

GEGARD

insulation system protection is designed to extend the life of your motors and generators.

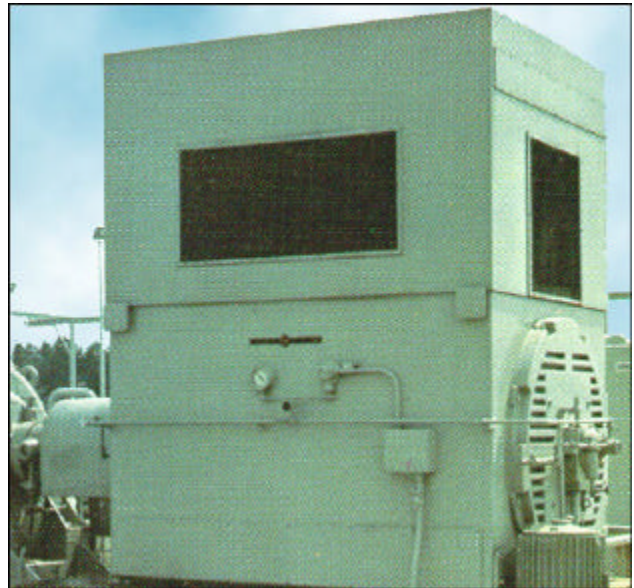
What is GEGARD system protection?

When a motor or generator is rewound after failure, care must be taken to preserve the design characteristics built into the original equipment. This is necessary for reliable operation. And to achieve maximum reliability, a high quality insulation system must be used when rewinding.

GEGARD insulation systems from GE increase dependability and reduce maintenance costs on your random- and form-wound ac motors and generators by providing the rugged protection they need against failure from contamination, thermal degradation, and mechanical abrasion.

GEGARD insulation systems are designed to match or exceed any load, voltage, size, application or operating environment requirements your motors and generators may have. State-of-the-art materials and craftsmanship assure high quality. Thorough testing of all GEGARD insulation systems to industry standards takes place in GE laboratories prior to motor rewind field applications.

As motor and generator replacement costs continue to rise, so does the cost of downtime. Fast shop turnaround and GEGARD insulation maximize uptime while reducing maintenance costs. You get high quality rewinds often better than the original which help to extend motor and generator life.



The ten GEGARD insulation systems: a commitment to quality.

Quality rewinds tailored to match your specific application mean long term protection for your motors and generators as well as upgraded performance.

That's why GE offers ten Class F GEGARD insulation systems. Each is designed for specific environmental conditions.

Four of the ten GEGARD systems are for use in medium voltage form-wound ac motors and generators. They include GEGARD 200, 300, 300S, 400.

All ten GEGARD systems emphasize sealing as the primary method for keeping out contaminants. Techniques for resisting abrasion and chemical damage vary from

GEGARD

system to system. Class H and custom designed systems are also available to meet even more specific customer requirements.

To assure customers of the highest quality form-wound rewind possible, GE manufactures its own coils in specialized

shops set up for that purpose. There, experienced technicians using modern equipment and electrical testing procedures insure proper quality and application of all GEGARD insulating materials.

