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GAMCO CORPORATION COMPUTER SIMULATION REPORT

SCOPE OF WORK
FG451IS FIXED - 1-3/8" IG - AAMA 507

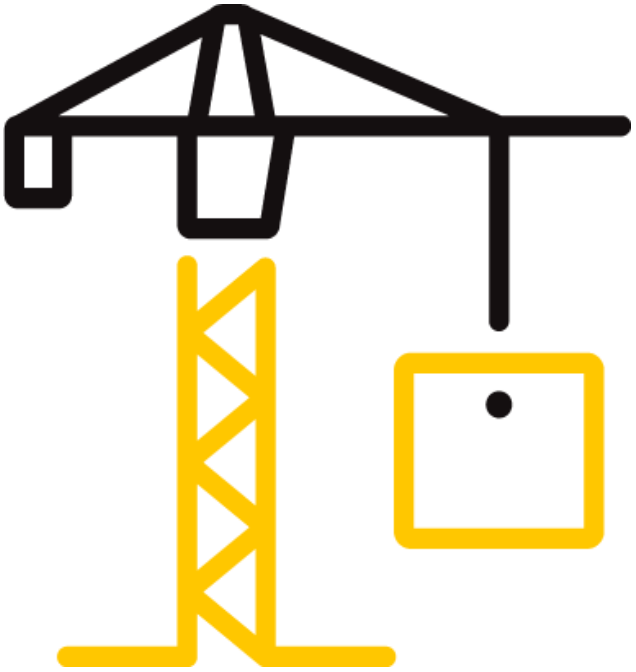
REPORT NUMBER
Q0185.01-116-45 R0

TEST DATE
10/16/23

ISSUE DATE
10/16/23

PAGES
18

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



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TEST REPORT FOR GAMCO CORPORATION
Report No.: Q0185.01-116-45 R0
Date: 10/16/23

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

SECTION 1
SUMMARY

SERIES/MODEL: FG451IS Fixed - 1-3/8" IG

Architectural Testing, Inc. (an Intertek company), dba Intertek Building & Construction (Intertek B&C) was contracted to perform AAMA 507 computer simulations utilizing thermal thermal modeling computer software developed by Lawrence Berkeley National Laboratory 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. The record retention end date of this report is 10/16/28.

For INTERTEK B&C:

COMPLETED BY:	Allison M. Ford	**REVIEWED BY:**	Eric S. Leitner
TITLE:	Technician Team Leader	**TITLE:**	Manager - Thermal Testing & Simulations
SIGNATURE:	Allison M Ford Digitally Signed by: Allison Ford	**SIGNATURE:**	Eric S. Leitner Digitally Signed by: Eric S. Leitner
DATE:	10/16/23	**DATE:**	10/16/23

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 100-2023, *Procedure for Determining Fenestration Product U-Factors*

ANSI/NFRC 200-2023, *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 7.8.71
CENTER-OF-GLASS MODELING	WINDOW 7.8.71
TOTAL PRODUCT CALCULATIONS	WINDOW 7.8.71
SPECTRAL DATA LIBRARY	IGDB 93.0

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 100-2023, Section 4.2.1.L. The painted finish was simulated since it is the worst case (highest emissivity).
3) Non-continuous hardware was not modeled.

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SECTION 4
SIMULATION SPECIMEN DESCRIPTION

SERIES/MODEL	FG451IS Fixed - 1-3/8" IG
PRODUCT TYPE	Fixed, 4-Sided
FRAME MATERIAL	AT - Aluminum w/ Thermal Breaks - All Members
SASH MATERIAL	NA - Not Applicable

GLAZING OPTIONS					
	OUTER PANE	***MIDDLE PANE***	***INNER PANE***	***GAP SIZES***	***IG OVERALL***
GL1	1/4"	N/A	3/8"	0.750"	1-3/8"
GL2	1/4"	HM	3/8"	0.375"	1-3/8"

GL1: Dual glazed IG unit (COG=0.48 - COG=0.20)
GL2: Dual glazed IG with 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

