

**TAS 201, TAS 202 AND TAS 203
TEST REPORT**

Rendered to:

FLEETWOOD WINDOWS & DOORS

SERIES/MODEL: Kona 3800 Vertical TDL

PRODUCT TYPE: Curtain Wall

This report contains in its entirety:

Cover Page: 1 page
Report Body: 12 pages
Sketches: 4 pages
Drawings: 3 pages

Report No.: 94550.03-301-18
Test Dates: 11/10/09
Through: 06/10/10
Report Date: 07/01/10
Expiration Date: 06/10/20

TAS 201, TAS 202 AND TAS 203 TEST REPORT

Rendered to:

FLEETWOOD WINDOWS & DOORS
395 Smitty Way
Corona, California 92879

Report No.: 94550.03-301-18
Test Dates: 11/10/09
Through: 06/10/10
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Project Summary: Architectural Testing, Inc. was contracted by Fleetwood Windows & Doors 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 Kona 3800 Vertical TDL, two lite curtain walls. The samples tested met the performance requirements set forth in the protocols for a ± 50.0 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.

Test Specimen Description:

Series/Model: Kona 3800 Vertical TDL

Product Type: Curtain Wall

Overall Size: 3048 mm (120") wide by 3048 mm (120") high

Daylight Opening Size (2): 1454 mm (57-1/4") wide by 2972 mm (117") high

Test Specimen Description: (Continued)

Screen Size: N/A

Finish: Anodized Aluminum

Glazing Details: The specimen utilized 1-1/4" thick insulating glass units fabricated from two 3/16" thick heat strengthened sheets, a 0.090" thick SentryGlas® Plus interlayer, a 5/8" airspace and one 3/16" thick heat strengthened sheet to the exterior. The glass was set from the exterior against a vinyl bulb gasket and Tremco silicone at the interior. An aluminum glazing stop and a vinyl bulb gasket was applied from the exterior. The glass bite was 1/2".

Weatherstripping: No weatherstripping was utilized.

Frame Construction: The vertical frame members corners were routed to fit the horizontal framing members and fully sealed with silicone. The frame corners were attached using three #10 x 1" stainless steel Phillips head screws. The intermediate vertical was attached with two #10 x 1" stainless steel Phillips head screws at each end. All frame members were thermally improved with a poured-and-debridged thermal break.

Screen Construction: No screen was utilized.

Hardware: No hardware was utilized.

Drainage:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
1/2" by 1/4" weep slots	4	6" from all corners in the sill face
2" by 1/2" weep slots	4	6" from all sill corners in the glazing stop leg
1" weep notch	4	6" from corners in center leg of sill

Reinforcement: No reinforcement was utilized.

Installation: The test specimens were installed into a nominal 2 x 8 Douglas Fir test buck. Eight #10 x 2" wood screws were located in each perimeter frame member located 6" from each corner and 16" on center.

Test Results: The following results have been recorded:

Protocol TAS 202-94, Static Air Pressure Tests

Test Unit #1

Design Pressure: ±50.0 psf

Title of Test	Results		
Air Infiltration			
1.57 psf (25 mph)	<0.01 cfm/ft ²		
6.24 psf (50 mph)	<0.01 cfm/ft ²		
Structural Loads	Indicator Readings (inch)		
	#1	#2	#3
50% of Test Pressure (+37.5 psf)			
Maximum Deflection	0.16	1.00	0.18
Permanent Set	0.12	0.18	0.10
Design Pressure (+50.0 psf)			
Maximum Deflection	0.26	1.33	0.24
Permanent Set	0.05	0.08	0.04
50% of Test Pressure (-37.5 psf)			
Maximum Deflection	0.21	0.99	0.24
Permanent Set	0.06	0.09	0.07
Design Pressure (-50.0 psf)			
Maximum Deflection	0.38	1.31	0.32
Permanent Set	0.06	0.10	0.07
Water Infiltration			
+12.0 psf	No Penetration		
Test Pressure (+75.0 psf)			
Maximum Deflection	0.32	2.11	0.31
Permanent Set	0.11	0.15	0.08
Test Pressure (-75.0 psf)			
Maximum Deflection	0.44	2.14	0.41
Permanent Set	0.08	0.10	0.06

Note: See Architectural Testing 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: 17 ft.

