



**AAMA/WDMA/CSA 101/I.S.2/A440-05  
TEST REPORT**

**Rendered to:**

**GAMCO CORPORATION**

**SERIES/MODEL: BD-325**

**PRODUCT TYPE: Side-Hinged Door**

<b>Title</b>	<b>Summary of Results</b>
Primary Product Designator	SHD-AW50 1219 x 2438 (48 x 96)
Design Pressure	$\pm 2400$ Pa ( $\pm 50.16$ psf)
Operating Force (in motion)	135 N (30 lbf)
Air Infiltration	$0.5$ L/s/m <sup>2</sup> (0.10 cfm/ft <sup>2</sup> )
Water Penetration Resistance Test Pressure	480 Pa (10.03 psf)
Uniform Load Structural Test Pressure	$\pm 3600$ Pa ( $\pm 75.24$ psf)
Forced Entry Resistance	Pass



**AAMA/WDMA/CSA 101/I.S.2/A440-05 TEST REPORT**

Rendered to:

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

Report No.: 89801.01-109-44

**Project Summary:** Architectural Testing, Inc. was contracted by Gamco Corporation to perform testing on a Series/Model BD-325, side-hinged door. The sample tested successfully met the performance requirements for a SHD-AW50 1219 x 2438 (48 x 96) rating. Test specimen description and results are reported herein. The sample was provided by the client.

**Test Specification:** The test specimen was evaluated in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-05, *Standard/Specification for Windows, Doors, and Unit Skylights*.

**Test Specimen Description:**

**Series/Model:** BD-325

**Product Type:** Side-Hinged Door

**Overall Size:** 1219 mm (48") wide by 2438 mm (96") high

**Leaf Size:** 908 mm (45-3/4") wide by 2397 mm (94-3/8") high

**Overall Area:** 3.0 m<sup>2</sup> (32 ft<sup>2</sup>)

**Finish:** All aluminum was painted.

**Test Specimen Description: (Continued)**

**Frame Construction:** The head and jambs were constructed of dual-strutted thermally improved, extruded aluminum. The sill was constructed of poured and debridged, thermally improved extruded aluminum. The head/jamb corners were mitered, sealed with silicone, and secured with twelve #9 x 3/8" long flat head screws and two aluminum corner keys, six screws per key. The threshold/jamb corners were coped, butted, sealed with silicone, and secured with two #8 x 1-1/4" long hex head screws. An extruded aluminum sill leg extension was utilized at the interior sill leg and was secured with #10 x 1/4" long Phillips flat head screws spaced 16" on center. The joint between the sill leg and the sill leg extension was sealed with silicone. Snap-in aluminum stops were utilized at the head and jambs. An extruded aluminum piece was secured to the hinge jamb using two #9 x 3/8" long flat head screws, located 1-1/4" from each end and spaced 5" on center.

**Leaf Construction:** The leaf was constructed of dual-strutted thermally improved extruded aluminum members. Corners were mitered, sealed with silicone, and secured with four #9 x 3/8" long pan head screws and a 1" by 1-1/2" solid aluminum corner key.

**Weatherstripping:**

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
0.187" backed, 1/4" diameter hollow vinyl bulb seal	1 Row	Sill
0.187" backed, 3/16" diameter hollow vinyl bulb seal	3 Rows	Head and jambs
0.187" backed, 3/16" diameter hollow vinyl bulb seal	3 Rows	Leaf stiles and top rail
0.187" backed, 3/16" diameter hollow vinyl bulb seal	4 Rows	Glazing beads
Kerf-mounted vinyl fin	1 Row	Bottom rail

**Glazing Details:** The unit was glazed with 1" thick insulating glass constructed of a sheet of 1/4" thick tempered glass inboard, a sheet of 7/16" thick laminated glass outboard and an aluminum box spacer system. The laminated glass was comprised of two sheets of 3/16" thick annealed glass and a 0.060" thick PVB interlayer. The glass was glazed from the exterior against a vinyl fin with a silicone cap bead and was secured with snap-in aluminum glazing beads with a hollow bulb seal against the glass and a silicone cap bead. A bead of silicone was utilized between the laminated glass and the leaf members.

**Drainage:** A sloped threshold was utilized.

**Test Specimen Description: (Continued)**

**Hardware:**

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
Lock handle assembly with multi-point lock	1	Lock stile, 35" from bottom rail with four locking points located 6" from end and spaced 28" on center
Barrel hinges	4	Hinge stile, 6" from each end and spaced 28" on center

**Reinforcement:** No reinforcement was utilized.

**Installation:** The unit was installed into a Spruce-Pine-Fir wood buck. The frame was secured through the head, sill, and jambs using #10 x 2-1/4" long flat head screws, located 3" from each corner and spaced 12" on center. The exterior perimeter was sealed with silicone.