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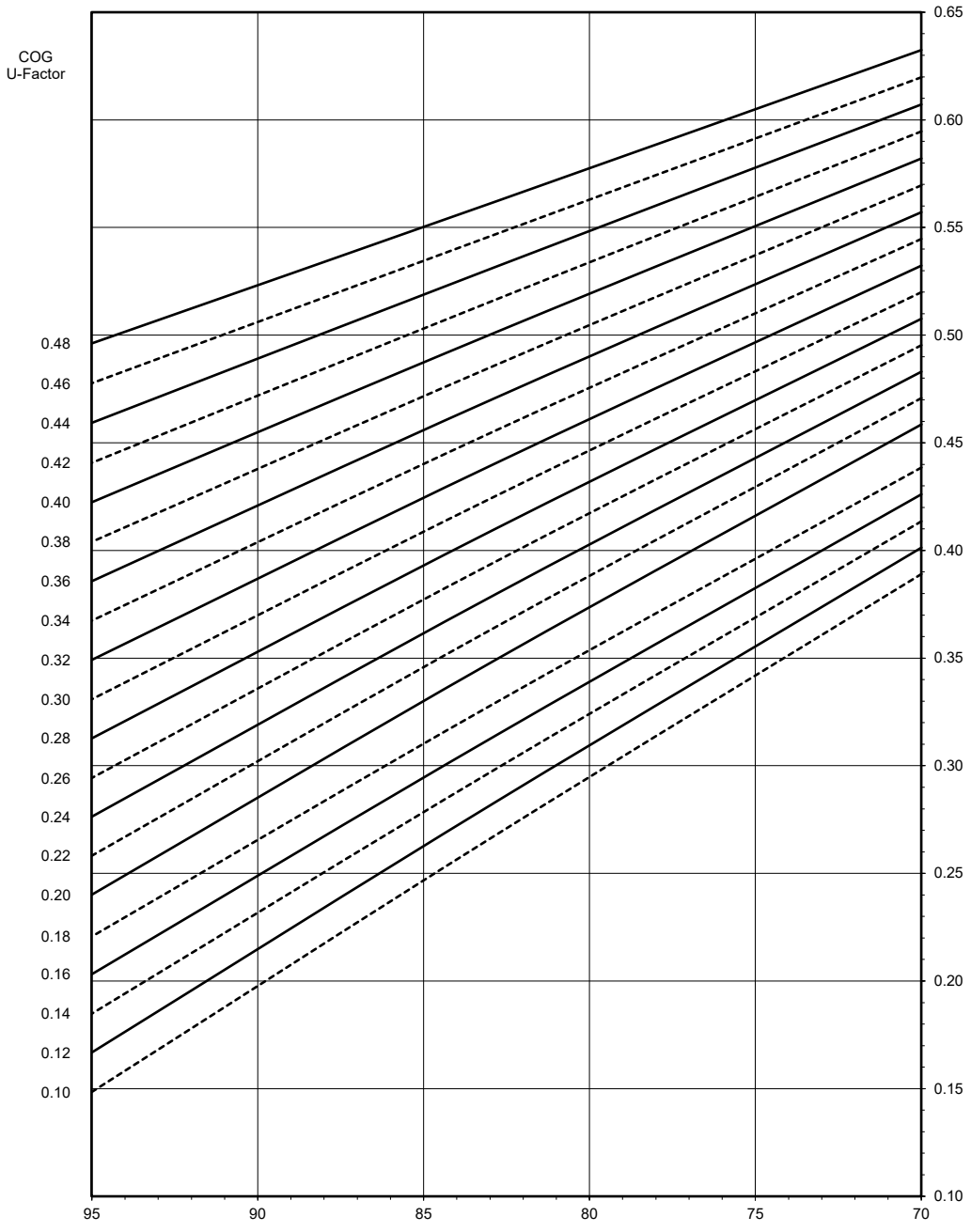
SECTION 6
SIMULATION RESULTS

