

GAMCO CORPORATION

COMPUTER SIMULATION

REPORT

SCOPE OF WORK

W250C PROJECT-OUT WINDOW - AAMA 507 SIMULATIONS TO DETERMINE U-FACTOR,
SOLAR HEAT GAIN COEFFICIENT, AND VISIBLE TRANSMITTANCE RATINGS

REPORT NUMBER

I4945.01-116-45 R0

TEST DATE

05/25/18

ISSUE DATE

05/25/18

RECORD RETENTION END DATE

05/25/23

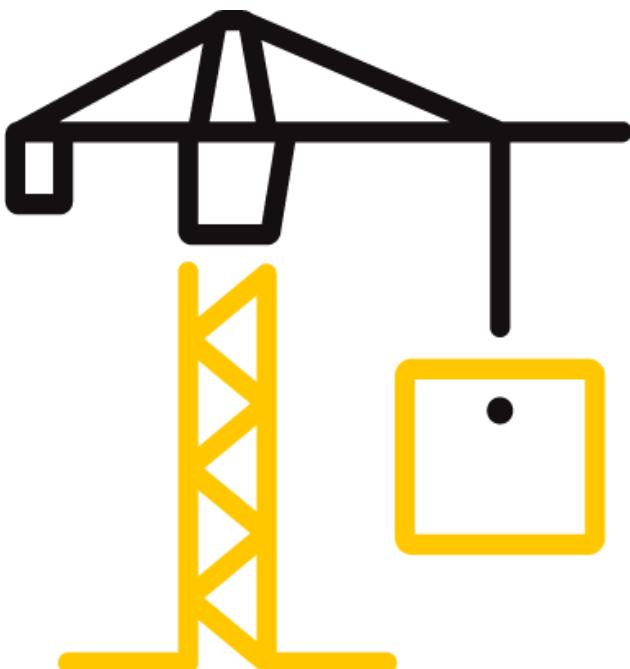
PAGES

20

DOCUMENT CONTROL NUMBER

RT-R-AMER-Test-3753 (02/20/18)

©2017 INTERTEK



TEST REPORT FOR GAMCO CORPORATION

Report No.: I4945.01-116-45 R0

Date: 05/25/18

REPORT ISSUED TO**GAMCO CORPORATION**

131-10 Maple Avenue

Flushing, New York 11355

SECTION 1**SUMMARY****SERIES/MODEL: W250C Project-Out Window**

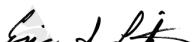
Intertek Building & Construction (Intertek B&C) was contracted to AAMA 507 computer simulations utilizing thermal modeling computer software developed by Lawrence Berkeley National Laboratory (LBNL). Results obtained are simulated values and were secured using the designated test methods.

Intertek B&C is an NFRC accredited simulation laboratory and all simulations were conducted in full compliance with NFRC approved procedures and specifications.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

For INTERTEK B&C:

COMPLETED BY:	Allison M. Ford
TITLE:	Simulation Technician
SIGNATURE:	 <small>Digitally Signed by: Allison Ford</small>
DATE:	05/25/18

REVIEWED BY:	Eric S. Leitner
TITLE:	Simulation Technician
SIGNATURE:	 <small>Digitally Signed by: Eric S. Leitner</small>
DATE:	05/25/18

AMF:amf

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample(s) tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

TEST REPORT FOR GAMCO CORPORATION

Report No.: I4945.01-116-45 R0

Date: 05/25/18

SECTION 2**TEST METHODS**

The products were evaluated in accordance with the following:

AAMA 507-15, Standard Practice for Determining the Thermal Performance Characteristics of Fenestration Systems Installed in Commercial Buildings

ANSI/NFRC 100-2017, Procedure for Determining Fenestration Product U-Factors

ANSI/NFRC 200-2017, Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence

SECTION 3**TEST PROCEDURE**

The total product, including specific frame, spacer, and glass details, was modeled using NFRC approved software.

FRAME AND EDGE MODELING	THERM 7.4.4
CENTER-OF-GLASS MODELING	WINDOW 7.4.14
TOTAL PRODUCT CALCULATIONS	WINDOW 7.4.14
SPECTRAL DATA LIBRARY	IGDB 60.0

Modeling Assumptions / Technical Interpretations

Any modeling assumptions and technical interpretations required to model this product are listed below.

- 1) To prevent air infiltration, tape was applied to all interior sash crack locations.
- 2) This product is available in either a painted or anodized finish. These two finish types may be grouped in accordance with ANSI/NFRC 100-2017, Section 4.2.1.L. The painted finish was simulated since it is the worst case (highest emissivity).

TEST REPORT FOR GAMCO CORPORATION

Report No.: I4945.01-116-45 R0

Date: 05/25/18

SECTION 4
SIMULATION SPECIMEN DESCRIPTION

SERIES/MODEL	W250C Project-Out Window
PRODUCT TYPE	Projected, Awning
FRAME MATERIAL	AT - Aluminum w/ Thermal Breaks - All Members
SASH MATERIAL	AT - Aluminum w/ Thermal Breaks - All Members

GLAZING OPTIONS					
	OUTER PANE	MIDDLE PANE	INNER PANE	GAP SIZES	IG OVERALL
GL1	1/4"	N/A	1/4"	0.500"	1"
GL2	1/4"	Heat Mirror	1/4"	0.250"	1"

GL1: Dual glazed IG unit (COG=0.48 - COG=0.20)

GL2: Dual glazed IG unit w/ heat mirror (COG=0.18 - COG=0.10)

SPACER OPTIONS				
	TYPE	PRIMARY SEAL	SECONDARY SEAL	CODE
Generic Aluminum Dual Seal Spacer		Butyl Rubber	Butyl Rubber	A1-D

