Architectural Testing

MIAMI-DADE COUNTY PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM

SERIES/MODEL: D900
PRODUCT TYPE: Thermally Improved Aluminum Architectural Terrace Door

This report contains in its entirety:

Cover Page:	**1 page**
Report Body:	**14 pages**
Sketch:	**1 page**
Drawings:	**16 pages**

SHAWN G. COLLINS LICENSE No. 70655 STATE OF FLORIDA PROFESSIONAL ENGINEER

Report No.:	**A3326.02-801-18**
Test Dates:	**08/12/10**
Through:	**04/24/12**
Report Date:	**05/15/12**
Expiration Date:	**05/15/22**
Miami-Dade County Notification No.:	**ATITX 08036**

Digitally Signed by: Shawn G. Collins
2012.08.01 18:39:20 -04'00'

2865 Market Loop
Southlake, Texas 76092
phone: 817-410-7202
fax: 817-424-8463

Architectural Testing

MIAMI-DADE COUNTY PERFORMANCE TEST REPORT

Rendered to:

United States Aluminum
200 Singleton Drive
Waxahachie, Texas 75165

Report No.:	A3326.02-801-18
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Project Summary: Architectural Testing, Inc. was contracted by United States 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 three Series/Model D900, aluminum architectural terrace doors. Unit #1 had TAS 201, 202, and 203 performed on it. 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 test specimen drawings have been reviewed and verified by Architectural Testing and are representative of the samples tested.

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Southlake, Texas 76092
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Test Specimen Description:

Series/Model: D900

Product Type: Thermally Improved Aluminum Architectural Terrace Door

Overall Size: 36" wide by 117-1/2" high

Rough Opening Size: 36-1/2" wide by 118" high

Panel Size: 34-5/8" wide by 116-1/8" high

Daylight Opening Size: 27-1/8" wide by 108-5/8" high

Finish: Brown painted aluminum

Glazing Details: Test units were glazed with insulating glass with 1" overall thickness. There was 3/16" thick tempered glass at the exterior, 5/16" anodized aluminum spacer, and at the interior was laminated glass with an 0.090" thick DuPont™ SentryGlas® Plus (SGP) interlayer with one piece of 3/16" thick heat strengthened glass on each side. Each unit was exterior glazed against Tremco glazing tape at the interior. Units 1 and 2 had a cap bead of Tremco Spec2 around the glazing at the interior and unit 3 had a cap bead of Dow 795 around the glazing at the interior. The exterior utilized wedge gasket. An aluminum snap-in glazing stop was at the exterior. Glazing bite on all units was 1/2".

Weatherstripping:

Description	Quantity	Location	Joinery	Method
0.170" x 0.250" vinyl bulb	1 Row	Exterior face of frame leg full perimeter	Kerf	Staked
0.187" x 0.250" foam filled vinyl	1 Row	Interior face of exterior panel leg, 10" of bulb removed at top of lock stile and 10" of bulb removed at each end of bottom rail	Kerf	Staked

Test Specimen Description: (Continued)

Frame Construction: All frame and retaining members were extruded aluminum members. The frame was thermally improved. Frame corners were milled and mechanically assembled using two #12 x 1" hex head screws at each corner. Sealant was applied to screw heads and at each corner joint, interior and exterior.

Panel Construction: All panel members were formed from thermally improved aluminum extrusions. Panel corners were mitered and angle reinforced. An aluminum corner key was inserted into each corner of the panel. Corner key was 4" x 1-1/2" x 1-1/8". Sealant was applied at each corner joint, interior and exterior.

