

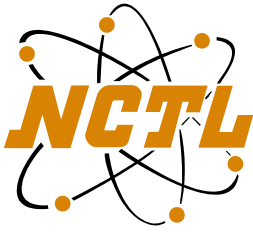


MGM Industries

*SIMULATION PERFORMANCE &
SOLAR HEAT GAIN REPORT*

*“5010”
Transom*

NCTL-110-10903-01



NATIONAL CERTIFIED TESTING LABORATORIES

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

REPORT NO: NCTL-110-10903-01
SIMULATION DATE: 09/11/07
REPORT DATE: 09/11/07

Client: MGM Industries
287 Freehill Road
Hendersonville, TN 37075

Product Line: MGM Industries' Series "5010" Transom

Specification: NFRC 100-2004: "Procedure for Determining Fenestration Product U-Factors".
NFRC 200-2004: "Procedure for Determining Fenestration Product Solar Heat
Gain Coefficients and Visible Transmittance at Normal Incidence".
NFRC 500-2004: "Procedure for Determining Fenestration Product
Condensation Resistance Values".
Therm 5.x / Window 5.x NFRC Simulation Manual (Approved at test date)

**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.

PRODUCT LINE DESCRIPTION

General: The product line modeled is MGM Industries' Series "5010" Transom.

Model Size Simulations: 2000mm x 600mm (78.740" x 23.622")

Note: All product drawings are included in Attachment A.

Reinforcement: Not applicable.

Finish: Vinyl

Dividers: 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.

Group Leaders: The following group leaders are actual simulated individual products per NFRC 4.2.4 and the NFRC Technical Interpretations where applicable. All remaining individual products' U-factors in the corresponding groups are represented by the group leader's U-factor.

COG Group Leader: Individual products which differ from another (base) individual product in glazing tint and/or obscurity (including obscure glass, fritted glass, and wired glass) only may be assumed to have the same U-factor as the base product unless this change is associated with a change in coating properties.

COG Group Leader:

Glazing ID	Glazing Description	U _{COG}
003	AFG TiAC#36 / Air / AFG Clear	0.303*
004	AFG TiAC#36 / Air / AFG Clear	0.316*

* Group Leader

Modeling Assumptions and Comments Deemed Important:

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.

Component Area and Frame Heights:

Frame heights, calculated areas, area weighted values for U-factor, SHGC, and VT, and center -of-glazing are located in approved NFRC simulation programs for all individual products.

General Notes:

The Condensation Resistance results obtained from this procedure are for controlled laboratory conditions and do not include the effects of air movement through the specimen, solar radiation, and the thermal bridging that may occur due to the specific design and construction of the fenestration system opening.

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.

Specialty Products Table: The specialty products method allows the manufacturer to determine the overall product SHGC and VT for any glazing option. The center of glass SHGC and/or VT must be determined using WINDOW 5.2. The method gives overall product SHGC and VT indexed on center of glass properties.

SHGC	No Dividers	Dividers <1"	Dividers ≥1"
0.00	0.003	0.005	0.008
1.00	0.789	0.716	0.646

VT	No Dividers	Dividers <1"	Dividers ≥1"
0.00	0.000	0.000	0.000
1.00	0.786	0.711	0.639

$$SHGC = SHGC_0 + SHGC_{COG} (SHGC_1 - SHGC_0)$$

$$VT = VT_0 + VT_{COG} (VT_1 - VT_0)$$

NCTL Therm Section Filename Methodology

Filename Codes Example: CU_HD2_003.THM	
CU	Spacer (Intercept)
HD	Frame Section (Head)
2	Glass Size (2.5mm)
_003	Glazing ID #3

Individual Product Descriptions and Model Size Matrix of U-Factors, SHGC, VT & CR

