GUANGZHOU GOODSENSE DECORATIVE BUILDING MATERIALS CO., LID.
NO.2 XIZHUYUAN, YANJIANG ROAD, TANBU TOWN, HUADU DISTRICT, GUANGZHOU, CHINA

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

Sample Description	:	ALUMINUM COMPOSITE PANEL
Supplier Item No.	:	FC9906
Supplier	:	GUANGZHOU GOODSENSE DECORATIVE BUILDING MATERIALS CO., LID.
Manufacturer	:	GUANGZHOU GOODSENSE DECORATIVE BUILDING MATERIALS CO., LID.
Sample Receiving Date	:	Jul.26, 2019
Test Performing Date	:	Aug.01, 2019 to Aug.23, 2019

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

SDHL1908013594HI

Peter Zhao
Approved signatory

SDHL 171337

Test Result Summary

No.		Test item	Test(s) Requested(Method)	Result(s)		Comments
Part 1	1	Adhesion	ASTM D3359-17 Method B	Classification: 5B		/
	2	Pencil Hardness	ASTM D3363-05(2011) $^{\varepsilon 2}$	Scratch hardness: H		/
	3	Alkali Resistance	With reference to ASTM D1308-02(2007) & ASTM D2244-11 & client's requirement	△E=0.6		/
	4	Acid Resistance	With reference to ASTM D1308-02(2007) & ASTM D2244-11 & client's requirement	△E=0.4		/
	5	Peel strength	ASTM D903-98(2010)	6.8N/mm		/
	6	Unit weight	As client's requirement	5.68kg/m^2		/
Part 2	1	Bend Test (Conical Mandrel)	ASTM D522/D522M-17 Method A	No visual cracking or peeling		/
	2	Coating Thickness	ASTM D7091-13	28.4μm		/
	3	Deflection Temperature under Load	ASTM D648-18 Method B	＞280℃		/
	4	Flexural Test	With reference to ASTM D790-17 Procedure A and client's requirement	Flexural Strength	105MPa	/
				Flexural Modulus	18900MPa	
	5	Shear Strength	ASTM D732-17	25.4MPa		/
	6	Tensile Test	ASTM D638-14	Tensile Strength	44.0MPa	/
				Tensile Stress at Yield	44.0MPa	

For further details, please refer to the following page(s)

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SDHL 171386

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Test Information:

Sample description: Aluminum Composite Panel

1. Test item: Adhesion

Test method: ASTM D3359-17 Method B

Test condition:

Tape: Elcometer 99

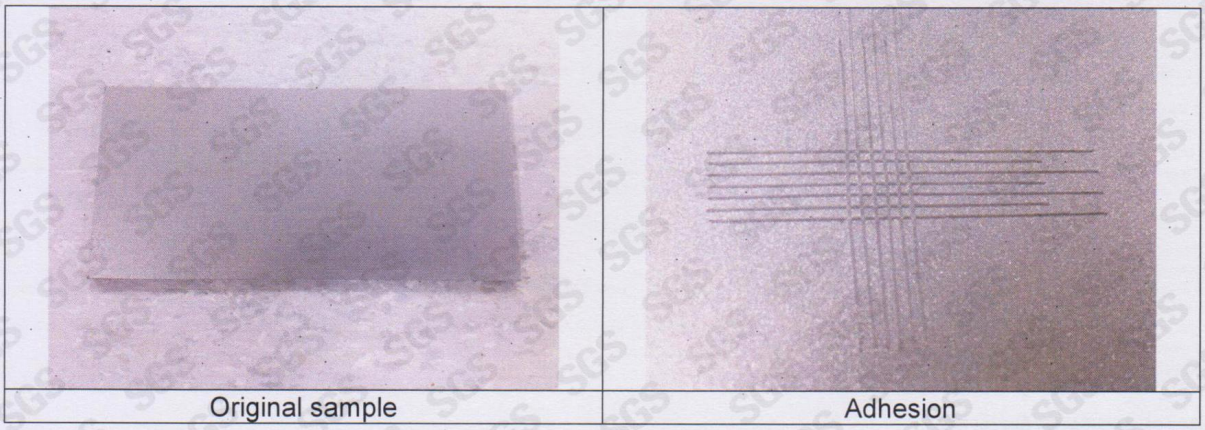
Space: 1mm

Test Result:

Sample	Classification
A	5B

Note: In ASTM D3359 Method B, 5B is the best and 0B is the worst.

