ZHEJIANG ECO NEW MATERIAL CO., LTD.

TEST REPORT

SCOPE OF WORK
VINYL FLOORING/SPC FLOORING

REPORT NUMBER
200323004SHF-002

TEST DATE(S)
2020-03-23 - 2020-04-02

ISSUE DATE
2020-04-08

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23

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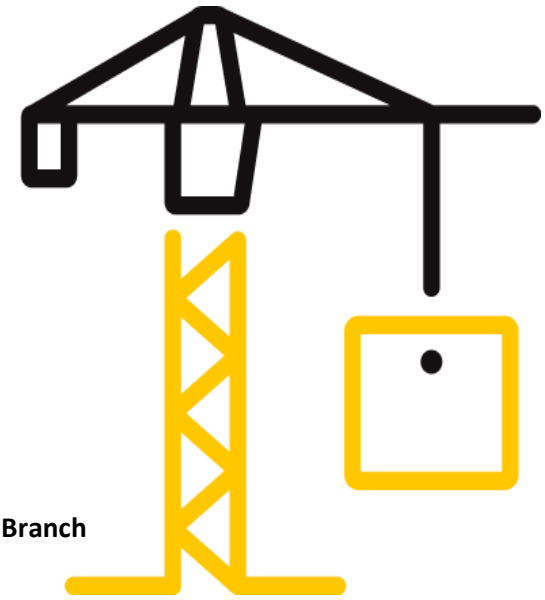

Intertek Testing Services Shenzhen Ltd. Shanghai Fengxian Branch

Test Report

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Intertek Testing Services Shenzhen Ltd. Shanghai Fengxian Branch
Plant 5, No. 6958 Daye Road, Fengxian District, Shanghai, China
Tel: 021-61136116 Fax: 021-61189921
Website: www.intertek.com

Test Report

Issue Date: 2020-04-08 Intertek Report No. 200323004SHF-002

Applicant: ZHEJIANG ECO NEW MATERIAL CO., LTD.

Address: No.38, ZIJIN ROAD, PUYUAN HIGH-TECH ZONE, TONGXIANG, ZHEJIANG, CHINA

Attn: Patrick Cao

Test Type： Performance test, samples provided by the applicant.

Product Information

Product Name	VINYL FLOORING/SPC FLOORING	**Brand**	ECO FLOORING
Sample Description	Good Condition	**Sample Amount**	50 PCS
		Received Date	2020-03-23

Sample ID	Model	Specification
S200323004SHF.001, 003~017	SPC-55	180*1220*5mm/0.5mm

Test Methods And Standards

Test Standard	ISO 24337:2006, EN 13329:2006+A1:2008 Annex F, EN 15468:2016 Annex A, EN 16094:2012 Procedure A, EN 425:2002, BS EN 424:2002/EN 424:2001, EN ISO 24343-1:2012/ISO 24343-1:2007, EN 438-2:2016+A1:2018 Section 26, ISO 24336:2005, ISO 24334:2014, EN ISO 23999:2018/ISO 23999:2018, EN 12667:2001, EN ISO 23996:2012/ISO 23996:2007 Method A, With reference to EN 71 part 3:1994 and amendment A1:2000 and AC:2002, EN ISO 24345:2012/ISO 24345:2006, ISO 105-B02:2014
Specification Standard	EN 16511:2014+A1:2019
Test Conclusion	The samples were tested according to the above standards, and the results are shown in the following page.

Note:
1.This report relates specifically to the sample(s) that were drawn and provided by the applicant or their nominated third party. The reported result(s) provide no warranty or verification on the sample(s) representing any specific goods and/or shipment and only relate to the sample(s) as received and tested.
2. The test result was cited from Report No.200323004SHF-001.

