

AAMA 507-12 THERMAL PERFORMANCE REPORT

Rendered to:

TORO ALUMINUM

SERIES/MODEL: Commdoor Aluminum 2500 Series Storefront

TYPE: Glazed Wall System

Report No: C9094.01-116-45
Report Date: 07/02/13

AAMA 507-12 THERMAL PERFORMANCE REPORT

Rendered to:

TORO ALUMINUM
330 Applewood Crescent
Concord, ON, Canada L4K 4V2

Report No: C9094.01-116-45
Report Date: 07/02/13
Simulation Date: 07/02/13

Project Summary:

Architectural Testing, Inc. was contracted by Toro Aluminum to provide U-Factor and Solar Heat Gain Coefficient thermal performance ratings on the Commdoor Aluminum 2500 Series Storefront Glazed Wall System. The thermal performance ratings were determined in accordance with AAMA 507-12, Standard Practice for Determining the Thermal Performance Characteristics of Fenestration Systems Installed in Commercial Building.

Reference Documents:

AAMA 507-12, Standard Practice for Determining the Thermal Performance Characteristics of Fenestration Systems Installed in Commercial Buildings

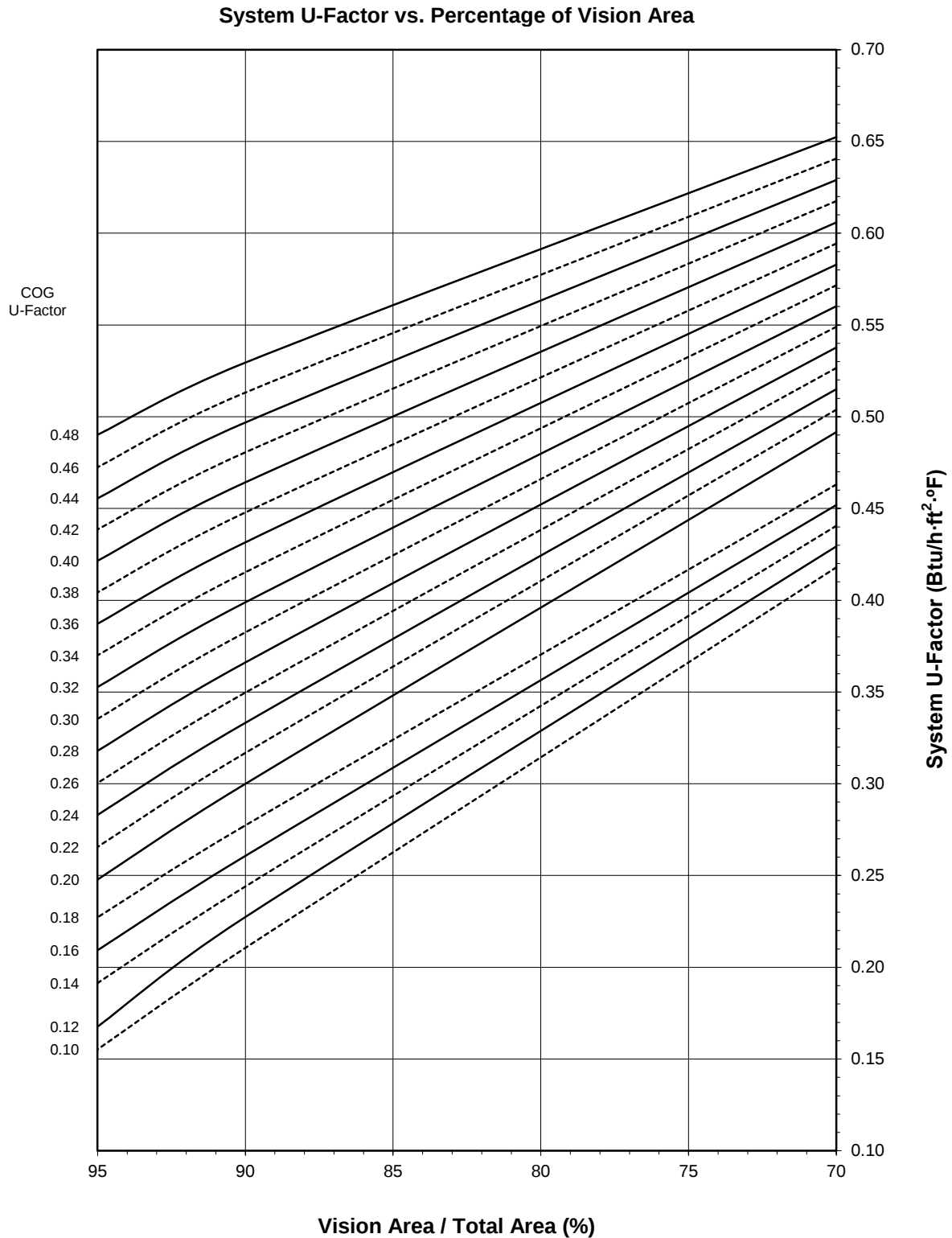
NFRC 100-2010, *Procedure for Determining Fenestration Product U-Factors*

NFRC 200-2010, *Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence*

Simulation Specimen Description:

Series/Model:	Commdoor Aluminum 2500 Series Storefront
Type:	Glazed Wall System
Frame Material:	Aluminum Thermally Broken Framing System
Material Finish:	Painted Aluminum
Specimen Size:	2000mm wide by 2000mm high (78-3/4" by 78-3/4")
Configuration:	Two vision lites separated by one intermediate vertical
Drawing Reference:	Toro Drawing Series 2500 Fixed Window System, dated 6/1/11

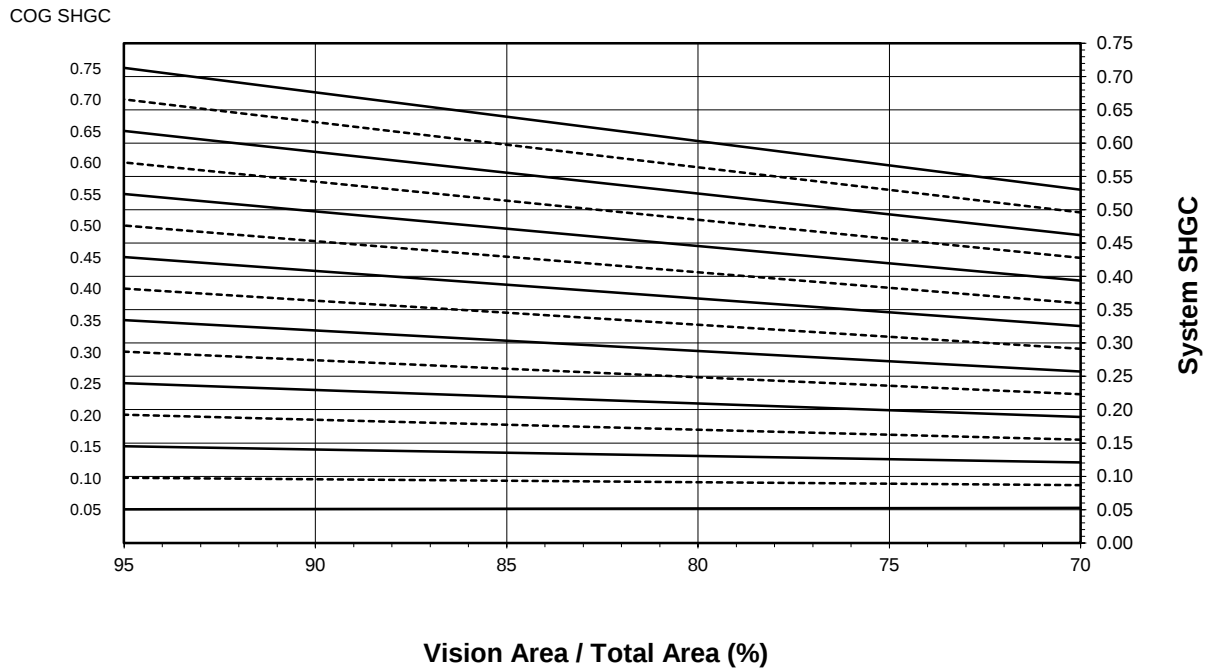
Toro Aluminum
Commdoor Aluminum 2500 Series Storefront - Glazed Wall System