<i>THERE'S A GEGARD INSULATION SYSTEM TO MATCH YOUR SPECIFIC APPLICATION</i>				
SYSTEM	CLASS	STANDARD FEATURES	OPTIONAL FEATURES AVAILABLE	APPLICATIONS
GEGARD 200	CLASS F-155°C	<ul style="list-style-type: none"> • Fused Polyester Glass or Esterimide Magnet Wire • Bonded Strands/Turns • 7000V Acrylic Lead Sleeving • Mica Paper Polyester Film and Glass Tapes & Slot Wrappers • Glass Tape Armor • Polyester Resin Treatments • Corona Grading 5200 VAC & Above 	<ul style="list-style-type: none"> • Customer Specified Magnet Wire • Taped Leads • Epoxy Resin Treatments • Corona Grading Below 5200 VAC 	Form-Wound Motors in Normal Environments
GEGARD 300-VPI	CLASS F-155°C	Same as GEGARD 200 Except Coils are Resin Treated After Installation with 100% Solids Polyester Resin for VPI	<ul style="list-style-type: none"> • Customer Specified Magnet Wire • Taped Leads • Corona Grading Below 5200 VAC • Epoxy VPI Resin 	Form-Wound Motors Requiring VPI – All Environments
GEGARD 300S-VPI	CLASS F-155°C	Same as GEGARD 200 Except Leads are Taped and Sealed and Coils are Resin Treated After Installation with 100% Solids Polyester Resin for VPI	<ul style="list-style-type: none"> • Customer Specified Magnet Wire • Corona Grading Below 5200 VAC • Epoxy VPI Resin 	Form-Wound Motors Requiring Ultimate in Sealing – All Environments
GEGARD 400	CLASS F-155°C	Same as GEGARD 200 Except Leads are taped and Coil Armor is "B" Staged Epoxy Seal Tapes <ul style="list-style-type: none"> • Corona Grading System 4200V & Above 	<ul style="list-style-type: none"> • Customer Specified Magnet Wire • Epoxy Resin 	Form-Wound Motors in All Environments and for On-Site Winding Requiring Ultimate in Sealing

