



NATIONAL CERTIFIED TESTING LABORATORIES

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STRUCTURAL PERFORMANCE TEST REPORT

Report No.: NCTL-210-3192-1A

Test Date: 08/30/05

Report Date: 09/08/05

Client: Gallina USA, LLC.
245 E Madison Avenue
Milton, WI 53563

Test Specimen: 16mm Hurricane Storm Panel R.D.C.
(48" x 96"- D/P Positive 60psf and Negative 60psf)

Test Method: ASTM E330-02, "Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference." ASTM E1886-99, "Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile and Exposed to Cyclic Pressure Differentials." ASTM E1996-02, "Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Storm Shutters Impacted by Windborne Debris in Hurricanes."

TEST SPECIMEN DESCRIPTION

General: The specimen tested was a 16mm hurricane storm panel, which consisted of one (1) sheet of cross-fluted polycarbonate. The overall dimensions were 48" wide x 96" high x 0.625" thick. Both interior and exterior skin walls measured 0.030" in thickness. The interior fluted walls, measured 0.010" in thickness.

Installation: Each hurricane storm panel was installed into the test buck with twenty-two (22) 0.25"/20 x 3.50" Tapcon S.G. Anchors with one (1) 0.25" washer and one (1) washer/wing nut each; three (3) on each jamb and eight (8) at the head and sills. They were located 6" from each corner and 14" on center on the head and sills. On the jambs 6" from each end mid-span.

Interior and Exterior Surface Finish: The interior and exterior surface finish was translucent plastic.

TEST RESULTS

Specimen # 1

<u>Title of Test and Method</u>	<u>Measured</u>		<u>Allowed</u>	
	Loc. #1	Loc. #2	Loc. #1	Loc. #2
Uniform Load Structural - ASTM E330				
90.0 psf Exterior	0.013"	0.020"	0.056"	0.072"
90.0 psf Interior	0.003"	0.009"	0.056"	0.072"

Loc. # 1 - Center between Fasteners at the Head

Loc. # 2 - Center between Fasteners on the Jamb

Loc. # 1 - Maximum Allowable Permanent Set (0.004" x 14" length of span) = 0.056"

Loc. # 2 - Maximum Allowable Permanent Set (0.004" x 18" length of span) = 0.072"

PROFESSIONALS IN THE SCIENCE OF TESTING

[Handwritten signature and date 9/14/05]

TEST PARAMETERS

The appropriate missile to be used for impact tests was selected in accordance with section 6 of ASTM E1996 based on the following criteria:

Level of Protection:	Basic Protection
Wind Zone:	Wind Zone 4 - greater than 140 mph
Assembly Height Above Ground Level:	Less than or equal to 30 feet

IMPACT TEST RESULTS

Large missile impact tests were conducted using a #2 Southern Yellow Pine 2 x 4 measuring 92" in length and weighing 9.25 lbs (Missile D) as shown in Table 2 of ASTM E 1996. Missile speeds and locations were in accordance with section 5.3 and Table 2 ASTM E1996. For pass/fail criteria, no penetration is defined as no tear longer than 5 inches in length and 1/16" wide or no opening through which a 3" diameter solid sphere can freely pass per section 7 of ASTM E 1996. All specimens were conditioned at 70° F ± 15° F prior to testing. Missile orientation at impact complies with section 11.2.2 of ASTM E1886.

Specimen # 2

<u>Impact No.</u>	<u>Impact Location</u>	<u>Missile Speed</u>	<u>Results</u>
1	Center of Panel	50 feet/sec 34 mph	No Penetration
2	Top Right Corner of Panel	50 feet/sec 34 mph	No Penetration

Specimen # 3

<u>Impact No.</u>	<u>Impact Location</u>	<u>Missile Speed</u>	<u>Results</u>
1	Bottom Left Corner of Panel	50 feet/sec 34 mph	No Penetration
2	Center of Panel	50 feet/sec 34 mph	No Penetration

IMPACT TEST RESULTS CONT**Specimen # 4**

<u>Impact No.</u>	<u>Impact Location</u>	<u>Missile Speed</u>	<u>Results</u>
1	Top Right Corner of Panel	50 feet/sec 34 mph	No Penetration
2	Center of Panel	50 feet/sec 34 mph	No Penetration



PRESSURE CYCLING TEST RESULTS

After completion of the impact tests, the specimens were pressure cycled in accordance with Table 1 of ASTM E1996. The duration of each air pressure cycle was between 1 and 5 seconds. Where required, two (2) mil plastic film was used to obtain cycle loads. The film did not affect the performance of the specimen or influence the results of the test. For pass/fail criteria, no opening is defined as no tear longer than 5 inches in length and 1/16" wide or no opening through which a 3" diameter solid sphere can freely pass per section 7 of ASTM E 1996.