Hardware: The multi-point steel lock bar was secured to the locking stile using #8 x 1" flat head Phillips screws located from top edge of panel at 1-1/2", 6", 9", 15-1/2", 23-1/2", 29-1/2", 37-1/2", 45", 53", 61-1/2", 68-1/2", 75", 83", 85", 89", 97", 99", 108", and 112-1/2" and #8 x 1/2" flat head Phillips screws at 75-1/2", 80-1/2", and 83-1/2". Located on the lock stile at 15-1/2" from top of panel was a lock bar splice that measured 5/8" x 1-3/4". It was secured with one #8 x 1" flat head Phillips screw. The lock bar was 5/8" wide x 3/32" thick. Each hinge was secured to the frame jamb using four #12 x 7/8" flat head Phillips screws. Each hinge was secured to the panel stile using four #12 x 1" pan head Phillips screws. Hinges were located on center from outside edge of frame head at 9", 42-1/2", 76", and 109-1/2". Sealant was applied to screw heads and in screw holes. There were five keepers, each secured to the frame with #10 x 1/2" flat head Phillips screws. Keepers on the jamb were located on center at 21-1/2", 81-1/2", and 105" from outside edge of frame head. Top and bottom keeper had two screws and the center dead bolt keeper had three screws. The remaining two keepers were located at the head and threshold. They were positioned on center at 2-1/2" from outside edge of keeper jamb. Each was fastened using two screws. A two bar arm was fastened to jamb head and panel top rail. Two #10 x 1/2" flat head Phillips screws were used to fasten the bar to the frame head and two #10 x 1-1/4" flat head Phillips screws were used to fasten the bar to the panel top rail.

Drainage:

Description	Quantity	Location
3/4" x 5/32" notch	2	Top of panel bottom rail, 4-1/2" on center from outside edge of stiles
1-3/4" x 9/32" notch	1	Bottom of threshold at exterior, midpoint

Test Specimen Description: (Continued)

Reinforcement: No reinforcement was utilized

Installation: The unit was installed into a 2x10 spf test buck. The unit was fastened into the buck through the jambs and threshold with 1/4" x 2-1/4" Tapcon screws. The head was fastened to the buck with 1/4" x 3-1/4" Tapcon screws. Screw spacing at threshold and head was 6" from outside corners with one at midpoint. Spacing at jambs was 6" from outside corners with remaining at 18" on center spacing. Sealant was used full perimeter around the frame at the interior and exterior.

Test Results: The following results have been recorded:

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

Test Unit #1
Design Pressure: ±65.0 psf

Title of Test	Results					
Air Infiltration						
1.57 psf (25 mph)	0.01 cfm/ft^2					
6.24 psf (50 mph)	0.07 cfm/ft^2					
	Indicator Readings (inch)					
Structural Loads	#1	#2	#3	#4	#5	#6
50% of Test Pressure (+48.75 psf)						
Maximum Deflection	0.03	0.08	0.11	0.06	0.12	0.11
Permanent Set	0.01	0.01	0.01	0.01	0.02	0.01
Design Pressure (+65.0 psf)						
Maximum Deflection	0.04	0.10	0.13	0.08	0.13	0.13
Permanent Set	0.01	0.02	0.02	0.02	0.02	0.02
50% of Test Pressure (-48.75 psf)						
Maximum Deflection	0.05	0.07	0.04	0.14	0.20	0.10
Permanent Set	0.02	0.03	0.02	0.03	0.02	0.02
Design Pressure (-65.0 psf)						
Maximum Deflection	0.08	0.09	0.05	0.17	0.27	0.13
Permanent Set	0.05	0.05	0.03	0.04	0.03	0.02
Water Infiltration						
15% Positive Design Pressure (+15.0 psf)	No Penetration					
Test Pressure (+97.5 psf)						
Maximum Deflection	0.06	0.13	0.15	0.09	0.16	0.14
Permanent Set	0.02	0.03	0.03	0.02	0.02	0.02
Test Pressure (-97.5 psf)						
Maximum Deflection	0.11	0.13	0.08	0.22	0.37	0.18
Permanent Set	0.07	0.06	0.05	0.06	0.04	0.03
Forced Entry - 300 lb Pull Test	Pass					

***Note**: See Architectural Testing Sketch #1 for indicator locations.*

Test Results: (Continued)

Protocol TAS 201-94, *Impact Test Procedures*

Missile Weight: 9.2 lbs
Muzzle Distance from Test Specimen: 16 ft.

