

**NFRC 102-2004 THERMAL PERFORMANCE
TEST REPORT**

Rendered to:

MGM INDUSTRIES

SERIES/MODEL: 4600 Picture Window

TYPE: Fixed

Summary of Results	
Standardized Thermal Transmittance (U-Factor)	0.30
Glazing Description:	DS Guardian Performance Plus II (e=0.044, #2) Annealed, 0.50" Gap, DuraSeal Spacer (A8), Air Filled*, DS Clear Annealed

Reference should be made to ATI Report No. 69435.08-116-46 for complete test specimen description and data.



NFRC 102-2004 THERMAL PERFORMANCE TEST REPORT

Rendered to:

MGM INDUSTRIES
287 Freehill Road
Hendersonville, Tennessee 37075

Report No: 69435.08-116-46
Test Date: 12/12/06
Report Date: 05/01/09
Expiration Date: 12/12/10

Test Sample Identification:

Series/Model: 4600 Picture Window

Type: Fixed

Overall Size: 47-1/4" x 58-7/8" (1200 mm x 1495 mm) (Model Size)

NFRC Standard Size: 47.2" x 59.1" (1200 mm wide x 1500 mm high)

Test Sample Submitted for: Validation for initial certification and No Plant
Qualification (Production Line Unit)

Test Procedure: U-factor tests were performed in a Guarded Hot Box in accordance with NFRC 102-2004, *Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems*.

Test Results Summary:

Standardized U-factor (U_{st}): 0.30 Btu/hr.ft².F CTS Method

Test Sample Description:

CONSTRUCTION	Frame
Size(in.)	47-1/4" x 58-7/8"
Daylight Opening (in.)	43-5/8" x 55-1/4"
CORNERS	Mitered
Fasteners	Welds
Sealant	No
MATERIAL	VY
Color Exterior	White
Finish Exterior	Vinyl
Color Interior	White
Finish Interior	Vinyl
GLAZING METHOD	Interior

Glazing Information

Layer 1	DS Guardian Performance Plus II (e=0.044, #2) Annealed
Gap 1	0.50" Gap, DuraSeal Spacer (A8), Air Filled*
Layer 2	DS Clear Annealed
Gas Fill Method	NA*

**Stated per Client/Manufacturer*

NA Non-Applicable

See Description Table Abbreviations

Test Sample Description: (Continued)

COMPONENTS		
Type	Quantity	Location
WEATHERSTRIP		
No weatherstrip		
HARDWARE		
No hardware		
DRAINAGE		
(1.00" x 0.25") weepslot with cover	4	Two per sill face and two per exterior sill leg
(0.25") diameter weephole	2	Glazing track

Thermal Transmittance (U-factor)

Measured Test Data

Heat Flows

1. Total Measured Input into Metering Box (Q_{total})	510.40 Btu/hr
2. Surround Panel Heat Flow (Q_{sp})	62.17 Btu/hr
3. Surround Panel Thickness	4.00 inches
4. Surround Panel Conductance	0.0556 Btu/hr·ft ² ·F
5. Metering Box Wall Heat Flow (Q_{mb})	14.02 Btu/hr
6. EMF vs Heat Flow Equation (equivalent information)	0.0388*EMF + -0.045
7. Flanking Loss Heat Flow (Q_{fl})	11.53 Btu/hr
8. Net Specimen Heat Loss (Q_s)	422.69 Btu/hr

Areas

1. Test Specimen Projected Area (A_s)	19.32 ft ²
2. Test Specimen Interior Total (3-D) Surface Area (A_h)	21.82 ft ²
3. Test Specimen Exterior Total (3-D) Surface Area (A_c)	20.92 ft ²
4. Metering Box Opening Area (A_{mb})	36.47 ft ²
5. Metering Box Baffle Area (A_{bt})	31.16 ft ²
6. Surround Panel Interior Exposed Area (A_{sp})	17.15 ft ²

Test Conditions

1. Average Metering Room Air Temperature (t_h)	69.80 F
2. Average Cold Side Air Temperature (t_c)	-0.40 F
3. Average Guard/Environmental Air Temperature	71.25 F
4. Metering Room Average Relative Humidity	14.02 %
5. Measured Cold Side Wind Velocity (Perpendicular Flow)	17.07 mph
6. Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"H ₂ O

