MGM Industries

SIMULATION PERFORMANCE &
SOLAR HEAT GAIN REPORT

"4010"
Double Hung

NCTL-110-10883-01a
(Revised April 20, 2009)

NATIONAL CERTIFIED TESTING LABORATORIES

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

REPORT NO:	*NCTL-110-10883-01a*
SIMULATION DATE:	*09/10/07*
REPORT DATE:	*09/10/07*
REVISION DATE:	*04/20/09*

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

Product Line: *MGM Industries' Series "4010" Double Hung*

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 "4010" Double Hung.*

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

Note: All product drawings are included in Attachment A.

Weatherseals:

Location	Weather Seal Description
Head	(1) single strip of weather-strip
Bottom Jamb	(3) single strip of weather-strip
Top Jamb	(3) single strip of weather-strip
Meeting Rail	(2) single strip of weather-strip
Sill	(1) single strip of weather-strip and bulb seal

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}
001	AFG Clear / Air / AFG Clear	0.481*
002	AFG TiAC#36 / Air / AFG Clear	0.298*

*** 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.

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.

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:

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.

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	0.004	0.006	0.009
1.00	0.750	0.670	0.595

VT	No Dividers	Dividers <1"	Dividers ≥1"
0.00	0.000	0.000	0.000
1.00	0.747	0.664	0.586

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

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

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	0.553	AIR				0.50	0.80	0.83	CU-D	N,G	CL	**0.47**	**42**	**0.60**	**0.62**	**0.54**	**0.55**
CLR_DS_AIR		887	887	0.118	0.118	0.514	AIR				0.50	0.79	0.82	CU-D	N,G	CL	**0.47**	**42**	**0.28**	**0.51**	**0.25**	**0.46**
TiAC36#2_SS_AIR	002	964	885	0.098	0.098	0.553	AIR		0.034		0.30	0.37	0.69	CU-D	N,G	LE	**0.34**	**51**	**0.59**	**0.61**	**0.53**	**0.55**
TiAC36#3_SS_AIR		885	964	0.098	0.098	0.553	AIR			0.034	0.30	0.47	0.69	CU-D	N,G	LE	**0.34**	**51**	**0.28**	**0.51**	**0.25**	**0.45**
TiAC36#2_DS_AIR		965	887	0.118	0.118	0.514	AIR		0.034		0.29	0.37	0.68	CU-D	N,G	LE	**0.34**	**51**	**0.35**	**0.51**	**0.32**	**0.46**
TiAC36#3_DS_AIR		887	965	0.118	0.118	0.514	AIR			0.034	0.29	0.46	0.68	CU-D	N,G	LE	**0.34**	**51**	**0.35**	**0.51**	**0.31**	**0.45**
CLR_SS_AIR	003	885	885	0.098	0.098	0.553	AIR				0.50	0.80	0.83	A5-D	N,G	CL	**0.47**	**43**	**0.60**	**0.62**	**0.54**	**0.55**
CLR_DS_AIR		887	887	0.118	0.118	0.514	AIR				0.50	0.79	0.82	A5-D	N,G	CL	**0.47**	**43**	**0.28**	**0.51**	**0.25**	**0.46**
TiAC36#2_SS_AIR	004	964	885	0.098	0.098	0.553	AIR		0.034		0.30	0.37	0.69	A5-D	N,G	LE	**0.34**	**53**	**0.59**	**0.61**	**0.53**	**0.55**
TiAC36#3_SS_AIR		885	964	0.098	0.098	0.553	AIR			0.034	0.30	0.47	0.69	A5-D	N,G	LE	**0.34**	**53**	**0.28**	**0.51**	**0.25**	**0.45**
TiAC36#2_DS_AIR		965	887	0.118	0.118	0.514	AIR		0.034		0.29	0.37	0.68	A5-D	N,G	LE	**0.34**	**53**	**0.35**	**0.51**	**0.32**	**0.46**
TiAC36#3_DS_AIR		887	965	0.118	0.118	0.514	AIR			0.034	0.29	0.46	0.68	A5-D	N,G	LE	**0.34**	**53**	**0.35**	**0.51**	**0.31**	**0.45**
Revised April 20, 2009																						
272#2_DS_Arg_75	005	2011	887	0.118	0.118	0.514	ARG	90	0.042		0.25	0.41	0.72	CU-D	N,G	LE	**0.31**	**54**	**0.31**	**0.54**	**0.28**	**0.48**
272#3_DS_Arg_75		887	2011	0.118	0.118	0.514	ARG	90		0.042	0.25	0.50	0.72	CU-D	N,G	LE	**0.31**	**54**	**0.38**	**0.54**	**0.34**	**0.48**
366#2_DS_Arg_75	006	2154	887	0.118	0.118	0.514	ARG	90	0.022		0.24	0.27	0.65	CU-D	N,G	LE	**0.30**	**55**	**0.21**	**0.48**	**0.19**	**0.43**
366#3_DS_Arg_75		887	2154	0.118	0.118	0.514	ARG	90		0.022	0.24	0.39	0.65	CU-D	N,G	LE	**0.30**	**55**	**0.29**	**0.48**	**0.26**	**0.43**

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/ºF) or 20% of the listed lowest simulated U-factor.***

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 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 only to the fenestration product simulated. The attached diskette(s) contain(s) all required NFRC data and software files.

NATIONAL CERTIFIED TESTING LABORATORIES

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Attachments

Report Log

Product Line: *MGM Industries' Series "4010" Double Hung*

Date:	
09/10/07	*- Original Report issued to MGM Industries and Inspection Agency*
04/20/09	*-Added options 5-6 to report. Revised report and issued original 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: 9/10/07
NCTL-110-10883-01

Bill of Materials Listing

Print Date: Oct 16, 2007

Product: 4000 Type: DH

Assembly Code	Part #	Description	Qty	<---Deducts---> Height	Width	Unit Code	Vert Hor	Sub Assy	Add Color	Fixed Length	W/Nailing Fin
ASSCR1	8X3/8PH	Assembly Screw #1	4.00			EA		IA	N		
BALCOV	VR-879	Balance Cover	2.00	.0000		LI	H	IA	Y		
CKEYS	1905-DAYTON	Corner Keys	4.00			EA		IA	N		
GLASS	1CL	Default Glass Type	1.00	1.8750	5.6875	SF		IA	N		
GLSSPC	SWGG-13/16	Glass Spacer	2.00		5.6875	LI	W	IA	N		
GLSSPC	SWGG-13/16	Glass Spacer	2.00	3.6250		LI	H	IA	N		
HEADER	1002	Frame Top Extrusion	1.00		3.8750	LI	W	IA	Y		
KEEPER	667108K4	Keeper	2.00			EA		IA	N		
LATCH	1906	Latch	2.00			EA		IA	Y		
LJAMB	1000	Left Side Extrusion	1.00	.2500		LI	H	IA	Y		
LSPRNG	1909	Latch Spring	4.00			EA		IA	N		
MUNCLP	10946-002	Muntin Clips	1.00			EA		IA	N		
MUNTNH	536006	Muntin Bar Horizontl	1.00		6.1875	LI	W	IA	Y		
MUNTNV	536006	Muntin Bar Vertical	1.00	5.0625		LI	H	IA	Y		
NLATCH	1941	Night Latch	2.00			EA		IA	Y		
POPRVT	AB64A	Pop Rivet	4.00			EA		IA	Y		
REBAR	1920	Reinforcement Bar	1.00		12.0000	LI	W	IA	N		
RJAMB	1000	Right Side Extrusion	1.00	.2500		LI	H	IA	Y		
SEAMSL	LV	Liquid Vinyl	8.00					IA	Y		
SILL	1003	Bottom Extrusion	1.00		3.8750	LI	W	IA	Y		
THBBUT	1907	Thumb Button	2.00			EA		IA	Y		
TLTKEY	1943	Pivot Bar W/ T-Nose	2.00			EA		IA	N		
VSWEEP	1005	Vinyl Sweep	1.00		3.8750	LI	W	IA	Y		
WTSTPH	W213059G	Weather Strip(H)	2.00		3.8750	LI	W	IA	N		
WTSTPV	W213059G	Weather Strip(V)	4.00	3.8750		LI	H	IA	N		