Photo Appendix:



Original sample	Adhesion

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2. Test item: Pencil Hardness

Test method: ASTM D3363-05(2011) $^{\varepsilon 2}$

Test condition:

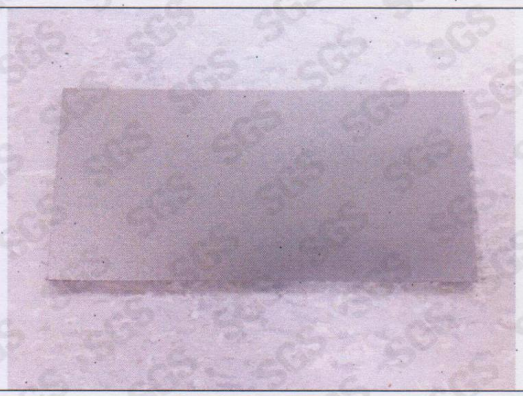
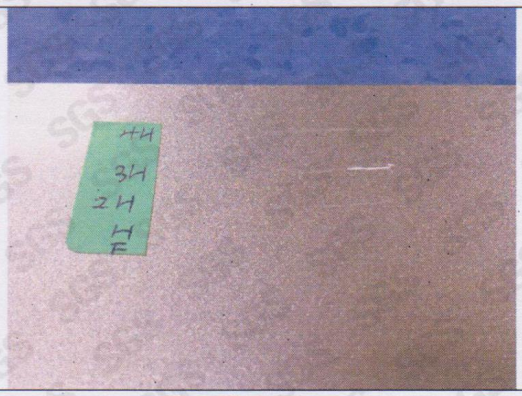
Pencil: Mitsubishi®

Test result:

Sample	Scratch hardness
A	H

Note: In ASTM D3363, 6H is the hardest and 6B is the softest.

Photo Appendix:

	
Original sample	Pencil Hardness

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3. Test item: Alkali Resistance

Test method: With reference to ASTM D1308-02(2007) & ASTM D2244-11 & client's requirement

Test condition:

Immersion

Test reagent: 5%NaOH,23℃

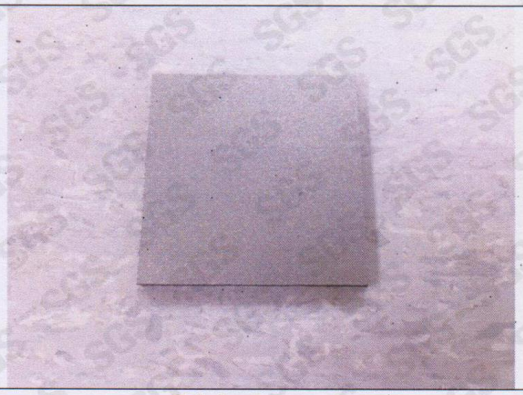
Duration: 48h

Test result:

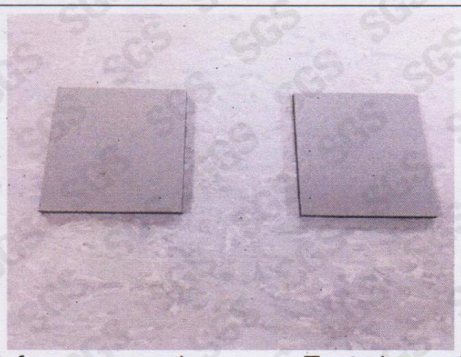
Sample	Test results
A	△E=0.6

Note: △E values were measured by sphere spectrophotometer, and under D65 standard light source with 10° observer. The results include specular rellection condition. 8mm aperture.