Results

1. Thermal Transmittance of Test Specimen (U_s)	0.31 Btu/hr·ft ² ·F
2. Standardized Thermal Transmittance of Test Specimen (U_{st})	0.30 Btu/hr·ft ² ·F

Thermal Transmittance (U-factor)

Calculated Test Data

CTS Method

1. Emittance of Glass (e_i)	0.84
2. Warm Side Baffle Emittance (e_{b1})	0.92
3. Equivalent Warm Side Surface Temperature	54.51 F
4. Equivalent Cold Side Surface Temperature	3.73 F
5. Warm Side Baffle Surface Temperature	69.67 F
6. Measured Warm Side Surface Conductance (h_h)	1.43 Btu/hr·ft ² ·F
7. Measured Cold Side Surface Conductance (h_c)	5.30 Btu/hr·ft ² ·F
8. Test Specimen Thermal Conductance (C_s)	0.43 Btu/hr·ft ² ·F
9. Convection Coefficient (K_c)	0.33 Btu/(hr·ft ² ·F ^{1.25})
10. Radiative Test Specimen Heat Flow (Q_{r1})	229.03 Btu/hr
11. Conductive Test Specimen Heat Flow (Q_{c1})	193.67 Btu/hr
12. Radiative Heat Flux of Test Specimen (q_{r1})	11.86 Btu/hr·ft ² ·F
13. Convective Heat Flux of Test Specimen (q_{c1})	10.02 Btu/hr·ft ² ·F
14. Standardized Warm Side Surface Conductance (h_{st1})	1.22 Btu/hr·ft ² ·F
15. Standardized Cold Side Surface Conductance (h_{stc})	5.28 Btu/hr·ft ² ·F
16. Standardized Thermal Transmittance (U_{st})	0.30 Btu/hr·ft ² ·F

Test Duration

1. The environmental systems were started at 15:49 hrs., 12/11/06
2. The test parameters were considered stable for two consecutive four hour test periods
23:49 hrs., 12/11/06 to 07:49 hrs., 12/12/06.
3. The thermal performance test results were derived from 03:49 hrs, 12/12/06
to 07:49 hrs, 12/12/06.

The reported Standardized Thermal Transmittance (U_{st}) was determined using CTS Method, per Section 8.2(A) of NFRC 102.

Glazing Deflection:

	Fixed Glazing*
Edge Gap Width	0.50
Estimated gap width upon receipt of specimen in laboratory (after stabilization)	0.44
Effective gap width at laboratory ambient conditions on day of testing	0.44
Effective gap width at test conditions	0.41

*Note: All measurements are in inches

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.

A calibration of the ATI 'thermal test chamber' in York, Pennsylvania was conducted in March 2006.

"This test method does not include procedures to determine the heat flow due to either air movement through the specimen or solar radiation effects. As a consequence, the thermal transmittance results obtained do not reflect performances which may be expected from field installations due to not accounting for solar radiation, air leakage effects, and the thermal bridge effects that may occur due to the specific design and construction of the fenestration system opening. Therefore, it should be recognized that the thermal transmittance results obtained from this test method are for ideal laboratory conditions and should only be used for fenestration product comparisons and as input to thermal performance analyses which also include solar, air leakage and thermal bridge effects."

Ratings included in this report are for submittal to an NFRC-licensed IA for certification purposes and are not meant to be used for labeling purposes. Only those values identified on a valid Certification Authorization Report (CAR) are to be used for labeling purposes.

ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 2.28%.

Report was written in compliance with NFRC 102-2004 Section 9.

Detailed drawings, representative samples of the test specimen and a copy of this report will be retained by ATI for a period of four years. This report is the exclusive property of the client so named herein and relates only to the fenestration product tested. This report may not be reproduced, except in full, without the approval of the laboratory. ATI is an NFRC accredited test laboratory. Results obtained are tested values and do not constitute an opinion or endorsement by this laboratory. This report does not constitute certification of this product, which may only be granted by an NFRC approved Independent Administrator.