End of Subassembly IA **********

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Print Date: Oct 16 2007

Product: 4000 Type: DH

Assembly Code	Part #	Description	Qty	<---Deducts---> Height	Width	Unit Code	Vert Hor	Sub Assy	Add Color	Fixed Length	W/Nailing Fin
ASSCR1	8X3/8PH	Assembly Screw #1	4.00			EA		IB	N		
CKEYS	1905-DAYTON	Corner Keys	4.00			EA		IB	N		
CWSTRP	P2553AFW	Corner Weather Strip	2.00			LI		IB	N		
GLASS	1CL	Default Glass Type	1.00	1.8750	4.6875	SF		IB	N		
GLSSPC	SWGG-13/16	Glass Spacer	2.00		4.6875	LI	W	IB	N		
GLSSPC	SWGG-13/16	Glass Spacer	2.00	3.6250		LI	H	IB	N		
HEADER	1004A	Frame Top Extrusion	1.00		2.9375	LI	W	IB	Y		
LATCH	1906	Latch	2.00			EA		IB	Y		
LJAMB	1000	Left Side Extrusion	1.00	.2500		LI	H	IB	Y		
LOCK	667202K4	Sash Lock	2.00			EA		IB	N		
LSPRNG	1909	Latch Spring	4.00			EA		IB	N		
MUNCLP	10946-002	Muntin Clips	1.00			EA		IB	N		
MUNTNH	536006	Muntin Bar Horizontl	1.00		5.1875	LI	W	IB	Y		
MUNTNV	536006	Muntin Bar Vertical	1.00	5.0625		LI	H	IB	Y		
REBAR	1033	Reinforcement Bar	1.00		11.0000	LI	W	IB	N		
RJAMB	1000	Right Side Extrusion	1.00	.2500		LI	H	IB	Y		
SEAMSL	LV	Liquid Vinyl	8.00					IB	Y		
SILL	1002	Bottom Extrusion	1.00		2.9375	LI	W	IB	Y		
THBBUT	1908	Thumb Button	2.00			EA		IB	Y		
TLTKEY	1943	Pivot Bar W/ T-Nose	2.00			EA		IB	N		
VSWEEP	1006	Vinyl Sweep	1.00		2.9375	LI	W	IB	Y		
WTSTPH	W213059G	Weather Strip(H)	2.00		2.9375	LI	W	IB	N		
WTSTPV	W213059G	Weather Strip(V)	4.00	.3750		LI	H	IB	N		
End of Subassembly IB	**********										
ASSCR1	8X3/8PH	Assembly Screw #1	16.00			EA		MF			
ASSCR2	10-24X7/8	Assembly Screw #2	2.00			EA		MF			

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Product: 4000 Type: DH

Assembly Code	Part #	Description	Qty	<---Deducts---> Height	Width	Unit Code	Vert Hor	Sub Assy	Add Color	Fixed Length	W/Nailing Fin
ASSCR3	8X11/2PH	Assembly Screw #3	2.00			EA		MF			
ASSCR4	8X7/8PH	Assembly Screw #4	2.00			EA		MF			
ASSCR5	8X2PH	Assembly Screw #5	4.00			EA		MF	Y		
BALSHO	530CSB	Balance Shoes	4.00			EA		MF			
BCKEY	1901	Bottom Corner Keys	2.00			EA		MF			
COVBUT	326	Cover Button	4.00			EA		MF	Y		
EXPAND	M-4000	Head Expander	1.00		.0000	LI	W	MF	Y		
EXPASP	1911	Expand-A-Spring-But.	2.00			EA		MF			
HEADER	1011	Frame Top Extrusion	1.00			LI	W	MF	Y		
INSSTP	609	Insert Stop	2.00			EA		MF	Y	6.5000	
LJAMB	1012	Left Side Extrusion	1.00	.0000		LI	H	MF	Y		
RJAMB	1012	Right Side Extrusion	1.00	.0000		LI	H	MF	Y		
SCAULK	100	Silicone Caulk	1.00			EA		MF	N		
SHSTRP	MA1235	Strapping 1/2x.023	1.00		.0000	EA		MF			
SILANG	612	Sill Angle	1.00		.0000	LI	W	MF	Y		
SILL	1013	Bottom Extrusion	1.00			LI	W	MF	Y		
TCKEY	1903	Top Corner Key	2.00			EA		MF			
WTSTPH	W213059G	Weather Strip(H)	2.00		-.1250	LI	W	MF	N		
End of Subassembly MF		**********									
CKEYS	CORB38PSW	Corner Keys	4.00			EA		SC	N		
HEADER	BARB38020	Frame Top Extrusion	1.00		6.0000	LI	W	SC	N		
LJAMB	BARB38020	Left Side Extrusion	1.00	1.6250		LI	H	SC	N		
LSPRNG	V8-3769	Leaf Spring	2.00			EA		SC	N		
RJAMB	BARB38STOP020	Right Side Extrusion	1.00	1.6250		LI	H	SC	N		
SCDEDF	1	Full Screen Deduct		1.0000	4.1875			SC			
SCDEDH	1	Half Screen Deduct		-.2500	3.9375			SC			