Photo Appendix:



Original sample



Reference sample Tested sample

Alkali Resistance

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4. Test item: Acid Resistance

Test method: With reference to ASTM D1308-02(2007) & ASTM D2244-11 & client's requirement

Test condition:

Immersion

Test reagent: 5%HCl,23℃

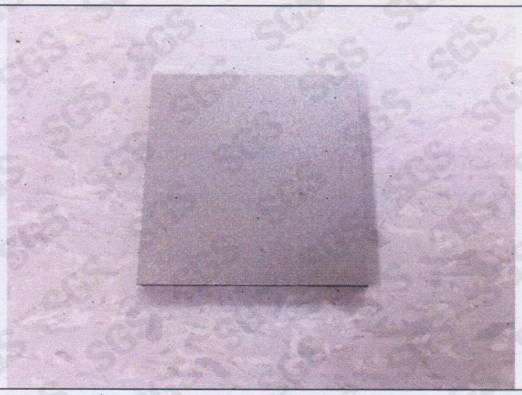
Duration: 48h

Test result:

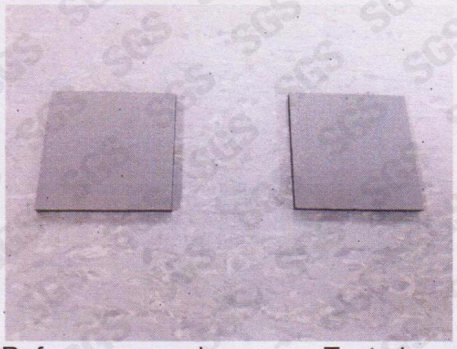
Sample	Test results
A	△E=0.4

Note: △E values were measured by sphere spectrophotometer, and under D65 standard light source with 10° observer. The results include specular rellection condition. 8mm aperture.

Photo Appendix:



Original sample



Reference sample Tested sample

Acid Resistance

5. Test item: Peel strength

Test method: ASTM D903-98(2010)

Test condition:

Testing speed: 152.4mm/min

Sample size: 305x25mm

Test result:

Sample	Peel strength
A	6.8N/mm

6. Test item: Unit weight

Test method: As client's requirement

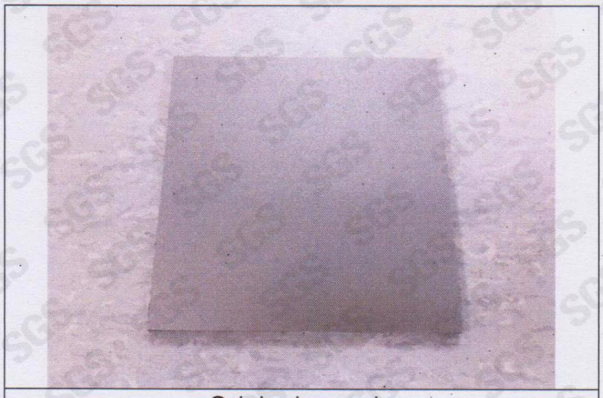
Test condition:

Sample size: 100x100mm

Test result:

Sample	Unit weight
A	5.68kg/m^2

Photo Appendix:



Original sample

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Part 2 (SGS Ref. No.: GZIN1908041848MR)

Summary of Results:

No.	Test Item	Test Method	Result		Conclusion
1	Bend Test (Conical Mandrel)	ASTM D522/D522M-17 Method A	No visual cracking or peeling		/
2	Coating Thickness	ASTM D7091-13	28.4μm		/
3	Deflection Temperature under Load	ASTM D648-18 Method B	>280℃		/
4	Flexural Test	With reference to ASTM D790-17 Procedure A and client's requirement	Flexural Strength	105MPa	/
			Flexural Modulus	18900MPa	
5	Shear Strength	ASTM D732-17	25.4MPa		/
6	Tensile Test	ASTM D638-14	Tensile Strength	44.0MPa	/
			Tensile Stress at Yield	44.0MPa	

Note: Pass : Meet the requirements;

Fail : Does not meet the requirements;

/ : Not Apply to the judgment.

