

TEST REPORT

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

REPORT NO.: 1931.06-106-211

RENDERED TO: GAMCO CORPORATION
Flushing, New York

PRODUCT TYPE: Aluminum Inswing Hopper Window

SERIES / MODEL: W250C

Test	Summary of Results
Primary Product Designator	Class CW – PG50 1219 x 813 (48 x 32)-AP
Design Pressure	±2400 Pa (±50.13 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 (0.02 cfm/ft ²)
Water Penetration Resistance Test Pressure	360 Pa (7.52 psf)

Test Completion Date: 5/15/2019

Reference must be made to Report No. 1931.06-106-211, 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: W250C

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 – PG50 1219 x 813 (48 x 32)-AP

PROJECT DETAILS:

Test Date: 5/15/2019

Test Record Retention End Date: 5/15/2023

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: 1219 mm x 813 mm (48" x 32")
Overall Area: 0.99 m² (10.67 ft²)
Sash Size: 1174.7 mm x 742.9 mm (46-1/4" x 29-1/4")

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 glass 3/4" desiccant filled, aluminum box type spacer 1/8" 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:	1035 mm x 603.2 mm (40-3/4"x 23-3/4")

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

TEST RESULTS: The temperature during testing was 15.4 °C (59.8 °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 Pa (1.57 psf)	0.1 L/s/m ² (0.02 cfm/ft ²)	0.5 L/s/m ² (0.10 cfm/ft ²)
Exfiltration @ 75 Pa (1.57 psf)	0.1 L/s/m ² (0.02 cfm/ft ²)	0.5 L/s/m 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)

Test	Results	Allowable
360 Pa (7.52 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 along the right stile +2400 Pa (+50.13 psf) -2400 Pa (-50.13 psf)	1.4 mm (0.055") 1.8 mm (-0.070")	3.81 mm (0.15") 3.81 mm (0.15")

Structural Test	Results	Allowable
Permanent Set measured between the lock points +3600 Pa (+75.19 psf) -3600 Pa (-75.19 psf)	1.4 mm (0.055 ") 0.2 mm (-0.010")	2.0 mm (0.08") 2.0 mm (0.08")

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.

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)	24.9 mm (0.98")	33.5 mm (1.32")

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

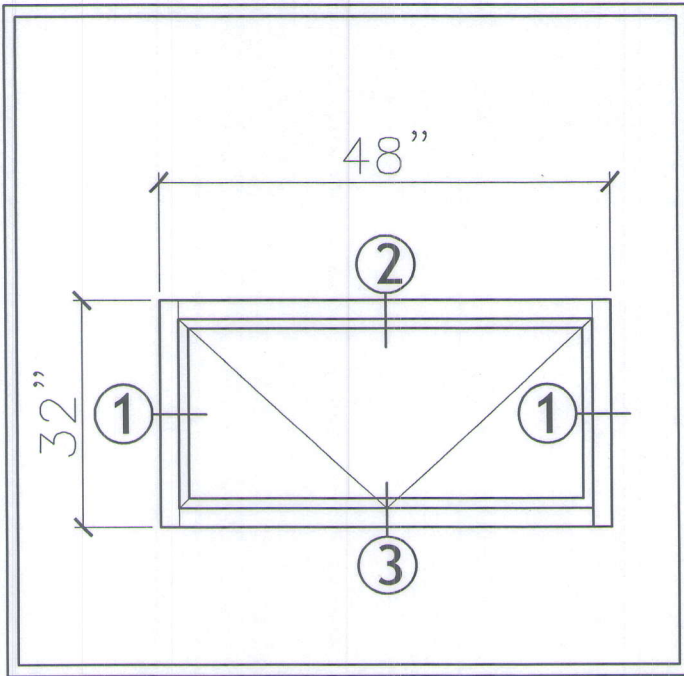
No alterations performed.

Appendix C

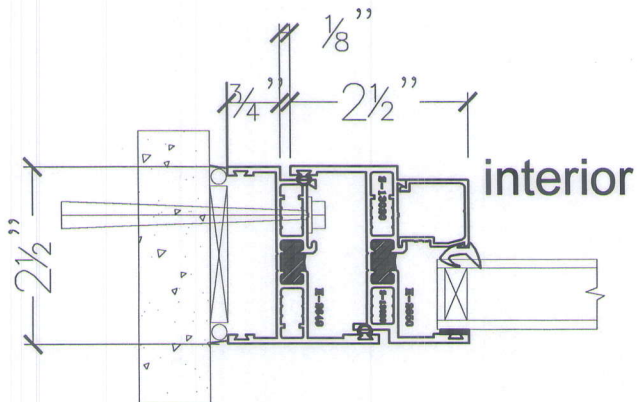
Drawings

BOM: W250C-HOPPER			
ITEM	DESCRIPTION	PART NO.	QTY.
1	250C/HC Window Head/Sill	H-16980	2
2	250 Main Frame	H-2649	2
3	250HC Project-in	H-2650	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	LC 4 Bar Hinge, 2.5mm x 18m W x 20" L	WH1H520S	2
9	Locking Block	WH7B2011	1
10	Setting Block	WH6N551	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