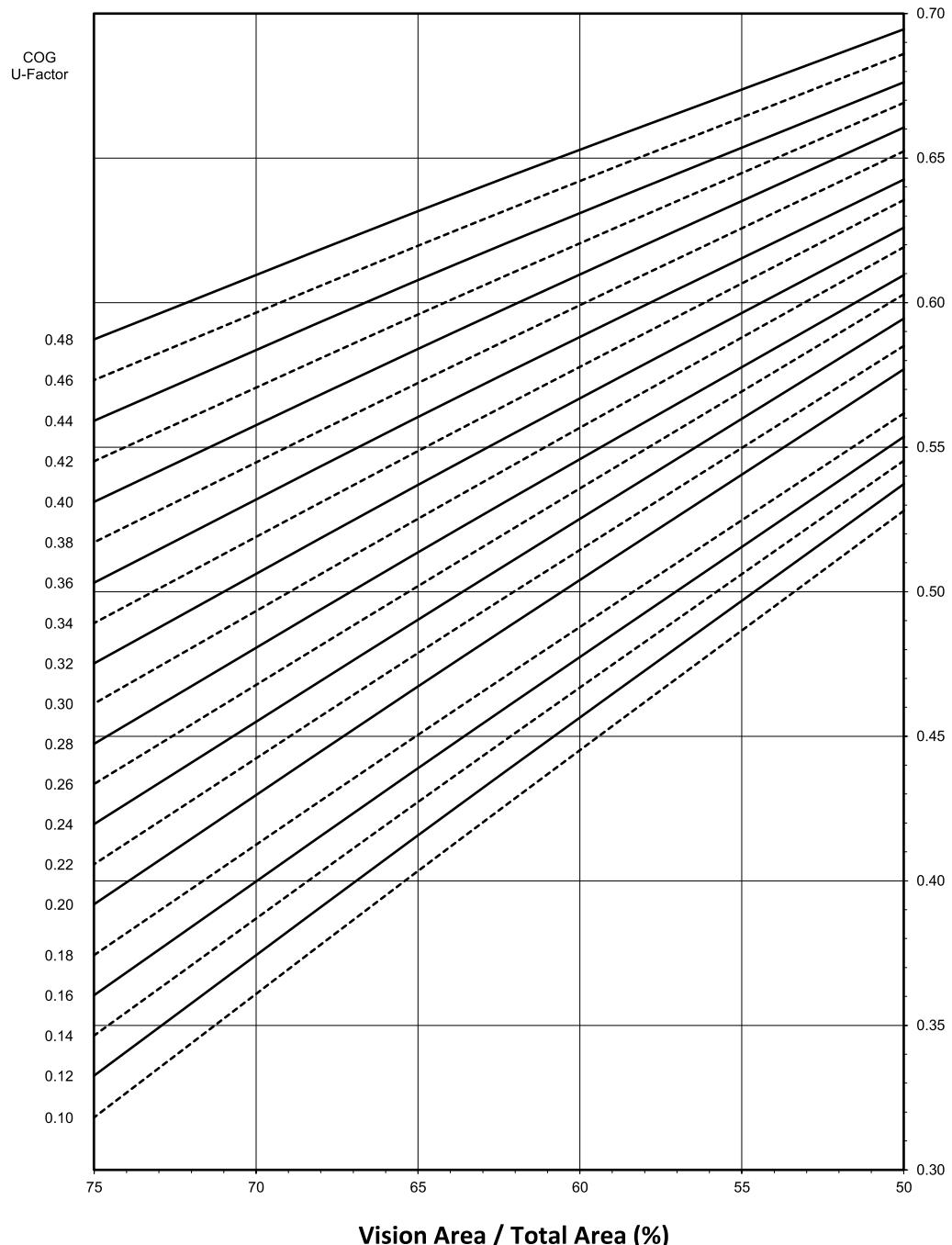
SECTION 5
MEASURED SIMULATION DATA

U-FACTOR CALCULATIONS	
Exterior Air Temperature	-0.4°F
Exterior Wind Velocity	12.3 mph (Perpendicular Flow)
Interior Air Temperature	69.8°F

TEST REPORT FOR GAMCO CORPORATION

Report No.: I4945.01-116-45 R0

Date: 05/25/18

SECTION 6
SIMULATION RESULTS**U-FACTOR CALCULATIONS: System U-Factor vs. Percentage of Vision Area**

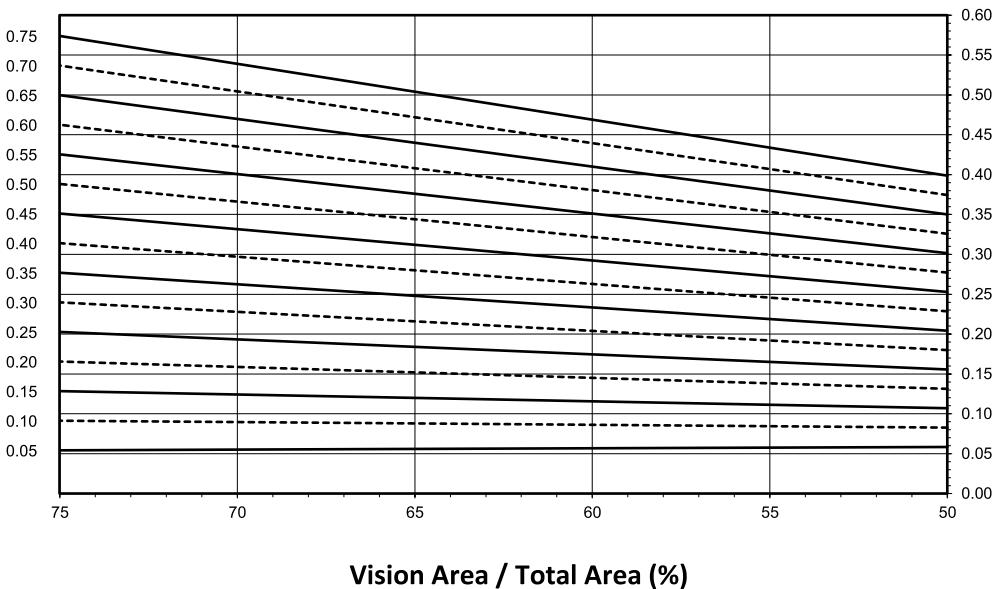
TEST REPORT FOR GAMCO CORPORATION

Report No.: I4945.01-116-45 R0

Date: 05/25/18

SECTION 6
SIMULATION RESULTS**SHGC CALCULATIONS: System SHGC vs. Percentage of Vision Area**

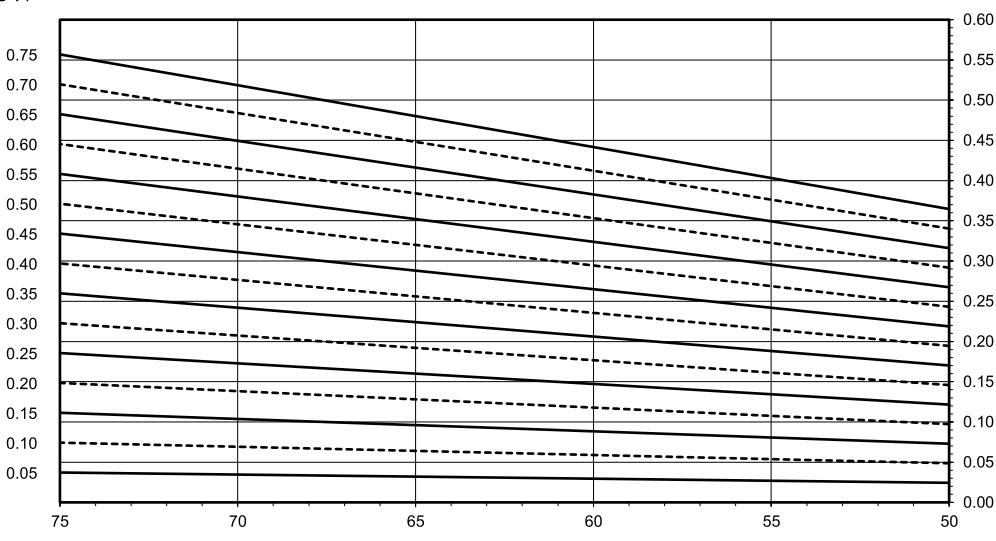
COG SHGC



Vision Area / Total Area (%)

