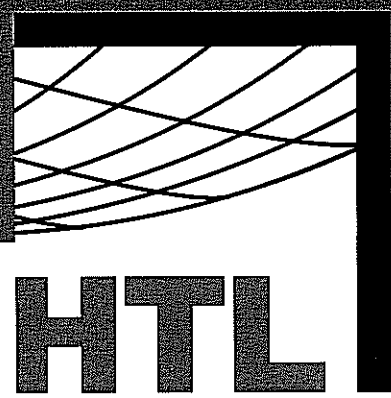
HTL
Compliance Test Report



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Transparent Protection Systems, Inc.

CLEARGUARD® POLYCARBONATE
STORM PANELS

Linking Manufacturers with Knowledge, Experience & Service in Architectural Testing

FLORIDA | GEORGIA | TEXAS

CORPORATE HEADQUARTERS
6655 Garden Road
Riviera Beach, Florida 33404
HTLTEST.COM
P: 888.477.2454
F: 561.881.0075

4/4/2008

Scott Kuntz
Transparent Protection Systems, Inc.
6643 42nd Terrace North
West Palm Beach, FL 33407

Re: CLEARGUARD® POLYCARBONATE STORM PANELS (Removable Hurricane Panels)

Dear Mr. Kuntz:

Enclosed you will find the test report package for the CLEARGUARD® POLYCARBONATE STORM PANELS (Removable Hurricane Panels) tests that were performed at Hurricane Test Laboratory, LLC (HTL).

This test report package includes the following items:

- Laboratory compliance letter
- HTL test report # 0239-1013-07 (8 pages)
- Transparent Protection Systems, Inc. drawing #06-TPS-0003 (sheets 1 through 3) and #06-TPS-0003 TEST PROGRAM (4 sheets) and drawing #03-TPS-1343 (1 sheet)

If you have any questions, please contact our office.

Sincerely,

HURRICANE TEST LABORATORY, LLC

Vinu J. Abraham, P.E.
FL Reg. # 53820

LABORATORY COMPLIANCE LETTER

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6655 Garden Road
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4/4/2008

Jaime D. Gascon
Miami-Dade Building Code Compliance Office
Metro-Dade Flagler Building, Suite 1603
140 West Flagler Street
Miami, Florida 33130-1563

Re: Laboratory Compliance Letter (HTL06024)

Dear Mr. Gascon:

The tests described in the reports for the below jobs and specimen numbers have been performed in full accordance of the requirements of the Florida Building Code, with no deviations.

Job #	Specimen #	TAS 201	TAS 203	TAS 202			FORCED ENTRY
				AIR	WATER	STATIC	
0239-1013-07	5					X	
0239-1013-07	6	X	X				

If you have any questions, please contact our office.

Sincerely,

HURRICANE TEST LABORATORY, LLC

Vinu J. Abraham, P.E.
FL Reg. # 53820

TEST REPORT

HURRICANE TEST LABORATORY, LLC
TESTING AND EVALUATION SOLUTIONS
6655 Garden Road
Riviera Beach, FL 33404
www.htltest.com

FLORIDA GEORGIA TEXAS
HTLTEST.COM

MANUFACTURER INFORMATION

1.0 NAME OF APPLICANT: Transparent Protection Systems, Inc.
6643 42nd Terrace North
West Palm Beach, FL 33407
888.447.8320

2.0 CONTACT PERSON: Scott Kuntz

3.0 HTL TEST NOTIFICATION #: HTL 06024 (Miami-Dade)

4.0 HTL LAB CERTIFICATION: Miami-Dade County (05-1014.01); Florida Building Code (TST1527); IAS-ES (TL-244); AAMA; WDMA; Keystone Certifications; Texas Department of Insurance.