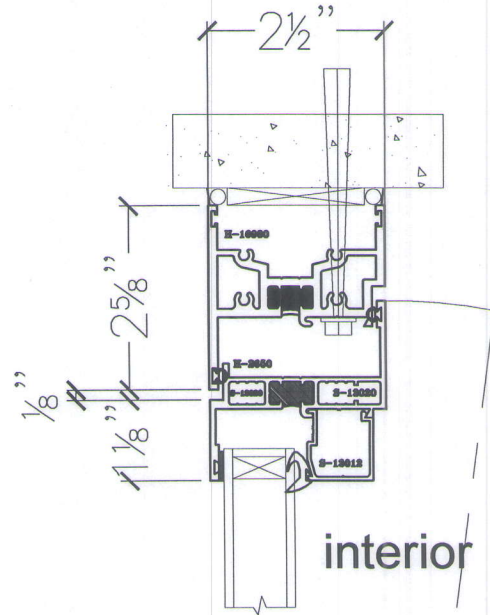
 Molimo™ Architectural Product Testing	
Report #:	1931.06-106-11
Date:	8/23/2019
By:	M. Stremmel



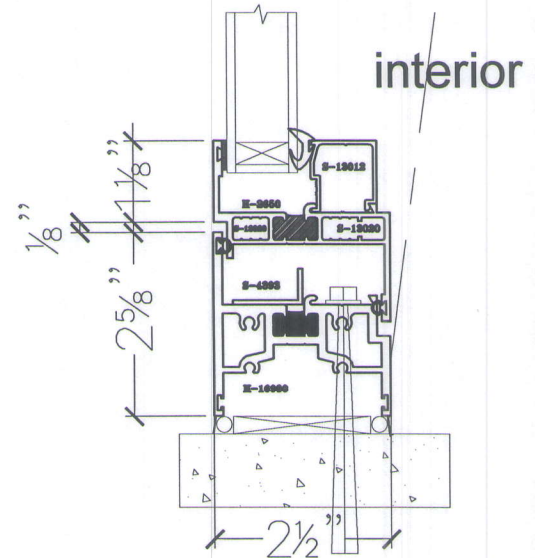
W250C SERIES WINDOW PROJECT-IN HOPPER



1 VENT /
JAMB



2 VENT /
HEAD



3 VENT /
SILL



Molimo
Architectural Product Testing

Report #: 1931.06-106-11

Date: 8/23/2019

By: M. Stremmel

SHEET #

1G

Drawn by: C. CHAN

Checked by:

Date: 4-7-16

Scale: 3":1'-0"

Customer

Project : W250C
PROJECT-IN WINDOW

Revisions

No.	Date	Description
01	5-20-16	UPDATED DIMENSIONS
02	9-07-18	NEW SILL / HEAD DETAIL