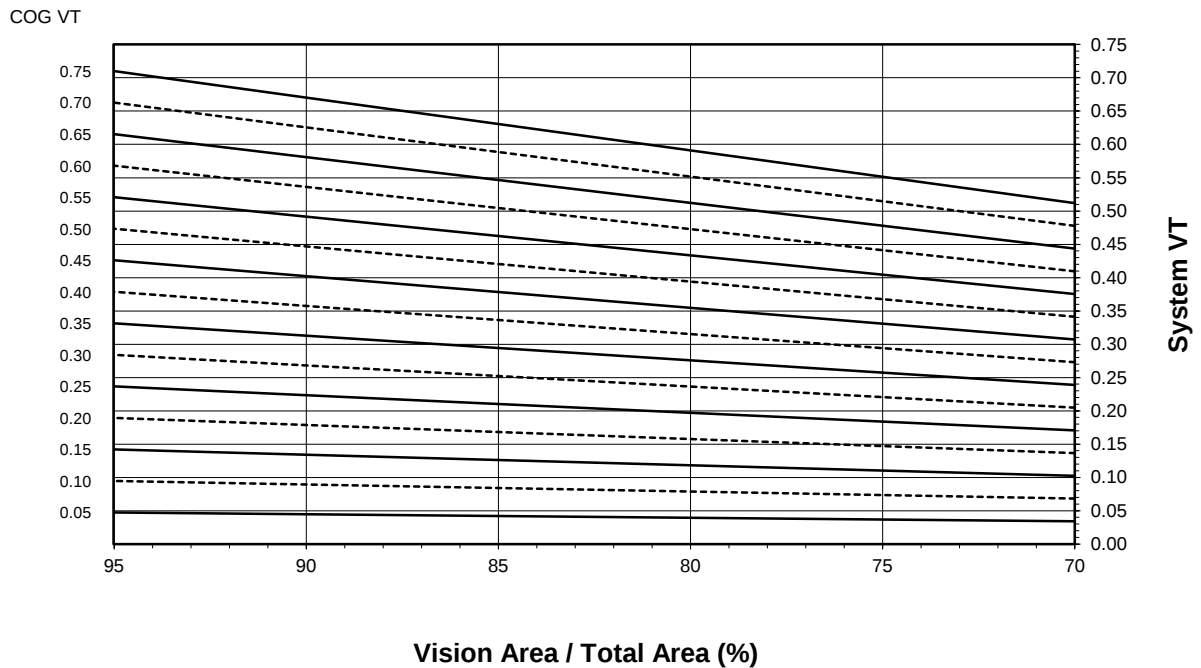
Note: 1 inch Overall - Dual Glazed Glass (0.48-0.20 COG) with Aluminum Spacer, Dual Glazed Glass with Heat Mirror (0.18-0.10 COG) with Aluminum Spacer

Toro Aluminum
CommDoor Aluminum 2500 Series Storefront - Glazed Wall System

System SHGC vs. Percentage of Vision Area



System VT vs. Percentage of Vision Area



Toro Aluminum
CommDoor Aluminum 2500 Series Storefront - Glazed Wall System

Size Specific U-Factor Matrix*

Glazing Option	Center of Glass U-Factor	Overall U-Factor
1	0.48	0.53
2	0.46	0.51
3	0.44	0.50
4	0.42	0.48
5	0.40	0.46
6	0.38	0.45
7	0.36	0.43
8	0.34	0.41
9	0.32	0.40
10	0.30	0.38
11	0.28	0.37
12	0.26	0.35
13	0.24	0.33
14	0.22	0.32
15	0.20	0.30
16	0.18	0.28
17	0.16	0.26
18	0.14	0.24
19	0.12	0.23
20	0.10	0.21

Note: 1 inch Overall - Dual Glazed Glass (0.48-0.20 COG) with Aluminum Spacer, Dual Glazed Glass with Heat Mirror (0.18-0.10 COG) with Aluminum Spacer

Toro Aluminum
Commdoor Aluminum 2500 Series Storefront - Glazed Wall System

Size Specific SHGC Matrix*

Center of Glass SHGC	Overall SHGC
0.75	0.68
0.70	0.63
0.65	0.59
0.60	0.54
0.55	0.50
0.50	0.45
0.45	0.41
0.40	0.36
0.35	0.32
0.30	0.27
0.25	0.23
0.20	0.19
0.15	0.14
0.10	0.10
0.05	0.05

Size Specific VT Matrix*

Center of Glass VT	Overall VT
0.75	0.67
0.70	0.63
0.65	0.58
0.60	0.54
0.55	0.49
0.50	0.45
0.45	0.40
0.40	0.36
0.35	0.31
0.30	0.27
0.25	0.22
0.20	0.18
0.15	0.13
0.10	0.09
0.05	0.04

*Size Specific U-Factor, SHGC, and VT Matrices are based on the standard Glazed Wall System specimen size of 2000mm wide by 2000mm high (78-3/4" by 78-3/4"). This represents 90.1% Vision Area / Total Area.

