

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

Rendered to:

MASTER WINDOW SYSTEMS, INC.

**SERIES/MODEL: Master 1000 Single Hung Window
PRODUCT TYPE: PVC Single Hung Window &
Twin Single Hung Window System**

Summary of Results		
Title	Test Specimen #1	Test Specimen #2
Primary Product Designator	H-R25 1016 x 1676 (40 x 66)	H-R20 1822 x 1676* (72 x 66*)
Design Pressure*	1200 Pa (25.0 psf)	960 Pa (20.0 psf)
Negative Design Pressure*	1200 Pa (25.0 psf)	960 Pa (20.0 psf)
Operating Force (in motion)	68 N (15 lbf)	N/A
Air Infiltration	1.2 L/s/m ² (0.23 cfm/ft ²)	1.2 L/s/m ² (0.24 cfm/ft ²)
Canadian Air Infiltration/Exfiltration Level*	N/A	N/A
Water Penetration Resistance Test Pressure	290 Pa (6.0 psf)	260 Pa (5.25 psf)
Uniform Load Structural Test Pressure	±1800 Pa (37.5 psf)	±1440 Pa (30.0 psf)
Forced Entry Resistance	Grade 10	N/A

*Optional Secondary Designators

Test Completion Date: 12/22/06

Reference must be made to Report No. 69048.02-501-47, dated 09/13/07 for complete test specimen descriptions and data.

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

Rendered to:

MASTER WINDOW SYSTEMS, INC.
2060 DeFoor Hills Road, N.W.
Atlanta, Georgia 30318

Report No.: 69048.02-501-47
Test Dates: 11/07/06
Through: 12/22/06
Report Date: 09/13/07
Expiration Date: 12/22/10

Project Summary: Architectural Testing, Inc. (ATI) was contracted by Veka, Inc. to witness testing on two Series/Model SH27WW, single hung windows at their test facility in Fombell, Pennsylvania. The samples tested successfully met the performance requirements for the following ratings: Test Specimen #1: H-R25 1016 x 1676 (40 x 66); Test Specimen #2: H-R20 1822 x 1676* (72 x 66*) rating. This report is a reissue of the original Report No. 69048.01-501-47. This report is reissued in the name of Master Window Systems, Inc. through written authorization of Veka, Inc. Test specimen descriptions and results are reported herein.

General Note: *An asterisk (*) next to the performance grade indicates that the size tested for optional performance was smaller than the Gateway test size for the product type and class.*

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

Test Specimen Descriptions:

Series/Model: Master 1000 Single Hung Window

Test Specimen #1: H-R25 1016 x 1676 (40 x 66)

Type: Poly Vinyl Chloride (PVC) Single Hung Window

Overall Size: 1016 mm (40") wide by 1676 mm (66") high

Daylight Opening Size: 883 mm (34-3/4") wide by 737 mm (29") high

Bottom Sash Size: 943 mm (37-1/8") wide by 816 mm (32-1/8") high

Screen Size: 911 mm (35-7/8") wide by 794 mm (31-1/4") high

Overall Area: 1.7 m² (18.3 ft²)

Test Specimen Description: (Continued)

Test Specimen #2: H-R20 1822 x 1676* (72 x 66*)

Type: Poly Vinyl Chloride (PVC) Twin Single Hung Window System

Overall Size: 1829 mm (71-3/4") wide by 1676 mm (66") high

Daylight Opening Size (2): 778 mm (30-5/8") wide by 733 mm (28-7/8") high

Bottom Sash Size (2): 835 mm (32-7/8") wide by 819 mm (32-1/4") high

Screen Size (2): 803 mm (31-5/8") wide by 797 mm (31-3/8") high

Overall Area: 3.1 m² (33.0 ft²)

The following descriptions apply to all specimens.

Finish: All PVC was white.

Glazing Details: The sash was exterior glazed and the fixed lite was interior glazed with nominal 19.1 mm (3/4") thick, sealed insulating glass fabricated from two sheets of 2.5 mm (3/32") clear annealed glass and butyl spacer material with stainless steel substrate, single sealed. The insulating glass was set against a double-sided adhesive tape and secured with rigid vinyl glazing beads. A cap bead of silicone sealant was located at the perimeter of the fixed lite.

Frame Construction: The PVC frame was constructed using mitered and welded corner construction. The fixed meeting rail was coped and fastened through the jambs with two #8 x 76 mm (3") long screws per end.