TEST SPECIMEN COMPLIES
WITH THESE DETAILS.
ANY DEVIATION IS NOTED.
TEST COMPLETE: 9/10/07
NCTL-110-10883-01

Bill of Materials Listing

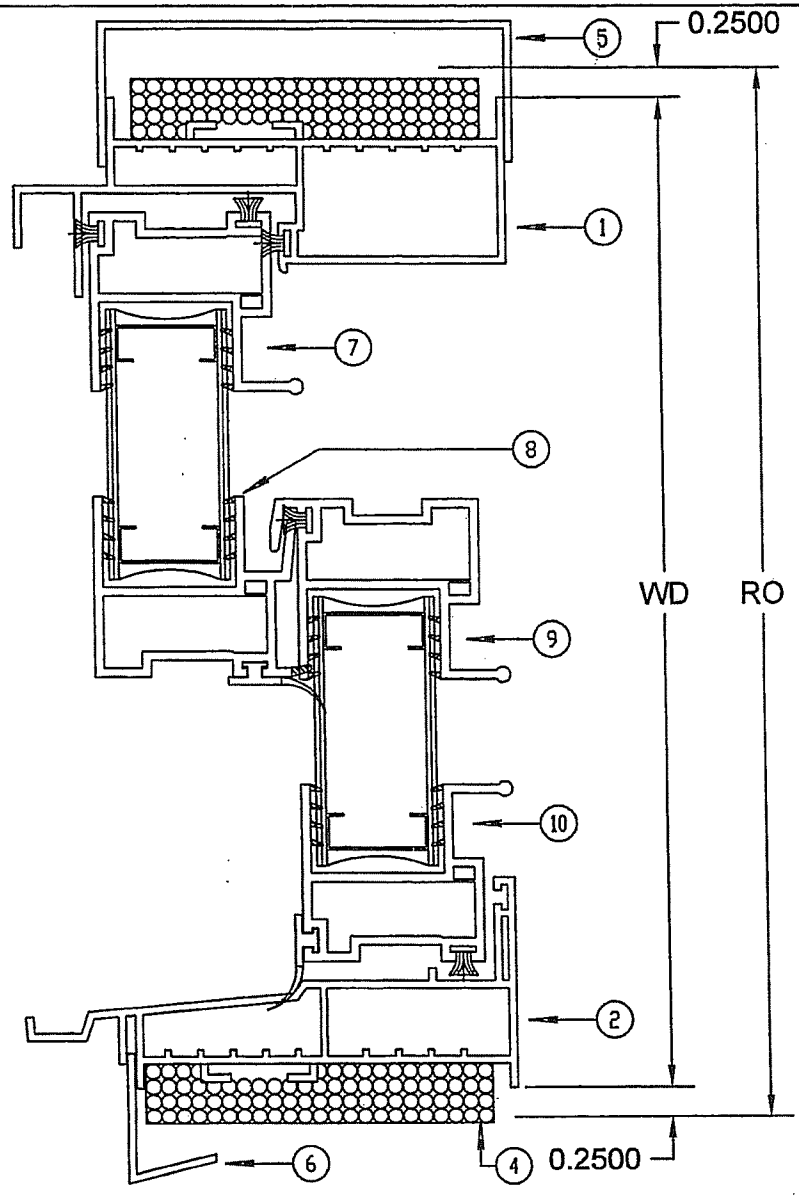
Print Date: Oct 16, 2007

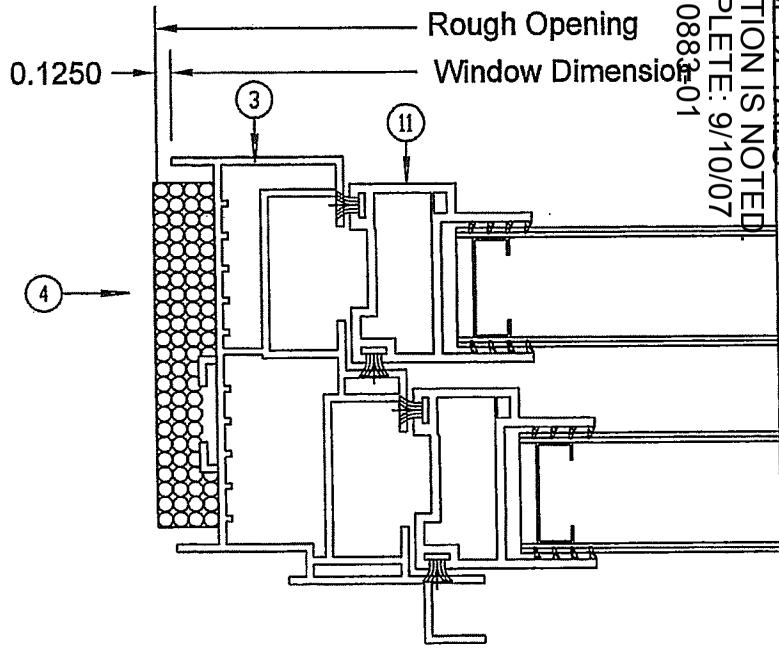
Product: 4000 Type: DH

Assembly Code	Part #	Description	Qty	<---Deducts---> Height	Width	Unit Code	Vert Hor	Sub Assy	Add Color	Fixed Length	W/Nailing Fin
SCLOTH	1816	Screen Cloth(Std)	1.00	.2500	4.6250	SF		SC	N		
SCLOTW	1816	Screen Cloth(Wire)	1.00			SF		SC	N		
SILL	BARB38020	Bottom Extrusion	1.00		6.0000	LI	W	SC	N		
SSPLIN	.150	Screen Spline	2.00	.0000	4.2500	LI	W	SC	N		
SSPLIN	.150	Screen Spline	2.00	.2500		LI	H	SC	N		

End of Subassembly SC **********

TEST SPECIMEN COMPLIES
WITH THESE DETAILS.
ANY DEVIATION IS NOTED.
TEST COMPLETE: 9/10/07
NCTL-110-10882-01



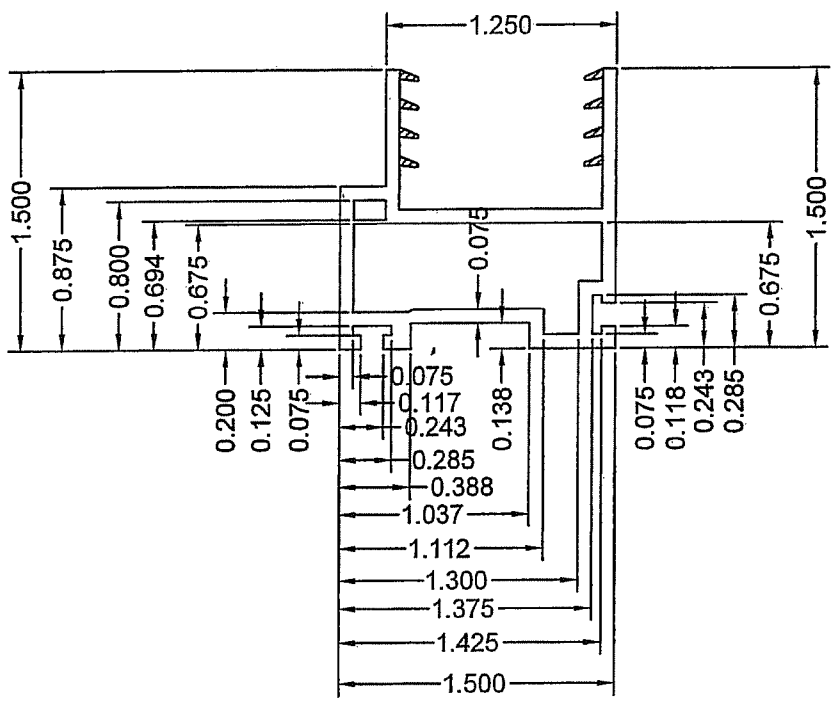


1	M-1011 FRAME HEAD	7	M-1002 PULL RAIL
2	M-1013 FRAME SILL	8	1003 KEEPER RAIL
3	M-1012 FRAME JAMB	9	M-1004 LOCK RAIL
4	62002 FOAM WRAP	10	M-1002 LIFT RAIL
5	608 HEAD EXPANDER	11	M-1000 SASH VERTICALS
6	SILL ANGLE		

