Architectural Testing

MIAMI-DADE COUNTY
PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM

SERIES/MODEL: 7500-IMPACT
PRODUCT TYPE: Project-Out at Bottom (P.O.B.)

This report contains in its entirety:

Cover Page:	**1 page**
Report Body:	**13 pages**
Sketches:	**2 pages**
Drawings:	**13 pages**

Report No.:	**71709.01-801-18**
Test Dates:	**04/16/07**
Through:	**05/02/07**
Report Date:	**06/13/07**
Expiration Date:	**05/02/17**
Miami-Dade County Notification No.:	**ATITX 07002**

2865 Market Loop, Suite B
Southlake, Texas 76092
phone: 817-410-7202
fax: 817-424-8463
www.archtest.com

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200 Singleton Drive
Waxahachie, Texas 75165

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Project Summary: Architectural Testing, Inc. (ATI) was contracted by United Stats Aluminum to perform testing per Florida Building Code, Test Protocols for High Velocity Hurricane Zone, Protocols TAS 201-94, TAS 202-94 and TAS 203-94 on four (4) Series/Model 7500-IMPACT, projected windows. The samples tested met the performance requirements set forth in the protocols for a ±65.0 psf *Design Pressure* rating. Test specimen description and results are reported herein. The samples were provided by the client.

Test Procedures: The test specimens were evaluated in accordance with the following:

TAS 201-94, *Impact Test Procedures*.

TAS 202-94, *Criteria for Testing Impact and Non Impact Resistant Building Envelope Components Using Uniform Static Air Pressure Loading*.

TAS 203-94, *Criteria for Testing Products Subject to Cyclic Wind Pressure Loading*.

Drawing Reference: The attached drawings have been reviewed by ATI and are representative of the samples tested.

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Test Specimen Description:

Series/Model: 7500-IMPACT

Product Type: Projected (POB)

Overall Size: 1657 mm (65-1/4") wide by 975 mm (38-3/8") high

Rough Opening Size: 1664 mm (65-1/2") wide by 981 mm (38-5/8") high

Vent Size: 1518 mm (59-3/4") wide by 797 mm (31-3/4") high

Overall Area: 1.62 m^2 (17.39 ft^2)

Glazing Type: Sealed insulating glass with an exterior sheet of 3/16" heat strengthened glass, 3/8" aluminum spacer and an interior sheet of laminated glass. The laminated glass was constructed from two sheets of 3/16" heat strengthened glass with a 0.090" thick DuPont SentryGlas® Plus interlayer. The glazing had a 1" overall thickness, an overall glass size of 58-1/2" wide by 30-9/16" high and a 7/8" glazing bite.

Reinforcement: No reinforcement was utilized.

Finish: Painted aluminum

IG600 Frame Construction: IG 626 and IG 675 frame corners were square cut and secured with two #12 x 1" screws. An IG100 filler was snapped into the jambs and head at the lateral face. A J-175 modified tube filler was sealed in the intermediate channel full perimeter. An ID663 glass stop was snapped at the exterior of the sill. The sill was sealed to an IG570 sill flashing at the base of the interior sill flashing leg full length. An aluminum EC801 end dam was located at each end of the sill flashing and sealed to the sill flashing and jamb full perimeter. The end dam was secured to the sill flashing with two #10 x 1" screws. Screw heads were sealed with seam sealer. The 7500 projected frame was secured to the IG600 frame with 1/4" x 1-1/2" screws located 3-9/16" from each end and 13" on center thereafter. The screw heads were sealed in the sill.

7500 Projected Frame Construction: The 7500 frame was coped, butted, and the corners were sealed with Tremsil-600 at the exterior. The frame corners were secured with two ST193 #8 x 3/4"screws. The 7500 frame was sealed to the IG600 frame at the exterior full perimeter.

Test Specimen Description: (Continued)

IG600 Frame Component Parts List:

Description	Quantity	Part #	Manufacturer
Head/jamb	3	IG626	US Aluminum
Lateral head jamb filler	3	IG100	US Aluminum
Sill	1	IG672	US Aluminum
Tube filler	4	J175	US Aluminum
Sill Glass Stop	1	IG663	US Aluminum
Sill Flashing	1	IG570	US Aluminum
Sill flashing end dam	2	EC801	US Aluminum

7500 Frame Component Parts List:

Description	Quantity	Part #	Manufacturer
Frame jamb	2	WN503	US Aluminum
Frame head and sill	2	WN501	US Aluminum

Vent Construction: Thermally broken aluminum vent. Corners were mitered, crimped to an aluminum corner key and sealed with Tremsil-600.

