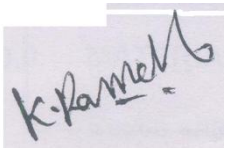
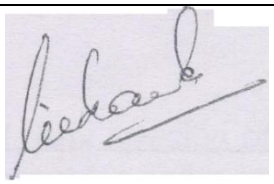
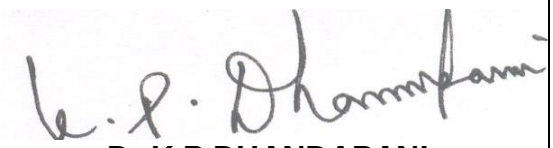
SPECIFICATION FOR
MR GRADE PLY WOOD FOR PACKING PURPOSES

Prepared by	Reviewed by		Approved by
 **K.RAMESH** AE -2. Plant Laboratory	 **L.GRAGORI** Manager Plant Laboratory	 **M.VIVEKANANDAN** Sr.Manager Logistics	 **Dr.K.P.DHANDAPANI** AGM Plant Laboratory

RECORD OF REVISIONS

Rev. No.	Date	Details of revision	Remarks
00	18.08.2011	New Document	Prepared in line with IS 303
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1.0 **SCOPE:**

This specification prescribes the requirements of MR Grade Plywood for packing of engineering components for safe transportation.

2.0 **DEFINITION :**

2.1 Plywood: A board formed of three or more layers of veneer cemented or glued together usually with the grain of adjacent veneers running at right angles to each other.

2.2 Composition structure of plywood: 8mm thickness plywood is composed of 7 plies. 6mm thickness plywood is composed of 5 plies.

2.3 MR Grade: Moisture Resistant grade.

3.0 **MATERIALS:**

Boxes shall be made from plywood. Any species of timber preferably pine wood pallet with heat treatment may be used for pallet manufacture. All reinforcement shall be made of ply wood/pine wood/Lumber. The veneers shall be either rotary cut or sliced. The veneers shall be sufficiently smooth to permit an even spread of adhesive.

4.0 **ADHESIVE:**

The adhesive used for bonding the veneers shall meet all requirements of HSE policy prevailing in BHEL.The adhesive may be of Urea formaldehyde based resin; But formaldehyde emission level should meet E1 level.i.e.the emission shall be restricted to < 1.5 mg/Lt.

5.0 **REQUIREMENTS**

5.1 Dimensions and Its Tolerance:
The dimensions shall be as specified in purchase order
The dimensional tolerance shall be as follows:

Length	+6mm - 0mm
Width	+3 mm -0 mm
Thickness < 6mm > 6mm	±10% ± 5%
Maximum thickness difference in the same board i) For 8 mm ii) For 6 mm	 0.8 mm 0.6 mm
Squarness	0.2%
Edge Straightness	0.2%

5.2. Surface Finish:

Sanding of face is required. Sanding of back is not necessary but it must be clean and free from all pollutants.

6.0. REQUIREMENTS OF PLYWOOD:

Sl.No.	Type of test	Requirements
1	% Moisture Content	6 to 14%
2	Density in Kg/M^3 (min)	520
3	Bending Stiffness (min) i) for 6mm ii) for 8mm	 9 MPa 24 MPa
4	Breaking force (min) i) for 6mm ii) for 8mm	 160 N 320 N
5	Formaldehyde Emission	< 1.5 mg/Lt.
6	Glue Adhesion & Water Resistance test (cyclic test followed by knife test) vide Cl.8.1	Should pass

Note: Tests 1, 2, 3 & 4 are routine and should be done for all batches. Tests 5 & 6 are type tests and are to be done by the supplier once in 4 months and TC should be submitted to BHEL.

7.0 QUALITY REQUIREMENTS:

The quality of plywood on the front surface shall be free from all surface defects like blister, checks, and discolouration, dote, insect hole, knots, joints, swirl etc., However small patches, minor filled checks and some colour variation on the back side of the ply wood will not be the cause for rejection. But the total surface defects area shall not exceed 10%.

8.0 WORKMANSHIP & FINISH:

The plywood boards shall be of uniform thickness within tolerance limits as specified in this specification. Construction of packing box shall be of nailless joints with steel tongues for erection and closing of boxes.

8.1 The plywood shall be moisture resistant grade. It should pass the following test:

Specimen shall be submerged in water at a temperature of 60 ± 2˚C for 3 hrs and dried for 8 hr at a temperature of 65 ± 2˚C and then followed by three cycles (min) of soaking and drying under the same conditions described above. The specimen shall be visually examined for any damage and knife test shall be carried out.

9.0 MARKING :

Screen printed box with BHEL logo with other required details as given in the P.O. shall be supplied. All supplies should accompany Test certificate complying the requirements as given in this specification without fail, including performance guarantee.

10.0 STORAGE:

All plywood boxes shall be stored in a covered shelter.