

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

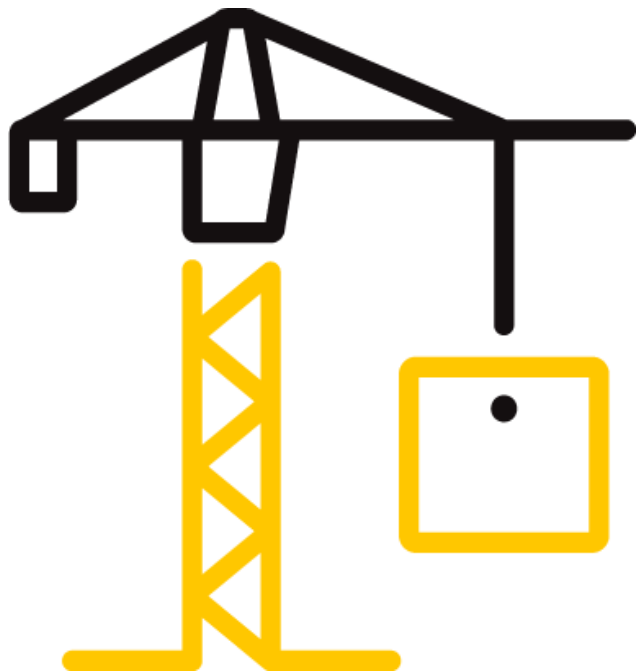
PAGES

20

DOCUMENT CONTROL NUMBER

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

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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: 
Digitally Signed by: Allison Ford
DATE: 05/25/18

REVIEWED BY: Eric S. Leitner
TITLE: Simulation Technician
Team Leader, SIRC
SIGNATURE: 
Digitally Signed by: Eric S. Leitner
DATE: 05/25/18

AMF:amf

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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).

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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					
	<i>OUTER PANE</i>	<i>MIDDLE PANE</i>	<i>INNER PANE</i>	<i>GAP SIZES</i>	<i>IG OVERALL</i>
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			
<i>TYPE</i>	<i>PRIMARY SEAL</i>	<i>SECONDARY SEAL</i>	<i>CODE</i>
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