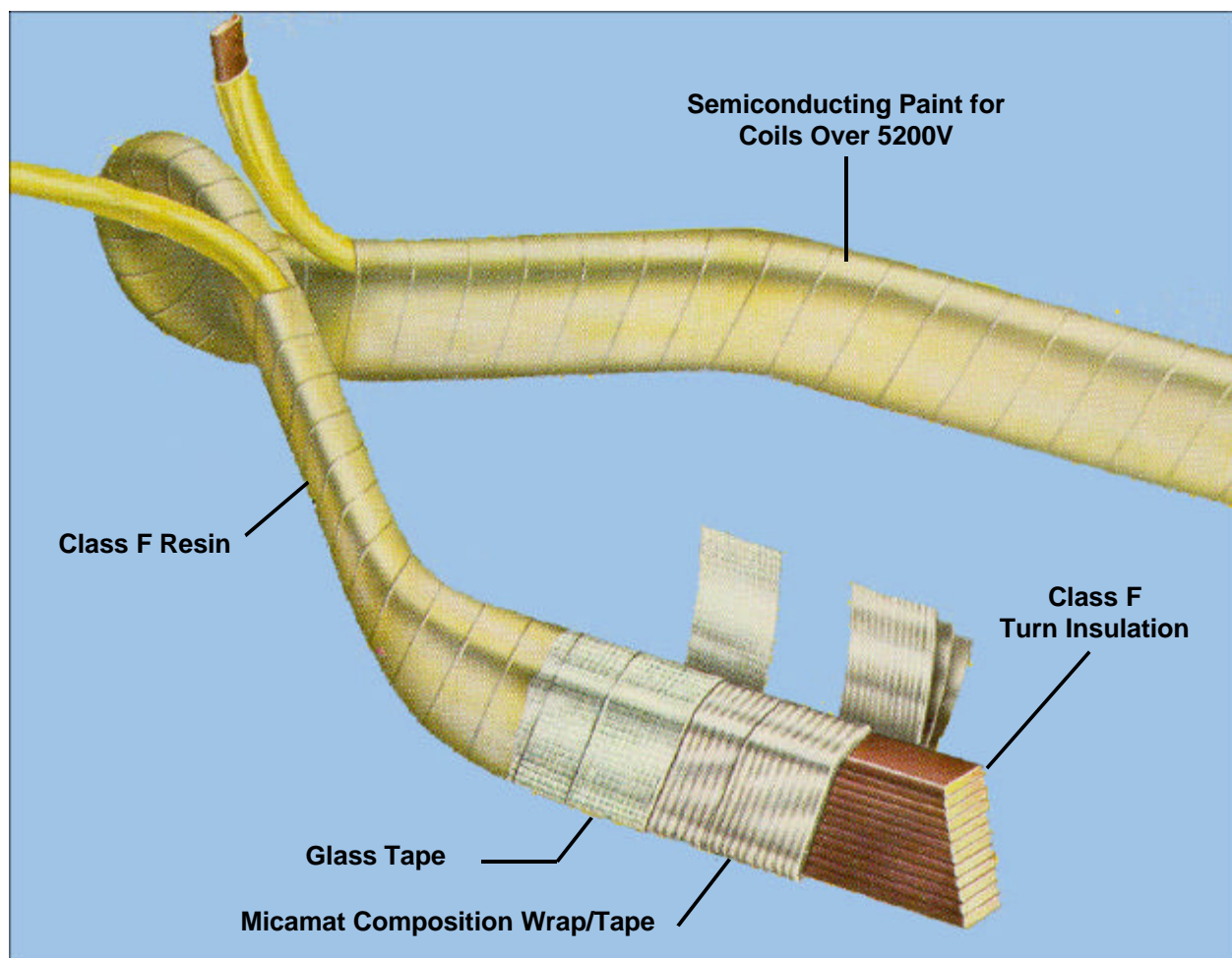
GEGARD 200

insulation keeps your form-wound ac motors running longer and more reliably.

GEGARD 200 insulation rated Class F or higher is specially designed to protect ac form-wound coils.

GEGARD 200 insulation gives form-wound replacement coils dependable performance across a wide spectrum of applications using materials rated Class F or higher.

GEGARD 200 insulation is ideal for drip-proof and TEFC motors and generators originally wound with Class A, B or F insulation systems, and for voltages up to 7000. Semiconducting paint is used on the slots of all coils 5200 volts and above to provide corona suppression. The GEGARD 200 systems have proven highly reliable in industrial, utility, and continuous process applications and have been used and improved by GE for almost twenty years on both new **and** rewound motors and generators.

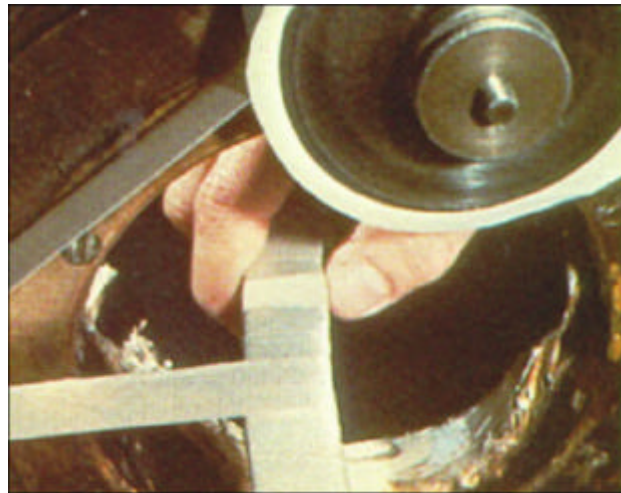


GEGARD 200

The GEGARD 200 coil construction process.

Turn and strand insulation is scientifically selected so that each insulation system design will provide maximum motor uptime. Coils are wound using rectangular copper conductors insulated with a minimum of .013 inches of fused polyester glass fibers. Film coatings .004 inches thick may also be used when needed. Some applications may require the use of fused polyester and film combinations as well as taped turn construction. Standard film coatings are of esterimide.

Conductors are heated and pressure bonded and sized to form a highly flexible but mechanically stable insulating material. After the conductors are bonded, the coil is shaped to precise dimensions in a coil spreader. Conductor lead insulation is next removed to provide a clean surface for soldering or brazing connections.



Turns are automatically taped to assure quality and prolong motor life.

Additional GEGARD 200 systems are available for special motor applications.

GE also provides the GEGARD 200M, 200A, and 200C series of insulation protection systems for special environmental applications.

GEGARD 200M insulation, for example, is designed to offer additional protection for your motors that operate in extremely moist environments.