VT CALCULATIONS: System VT vs. Percentage of Vision Area

COG VT



Vision Area / Total Area (%)

TEST REPORT FOR GAMCO CORPORATION

Report No.: I4945.01-116-45 R0

Date: 05/25/18

SECTION 6
SIMULATION RESULTS

U-FACTOR CALCULATIONS (W250C Project-Out Window)		
Size Specific U-Factor Matrix*		
Glazing Option	Center-of-Glass U-Factor	Overall U-Factor
1	0.48	0.64
2	0.46	0.63
3	0.44	0.61
4	0.42	0.60
5	0.40	0.59
6	0.38	0.58
7	0.36	0.57
8	0.34	0.56
9	0.32	0.54
10	0.30	0.53
11	0.28	0.52
12	0.26	0.51
13	0.24	0.50
14	0.22	0.49
15	0.20	0.48
16	0.18	0.46
17	0.16	0.45
18	0.14	0.44
19	0.12	0.43
20	0.10	0.41

*The size specific U-Factor matrix is based on the Projected, Awning NFRC specimen size of 1500mm x 600mm (59 in x 23.625 in). This represents 63.7% Vision Area / Total Area.

TEST REPORT FOR GAMCO CORPORATION

Report No.: I4945.01-116-45 R0

Date: 05/25/18

SECTION 6
SIMULATION RESULTS

SHGC/VT CALCULATIONS (W250C Project-Out Window)			
Size Specific SHGC Matrix*		Size Specific VT Matrix*	
Center-of-Glass SHGC	Overall SHGC	Center-of-Glass VT	Overall SHGC
0.75	0.49	0.75	0.47
0.70	0.46	0.70	0.44
0.65	0.43	0.65	0.41
0.60	0.40	0.60	0.38
0.55	0.37	0.55	0.34
0.50	0.34	0.50	0.31
0.45	0.31	0.45	0.28
0.40	0.28	0.40	0.25
0.35	0.24	0.35	0.22
0.30	0.21	0.30	0.19
0.25	0.18	0.25	0.16
0.20	0.15	0.20	0.13
0.15	0.12	0.15	0.09
0.10	0.09	0.10	0.06
0.05	0.06	0.05	0.03

*The size specific SHGC and VT matrices are based on the Projected, Awning NFRC specimen size of 1500mm x 600mm (59 in x 23.625 in). This represents 63.7% Vision Area / Total Area.

TEST REPORT FOR GAMCO CORPORATION

Report No.: I4945.01-116-45 R0

Date: 05/25/18

SECTION 6
SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (W250C Project-Out Window)								Total Product U-Factor		
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	50.00% Vision Area	NFRC	75.00% Vision Area	
								100-2017		
1	0.48	43.7°F	Head	3.4328	0.8697	0.4462	0.6946	0.6371	0.5873	
			L. Jamb	3.4328	0.8636	0.1279				
			R. Jamb	3.4328	0.8636	0.1279				
			Sill	3.4328	0.8698	0.4461				
2	0.46	44.8°F	Head	3.4328	0.8692	0.4340	0.6861	0.6254	0.5732	
			L. Jamb	3.4328	0.8630	0.1244				
			R. Jamb	3.4328	0.8630	0.1244				
			Sill	3.4328	0.8692	0.4339				
3	0.44	45.8°F	Head	3.4328	0.8687	0.4219	0.6762	0.6137	0.5592	
			L. Jamb	3.4328	0.8625	0.1209				
			R. Jamb	3.4328	0.8625	0.1209				
			Sill	3.4328	0.8687	0.4218				
4	0.42	46.8°F	Head	3.4328	0.8682	0.4100	0.6691	0.6022	0.5452	
			L. Jamb	3.4328	0.8620	0.1175				
			R. Jamb	3.4328	0.8620	0.1175				
			Sill	3.4328	0.8683	0.4099				
5	0.40	47.9°F	Head	3.4328	0.8677	0.3979	0.6606	0.5905	0.5311	
			L. Jamb	3.4328	0.8615	0.1140				
			R. Jamb	3.4328	0.8615	0.1140				
			Sill	3.4328	0.8678	0.3978				
6	0.38	48.9°F	Head	3.4328	0.8673	0.3862	0.6524	0.5790	0.5171	
			L. Jamb	3.4328	0.8610	0.1106				
			R. Jamb	3.4328	0.8610	0.1106				
			Sill	3.4328	0.8673	0.3861				
7	0.36	50.0°F	Head	3.4328	0.8668	0.3743	0.6426	0.5675	0.5031	
			L. Jamb	3.4328	0.8605	0.1072				
			R. Jamb	3.4328	0.8605	0.1072				
			Sill	3.4328	0.8669	0.3743				
8	0.34	51.0°F	Head	3.4328	0.8664	0.3625	0.6355	0.5561	0.4892	
			L. Jamb	3.4328	0.8601	0.1038				
			R. Jamb	3.4328	0.8601	0.1038				
			Sill	3.4328	0.8664	0.3624				

TEST REPORT FOR GAMCO CORPORATION

Report No.: I4945.01-116-45 R0

Date: 05/25/18

SECTION 6
SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (W250C Project-Out Window)								Total Product U-Factor		
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	50.00% Vision Area	NFRC	75.00% Vision Area	
								100-2017		
9	0.32	52.0°F	Head	3.4328	0.8660	0.3508	0.6260	0.5446	0.4752	
			L. Jamb	3.4328	0.8596	0.1005				
			R. Jamb	3.4328	0.8596	0.1005				
			Sill	3.4328	0.8660	0.3507				
10	0.30	53.1°F	Head	3.4328	0.8656	0.3392	0.6192	0.5332	0.4613	
			L. Jamb	3.4328	0.8592	0.0972				
			R. Jamb	3.4328	0.8592	0.0972				
			Sill	3.4328	0.8656	0.3391				
11	0.28	54.2°F	Head	3.4328	0.8652	0.3276	0.6095	0.5218	0.4474	
			L. Jamb	3.4328	0.8588	0.0938				
			R. Jamb	3.4328	0.8588	0.0938				
			Sill	3.4328	0.8652	0.3275				
12	0.26	55.2°F	Head	3.4328	0.8648	0.3160	0.6029	0.5105	0.4335	
			L. Jamb	3.4328	0.8584	0.0905				
			R. Jamb	3.4328	0.8584	0.0905				
			Sill	3.4328	0.8649	0.3159				
13	0.24	56.3°F	Head	3.4328	0.8645	0.3045	0.5945	0.4992	0.4196	
			L. Jamb	3.4328	0.8580	0.0872				
			R. Jamb	3.4328	0.8580	0.0872				
			Sill	3.4328	0.8645	0.3044				
14	0.22	57.3°F	Head	3.4328	0.8641	0.2930	0.5851	0.4879	0.4058	
			L. Jamb	3.4328	0.8576	0.0839				
			R. Jamb	3.4328	0.8576	0.0839				
			Sill	3.4328	0.8642	0.2930				
15	0.20	58.4°F	Head	3.4328	0.8638	0.2816	0.5770	0.4766	0.3919	
			L. Jamb	3.4328	0.8573	0.0806				
			R. Jamb	3.4328	0.8573	0.0806				
			Sill	3.4328	0.8638	0.2815				
16	0.18	59.5°F	Head	3.4328	0.8530	0.2640	0.5617	0.4600	0.3743	
			L. Jamb	3.4328	0.8484	0.0757				
			R. Jamb	3.4328	0.8484	0.0757				
			Sill	3.4328	0.8530	0.2640				

