

TEST REPORT

AAMA/WDMA/CSA 101/I.S.2/A440-17

- REPORT NO.: 1931.02-106-211
- RENDERED TO: GAMCO CORPORATION Flushing, New York
- PRODUCT TYPE: Aluminum Inswing Hopper Window

SERIES / MODEL: W250HC

Test	Summary of Results
Primary Product Designator	Class CW – PG40 1524 x 914 (60 x 36)-AP
Design Pressure	±1920 Pa (±40.10 psf)
Air Infiltration at 75 Pa (1.57 psf)	0.1 L/s/m ² (0.02 cfm/ft ²)
Air Exfiltration at 75 Pa (1.57 psf)	0.1 L/s/m ² (0.03 cfm/ft ²)
Water Penetration Resistance Test Pressure	290 Pa (6.06 psf)

Test Completion Date: 6/28/2019

Reference must be made to Report No. 1931.02-106-211, dated 8/23/2019 for complete test specimen description and detailed test results.



CLIENT INFORMATION:	GAMCO CORPORATION	
	131-10 Maple Ave.	
	Flushing, New York 11355	
TEST LABORATORY:	Molimo, LLC	

1410 Eden Road York, Pennsylvania 17402 717-900-6034

PROJECT SUMMARY:

PRODUCT TYPE: Aluminum Inswing Hopper Window

SERIES/MODEL: W250HC

PROJECT SUMMARY:

Molimo, LLC was contracted to perform testing on the above referenced product. The results are tested values and were secured by using the designated test methods. A summary of the ratings achieved for the specimen tested are shown in the table below.

SPECIMEN	SPECIFICATION	PRODUCT RATING
1	101/I.S.2/A440-17	Class CW – PG40 1524 x 914 (60 x 36)-AP

PROJECT DETAILS:

Test Dates: 5/15/2019 - 6/28/2019

Test Record Retention End Date: 6/28/2023

Test Location: Molimo, LLC test facility in York, Pennsylvania.

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

Drawing Reference: The test specimen drawings were supplied by the client. The test specimen construction was verified by Molimo and was found to be representative of the product tested. Test specimen drawings are located in Appendix C of this report.



WITNESSES:

The following representatives witnessed all or part of the testing.

Name	Company
Joe Allison	Molimo, LLC
Michael D. Stremmel, P.E.	Molimo, LLC
Joseph Enriquez	Molimo, LLC

TEST METHOD:

AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS 2017 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights

TEST SPECIMEN DESCRIPTION:

PRODUCT SIZES:

Overall Size:	1524 mm x 914 mm (60" x 36")
Overall Area:	1.39 m ² (15.0 ft ²)
Sash Size:	1479.5 mm x 844.5 mm (58-1/4" x 33-1/4")

FRAME CONSTRUCTION:

Material:	Poured and debridged, thermally improved, extruded aluminum
Corner Details:	Coped and butted, sealed with sealant and secured with four #8 x 2" $$
	pan head screws per corner

VENT CONSTRUCTION:

Material:	Poured and debridged, thermally improved, extruded aluminum
Corner Details:	Miter-cut, sealed with sealant and secured with two internal aluminum
	corner keys with one lanced stake per member end

REINFORCEMENT: No reinforcement was utilized.



TEST SPECIMEN DESCRIPTION: (Continued)

GLAZING DETAILS: No conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen can be made.

Description	Detail
Glass Type	1" IG
Glazing Construction (exterior to interior)	1/8" thick tempered glass3/4" desiccant filled, aluminum box type spacer1/8" thick tempered glass
Glazing Method	Set from the interior glazed against a bead of sealant and secured with aluminum snap-fit glazing beads with a gasket against the glass
Glazing Bite	1/2"
Daylight Opening Vent:	1346 mm x 711 mm (53 x 28")

WEATHERSTRIPPING:

Description	Quantity	Location
3/16" diameter foam-filled vinyl bulb	1 Row	Frame and vent perimeters

DRAINAGE:

Description	Quantity	Location
1-1/8" wide x 1/4" high weepslot	2	Sill face, 4" from each end

HARDWARE:

Description	Quantity	Location
Lever lock	2	Head, 11" from each corner
Single Bar Support Hinge	2	One at each jamb located at the bottom corners of each stile
Plastic snubber	1	Midspan of the bottom rail



TEST SPECIMEN DESCRIPTION: (Continued)

INSTALLATION: The specimen was installed into a Spruce-Pine-Fir wood buck. The rough opening allowed for a 1/2" shim space. The exterior perimeter of the specimen was sealed with sealant.