MGM INDUSTRIES
287 Freehill Road
Hendersonville, TN

TITLE: Series 4000DH Cross-Section
MATERIALS:
DO NOT SCALE DRAWING
BY: R.Graves
DATE: 06-15-07
DWG #:

APPLICATION	REVISIONS			
NEXT ASSY USED ON	REV.	DESCRIPTION	DATE	APPROVED
TEST SPECIMEN COMPLIES WITH THESE DETAILS. ANY DEVIATION IS NOTED. TEST COMPLETE: 9/10/07 NCTL-110-10883-01				

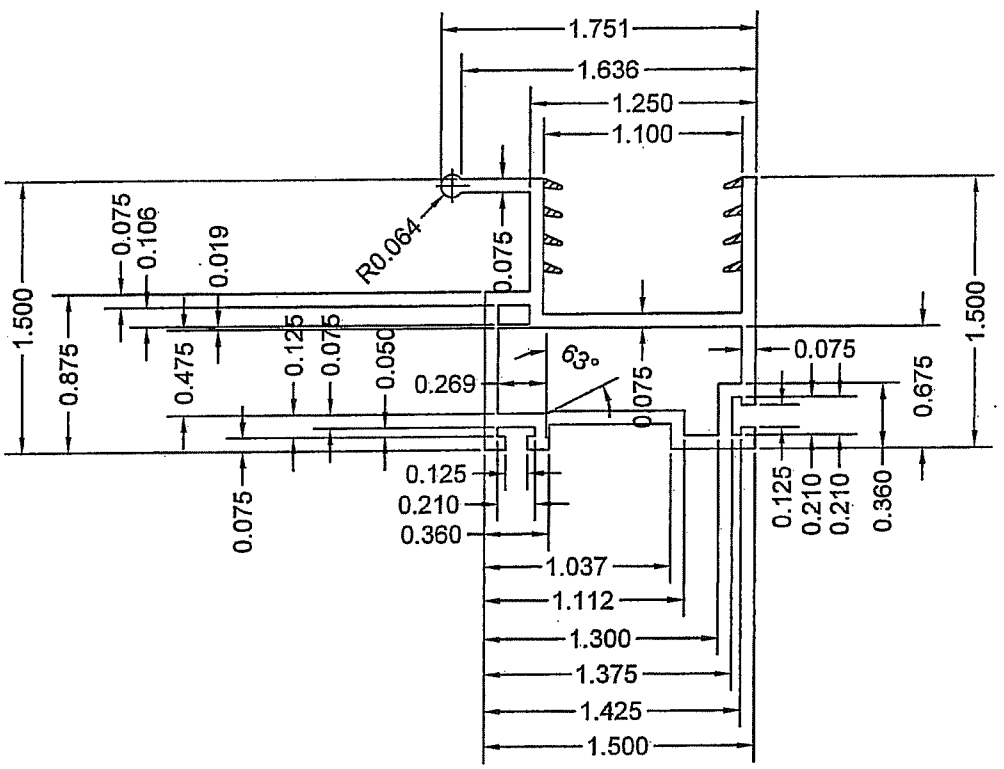


0.320 Lb/ft

MGM INDUSTRIES 287 FREEHILL ROAD HENDERSONVILLE,TN 37075	DESCRIPTION: Sash Stiles	ALL RADI TO BE 0.015 ALL WALL THK TO BE 0.075 UNLESS OTHERWISE SPECIFIED INTERNAL WALLS 0.050	DWG. NO. M-1000	REV.
DO NOT SCALE DRAWING	DATE 02/28/04	WEIGHT ☒	AREA ☒	BY: ABG

APPLICATION	REVISIONS			
NEW ASSY. USED	REV.	DESCRIPTION	DATE	APPROVED

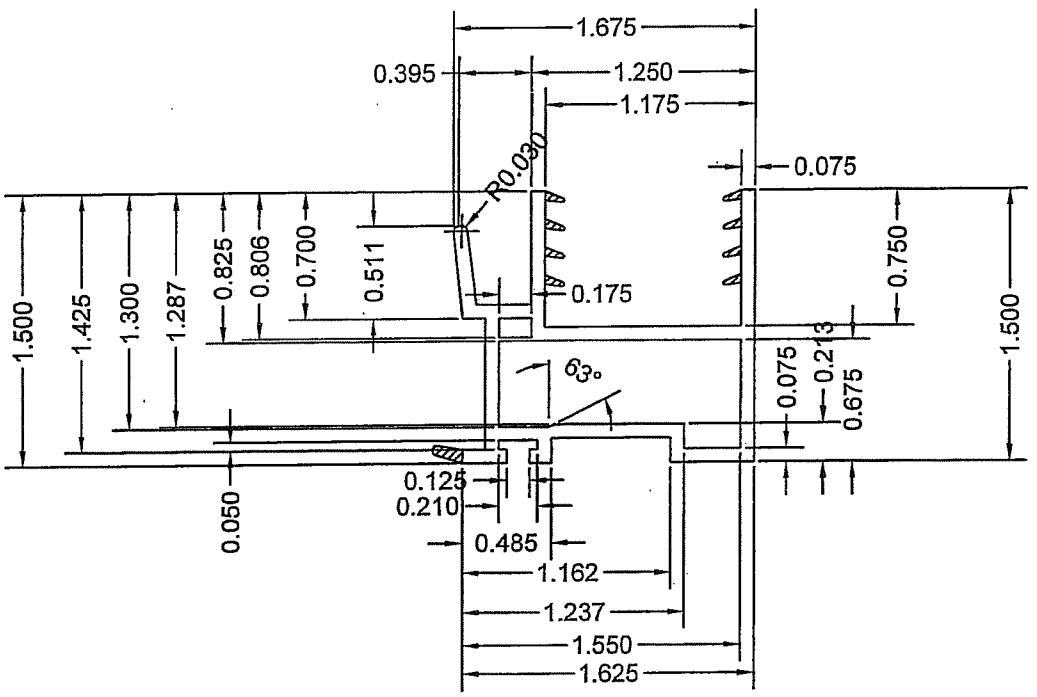
TEST SPECIMEN COMPLIES WITH THESE DETAILS
ANY DEVIATION IS NOTED.
TEST COMPLETE: 9/10/07
NCTL-110-10883-01



0.344 Lb/ft

MGM INDUSTRIES 287 FREEHILL ROAD HENDERSONVILLE,TN 37075	DESCRIPTION: 4000 top and Bottom Rail	ALL RADI TO BE 0.015 ALL WALL THK TO BE 0.075 UNLESS OTHERWISE SPECIFIED INTERNAL WALLS 0.050	DWG. NO. M-1002	REV.
DO NOT SCALE DRAWING	DATE 02/28/04	WEIGHT ☒	AREA ☒	BY: ABG

APPLICATION	REVISIONS			
TEST SPECIMEN COMPLIES WITH THESE DETAILS. ANY DEVIATION IS NOTED. TEST COMPLETE: 9/10/07 NCTL-110-10883-01	REV.	DESCRIPTION	DATE	APPROVED

