

# NEW HORIZON SHUTTERS

NEW HORIZON PANEL AND  
LOUVER SHUTTER



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*Testing & Evaluation  
Solutions*



**MANUFACTURER INFORMATION**

- 1.0 NAME OF APPLICANT:** **NEW HORIZON SHUTTERS**  
 7259 Spa Road  
 N. Charleston, South Carolina 29418  
 (843) 830-2054
- 2.0 CONTACT PERSON:** Harry Rembert
- 3.0 HTL TEST NOTIFICATION #:** N/A
- 4.0 HTL LAB CERTIFICATION:** Miami-Dade County (01-0205.03)  
 SBCCI (TL9704A)  
 Texas Department of Insurance (TDI)  
 American Architectural Manufacturers Association (AAMA)

**PRODUCT DESCRIPTION**

- 5.0 DESCRIPTION OF TESTED UNITS:**
  - 5.1 Model Designation:** NEW HORIZON PANEL AND LOUVER SHUTTER
  - 5.2 Overall Size:** 40-in. (w) x 118-in. (h)
  - 5.3 Configuration:** This sample was configured two (2), panels wide and was hinged on the sides with three (3) lock locations at meeting stiles.
  - 5.4 No./Size of Panels:** Two (2) panels, each panel is 20-in. (w) x 118-in (h).

**6.0 MATERIAL CHARACTERISTICS:**

- 6.1 Individual Panel Construction:** There were two panels used in this sample, each was fabricated as follows:

Description	Overall Cross Section	Material
Side Stiles	2.000" x 1.250 x 0.125"	6061 Aluminum Channel
Raised Panels (outside)	5/8" thick	PVC
Panel Interlayer	1/8" thick	Polycarbonate by Piedmont Plastics, Inc.
Raised Panels (inside)	1/2" thick	PVC
Louvers	1.5" wide x 3/16" thick	Acrylonitrile Butadiene Styrene (ABS)

The panels and the polycarbonate interlayer were glued together using BOSTIC 920 Marine Urethane Sealant. The sealant was applied to both faces of the polycarbonate using an "S" pattern.

**6.2 Hinges:**

Qty.	Description	Location	Attachment to Panel
6	Heavy Duty L-Type Shutter Hinge # 4000 by James Peters & Son, Inc.	Three (3) per panel attached to opening 5" from top and bottom and at geometric center.	Each hinge is attached to the shutter using two (2) 1/4" x 1.75" x 20-ga. Stainless steel bolt and nut and three (3) # 10 x 1" self-tapping hex head screw.

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**6.3 Storm Bars/Lock:**

Qty.	Description	Size	End Connection Type
3	6061 Aluminum angle	1.5" x 3/16" x 11" long	Through bolted with four (4) 1/4" x 20 bolts
3	Steel Barrel Bolts or Steel Slide Bolts	8" x 2.5" or 11" x 2"	(8) 1/4" x 20 bolts or (8) #10 x 1" self tapping hex head screws

**INSTALLATION**

**7.0** Following is a description of how this sample was installed in the test buck when viewed from the exterior side:

Item	Attachment
Wall Hinge	Each wall hinge is attached to the opening using three (3), #10 x 2.5" square drive stainless steel deck screws.

**STRUCTURAL TEST RESULTS**

**8.0 SUMMARY OF RESULTS:**

<b>SPECIMEN # 3 (HTL # 0315-1024-02) – Panel with Barrel Bolt</b>		
Test Method	Test Conditions	Test Conclusion
Static Load Test (ASTM E330 and TAS 202)	+ 42 and – 42 psf Design Pressure	PASS

<b>SPECIMEN # 4 (HTL # 0315-1024-02) – Louvered with Slide Bolt</b>		
Test Method	Test Conditions	Test Conclusion
Static Load Test (ASTM E330 and TAS 202)	+ 42 and – 42 psf Design Pressure	PASS

