SUPERSEDES
BP22992 Rev.02

EPOXY RESIN (B-STAGE) PREIMPREGNATED POLYESTER FELT

1. GENERAL:

This specification governs the quality of polyester felt in strip form. It is manufactured by impregnating polyester felt with epoxy resin. The cured material shall have good water, oil and arc resistance and shall have temperature index of at least 155.

2. APPLICATION:

The material is suitable for use as conformable packing in stator winding overhangs of large electrical machines.

3. COMPLIANCE WITH NATIONAL STANDARDS:

There is no Indian Standard covering this type of material.

4. DIMENSIONS AND TOLERANCES:

Thickness, Width and Length shall be stated on the order.

4.1 Preferred Thickness & Tolerance

2 , 3 & 5 mm with tolerance of ± 10%

Other thickness can also be ordered.

4.2 Width:

30, 40, 50 mm. Other width can also be ordered.

5. COLOUR:

Off-white, unless otherwise specified.

6. TEST METHODS:

The tests shall be conducted as stated against each clause.

7. SAMPLE FOR TEST:

Two Sheets of ordered thickness and size 300x300 mm or 1 Roll of Felt strip shall be supplied for testing and approval.

8. SHELF LIFE & STORAGE:

At 20 deg.C : 6 Months Minimum
At 5 deg.C : 12 Months Minimum

However supplier should clearly state shelf life and storage condition.

9. CURING TIME: Recommended curing schedule is as follow:

At 160 ± 2 deg.C : 1 Hour
At 130 ± 2 deg.C : 5 Hours.

However supplier shall furnish exact curing schedule.

10. COMPOSITION:

10.1 Polyester Felt:

The type of polyester felt used shall be disclosed to BHEL and prior approval obtained. Once approved it shall not be changed unless concurred by BHEL.

10.2 Resin:
The modified epoxide bond used shall be disclosed to BHEL. It shall have a temperature index of at least 155.

The modified epoxide resin shall be identified by Infrared Spectrometer or by any conventional method.

11. PROPERTIES:

11.1 Resin Content (Appendix) : 60 ± 5% by Wt.

11.2 Volatile Content (Appendix II) : 0.5 to 1%.

11.3 Acetone Solubility (Appendix III) : 55%, Min.

11.4 Bond Strength:

The treated polyester felt when tested by double lap joint method as given in the Appendix-IV shall have bond strength as given below:

11.4.1 After curing for 1 hour at 160 ± 2 °.C. :,5kn min

11.5 Compressibility : 65 ± 5%.

Calculated on unpressed thickness after curing at 160 ± 2 deg.C for 1 hour under a pressure of 7 kg/cm ^{2}.

11.6 Flexibility:

The material shall be sufficiently flexible under normal temperature during application.

12. TEST CERTIFICATE:

Unless otherwise specified, three copies of test certificates Shall be supplied with each consignment .

In addition, the supplier shall ensure to enclose one copy of the test certificate alongwith their despatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information.

BP 22992: Epoxy Resin (B-Stage) Pre-impregnated
Rev.03
Polyester Felt.

Our Order No.

Batch/Lot No.

Test values obtained/certificate for compliance for clause 4, 5, 8 to 11.

13. PACKING AND MARKING:

The material shall be supplied in roll form with suitable interleaving foil/film and packed suitably to prevent from contamination and damage during transit.

Each package/roll shall be marked with the following information:

BP 22992: Epoxy Resin (B-Stage) Pre-impregnated Polyester Felt.
Our Order No.
Manufacturer's Name and Grade.

Batch/Lot No.

Thickness, Width & Length.

Quantity.

Date of Manufacture/Expiry.

APPENDIX-I

RESIN CONTENT

The specimen of size 100 mm square shall be dried in an oven at 105 ±5 °C for 4 hours and shall then be cooled and weighed (W_2). The specimen shall then be refluxed with a suitable blend of Solvent mixture in a soxhlet apparatus for 4 hours or unless it is free from resin content. The specimen shall be allowed to dry in air for 10 minutes and then transferred in an oven at 105 ± 5 ° C for 1 hour, cooled and reweighed (W_3).

$$R.C = \frac{W_2 - W_3}{W_2} \times 100$$

Where R.C. = Resin Content in percent
W_2 = Wt. of Volatile free specimen in gms.
W_3 = Wt. of resin free specimen after solvent extraction in gms.