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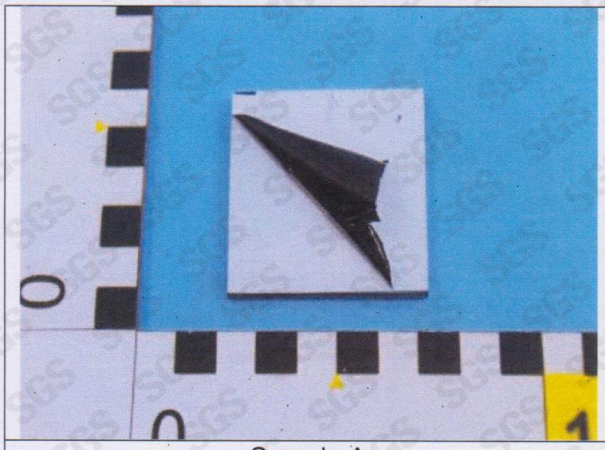
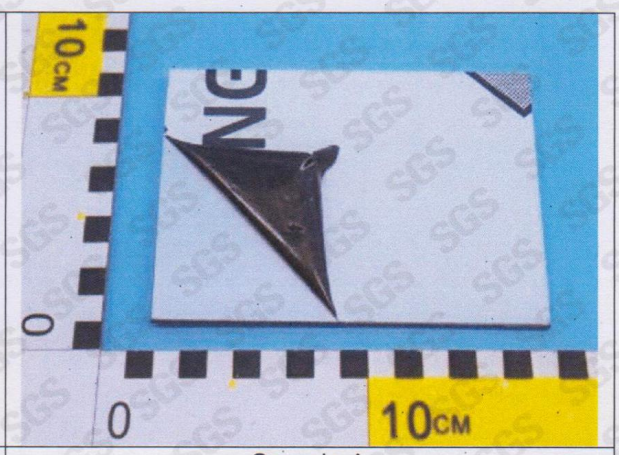
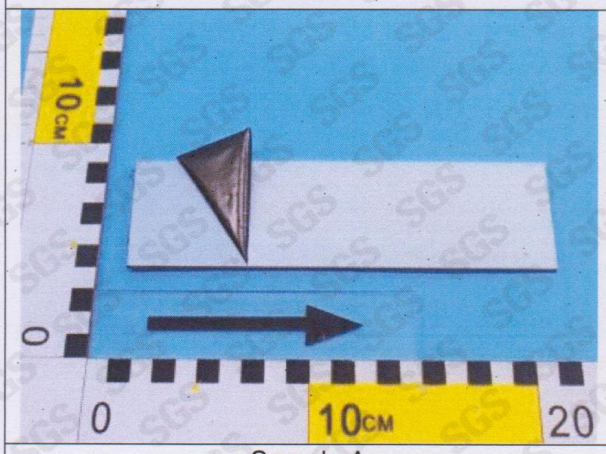
Original Sample Photo:



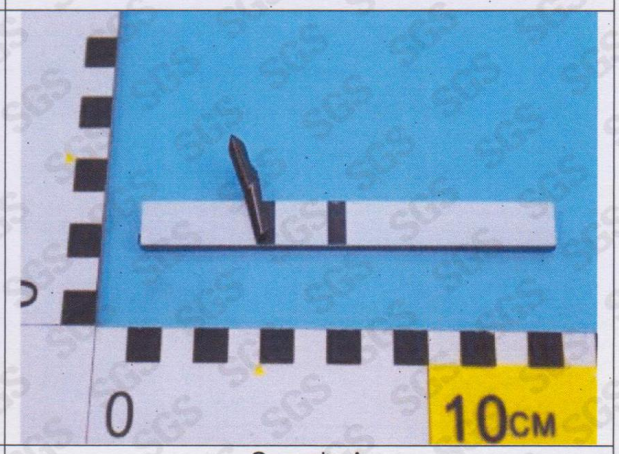
Sample A



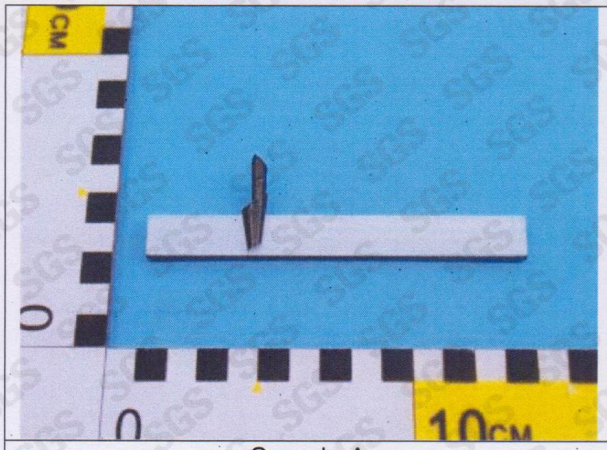
Sample A



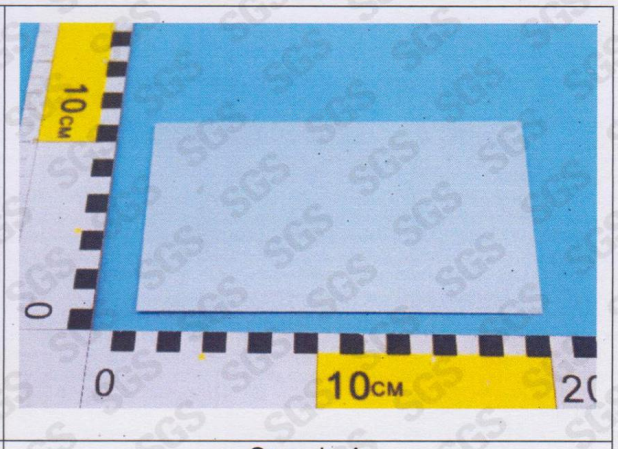
Sample A



Sample A



Sample A



Sample A

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1.Test Item: Bend Test (Conical Mandrel)

Sample Description: Aluminum Composite Panel

Test Method: ASTM D522/D522M-17 Method A

Test Condition:

Coating thickness: 25μm

Sample thickness: 0.55mm

Length of cone: 200mm

Min: Φ3.0mm

Max: Φ38mm

Test Result:

Sample	Appearance
A	No visual cracking or peeling

Note: Observation magnification is 4×.

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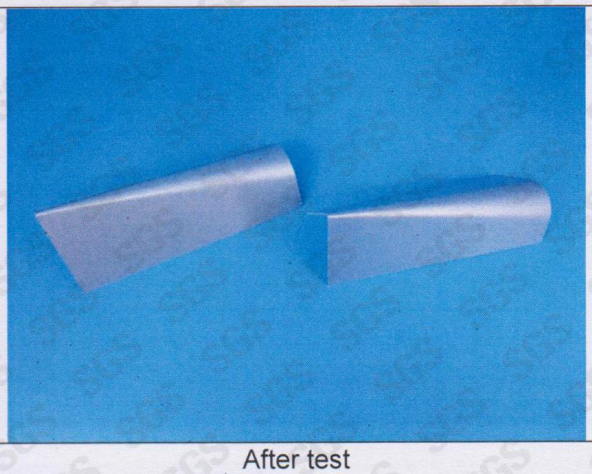
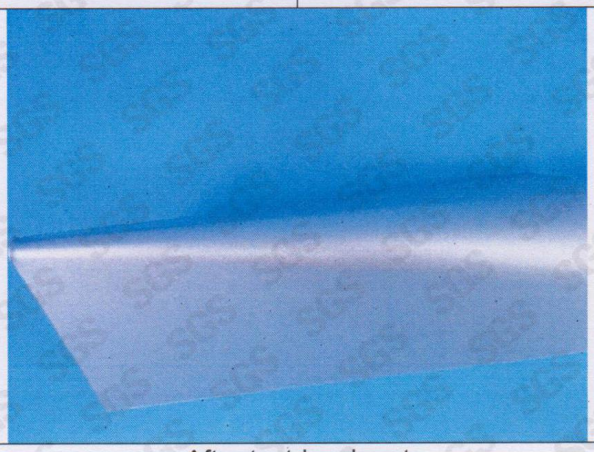
Test Photo:

During test



After test



After test-local part

Equipment Information:

Equipment	Model	Equipment No.	Calibration date	Next Calibration date
Conical Mandrel Bend Tester	BGD 566	GZMR-AG-E098	2019-05-13	2020-05-12
Digital Coating Thickness Gauge	FNbasic	GZMR-AG-E170	2018-11-07	2019-11-06
Digital Vernier Caliper	CD-20AX	GZMR-AG-E128-02	2019-07-26	2020-07-25

