

# Architectural Testing

## PERFORMANCE TEST REPORT

**Rendered to:**

**SUMMIT GLASS COATINGS, LLC**

**PRODUCT: Back-Painted Glass**

**Report No: C7713.01-106-31**

**Report Date: 07/11/13**

**Test Record Retention Period: 07/11/17**

## Architectural Testing

### PERFORMANCE TEST REPORT

Rendered to:

SUMMIT GLASS COATINGS, LLC  
1600 West Evans Avenue  
Unit A  
Englewood, Colorado 80110

Report No: C7713.01-106-31  
Test Dates: 05/01/13  
Through: 06/12/13  
Report Date: 07/11/13  
Test Record Retention Period: 07/11/17

**Product:** Back-Painted Glass

**Project Summary:** Architectural Testing, Inc. was contracted by Summit Glass Coatings, LLC to evaluate the coating on back-painted glass. The product description, test procedures and test results are reported herein.

**Test Methods:** The test specimens were evaluated in accordance with the following methods.

ASTM D 3359-09<sup>02</sup>, *Standard Test Methods for Measuring Adhesion by Tape Test*, Method B

ASTM D 4587-11, *Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings*

ASTM D 2244-11, *Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates*

ASTM B 117-11, *Standard Practice for Operating Salt Spray (Fog) Apparatus*

ASTM C 650-04 (Reapproved 2009), *Standard Test Method for Resistance of Ceramic Tile to Chemical Substances*

The test specimens were evaluated in general accordance with the following method.

AAMA 800-10, *Voluntary Specifications and Test Methods for Sealants*, Section 3.7 Compatibility, modified Method B

**Product Description:** The back-painted glass was submitted to Architectural Testing by Summit Glass Coatings consisting of many nominal 6" x 3" x 1/4" thick and several 2" x 2" x 1/4" thick glass pieces with a nominal 2 to 3 mil thick white coating on one side. Refer to the photo in Appendix A.

**Test Procedures and Test Results:** The results are reported in the following tables. All specimen conditioning and test conditions were at standard laboratory conditions averaging 68.5 °F and 50.0% relative humidity unless otherwise stated. Refer to the photos in Appendix A.

#### ASTM D 3359 - Adhesion by Tape Test

Six cuts 20 mm apart and parallel to each other were made through the coating to the substrate and then six more cuts were made 90° to and centered on the original cuts to produce a cross-cut grid of 25 squares. Pressure sensitive tape was applied over the grid and then peeled off at a 180° angle within 90 ±30 seconds.

#### Adhesion of Coating to Glass

Specimen	Rating	Comments
1	5B	None of the squares of the grid were detached
2	4B	Small piece of coating flaked off in one square
3	5B	None of the squares of the grid were detached

**Test Procedures and Test Results: (Continued)**

**ASTM D 4587 and ASTM D 2244 - UV Exposure and Color Differences**

Specimens were exposed with the glass side facing the light in a QUV Accelerated Weathering Tester (ICN Y000174 and 005419) to UVA-340 bulbs for 500 hours with the following repeating cycle: 8 hours UV at 60 °C then 4 hours condensation at 50 °C. The specimens were situated 2" from the UVA bulbs. Color readings of the coating were taken from the glass side before and after exposure utilizing a GretagMachbeth Color i5 Spectrophotometer (ICN 004725) with a diffuse spherical geometry and a xenon lamp, CIE 1964 color space, D65 illuminant and 10° observer. A glossy white background was used for the color readings.

**Color Readings at 255.5 Hours**

Specimen	Before Exposure			At 255.5 hrs Exposure			Change in Color			
	L*	a*	b*	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
1	74.72	-0.83	0.58	74.38	-0.91	0.60	-0.34	-0.08	0.02	0.35
2	74.76	-0.81	0.62	74.42	-0.88	0.64	-0.34	-0.07	0.02	0.35
3	74.41	-0.81	0.58	74.03	-0.91	0.68	-0.38	-0.10	0.10	0.40
4	74.51	-0.83	0.62	74.14	-0.92	0.72	-0.37	-0.09	0.10	0.39
5	74.67	-0.81	0.61	74.31	-0.92	0.71	-0.36	-0.11	0.10	0.39
6	74.71	-0.80	0.61	74.38	-0.92	0.67	-0.34	-0.12	0.05	0.36
7	74.77	-0.81	0.60	74.45	-0.89	0.60	-0.32	-0.08	0.00	0.33
8	74.42	-0.82	0.61	74.17	-0.93	0.69	-0.24	-0.11	0.07	0.27
9	74.12	-0.87	0.69	73.69	-0.94	0.77	-0.42	-0.07	0.08	0.44
<b>Average</b>							<b>-0.35</b>	<b>-0.09</b>	<b>0.06</b>	<b>0.36</b>

