Intertek | Architectural Testing

AAMA 1503-09 THERMAL PERFORMANCE TEST REPORT

Rendered to:

GAMCO CORPORATION

SERIES/MODEL: BD-325 Series Balcony Door
TYPE: Swinging Door with Frame

Summary of Results			
Thermal Transmittance (U-Factor)			0.43
Condensation Resistance Factor - Frame (CRF_f)			52
Condensation Resistance Factor - Glass (CRF_g)			66
Unit Size:		39-3/8" x 78-3/4"	
Layer 1:	1/4"	Clear	
Gap 1:	0.53"	A1-D: Aluminum Spacer	90% Argon*
Layer 2:	1/4"	PPG Solarban 60 (e=0.035*, #3)	

Reference must be made to Report No. E5290.01-116-46, dated 04/21/15 for complete test specimen description and data.

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AAMA 1503-09 THERMAL PERFORMANCE TEST REPORT

Rendered to:

GAMCO CORPORATION
131-10 Maple Avenue
Flushing, New York 11355

Report Number:	E5290.01-116-46
Test Date:	04/14/15
Report Date:	04/21/15

Test Sample Identification:

Series/Model: BD-325 Series Balcony Door

Type: Swinging Door with Frame

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	-0.41 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)	52
Condensation resistance factor - Glass (CRF_g)	66
2. Thermal transmittance due to conduction (U)	0.43
(U-factors expressed in Btu/hr·ft^2·F)	

Test Sample Description:

Frame:

Material:	AU (0.16"): Aluminum with Thermal Improvement*		
Size:	39-3/8" x 78-3/4"		
Daylight Opening:	N/A	**Glazing Method:**	N/A
Exterior Color:	Clear	**Exterior Finish:**	Anodized
Interior Color:	Clear	**Interior Finish:**	Anodized
Corner Joinery:	Mitered / Keys & Screws / Sealed		

*Mill-finish sill was AU (0.16"), Head and Jambs were AT (0.28")

Panel:

Material:	AT (0.28"): Aluminum with Thermal Breaks - All Members		
Size:	371/4" x 77"		
Daylight Opening:	30-1/2" x 70-1/2"	**Glazing Method:**	Exterior
Exterior Color:	Clear	**Exterior Finish:**	Anodized
Interior Color:	Clear	**Interior Finish:**	Anodized
Corner Joinery:	Mitered / Keys & Screws / Sealed		

Glazing Information:

Layer 1:	1/4"	Clear	
Gap 1:	0.53"	A1-D: Aluminum Spacer	90% Argon*
Layer 2:	1/4"	PPG Solarban 60 (e=0.035*, #3)	
Gas Fill Method:		Single-Probe Method*	
Desiccant:		Yes	

**Stated per Client/Manufacturer*
N/A Non-Applicable

Test Sample Description: (Continued)

Weatherstripping:

Description	Quantity	Location
Flexible hollow bulb gasket	1 row	Frame and panel perimeter, exterior glazing perimeter

Hardware:

Description	Quantity	Location
Multi-point lock/dead-bolt assembly	1	Lock stile
Metal keeper	3	Lock jamb
Metal hinges	4	Hinge jamb/stile
Single-arm hinge	1	Head/top rail
Aluminum door stop	3	Jambs and head

Drainage:

Drainage Method	Size	Quantity	Location
Weepslot	0.88" x 0.25"	2	Sill

Test Duration:

1. The environmental systems were started at 17:00 hours, 04/13/15.

2. The thermal performance test results were derived from 01:59 hours, 04/14/15 to 05:59 hours, 04/14/15.

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	-0.41 F
FT_p	=	Average of pre-specified frame temperatures (14)	36.58 F
FT_r	=	Average of roving thermocouples (4)	31.18 F
W	=	$[(FT_p - FT_r) / (FT_p - (T_c + 10))] \times 0.40$	0.080
FT	=	$FT_p(1-W) + W (FT_r)$ = Frame Temperature	36.15 F
GT	=	Glass Temperature	45.74 F
CRF_g	=	Condensation resistance factor – Glass	66
		$CRF_g = (GT - T_c) / (T_h - T_c) \times 100$	
CRF_f	=	Condensation resistance factor – Frame	52
		$CRF_f = (FT - T_c) / (T_h - T_c) \times 100$	

The CRF number was determined to be 52 (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	69.80 F
T_c	=	Average cold side ambient temperature	-0.41 F
P	=	Static pressure difference across test specimen 15 mph dynamic perpendicular wind at exterior	0.00 psf
Nominal sample area			21.53 ft^2
Total measured input to calorimeter			707.22 Btu/hr
Calorimeter correction			56.35 Btu/hr
Net specimen heat loss			650.87 Btu/hr
U	=	Thermal Transmittance	0.43 $Btu/hr \cdot ft^2 \cdot F$

Glazing Deflection:

	Panel
Edge Gap Width	0.53"
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	0.56"
Center gap width at laboratory ambient conditions on day of testing	0.56"
Center gap width at test conditions	0.47"

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.

