

# GRAFFITI SHIELD TEST REPORT

**SCOPE OF WORK**

ANSI/SAE Z26.1 EVALUATION OF SAFETY GLAZING MATERIALS FOR GLAZING MOTOR VEHICLES

**REPORT NUMBER**

H4015.02-106-31 R1

**TEST DATE(S)**

08/22/17 - 09/12/17

**ISSUE DATE**

10/18/17

**REVISED DATE**

02/13/20

**RECORD RETENTION END DATE**

09/12/21

**PAGES**

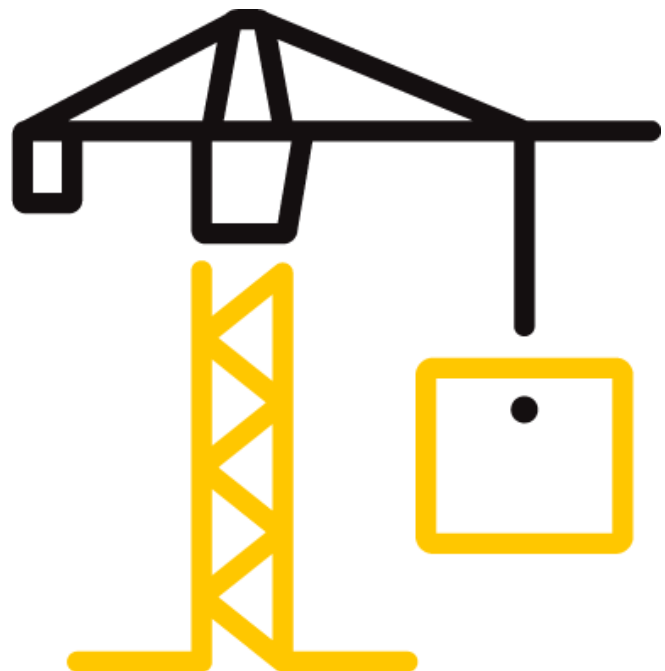
17

**DOCUMENT CONTROL NUMBER**

ATI 00231 (09/05/17)

RT-R-AMER-Test-2827

© 2017 INTERTEK



## TEST REPORT FOR GRAFFITI SHIELD

Report No.: H4015.02-106-31 R1

Date: 10/18/17

### REPORT ISSUED TO

#### GRAFFITI SHIELD, INC.

2940 E. La Palma Avenue  
Anaheim, CA 92806

### SECTION 1

#### SCOPE

**Products:** Glass Shield Organic Coating (Film)

Intertek Building & Construction (B&C) was contracted by Graffiti Shield, Inc. of Anaheim, CA to perform testing in accordance with ANSI/SAE Z26.1-1996, American National Standard for Safety Glazing Materials for Glazing Motor Vehicles and Motor Vehicle Equipment Operating on Land Highways- Safety Standard on uncoated glass and film-backed glass. Results obtained are tested values and were secured by using the designated test methods. Testing was conducted at Intertek test facility in York, PA. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

For INTERTEK B&C:

<b>COMPLETED BY:</b>	J. Rich Hammons
<b>TITLE:</b>	Technician III Materials Laboratory
<b>SIGNATURE:</b>	
<b>DATE:</b>	02/13/20

<b>REVIEWED BY:</b>	Joseph M. Brickner
<b>TITLE:</b>	Laboratory Supervisor Materials Laboratory
<b>SIGNATURE:</b>	
<b>DATE:</b>	02/13/20

JRH:jmb:kf

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample(s) tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

**TEST REPORT FOR GRAFFITI SHIELD**

Report No.: H4015.02-106-31 R1

Date: 10/18/17

**SECTION 2**

**SUMMARY OF TEST RESULTS**

TEST	TEST DATE(S)	SECTION	RESULT <sup>1</sup>		
			GLASS	MIRROR	METAL
Test 1 Light Stability	08/22/17 - 09/12/17	5.1.3	Pass	--	--
Test 2 Luminous Transmittance	08/22/17 - 09/12/17	5.2.3	Pass	--	--
Test 17 Abrasion Resistance	09/11/17 - 09/12/17	5.17.3	Pass	--	--
Test 17* Custom Gloss Test Abrasion Resistance	09/11/17 - 09-12-17	5.17.3	--	See Results	See Results
Test 19 Chemical Resistance	09/01/17	5.19.3	Pass	Pass	Pass
Test 28 Resistance to Temp. Change	08/31/17 - 09/01/17	5.28.3	Pass	--	--