Vision Area Data

Option No.	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							70% Vision Area	NFRC 100-2010	95% Vision Area
							24.49" by 24.49"	78.74" by 78.74"	158.07" by 158.07"
1	0.48	43.7	Head	2.0864	0.8719	0.4999	0.6524	0.5289	0.4901
			L. Jamb	1.0863	1.1082	0.4999			
			R. Jamb	1.0863	1.1052	0.4999			
			Mullion	2.1725	1.1067	0.4999			
			Sill	2.0863	0.8671	0.4999			
2	0.46	44.8	Head	2.0864	0.8710	0.4858	0.6407	0.5125	0.4725
			L. Jamb	1.0863	1.1065	0.4858			
			R. Jamb	1.0863	1.1034	0.4858			
			Mullion	2.1725	1.1050	0.4858			
			Sill	2.0863	0.8662	0.4858			
3	0.44	45.8	Head	2.0864	0.8701	0.4717	0.6290	0.4962	0.4555
			L. Jamb	1.0863	1.1049	0.4717			
			R. Jamb	1.0863	1.1016	0.4717			
			Mullion	2.1725	1.1033	0.4717			
			Sill	2.0863	0.8654	0.4717			
4	0.42	46.8	Head	2.0864	0.8693	0.4580	0.6175	0.4799	0.4386
			L. Jamb	1.0863	1.1034	0.4580			
			R. Jamb	1.0863	1.1000	0.4580			
			Mullion	2.1725	1.1017	0.4580			
			Sill	2.0863	0.8645	0.4580			
5	0.40	47.9	Head	2.0864	0.8685	0.4439	0.6059	0.4635	0.4215
			L. Jamb	1.0863	1.1018	0.4439			
			R. Jamb	1.0863	1.0984	0.4439			
			Mullion	2.1725	1.1001	0.4439			
			Sill	2.0863	0.8637	0.4439			
6	0.38	48.9	Head	2.0864	0.8677	0.4301	0.5944	0.4471	0.4043
			L. Jamb	1.0863	1.1004	0.4301			
			R. Jamb	1.0863	1.0968	0.4301			
			Mullion	2.1725	1.0986	0.4301			
			Sill	2.0863	0.8629	0.4301			
7	0.36	50.0	Head	2.0864	0.8669	0.4163	0.5829	0.4308	0.3872
			L. Jamb	1.0863	1.0988	0.4163			
			R. Jamb	1.0863	1.0951	0.4163			
			Mullion	2.1725	1.0969	0.4163			
			Sill	2.0863	0.8621	0.4163			
8	0.34	51.0	Head	2.0864	0.8663	0.4028	0.5716	0.4145	0.3700
			L. Jamb	1.0863	1.0976	0.4028			
			R. Jamb	1.0863	1.0939	0.4028			
			Mullion	2.1725	1.0958	0.4028			
			Sill	2.0863	0.8615	0.4028			
9	0.32	52.0	Head	2.0864	0.8656	0.3891	0.5602	0.3981	0.3527
			L. Jamb	1.0863	1.0964	0.3891			
			R. Jamb	1.0863	1.0925	0.3891			
			Mullion	2.1725	1.0944	0.3891			
			Sill	2.0863	0.8608	0.3891			

Vision Area Data

Option No.	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							70% Vision Area	NFRC 100-2010	95% Vision Area
							24.49" by 24.49"	78.74" by 78.74"	158.07" by 158.07"
10	0.30	53.1	Head	2.0864	0.8649	0.3757	0.5490	0.3817	0.3353
			L. Jamb	1.0863	1.0951	0.3757			
			R. Jamb	1.0863	1.0911	0.3757			
			Mullion	2.1725	1.0931	0.3757			
			Sill	2.0863	0.8601	0.3757			
11	0.28	54.2	Head	2.0864	0.8643	0.3621	0.5377	0.3652	0.3179
			L. Jamb	1.0863	1.0940	0.3621			
			R. Jamb	1.0863	1.0899	0.3621			
			Mullion	2.1725	1.0919	0.3621			
			Sill	2.0863	0.8595	0.3621			
12	0.26	55.2	Head	2.0864	0.8637	0.3487	0.5265	0.3488	0.3004
			L. Jamb	1.0863	1.0929	0.3487			
			R. Jamb	1.0863	1.0886	0.3487			
			Mullion	2.1725	1.0907	0.3487			
			Sill	2.0863	0.8589	0.3487			
13	0.24	56.3	Head	2.0864	0.8592	0.3347	0.5150	0.3323	0.2830
			L. Jamb	1.0863	1.0918	0.3347			
			R. Jamb	1.0863	1.0874	0.3347			
			Mullion	2.1725	1.0896	0.3347			
			Sill	2.0863	0.8583	0.3347			
14	0.22	57.3	Head	2.0864	0.8586	0.3213	0.5038	0.3159	0.2656
			L. Jamb	1.0863	1.0909	0.3213			
			R. Jamb	1.0863	1.0864	0.3213			
			Mullion	2.1725	1.0887	0.3213			
			Sill	2.0863	0.8578	0.3213			
15	0.20	58.4	Head	2.0864	0.8580	0.3080	0.4916	0.2990	0.2478
			L. Jamb	1.0863	1.0840	0.3080			
			R. Jamb	1.0863	1.0795	0.3080			
			Mullion	2.1725	1.0818	0.3080			
			Sill	2.0863	0.8573	0.3080			
16	0.18	59.5	Head	2.0864	0.8350	0.2839	0.4631	0.2764	0.2272
			L. Jamb	1.0863	1.0290	0.2839			
			R. Jamb	1.0863	1.0248	0.2839			
			Mullion	2.1725	1.0269	0.2839			
			Sill	2.0863	0.8350	0.2839			
17	0.16	60.6	Head	2.0864	0.8343	0.2706	0.4519	0.2597	0.2093
			L. Jamb	1.0863	1.0276	0.2706			
			R. Jamb	1.0863	1.0232	0.2706			
			Mullion	2.1725	1.0254	0.2706			
			Sill	2.0863	0.8344	0.2706			
18	0.14	61.7	Head	2.0864	0.8343	0.2561	0.4406	0.2431	0.1914
			L. Jamb	1.0863	1.0275	0.2561			
			R. Jamb	1.0863	1.0231	0.2561			
			Mullion	2.1725	1.0253	0.2561			
			Sill	2.0863	0.8344	0.2561			

Vision Area Data

Option No.	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							70% Vision Area	NFRC 100-2010	95% Vision Area
							24.49" by 24.49"	78.74" by 78.74"	158.07" by 158.07"
19	0.12	62.8	Head	2.0864	0.8337	0.2426	0.4294	0.2264	0.1676
			L. Jamb	1.0863	1.0264	0.2426			
			R. Jamb	1.0863	1.0218	0.2426			
			Mullion	2.1725	1.0241	0.2426			
			Sill	2.0863	0.8338	0.2426			
20	0.10	63.9	Head	2.0864	0.8332	0.2291	0.4179	0.2095	0.1552
			L. Jamb	1.0863	1.0253	0.2291			
			R. Jamb	1.0863	1.0206	0.2291			
			Mullion	2.1725	1.0230	0.2291			
			Sill	2.0863	0.8307	0.2291			

Architectural Testing will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Architectural Testing, Inc. for the entire test record retention period. The test record retention end date for this report is July 2, 2017.

Results obtained are simulated values and were secured by using the designated test methods. This 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 product simulated. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:

SIMULATED BY:

REVIEWED BY:

Kristen L. Livelsberger
Senior Simulation Technician

Kevin S. Louder
Project Engineer

KLL:KLL
C9094.01-116-45

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A: Drawings and Bills of Material (12)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
.01R0	07/02/13	All	Original Report Issued to Toro Aluminum

All drawings and Bills of Material used in simulating this product are enclosed in this Appendix.

