

AAMA 507-07 THERMAL PERFORMANCE REPORT

Rendered to:

CMI ARCHITECTURAL PRODUCTS, INC.

SERIES/MODEL: CTS Thermal Clip Framing System

Report No: A0667.01-201-45
Simulation Date: 05/03/10
Report Date: 05/04/10
Report Retention Date: 05/04/14

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Rendered to:

CMI ARCHITECTURAL PRODUCTS, INC.
2800 Freeway Blvd Ste 205
Minneapolis, Minnesota 55430

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Project Summary:

Architectural Testing, Inc. was contracted by CMI Architectural Products, Inc. to provide U-Factor and Solar Heat Gain Coefficient thermal performance ratings on the CTS Thermal Clip Framing System. The thermal performance ratings were determined in accordance with AAMA 507-03, Standard Practice for Determining the Thermal Performance Characteristics of Fenestration Systems Installed in Commercial Building.

Reference Documents:

AAMA 507-07, 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

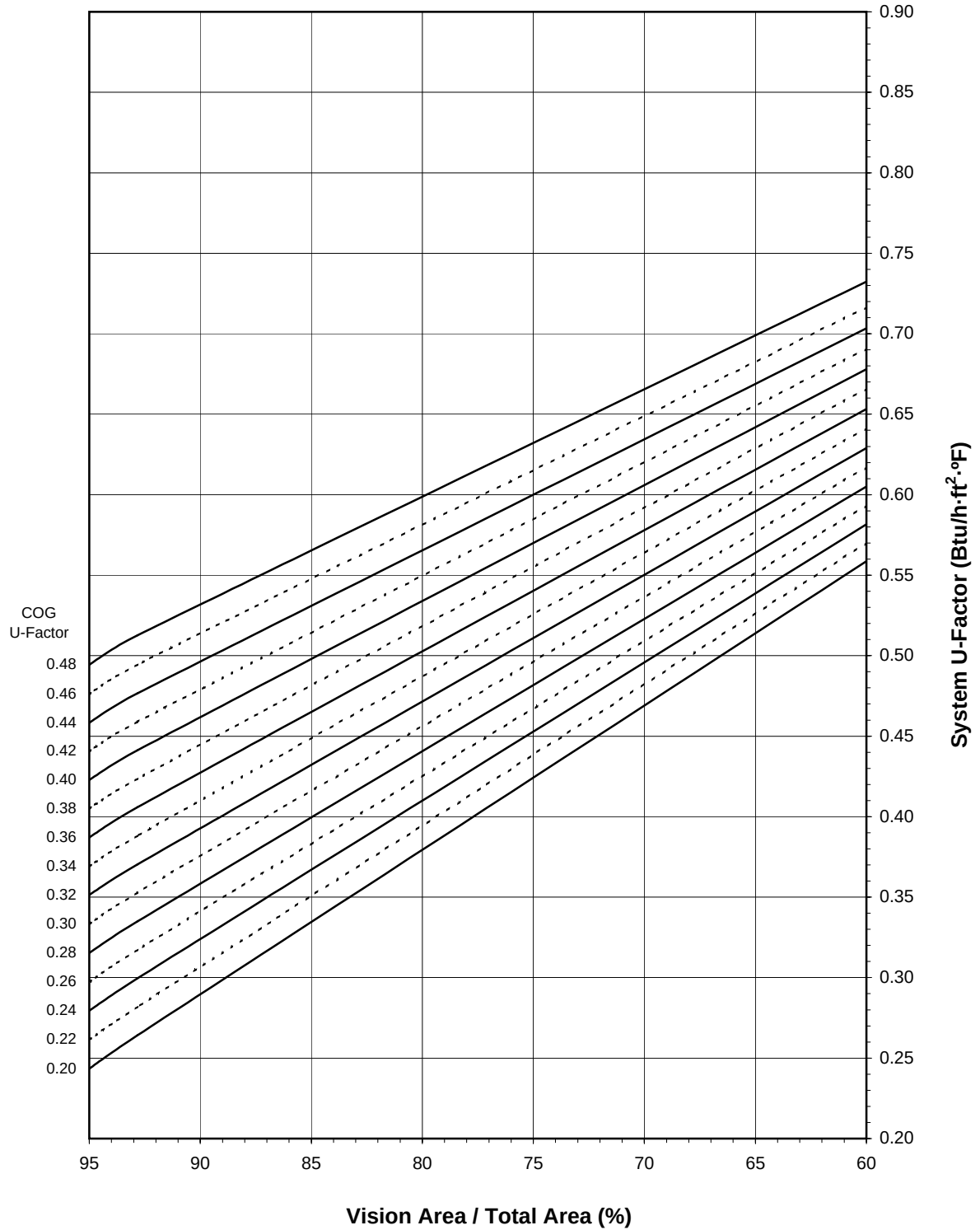
NFRC 200-2010, Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence

Simulation Specimen Description:

Series/Model:	CTS Thermal Clip Framing System
Type:	Glazed Wall
Frame Material:	Aluminum with Thermally Broken Framing System
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:	CMI Drawing

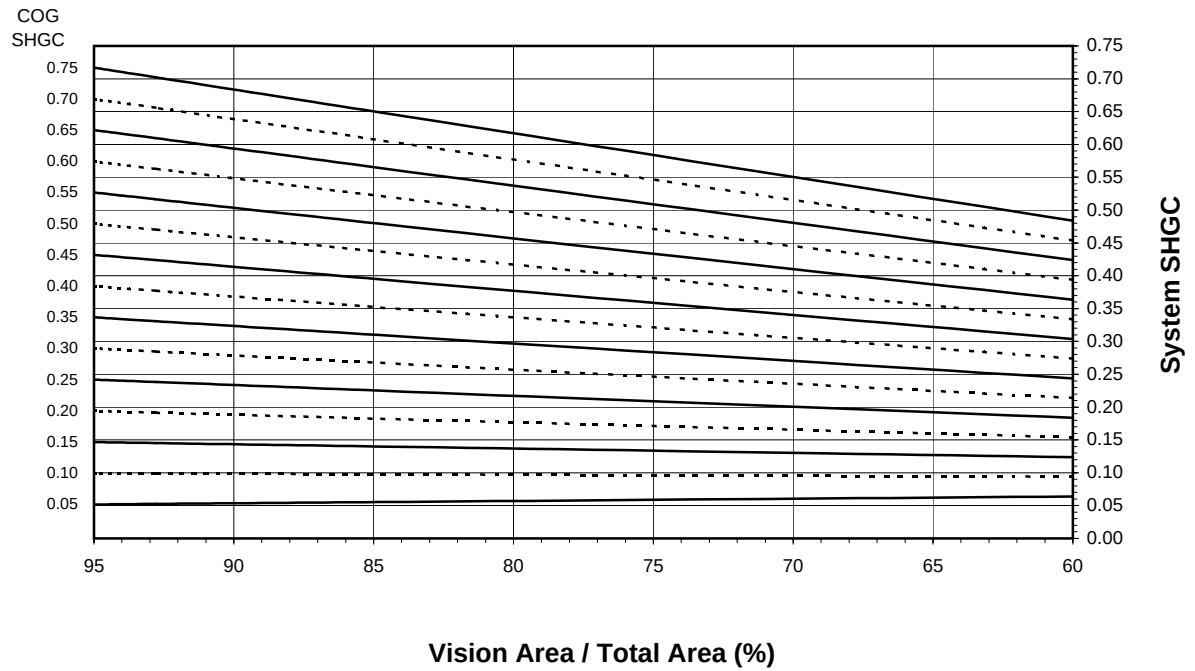
CMI Architectural Products, Inc.
CTS Thermal Clip Framing System - Glazed Wall