Test Unit #1

Impact #1: Missile Velocity: 50.7 fps

Impact Area: Center of glass
Observations: No rupture, no penetration

Results: Pass

Impact #2: Missile Velocity: 50.1 fps

Impact Area: Bottom right corner of glass
Observations: No rupture, no penetration

Results: Pass

Impact #3: Missile Velocity: 50.3 fps

Impact Area: Midpoint of lock stile
Observations: No rupture, no penetration

Results: Pass

Impact #4: Missile Velocity: 50.5 fps

Impact Area: Midpoint of bottom rail
Observations: No rupture, no penetration

Results: Pass

***Note**: Refer to Architectural Testing Sketch #1 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 to 32.5	3500	1.57	0.16	0.06	0.04
0 to 39	300	1.92	0.19	0.06	0.04
32.5 to 52	600	2.18	0.23	0.06	0.06
19.5 to 65	100	2.27	0.23	0.07	0.07
			Permanent Set (inch)		
			0.03	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	50	2.19	0.15	0.25	0.08
32.5 to 52	1050	1.80	0.13	0.22	0.07
0 to 39	50	2.29	0.09	0.17	0.05
13 to 32.5	3350	2.01	0.08	0.16	0.04
			Permanent Set (inch)		
			0.04	0.05	0.07

Result: Pass

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

Test Results: (Continued)

Protocol TAS 201-94, *Impact Test Procedures*

Missile Weight: 9.2 lbs
Muzzle Distance from Test Specimen: 16 ft.

Test Unit #2

Impact #1: Missile Velocity: 50.7 fps

Impact Area: Bottom left corner of glass
Observations: No rupture, no penetration

Results: Pass

Impact #2: Missile Velocity: 50.3 fps

Impact Area: Center of glass
Observations: No rupture, no penetration

Results: Pass

Impact #3: Missile Velocity: 50.2 fps

Impact Area: Midpoint of lock stile
Observations: No rupture, no penetration

Results: Pass

Impact #4: Missile Velocity: 50.3 fps

Impact Area: Midpoint of bottom rail
Observations: No rupture, no penetration

Results: Pass

***Note**: Refer to Architectural Testing Sketch #1 for impact locations.*

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 to 32.5	3500	1.56	0.12	0.09	0.08
0 to 39	300	2.06	0.13	0.09	0.08
32.5 to 52	600	1.51	0.15	0.10	0.08
19.5 to 65	100	2.24	0.17	0.12	0.09
			Permanent Set (inch)		
			0.05	0.03	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	50	2.22	0.06	0.46	0.11
32.5 to 52	1050	1.58	0.04	0.31	0.05
0 to 39	50	2.24	0.02	0.26	0.04
13 to 32.5	3350	1.62	0.02	0.23	0.03
			Permanent Set (inch)		
			0.02	0.05	0.02

Result: Pass

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

Test Results: (Continued)

Protocol TAS 201-94, *Impact Test Procedures*

Missile Weight: 9.2 lbs
Muzzle Distance from Test Specimen: 16 ft.

Test Unit #3

Impact #1: Missile Velocity: 50.7 fps

Impact Area: Top right corner of glass
Observations: No rupture, no penetration

Results: Pass

Impact #2: Missile Velocity: 50.8 fps

Impact Area: Center of glass
Observations: No rupture, no penetration

Results: Pass

Impact #3: Missile Velocity: 51.0 fps

Impact Area: Midpoint of lock stile
Observations: No rupture, no penetration

Results: Pass

Impact #4: Missile Velocity: 50.8 fps

Impact Area: Midpoint of bottom rail
Observations: No rupture, no penetration

Results: Pass

***Note**: Refer to Architectural Testing Sketch #1 for impact locations.*

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 to 32.5	3500	1.65	0.20	0.04	0.03
0 to 39	300	2.22	0.21	0.04	0.03
32.5 to 52	600	1.39	0.21	0.06	0.03
19.5 to 65	100	2.36	0.25	0.07	0.04
			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	50	2.50	0.18	0.19	0.06
32.5 to 52	1050	1.45	0.17	0.16	0.05
0 to 39	50	2.42	0.16	0.12	0.05
13 to 32.5	3350	1.47	0.14	0.11	0.04
			Permanent Set (inch)		
			0.07	0.05	0.05

