Architectural Testing

AAMA 1503-09 THERMAL PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM

SERIES/MODEL: TT601 Top-Notch Ribbon Wall
TYPE: Glazed Wall Systems (Site-built)

Summary of Results	
Thermal Transmittance (U-Factor)	0.44
Condensation Resistance Factor - Frame (CRF_f)	72
Condensation Resistance Factor - Glass (CRF_g)	65
Unit Size	79" x 79" (2007 mm x 2007 mm)
Layer 1	1/4" TiAC-36 (e=0.034*, #2)
Gap 1	0.50" Gap, Aluminum Spacer (A1-D), 100% Air-Filled*
Layer 2	1/4" Clear

Reference must be made to Report No. B6096.02-201-46, dated 09/10/12 for complete test specimen description and data.

849 Western Avenue North
St. Paul, MN 55117
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AAMA 1503-09 THERMAL PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM
200 Singleton Drive
Waxahachie, Texas 75165

Report Number:	B6096.02-201-46
Test Date:	07/20/12
Report Date:	09/10/12
Test Record Retention Date:	07/20/16

Test Sample Identification:

Series/Model: TT601 Top-Notch Ribbon Wall

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) 72
   Condensation resistance factor - Glass (CRF_g) 65
2. Thermal transmittance due to conduction (U) 0.44
   (U-factors expressed in Btu/hr·ft^2·F)

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Test Sample Description:

CONSTRUCTION	**Frame**
Size (in.)	79 x 79
Daylight Opening (in.)	36 x 74-1/2 (x2)
CORNERS	Square Cut
Fasteners	Screws
Sealant	No
MATERIAL	AT (0.22")
Color Exterior	White
Finish Exterior	Paint
Color Interior	White
Finish Interior	Paint
GLAZING METHOD	Channel

Glazing Information:

Layer 1	1/4" TiAC-36 (e=0.034*, #2)
Gap 1	0.50" Gap, Aluminum Spacer (A1-D), 100% Air-Filled*
Layer 2	1/4" Clear
Gas Fill Method	N/A
Desiccant	Yes

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

Test Sample Description: (Continued)

COMPONENTS			
	Type	**Quantity**	**Location**
WEATHERSTRIP			
	No weatherstrip		
HARDWARE			
	No hardware		
DRAINAGE			
	No drainage		

Test Duration:

1. The environmental systems were started at 12:00 hours, 07/19/12.

2. The thermal performance test results were derived from 01:27 hours, 07/20/12 to 05:27 hours, 07/20/12.

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)	50.39 F
FT_r	=	Average of roving thermocouples (4)	44.67 F
W	=	$[(FT_p - FT_r) / (FT_p - (T_c + 10))] \times 0.40$	0.056
FT	=	$FT_p(1-W) + W (FT_r)$ = Frame Temperature	50.07 F
GT	=	Glass Temperature	45.33 F
CRF_g	=	Condensation resistance factor – Glass	65
		$CRF_g = (GT - T_c) / (T_h - T_c) \times 100$	
CRF_f	=	Condensation resistance factor – Frame	72
		$CRF_f = (FT - T_c) / (T_h - T_c) \times 100$	

The CRF number was determined to be 65 (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_c):

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 15 mph dynamic perpendicular wind at exterior	0.00 psf
Nominal sample area			43.34 ft^2
Total measured input to calorimeter			1481.63 Btu/hr
Calorimeter correction			127.78 Btu/hr
Net specimen heat loss			1353.84 Btu/hr
U	=	Thermal Transmittance	0.44 $Btu/hr \cdot ft^2 \cdot F$

Glazing Deflection (in.):

	Left Glazing	Right Glazing
Edge Gap Width	0.50	0.50
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	0.50	0.38
Center gap width at laboratory ambient conditions on day of testing	0.50	0.38
Center gap width at test conditions	0.50	0.38

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.