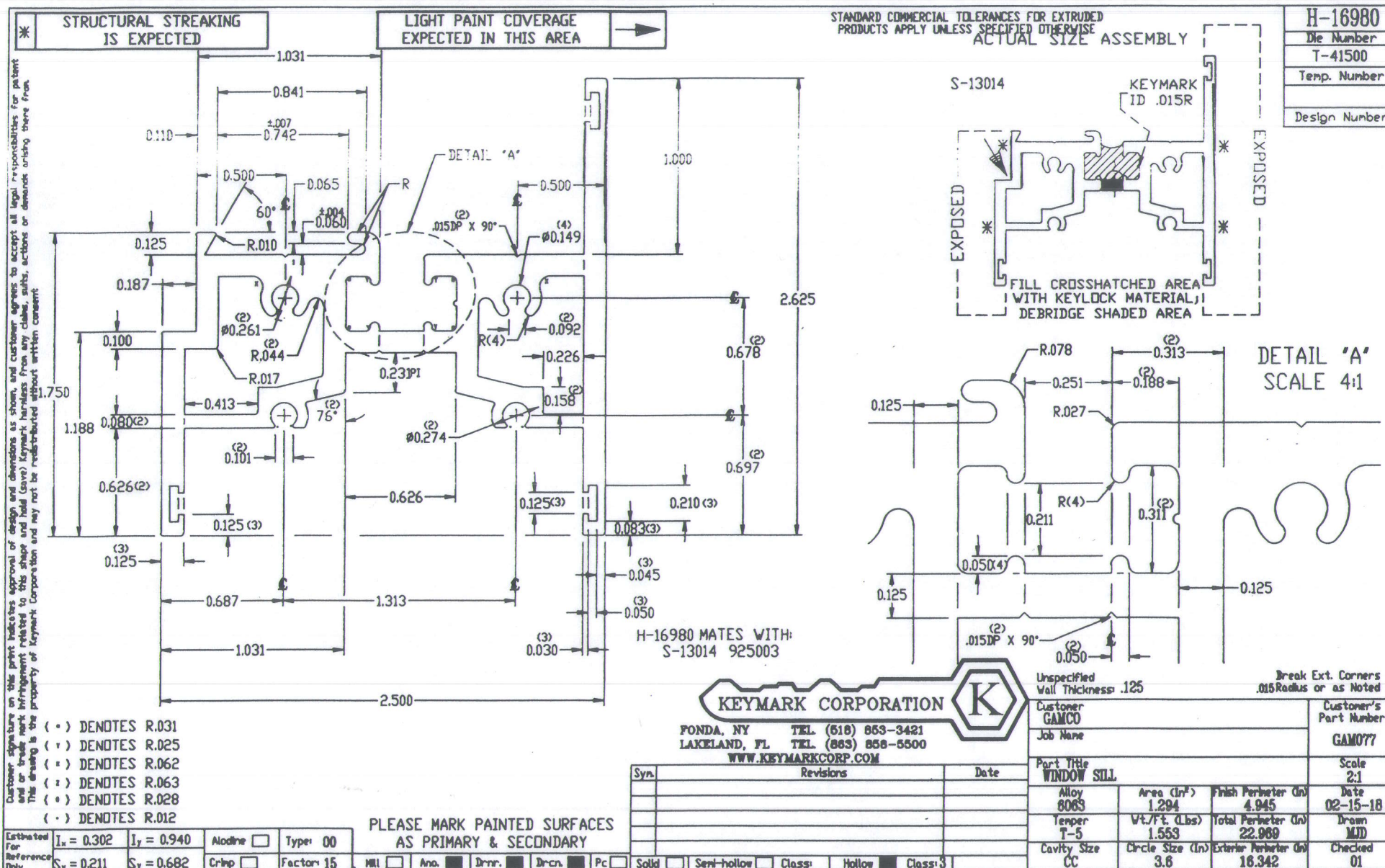
GAMCO CORPORATION

MANUFACTURERS OF FENESTRATION PRODUCTS

131-10 MAPLE AVE. FLUSHING, N.Y. 11355

TEL: (718)359-8833 FAX: (718)359-8861

info@gamcocorp.com www.gamcocorp.com



Molimo™
Architectural Product Testing

Report #: 1931.06-106-11

Date: 8/23/2019

By: M. Stremmel

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STRUCTURAL STREAKING
IS EXPECTED

UNIFORM PAINT COVERAGE
NOT EXPECTED IN THIS AREA

STANDARD COMMERCIAL TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS SPECIFIED OTHERWISE

H-02649

Die Number

Temp. Number

Design Number

DETAIL "A"
SCALE 4:1

DETAIL "B"
SCALE 4:1

R.015
X .015HI
TYP. (12)

KEYMARK
ID .015R

ACTUAL SIZE

EXPOSED

EXPOSED

FILL CROSSHATCHED AREA
WITH KEYLOCK MATERIAL;
DEBRIDGE SHADED AREA

FOR ASSEMBLE REFER TO H-02650

MATES WITH:

S-13011	923001
S-13012	923004
S-13014	923003
S-13023	923009



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Date: 8/23/2019

By: M. Stremmel

KEYMARK CORPORATION

FONDA, NY TEL. (518) 853-3421
LAKELAND, FL TEL. (863) 858-5500
WWW.KEYMARKCORP.COM

Unspecified
Wall Thickness: .062

Break Ext. Corners
.015 Radius or as Noted

Customer
KEYMARK CORPORATION

Customer's
Part Number

Job Name
925 PROJECTED WINDOW

925001

Part Title	MAIN FRAME - MALE
------------	-------------------

Scale
1-4Alloy
6063

Area (in ²):	0.635
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Finish Perimeter (in)	3.937
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Date
07-28-88

Temper
T-5

Wt./Ft. (Lbs)	0.782
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Total Perimeter (In)	18.632
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Drawn
F.A.S.