Appendix A

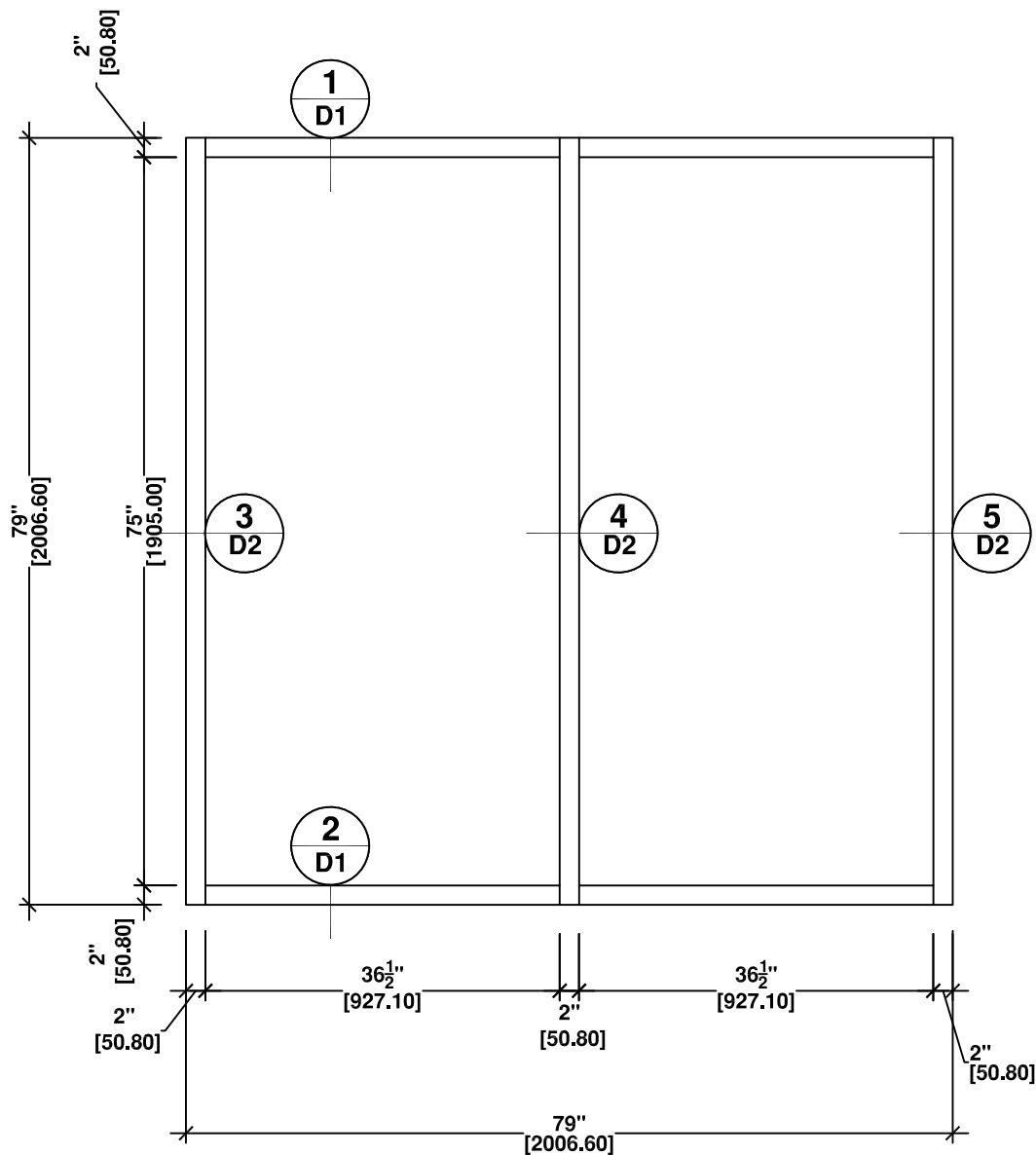
C9094.01-116-45



Architectural Testing

Report #: C9094-116-45

Date: 07/02/13

Verified by: *Kristen S. Friedberger***Glass Specs.**

1. Use Low-E on Second surface, TI-AC # 23 Coating on third surface and 1/2" Warm Edge Spacer.

2. Glass need to be **edge sanded** to avoid premature breakage with shipping and testing processes

G= GLASS

G1= 37-1/4"X75-3/4"(2)

GLASS SPECIFICATIONS

Name	Type	Description	O.T
G1	S/U	Internal Glass: 6mm Temp.	1"
		External Glass: 6mm Temp.	

SAMPLE 430

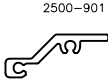
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121 Applewood Crescent Tel: (416) 743-DOOR (3667)
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 Website: www.commdooraluminum.com

REV	DESCRIPTION	DATE	BY	TITLE:
				SERIES 2500 FIXED WINDOW SYSTEM

SCALE: 1:20
 DRAWN BY: FO
 DATE: June. 01, 2011
 DRWG #:

E1

PART NUMBER: 2500-709	☐	MULLION (2) POCKETS	PART NUMBER:	☐	
					
PART NUMBER: 2500-702	☐	HORIZONTAL MULLION	PART NUMBER:	☐	
					
PART NUMBER: 2500-006	☐	GLASS STOP FOR HOR. MULLION	PART NUMBER:	☐	
					
PART NUMBER: 2500-901	☐	SMALL BRACKET EXTRUSION	PART NUMBER:	☐	
					
PART NUMBER: 2500-900	☐	LARGE BRACKET EXTRUSION	PART NUMBER:	☐	
					
PART NUMBER: 9903-141	1	GLAZING SPLINE	PART NUMBER:	☐	
					
PART NUMBER: S/U GLASS	2	TI-AC # 23 on clear 12mm air space warm edge spacer with Argon gas. Low-E on second surface. Glass Thk. 6mm X 6mm.	PART NUMBER:	☐	
					
PART NUMBER:	☐		PART NUMBER:	☐	
PART NUMBER:	☐		PART NUMBER:	☐	



Report #: C9094-116-45

Date: 07/02/13

Architectural Testing

Verified by: *Kristen R. Landsberger*

COMMDOOR ALUMINUM

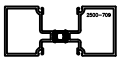
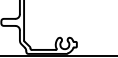
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 Website: www.commdooraluminum.com

REV	DESCRIPTION	DATE	BY	TITLE:
				SERIES 2500 FIXED WINDOW SYSTEM

SCALE:	1:2
DRAWN BY:	FO
DATE:	June. 01, 2011
DRWG #:	L1

BILL OF MATERIAL-ALUMINUM

DIAGRAM	TAG	ITEM	DESCRIPTION	QTY	LENGTH
		2500-709	MULLION TWO POCKET -- --	3	79"
		2500-701	FRAME HEADER -- --	2	36-1/2"
		2500-702	HORIZONTAL MULLION -- --	2	36-1/2"
		2500-006	GLASS STOP FOR HOR. MULLION --	2	36-1/2"
		2500-901	SMALL BRACKET EXTRUSION --	4	PCS
		2500-900	LARGE BRACKET EXTRUSION -- --	4	PCS

BILL OF MATERIAL-ALUMINUM

DIAGRAM	TAG	ITEM	DESCRIPTION	QTY	LENGTH
		9903-141	GLAZING SPLINE -- --	—	80'



Report #: C9094-116-45

Date: 07/02/13

Architectural Testing

Verified by: *Kristen R. Riedelberger*

DRWG. FOR FABRICATION



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REV	DESCRIPTION	BY	DATE	COMMENTS	TITLE:	SCALE:
					SERIES 2500 BILL OF MATERIAL	DRAWN BY: FO
						DATE: 05/02/11
						DRWG #:
						BM1

