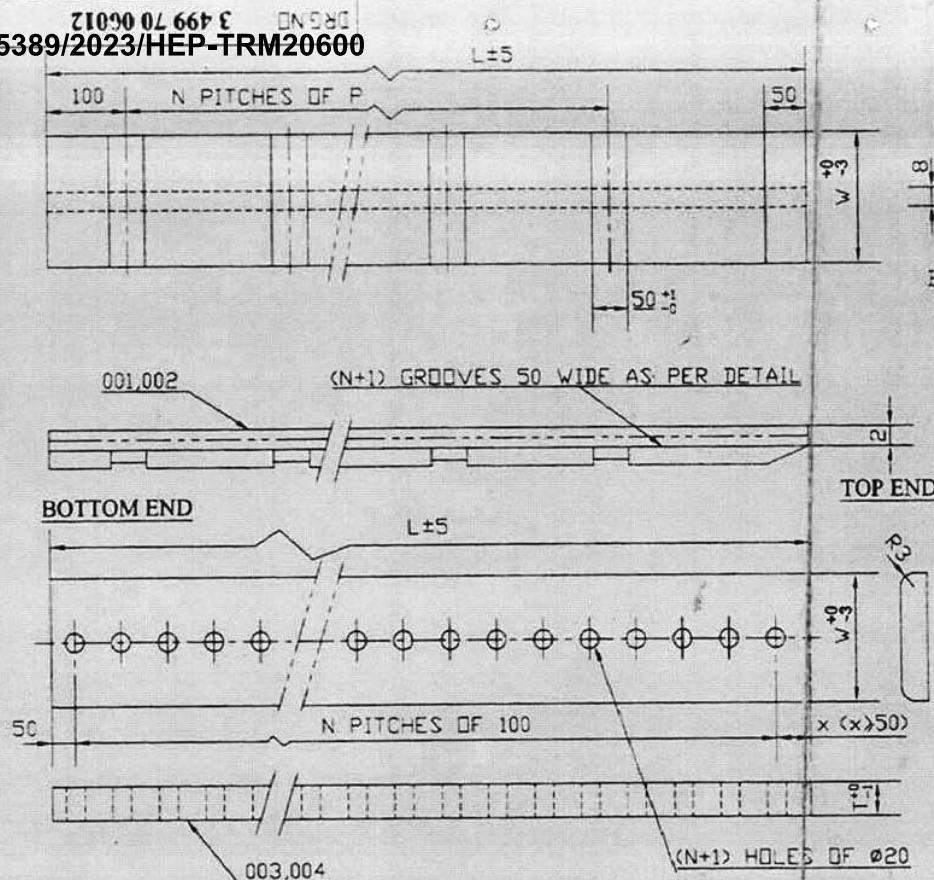


3455389/2023/HEP-TRM20600



NOTES:

1. FOR DIMS. T, W, L, B, N, P & WTS REFER W.O. & COMPUTER DRG.
2. REMOVE ALL SHARP CORNERS.
3. ITEMS 001, 002 & 003 TO BE TREATED TO PROCESS SPEC:22057.

NOTES TO D/MAN:

1. ITEM.002 TO BE USED ONLY WHEN THERE IS A OIL DUCT IN BETWEEN THE MAX. PACKET.
2. ITEM 003 & 004 ARE TO BE USED OVER MAX. PACKET WHEN THICKNESS 'T' < '9'.
3. ITEM 004 IS TO BE USED WHEN 'T' < '5'.
4. FOR BOM REFER DELINK BOM NO: 34997000012 SHT. 1 OF 1.

o/c

ADDITIONAL INFORMATION			
STANDARD			
STATUS OF DRAWING			
U			
DISTRIBUTION OF PRINTS			
TRE	TRM	TRX	
1	1	1	

REV	DATE	ALTERED CHECKED	SKG NM	APPROVED A.D.
06	30/08/21			

REV	DATE	ALTERED CHECKED	MANISH
05	29.01.21		

ZONE MATERIAL CODE FOR ITEM NO 001 TO 003 CHANGED

ZONE DRAWING COMPUTERIZED, IN NOTES TO D/MAN. NOTE-4 ADDED GROOVE DETAIL WAS IN FIG 003 & 004 MODIFIED. NO CHANGE IN BOM.