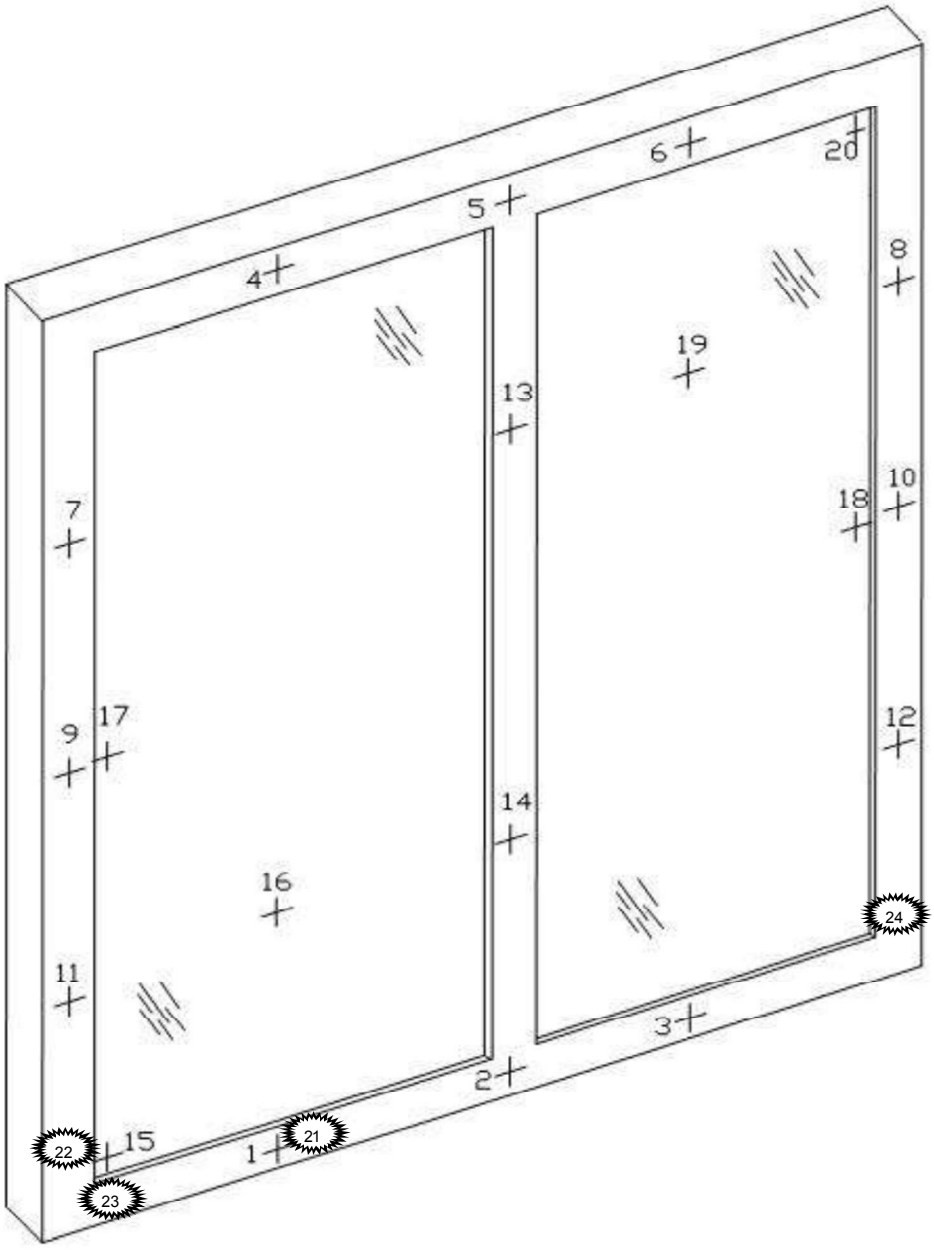
A calibration of the Architectural Testing Inc. 'thermal test chamber' (ICN N000235) in St. Paul, Minnesota was conducted in October 2011 in accordance with Architectural Testing Inc. calibration procedure.