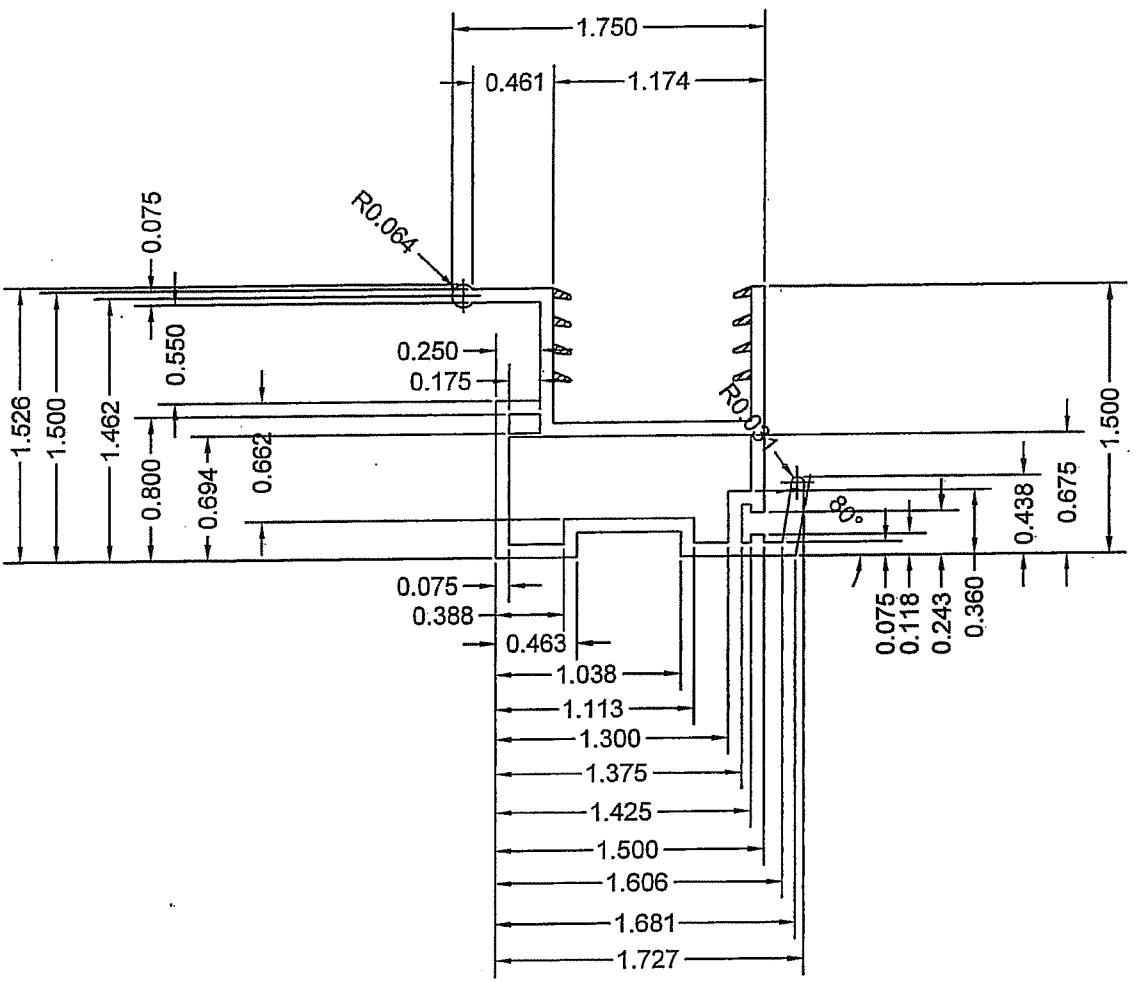


0.348 lb/ft

MGM INDUSTRIES 287 FREEHILL ROAD HENDERSONVILLE,TN 37075	DESCRIPTION: 4000 Top Sash Bottom Rail	ALL RADI TO BE 0.015 ALL WALL THK TO BE 0.075 UNLESS OTHERWISE SPECIFIED ~~INTERNAL WALLS 0.050~~	DWG. NO. M-1003	REV.
DO NOT SCALE DRAWING	DATE 02/28/04	WEIGHT ☒ AREA ☒		BY: ABG