TEST REPORT FOR GAMCO CORPORATION

Report No.: I4945.01-116-45 R0

Date: 05/25/18

SECTION 6
SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (W250C Project-Out Window)								Total Product U-Factor		
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	50.00% Vision Area	NFRC	75.00% Vision Area	
								100-2017		
17	0.16	60.6°F	Head	3.4328	0.8526	0.2524	0.5536	0.4487	0.3605	
			L. Jamb	3.4328	0.8480	0.0724				
			R. Jamb	3.4328	0.8480	0.0724				
			Sill	3.4328	0.8527	0.2524				
18	0.14	61.6°F	Head	3.4328	0.8526	0.2400	0.5453	0.4373	0.3465	
			L. Jamb	3.4328	0.8479	0.0688				
			R. Jamb	3.4328	0.8479	0.0688				
			Sill	3.4328	0.8526	0.2399				
19	0.12	62.7°F	Head	3.4328	0.8522	0.2283	0.5373	0.4261	0.3327	
			L. Jamb	3.4328	0.8476	0.0654				
			R. Jamb	3.4328	0.8476	0.0654				
			Sill	3.4328	0.8523	0.2283				
20	0.10	63.9°F	Head	3.4328	0.8499	0.2164	0.5280	0.4140	0.3182	
			L. Jamb	3.4328	0.8451	0.0620				
			R. Jamb	3.4328	0.8451	0.0620				
			Sill	3.4328	0.8499	0.2163				



Total Quality. Assured.

130 Derry Court
York, PA, 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR GAMCO CORPORATION

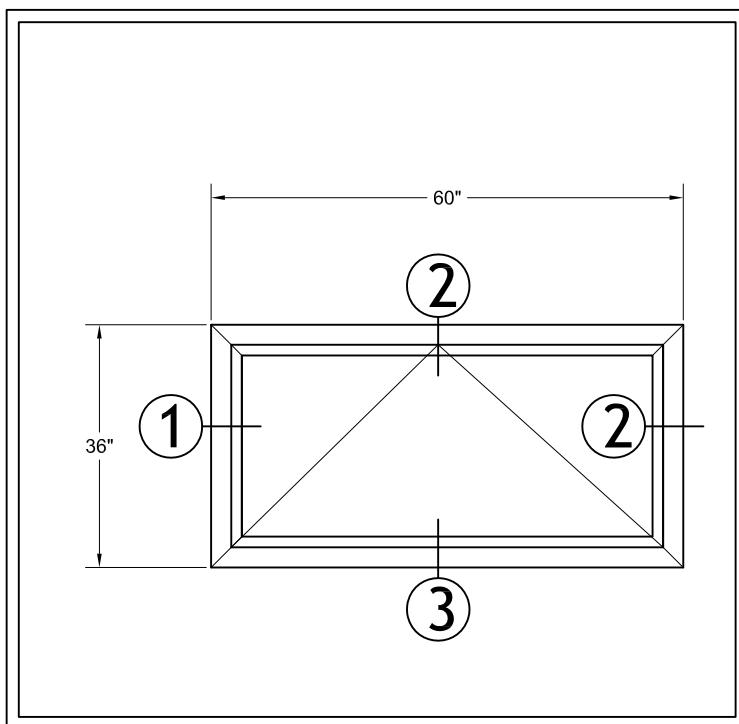
Report No.: I4945.01-116-45 R0

Date: 05/25/18

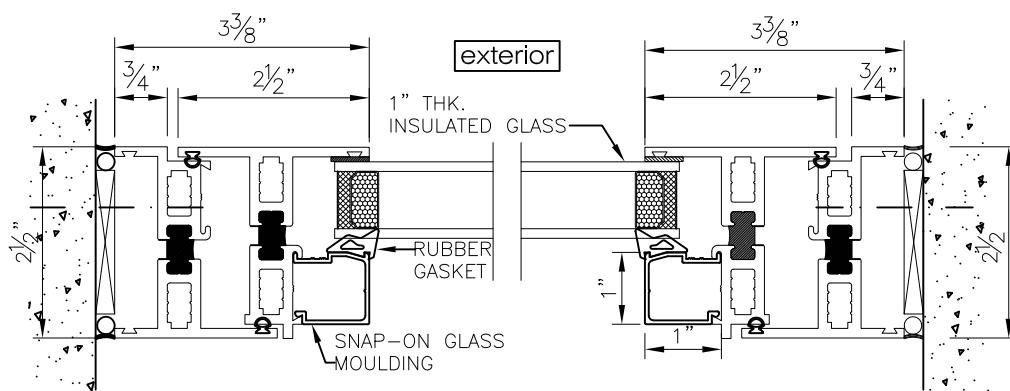
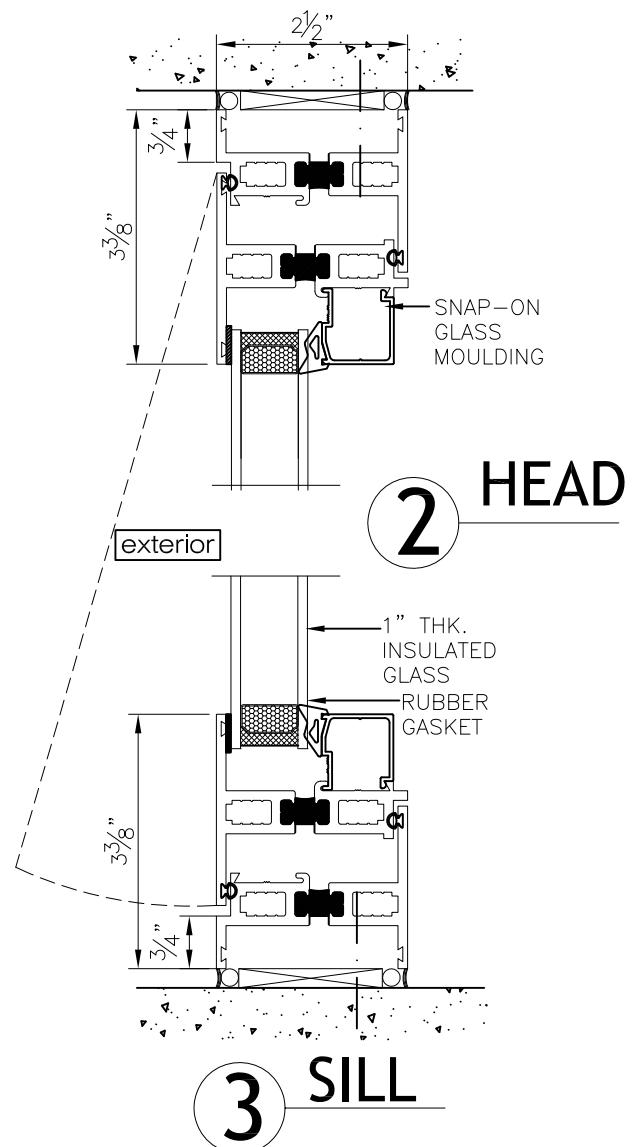
SECTION 7