Test Unit #1

Impact #1: Missile Velocity: 15.2 m/s (49.8 fps); orientation within $\pm 5^\circ$ of horizontal

Impact Area: Center of left lite

Observations: Missile hit target area; no penetration

Results: Pass

Impact #2: Missile Velocity: 15.3 m/s (50.1 fps); orientation within $\pm 5^\circ$ of horizontal

Impact Area: Top right hand corner of left lite

Observations: Missile hit target area; no penetration

Results: Pass

Impact #3: Missile Velocity: 15.1 m/s (49.6 fps); orientation within $\pm 5^\circ$ of horizontal

Impact Area: Bottom left hand corner of right lite

Observations: Missile hit target area; no penetration

Results: Pass

Impact #4: Missile Velocity: 15.1 m/s (49.7 fps); orientation within $\pm 5^\circ$ of horizontal

Impact Area: Center of right lite

Observations: Missile hit target area; no penetration

Results: Pass

Note: See Architectural Testing Sketch #2 for impact locations.

Test Results: (Continued)

Protocol TAS 203-94, Cyclic Wind Pressure Loading

Test Unit #1

Design Pressure: ±50.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
10 to 25	3500	1.97	0.10	0.61	0.11
0 to 30	300	4.02	0.16	0.72	0.14
25 to 40	600	2.86	0.21	0.91	0.21
15 to 50	100	5.00	0.25	1.36	0.26
			Permanent Set (inch)		
			0.09	0.12	0.06

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
15 to 50	50	4.90	0.32	1.41	0.34
25 to 40	1050	2.66	0.28	1.22	0.29
0 to 30	50	5.00	0.24	0.91	0.23
10 to 25	3350	2.72	0.20	0.71	0.26
			Permanent Set (inch)		
			0.13	0.15	0.14

Result: Pass

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

Test Results: (Continued)

Protocol TAS 201-94, *Impact Test Procedures*

Missile Weight: 9.0 lbs

Muzzle Distance from Test Specimen: 17 ft.

Test Unit #2

Impact #1: Missile Velocity: 15.3 m/s (50.3 fps); orientation within $\pm 5^\circ$ of horizontal

Impact Area: Lower left corner of left lite

Observations: Missile hit target area; no penetration

Results: Pass

Impact #2: Missile Velocity: 15.5 m/s (50.9 fps); orientation within $\pm 5^\circ$ of horizontal

Impact Area: Center of left lite

Observations: Missile hit target area; no penetration

Results: Pass

Note: See Architectural Testing Sketch #3 for impact locations.

Test Results: (Continued)

Protocol TAS 203-94, Cyclic Wind Pressure Loading

Test Unit #2

Design Pressure: ±50.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
10 to 25	3500	2.89	0.25	0.71	0.15
0 to 30	300	4.62	0.36	0.98	0.18
25 to 40	600	3.14	0.49	1.21	0.20
15 to 50	100	4.04	0.60	1.41	0.24
			Permanent Set (inch)		
			0.21	0.16	0.12

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
5 to 50	50	4.21	0.65	1.59	0.30
25 to 40	1050	2.98	0.55	1.23	0.24
0 to 30	50	3.87	0.53	1.01	0.21
10 to 25	3350	3.11	0.49	0.85	0.19
			Permanent Set (inch)		
			0.38	0.32	0.16

Result: Pass

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

Test Results: (Continued)

Protocol TAS 201-94, *Impact Test Procedures*

Missile Weight: 9.0 lbs

Muzzle Distance from Test Specimen: 17 ft.

Test Unit #3

Impact #1: Missile Velocity: 15.1 m/s (49.7 fps); orientation within $\pm 5^\circ$ of horizontal

Impact Area: Top right corner of left lite

Observations: Missile hit target area; no penetration

Results: Pass

Impact #2: Missile Velocity: 15.1 m/s (49.6 fps); orientation within $\pm 5^\circ$ of horizontal

Impact Area: Center of vertical intermediate member

Observations: Missile hit target area; no penetration

Results: Pass

Note: See Architectural Testing Sketch #4 for impact locations

Test Results: (Continued)

Protocol TAS 203-94, Cyclic Wind Pressure Loading

Test Unit #3

Design Pressure: ±50.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
10 to 25	3500	2.43	0.12	0.74	0.13
0 to 30	300	3.42	0.17	0.91	0.16
25 to 40	600	2.52	0.21	1.21	0.21
15 to 50	100	3.61	0.26	1.42	0.24
			Permanent Set (inch)		
			0.08	0.09	0.05

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator (inch)		
			#1	#2	#3
15 to 50	50	3.72	0.30	1.37	0.36
25 to 40	1050	2.39	0.23	1.20	0.31
0 to 30	50	3.32	0.20	0.87	0.26
10 to 25	3350	2.70	0.19	0.69	0.16
			Permanent Set (inch)		
			0.11	0.14	0.09

Result: Pass

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

Test Equipment: (See Appendix A)

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.

