

Test Report No. 7191119213-MEC15-KSY (221407919)
dated 05 AUG 2015



PSB Singapore

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SUBJECT

Testing of Compact Laminate

TESTED FOR

Maica Laminates Sdn Bhd
5100, Lorong Mak Mandin 5
Mak Mandin Industrial Estate
13400 Butterworth
Pulau Pinang
Penang Malaysia

Attn: Mr Ooi Ee Chia

SAMPLE DESCRIPTION:

The following samples were submitted by Maica Laminates Sdn Bhd on 02 April 2015 for testing:

Label	Nominal Dimension	Qty	Typical Photograph
C1	100 mm x 100 mm x 12 mm, 6.7mm hole at center	6 pcs	
C2	50 mm x 50 mm x 12 mm	6 pcs	
C3	100 mm x 100 mm x 12 mm	6 pcs	
C4	230 mm x 230 mm x 12 mm	3 pcs	
C5	250 mm x 50 mm x 12 mm (fibre direction)	8 pcs	
C6	250 mm x 50 mm x 12 mm (cross fibre direction)	8 pcs	
C7	230 mm x 230 mm x 12 mm	7 pcs	



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TUV®

SAMPLE DESCRIPTION (CONT'D):

Label	Nominal Dimension	Qty	Typical Photograph	
C8	250 mm x 250 mm x 12 mm	4 pcs		
C9	100 mm x 100 mm x 12 mm, 6.7 mm hole at center	5 pcs		
C10	70 mm x 70 mm x 12 mm	10 pcs		
C11	120 mm x 40 mm x 12 mm	3 pcs		
C12	230 mm x 230 mm x 12 mm	2 pcs		
C13	150 mm x 150 mm x 12 mm	5 pcs		
C14	25 mm x 25 mm x 12 mm	4 pcs		
C15	250 mm x 20 mm x 12 mm	8 pcs		 Top View
C16	250 mm x 20 mm x 12 mm	8 pcs		 Bottom View
C17	180 mm x 20 mm x 12 mm	8 pcs		 Top View  Bottom View






TEST METHODS: (AS SPECIFIED BY THE CLIENT):

BS EN 438-4 : 2005

High-pressure decorative laminates (HPL) – Sheets based on thermosetting resins (Usually called Laminates) -

Part 4: Classification and specifications for compact laminates of thickness 2mm and greater

BS EN 438-2 : 2005

High-pressure decorative laminates (HPL) - Sheets based on thermosetting resins (Usually called Laminates) -

Part 2: Determination of properties

1. Resistance to surface wear

Nominal specimen dimensions : 100 mm x 100 mm x 12 mm (with a 6.7 mm hole at the center)

No. of determinations : 3

2. Resistance to immersion in boiling water

Nominal specimen dimensions : 50 mm x 50 mm x 12 mm

No. of determinations : 3

3. Resistance to water vapour

Nominal specimen dimensions : 100 mm x 100 mm x 12 mm

No. of determinations : 1

4. Resistance to dry heat

Nominal specimen dimensions : 230 mm x 230 mm x 12 mm

No. of determinations : 1

5. Dimensional stability at elevated temperature

Nominal specimen dimensions : 250 mm x 50 mm x 12 mm

No. of determinations : 4 per fibre and cross fibre directions

6. Resistance to impact by large diameter ball

Nominal specimen dimensions : 230 mm x 230 mm x 12 mm

No. of determinations : 5



TEST METHODS: (CONT'D):

7. Resistance to crazing

Nominal specimen dimensions : 250 mm x 250 mm x 12 mm
No. of determinations : 2

8. Resistance to scratching

Nominal specimen dimensions : 100 mm x 100 mm x 12 mm (with a 6.7 mm hole at the center)
No. of determinations : 1

9. Resistance to Staining

Nominal specimen dimensions : 70 mm x 70 mm x 12 mm
Reagent used : a) Acetone (16h)
b) Coffee (16h)
c) 25% Sodium Hydroxide (10min)
d) 30% Hydrogen Peroxide (10min)
e) Shoe Polish (10min)
No. of determinations : 2

10. Lightfastness (xenon arc)

Nominal specimen dimensions : 120 mm x 40 mm x 12 mm
Duration : 100 hrs
No. of determinations : 1

11. Resistance to cigarette burn

Nominal specimen dimensions : 230 mm x 230 mm x 12 mm
No. of determinations : 1

12. Resistance to wet heat

BS EN 12721:2009

Furniture - Assessment of surface resistance to wet heat

Nominal specimen dimensions : 150 mm x 150 mm x 12 mm
No. of determinations : 1



TEST METHODS: (CONT'D):

13. Density
BS EN ISO 1183-1:2012
Methods for determining the density of non-cellular plastics
Part 1 : Immersion method, liquid pyknometer method and titration method