Specimen # 2

Design Pressure + 60psf -60psf

<u>Positive Loading Range</u>	<u>Pressures</u>	<u>No. of Cycles</u>	<u>Results</u>
0.2 DP to 0.5 DP	12.0 psf to 30.0 psf	3500	Passed
0.0 DP to 0.6 DP	0.0 psf to 36.0 psf	300	Passed
0.5 DP to 0.8 DP	30.0 psf to 48.0 psf	600	Passed
0.3 DP to 1.0 DP	18.0 psf to 60.0 psf	100	Passed

<u>Negative Loading Range</u>	<u>Pressures</u>	<u>No. of Cycles</u>	<u>Results</u>
-0.3 DP to -1.0 DP	18.0 psf to 60.0 psf	50	Passed
-0.5 DP to -0.8 DP	30.0 psf to 48.0 psf	1050	Passed
-0.0 DP to -0.6 DP	0.0 psf to 36.0 psf	50	Passed
-0.2 DP to -0.5 DP	12.0 psf to 30.0 psf	3350	Passed

Specimen # 3

Design Pressure + 60psf -60psf

<u>Positive Loading Range</u>	<u>Pressures</u>	<u>No. of Cycles</u>	<u>Results</u>
0.2 DP to 0.5 DP	12.0 psf to 30.0 psf	3500	Passed
0.0 DP to 0.6 DP	0.0 psf to 36.0 psf	300	Passed
0.5 DP to 0.8 DP	30.0 psf to 48.0 psf	600	Passed
0.3 DP to 1.0 DP	18.0 psf to 60.0 psf	100	Passed

<u>Negative Loading Range</u>	<u>Pressures</u>	<u>No. of Cycles</u>	<u>Results</u>
-0.3 DP to -1.0 DP	18.0 psf to 60.0 psf	50	Passed
-0.5 DP to -0.8 DP	30.0 psf to 48.0 psf	1050	Passed
-0.0 DP to -0.6 DP	0.0 psf to 36.0 psf	50	Passed
-0.2 DP to -0.5 DP	12.0 psf to 30.0 psf	3350	Passed



PRESSURE CYCLING TEST RESULTS Con't**Specimen #4***Design Pressure + 60psf -60psf*

<u>Positive Loading Range</u>	<u>Pressures</u>	<u>No. of Cycles</u>	<u>Results</u>
0.2 DP to 0.5 DP	12.0 psf to 30.0 psf	3500	Passed
0.0 DP to 0.6 DP	0.0 psf to 36.0 psf	300	Passed
0.5 DP to 0.8 DP	30.0 psf to 48.0 psf	600	Passed
0.3 DP to 1.0 DP	18.0 psf to 60.0 psf	100	Passed

<u>Negative Loading Range</u>	<u>Pressures</u>	<u>No. of Cycles</u>	<u>Results</u>
-0.3 DP to -1.0 DP	18.0 psf to 60.0 psf	50	Passed
-0.5 DP to -0.8 DP	30.0 psf to 48.0 psf	1050	Passed
-0.0 DP to -0.6 DP	0.0 psf to 36.0 psf	50	Passed
-0.2 DP to -0.5 DP	12.0 psf to 30.0 psf	3350	Passed

Testing Observed by: Daniel Ocasio (NCTL)
Rick Moffett (NCTL)
Jim Moore (PTC.)
Frank Meints (Gallina USA, LLC).

Sampling: The sampling of the product(s) in this test report was accomplished by the client in accordance with the specification(s) the sample was tested to.

The listed results were secured by using the ASTM E1886 test method and indicate compliance with the performance requirements of ASTM E1996 for the listed test parameters at the following design pressures:

Positive Design Pressure: + 60.0 psf
Negative Design Pressure: - 60.0 psf

TEST COMPLETED 08/30/05



Detailed drawings were available for laboratory records and compared to the test specimens at the time of this report. A copy of this report along with representative sections of the test specimens will be retained by NCTL for a period of four (4) years. The results obtained apply only to the specimens tested. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimens may be drawn from this test. This report does not constitute certification of the product, which may only be granted by a certification program validator.

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ASTM E1996 COMPLIANCE STATEMENT

On August 30th, 2005, Gallina USA, LLC. completed impact testing at National Certified Testing Laboratories in Orlando, FL. All tests were performed in full accordance with ASTM E1886 and ASTM E1996 with no deviations.

*Manufacturer: Gallina USA, LLC.
Product Series: 16mm Hurricane Storm Panels R.D.C.
Product Configuration Tested: Single Panel
Tested Size: 48" x 96" overall
Glazing Configuration: N/A*


*Level of Protection: Basic Protection
Wind Zone: Wind Zone 4 - Greater than 140 mph
Assembly Height above Ground: Less than or equal to 30 feet*

*Impact Missile Used: Missile D
Positive Design Pressure: + 60 psf
Negative Design Pressure: - 60 psf*

See NCTL Report 210-3192-1A for complete specimen description and test results.

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