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

Product Description	Product Number	Pane ID (Exterior)	Pane ID (Interior)	Pane Thickness (Exterior)	Pane Thickness (Interior)	Gap	Gap Fill	% of Gap Fill	Emissivity Surface 2	Emissivity Surface 3	U-factor C-O-G	SHGC C-O-G	VT C-O-G	Spacer	Grid Type	Tint	U-factor	Condensation Resistance	Solar Heat Gain Coefficient (ND)	Visual Transmittance (ND)	Solar Heat Gain Coefficient (<1")	Visual Transmittance (<1")
CLR_SS_AIR	001	885	885	0.098	0.098	0.428	AIR				0.49	0.80	0.83	CU-D	N,G	CL	0.51	44	0.63	0.65	0.58	0.59
CLR_DS_AIR		887	887	0.118	0.118	0.389	AIR				0.50	0.79	0.82	CU-D	N	CL	0.52	41	0.29	0.54	N/A	N/A
TiAC36#2_SS_AIR	002	964	885	0.098	0.098	0.428	AIR		0.034		0.30	0.37	0.69	CU-D	N,G	LE	0.37	57	0.62	0.65	0.56	0.58
TiAC36#3_SS_AIR		885	964	0.098	0.098	0.428	AIR			0.034	0.30	0.46	0.69	CU-D	N,G	LE	0.37	57	0.29	0.53	0.27	0.48
TiAC36#2_DS_AIR	003	965	887	0.118	0.118	0.389	AIR		0.034		0.32	0.37	0.68	CU-D	N	LE	0.38	51	0.37	0.54	N/A	N/A
TiAC36#3_DS_AIR	004	887	965	0.118	0.118	0.389	AIR			0.034	0.32	0.46	0.68	CU-D	N	LE	0.38	51	0.36	0.53	N/A	N/A
TiAC36#2_DS_AIR_RECT	005	965	887	0.118	0.118	0.389	AIR		0.034		0.32	0.37	0.68	CU-D	G	LE	0.39	51	N/A	N/A	0.33	0.49
TiAC36#3_DS_AIR_RECT		887	965	0.118	0.118	0.389	AIR			0.034	0.32	0.46	0.68	CU-D	G	LE	0.39	51	N/A	N/A	0.33	0.48
CLR_DS_AIR_RECT	006	887	887	0.118	0.118	0.389	AIR				0.50	0.79	0.82	CU-D	G	CL	0.52	41	N/A	N/A	0.27	0.49

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 100-2004, "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.**

Product Description	Product Number	Pane ID (Exterior)	Pane ID (Interior)	Pane Thickness (Exterior)	Pane Thickness (Interior)	Gap	Gap Fill	Emissivity Surface 3	Spacer	Grid Type	U-factor
TiAC36#3_DS_AIR Overall Size: 47.25 x 59.25"	004	887	965	0.118	0.118	0.389	AIR	0.034	CU-D	N	0.36

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 THERM program.

For the purposes of validation testing, production line units and sizes shall be used to represent the baseline products. Representative sizes are therefore defined as the production sizes with the least deviation (D) from the model sizes, calculated per NFRC 100. The previously listed model sizes shall 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 only to the fenestration product simulated. The attached diskette(s) contain(s) all required NFRC data and software files.

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DIGITAL SIGNATURE

CHRISTIAN J. MITCHELL

Simulator



DIGITAL SIGNATURE

STEVEN H. COBLE

NFRC Accredited Simulator

Simulator-In-Responsible-Charge

Attachments

Report Log

Product Line: *MGM Industries' Series "5010" Transom*

Date:
09/11/07 - *Original Report issued to MGM Industries and Inspection Agency*

NFRC CODES

Door	
Code	Description
EM	Embossed
FL	Flush
LF	Full Lite
LH	1/2 - Lite
LQ	1/4 - Lite
LT	3/4 - Lite
N	Not Applicable
RP	Raised Panel

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

Sealant	
Code	Description
D	Dual Seal Spacer System
N	Not Applicable
S	Single Seal Spacer System

Gap Fill	
Code	Description
AIR	Air
AR3	Argon/Krypton/Air Mixture
ARG	Argon
KRY	Krypton
N	Not Applicable

Glass Tint	
Code	Description
AZ	Azurlite
BG	Blinds between the Glazing
BL	Blue
BZ	Bronze
CL	Clear
DV	Dynamic Glazing (Variable)
DY	Dynamic Glazing (Non-Variable)
EV	Evergreen
GC	Gold (reflective coating)
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

Spacer		
Code	Type	Definition
A1-D	Aluminum	Aluminum spacer system - dual sealed.
A1-S	Aluminum	Aluminum spacer system - single sealed.
A2-D	Aluminum (thermally-broken)	Thermally improved aluminum spacer system - dual sealed.
A2-S	Aluminum (thermally-broken)	Thermally improved aluminum spacer system - single sealed.
A3-D	Aluminum-reinforced polymer	Polymer spacer material with aluminum substance - dual sealed.
A3-S	Aluminum-reinforced polymer	Polymer spacer material with aluminum substance - single sealed.
A4-D	Aluminum/Wood	Composite spacer system of two materials - dual sealed.
A4-S	Aluminum/Wood	Composite spacer system of two materials - single sealed.
A5-D	Aluminum-reinforced butyl	Butyl spacer material with aluminum substrate - dual sealed.
A5-S	Aluminum-reinforced butyl	Butyl spacer material with aluminum substrate - single sealed.
A6-D	Aluminum/Foam/Aluminum	Two aluminum spacers separated by foam-type material - dual sealed
A6-S	Aluminum/Foam/Aluminum	Two aluminum spacers separated by foam-type material - single sealed
A7-D	Aluminum U-shaped	U-shaped spacer system embedded in sealant - dual sealed.
A7-S	Aluminum U-shaped	U-shaped spacer system embedded in sealant - single sealed.