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

CRF Report

Time:	03:27	03:57	04:27	04:57	05:27	AVERAGE
Pre-specified Thermocouples - Frame						
1	45.98	45.96	45.98	46.00	45.98	45.98
2	46.96	46.94	46.95	46.96	46.99	46.96
3	47.08	47.07	47.10	47.07	47.08	47.08
4	52.73	52.72	52.74	52.75	52.77	52.74
5	53.58	53.59	53.58	53.60	53.61	53.59
6	50.26	50.26	50.27	50.30	50.29	50.28
7	51.54	51.52	51.54	51.57	51.57	51.55
8	50.75	50.75	50.77	50.80	50.78	50.77
9	50.33	50.28	50.23	50.36	50.36	50.31
10	50.33	50.28	50.23	50.36	50.36	50.31
11	49.28	49.27	49.26	49.28	49.32	49.28
12	48.47	48.46	48.47	48.49	48.52	48.48
13	55.26	55.27	55.27	55.28	55.28	55.27
14	52.81	52.82	52.82	52.83	52.84	52.82
FT_P	50.38	50.37	50.37	50.40	50.41	50.39
Pre-specified Thermocouples - Glass						
15	48.46	48.45	48.47	48.56	48.59	48.50
16	53.10	53.13	53.11	53.15	53.16	53.13
17	40.04	40.01	40.04	40.07	40.05	40.04
18	41.07	41.07	41.08	41.08	41.10	41.08
19	55.50	55.44	55.49	55.52	55.49	55.49
20	33.70	33.71	33.77	33.79	33.75	33.74
GT	45.31	45.30	45.32	45.36	45.35	45.33
Cold Point (Roving) Thermocouples						
21	45.98	45.96	45.98	46.00	45.98	45.98
22	44.81	44.82	44.82	44.83	44.82	44.82
23	43.66	43.73	43.70	43.60	43.58	43.65
24	44.23	44.25	44.27	44.22	44.23	44.24
FT_R	44.67	44.69	44.69	44.66	44.65	44.67
W	0.06	0.06	0.06	0.06	0.06	0.06
FT	50.06	50.05	50.06	50.08	50.09	50.07
Warm Side - Room Ambient Air Temperature						
	69.79	69.78	69.80	69.81	69.81	69.80
Cold Side - Room Ambient Air Temperature						
	-0.48	-0.43	-0.39	-0.50	-0.36	-0.43
CRF_f	72	72	72	72	72	72
CRF_g	65	65	65	65	65	65

Thermocouple Location Diagram



Cold Point Locations

21. 45.98
22. 44.82
23. 43.65
24. 44.24

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.

Digitally Signed by: Mike Topitzhofer

Michael D. Topitzhofer
Technician

Digitally Signed by: Michael Resech

Michael P. Resech
Senior Project Manager
Individual-In-Responsible-Charge

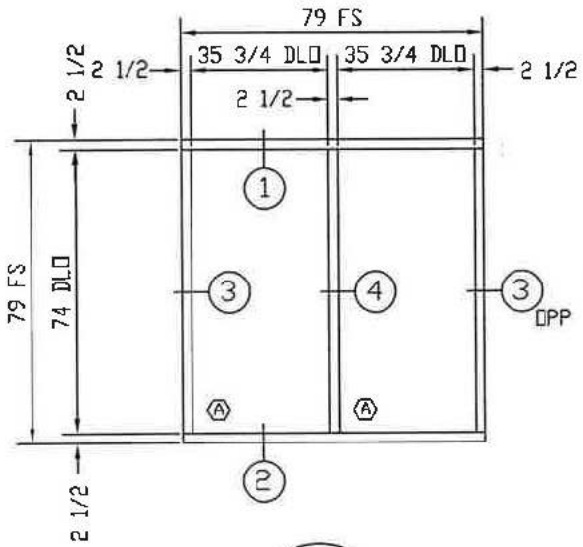
MDT:mdt
B6096.02-201-46

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Description Table Abbreviations (1)
Appendix-B: Drawings (10)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
02-R0	09/10/12	All	Original Report Issue. Work requested by Mr. Don Willard of United States Aluminum.