5.0 REPORT INFORMATION:

Report #	HTL Specimen #	Test Date
0239-1013-07	1	11/28/07
	2	11/28/07
	3	1/4/08
	4	1/18/08
	5	
	6	1/25/08

PRODUCT IDENTIFICATION

6.0 Product Type: Removable Hurricane Panels

7.0 Model Number: CLEARGUARD® POLYCARBONATE STORM PANELS

8.0 Performance Class and Overall Size:

HTL Specimen #	Performance Class	Overall Size
1	+ 35 psf/ - 38 psf	42" (w) x 75" (h)
2	+ 35 psf/ - 38 psf	
3	+ 48 psf/ - 48 psf	42" (w) x 63" (h)
4	+ 78 psf/ - 80 psf	42" (w) x 52" (h)
5		
6		

9.0 Configuration: See Transparent Protection System, Inc. drawing #06-TPS-0003, sheet 1 for an overall elevation of these units.

10.0 Drawing: This test report is incomplete if not accompanied by Transparent Protection Systems, Inc. drawing #06-TPS-0003 (sheets 1 through 3) and #06-TPS-0003 TEST PROGRAM (sheets 1 through 4) and drawing #03-TPS-1343 (sheet 1 of 1) each bearing the ink stamp of Hurricane Test Laboratory, LLC.

11.0 Sample Source: Sample provided by Transparent Protection Systems, Inc.

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FL Reg. # 53820
4/4/08

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PRODUCT DESCRIPTION

12.0 DETAILED DESCRIPTION:

12.1 Panels: Each sample tested as part of this test program consisted of three (3) storm panels that were interlocked together. The panels were fabricated from Dow CALIBRE™ 302V-6 extruded Polycarbonate Resin. Each storm panel had an effective covering width of 12". The valleys of each storm panel had a 0.580" x 1.220" standard key slot punched with the centerline 1.375" from each panel end. The panels had overall cross sectional dimensions as listed in the following table:

Description	Item #	Overall Cross Section
UV-stabilized Polycarbonate Storm Panel	1	2.000" (h) x 14.394" (w) x 0.100" (t)

The following procedures (typical) were utilized when assembling the shutter sample:
Storm Panel Attachment: Each storm panel was trap–mounted to the opening using some or all of the accessories listed in Section 12.2 of this report.

12.2 Storm Panel Mounting Fixtures: Some or all of the following fixtures were utilized in the testing of the storm panel samples:

Description	Item #	Overall Cross Section	Aluminum Alloy
Studded Angle	1A	2.000" x 2.000" x 0.093"	6063-T6
Studded Angle	2	2.000" x 2.000" x 0.091"	6063-T6
U-Header	3	2.125" x 2.125" x 0.094"	6063-T6
U-Header	4	2.000" x 2.250" x 0.094"	6063-T6

Panel Attachment: The panels were attached to their respective mounting fixtures using ¼-20 x 3/4" MS studded angles with keyhole washers and washered wingnuts spaced 2" from each end and 6" on center thereafter.

PRODUCT INSTALLATION

13.0 The following section of this report details how each specimen was installed into the provided openings:

Mounting Style		Substrate	Anchor Type	Anchor Schedule	Specimen
Top Extrusion	Item #3	CMU	¼" Elco Tapcon (min. 1-1/4" embedment)	2" from each end and 6" on center	1/3/6
Bottom Extrusion	Item #1A			6" on center	
Top Extrusion	Item #4			2" from each end and 6" on center	2/4/5
Bottom Extrusion	Item #2			6" on center	

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Specimen #	Location	Load (psf)	Net Deflection (in.)	Permanent Set (in.)	Percent Recovery (%)
3	Geometric Center of Shutter	+36.00	1.204	0.026	97.84
		+48.00	1.576	0.066	95.81
		+72.00	2.560	0.082	96.80
		-36.00	1.244	0.064	94.86
		-48.00	1.567	0.089	94.32
		-72.00	2.236	0.124	94.45
4	Geometric Center of Shutter	+58.50	0.874	0.014	98.40
		+78.00	1.243	0.022	98.23
		+117.00	2.099	0.032	98.48
		-60.00	1.030	0.043	95.83
		-80.00	1.460	0.058	96.03
		-120.00	2.050	0.082	96.00

16.2 REMARKS:

No signs of failure were observed during the uniform static load tests. As such, these specimens were found to satisfy the uniform static load test requirements of ASTM E330.