GEGARD 200A insulation is designed to offer superior abrasion resistance for your motors and generators that experience excessive wear or contact with dust.

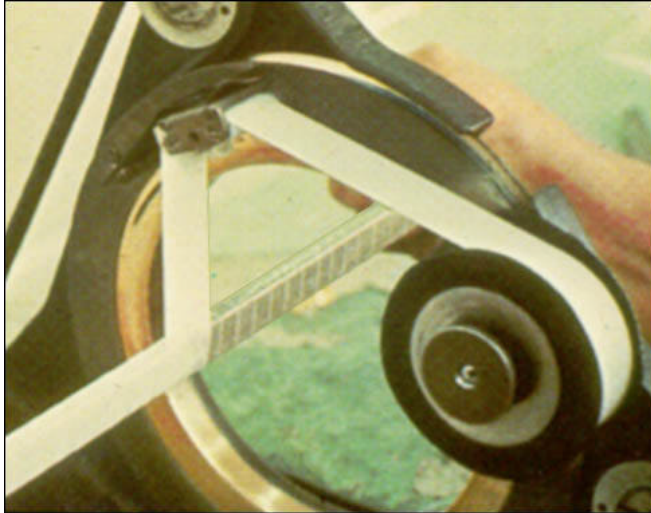
And GEGARD 200C insulation provides highly efficient chemical resistance for your motors which are subjected to extremely corrosive materials such as acids.

Whatever your special application, there's a GEGARD 200 insulation protection system to match it.

GEGARD 200

Coil ground insulation may consist entirely of micamat tapes or a combination of tapes and slot wrappers followed by glass armor tapes. These tapes and wrappers are composites of mica paper, polyester film and glass to ensure superior mechanical strength.

Coil leads are then insulated using an acrylic or multiple layers of tape depending on the voltage and application.



Coils are tested for compliance with strict quality standards.

All sleeving has a Class F temperature rating and a 7000 volt dielectric rating for maximum protection.

After the coils are insulated, they are given a minimum of two dips and bakes of Class F polyester insulating resin for extra sealing protection. An alternate procedure equally acceptable is the use of self-sealing armour tapes that are resin rich with "B" stage epoxy. This construction technique is often used when an extremely short turnaround cycle is required.

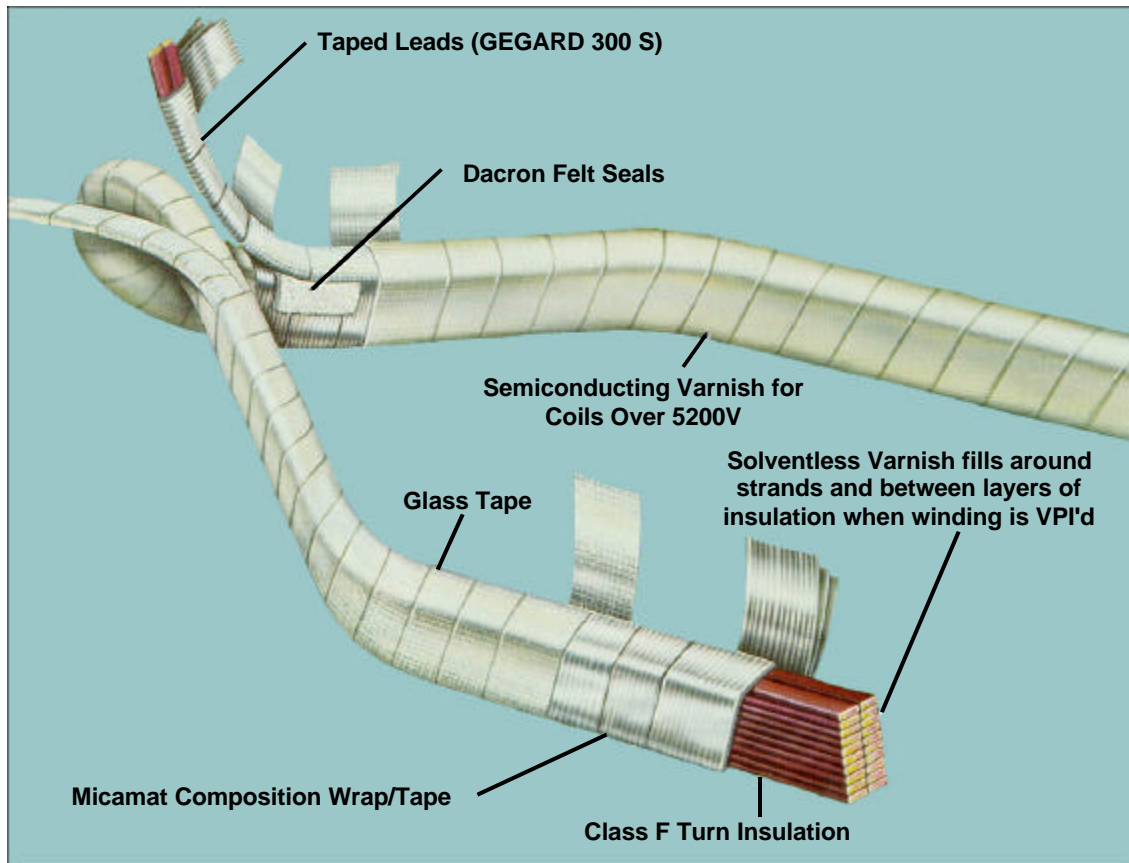
Rigid testing assures the highest quality rewinds.