DRAWINGS / BILL OF MATERIALS

The drawings which follow have been reviewed by Intertek B&C and are representative of the simulation result(s) reported herein. Any deviations are documented herein or on the drawings.



PROJECT-OUT AWNING



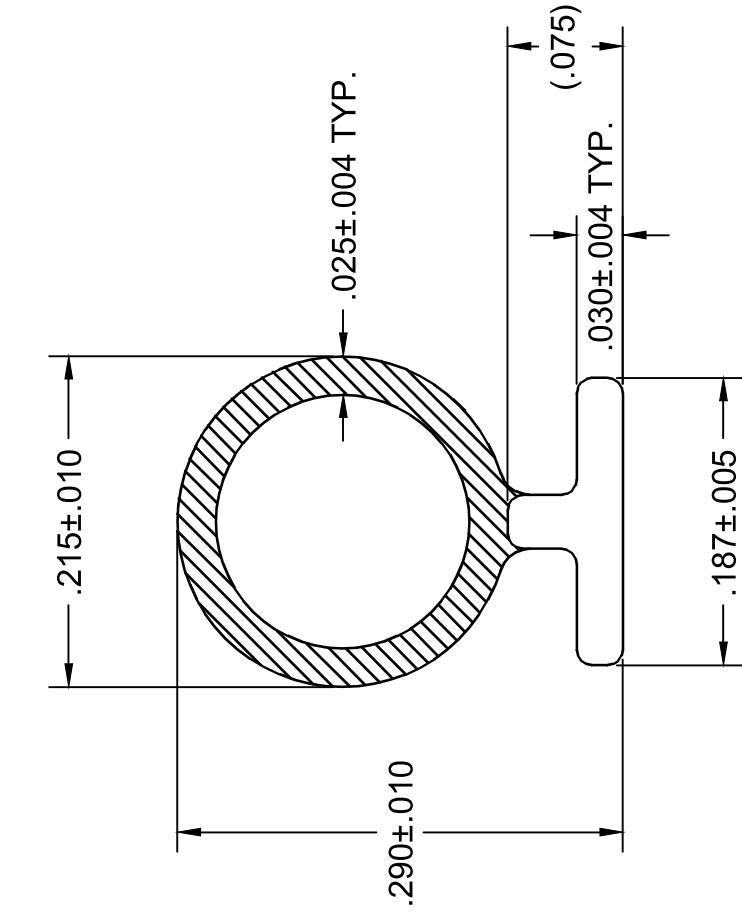
1 JAMB/VENT

intertek
Total Quality. Assured.

Report #: I4945-116-45
Date: 05/25/18
Verified by: Allison M Ford

SHEET #	Drawn by:	Customer	Revisions				GAMCO CORPORATION MANUFACTURERS OF FENESTRATION PRODUCTS
			No.	Date	Description		
C	Checked by:						
	Date:	6-2-16					
	Scale:	3":1'-0"	Project :	W250HC			
			PROJECT-OUT WINDOW				

REVISIONS	
REV	DESCRIPTION
B	FORMAT UPDATES



LEGEND

BLACK PP
BLACK TPE

THIS INFORMATION IS CONFIDENTIAL AND PROPRIETARY, AND REMAINS THE PROPERTY OF ULTRAFAB. IT SHALL BE USED SOLELY FOR THE PURPOSE FOR WHICH IT IS INTENDED AND MAY NOT BE DISCLOSED TO A THIRD PARTY. IF REQUESTED, THIS DOCUMENT AND ANY COPIES PROMPTLY SHALL BE RETURNED TO ULTRAFAB. BY REVIEWING THIS DOCUMENT, YOU AGREE TO THE FOREGOING TERMS.

