MGM Industries

THERMAL PERFORMANCE &
SOLAR HEAT GAIN REPORT

Series "4700"
Vinyl Fixed

NCTL-110-8995-01

NATIONAL CERTIFIED TESTING LABORATORIES

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Thermal Performance, Solar Heat Gain Coefficient, Visible Transmittance and Condensation Resistance Calculation Report

REPORT NO:	*NCTL-110-8995-01*
SIMULATION DATE:	*11/26/03*
REPORT DATE:	*11/26/03*

Client: *MGM Industries*
287 Freehill Road
Hendersonville, TN 37075

Product Line: *MGM Industries' Series12"4700" Vinyl Fixed Prime Window*

Specification: *NFRC 100-2001: "Procedure for Determining Fenestration Product U-Factors".*
NFRC 200-2001: "Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence".
NFRC 500-2001: "Procedure for Determining Fenestration Product Condensation Resistance Values".
Therm 5 / Window 5 NFRC Simulation Manual

Procedures and Compliance: *All U-factor, Solar Heat Gain Coefficients, Visible Transmittance and Condensation Resistance values were calculated using the following characteristics: a default value of 0.30 solar absorptance for all products other than window glazed wall and sloped glazing which have a solar absorptance of 0.50. The best glazing option was used as the configuration for SHGC and VT specialty products table. NCTL is a NFRC accredited simulation laboratory and this simulation was conducted in full compliance with NFRC requirements. This report does not constitute an opinion or endorsement by the laboratory. "Ratings values included in this report are for submittal to an NFRC-licensed IA and are not meant to be used directly for labeling purposes. Only those values identified on a valid Certification Authorization Report (CAR) by an NFRC accredited Inspection Agency (IA) are to be used for labeling purposes". Rounding per IEEE/ASTM SI 10-1997 except section 5.4.1.3.* *(L.4.9.A.1-6, A.7.a, k, 22, A.17)*

PRODUCT LINE DESCRIPTION

(L.4.9.A.7.a-b, d, i)

General: *The product line modeled is MGM Industries' Series "4700" Vinyl Fixed Prime Window.*

Model Size Simulations: *1200mm x 1500mm (47.244" x 59.055")*

Note: All product drawings are included in Attachment A.

Weatherseals: *Not applicable*

Gas Fillings: *(L.4.9.A.7.f, A.8.j, SM. 5.3.3) - Not applicable.*

Reinforcement: *Not applicable.*

Finish: *Vinyl*

Dividers: *(L.4.9.A.7.h) Where applicable, dividers were not modeled because the gap between dividers and lites were greater than 3mm. For Solar Heat Gain and Visual Light Transmittance default dividers less than 1" and greater or equal to 1" and default patterns were used for simulations.*

Modeling Assumptions and Comments Deemed Important: *(L.4.9.A.7.j, A.8.g, L.4.9.10a, 10b, SM. 6.3.7)*

Sealing Rules:

All cavities that are opened to the exterior within a frame section shall be modeled according to ISO 15099, Section 6.7.1, which states that cavities greater than 2mm but equal to or less than 10 mm shall be modeled as "slightly ventilated air cavities". For physical testing purposes the product is sealed at the inside surface with tape or equivalent to prevent air infiltration. Air cavities created by this sealing technique must be simulated with the standard NFRC "Frame Cavity" material. If cavities on the frame are sealed (covered) to the surround panel with tape or equivalent, those cavities are also filled with NFRC "Frame Cavity" material within the simulation model. If the frame is not covered or sealed, those areas are left hollow or opened within the simulation model.

Continuous elements:

All elements continuous within the product line are identified from the Bill-of-Materials and detailed drawings via the referenced dimensions and cut lengths as compared to the overall size of the product.

Modeling assumptions:

The product was modeled with a nominal 1" x 4" wood stud attached to the exterior flange.

Miscellaneous assumptions:

1. *The screen extrusions were not modeled.*
2. *All radii are simulated at angles.*
3. *Any spacer simulated using a spacer system from the Frame Spacer Library match the required configurations for this manufacturer's spacer system.*
4. *The modeling was performed in accordance with the manufacturer's assembly drawing from a DXF file.*

COMPONENT AREA AND FRAME HEIGHTS

(L.4.9.A.8.a-d)

Note: U-factors for all components used in area-weighting are located in approved thermal analysis program for all individual products.

Window Component	Area
Center of Glass Area	1.26m² (13.55 ft²)
Edge of Glass Area	0.30m² (3.27 ft²)
Frame Area	0.24m² (2.55 ft²)
Total Area	1.80m² (19.37 ft²)

Frame Section	Frame Height
All Frame Sections	45.6mm (1.79")

NCTL Therm Section Filename Methodology

Filename Codes Example: AHD2_003.THM	
A	Reinforcement
HD	Frame Section (Head)
2	Glass Size (2.5mm)
_003	Glazing ID #3

Filename Codes for NCTL-110-8995-01	
A	U – Shaped Spacer
B	Swiggle Spacer

Individual Product Descriptions and Model Size Matrix Of U-Factors

All U-factors are given in BTU/HR/ft²/°F

(L.4.9.A.7 e, f, g, A.12)