	1.0
Cavity Size	CC

Circle Size (in)	3.2
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Exterior Perimeter (in)	14.043
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Checked
S.J.S.

Estimated For Reference Only	$I_x = 0.119$	$I_y = 0.518$	Alodine <input type="checkbox"/>	Type: 00
	$S_x = 0.098$	$S_y = 0.357$	Crimp <input type="checkbox"/>	Factor: 24

MU	<input type="checkbox"/>	Ano.	<input checked="" type="checkbox"/>	Drnr.	<input checked="" type="checkbox"/>	Dr.cn.	<input checked="" type="checkbox"/>	Pc	<input type="checkbox"/>	Solid	<input type="checkbox"/>	Semi-hollow	<input type="checkbox"/>	Class	Hollow	Class
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FP	CC	3.2	14.049	S.J.S.
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Customer signature on this print indicates approval of design and dimensions as shown, and customer agrees to accept all legal responsibilities for patent and or trade mark infringement related to this shape and hold (save) Keymark harmless from any claims, suits, actions or demands arising there from. This drawing is the property of Keymark Corporation and may not be redistributed without written consent

* STRUCTURAL STREAKING IS EXPECTED

UNIFORM PAINT COVERAGE NOT EXPECTED IN THIS AREA

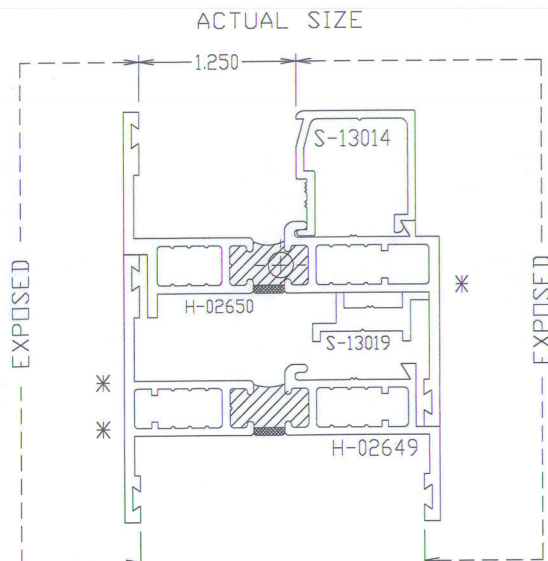
STANDARD COMMERCIAL TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS SPECIFIED OTHERWISE

H-02650

Die Number

Temp. Number

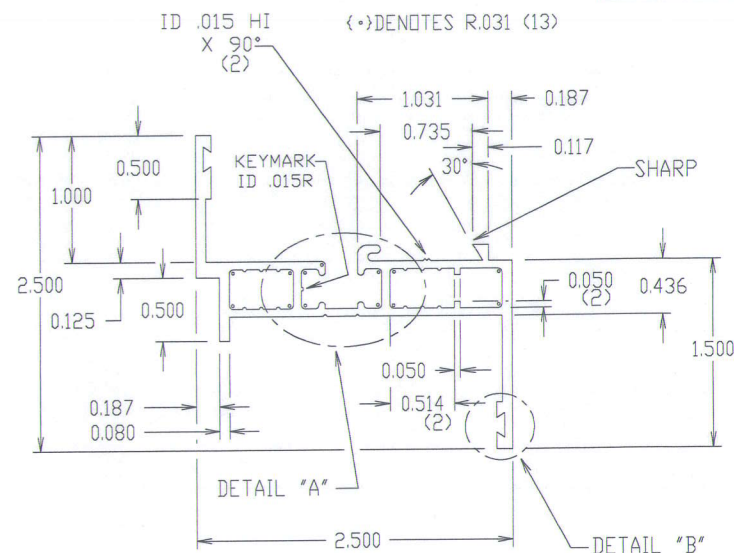
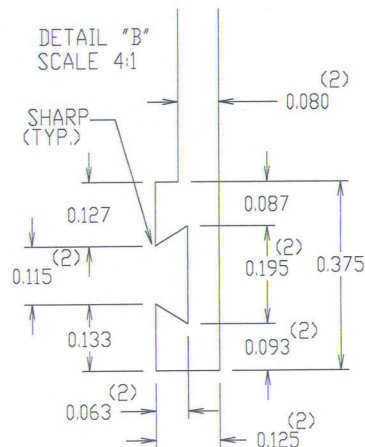
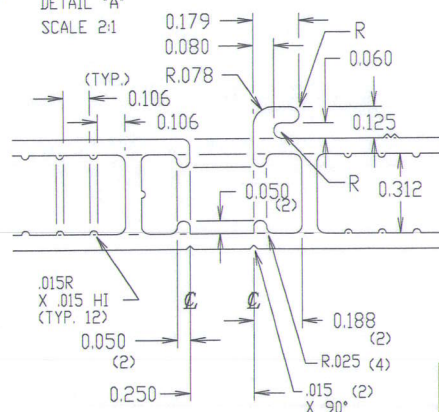
Design Number