System U-Factor vs. Percentage of Vision Area

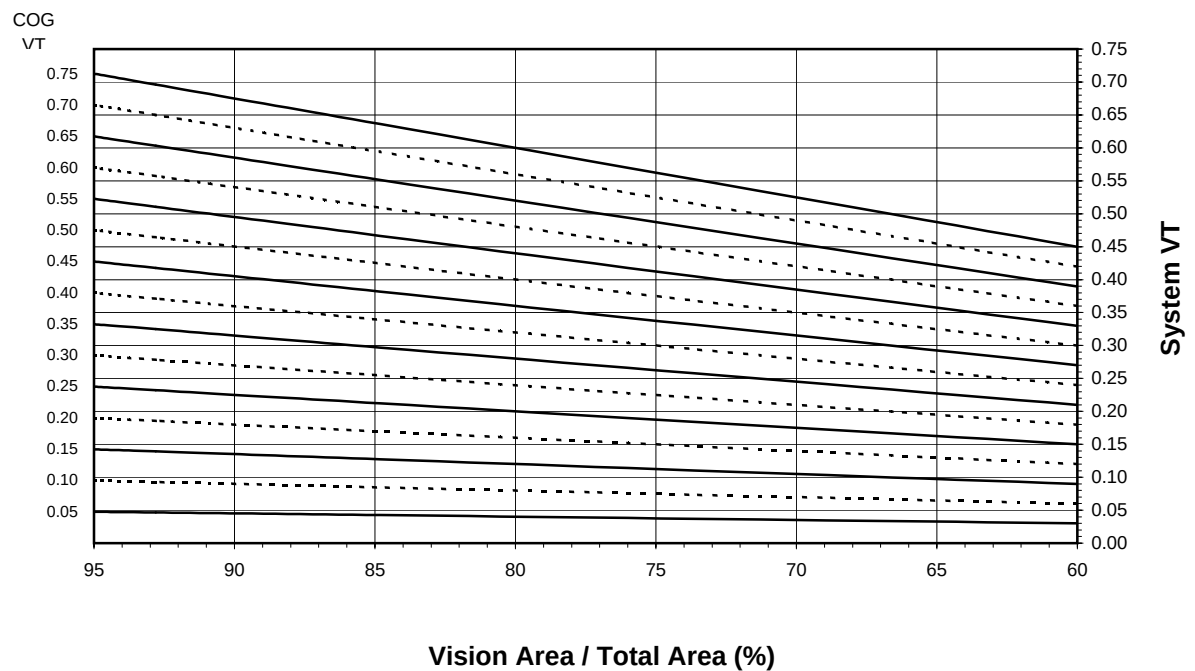


CMI Architectural Products, Inc.
CTS Thermal Clip Framing System - Glazed Wall

System SHGC vs. Percentage of Vision Area



System VT vs. Percentage of Vision Area



**CMI Architectural Products, Inc.
CTS Thermal Clip Framing System - Glazed Wall**

Size Specific U-Factor Matrix*

Glazing Option	Center of Glass U-Factor	Overall U-Factor
1	0.48	0.51
2	0.46	0.49
3	0.44	0.48
4	0.42	0.46
5	0.40	0.44
6	0.38	0.42
7	0.36	0.41
8	0.34	0.39
9	0.32	0.37
10	0.30	0.35
11	0.28	0.33
12	0.26	0.32
13	0.24	0.30
14	0.22	0.28
15	0.20	0.26

Size Specific SHGC Matrix*

Center of Glass SHGC	Overall SHGC
0.75	0.70
0.70	0.66
0.65	0.61
0.60	0.56
0.55	0.52
0.50	0.47
0.45	0.42
0.40	0.38
0.35	0.33
0.30	0.28
0.25	0.24
0.20	0.19
0.15	0.15
0.10	0.10
0.05	0.05

Size Specific VT Matrix*

Center of Glass VT	Overall VT
0.75	0.70
0.70	0.65
0.65	0.60
0.60	0.56
0.55	0.51
0.50	0.46
0.45	0.42
0.40	0.37
0.35	0.32
0.30	0.28
0.25	0.23
0.20	0.19
0.15	0.14
0.10	0.09
0.05	0.05