2.Test Item: Coating Thickness

Sample Description: Aluminum Composite Panel

Test Method: ASTM D7091-13

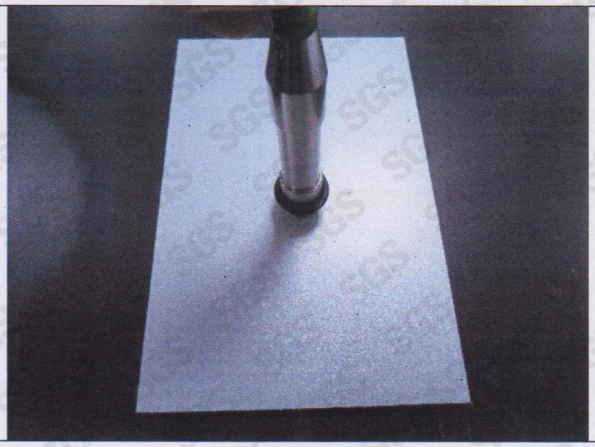
Test Condition: Eddy-Current Gauge

Test Result:

Sample	Coating Thickness
A	28.4μm

Note: The protected film was ripped off before test.

Test Photo:



During test

Equipment Information:

Equipment	Model	Equipment No.	Calibration date	Next Calibration date
Digital Coating Thickness Gauge	FNbasic	GZMR-AG-E170	2018-11-07	2019-11-06

3. Test Item: Deflection Temperature under Load

Sample Description: Aluminum Composite Panel

Test Method: ASTM D648-18 Method B

Test Condition:

Specimen: 127mm×4.05mm×13.26mm

Heat-transfer media: Silicone oil

Rate of temperature: 120℃/h

Load: 1.82MPa

Span: 100mm

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

Test Result:

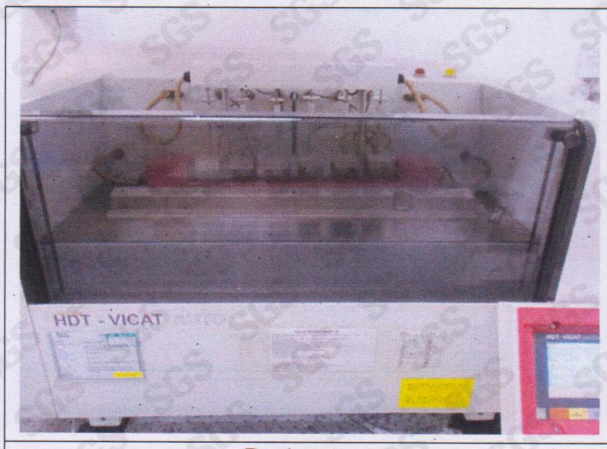
Test Item	Test Result
Deflection Temperature under Load	>280℃

Note:

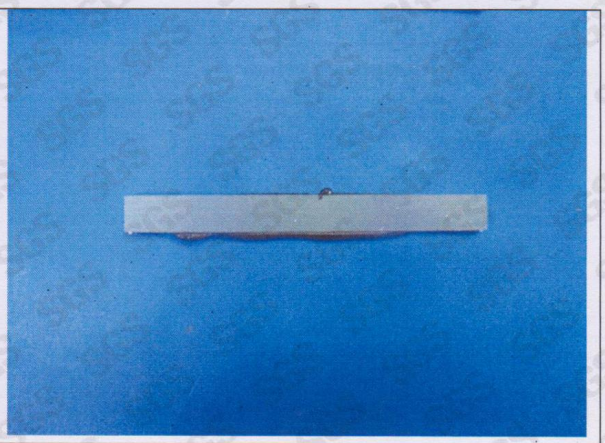
1. Test result exceeded the upper limit of the tester.

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

Test Photo:



During test



After test

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Equipment Information:

Equipment	Model	Equipment No.	Calibration date	Next Calibration date
HDT and VICAT Tester	6970.000	GZMR-PL-E091	2019-03-13	2020-03-12

4.Test Item: Flexural Test
Sample Description: Aluminum Composite Panel

Test Method: With reference to ASTM D790-17 Procedure A and client's requirement

Test Condition:

Specimen: 127mm×13.27mm×4.05mm

Testing speed: 1.7mm/min

Span: 64mm

Number of specimens tested:4

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

Test Result:

Test Item	Test Result
Flexural Strength	105MPa
Flexural Modulus	18900MPa

Note: The protected film of test specimens was ripped off before test. And the surface with protected film was faced to the loading.

