

Test Report

Date: Jul.08, 2025

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CUZI INDUSTRY CO., LIMITED

The following sample(s) was / were submitted and identified on behalf of the client as:

Sample Description : MARINE PLYWOOD
 Style / Item No. : 1220*2440*18MM
 Manufacturer : CUZI INDUSTRY CO., LIMITED
 Sample Receiving Date : Jun.15, 2025
 Test Performing Date : Jun.15, 2025 to Jul.08, 2025

Test Result Summary

No.	Test(s) Requested	Result(s)	Comments
1	BS 1088-1:2003 Marine plywood —Part 1: Requirements (Selected test item as requested)	Refer to next page(s)	/
For further details, please refer to the following page(s)			

Signed for and on behalf of
 SGS-CSTC Co., Ltd.

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Test results summary

Clause	Test Item	Test method	Requirement	Test results	Comment
5.1	Dimensional tolerances	BS EN 324-1:1993	See table 4	See test details	Pass
	Squareness and edge-straightness	BS EN 324-2:1993	See table 4	See test details	Pass
5.2	Moisture content	BS EN 322:1993	Between 6 % and 14 %	11.1%	Pass
5.3	Quality of surface appearance	Visual inspection	See table 1	See test details	Pass
5.4	Manufacturing defects	Visual inspection	See test details	See test details	Pass
5.6	Bonding quality	BS EN 314-1:2004	Class 3	Class 3	Pass
5.7	Density	EN 323:1993	> 500 kg/m ³	599 kg/m ³	Pass

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Test details:

BS 1088-1:2003 Marine plywood —Part 1: Requirements

Clause 5.1 Dimensional tolerances, squareness and edge-straightness

The test method:

BS EN 324-1:1993 Wood-based panels — Determination of dimensions of boards — Part 1: Determination of thickness, width and length.

BS EN 324-2:1993 Wood-based panels — Determination of dimensions of boards — Part 2: Determination of squareness and edge straightness

Sample description:

Sample description:	Marine Plywood
Nominal length:	2440 mm
Nominal width:	1220 mm
Nominal thickness:	18 mm

Requirement:

When tested in accordance with BS EN 324-1:1993, the tolerance on the nominal length, width and thickness of the panels shall conform to Table 4.

When tested in accordance with BS EN 324-2:1993, the tolerance on the squareness and edge-straightness of the panels shall conform to Table 4.

Test Results:

1. Determination of thickness of boards

Points	Measuring Thickness (mm)
#1	18.01
#2	17.81
#3	18.02
#4	17.89
#5	18.08
#6	18.01
#7	17.88
#8	17.86
Mean value	17.95
Tolerance	0.05
Comment	Pass

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2. Determination of length and width of boards

Points	Width of boards(mm)	Length of boards(mm)
#1	1221	2441
#2	1221	2441
Mean value	1221	2441
Tolerance	1	1
Comment	Pass	Pass

3. Determination of squareness and edge straightness

Test item	Test results(mm/m)	Comment
Squareness of boards	0.5	Pass
Edge straightness of boards	0.3	Pass

Table 4 — Permissible tolerances for nominal length, width, thickness and squareness and edge-straightness of panels

Tolerances on nominal thickness t mm	Unsanded panels		Sanded panels	
	Thickness tolerance within one panel mm	Tolerances on nominal thickness mm	Thickness tolerance within one panel mm	Tolerances on nominal thickness mm
	$3 \leq t \leq 12$	1.0	+ (0.8 + 0.03 t) - (0.4 + 0.03 t)	0.6
$t > 12$	1.5			
Tolerance on nominal length and width	± 3.5 mm			
Tolerance on squareness and edge straightness	1 mm/m			

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Clause 5.2 Moisture content

Test methods:

EN 322:1993 Wood-based panels —Determination of moisture content

I. Sample description:

Sample description:	Marine Plywood
Specimen size:	100mm x100mm x 18mm

II. Procedure:

1. Weighing before drying

Weigh each test piece in the as-sampled state to an accuracy of 0,01g. This initial weighing shall be carried out immediately after sampling or where this is impossible, precautions shall be taken to avoid changes in the moisture content of the test piece after sampling.

2. Drying

Place the test pieces in the drying oven (4.2) at a temperature of $(103 \pm 2) ^\circ\text{C}$ until constant mass has been reached. Constant mass is considered to be reached when the results of two successive weighing operations, carried out at an interval of 6 h, do not differ by more than 0,1 % of the mass of the test piece.

3. Weighing after drying

After the test pieces have been cooled to approximately room temperature in the desiccator (4.3), weigh each test piece to an accuracy of 0,01 g, rapidly enough to avoid an increase in moisture content greater than 0,1 %.

III. Test Results

Specimen No.	Moisture content H (%)
#1	11.2
#2	11.1
#3	11.0
#4	11.1
Arithmetic mean	11.1

Requirement:

When determined in accordance with BS EN 322:1993, at a minimum sampling frequency of one panel per eight hours or per shift, at the time of leaving the manufacturer's premises the moisture content of marine plywood shall be between 6 % and 14 %.

Conclusion: The test result complies with the requirement of moisture content of marine plywood.