CUSTOMER DRAWING

.187 WIDE BASE X 290 HIGH BULB

E20218KN4020

SOFTWARE: AUTOCAD
VERSION: 15.0

DRAWN:
MM
CHECKED:
CAB

CUST. APPR.:
ISSUED: 07/01/2016



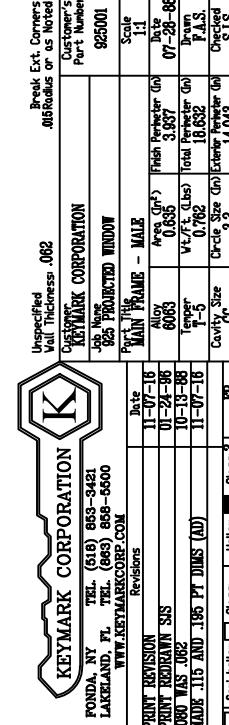
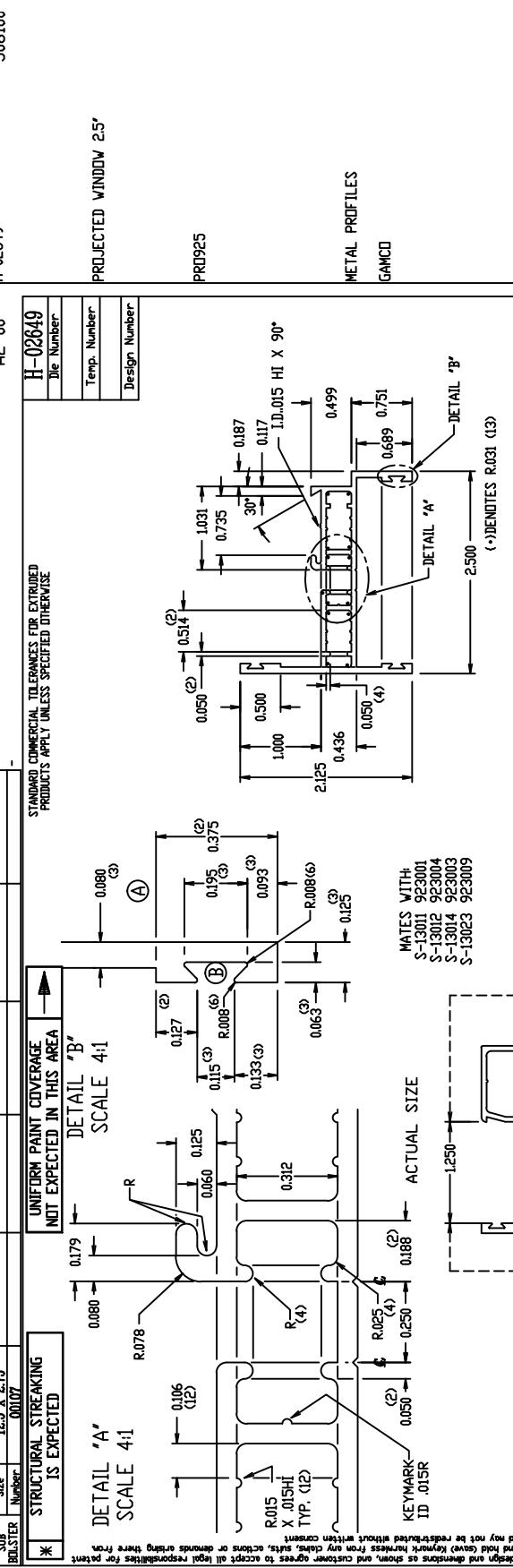
Report #:	14945-116-45
Date:	05/25/18
Verified by:	<i>Julian M. Ford</i>
Total Quality Assured.	

Materiel: EPDM/Polypropylene

1) ALL DIMENSIONS ARE IN INCHES
NOTES:

01	REV. A - .080 WAS .062	10-13-88	11
02	TITLE BLOCK - CUSTOMER NAME	10-18-95	12
03	PRINT REDRAWN SJS - A2	01-24-95	13
04	TRANSFER	05-17-97	14
05	I.V. ADDED (SJS)	11-02-99	15
06	REV. B - MADE .115 AND .195 PT DIMS (AID)	11-07-16	16
07		17	
08		18	
09		19	
10		20	

REGULAR RING



KEYMARK CORPORATION
PONDA, NY TEL (518) 863-5421
LAKELAND, FL TEL (863) 855-5600
WWW.KEYMARKCORP.COM

Unspecified Wall Thickness .082
Proj. Wall Thickness .082
Proj. Window

Break Ext. Corners
Jog Radii or as Noted
Customer's
Part's Number
PR92001

Proj. Window

MAIN FRAME - MALE

Date 11-07-16
Prod. 11-07-16
Area (in²) 6063
Weld 0.635
Taper 0.762
Total Perimeter (in) 3.057
Drawn 10-13-88
F.A.S. 18.632

Date 07-26-98
Prod. 10-13-88
Area (in²) 6063
Weld 0.762
Taper 1-5
Total Perimeter (in) 18.632