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



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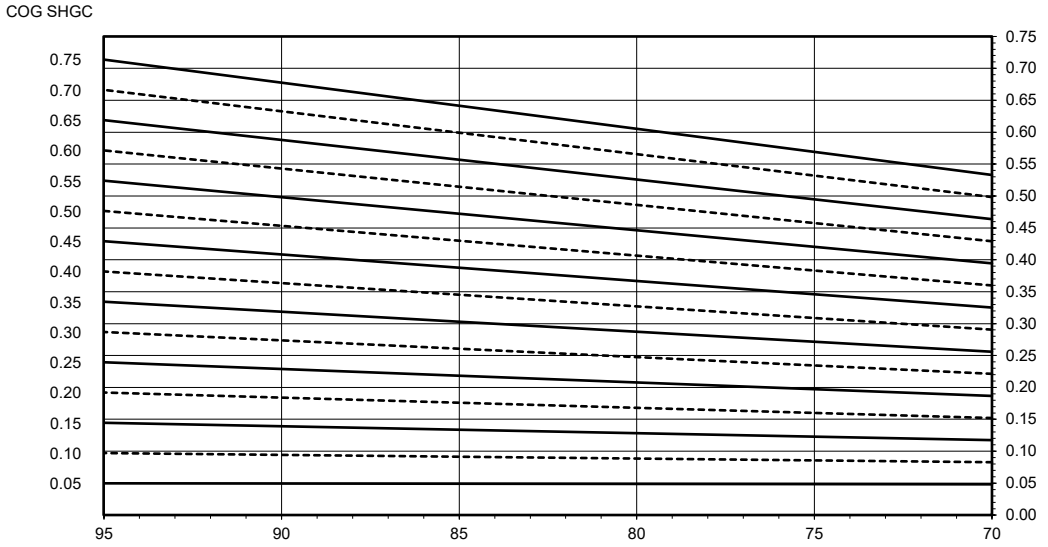
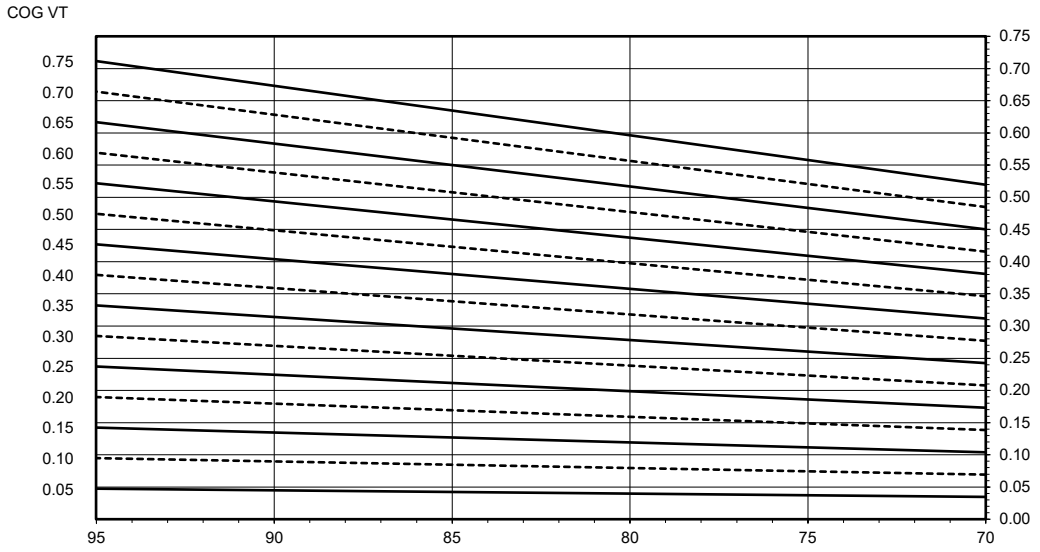
SECTION 6
SIMULATION RESULTS

SHGC CALCULATIONS: System SHGC vs. Percentage of Vision Area



Vision Area / Total Area (%)

VT CALCULATIONS: System VT vs. Percentage of Vision Area



otal Area (%)

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SECTION 6
SIMULATION RESULTS

U-FACTOR CALCULATIONS (FG451IS Fixed - 1-3/8" IG)		
Size Specific U-Factor Matrix*		
Glazing Option	Center-of-Glass U-Factor	Overall U-Factor
1	0.48	0.56
2	0.46	0.55
3	0.44	0.53
4	0.42	0.52
5	0.40	0.50
6	0.38	0.49
7	0.36	0.47
8	0.34	0.46
9	0.32	0.44
10	0.30	0.43
11	0.28	0.41
12	0.26	0.39
13	0.24	0.38
14	0.22	0.36
15	0.20	0.35
16	0.18	0.33
17	0.16	0.31
18	0.14	0.30
19	0.12	0.28
20	0.10	0.27

*The size specific U-Factor matrix is based on the Fixed, 4-Sided NFRC specimen size of 1200mm x 1500mm (47.25 in x 59 in). This represents 82.8% Vision Area / Total Area.

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SECTION 6
SIMULATION RESULTS

SHGC/VT CALCULATIONS (FG451IS Fixed - 1-3/8" IG)			
Size Specific SHGC Matrix*		Size Specific VT Matrix*	
Center-of-Glass SHGC	Overall SHGC	Center-of-Glass VT	Overall VT
0.75	0.63	0.75	0.62
0.70	0.58	0.70	0.58
0.65	0.54	0.65	0.54
0.60	0.50	0.60	0.49
0.55	0.46	0.55	0.45
0.50	0.42	0.50	0.41
0.45	0.38	0.45	0.37
0.40	0.34	0.40	0.33
0.35	0.30	0.35	0.29
0.30	0.25	0.30	0.25
0.25	0.21	0.25	0.21
0.20	0.17	0.20	0.16
0.15	0.13	0.15	0.12
0.10	0.09	0.10	0.08
0.05	0.05	0.05	0.04

*The size specific SHGC and VT matrices are based on the Fixed, 4-Sided NFRC specimen size of 1200mm x 1500mm (47.25 in x 59 in). This represents 82.8% Vision Area / Total Area.

