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GUTMANN NORTH AMERICA COMPUTER SIMULATION REPORT

SCOPE OF WORK
S70+ FIXED WINDOW (25MM - DUAL GLAZED) - AAMA 507 SIMULATIONS TO DETERMINE U-FACTOR, SOLAR HEAT GAIN COEFFICIENT, AND VISIBLE TRANSMITTANCE RATINGS

REPORT NUMBER
L0395.01-116-45 R0

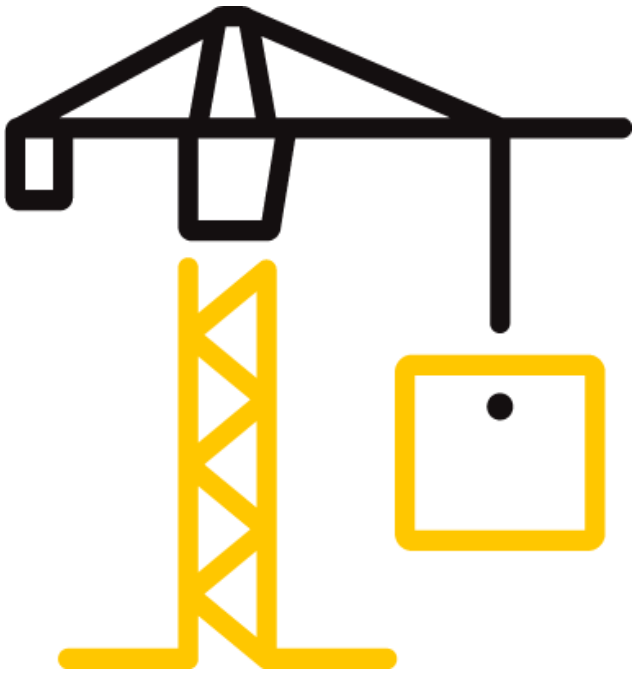
TEST DATE
05/27/20

ISSUE DATE
05/27/20

RECORD RETENTION END DATE
05/27/25

PAGES
16

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



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TEST REPORT FOR GUTMANN NORTH AMERICA
Report No.: L0395.01-116-45 R0
Date: 05/27/20

REPORT ISSUED TO
GUTMANN NORTH AMERICA
911-90 Queens Wharf Road
Toronto, Ontario, Canada M5V 0J4

SECTION 1
SUMMARY

SERIES/MODEL: S70+ Fixed Window (25mm - Dual Glazed)

Intertek Building & Construction (Intertek B&C) was contracted to perform 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	**REVIEWED BY:**	Eric S. Leitner
TITLE:	Simulation Technician	**TITLE:**	Manager - Thermal Testing & Simulations
SIGNATURE:	Allison M. Ford Digitally Signed by: Allison Ford	**SIGNATURE:**	Digitally Signed by: Eric S. Leitner
DATE:	05/27/20	**DATE:**	05/27/20

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 72.0

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	S70+ Fixed Window (25mm - Dual Glazed)
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	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

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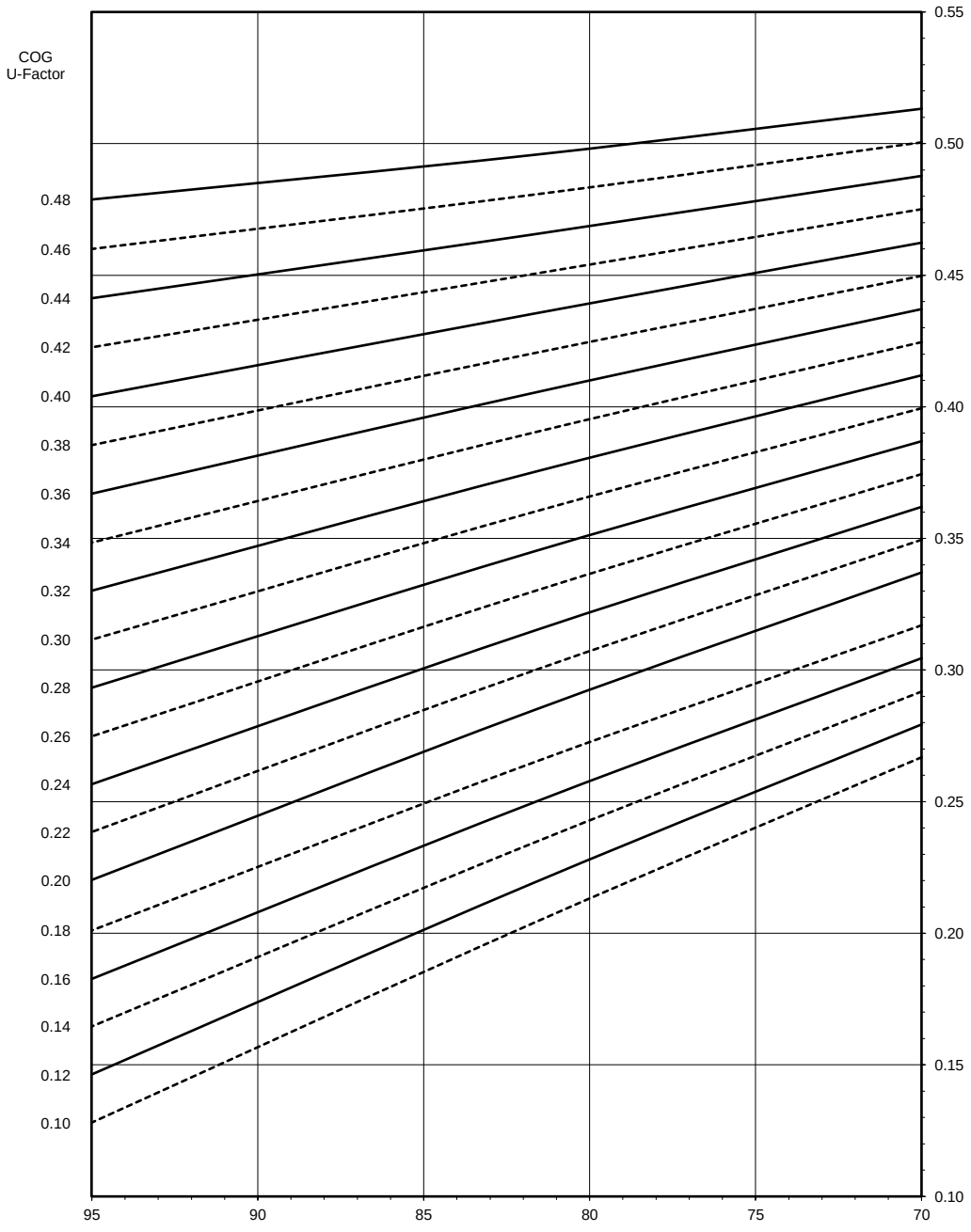
SECTION 6
SIMULATION RESULTS