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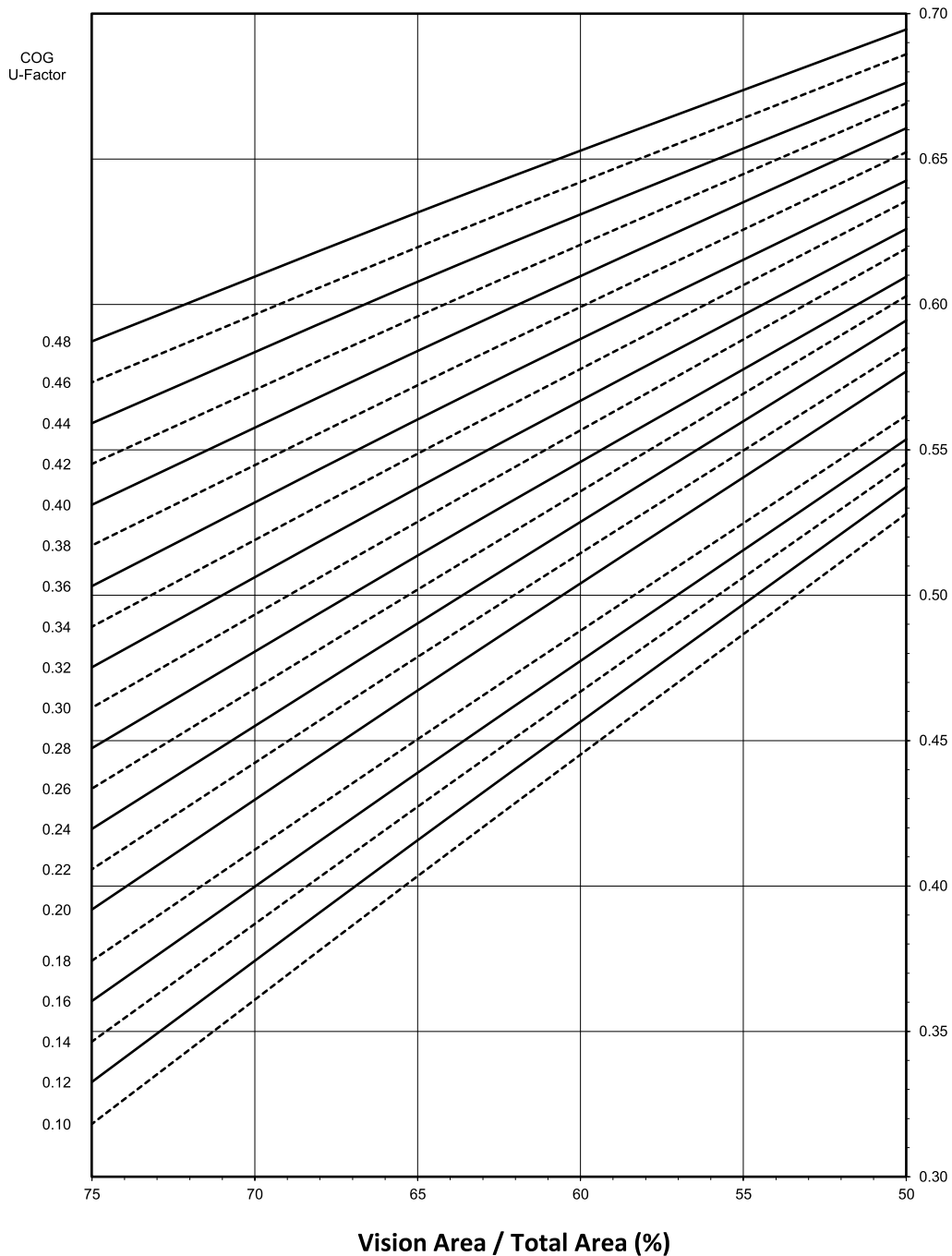
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SECTION 6

