

TEST REPORT

Report No.: D7635.03-550-47

Rendered to:

KAWNEER COMPANY, INC.
Norcross, Georgia

PRODUCT TYPE: Storefront
SERIES/MODEL: 451T (Front-Set)

SPECIFICATION: AAMA 501-05 *Methods of Tests for Exterior Walls*
CAN/CSA A440-00, *Windows*, prepared by the Canadian Standards Association. Evaluation
to the prescriptive requirements was not performed.

Title of Test	Summary of Results	Rating
Air Tightness	0.20 (m ³ /h)/m (0.04 cfm/ft)	Fixed
Water Tightness	500 Pa (10.44 psf)	B5
	600 Pa (12.53 psf)	B6*
Wind Load Resistance	1911 Pa (±40.00 psf)	C2

*Achieved with interior perimeter seal

Reference must be made to Report No. D7635.03-550-47, dated 06/24/14 for complete test specimen description and detailed test results.

1.0 Report Issued To: Kawneer Company Inc.
555 Guthridge Court
Norcross, Georgia 30092

2.0 Test Laboratory: Architectural Testing, Inc.
1701 Westfork Drive, Suite 106
Lithia Springs, Georgia 30122
770-941-6916

3.0 Project Summary:

3.1 Product Type: Storefront

3.2 Series/Model: 451T (Front-Set)

3.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test methods. The specimen tested successfully met the performance requirements for AAMA 501 and the following CSA ratings: Fixed, B5/B6, and C2.

3.4 Test Dates: 05/05/2014 - 05/08/2014

3.5 Test Location: Kawneer Company Inc. test facility in Norcross, Georgia. Calibration of test equipment was performed by Architectural Testing in accordance with AAMA 205-01 "In-Plant Testing Guidelines for Manufacturers and Independent Laboratories".

3.6 Test Sample Source: The test specimen was provided by the client. Representative samples of the test specimen will be retained by Architectural Testing for a minimum of four years from the test completion date.

3.7 Drawing Reference: The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen reported herein. Test specimen construction was verified by Architectural Testing per the drawings located in Appendix C. Any deviations are documented herein or on the drawings.

3.8 List of Official Observers:

<u>Name</u>	<u>Company</u>
Mike Mitchell	Kawneer Company Inc.
Matt Sourewine	Kawneer Company Inc.
José Colón	Architectural Testing, Inc.
Ryan Hedgepeth	Architectural Testing, Inc.

4.0 Test Specification(s):

AAMA 501-05, *Methods of Tests for Exterior Walls*

AAMA 501.4-09, *Recommended Static Testing Method for Evaluating Curtain Wall and Storefront Systems subjected to Seismic and Wind Induced Interstory Drift*

ASTM E 283-04, *Test Method for Determining Rate of Airflow Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.*

ASTM E 330-14, *Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.*

ASTM E 331-00, *Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.*

ASTM E 547-00, *Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Difference.*

CAN/CSA A440-00, *Windows*, prepared by the Canadian Standards Association. Evaluation to the prescriptive requirements was not performed.

NFRC 400-2014, *Procedure for Determining Fenestration Product Air Leakage*

5.0 Test Specimen Description:

5.1 Product Sizes:

Crack Length: 18.2 m (59.8 ft)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	2438	96	2438	96

5.0 Test Specimen Description: (Continued)

5.2 Frame Construction:

Frame Member	Material	Description
IG Head (Part# 451TV103)	Aluminum alloy	Extruded, thermally broken aluminum alloy
OG Head (Part# 451TV003)	Aluminum alloy	Extruded, thermally broken aluminum alloy
Mullion/Jamb/Sill (Part# 451TV001)	Aluminum alloy	Extruded, thermally broken aluminum alloy
IG Horizontal (Part# 451TV111)	Aluminum alloy	Extruded, thermally broken aluminum alloy
OG Horizontal (Part# 451TV011)	Aluminum alloy	Extruded, thermally broken aluminum alloy
Split mullion (Part# 451TV012)	Aluminum alloy	Extruded, thermally broken aluminum alloy
HP Thermal Flashing (Part# 451THP037)	Aluminum alloy	Extruded, thermally broken aluminum alloy
Thermal Snap Insert (Part# 451THP126)	Aluminum alloy	Extruded, thermally broken aluminum alloy

	Joinery Type	Detail
All corners	Butted and mechanically fastened	Butted and mechanically fastened using #12 x 1-1/8" pan head fastener

5.3 Weatherstripping: No weatherstripping was utilized.

5.4 Glazing:

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
1" IG	1/2" aluminum	1/4" annealed	1/4" annealed	Utilizes EPDM Gasket (Part# 027074) on both interior and exterior. Glazed side utilizes glass stop (Part# 451CG004)

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Fixed lite	4	1143 x 1138	45 x 44-13/16	3/8"

5.0 Test Specimen Description: (Continued)

5.5 Drainage:

Drainage Method	Size	Quantity	Location
Weephole	1/4"	4	Quarter-points on frame sill

5.6 Hardware: No hardware was utilized.

5.7 Reinforcement: No reinforcement was utilized.

6.0 Installation:

The specimen was installed into a 2x12 double wood buck. The rough opening allowed for a 3/8" shim space. The exterior perimeter of the window was sealed with sealant. Later in testing the interior and exterior were sealed with sealant – see test results.