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



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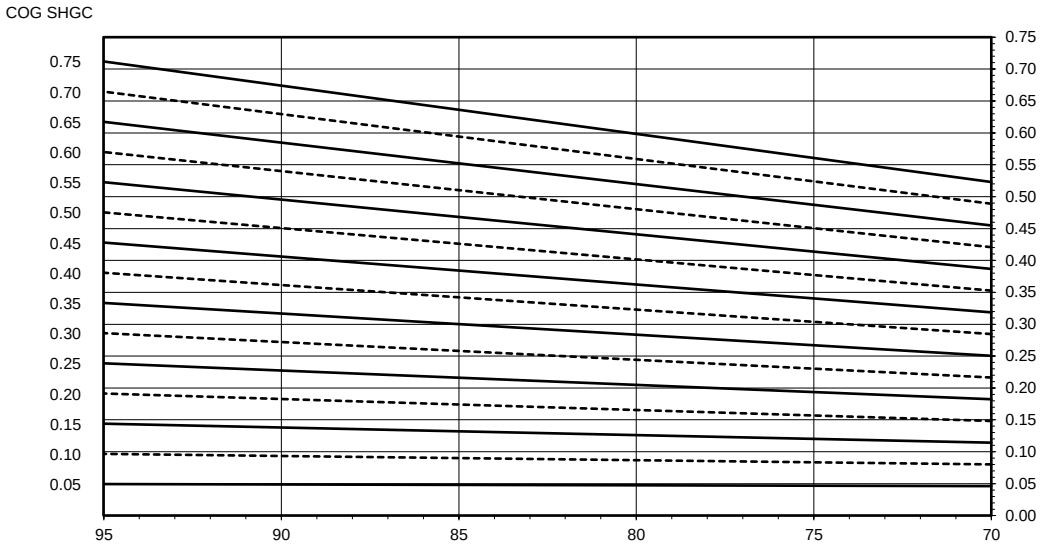
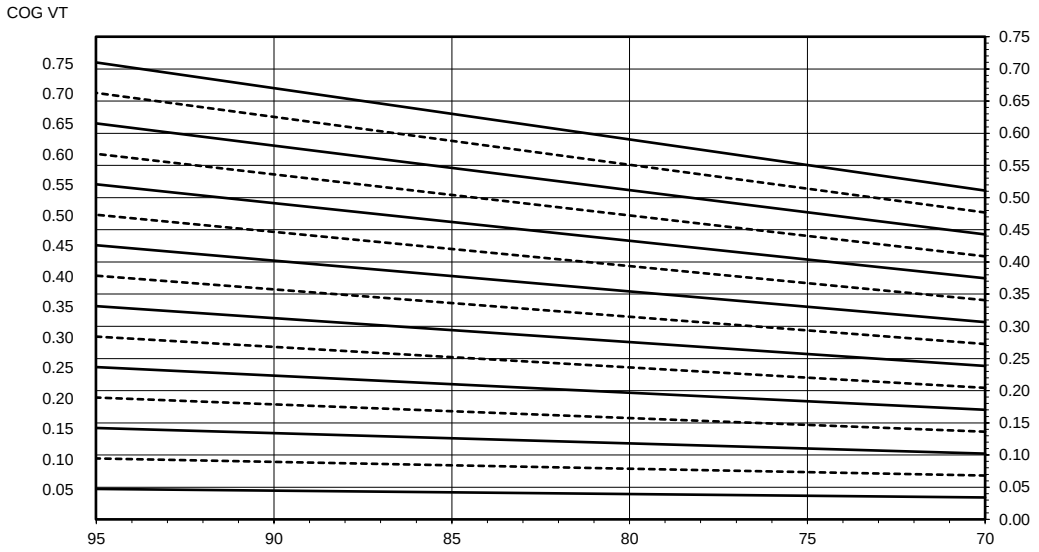
SECTION 6
SIMULATION RESULTS