This report is reissued in the name of MGM Industries through written authorization of Veka, Inc. to whom the original report was rendered. The original Veka, Inc. report number is 69435.01-116-46.

For ARCHITECTURAL TESTING, INC.

Tested By:

Reviewed By:

Ryan P. Moser
Technician

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

RPM:kmm
69435.08-116-46

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

- Appendix-A: Description Table Abbreviations (1)
- Appendix-B: Submittal Form and Drawings (2)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
.01R0	12/28/06	All	Original Report Issue. Work requested by Michael Zilian of Veka, Inc.
.08R0	05/01/09	All	Reissue .01 Report in the name of MGM Industries

This report produced from controlled document template ATI 00025, issued 07/10/08.

Appendix A: Description Table Abbreviations

CODE	Frame / Sash Types
AI	Aluminum w/ Vinyl Inserts (Caps)
AL	Aluminum
AP	Aluminum w/ Thermal Breaks - Partial
AS	Aluminum w/ Steel Reinforcement
AT	Aluminum w/ Thermal Breaks - All Members (> 0.21")
AU	Aluminum Thermally Improved - All Members (0.062" - 0.209"
AV	Aluminum / Vinyl Composite
AW	Aluminum-clad Wood
FG	Fiberglass
PA	ABS Plastic w/ All Members Reinforced
PC	ABS Plastic-clad Aluminum
PF	ABS Plastic w/ Foam-filled Insulation
PH	ABS Plastic w/ Horizontal Members Reinforced
PI	ABS Plastic w/ Reinforcement - Interlock
PL	ABS Plastic
PP	ABS Plastic w/ Reinforcement - Partial
PV	ABS Plastic w/ Vertical Members Reinforced
PW	ABS Plastic-clad Wood
ST	Steel
VA	Vinyl w/ All Members Reinforced
VC	Vinyl-clad Aluminum
VF	Vinyl w/ Foam-filled Insulation
VH	Vinyl w/ Horizontal Members Reinforced
VI	Vinyl w/ Reinforcement - Interlock
VP	Vinyl w/ Reinforcement - Partial
VV	Vinyl w/ Vertical Members Reinforced
VW	Vinyl-clad Wood
VY	Vinyl
WA	Aluminum / Wood composite
WD	Wood
WV	Vinyl / Wood composite
WF	Fiberglass/Wood Combination
WC	Composite/Wood Composite (Shaped vinyl/wood composite members)
CW	Copper Clad Wood
CO	Vinyl/Wood Composite Material

CODE	Spacer Types (See sealant)
A1	Aluminum
A2	Aluminum (Thermally-broken)
A3	Aluminum-reinforced Polymer
A4	Aluminum / Wood
A5	Aluminum-reinforced Butyl (Swiggle)
A6	Aluminum / Foam / Aluminum
A7	Aluminum U-shaped
A8	Aluminum-Butyl (Corrugated) (Duraseal)
ER	EPDM Reinforced Butyl
FG	Fiberglass
GL	Glass
OF	Organic Foam
PU	Polyurethane Foam
SU	Stainless Steel, U-shaped
CU	Coated Steel, U-shaped (Intercept)
S2	Steel (Thermally-broken)
S3	Steel / Foam / Steel
S5	Steel-reinforced Butyl
S6	Steel U-channel w/ Thermal Cap
SS	Stainless Steel
CS	Coated Steel
TP	Thermo-plastic
WD	Wood
ZE	Elastomeric Silicone Foam
ZF	Silicone Foam
ZS	Silicone / Steel
N	Not Applicable
TS	Thermo-plastic w/ stainless steel substrate

CODE	Tint Codes
AZ	Azurlite
BL	Blue
BZ	Bronze
CL	Clear
EV	Evergreen
GD	Gold
GR	Green
GY	Gray
LE	Low 'e' Coating
OT	Other (use comment field)
RC	Solar or Reflective Coating
RG	Roller Shades between glazing
RS	Silver (reflective coating)
SF	Suspended Polyester Film
SR	Silver
BG	Blinds between the Glazing
DV	Dynamic Glazing-Variable
DY	Dynamic Glazing-NonVariable