Nominal specimen dimensions : 25 mm x 25 mm x 12 mm
No. of determinations : 3

14. Flexural Properties
BS EN ISO 178 : 2010+A1 : 2013
Plastics - Determination of flexural properties

Nominal specimen dimensions : 250 mm x 20 mm x 12 mm
Support span length : 198 mm
Crosshead speed : 2 mm/min
No. of determinations : 5

15. Tensile Strength
ISO 527-2 : 2012
Plastics - Determination of tensile properties
Part 2 : Test conditions for moulding and extrusion plastics

Nominal specimen dimensions : Dumbbell shape, Type 1A
Length of grips separation : 115 mm
Crosshead speed : 5 mm/min
No. of determinations : 5

 

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TEST RESULTS:

Characteristics	Label	unit	Results
1. Resistance to surface wear, average a) Initial point b) Wear value	C1	Revolutions	725 1292
2. Resistance to immersion in boiling water, average a) Mass increase b) Thickness increase c) Appearance	C2	% t ≥ 5 mm % t ≥ 5 mm Rating Other finishes	0.24 0.43 5
3. Resistance to Water Vapour Appearance	C3	Rating Other finishes	5
4. Resistance to Dry Heat (180°C) Appearance	C4	Rating Other finishes	5

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TEST RESULTS (CONT'D):

Characteristics	Label	unit	Results
5. Dimensional Stability at Elevated Temperature, average			
i) Dry-heat test (70 °C for 24 h)	C5	Cumulative Dimensional Change % t ≥ 5 mm	0.19
a) Longitudinal Direction			0.48
b) Transverse Direction			
ii) High-humidity test (40 °C / 92 % for 96h)	C6		0.19
a) Longitudinal Direction			0.23
b) Transverse Direction			
6. Resistance to Impact by Large Diameter Ball Drop Height	C7	mm	> 1850
7. Resistance to Crazing Appearance	C8	-	Grade 5
8. Resistance to Scratching Force	C9	Rating Textured finishes	4

[Signature] *Hu Gmang*

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TEST RESULTS (CONT'D):

Characteristics	Label	unit	Results
9. Resistance to Staining Appearance a) Groups 1 & 2 b) Group 3 i) Sodium hydroxide ii) Hydrogen peroxide iii) Shoe polish	C10	Rating	5 5 5 4
10. Lightfastness	C11	Grey Scale Rating	> 4
11. Resistance to Cigarette Burn Appearance	C12	Rating	5
12. Resistance to wet heat (100 °C)	C13	Rating Other finishes	5
13. Density	C14	g/cm ³	1.44
14. Flexural Modulus (MPa), average	C15	MPa	13079
15. Flexural Strength (MPa), average	C16	MPa	147
16. Tensile Strength (MPa), average	C17	MPa	134

NOTE: Detail information of the tests were shown in Appendix 1.

Kong Siew Yong
Product Manager

Dr Hu Guang Xia
Senior Consultant
Polymer Products
Mechanical Centre

Appendix 1

No.	Label	Test items	EN 438 : Part 2	Attached to chipboard	Nominal Specimen Dimensions	Quantity
1	C1	Resistance to Surface Wear	Clause 10	No	100 mm x 100 mm (with a hole of 6.7 mm at the centre)	6
2	C2	Resistance to immersion in boiling water	Clause 12		50 mm x 50 mm	6
3	C3	Resistance to water vapour	Clause 14		100 mm x 100 mm	6
4	C4	Resistance to dry heat (180 °C)	Clause 16		230 mm x 230 mm	3
5	C5	Dimensional stability at elevated temperature	Clause 17		250 mm x 50 mm (fibre direction)	8
	C6				250 mm x 50 mm (cross fibre direction)	8
6	C7	Resistance to impact by large diameter ball	Clause 21		230 mm x 230 mm	7
7	C8	Resistance to crazing	Clause 24		250 mm x 250 mm	4
8	C9	Resistance to scratching	Clause 25		100 mm x 100 mm (with a hole of 6.7 mm at the centre)	5
		Resistance to staining	Clause 26		70 mm x 70 mm	10
10	C11	Lightfastness	Clause 27		120 mm x 40 mm	3
11	C12	Resistance to cigarette burn	Clause 30		230 mm x 230 mm	2
12	C13	Resistance to wet heat (100°C)	EN 12721 : 2009		150 mm x 150 mm	5
13	C14	Density	EN ISO 1183-1 : 2012		25 mm x 25 mm	4
14	C15	Flexural Modulus	BS EN ISO 178 : 2010+A1 : 2013		250 mm x 20 mm	8
15	C16	Flexural Strength	BS EN ISO 178 : 2010+A1 : 2013			
16	C17	Tensile Strength	ISO 527-2 : 2012	180 mm x 20 mm	8	

The arrow is mark as fibre direction →



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July 2011