Mullion Construction: The PVC H mullion of Test Specimen #2 was secured to the mating jambs with three #8 x 32 mm (1-1/4") long screws, one each at the top, bottom and midspan. The exterior was sealed with a silicone sealant.

Sash Construction: The PVC sash were assembled utilizing mitered and welded corner construction.

Screen Construction: The screen was constructed with formed aluminum. The corners were square-cut and secured using plastic corner keys. The fiberglass mesh screen cloth was secured with a flexible vinyl spline.

Test Specimen Description: (Continued)

Weatherstripping:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
4.7 mm (0.187") backed by 7.1 mm (0.280") high pile with center fin	1 Row	Lock rail, fixed meeting rail, sill
4.7 mm (0.187") backed by 7.1 mm (0.280") high pile with center fin	2 Rows	Sash stiles
4.7 mm (0.187") backed by 8.9 mm (0.350") diameter, vinyl jacket/foam-filled bulb	1 Row	Bottom rail

Hardware:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
Metal button cam lock and keeper	2 (4)	Lock rail, 203 mm (8") in from each end, mating keepers at exterior meeting rail
Plastic tilt latch	2 (4)	Top corner of sash
Metal pivot bar	2 (4)	Bottom corner of sash
Constant force balance system with locking tilt shoes	2 (4)	One per jamb

Note: Twin unit quantities in parenthesis ().*

Test Specimen Description: (Continued)

Drainage:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
25.4 mm (1") wide by 4.7 mm (3/16") high weepslot (with flap)	2 (4)	Exterior face of sill, one at each end
25 mm (1") wide by 12.7 mm (1/2") deep weepslot	2 (4)	Sill/jamb intersection, one at each end
25 mm (1") wide by 4.7 mm (3/16") high weepslot	2 (4)	Intermediate sill wall, one at each end
16 mm (5/8") wide by leg height weep notch	4 (8)	Sill screen track, two at each end
4.7 mm (3/16") diameter weep hole	2 (4)	Bottom rail, one at each end

Note: Twin unit quantities in parenthesis ().*

Reinforcement: The fixed meeting rail contained a custom shaped extruded aluminum reinforcement measuring 25.4 mm by 23.5 by 3.2 mm (1.000" by 0.924" by 0.125"), reference Drawing No. RFSH204AOM.

Installation: The unit was installed in a wood buck constructed of Spruce-Pine-Fir construction lumber and secured through the nail fin with #8 x 32 mm (1-1/4") long screws, spaced approximately 100 mm (4") on center. The nail fin perimeter was sealed with a silicone sealant. A nominal 3 mm (1/8") gap was maintained at the perimeter between the buck and window frame.

Test Results: The results are tabulated as follows:

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
<u>Test Specimen #1:</u> H-R25 1016 x 1676 (40 x 66)			
5.3.1.1	Operating Force		
	<u>Open</u>		
	Breakaway	68 N (15 lbs)	N/A
	Maintain motion	45 N (10 lbs)	135 N (30 lbs)
	<u>Close</u>		
	Breakaway	45 N (10 lbs)	N/A
	Maintain motion	68 N (15 lbs)	135 N (30 lbs)
	<u>Lock</u>		
	Open	14 N (3 lbs)	100 N (22.5 lbs)
	Close	9 N (2 lbs)	100 N (22.5 lbs)
	<u>Latches</u>		
	Open	5 N (1 lb)	100 N (22.5 lbs)
5.3.2	Air Leakage Resistance per ASTM E 283		See Note #1
	75 Pa (1.57 psf, 25 mph)	1.2 L/s/m ² (0.23 cfm/ft ²)	1.5 L/s/m ² (0.30 cfm/ft ²) max.
<i>Note #1:</i> The tested specimen meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-05 for air leakage resistance.			
5.3.3	Water Resistance per ASTM E 547 (with and without screen)		
	140 Pa (2.90 psf)	No leakage	No leakage
5.3.4.2	Uniform Load Deflection per ASTM E 330 (Deflections reported were taken on the exterior meeting rail) (Loads were held for 10 seconds)		
	720 Pa (15.0 psf) (positive)	2.5 mm (0.10")	See Note #2
	720 Pa (15.0 psf) (negative)	4.3 mm (0.17")	See Note #2

Note #2: The deflections reported are not limited by AAMA/WDMA/CSA 101/I.S.2/A440-05 for this product designation. The deflection data is recorded in this report for special code compliance and information only.