Spacer		
Code	Type	Definition
A8-D	Aluminum-Butyl Composite	Exposed corrugated aluminum spacer with butyl - dual sealed.
A8-S	Aluminum-Butyl Composite	Exposed corrugated aluminum spacer with butyl - single sealed.
CS-D	Coated Steel	Coated Steel (galvanized or tinplated) - Dual seal
CS-S	Coated Steel	Coated Steel (galvanized or tinplated) - Single seal
CU-D	Coated Steel U-Shaped	Coated Steel (galvanized or tinplated) U-shaped spacer system embedded in sealant - Dual sealed
CU-S	Coated Steel U-Shaped	Coated Steel (galvanized or tinplated) U-shaped spacer system embedded in sealant - Single sealed
ER-D	EPDM Reinforced Butyl	EPDM reinforced butyl spacer system - dual sealed.
ER-S	EPDM Reinforced Butyl	EPDM reinforced butyl spacer system - single sealed.
FG-D	Fiberglass	Fiberglass - dual sealed.
FG-S	Fiberglass	Fiberglass - single sealed.
GL-S	Glass	Welded glass edge condition at glazing perimeter.
N	Not Applicable	
OF-D	Organic Foam	Organic-based foam spacer system - dual sealed.
OF-S	Organic Foam	Organic-based foam spacer system - single sealed.
P1-D	Polycarbonate- Butyl Composite	Exposed corrugated polycarbonate spacer with butyl - dual sealed.
P1-S	Polycarbonate- Butyl Composite	Exposed corrugated polycarbonate spacer with butyl - single sealed.
PU-D	Polyurethane foam	Polyurethane foam - dual sealed.
PU-S	Polyurethane foam	Polyurethane foam - single sealed.
S2-D	Steel (thermally-broken)	Stainless steel spacer with urethane thermal break - dual sealed.
S2-S	Steel (thermally-broken)	Stainless steel spacer with urethane thermal break - single sealed.
S3-D	Steel/Foam/Steel	Two steel spacers separated by foam-type material - dual sealed.
S3-S	Steel/Foam/Steel	Two steel spacers separated by foam-type material - single sealed.
S5-D	Steel reinforced butyl	Butyl spacer material with stainless steel substrate - dual sealed.
S5-S	Steel reinforced butyl	Butyl spacer material with stainless steel substrate - single sealed.
S6-D	Steel U-channel w/ thermal cap	U-shaped steel spacer system with a thermal cap - dual sealed.
S6-S	Steel U-channel w/ thermal cap	U-shaped steel spacer system with a thermal cap - single sealed.
SS-D	Stainless Steel	Stainless Steel - Dual Seal
SS-S	Stainless Steel	Stainless Steel - Single Sealed
SU-D	Stainless Steel U-Shaped	Stainless Steel U-shaped spacer system embedded in sealant - Dual sealed
SU-S	Stainless Steel U-Shaped	Stainless Steel U-shaped spacer system embedded in sealant - Single sealed
TP-D	Thermo-plastic	Thermo-plastic - dual sealed.
TP-S	Thermo-plastic	Thermo-plastic - single sealed.
TS-D	Thermo-plastic	Thermoplastic spacer with stainless steel substrate - dual-sealed
TS-S	Thermo-plastic	Thermoplastic spacer with stainless steel substrate - single-sealed
WD	Wood	Wood spacer system
ZF-D	Silicone Foam	Silicone foam spacer system - dual sealed.
ZF-S	Silicone Foam	Silicone foam spacer system - single sealed.
ZS-D	Silicone/Steel	Combination of two separate spacers: a steel spacer and silicone spacer - dual sealed.
ZS-S	Silicone/Steel	Combination of two separate spacers: a steel spacer and silicone spacer - single sealed.

