

Internet:  
[www.hurricanetest.com](http://www.hurricanetest.com)

E-Mail:  
[Info@hurricanetest.com](mailto:Info@hurricanetest.com)

6655 Garden Road  
Riviera Beach  
Florida 33404

Phone: (561) 881-0020  
Fax: (561) 881-0075

## Hurricane Test Laboratory, Inc.

Windows / Doors / Storefronts / Curtain Walls / Skylights / Shutters / EIFS / Metal Building Systems

### STRUCTURAL TEST REPORT – FIXED WINDOW

Test Date: 04/05/00

Job #: 0226-0403-00

Specimen #: 1

Page #: 1

#### CUSTOMER INFORMATION

- 1.0 NAME OF APPLICANT: GLASS MASONRY, INC.  
5000 OAKES ROAD, #F  
Ft. Lauderdale, FL 33314
- 2.0 CONTACT PERSON1: Richard Bushong
- 3.0 HTL TEST NOTIFICATION #: N/A
- 4.0 HTL LAB CERTIFICATION: SBCCI (TL9704A)  
American Architectural Manufacturers Association (AAMA)  
Texas Department of Insurance (TDI)


#### PRODUCT DESCRIPTION

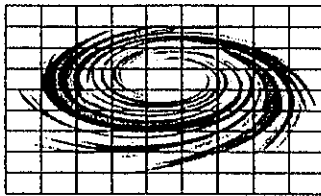
- 5.0 DESCRIPTION OF TESTED UNITS: Please note that GMI Drawing No. 1006 and all accompanying sheets are incorporated into this test report by reference.
- 5.1 Model Designation: NON-IMPACT GLASS BLOCK SYSTEM IN ALUMINUM FRAME
- 5.1 Overall Size: 65-in. (w) x 65-in. (h)
- 5.2 Configuration: Fixed
- 5.3 No./Size of Vents: N/A
- 6.0 MATERIAL CHARACTERISTICS:
- 6.1 Perimeter Frame Construction: All components of the perimeter frame are fabricated from an aluminum alloy 6063-T5 extrusion with cross sectional dimensions of 2.386-in. (face) x 1.890-in. (deep) x 0.050-in. (min. wall thickness. At the corners of the frame, the aluminum members are mitered and attached together at each end using a 1-1/2-in. long, 2-in. x 2-in. x 1/16-in. aluminum alloy 6063-T5 corner angle. Each corner angle is secured to each frame member using two (2), 1/8-in. diameter aluminum pop rivets. Please note that each of these pop rivets passes through the screw boss contained in the perimeter frame extrusion. Please refer to GMI Drawing No. 1006, Sheet 3 of 4, "FRAME CORNER DETAIL" for more information.
- 6.2 Glass Block Construction: Each glass block used in this sample was separated vertically and horizontally from adjacent glass blocks using an aluminum alloy 6063-T5 separator having overall cross-sectional dimensions of 0.232-in. (face) x 1.614-in. (deep) x 0.059-in. (Min. wall thickness). Please refer to GMI Drawing No. 1006, Sheet 3 of 4, Detail "SEPARATOR" for exact cross-sectional dimensions. The horizontal separators used between each row of glass blocks was a continuous member that ran the entire width of the sample while the vertical separators used between each glass block nested in between the horizontal separators. Each horizontal separator was attached at either end to the perimeter frame via a separator clip that was inserted into the separator extrusion. This separator clip was fabricated from zinc plated steel and had overall cross-sectional

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dimensions as shown on GMI Drawing No. 1006, Sheet 3 of 4, Detail "SEPARATOR CLIP". Each separator clip was slid into the vertical perimeter frame member and engaged into the slots contained in the perimeter frame extrusion. Please refer to GMI Drawing No. 1006, Sheet 3 of 4, Detail "SEPARATOR CLIP TO FRAME CONNECTION DETAIL" for more information on how the separator clip engaged the perimeter frame member. One (1), 1/8-in. diameter aluminum pop rivet, was used to attach each separator clip to the horizontal separator at every other horizontal separator location for shipping purposes only. Please refer to GMI Drawing No. 1006, Sheet 3 of 4, Detail "SEPARATOR CLIP TO FRAME CONNECTION DETAIL" for more information on the location of this pop rivet. Please note that there was a continuous horizontal separator used at each row of glass blocks including the bottom row.

