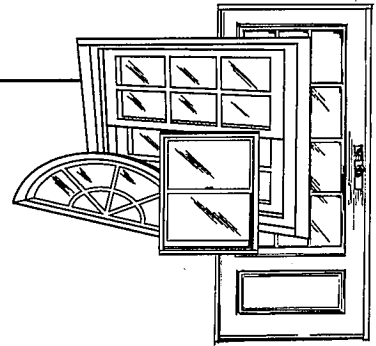


CERTIFIED TESTING LABORATORIES

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Report Number: CTLA 1641W-1R
Report Date: April 20, 2007; Revised: May 8, 2007

STRUCTURAL PERFORMANCE TEST REPORT

Client: MGM Industries
287 Freehill Rd.
Hendersonville, TN 37075

Product Type and Series: Series 8065 Vinyl Fin Frame Double Hung Window
H-C30 1372 x 2286 (54 x 90)
H-C30 914 x 1829* (36 x 72*)

Test Specification: AAMA/WDMA/CSA 101/I.S.2/A440-05 "Standard/Specification for Windows, Doors and Unit Skylights"

Frame: **Gateway:** The extruded vinyl fin frame measured 1372mm (54") wide x 2286mm (90") high buck opening overall. Corners of frame sill and frame jambs utilized coped and butted corner construction and secured with three (3) #8 x 76mm (3.000") Phillips C.S S.M.S. fasteners in each corner. Corners of frame head and frame jambs utilized mitered and welded corner construction. A 51mm (2.000") extruded aluminum slide on fin was utilized on the sill mainframe and measured 56mm (2.190") wide x 45mm (1.776") high. (drawing #A-127). The frame sill utilized an extruded aluminum sill adapter that snapped on the vinyl sill. The sill adapter measured 056mm (2.216") wide x 055mm (2.156") high. Ref. Drawing # M-406AA).

Downsize: The extruded vinyl fin frame measured 914mm (36") wide x 1829mm (72") high buck opening overall. Corners of frame sill and frame jambs utilized coped and butted corner construction and secured with three (3) #8 x 76mm (3.000") Phillips C.S S.M.S. fasteners in each corner. Corners of frame head and frame jambs utilized mitered and welded corner construction. A 51mm (2.000") extruded aluminum slide on fin was utilized on the sill mainframe and measured 56mm (2.190") wide x 45mm (1.776") high. (drawing #A-127). The frame sill utilized an extruded aluminum sill adapter that snapped on the vinyl sill. The sill adapter measured 056mm (2.216") wide x 055mm (2.156") high. Ref. Drawing # M-406AA).

Configuration: One (1) operable sash in top, one (1) operable sash in bottom.
Gateway & Downsize

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Sash: **Gateway:** Two (2) Active Sashes. Bottom sash measured 1321mm (52") wide x 1124mm (44.250") high. Top sash measured 1295mm (51") wide x 1118mm (44.000") high. Sash constructed from extruded vinyl with coped and butted corner construction and secured with one (1) #8 x 25mm (1.00") Phillips P.H. S.M.S fastener. Bottom sash day lite opening measured 1272mm (50.0625") wide x 1024mm (40.3125") high. Top sash had a day lite opening of 1246mm (49.0625") wide x 1026mm (40.375") high.

Downsize: Two (2) Active Sashes. Bottom sash measured 864mm (34") wide x 895mm (35.250") high. Top sash measured 838mm (33") wide x 889mm (35.000") high. Sash constructed from extruded vinyl with coped and butted corner construction and secured with one (1) #8 x 25mm (1.00") Phillips P.H. S.M.S fastener. Bottom sash day lite opening measured 814mm (32.0625") wide x 795mm (31.3125") high. Top sash had a day lite opening of 789mm (31.0625") wide x 797mm (31.375") high.

Weather-stripping: Gateway & Downsize

| <u>Quantity</u> | <u>Description</u> | <u>Location</u> |
|--------------------|---|--|
| Twelve (12) strips | Ultrafab woolpile w/fin 4.8mm (.187") x 6mm (.250") | Three (3) each side of sash stiles. |
| Two (2) strips | Ultrafab woolpile: w/fin 4.8mm (.187") x 6mm (.250") | Exterior channel of interlock rail. |
| One (1) strip | Amesbury bulb vinyl Foam filled with fin 3/8" | Exterior of sill. |
| Two (2) strips | Ultrafab woolpile w/fin 3mm (.125") x 6mm (.250") | One (1) each side of interior sash stiles. |

