

TEST REPORT

No. : GZIN160701162CCM

Date : Jul. 20, 2016

Page: 1 of 33

CLIENT NAME: GUANGDONG GAOLI ALUMINIUM INDUSTRY CO., LTD.
ADDRESS: INDUSTRIAL DEVELOPMENT ZONE, YANGHE TOWN, GAOMING DISTRICT,
FOSHAN, GUANGDONG, P.R. OF CHINA

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

Sample Name : GLOBOND aluminium composite panel
SGS Ref. No. : GZIN160701162CCM
Test Performed : Selected test(s) as requested by applicant
Date of Receipt : Jul. 01, 2016
Test Period : Jul. 01, 2016 to Jul. 18, 2016

Test result(s) : Please refer to the following page(s)

*****To be continued*****

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Signed for and on behalf of
SGS-CSTC Standards Technical Services Co.,Ltd
Guangzhou Branch

Jay Xue
Authorized signatory

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Summary of Results:

No.	Test Item	Test Method	Result	Conclusion	
1	Deflection Temperature under Load	With reference to ASTM D648-07 Method B and client's requirement	96.0 °C	/	
2	Flexural Test	ASTM D790-15 ^{e2} Procedure A	Flexural Strength	85.8 MPa	/
			Flexural Modulus	16400 MPa	
3	Peel Strength	ASTM D903-98(2010)	0.8 kgf/mm	/	
4	Shear Strength	ASTM D732-10	21.5 MPa	/	
5	Tensile Strength	With reference to ASTM D638-14 and client's requirement	33.4 MPa	/	
6	Mass per Unit Area	With reference to ASTM D5947-11 and client's requirement	5319 g/m ²	/	
7	Bend Test (Cylindrical Mandrel)	ASTM D522/D522M-13 Method B	No cracking of 2mm mandrel	/	
8	Effect of Household Chemicals	ASTM D1308-02(2013)	No blistering or other visual change	/	
9	Falling Sand Abrasion	ASTM D968-15 Method A	58.0L/mil	/	
10	Gloss	ASTM D523-14	35	/	
11	Impact Resistance	ASTM D2794-93(2010)	2.88 kg·m	/	
12	Pencil Hardness	ASTM D3363-05(2011) ^{e2}	2H	/	
13	Dry Adhesion	AAMA 2605-13 Section 8.4.1.1, 8.4.1.2	No visual peeling	/	

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No.	Test Item	Test Method	Result		Conclusion
14	Wet Adhesion	AAMA 2604-13 Section 8.4.1.3 & 8.4.1.2	No visual peeling		/
15	Boiling Water Adhesion	AAMA 2604-13 Section 8.4.1.4 & 8.4.1.2	No visual peeling		/
16	Muriatic Acid Resistance	AAMA 2604-13 Section 8.7.1	No blistering or other visual change		/
17	Mortar Resistance	AAMA 2604-13 Section 8.7.2	No visual change		/
18	Window Cleanability Resistance	AAMA 2604-13 Section 8.7.5	No blistering or other visible change, no removal of film		/
19	Thermal Conductivity And Thermal Resistance	ASTM C518-15	Thermal Conductivity [W/(m·K)]	Thermal Resistance [m ² ·K/W]	/
			0.101	0.040	
20	Coefficient Of Linear Thermal Expansion	With reference to ASTM D696 - 08	-30°C ~ 30°C: 239.2 × 10 ⁻⁶ (1/°C)		/

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



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1. Test Item: Deflection Temperature under Load

Sample Description: See photo

Test Method: With reference to ASTM D648-07 Method B and client's requirement

Test Condition:

Specimen: 127 mm × 13.38 mm × 4.11 mm

Heat-transfer media: Silicone oil

Rate of temperature: 120 °C/h

Load: 1.82 MPa

Span: 100 mm

Lab Environmental Condition: 23 ± 2 °C, 50 ± 5 % RH

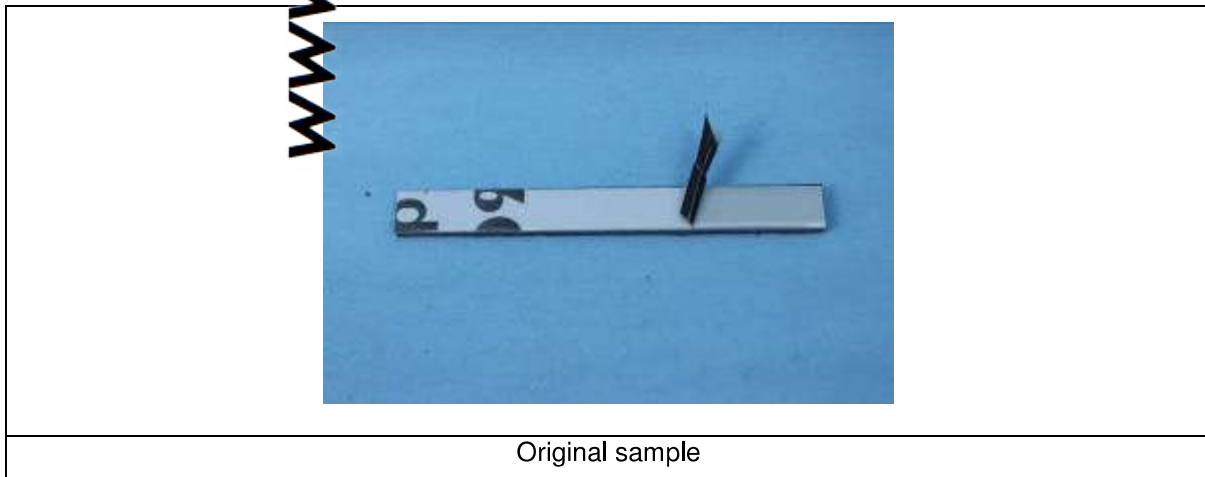
Test Result:

Test Item	Test Result
Deflection Temperature under Load	96.0 °C

Note:

1. The protected film of test specimens was ripped off before test.
2. The surface with protected film was faced to the loading.

Test Photo:



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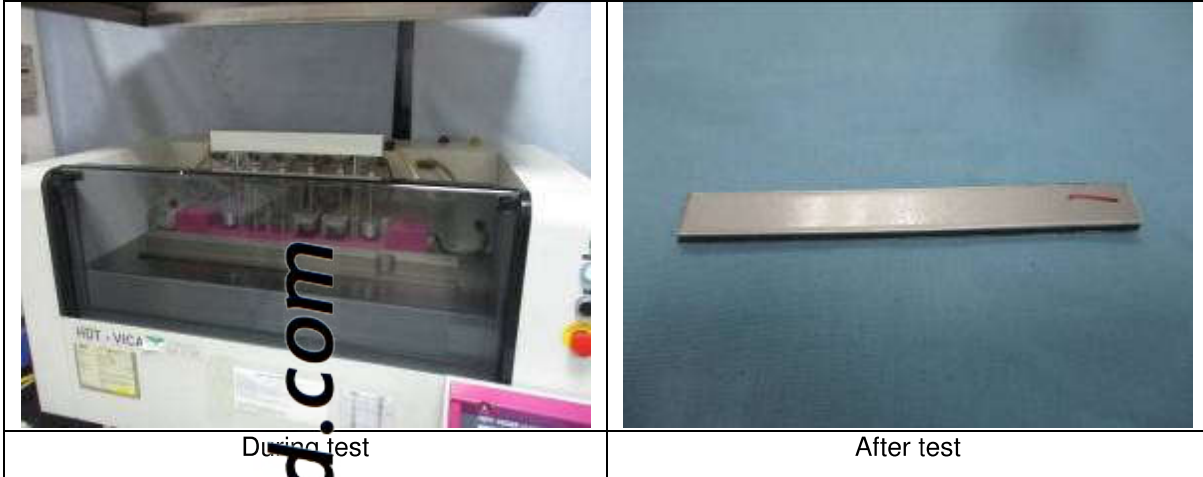
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2. Test Item: Flexural Test

Sample Description: See photo

Test Method: ASTM D790-15E Procedure A

Test Condition:

Specimen: 127 mm × 15.23 mm × 4.14 mm

Testing speed: 1.3 mm/min

Span: 70 mm

Lab Environmental Condition: 23 ± 2 °C, 50 ± 5 % RH

Test Result:

Test Item	Test Result
Flexural Strength	85.8 MPa
Flexural Modulus	16400 MPa

Note:

1. The protected film of test specimens was ripped off before test.
2. The surface with protected film was faced to the loading.