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SECTION 6
SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (FG451IS Fixed - 1-3/8" IG)									
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							70.00% Vision Area	ANSI/NFRC 100-2020	95.00% Vision Area
1	0.48	43.7°F	Head	2.3137	0.9002	0.5038	0.6324	0.5621	0.4962
			L. Jamb	2.3137	0.9401	0.5058			
			R. Jamb	2.3137	0.9401	0.5058			
			Sill	2.8137	0.9981	0.5221			
2	0.46	44.8°F	Head	2.3137	0.8987	0.4904	0.6198	0.5470	0.4777
			L. Jamb	2.3137	0.9386	0.4925			
			R. Jamb	2.3137	0.9386	0.4925			
			Sill	2.8137	0.9973	0.5090			
3	0.44	45.8°F	Head	2.3137	0.8972	0.4771	0.6072	0.5318	0.4593
			L. Jamb	2.3137	0.9372	0.4792			
			R. Jamb	2.3137	0.9372	0.4792			
			Sill	2.8137	0.9966	0.4959			
4	0.42	46.8°F	Head	2.3137	0.8957	0.4639	0.5946	0.5166	0.4408
			L. Jamb	2.3137	0.9361	0.4660			
			R. Jamb	2.3137	0.9361	0.4660			
			Sill	2.8137	0.9958	0.4829			
5	0.40	47.9°F	Head	2.3137	0.8943	0.4508	0.5821	0.5014	0.4224
			L. Jamb	2.3137	0.9345	0.4530			
			R. Jamb	2.3137	0.9345	0.4530			
			Sill	2.8137	0.9951	0.4701			
6	0.38	48.9°F	Head	2.3137	0.8929	0.4377	0.5696	0.4862	0.4040
			L. Jamb	2.3137	0.9332	0.4400			
			R. Jamb	2.3137	0.9332	0.4400			
			Sill	2.8137	0.9944	0.4572			
7	0.36	50.0°F	Head	2.3137	0.8916	0.4248	0.5571	0.4710	0.3858
			L. Jamb	2.3137	0.9319	0.4271			
			R. Jamb	2.3137	0.9319	0.4271			
			Sill	2.8137	0.9937	0.4445			
8	0.34	51.0°F	Head	2.3137	0.8903	0.4119	0.5447	0.4558	0.3674
			L. Jamb	2.3137	0.9307	0.4143			
			R. Jamb	2.3137	0.9307	0.4143			
			Sill	2.8137	0.9931	0.4319			

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TOTAL PRODUCT CALCULATIONS (FG451IS Fixed - 1-3/8" IG)									
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							70.00% Vision Area	ANSI/NFRC 100-2020	95.00% Vision Area
9	0.32	52.0°F	Head	2.3137	0.8890	0.3991	0.5323	0.4406	0.3492
			L. Jamb	2.3137	0.9295	0.4016			
			R. Jamb	2.3137	0.9295	0.4016			
			Sill	2.8137	0.9924	0.4192			
10	0.30	53.1°F	Head	2.3137	0.8877	0.3863	0.5200	0.4254	0.3309
			L. Jamb	2.3137	0.9283	0.3889			
			R. Jamb	2.3137	0.9283	0.3889			
			Sill	2.8137	0.9918	0.4067			
11	0.28	54.2°F	Head	2.3137	0.8865	0.3736	0.5076	0.4102	0.3128
			L. Jamb	2.3137	0.9272	0.3762			
			R. Jamb	2.3137	0.9272	0.3762			
			Sill	2.8137	0.9912	0.3942			
12	0.26	55.2°F	Head	2.3137	0.8853	0.3610	0.4953	0.3949	0.2944
			L. Jamb	2.3137	0.9261	0.3636			
			R. Jamb	2.3137	0.9261	0.3636			
			Sill	2.8137	0.9906	0.3818			
13	0.24	56.3°F	Head	2.3137	0.8842	0.3484	0.4830	0.3798	0.2764
			L. Jamb	2.3137	0.9250	0.3511			
			R. Jamb	2.3137	0.9250	0.3511			
			Sill	2.8137	0.9901	0.3693			
14	0.22	57.3°F	Head	2.3137	0.8831	0.3356	0.4708	0.3645	0.2583
			L. Jamb	2.3137	0.9240	0.3384			
			R. Jamb	2.3137	0.9240	0.3384			
			Sill	2.8137	0.9896	0.3568			
15	0.20	58.4°F	Head	2.3137	0.8821	0.3231	0.4585	0.3493	0.2402
			L. Jamb	2.3137	0.9230	0.3259			
			R. Jamb	2.3137	0.9230	0.3259			
			Sill	2.8137	0.9891	0.3444			
16	0.18	59.5°F	Head	2.3137	0.8645	0.3003	0.4385	0.3294	0.2207
			L. Jamb	2.3137	0.9030	0.3029			
			R. Jamb	2.3137	0.9030	0.3029			
			Sill	2.8137	0.9763	0.3227			