CODE	Gap Fill Codes
AIR	Air
AR2	Argon/Krypton Mixture
AR3	Argon / Krypton / Air
ARG	Argon/Air
CO2	Carbon Dioxide
KRY	Krypton/Air
SF6	Sulfur Hexafluoride
XE2	Xenon/Krypton/Air
XE3	Xenon/Argon/Air
XEN	Xenon/Air
N	Not Applicable

DOOR DETAILS	
N	Not Applicable
CODE	Door Type
EM	Embossed
FL	Flush
LF	Full Lite
LH	1/2 - Lite
LQ	1/4 - Lite
LT	3/4 - Lite
RP	Raised Panel
CODE	Skin
AL	Aluminum
FG	Fiberglass
GS	Galvanized Steel
ST	Steel
WD	Wood
VY	Vinyl
CODE	Panel
FG	Fiberglass
PL	Plastic
WP	Wood - Plywood
WS	Wood - Solid
CODE	Sub-Structure
GS	Galvanized Steel
ST	Steel
WD	Wood
VY	Vinyl
CODE	Core Fill
CH	Cellular - Honeycomb
EP	Expanded Polystyrene
PI	Polyisocyanurate
PU	Polyurethane
WP	Wood - Plywood
WS	Wood - Solid
XP	Extruded Polystyrene

CODE	Spacer Sealant
D	Dual Seal Spacer System
S	Single Seal Spacer System

CODE	Grid Description
N	No Muntins
G	Grids between glass
S	Simulated Divided Lites
T	True Muntins

CODE	Grid Size Codes
	Blank for no grids
0.75	Grids < 1"
1.5	Grids >= 1"

CODE	Thermal Breaks
F	Foam
U	Urethane
V	Vinyl
FB	Fiberglass
O	Other
AB	ABS
NE	Neoprene
AI	Air
N	Not Applicable
P	Polyamide

Appendix B: Submittal Form and Drawings



SUBMITTAL FORM for TEST SAMPLES

(for use by manufacturers, lineal suppliers, and fabricators)

1. Information on Production of the Test Sample (complete all fields):

Manufacturer: Master Window Systems Date of sample manufacture: 11-7-06
 Plant address where manufactured: 2060 DeFoor Hills Rd
 City/State/Zip: Atlanta G.A. 30318
 Phone/Fax: (404)355-5844 (404)355-4213 Name of IA: Keystone Certifications

2. Product Information (complete all fields):

Product Line ID Number: New Operator Type (NFRCC 100, Table 1): P.W.
 Series/Model: Master 2000 P.W.

3. Test sample is being submitted for (select one):

- a. Validation for Initial Certification (prototype only; NFRCC PCP Section 2.2.A.3), no plant qualification
- b. Validation for Initial Certification (production line unit; NFRCC PCP Section 2.2.A.2.b) and plant qualification
- c. Validation for Recertification (production line unit; NFRCC PCP Section 2.2.A.2.b) and plant qualification
- d. Plant Qualification Only (production line unit; NFRCC PCP Section 2.2.A.2.b)

(Note: If the test only option is to be used, include a copy of the NFRCC-certified simulator's statement and NFRCC approval as required in NFRCC 100 (1997) Sections B.1. and E.1.1)

I, Brian Brannick, as the designated agent for Master Window Systems, do hereby attest that the foregoing information is true to the best of my information, knowledge, and belief. Further, if the unit is identified in Section 3 as a production line unit, I hereby authorize the NFRCC-accredited testing laboratory to send a copy of the test report to the IA identified above for plant qualification purposes pursuant to the NFRCC Product Certification Program.

Signature: Brian Brannick Date: 11-13-06

FOR LABORATORY USE ONLY

1. Laboratory name: Architectural Testing
2. Date sample received: 11-14-06 File number ID: 69435.01
3. Date sample tested: 12/12/06 By: RPM
4. Modifications made: _____
5. Reason for non-testing of sample unit: _____

(Note: If the sample submitted can not be tested due to damage prior to testing, a new sample and new form shall be submitted to the testing laboratory. Both forms shall be submitted to the IA when the testing is completed).