Scale 1.1
Drawn 07-26-98
F.A.S. 18.632

Check 14.043
S.I.S. 14.043

KEYMARK CORPORATION
PR925

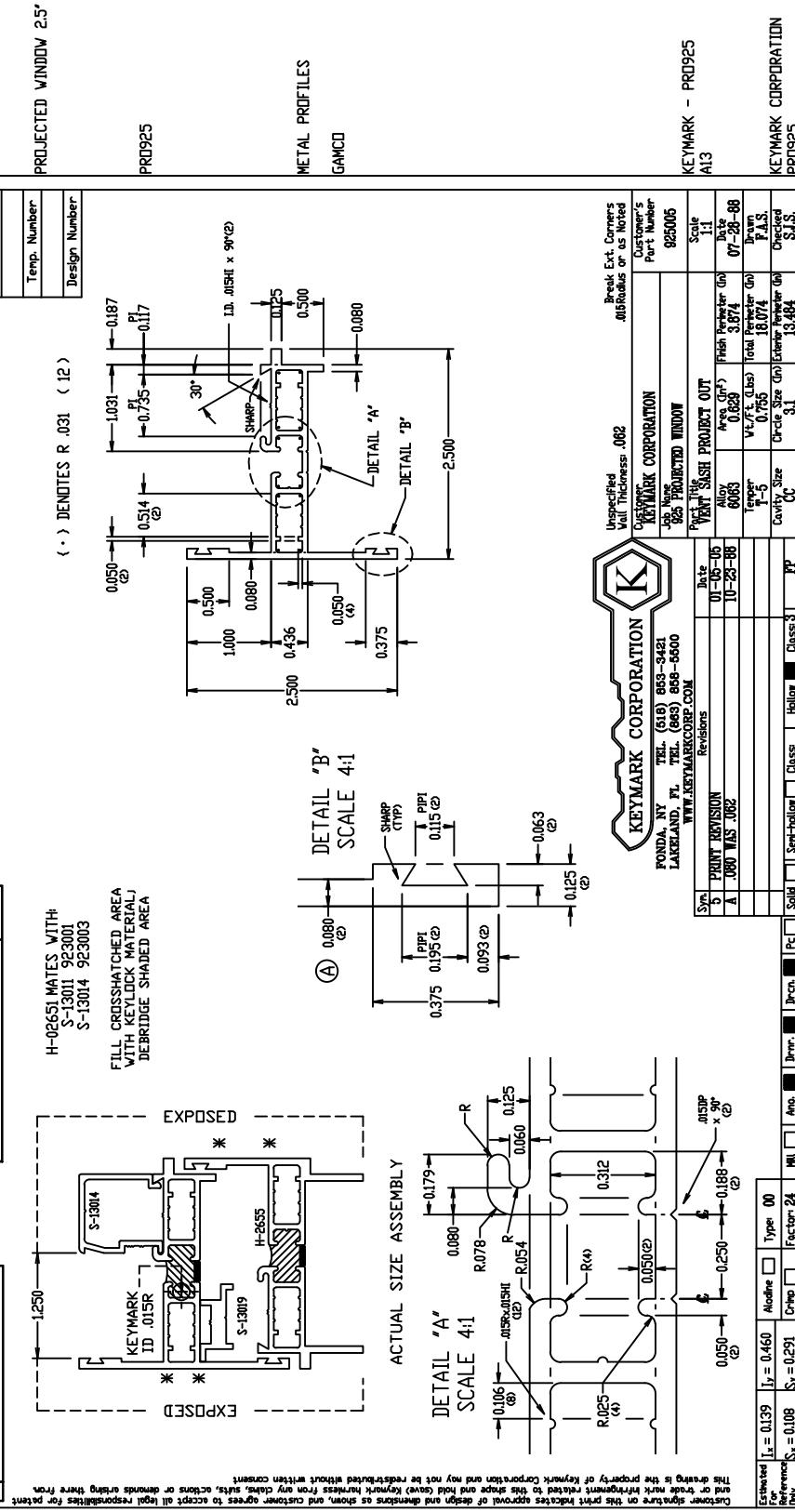
Material: Painted or Anodized Aluminum



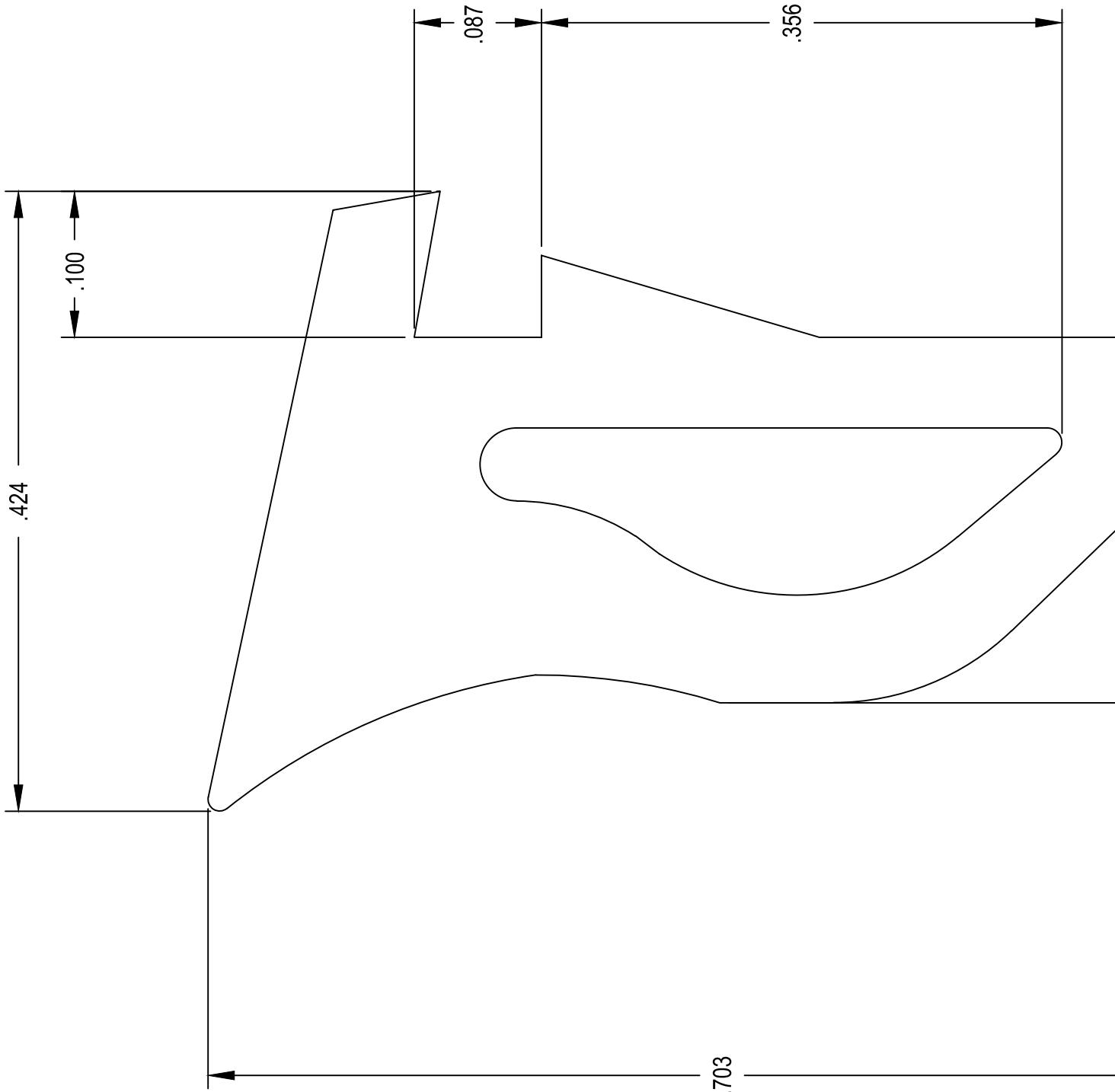
01	REV. A - 080 WAS .062	10-23-88	11
02	TITLE BLOCK	10-17-97	12
03	PRINT REDRAWN SJS - A1	01-23-98	13
04	I.V. ADDED (SJS)	11-02-99	14
05	PRINT REDRAWN JR - A2	01-05-05	15
06			16
07			17
08			18
09			19
10			20 PRINT RETRAIN JR - A2
			01-05-05

H-02651		DIE DATA		NOTES	
SUB NUMBER(S)	1	2	3	4	5
PRESS					6
DIE	Size	9 X 5			H-02651
	Holes	1			Time In Box
BACER	Size	PORT			5 HRS
	Number				Start Billet
VELD	Size				2nd Billet
CHAMBER	Number				REGULAR
BOLSTER	Size	9.5 X 4.5			Bolster In Box
	Number	H0976			No
SUB	Size	13 X 1.5			Use Gauge
BOLSTER	Number	00790			-
*	STRUCTURAL STREAKING IS EXPECTED				A2-11
	UNIFORM PAINT COVERAGE NOT EXPECTED IN THIS AREA				H-02651
					508100

REGULAR RING



Material: Painted or Anodized Aluminum



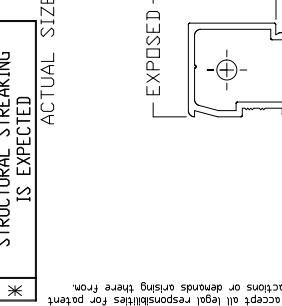
S-13014

01			11
02			12
03	PRINT REDRAWN SJS - A2	03-27-98	13
04	PART NUMBER CHANGE (JR)	07-23-08	14
05		15	
06		16	
07		17	
08		18	
09		19	
10		20	

REGULAR RING

STRUCTURAL STREAKING IS EXPECTED	UNIFORM PAINT COVERAGE NOT EXPECTED IN THIS AREA
ACTUAL SIZE	EXPOSED

Actual Size



REFER FOR ASSEMBLY TO H-02650

This drawing is for trade mark infringement related to the property of Keymark Corporation and may not be reproduced without written consent.

The customer agrees to accept all legal responsibilities for patent or trademark infringement if this drawing is used without permission.

