

## SCOPE

The specifications describe material, construction and testing standards for manufacturing of VPI (Green) stator coils voltage rating up to 13800 volts with class F insulation. Higher Voltages up to 15000V possible with this insulation. This insulation will be rated class H if used with a resin that is class H certified.

## MATERIALS

### a) Conductors

Copper Conductors are 99.97% pure EC Grade.

### b) Conductor Strand insulation

Bare Copper Conductor shall be covered with any one of the following insulation based on the design.

1. Single or double Daglass/Fiberglass
2. Enamel with daglass (Preferred)
3. Enamel with fiberglass
4. Mica tape without enamel
5. Enamel with Mica

### c) Turn insulation (If applicable)

Highly porous uncalcined muscovite mica paper, reinforced on one side with glass cloth and bonded together with a small amount of epoxy resin for insulation of slot portion, one or two Layers half lap with 0.15mm (0.0059") thickness.

### d) Lead insulation

Highly porous uncalcined muscovite mica paper, reinforced on one side with glass cloth and Bonded together with a small amount of epoxy resintape 0.15mm (0.0059") shall be applied as below:

VOLTAGE	NO. OF LAYERS
Up to 3.3 KV	2 layers
4.16 KV	3 layers
6.6 KV	5 Layers
11 KV	8 Layers
13.8 KV	9 Layers

### e ) Main wall insulation

Highly porous uncalcined muscovite mica paper, reinforced on one side with glass cloth and Bonded together with a small amount of epoxy resin tape 0.15mm (0.0059") shall be applied Generally all layers applied by half lap.

VOLTAGE	RADIAL GROUND WALL INSULATION ( field strength – 2.15 KV/mm )	NO.OF LAYERS
3.3 KV	0.88mm	3 layers
4.16 KV	1.12mm	4 layers
6.6 KV	1.76mm	6 layers
11 KV	2.95mm	10 layers
13.8 KV	3.70mm	12 layers

### f) End winding insulation

Highly porous uncalcined muscovite mica paper, reinforced on one side with glass cloth and Bonded together with a small amount of epoxy resin tape 0.15mm (0.0059") shall be applied Generally all layers applied by half lap.

VOLTAGE	NO. OF LAYERS
Up to 3.3 KV	2 layers
4.16 KV	3 layers
6.6 KV	5 Layers
11 KV	8 Layers
13.8 KV	9 Layers

**Note:**

**If the resin contains of accelerator, we shall use tape without accelerator.**

**If the resin does not contain accelerator, we shall use tape with accelerator.**

**g) Slot corona protection**

The slot corona in the form of conducting tape is applied after application of main wall

Insulation above 3 KV. Slot corona protection consists of non-woven polyester mat (fleece) impregnated with a special varnish containing carbon black and graphite.

Generally tape thickness 0.09/0.10mm is used.

**h) End corona protection**

End corona in the form of semiconducting or stress grading tape is applied to the end Portions above 3.3 KV with one half layers.

The tape consists of polyester – fabric, impregnated with silicon Carbide resin mixture in B-Stage.

The semiconducting overlap on conducting tape is 20 mm shall be maintained.

VOLTAGE	LENGTH
4.16 KV	80mm
6.6 KV	100mm
11 KV	150mm
13.8 KV	180mm

**i) Sealing protection**

Impregnated mixed glass – polyester fabric combined with shrinkable PET film tape is used for finishing of end winding portion with one half lap layer.

### CONSTRUCTION

- a) The looped coils are stack consolidated with B – staged epoxy resin impregnated glass cloth tape
- b) The turn insulation and lead insulations are applied by hand taping
- c) The ground wall insulation(straight portion) is applied by machine
- d) The End winding insulation is same as followed as ground wall insulation
- e) The insulated random coils are inspected with wooden cradle before shipment

### TESTING

The electrical routine tests are to be carried out prior on all coils before shipment of insulated Coils.

- a) Inter-turn test at 1.5 times rated voltage with recurring surge voltage – should not short circuited
- b) IR measurement before and after DC high voltage as per IEEE 43-2000
- c) DC high voltage test should pass at  $2 \times U_n$  for 1 minute  
Where  $U_n$  is line voltage of the coil, High voltage to be conducted on straight portion (ground wall insulation)
- d) DCR measurement

### GUARANTEE

12 months from the date of supply. The coils after receipt of material at your end shall be tested as per IEEE standards before insertion in to the slot. If any coil fails during this testing, we shall replace the quantity of failed coils with new coils at free of cost for which we shall not hold any liability for the consequential losses.

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