Form-wound replacement coils using GEGARD 200 insulation systems are built to strict quality standards and are required to pass numerous quality checks.

Single coils are tested at values well above IEEE standards as manufactured. The completed motors are tested to the IEEE high-potential standard for new motors of twice the rated voltage plus, 1000 volts.

GEGARD 300

VPI systems provide long-term motor protection for severe applications.



Coils are tested at voltages well above IEEE standards.

VPI treated stators rewound with GEGARD 300 coils resist vibration, moisture, and other contaminants.

Form-wound ac stators made with GEGARD 300 coils that are Vacuum Pressure Impregnation (VPI) treated demonstrate increased ability to resist mechanical vibrations and penetration by moisture and other contaminants. They also provide excellent heat transfer and a cooler running motor.

GEGARD 300 insulation is recommended for motors requiring sealing protection against any severe duty contaminant.

GEGARD 300

The GEGARD 300 coil construction process.

Coils are wound, bonded and sized, and shaped in the same manner as with the GEGARD 200 system. GEGARD 300 coil leads are then insulated either with sleeving or with tape depending upon the application required.

Coil ground insulation consists entirely of micamat tapes or a combination of tapes and slot wrappers followed by untreated glass armor. After the coils are insulated, no resin treatments are applied. Coils are left untreated so as to allow the resin to penetrate and fill the insulation system during the VPI treatment.

Slot portions of coils with a rating of 5200V and above are painted with a semiconducting varnish and baked for thorough drying at 150°C. Each coil is then ground and turn surge tested at values well above IEEE standards to assure that the completed winding will pass the 2E + 1000V test for new motors.

GEGARD 300 insulation for VPI treatment is offered in many GE Service Center locations around the country. VPI treatment employs a solventless resin to provide essentially void-free stator windings. The resin seals out contaminants and bonds coils and other winding components into a solid, rigid structure.



Special Dacron® felt sealing is added to retain VPI resin and increase coil insulation protection.

GEGARD 300

GEGARD 300S insulation – for even more rugged applications.



GEGARD tying and bracing procedures reduce winding vibration.

The GEGARD 300S system is also available to provide extra sealing protection for motors operating in atmospheres containing unusually high amounts of moisture or other contaminants.

