



Insulation Specifications A/C MOTOR & GENERATOR VACUUM PRESSURE IMPREGNATION WATER SUBMERGENCE TEST COIL SYSTEMS

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SCOPE

1.00 These specifications cover the general material, and fabrication standards employed by Kencoil in the manufacture of A/C stator coils operating at normal voltage ratings up to and including 7200 volts. This insulation system requires a V.P.I. process utilizing a 100% solids epoxy resin.

STANDARDS

2.00 All coils manufactured under these specifications are done so in accordance with the latest published IEEE and NEMA Standards, unless otherwise specified.

MATERIALS

3.00 All materials are compatible during their manufacture and unless otherwise specified will be compatible with standard materials used in the industry. Materials meet or exceed class "F" temperature ratings. All materials used in this system should be of an untreated resin free, or low resin type.

4.00 Conductors used are high conductivity 100% virgin copper.

5.00 Conductor strand insulation shall be heavy or quad amide-imide film covered wire or a heavy or quad amide-imide film served with a fused single or double glass over film wire. Other supplemental turn insulation (if required); will consist of taped turn insulation.

5.01 Strand insulation choice is determined from any of the following factors:

- A. RMS volts between turns
- B. Available slot space
- C. Machine application

5.02 Supplemental end turn insulation shall consist of an open weave untreated fiberglass sleeving of a size which fits snugly over the turn conductor/s.

5.03 Lead seal pad material shall be a highly absorbent polyester Dacron mat.

6.00 The end turn insulation shall consist of a low resin content mica tape .0075 $\frac{3}{4}$ lapped, with the minimum servings as indicated below:

Voltage	No. of Servings
Thru 2300	3
4160	4
7200	6

7.00 The ground wall insulation shall be a low resin content mica tape only, .006 thick, applied in a $\frac{1}{2}$ lap fashion to the minimum total thickness as indicated below:

Voltage	Thickness
Thru 2300	.090
4160	.120
7200	.180

8.00 The lead insulation for various voltages shall be as indicated below:

Voltage	Type
Thru 4160	4 servings of .0075 mica $\frac{1}{2}$ lap, overlaid with a single Serving of polyester Dacron
7200	7 servings of .0075 mica $\frac{1}{2}$ lap, overlaid with a single serving of Polyester Dacron

9.00 The outer protective armor tape consists of one layer, $\frac{1}{2}$ lapped polyester Dacron.



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CONSTRUCTION

10.00 Coils are shuttle (loop) wound, hydraulically press molded to assure conductor alignment.

10.01 During the looping process the second turn at the pin area is served with a fiberglass sleeving of a size which fits snugly over the turn conductor/s.

11.00 The hairpin loops have the lead insulation wiped clean to bare copper; are spread to proper shape, and checked for uniformity prior to receiving any insulation.

12.00 The leads are taped with the prescribed number of layers of mica tape, starting at an appropriate point at the outer end of each lead, and ending in the diamond. Each successive layer is shortened approximately $\frac{1}{2}$ " to avoid build-up.

12.01 A single layer of polyester Dacron is applied to the leads over the mica, beginning at the lead end and finishing in the diamond.

13.00 The prescribed number of layers of mica tape is applied to the entire coil, beginning and ending at the diamond on the lead end. Splices of any type within the slot portion of the coil are not permitted. The start and finish of each successive layer is shifted slightly toward the knuckle to prevent build-up.

14.00 The lead breakout area will receive a polyester Dacron pad that extends into the diamond.

TESTING

15.00 Prior to shipment a random sampling of coils must pass a D.C. ground test of twice normal operating voltage for one minute. Coils must pass a ten second high frequency turn to turn insulation test as follows:

<u>Strand Ins.</u>	<u>Applied Voltage</u>
Heavy Film	Turns per coil x 500 = test volt
Quad Film	Turns per coil x 850 = test volt
[Single glass over	add 200 volts/turn]
[Double glass over	add 400 volts/turn]
[Kapton Glass Over	add 300 volts/turn]
[Dacron Over	add 600 volts/turn]
[Mica Over	add 1,300 volts/turn]

WINDING PROCEDURES

16.00 The materials utilized in this system are porous in nature and require care in handling; consequently the coils are designed to fit into the slot without use of force.

17.00 Top sticks should be "spaced" leaving approximately a one inch gap for every 2 or 3 inches of wedge.

17.01 The individual coil series connections should be done in a "U" fashion. Apply a layer of glass adhesive, thermosetting acrylic tape, electrical grade, over each welded joint directly against the wires.

17.02 Apply the appropriate number of layers of mica tape over the welded area. The mica should overlap the exiting mica on the coil leads.

17.03 A single layer of polyester Dacron mat is applied over the mica, taking care to assure a continuous covering of the entire lead area with the mat.

17.04 The terminal leads are welded in place, and a thorough coating of RTV silicone rubber is massaged in and around the lead wire stands to effect a proper seal.

17.05 The appropriate number of layers of mica tape is applied, overcoated with a single layer of mat.



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TESTING (COMPLETED WINDING)

18.00 The following test values are recommended when applying D.C. voltage to a completed winding:

Before V.P.I. processing	100% of line voltage
After V.P.I. processing	$(2E + 1000) \times 1.7$

GUARANTEE

19.00 Kencoil, Inc. guarantees its manufactured products to be free of defective materials and workmanship. It further guarantees the coils will pass the standard hi-pot and surge tests after complete insertion and proper connections are made. This guarantee remains in effect for one year from date of our invoice. Exceptions will be taken should the end user, through neglect or abuse, allow the machine to become victim of faulty electrical, mechanical, or environmental circumstances.