Location	Anchor Description	Anchor Location
Head	#12 x 3" fastener, min. 1-1/2" embedment	6" from edges and vertical mullion and 18" max. on center
Jamb	#12 x 3" fastener, min. 1-1/2" embedment	6" from edges and intermediate mullion
Sub-sill	#12 x 2" fastener	6" from edges and 12" on center

7.0 Test Results: The temperature during testing was 23°C (74°F). The results are tabulated as follows:

Title of Test	Results	Allowed	Rating	Note
Air Infiltration, per ASTM E 283/NFRC 400 at 75 Pa (1.6 psf)	0.2 L/s/m ² (0.04 cfm/ft ²)	0.3 L/s/m ² (0.06 cfm/ft ²) max.	Fixed	
Air Exfiltration, per ASTM E 283 at 75 Pa (1.6 psf)	0.1 L/s/m ² (0.02 cfm/ft ²)/ 0.12 m ³ /h/m (0.021 cfm/ft) max.	0.3 L/s/m ² (0.06 cfm/ft ²) max. / 0.25 m ³ /h/m (0.045 cfm/ft) max.	Fixed	1
Air Exfiltration, per ASTM E 283 at 300 Pa (6.2 psf)	0.2 L/s/m ² (0.04 cfm/ft ²)/ 0.21 m ³ /h/m (0.039 cfm/ft) max.	0.3 L/s/m ² (0.06 cfm/ft ²) max. / 0.25 m ³ /h/m (0.045 cfm/ft) max.		1
Water Tightness, per ASTM E 331 and ASTM E547 at 500 Pa (10.44 psf)	Pass	No leakage	B5	
Uniform Load Deflection, per ASTM E 330 taken at intermediate mullion +1911 Pa (+40.00 psf) -1911 Pa (-40.00 psf)	10.6 mm (0.41") 9.60 mm (0.38")	13.9 mm (0.54") 13.9 mm (0.54")	C2	2,3
Uniform Load Deflection, per ASTM E 330 taken at intermediate horizontal +1911 Pa (+40.00 psf) -1911 Pa (-40.00 psf)	0.50 mm (0.02") 0.76 mm (0.03")	6.6 mm (0.25") 6.6 mm (0.25")	C2	2,3
Water Tightness, per ASTM E 331 at 500 Pa (10.44 psf)	Pass	No leakage	B5	
Seismic Racking Test, Per AAMA 501.4 At 1% L (+/- 0.96")	Pass	No glass breakage		
Air Infiltration, per ASTM E 283 at 75 Pa (1.6 psf)	0.1 L/s/m ² (0.03 cfm/ft ²)	0.3 L/s/m ² (0.06 cfm/ft ²) max.		
Air Infiltration, per ASTM E 283 at 300 Pa (6.2 psf)	0.3 L/s/m ² (0.06 cfm/ft ²)	0.3 L/s/m ² (0.06 cfm/ft ²) max.		

7.0 Test Results: (Continued)

Title of Test	Results	Allowed	Rating	Note
Water Tightness, per ASTM E 331 at 500 Pa (10.44 psf)	Pass	No leakage	B5	
Interior of perimeter was sealed and testing resumed				
Air Infiltration, per ASTM E 283/NFRC 400 at 75 Pa (1.6 psf)	0.1 L/s/m ² (0.01 cfm/ft ²)	0.3 L/s/m ² (0.06 cfm/ft ²) max.	Fixed	
Air Infiltration, per ASTM E 283 at 300 Pa (6.2 psf)	0.1 L/s/m ² (0.01 cfm/ft ²)	0.3 L/s/m ² (0.06 cfm/ft ²) max.		
Air Exfiltration, per ASTM E 283 at 75 Pa (1.6 psf)	0.1 L/s/m ² (0.01 cfm/ft ²)/ 0.01 m ³ /h/m (0.002 cfm/ft) max.	0.3 L/s/m ² (0.06 cfm/ft ²) max. / 0.25 m ³ /h/m (0.045 cfm/ft) max.	Fixed	1
Air Exfiltration, per ASTM E 283 at 300 Pa (6.2 psf)	0.1 L/s/m ² (0.01 cfm/ft ²)/ 0.01 m ³ /h/m (0.002 cfm/ft) max.	0.3 L/s/m ² (0.06 cfm/ft ²) max. / 0.25 m ³ /h/m (0.045 cfm/ft) max.		1
Water Tightness, per ASTM E 331 at 600 Pa (12.53 psf)	Pass	No leakage	B6	
Uniform Load Structural, per ASTM E 330 taken at intermediate mullion +2867 Pa (+60.00 psf) -2867 Pa (-60.00 psf)	0.2 mm (0.01") 0.2 mm (0.01")	4.8 mm (0.19") 4.8 mm (0.19")	C2	2,3
Uniform Load Structural, per ASTM E 330 taken at intermediate horizontal +2867 Pa (+60.00 psf) -2867 Pa (-60.00 psf)	0.2 mm (0.01") 0.2 mm (0.01")	2.2 mm (0.08") 2.2 mm (0.08")	C2	2,3
Seismic Racking Test, Per AAMA 501.4 At 1.5% L (+/- 1.44")	Pass	No glass breakage		

Note 1: Results shown as per unit area (L/s/m²) and as per crack length (m³/h/m)

Note 2: Loads were held for 10 seconds.

Note 3: Tape and film were not used to seal against air leakage during structural testing.

The service life of this report will expire on the stated Test Record Retention End Date of 05/08/2018, at which time such materials as drawings, data sheets, samples of test specimens, copies of this report, and any other pertinent project documentation, shall be discarded without notice.

If test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen(s) can be made. 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: Ryan K. Hedgepeth

Ryan K. Hedgepeth, E.I.T.
Project Engineer



Digitally Signed by: Jose E. Colon

José E. Colón
Director – Regional Operations

RKH:jab

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

Appendix-A: Alteration Addendum (1)

Appendix-B: Photographs (3)

Appendix-C: Drawings (3) Complete drawings packet on file with Architectural Testing, Inc.