17.0 UNIFORM STATIC LOAD TEST RESULTS:

17.1 TEST PRESSURES:

Specimen	Load (psf)	Result
5	+58.50	PASS
	+78.00	PASS
	+117.00	PASS
	-60.00	PASS
	-80.00	PASS
	-120.00	PASS

17.2 DEFLECTION DATA:

Location	Measured Deflection @ Design Pressure	Allowed Deflection @ Design Pressure	Measured Permanent Set @ 100% Test Load	Allowed Permanent Set @ 100% Test Load
Specimen 5				
Positive	1.243	1.733	0.032	N/A
Negative	1.460	1.733	0.082	N/A

17.3 REMARKS:

No signs of failure were observed during the uniform static load tests. As such, these specimens were found to satisfy the uniform static load test requirements of TAS 202.

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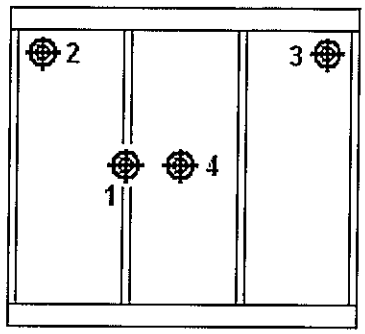
Specimen: 6



18.3 REMARKS:

Each impact test conducted on this specimen was performed in accordance with the requirements of ASTM E 1886/1996. All of the impacts hit their intended targets resulting in the recorded measurements. Upon completion of the missile impact test, this sample subsequently underwent the cyclic load test as specified by ASTM E 1886/1996.

19.0 CYCLIC LOAD TEST RESULTS:

19.1 TEST PRESSURE:

	CYCLIC TEST PRESSURE	
Specimen #	$(P_d)_{in} = P_{max}$	$(P_d)_{out} = P_{max}$
2	35.0 psf	38.0 psf

19.2 TEST SPECTRUM:

19.2.1 POSITIVE:

Specimen #	PSF	# OF INWARD ACTING CYCLES/STAGE			
		3500	300	600	100
2	+35	7.0-17.5 (psf)	0.0-21.0 (psf)	17.5-28.0 (psf)	10.5-35.0 (psf)

19.2.2 NEGATIVE:

Specimen #	PSF	# OF INWARD ACTING CYCLES/STAGE			
		3500	300	600	100
2	-38	10.5-35.0 (psf)	17.5-28.0 (psf)	0.0-21.0 (psf)	7.0-17.5 (psf)

19.3 DEFLECTION DATA:

Specimen #	Location	Permanent Set (in.)	Percent Recovery (%)
2	Geometric Center of Shutter	0.200	92.00
		0.160	93.07

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representative sections of the test specimens will be retained at HTL for a period of three (3) years. All results obtained apply only to the specimens tested and they do indicate compliance with the performance requirements of the test methods and specifications listed in the following section.

22.0 APPLICABLE CODES, STANDARDS & TEST METHODS:

ASTM E330-02 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

ASTM E1886-05 – Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials

ASTM E1996-02 –Standard Specification for Performance of Exterior Walls, Glazed Curtain Walls, Doors, and Storm Shutters Impacted by Windborne Debris in Hurricanes.

Florida Building Code TAS 201-94 – Impact Test Procedures

Florida Building Code TAS 202-94 – Criteria for Testing Impact & Nonimpact Resistant Building Envelope Components using Uniform Static Air Pressure

Florida Building Code TAS 203-94 – Criteria for Testing Products Subject to Cyclic Wind Pressure Loading

23.0 LIST OF OFFICIAL OBSERVERS:

Vinu J. Abraham, P.E. – HTL, Managing Partner
Kristin Norville, E.I.T. – HTL, Assistant Operations Manager
Ron Pretto – HTL, Technician
Fred Henderson – HTL, Technician
Eric Reyes – HTL, Technician
John Spallina – HTL, Technician
Veron Wickham – HTL, Technician
Veron Wickham – HTL, Technician
Martin Gibbard – HTL, Technician
Scott Kuntz – TPS

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DRAWINGS