APPLICATION	REVISIONS			
NEXT ASSY USED ON	REV.	DESCRIPTION	DATE	APPROVED

TEST SPECIMEN COMPLIES WITH THESE DETAILS
ANY DEVIATION IS NOTED.
TEST COMPLETE: 9/10/07
NCTL-110-10883-01

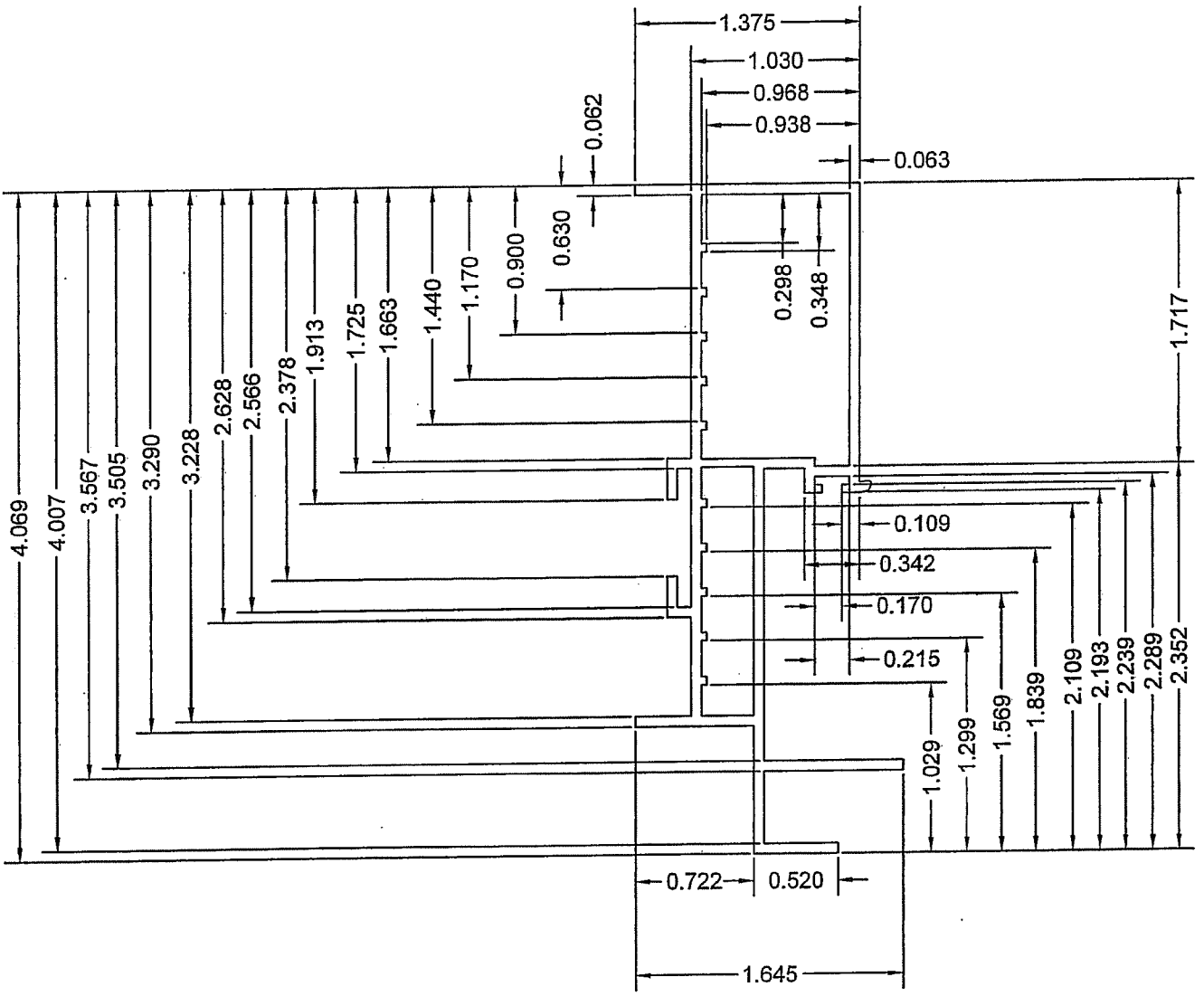


0.369lb/ft

MGM INDUSTRIES 287 FREEHILL ROAD HENDERSONVILLE,TN 37075	DESCRIPTION: 4000 Bottom Sash Top Rail	ALL RADI TO BE 0.015 ALL WALL THK TO BE 0.062 UNLESS OTHERWISE SPECIFIED INTERNAL WALLS 0.050	DWG. NO. M-1004	REV.
DO NOT SCALE DRAWING	DATE 02/28/04	WEIGHT ☒	AREA ☒	BY: ABG