उत्पाद का प्रकार या ग्राहक/परियोजना का नाम		TRANSFORMER	
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT			
भारत हेवी इलेक्ट्रिकल्स लिमिटेड भोपाल		नाम NAME	हस्ताक्षर SIGN
BHARAT HEAVY ELECTRICALS LTD. BHOPAL.		खसका DRN	TAWDEKAR sd /- 15.12.79
		प्रो. प्रो. BPRASAD sd /- 22.12.79	
		स्वीकृत APPD MLRATTI sd /- 22.12.79	
भारत हेवी इलेक्ट्रिकल्स लिमिटेड	भारत हेवी इलेक्ट्रिकल्स लिमिटेड	जैसे. ड्राइंग का संदर्भ REF TO ASSY DRG	मद. को. ITEM NO.
DEPT TRE	SCALE NTS	DRAWING NO	REV
406		3 499 70 00012	06
TITLE		पृष्ठ क्र.सं.सं. पृष्ठों की सं.सं.सं.	
PACKING CORE TO COIL (UDL WOOD & PRE-COMP. PRESS BOARD)			

1455389/2023/HEP-TRM20600
INVENTORY NO.
SIGN AND DATE
REF DRG NO.

First Angle Projection

All dimensions in mm

34527000286

DRG. NO. :

320/ 36

610/ 10

660/ 12

710/ 11

750/ 11

790/ 12

830/ 13

870/ 14

910/ 14

950/ 16

990/ 17

1030/ 17

1070/ 18

1100/ 15

1130/ 15

1160/ 17

1190/ 18

1220/ 19

1250/ 20

1280/ 22

1310/ 23

1340/ 25

1370/ 18

1390/ 20

1410/ 20

1430/ 23

1450/ 25

1470/ 27

1490/ 31

1510/ 37

1530/ 47

1550/ 31

1560/108

Fig 2

It No 5, 6

It No 5, 6

It No 7, 8

It No 7, 8

It No 5, 6

It No 5, 6

It No 5, 6

It No 5, 6

It No 9, 10

It No 9, 10

It No 5, 6

It No 5, 6

It No 5, 6

It No 5, 6

It No 9, 10

It No 9, 10

It No 5, 6

It No 5, 6

It No 9, 10

It No 9, 10

It No 7, 8

It No 7, 8

It No 7, 8

It No 7, 8

It No 5, 6

It No 5, 6

It No 5, 6

It No 5, 6

It No 2

Notes :

1. Max dia over resiglass tape 1582 mm (CR)

2. Dimensions of item no: 1

W = 300, B =15, T =28, L = 2640, N =18, P =133

3. Dimensions of item no: 2

W = 196, T = 3, L = 2640

4. Clamp plate width = 320, tk = 20

(EHT), Pin dia =110

5. All hardwood items to be treated with oil

as per process spec 22067

37

121

1

Fig-2

NOTE :- Buckles Type Leg clamping to be provided.

DISTRIBUTION OF PRINTS

W.O: 65001A51201

REV. DATE

ALTERED

CHECKED

APPROVED

DEPT TRE

CODE

UNTOL.DIMS.GR.

BHOPAL

SCALE

N.T.S

WEIGHT

87.8

REF. TO ASSY.DRG.

IT.NO

NO.

TITLE

Core - Coil Packing

275 MVA, 21/420KV 1-P; TANGEDCO ENNORE

DRAWING NO

34527000286

SHT NO: 1

NO OF SHTS: 02

B I L L		DEP	NO OF	TYPE OF PRODUCT		W O R K O R D E R		D R G N O		REV	VER
O F		NO	IT	VAR	CUSTOMER/PROJECT			B O M - 34527000286		00	--
M A T E R I A L		TRE		010	00	275 MVA, 21/420KV 1-P		TITLE		SHT NO	
		406						CORE TO COIL PACKING		01	

DU	VAR03	VAR02	VAR01	VAR00	REMARKS	VA	IT	DESCRIPTION	DRAWING NO	IT	MATCODE	A	UT	UNIT WT	G/S
						NO	NO					/			
								MAT SIZE	DETAILS	VAR	MATSPEC	C		QTY	ZONE