ATTACHMENT A

Product Drawings

TEST SPECIMEN COMPLIES WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

TEST COMPLETE: 9/12/07

Bill of Materials Listing

Print Date: Aug 16, 2007

NCTL-110-10903-01

Product: 5010

Type: TR

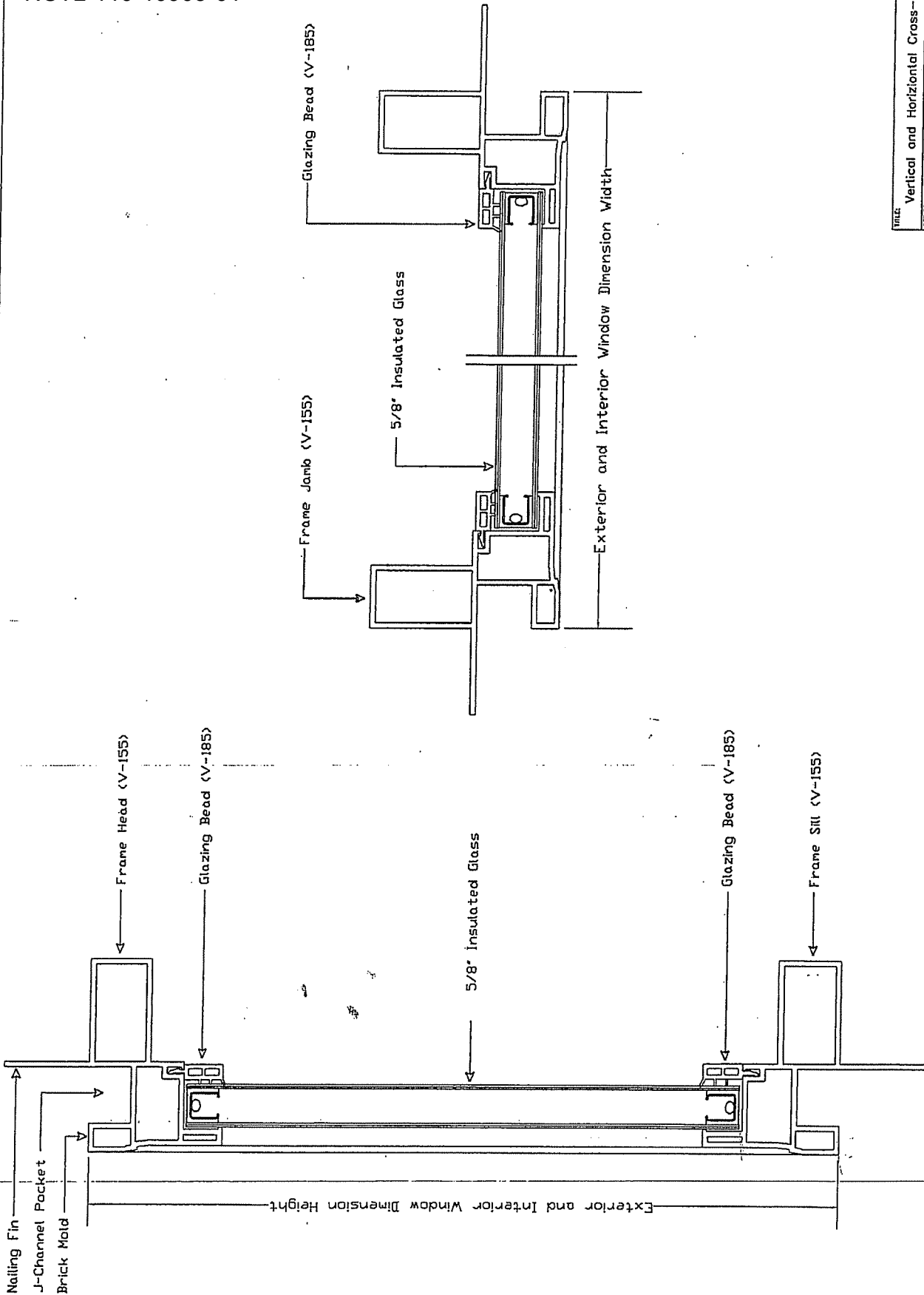
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GLASS	1CL	Default Glass Type	1.00	3.0000	3.0000	SF		IA	N		
GLSSPC	SWG-3/8	Glass Spacer	2.00		3.0000	LI	W	IA			
HEADER	V-185	Frame Top Extrusion	1.00		2.8125	LI	W	IA	Y		
LJAMB	V-185	Left Side Extrusion	1.00	3.9375		LI	H	IA	Y		
MUNCLP	11052-002	Muntin Clips	12.00			EA		IA			
MUNTIN	536006	Muntin Bar	1.00	3.6875		LI	H	IA	Y		
RJAMB	V-185	Right Side Extrusion	1.00	3.9375		LI	H	IA	Y		
SCAULK	100	Silicone Caulk	1.00			EA		IA			
SILL	V-185	Bottom Extrusion	1.00		2.8125	LI	W	IA	Y		