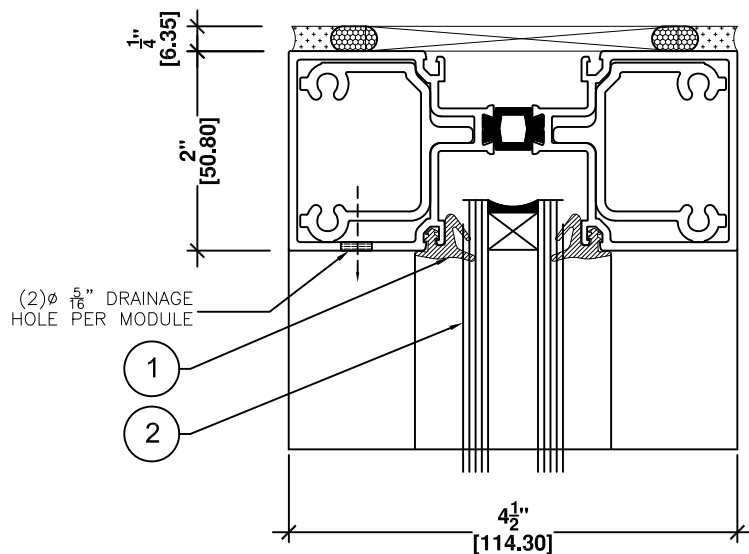


Architectural Testing

Report #: C9094-116-45

Date: 07/02/13

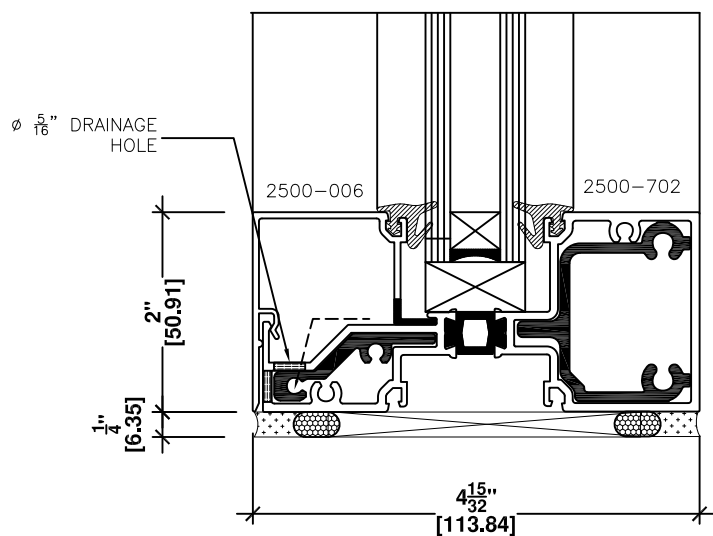
Verified by: *Kristen R. Friedlsberger*



1

SERIES 2500 FIXED

VISION
@ HEAD CONDITION



2

SERIES 2500 FIXED

VISION
@ SILL CONDITION



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Website: www.commdooraluminum.com

REV	DESCRIPTION	DATE	BY	TITLE:
				SERIES 2500 FIXED WINDOW SYSTEM

SCALE:	1:20
DRAWN BY:	FO
DATE:	June. 01, 2011
DRWG #:	

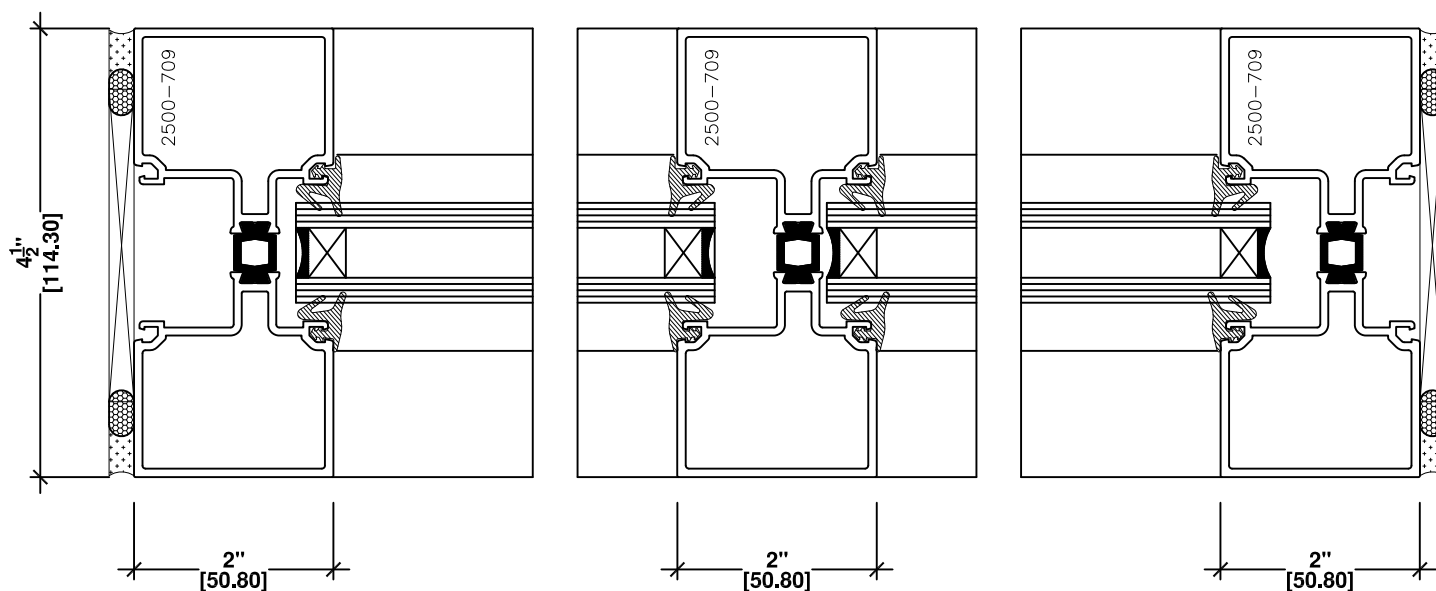
D1



Architectural Testing

Report #: C9094-116-45

Date: 07/02/13

Verified by: *Kristen R. Luedersberger*

3

SERIES 2500 FIXEDVISION
@ JAMB CONDITION

4

SERIES 2500 FIXED

VISION-VISION

5

SERIES 2500 FIXEDVISION
@ JAMB CONDITIONA member of the Toro Aluminum
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Canada, L4K 4J3 E-mail: info@commdooraluminum.com
Website: www.commdooraluminum.com

REV	DESCRIPTION	DATE	BY	TITLE:
				SERIES 2500 FIXED WINDOW SYSTEM

SCALE:	1:2
DRAWN BY:	FO
DATE:	June. 01, 2011
DRWG #:	

D2

CUSTOMER NO.

2500-012

COMMDOR

DIE NO.

H-15488



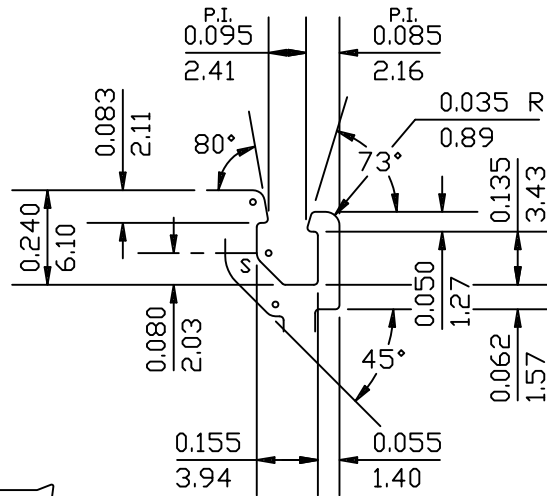
Architectural Testing

Report #: C9094-116-45

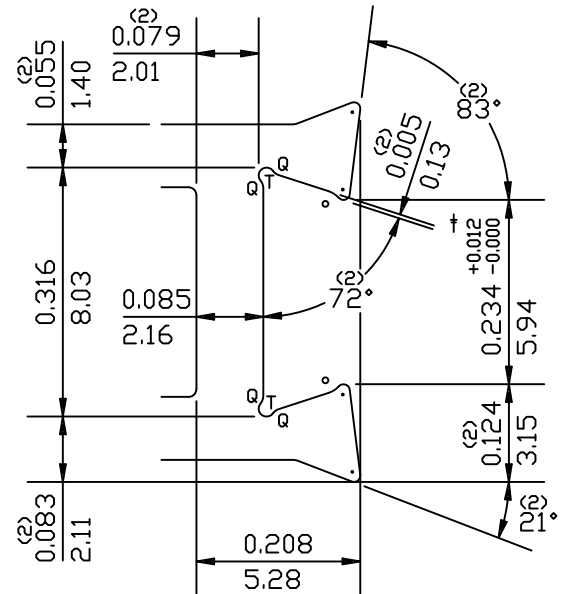
Date: 07/02/13

Verified by: *Quinton R. Luedersberger*

DETAIL "A"

SCALE: 2X
TYP. (2)DETAIL "B" Δ

SCALE: 4X

EXTRUDEX ID. (SEE DETAIL)
0.010(0.25)D. X 90° (2)

EXPOSED SURFACE

(†) = SPECIAL TOLERANCE

(·) = 0.008(0.20) R.