					00002	SEE NOTE 2		001	PACKING		34997000012	001			24.571
					00002	SEE NOTE 3		002	PACKING		34997000012	004			5.160
					00004	SEE FIG 2		003	HARDWOOD PACKING			AA21151			5.094
								37. x *** x 1960.							
					00004	SEE FIG 2		004	HARDWOOD PACKING			AA21151			1.767
								37. x *** x 680.							
					00060			005	HARDWOOD ROD			ST 604131			0.171
									10 DIA x 1960						
					00030	CUT 680 LG		006	HARDWOOD ROD			ST 604131			0.174
						60 OFF			10 DIA x 2000						
					00024			007	HARDWOOD ROD			ST 604130			0.109
									8 DIA x 1960						
					00012	CUT 680 LG		008	HARDWOOD ROD			ST 604130			0.111
						24 OFF			8 DIA x 2000						
					00024			009	HARDWOOD ROD			ST 604132			0.246
									12 DIA x 1960						
					00012	CUT 680 LG		010	HARDWOOD ROD			ST 604132			0.251
						24 OFF			12 DIA x 2000						
								011							
								012							

D I S T R I B U T I O N & Q T Y		PREP BY	CKD BY	APPD BY	DATE	REF TO ASSY DRG -	
---------------------------------	--	---------	--------	---------	------	-------------------	--

TRE	TRM	TRX	FTM		AK	RKS	SKG	D R G N O	SHT 2 OF 2
1	3	1						B O M -- 34527000286	REV-00 VER--

BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL
REFERENCE QUALITY PLAN FOR SEASONED HARDWOOD

QAP no. : QA/TCB/BO/06 Rev 00

Date: 23/05/2016

Sl. No.	Components/ Operation & Description or Test	Type of check	Quantum of check/ Sampling with basis	Reference Document for Testing	Acceptance Norms	Format of Records	AGENCY	Remarks
1.1	Visual and Dimensional	V, M	Sample/ lot, Type	BHEL Drg	BHEL Drg	TC	BHEL/TPIA	CIP
1.2	Testing							
	a) Electrical properties	T	Sample	AA21151	AA21151	TR	BHEL	Record Review
	b) Chemical Properties	T	Sample	AA21151	AA21151	TR	BHEL	Record Review
Note: First supply of supplier shall be tested at BHEL,Bhopal and this type test report shall be valid for 1 year and based on which acceptance of further supplies shall be issued. Supplier to supply extra material for drawing sample as AA21151 with remark on sample(TEST SAMPLE).								

TPIA-THIRD PARTY INSPECTION AGENCY, CIP-CUSTOMER INSPECTION POINT (VENDOR CAN NOT PROCEED WITHOUT GETTING CLEARANCE FROM BHEL/TPIA, TC-TEST CERTIFICATE, TR-REPORT/QC RECORD/MFG. RECORD OF MANUFACTURER.

V= VISUAL, M= MEASUREMENT, T= TEST

Prepared By:
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 सहायक अभियंता / Asstt. Engineer
 गुणता आश्वासन-टी.सी.बी. / Quality Assurance-TCB
 बी.एच.ई.एल., भोपाल / BHEL, BHOPAL

सुरेश कुमार गुप्ता / Suresh Kumar Gupta
 उप महाप्रबंधक / Dy. General Manager
 गुणता आश्वासन-टी.सी.बी. / Quality Assurance-TCB
 बी.एच.ई.एल., भोपाल / B.H.E.L., BHOPAL



CORPORATE PURCHASING
SPECIFICATIONS

AA 22001
Rev. No.02
PREFACE SHEET

UNIMPREGNATED DENSIFIED LAMINATED WOOD-LOW
DENSITY

FOR INTERNAL USE ONLY

REMOVE THIS PREFACE SHEET BEFORE ISSUE TO SUPPLIERS

Equivalent Standards :

Suggested/Probable Suppliers and Grades:

- 1.0 M/s.Permal Wallace, Bhopal - Pernawood Lv/67/60
- 2.0 M/s. western India Plywood, Kerala - wiplam WI (LD) 2

User plants & Replaced Plant Specifications / References:

- BHOPAL PS 22001 B
- JHANSI PS 22001 B

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It must not be used directly or indirectly in any way detrimental to the Interest of the company.

Revisions: Ref: C 1.34.1.25 of MOM of MRC (E)				APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(E)			
Rev. No.02	Amd. No.	Reaffirmed	Prepared	Issued	Dt. of 1 st Issue		
Dt:01-01-1998	Dt:	Year: 2007	HEP, Bhopal	Corp. R&D	01.05.1980		

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	CORPORATE PURCHASING SPECIFICATIONS	
	AA 22001	
	Rev. No.02	
	PAGE 1 of 6	

UNIMPREGNATED DENSIFIED LAMINATED WOOD-LOW DENSITY

1.0 GENERAL:

This specification governs the quality requirements of an unimpregnated densified laminated wood of low density, consisting of layers or cross laminated 2 mm thick wood veneers, bonded and densified under heat and pressure. The material in insulating oil has temperature index of at least 105.

