TEST REPORT

No. : SHIN2307001048CM01_EN

Date : 2023-08-18

CUSTOMER NAME: DAREKAOU(CHANGZHOU) DECORATIVE MATERIALS CO.,LTD

ADDRESS: CUIBEI VILLAGE,HENGLIN TOWN, WUJIN DISTRICT, CHANGZHOU CITY, JIANGSU PROVINCE, CHINA

Sample Name : REINFORCED COMPOSITE WOOD FLOORING

Above information and sample(s) was/were submitted and confirmed by the client. SGS, however, assumes no responsibility to verify the accuracy, adequacy and completeness of the sample information provided by client.

****

Date of Receipt : 2023-07-26

Testing Period : 2023-07-26 ~ 2023-08-18

Test result(s) : For further details, please refer to the following page(s)
(Unless otherwise stated the results shown in this test report refer only to the sample(s) tested)

Signed for
SGS-CSTC Standards Technical
Services (Shanghai) Co., Ltd..

王支援 Ziven Wang

Ziven Wang
Authorized signatory

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Summary of Results:

No.	Test Item	Test Method	Result	Conclusion
1	Dimensional Stability and Curling after Exposure to Heat	ASTM F2199-20	See Result	/
2	Resistance to Stubbed and Burning Cigarettes	EN 1399:1997/AC:1998 Method A	See Result	/
3	Locking Strength	ISO 24334:2019	See Result	/
4	Thickness Swell	ANSI NALFA LF-01-2019 Section 3.2	1.83 %	/
5	Large Ball Impact Resistance	ANSI NALFA LF-01-2019 Section 3.5	2425 mm	/
6	Formaldehyde Emission	ASTM D6007-14	See Result	/
7	Wear Resistance	NALFA LF 01-2019 Section 3.7	Average corrected abrasion cycles: 9000r (Not worn through to the substrate)	
8	Scratch Resistance	ISO 1518-1:2023	No worn-out to the substrate with 20N	/
9	Determination of the Burning Behavior Using a Radiant Heat Source	ASTM E648-19a$^{\epsilon 1}$	Class Ⅰ	/
10	Coefficient of Friction	ASTM D2394-17(2022) Section 33-37	See Result	/

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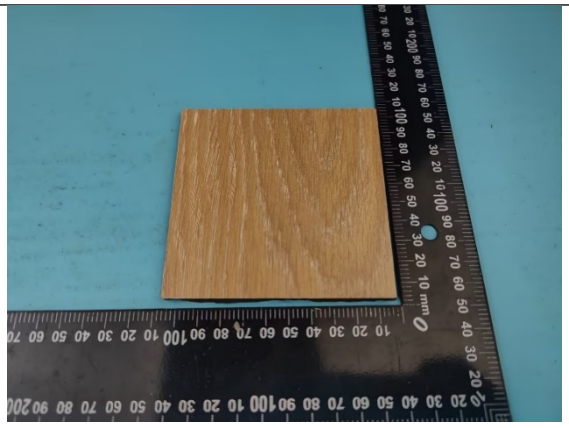
Note: Pass : Meet the requirements;
Fail : Does not meet the requirements;
/ : Not Apply to the judgment.

Original Sample Photo(s):

	
Dimensional Stability and Curling after Exposure to Heat/Resistance to Stubbed and Burning Cigarettes/Locking Strength/Thickness Swell/Large Ball Impact Resistance - Front View	Dimensional Stability and Curling after Exposure to Heat/Resistance to Stubbed and Burning Cigarettes/Locking Strength/Thickness Swell/Large Ball Impact Resistance - Back View
	
Formaldehyde Emission	Wear Resistance

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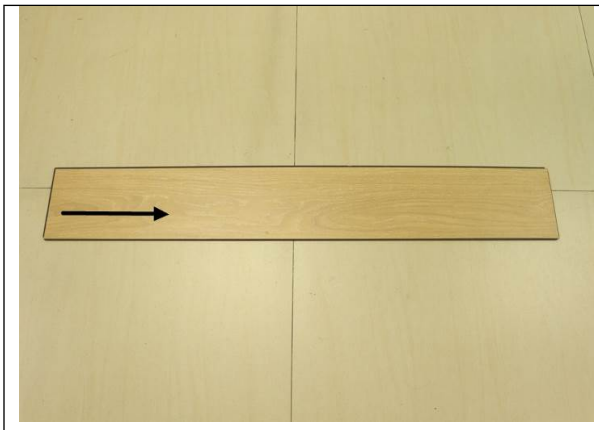	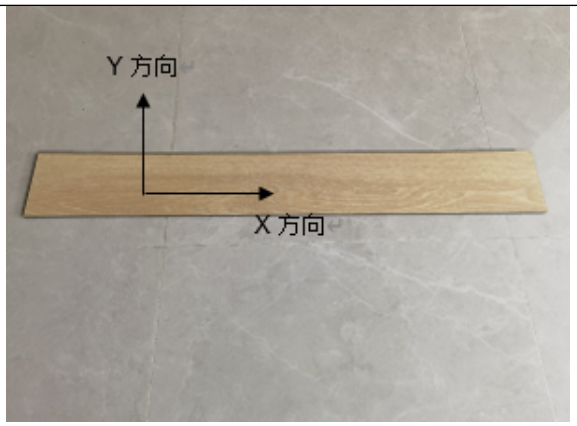
Scratch Resistance/Determination of the Burning Behavior Using a Radiant Heat Source	Coefficient of Friction