*Size Specific U-Factor, SHGC, and VT Matrices are based on the standard Glazed Wall specimen size of 2000mm wide by 2000mm high (78-3/4" by 78-3/4"). This represents 92.8% 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		
							60% Vision Area	NFRC 100-2010	95% Vision Area
							12.91" by 12.91"	78.74" by 78.74"	113.39" by 113.39"
1	0.48	43.7	Ext. Head	0.9579	1.1904	0.4309	0.7326	0.5127	0.4943
			Left Jamb	0.9579	1.1787	0.4310			
			Int. Head	0.9579	1.1904	0.4309			
			Mullion	1.9120	1.1800	0.4305			
			Right Jamb	0.9541	1.1813	0.4300			
			Ext. Sill	0.9541	1.1931	0.4299			
			Int. Sill	0.9541	1.1931	0.4299			
2	0.46	44.7	Ext. Head	0.9579	1.1733	0.4155	0.7166	0.4944	0.4761
			Left Jamb	0.9579	1.1619	0.4156			
			Int. Head	0.9579	1.1733	0.4155			
			Mullion	1.9120	1.1632	0.4151			
			Right Jamb	0.9541	1.1645	0.4146			
			Ext. Sill	0.9541	1.1759	0.4145			
			Int. Sill	0.9541	1.1759	0.4145			
3	0.44	45.8	Ext. Head	0.9579	1.1644	0.3999	0.7036	0.4767	0.4583
			Left Jamb	0.9579	1.1529	0.4000			
			Int. Head	0.9579	1.1644	0.3999			
			Mullion	1.9120	1.1542	0.3995			
			Right Jamb	0.9541	1.1555	0.3990			
			Ext. Sill	0.9541	1.1671	0.3990			
			Int. Sill	0.9541	1.1671	0.3990			
4	0.42	46.8	Ext. Head	0.9579	1.1558	0.3846	0.6909	0.4590	0.4406
			Left Jamb	0.9579	1.1441	0.3846			
			Int. Head	0.9579	1.1558	0.3846			
			Mullion	1.9120	1.1455	0.3842			
			Right Jamb	0.9541	1.1468	0.3837			
			Ext. Sill	0.9541	1.1585	0.3837			
			Int. Sill	0.9541	1.1585	0.3837			
5	0.40	47.9	Ext. Head	0.9579	1.1475	0.3693	0.6783	0.4413	0.4228
			Left Jamb	0.9579	1.1356	0.3693			
			Int. Head	0.9579	1.1475	0.3693			
			Mullion	1.9120	1.1369	0.3689			
			Right Jamb	0.9541	1.1382	0.3684			
			Ext. Sill	0.9541	1.1501	0.3684			
			Int. Sill	0.9541	1.1501	0.3684			