**Test Results:** The temperature during testing was 20°C (68°F). The results are tabulated as follows:

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
<u>AAMA 910 Life Cycle Testing Procedures:</u>			
2.1.1 to 2.1.12			
5.3.1.2	Force to Latch Side-Hinged Door System per ANSI/BHMA A156.2 (First Half)		
	Force to latch	156 N (35 lbf)	Report Only
	Deadbolt	36 N (8 lbf)	Report Only
2.1.2	Air Leakage Resistance per ASTM E 283 (First Half)		
	300 Pa (6.20 psf)	0.1 L/s/m <sup>2</sup> (0.02 cfm/ft <sup>2</sup> )	0.5 L/s/m <sup>2</sup> (0.10 cfm/ft <sup>2</sup> ) max.
<i>Note #1: The tested specimen meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-05 for air leakage resistance.</i>			
2.1.3	Water Penetration Resistance per ASTM E 547 and E 331 (First Half)		
	528 Pa (11.03 psf)	No leakage	No leakage



**Test Results: (Continued)**

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
2.1.4	Leaf Cycle Testing (First Half - 1250 cycles) Leaf	No damage	No damage

**Observations:** *Oil dripped from hinges.*

2.1.5	Locking Hardware Cycle Testing (First Half - 1250 cycles) Lock Handle	No damage No damage	No damage No damage
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**Observations:** *Slight wear and shavings visible.*

2.1.7	Misuse Testing		
2.5.2.2	Ventilator Vertical Load Test 445 N (100 lbf)	No damage	No damage
2.1.8	Leaf Cycle Testing (Second Half - 1250 cycles) Leaf	No damage	No damage

**Observations:** *Slight wear on hinges.*

2.1.9	Locking Hardware Cycle Testing (Second Half - 1250 cycles) Lock Handle	No damage No damage	No damage No damage
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**Observations:** *Slight wear and shavings visible.*

5.3.1.3	Force to Latch Side-Hinged Door System per ANSI/BHMA A156.2 (Second Half) Force to latch Deadbolt	135 N (30.0 lbf) 33 N (7.50 lbf)	Report Only Report Only
2.1.11	Air Leakage Resistance per ASTM E 283 (Second Half) 300 Pa (6.2 psf)	0.5 L/s/m <sup>2</sup> (0.10 cfm/ft <sup>2</sup> )	0.5 L/s/m <sup>2</sup> (0.10 cfm/ft <sup>2</sup> ) max.

**Note #1:** *The tested specimen meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/IS.2/A440-05 for air leakage resistance.*

**Test Results: (Continued)**

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
2.1.12	Water Penetration Resistance per ASTM E 547 and E 331 (Second Half) 480 Pa (10.03 psf)	No leakage	No leakage
5.3.4.2	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the top rail) (Loads were held for 10 seconds) 1920 Pa (40.13 psf) (positive) 1920 Pa (40.13 psf) (negative)	0.3 mm (0.01") 1.5 mm (0.06")	6.4 mm (0.25") max. 6.4 mm (0.25") max.
5.3.4.3	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the top rail) (Loads were held for 10 seconds) 2880 Pa (60.19 psf) (positive) 2880 Pa (60.19 psf) (negative)	0.3 mm (0.01") 0.3 mm (0.01")	2.3 mm (0.09") max. 2.3 mm (0.09") max.
5.3.5	Forced Entry Resistance per AAMA 1304 1330 N (300 lbf) point load Top lock stile corner Bottom lock stile corner Above lock	No entry No entry No entry	No entry No entry No entry
5.3.6.10	Operation/Cycling Performance per AAMA 920 25,000	Meets as stated	Meets as stated
5.3.6.11	Vertical Loading Resistance per AAMA 925 Pre-load - 200 N (45 lbf) Maximum vertical deflection Residual vertical deflection Test load - 2224 N (500 lbf) Maximum vertical deflection Residual vertical deflection Diagonal deformation Force to latch	1.3 mm (0.05") 0.3 mm (0.01") 15.2 mm (0.60") 9.1 mm (0.36") <0.3 mm (<0.01") 65 N (15 lbf)	N/A N/A N/A N/A N/A 65 N (15 lbf) max.

Optional Performance

4.4.2.6	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the top rail) (Loads were held for 10 seconds) 2400 Pa (50.16 psf) (positive) 2400 Pa (50.16 psf) (negative)	1.3 mm (0.05") 2.3 mm (0.09")	6.4 mm (0.25") max. 6.4 mm (0.25") max.
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**Test Results: (Continued)**

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
<u>Optional Performance: (Continued)</u>			
4.4.2.6	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the top rail) (Loads were held for 10 seconds)		
	3600 Pa (75.24 psf) (positive)	0.3 mm (0.01")	2.3 mm (0.09") max.
	3600 Pa (75.24 psf) (negative)	0.3 mm (0.01")	2.3 mm (0.09") max.

Tape and film were used to seal against air leakage during structural testing. In our opinion, the tape and film did not influence the results of the test.

**Drawing Reference:** The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen reported herein.

**List of Official Observers:**

<u>Name</u>	<u>Company</u>
Charlie Chan	Gamco Corporation
John Chang	Gamco Corporation
Michael D. Stremmel, P.E.	Architectural Testing, Inc.
Emily C. Riley	Architectural Testing, Inc.

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 will expire.

Results obtained are tested values and were secured by using the designated test methods. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen can be made. 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: Emily C. Riley

Emily C. Riley  
Technician



Digitally Signed by: Michael D. Stremmel

Michael D. Stremmel, P.E.  
Senior Project Engineer

ECR:dem

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

Appendix-A: Alteration Addendum (1)

Appendix-B: Drawings (9)