**9.0 TEST SEQUENCE:**

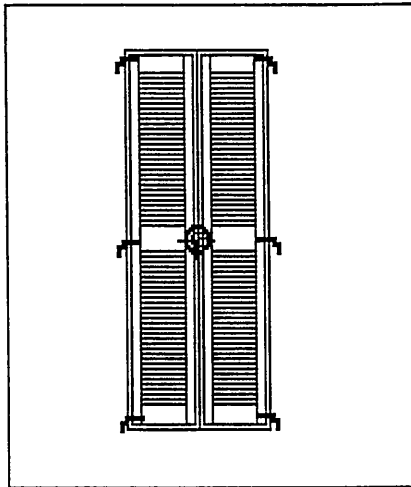
- a. Uniform static load test at 50% of positive test pressure.
- b. Uniform static load test at positive design pressure.
- c. Uniform static load test at 100% of positive test pressure.
- d. Uniform static load test at 50% of negative test pressure.
- e. Uniform static load test at negative design pressure.
- f. Uniform static load test at 100% of negative test pressure.

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**10.0 UNIFORM STATIC LOAD TEST RESULTS:**  
**10.1 LOCATION OF DEFLECTION MEASUREMENT:**



**10.2 DEFLECTION DATA (Specimen # 3 – HTL # 0315-1024-02):**  
**10.2.1 POSITIVE LOAD:**

**LOCATION (Geometric Center):**

Load	Net Deflection	Permanent Set	% Recovery
31.5 psf	1.88"	0.13"	93.33
42 psf	2.25"	0.13"	94.44
63 psf	2.88"	0.13"	95.65

**10.2.2 NEGATIVE LOAD:**

**LOCATION (Geometric Center):**

Load	Net Deflection	Permanent Set	% Recovery
31.5 psf	4.50"	0.50"	88.89
42 psf	5.06"	1.00"	80.25
63 psf	6.13"	1.75"	71.43

**10.3 DEFLECTION DATA (Specimen # 4 – HTL # 0315-1024-02):**  
**10.3.1 POSITIVE LOAD:**

**LOCATION (Geometric Center):**

Load	Net Deflection	Permanent Set	% Recovery
31.5 psf	1.88"	0.00"	100.00
42 psf	2.50"	0.06"	97.60
63 psf	3.38"	0.13"	96.30

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**10.3.2 NEGATIVE LOAD:**  
**LOCATION (Geometric Center):**

Load	Net Deflection	Permanent Set	% Recovery
31.5 psf	4.50"	0.50"	88.89
42 psf	5.38"	0.81"	84.88
63 psf	6.75"	1.50"	77.78

**10.4 REMARKS:**

The deflection shown is the net deflection at the geometric center of the shutter system. No signs of failure were found on this specimen after the static load test.

**MISSILE IMPACT AND CYCLIC LOAD TEST RESULTS**

**11.0 SUMMARY OF RESULTS:**

<b>Specimen # 6 (HTL # 0315-1024-02) Louvered with Slide Bolt</b>		
Test Method	Test Conditions	Test Conclusion
Large Missile Impact Test	ASTM E-1996 Missile Level "D"	PASS
Cyclic Load Test (ASTM E-1996)	+ 42 and - 42 psf Design Pressure	PASS

<b>Specimen # 3 (HTL # 0315-1110-02) Panel with Barrel Bolt</b>		
Test Method	Test Conditions	Test Conclusion
Large Missile Impact Test	ASTM E-1996 Missile Level "D"	PASS
Cyclic Load Test (ASTM E-1996)	+ 42 and - 42 psf Design Pressure	PASS

<b>Specimen # 4 (HTL # 0315-1110-02) Panel with Slide Bolt</b>		
Test Method	Test Conditions	Test Conclusion
Large Missile Impact Test	ASTM E-1996 Missile Level "D"	PASS

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Test Method	Test Conditions	Test Conclusion
Cyclic Load Test (ASTM E-1996)	+ 42 and - 42 psf Design Pressure	PASS

**12.0 TEST SEQUENCE:**

- a. Large Missile Impact Test.
- b. Positive Cyclic Load Test.
- c. Negative Cyclic Load Test.