Leads on GEGARD 300S coils are always taped. Polyester felt lead seals are then installed at the point where the lead exits the coil. Lead tape construction is of micamat reinforced with glass. The resin in the tape is of flexible polyester. Leads of six conductors or more are firmly attached to the coil arms with thermo-setting polyester glass cord for added strength.

GEGARD 400

insulation provides an external seal for form-wound coil applications when VPI is not possible.

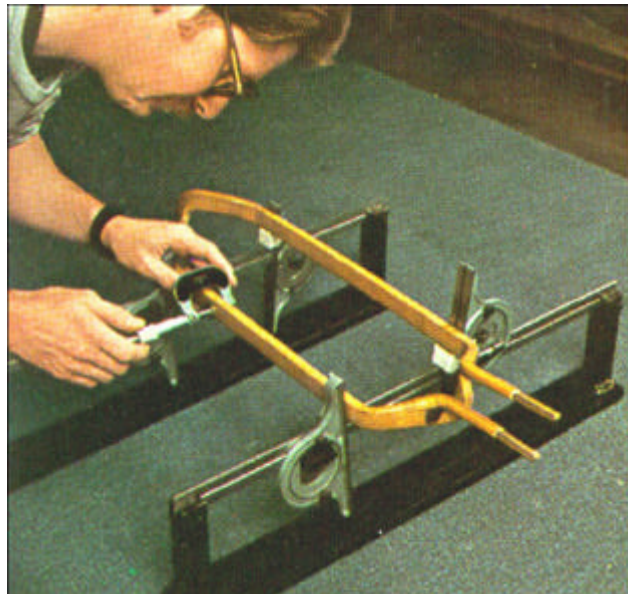
GEGARD 400 insulation systems provide excellent sealing against contaminants.

This rugged insulation system provides a barrier between the conductors and moisture, oil, solvents or other aggressive, conducting materials. For sealed winding applications up to and including Class F, GEGARD 400 is the choice. It can be used in drip proof and weather-protected motors, indoors or outdoors, for voltage levels up to 7000.

The GEGARD 400 coil construction process.

Coils are looped, bonded and pulled to shape in the same manner as the GEGARD 200 and 300 series. The slot section of the 400 series is insulated with a micamat wrapper, and the entire coil receives wraps, this time with micamat tape and finally, one layer of B-staged, resin-rich armor tape.

This armor tape is epoxy resin-filled polyester glass and is designed so the flow of resin and shrinkage during cure ensures a leakproof seal. The B-staged tape has high dielectric strength and insulation resistance.

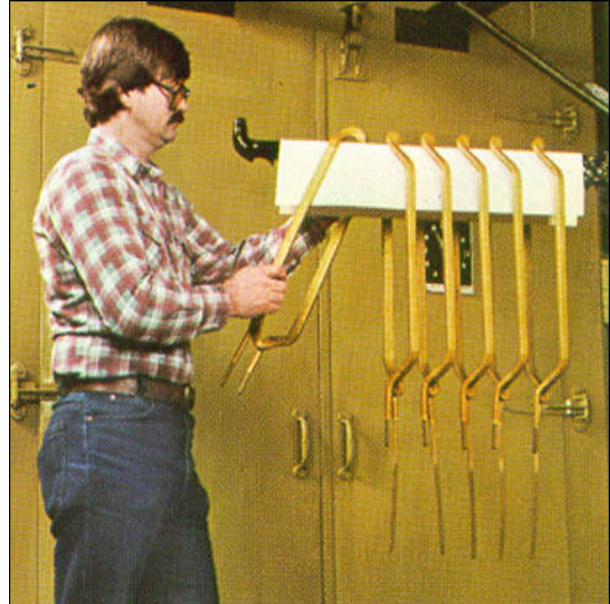


Slot section of coil is bonded for electrical integrity and consistent size for good slot fit.

GEGARD 400



Leads are sealed with a compatible B-staged epoxy pad.