Location	Anchor Description	Anchor Spacing
		5" from each end and spaced
Head and sill	#8 x 3" wood screw	16" on center, through the
		frame into the wood buck
		5" from each end and midspan,
Jambs	#8 x 3" wood screw	through the frame into the
		wood buck

TEST RESULTS: The temperature during testing was 21.7 °C (71 °F).

OPERATING FORCE: First Half (per ASTM E 2068)

Test	Results	Allowable
Initiate Motion	18 N (4 lbf)	70 N (15 lbf)
Maintain Motion (Opening)	18 N (4 lbf)	45 N (10 lbf)
Maintain Motion (Closing)	18 N (4 lbf)	45 N (10 lbf)
Locks / Latches	22 N (5 lbf)	100 N (22.5 lbf)

Note #1: The operating force results listed above represent the maximum force measured among all sash tested.

AIR LEAKAGE TESTING: First Half (per ASTM E 283)

Test	Results	Allowable
Infiltration @ 75 Da (1 57 pcf)	0.1 L/s/m ²	0.5 L/s/m ²
Inflitration @ 75 Pa (1.57 pst)	(0.02 cfm/ft ²)	(0.10 cfm/ft ²)
Eufiltration @ 75 Do (1 57 pof)	0.1 L/s/m ²	0.5 L/s/m ²
Exhitration @ 75 Pa (1.57 psr)	(0.03 cfm/ft ²)	(0.10 cfm/ft ²)

Note #2: The specimen tested meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440 for air leakage resistance.



TEST RESULTS: (Continued)

WATER PENETRATION TESTING: (per ASTM E 547 and ASTM E 331)

Test	Results	Allowable	
290 Pa	Dace	Nolookaga	
(6.06 psf)	Pass	NO LEakage	

Note #3: Water Penetration testing was performed without an insect screen.

UNIFORM LOAD TESTING: (per ASTM E 330)

Design Pressure Test	Results	Allowable
Deflection measured between		
the lock points		
+1920 Pa (+40.10 psf)	0.5 mm (-0.021")	5.0 mm (0.20")
-1920 Pa (-40.10 psf)	0.8 mm (0.033")	5.0 mm (0.20")

Structural Test	Results	Allowable
Permanent Set measured between		
the lock points		
+2880 Pa (+60.15 psf)	0.2 mm (0.010 ")	1.7 mm (0.07")
-2880 Pa (-60.15 psf)	0.7 mm (-0.028")	1.7 mm (0.07")

Note #4: All loads were held for 10 seconds.

Note #5: Tape and film were used to seal against air leakage. In our opinion, the tape and film did not influence the results of the test.



TEST RESULTS: (Continued)

SECONDARY TESTING:

Test	Results	Allowable
FORCED ENTRY RESISTANCE		
per ASTM F 588		
Type: B – Grade: 10	Pass	No Entry
AWNING, HOPPER, PROJECTED		
HARDWARE LOAD TEST		
140 N (30 lbf)	41.9 mm (1.65")	47.8 mm (1.88")

General Note: All testing was performed in accordance with reference test methods.



A copy of this report, detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Molimo, LLC for the entire test record retention period. At the end of this retention period, the service life of this report will expire.

Results obtained are tested values and were secured by using the designated test methods. This test 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 permission of Molimo, LLC.

For MOLIMO, LLC:

Joseph W. Enriquez Project Manager Michael D. Stremmel, P.E. Senior Project Engineer

MDS:jld

Attachments (pages): This report is complete only when all attachments listed are included. Appendix-A: Alteration Addendum (1) Appendix-B: Air Seal Location (1) Appendix-C: Drawings (8)

This report was produced from controlled document template MMO 00013, Rev 2, 8/28/2018.