SHGC CALCULATIONS: System SHGC vs. Percentage of Vision Area



VT CALCULATIONS: System VT vs. Percentage of Vision Area



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SECTION 6
SIMULATION RESULTS

U-FACTOR CALCULATIONS (S70+ Fixed Window (25mm - Dual Glazed))		
Size Specific U-Factor Matrix*		
Glazing Option	Center-of-Glass U-Factor	Overall U-Factor
1	0.48	0.50
2	0.46	0.48
3	0.44	0.47
4	0.42	0.45
5	0.40	0.44
6	0.38	0.42
7	0.36	0.41
8	0.34	0.39
9	0.32	0.38
10	0.30	0.36
11	0.28	0.34
12	0.26	0.33
13	0.24	0.31
14	0.22	0.30
15	0.20	0.28
16	0.18	0.26
17	0.16	0.25
18	0.14	0.23
19	0.12	0.22
20	0.10	0.20

*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 81.7% Vision Area / Total Area.

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SIMULATION RESULTS

SHGC/VT CALCULATIONS (S70+ Fixed Window (25mm - Dual Glazed))			
Size Specific SHGC Matrix*		Size Specific VT Matrix*	
Center-of-Glass SHGC	Overall SHGC	Center-of-Glass VT	Overall VT
0.75	0.61	0.75	0.60
0.70	0.57	0.70	0.56
0.65	0.53	0.65	0.52
0.60	0.49	0.60	0.48
0.55	0.45	0.55	0.44
0.50	0.41	0.50	0.40
0.45	0.37	0.45	0.36
0.40	0.33	0.40	0.32
0.35	0.29	0.35	0.28
0.30	0.25	0.30	0.24
0.25	0.21	0.25	0.20
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 81.7% Vision Area / Total Area.

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SECTION 6
SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (S70+ Fixed Window (25mm - Dual Glazed))									
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	NFRC 100-2017	95.00% Vision Area
1	0.48	43.7°F	Head	2.6937	0.5644	0.3544	0.5132	0.4957	0.4788
			L. Jamb	2.6937	0.5426	0.4603			
			R. Jamb	2.6937	0.5426	0.4603			
			Sill	2.6937	0.5637	0.3544			
2	0.46	44.8°F	Head	2.6937	0.5633	0.3443	0.5005	0.4806	0.4600
			L. Jamb	2.6937	0.5415	0.4472			
			R. Jamb	2.6937	0.5415	0.4472			
			Sill	2.6937	0.5626	0.3444			
3	0.44	45.8°F	Head	2.6937	0.5623	0.3343	0.4877	0.4655	0.4413
			L. Jamb	2.6937	0.5404	0.4342			
			R. Jamb	2.6937	0.5404	0.4342			
			Sill	2.6937	0.5616	0.3343			
4	0.42	46.8°F	Head	2.6937	0.5612	0.3246	0.4751	0.4504	0.4226
			L. Jamb	2.6937	0.5393	0.4215			
			R. Jamb	2.6937	0.5393	0.4215			
			Sill	2.6937	0.5606	0.3246			
5	0.40	47.9°F	Head	2.6937	0.5602	0.3146	0.4624	0.4353	0.4040
			L. Jamb	2.6937	0.5383	0.4085			
			R. Jamb	2.6937	0.5383	0.4085			
			Sill	2.6937	0.5595	0.3146			
6	0.38	48.9°F	Head	2.6937	0.5593	0.3049	0.4498	0.4203	0.3854
			L. Jamb	2.6937	0.5373	0.3959			
			R. Jamb	2.6937	0.5373	0.3959			
			Sill	2.6937	0.5586	0.3050			
7	0.36	50.0°F	Head	2.6937	0.5583	0.2952	0.4371	0.4052	0.3670
			L. Jamb	2.6937	0.5362	0.3832			
			R. Jamb	2.6937	0.5362	0.3832			
			Sill	2.6937	0.5576	0.2952			
8	0.34	51.0°F	Head	2.6937	0.5577	0.2856	0.4246	0.3901	0.3484
			L. Jamb	2.6937	0.5353	0.3705			
			R. Jamb	2.6937	0.5353	0.3705			
			Sill	2.6937	0.5567	0.2855			