(T) = 0.010(0.25) R.

(Q) = 0.015(0.38) R.

(O) = 0.030(0.76) R.

(S) = 0.092(2.34) R.

UNMARKED RADII = RADIUS TO SUIT

EXTERIOR PERIMETER: 9.450(240.02)

UNMARKED THICKNESS 0.080(2.03)

BREAK CORNERS .010" (0.25mm), OUTSIDE CORNERS .015" (0.38mm)

STANDARD TOLERANCES TO APPLY UNLESS OTHERWISE STATED.

MATERIAL: PAINTED or ANODIZED ALUMINUM

DETAIL:
EXTRUDEX ID.

DESCRIPTION DOUBLE POCKET MULLION

DWN. BY G.H. DATE 03/17/03

SCALE FULL ALLOY 6063

EST. AREA 0.668 IN² mm²

EST. WT. 0.788 LBS/FT 1.173 KG/M

EST. PER. 16.370 IN mm

FACTOR 21

PLEASE SIGNIFY BELOW THAT SHAPE AND DIMENSIONS CONFORM TO YOUR REQUIREMENTS AND THAT YOU AGREE TO ACCEPT ALL LEGAL RESPONSIBILITIES FOR PATENT OR TRADE MARK INFRINGEMENT RELATING TO THIS SHAPE AND SAVE HARMLESS EXTRUDEX FROM ANY CLAIMS, SUITS, ACTIONS OR DEMANDS ARISING THEREFROM.

SIGNED BY DATE

09/07	Δ DETAIL "B" CHANGED	G.H.
DATE	REVISION	BY

DIE NO.
H-15488



Verified by: *Kristen L. Livelsberger*



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Canada, L4K 4J3 E-mail: info@commdooraluminum.com
Website: www.commdooraluminum.com

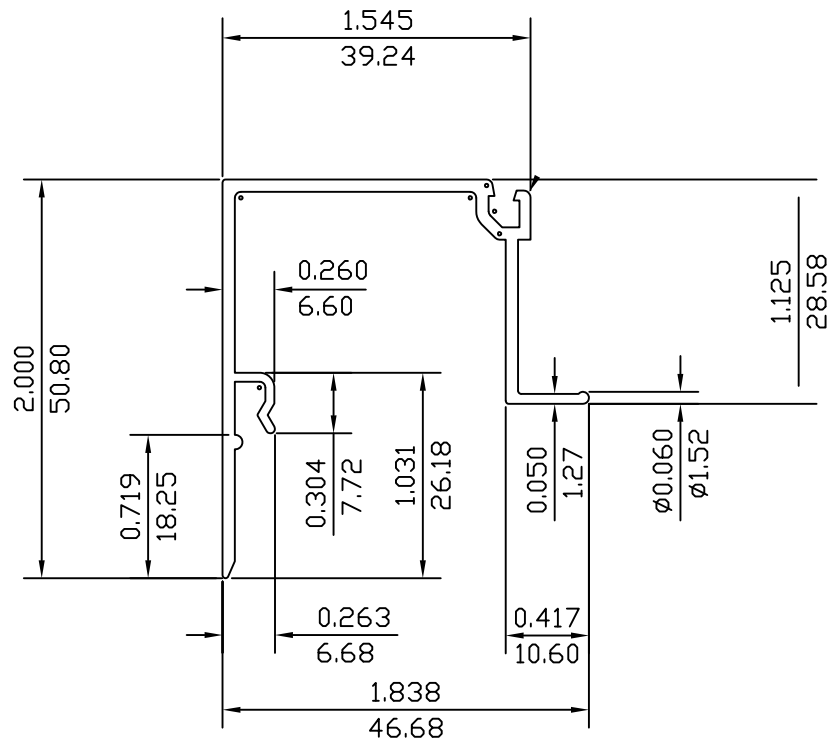
REV	DESCRIPTION	DATE	BY	TITLE:
				SERIES 2500
				MULLION HALF
				PART # 2500-002

SCALE:	1:20
DRAWN BY:	FO
DATE:	June. 01, 2011
DRWG #:	
DIE 1	



Report #: C9094-116-45

Date: 07/02/13

Architectural Testing Verified by: *Kristen A. Friedlschug***MATERIAL: PAINTED or ANODIZED ALUMINUM****A member of the Toro Aluminum
Group of Companies**121 Applewood Crescent Tel: (416) 743-DOOR (3667)
Concord, Ontario Fax: (416) 746-0979
Canada, L4K 4J3 E-mail: info@commdooraluminum.com
Website: www.commdooraluminum.com

REV	DESCRIPTION	DATE	BY	TITLE:
				SERIES 2500 GLASS
				STOP FOR H. MULLION
				PART # 2500-006

SCALE:	1:20
DRAWN BY:	FO
DATE:	June. 01, 2011
DRWG #:	

