil conductors.

The advantage of foil construction is that short circuit axial forces are reduced, due to the matched electrical lengths of the low voltage and high voltage coils.

The low voltage foil conductor edges are conditioned prior to winding, and each turn is insulated with three-ply, resin impregnated high temperature film laminate.

“State of the Art” winding machines enable insulation and conductor materials to be simultaneously wound, resulting in a very compact winding, capable of resisting radial short circuit forces.

The high voltage winding is constructed using strip conductor wound in discs supported by high temperature, precision machined combs. The conductor is insulated with three coatings. The first coating in high temperature enamel, the second is overlapped and crossed glass tape and the third is high temperature varnish. This combination of insulation results in a mechanically and electrically robust winding that resists constant vibration.

After winding, a vacuum impregnation and final oven hardening fully protects the coil from infiltration of moisture.

### Insulation and Protective Coatings

Only non-hygroscopic high temperature resistant insulation materials are used on **TMC** dry-type power transformers. These coatings provide additional resistance to moisture and add considerably to the mechanical strength of the complete unit.

### Forced Air Cooling

**TMC** dry-type transformers can be supplied with fans and controls to obtain additional kVA capacity. Forced circulation of air correctly applied permits an increase of 35% above the rated kVA.

### Environmentally Safe

**TMC** Dry Type Transformers contain no liquid to pollute ground or water supplies, and no special measures are required to guard against spillage.

### Quality Assurance

**TMC** is accredited and audited for compliance to ISO9001 Quality Assurance standards.

The rigorous requirements of this International Standard, together with the Customer’s own technical specifications, ensure that **TMC** supplies products that are safe, reliable and of the highest quality.

The Quality Manager continuously monitors the approved quality assurance programme.

The quality program has resulted in the increasing effective operation of the plant and improved in product quality and delivery.

### Routine Testing

Specified routine tests are carried out by trained personnel using modern, calibrated digital test equipment.

These tests include:

- Ratio and Vector Group
- Insulation Resistance
- Applied Voltage
- Induced Overvoltage
- No Load Loss
- Load Loss
- Impedance
- Partial Discharge

### Type Testing

On request, the following type tests can be carried out at an extra cost:

- Short Circuit Test
- Sound Level Test
- Impulse Test
- Temperature Rise

**Core**

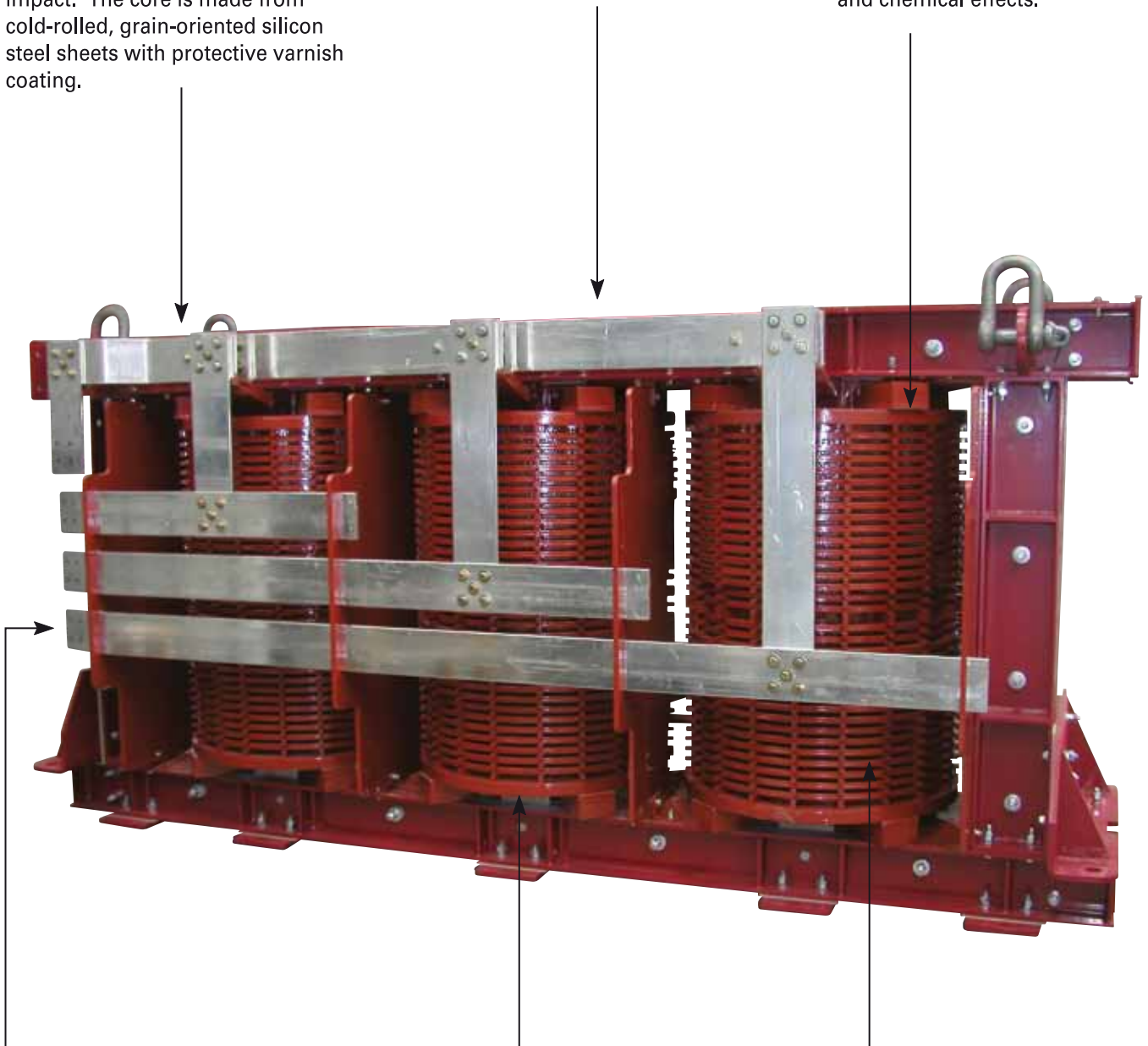
This core is retained by multiple braces which resist radial short circuit forces and mechanical impact. The core is made from cold-rolled, grain-oriented silicon steel sheets with protective varnish coating.