Vision Area Data

Option No.	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							60% Vision Area	NFRC 100-2010	95% Vision Area
							12.91" by 12.91"	78.74" by 78.74"	113.39" by 113.39"
6	0.38	48.9	Ext. Head	0.9579	1.1393	0.3542	0.6659	0.4236	0.4050
			Left Jamb	0.9579	1.1273	0.3542			
			Int. Head	0.9579	1.1393	0.3542			
			Mullion	1.9120	1.1286	0.3537			
			Right Jamb	0.9541	1.1299	0.3533			
			Ext. Sill	0.9541	1.1420	0.3533			
			Int. Sill	0.9541	1.1420	0.3533			
7	0.36	50.0	Ext. Head	0.9579	1.1313	0.3390	0.6535	0.4059	0.3871
			Left Jamb	0.9579	1.1191	0.3390			
			Int. Head	0.9579	1.1313	0.3390			
			Mullion	1.9120	1.1204	0.3386			
			Right Jamb	0.9541	1.1217	0.3381			
			Ext. Sill	0.9541	1.1339	0.3381			
			Int. Sill	0.9541	1.1339	0.3381			
8	0.34	51.0	Ext. Head	0.9579	1.1235	0.3240	0.6413	0.3881	0.3692
			Left Jamb	0.9579	1.1112	0.3241			
			Int. Head	0.9579	1.1235	0.3240			
			Mullion	1.9120	1.1125	0.3236			
			Right Jamb	0.9541	1.1138	0.3232			
			Ext. Sill	0.9541	1.1262	0.3232			
			Int. Sill	0.9541	1.1262	0.3232			
9	0.32	52.1	Ext. Head	0.9579	1.1159	0.3090	0.6292	0.3704	0.3513
			Left Jamb	0.9579	1.1033	0.3090			
			Int. Head	0.9579	1.1159	0.3090			
			Mullion	1.9120	1.1046	0.3086			
			Right Jamb	0.9541	1.1060	0.3082			
			Ext. Sill	0.9541	1.1185	0.3082			
			Int. Sill	0.9541	1.1185	0.3082			
10	0.30	53.1	Ext. Head	0.9579	1.1085	0.2943	0.6173	0.3528	0.3334
			Left Jamb	0.9579	1.0958	0.2943			
			Int. Head	0.9579	1.1085	0.2943			
			Mullion	1.9120	1.0971	0.2939			
			Right Jamb	0.9541	1.0984	0.2935			
			Ext. Sill	0.9541	1.1111	0.2935			
			Int. Sill	0.9541	1.1111	0.2935			

Vision Area Data

Option No.	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							60% Vision Area	NFRC 100-2010	95% Vision Area
							12.91" by 12.91"	78.74" by 78.74"	113.39" by 113.39"
11	0.28	54.2	Ext. Head	0.9579	1.1011	0.2794	0.6054	0.3350	0.3154
			Left Jamb	0.9579	1.0882	0.2794			
			Int. Head	0.9579	1.1011	0.2794			
			Mullion	1.9120	1.0896	0.2790			
			Right Jamb	0.9541	1.0909	0.2787			
			Ext. Sill	0.9541	1.1038	0.2787			
			Int. Sill	0.9541	1.1038	0.2787			
12	0.26	55.2	Ext. Head	0.9579	1.0940	0.2647	0.5936	0.3172	0.2973
			Left Jamb	0.9579	1.0809	0.2647			
			Int. Head	0.9579	1.0940	0.2647			
			Mullion	1.9120	1.0823	0.2643			
			Right Jamb	0.9541	1.0836	0.2639			
			Ext. Sill	0.9541	1.0967	0.2639			
			Int. Sill	0.9541	1.0967	0.2639			
13	0.24	56.3	Ext. Head	0.9579	1.0870	0.2501	0.5819	0.2996	0.2794
			Left Jamb	0.9579	1.0738	0.2501			
			Int. Head	0.9579	1.0870	0.2501			
			Mullion	1.9120	1.0751	0.2497			
			Right Jamb	0.9541	1.0764	0.2493			
			Ext. Sill	0.9541	1.0897	0.2494			
			Int. Sill	0.9541	1.0897	0.2494			
14	0.22	57.3	Ext. Head	0.9579	1.0801	0.2356	0.5704	0.2818	0.2614
			Left Jamb	0.9579	1.0667	0.2355			
			Int. Head	0.9579	1.0801	0.2356			
			Mullion	1.9120	1.0680	0.2352			
			Right Jamb	0.9541	1.0694	0.2348			
			Ext. Sill	0.9541	1.0828	0.2349			
			Int. Sill	0.9541	1.0828	0.2349			
15	0.20	58.4	Ext. Head	0.9579	1.0734	0.2211	0.5589	0.2641	0.2434
			Left Jamb	0.9579	1.0599	0.2210			
			Int. Head	0.9579	1.0734	0.2211			
			Mullion	1.9120	1.0612	0.2207			
			Right Jamb	0.9541	1.0625	0.2204			
			Ext. Sill	0.9541	1.0761	0.2204			
			Int. Sill	0.9541	1.0761	0.2204			