### 6.3 Glazing:

**6.3.1 6.3.1 Glazing Material:** The glazing material used in this sample was nominal 8-in. x 8-in. x 2-in. (thick) glass block manufactured by J. WECK CO. Please refer to GMI Drawing No. 1006, Sheet 3 of 4, Detail "GLASS BLOCK" for exact dimensions of the glass block used in this sample.

### 6.3.2 Glazing Method:

Interior Side: There was a continuous bead of DOW Corning 1199 silicone glazing sealant applied around the interior perimeter of each glass block used in this sample.

Exterior Side: There was a continuous bead of DOW Corning 1199 silicone glazing sealant applied around the exterior perimeter of each glass block used in this sample.

### 6.3.3 Daylight Opening:

Quantity	Location	Daylight Opening	Glass Bite
1	Fixed Panel	63-in. (w) x 63-in. (h)	N/A

**6.3.4 Weather-stripping:** None used in this sample.

**6.4 Hardware:** None used in this sample.

**6.5 Weep Holes:** None used in this sample.

**6.6 Muntins:** None used in this sample.

**6.7 Sealant's Used:**

Perimeter and Glazing Seal – Dow Corning 1199 Silicone Glazing Sealant.

## INSTALLATION

**7.0** Following is a description of how this sample is installed in the wood buck for testing:

**7.1 Window Perimeter Frame to Buck:** The window perimeter frame was mechanically secured to the wood buck on all four sides through the nailing fin using a single row of #8 x 1-1/2-in. P.H. SMS. These fasteners were located 2-in. away from each window frame corner and then 8-in. on center thereafter. Please refer to GMI Drawing No. 1006, Sheet 1 of 4, "EXTERIOR ELEVATION" for additional information on the location of the fasteners used to secure the window frame to the opening. Please note that there was a continuous perimeter bead of OSI PR-255 Polyurethane Sealant applied between the nailing fin and the wood buck. Please refer to GMI Drawing No. 1006, Sheet 2 of 4, Section "A1" for additional information on the perimeter sealant used.

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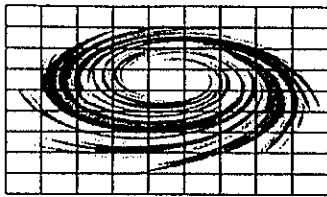
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**TEST RESULTS**

**8.0 TEST SEQUENCE:**

- a. Air infiltration test at 1.57 psf.
- b. Air infiltration test at 6.24 psf.
- c. Water infiltration test at 15% of positive design pressure per ASTM E547.
- d. Water infiltration test at 15% of positive design pressure per ASTM E331.
- e. Uniform static load test at 50% of positive test pressure.
- f. Uniform static load test at positive design pressure.
- g. Uniform static load test at 100% of positive test pressure.
- h. Uniform static load test at 50% of negative test pressure.
- i. Uniform static load test at negative design pressure.
- j. Uniform static load test at 100% of negative test pressure.
- k. Forced entry resistance test.

**9.0 AIR INFILTRATION TEST RESULTS:**

**9.1 TEST DATA :**

Test Pressure (psf)	q (ft <sup>3</sup> /min)	q <sub>A</sub> (ft <sup>3</sup> /min*ft <sup>2</sup> )
1.57	0.10	0.003
6.24	0.50	0.016

q = Measured Air Leakage

q<sub>A</sub> = Air Leakage Per Area of Specimen

**9.2 REMARKS:**

According to section 2.1.2 of AAMA/NWWDA 101/I.S.2-97, the Air Infiltration Test was conducted in accordance to ASTM E283. The allowable air leakage for this product was 0.30 cfm/sq.ft. at 1.57 psf and 0.10 cfm/sq.ft. at 6.24 psf. The air infiltration measured through this specimen fell within the allowable limits for this type of product. As such, this sample was found to satisfy the air infiltration requirements of AAMA/NWWDA 101/I.S.2-97. This test was completed on 4/5/00.