2.0 APPLICATION:

Used for coil support ring, winding support flange, supporting cleates etc. in Transformers

3.0 COMPLAINEE WITH NATIONAL STANDARDS:

There is no Indian Standard covering this type of material.

4.0 TEST METHODS:

Unless otherwise specified, the tests shall be conducted in accordance with the relevant methods of AA 085 17 01.

5.0 SAMPLE FOR TEST:

Two sheets of ordered thickness and size 500 x 500 mm prepared from the same batch, shall be supplied for testing and approval.

6.0 DIMENSIONS AND TOLERANCES:

Thickness, width, length of the laminated wood shall be stated on the order.

6.1 Preferred Thickness (mm):

10, 12, 14, 16, 20, 25, 30, 40, 45, 50, 60, 70, 75, 80, 90 and 100.

Revisions: Ref: C 1.34.1.25 of MOM of MRC (E)			
-----------------------------------------------	--	--	--

APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(E)			
---------------------------------------------------------------------	--	--	--

Rev. No.02	Amd. No.	Reaffirmed
Dt:01-01-1998	Dt:	Year: 2007

Prepared HEP, Bhopal	Issued Corp. R&D	Dt. of 1 st Issue 01.05.1980
-------------------------	---------------------	--------------------------------------------

CORPORATE PURCHASING SPECIFICATIONS



6.2 Tolerance on Nominal Thickness:

Nominal thickness (mm)	Above Up to & Including	Tolerance (±)(mm)
10	25	0.8
25	40	1.0
40	50	1.25
50	-	1.5

6.3 Tolerance on width Length:

± 3.5 mm.

7.0 PHYSICAL PROPERTIES:

7.1 Density, as received condition (IS : 1708):

0.90 – 1.09 g/cm³

7.2 Moisture & Volatile Content:

7% Max.

Test Specimen (40 x 12mm x thickness of board) shall be dried at 145 ± 2°C till the weight is constant. Thickness above 12 mm shall be machined down to 12 mm, keeping one surface intact.

7.3 Oil Absorption:

9%, Min.

Test specimen (100 x 100 mm x thickness of board) shall be dried at 105 ± 2°C for 72 hours and then impregnated with insulating oil (IS: 335) at 90 ± 2°C for 72 hours. Thickness above 12 mm shall be machined down to 12 mm, keeping one surface intact.

8.0 EFFECT OF OIL ON WOOD (TYPE TEST):

8.1 Sludge and Oil Acidity (Appendix – 1):

8.1.1 Increase in acidity: 0.1 mg KOH/g, Max.

8.1.2 Increase in Sludge content: 0.05% Max.



CORPORATE PURCHASING SPECIFICATIONS

AA 22001

Rev. No.02

PAGE 3 of 6

9.0 ELECTRICAL PROPERTIES;

9.1 Electric Strength (Proof) in Oil at $90 \pm 2^\circ\text{C}$:

Three test specimens shall be dried at $105 \pm 2^\circ\text{C}$ for 72 hours and, impregnated with insulating oil (IS: 335) at $90 \pm 2^\circ\text{C}$ 72 hours.

9.1.1 Flatwise:

4 k v/mm

Sample size shall be at least 150 x 150 mm x thickness of board. However thickness above 12 mm shall be machined down to 12mm keeping one surface intact.

9.1.2 Edgewise:

60 kV

10.0 MECHANICAL PROPERTIES:

10.1 Tensile strength:

Along the grain 70 MPa, Min.

10.2 Cross Breaking Strength:

Along the grain : 90 MPa, Min.

Across the grain: 67 MPa Min.

10.3 Compressive Strength:

Flatwise: 160 MPa, Min.

The test shall be carried out on 20 x 20 mm x thickness of board. However thickness above 20 mm shall be machined down to 20 mm keeping one side intact.

