



**AAMA/WDMA/CSA 101/I.S.2/A440-05
TEST REPORT**

Rendered to:

GAMCO CORPORATION

SERIES/MODEL: W250HC

PRODUCT TYPE: Aluminum Casement Window (Out-Swing)

Title	Summary of Results
Primary Product Designator	C-AW60 914 x 1524 (36 x 60)
Design Pressure	± 2880 Pa (± 60.15 psf)
Operating Force (in motion)	9 N (2 lbf)
Air Infiltration	< 0.1 L/s/m ² (< 0.01 cfm/ft ²)
Water Penetration Resistance Test Pressure	580 Pa (12.12 psf)
Uniform Load Structural Test Pressure	± 4320 Pa (± 90.23 psf)
Forced Entry Resistance	Grade 10

Reference must be made to Report No. 89802.01-109-44, dated 05/06/10 for complete test specimen description and data.



AAMA/WDMA/CSA 101/I.S.2/A440-05 TEST REPORT

Rendered to:

GAMCO CORPORATION
131-10 Maple Avenue
Flushing, New York 11355

Report No.: 89802.01-109-44

Project Summary: Architectural Testing, Inc. was contracted by Gamco Corporation to perform testing on a Series/Model W250HC, aluminum casement window (out-swing). The sample tested successfully met the performance requirements for a C-AW60 914 x 1524 (36 x 60) rating. Test specimen description and results are reported herein. The sample was provided by the client.

Test Specifications: The test specimen was evaluated in accordance with the following:

AAMA/WDMA/CSA 101/I.S.2/A440-05, *Standard/Specification for Windows, Doors, and Unit Skylights.*

AAMA 910, *Voluntary "Life Cycle" Specifications and Test Methods for Architectural Grade Windows and Sliding Glass Doors.*

Test Specimen Description:

Series/Model: W250HC

Product Type: Aluminum Casement Window (Out-Swing)

Overall Size: 914 mm (36") wide by 1524 mm (60") high

Vent Size: 867 mm (34-1/8") wide by 1478 mm (58-3/16") high

Overall Area: 1.4 m² (15.0 ft²)

Test Specimen Description: (Continued)

Finish: All aluminum was anodized.

Frame Construction: The frame was constructed of poured and debridged, thermally improved extruded aluminum. The corners were mitered, sealed, keyed, and staked.

Vent Construction: The vent was constructed of thermally improved extruded aluminum. The corners were mitered, sealed, keyed, and staked.

Weatherstripping:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
0.187" backed by 3/16" diameter vinyl bulb gasket	1 Row	All vent members and all frame members

Glazing Details: The unit was glazed with 1" thick, sealed insulating glass constructed of one sheet of 5/16" thick laminated glass outboard, and one sheet of 3/16" thick, clear tempered glass inboard with a standard metal spacer. The laminated glass was constructed of two sheets of 1/8" thick clear tempered glass with a 0.090" thick PVB interlayer. The glass was interior glazed onto a 1/2" wide butyl glazing tape. The perimeter of the glass was sealed to the vent with silicone. The glass was secured with aluminum snap-in glazing beads with a rubber gasket against the glass.

Drainage:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
1/4" high by 3/4" wide weep notch	2	Sill face, 6-1/2" from each end

Hardware:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
Lever lock	3	Lock jamb 9" from each end and midspan
Two-bar hinge	2	Vent top and bottom rails at hinge stile
Surface mount hinges	4	Hinge jamb, 5-1/4" from each end and 16" on center

Test Specimen Description: (Continued)

Reinforcement: No reinforcement was utilized.

Installation: The unit was installed into a Spruce-Pine-Fir wood buck. The unit was secured through head and sill with #8 x 1-1/4" long pan head screws, located 2" and 12" from each end. The unit was also secured through the jambs with #8 x 1-1/4" long pan head screws, located 2" from head and sill and spaced 12" on center. The exterior perimeter was sealed with silicone.

Test Results: The temperature during testing was 16°C (60°F). The results are tabulated as follows:

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
<u>AAMA 910 Life Cycle Testing Procedures:</u>			
2.1.1 to 2.1.12			
2.1.1	Operating Force per ASTM E 2068 (First Half)		
	Initiate motion	49 N (11 lbf)	Report Only
	Maintain motion	9 N (2 lbf)	135 N (30 lbf)
	Latches	71 N (16 lbf)	Report Only
2.1.2	Air Leakage Resistance per ASTM E 283 (First Half)		
	300 Pa (6.2 psf)	0.1 L/s/m ² (0.01 cfm/ft ²)	0.5 L/s/m ² (0.10 cfm/ft ²) max.
<i>Note #1: The tested specimen meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-05 for air leakage resistance.</i>			
2.1.3	Water Penetration Resistance per ASTM E 547 and E 331 (First Half) (without insect screen)		
	580 Pa (12.12 psf)	No leakage	No leakage
2.1.4	Sash/Vent Cycle Testing (First Half - 1250 cycles)		
	Vent	No damage	No damage

Observations: No visible wear observed.

