

	AMENDMENT -NOTIFICATION		AA 211 08		Rev. No. 04	
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AA 211 08: PRECOMPRESSED PRESSBOARD - SOLID PAGE 3 OF 5; Cl 9.2 Elongation: Heading of above clause is modified as follows: "Cl 9.2 Elongation (Type Test) :"						
Please see Instructions on the reverse.						
Ref : Cl. 32.4.12 OF MOM OF MRC-E		Amd No. 02	Approved MRC-E	Issued CORP. R&D	Date 15.01.2003	Cum.Sr.No. A 3365

	AMENDMENT -NOTIFICATION		AA 211 08	Rev. No. 04	
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AA 211 08: PRECOMPRSED PRESSBOARD - SOLID PAGE 2 OF 5; Cl 8.2 Oil Absorption: In the table, heading of the last column is modified as " Oil Absorption. % min."					
Please see Instructions on the reverse.					
Ref : JS/TREE/STD/607/GPS/ dt: 18.12.2001 from Jhansi		Amd No. 01	Approved MRC-E	Issued CORP. R&D	Date 15.12.2001
					Cum.Sr.No. A 3079

**PRECOMPRESSED PRESSBOARD - SOLID****FOR INTERNAL USE ONLY****REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS****Comparable Standards:**

1. International : IEC : 60641-3-1 : 1992-04, Type B-3.1

Suggested/Probable Suppliers And Grades:

1. M/s. Senapathy Whiteley Ltd., Bangalore : Kheddahide - Grade KPC
2. M/s. Figeholms Bruk, Sweden : ELBOARD - HD
3. M/s. H.Weidmann Ltd., Switzerland : Transformer Board - T IV
4. M/s. Raman Boards, Mysore

User Plants And Replaced Plant Specifications/References:

1. BHOPAL : BP 21198
2. JHANSI : BP 21198

Revision : Lt No.s TSD/SM/793 dt : 24/07/98;
03/03/99 & 5/3/99; 10/4/99 BHEL, BHOPAL

Approved: INTERPLANT MATERIAL
RATIONALISATION COMMITTEE-MRC(E)

Rev No. 04

Amd. No.

Reaffirmed

Prepared

Issued

Dt. of 1st issue

Dt. May '99

Dt.

Year :

BHOPAL

CORP. R& D

June '82

**PRECOMPRESSED PRESSBOARD - SOLID****1.0 GENERAL :-**

This specification governs the quality requirements of a very hard and rigid solid pressboard characterised by high purity and mechanical strength and capable of being sheared without showing ragged edges. Its surface bears cloth mesh marks. It is manufactured by hot pressing 100% sulphate wood pulp board without the addition of any additive/adhesive into the solid plastic state. The material shall be free from soluble electrolytes such as chlorides, sulphates and carbonates and also from conducting particles. The material in insulating oil shall have temperature index of at least 105.

2.0 APPLICATION :

Used as insulating blocks, spacer strips, cylinders & other insulating components, barriers etc. in transformers, reactors and capacitors etc.

3.0 COMPLIANCE WITH NATIONAL STANDARDS :

The material shall comply, in general, with the requirements of the following International Standard and also meet the requirements of this specification.

IEC : 60641-3-1,
Type B 3.1; (First edition 1992-04)

Specification for Pressboard and
Presspaper for electrical Purposes.

4.0 DIMENSIONS AND TOLERANCES :

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

The sheet shall be rectangular in shape with the two diagonals being equal. Sheet shall not form parallelogram. Two diagonals of the sheet shall be within ± 3 mm.

4.1 Preferred Thickness :

1, 1.5, 2, 3, 4, 5, 6 and 8 mm

4.1.1 Tolerance On Thickness :

Thickness, mm	Tolerance, $\pm$ %
Upto and including 1.6	7.5
Over 1.6	5

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**4.2 Preferred Length And Width And Tolerance :**

2100 X 3200, 2000 X 3000, 2250 X 2250 and 2500 X 2500 mm with a tolerance of $\pm 0.5\%$

4.3 Bow (Edge Camber) :

Lateral departure of the four edges of the sheet from a straight line forming a cord shall not be more than 1 mm.

5.0 FINISH

Shall have matt finish with no irregularities except regular indentations due to wire mesh used during pressing operation.