11.0 TEST CERTIFICATES:

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

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

AA 22001		CORPORATE PURCHASING SPECIFICATIONS	<div><div>बीएचईएल</div><div>BHEL</div></div>			
Rev. No.02						
PAGE 4 of 6						
<p>The test certificates shall bear the following Information:</p> <p>AA 22001 : Unimpregnated Densified Laminated Wood - (Rev.No.02) Low Density BHEL order No. Batch/LOt NO. Thickness, Width & length Net weight/No of boards Test values obtained and certificate tor compliance with clauses 4, 7 to 10.</p> <p>12.0 PACKING AND MARKING:</p> <p>The laminated wood shall be suitably packed to prevent any damage during transit, Each package shall bear the following information:</p> <p>AA 22001: Unimpregnated Densified Laminated wood – Low Density BHEL Order No. Manufacturer's Name & Grade. Thickness, width & Length, No, of boards/Components, Net weight & Gross Weight.</p> <p>13.0 REFERRED STANDARDS (Latest publications Including Amendments):</p> <table><tr><td>1. IS: 335</td><td>2. IS: 1708</td><td>3. AA 085 17 01</td></tr></table>				1. IS: 335	2. IS: 1708	3. AA 085 17 01
1. IS: 335	2. IS: 1708	3. AA 085 17 01				



CORPORATE PURCHASING SPECIFICATIONS

AA 22001

Rev. No.02

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Appendix – I

Slug and Oil Acidity:

1. Conditioning: Condition the test piece for 168 hours in controlled atmosphere of 65 ± 5% RH and 27 ± 2°C.

2. Test Specimen: Cut the specimen to dimension of 75mm x 12.5mm x Thickness.

NOTE: Thickness above 9 mm shall be machined to 9 mm. Both the surfaces shall be machined evenly to achieve thickness of 9 mm.

3. Procedure: Into a 150 mm x 25 mm test tube weigh 25 g of, transformer oil. Transformer oil complying with the requirements of IS 335 is suitable. Prepare the test specimen, weigh it to the nearest 0.01 g and introduce it into the oil. Lightly plug the Mouth of the tube with cotton wool and place it in a constant temperature bath maintained at 100 ± 0.5° c for 164±1 hour.


Place a similar quantity of the same oil in a second tube and maintain this under the same conditions as a 'blank' sample.

At the end of the specified heating period, remove the tubes from the bath and allow them to cool to room temperature. If it can be seen that delamination has occurred, the specimen has failed. If there is no visible-n delaminating, determine the sludge content of the oil in which the pressboard has been impressed as follows.

Pour the oil into a 600 ml beaker and wash the test tube and pressboard sample with n-heptanes until oil-free, adding the washings to the oil in the beaker. Make the contents of the beaker up to approximately 300 ml with n-heptanes. cover the beaker with a watch glass and allow to stand in the dark for 24 hrs. At room temperature.

Filter the solution through a tared, dried, sintered glass filter, of no. 4 filter transferring all the sediment to the filter with the aid of n-heptane from a wash-bottle. Dry the filter at 105 ± 2°C to constant mass. Express the amount of sediment as a percentage of the original sample mass.

Make the filtrate up to 500 ml in a measuring cylinder with n-heptane. Make the 'blank' sample up to 500 ml in a second cylinder- Determine the acid values of the heptane solutions as follows.

AA 22001		CORPORATE PURCHASING SPECIFICATIONS	
Rev. No.02			
PAGE 6 of 6			

Place 60ml toluene and 40ml industrial methylated spirits(66 overproof) in a 600 ml conical flask.Add 2ml to 3 ml Alkali blue indicator solution(2% by mass in industrial methylated spirits and one drop of 0,1N hydrochloric acid),Neutralize this mixture, with 0.1N alcoholic hydrochloric potassium hydroxide ‘(KOH),to give a red colour which persists for 15 s .Add 100ml of the above filtrate to the neutralized solvents and titrate to the same and point with the 0.1N alcoholic KOH.Repeat the titration on 100 ml of the’ blank’ solution.

Results: Calculated the increases in the acid value of the oil per gram of pressboard in mg KOH//g from the expression.

Increase in acid value = $\frac{(t_2-t_1)}{W} \times 5.61 \times 5$

Where

T₁ is the number of millitres of 0.1n KOH required to neutralize 100 ml n-heptane in blank solution.

T₂ is the number of millitres of 0.1n KOH required to neutralize 100 ml of filtrate: and

W is the sample mass of laminated pressboard (grams).

Report the acid value of the 'blank' oil together with the increase in acid value due to the sample as calculated from the above equation. Report also the percentage sludge produced by the sample.