Architectural Testing

AAMA 1503-98 THERMAL PERFORMANCE TEST REPORT

Rendered to:

CMI ARCHITECTURAL PRODUCTS, INC.

SERIES/MODEL: 278-SSG - Awning

TYPE: Projecting (Awning)

Summary of Results	
Thermal Transmittance (U-Factor)	0.38
Condensation Resistance Factor - Frame (CRFf)	63
Condensation Resistance Factor - Glass (CRFg)	69
Glazing Description:	1/4" Softcoat LowE glass (surface #2) Annealed, 0.50" Gap, Aluminum Spacer (A1), Argon Filled, 1/4" Clear Annealed

Reference should be made to ATI Report No. 62688.01-202-46 for complete test specimen description and data.

849 Western Avenue North
St. Paul, MN 55117
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Architectural Testing

AAMA 1503-98 THERMAL PERFORMANCE TEST REPORT

Rendered to:

CMI ARCHITECTURAL PRODUCTS, INC.
2800 Freeway Boulevard, Suite 205
Minneapolis, Minnesota 55430

Report No:	62688.01-202-46
Test Date:	02/12/06
Report Date:	02/27/06
Expiration Date:	02/12/10

Test Sample Identification:

Series/Model: 278-SSG - Awning

Type: Projecting (Awning)

Test Procedure: The condensation resistance factor (CRF) and thermal transmittance (U) were determined in accordance with AAMA 1503-98, *Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections*

1. Average warm side ambient temperature	70.00 F
2. Average cold side ambient temperature	0.02 F
3. 15 mph dynamic wind applied to test specimen exterior.	
4. 0.0" $\pm$0.04" static pressure drop across specimen.	

Test Results Summary:

1. Condensation resistance factor - Frame (CRF_f)	63
Condensation resistance factor - Glass (CRF_g)	69
2. Thermal transmittance due to conduction (U_c)	0.38
(U-factors expressed in Btu/hr-ft^2-F)	

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Test Sample Description:

CONSTRUCTION	Frame	Sash
Size(in.) Non-Standard	60 x 32 1/8	59 5/8 x 31 3/4
Daylight Opening (in.)	NA	56 1/2 x 28 1/2
CORNERS	Mitered	Mitered
Fasteners	Crimped Keys	Crimped Keys
Sealant	Yes	Yes
MATERIAL	AL	Thermally Broken Aluminum
Color Exterior	Gray	Gray
Finish Exterior	Anodized	Anodized
Color Interior	Gray	Gray
Finish Interior	Anodized	Anodized
GLAZING METHOD	NA	Exterior

Glazing Information

*** Layer 1**	1/4" Softcoat LowE glass (surface #2) Annealed
***Gap 1**	0.50" Gap, Aluminum Spacer (A1), Argon Filled
Layer 2	1/4" Clear Annealed
Gas Fill Method	IG supplied by Oldcastle

**Stated per Client/Manufacturer*
NA Non-Applicable
See Description Table Abbreviations

Test Sample Description: (Continued)

COMPONENTS			
	Type	**Quantity**	**Location**
WEATHERSTRIP			
	Flexible hollow bulb gasket	2 Rows	Sash Perimeter
HARDWARE			
	Lever-lock cam Handle	2	Sill
	Multi-arm Hinge	2	Stiles and jambs
DRAINAGE			
	No drainage		

Test Duration:

1. The environmental systems were started at 12:05 hrs., 02/11/06

2. The thermal performance test results were derived from 13:02 hrs., 02/12/06 to 15:02 hrs., 02/12/06.

Condensation Resistance Factor (CRF):

The following information, condensed from the test data, was used to determine the condensation resistance factor:

T_h	=	Warm side ambient air temperature	70.00 F
T_c	=	Cold side ambient air temperature	0.02 F
FT_p	=	Average of pre-specified frame temperatures (14)	44.16 F
FT_r	=	Average of roving thermocouples (4)	41.34 F
W	=	$(FT_p - FT_r) / [FT_p - (T_c + 10)] \times 0.40$	0.033
FT	=	$FT_p(1-W) + W (FT_r)$ = Frame Temperature	44.07 F
GT	=	Glass Temperature	48.07 F
CRF_g	=	Condensation resistance factor – Glass	69
		$CRF_g = (GT - T_c) / (T_h - T_c) \times 100$	
CRF_f	=	Condensation resistance factor – Frame	63
		$CRF_f = (FT - T_c) / (T_h - T_c) \times 100$	

The CRF number was determined to be 63 (on the size as reported). When reviewing this test data, it should be noted that the frame temperature (FT) was colder than the glass temperature (GT) therefore controlling the CRF number. Refer to the 'CRF Report' page and the 'Thermocouple Location Diagram' page of this report.