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TOTAL PRODUCT CALCULATIONS (S70+ Fixed Window (25mm - Dual Glazed))									
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	NFRC 100-2017	95.00% Vision Area
9	0.32	52.0°F	Head	2.6937	0.5564	0.2758	0.4120	0.3751	0.3301
			L. Jamb	2.6937	0.5343	0.3579			
			R. Jamb	2.6937	0.5343	0.3579			
			Sill	2.6937	0.5557	0.2758			
10	0.30	53.1°F	Head	2.6937	0.5554	0.2662	0.3995	0.3600	0.3116
			L. Jamb	2.6937	0.5333	0.3455			
			R. Jamb	2.6937	0.5333	0.3455			
			Sill	2.6937	0.5548	0.2663			
11	0.28	54.2°F	Head	2.6937	0.5545	0.2567	0.3869	0.3449	0.2933
			L. Jamb	2.6937	0.5324	0.3331			
			R. Jamb	2.6937	0.5324	0.3331			
			Sill	2.6937	0.5539	0.2567			
12	0.26	55.2°F	Head	2.6937	0.5536	0.2472	0.3744	0.3298	0.2748
			L. Jamb	2.6937	0.5314	0.3206			
			R. Jamb	2.6937	0.5314	0.3206			
			Sill	2.6937	0.5530	0.2472			
13	0.24	56.3°F	Head	2.6937	0.5529	0.2380	0.3620	0.3148	0.2566
			L. Jamb	2.6937	0.5305	0.3083			
			R. Jamb	2.6937	0.5305	0.3083			
			Sill	2.6937	0.5521	0.2377			
14	0.22	57.3°F	Head	2.6937	0.5519	0.2282	0.3495	0.2997	0.2385
			L. Jamb	2.6937	0.5296	0.2959			
			R. Jamb	2.6937	0.5296	0.2959			
			Sill	2.6937	0.5513	0.2282			
15	0.20	58.4°F	Head	2.6937	0.5511	0.2188	0.3371	0.2846	0.2203
			L. Jamb	2.6937	0.5288	0.2837			
			R. Jamb	2.6937	0.5288	0.2837			
			Sill	2.6937	0.5504	0.2188			
16	0.18	59.5°F	Head	2.6937	0.5338	0.2030	0.3170	0.2648	0.2011
			L. Jamb	2.6937	0.5112	0.2629			
			R. Jamb	2.6937	0.5112	0.2629			
			Sill	2.6937	0.5329	0.2029			

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TOTAL PRODUCT CALCULATIONS (S70+ Fixed Window (25mm - Dual Glazed))									
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	NFRC 100-2017	95.00% Vision Area
17	0.16	60.6°F	Head	2.6937	0.5329	0.1934	0.3045	0.2495	0.1827
			L. Jamb	2.6937	0.5102	0.2504			
			R. Jamb	2.6937	0.5102	0.2504			
			Sill	2.6937	0.5320	0.1933			
18	0.14	61.6°F	Head	2.6937	0.5322	0.1831	0.2918	0.2342	0.1646
			L. Jamb	2.6937	0.5095	0.2370			
			R. Jamb	2.6937	0.5095	0.2370			
			Sill	2.6937	0.5314	0.1830			
19	0.12	62.7°F	Head	2.6937	0.5312	0.1737	0.2793	0.2190	0.1464
			L. Jamb	2.6937	0.5085	0.2247			
			R. Jamb	2.6937	0.5085	0.2247			
			Sill	2.6937	0.5304	0.1735			
20	0.10	63.9°F	Head	2.6937	0.5303	0.1641	0.2669	0.2038	0.1281
			L. Jamb	2.6937	0.5075	0.2123			
			R. Jamb	2.6937	0.5075	0.2123			
			Sill	2.6937	0.5295	0.1640			