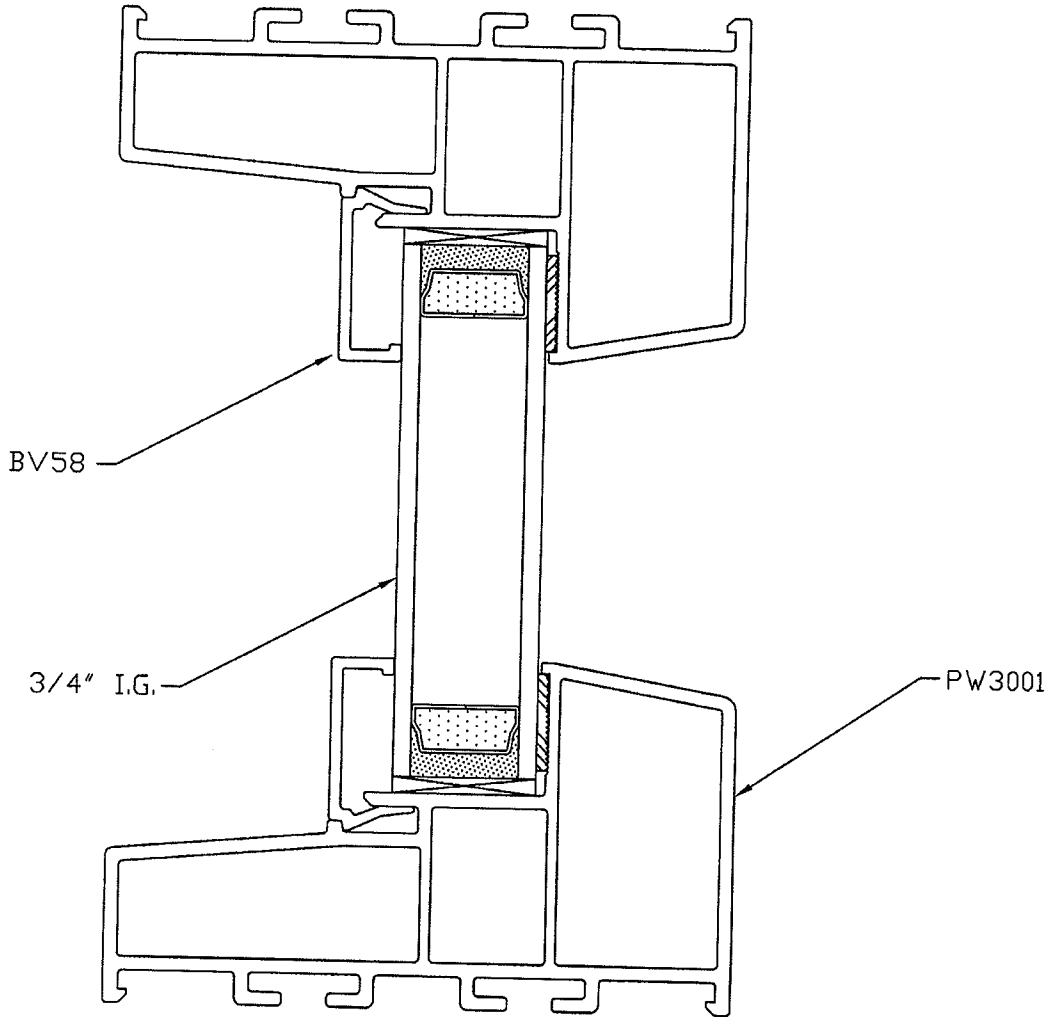


Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# 69435
Date 12/27/06 Tech RPM

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NOTE:
FOR OTHER PROFILE, GLAZING BEAD,
& GLASS OPTIONS, PLEASE SEE THE
LINEAL PROFILE CHARTS FOR THIS
SYSTEM.

REVISIONS	DATE



VEKA INC.
100 VEKA DRIVE
FOMBELL, PA 16123

DRAWN: SES	DATE: 16 JAN 97	SCALE: FULL
CHK'D:	DATE:	APPV'D:
TITLE: PICTURE WINDOW PW30W TYPICAL ASSEMBLY		DWG. # PW30WASMO