End of Subassembly IA *****

HEADER	V-155	Frame Top Extrusion	1.00		-.2500	LI	W	MF	Y		V-155
JAMEXS	WOOD	Jamb Extension	2.00	-.2500		LI	H	MF			WOOD
JAMEXT	WOOD	Jamb Extension	2.00		1.2500	LI	W	MF			WOOD
LJAMB	V-155	Left Side Extrusion	1.00	-.2500		LI	H	MF	Y		V-155
RJAMB	V-155	Right Side Extrusion	1.00	-.2500		LI	H	MF	Y		V-155
SILL	V-155	Bottom Extrusion	1.00		-.2500	LI	W	MF	Y		V-155

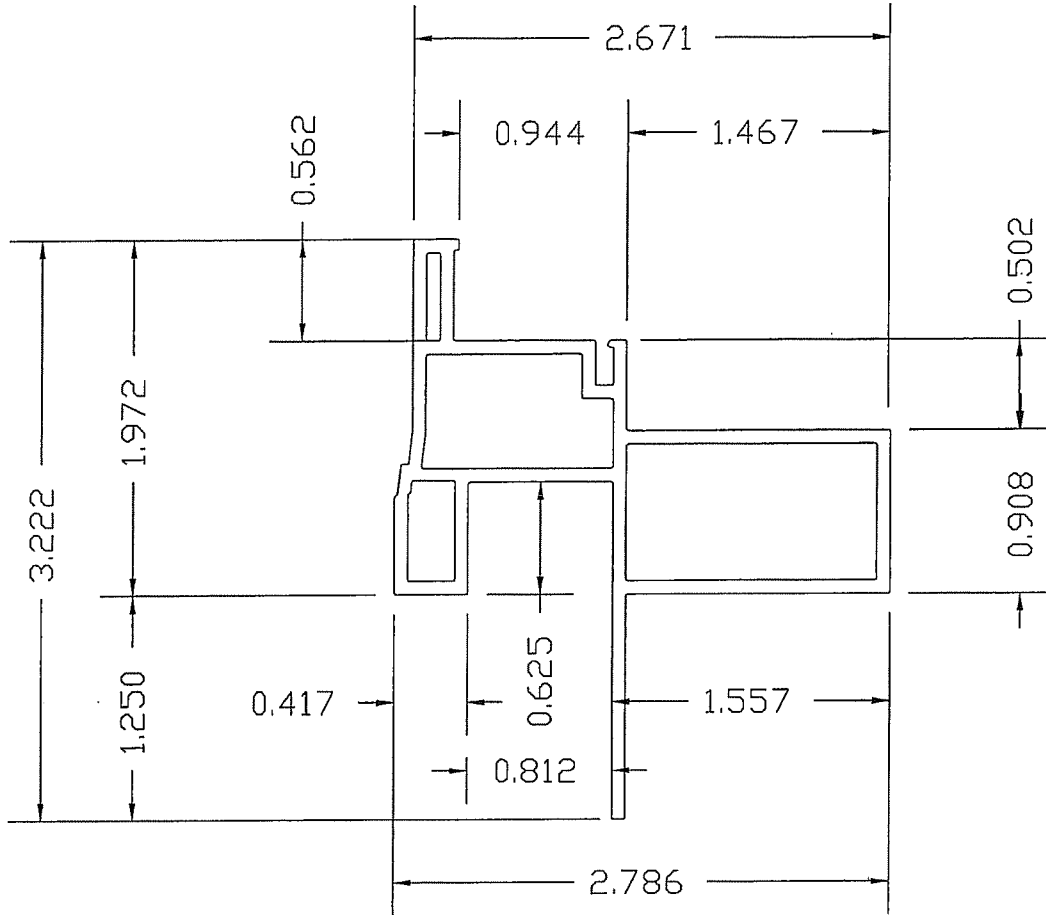
End of Subassembly MF *****

TEST SPECIMEN COMPLIES
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 ANY DEVIATION IS NOTED.
 TEST COMPLETE: 9/12/07
 NCTL-110-10903-01



TITLE	Vertical and Horizontal Cross-Section
SERIES	5000 Picture Transom
DATE	07/01/03
DESIGNED BY	R. Groves
DRAWN BY	R. Groves
CHECKED BY	R. Groves
SCALE	Do Not Scale

