



**AAMA 1503-09 THERMAL PERFORMANCE
TEST REPORT**

Rendered to:

US ALUMINUM

SERIES/MODEL: 3150 Curtain Wall SSG

TYPE: Glazed Wall Systems (Site-built)

Summary of Results		
Thermal Transmittance (U-Factor)		0.35
Condensation Resistance Factor - Frame (CRF _f)		79
Condensation Resistance Factor - Glass (CRF _g)		73
Unit Size:	78-3/4" x 78-3/4"	
Layer 1:	1/4"	Cardinal LoE 366 (e=0.022*, #2)
Gap 1:	0.50"	SS-D: Stainless Steel Spacer
Layer 2:	1/4"	Clear
		90% Argon*

Reference must be made to Report No. C4345.02-201-46, dated 12/06/12 for complete test specimen description and data.



AAMA 1503-09 THERMAL PERFORMANCE TEST REPORT

Rendered to:

US ALUMINUM
200 Singleton Drive
Waxahachie, Texas 75165

Report Number: C4345.02-201-46

Test Date: 11/29/12

Report Date: 12/06/12

Test Record Retention End Date: 11/29/16

Test Sample Identification:

Series/Model: 3150 Curtain Wall SSG

Type: Glazed Wall Systems (Site-built)

Test Sample Submitted by: Client

Test Procedure: The condensation resistance factor (CRF) and thermal transmittance (U) were determined in accordance with AAMA 1503-09, *Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections*

- | | |
|---|---------|
| 1. Average warm side ambient temperature | 69.80 F |
| 2. Average cold side ambient temperature | -0.42 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) | 79 |
| Condensation resistance factor - Glass (CRF _g) | 73 |
| 2. Thermal transmittance due to conduction (U) | 0.35 |
| (U-factors expressed in Btu/hr·ft ² ·F) | |

Test Sample Description:

Frame:

Material:	AU (0.13"): Aluminum with Thermal Improvement - All Members		
Size:	78-3/4" x 78-3/4"		
Daylight Opening:	35-5/8" x 73-3/4" (x2)	Glazing Method:	Exterior
Exterior Color:	Gray	Exterior Finish:	Anodized
Interior Color:	Gray	Interior Finish:	Anodized
Corner Joinery:	Butted / Screws / Sealed		

Glazing Information:

Layer 1:	1/4"	Cardinal LoE 366 (e=0.022*, #2)	
Gap 1:	0.50"	SS-D: Stainless Steel Spacer	90% Argon*
Layer 2:	1/4"	Clear	
Gas Fill Method:	Single-Probe Method*		
Desiccant:	Yes		

**Stated per Client/Manufacturer*

N/A Non-Applicable

Test Sample Description: (Continued)

Weatherstripping:

Description	Quantity	Location
No weatherstrip		

Hardware:

Description	Quantity	Location
No hardware		

Drainage:

Description	Size	Quantity	Location
No visible weeps			

Test Duration:

1. The environmental systems were started at 12:00 hours, 11/28/12.
2. The thermal performance test results were derived from 03:23 hours, 11/29/12 to 07:23 hours, 11/29/12.

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	69.80 F
T_c	=	Cold side ambient air temperature	-0.42 F
FT_p	=	Average of pre-specified frame temperatures (14)	55.51 F
FT_r	=	Average of roving thermocouples (4)	50.08 F
W	=	$[(FT_p - FT_r) / (FT_p - (T_c + 10))]$ x 0.40	0.047
FT	=	$FT_p(1-W) + W (FT_r)$ = Frame Temperature	55.25 F
GT	=	Glass Temperature	50.67 F
CRF_g	=	Condensation resistance factor – Glass	73
		$CRF_g = (GT - T_c) / (T_h - T_c) \times 100$	
CRF_f	=	Condensation resistance factor – Frame	79
		$CRF_f = (FT - T_c) / (T_h - T_c) \times 100$	

The CRF number was determined to be 73 (on the size as reported). When reviewing this test data, it should be noted that the glass temperature (GT) was colder than the frame temperature (FT) therefore controlling the CRF number. Refer to the 'CRF Report' page and the 'Thermocouple Location Diagram' page of this report.