Sash Component Parts List:

Description	Quantity	Part #	Manufacturer
Stile/Rail	4	WN510 (new sash)	US Aluminum

Weatherstripping: All weatherstripping was placed in an extruded slot and retained with a stake.

Description	Quantity	Location	Part #	Manufacturer
3/8" tall one finger vinyl leaf	1 row on all sides	Exterior leg of vent full perimeter	NP801	Tremco #TR-15076P (no chord)
1/4" diameter foam filled vinyl bulb	1 row on all sides	Interior leg of frame full perimeter	WH342	Amesbury
1/4" diameter foam filled vinyl bulb	1 row on all sides	Interior leg of vent full perimeter	WH342	Amesbury

Glazing Details: The vent was glazed with tape and structural silicone glazing at the interior and structural silicone glazing at the lateral face.

Test Specimen Description: (Continued)

Drainage:

Description	Quantity	Location
3/8" hole	2	6" from each end of the IG672 top face of the intermediate channel
3/8" hole	2	6" from each end of the IG672 top face of the exterior channel
3/8" hole	2	6" from each end of the IG570 top face of the exterior cavity
3/8" hole	2	6" from each end of the IG572 exterior face of the exterior cavity

Hardware: All hardware was secured with two (2) #10 x 1/2" screws.

Description	Quantity	Location	Part #	Manufacturer
4 bar hinge (16" Hinge)	2	Jambs	316	AMC
Impact handle	2	6-15/16" from outside edge of jamb frame	BC-162-201 (Yellow Bronze)	Bronze Craft
Impact keeper	2	6-15/16" from outside edge of jamb frame	BC-208-043 (Yellow Bronze)	Bronze Craft
Angle base for handle	2	6-15/16" from outside edge of jamb frame	WH-040	AMC
Snubbers	3	6-15/16" from outside edge of jamb frame and the midpoint	616 & 617-625	AMC

Installation: The unit was sealed into a 2x10 test buck and secured at the head through the frame using 3/8" x 4-1/2" lag bolts with washers located 4-1/8" from each end and 13" on center thereafter. At each jamb, it was secured through the frame using 3/8" x 4-1/2" lag bolts with washers located 4" from each end and 14" on center thereafter. At the sill, it was secured through the frame using 3/8" x 4-1/2" lag bolts with washers located 2-3/4" from each end and 12" on center thereafter. Screw heads in the sill were sealed with seam sealer.

Test Results: The following results have been recorded:

Protocol TAS 202-94, *Static Air Pressure Tests*

Test Unit #4

Design Pressure: ±75.0 psf

Title of Test	Results		
Air Infiltration			
1.57 psf (25 mph)	0.04 cfm/ft^2		
6.24 psf (50 mph)	0.09 cfm/ft^2		
	Indicator Readings (inch)		
	#1	#2	#3
Structural Loads			
50% of Test Pressure (+56.5 psf)			
Maximum Deflection	0.04	0.08	0.04
Permanent Set	0.01	0.02	0.01
Design Pressure (+75.0 psf)			
Maximum Deflection	0.05	0.10	0.05
Permanent Set	0.01	0.03	0.02
50% of Test Pressure (-56.5 psf)			
Maximum Deflection	0.11	0.18	0.10
Permanent Set	0.03	0.02	0.01
Design Pressure (-75.0 psf)			
Maximum Deflection	0.17	0.26	0.16
Permanent Set	0.04	0.04	0.03
Water Infiltration			
Positive Water Test Pressure: 15.0 psf	No Penetration		
Test Pressure (+112.5 psf)			
Maximum Deflection	0.10	0.16	0.09
Permanent Set	0.02	0.04	0.03
Test Pressure (-112.5 psf)			
Maximum Deflection	0.02	0.37	0.24
Permanent Set	0.04	0.03	0.03
Forced Entry - ASTM F 588-97	Pass		

***Note**: See ATI Sketch #1 for indicator locations.*

Test Results: (Continued)

Protocol TAS 201-94, *Impact Test Procedures*

Missile Weight: 9.0 lbs
Muzzle Distance from Test Specimen: 16' 0"

Test Unit #1

Impact #1: Missile Velocity: 50.4 fps
Impact Area: Center of sash
Observations: Broke glass. No rupture or penetration.

Results: Pass

Impact #2: Missile Velocity: 50.0 fps
Impact Area: Bottom right corner
Observations: Broke glass. No rupture or penetration.

Results: Pass

Test Unit #2

Impact #1: Missile Velocity: 50.0 fps
Impact Area: Top right corner
Observations: Broke glass. No rupture or penetration.

Results: Pass

Impact #2: Missile Velocity: 50.6 fps
Impact Area: Center of sash
Observations: Broke glass. No rupture or penetration.