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TOTAL PRODUCT CALCULATIONS (FG451IS Fixed - 1-3/8" IG)									
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							70.00% Vision Area	ANSI/NFRC 100-2020	95.00% Vision Area
17	0.16	60.6°F	Head	2.3137	0.8650	0.2855	0.4261	0.3141	0.2032
			L. Jamb	2.3137	0.9036	0.2881			
			R. Jamb	2.3137	0.9036	0.2881			
			Sill	2.8137	0.9770	0.3075			
18	0.14	61.6°F	Head	2.3137	0.8636	0.2730	0.4135	0.2986	0.1849
			L. Jamb	2.3137	0.9022	0.2757			
			R. Jamb	2.3137	0.9022	0.2757			
			Sill	2.8137	0.9730	0.2947			
19	0.12	62.7°F	Head	2.3137	0.8635	0.2596	0.4013	0.2833	0.1669
			L. Jamb	2.3137	0.9019	0.2624			
			R. Jamb	2.3137	0.9019	0.2624			
			Sill	2.8137	0.9729	0.2814			
20	0.10	63.9°F	Head	2.3137	0.8625	0.2467	0.3890	0.2679	0.1485
			L. Jamb	2.3137	0.9011	0.2495			
			R. Jamb	2.3137	0.9011	0.2495			
			Sill	2.8137	0.9725	0.2686			

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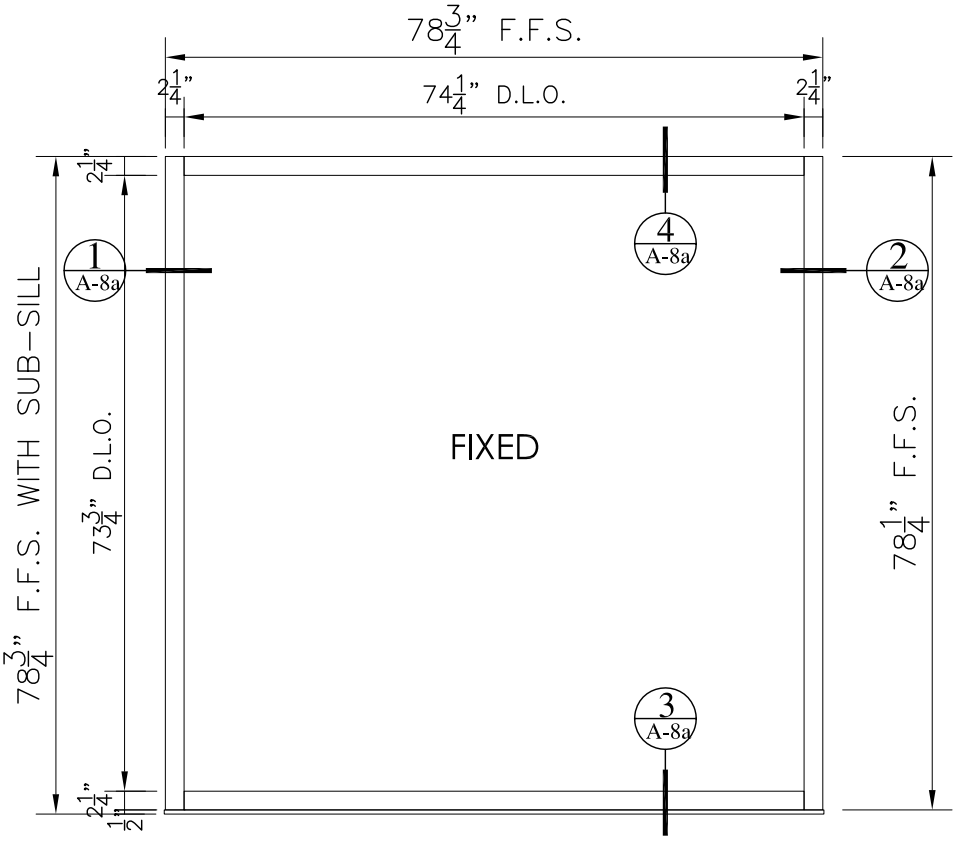
SECTION 7
DRAWINGS / BILL OF MATERIALS

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.