**13.0 MISSILE IMPACT TESTS:**

**13.1 LARGE MISSILE IMPACT TEST DATA (Specimen # 6 – HTL # 0315-1024-02):**

**Missile Weight:** 9.38 lb.

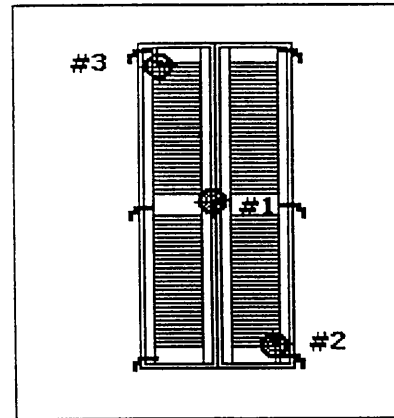
**Missile Length:** 96"

Impact #	Velocity	Instant Deflection	Permanent Deflection	X Coordinate	Y Coordinate
1	50.03 ft/sec	--	--	20.00"	59.00"
2	49.68 ft/sec	--	--	31.00"	6.00"
3	49.08 ft/sec	--	--	12.00"	113.00"

**13.2 IMPACT LOCATIONS AND REMARKS:**

Impact # 1 – 3 hit the intended targets resulting in the recorded measurements. Both interior and the exterior face of the panel split in several places around the impact location. No penetration was observed on the polycarbonate interlayer.

Upon completion of the large missile impact test, this sample subsequently underwent the cyclic load test as specified ASTM E-1996.



**13.3 LARGE MISSILE IMPACT TEST DATA (Specimen # 3 – HTL # 0315-1110-02):**

**Missile Weight:** 9.00 lb.

**Missile Length:** 97"

Impact #	Velocity	Instant Deflection	Permanent Deflection	X Coordinate	Y Coordinate
1	49.04 ft/sec	3.48"	0.24"	33.00"	8.00"
2	49.02 ft/sec	3.13"	0.15"	9.00"	107.50"
3	49.12 ft/sec	1.79"	0.00"	20.25"	58.75"

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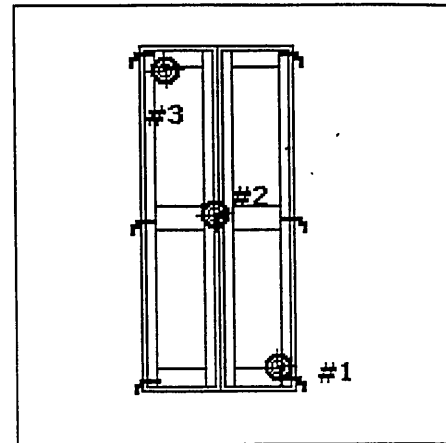
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**13.4 IMPACT LOCATIONS AND REMARKS:**

Impact # 1 – 3 hit the intended targets resulting in the recorded measurements. Both interior and the exterior face of the panel split in several places around the impact location. No penetration was observed on the polycarbonate interlayer.

Upon completion of the large missile impact test, this sample subsequently underwent the cyclic load test as specified ASTM E-1996.



**13.5 LARGE MISSILE IMPACT TEST DATA (Specimen # 4 – HTL # 0315-1110-02):**

**Missile Weight:** 9.00 lb.

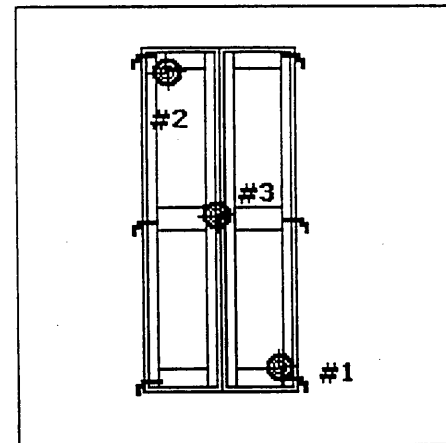
**Missile Length:** 97"

Impact #	Velocity	Instant Deflection	Permanent Deflection	X Coordinate	Y Coordinate
1	49.98 ft/sec	4.88"	0.44"	31.00"	9.50"
2	49.73 ft/sec	3.85"	0.21"	7.00"	108.00"
3	49.93 ft/sec	0.75"	0.02"	21.50"	62.00"

**13.6 IMPACT LOCATIONS AND REMARKS:**

Impact # 1 – 3 hit the intended targets resulting in the recorded measurements. Both interior and the exterior face of the panel split in several places around the impact location. No penetration was observed on the polycarbonate interlayer.