SIMULATION RESULTS

U-FACTOR CALCULATIONS: System U-Factor vs. Percentage of Vision Area



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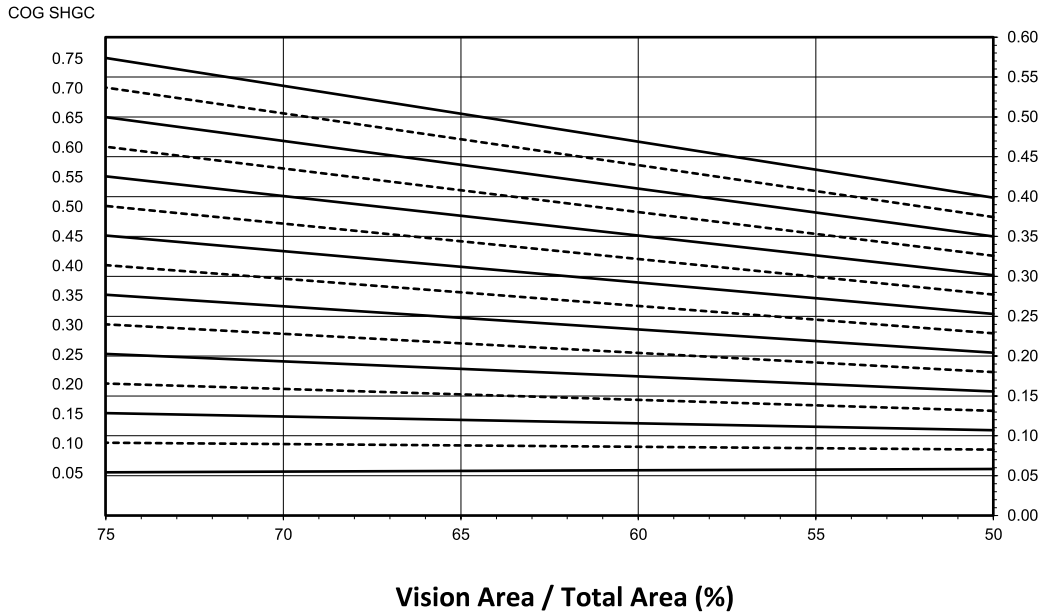
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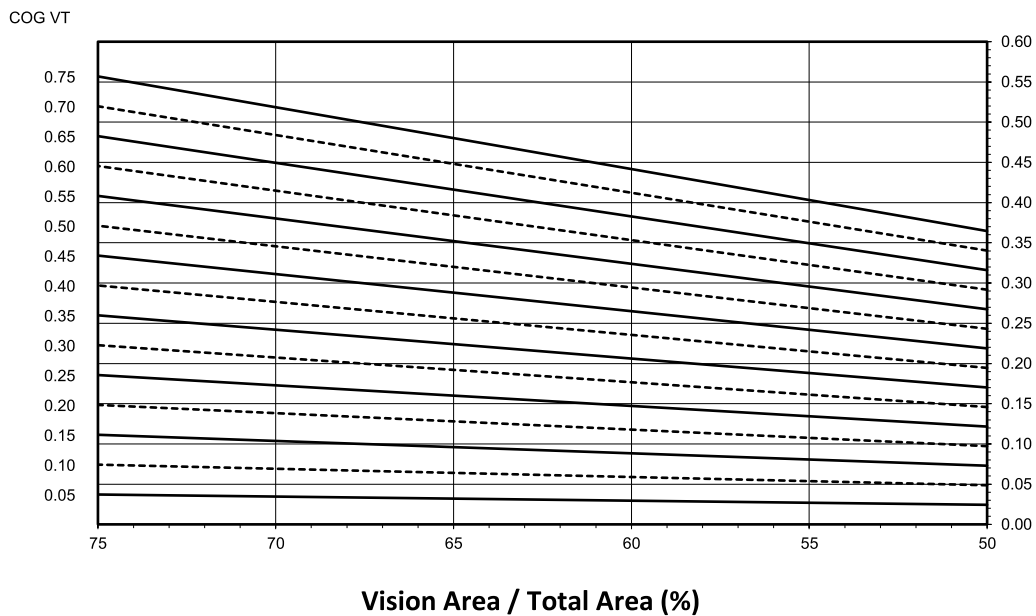
SECTION 6

SIMULATION RESULTS

SHGC CALCULATIONS: System SHGC vs. Percentage of Vision Area



VT CALCULATIONS: System VT vs. Percentage of Vision Area



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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.

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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.

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SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (W250C Project-Out Window)									
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							50.00% Vision Area	NFRC 100-2017	75.00% Vision Area
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			

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SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (W250C Project-Out Window)									
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							50.00% Vision Area	NFRC 100-2017	75.00% Vision Area
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			

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TOTAL PRODUCT CALCULATIONS (W250C Project-Out Window)									
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							50.00% Vision Area	NFRC 100-2017	75.00% Vision Area
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.