**10.0 WATER LEAKAGE TEST RESULTS:**

**10.1 TEST CONDITIONS:**

**10.1.1 ASTM E-547:**

Test Pressure (0.15P<sub>d</sub>) = 12.00 psf  
 Test Duration = 24.00 min.  
 Spray Rate = 5.0 gal/(ft<sup>2</sup>\*hr)

**10.1.2 ASTM E-331:**

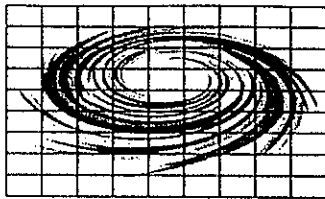
Test Pressure (0.15P<sub>d</sub>) = 12.00 psf  
 Test Duration = 15.00 min.  
 Spray Rate = 5.0 gal/(ft<sup>2</sup>\*hr)

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**10.2 REMARKS:**

According to section 2.1.3 of AAMA 101-97, the Water Infiltration Test was conducted in accordance to both ASTM E331 and E547. At the conclusion of the test durations, there was no moisture detected inside the specimen. This specimen was found to satisfy the requirements of AAMA 101-97. These tests were completed on 4/5/00.

**11.0 UNIFORM STATIC LOAD TEST RESULTS:**

**11.1 TEST LOAD (P<sub>t</sub>) COMPUTATION:**

**Manufacturer Specified Design Pressures:**

Inward Acting Design Pressure (P<sub>d</sub>)<sub>in</sub> = 70.00 psf

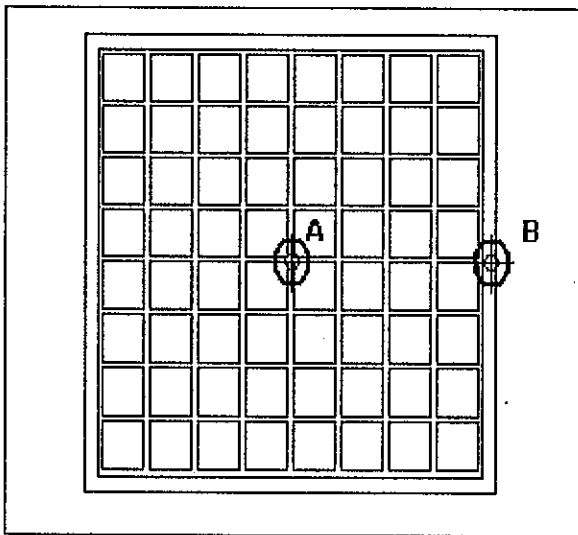
Outward Acting Design Pressure (P<sub>d</sub>)<sub>out</sub> = 75.00 psf

**Conversion to Equivalent Test Load:**

Maximum Inward Acting Test Load (P<sub>t</sub>)<sub>in</sub> = 1.5(P<sub>d</sub>)<sub>in</sub> = 105.00 psf

Maximum Outward Acting Test Load (P<sub>t</sub>)<sub>out</sub> = 1.5(P<sub>d</sub>)<sub>out</sub> = 112.50 psf

**11.2 LOCATION OF DEFLECTION MEASUREMENTS:**



**11.3 DEFLECTION DATA:**

**11.3.1 POSITIVE LOAD:**

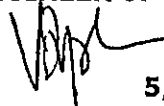
**LOCATION A:**

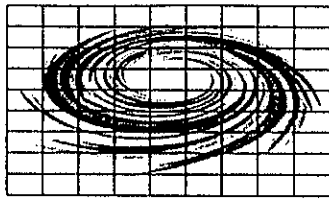
Load (psf)	Net Deflection (in.)	Permanent Set (in.)	% Recovery
52.5	1.30	0.02	98.46
70	2.25	0.33	85.33
105	2.75	0.46	83.27

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### LOCATION B

Load (psf)	Net Deflection (in.)	Permanent Set (in.)	% Recovery
52.5	0.09	0.00	100.00
70	0.14	0.00	100.00
105	0.20	0.02	90.00