Report Authorized

Name: Flora Fan Name: Tod Qian

Title: Reviewer Title: Project Engineer

Test Report

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Test Items, Method and Results:

EN 16511:2014+A1:2019 Loose-laid panels - Semirigid multilayer modular floor covering (MMF) panels with wear resistant top layer

General requirements:

Characteristics	Test results	Verdict
Geometrical Characteristics	refer to next page(s)	Pass

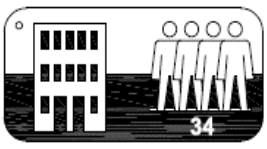
Classification requirements:

Characteristics	Test results	Classification
Wear resistance (method B)	> 7000 cycles	Class 34
Impact resistance (big ball)	> 1800 mm	Class 34
Micro-scratch resistance	MSR-A2	Class 34
Castor chair resistance	25000 cycles	Class 34
Effect of furniture leg	No visible damage	Class 34
Residual indentation	0 mm	Class 34
Resistance to staining	refer to next page(s)	Class 34
Swelling	refer to next page(s)	Class 34
Locking strength	refer to next page(s)	Class 34
Dimensional stability due to variation of temperature	refer to next page(s)	Class 34

Note:

1. Detail test results please see Page 7 - 17.

Level of use class:

Class	Symbol	Intensity of use
34		Very heavy

Note:

1. The classification scheme and use intensity symbols are described in EN ISO 10874:2012.

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Test Items, Method and Results:

EN 16511 Classification

Class (EN ISO 10874) → **Characteristic**↓	**21/22**	**23**	**31**	**32**	**33**	**34**	**Reference test method**
Wear resistance IP, method A or	≥ 200 cycles	≥ 400 cycles	≥ 600 cycles	≥ 1200 cycles	≥ 2000 cycles	≥ 4000 cycles	EN 13329:2006+ A1:2008, Annex E
Wear resistance IP, method B	≥ 500 cycles	≥ 1000 cycles	≥ 1500 cycles	≥ 3000 cycles	≥ 5000 cycles	≥ 7000 cycles	EN 15468:2016, Annex A
Impact resistance [mm] (big ball)	≥ 400 mm	≥ 600 mm	≥ 800 mm	≥ 1200 mm	≥ 1600 mm	≥ 1800 mm	EN 13329:2006 + A1:2008, Annex F[f]
Micro-scratch resistance [class]				≤ MSR-A3[e]	≤ MSR-A2[e]	≤ MSR-A2[e]	EN 16094
Castor chair resistance [a, c]			10000 cycles	25000 cycles	25000 cycles	25000 cycles	EN 425:2002
Effect of furniture leg				No visible damage	No visible damage	No visible damage	EN 424 (tested with foot type 0)
Residual indentation	≤0.3mm	≤0.3mm	≤0.3mm	≤ 0.2mm	≤ 0.2mm	≤ 0.15mm	EN ISO 24343-1
Resistance to staining [grade, per group]	Water, coffee, cleaning solution (10 min): grade 4	Water, coffee, cleaning solution (10 min): grade 4	Groups 1 and 2: grade 4 Group 3: grade 3	Groups 1 and 2: grade 5 Group 3: grade 4	Groups 1 and 2: grade 5 Group 3: grade 4	Groups 1 and 2: grade 5 Group 3: grade 4	EN 438-2: Group 1 only 10 min
Swelling * [%]	≤ 20	≤ 20	≤ 20	≤ 18	≤ 18	≤ 12	ISO 24336
Locking strength[b]** [kN/m] Locking strength[b]*				Long side ≥ 1.0 Short side ≥ 1.5 Long side ≥ 1.0 Short side ≥ 2.0		Long side ≥ 2.0 Short side ≥ 3.5 Long side ≥ 1.0 Short side ≥ 3.5	ISO 24334
Dimensional variations due to variation of climate *						ΔW_{avg} , Δl_{avg}: ≤0.15% -0.20% ≤ C_{avg} ≤ 0.25%[d] $J_{L, avg}$, $J_{S, avg}$ ≤0.15mm $h_{L,avg}$, $h_{S,avg}$ ≤0.15 mm	ISO 24339
Dimensional stability due to variation of temperature **	≤ 0.5%	≤ 0.5%	≤ 0.25%	≤ 0.25%	≤ 0.25%	≤ 0.25%	EN ISO 23999

a. No disturbance to the surface only gloss changes, no delamination, cracks or disruptions.