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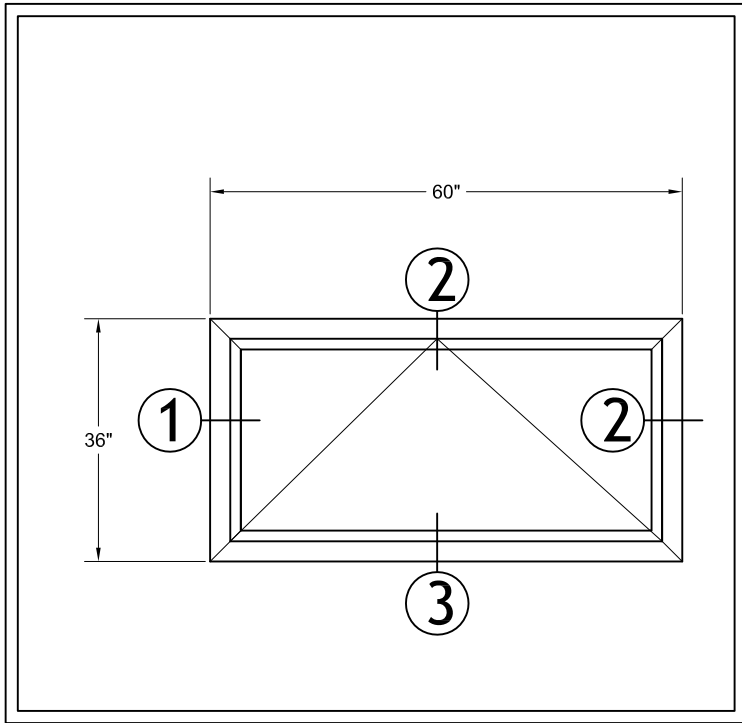
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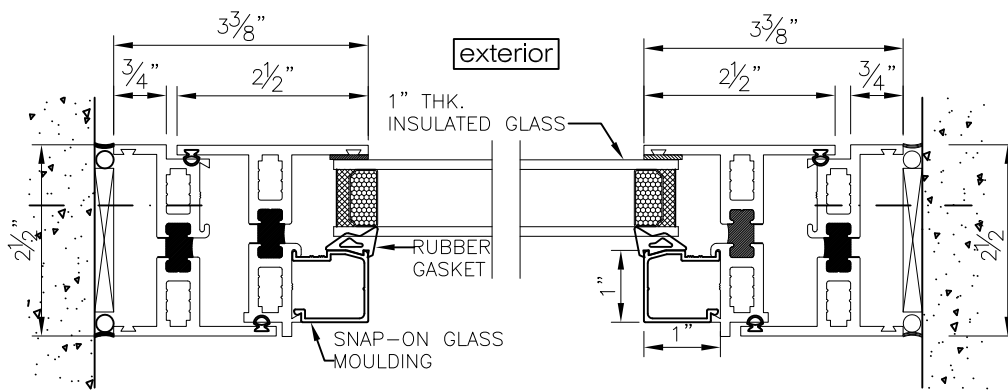
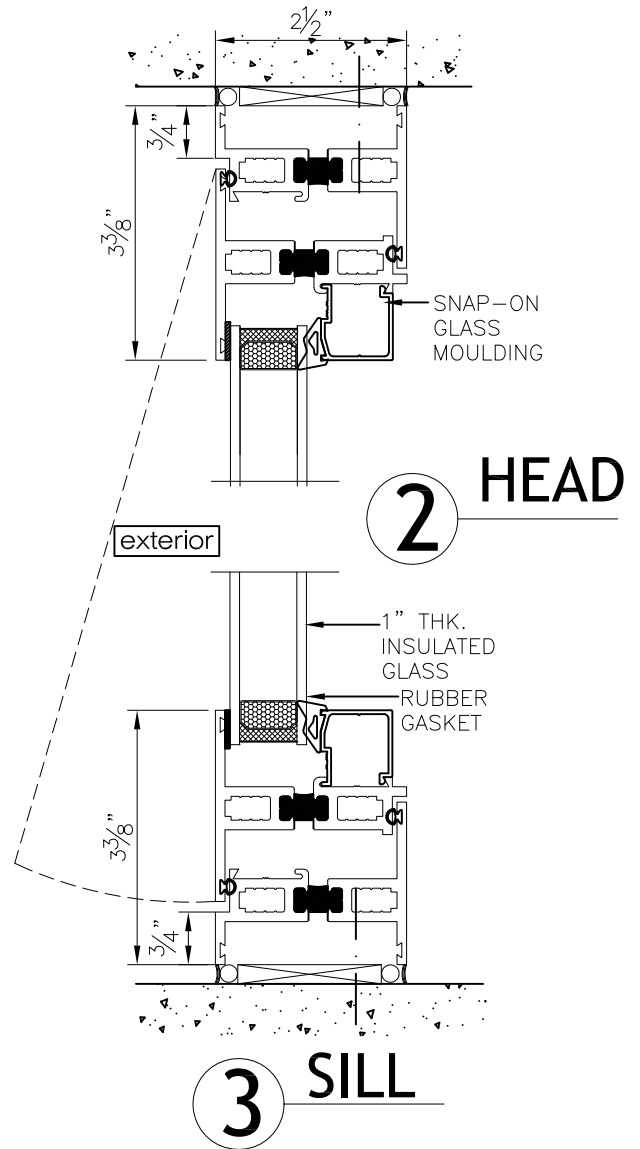
SECTION 7