DIE 2

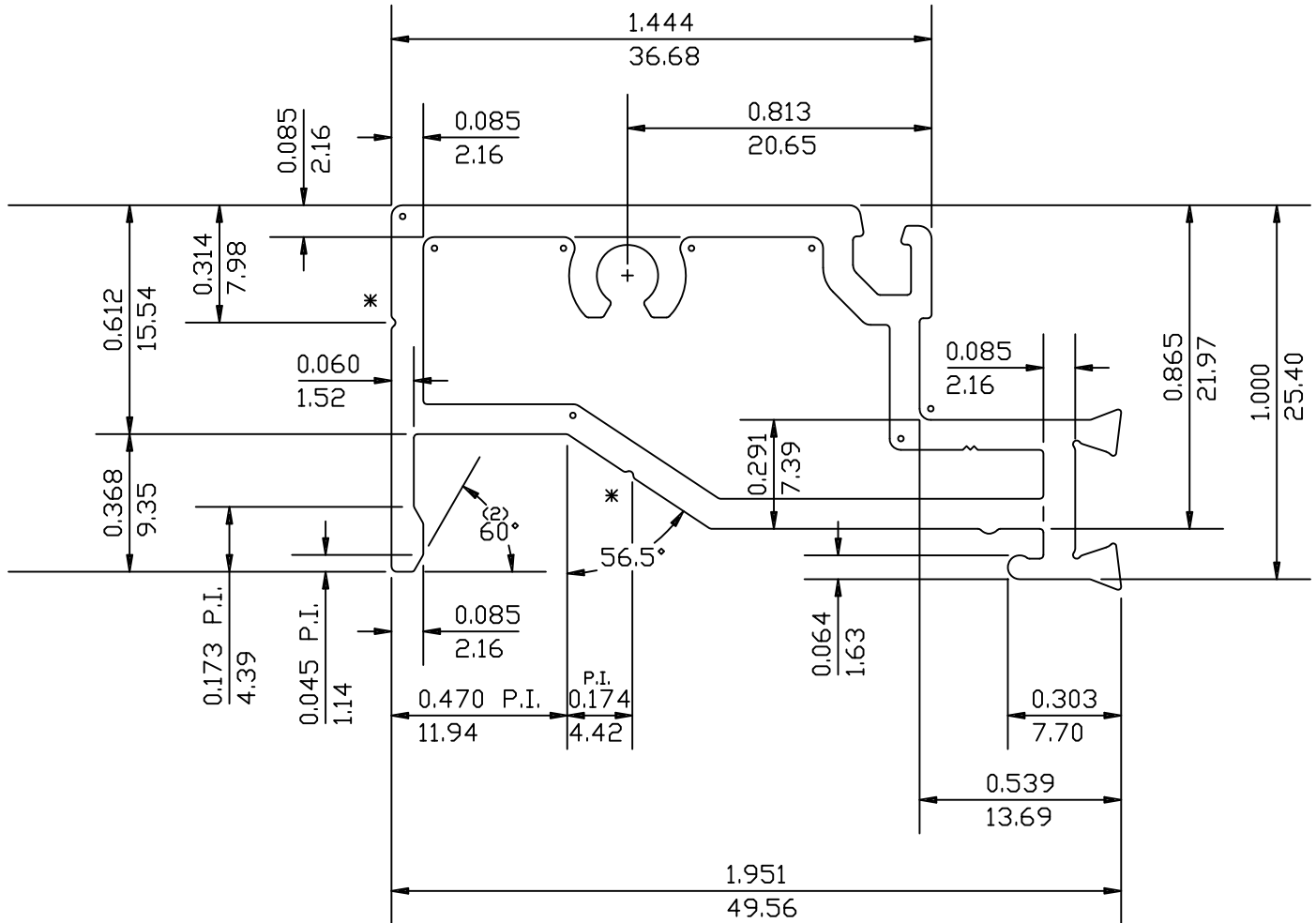


Architectural Testing

Report #: C9094-116-45

Date: 07/02/13

Verified by: *Kristen R. Luedersberger*



MATERIAL: PAINTED or ANODIZED ALUMINUM



A member of the Toro Aluminum Group of Companies

121 Applewood Crescent Tel: (416) 743-DOOR (3667)
Concord, Ontario Fax: (416) 746-0979
Canada, L4K 4J3 E-mail: info@commdooraluminum.com
Website: www.commdooraluminum.com

REV	DESCRIPTION	DATE	BY	TITLE:
				SERIES 2500 GLASS
				STOP FOR H. MULLION
				PART # 2500-005

SCALE:	1:20
DRAWN BY:	FO
DATE:	June. 01, 2011
DRWG #:	DIE 3

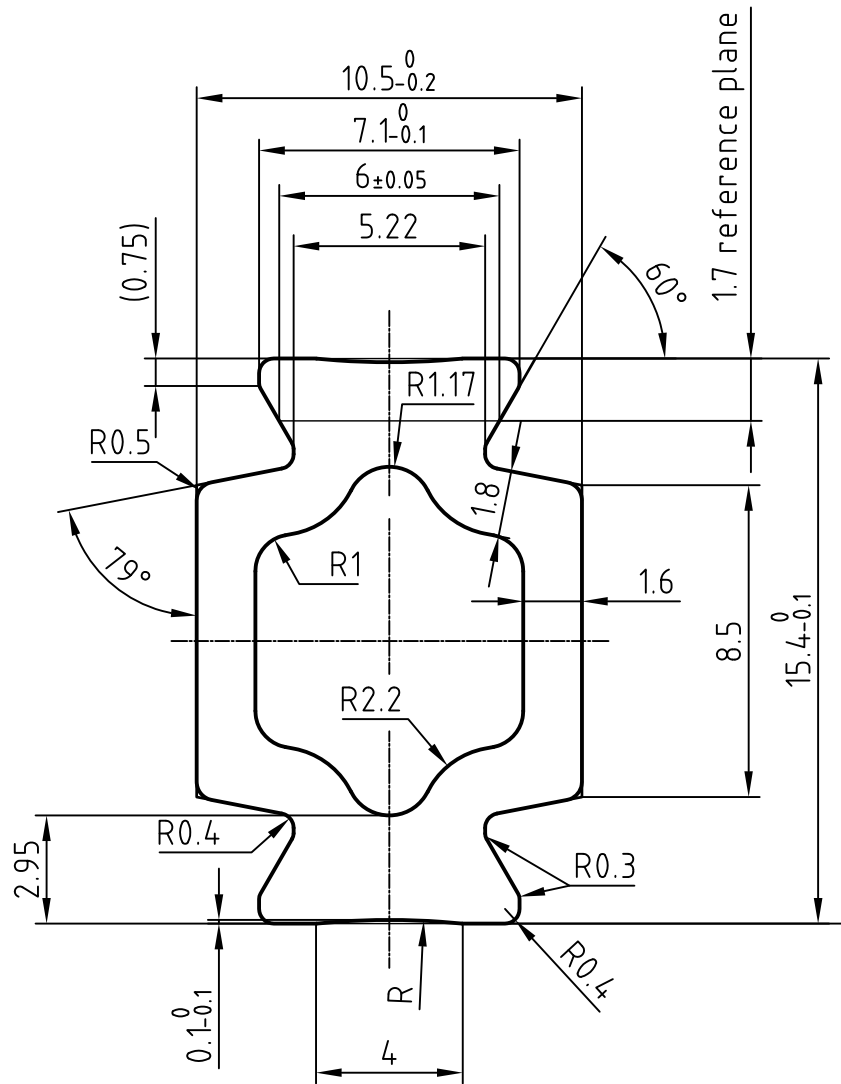


Architectural Testing

Report #: C9094-116-45

Date: 07/02/13

Verified by: Kristen R. Fiedlsinger



1 : 1

**MATERIAL: POLYAMIDE 6.6 w/ 25% GLASS FIBER**Dimensions valid at H₂O <0.1%

Radii not quoted R0.2

ENSINGERTolerances of
dimensions not quoted
according to
DIN 16941-2ATake account of
protective note
according to
DIN 34

Scale: 5 : 1, 1 : 1

TECATHERM 66 GF

	date	name
designed	06.04.10	MDC
checked	29.06.10	Ler

6362
Art. B 123 000 2779**insulbar.** 15.4 x 10.5 mm
single hollow profile9906 - 071
Commdoor Aluminum / CDNPage
of
pages