Results: Pass

Test Results: (Continued)

Test Unit #3

Impact #1: Missile Velocity: 51.7 fps
Impact Area: Bottom left corner
Observations: Broke glass. No rupture or penetration.

Results: Pass

Impact #2: Missile Velocity: 51.7 fps
Impact Area: Center of sash
Observations: Broke glass. No rupture or penetration

Results: Pass

***Note**: Refer to ATI Sketch #2 for impact locations.*

Test Results: (Continued)

Protocol TAS 203-94, *Cyclic Wind Pressure Loading*

Test Unit #1

Design Pressure: ±65.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
13.0 to 32.5	3500	1.44	0.03	0.04	<0.01
0.9 to 39.0	300	1.80	0.03	0.04	<0.01
32.5 to 52.0	600	1.68	0.04	0.05	<0.01
19.5 to 65.0	100	1.93	0.05	0.05	<0.01
			Permanent Set (inch)		
			<0.01	<0.01	<0.01

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
19.5 to 65.0	50	1.00	0.09	0.22	0.14
32.5 to 52.0	1050	1.83	0.08	0.20	0.14
0.0 to 39.0	50	1.59	0.06	0.15	0.10
13.0 to 32.5	3350	1.11	0.05	0.13	0.09
			Permanent Set (inch)		
			0.01	0.04	0.03

Result: Pass

Test Results: (Continued)

Protocol TAS 203-94, *Cyclic Wind Pressure Loading*

Test Unit #2

Design Pressure: ±65.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
13.0 to 32.5	3500	1.44	0.03	0.04	<0.01
0.9 to 39.0	300	1.80	0.03	0.04	<0.01
32.5 to 52.0	600	1.68	0.04	0.05	<0.01
19.5 to 65.0	100	1.93	0.05	0.05	<0.01
			Permanent Set (inch)		
			<0.01	<0.01	<0.01

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
19.5 to 65.0	50	1.00	0.06	0.20	0.09
32.5 to 52.0	1050	1.88	0.05	0.17	0.08
0.0 to 39.0	50	1.59	0.03	0.13	0.05
13.0 to 32.5	3350	1.93	0.03	0.11	0.07
			Permanent Set (inch)		
			0.01	0.03	0.03

Result: Pass

Test Results: (Continued)

Protocol TAS 203-94, *Cyclic Wind Pressure Loading*

Test Unit #3

Design Pressure: ±65.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
13.0 to 32.5	3500	1.31	0.03	0.05	0.05
0.9 to 39.0	300	1.65	0.03	0.05	0.05
32.5 to 52.0	600	1.53	0.04	0.07	0.06
19.5 to 65.0	100	1.74	0.04	0.08	0.08
			Permanent Set (inch)		
			0.01	0.03	0.03

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
19.5 to 65.0	50	2.12	0.07	0.18	0.10
32.5 to 52.0	1050	1.19	0.05	0.18	0.10
0.0 to 39.0	50	1.42	0.03	0.15	0.09
13.0 to 32.5	3350	1.09	0.03	0.13	0.08
			Permanent Set (inch)		
			0.02	0.02	0.02

Result: Pass

***Note**: Refer to ATI Sketch #1 for indicator locations.*

Test Equipment:

Cannon: Steel pipe barrel utilizing compressed air to propel the missile

Missile: 2x4 Southern Pine

Timing Device: Electronic Beam Type

Cycling Mechanism: Computer controlled centrifugal blower with electronic pressure measuring device

Deflection Measuring Device: Linear transducers

Laboratory Compliance Statements: The following are provided as required by the protocols for the testing reported herein.

Upon completion of testing, specimens tested for TAS 201-94 met the requirements of Section 1626 of the Florida Building Code, Building (2004).

Upon completion of testing, specimens tested for TAS 202-94 met the requirements of Section 1620 of the Florida Building Code, Building (2004).

Upon completion of testing, specimens tested for TAS 203-94 met the requirements of Section 1626 of the Florida Building Code, Building (2004).

Tape and film were used to seal against air leakage during structural testing. In our opinion, the tape and film did not influence the results of the test.

List of Official Observers:

Name	Company
Joseph A. Reed, P.E.	Architectural Testing, Inc.
Andy Cost	Architectural Testing, Inc.

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of ten years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report will expire. Results obtained are tested values and were secured by using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

Digitally Signed by: Andy Cost

Andy Cost
Laboratory Manager

Digitally Signed by: Joseph A. Reed

Joseph A. Reed, P.E.
Director - Engineering and Product Testing

AC:ay/cmd

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Sketches (2)
Appendix-B: Drawings (13)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	06/13/07	N/A	Original report issue