MU2011-001-01



A

QTY = 1

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# BL096

Date 9/10/12 Tech HB

SYMBOL KEY			
SYMBOL	DESCRIPTION	QTY	COMMENTS
(A)	36.625 X 74.875	2	1 INS = INSULATED GLASS

REV	REV_DESCRIPTION	DATE	XXX

DCW

12/20/2011

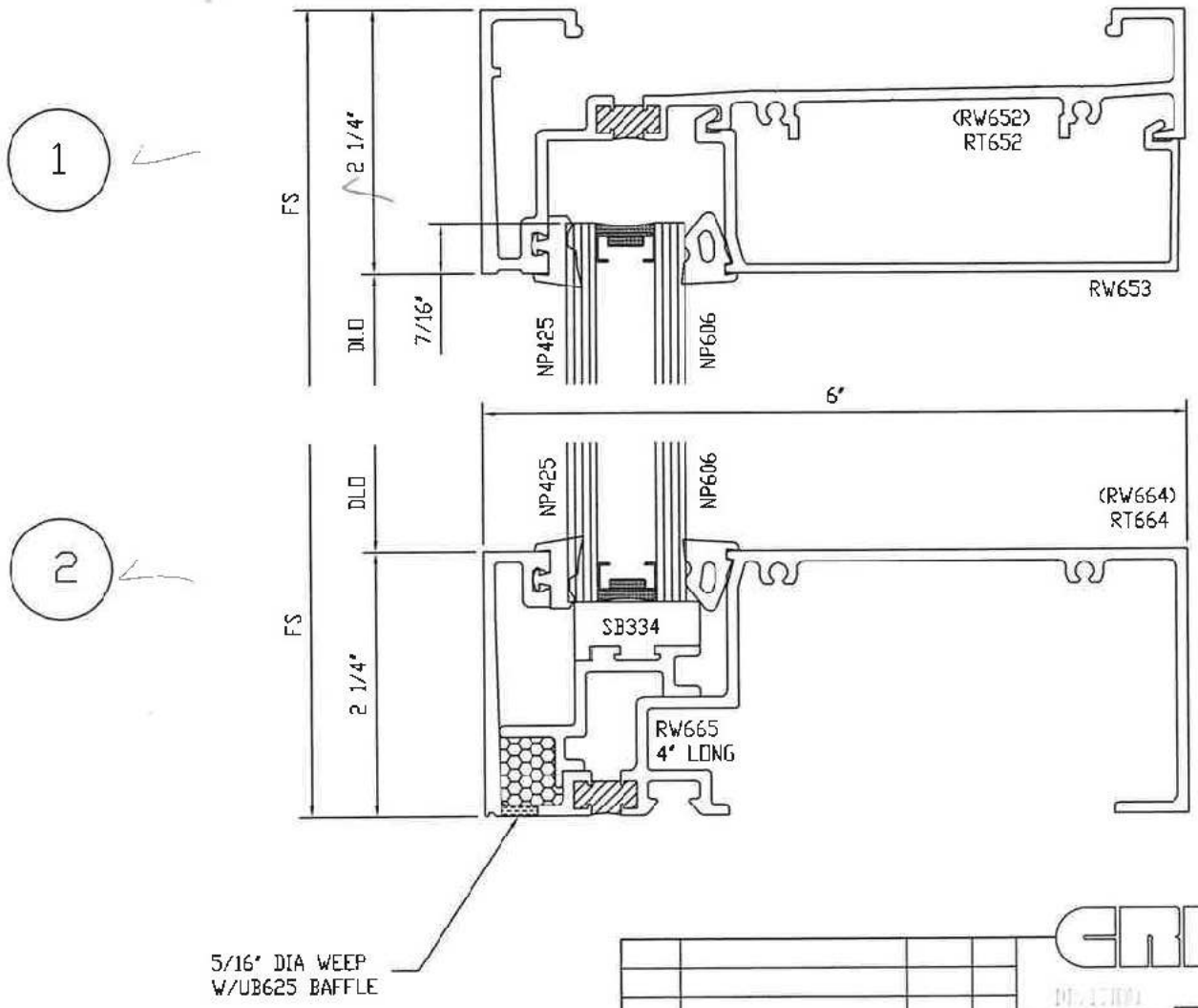
3/8"=1"

