



NATIONAL ELECTRIC COIL®

Our Experience Generates Results!

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(1) Application of NECCOBond-E™ ground insulation by taping robot to large turbogenerator bar. (2) Dimensional verification of fully-cured coils in mock stator core. (3) Voltage Endurance testing of stator bars. (4) NECCOBond-E™ insulated multi-turn coils packed for shipment. (5) Installation of NECCOBond-E™ insulated stator bars as part of a NEC rewind.

NECCOBond-E™ Coil & Bar Insulation System

Engineered & Tested to Meet Rigorous Standards for Quality & Performance

NECCOBond-E™, NEC's premier stator winding insulation system for large turbo and hydro generators, has been utilized in generators rated up to 945,000 kVA and 26,000 volts. Since its introduction over 20 years ago, this Class F (155° C) insulation system has been in-service without an insulation system failure resulting in a forced outage, proving NECCOBond-E™ to be one of the most reliable stator winding insulation systems in the industry. It is a system that meets IEEE, IEC and other international testing standards, so you can be confident that NECCOBond-E™ will meet the requirements for your next replacement winding.

An Insulation System for the Way Today's Machines Are Operated

NECCOBond-E™ is not just a single tape or a specific resin, but an insulation system carefully designed to meet the insulation requirements for windings in machines operating in the most demanding of conditions. Key components included are:

- Strand insulation made of two layers of fused Dacron® and glass fibers.
- Turn insulation for multi-turn coils comprised of multiple layers of mica tape
- Ground insulation made of multiple layers of mica tape; conservative volts/mil design standards
- Epoxy resin used in a VPI (Vacuum Pressure Impregnation) process
- Corona Suppression – various internal and external systems are used depending on coil/bar design

NEC's Quality Management System for stator bar and coil manufacturing is ISO 9001-certified and puts to use the body of knowledge and experience NEC has gained from the design and installation of thousands of turbogenerator and hydrogenerator windings over the last 90 years.

Rigorous research and prototype testing have been done to develop and continuously improve the NECCOBond-E™ stator winding insulation system. Coils and bars made with the NECCOBond-E™ Insulation System have shown outstanding reliability and performance characteristics, including high dielectric strength, superior mechanical strength, thermal stability, long-term resistance to the effects of aging, and resistance to tracking. Continued testing including both prototype and production testing, is done on every NECCOBond-E™ stator winding set manufactured by NEC.

Coils and bars made with the NECCOBond-E™ Insulation System meet the following international testing requirements and standards*:

- Strand Insulation Testing: EN 50209
- Turn Insulation Testing: IEEE 522 / EN 50209 / IEC 60034-15
- Power Factor / Dissipation Factor / Tan Delta: IEEE 286 / EN 50209 / IEC 60894
- High Potential Testing: IEEE 433 / EN 4999 / IEEE 95
- Voltage Endurance Testing: IEEE 1043 / IEEE 1553
- Thermal Cycling Testing: IEEE 1310 / IEC 60034-18-34
- Partial Discharge Testing: IEEE 1434 / IEC 60894 / ASTM D 1868
- Breakdown Testing: EN 50209
- Blackout Testing: IEEE P1799**
- Other Testing Standards, both Factory and Field: IEEE 4, 43, C50.12, C50.13, 95, 115, P1665**

* Note that not all of the above-referenced standards include specific acceptance criteria.
** IEEE standards still in committee.

NECCOBond-E™ Insulation System will deliver superior performance and reliability. We invite you to visit our state-of-the-art high-voltage coil facility in Brownsville, Texas and welcome your further inquiries.

To discuss your next project or for answers to technical questions, please contact Steve Jeney at (614) 488-1151 x105 or sjeney@national-electric-coil.com or Bill Moore at (614) 488-1151 x125 or bmoore@national-electric-coil.com.

NEC's Approach to Serving Its Customers' Needs

- **Customers First:** As a supplier, we believe serving our customers and the power generation industry require a long-term commitment.
- **Quality:** We believe Quality requires continuous improvement and the maintenance of our ISO 9001 certifications.
- **Ability to Perform:** We believe the right resources – people, experience, equipment – are essential to a job well done, on time and within budget.
- **Expertise in Generator Care:** We believe our expertise in providing technical solutions to a full range of generator problems sets us apart from other service providers.
- **Exceptional Value:** We believe NEC combines the best resources in manufacturing and service for any generator project.