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 Report #: 14945-116-45
 Total Quality. Assured. Date: 05/25/18
 Verified by: *Allison M Ford*

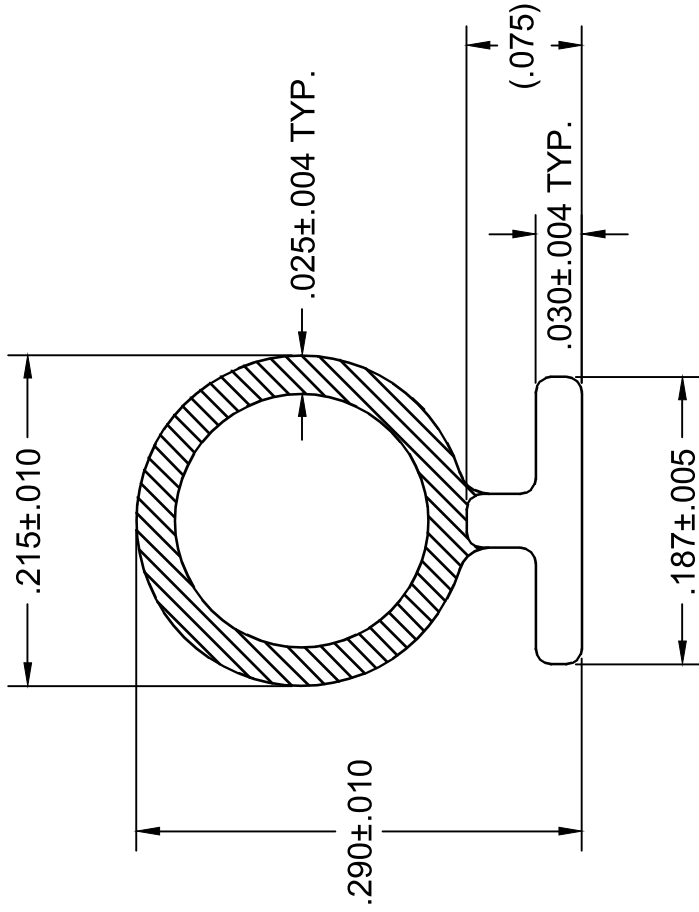
C	SHEET #	Drawn by: C. CHAN	Customer	Revisions		
		Checked by:				
		Date: 6-2-16	Project: W250HC	No.	Date	Description
		Scale: 3":1'-0"	PROJECT-OUT WINDOW			



GAMCO CORPORATION
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REVISIONS

REV	DESCRIPTION	DATE	APPR	ECR NO
B	FORMAT UPDATES	07/01/2016	APPR	2648



LEGEND

- BLACK PP
- BLACK TPE

SOFTWARE: AUTOCAD		ULTRAFAB INC.	
VERSION: 15.0		1050 HOOK ROAD FARMINGTON, NY 14425 www.ultrafab.com	
DRAWN: MMM	07/01/2016	CUSTOMER DRAWING	
CHECKED: CAB	07/01/2016	.187 WIDE BASE X .290 HIGH BULB E20218KN4020	
CUST. APPR.:		SIZE	REV
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		N.A.	10-14-67
ISSUED:	07/01/2016	SCALE 8:1	SHEET 1 OF 4