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Clause 5.3 Quality of surface appearance

Sample description:

Sample description:	Marine Plywood
Sample size:	1220mm x 2440mm x 18mm

Requirement:

On visual inspection the surface of panels after sanding shall not exceed the limits given in Table 1

Table 1 — Permissible frequencies of defects and joints in veneer for outer and inner plies

Defect/joint type	Veneer for outer plies	Veneer for inner plies	Results (Visual Inspection)
Pin knots	Up to 6 per square metre of panel surface	No limit	No found
Closed splits	A maximum of 2 per metre width of panel area with a total length of 200 mm	No limit	No found
Open splits	Not permitted	A maximum of 1 split of up to 0.5 mm wide on any panel edge	No found
Small worm holes, ≤1.5 mm diameter	Up to 2 per square metre Holes in plane of veneer not permitted	Greater number permitted including some in plane of veneer, provided they do not produce voids	No found
Variation in colour	Low contrast variation in colour is permitted if free from fungal decay	Permitted, if free from fungal decay	Low
Edge joints	For peeled face veneers: the minimum distance between edge joints shall be 300 mm For sliced face veneers: the minimum distance between edge joints shall be 100 mm	No limit	No found
End joints	Not permitted	Not permitted	No found
Compression failure	Not permitted	Not permitted	No found
Others: Knots other than pin knots Worm holes > 1.5 mm diameter Fungal decay	Not permitted	Not permitted	No found
Repairs	Not permitted	Properly made and tightly fitted glued patches with their grain aligned with the grain of the veneer and having a maximum dimension of 60 mm permitted up to 3 per square metre	See Photo

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Clause 5.4 Manufacturing defects

Sample description:

Sample description:	Marine Plywood
Sample size:	1220mm x 2440mm x 18mm

Requirement:

Panels conforming to this standard shall not contain any of the following manufacturing defects: open joints (e.g. core gaps, overlaps and pleats, blisters, hollows, bumps and imprints), roughness (other than that due to the irregular structure of the wood), sanding through, foreign particles, defects in the edges of panels (e.g. due to sanding, sawing, missing wood).

Glue penetration shall only be permitted in areas adjacent to permitted defects, up to a maximum of 5 % of the area of each outer ply.

Test results:

Defect	Results(Visual Inspection)
Open joints (e.g. core gaps, overlaps and pleats, blisters, hollows, bumps and imprints)	No found
Roughness (other than that due to the irregular structure of the wood)	No found
Sanding through	No found
Foreign particles	No found
Defects in the edges of panels (e.g. due to sanding, sawing, missing wood).	No found
Glue penetration	No found

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Clause 5.6: Bonding quality

The test methods and requirements are as below:

BS EN 314-1:2004 Plywood — Bonding quality —Part 1 :Test methods

BS EN 314-2:1993 Plywood — Bonding quality —Part 2: Requirements

Sample Details:

Sample Description:	Marine Plywood
Number of plies:	11
Nominal thickness:	18 mm

Requirement of BS 1088-1:2003 Clause 5.6

Bonding quality

When tested in accordance with BS EN 314-1:2004, the bonding quality shall meet the requirements of BS EN 314-2, Bonding Class 3.

Pre-treatments:

Sequence of pre-treatment	Pre-treatment(according to BS EN 314-1)
5.1.1	Immersion for 24 h in water at $(20 \pm 3) ^\circ\text{C}$.
5.1.3	Immersion for 4 h in boiling water, then drying in the ventilated drying oven for 16 h to 20 h at $(60 \pm 3) ^\circ\text{C}$, then immersion in boiling water for 4 h, followed by cooling in water at $(20 \pm 3) ^\circ\text{C}$ for at least 1 h.
5.1.4	Immersion for (72 ± 1) h in boiling water, followed by cooling in water at $(20 \pm 3) ^\circ\text{C}$ for at least 1 h.

Test details:

Glue-line	Shear strength $f_v(\text{N/mm}^2)$	Apparent cohesive wood failure $\omega \%$
#1	1.02	\
#2	1.18	\
#3	1.27	\

Criteria of BS EN 314-2:1993

For bonding class 3, each glue-line shall satisfy two criteria: the mean shear strength and the mean apparent cohesive wood failure, as combined in the following table:

Requirement	
Mean shear strength f_v N/mm^2	Mean apparent cohesive wood failure ω %
$0.2 \leq f_v < 0.4$	≥ 80
$0.4 \leq f_v < 0.6$	≥ 60
$0.6 \leq f_v < 1.0$	≥ 40
$1.0 \leq f_v$	no requirement

Test Results: According to the test details and the requirement above, the test result meets the requirement of BS EN 314-2:1993.

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Conclusion: The submitted sample meets the requirement of BS 1088-1:2003 Clause 5.6 Bonding quality requirement.

Clause 5.7 Density

Sample description:

Sample description:	Marine Plywood
Sample style:	Standard marine plywood
Nominal sample size:	100mm x 100mm x 18mm

Requirement:

For standard marine plywood the nominal density at 12 % moisture content (as defined in BS EN 350-2:1994) of the species used shall be $> 500 \text{ kg/m}^3$. For lightweight marine plywood the nominal density at 12 % moisture content (as defined in BS EN 350-2:1994) of the species used shall be $\leq 500 \text{ kg/m}^3$.

Test results:

Specimen No.	#1	#2	#3	#4	#5	#6	Mean value
Density(kg/m^3)	606	595	597	600	600	597	599

Photo Appendix:



Full size finished product

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Repair



Repair



Sample for Clause 5.6 Glueline#1



Glueline#2



Glueline#3

End of Report

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