**SECTION 3**

**TEST METHOD**

The specimens were evaluated in accordance with the following:

**ANSI/SAE Z26.1-1996**, *American National Standard for Safety Glazing Materials for Glazing Motor Vehicles and Motor Vehicle Equipment Operating on Land Highways- Safety Standard*

**NOTICE:** To be found in full compliance with the referenced standard, the material shall meet the performance requirements of all tests identified in ANSI/SAE Z26.1. This report contains select test results and does not contain all tests required by the referenced standard. Compliance to only one required test does not constitute conformance to the standard if additional tests are required for the material type. Required tests are determined by the material type and the intended use or location within the vehicle.

**SECTION 4**

**MATERIAL SOURCE**

Test samples were provided by the client. Representative samples of the test specimens will be retained by Intertek B&C for a minimum of 30 days from the test completion date.

## TEST REPORT FOR GRAFFITI SHIELD

Report No.: H4015.02-106-31 R1

Date: 10/18/17

### SECTION 5

#### LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Rich Hammons	Intertek B&C
Joseph M. Brickner	Intertek B&C

### SECTION 6

#### TEST PROCEDURES

All conditioning of test specimens and test conditions were at standard laboratory conditions unless otherwise reported. Refer to the test related photos in Section 10.

##### Test 1 - Light Stability

Three samples, each measuring 12" x 12" were measured for luminous transmittance under CIE Lab "illuminant A" conditions using a Gretag MacBeth Color i5 spectrophotometer (ICN: 004725). Samples were exposed in a QUV Accelerated Weathering Chamber to 100 hours of continuous UVA (340nm) radiation at a distance of 2" with a conditioning temperature of 44°C. No condensation cycle was used. Specimen conditioning and testing was executed at standard laboratory conditions unless otherwise reported.

##### Test 2 - Luminous Transmittance

The test procedure and transmittance data from AS-2 Test Number 1: Light Stability was used for this test.

##### Test 17 - Abrasion Resistance

The haze of the safety glazing material was measured utilizing a Gretag MacBeth Color i5 spectrophotometer for the glass specimens. Glossmeter (ICN: 005609) was utilized for readings taken prior and post on the mirror and 20g steel specimens lieu of haze measurements. Two readings were recorded across each direction of the wear path in each quadrant. Three specimens of each laminated material were subjected to 100 cycles on a Taber Model 5130 Abraser (ICN: Y001522) with Calibrase CS-10F wheels and a 500-gram load employed on each wheel. The fine side of a Taber ST-11 resurfacing stone was utilized to reface the wheels for 25 cycles before abrading each specimen. The abrasion resistance results are displayed in the table below.

**TEST REPORT FOR GRAFFITI SHIELD**

Report No.: H4015.02-106-31 R1

Date: 10/18/17

**Test 19 - Chemical Resistance (Non Stress)**

The resistance of the film to certain chemicals was determined by exposing two new specimens each to five different chemicals. The five chemicals utilized were one-percent solution of nonabrasive soap in deionized water, kerosene, undiluted denatured alcohol, gasoline (ASTM Reference Fuel C), and windshield cleaner. Each specimen was held in the fluid for one minute, immediately wiped with absorbent cotton, and examined for evidence of tackiness, crazing, or apparent loss of transparency. The chemical test results are displayed in the table below.

**Test 28 - Resistance to Temperature Change**

The capability of the film to withstand changes in temperature without deterioration was determined by exposing two nominally twelve-inch square specimens in diverse temperature conditions. Each specimen was subjected to cycling by placing them in a Thermo Scientific freezer (INT: 000209) for six hours at -40°F, warmed in standard laboratory conditions for one hour at 71°F, heated in a Lindberg Blue M circulating air oven (ICN: Y002567) for three hours at 162°F, and then cooled in standard laboratory conditions at 71°F. The test results are displayed in the table below.