Thermal Transmittance (U_o):

T_h	=	Average warm side ambient temperature	69.80 F
T_c	=	Average cold side ambient temperature	-0.42 F
P	=	Static pressure difference across test specimen	0.00 psf
		15 mph dynamic perpendicular wind at exterior	
Nominal sample area			43.07 ft ²
Total measured input to calorimeter			1166.15 Btu/hr
Calorimeter correction			104.14 Btu/hr
Net specimen heat loss			1062.02 Btu/hr
U	=	Thermal Transmittance	0.35 Btu/hr·ft ² ·F

Glazing Deflection:

	Left Glazing	Right Glazing
Edge Gap Width	0.50"	0.50"
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	0.39"	0.42"
Center gap width at laboratory ambient conditions on day of testing	0.39"	0.42"
Center gap width at test conditions	0.34"	0.36"

The sample was inspected for the formation of frost or condensation, which may influence the surface temperature measurements. The sample showed no evidence of condensation/frost at the conclusion of the test.

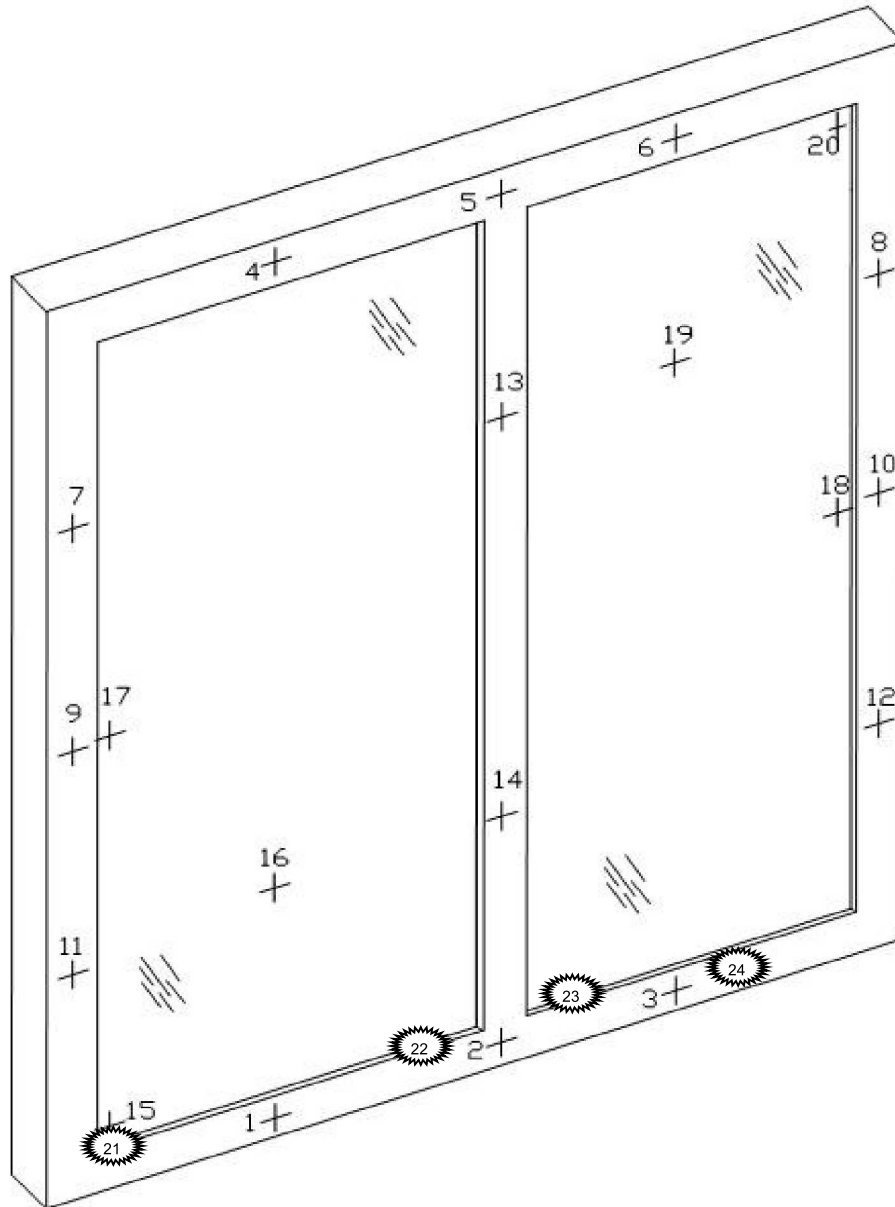
Prior to testing the specimen was sealed with silicone on the interior side and checked for air infiltration per Section 9.3.4.