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

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

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 Fresno, California.

List of Official Observers:

<u>Name</u>	<u>Company</u>
Dennis Janzen	Architectural Testing, Inc.
Mason Kelly	Architectural Testing, Inc.
Joseph A. Reed, P.E.	Architectural Testing, Inc.
Tyler Westerling, 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 specimens tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

Tyler Westerling, P.E.
Project Engineer

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

TW:he/cmd

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: Test Equipment (1)
- Appendix-B: Sketches (4)
- Appendix-C: Drawings (3)

Revision Log

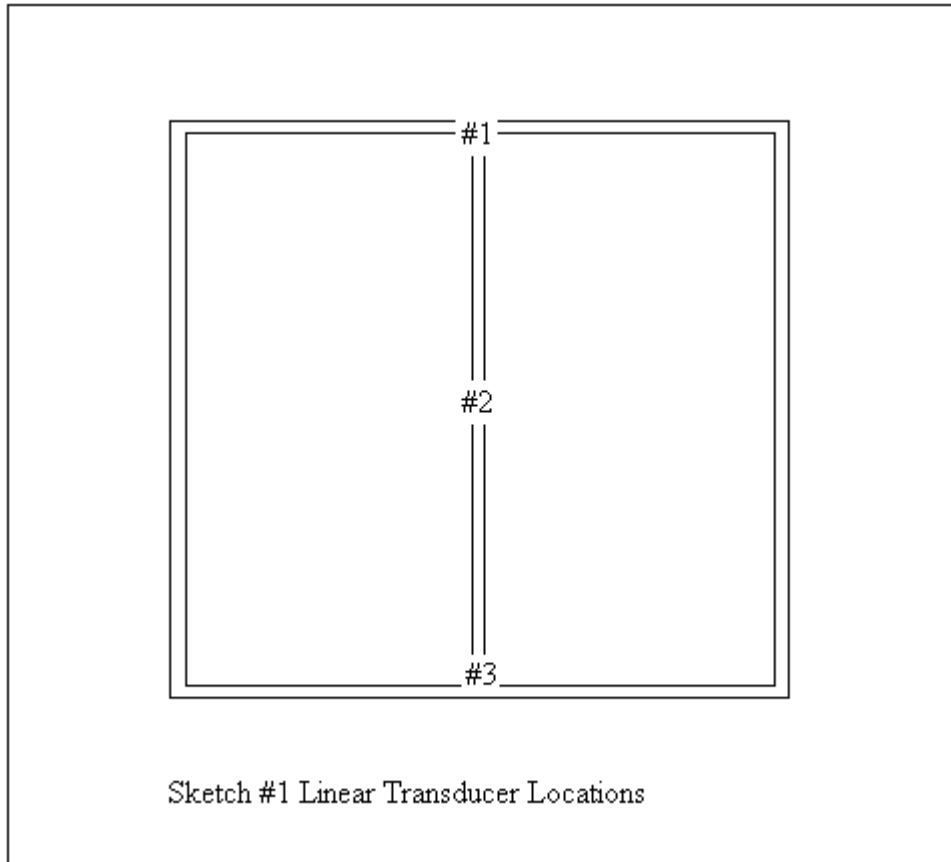
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0	07/01/10	N/A	Original report issue