THERMAL UNITS



QTY: 1 UNIT W/ 1-3/8" I.G.

1-3/8" GLASS SIZE: 75" X 74-1/2" - 1 PCS

ALUMINUM STOREFRONT ELEVATIONS

* NOTE: ALL ELEVATIONS SHOWN TO BE VIEW FROM EXTERIOR. SCALE: 3/8" = 1'-0"

Report #: Q0185-116-45
Date: 10/16/23
Verified by: Allison M Ford

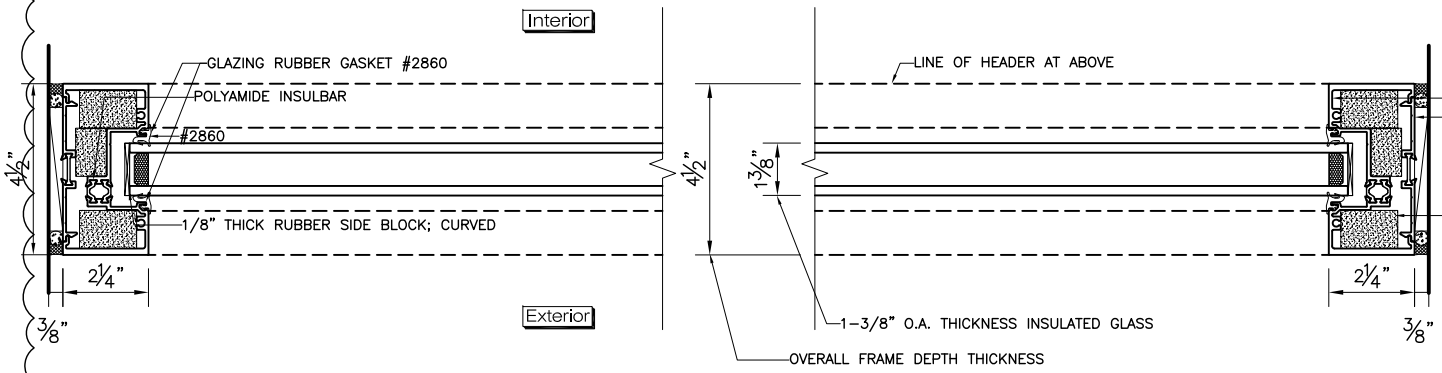
AAMA 507 - THERMAL TEST

MODEL TESTED: FG451IS

GLAZING SET-UP FOR 1-3/8" O.A.