TEST REPORT

1. Test Item: Dimensional Stability and Curling after Exposure to Heat

Test Method: ASTM F2199-20

Test Condition:

Specimen: 305mm×127mm×5.3mm, 2pcs

Heating temperature: 82℃

Heating time: 6h

Lab Environmental Condition: (23±2)℃, (50±5)%RH

Test Result:

Test Item			Test Result		
			Individual Value		Average Value
Dimensional Stability and Curling After Exposure to Heat	Dimensional Stability - Linear Change (%)	MD	-0.142	-0.125	-0.134
		AMD	-0.158	-0.162	-0.160
	Curling (in)		0.000	0.000	0.000
			Maximum Curling: 0.000		

Note:

1). A negative value indicates shrinkage, and a positive value indicates growth.

2). Upward curl is expressed as a positive curling and downward curl is expressed as a negative curling.

3). Test specimens were cut from original samples.

2. Test Item: Resistance to Stubbed and Burning Cigarettes

Test Method: EN 1399:1997/AC:1998 Method A

Test Condition:

Specimen: 100mm×100mm×5.3mm, 3pcs

Method A: Light one end of a cigarette and draw air through it until 10 mm has been consumed. Place the smoldering cigarette(s) in position on the surface of the specimen(s), with full-length contact with the horizontal surface; The cigarettes shall be allowed to burn for a further 20 s. Apply the load to keep the lighted cigarette butt in place. Rotate the specimen(s) through 90° within 2 s and remove the load. After cleaning, examine the specimen and express the results according to Table 1.

Lab Environmental Condition: (23±2)℃, (50±5)%RH

Test Result:

Test Item	Cigarette Type	Test Result
Resistance to Stubbed Cigarettes (Method A)	Da Qian Men	Rating 5
	Zhong Hua	Rating 5
	Tian Zi	Rating 5

Note: Test specimens were cut from original sample.

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Table 1: Presentation of results

Rating	Effect on surface of test piece
5	No visible change
4	Slight change of gloss only visible at certain viewing angles and/or slight brown stain
3	Moderate change of gloss and/or moderate brown stain
2	Severe brown mark, but no destruction of surface
1	Blistering and/or destruction of surface

3. Test Item: Locking Strength

Test Method: ISO 24334:2019

Test Condition:

Specimen:

long side: 200mm×220mm×5.3mm, 5pcs

short side: 175mm×220mm×5.3mm, 5pcs

Test rate: 0.5mm/min

Lab Environmental Condition: (23±2)℃，(50±5)%RH

Test Result:

Test Item		Test Result		
		f_{max} (kN/m)	$f_{0.2}$ (kN/m)	Δs (mm)
Locking Strength	Short side	4.4	0.2	0.90
	Long side	6.5	0.2	1.74

Note: Test specimens were cut from original sample which were jointed by two pieces.

4. Test Item: Thickness Swell

Test Method: ANSI NALFA LF-01-2019 Section 3.2

Test Condition:

Specimen: 150mm×150mm×5.3mm, 2pcs

Immersion time: 24h

Lab Environmental Condition: (23±3)℃, (50±5)%RH

Test Result:

Test Item	Test Result								
	Individual Value								Average Value
Thickness Swell (%)	1.76	1.88	2.01	1.68	1.89	1.66	1.91	1.86	1.83

Note: Test specimens were cut from original sample.

5. Test Item: Large Ball Impact Resistance

Test Method: ANSI NALFA LF-01-2019 Section 3.5

Test Condition:

Specimen: 300mm×175mm×5.3mm, 5pcs

Steel ball: Φ38.1mm, 224g

Test surface: Front view

Lab Environment Condition: (23±2)℃, (50±5)%RH

Test Result:

Test Item	Test Result					
Large Ball Impact Resistance	Individual Value (mm)					Average Value (mm)
	2425	2425	2425	2425	2425	2425

Note: Test specimens were cut from original sample.