**Frame**

Mechanically resilient frame resists movement due to connection of haulage equipment.

**Mouldless vacuum casting**

Casting allows application in an environment with high humidity and protects against mechanical and chemical effects.



**Terminations**

All terminations are fully supported to withstand short circuit forces

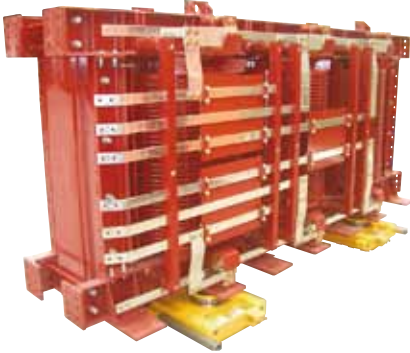
**Low Voltage Windings (inside)**

Circular foil wound concentric windings provide the highest short circuit strength and have excellent cooling performance.

**Medium Voltage Winding Combs**

Disc windings incorporate precision manufactured combs to provide uniform mechanical and electrical spacing.

## GENERAL INFORMATION



**TMC** is an international group of companies with over 75 years of transformer manufacturing experience. The group has excelled at providing high quality induction equipment to the electrical power industry, with an emphasis on meeting exacting specifications and standards, whilst minimising cost. **TMC** is fully accredited to the international quality standard ISO9001, and continues to build on a tradition of product excellence and customer focus and satisfaction.

The company's philosophy is to supply the customer with the transformer which best suits its requirements. The engineering department has accordingly been equipped with the most modern scientific data processing facilities so as to ensure that the most economical unit can be easily and efficiently designed.

**TMC** has a long and successful portfolio of equipment constructed for the mining industry.

### Range

- 100kVA to 20000kVA
- 24kV System Highest Voltage
- Temperature Class H, 200 or 220
- Indoor or Outdoor or Underground Mining Application
- Degree of Protection IP00 to IP66
- Nitrogen pressurised for safety (GNAN)

### Application

Transformers and Reactors suitable for special purposes can be supplied to particular customer requirements, such as: Mobile Substation Transformers, Rectifier Transformers, Traction Transformers, Furnace Transformers as well as Air or Iron Cored Reactors.

Indoor or outdoor housings can be supplied. These comply with a degree of protection to suit any particular requirement.

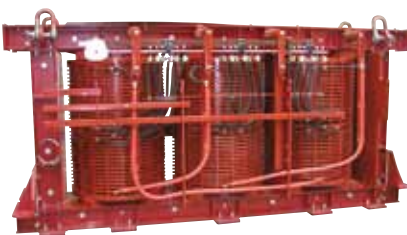
**TMC** Dry Type Transformers comply with the latest National or International Standard, consistent with the Customer's own specifications. Due to the possibility of installation close to the load centre, without the attendant fire risk from flammable oil leaks inherent in oil cooling, significant economic benefits will result if the use of **TMC** Dry Type Transformers is considered at the planning stage. This will ensure that the overall costs of an installed power supply system are considerably reduced. **TMC** Dry Type Transformers are low maintenance.

**TMC** dry type transformers with protection rating up to IP66 are available for outdoor applications. Dry type power transformers can be installed as core/coil assemblies within switchgear enclosures, or as separate units in their own cubicles.

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### Information Required with Enquiry

- Design Standard
- Rated Power
- Overload Requirements
- Ambient Conditions
- No-load Voltage Ratio
- Insulation Levels (BIL)
- Number of Phases
- Frequency
- Connection Symbol
- Tapping Range
- Impedance
- Enclosure Protection
- Sealed and Pressurised with Nitrogen
- Bushings Arrangement
- Dimensional Restraints (Typically Height for Underground Use)





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### **TMC range of products**

- Cast Resin Transformers
- Dry Type Transformers
- Oil Cooled Transformers
- Water Cooled Transformers
- Reactors and Inductors



### **Typical field applications**

- Power and Distribution
- Rectifier
- Furnace
- Industrial
- Mining