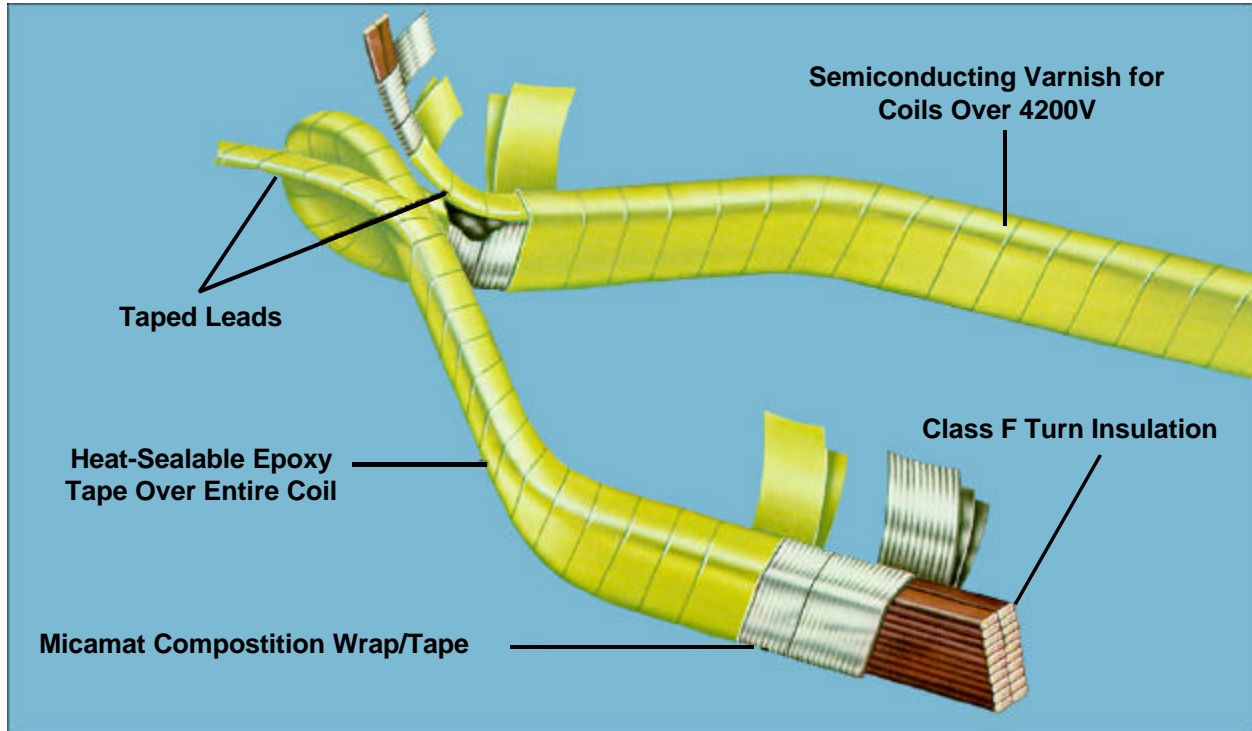


Coils are baked at high temperatures to cure resin and seal coils

The lead seal pads are then installed under the taped leads and the entire coil and leads are overtaped with a second layer of resin-rich armor tape. Coils are baked at high-temperature, curing the epoxy in order to develop the dielectric and mechanical strengths, and the resistance to moisture, dirt and chemicals. The chart below demonstrates the resistance of GEGARD 400 to typical conducting contaminants

Form-wound GEGARD 400 coils meet strict quality standards. The coils pass test values well above IEEE standards both before and during installation. Completed motors are tested to IEEE standard for new motors of twice the rated voltage, plus 1000V.

GEGARD 400



CHEMICAL RESISTANCE (Tested at Room Temperature, 25°C)			
	Immersion Time (Hours)	Weight Loss %	Retention Dielectric Strength %
Base (10% NaOH Solution)	240	5	60
Acid (10% H ₂ SO ₄ Solution)	240	2	93
Water (H ₂ O)	240	0	97
Salt (3% NaCl Solution)	240	0	97