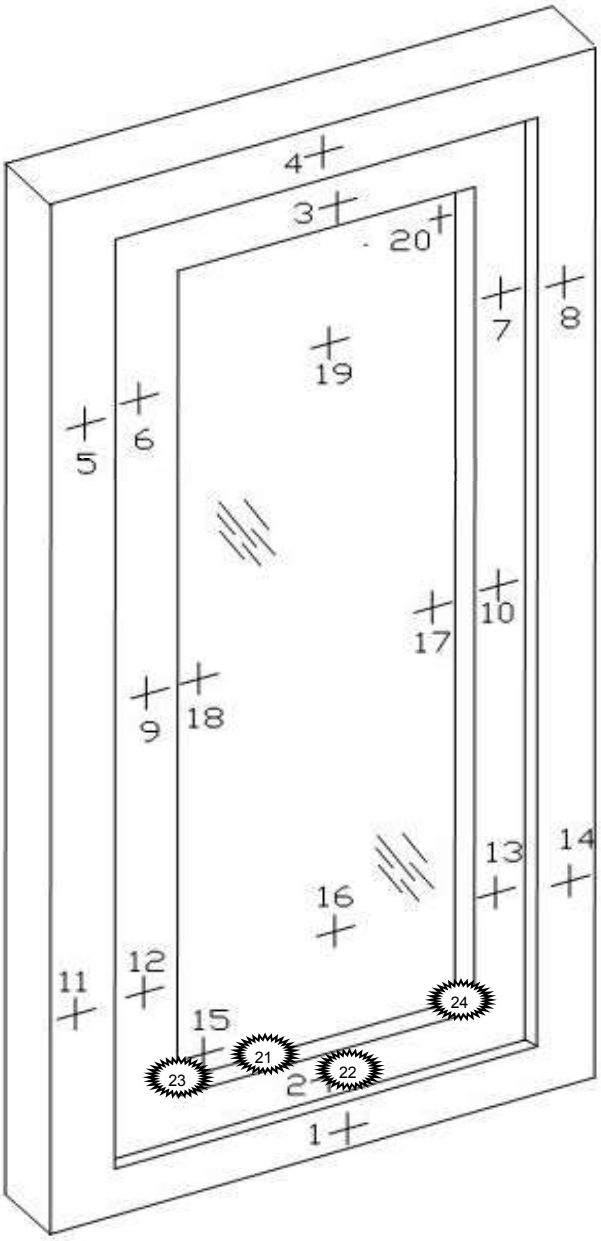
Prior to testing the specimen was sealed with silicone on the interior side and checked for air infiltration per Section 9.3.4.

Required annual calibrations for the Architectural Testing Inc. 'thermal test chamber' (ICN 000001) in York, Pennsylvania were last conducted in May 2014 in accordance with Architectural Testing Inc. calibration procedure. A CTS Calibration verification was performed December 2014. A Metering Box Wall Transducer and Surround Panel Flanking Loss Characterization was performed December 2014.

CRF Report

Time:	03:59	04:29	04:59	05:29	05:59	AVERAGE
Pre-specified Thermocouples - Frame						
1	34.68	34.66	34.62	34.56	34.58	34.62
2	31.14	31.12	31.10	31.06	30.99	31.08
3	35.95	35.92	35.96	35.96	36.04	35.96
4	44.90	44.88	44.89	44.95	44.98	44.92
5	45.22	45.18	45.27	45.37	45.39	45.28
6	36.35	36.37	36.39	36.49	36.49	36.42
7	36.26	36.25	36.31	36.36	36.36	36.31
8	38.79	38.86	39.08	39.32	39.37	39.08
9	35.09	35.06	35.14	35.10	35.12	35.10
10	33.89	34.04	34.05	33.97	33.86	33.96
11	40.25	40.21	40.18	40.13	40.14	40.18
12	33.67	33.50	33.49	33.50	33.52	33.53
13	32.50	32.44	32.37	32.34	32.27	32.39
14	33.57	33.52	33.34	33.16	33.11	33.34
FT_P	36.59	36.57	36.58	36.59	36.59	36.58
Pre-specified Thermocouples - Glass						
15	34.21	34.20	34.16	34.08	34.03	34.14
16	56.57	56.56	56.54	56.57	56.53	56.55
17	41.61	41.56	41.61	41.67	41.63	41.62
18	44.18	44.17	44.20	44.20	44.23	44.20
19	57.73	57.69	57.72	57.68	57.68	57.70
20	40.20	40.25	40.21	40.25	40.24	40.23
GT	45.75	45.74	45.74	45.74	45.72	45.74
Cold Point (Roving) Thermocouples						
21	30.80	30.80	30.80	30.80	30.80	30.80
22	31.10	31.10	31.10	31.10	31.10	31.10
23	31.40	31.40	31.40	31.40	31.40	31.40
24	31.40	31.40	31.40	31.40	31.40	31.40
FT_R	31.18	31.18	31.18	31.18	31.18	31.18
W	0.08	0.08	0.08	0.08	0.08	0.08
FT	36.16	36.14	36.15	36.16	36.15	36.15
Warm Side - Room Ambient Air Temperature						
	69.82	69.80	69.80	69.80	69.81	69.81
Cold Side - Room Ambient Air Temperature						
	-0.43	-0.41	-0.41	-0.40	-0.45	-0.42
CRF_f	52	52	52	52	52	52
CRF_g	66	66	66	66	66	66

Thermocouple Location Diagram



Cold Point Locations

21. 30.80
22. 31.10
23. 31.40
24. 31.40

Architectural Testing, Inc. 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 April 14, 2019.

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For ARCHITECTURAL TESTING, INC.

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Senior Technician

Shon W. Einsig
Senior Technician
Individual-In-Responsible-Charge

RPM:klb
E5290.01-116-46

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

ACCREDITED	Architectural Testing, Inc. is accredited by the International Accreditation Service (IAS) under the specific test methods listed under lab code TL-144, in accordance with the recognized International Standard ISO/IEC 17025:2005. The laboratory's accreditation or test report in no way constitutes or implies product certification, approval, or endorsement by IAS.

Revision Log

Rev. #	Date	Page(s)	Revision(s)
.01R0	04/21/15	All	Original Report Issue. Work requested by Howard Nguyen of Gamco Corporation