

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

**Rendered to:**

**GAMCO CORPORATION**

**SERIES/MODEL: BD-325 Series Balcony Door**

**TYPE: Swinging Door with Frame**

<b>Summary of Results</b>		
Thermal Transmittance (U-Factor)		0.43
Condensation Resistance Factor - Frame (CRF <sub>f</sub> )		52
Condensation Resistance Factor - Glass (CRF <sub>g</sub> )		66
<b>Unit Size:</b>	39-3/8" x 78-3/4"	
<b>Layer 1:</b>	1/4"	Clear
<b>Gap 1:</b>	0.53"	A1-D: Aluminum Spacer <span style="float: right;">90% Argon*</span>
<b>Layer 2:</b>	1/4"	PPG Solarban 60 (e=0.035*, #3)

Reference must be made to Report No. E5290.01-116-46.

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

Rendered to:

GAMCO CORPORATION  
131-10 Maple Avenue  
Flushing, New York 11355**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 <sub>f</sub> )  | 52   |
| Condensation resistance factor - Glass (CRF <sub>g</sub> )   | 66   |
| 2. Thermal transmittance due to conduction (U)<br>(U-factors expressed in Btu/hr·ft <sup>2</sup> ·F) | 0.43 |

**Test Sample Description:****Frame:**

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

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

**Panel:**

<b>Material:</b>	AT (0.28"): Aluminum with Thermal Breaks - All Members		
<b>Size:</b>	37 1/4" x 77"		
<b>Daylight Opening:</b>	30-1/2" x 70-1/2"	<b>Glazing Method:</b>	Exterior
<b>Exterior Color:</b>	Clear	<b>Exterior Finish:</b>	Anodized
<b>Interior Color:</b>	Clear	<b>Interior Finish:</b>	Anodized
<b>Corner Joinery:</b>	Mitered / Keys & Screws / Sealed		

**Glazing Information:**

<b>Layer 1:</b>	1/4"	Clear	
<b>Gap 1:</b>	0.53"	A1-D: Aluminum Spacer	90% Argon*
<b>Layer 2:</b>	1/4"	PPG Solarban 60 (e=0.035*, #3)	
<b>Gas Fill Method:</b>	Single-Probe Method*		
<b>Desiccant:</b>	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
$W$	=	$[(FT_p - FT_r) / (FT_p - (T_c + 10))]$ x 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
		$CRF_g = (GT - T_c) / (T_h - T_c)$ x 100	
$CRF_f$	=	Condensation resistance factor – Frame	52
		$CRF_f = (FT - T_c) / (T_h - T_c)$ x 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 <sup>2</sup>
	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·ft <sup>2</sup> ·F

**Glazing Deflection:**

	<b>Panel</b>
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.

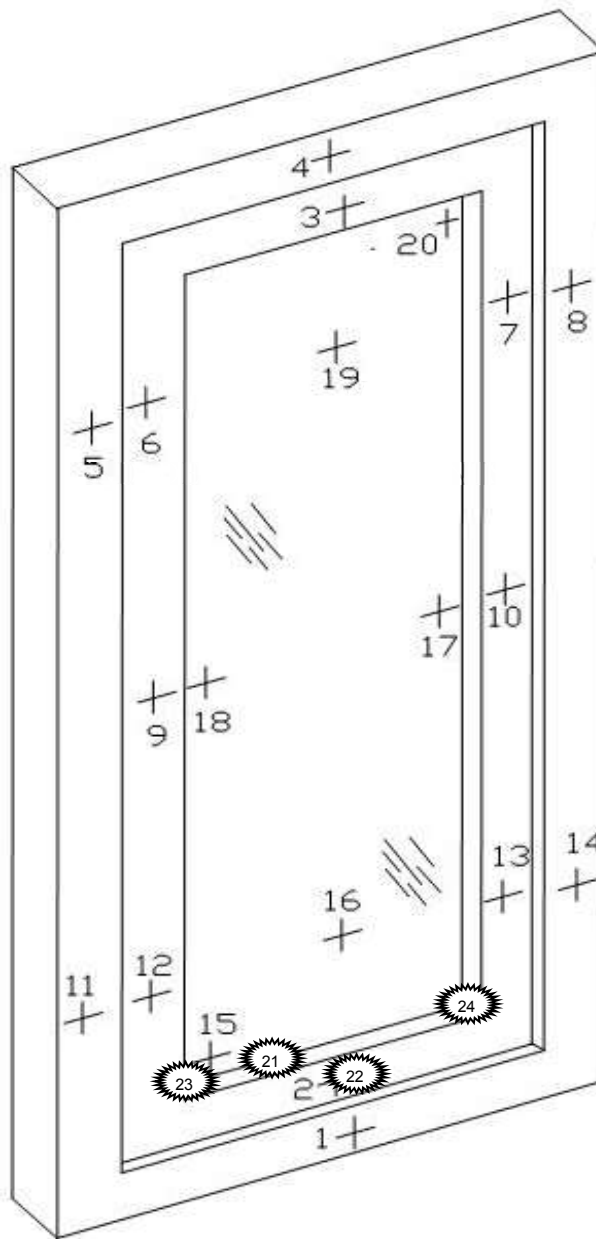
Prior to testing the specimen was sealed with silicone on the interior side and checked for air infiltration per Section 9.3.4.

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
<b>Pre-specified Thermocouples - Frame</b>						
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 <sub>p</sub>	36.59	36.57	36.58	36.59	36.59	36.58
<b>Pre-specified Thermocouples - Glass</b>						
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
<b>Cold Point (Roving) Thermocouples</b>						
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 <sub>R</sub>	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
<b>Warm Side - Room Ambient Air Temperature</b>						
	69.82	69.80	69.80	69.80	69.81	69.81
<b>Cold Side - Room Ambient Air Temperature</b>						
	-0.43	-0.41	-0.41	-0.40	-0.45	-0.42
CRF <sub>f</sub>	52	52	52	52	52	52
CRF <sub>g</sub>	66	66	66	66	66	66

### Thermocouple Location Diagram



#### Cold Point Locations

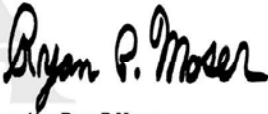
-  21. 30.80
-  22. 31.10
-  23. 31.40
-  24. 31.40



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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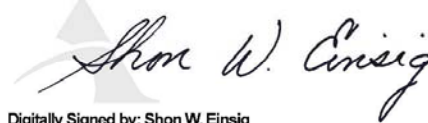
For ARCHITECTURAL TESTING, INC.



Digitally Signed by: Ryan P. Moser

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Ryan P. Moser  
Senior Technician



Digitally Signed by: Shon W. Einsig

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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)



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### Revision Log

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