Result: Pass

***Note**: Refer to Architectural Testing 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 (2010).

AND

Upon completion of testing, specimens tested for TAS 202-94 met the requirements of Section 1620 of the Florida Building Code, Building (2010).

AND

Upon completion of testing, specimens tested for TAS 203-94 met the requirements of Section 1626 of the Florida Building Code, Building (2010).

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.

Testing was conducted at the Architectural Testing, Inc. laboratory located in Southlake, Texas.

List of Official Observers:

Name	Company
Terry Hopgood	United States Aluminum
Don Willard	United States Aluminum
Tom Klein	Architectural Testing, Inc.
Andy Cost	Architectural Testing, Inc.
Shawn G. Collins, P.E.	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: Tom Klein

Tom Klein
Test Technician

Digitally Signed by: Shawn G. Collins

Shawn G. Collins, P.E.
Laboratory Support Engineer

TK:ac

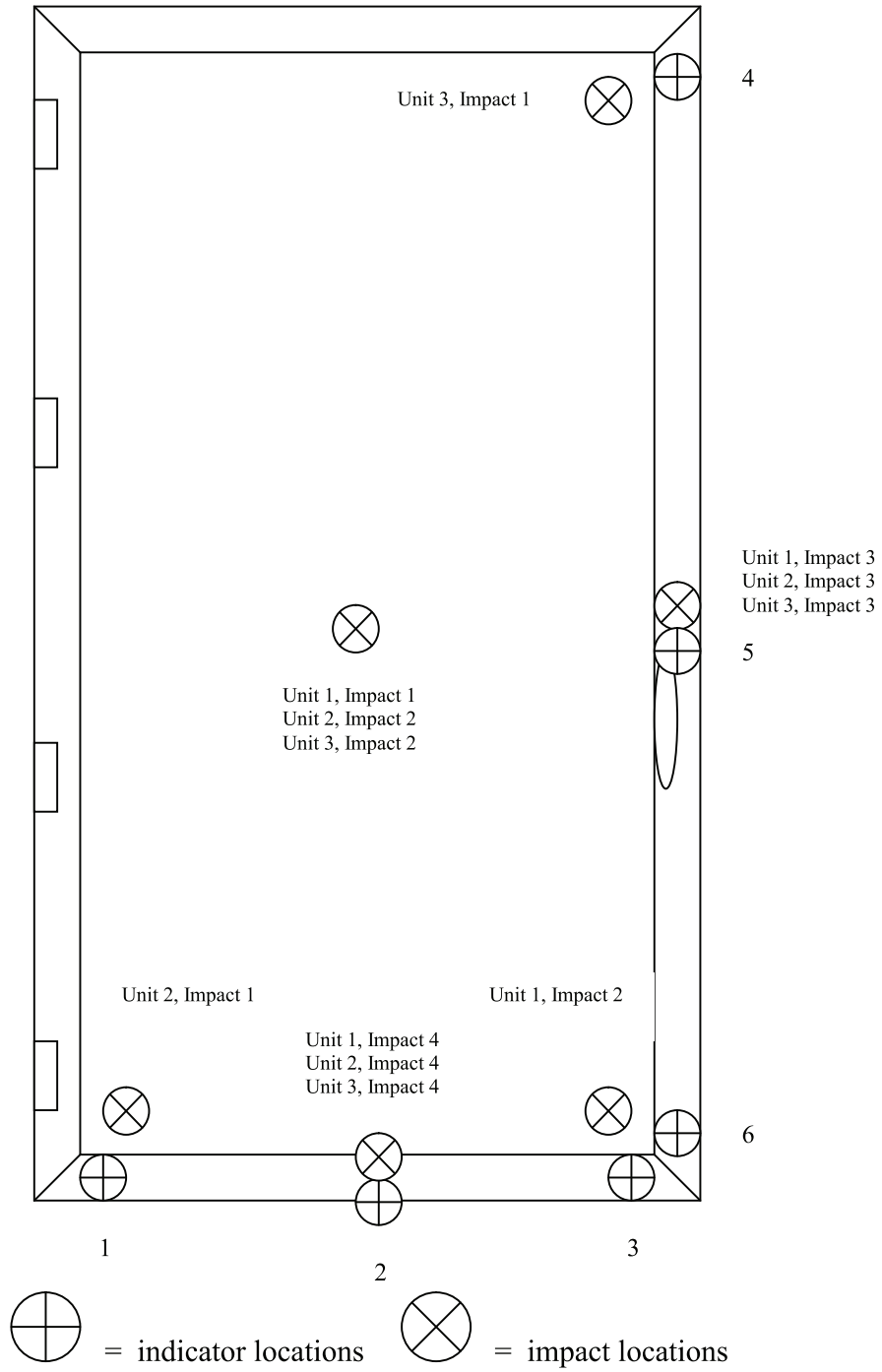
Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Sketches (1)
Appendix-B: Drawings (16)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	05/15/12	N/A	Original report issue

