



CORPORATE PURCHASING SPECIFICATION

AA 229 01

Rev. No. 05

PREFACE SHEET

## POLYAMIDE (ARAMID) CALENDER PAPER

FOR INTERNAL USE ONLY  
REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS

### Comparable Standards:

### Suggested/Probable Suppliers and Grades:

1. M/S DUPONT, USA : NOMEX 410
2. Refer plant vendors list

### User Plant References:

1. HEEP, HARDWAR : NOMEX 410
2. BHOPAL : BP 22994

Revisions :As per 38<sup>th</sup> MOM of MRC-E

APPROVED :  
INTERPLANT MATERIAL  
RATIONALISATION COMMITTEE-MRC (E)

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Corp. R&D

AUGUST, 1983

**POLYAMIDE (ARAMID) CALENDER PAPER****1.0 GENERAL:**

This specification governs with the quality requirements calender polyamide (Aramid) paper made from specially formulated polyamide fibres with a high degree of thermal stability. The material is used upto a maximum operating temperature of 220°C.

**2.0 APPLICATION:**

Used as inter-turn insulation, slot liner of electrical machines.

**3.0 COMPLIANCE WITH NATIONAL STANDARDS:**

There is no national standard covering this type of material.

**4.0 DIMENSIONS AND TOLERANCES:****4.1 Sizes:**

Thickness, width and length of the sheet / tape shall be as specified in BHEL order.

**4.1.1 Preferred thickness and Tolerances:**

0.05, 0.08, 0.13, 0.18, 0.2, 0.25, 0.3, 0.4, 0.5 and 0.8 mm with tolerances as per Annexure I.

**4.1.2 Preferred Width and Tolerances:**

**Sheet:** 600mm and 900mm with tolerance of  $\pm 15$  mm.

**Tape:** 20, 25 and 30 mm with tolerance of  $\pm 0.5$  mm.

**5.0 FINISH:**

The material shall be free from surface or edge defects, inclusions, voids, pin-holes and cracks which may affect its suitability for use. Visual properties shall be consistent from lot to lot.

**6.0 TEST SAMPLES:**

A roll of at least 50 metres length for tape or 2 m<sup>2</sup> sample from inner portion of sheet roll of ordered thickness from the same batch shall be supplied for testing and approval.

**7.0 PROPERTIES:**

When tested in accordance with the relevant clauses of the test methods mentioned against each, the test samples shall show the following values.

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**7.1 Physical properties:****7.1.1 Moisture absorption:** 8%, maximum

A sample of  $75 \pm 1$  mm x  $75 \pm 1$  mm is kept at 90% RH and room temperature ( $27^0 \pm 2^0$ C) for 72 hours.

**8.0 TYPE TESTS:****8.1 Mechanical properties**

:

**Breaking strength**

: As per Annexure I

**Elongation at break**

: As per Annexure I

**8.2 Electrical Properties:****Electrical strength (BDV) in air at  $27 \pm 2^0$  C**

: As per Annexure I

**Volume Resistivity (ASTM D -257)**:  $1 \times 10^{16}$  ohm-cm, minimum.**9.0 ACCEPTANCE CRITERIA:**

Material shall be accepted on the basis of the following:

- a) Compliance certificate furnished by the supplier
- b) Test certificate furnished by the supplier and / or testing carried out at BHEL end.

**10.0 TEST CERTIFICATES:**

Unless otherwise stated, three copies of test certificates shall be supplied along with each consignment giving following information:

In addition, the supplier shall ensure to send one copy of test certificate along with the dispatch documents to facilitate quick clearance of the materials.

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BHEL order No.

Manufacturers/suppliers Name:

Trade name/mark, if any:

Batch/Lot No.

Quantity supplied

Test results of clauses 4.0, 7.0 and 8.0

**11.0 PACKING AND MARKING:**

Rolls shall be suitably packed to prevent damage during transit and storage.

Each consignment shall be legibly marked or labeled with the following information:

AA 229 01: Polyamide (Aramid) calender paper

BHEL order No.

Manufacturers/suppliers Name:

Batch/Lot No.

Trade mark, if any

Sizes and Quantity supplied

**12.0 REFERRED STANDARDS (Latest Publications Including Amendments):**

- 1) ASTM D 257



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**ANNEXURE I - CLAUSE 8.0**

Nominal Thickness, mm	Tolerance ± mm	Substance g/m <sup>2</sup> Tolerance of ±10%	Breaking strength , N/cm width, minimum		Elongation, percent, minimum		Tear strength, N, minimum		Dissipation factor, maximum	Electric strength (BDV) in air at 27±2°C kV/mm, min.
			Machine direction (MD)	Cross machine direction (XD)	Machine direction (MD)	Cross machine direction (XD)	Machine direction (MD)	Cross machine direction (XD)		
0.05	0.01	40	44	19	11	8	0.7	1.6	0.004	19
0.08	0.01	63	70	35	11	9	1.2	2.3	0.005	24
0.13	0.02	120	140	68	16	13	2.4	5.1	0.006	27
0.18 0.2	0.02	170	230	120	19	15	3.6	7.1	0.006	35
0.25	0.03	250	320	160	20	16	5.2	9.8	0.006	33
0.3	0.03	310	390	210	23	19	6.5	12	0.007	34
0.4	0.05	410	490	260	21	17	8.1	15	0.007	33
0.5	0.06	540	670	390	22	17	12	19	0.007	33
0.8	0.10	850	910	610	20	16	--	--	0.007	28