6.0 TEST METHODS :

Unless otherwise specified, when tested in accordance with the relevant methods of IEC 60641-2 : Specification For Pressboard And Presspaper For Electrical Purposes - Methods of Test, the test samples shall show the following properties.

For drying of test specimens, air drying for 96 hours to method B of IEC 763 Part II, may be carried out as an alternative.

7.0 TEST SAMPLES :

Three boards of ordered thickness in 500 x 500 mm size shall be supplied for testing and approval.

8.0 PHYSICAL PROPERTIES :**8.1 Apparent Density :**

Thickness, mm		g/cm ³
Above	Upto & incld.	
-	1.6	1.0 to 1.2
1.6	3	1.10 to 1.25
3	6	1.15 to 1.3
6	8	1.2 to 1.3

8.2 Oil Absorption

Thickness, mm		Oil Absorption, % Max
Above	Upto & incld.	
-	1.6	11
1.6	3.0	9
3.0	8.0	7

**8.3 Moisture Content :**

6% Maximum

8.4 Shrinkage in Air :

Direction	Shrinkage, % Max.
Machine (MD)	0.5
Cross (XD)	0.7
Thickness (TK)	5.0

8.5 Cohesion Between Plies - Visual Test :

The split shall show a rupture one or more plies and have a distinctly ragged or hairy appearance.

9.0 MECHANICAL PROPERTIES :**9.1 Tensile Strength :**

Thickness, mm		Tensile strength, N/mm ²	
Above	Upto & incld.	Machine Direction	Cross machine Direction
	1.6	100	75
1.6	3.0	105	80
3.0	6.0	110	85
6.0	8.0	110	85

9.2 Elongation :

Machine Direction (MD)	3% minimum
Cross Machine Direction (MD)	4% minimum

9.3 Compressibility In Air :

Thickness, mm		Compressibility C % max	Reversible Compressibility C Rev. % min
Above	Upto & incld.		
	1.6	10	45
1.6	3.0	7.5	50
3.0	6.0	5	50
6.0	8.0	4	50

**10.0 ELECTRICAL PROPERTIES :****10.1 Electric Strength in oil at room temp. short time (Rapid ^{Rise} ~~Rix~~) Test :**

Thickness, mm		KV / mm, Min.
Over	Upto & incl.	Oil
-	1.6	40
1.6	3.0	35
3.0	6.0	30
6.0	8.0	30

Note : Thickness of test piece shall be thickness of sheet under test except that where it exceeds 2 mm, the thickness at electrode contact area may be reduced to 2.0 ± 0.1 mm by machining from one side only keeping the other side intact. In this option required value shall be 35kv/mm min irrespective of nominal thickness of pre compressed press board sheet under test.

11.0 CHEMICAL PROPERTIES :**11.1 Ash Content :**

1.0%, Max.

11.2 pH of 5% Aqueous Extract :

6.0 to 9.0

11.3 Conductivity of 5% Aqueous Extract :

Thickness, mm		mS / m, Max.
Over	Upto & incl.	
-	1.6	5
1.6	3.0	6
3.0	7.0	8
6.0	8.0	10

12.0 TEST CERTIFICATES :

Unless and otherwise stated, three copies of test certificates shall be supplied along with each consignment.

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



The test certificates shall bear the following information.

AA 21108 (Rev. No. 04) : Precompressed Pressboard - Solid

BHEL order no.

Manufacturer's / supplier's name.

Trade mark, if any.

Batch / lot no.

Size and quantity supplied.

Date of manufacture.

Test results of clause 4 and 7.

13.0 PACKING AND MARKING :

Manufacturer's name or identification slips shall be given on each board which shall be compatible with insulating oil to IS : 335 / IEC 296. The boards shall be sealed in high density polyethylene sheets which shall then be covered all around with water proof bituminised brown paper to prevent entry of rain water. These boards then shall be packed in a wooden case to avoid damage during transit.

The packing shall be marked legibly with the following information :

AA 21108 : Precompressed pressboard - Solid

BHEL : Order No.

Manufacturer's / Supplier's name.

Grades / Trade mark, if any.

Batch / lot No.

Thickness, Length and width of boards

Quantity of boards (kg)

Date of manufacture.

No of boards

11.0 REFERRED STANDARDS (Latest Publications Including Amendments)

1. IS : 335 / IEC 296

2. IEC 60641 - Part II-