Upon completion of the large missile impact test, this sample subsequently underwent the cyclic load test as specified ASTM E-1996.



**14.0 CYCLIC LOAD TEST:**

**14.1 CYCLIC TEST PRESSURE:**

$(P_d)_{in} = P_{max} = 42 \text{ psf}$

$(P_d)_{out} = P_{max} = 42 \text{ psf}$

**14.2 CYCLIC LOAD SPECTRUM:**

**14.2.1 POSITIVE CYCLIC LOAD SPECTRUM:**

# OF INWARD ACTING CYCLES/STAGE			
8.4 – 21 (psf)	0 – 25.2 (psf)	21 – 33.6 (psf)	12.6 – 42 (psf)
3500	300	600	100

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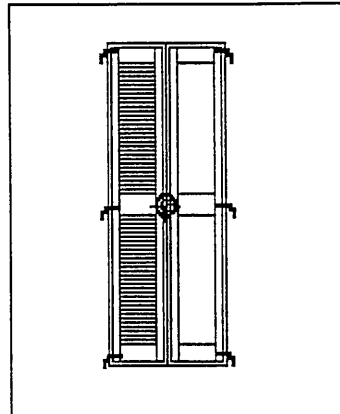
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**14.2.2 NEGATIVE CYCLIC LOAD SPECTRUM:**

# OF OUTWARD ACTING CYCLES/STAGE			
12.6 – 42 (psf)	21 – 33.6 (psf)	0 – 25.2 (psf)	8.4 – 21 (psf)
50	1050	50	3350

**14.2.3 DEFLECTION GAGE LOCATIONS:**



**14.2.4 DEFLECTION DATA:**

**SPECIMEN # 6 (HTL # 0315-1024-02) - LOCATION (Geometric Center):**

MAXIMUM INWARD DEFLECTION DATA (in.)			MAXIMUM OUTWARD DEFLECTION DATA (in.)		
Net	Permanent Set	% Recovery	Net	Permanent Set	% Recovery
2.63"	0.38"	85.71	6.25"	0.63"	90.00

**SPECIMEN # 3 (HTL # 0315-1110-02) - LOCATION (Geometric Center):**

MAXIMUM INWARD DEFLECTION DATA (in.)			MAXIMUM OUTWARD DEFLECTION DATA (in.)		
Net	Permanent Set	% Recovery	Net	Permanent Set	% Recovery
3.25"	0.63"	80.62	5.50"	1.50"	72.73

**SPECIMEN # 4 (HTL # 0315-1110-02) - LOCATION (Geometric Center):**

MAXIMUM INWARD DEFLECTION DATA (in.)			MAXIMUM OUTWARD DEFLECTION DATA (in.)		
Net	Permanent Set	% Recovery	Net	Permanent Set	% Recovery
3.75"	0.60"	84.13	4.75"	0.50"	89.47

**14.2.5 REMARKS:**

Deflection data was measured at the geometric center of each shutter system. This sample was inspected carefully upon completion of the cyclic test for failures. None were found. As such, this specimen was found to satisfy the cyclic test requirements of ASTM E-1996.

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## MISCELLANEOUS INFORMATION

### 15.0 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. The above results were secured by using the designated test methods and they indicate compliance with the performance requirements of the referenced specification.

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

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

**ASTM E1886** - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missiles(s) and Exposed to Cyclic Pressure Differentials.

**ASTM E1996** - Standard Specification for Performance of Exterior Walls, Glazed Curtain Walls, Doors, and Storm Shutters Impacted by Windborne Debris in Hurricanes

### 17.0 LIST OF OFFICIAL OBSERVERS:

Vinu J. Abraham, P.E. - HTL, General Manager  
José E. Colón, E.I. - HTL, Engineering Group - Test Services  
Ron Nixon Sr. - HTL, Test Team Supervisor  
Frank Hughs - HTL, Test Team  
Harry Rembert - NEW HORIZON SHUTTERS

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