GLASS TYPE:
EXT: 1/4" THICKNESS
3/4" SPACER (ARGON)
INT: 3/8" THICKNESS
GLASS SIZE D.L.O. + 0.750
****

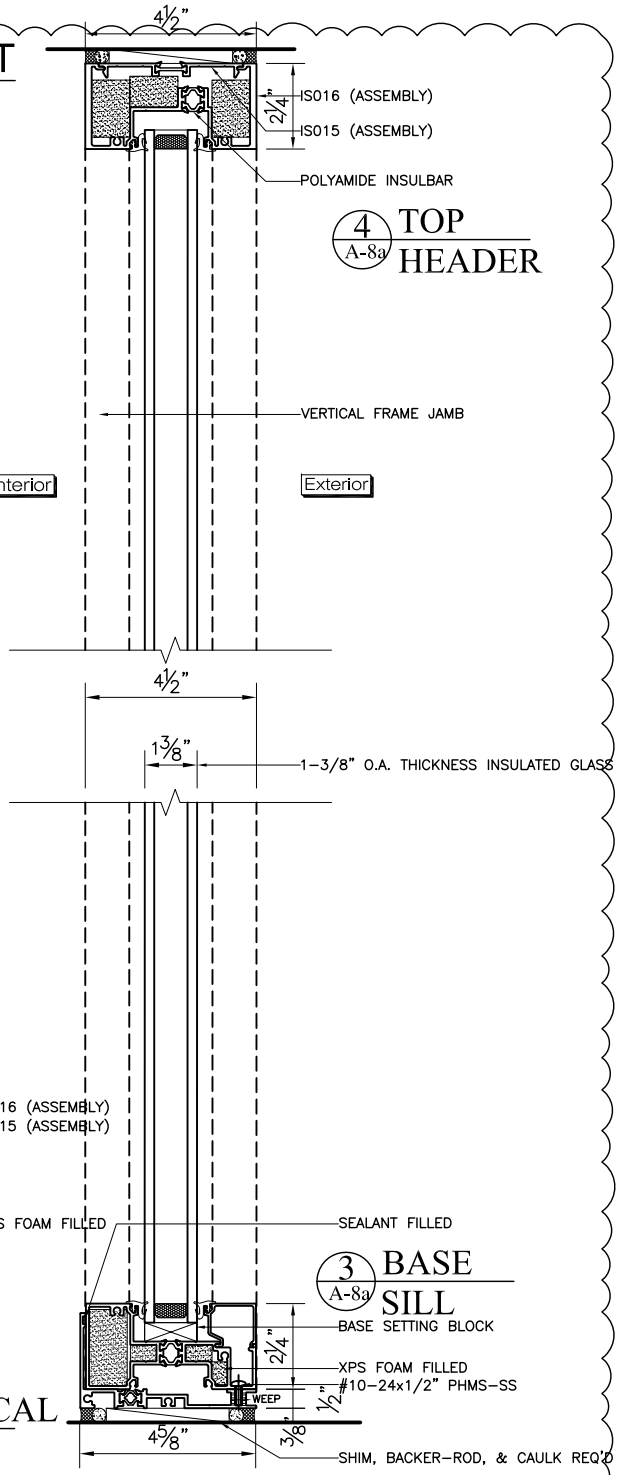
ALL POLYAMIDE INSULBAR'S PROPRIETARY THERMAL CONDUCTIVITY MATERIAL IS LISTED IN THE NFRC 101 DATABASE IN APPENDIX C, PROVIDED COMPANY "ENSINGER"



1 A-8a VERTICAL JAMB

HORIZONTAL SECTIONAL DETAILS

SCALE : 3" = 1'-0"



2 A-8a VERTICAL JAMB

VERTICAL SECTIONAL DETAILS

SCALE : 3" = 1'-0"

DATE CREATED: 10/12/23

FG451IS FRAME - BOM LIST
THERMAL TESTING MOCK-UP
1-3/8" I.G. SETUP

LINE #	PART #	DESCRIPTION	MATERIAL
1	IS016	HEADER / JAMB	6060-T5
2	IS015	FLAT FILLER	6060-T5
3	ISS019	SILL CAP	6060-T5
4	IS017	MID / BASE SILL	6060-T5
5	IS006	SUB-SILL	6060-T5
6	PLATE	SUB-SILL END PLATES	6060-T5
7	2860	GLAZING GASKET	EPDM
8	SETTING(2)	SETTING BLOCK	EPDM
9	FOAM	VARIES CUT SIZE FOAMS	XPS FOAM
10			
11			
12			
13			
14			
15			
16			

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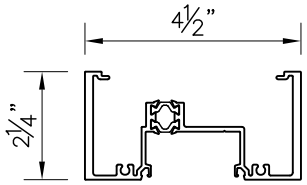
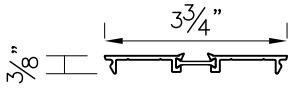
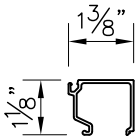
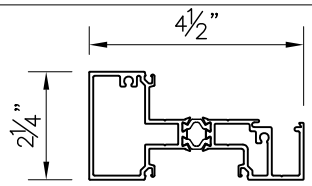
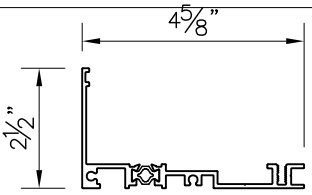
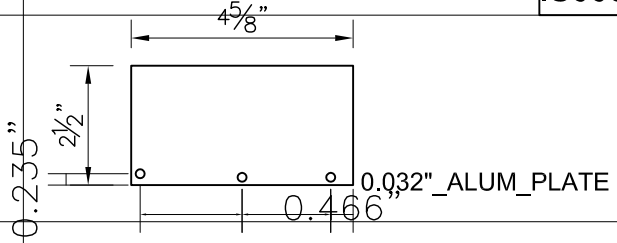
FG451IS FRAME - CUTTING LIST
THERMAL TESTING MOCK-UP
1-3/8" I.G. SETUP

QTY.	PROFILE + PART #	COLOR	LENGTH (")
1	 HEADER_JAMB IS016	AL	74.250"
2			78.250"
1	 FLAT_FILLER IS015	AL	74.250"
2			78.250"
1	 SILL_CAP ISS019	AL	74.250"
1	 MID/BASE_SILL IS017	AL	74.250"
1	 SUB_SILL IS006	AL	78.875"
2		AL	