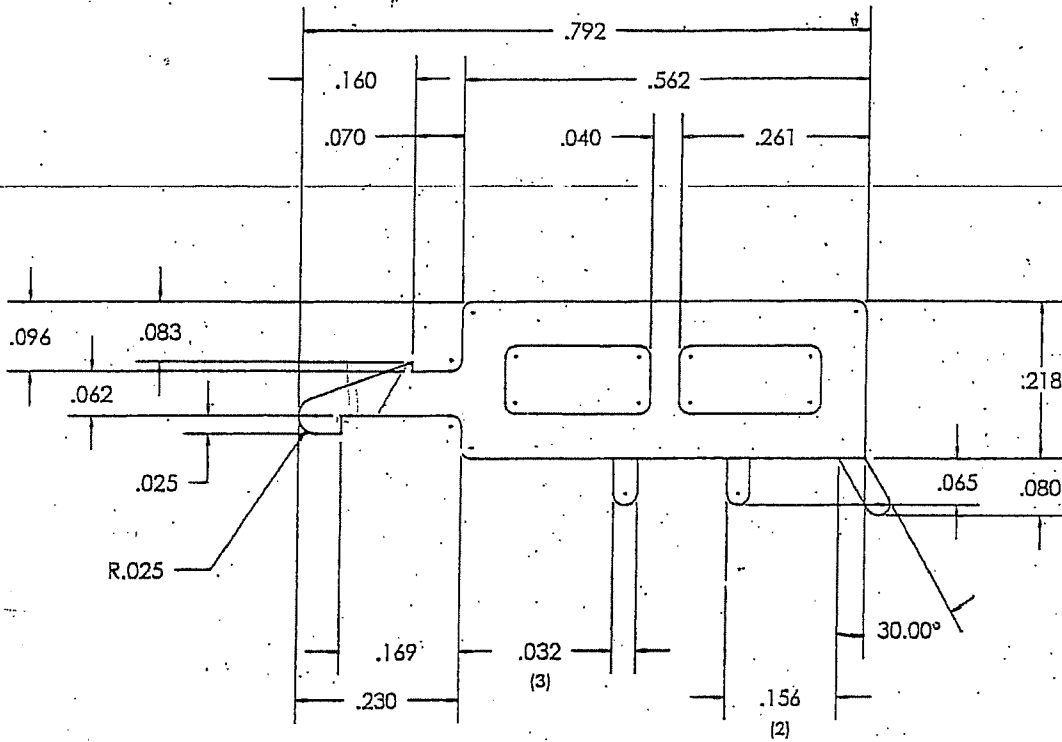
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 TEST COMPLETE: 9/12/07
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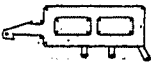
ALL RADI TO BE 0.015. ALL WALL THKS TO BE 0.060 UNLESS OTHERWISE SPECIFIED.

MGM INDUSTRIES 287 FREEHILL ROAD HENDERSONVILLE, TN 37075	DESCRIPTION:	SERIES#:	DWG. NO.:	REV.:
	Fix PW MainFrame Bendable	5000	V-155	
	DO NOT SCALE DRAWING	WEIGHT:	AREA:	BY: RGraves
			DATE:	10-15-03

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 ANY DEVIATION IS NOTED
 TEST COMPLETE: 9/12/07
 NCTL-110-10903-01



FULL SIZE



NOTE: AREA WT/FT
 RIGID .098 .061
 FLEX .007 .004

MGM Industries INC.