**SECTION 7**

**TEST SPECIMEN DESCRIPTIONS**

**Overview of Test Specimen Sizes**

TEST	SPECIMEN SIZE
Test 1 - Light Stability	12" x 12" (305 mm x 305 mm)
Test 2 - Luminous Transmittance	12" x 12" (305 mm x 305 mm)
Test 17 - Abrasion Resistance	4" x 4" (101.6 mm x 101.6 mm)
Test 19 - Chemical Resistance	1" x 7" (25 mm x 178 mm)
Test 28 - Resistance to Temp. Change	12" x 12" (305 mm x 305 mm)

**Test Specimen Construction**

SET	PRODUCT ID	DESCRIPTION
1 (Glass)	Glass	6 mil clear Glass Shield organic coating (film) applied to 6 mm flat glass
2 (Mirror)	Mirror	5 mil Mirror Shield organic coating (film) applied to 1/4" annealed and mirrored glass
3 (Metal)	20g Steel	6 mil Metal Shield organic coating (film) applied to 12ga (0.1046") Stainless Steel

**TEST REPORT FOR GRAFFITI SHIELD**

Report No.: H4015.02-106-31 R1

Date: 10/18/17

**SECTION 8  
TEST RESULTS**

<b>TEST 1 - LIGHT STABILITY - SET 1 (GLASS)</b>				
<b>SPECIMEN ID</b>	<b>PRE-EXPOSURE TRANSMITTANCE (%)</b>	<b>POST-EXPOSURE TRANSMITTANCE (%)</b>	<b>CHANGE</b>	<b>RESULT</b>
<b>1</b>	86.91	84.71	-2.2	Pass
<b>2</b>	87.49	84.86	-2.6	Pass
<b>3</b>	87.40	84.85	-2.6	Pass
<b>Average</b>	<b>87.27</b>	<b>84.81</b>	<b>-2.5%</b>	<b>Pass</b>
Test Criteria: A reduction in luminous transmittance greater than 5% shall not occur. Slight discoloration may occur, but no other defects shall develop.				

<b>TEST 2 - LUMINOUS TRANSMITTANCE - SET 1 (GLASS)</b>				
<b>SPECIMEN ID</b>	<b>PRE-EXPOSURE TRANSMITTANCE (%)</b>	<b>POST-EXPOSURE TRANSMITTANCE (%)</b>	<b>REQUIREMENT</b>	<b>RESULT</b>
<b>1</b>	86.91	84.71	> 70%	Pass
<b>2</b>	87.49	84.86	> 70%	Pass
<b>3</b>	87.40	84.85	> 70%	Pass
<b>Average</b>	<b>87.27</b>	<b>84.81</b>	<b>&gt; 70%</b>	<b>Pass</b>
Test Criteria: Luminous Transmittance shall not be less than 70% of the light both before and after irradiation.				

<b>TEST 17 - ABRASION RESISTANCE - SET 1 (GLASS)</b>				
<b>SPECIMEN ID</b>	<b>PRE-ABRASION HAZE (%)</b>	<b>POST-ABRASION HAZE (%)</b>	<b>CHANGE (%)</b>	<b>RESULT</b>
<b>1</b>	1.90	6.04	4.14	Pass
<b>2</b>	0.62	4.33	3.71	Pass
<b>3</b>	0.90	5.96	5.05	Pass
<b>Average</b>	<b>1.14</b>	<b>5.44</b>	<b>4.30</b>	<b>Pass</b>
Test Criteria: The arithmetic mean of the percentage of light scattered by the three specimens shall not exceed 15.0%.				

**TEST REPORT FOR GRAFFITI SHIELD**

Report No.: H4015.02-106-31 R1

Date: 10/18/17

<b>TEST 17 - ABRASION RESISTANCE - SET 2 (MIRROR)</b>							
SPECIMEN ID	PRE-ABRASION GLOSS			POST-ABRASION GLOSS			RESULT
	(20°)	(60°)	(85°)	(20°)	(60°)	(85°)	
1	163.7	241.6	92.5	163.2	241.1	86.9	N/A
2	164.3	243.1	93.7	163.2	241.1	84.7	N/A
3	164.3	243.1	94.1	163.2	241.1	86.6	N/A
<b>Average:</b>	<b>164.1</b>	<b>242.6</b>	<b>93.4</b>	<b>163.2</b>	<b>241.1</b>	<b>86.1</b>	N/A
<b>Units Change:</b>				<b>-0.5</b>	<b>-0.6</b>	<b>-8.6</b>	