APPENDIX-II

VOLATILE CONTENT

The specimen of size 100 mm square shall be weighed (W_1)and then transferred to an oven at 105 ± 5 ° C for 4 hours. The specimen shall then be removed, cooled and weighed (W_2).

$$V.C. = \frac{W_1 - W_2}{W_1} \times 100$$

Where V.C. = Volatile Content in percent
W1 = Wt. of specimen before drying in gms.
W2 = Wt. of specimen after drying in gms.

APPENDIX-III

ACETONE SOLUBILITY

The specimen of size 100 mm square shall be cut and weighed (W_1). The specimen shall then be suspended in acetone at room temperature for 20 minutes ensuring that the sample does not stick to the sides or to other samples. The sample shall then be transferred to clean acetone for 1 minute. The sample shall be removed and allowed to dry in air for 5 minutes and then transferred in an oven at 105 ±5° c f or 1hour, cooled and reweighed (W_2).

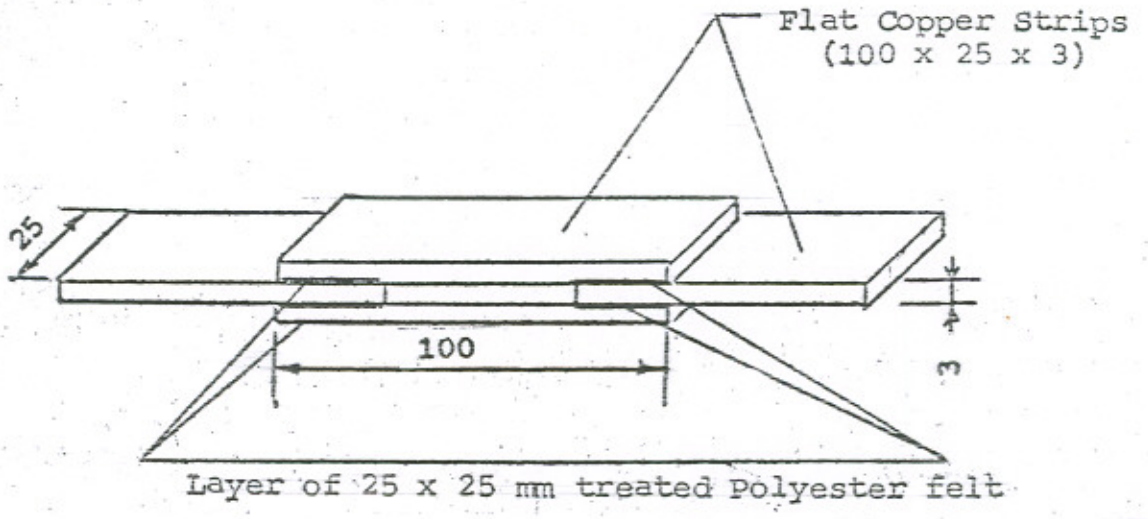
$$\text{Acetone Solubility} = \frac{W_1 - W_2}{W_1} \times 100$$

Where W_1 = Wt. of specimen in gms.

W_2 = Wt. of specimen after removing from acetone in gms.

APPENDIX - IV

BOND STRENGTH (DOUBLE LAP JOINTED METHOD)
(ALL DIMENSIONS IN MM)



1. Four numbers of flat copper strips of size 100 x 25 x 3 mm tk are taken for making the double lap joints as shown in the figure above.

2. The copper strips are thoroughly degreased with white spirit / trichloroethylene.

3. Four Nos. of 25 x 25 mm pieces of treated polyester felt shall be cut and placed on four joints of the test set in an area of 25 x 25 mm at the edges of the copper strips as shown in the figure above.

4. The whole set shall be placed in the hot-press at 160 ± 2 deg.C for one hour under a load of 1 N/mm^2 (10 Kg/Cm^2) to ensure that the treated polyester felt layers forming the joint remain in a fixed position during the curing cycle.

5. After 1 hour, the specimen shall be allowed to cool in the press. The pressure shall only be released when the temp. of press reaches 40 deg.C and the specimen shall be allowed to cool down to ambient temp. Bond strength shall be determined using a standard tensometer at a speed of 80 mm / minutes.