287 Freehill Road
 HENDERSONVILLE, TN 37075

DESCRIPTION: GLAZING BEAD

ALL RADII TO BE .015, ALL WALL THK TO BE .062 UNLESS OTHERWISE SPECIFIED

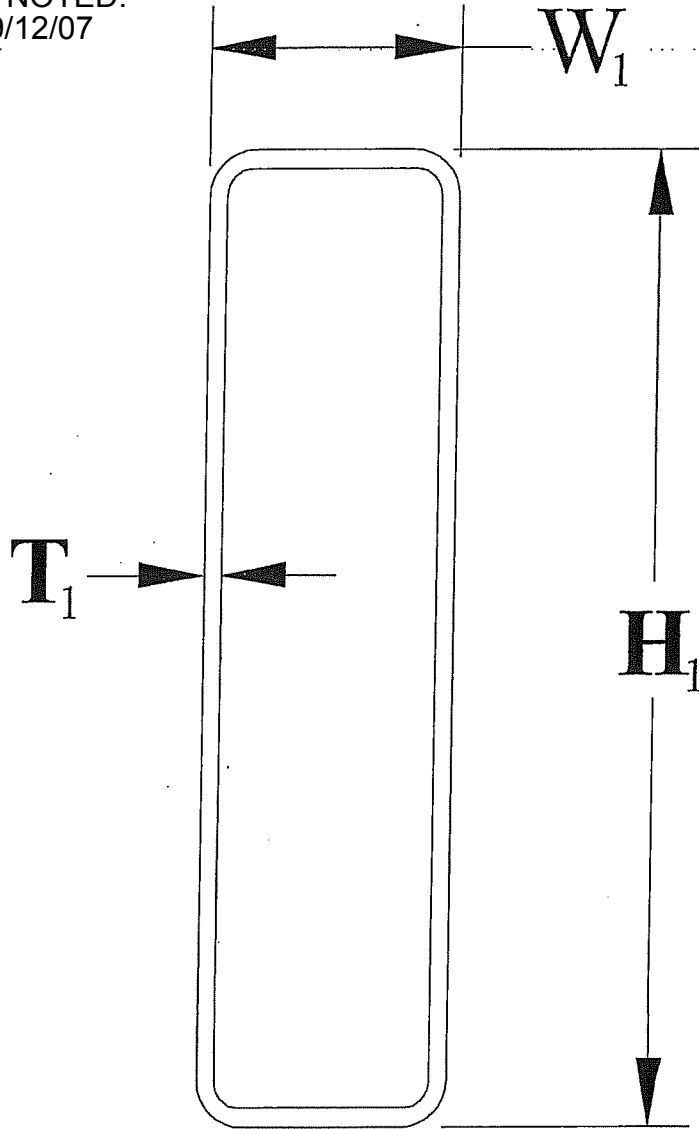
BY MJP DATE 10-6-89

REV	DESCRIPTION	BY	DATE
P			
O			
L	REDRAWN ON NEW BORDER	MU	6-15-98

AREA	WT/FT	SCALE	DIE #
.106	.066	4X	V-185

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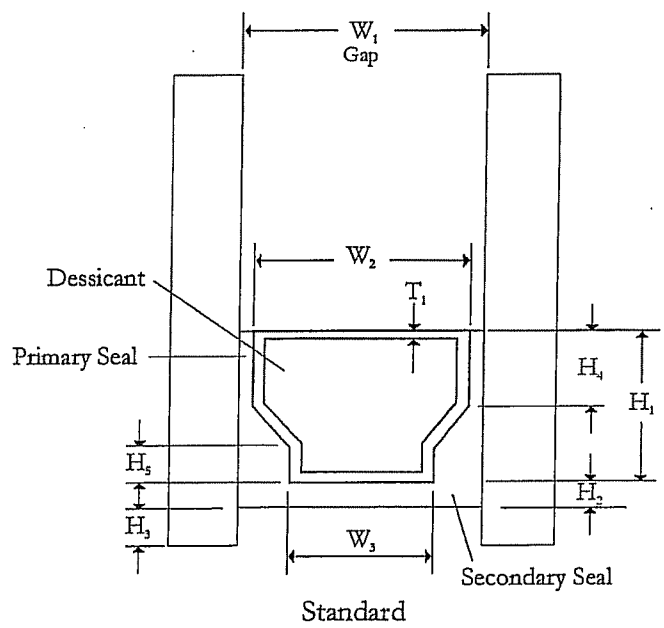
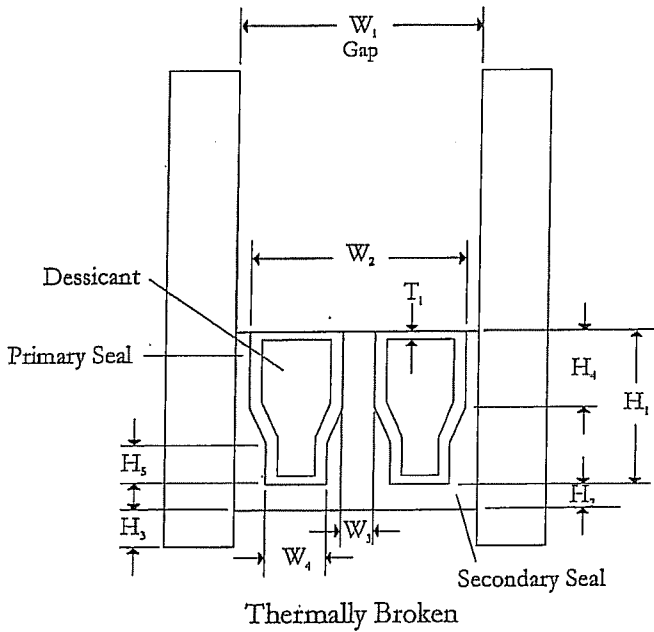
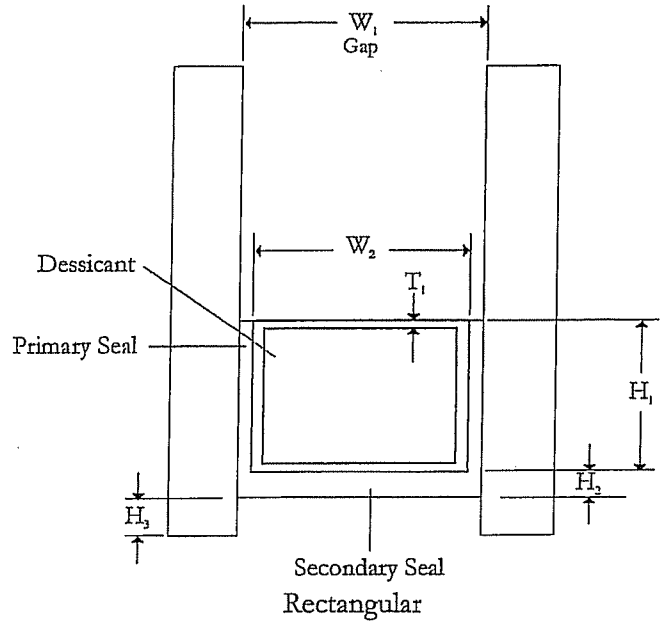
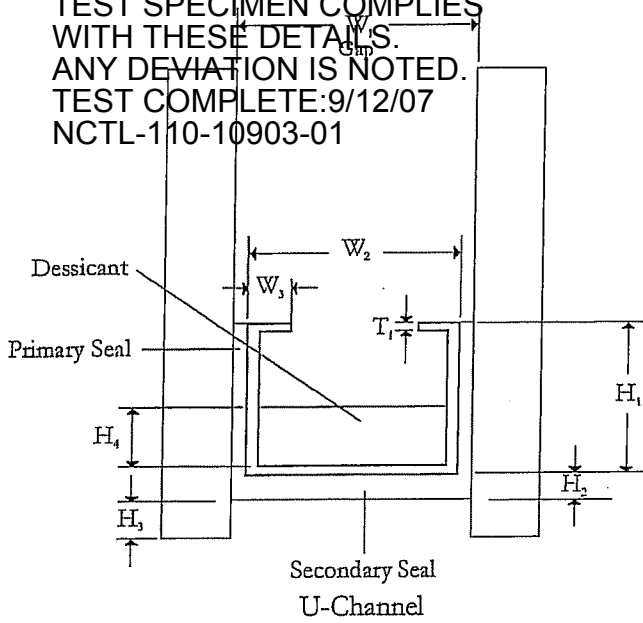