Detailed drawings, simulation data disks, and a copy of this report will be retained by Architectural Testing, Inc. for a period of four years. The above results are the exclusive property of the client so named herein and are applicable to the sample simulated. This report does not constitute an opinion or endorsement by this laboratory. This report may not be reproduced except in full without the approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:

SIMULATED BY:

REVIEWED BY:

Armeya R. Saroufiem
Simulation Technician

Stephanie M. Skoglund
Project Manager
Simulator-In-Responsible-Charge

ARS:ars
A0667.01-201-45

Attachments (pages):

Appendix A: Drawings and Bills of Material (2)

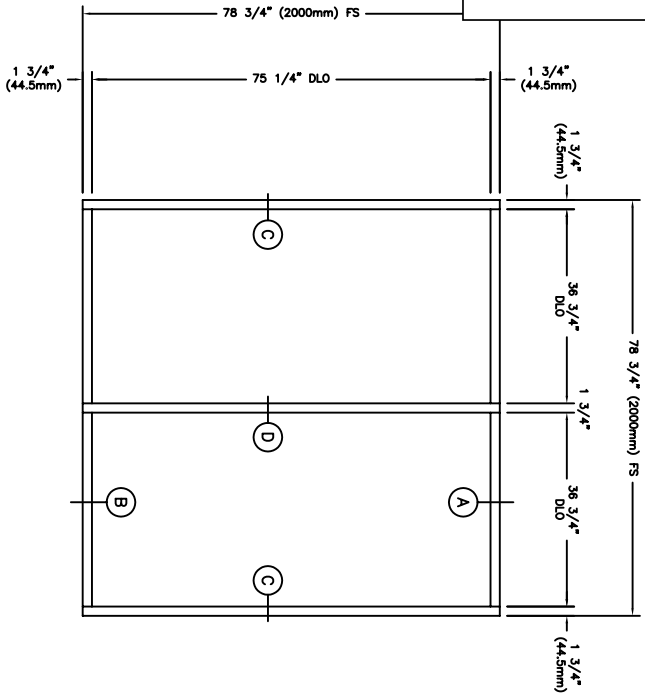
Revision Log

Rev. #	Date	Page(s)	Revision(s)
01-R0	5/4/10	All	Original Report Issue. Work requested by Philip Leonard of CMI Architectural Products, Inc.



Drawings and Bill of Materials

Reviewed: **AS**

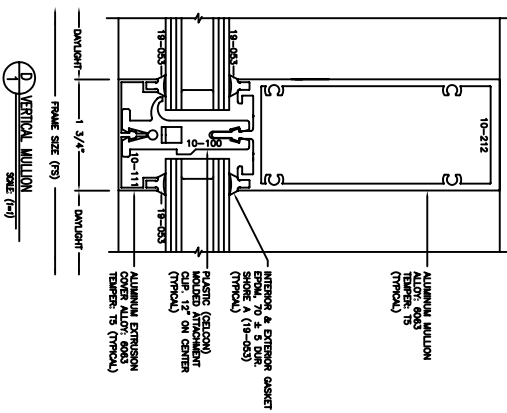
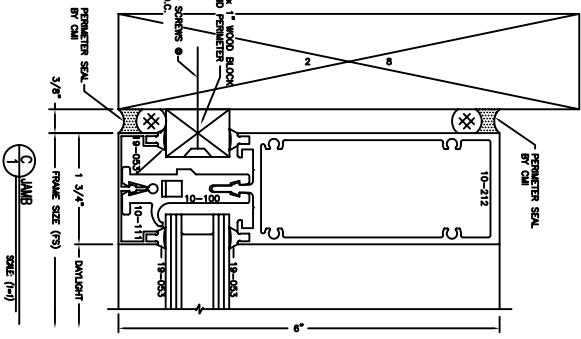
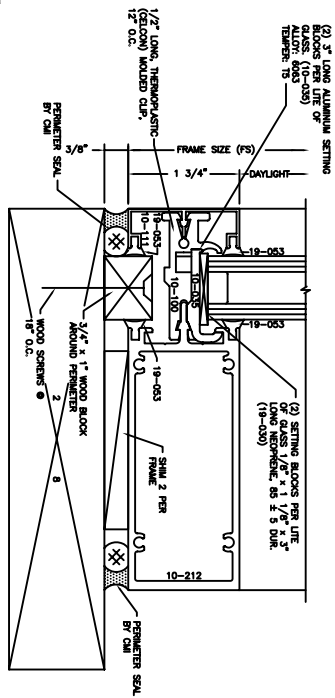
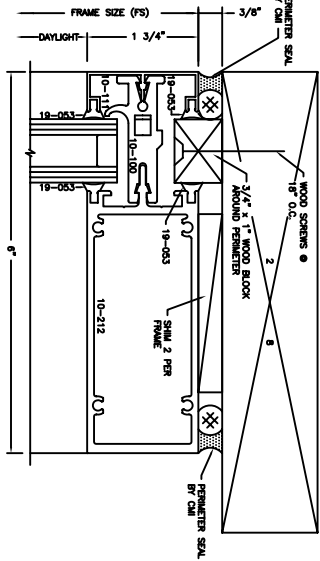