### 11.3.2 NEGATIVE LOAD:

#### LOCATION A:

Load (psf)	Net Deflection (in.)	Permanent Set (in.)	% Recovery
56.25	1.64	0.08	95.12
75	1.89	0.13	93.12
112.5	3.25	0.40	87.69

#### LOCATION B

Load (psf)	Net Deflection (in.)	Permanent Set (in.)	% Recovery
56.25	0.23	0.05	78.26
75	0.26	0.05	80.80
112.5	0.36	0.06	83.33

### 11.4 REMARKS:

Deflection was measured at geometric center of the window and the center of the right frame jamb. According to section 2.1.4.1 and 2.1.4.2 of AAMA 101-97, the Uniform Load Structural Test was conducted in accordance to ASTM E330. Each load was applied for 33 seconds (except for the test loads, they were applied for 10 seconds each). No signs of failure were observed during the test. As such, this specimen was found to satisfy the uniform static load test requirements set forth by AAMA101-97 and ASTM E330. This test was completed on 4/5/00.


### 12.0 FORCED ENTRY RESISTANCE TEST RESULTS (ASTM F588):

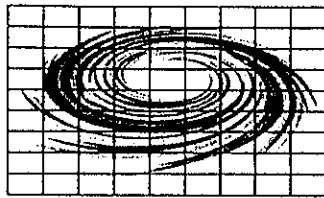
According to section 2.1.8 of AAMA 101-97, the Forced Entry Resistance Test was conducted in accordance to ASTM F588. In accordance with the requirements of this test method, HTL technicians were unable to cause the window to fail. As such, this specimen was found to satisfy the requirements set forth by AAMA101-97. This test was completed on 4/5/00.

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### 13.0 SUMMARY OF RESULTS:

Test Method	Test Conditions	Test Conclusion
Air Infiltration Test (ASTM E283)	1.57 psf & 6.24 psf	PASS
Water Infiltration Test (ASTM E547)	12.00 psf	PASS
Water Infiltration Test (ASTM E331)	12.00 psf	PASS
Static Load Test (ASTM E330)	+ 70 and – 75 psf Design Pressure	PASS
Forced Entry Resistance Test (ASTM F588)	Grade 10	PASS

### MISCELLANEOUS INFORMATION

#### 14.0 CERTIFICATION & DISCLAIMER STATEMENT:

The test and the results summarized in this test report were conducted in accordance with the specifications of the applicable codes, standards & test methods listed below by the Hurricane Test Laboratory, Inc. located at 6655 Garden Road, Riviera Beach, FL 33404. This report is only intended for the use of the entity named in section 1.0 of this report. Detailed assembly drawings showing wall thickness of all members, corner construction and hardware applications are on file and have been compared to the sample submitted. A test sample will be retained at the test laboratory. A copy of this report has been forwarded to the validator. The above results were secured by using the designated test methods and they indicate compliance with the performance requirements of the referenced specification. This report does not constitute certification of this product, which may only be granted by the Validator.

#### 15.0 APPLICABLE CODES, STANDARDS & TEST METHODS:

**ASTM E283** - Standard Test Method For Determining The Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences.

**ASTM E330** - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.


**ASTM E331** - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

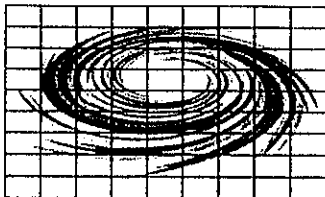
**ASTM F588** - Standard Test Methods for Resistance of Window Assemblies to Forced Entry Excluding Glazing.

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José E. Colón, E.I.T.~~

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**AAMS 101/I.S.2-97** – Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.

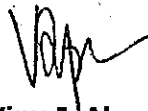
**16.0 LIST OF OFFICIAL OBSERVERS:**

Vinu Abraham - HTL, Professional Engineer  
José Colón - HTL, Engineer  
Joe Gibson - HTL, Technician  
Terry Roberts - HTL, Technician

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~~5/10/00  
José E. Colón, E.I.T.~~

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