Hardware & Location: Gateway & Downsize

| <u>Quantity</u> | <u>Description</u> | <u>Location</u> |
|-----------------|-------------------------------|---|
| Four (4) | Constant Force Balance System | Two (2) per frame jamb |
| Two (2) | Metal cam locks | 152mm (6.00") from each sash top rail. |
| Two (2) | Metal keeper | 152mm (6.00") from each corner of fixed meeting rail. |
| Four (4) | Plastic tilt latch | One (1) each corner of sash top rail. |
| Four (4) | Metal pivot bar | One (1) each corner of sash bottom rail. |

Glazing: **Gateway & Downsize:** Insulated 19mm (.750") overall with 3mm (.125") Clear Annealed exterior lite, 13mm (.50") air space, 3mm (.125") Clear Annealed interior lite. Interior glazed with adhesive back bedding compound. Air space is comprised of galvanized steel "U" channel squiggle with Butyl seal. Glazing rested on rubber-setting blocks that measured 22mm (.850") wide x 22mm (.850") high x 17mm (.650") thick. With a 13mm (.50") glazing bite.

Sealant: A narrow joint sealant was used on all frame corners and vent corners

Weep System: N/A

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Reinforcement:

Gateway & Downsize: One (1) extruded aluminum reinforcement was inserted in the sash lock rail and measured 37mm (1.464") wide x 22mm (.885") high x full length. The aluminum reinforcement was secured at each end through the tilt latch with three (3) #8 x 25mm (1") Phillips F.H. self-tapping S.M.S. Reference drawing # 8004A. One (1) extruded aluminum reinforcement was inserted in the sash keeper rail and measured 37mm (1.474") wide x 25mm (.994") high x full length. The aluminum reinforcement was secured at each end through the sash stile with three (3) #8 x 25mm (1") PPH Reference drawing # 8003A. Each sash stile contained one flat aluminum reinforcement that measured 18mm (.714") wide x 5mm (.183") thick x full length. The flat bar aluminum reinforcement was secured at each end with three (3) #8 x 25mm (1") PPH. Reference drawing # 8000A.

Screen:

Gateway & Downsize: Roll form aluminum frame with plastic corner keys, vinyl spline, screen mesh. Two (2) plastic spring pins with one (1) located on each side of screen frame.

Installation:

Gateway: Forty-Eight (48) #8 x 1.000" Phillips P.H. S.M.S. were used to secure the specimen to the wooden buck in the following manner: Nine (9) in the frame head and sill located at .875", 7.500", 13.6875", 20.375", 26.6875", 33.1875", 39.875", 46.375", and 52.875" measuring from left frame jamb to right frame jamb. Fifteen (15) in each frame jamb located at 1.000", 7.500", 14.000", 20.500", 27.000", 33.500", 40.000", 46.500", 53.000", 59.500", 66.000", 72.500", 79.000", 85.500", and 91.5625" measuring from frame sill to frame head. Reference drawing- Installation Detail Screw Location.

Downsize: Thirty-Six (36) #8 x 1.000" Phillips P.H. S.M.S. were used to secure the specimen to the wooden buck in the following manner: Six (6) in the frame head and sill located at .875", 7.500", 13.6875", 20.375", 26.6875", and 33.1875" measuring from left frame jamb to right frame jamb. Twelve (12) in each frame jamb located at 1.000", 7.500", 14.000", 20.500", 27.000", 33.500", 40.000", 46.500", 53.000", 59.500", 66.000", and 72.500" measuring from frame sill to frame head. Reference drawing- Installation Detail Screw Location.

Surface Finish:

White/Vinyl

Comment:

Nominal 2-mil polyethylene film was used to seal against air leakage during structural loads. The film was used in a manner that did not influence the test results.

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Performance Test Results

| <u>Paragraph</u> | <u>Title of Test</u> | <u>Method</u> | <u>Measured</u> | <u>Allowed</u> |
|---------------------|-------------------------------|--------------------------------|-----------------|----------------|
| Gateway unit | | | | |
| 5.3.1.1.1 | Operating Force Operable sash | ASTM E2068 | | |
| | | Max. Force to maintain motion | 40/lbf | 45/lbs |
| | | Max. Force to initiate motion° | 43/lbf | Report only |

5.3.2 Air Infiltration **ASTM E283-99** 0.20 cfm/ft² .30 cfm/ft²
 @ 1.57psf

The tested specimen meets the performance levels specified in AAMA/WDMA 101.I.S.2/A440-05.

| | | | | |
|---------|------------------|------------------------------|----------|----------|
| 5.3.3.2 | Water Resistance | ASTM E547-00 | | |
| | 5.0 gph/ft² | Four (4) 5 min. cycles | No Entry | No Entry |
| | WTP=4.50 psf | ASTM E331-00 | No Entry | No Entry |
| | | Fifteen (15) minute duration | | |

The specimen was tested with and without an insect screen installed.