Prod #	Glazing Descriptions								U-Factor	CR	Ref. Notes
	Exterior Lite	Gap	Spacer	Center Lite	Gap	Interior Lite	Grids	Glazing ID			
001	Clear – 2.5mm	0.562" Air	U – Shaped Galvanized Steel			Clear – 2.5mm	B	1	0.47	42.2	
002	AFG Comfort TiAC36 (e=0.034 on #2) – 2.5mm	0.562" Air	U – Shaped Galvanized Steel			Clear – 2.5mm	B	2	0.32	52.5	
003	Clear – 3mm	0.514" Air	Swiggle Aluminum			Clear – 3mm	B	3	0.46	43.0	
004	AFG Comfort TiAC36 (e=0.034 on #2) – 3mm	0.514" Air	U – Shaped Galvanized Steel			Clear – 3mm	B	4	0.32	51.9	
005	Clear – 2.5mm	0.562" Air	U – Shaped Galvanized Steel			AFG Comfort TiAC36 (e=0.034 on #3) – 2.5mm	B	5	0.32	52.6	

General Notes:

1)

Referenced Notes:

1)

Individual Product Descriptions and Model Size Matrix Of Condensation Resistance

All U-factors are given in BTU/HR/ft²/°F

(L.4.9.A.7 e, f, g, A.12)

	Glazing Descriptions											
Prod #	Exterior Lite	Gap	Spacer	Center Lite	Gap	Interior Lite	Grids	Glazing ID	CR	CR_f	CR_g	Ref. Notes
001	Clear – 2.5mm	0.562" Air	U – Shaped Galvanized Steel			Clear – 2.5mm	B	1	42.2	66.0	48.0	
002	AFG Comfort TiAC36 (e=0.034 on #2) – 2.5mm	0.562" Air	U – Shaped Galvanized Steel			Clear – 2.5mm	B	2	52.5	67.8	65.9	
003	Clear – 3mm	0.514" Air	Swiggle Aluminum			Clear – 3mm	B	3	43.0	67.2	48.2	
004	AFG Comfort TiAC36 (e=0.034 on #2) – 3mm	0.514" Air	U – Shaped Galvanized Steel			Clear – 3mm	B	4	51.9	67.8	66.2	
005	Clear – 2.5mm	0.562" Air	U – Shaped Galvanized Steel			AFG Comfort TiAC36 (e=0.034 on #3) – 2.5mm	B	5	52.6	67.4	65.9	

General Notes:

1)

Referenced Notes:

1)

Individual Product Descriptions and Model Size Matrix Of SHGC & VT

Solar Heat Gain Coefficient and Visible Transmittance

(L.4.9.A.8.e, f, A.12)

	Glazing Descriptions									
Prod #	Exterior Lite	Interspace	Spacer	Center Lite	Interspace	Interior Lite	Dividers	SHGC	VT	Ref. Notes
001	Clear – 2.5mm	0.562" Air	U – Shaped Galvanized Steel			Clear – 2.5mm	N	0.69	0.72	
							<1"	0.63	0.65	
							≥1"	0.56	0.58	
002	AFG Comfort TiAC36 (e=0.034 on #2) – 2.5mm	0.562" Air	U – Shaped Galvanized Steel			Clear – 2.5mm	N	0.31	0.59	
							<1"	0.28	0.53	
							≥1"	0.26	0.47	
003	Clear – 3mm	0.514" Air	Swiggle Aluminum			Clear – 3mm	N	0.68	0.71	
							<1"	0.61	0.64	
							≥1"	0.55	0.57	
004	AFG Comfort TiAC36 (e=0.034 on #2) – 3mm	0.514" Air	U – Shaped Galvanized Steel			Clear – 3mm	N	0.31	0.58	
							<1"	0.28	0.52	
							≥1"	0.26	0.47	
005	Clear – 2.5mm	0.562" Air	U – Shaped Galvanized Steel			AFG Comfort TiAC36 (e=0.034 on #3) – 2.5mm	N	0.40	0.59	
							<1"	0.36	0.53	
							≥1"	0.33	0.47	

General Notes:

1)

Referenced Notes:

1)

A baseline product test in accordance with the "NFRC 102: Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems" is required in order to validate the "Model Size Matrix of U-Values" as previously indicated. Per Section 1.4.3 of NFRC 100-2001, "the baseline product is the individual product selected for validation testing". ***The individual product selected as the baseline product shall be the lowest simulated individual product or an individual product having a simulated U-factor within 0.60 W/(m²*K) (0.10 BTU/HR/ft²/°F) or 20% of the listed lowest simulated U-factor.***

Options Within Baseline Product Tolerance

(L.4.9.11)

Prod #	U-Factor	Ref. Notes
002	0.32	
004	0.32	
005	0.32	

General Notes:
1)

Referenced Notes:
1)

Note:

1. *For lowest U-factor listings where multiple individual products are shown, validation testing can be conducted on any of the configurations listed.*
2. *Actual simulated individual products are required for product line validation testing.*
3. *All individual products in the product line were simulated using the approved NFRC program FRAME or Therm.*

For the purposes of validation testing, production line units and sizes shall be used to represent the baseline product. Per the client, the model size is manufactured as part of their product line; therefore the previously listed model size can be used for baseline product validation testing.

Copies of this report and the detailed product drawings will be retained by NCTL for a period of four (4) years. This report may not be reproduced, except in full, without the approval of NCTL. The results obtained apply only to the modeled product line. The attached diskette(s) contain(s) all required NFRC data and software files. (L.4.9. 9, 15, 16)

NATIONAL CERTIFIED TESTING LABORATORIES (L.4.9.13, 14)

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Attachments