Test Results: (Continued)

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
<u>Test Specimen #1:</u> H-R25 1016 x 1676 (40 x 66) (Continued)			
5.3.4.3	Uniform Load Structural per ASTM E 330 (Permanent sets reported were taken on the exterior meeting rail) (Loads were held for 10 seconds)		
	1080 Pa (22.5 psf) (positive)	<0.3 mm (<0.01")	3.8 mm (0.15") max.
	1080 Pa (22.5 psf) (negative)	0.5 mm (0.02")	3.8 mm (0.15") max.
5.3.5	Forced Entry Resistance per ASTM F 588		
	Type: A	Grade: 10	
	Hand Tool Manipulation	No entry	No entry
	Tests A1 through A7	No entry	No entry
	Hand Tool Manipulation	No entry	No entry
5.3.6.2	Thermoplastic Corner Weld Test	Meets as stated	Meets as stated
5.3.6.3	Deglazing Test per ASTM E 987		
	<u>Bottom Sash</u>		
	In operating direction - 320 N (70 lbs)		
	Meeting rail	1.5 mm (0.06")	11.43 mm (0.45")
	Bottom rail	1.5 mm (0.06")	11.43 mm (0.45")
	In remaining direction - 230 N (50 lbs)		
	Left stile	1.5 mm (0.06")	11.43 mm (0.45")
	Right stile	1.5 mm (0.06")	11.43 mm (0.45")
<u>Optional Performance</u>			
4.4.2.6	Water Resistance per ASTM E 547 (with and without screen)		
	290 Pa (6.0 psf)	No leakage	No leakage

Test Results: (Continued)

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
<u>Test Specimen #1:</u> H-R25 1016 x 1676 (40 x 66) (Continued)			
<u>Optional Performance</u> (Continued)			
4.4.2.6	Uniform Load Deflection per ASTM E 330 (Deflections reported were taken on the exterior meeting rail) (Loads were held for 10 seconds)		
	1200 Pa (25.0 psf) (positive)	4.6 mm (0.18")	See Note #2
	1200 Pa (25.0 psf) (negative)	6.6 mm (0.26")	See Note #2
4.4.2.6	Uniform Load Structural per ASTM E 330 (Permanent sets reported were taken on the exterior meeting rail) (Loads were held for 10 seconds)		
	1800 Pa (37.5 psf) (positive)	0.3 mm (0.01")	3.8 mm (0.15") max.
	1800 Pa (37.5 psf) (positive)	<10.3 mm (<0.01")	3.8 mm (0.15") max.
<u>Test Specimen #2:</u> H-R20 1829 x 1676* (72 x 66*)			
5.3.2	Air Leakage Resistance per ASTM E 283		See Note #1
	75 Pa (1.57 psf, 25 mph)	1.2 L/s/m ² (0.24 cfm/ft ²)	1.5 L/s/m ² (0.30 cfm/ft ²) max.
<u>Optional Performance</u>			
4.4.2.6	Water Resistance per ASTM E 547 (with and without screen)		
	260 Pa (5.25 psf)	No leakage	No leakage
4.4.2.6	Uniform Load Deflection per ASTM E 330 (Deflections reported were taken on the vertical mullion) (Loads were held for 10 seconds)		
	960 Pa (20.0 psf) (positive)	20.8 mm (0.82")	See Note #2
	960 Pa (20.0 psf) (negative)	28.2 mm (0.82")	See Note #2
4.4.2.6	Uniform Load Structural per ASTM E 330 (Permanent sets reported were taken on the vertical mullion) (Loads were held for 10 seconds)		
	1440 Pa (30.0 psf) (positive)	1.0 mm (0.04")	6.7 mm (0.26") max.
	1440 Pa (30.0 psf) (positive)	1.3 mm (0.05")	6.7 mm (0.26") max.

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

This report is reissued in the name of Master Window Systems, Inc. through written authorization of Veka, Inc. to whom the original report was rendered. The original Veka, Inc. Report No. is 69048.01-501-47.

Detailed drawings, representative samples of the test specimens, and a copy of this report will be retained by Architectural Testing, Inc. for a period of four years from the original test date. The above results were secured by using the designated test methods and they indicate compliance with the performance requirements of the above referenced specification. This report does not constitute certification of this product, which may only be granted by the certification program administrator. This report may not be reproduced, except in full, without the approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

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LG:cls/jld

Attachments (pages):

Appendix-A: Alteration Addendum (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	09/13/07	N/A	Original report issue - Reissue of Report No. 69048.01-501-47 in the name of Master Window Systems, Inc.

Appendix A

Alteration Addendum

***Note:** No alterations were required.*