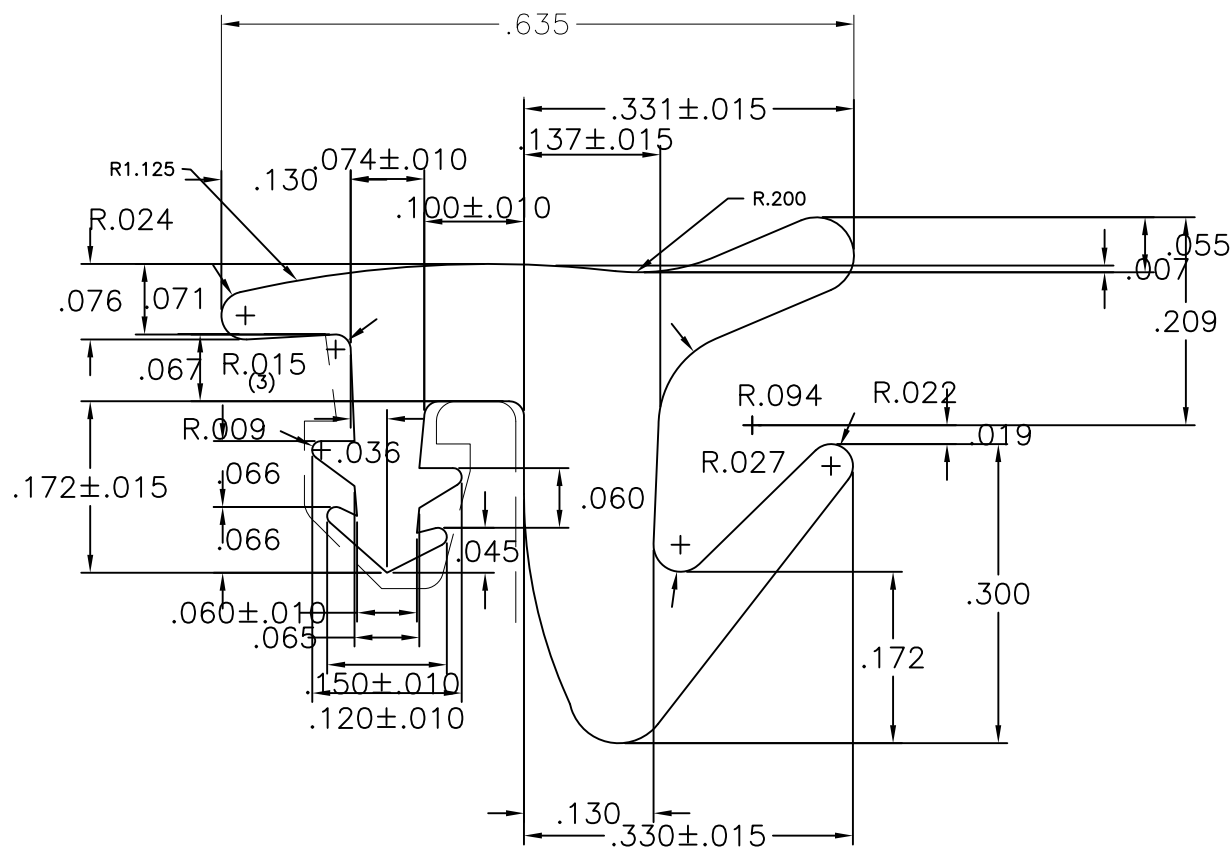
State Alteration Date Name CAD: AutoCAD LT

file: 2779.dwg



Report #: C9094-116-45

Date: 07/02/13

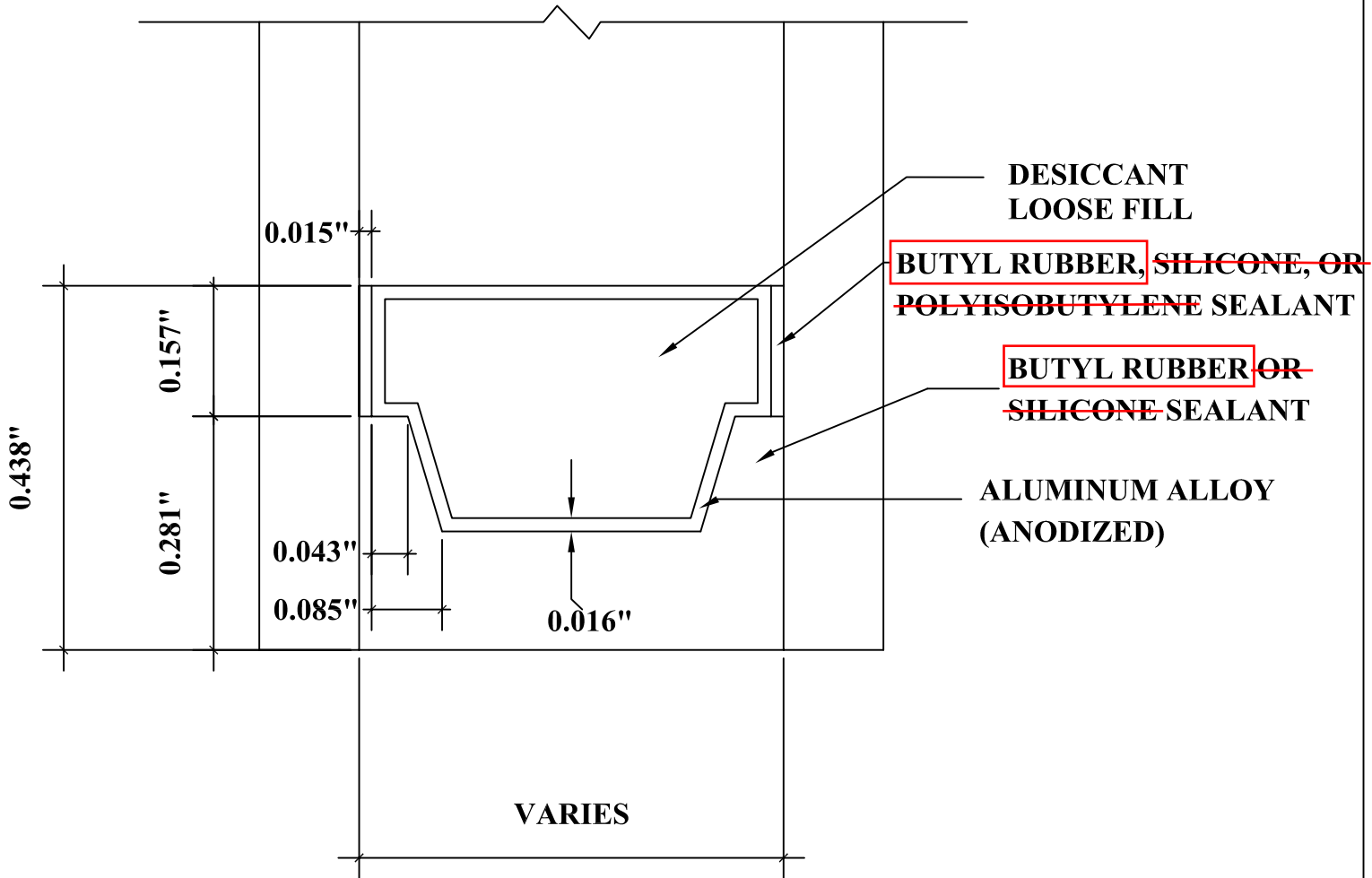
Architectural Testing Verified by: *Kristen R. Landsberger***MATERIAL: EPDM****A member of the Toro Aluminum Group of Companies**

121 Applewood Crescent Tel: (416) 743-DOOR (3667)
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Canada, L4K 4J3 E-mail: info@commdooraluminum.com
Website: www.commdooraluminum.com

REV	DESCRIPTION	DATE	BY	TITLE:
				SERIES 2500
				GLAZING SPLINE
				PART # 9903-141

SCALE:	1:2
DRAWN BY:	FO
DATE:	July 15, 2011
DRWG #:	

DIE 4



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