

2-Pole Turbine Generators



Stator Winding Construction

Class F stator insulation and Vacuum Pressure Impregnation (VPI) is provided.

Strand Insulation

The strand insulation consists of polyester/glass fibers.

Stator Winding

Model series 2400 and 2800 utilize full loop multi-turn stator coils whereas for reasons of larger size Model series 3100 utilizes half loop multi or single turn stator coils. The stator is VPI'd after the stator winding process.

Model series 3400 and 3600 for reasons of large size utilize half loop single turn stator coils that are VPI'd and fully cured prior to the stator winding process.

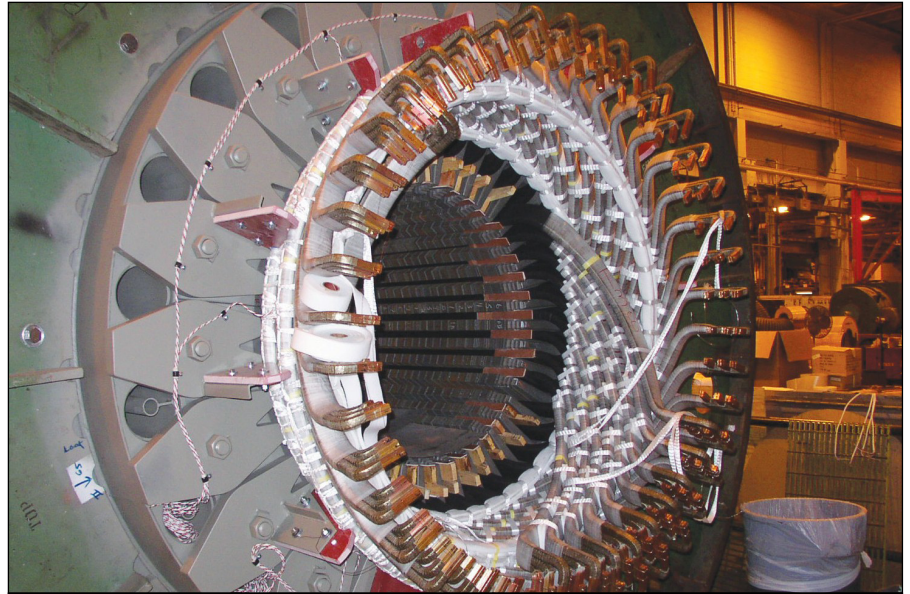
Duraguard VPI Insulation System

The Duraguard™ insulation system is a vacuum pressure impregnated epoxy-mica insulation system that offers the following benefits:

- Full Class F (155°C) Thermal Capability
- Outstanding Dielectric Properties
- Superior Moisture and Chemical Resistance
- The Superb Mechanical Integrity of an Epoxy Resin System

Coil Forming

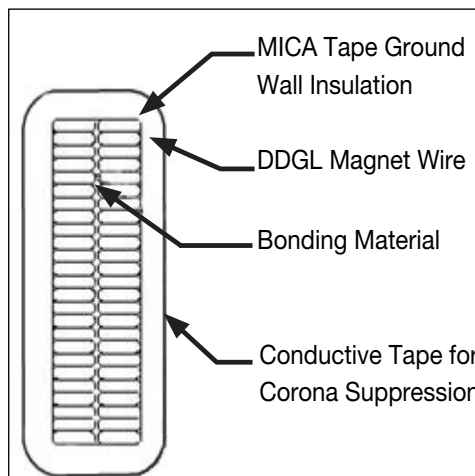
The coils are precisely formed using steel forming cradles.



Stator Winding in Progress

Coil Insulation

Prior to applying the ground insulation, turn insulation of multi turn coils is applied to each turn using mica glass tape. The main ground insulation is mica glass tape. For corona protection semiconducting materials are applied to the outside of the coils.



Stator Coil Cross Section

Transpositions

Full loop coil strands are assembled and utilize a transposition made in each individual turn in the end turn area. Half coil strands are assembled using a Roebel transposition.

Bonding

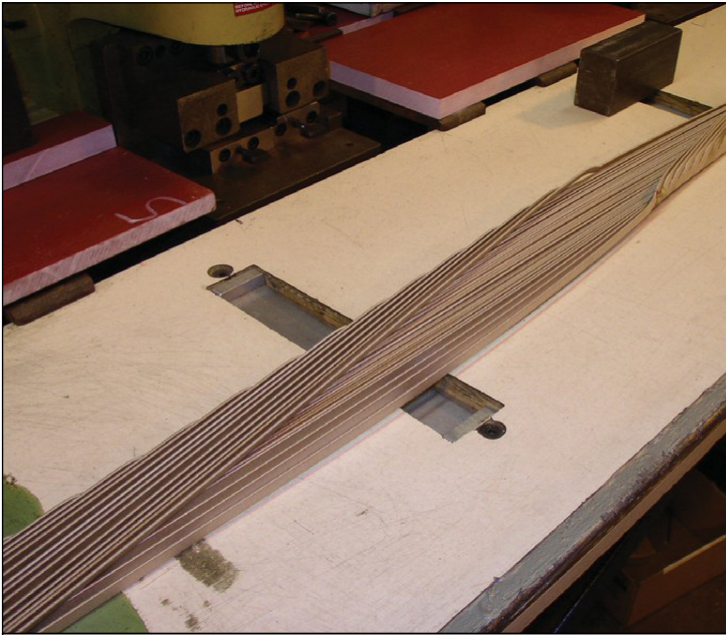
To prevent wire movement and provide a uniform solid base for ground insulation, the coil strands are bonded together under heat and pressure with a thermosetting adhesive.

Tests

Extensive in process testing is performed during coil manufacturing, stator winding and on the complete stator. Tests include turn insulation testing and high potential.

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Stator Winding Construction



Fabrication of half loop stator coil with Roebel transpositions



Wound stator entering the VPI tank for impregnation

Winding and VPI

For Model series 2400, 2800, and 3100, the coils are carefully wound in to the stator slots. The VPI and curing process takes place after coil winding. For Model series 3400 and 3600, the half coils are VPI'd and fully cured prior to winding in to the stator. After coil winding, retaining wedges are installed in the slots. Coil ends are firmly braced to prevent movement due to transient or short circuit conditions. Coils are lashed to support rings. Coil ends are separated by pads that conform and bond to the coil sides. For Model series 3100, 3400 and 3600, the top and bottom half of each coil are connected using special connectors. Insulating material is then applied.

Temperature Detectors

During the stator winding process resistance type temperature detectors (RTDs) are placed between upper and lower coil sections in the slot area to provide stator coil temperature detection. Detectors are positioned in each phase to detect the hottest portions of the windings.

Main High Voltage Terminals

The line and neutral leads are brought out through the sides or bottom of the stator through insulating support plates. The leads project in to a larger terminal box that can be arranged for a bus duct flange or cable connection. Current transformers, potential transformers, surge capacitors and lightning arrestors can be provided as required.

VPI (Vacuum Pressure Impregnation)

The insulating materials and VPI epoxy resin are all components of a specially designed split component system which is designed to assure process uniformity and maximum retention of resin in the insulating materials. For Model series 2400, 2800 and 3100 the fully wound stator goes through the VPI process. For Model series 3400 and 3600 the coils go through the VPI process and are fully cured in fixtures prior to winding into the stator.

For more information, please contact:

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