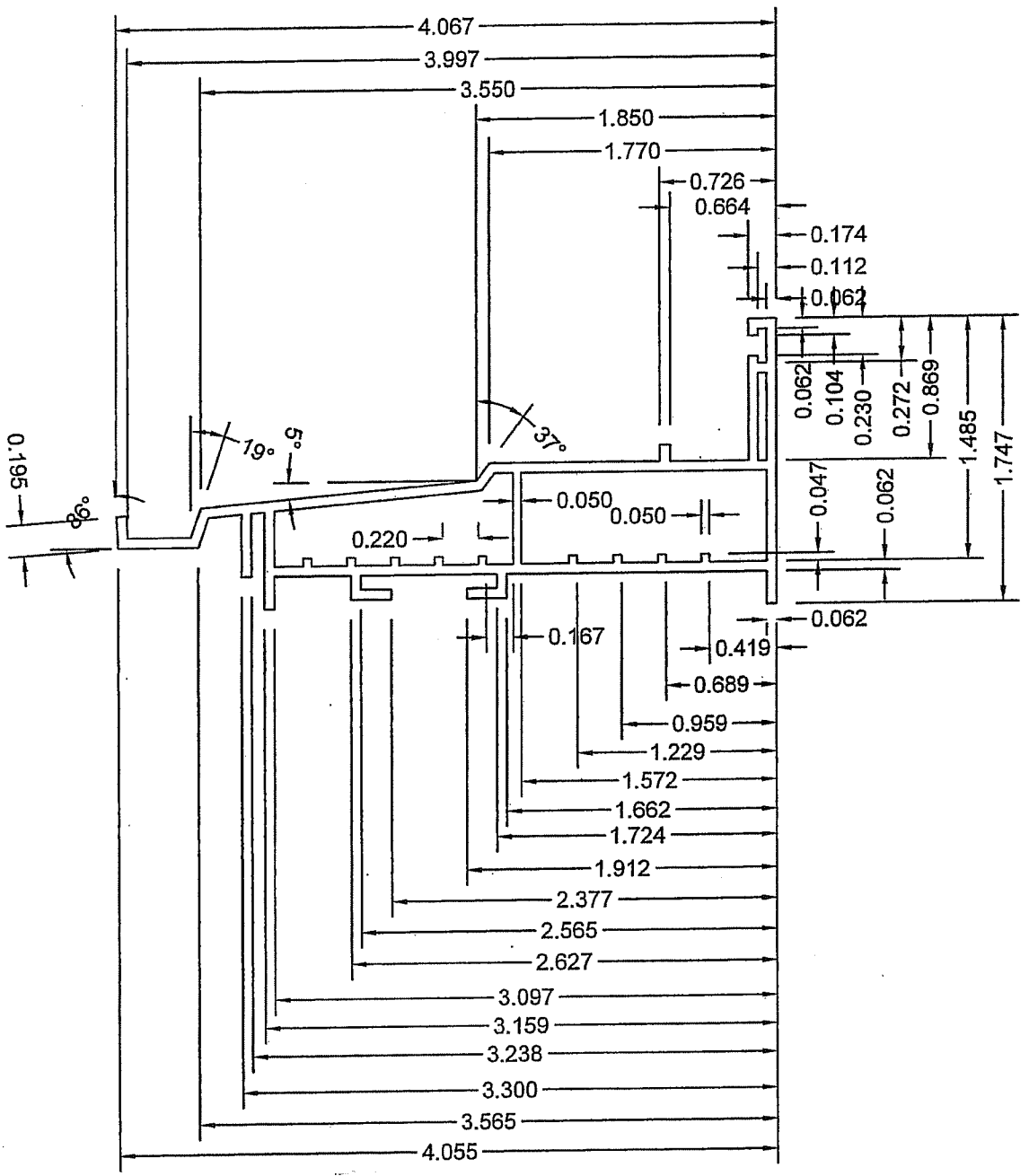
APPLICATION	REVISIONS			
NEXT ASSY. USED ON	REV.	DESCRIPTION	DATE	APPROVED

TEST SPECIMEN COMPLIES WITH THESE DETAILS ANY DEVIATION IS NOTED.
TEST COMPLETE: 9/10/07
NCTL-110-10883-01



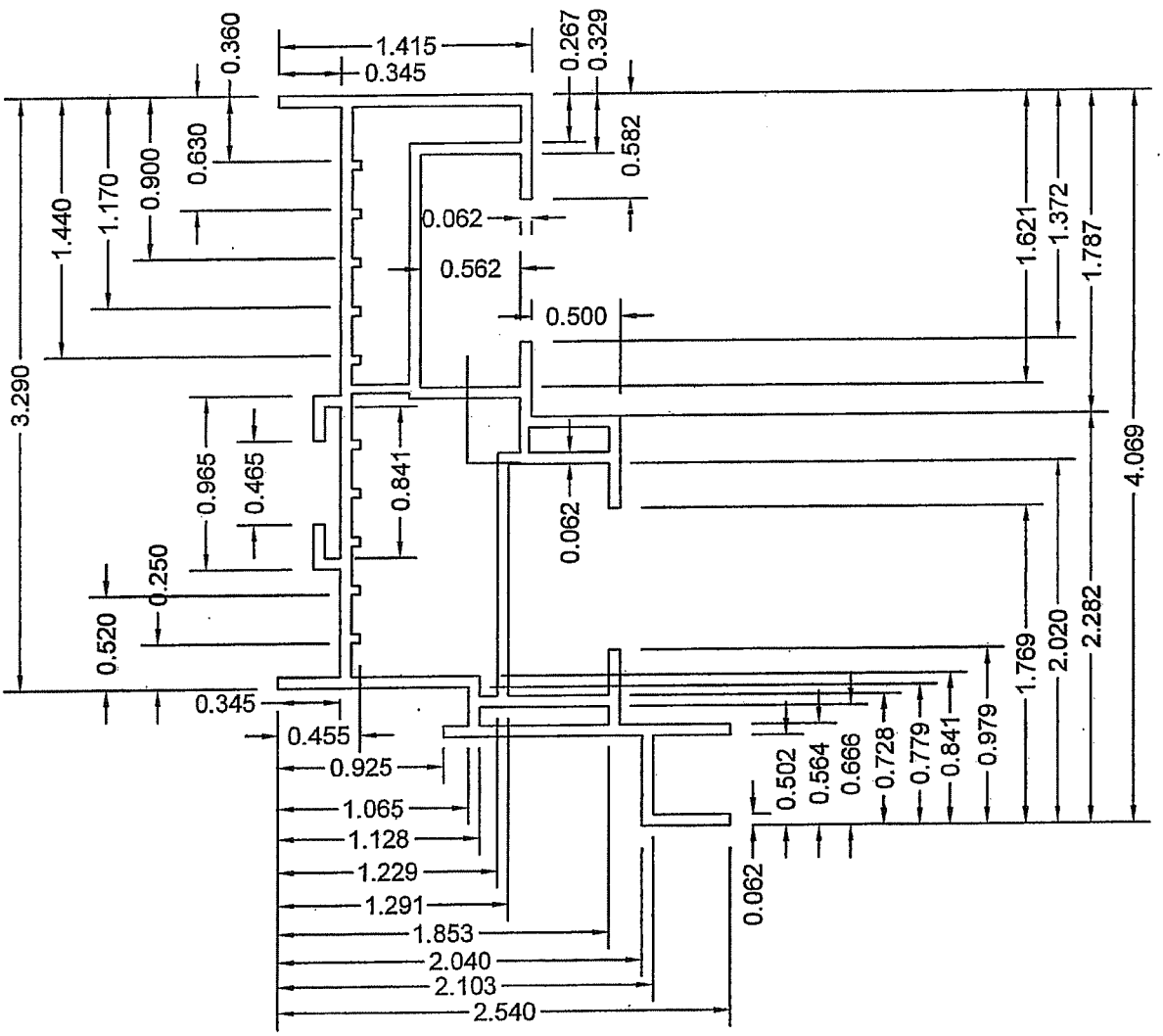
MGM INDUSTRIES 287 FREEHILL ROAD HENDERSONVILLE,TN 37075	DESCRIPTION: 4000 Double Hung Header	ALL RADI TO BE 0.015 ALL WALL THK TO BE 0.062 UNLESS OTHERWISE SPECIFIED INTERNAL WALLS 0.050	DWG. NO. M-1011	REV.	
DO NOT SCALE DRAWING	DATE 12/29/03	WEIGHT 0.499	AREA 0.800	BY: ABG	

APPLICATION	REVISIONS			
NEXT ASSY USED ON	REV.	DESCRIPTION	DATE	APPROVED
TEST SPECIMEN COMPLIES WITH THESE DETAILS. ANY DEVIATION IS NOTED. TEST COMPLETE: 9/10/07 NCTL-110-10883-01				



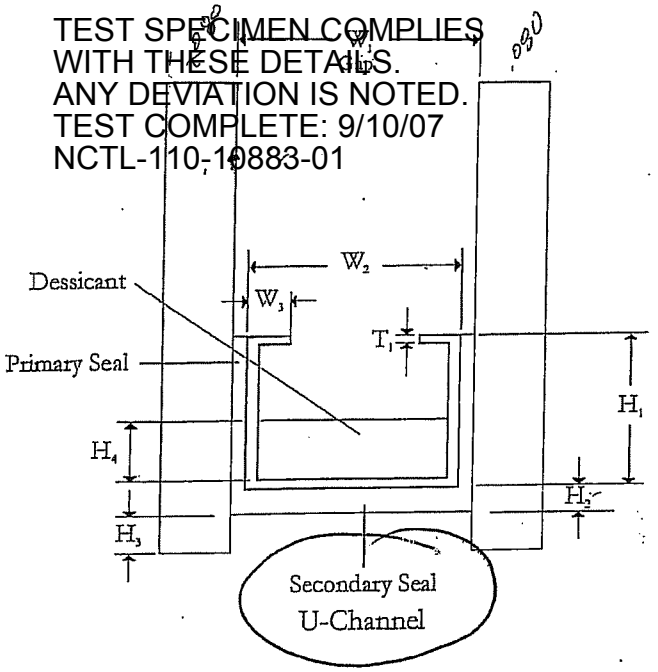
MGM INDUSTRIES 287 FREEHILL ROAD HENDERSONVILLE,TN 37075	DESCRIPTION: 4000 MF Sill	ALL RADI TO BE 0.015 ALL WALL THK TO BE 0.062 UNLESS OTHERWISE SPECIFIED INTERNAL WALLS 0.050		DWG. NO. M-1013	REV.
DO NOT SCALE DRAWING	DATE 12/29/03	WEIGHT 0.477	AREA 0.765	BY: ABG	

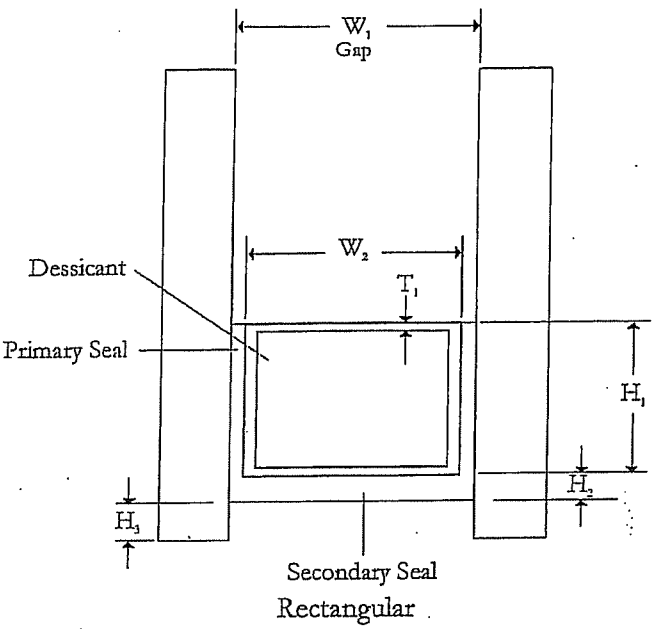
APPLICATION	REVISIONS			
NEXT ASSY USED ON	REV.	DESCRIPTION	DATE	APPROVED
TEST SPECIMEN COMPLIES WITH THESE DETAILS ANY DEVIATION IS NOTED. TEST COMPLETE: 9/10/07 NCTL-110-10883-01				