b. Only for loose-laid panels.

c. Tested with soft wheels on loose laid panels without underlayment.

d. Take the maximum of Cavg from wet climate (23 °C, 85 % relative humidity) and the minimum of Cavg from dry climate (23 °C, 30 % relative humidity) for the evaluation.

e. Due to detected inhomogeneity of the Scotch Brite fleece SB 7440 (medium fine), the test results of EN 16094,procedure B shall not be used for classification.

f. Only the assessment of cracks on the surface shall be carried out. The deformation is not to be taken into consideration.

* Only for panels with substrates or layers with hygroscopic properties, e.g. HDF or cork.

** Only for products with significant reaction on temperature changing, e.g. thermoplastic vinyl core.

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Test Items, Method and Results:

Test Item: Geometrical characteristics
Test Method: ISO 24337:2006
Conditioning: Condition the test specimens at (23±2)°C and (50±5)% relative humidity to constant mass

Test Item	Test Result	Nominal value	Test Requirement in EN 16511
Thickness	Average value= 5.03 mm $^{\triangle}t_{avg}$ = 0.03 mm t_{max}-t_{min} = 0.04 mm	5.0 mm	$^{\triangle}t_{avg} \leq 0.50$ mm t_{max}-$t_{min} \leq 0.50$mm
Length	Average value= 1220.03 mm Maximum $^{\triangle}l$ = 0.04 mm N/A mm/m	1220 mm	$l \leq 1500$mm: $^{\triangle}l \leq 0.5$ mm $l > 1500$mm: $^{\triangle}l \leq 0.3$ mm/m
Width	Average value= 180.02 mm $^{\triangle}W_{avg}$ = 0.02 mm W_{max}-W_{min} = 0.04 mm	180 mm	$^{\triangle}W_{avg} \leq 0.10$ mm W_{max}-$W_{min} \leq 0.20$ mm
Squareness	q_{max} = 0.02 mm	-	$q_{max} \leq 0.20$ mm
Straightness	S_{max} = 0.03 mm/m	-	$S_{max} \leq 0.30$ mm/m
Flatness	Maximum single values: $f_{w, concave}$= 0.02 % $f_{w, convex}$ = N/A % Maximum single values: $f_{l, concave}$ = 0.00 % $f_{l, convex}$ = N/A %	-	Maximum single values: $f_{w, concave} \leq 0.15$ %, $f_{w, convex} \leq 0.20$ % $f_{l, concave} \leq 0.50$ %, $f_{l, convex} \leq 1.00$ %
Openings	O_{avg} = 0.02 mm O_{max} = 0.02 mm	-	$O_{avg} \leq 0.15$ mm $O_{max} \leq 0.20$ mm
Height difference	h_{avg} = 0.03 mm h_{max} = 0.03 mm	-	$h_{avg} \leq 0.10$ mm $h_{max} \leq 0.15$ mm

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Test Items, Method and Results:

Test Item: Abrasion resistance

Test Method: EN 15468:2016, Annex A

Conditioning: Condition the test specimens at (23±2)°C and (50±5)% relative humidity for at least 24h

Test Condition:

Rotation frequency: 60 r/min

Abrasive material: Taber S-39 abrasive wheels; S-41 #240 Aluminum Oxide grit

Load on each wheel: 1000 g

Rate of grit flow: 21±3 g/min

Calibration factor: 0.96

Inspect the test piece after every 200 r. When the test nears its end, inspect after every 100 r.