No requirement for clear film over mirror, gloss, and abrasion results

<b>TEST 17 - ABRASION RESISTANCE - SET 3 (METAL)</b>							
SPECIMEN ID	PRE-ABRASION GLOSS			POST-ABRASION GLOSS			RESULT
	(20°)	(60°)	(85°)	(20°)	(60°)	(85°)	
1	152.1	120.0	66.7	145.7	114.7	63.8	N/A
2	151.4	119.8	67.0	144.7	114.3	64.2	N/A
3	158.7	122.3	67.2	153.7	117.9	64.5	N/A
<b>Average:</b>	<b>154.1</b>	<b>120.7</b>	<b>67.0</b>	<b>148.0</b>	<b>115.6</b>	<b>64.2</b>	N/A
<b>Units Change:</b>				<b>-4.1</b>	<b>-4.4</b>	<b>-4.3</b>	

No requirement for clear film over steel, gloss, and abrasion results

**TEST REPORT FOR GRAFFITI SHIELD**

Report No.: H4015.02-106-31 R1

Date: 10/18/17

<b>TEST 19 - CHEMICAL RESISTANCE</b>					
<b>CHEMICAL</b>	<b>SPECIMEN ID</b>	<b>OBSERVATIONS</b>	<b>RESULT</b>		
			<b>SET 1 (GLASS)</b>	<b>SET 2 (MIRROR)</b>	<b>SET 3 (METAL)</b>
<b>Nonabrasive Soap</b>	<b>C-1</b>	No tackiness, crazing, or loss of transparency	Pass	Pass	Pass
	<b>C-2</b>	No tackiness, crazing, or loss of transparency	Pass	Pass	Pass
<b>Kerosene</b>	<b>C-3</b>	No tackiness, crazing, or loss of transparency	Pass	Pass	Pass
	<b>C-4</b>	No tackiness, crazing, or loss of transparency	Pass	Pass	Pass
<b>Denatured Alcohol</b>	<b>C-5</b>	No tackiness, crazing, or loss of transparency	Pass	Pass	Pass
	<b>C-6</b>	No tackiness, crazing, or loss of transparency	Pass	Pass	Pass
<b>Gasoline</b>	<b>C-7</b>	No tackiness, crazing, or loss of transparency	Pass	Pass	Pass
	<b>C-8</b>	No tackiness, crazing, or loss of transparency	Pass	Pass	Pass
<b>Windshield Cleaner</b>	<b>C-9</b>	No tackiness, crazing, or loss of transparency	Pass	Pass	Pass
	<b>C-10</b>	No tackiness, crazing, or loss of transparency	Pass	Pass	Pass
Test Criteria: No tackiness, crazing, or loss of transparency					

<b>TEST 28 - RESISTANCE TO TEMPERATURE CHANGE - SET 1 (GLASS)</b>					
<b>SPECIMEN ID</b>	<b>OBSERVATIONS</b>				<b>RESULT</b>
	<b>CRACKING</b>	<b>CLOUDING</b>	<b>DELAMINATION</b>	<b>DETERIORATION</b>	
<b>T1</b>	No	No	No	No	Pass
<b>T2</b>	No	No	No	No	Pass
Test Criteria: The specimens shall show no evidence of cracking, clouding, delaminating, or other evidence of deterioration.					



## TEST REPORT FOR GRAFFITI SHIELD

Report No.: H4015.02-106-31 R1

Date: 10/18/17

### SECTION 9

#### CONCLUSION

The Glass Shield Organic Coating (Film) met the specified performance requirements. The Mirror and Metal Coating (Film) met the specified performance test requirements for test 17 Abrasion Resistance and test 19 Chemical Resistance.