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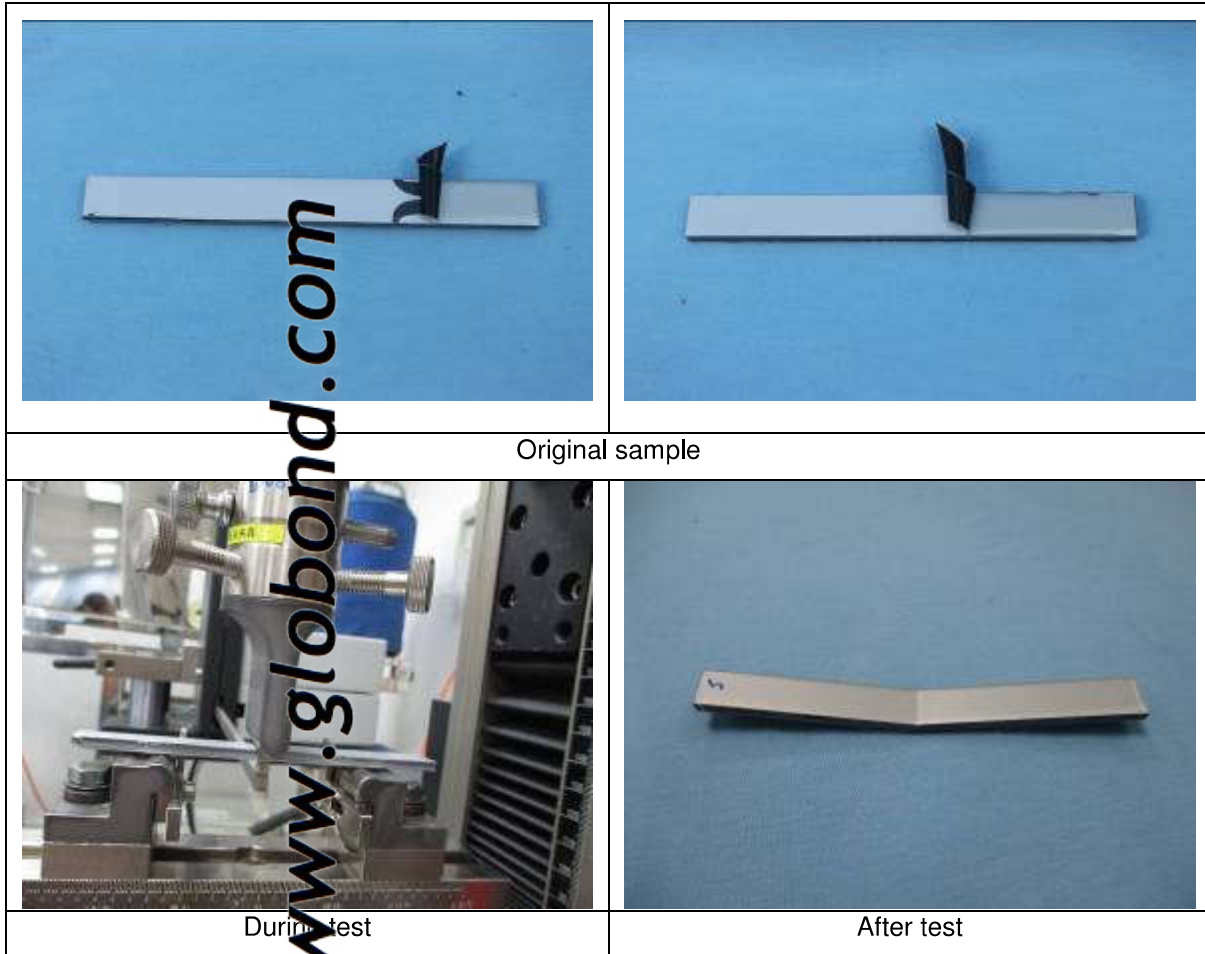
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Test Photo:



Original sample

During test

After test



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3.Test Item: Peel Strength

Sample Description: See photo

Test Method: ASTM D903-98(2010)

Test Condition:

Specimen width: 25 mm

Separation speed: 152.4 mm/min

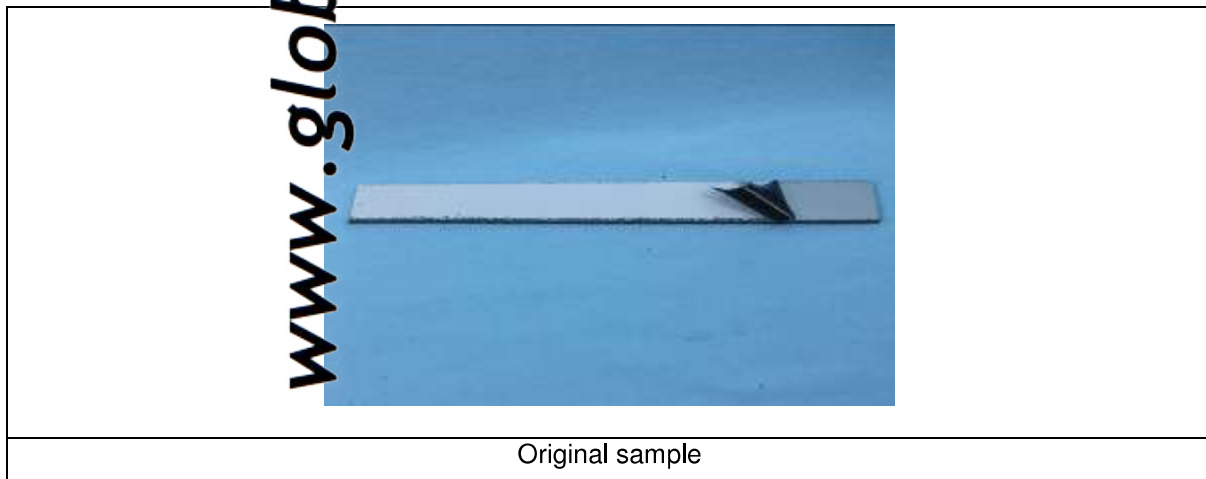
Lab Environmental Condition: 23 ± 2 °C, 50 ± 5 % RH

Test Result:

Test Item	Test Result
Peel strength	0.8 kgf/mm

Note: The protected film of test specimens was ripped off before test.

Test Photo:



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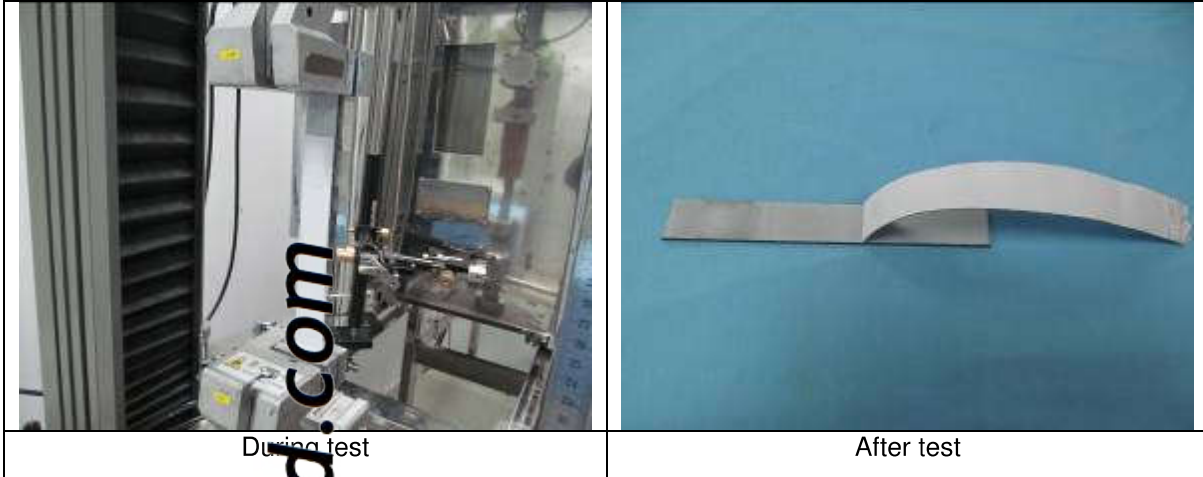
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4. Test Item: Shear Strength

Sample Description: See photo

Test Method: ASTM D732

Test Condition:

Specimen thickness: 4.15 mm

Punch diameter: 25 mm

Testing speed: 1.25 mm/min

Lab Environmental Condition: 23 ± 2 °C, 50 ± 5 % RH

Test Result:

Test Item	Test Result
Shear Strength	21.5 MPa

Note: The protected film of test specimens was ripped off before test.

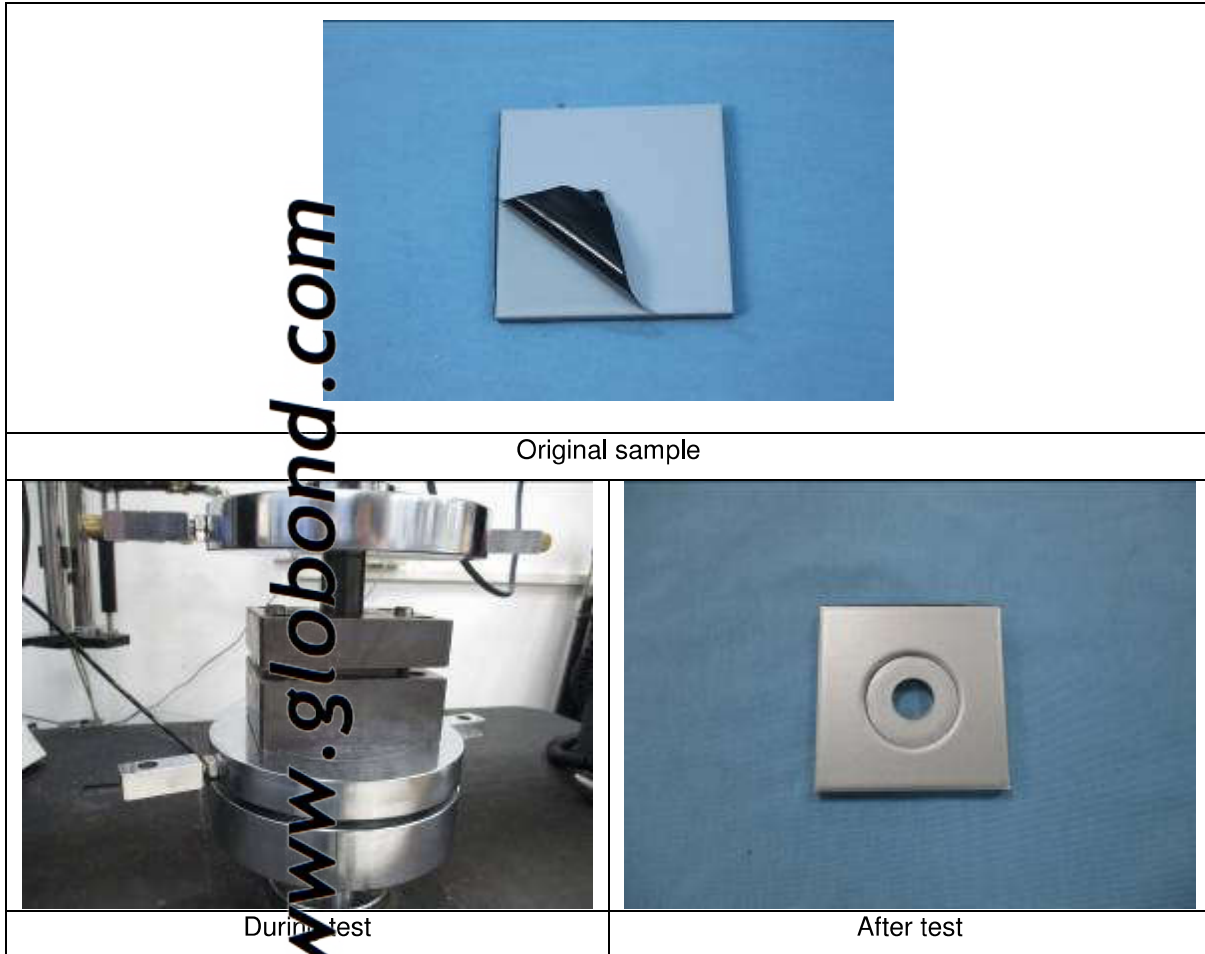
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Test Photo:



Original sample

During test

After test



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5.Test Item: Tensile Strength

Sample Description: See photo

Test Method: With reference to ASTM D638-14 and client's requirement

Test Condition:

Specimen width: 20.1 mm

Specimen thickness: 4.24 mm

Testing speed: 5 mm/min

Distance between grips: 70 mm

Lab Environmental Condition: 23 ± 2 °C, 50 ± 5 % RH

Test Result:

Test Item	Test Result
Tensile Strength	33.4 MPa

Note: The protected film of test specimens was ripped off before test

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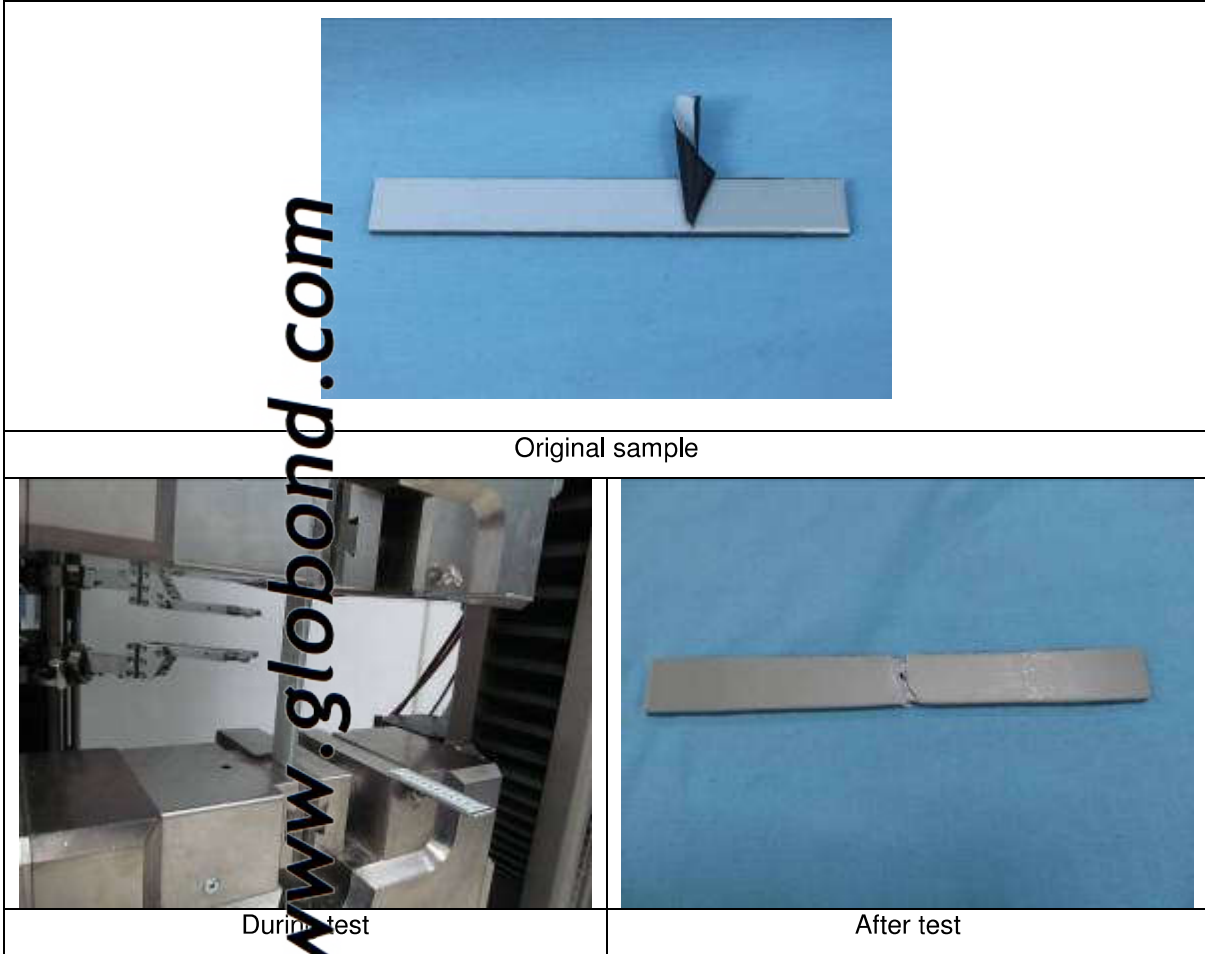
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Test Photo:



Original sample

During test

After test



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6. Test Item: Mass per Unit Area

Sample Description: See photo

Test Method: With reference to ASTM D5947-11 and client's requirement

Test Condition:

Specimen: 101 mm × 101 mm

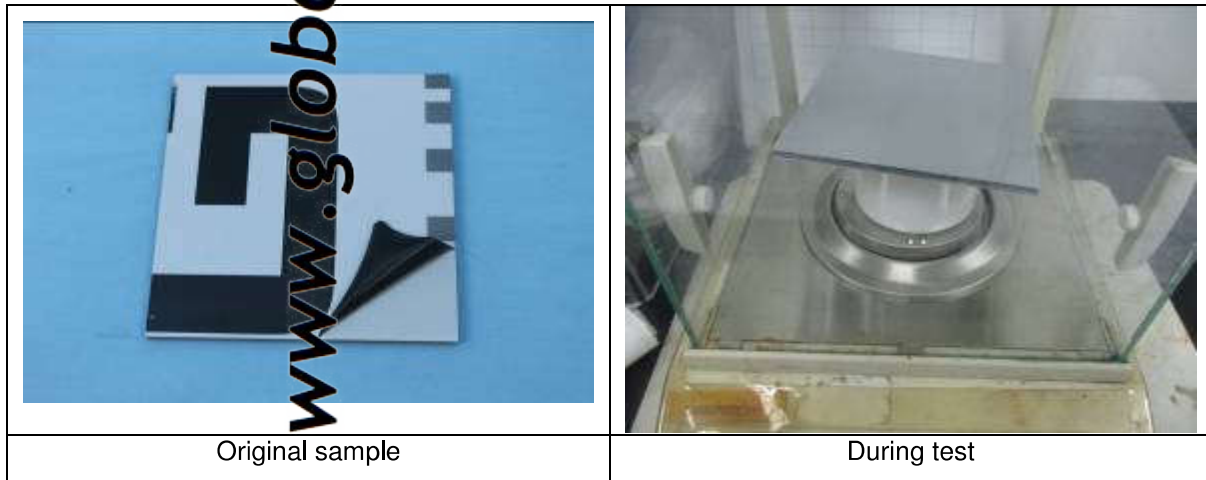
Lab Environmental Condition: 23 ± 2 °C, 50 ± 5 % RH

Test Result:

Test Item	Test Result
Mass per Unit Area	5319 g/m ²

Note: The protected film of test specimens was ripped off before test

Test Photo:



Original sample

During test



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7. Test Item: Bend Test (Cylindrical Mandrel)

Sample Description: See photo

Test Method: ASTM D522/D522M-13 Method B

Test Condition:

Coating thickness: 30.0µm

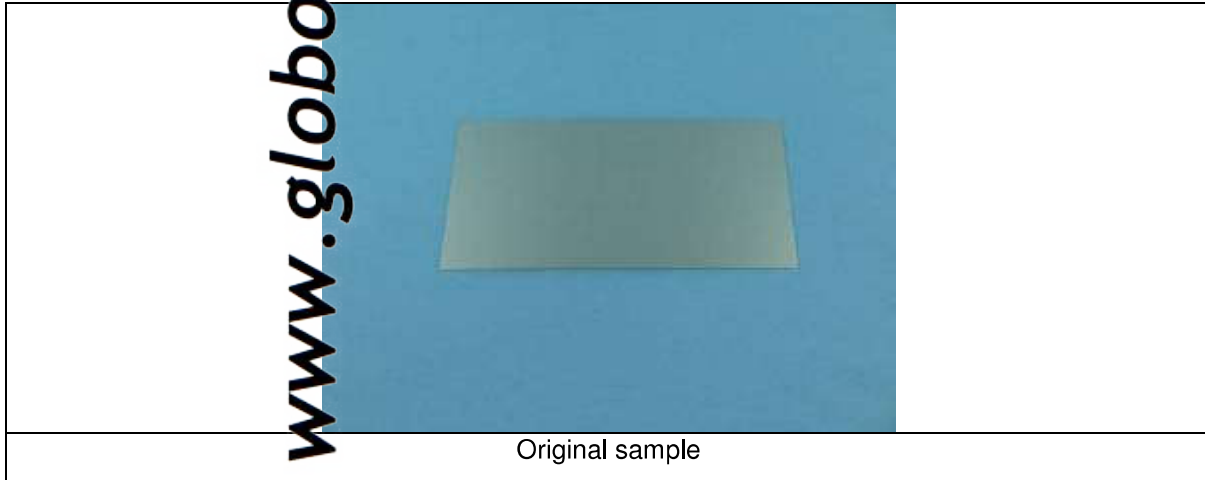
Sample thickness: 4.02mm

Test Result:

Test item	Appearance(See Note)
Bend Test	No cracking of 2mm mandrel

Note: Observation magnification is 4x.