Appendix A

Alteration Addendum

Alteration #1	
Date:	5/15/2019
Reason:	Failed initial Water Penetration testing at 8.15 psf (390 Pa)
Remedial Work:	No remedial work performed, test pressure lowered to 6.06 psf (290 Pa) for static and cyclic Water Penetration testing



Appendix B Air Seal Location





Appendix C

Drawings

BOM: W250HC-HOPPER					
ITEM	DESCRIPTION	PART NO.	QTY.		
1	250C/HC Window Head/Sill	H-16980	2		
2	250HC Main Frame	H-2656	2		
3	250HC Project-in	H-2661	4		
4	250 Corner Key	S-13020	8		
5	250 1" Glazing Bead	S-13014	4		
6	Project-in cam handle w/ keeper. LH	WH2L42577	1		
7 Project-in cam handle w/ keeper. RH		WH2L42578	1		
8	HC 4 Bar Hinge, 3mm x 22m W x 28" L	WH1H728N	2		
9	Locking Block	WH7B2011	1		
10	Setting Block	WH6N582	2		
11	Butyl Tape for 1" I.G.	WH5G3654	4		
12	Rubber Apply for 1" I.G.	WH6U3175	4		
13	T-slot Bulb Seal Rubber	WH5T175B	8		
14	Insulated Glass 1"	1/8" x 1/8"	-		
15	1/2" x 1" Angle For Hopper	S-4393	1		













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	Date:	8/23/2019	(C	FONDA, N	NEW YORK		KEYMARK COF	PORATION		Customer's Part Number
	Ву:	M. Stremmel		FAX ENG.(518)853-3435 TEL. (518) 853-3421 E-	SALES(518)853-3130 -MAIL engny@keymarl	kcorp.com	915/922/923/9 Part Title	25/930 PROJECT	ED WINDOW	925000 Scale
			Sym.	Re	WISIONS	Date	CORNER KEY	Est. Area	Finish Perimeter	1:1 Date
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$S_x = 0.294$ $S_y = 0.29$	14 Crimp Fac	tor 8 Mill Ano. D	Drnr. Drcn. Pc Solio	Semi-hollow 🗌 Class	Hollow 🗌 Class		Cavity Size	Circle Size 3.2 In	Exterior Perimeter 9.490 Tr	Checked S.J.S. 03

*	STRUCTURAL STREAKING IS EXPECTED	UNIFORM PAINT COVERAGE	STANDARD COMMERCIAL TOLERANC PRODUCTS APPLY UNLESS SPECI	ES FOR EXTRUDED IFIED OTHERWISE	S-04393 Die Number
	ACTUAL SIZE		0.500	R (2)	Die Number
	Architectural Product	In the state of t		Linspecified Break Ext	Company
	Report #: 1931.02-10 Date: 8/23/201 By: M. Stremmer	9 nel	KEYMARK CORPORATION FONDA, NEW YORK FAX ENG.(518)853-3435 SALES(518)853-3130 TEL. (518) 853-3421 E-MAIL keyeng@superior.net	Vall Thickness: .062 .015 Radii Customer <u>KEYMARK CORPORATION</u> Job Name STANDARD SHAPES - 13	us or as Noted Customer's Part Number
			Sym. Revisions Date 2 PRINT REVISION 03-04-96 PRINT REDRAWN MFW 03-04-96	Part Title 1.0 X .5 X .062 ANGLE .031RAD Alloy Est. Area Finish Perimeter 6063 .089 In*2	Scale 1:1 Date 04-25-79
Estimo For Refer Only	$\frac{I_{x} = I_{y} = Factor}{S_{x} = S_{y} = 28}$	Type Df Finish Mill Ano. Drnr. Drcn.	Solid Zemi-hollow Class Hollow Class	Temper Est. Wt./Ft. Est. Perimeter T-5 .107 Lbs 2.945 In Cavity Size Circle Size Exterior Perimeter 1-2 In 2.945 In	Drawn J.H. Checked