## TEST REPORT FOR GRAFFITI SHIELD

Report No.: H4015.02-106-31 R1

Date: 10/18/17

### SECTION 10 PHOTOGRAPHS



**Photo No. 1**  
**Test 1 and 2 Specimens**



**Photo No. 2**  
**Test 17 - Specimens One of Each Shown, Left to Right,**  
**20g Metal, Glass, and Mirror**

## TEST REPORT FOR GRAFFITI SHIELD

Report No.: H4015.02-106-31 R1

Date: 10/18/17



**Photo No. 3**  
**Test 19 - Glass Specimens**

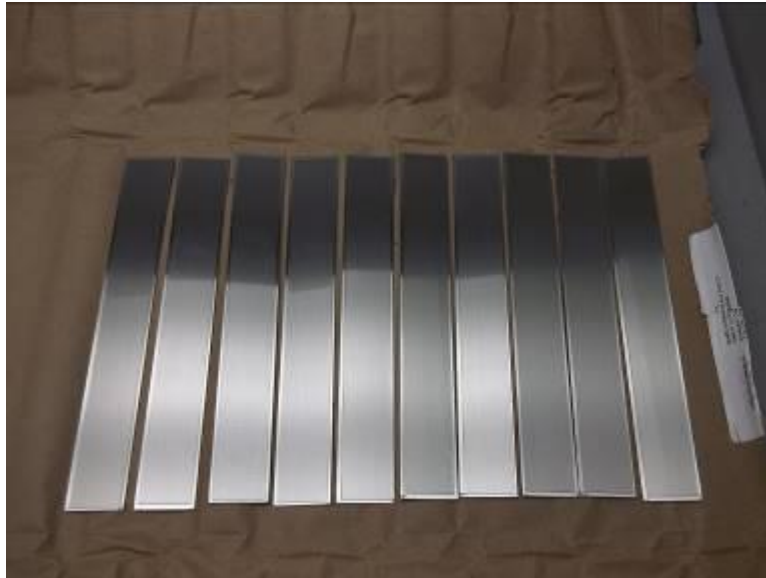


**Photo No. 4**  
**Test 19 - Mirror Specimens**

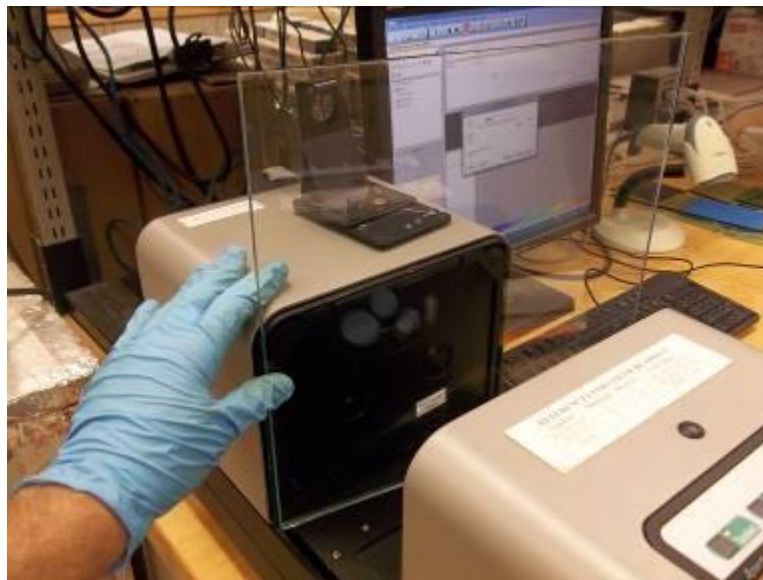
## TEST REPORT FOR GRAFFITI SHIELD

Report No.: H4015.02-106-31 R1

Date: 10/18/17



**Photo No. 5**  
**Test 19 - 20g Metal Specimens**

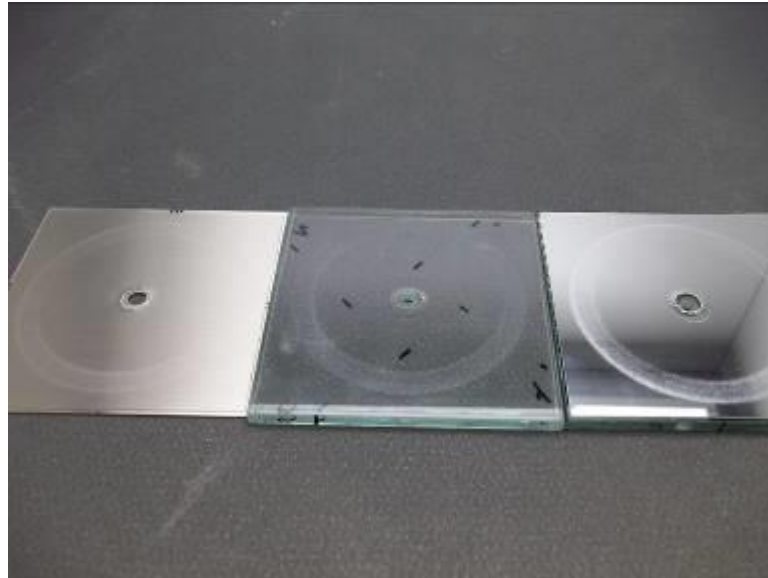


**Photo No. 6**  
**Typical Luminance Transmittance Test Setup Detail**

## TEST REPORT FOR GRAFFITI SHIELD

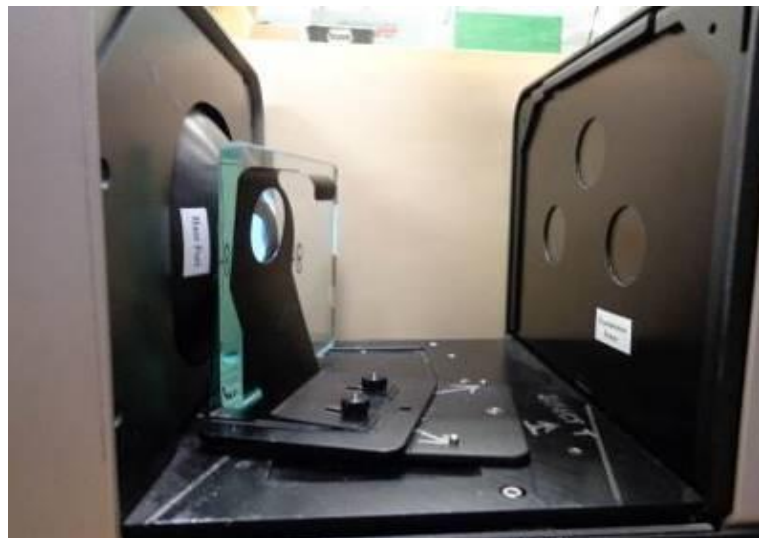
Report No.: H4015.02-106-31 R1

Date: 10/18/17



**Photo No. 7**

**Test 17 - Abrasion Results, One of Each Shown, Left to Right,  
20g Metal Glass, and Mirror (Typical)**



**Photo No. 8**

**Typical Haze Test Setup Detail**

## TEST REPORT FOR GRAFFITI SHIELD

Report No.: H4015.02-106-31 R1