Appendix A

Sketch



Indicators 4-6 were the only indicators used during cycling

Appendix B

Drawings

UNITED STATES ALUMINUM

D900 TERRACE DOOR BOM

Architectural Testing

4/23/2012

Test sample complies with these details
Deviations are noted.

Report# 43326.02-801-18

Date 5/15/12 Tech JL

PART	DIE	DESCRIPTION	SUPPLIER
		FRAME / VENT	
HT450		HEAD ASSEMBLY	
HE450	61266	EXTERIOR HEAD	INTEX
HI450	61265	INTERIOR HEAD	INTEX
HT456		SILL ASSEMBLY	
HE450	61266	EXTERIOR SILL	INTEX
HU456	61393	INTERIOR SILL	INTEX
JT450		JAMB ASSEMBLY	
JE450	61264	EXTERIOR JAMB	INTEX
JI450	61263	INTERIOR JAMB	INTEX
HT300		SASH ASSEMBLY	
HE300	61237	EXTERIOR SASH	INTEX
HI300	61272	INTERIOR SASH	INTEX
TB146		6/6 NYLON STRUT	TECHNOFORM
		HARDWARE	
ST240		#10UCX1/2" PHL FH SMS SS	VARIES
TH701		STRIKE DEAD BOLT	HOPPE
TH702		STRIKE TONGUES	HOPPE
TH703		SHOOT BOLTS L/R	HOPPE
NP257		FRAME GASKET	AMESBURY
ST123		#12ABX3/8" SMS SS	VARIES
ST276		#12ABX1" SMS SS	VARIES
WH276		WEEP COVER	
MS174		#12-24UX7/8"PHL FH MS SS	VARIES
ST275		#12ABX1"PHL PH SMS SS	VARIES
WH751		BUTT HINGE	
ST198		#8ABX1" PHL FH SMS SS	VARIES
TH782		ACT GEAR BOT	HOPPE
TH864		TOP-EXTN ACT 5 PT	HOPPE
TH791		COVER PLATE	
CB300		CORNER BLOCK	
ST250		#10ABX1-1/4"PHL FH SMS SS	VARIES
WH342		BULB GASKET	AMESBURY
SB222		SETTING BLOCK	TREMCO
WB410		SIDE BLOCK	TREMCO
WH344		WEDGE GASKET	TREMCO
GT416		GLAZING TAPE	TREMCO
		Sealant	Tremco Spec 2
		Sealant	Dow 795