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6. Test Item: Formaldehyde Emission

Test Part Description：Yellow/black solid board

Test Method: With reference to ASTM D6007-14, analysis was performed by UV-Vis.

Test Result(s):

Test Item(s)	Limit	Unit(s)	MDL	Test Result
Background	-	ppm	0.01	ND
Formaldehyde Emission	-	ppm	0.01	0.02
Formaldehyde Emission (Corrected)	0.08	ppm	0.01	0.02

Remarks:

(1) 1 mg/kg = 1 ppm = 0.0001%

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

Notes:

(1) The scope of CARB ATCM is applicable for composite wood, but not for other wood products.

(2) Formaldehyde emission test is one of the conformity criteria under CARB ATCM. Full conformity of a composite wood product happens provided that this composite wood fulfill all the requirement as stated in CARB ATCM title 17 section 93120 to 93120.12.

(3) ppm = parts of formaldehyde per million parts air.

(4) Formaldehyde Emission (Corrected) is Formaldehyde concentration corrected to 25℃ and 50% Relative Humidity.

Reference Limit:

Maximum Permissible Limit according to Section 93120.2, Title 17, California Code of Regulation:

Table 1: Phase 1 and Phase 2 Formaldehyde Emission Standards for Hardwood Plywood(HWPW), Particleboard(PB), and Medium Density Fiberboard(MDF)	
	Phase 1(P1) and Phase 2(P2) Emission Standards(ppm)

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Effective Date	HWPW-VC	HWPW-CC	PB	MDF	Thin MDF
1-1-2009	P1:0.08	----------	P1:0.18	P1:0.21	P1:0.21
7-1-2009	--------	P1:0.08	----------	----------	----------
1-1-2010	P2:0.05	----------	----------	----------	----------
1-1-2011	--------	----------	P2:0.09	P2:0.11	----------
1-1-2012	----------	----------	----------	----------	P2:0.13
7-1-2012	---------	P2:0.05	----------	----------	----------
HWPW-VC = Veneer Core; HWPW-CC = Composite Core.					

Sample Conditioning / Parameters			
Average Temperature (℃)	24.0	Average Relative Humidity (%)	50.0
Range of Temperature (℃)	21.0- 27.0	Range of Relative Humidity (%)	45.0 – 55.0
Sampling Time (hour)	168	Formaldehyde background (ppm)	< 0.1
Sample Details and Apparatus			
Chamber Dimensions (m)	1.578 x 0.8 x 0.8 or 1.56 x 0.8 x 0.8 (Nominal)		
Chamber Volume (m^3)	1.0	Chamber Load Ratio (m^2/m^3)	0.6399 (Particleboard, Hardwood Plywood Panels) / 0.3937 (MDF) / 1.4259 (Hardwood Plywood Wall Paneling) / 0.1968 (Particleboard Door Core)
Chamber Q/A Ratio (±2%)	1.172 (Particleboard, Hardwood Plywood Panels) / 1.905 (MDF) / 0.526 (Hardwood Plywood Wall Paneling) / 3.811 (Particleboard Door Core)		

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Date : 2023-08-18

Sample Size	32.3 cm x 33 cm (Particleboard, Hardwood Plywood Panels) / 25.6 cm x 25.6 cm (MDF) / 35 cm x 68 cm (Hardwood Plywood Wall Paneling) / 18.1 cm x 18.1 cm (Particleboard Door Core)		
Number of Samples	3	Number of Exposed Surfaces	6
Sampling Parameters of Emission Test			
Average Temperature (℃)	25.0	Average Relative Humidity (%)	50.0
Range of Temperature (℃)	24.0- 26.0	Range of Relative Humidity (%)	46.0 – 54.0
Air-sampling Time (min)	30	Sampling Time in Chamber (min)	240
Air-sampling Rate (L/min)	1.0	Formaldehyde background (ppm)	< 0.01

Remark:

The reported result is for reference only.

Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (*w*=0) stated in ILAC-G8:09/2019.

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7. Test Item: Wear Resistance

Sample Description: See photo

Test Method: NALFA LF 01-2019 Section 3.7

Test Condition:

Specimen: 100mm×100mm

Condition: 23±2°C, 50±5%RH, 24h

Type of wheel: CS-0

Load: 500g/wheel(total 1000g)

Rotating speed: 60r/min

Abrasive paper strips: S-42(P180)

Calibration factor: 1.00

Test Result:

Average corrected abrasion cycles: 9000r (Not worn through to the substrate)

Note: Test item 7 was performed by SGS-CSTC Standards Technical Services Co., Ltd. Xiamen Branch Testing Center.