Thermal Transmittance (U_c):

T_h	=	Average warm side ambient temperature	70.00	F
T_c	=	Average cold side ambient temperature	0.02	F
P	=	Static pressure difference across test specimen	0.00	psf
		15 mph dynamic perpendicular wind at exterior		
Nominal sample area			13.39	ft^2
Total measured input to calorimeter			549.07	Btu/hr
Calorimeter correction			195.53	Btu/hr
Net specimen heat loss			353.54	Btu/hr
U_c	=	Thermal Transmittance	0.38	Btu/hr-ft^2-F

Glazing Deflection (in.):

	Glazing*
Actual Gap Width	0.50
Effective gap width upon receipt of specimen in laboratory (after stabilization)	0.45
Effective gap width at laboratory ambient conditions on day of testing	0.45
Effective gap width at test conditions	0.34

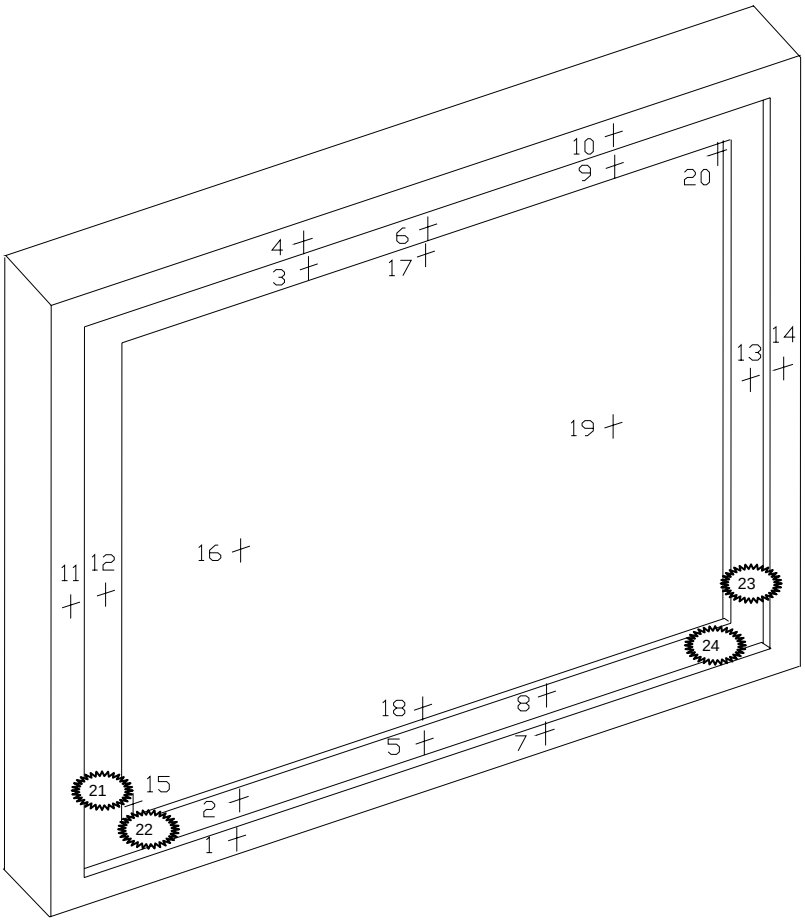
The test sample was inspected for the formation of frost or condensation which may influence the surface temperature measurements. Any observed condensation/frost is indicated on the 'Thermocouple Location Diagram.'

A calibration of the ATI 'thermal test chamber' in St. Paul, Minnesota was conducted in November 2005.