| | | | | |
|---------|---|--------------------------|-------------------|--|
| 5.3.4.2 | Uniform Load Structural | ASTM E330-02 | | |
| | Permanent Deformation | Ten (10) second duration | | |
| | @ 45.0 psf Positive (D/P +30) | Loc.1 0.5842mm (0.023") | 5.1816mm (0.204") | |
| | @ 45.0 psf Negative (D/P -30) | Loc.1 0.4572mm (0.018") | 5.1816mm (0.204") | |
| | Location (1)-Max. Allowable Perm. Set after test load at center of meeting rail (0.4% of 1298.575mm (51.125") span) = 5.1816mm (0.204") | | | |

5.3.5 Forced Entry Resistance **ASTM F588-04** Passed
 Type "A" Window Assembly T₁ = 10 minutes
 Tools used: a spatula (10.1.1.1) and a piece of stiff wire (10.1.1.2).
 The test specimen meets the performance Grade 40.

5.3.6.2 Welded Corner Test **ASTM D618-00** Passed
 Procedure "A"
Note: When loaded to failure, the break did not extend along the entire weld line.

| | | | | |
|---------|---------------------|----------------------|-------------------------------|--|
| 5.3.6.3 | Deglazing | ASTM E 987-94 | | |
| | Bottom Sash | | | |
| | Top Rail 70 lbs. | | 1.143mm (.045")= 9.6% <100% | |
| | Bottom Rail 70 lbs. | | 1.2954mm (.051")= 10.9% <100% | |
| | Left Stile 50 lbs. | | 0.2032mm (.008")= 1.5% <100% | |
| | Right Stile 50 lbs. | | 2.032mm (.080")= 15.0% <100% | |

| | | | | |
|---------|---------------------|----------------------|-------------------------------|--|
| 5.3.6.3 | Deglazing | ASTM E 987-94 | | |
| | Top Sash | | | |
| | Top Rail 70 lbs. | | 1.5748mm (.062")= 13.2% <100% | |
| | Bottom Rail 70 lbs. | | 1.8796mm (.074")= 15.8% <100% | |
| | Left Stile 50 lbs. | | 1.143mm (.045")= 9.0% <100% | |
| | Right Stile 50 lbs. | | 0.4318mm (.017")= 3.4% <100% | |

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Performance Test Results: Downsize unit

| <u>Paragraph</u> | <u>Title of Test</u> | <u>Method</u> | <u>Measured</u> | <u>Allowed</u> |
|-------------------------|-----------------------------|--------------------------|------------------------|-----------------------|
| *Downsize unit | | | | |
| | | ASTM E330-02 | | |
| *5.3.4.2 | Uniform Load Structural | | | |
| | Permanent Deformation | Ten (10) second duration | | |
| (D/P + 65) | @ 97.5 psf Positive | Loc.1 | 0.3302mm (0.013") | 3.098mm (0.122") |
| (D/P - 65) | @ 97.5 psf Negative | Loc.1 | 0.381mm (0.015") | 3.098mm (0.122") |

Location (1)-Max. Allowable Perm. Set after test load at center of fixed meeting rail (0.4% of 30.500" span) = 0.122"

| | | | | |
|------------|-----------------|-------------------------------|--------|-------------|
| *5.3.1.1.2 | Operating Force | ASTM E2068 | | |
| | Operable sash | Max. Force to maintain motion | 31/lbf | 45/lbs |
| | | Max. Force to initiate motion | 34/lbf | Report only |

***Reference Gateway unit for Air, Water, Forced Entry and Deglazing test results.**

Test Date: January 22, 2007

Test Completion Date: January 23, 2007

Comments: Testing was witnessed at MGM Industries at the Hendersonville, TN location. All equipment was calibrated in accordance with AAMA 103. Nominal 2-mil polyethylene film was used to seal against air leakage during structural loads. The film was used in a manner that did not influence the test results.

Remarks: Detail drawings were available for laboratory records and comparison to the test specimen at the time of this report. A copy of this report along with representative sections of the test specimen will be retained by CTL for a period of four (4) years. The results obtained apply only to the specimen tested.

This test report does not constitute certification of this product, but only the above test results were obtained using the designated test methods and they indicate compliance with the performance requirements (paragraphs as listed) of the above referenced specifications.

Certified Testing Laboratories assumed that all information provided by the client is accurate and that the physical and chemical properties of the components are as stated by the manufacturer.

Certified Testing Laboratories, Inc.

[Handwritten Signature]
4/23/07

All Tests Witnessed by:

Trace Blakely Certified Testing Laboratories
Randy Graves MGM Industries.

Michael Miller

Michael Miller
Senior Lab Technician
Architectural Division
Certified Testing Laboratories, Inc.

cc: MGM Industries (2)
 A.L.I. (2)
 Ramesh Patel P.E. (1)
 File (1)

Ramesh Patel P.E.
Ramesh Patel, P.E. 4/23/07
Florida Reg. #20224