

# **WINDOW SIMULATION REPORT**

**NFRC 100: Procedure for Determining Fenestration Product U-Factors**

**NFRC 200: Solar Heat Gain Coefficient and Visible Transmittance**

**NFRC 500: Procedure for Determining Fenestration Product Condensation  
Resistance Values**

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**REPORT PREPARED FOR:**

**Chip Vaughn  
Great Land Windows  
261 College Road  
Fairbanks  
Alaska  
99701  
(907) 479-8437**

**REPORT NUMBER:**

**ILF10003w-c**

**PRODUCT LINE:**

**301 Tilt and Turn Door**

**August 23 , 2010**

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**Enermodal Engineering Ltd.  
582 Lancaster St. W.  
Kitchener ON  
N2K 1M3  
(519) 743-8777  
office@enermodal.com**

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Manufacturer: Great Land Windows  
Report Number: ILF10003w-c  
Product Line: 301 Tilt and Turn Door

Frame: Fiberglass with Styrofoam

Sash: Fiberglass with Styrofoam

Thermal Break: N

Edge of Glass: The glazing is held by a neoprene glazing wedge on the interior edge and foam weatherstripping on the exterior edge.

Glazing: Glazing options are triple, quint, argon and krypton fill.

Spacer: Steel: CS-D

Weatherstripping: Flexible PVC bulbs on the frame and sash.

Simulations: Performed using WINDOW 5, and THERM 5.

General: This product line includes the 301 Tilt and Turn Door manufactured by Great Land Windows.

This is a reissued report of ILF701w-o.

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Michael Barclay, P.Eng.

Simulator

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Michael Barclay, P.Eng.

Simulator in Responsible Charge

## **WINDOW SIMULATION REPORT**

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The windows documented in this report were simulated in accordance with the NFRC 100: Procedure for Determining Fenestration Product U-Factors (2010), NFRC 200: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence (2010) and NFRC 500: Procedure for Determining Fenestration Product Condensation Resistance Values (2010).

The windows were simulated using WINDOW 5 and THERM 5 computer programs as specified in NFRC 100 and NFRC 200. The most currently approved spectral data files from NFRC were also used. The WINDOW program models the one-dimensional heat flow through the center-of-glass portion of the window. The THERM program models the two-dimensional heat flow through the frame, edge-of-glass, divider, and divider-edge portions of the window. The input data for both programs is based on manufacturer's specifications. Defaults for material thermal and optical properties are given in the computer programs. When values other than defaults were used, they are documented.

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.

### **DISCLAIMER:**

This window simulation report was generated by Enermodal Engineering Ltd. of Kitchener, ON. The report relates only to the items specified.

No part of this report may be reproduced except in full, without the written consent of Enermodal Engineering Ltd.

Enermodal Engineering Ltd. and its employees neither endorse nor warrant the suitability of the product simulated. Every effort was taken to accurately model the performance of the windows documented in this report. Because of the large amount of input data and analyses, it is possible that errors or omissions could occur.

Neither Enermodal Engineering Ltd. nor any of its employees shall be responsible for any loss or damage resulting directly or indirectly from any default, error, or omission.

## **SIMULATION NOTES**

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- 1 Unless otherwise stated. All continuous hardware that does not create a thermal bridge such as hinges, balances, locks etc. are not modeled.
- 2 This is an "NFRC 100: Procedure for Determining Fenestration Product U-Factors" Certification Report.
- 3 This is an "NFRC 200: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence" Certification Report.
- 4 This is an "NFRC 500: Procedure for Determining Fenestration Product Condensation Resistance Values" Certification Report.
- 5 Unit conversions are performed according to NFRC601.
- 6 All glazing surface emissivities are assumed to be 0.84 unless otherwise stated.
- 7 The gas fill method is single probe with 90% argon and 90% krypton fill.

## NFRC - U-Value Baseline Product

Manufacturer: Great Land Windows  
 Product line: 301 Tilt and Turn Door  
 Product Type: EDSL  
 Frame: Fiberglass with Styrofoam

Mfr contact: Chip Vaughn  
 Simulator in Michael Barclay,  
 Responsible P.Eng.  
 Charge:  
 IA Name:

Report number: ILF10003w-c  
 Date: 8/23/2010  
 Revised date:  
 CPD:

Product Description	272-kry-TC88-kry-TC88-kry-272, bsl	
Glass Thick 1 (in)	0.154	
Glass Thick 2 (in)	0.003	
Glass Thick 3 (in)	0.003	
Glass Thick 4 (in)	0.154	
Glass Thick 5 (in)		
# of Glazing Layers	4	
Surface #2 Emissivity	0.04	
Surface #3 Emissivity	0.13	
Surface #4 Emissivity	0.11	
Surface #5 Emissivity	0.13	
Surface #6 Emissivity	0.11	
Surface #7 Emissivity	0.04	
Surface #8 Emissivity		
Gap 1	0.372	
Gap 2	0.372	
Gap 3	0.372	
Gap 4		
Validation Size	1000 x 2000 mm	
	39.37 x 78.74 in	
Spacer Type	CS-D	
Grid	N	
Gap Fill	Air (10%) / Krypton (90%) Mix	
U-Value	0.23	