Test Results: (Continued)

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
2.1.5	Locking Hardware Cycle Testing (First Half - 1250 cycles)		
	Latch	No damage	No damage
	Handles	No damage	No damage
Observations: <i>Metal shavings observed.</i>			
2.1.7	Misuse Testing		
2.5.2.1	Vent Torsion Test 222 N (50 lbf)	No damage	No damage
2.5.2.2	Ventilator Vertical Load 445 N (100 lbf)	No damage	No damage
2.1.8	Sash/Vent Cycle Testing (Second Half - 1250 cycles)		
	Vent	No damage	No damage
Observations: <i>No visible wear observed.</i>			
2.1.9	Locking Hardware Cycle Testing (Second Half - 1250 cycles)		
	Latch	No damage	No damage
	Handles	No damage	No damage
Observations: <i>Metal shavings observed.</i>			
2.1.10	Operating Force per ASTM E 2068 (Second Half)		
	Initiate motion	58 N (13 lbf)	Report Only
	Maintain motion	9 N (2 lbf)	135 N (30 lbf)
	Latches	80 N (18 lbf)	Report Only
2.1.11	Air Leakage Resistance per ASTM E 283 (Second Half)		
	300 Pa (6.2 psf)	<0.1 L/s/m ² (<0.01 cfm/ft ²)	0.5 L/s/m ² (0.10 cfm/ft ²) max.
Note #1: <i>The tested specimen meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/IS.2/A440-05 for air leakage resistance.</i>			
2.1.12	Water Penetration Resistance per ASTM E 547 and E 331 (Second Half) (without insect screen)		
	580 Pa (12.12 psf)	No leakage	No leakage

Test Results: (Continued)

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
5.3.4.2	Uniform Load Deflection per ASTM E 330		See Note #2
5.3.4.3	Uniform Load Structural per ASTM E 330		See Note #2
<i>Note #2: The client opted to start at a pressure higher than the minimum required. Those results are listed under "Optional Performance".</i>			
5.3.5	Forced Entry Resistance per ASTM F 588		
	Type: B	Grade: 10	
	Disassembly Test	No entry	No entry
	Test B1 through B3	No entry	No entry
	Sash/Panel Manipulation Test	No entry	No entry
	Lock Hardware Manipulation Test	No entry	No entry
5.3.6.4.2	Sash/Leaf Torsion Test 90 N (20 lbf)	35.1 mm (1.38")	72.4 mm (2.85") max.
5.3.6.4.3	Sash Vertical Deflection Test 270 N (60 lbf)	1.0 mm (0.04")	1.8 mm (0.07") max.
5.3.6.6.2	Distributed Load Test 300 Pa (6.2 psf)	No damage	No damage

Optional Performance

4.4.2.6	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the lock jamb) (Loads were held for 10 seconds)		
	2880 Pa (60.15 psf) (positive)	0.3 mm (0.01")	2.5 mm (0.10") max.
	2880 Pa (60.15 psf) (negative)	0.3 mm (0.01")	2.5 mm (0.10") max.

Test Results: (Continued)

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
<u>Optional Performance: (Continued)</u>			
4.4.2.6	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the lock jamb) (Loads were held for 10 seconds)		
	4320 Pa (90.23 psf) (positive)	<0.3 mm (<0.01")	1.0 mm (0.04") max.
	4320 Pa (90.23 psf) (negative)	0.3 mm (0.01")	1.0 mm (0.04") max.

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.

Drawing Reference: The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen reported herein.

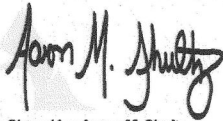
List of Official Observers:

<u>Name</u>	<u>Company</u>
Ken R. Stough	Architectural Testing, Inc.
Michael D. Stremmel, P.E.	Architectural Testing, Inc.
Aaron M. Shultz	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 four 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. If test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen 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: Aaron M. Shultz

Aaron M. Shultz
Technician



Digitally Signed by: Michael D. Stremmel

Michael D. Stremmel, P.E.
Senior Project Engineer

AMS:dem

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

- Appendix-A: Alteration Addendum (1)
- Appendix-B: Test Equipment (1)
- Appendix-C: Photographs (1)
- Appendix-D: Drawings (6)