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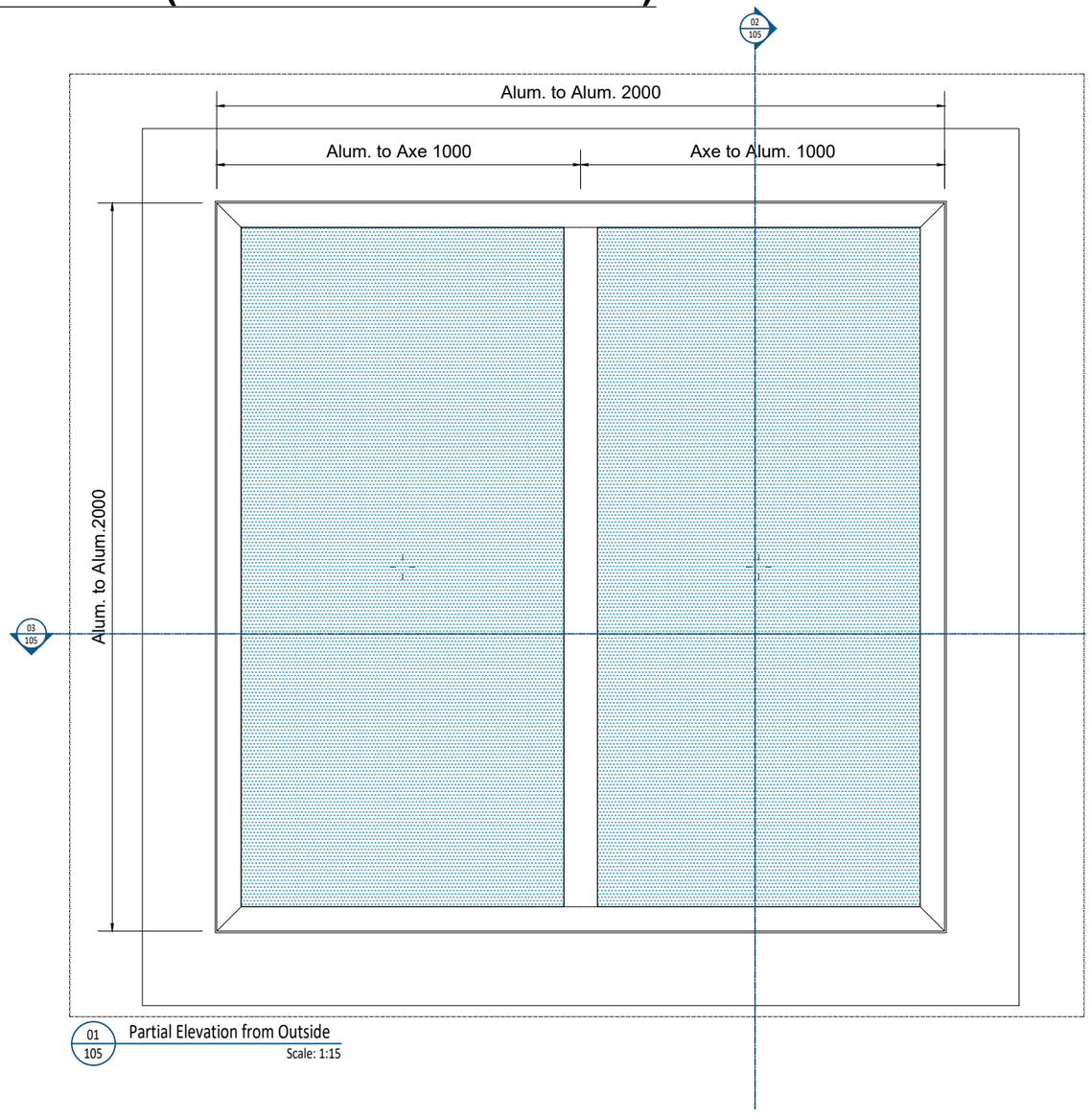
SECTION 7
DRAWINGS / BILL OF MATERIALS

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.

GUTMANN S70+ Fixed (25mm Glass thickness)



01 105 Partial Elevation from Outside
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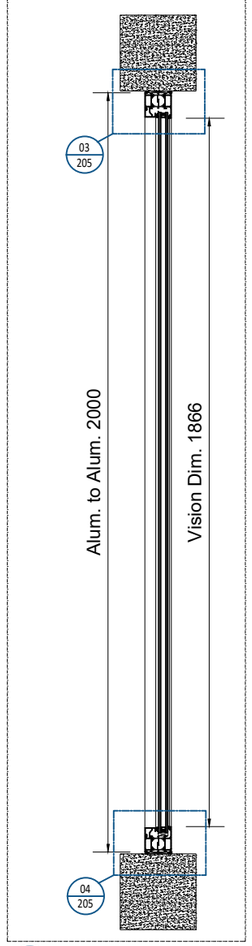
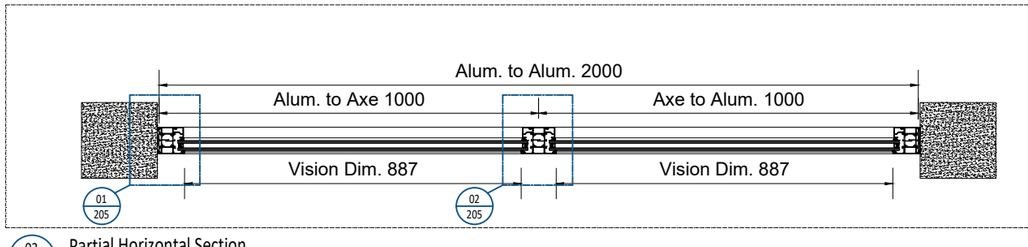


02 105 Partial Vertical Section
Scale: 1:15



03 105 Partial Horizontal Section
Scale: 1:15

IMPORTANT

NOTE

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REMARKS

1. Dimensioning of the profiles, substructure, welding seams, fixing accessories and fixing to the building have to be calculated in accordance with the final structural calculations.
2. Sealing of the glass joint must be effected with UV-resistant silicone sealant. In respect of adhesion and combatibility with the edge joint, the application guidelines of the sealant supplier must be observed.
3. Building attachment details are according to architects design and are subject to his approval.
4. GUTMANN FABRICATION GUIDELINES MUST BE OBSERVED.
5. ALL DIMENSIONS ARE IN MM.