CRF Report

Time:	13:02	13:32	14:02	14:32	15:02	AVERAGE
Pre-specified Thermocouples - Frame						
1	44.22	44.22	44.22	44.25	44.25	44.23
2	42.20	42.27	42.24	42.26	42.24	42.24
3	44.07	44.07	44.06	44.10	44.10	44.08
4	47.03	47.03	46.99	47.03	46.98	47.01
5	42.62	42.62	42.65	42.66	42.65	42.64
6	44.05	44.07	44.12	44.09	44.06	44.08
7	44.24	44.25	44.23	44.24	44.21	44.23
8	42.38	42.33	42.34	42.34	42.35	42.35
9	43.17	43.20	43.22	43.20	43.22	43.20
10	46.37	46.37	46.35	46.34	46.41	46.37
11	46.95	47.02	46.95	46.96	46.99	46.98
12	43.83	43.83	43.79	43.82	43.85	43.82
13	42.26	42.32	42.27	42.25	42.27	42.27
14	44.71	44.70	44.71	44.72	44.75	44.72
FTP	44.15	44.16	44.15	44.16	44.17	44.16
Pre-specified Thermocouples - Glass						
15	40.46	40.50	40.45	40.46	40.49	40.47
16	55.88	55.87	55.90	55.92	55.96	55.91
17	47.85	47.89	47.88	47.86	47.90	47.88
18	41.90	41.92	41.91	41.94	41.92	41.92
19	54.96	54.98	54.95	55.01	54.99	54.98
20	47.24	47.31	47.25	47.29	47.26	47.27
GT	48.05	48.08	48.06	48.08	48.09	48.07
Cold Point (Roving) Thermocouples						
21	41.35	41.35	41.35	41.35	41.35	41.35
22	41.56	41.56	41.56	41.56	41.56	41.56
23	41.42	41.42	41.42	41.42	41.42	41.42
24	41.03	41.03	41.03	41.03	41.03	41.03
FT_R	41.34	41.34	41.34	41.34	41.34	41.34
W	0.03	0.03	0.03	0.03	0.03	0.033
FT	44.06	44.07	44.06	44.07	44.07	44.07
Warm Side - Room Ambient Air Temperature						
	69.98	69.99	69.99	70.01	70.01	70.00
Cold Side - Room Ambient Air Temperature						
	0.06	-0.05	0.05	-0.01	0.02	0.01
CRF_f	62.92	62.99	62.92	62.95	62.94	63
CRF_g	68.63	68.71	68.64	68.68	68.67	69

Thermocouple Location Diagram



Cold Point Locations

21. 41.35
22. 41.56
23. 41.42
24. 41.03

Assembly drawings, representative samples of the test specimen and a copy of this report will be retained by ATI for a period of four years. This report is the exclusive property of the client so named herein and relates only to the fenestration product tested. This report may not be reproduced, except in full, without the approval of the laboratory. Results obtained are tested values and do not constitute an opinion or endorsement by this laboratory.

For ARCHITECTURAL TESTING, INC.

Digitally Signed by: Dax Stoehr

Dax R. Stoehr
Technician

Digitally Signed by: Dennis L. Anderson

Dennis L. Anderson
Laboratory Manager
Individual-In-Responsible-Charge

DRS:dla
62688.01-202-46

Attachments:
Assembly Drawing

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	02/27/06	All	Original Report Issue. Work requested by Gary Geigler of CMI Architectural Products, Inc.