Required annual calibrations for the Architectural Testing Inc. 'thermal test chamber' (ICN N000235) in St. Paul, Minnesota were last conducted in September 2012 in accordance with Architectural Testing Inc. calibration procedure. A CTS Calibration verification was performed November 2012. A Metering Box Wall Transducer and Surround Panel Flanking Loss Characterization was performed September 2012.

CRF Report

Time:	05:23	05:53	06:23	06:53	07:23	AVERAGE
Pre-specified Thermocouples - Frame						
1	52.05	52.07	52.07	52.03	52.03	52.05
2	53.38	53.35	53.36	53.36	53.36	53.36
3	50.63	50.66	50.63	50.70	50.64	50.65
4	53.53	53.55	53.50	53.53	53.51	53.52
5	54.46	54.41	54.44	54.43	54.41	54.43
6	53.10	53.05	53.16	53.09	53.11	53.10
7	57.34	57.34	57.34	57.34	57.32	57.33
8	58.64	58.66	58.65	58.68	58.62	58.65
9	55.51	55.49	55.48	55.48	55.47	55.49
10	58.96	58.88	58.96	58.92	58.96	58.93
11	53.97	53.94	53.93	53.95	53.97	53.95
12	56.20	56.17	56.20	56.17	56.14	56.18
13	59.75	59.73	59.74	59.73	59.73	59.73
14	59.74	59.72	59.75	59.78	59.73	59.74
FT _p	55.52	55.50	55.51	55.51	55.50	55.51
Pre-specified Thermocouples - Glass						
15	41.85	41.83	41.85	41.83	41.86	41.84
16	57.26	57.23	57.25	57.22	57.22	57.24
17	51.39	51.35	51.36	51.38	51.35	51.36
18	52.34	52.34	52.36	52.38	52.35	52.35
19	52.34	52.34	52.36	52.38	52.35	52.35
20	48.83	48.82	48.87	48.84	48.83	48.84
GT	50.67	50.65	50.68	50.67	50.66	50.67
Cold Point (Roving) Thermocouples						
21	47.48	47.48	47.49	47.50	47.47	47.48
22	50.73	50.70	50.77	50.72	50.73	50.73
23	51.43	51.43	51.51	51.49	51.49	51.47
24	50.63	50.66	50.63	50.70	50.64	50.65
FT _R	50.07	50.07	50.10	50.10	50.08	50.08
W	0.05	0.05	0.05	0.05	0.05	0.05
FT	55.26	55.24	55.26	55.26	55.24	55.25
Warm Side - Room Ambient Air Temperature						
	69.82	69.79	69.80	69.80	69.79	69.80
Cold Side - Room Ambient Air Temperature						
	-0.36	-0.44	-0.37	-0.43	-0.41	-0.40
CRF _f	79	79	79	79	79	79
CRF _g	73	73	73	73	73	73

Thermocouple Location Diagram



Cold Point Locations

	21. 47.48
	22. 50.73
	23. 51.47
	24. 50.65

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period such materials shall be discarded without notice and the service life of this report by Architectural Testing will expire. Results obtained are tested 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 specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.



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Michael P. Resech
Manager - Simulations and Thermal Testing
Individual-In-Responsible-Charge

GSB: _gsb
C4345.02-201-46

Attachments (pages): This report is complete only when all attachments listed are included.

Appendix-A: Drawings (10)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	12/06/12	All	Original Report Issue. Work requested by Don Willard of US Aluminum.