Test Result:

Parameter	Specimen 1	Specimen 2	Specimen 3
Initial wear point (IP) value, r	> 7000	> 7000	> 7000
Average IP value, r	> 7000		

Note:

1. The initial wear point (IP) is reached when the test specimen shows wear through in 12 sectors of 16 and wear through at least in 1 sector per quadrant.
2. Abbreviation "r" = revolutions/cycles
3. Test result is corrected with the calibration factor.

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Test Items, Method and Results:

Test Item: Resistance to impact by large diameter ball

Test Method: EN 13329:2006+A1:2008, Annex F

Conditioning: Condition the test specimens at (23±2)°C and (50±5)% relative humidity for at least 72h

Test Condition:

Impactor:	Polished steel ball	
Impactor mass:	324	g
Impactor diameter:	42.8	mm
Drop height:	1800	mm

Test Result:

Specimen	Crack (Yes/No)	Diameter of imprint (mm)	Verdict
1	No	7.62	Pass
2	No	7.22	
3	No	7.36	
4	No	7.25	
5	No	7.58	

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Test Items, Method and Results:

Test Item: Micro-scratch resistance

Test Method: EN 16094:2012, Procedure A

Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 1 week

Test Condition:

Scrub material:	SB 7447 (very fine)
Holder for scrub material:	Version 2, 6N
Speed factor:	1
Number of rubs:	80
Glossmeter geometry:	85 °

Test Result:

Specimen	|Gloss change |(%)
1	14.5
2	11.7
3	16.7
Average value	15
Classification	MSR-A2

Classification of mean values of gloss change as per EN 16094 procedure A

Micro-Scratch resistance class according to procedure A	|Change of gloss|
MSR-A1	≤ 10%
MSR-A2	> 10% to ≤ 30%
MSR-A3	> 30% to ≤ 50%
MSR-A4	> 50% to ≤ 70%
MSR-A5	> 70%

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Test Items, Method and Results:

Test Item: Castor chair test

Test Method: EN 425:2002

Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 24h

Test Condition: At a temperature range of 18°C to 25 °C

Load mass:	90	kg
Test castors:	Type	W
Speed of rotating platform:	20	r/min
Speed of castor assembly:	50	r/min
Total test revolutions:	25000	r
Mounting of the specimen:	Floating installation with click joints	

Test Result:

Type of damage	Observation (Yes/No)	Verdict
Delamination	No	Pass
Opening of joints	No	
Surface damage	No	
Crazing	No	

Test Photo:

After test

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Test Items, Method and Results:

Test Item: Effect of simulated movement of a furniture leg

Test Method: BS EN 424:2002/EN 424:2001

Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 5 days

Test Condition:

Type of Feet:	Type	0
Applied Mass:	32	kg
Test Speed:	0.18	m/s

Test Result:

Path	Observation		Verdict
	Length direction/Longitudinal direction	Width direction/Longitudinal direction	
1	No visible damage	No visible damage	Pass
2	No visible damage	No visible damage	
3	No visible damage	No visible damage	

Record the damage caused for each test path if any damage is observed

a) deterioration in the flatness of the surface;

b) damage which partially destroys the surface;

c) cuts of varying depths;

d) penetrating edges;

e) in the case of an open joint floor covering, a joint opening greater or equal to 1 mm;

f) in the case of a treated or welded joint, its failure.

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Test Items, Method and Results:

Test Item: Residual indentation

Test Method: EN ISO 24343-1:2012/ISO 24343-1:2007

Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 24h

Test Condition:

Indenter:	Steel cylindrical indenter, with the edge of the flat base slightly rounded	
Indenter diameter:	11.3	mm
Total load applied:	500	N
Indentation time:	150	min
Recovery time:	150	min

Test Result:

Residual Indentation	Result (mm)
Specimen 1	0.00
Specimen 2	0.00
Specimen 3	0.00
Average value	0.00

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Issue Date: 2020-04-08 Intertek Report No. 200323004SHF-002

Test Items, Method and Results:

Test Item: Resistance to staining

Test Method: EN 438-2:2016+A1:2018, Section 26

Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 24h

Test Result:

Group	Staining agent	Duration of contact	Result of visual changes
1	Water	10 min	5
1	Acetone	10 min	5
1	Cleaning solution	10 min	5
2	Coffee (approx. 80°C)	16 h	5
3	Sodium hydroxide (25% solution)	10 min	5
3	Hydrogen peroxide (30% solution)	10 min	5
3	Carbon black suspension in paraffin oil	10 min	5

Assessment of results

Numerical rating	Description
5	No change test area indistinguishable from adjacent surrounding area
4	Minor change test area distinguishable from adjacent surrounding area, only when the light source is mirrored on the test surface and is reflected towards the observer's eye, e. g. discoloration, change in gloss and colour
3	Moderate change test area distinguishable from adjacent surrounding area, visible in several viewing directions, e. g. discoloration, change in gloss and colour
2	Significant change test area clearly distinguishable from adjacent surrounding area, visible in all viewing directions, e. g. discoloration, change in gloss and colour, and/or structure of the surface slightly changed, e.g. cracking, blistering
1	Strong change the structure of the surface being distinctly changed and/or discoloration, change in gloss and colour, and / or the surface material being totally or partially delaminated

Total Quality. Assured.

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Test Items, Method and Results:

Test Item: Determination of thickness swelling after partial immersion in water

Test Method: ISO 24336:2005

Conditioning: Condition the test specimens at (23±2)°C and (50±5)% relative humidity to constant mass

Test Condition: Specimens are partially immersed(50 mm) in water at 20℃, during 24h

Test Result:

Specimen	Direction	Thickness swelling (%)			
		Point 1	Point 2	Point 3	Average
1	taken in length direction	0.00	0.20	0.00	0.05
2		0.20	0.20	0.00	
3	taken in width direction	0.00	0.00	0.00	
4		0.00	0.00	0.00	

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Test Items, Method and Results:

Test Item: Locking Strength
Test Method: ISO 24334:2014
Conditioning: Condition the test specimens at (23±2)°C and (50±5)% relative humidity to constant mass
Test Condition: Test speed 0.5 mm/min

Test Result:

Long side joint

Parameter	Average Result
Maximum locking strength F_{max} (N)	1480
Specific locking strength (kN/m)	7.45
Locking strength at 0.2 mm joint opening $F_{0.2}$ (N)	1398
Specific locking strength at 0.2 mm joint opening (kN/m)	7.13

Short side joint

Parameter	Average Result
Maximum locking strength F_{max} (N)	1295
Specific locking strength (kN/m)	7.20
Locking strength at 0.2 mm joint opening $F_{0.2}$ (N)	1267
Specific locking strength at 0.2 mm joint opening (kN/m)	7.04

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Test Items, Method and Results:

Test Item: Dimensional stability and curling

Test Method: EN ISO 23999:2018/ISO 23999:2018

Conditioning:

Temperature: 23 °C

Relative Humidity: 50 %

Duration: 24 h

Measure the initial length and curling

Test Condition:

Temperature: 80 °C

Duration: 6 h

Reconditioning:

Temperature: 23 °C

Relative Humidity: 50 %

Duration: 24 h

Measure the final length and curling

Test Result:

Specimen	Dimensional stability (%)		Curling (mm)
	Length direction/ Machine direction	Width direction/ Across machine direction	
1	0.02	0.02	0.04
2	0.04	0.00	0.04
3	0.04	0.01	0.05
Average	0.05	0.00	0.0
Max.	0.04	0.02	0.05

Note:

1. Dimensional stability = (initial length - final length)×100/initial length

Express the average value to the nearest 0.05%

A negative value indicates expansion, and a positive value indicates shrinkage.