Rectangular

Divider Dimensions - Fill dimensions where applicable - Please fill out a divider sheet for each divider size used.

Dimensions			Material		
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<input type="checkbox"/> H_1 <u>.805</u> "	<input type="checkbox"/> H_2 _____ "	<input type="checkbox"/> T_1 <u>.018</u> "	<input type="checkbox"/> Steel - Mild	<input type="checkbox"/> Steel - Stainless	

TEST SPECIMEN COMPLIES WITH THESE DETAILS. ANY DEVIATION IS NOTED. TEST COMPLETE: 9/12/07 NCTL-110-10903-01



Spacer Dimensions - Fill dimensions where applicable - Please fill out a spacer sheet for each spacer used whether spacer type or size.

Gap	Primary Seal	Secondary Seal	Material	Fill
<input type="checkbox"/> W ₁ <u>.451</u> "	<input checked="" type="checkbox"/> Butyl	<input checked="" type="checkbox"/> Butyl	<input type="checkbox"/> Aluminum	<input checked="" type="checkbox"/> Dessicant
<input type="checkbox"/> W ₂ <u>.405</u> "	<input type="checkbox"/> PIB	<input type="checkbox"/> PIB	<input type="checkbox"/> Steel - Mild	<input type="checkbox"/> Air
<input type="checkbox"/> W ₃ <u>.070</u> "	<input type="checkbox"/> Polysulphide	<input type="checkbox"/> Polysulphide	<input type="checkbox"/> Steel - Stainless	<input type="checkbox"/> Other _____
<input type="checkbox"/> W ₄ _____ "	<input type="checkbox"/> Silicone	<input type="checkbox"/> Silicone	<input checked="" type="checkbox"/> Steel - Galvanized	
<input type="checkbox"/> H ₁ <u>.300</u> "	<input type="checkbox"/> Urethane	<input type="checkbox"/> Urethane	<input type="checkbox"/> Vinyl	
<input type="checkbox"/> H ₂ <u>.045</u> "	<input type="checkbox"/> None	<input type="checkbox"/> None	<input type="checkbox"/> Foam _____	
<input type="checkbox"/> H ₃ <u>.08</u> "	<input type="checkbox"/> Other _____	<input type="checkbox"/> Other _____	<input type="checkbox"/> Other _____	
<input type="checkbox"/> H ₄ <u>.084</u> "				
<input type="checkbox"/> H ₅ _____ "				
<input type="checkbox"/> T ₁ <u>.013</u> "				