**Color Readings at 500 Hours**

Specimen	Before Exposure			At 500 hrs Exposure			Change in Color			
	L*	a*	b*	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
1	74.72	-0.83	0.58	74.50	-0.88	0.58	-0.21	-0.05	0.00	0.22
2	74.76	-0.81	0.62	74.58	-0.88	0.63	-0.18	-0.07	0.01	0.19
3	74.41	-0.81	0.58	74.14	-0.87	0.63	-0.27	-0.06	0.05	0.28
4	74.51	-0.83	0.62	74.29	-0.87	0.67	-0.21	-0.04	0.05	0.22
5	74.67	-0.81	0.61	74.51	-0.90	0.65	-0.16	-0.10	0.04	0.19
6	74.71	-0.80	0.61	74.53	-0.86	0.64	-0.18	-0.06	0.03	0.19
7	74.77	-0.81	0.60	74.64	-0.90	0.65	-0.13	-0.09	0.05	0.16
8	74.42	-0.82	0.61	74.30	-0.92	0.68	-0.11	-0.09	0.06	0.15
9	74.12	-0.87	0.69	73.86	-0.90	0.72	-0.26	-0.04	0.03	0.26
<b>Average</b>							<b>-0.19</b>	<b>-0.07</b>	<b>0.04</b>	<b>0.21</b>

*Note: There were no visual changes to the specimens as a result of the UV exposure.*

**Test Procedures and Test Results:** (Continued)

**ASTM B 117 - Salt Fog Exposure**

Specimens were placed on a slight angle coating side up in an Engelhard exposure chamber (ICN 005575) with continuous corrosive fog at 35 ±2 °C (95 ±3 °F) and 5% salt solution. At the end of the 250 hour exposure, the specimens were rinsed with warm water and evaluated.

**Salt Fog Exposure**

<b>Specimen</b>	<b>Observations</b>
<b>1</b>	No change or damage to the coating or glass
<b>2</b>	No change or damage to the coating or glass
<b>3</b>	No change or damage to the coating or glass
<b>4</b>	No change or damage to the coating or glass
<b>5</b>	No change or damage to the coating or glass
<b>6</b>	No change or damage to the coating or glass

**ASTM C 650 - Resistance to Chemical Substances**

A test tube containing a test solution was inverted on the coating for 24 hours. After the specimen was rinsed to remove residual test solution, it was visually observed and a pencil test performed.

**Chemical Resistance**

<b>Test Solution</b>	<b>Visual Test</b>	<b>Pencil Test</b>
<b>Lysol Kitchen Cleaner</b>	Affected; Can see test tube ring	Not affected
<b>Original Pine Sol (Full Strength)</b>	Affected; Can see test tube ring	Not affected
<b>Original Windex</b>	Not affected	Not affected
<b>Formula 409 All-Purpose Cleaner</b>	Not affected	Not affected

## Architectural Testing

### Test Procedures and Test Results: (Continued)

#### AAMA 800 - Compatibility

Three 1/4" beads of Bohle Xtragrip Green silicone glue were placed in contact with the coating on a piece of back-painted glass then immediately placed in a beaker and covered. A piece of back-painted glass was placed in another beaker and covered. Both beakers and their contents were conditioned for 24 hours at 25 °C ±3 °C (77 °F ±5 °F) followed by 72 hours at 82 °C ±3 °C (180 °F ±5 °F) and then conditioned to 25 °C ±3 °C (77 °F ±5 °F) for a minimum of one hour and evaluated.

#### Compatibility

Test Area	Observations as Compared to Control Specimen
1	No difference in fogging, separation, discoloration, cracking, staining, tackiness, softening or crazing of coating or sealant
2	No difference in fogging, separation, discoloration, cracking, staining, tackiness, softening or crazing of coating or sealant
3	No difference in fogging, separation, discoloration, cracking, staining, tackiness, softening or crazing of coating or sealant

Architectural Testing will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Architectural Testing, Inc. for the entire test record retention period.

Results obtained are tested values and were secured using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:

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**Revision Log**

<b>Rev. #</b>	<b>Date</b>	<b>Page(s)</b>	<b>Revision(s)</b>
0	07/11/13	N/A	Original report issue.