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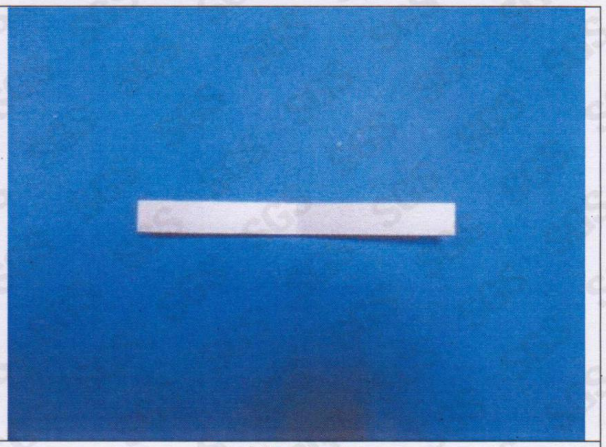
Test Photo:

	
During test	After test

Equipment Information:

Equipment	Model	Equipment No.	Calibration date	Next Calibration date
Universal Testing Machine	Z1.0	GZMR-PL-E252	2019-03-12	2020-03-11

5.Test Item: Shear Strength

Sample Description: Aluminum Composite Panel

Test Method: ASTM D732-17

Test Condition:

Specimen thickness: 4.03mm

Punch diameter: 25mm

Testing speed: 1.3mm/min

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

Test Result:

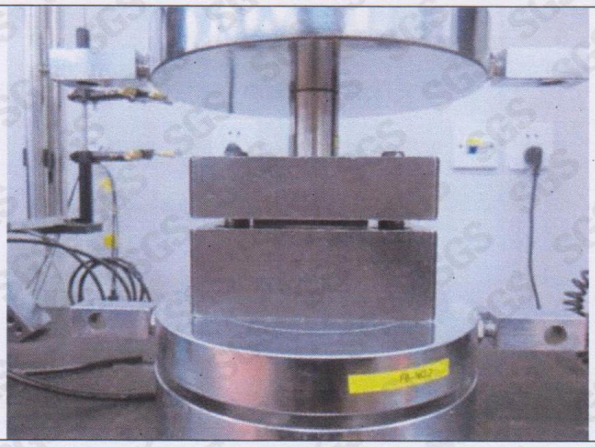
Test Item	Test Result
Shear Strength	25.4MPa

Note:

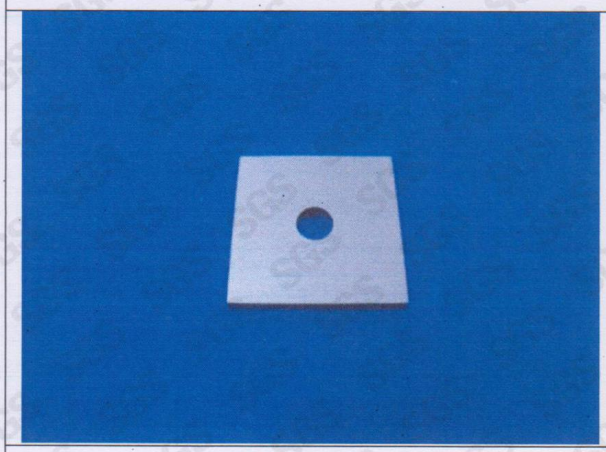
1.Test specimens were cut from the sample.

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

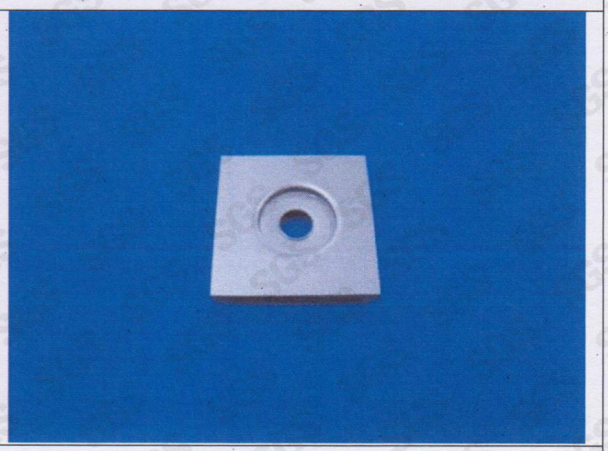
Test Photo:



During test



Before test



After test

Equipment Information:

Equipment	Model	Equipment No.	Calibration date	Next Calibration date
Universal Testing Machine	CMT4304	GZMR-PL-E062	2018-09-18	2019-09-17

6.Test Item: Tensile Test

Sample Description: Aluminum Composite Panel

Test Method: ASTM D638-14

Test Condition:

Specimen: Type Ⅰ

Specimen thickness: 4.02mm

Testing speed: 5mm/min

Gauge length: 50mm

Distance between grips: 115mm

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

Test Result:

Test Item	Test Result
Tensile Strength	44.0MPa
Tensile Stress at Yield	44.0MPa

Note:

1.Test specimens were cut from the sample.

2.The protected film of test specimens was ripped off before test.

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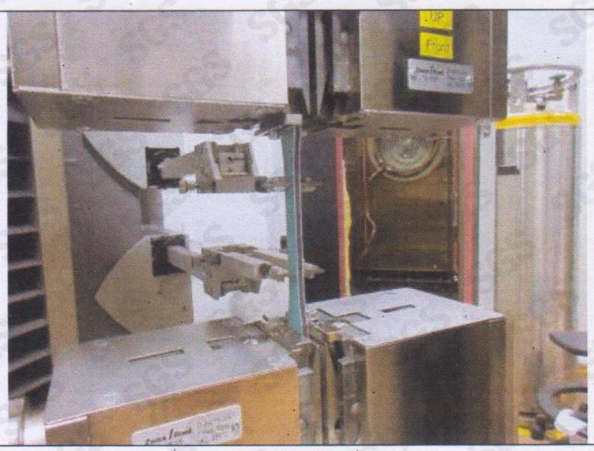
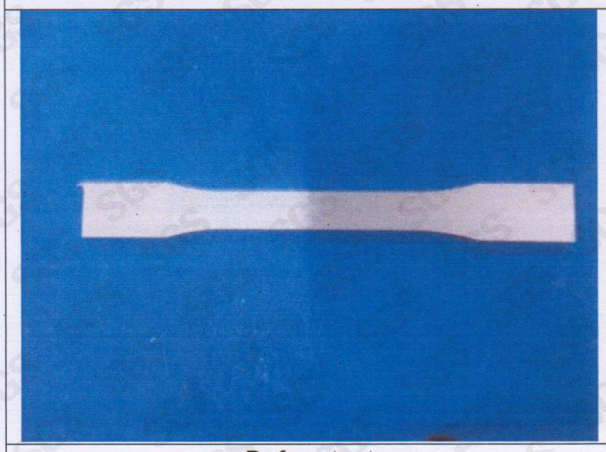
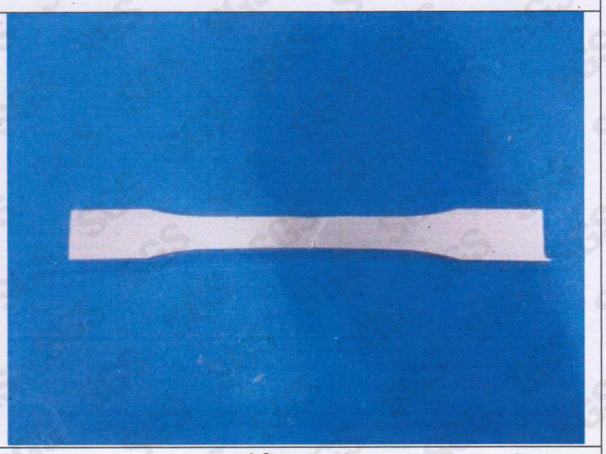
Test Photo:



During test



Before test



After test

Equipment Information:

Equipment	Model	Equipment No.	Calibration date	Next Calibration date
Universal Testing Machine	Z020	GZMR-PL-E264	2018-10-18	2019-09-27

Remark: Part 2 was subcontracted to SGS-CSTC Standards Technical Services Co., Ltd. GZ Branch Testing Center.

End of Report

SGS-CSTC Standards Technical Services Co., Ltd. Shunde Branch (Hardware)

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