Description Table Abbreviations

CODE	Frame / Sash Types
AI	Aluminum w/ Vinyl Inserts (Caps)
AL	Aluminum
AP	Aluminum w/ Thermal Breaks - Partial
AS	Aluminum w/ Steel Reinforcement
AT	Aluminum w/ Thermal Breaks - All Members
AV	Aluminum / Vinyl Composite
AW	Aluminum-clad Wood
FG	Fiberglass
PA	ABS Plastic w/ All Members Reinforced
PC	ABS Plastic-clad Aluminum
PF	ABS Plastic w/ Foam-filled Insulation
PH	ABS Plastic w/ Horizontal Members Reinforced
PI	ABS Plastic w/ Reinforcement - Interlock
PL	ABS Plastic
PP	ABS Plastic w/ Reinforcement - Partial
PV	ABS Plastic w/ Vertical Members Reinforced
PW	ABS Plastic-clad Wood
ST	Steel
VA	Vinyl w/ All Members Reinforced
VC	Vinyl-clad Aluminum
VF	Vinyl w/ Foam-filled Insulation
VH	Vinyl w/ Horizontal Members Reinforced
VI	Vinyl w/ Reinforcement - Interlock
VP	Vinyl w/ Reinforcement - Partial
VV	Vinyl w/ Vertical Members Reinforced
VW	Vinyl-clad Wood
VY	Vinyl
WA	Aluminum / Wood composite
WD	Wood
WV	Vinyl / Wood composite
WF	Fiberglass/Wood Combination
WC	Composite/Wood Composite (Shaped vinyl/wood composite members)
CW	Vinyl/Wood Composite Material

CODE	Spacer Types (See sealant)
A1	Aluminum
A2	Aluminum (Thermally-broken)
A3	Aluminum-reinforced Polymer
A4	Aluminum / Wood
A5	Aluminum-reinforced Butyl
A6	Aluminum / Foam / Aluminum
A7	Aluminum U-shaped
A8	Aluminum-Butyl (Corrugated)
ER	EPDM Reinforced Butyl
FG	Fiberglass
GL	Glass
OF	Organic Foam
PU	Polyurethane Foam
SU	Stainless Steel, U-shaped
CU	Coated Steel, U-shaped
S2	Steel (Thermally-broken)
S3	Steel / Foam / Steel
S5	Steel-reinforced Butyl
S6	Steel U-channel w/ Thermal Cap
SS	Stainless Steel
CS	Coated Steel
TP	Thermo-plastic
V1	Vinyl U-shaped
WD	Wood
ZF	Silicone Foam
ZS	Silicone / Steel

CODE	Spacer Sealant
D	Dual Seal Spacer System
S	Single Seal Spacer System

CODE	Gap Fill Codes
AIR	Air
AR3	Argon / Krypton / Air
ARG	Argon/Air
CO2	Carbon Dioxide
KRY	Krypton/Air

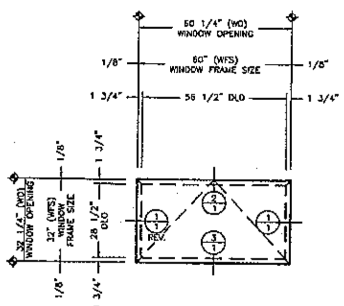
CODE	Grid Description
N	No Muntins
G	Grids between glass
S	Simulated Divided Lites
T	True Muntins

CODE	Grid Size Codes
	Blank for no grids
0.75	Grids < 1"
1.5	Grids >= 1"

DOOR DETAILS	
CODE	**Door Type**
EM	Embossed
FL	Flush
LF	Full Lite
LH	1/2 - Lite
LQ	1/4 - Lite
LT	3/4 - Lite
RP	Raised Panel
CODE	**Skin**
AL	Aluminum
FG	Fiberglass
GS	Galvanized Steel
ST	Steel
WD	Wood
CODE	**Panel**
FG	Fiberglass
PL	Plastic
WP	Wood - Plywood
WS	Wood - Solid
CODE	**Sub-Structure**
GS	Galvanized Steel
PL	Plastic
ST	Steel
WD	Wood
CODE	**Core Fill**
CH	Cellular - Honeycomb
EP	Expanded Polystyrene
PI	Polyisocyanurate
PU	Polyurethane
WP	Wood - Plywood
WS	Wood - Solid
XP	Extruded Polystyrene

CODE	Tint Codes
AZ	Azurlite
BL	Blue
BZ	Bronze
CL	Clear
EV	Evergreen
GD	Gold
GR	Green
GY	Gray

CODE	Thermal Breaks
FO	Foam
UR	Urethane
VY	Vinyl
FB	Fiberglass
RN	Reinforced Nylon
AB	ABS
NE	Neoprene
AI	Air