GLASS TYPE:
CLEAR 1" INSULATED GLASS UNITS
1/4" CLEAR WITH PRO SOLARSHIELD 60 SOLAR CONTROL LOW-E #2 ANNEALED
1/4" CLEAR WITH PRO SOLARSHIELD 60 SOLAR CONTROL LOW-E #2 ANNEALED
1/4" CLEAR ANNEALED
GLASS SIZE = 2 PICES 37 3/4" x 75 1/4"

1 3/4" x 6" CTS THERMAL TEST
SCALE: 1/2"=1'-0"

TESTING PARAMETERS:
AAMA 1503-09 VOLUNTARY TEST METHOD FOR THERMAL TRANSMITTANCE AND CONDENSATION
RESISTANCE OF WINDOWS, DOORS AND GLAZED CURTAIN WALL SECTIONS.
AAMA 507-03 STANDARD PRACTICE FOR DETERMINING THE THERMAL PERFORMANCE
CHARACTERISTICS OF FENESTRATION SYSTEMS INSTALLED IN COMMERCIAL BUILDINGS.
- STANDARD AAMA 507 INSULATED GLASS UNIT
- CONSTRUCTION WITH ALUMINUM SPACERS

NOTES:
FACTORY INSTALL FRAME IN WOOD BLOCK PERIMETER
FACTORY INSTALL GLAZING
FACTORY INSTALL EXTERIOR AND INTERIOR PERIMETER CALK SEAL TO
WOOD BLOCK PERIMETER
FACTORY INSTALL TEMPORARY DIAGONAL WOOD BRACING FOR SHIPPING
PROTECTION.



THIS DRAWING IS PREPARED FOR THE SOLE USE OF OBTAINING APPROVAL FOR MATERIAL, SHOWN. CMI-ARCHITECTURAL ASSUMES NO RESPONSIBILITY FOR GLASS SIZES, DETAILS OR MEASUREMENTS THAT CREATE ERRORS BY OTHER THANED THRU THE USE OF THESE DRAWINGS. PERIMETER AND STRUCTURAL ANCHOR CONDITIONS ARE NOT THE RESPONSIBILITY OF CMI-ARCHITECTURAL. ANCHOR CONDITIONS AND LOCATIONS ARE THE RESPONSIBILITY OF THE INSTALLER. THESE DRAWINGS ARE THE EXPRESS PROPERTY OF CMI-ARCHITECTURAL.