Date: 10/18/17



**Photo No. 9**  
**Typical Gloss Reading Test Setup Detail**

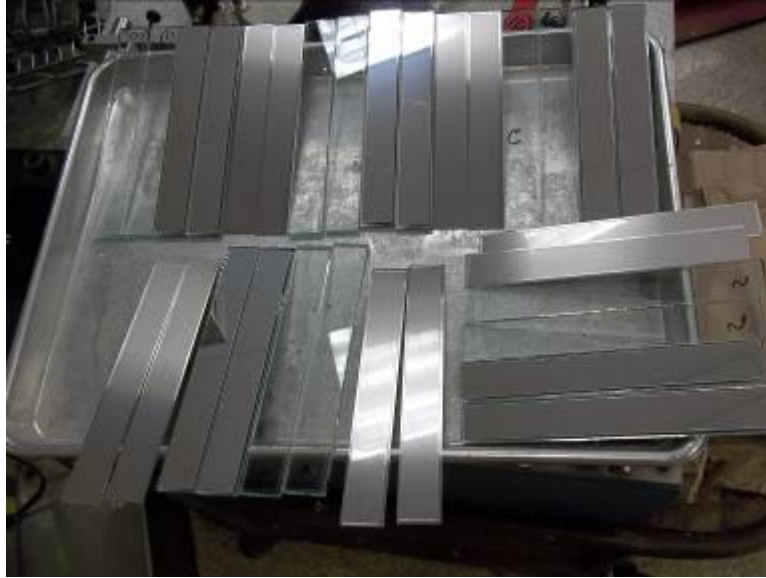


**Photo No. 10**  
**Typical Chemical Resistance Test Setup**

## TEST REPORT FOR GRAFFITI SHIELD

Report No.: H4015.02-106-31 R1

Date: 10/18/17



**Photo No. 11**  
**Chemical Resistance Tested Specimen**



**Photo No. 12**  
**Test 28 - Resistance to Temperature Specimens Conditioning**

**TEST REPORT FOR GRAFFITI SHIELD**

Report No.: H4015.02-106-31 R1

Date: 10/18/17



**Photo No. 13**

**Test 28 - Resistance to Temperature Specimens**



**Photo No. 14**

**Test 28 - Resistance to Temperature Specimens Result (Typical)**





Total Quality. Assured.

130 Derry Court  
York, Pennsylvania 17406

Telephone: 717-764-7700  
Facsimile: 717-764-4129  
[www.intertek.com/building](http://www.intertek.com/building)

## TEST REPORT FOR GRAFFITI SHIELD

Report No.: H4015.02-106-31 R1

Date: 10/18/17

### SECTION 11

#### REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	10/18/17	N/A	Original Report Issue
1	02/13/20	5	Test Description Updated