SUB NUMBER(S)		DIE DATA					S-13014	
PRESS	II	1	2	3	4	5	6	Notes:
DIE Size	9 X 1							5 HRS REGULAR AT 900 DEG.
Holes	4							
BACKER Size	9 X 3							
BACKER Number	13280							
WELD CHAMFER Number	9 X 1							
BULSTER Size	13 X 8							
BULSTER Number	00784							
BULSTER Size								

PROWIN
2.500
BEAD

S-13014

0366

PROJECTED WINDOW
2.5'

PROJECTED WINDOW
2.5'
25° PROJECTED WINDOW - HEAVY
STARLINE INDUSTRIES

METAL PROFILES
GACMO

A2-00

S-13014

508100

Report #: 14945-116-45
Date: 05/25/18
Verified by: Alison M Bond
Total Quality Assured.

Date	09-26-08	Perimeter (in)	1.851	Date	07-08-08
Avg. (in²)	0.083	Perimeter (in)	1.851	Drawn	Y
Temp	T-5	Wt. (oz./sq. in.)	0.188	Printed	N/A
		Total Perimeter (in)	0.226	Ext. Perimeter (in)	6.119
Revisions		Cavity Size (in)	1.3	Ext. Perimeter (in)	6.179

Material: Painted or Anodized Aluminum

Estimated Ls = 0.020 Ls = 0.026
Preference Ss = 0.053 Ss = 0.055 Crimp Factor: 27



Material: Painted or Anodized Aluminum

Intertek Report #:
14945-116-45
Date: 05/25/18
Verified by: Alison M Bond
Total Quality Assured.

Report #: 14945-116-45

Date: 05/25/18

Verified by: Alison M Bond

Total Quality Assured.

Ss	Ls	Avg. (in²)	Perimeter (in)	Date
		0.083	1.851	09-26-08

Projected Window
2.5' PROJECTED WINDOW
2.5° PROJECTED WINDOW - HEAVY
STARLINE INDUSTRIES

PROWIN
2.500
BEAD

A2-00

S-13014

Die Number

Temp. Number

Design Number

Part Number

Customer

KEYMARK CORPORATION

Job Name

25°/90° PROJECTED WINDOW

Port. This

GAGING BEAD FOR 1" GLASS

Scale

0.015

Break Ext. Corners

0.015 Radius on all Notches

Customer

KEYMARK CORPORATION

Part Number

925003

Drawn

Printed

Ext. Perimeter (in)

6.119

Ext. Perimeter (in)

6.179

Checked

SJ.S. 05

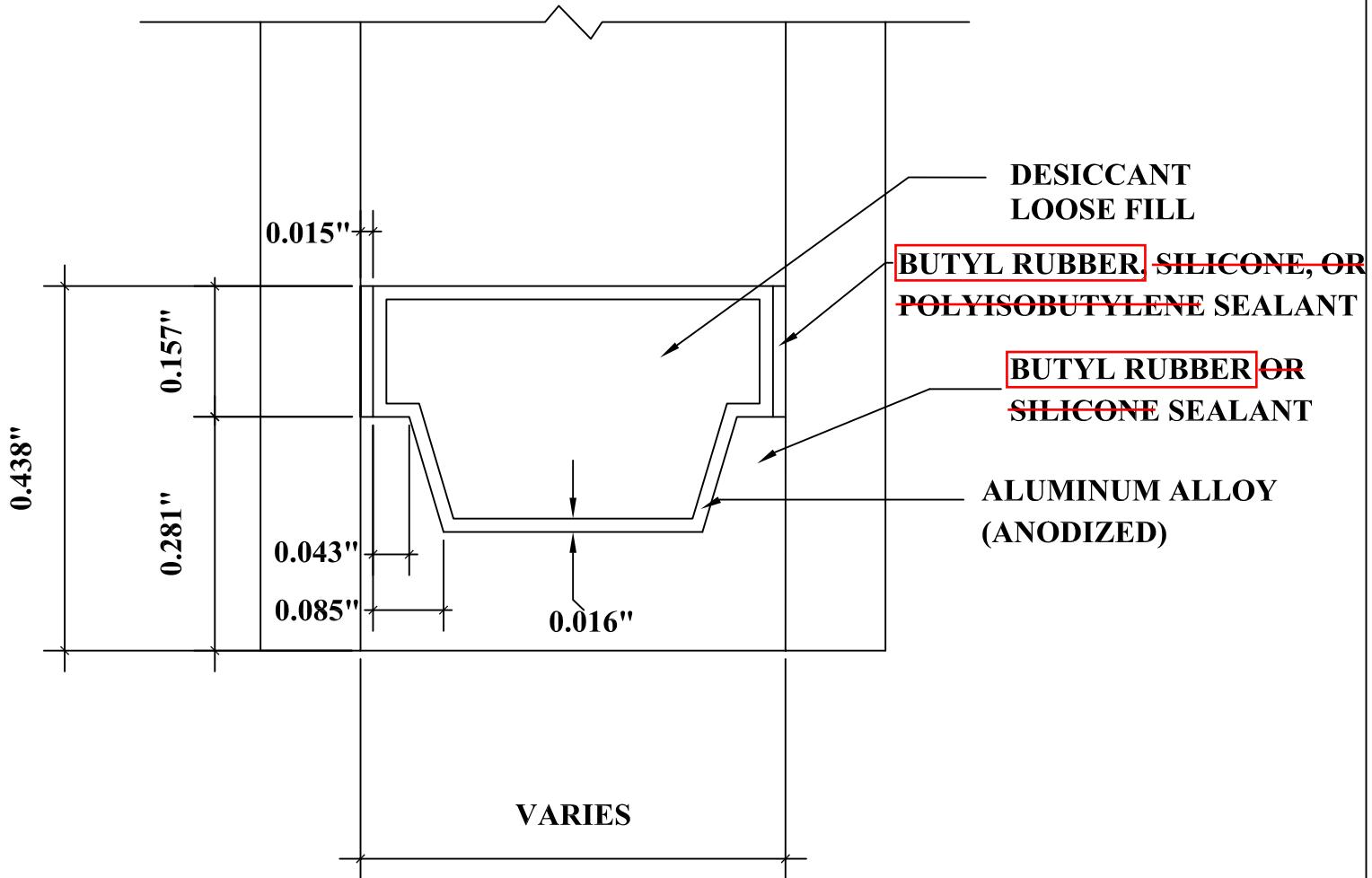
Date

07-08-08

Printed

Ext. Perimeter (in)

6.179



DETAIL FOR THERMAL MODELING OF
ALUMINUM SPACER (A1-D)



Total Quality. Assured.

130 Derry Court
York, PA, 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR GAMCO CORPORATION

Report No.: I4945.01-116-45 R0

Date: 05/25/18

SECTION 8 REVISION LOG

REVISION #	DATE	PAGES	REVISION
.01R0	05/25/18	N/A	Original Report Issued to Gamco Corporation.