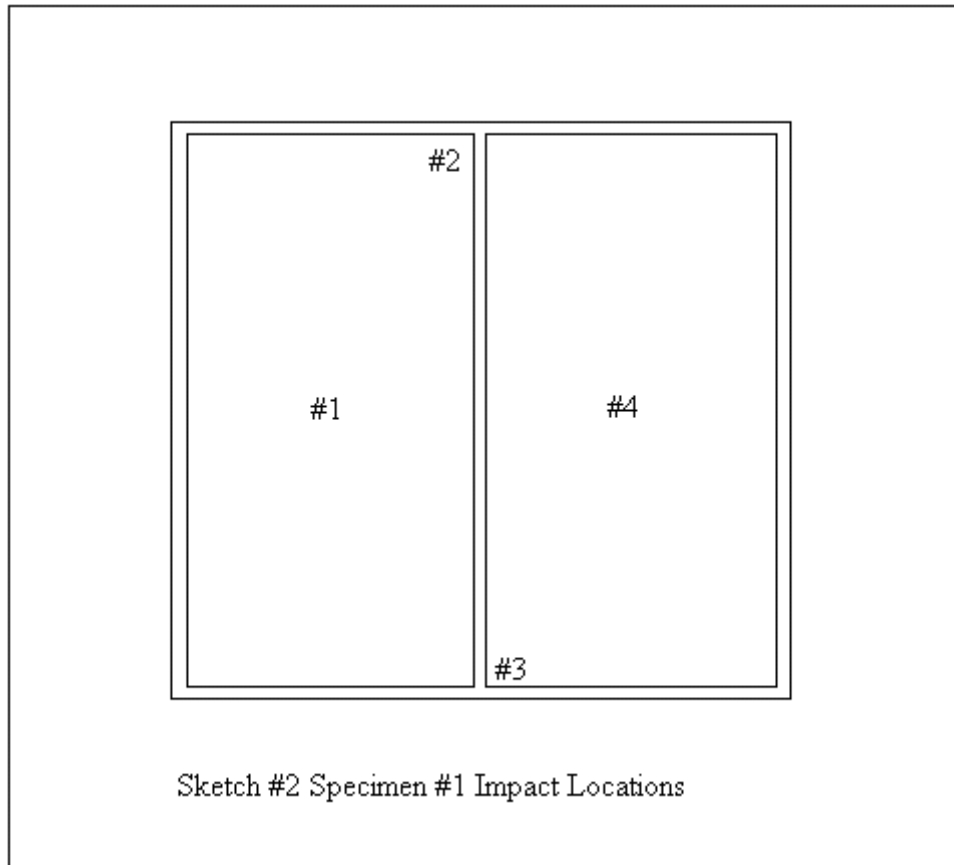
Appendix A
Test Equipment

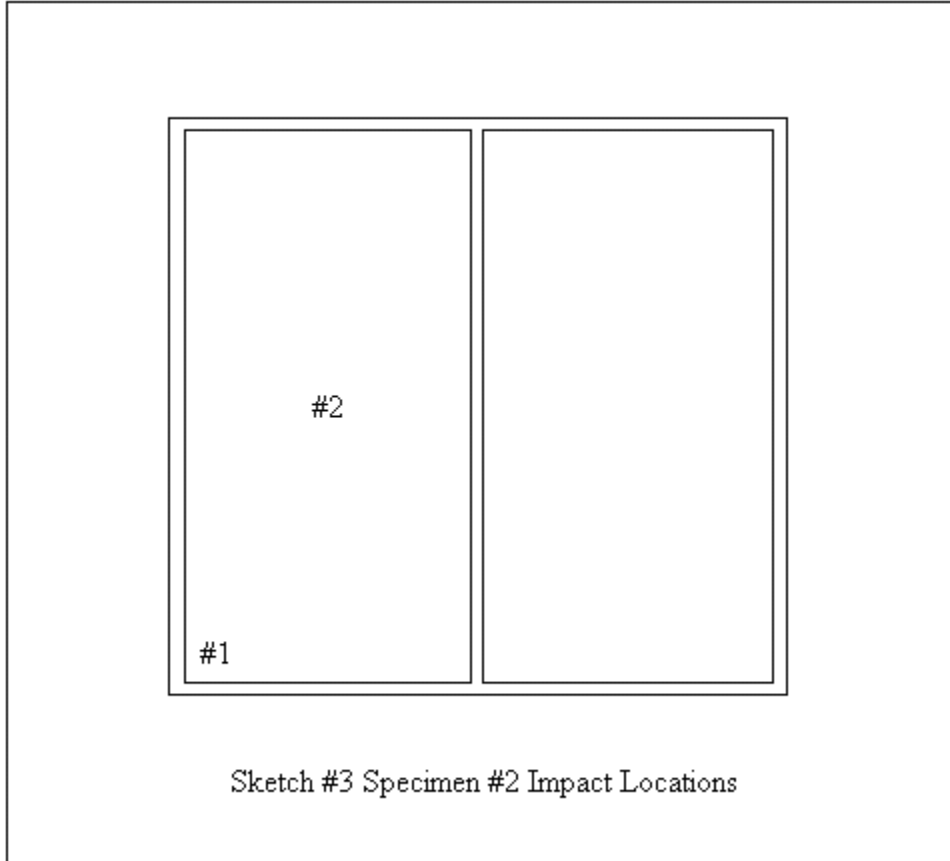
Instrument	Manufacturer	Asset #
Control Panel	Architectural Testing, Inc.	005062
2 x 4 Cannon	Architectural Testing, Inc.	003575
Spray Rack	Architectural Testing, Inc.	Mockup
Operating Force Gauge	Chatillon	005554
Linear Transducer	Celesco	003431
Linear Transducer	Celesco	004485
Linear Transducer	Celesco	003428
Linear Transducer	Celesco	004486
Linear Transducer	Celesco	005283
Linear Transducer	Celesco	004487
Spring Scale	Pelouze	62406
Dial Indicator	Ames	003574