Test Photo:



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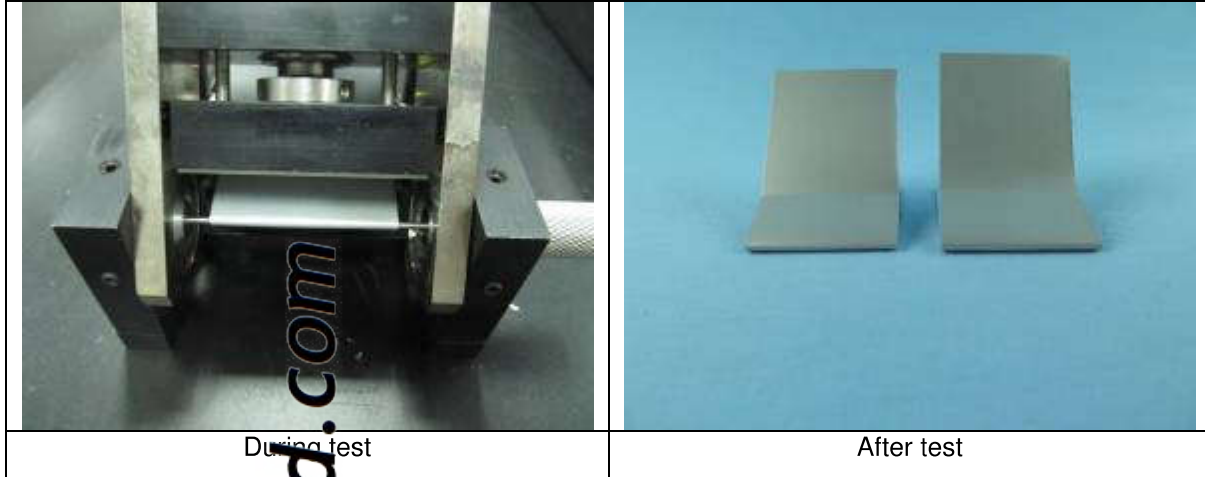
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8. Test Item: Effect of Household Chemicals

Sample Description: See photo

Test Method: ASTM D1309-03 (2013)

Test Condition:

Medium: 10 drops of 10 % (m/m) NaOH solution

Method of contact: Spot method

Temperature: Room temperature

Time of contact: 15min

Test Result:

Test item	Appearance
Effect of Household Chemicals	No blistering or other visual change



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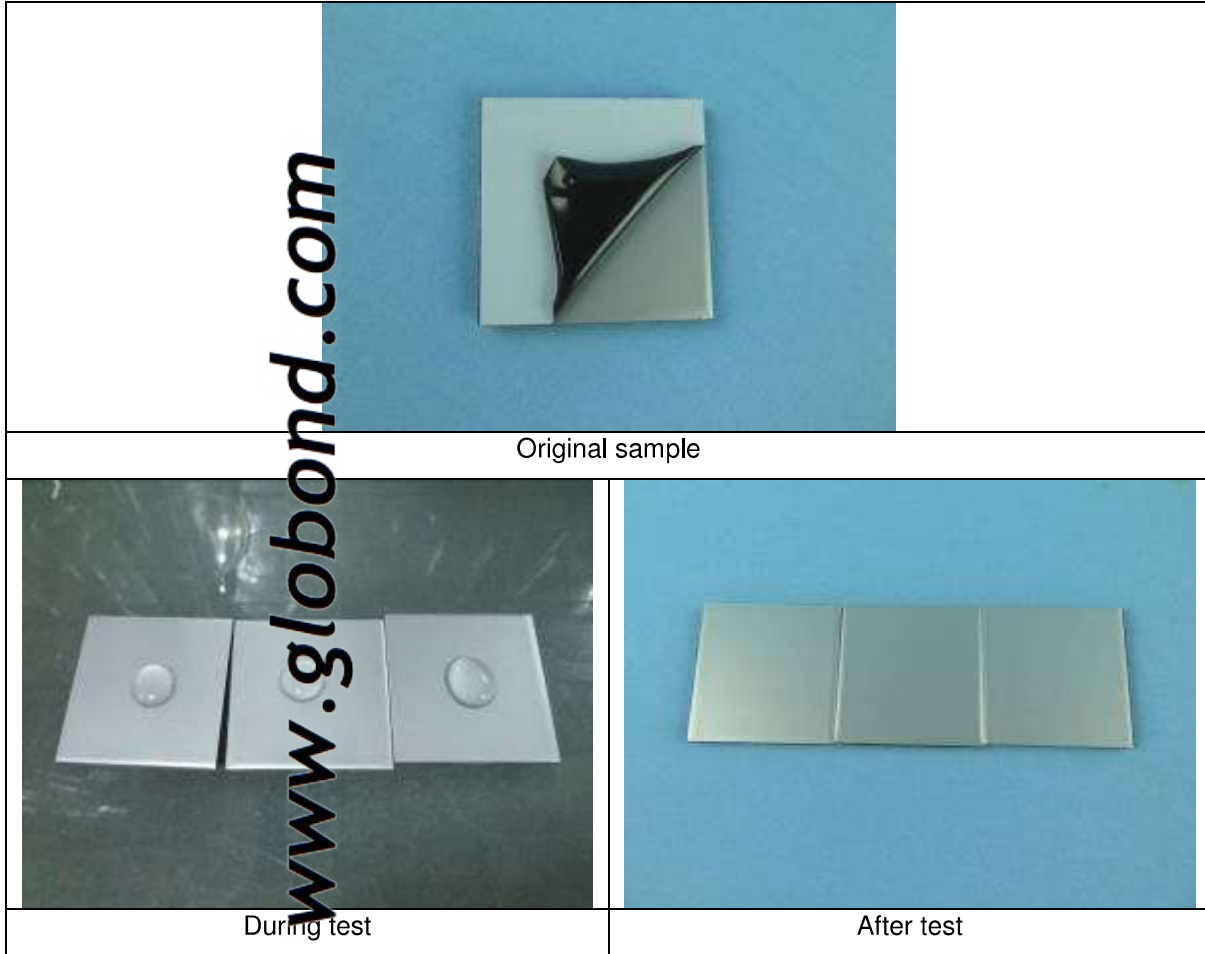
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Test Photo:



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9. Test Item: Falling Sand Abrasion

Sample Description: See photo

Test Method: ASTM D968-15 Method A

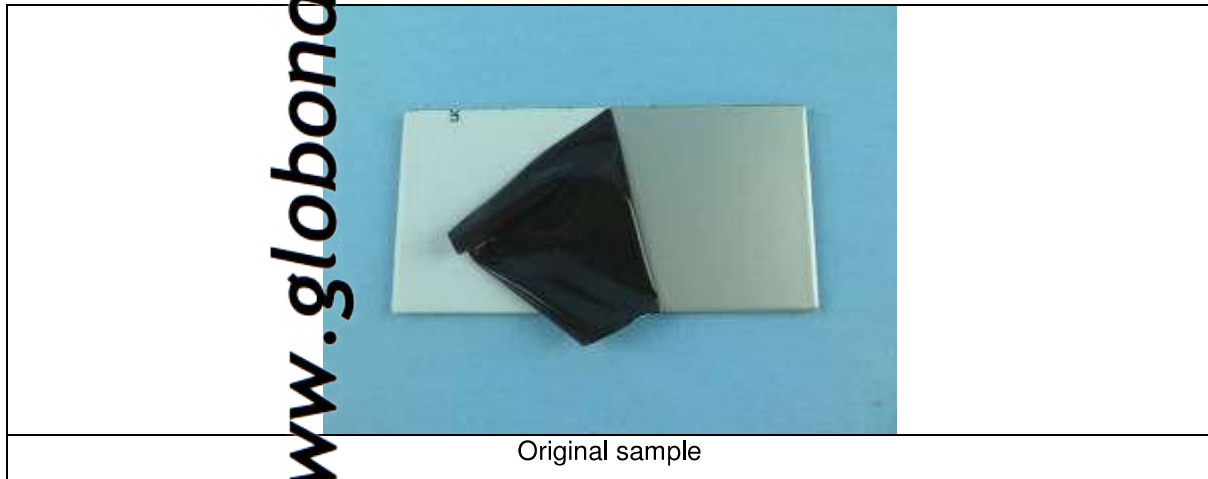
Test conditions:

Speed: 21.5~23.0s/2L

Test Result:

Test Item	Abrasion resistance
Falling Sand Abrasion	58.0L/mil

Test Photo:



Original sample

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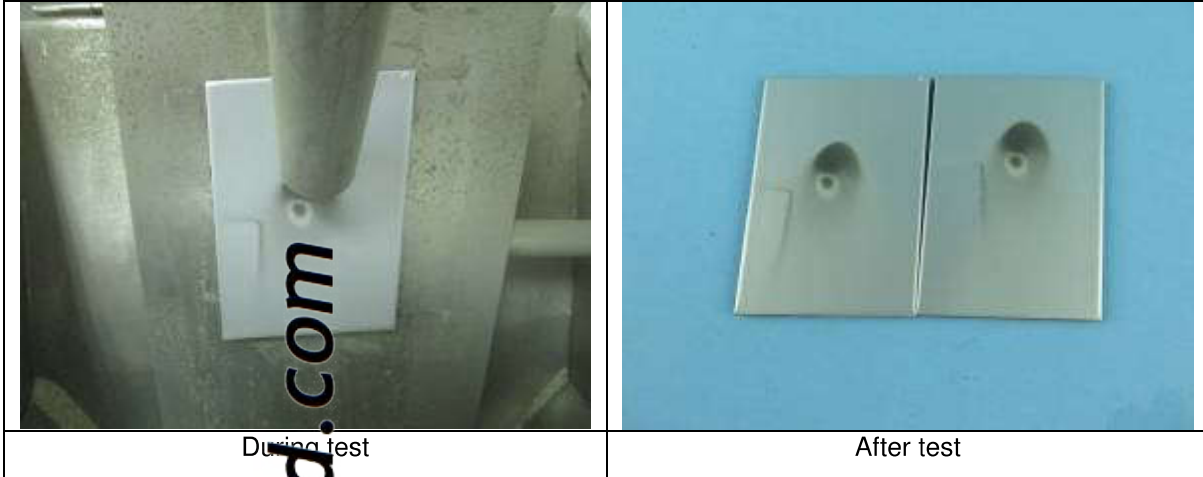
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10. Test Item: Gloss

Sample Description: See photo

Test Method: ASTM 523-1

Test Condition:

Geometry: 60°

Test Result:

Test Item	Test Result
Gloss	35



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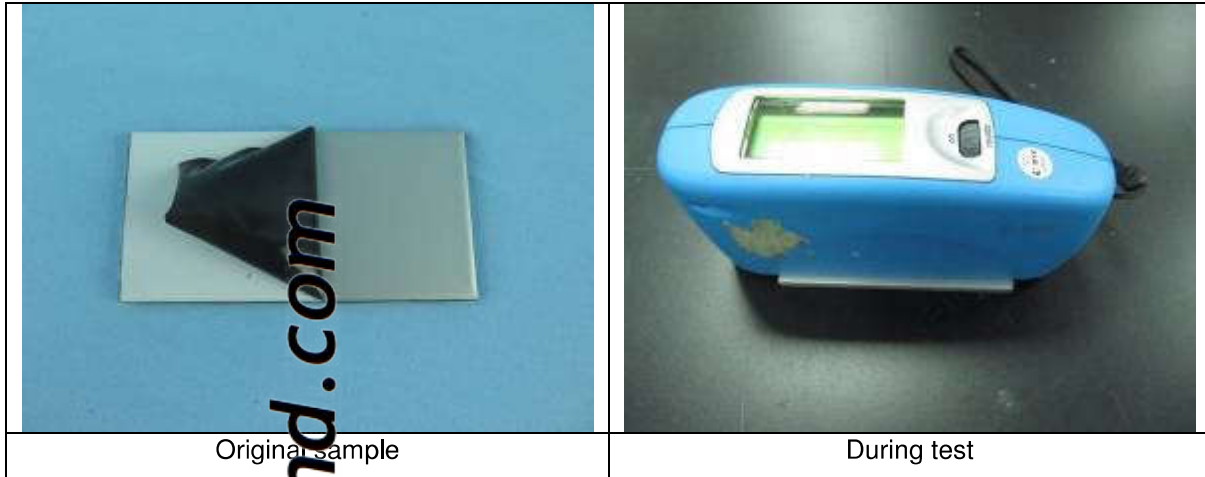
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Test Photo:



11. Test Item: Impact Resistance

Sample Description: See photo

Test Method: ASTM D2794-93 (2010)

Test Condition:

- Coating thickness: 30.0µm
- Sample thickness: 4.02mm
- Diameter of the punch: 19mm
- Impact model: extrusion

Test Result:

Test Item	Test Result
Impact failure end point	2.88 kg·m



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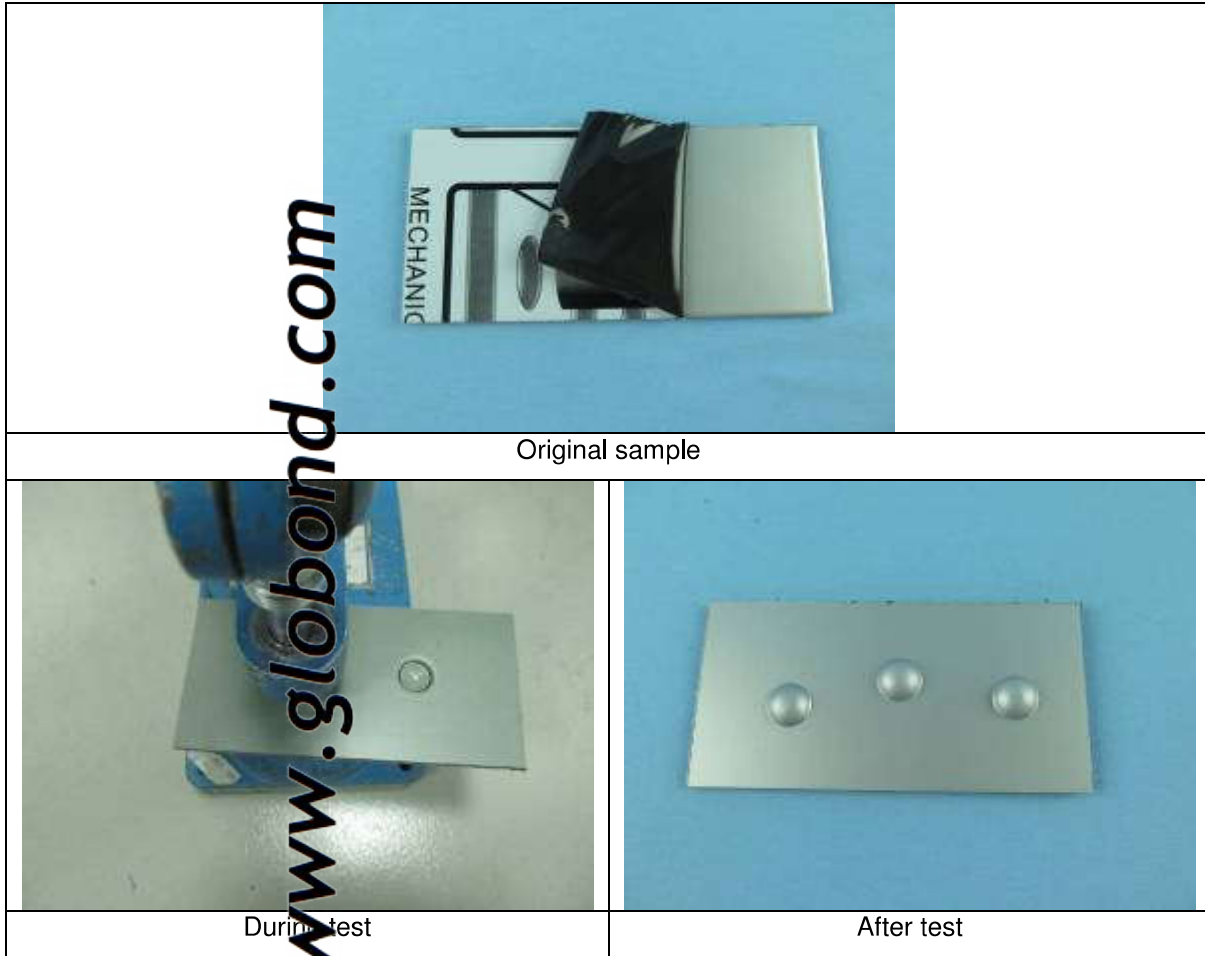
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Test Photo:



Original sample

During test

After test



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12. Test Item: Pencil Hardness

Sample Description: See photo

Test Method: ASTM D3363-05(2011)^{e2}

Test Condition:

Test Pencil: Mitsubishi® Uni

Test Result:

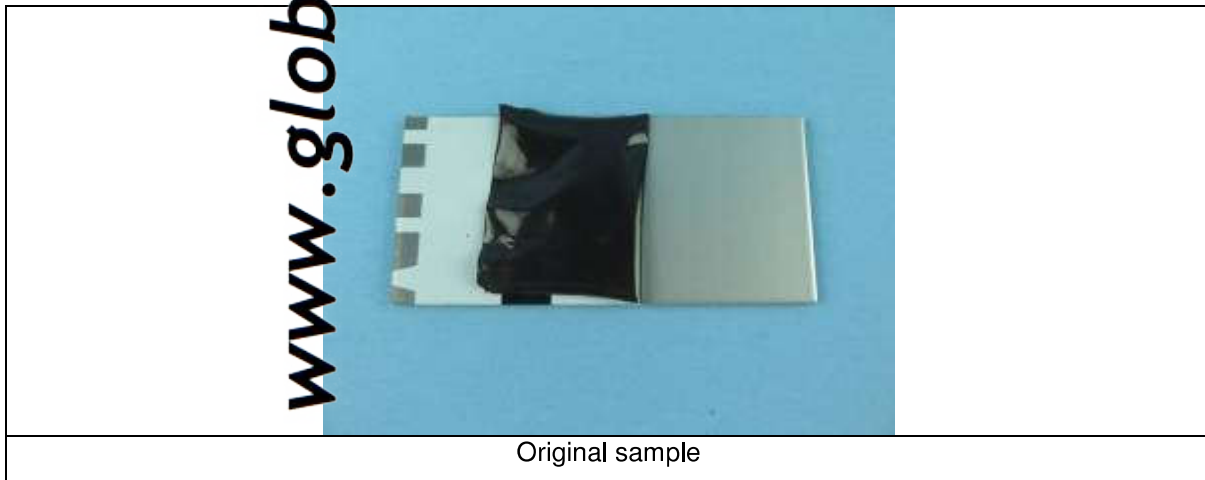
Test Item	Scratch hardness
Pencil Hardness	2H

Note: According to ASTM D3363-05(2011)^{e2}, 6H is the hardest and the grade 6B is the softest.

6B—5B—4B—3B—2B—B—HB—F—H—2H—3H—4H—5H—6H

Softer←-----→Harder

Test Photo:



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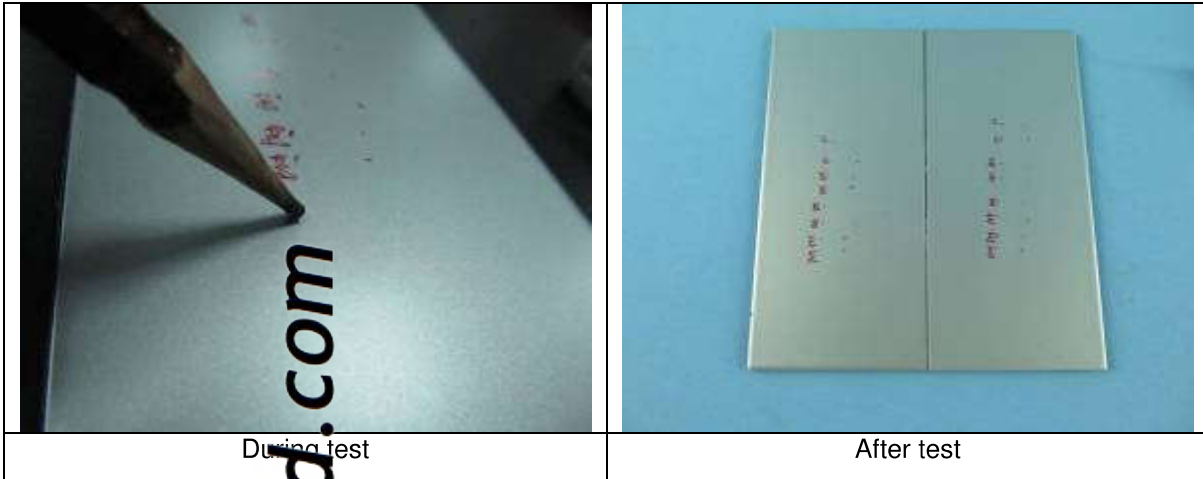
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13. Test Item: Dry Adhesion

Sample Description: See photo

Test Method: AAMA 2605-2 Section 8.4.1.1 & 8.4.1.2

Test Condition:

Space: 1mm

Tape: Elcometer 99

Test Result:

Test Item	Test results
Dry Adhesion	No visual peeling

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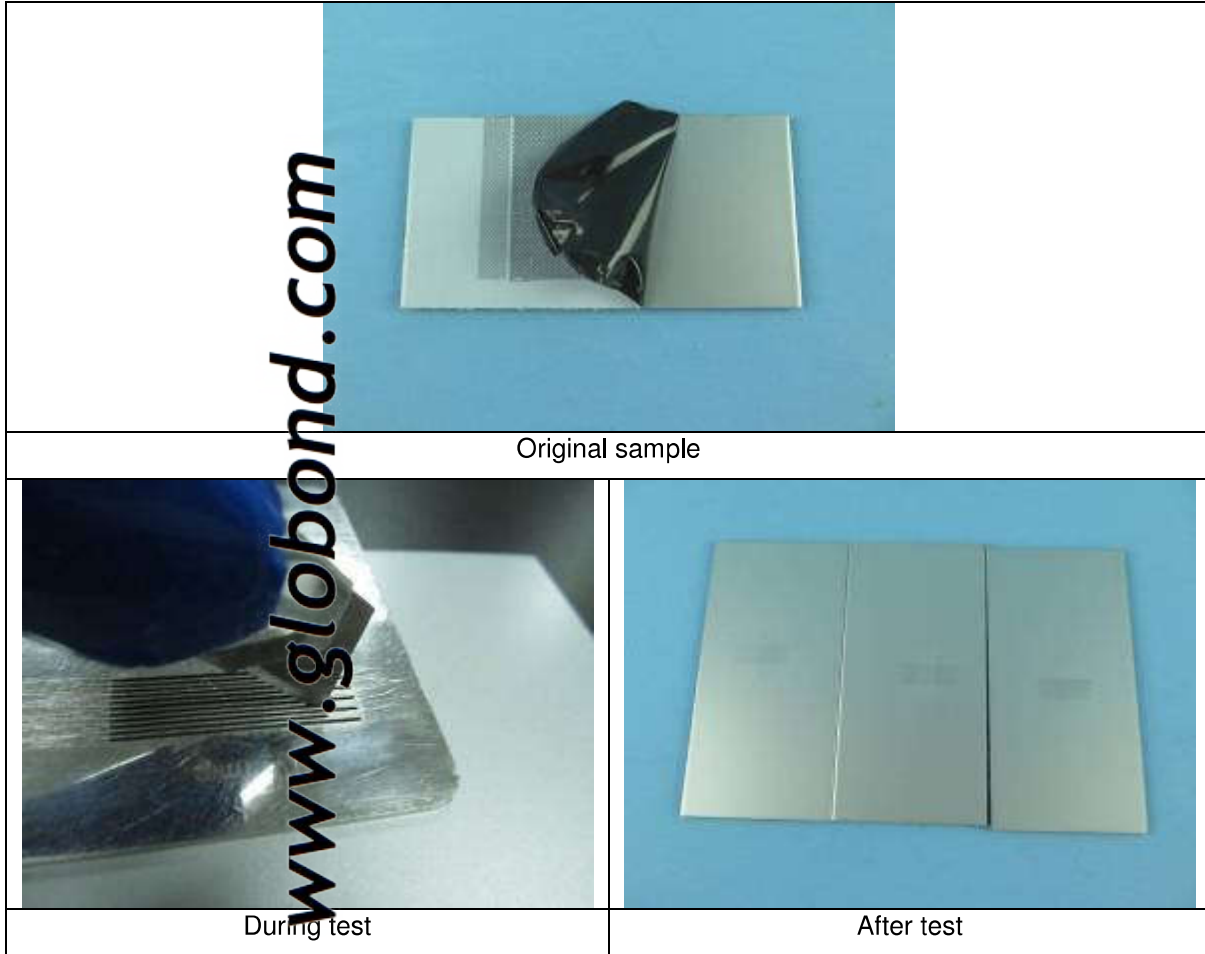
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Test Photo:



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14. Test Item: Wet Adhesion

Sample Description: See photo

Test Method: AAMA 2604-13 Section 8.4.1.3 & Section 8.4.1.2

Test Condition:

Cut space: 1mm

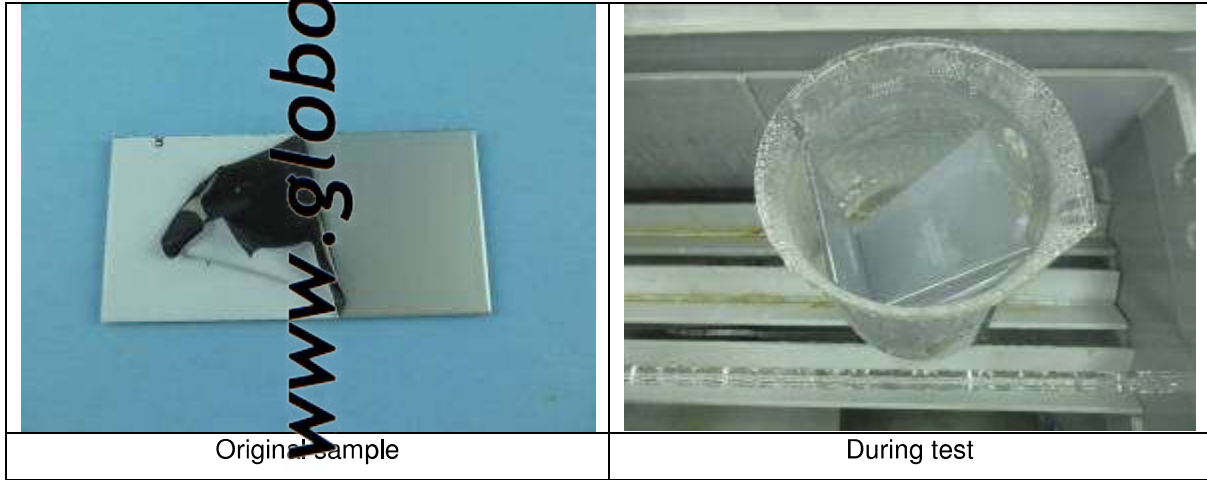
Immersed in 38°C water for 24h

Tape: Elcometer 99

Test Result:

Test Item	Test result
Wet Adhesion	No visual peeling

Test Photo:

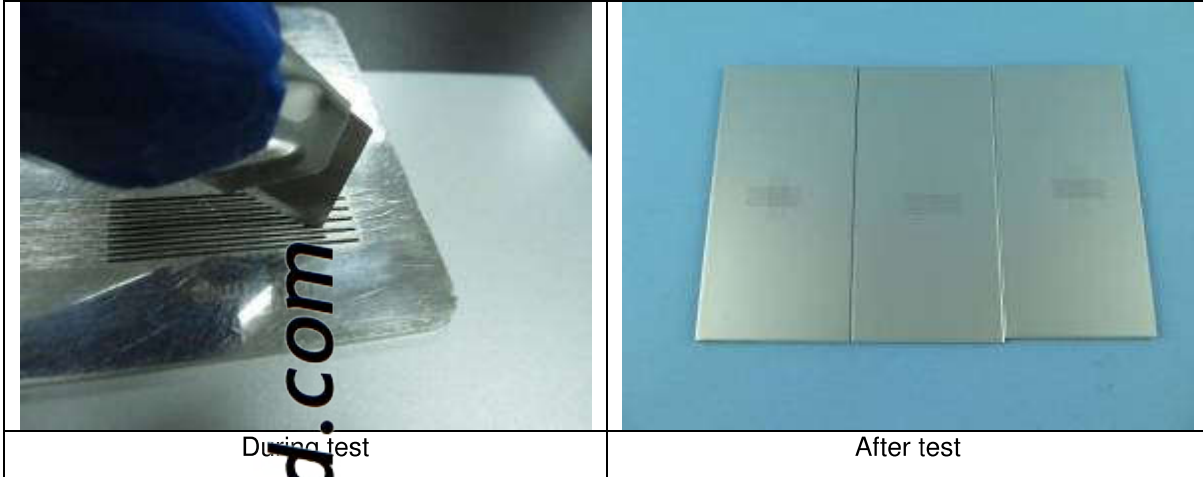


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15. Test Item: Boiling Water Adhesion

Sample Description: See photo

Test Method: AAMA 2604-2 Section 8.4.1.4 & 8.4.1.2

Test Condition:

Cut space: 1mm

Immersed in boiling water for 20min

Tape: Elcometer 99

Test Result:

Test Item	Test result
Boiling Water Adhesion	No visual peeling



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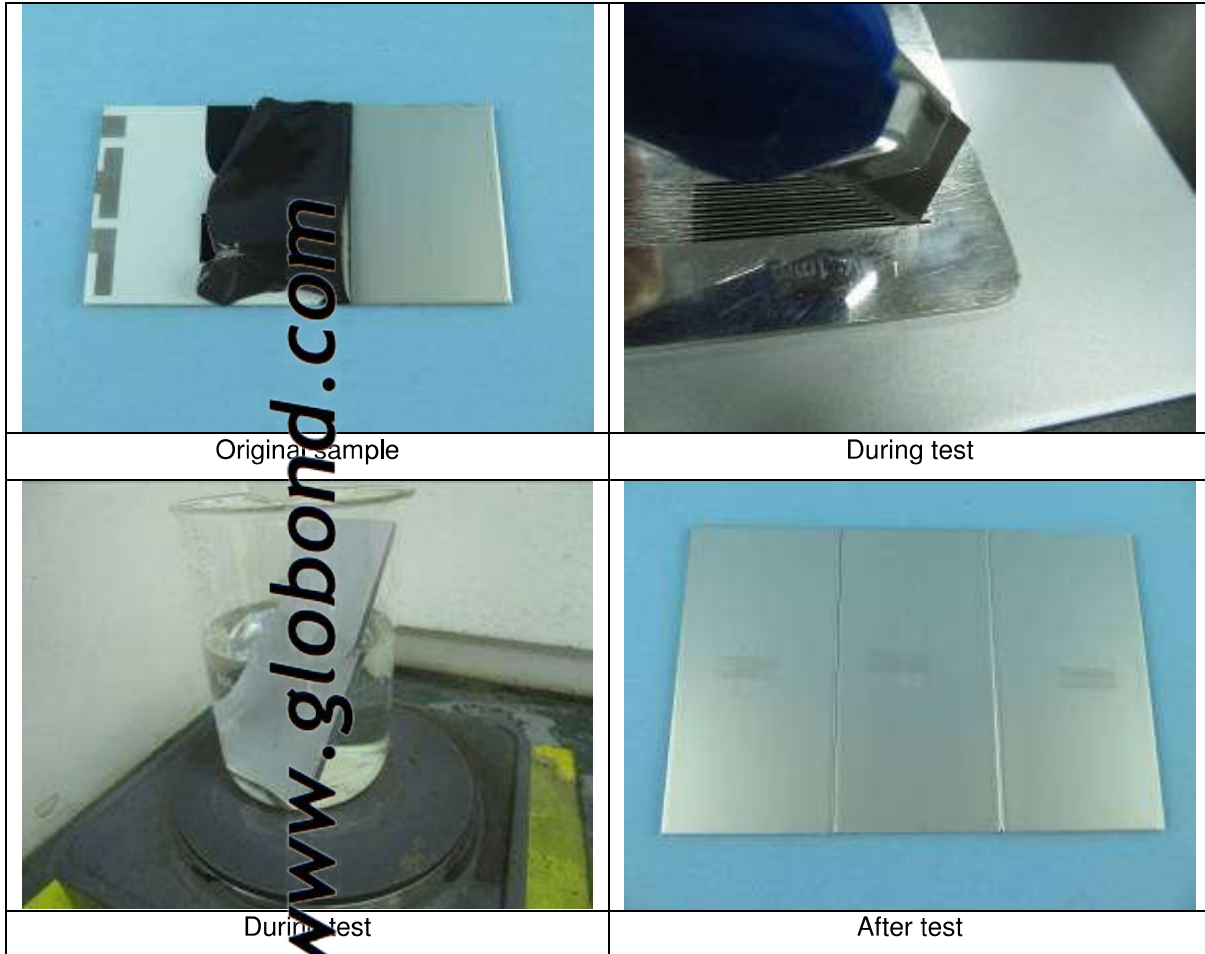
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16. Test Item: Muriatic Acid Resistance

Sample Description: See photo

Test Method: AAMA 2604-13 Section 8.7.1

Test Condition:

Medium: 10%(v/v) HCl (AR)

Method of contact: Spot method

Temperature: Room temperature

Time of contact: 15min

Test Result:

Test item	Test Result
Muriatic Acid Resistance	No blistering or other visual change

Test Photo:



Original sample



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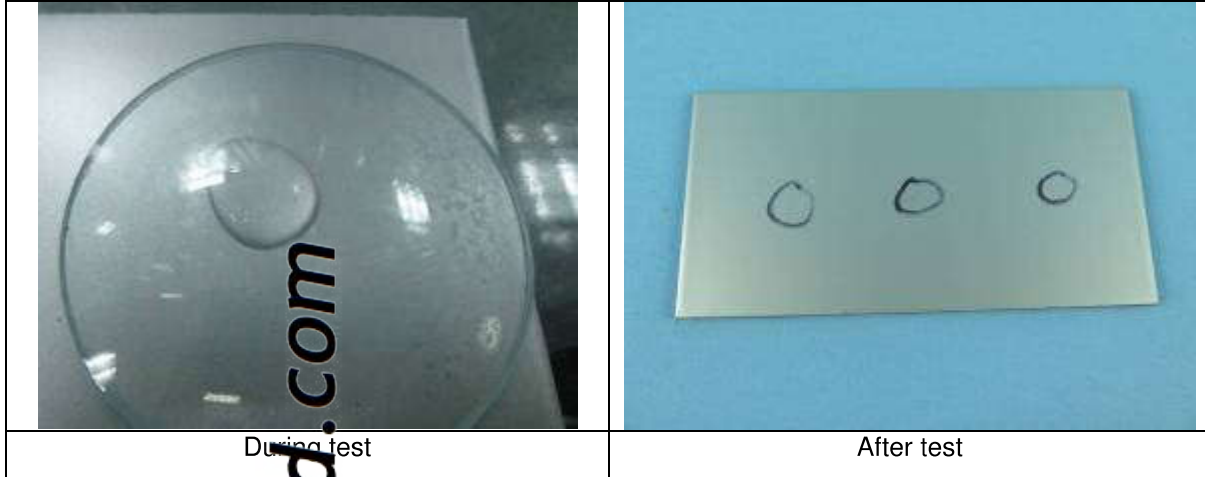
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17. Test Item: Mortar Resistance

Sample Description: See photo

Test Method: AAMA 2604-12 Section 8.7.2

Test Condition:

Temperature: 38°C

Humidity: 100%RH

Exposure period: 24h

Test Result:

Test Item	Test Result
Mortar Resistance	No visual change

Note: The mortar composition is as follows:

Building lime: 75g

Dry sand: 225g

Water: 100g



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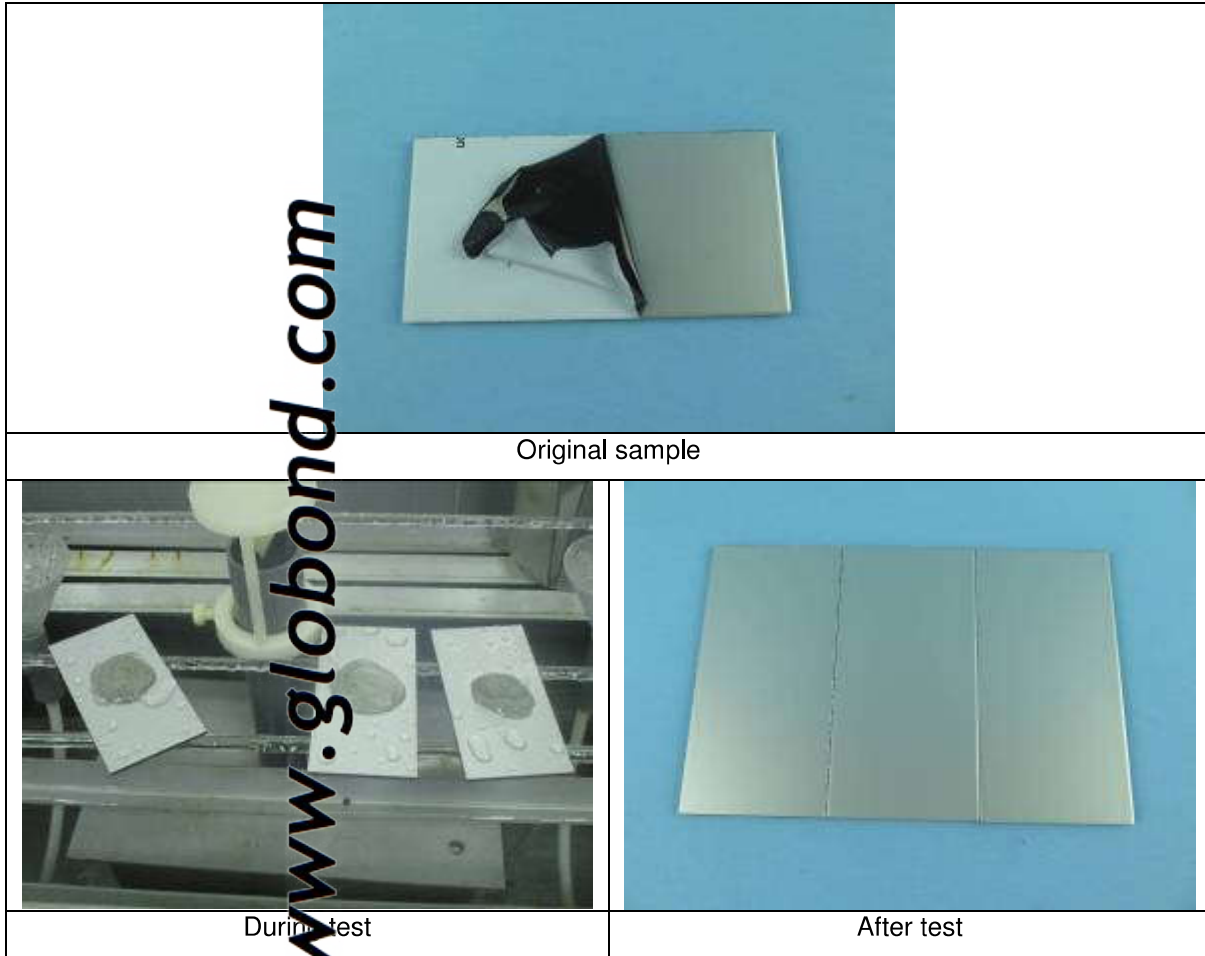
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Test Photo:



Original sample

During test

After test



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18. Test Item: Window Cleaner Resistance

Sample Description: See photo

Test Method: With refer to AAMA 2604-13 Section 8.7.5 and client's requirement

Test Condition:

Medium: Windex® Window Cleaner with Ammonia-d®

Method of contact: Spot method

Temperature: Room temperature

Time of contact: 24h

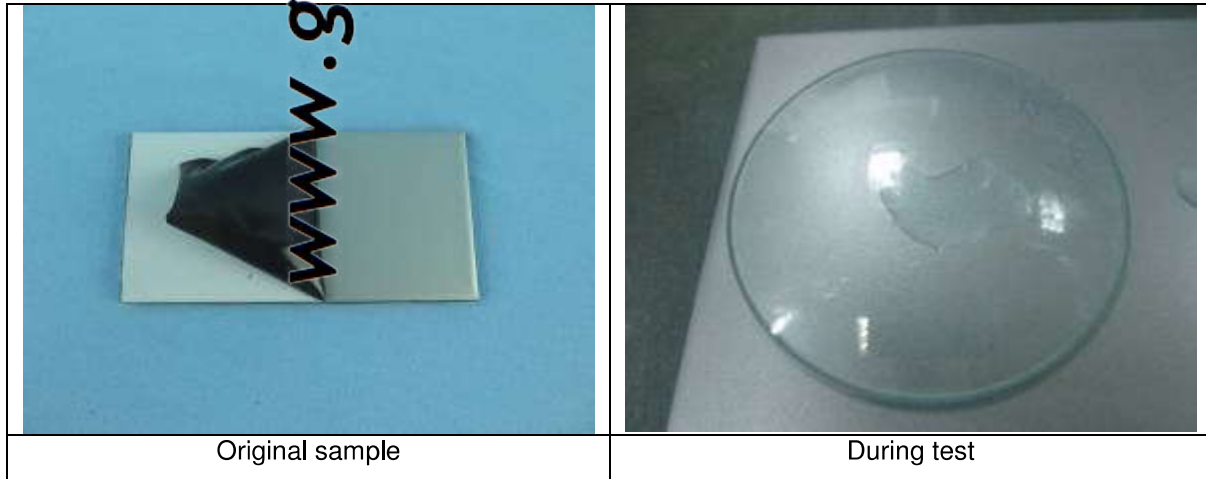
Cut space: 1mm

Tape :Elcometer 99

Test Result:

Test item	Test Result
Window Cleaner Resistance	No blistering or other visible change, no removal of film

Test Photo:



Original sample

During test



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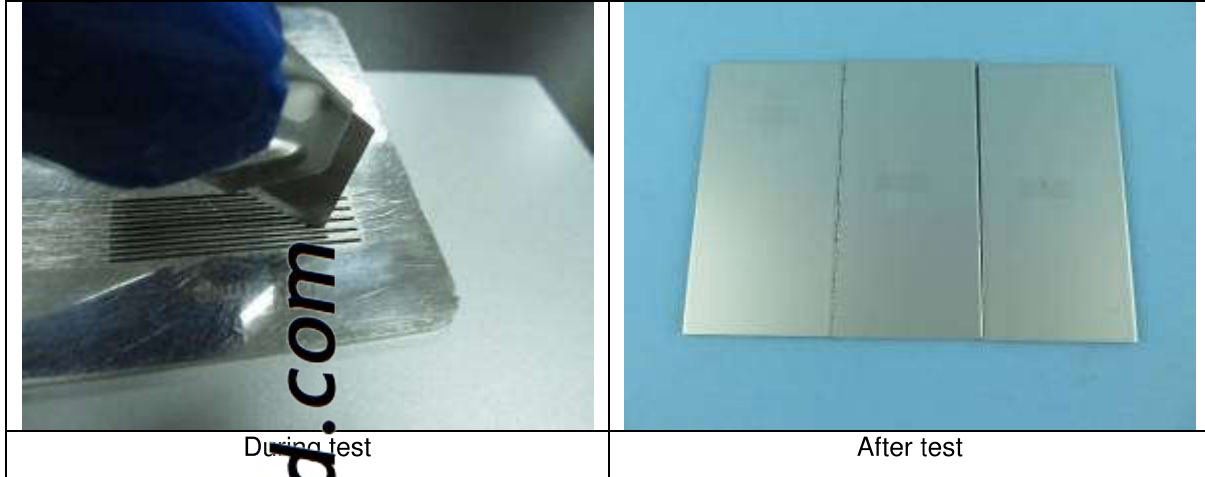
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19. Test Item: Thermal Conductivity and Thermal Resistance

Sample description:

Sample Description	Sample Dimension
See sample photos, density is about 1295kg/m ³	300mm×300mm×4.1mm

Test result:

Test Method	Test Condition		Test Result	
	Mean temperature (°C)	Temperature difference (°C)	Thermal Conductivity [W/(m·K)]	Thermal Resistance [m ² ·K/W]
ASTM C518-15	23.49	9.36	0.101	0.040
Remark	The test result can not be compared with other results obtained from different test conditions, and should not be cited to the use condition directly.			

Note: The above test was carried out by a SGS internal laboratory.



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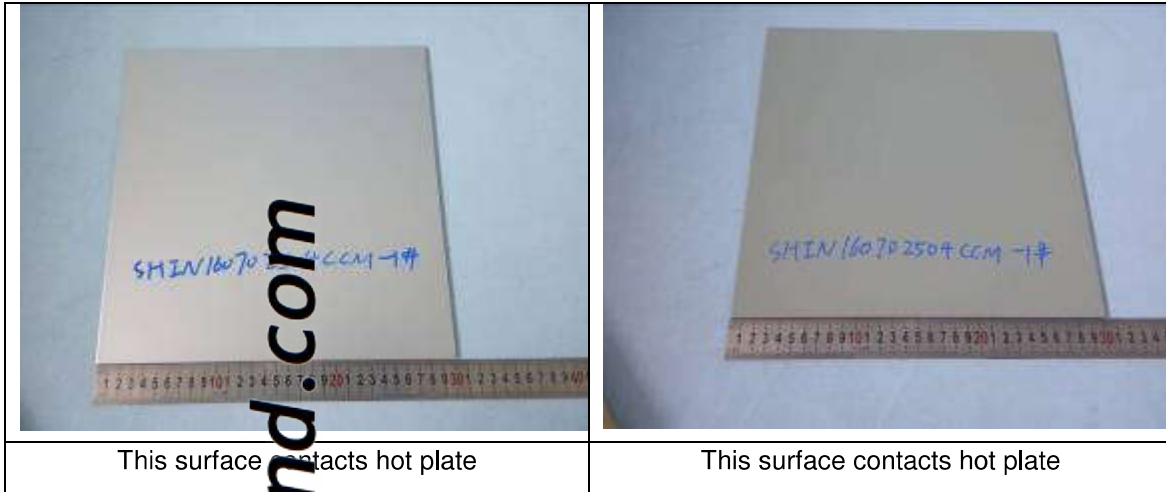
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Test Photo:



This surface contacts hot plate

This surface contacts hot plate

20. Test Item: Coefficient Of Linear Thermal Expansion

Sample Description: See photo

Test Method: With reference to ASTM D696 - 08 Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer.

Test Condition:

Test temperature range : Ramp 10°C/min from -30°C to 30°C

Purge gas : Nitrogen (N₂), Purity 99.999%, Flow rate 50ml/min.

Measurement Direction : Thickness

Test Result:

Test Item	Test Result
Coefficient of linear thermal expansion (1/°C)	-30°C~30°C : 239.2×10 ⁻⁶

Note: The above test was carried out by a SGS internal laboratory.



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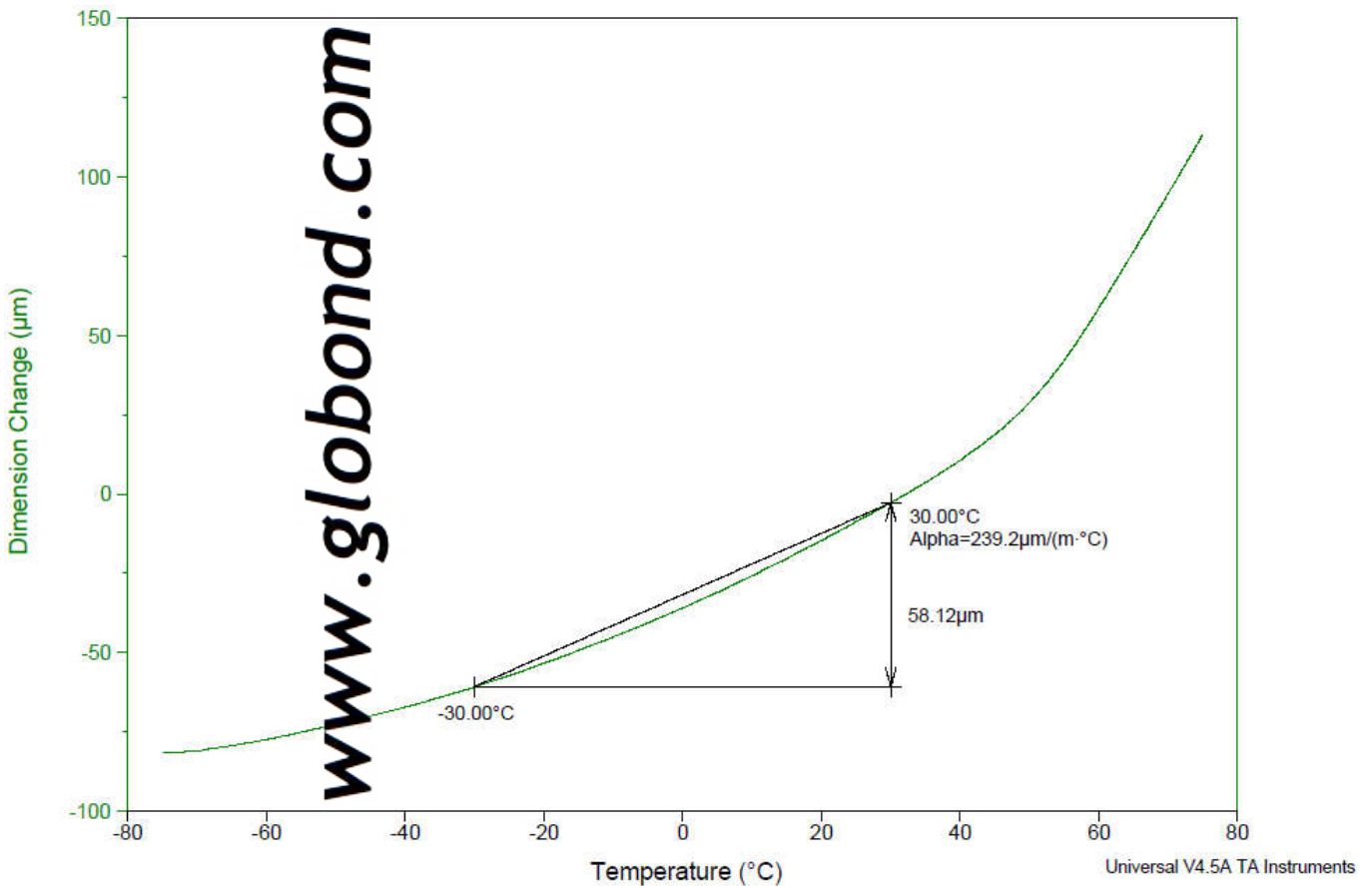
Test Spectrum:

Sample: KV-16-05937
Size: 4.0503 mm

TMA

File: C:\TA\Data\TMA\201607\KV-16-05937.001
Operator: Mina
Run Date: 14-Jul-2016 17:18
Instrument: TMA Q400 V7.4 Build 93

Comment: GZIN160701162CCM



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