THERMAL_TEST_NFRC_AAMA_1503

SERIES_TT601

MU2011-001-01

MU2011-001-02



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# B6096

Date 9/16/12 Tech HJB

REV	REV_DESCRIPTION	DATE	XXX

DRAWN DCW

DATE 12/20/2011

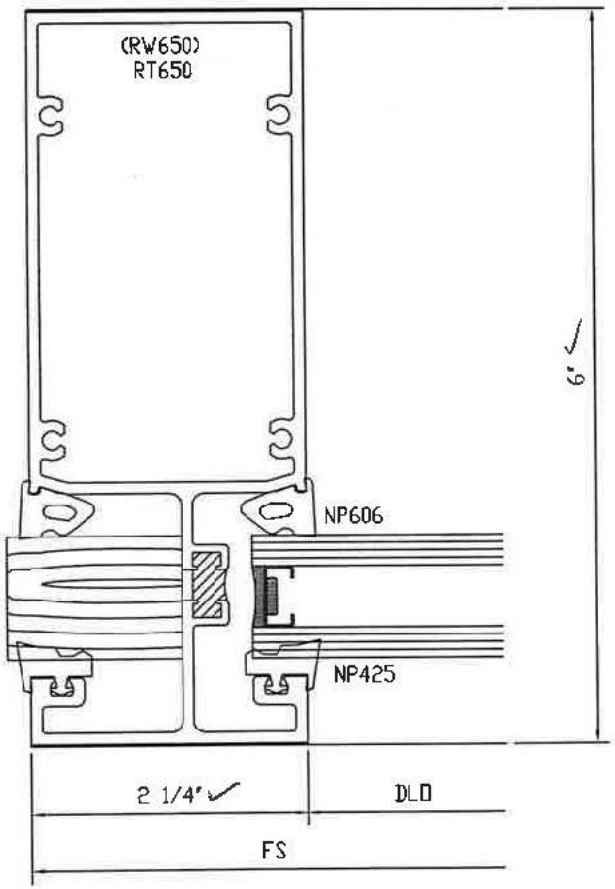
SCALE FULL

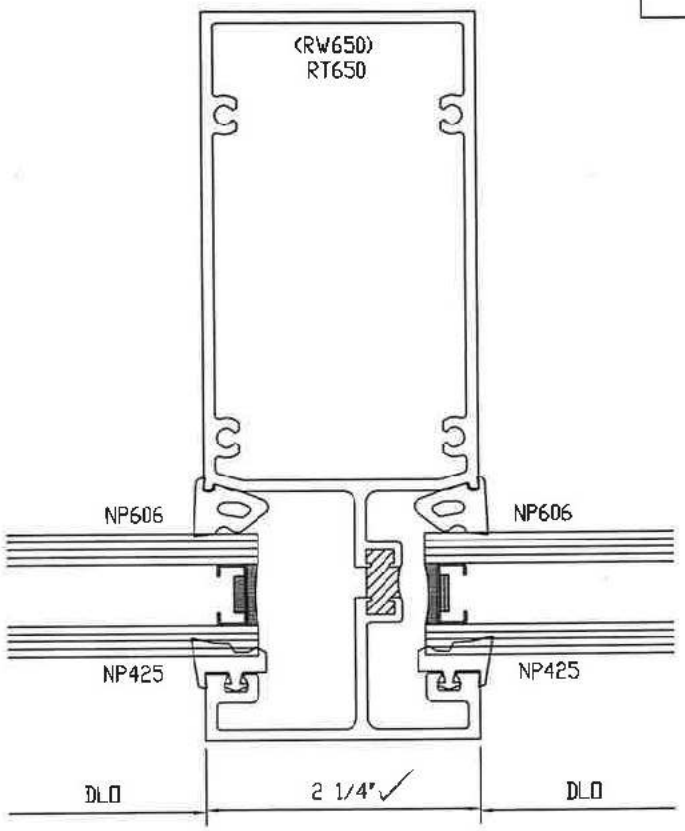
THERMAL_TEST_NFRC_AAMA_1503

SERIES_TT601

DWG NO MU2011-001-02

MU2011-001-03





Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# B6096

Date 9/10/12 Tech [illegible]

3

4

REV	REV_DESCRIPTION	DATE	XXX

DCW

12/20/2011

FULL

THERMAL_TEST_NFRC_AAMA_1503

SERIES_TT601

DWG NO

MU2011-001-03