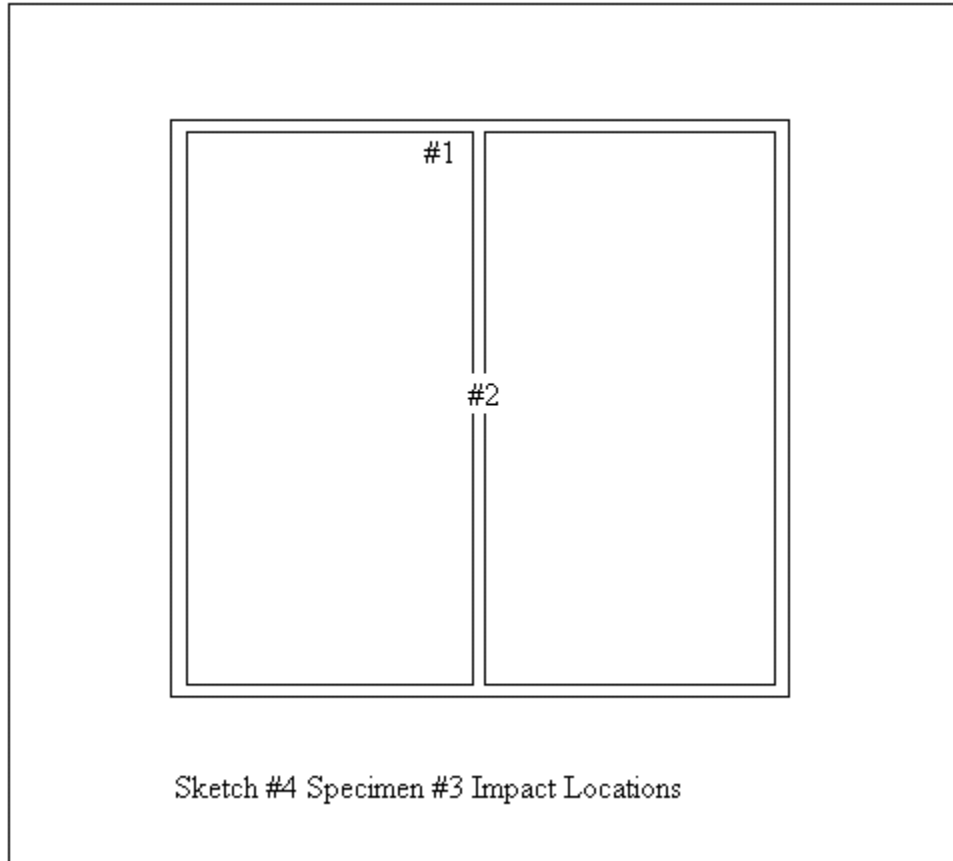
Appendix B

Sketches



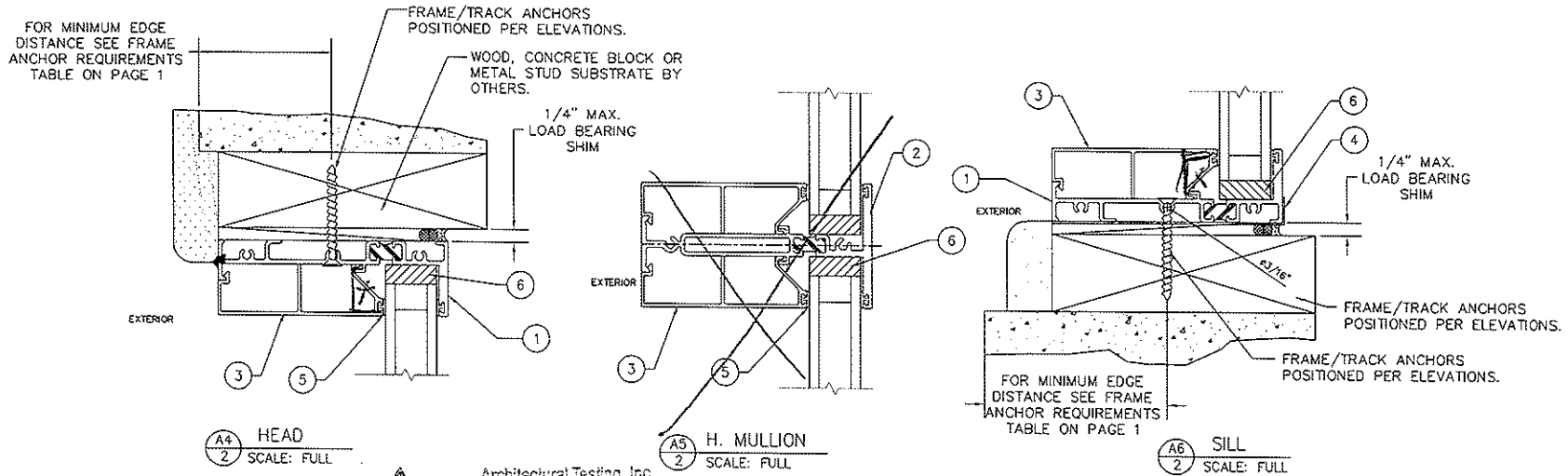
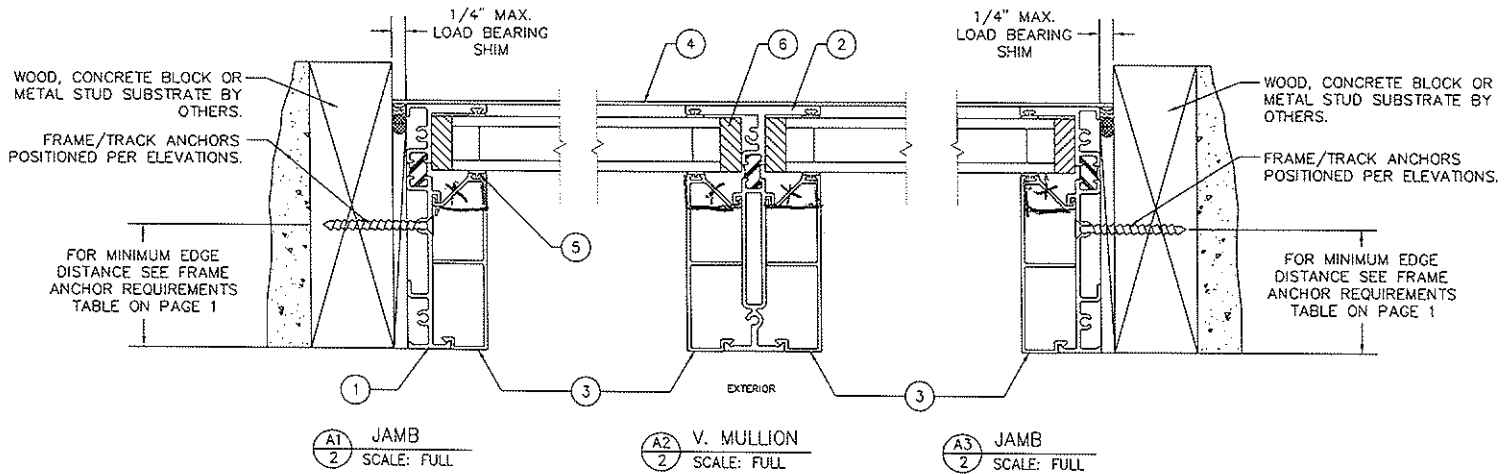






Appendix D

Drawings



Architectural Testing, Inc.
Test sample complies with these details
Deviations are noted

94550

JAN 05 2010

Revised

Date

Tech

VALCATOR INITIAL

NO.	DATE	REVISIONS	DRAWN BY	DATE	COMMENTS
1	08/17/2009		JUSTIN		
2	08/17/2009		JUSTIN		
3	08/17/2009		JUSTIN		
4	08/17/2009		JUSTIN		
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SCALE: 1/4" = 1"

DRAWING NO.: CERT 3800-09

SHEET 1 OF 3