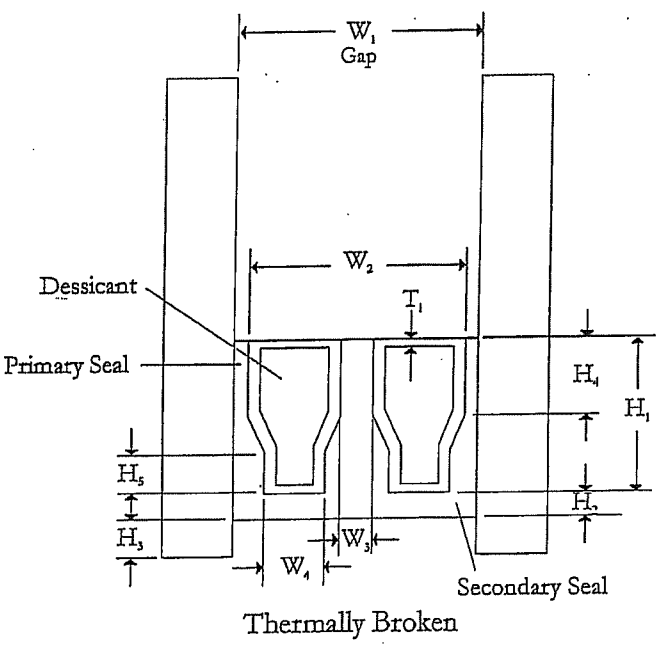


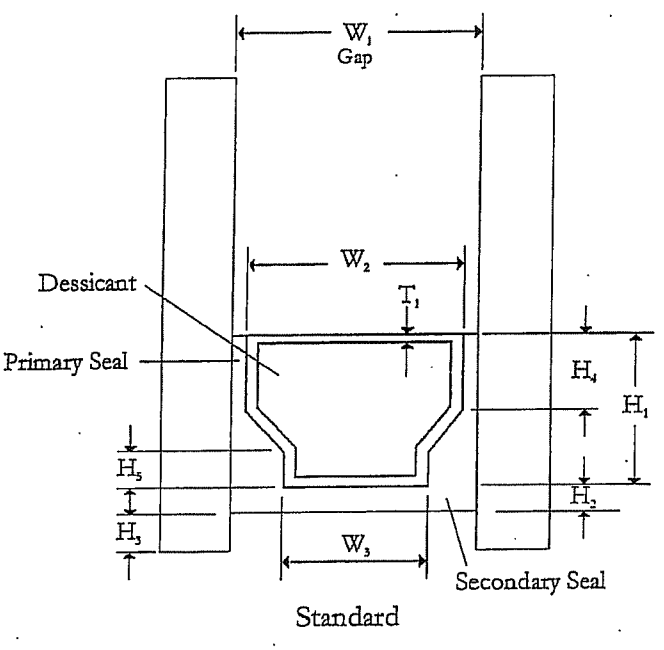
MGM INDUSTRIES 287 FREEHILL ROAD HENDERSONVILLE,TN 37075	DESCRIPTION: 4000 MF JAMB	ALL RADI TO BE 0.015 ALL WALL THK TO BE 0.062 UNLESS OTHERWISE SPECIFIED INTERNAL WALLS 0.050	DWG. NO. A-1012	REV.	
DO NOT SCALE DRAWING	DATE 04/29/03	WEIGHT 0.670	AREA 1.074	BY: ABG	

TEST SPECIMEN COMPLIES
WITH THESE DETAILS.
ANY DEVIATION IS NOTED.
TEST COMPLETE: 9/10/07
NCTL-1110-10883-01





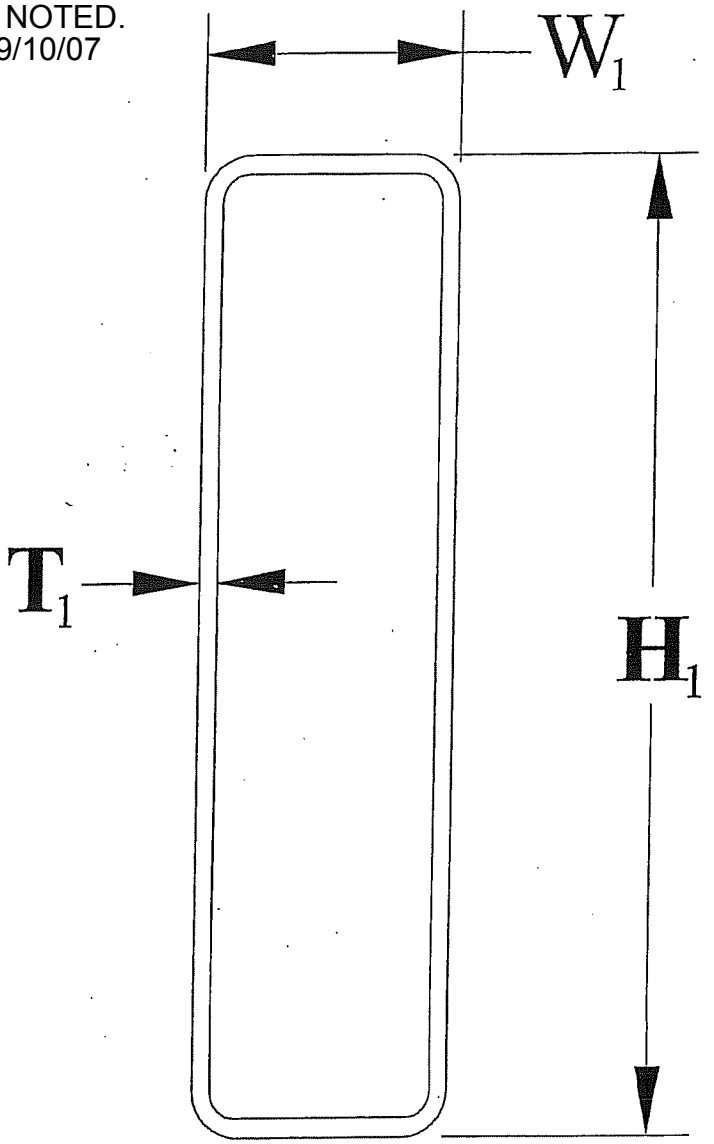




Spacer Dimensions -Fill dimensions where applicable - Please fill out a spacer sheet for each spacer used whether spacer type or size:

Gap		Primary Seal	Secondary Seal	Material	Fill
☐ W_1	.840 "	☑ Butyl	☑ Butyl	☐ Aluminum	☑ Dessicant
☐ W_2	.796 "	☐ PIB	☐ PIB	☐ Steel - Mild	☐ Air
☐ W_3	.070 "	☐ Polysulphide	☐ Polysulphide	☐ Steel - Stainless	☐ Other _____
☐ W_4	_____ "	☐ Silicone	☐ Silicone	☑ Steel - Galvanized	
☐ H_1	.300 "	☐ Urethane	☐ Urethane	☐ Vinyl	
☐ H_2	.045 "	☐ None	☐ None	☐ Foam _____	
☐ H_3	.108 "	☐ Other _____	☐ Other _____	☐ Other _____	
☐ H_4	.084 "				
☐ H_5	_____ "				
☐ T_1	.013 "				

TEST SPECIMEN COMPLIES
WITH THESE DETAILS.
ANY DEVIATION IS NOTED.
TEST COMPLETE: 9/10/07
NCTL-110-10883-01



Rectangular

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

Dimensions			Material		
☐ W_1 .188"	☐ W_2 ____"	☐ W_3 ____"	☑ Aluminum	☐ Steel - Galvanized	☐ Other ____
☐ H_1 .625"	☐ H_2 ____"	☐ T_1 .018"	☐ Steel - Mild	☐ Steel - Stainless	