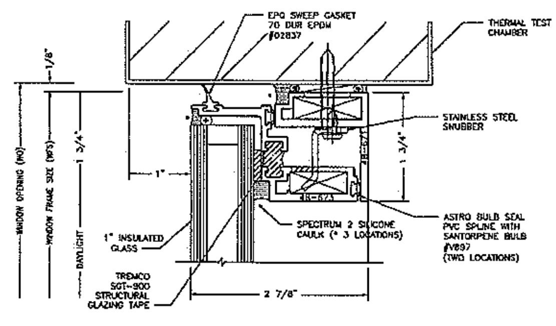


TEST UNIT ELEVATION 1" GLAZING
1 THUS 278SSG
SCALE: 1/2"=1'-0"

WINDOW HARDWARE SCHEDULE

278-SSG AWNING WINDOW SUPPLIED BY AND FABRICATED BY CMI

2 EA. AND 301SS12 4-BAR HINGE ASSEMBLIES
2 EA. TRUTH 2539 ANGLE BASE CAM HANDLES
1 EA. S.S. SASH SNUBBER



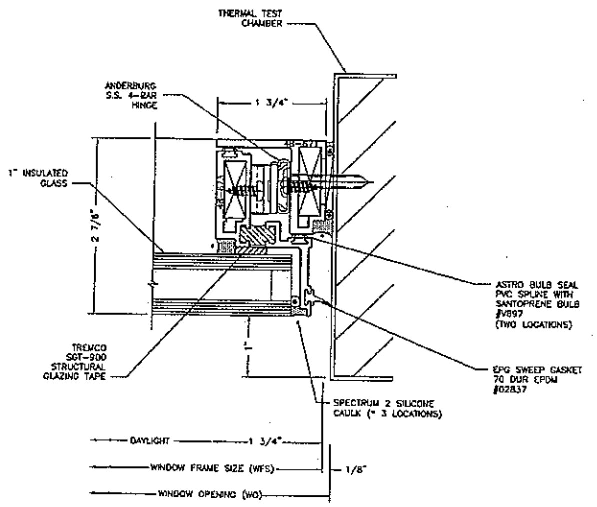
HEAD
SCALE: (1=1)

GLASS
1" INSULATED GLASS UNIT
1/4" CLEAR, PLATED WITH SOFT COAT
LOW-E ON SURFACE #2
1/2" SPACE – ARGON GAS FILLED
1/4" CLEAR PLATE
GLASS SIZE: 58 15/16" x 30 15/16"

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# 62688
Date 2/12/06 Tech [signature]



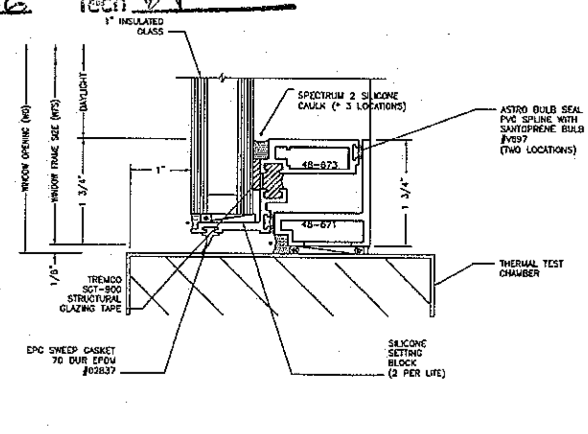
JAMB
SCALE: (1=1)

TEST FORMAT:

CONDUCT THERMAL PERFORMANCE TESTING IN COMPLIANCE WITH AAMA 1502.7 TO DETERMINE R-VALUE, U-VALUE AND CRF RATINGS.

NOTES:

MITERED CORNERS ARE SEALED AND CRIMPED ONTO SOLID ALUMINUM CORNER KEYS.



SILL
SCALE: (1=1)

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PROJECT: 278SSG-AWNING
THERMAL TEST
ARCHITECT: GARY GEIGLER
GLAZING CONTRACTOR:

REVISIONS

SYM.	INT'L	DATE

DATE DRAWN: 6-23-05
DRAWN BY: SGM
PO#:
SCALE: AS NOTED
PROJECT MGR. GARY GEIGLER
CMI S.O.#
SHEET: 1