8. Test Item: Scratch Resistance

Sample Description: Panel

Test Method: ISO 1518-1:2023

Test Condition:

Scratch stylus: HM 1.0

Speed: (35±5)mm/s

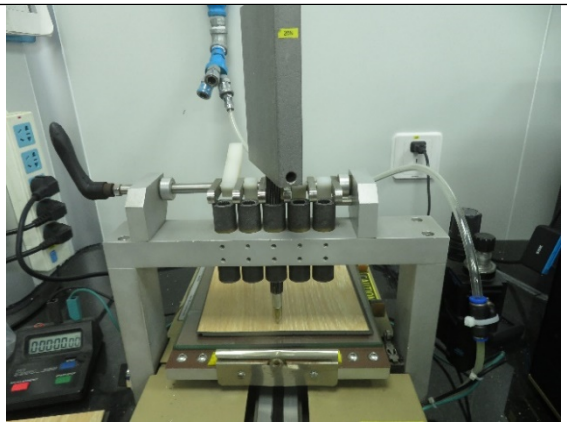
Scratch length: ≥40mm

Test Result:

Test Item	Result
Scratch Resistance	No worn-out to the substrate with 20N

Note: Observation magnification is 4X.

Test Photo(s):

	
In Test	After Test

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After Test (Local part)

Equipment Information:

Equipment	Model	Equipment No.	Calibration date	Next Calibration date
Multi-Finger Scratch/Mar Tester	710	GZMR-AG-E023	2023-02-17	2024-02-16

9. Test item: Determination of the Burning Behavior Using a Radiant Heat Source

Sample Description: Panel

Test Method: ASTM E648-19a$^{\epsilon 1}$

Test condition:

Specimen: 1050mm×230mm×3.3mm (make up of 2 pieces sample)

Flame application time: 5min

Test Result:

Specimen No.	Furthest extent of spread of flame, mm	Critical heat flux, watts/cm^2
1	230	0.92
2	210	0.96
3	110	≥1.0
Average	180	≥0.96

Note:

1. Test specimens were cut from sample.
2. Observations of the burning characteristics: Charring
3. The wood grain surface was faced to the flame.
4. ASTM E648-19a$^{\epsilon 1}$ is solely a test procedure and, as such, has no specific pass/fail criteria of its own. Table 1 specification criteria are cited for reference purposes only, and may or may not apply to this tested product. International Building Code, Chapter 8, Interior Finishes, Section 804 “INTERIOR FLOOR FINISH”, was classified in accordance with ASTM E648-19a$^{\epsilon 1}$ or NFPA 253. Such interior finish materials shall be grouped in table 1 classes in accordance with their critical heat flux ratings.

The classifications are as follows:

Ratings	Class Ⅰ	Class Ⅱ
Critical heat flux, watts/cm^2	≥0.45	≥0.22

Result: Met the requirement of Class Ⅰ

Statement: The test results relate to the behavior of the test specimens of a product under the particular conditions of the test, they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

Test Photo(s):

<table>
<tr><td colspan="2">  </td></tr>
<tr><td colspan="2">In Test</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Before Test</td><td>After Test</td></tr>
</table>

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Equipment Information:

Equipment	Model	Equipment No.	Calibration date	Next Calibration date
Flooring Radiant Panel Tester	FPR	GZMR-PL-E227	2023-04-21	2024-04-20

Note: Test items 8-9 were performed by SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch Testing Center.

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10. Test Item: Coefficient of Friction

Sample Description: See photo

Test Method: ASTM D2394-17(2022) Section 33-37

Test Condition:

Specimen: 500mm×175mm×5.1mm

Sliding weight: 11.8kg

Testing speed of Static Coefficient of Friction: 1.27mm/min

Testing speed of Sliding coefficient of friction: 51mm/min

Test Result:

Test Item		Test Result
Static Coefficient of Friction	X Direction	0.76
	Y Direction	0.94
Sliding coefficient of friction	X Direction	0.48
	Y Direction	0.73

Note:

1. All test specimens were cut from the sample.
2. Test item 10 was performed by SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch Testing Center.

In the territory of the People's Republic of China, the test report with CMA logo expresses that the test items are within the scope of China Metrology Accreditation(CMA); without CMA logo expresses that part/all of the test items are not within the scope of China Metrology Accreditation(CMA), and just for client internal reference.

********End of report********

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