IMPORTANT

All Combinations of Glass, Silicone Adhesive and Pre-Filler should be agreed with the Glass, Adhesive and Sealant Suppliers. (Warranty)

REV	DATE	DESCRIPTION
00	10.03.2020	PROPOSED CONCEPT DWG

CONSTRUCTION ISSUE

CLIENT:

MAIN CONSULTANT:

CONTRACTOR:

DESIGNER:

PROJECT:

PROJECT DESCRIPTION:

ALUMINUM SYSTEM:

Gutmann System Lebanon S.A.L
PO BOX 11-4368, 5th FL., Le Bureau Bldg., Pierre Gemayel St., National Museum Area, Beirut
Tel: +961 1 425 280
Fax: +961 1 425 281
GUTMANN www.gutmann.ae

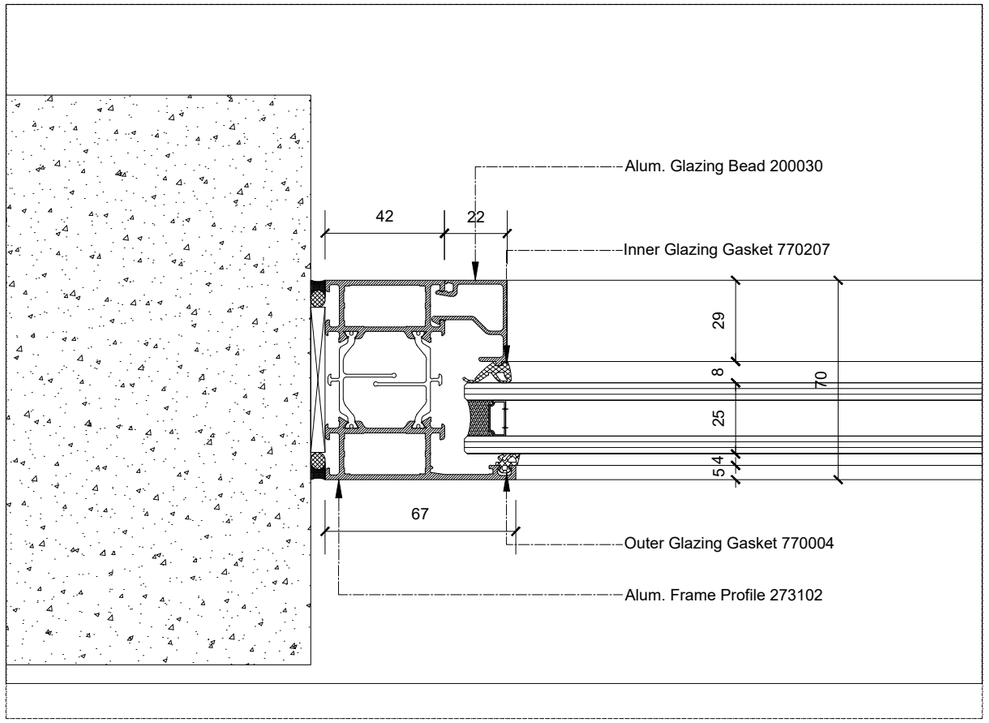
"ALUMINIUM SHAPED BY GUTMANN"

S70+ Fixed
25mm Glass Thickness

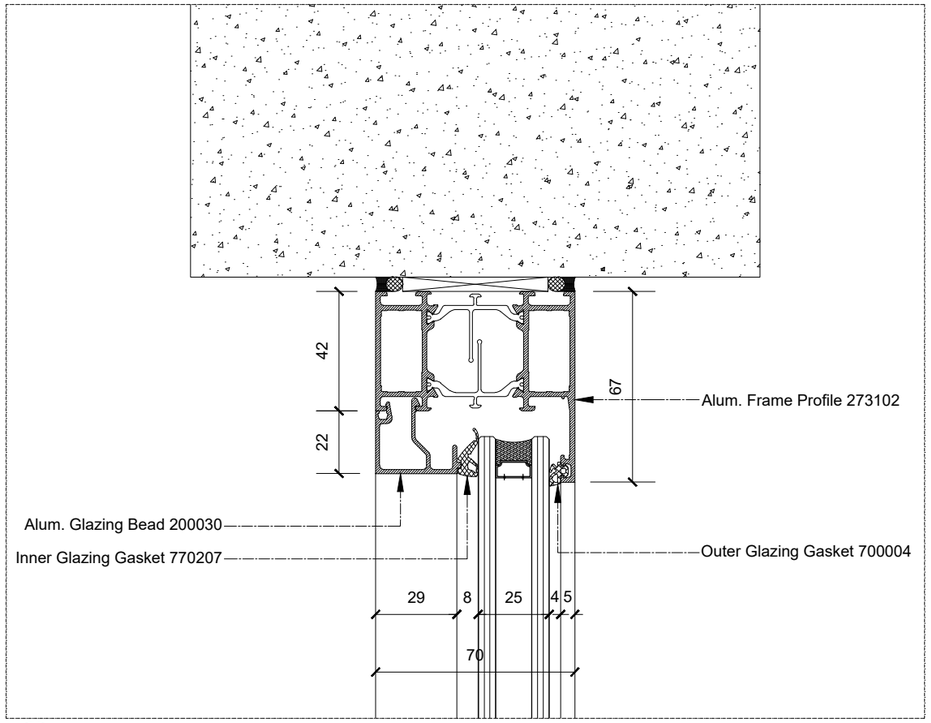
DRAWING TITLE:

Elevation, Horizontal & Vertical Sections

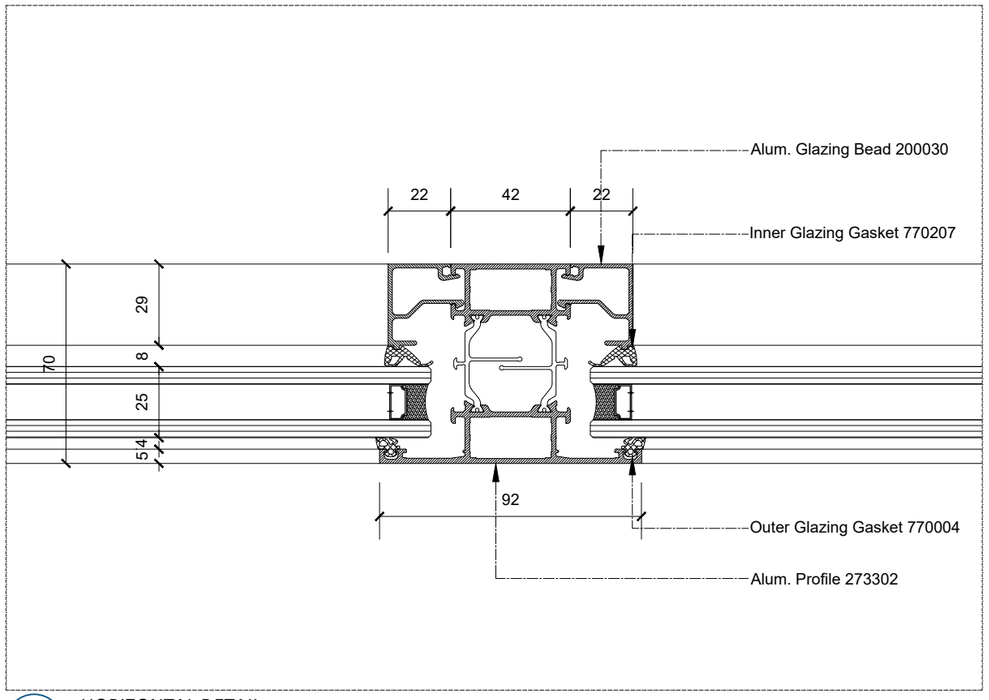
DATE	10.03.2020	DWG. No.	REV.
PROJECT NO.		CD-105	0
PLOT. SCALE	AS SHOWN		
PLOT. SCALE			
FOLIO SIZE	A3		
DRAWN BY	S.L		
CHECKED BY	DESIGN DEPARTMENT		



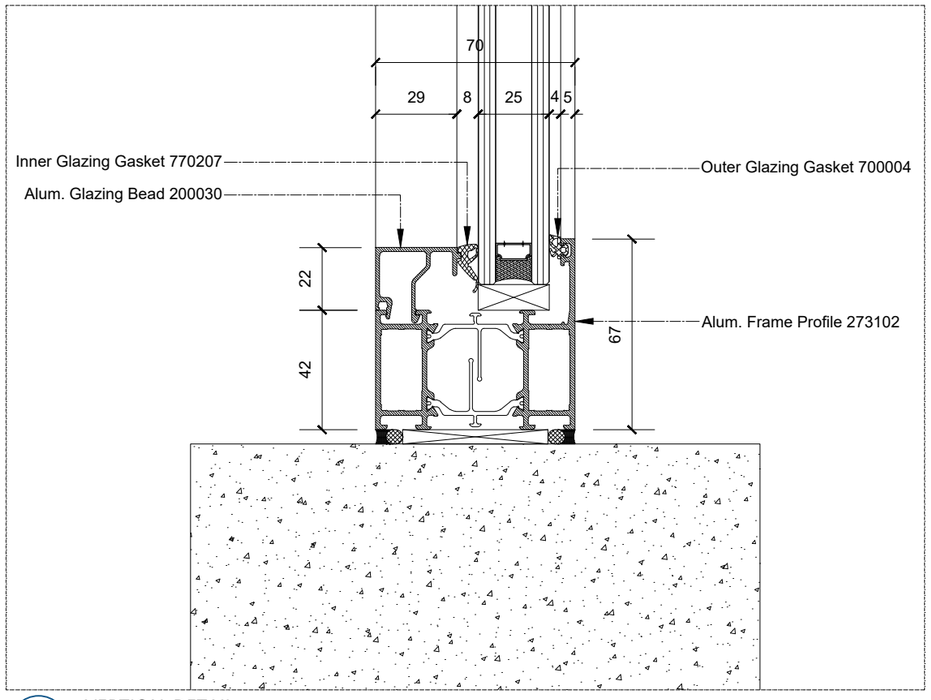
01 / 205 HORIZONTAL DETAIL
Scale: 1:2



03 / 205 VERTICAL DETAIL
Scale: 1:2



02 / 205 HORIZONTAL DETAIL
Scale: 1:2



04 / 205 VERTICAL DETAIL
Scale: 1:2

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REV	DATE	DESCRIPTION
00	10.03.2020	PROPOSED CONCEPT DWG

CONSTRUCTION ISSUE

CLIENT:

MAIN CONSULTANT:

CONTRACTOR:

DESIGNER:

PROJECT:

PROJECT DESCRIPTION:

ALUMINUM SYSTEM:

Gutmann System Lebanon S.A.L.
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Fax: +961 1 425 281
www.gutmann.ae

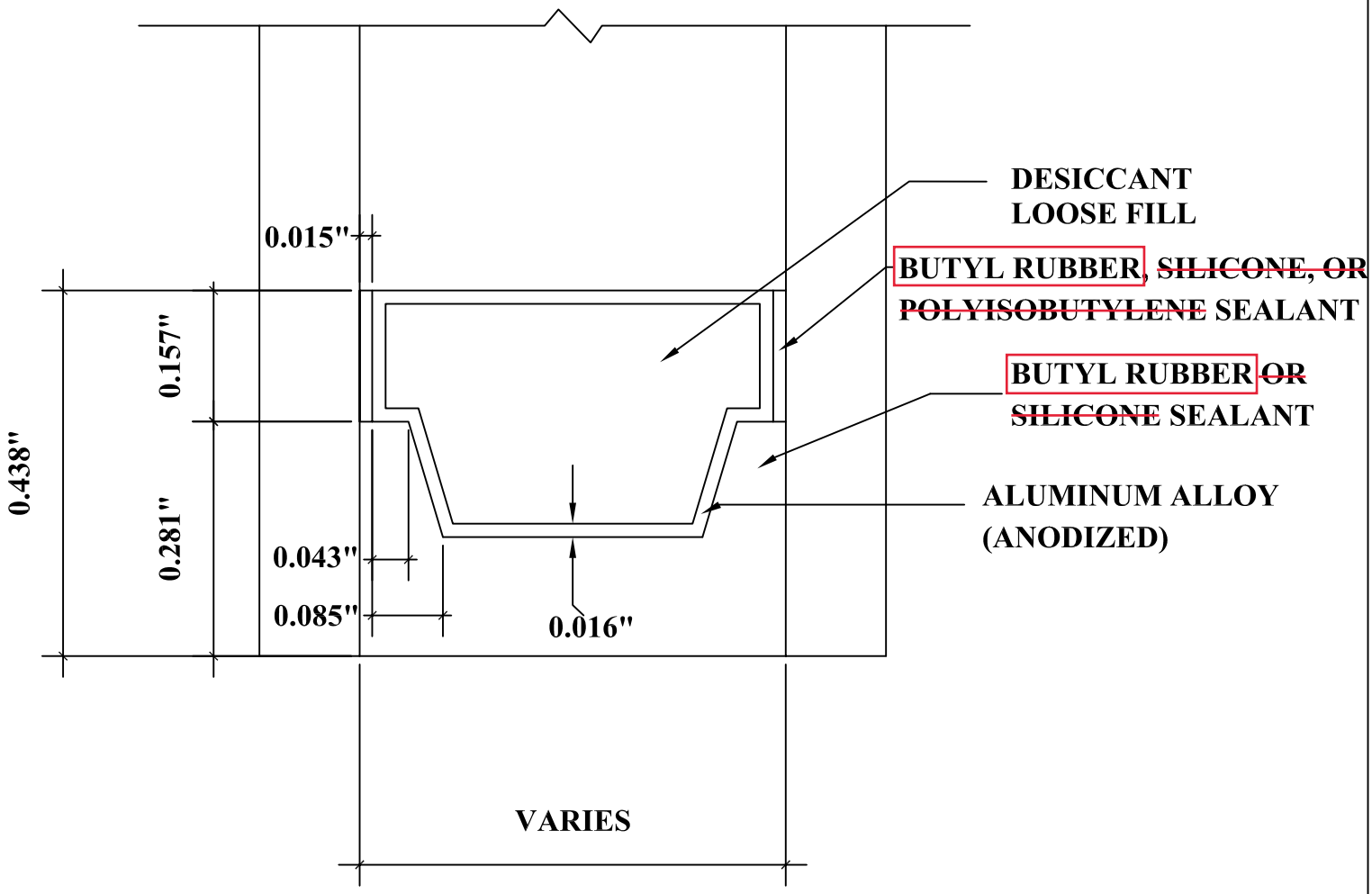
"ALUMINIUM SHAPED BY GUTMANN"

S70+ Fixed
25mm Glass Thickness

DRAWING TITLE:

Horizontal & Vertical Details

DATE	10.03.2020	DWG. No.	REV.
PROJECT NO.		CD-205	0
PLOT. SCALE	AS SHOWN		
PLOT. SCALE			
FOLIO SIZE	A3		
DRAWN BY	SL		
CHECKED BY	DESIGN DEPARTMENT		



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

130 Derry Court
York, PA, 17406

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

SECTION 8
REVISION LOG

REVISION #	DATE	PAGES	REVISION
.01R0	05/27/20	N/A	Original Report Issued to Gutmann North America.