MATES WITH:
S-13011 923001
S-13014 923003
S-13019 925008
S-23917

FILL CROSSHATCHED AREA WITH KEYLOCK MATERIAL; DEBRIDGE SHADED AREA

DETAIL "A"
SCALE 2:1



Molimo
Architectural Product Testing

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Date: 8/23/2019

By: M. Stremmel

KEYMARK CORPORATION



FONDA, NY TEL. (518) 853-3421
LAKELAND, FL TEL. (863) 858-5500
WWW.KEYMARKCORP.COM

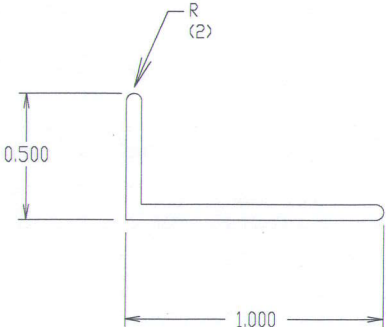
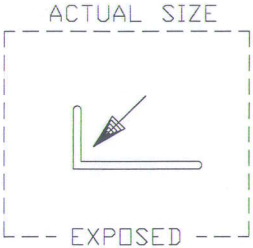
Syn.	Revisions	Date
3	PRINT REVISION	11-02-99
	PRINT REDRAWN SJS	01-24-96

Unspecified Wall Thickness: .062		Break Ext. Corners .015 Radius or as Noted	
Customer KEYMARK CORPORATION		Customer's Part Number 925006	
Job Name 925 PROJECTED WINDOW		Scale 1:1	
Part Title VENT SASH PROJECT-IN		Date 07-28-88	
Alloy 6063	Area (In ²) 0.630	Finish Perimeter (In) 3.874	Drawn F.A.S.
Temper T-5	Wt./Ft. (Lbs) 0.756	Total Perimeter (In) 17.844	Checked S.J.S.
Cavity Size CC	Circle Size (In) 3.5	Exterior Perimeter (In) 13.490	

Estimated For Reference Only	I _x = 0.139	I _y = 0.530	Alodine <input type="checkbox"/>	Type: 00
	S _x = 0.108	S _y = 0.423	Crimp <input type="checkbox"/>	Factor: 24

Mill ☐ Ano. ☒ Dnnr. ☒ Drnn. ☒ Pc ☐ Solid ☐ Semi-hollow ☐ Class: Hollow ☒ Class: 3 FP

Estimated For Reference Only	$I_x = 0.505$	$I_y = 0.505$	Alodine <input type="checkbox"/>	Type: 00
	$S_x = 0.294$	$S_y = 0.294$	Crimp	Factor 8



Molimo™

Architectural Product Testing

Report #:

1931.06-106-11

Date:

8/23/2019

By:

M. Stremmel

KEYMARK CORPORATION

FONDA, NEW YORK

FAX ENG.(518)853-3435 SALES(518)853-3130

TEL. (518) 853-3421 E-MAIL keyeng@superior.net

Sym.	Revisions	Date
2	PRINT REVISION	03-04-96
	PRINT REDRAWN MFW	03-04-96

Unspecified Wall Thickness: .062		Break Ext. Corners .015 Radius or as Noted	
Customer		Customer's Part Number	
KEYMARK CORPORATION			
Job Name		Scale	
STANDARD SHAPES - 13		1:1	
Part Title		Date	
1.0 X .5 X .062 ANGLE .031RAD		04-25-79	
Alloy	Est. Area	Finish Perimeter	J.H. Checked
6063	.089 In ²	2.945 In	
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	

Estimated For Reference Only	I _x =	I _y =	Factor	Type Of Finish			
	S _x =	S _y =		MILL <input checked="" type="checkbox"/>	Ano. <input checked="" type="checkbox"/>	Dnrr. <input checked="" type="checkbox"/>	Drcn. <input checked="" type="checkbox"/>
			28				
				Solid <input checked="" type="checkbox"/>	Semi-hollow <input type="checkbox"/>	Class <input type="checkbox"/>	Hollow <input type="checkbox"/>