NOTE:

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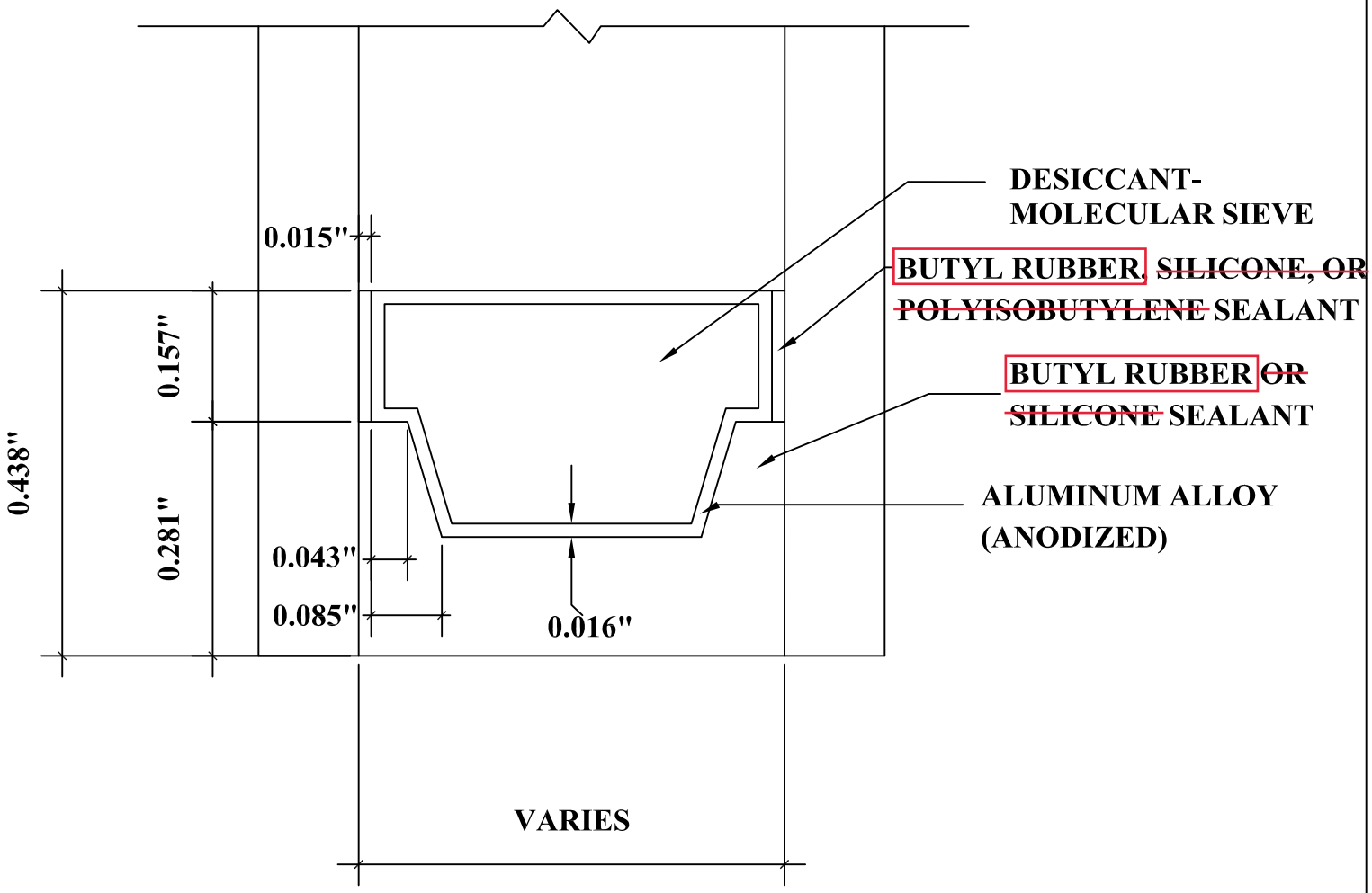
Date: 10/16/23
Verified by: Allison M Ford



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

130 Derry Court
York, PA, 17406

Telephone: 717-764-7700
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TEST REPORT FOR GAMCO CORPORATION
Report No.: Q0185.01-116-45 R0
Date: 10/16/23

SECTION 8
REVISION LOG

REVISION #	DATE	PAGES	REVISION
.01R0	10/16/23	N/A	Original Report Issued to Gamco Corporation.