



CORPORATE PURCHASING SPECIFICATION

AA 211 16

Rev. No. 03

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KRAFT INSULATING PAPER - LOW AIR PERMEABILITY

1.0 GENERAL:

This specification governs the quality requirements of high density Kraft Insulating Paper for electrical purposes made entirely from soft-wood pulp manufactured by the sulphate process. The paper shall be manufactured in natural colour (undyed) and shall be free from metallic particles. This material in insulating oil shall have a temperature index of at least 105.

2.0 APPLICATION:

Used in the manufacture of paper covered continuously transposed copper cable to BHEL specification AA 281 27 and AA 281 29.

3.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material is generally based on Grade 5B4-2L4 of IS:9335 (Part3/Sec5)-1985 and IEC:60554-3-5-1984. "Specification for Cellulosic papers for Electrical purposes- Specification for Individual Materials-special papers".

4.0 DIMENSIONS AND TOLERANCES:

4.1 Thickness:

Nominal Thickness and Tolerances shall be as shown below:

<u>Nominal Thickness, micron</u>		Tolerance, $\pm\%$
Over	Upto & Includ.	
-	75	10
75	105	7
105	125	6
125	-	4

4.2 Width:

250, 450, 500, 610, 1015, 1145, 1320, 1400, 1780, 2030, 2285 and 2540 mm with a tolerance of ± 5 mm. However any other width can also be ordered.

Revisions :

Cl: 33.5.8 of MOM of MRC-E

APPROVED :

INTERPLANT MATERIAL
RATIONALISATION COMMITTEE-MRC (E)

Rev. No. 03

Amd.No.

Reaffirmed

Prepared

Issued

Dt. of 1st Issue

Dt:15.01.2003

Dt :

Year :

BHOPAL

Corp. R&D

DECEMBER, 1984

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5.0 FINISH:

The paper shall have smooth but unglazed surface.

6.0 TEST METHODS:

Unless other wise specified, the tests shall be conducted in accordance with the relevant methods of IEC 60554-2 / IS:9335 Part II.

7.0 SAMPLE FOR TEST:

20 sheets of size 300 X 300 mm of ordered thickness suitably packed shall be supplied for testing and approval purposes. Machine direction shall be marked clearly on all the sheets.

8.0 PHYSICAL PROPERTIES:

8.1 Substance (grammage):

Nominal Thickness (μm)	Substance (g/m ²)	Tolerance (± %)
50	50	5
65	65	5
75	75	5
100	100	5
125	125	5
140	140	5

Note: Substance for intermediate thickness shall be equal to the thickness of the paper, in micron.

8.2	Apparent Density	:	1.00 ± 0.05 g/cm ³
8.3	Moisture Content	:	8%, max.
8.4	Water absorption	:	5 mm, min.
8.5	Air permeability	:	0.02 to 0.05 μm/Pa.S

9.0 MECHANICAL PROPERTIES:

9.1 Tensile Strength (Expressed as tensile index):

Machine Direction (MD)	:	98 Nm/g, min.
Cross Direction (XD)	:	37 Nm/g, min.



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9.2 Heat Stability (Type Test):

Paper shall be heated in air at $120^{\circ}\pm 2^{\circ}$ C for 168 hours and following requirements shall be met:

- Increase in Conductivity of aqueous extract shall not be more than 23 ms/m.
- Decrease in Bursting shall not exceed 20 %.

9.3 Tear Index:

The material when tested shall show a minimum Internal Tearing Resistance as shown below, expressed as Tear Index.

<u>Substance, g/m²</u>		Machine Direction , m N m ² / g, min	Cross Direction, m N m ² /g , min
Above	Upto & Incd.		
30	80	5.0	6.0
80	120	6.0	7.0
120	-	8.0	9.0

10.0 ELECTRICAL PROPERTIES:

10.1 Electric strength in air:

<u>Thickness, micron</u>		BDV, (kV/mm), min.
Above	Upto & Incd.	
-	90	9.0
90	125	8.5
125	-	8.0

Electric strength shall be determined at room temperature after drying the paper for 1 to 2 hours at $105^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and then tested within 2 minutes of removal from the oven.

11.0 CHEMICAL PROPERTIES:

- 11.1 Ash Content : 1%, max.
- 11.2 Conductivity of 5% aqueous extract : 10 mS/m, max.
- 11.3 pH of 5% aqueous extract : 6 to 8



12.0 TEST CERTIFICATES:

Unless otherwise specified, three copies of test certificates shall be supplied alongwith each consignment .

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

The test certificate shall bear the following information:

AA 21116 (Rev.No 03): Kraft Insulating Paper - Low Air Permeability.

BHEL order No.

Manufacturer's/Supplier's Name.

Batch/Lot No.

Thickness & Width.

Net weight/No. of rolls.

Test values obtained and certificate for Physical, Mechanical, Electrical and Chemical properties called for in this specification.

13.0 PACKING AND MARKING:

The paper shall be supplied in rolls tightly wound on suitable hollow formers of 70, 75 or 90mm inside diameter (as specified on order) and shall be adequately wrapped to prevent damage during transport, handling and storage.

The ends of rolls shall be protected during packing to avoid any radial or telescopic information.

Each roll shall be clearly and indelibly marked with the following information:

AA 21116: Kraft insulating Paper-Low Air permeability.

BHEL order No.

Manufacturer's / Supplier's Name

Batch/Lot No.

Thickness, Width and outside diameter.

Net weight.

14.0 REFERRED STANDARDS (Latest Publications Including Amendments) :

- 1) IS:9335, Part 2 &3
- 2) IEC 60554-3-5 and IEC 60554-2
- 3) AA 28127
- 4) AA 28129