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PROJECT:	CMI THERMAL TEST CTS THERMAL WINDOW TEST
ARCHITECT:	
GLAZING CONTRACTOR:	

REVISIONS		
REV	INTL	DATE

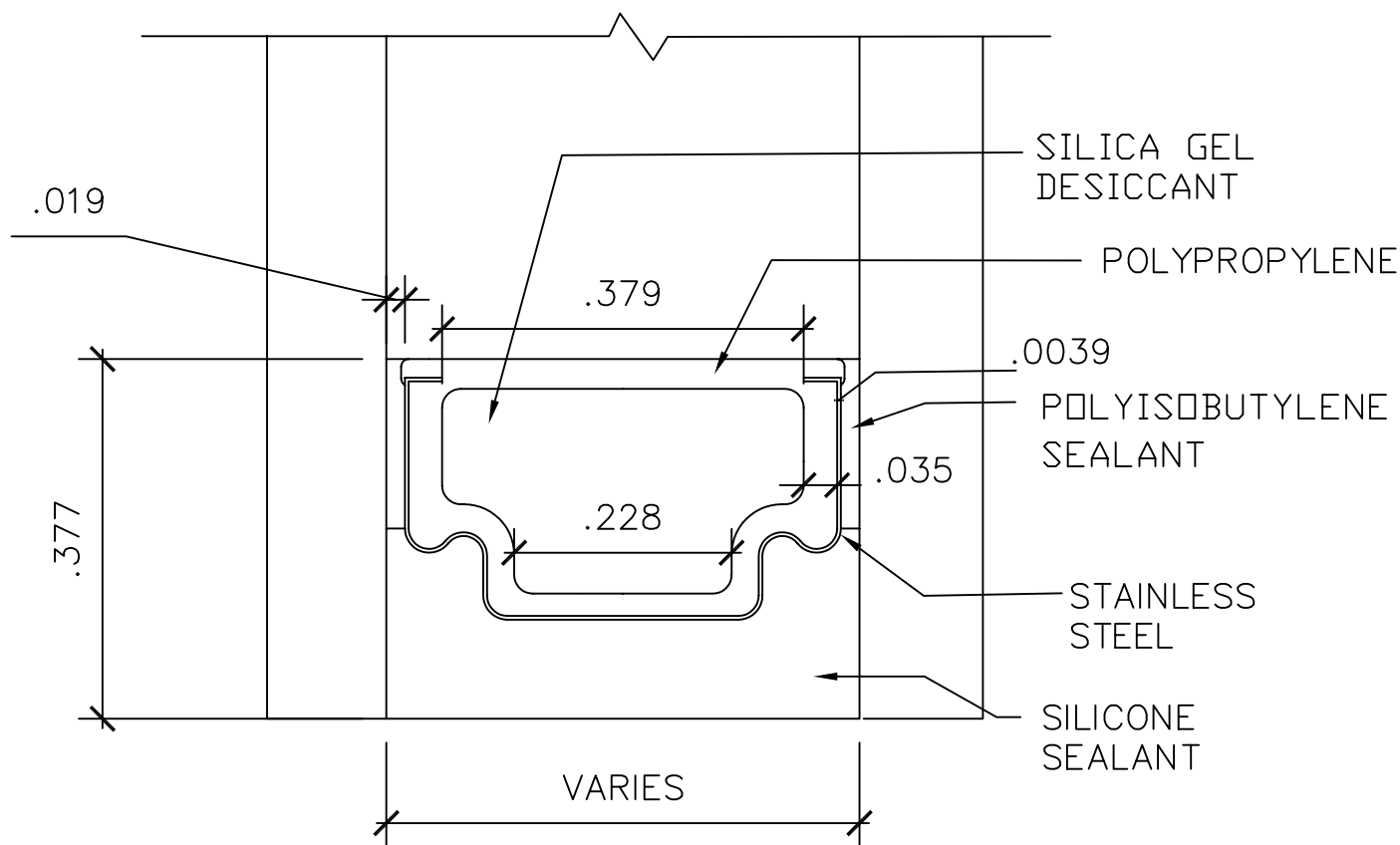
TEST SAMPLE COMPLIES WITH THESE DETAILS,

ANY DEVIATION IS NOTED.

ATI Report No. A0667

Verified Date: 5/03/10

Reviewed: *AS*



DETAIL FOR THERMAL MODELING OF
TGI WAVE SPACER (TS-D)