2. Curling = final curling - initial curling

Express the average value to the nearest 0.5mm

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Test Items, Method and Results:

Test Item: Thermal conductivity and thermal resistance

Test Method: EN 12667:2001

Conditioning: Condition the test specimen at (23±2)°C and (50±5)% relative humidity to constant mass

Test Result:

Sample	Thickness	Mean Temperature	Temperature Difference	Thermal Conductivity	Thermal Resistance
	(mm)	(°C)	(°C)	(W/m·K)	$(m^2 \cdot K)/W$
1	5.00	24.2	12.5	0.160	0.031
2	5.01	24.2	12.5	0.161	0.031
3	5.00	24.0	12.6	0.155	0.032
Average	5.00	24.0	13.0	0.159	0.031

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Test Items, Method and Results:

Test Item: Density

Test Method: EN ISO 23996:2012 / ISO 23996:2007 Method A

Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 24h

Test Result:

Average value: 1994 kg/m^3

intertek
Total Quality. Assured.

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Test Items, Method and Results:

Test Item: Toxic elements analysis

Test Method: With reference to European standard on safety of toys EN 71 part 3:1994 and amendment A1:2000 and AC:2002, acid extraction method was used and toxic elements content were determined By Inductively Coupled Argon Plasma Spectrometry.

Test Item	Test Result (mg/kg)	Detection Limit (mg/kg)	Limit(mg/kg)
Barium (Ba)	ND	5	1000
Lead (Pb)	ND	5	90
Cadmium (Cd)	ND	5	75
Antimony (Sb)	ND	5	60
Selenium (Se)	ND	5	500
Chromium (Cr)	ND	5	60
Mercury (Hg)	ND	5	60
Arsenic (As)	ND	2.5	25

Remark:

1. mg/kg = milligram per kilogram
2. ND = Not detected(less than the detection limit)
3. Test location: Central Chemical Lob of Intertek Testing Services Ltd., Shanghai
   Address: Block B, Jinling Business Square, No. 801 Yi Shan Road, Shanghai, China

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Test Items, Method and Results:

Test Item: Peel resistance

Test Method: EN ISO 24345:2012/ISO 24345:2006

Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 24h

Test Condition:

Speed: 100 mm/min

Test Result:

Test Item	Test Direction	Result
Peel resistance	Length direction/Machine direction	Average: 105 N/50mm Min: 105 N/50mm
	Width direction/Across machine direction	Average: 115 N/mm Min: 110 N/mm

Note:

Express the result to the nearest 5N/50mm.

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Test Items, Method and Results:

Test Item: Colour fastness to artificial light

Test Method: ISO 105-B02:2014, Xenon-arc lamp
Exposure Cycle A1, Method 3

Test Result: Above grade 6

Note:

1. Test item was subcontracted on acceditation by CNAS L0139

Test position: Intertek Testing Services Ltd., Shanghai

Address: 2/F, Building No.4, Shanghai Comalong Technology Service Park, 889 Yishan Road, Shanghai 200233, China

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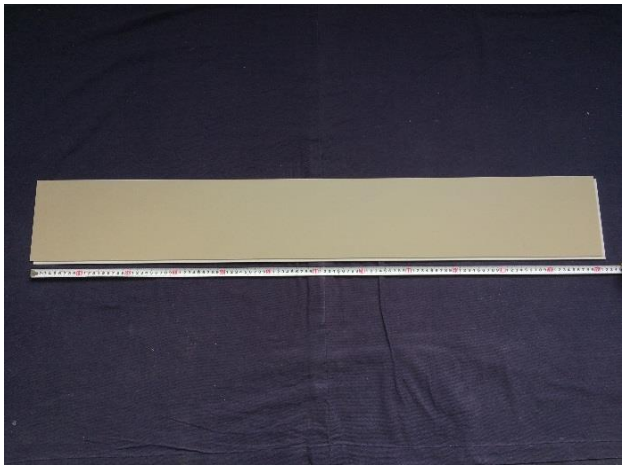
Appendix B: Sample Received Photo

Front View



Back View

Revision:

NO.	Date	Changes	Author	Reviewer
200323004SHF-002	2020-04-08	First issue	Tod Qian	Flora Fan