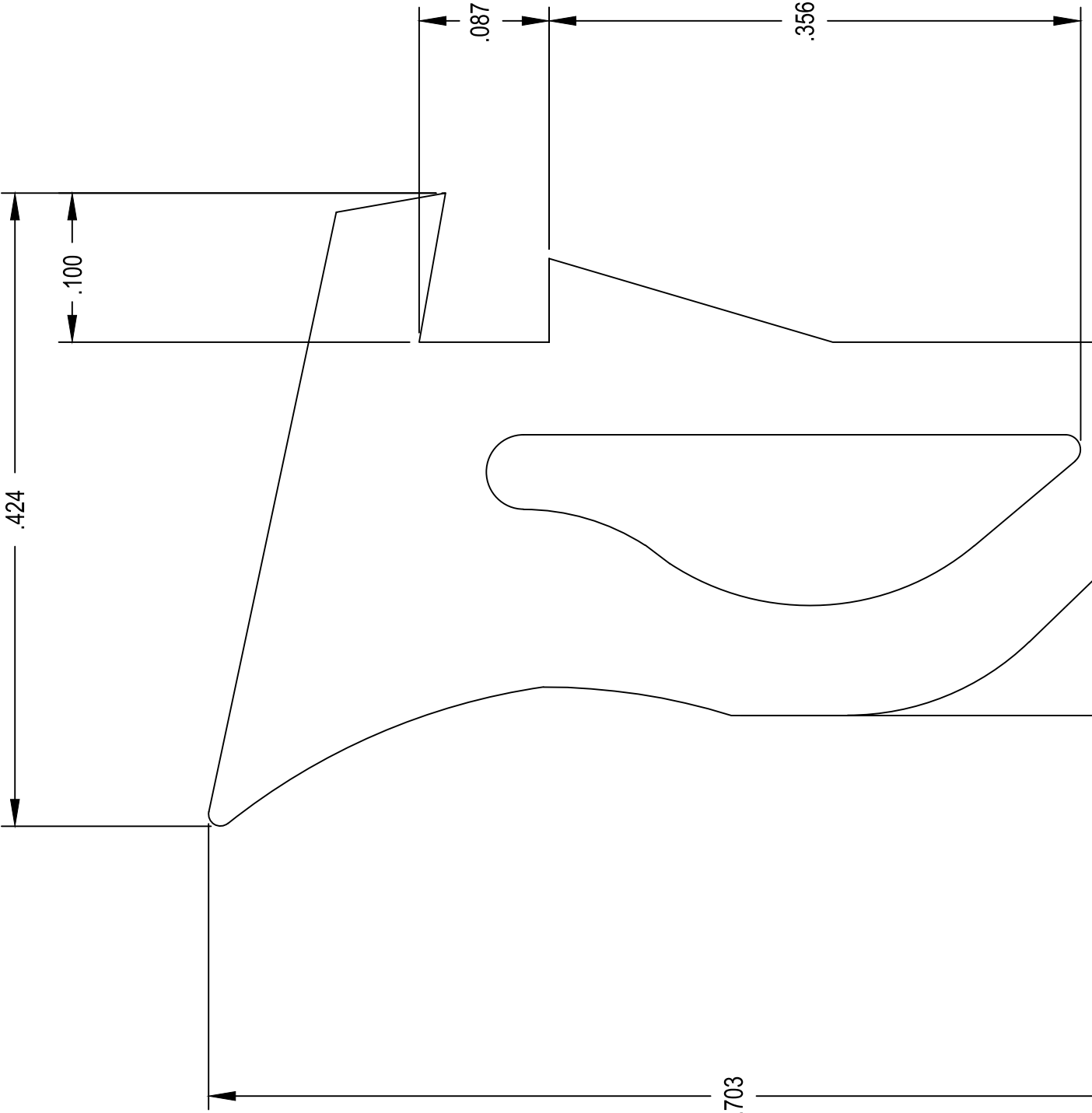
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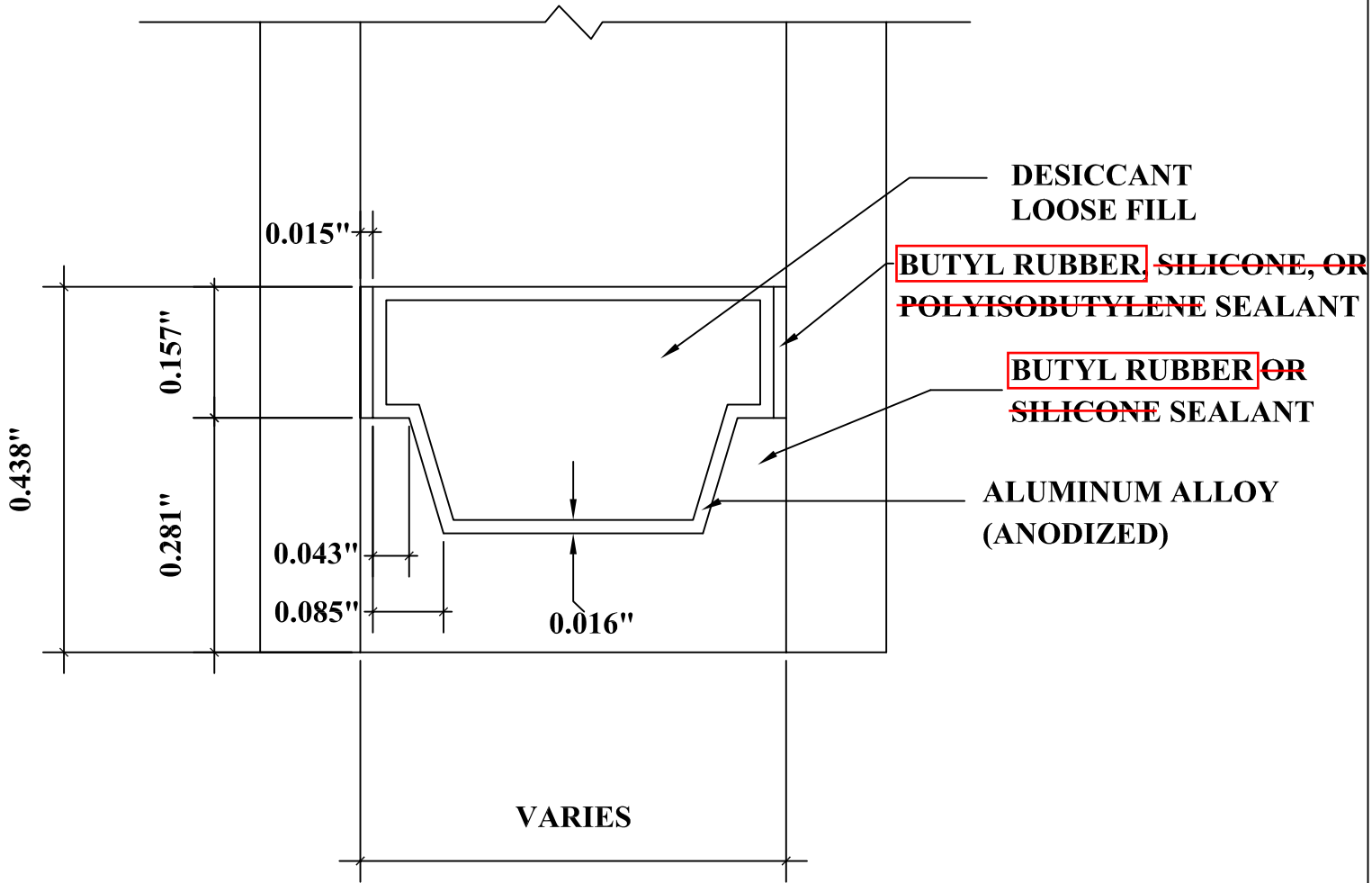
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Material: EPDM/Polypropylene

1) ALL DIMENSIONS ARE IN INCHES

NOTES:





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



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SECTION 8

REVISION LOG

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