ID	Name	No. of Layers	Mode	Tilt	Environmental Conditions	$K_{eff}$ (Btu/h* $ft^2$ *F)	Overall Thickness (in)	Uval (Btu/h* $ft^2$ *F)	SHGC	Visible Transmittance
1	cl-arg-TC88-arg-Cl	3	#	90	NFRC 100-2001	0.016	1.364	0.145	0.510	0.650
2	cl-kry-TC88-kry-cl-kry-TC88-kry-cl	5	#	90	NFRC 100-2001	0.009	1.360	0.083	0.384	0.472
14	272-kry-TC88-kry-TC88-kry-272	4	#	90	NFRC 100-2002	0.007	1.437	0.070	0.291	0.399

## NFRC Simulation Data – Summary

Manufacturer: Great Land Windows  
 Series/Model #: 301 Tilt and Turn Door

Spacer: Steel: CS-D

Operator Type: EDSL                      Sim Lab Code: SEEL  
 Model Size: 960 x 2090                  Report number: ILF10003w-c  
 Thermal Break: N                          Date: 8/23/2010  
    Revised Date:  
    Rating Procedure: 2010

Mfr-Product Code	Product Number	Gap 1 (in)	Gap 2 (in)	Gap Fill 1	Gap Fill 2	Emissivity Surface 2	Emissivity Surface 3	Emissivity Surface 4	Emissivity Surface 5	Tint	Spacer	Grid Type	Grid Size	U-Factor (Btu/h*F <sup>2</sup> )	SHGC	VT	*CR
cl-arg-TC88-arg-cl, sl	0001	0.56	0.56	ARG	ARG		0.13	0.11		CL	CS-D	N		0.22	0.33	0.41	67
cl-kry-TC88-kry-cl-kry-TC88-kry-cl, sl	0002	0.25	0.25	KRY	KRY		0.13	0.11		CL	CS-D	N		0.17	0.25	0.30	69

\*Note: 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.

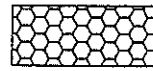


# **APPENDIX A**

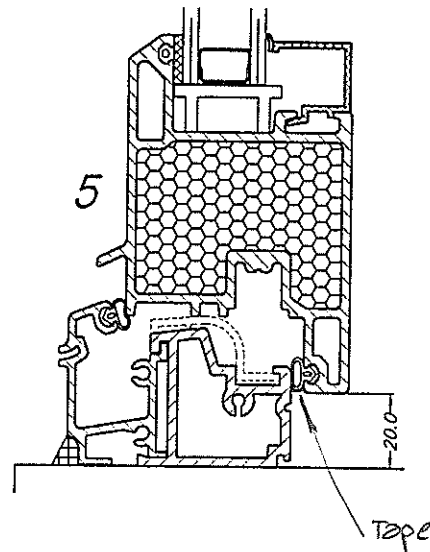
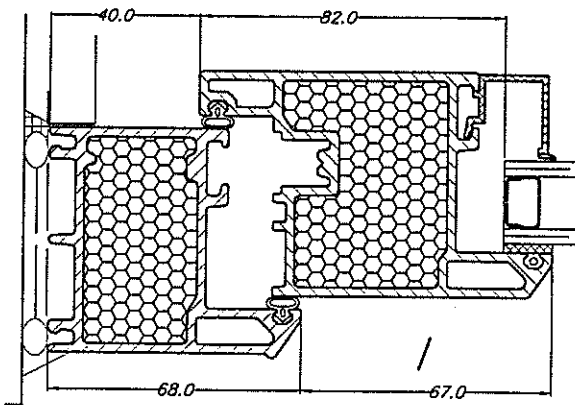
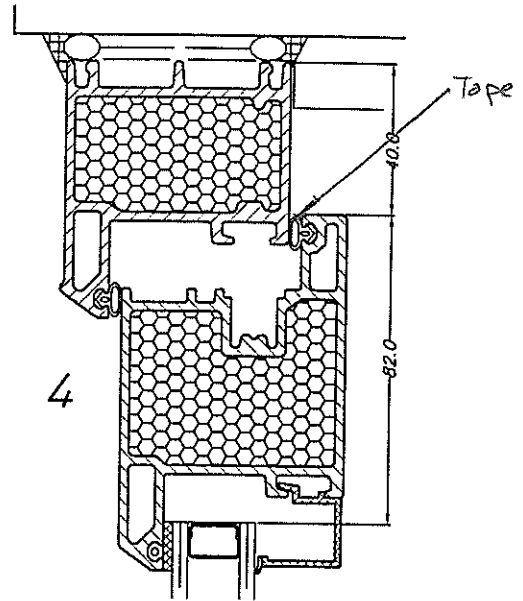
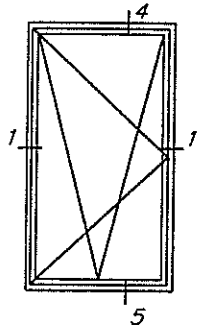
## **Product Drawings**



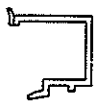
SERIES 301 TILT'N TURN DOOR  
(SINGLE)



~~OPTIONAL STYROFOAM~~



Report Number:  
ILF 70(W-0)  
AUG 01 2007  
Enermodal Engineering Ltd.



22mm(DOUBLE GLASS)  
GLASS STOP(PVC)



5.08mm F.C. 4.06mm F.C. 3.04mm F.C.

GLAZING WEDGE(NEOPRENE)



35mm(TRIPLE GLASS)  
GLAZING STOP(ALUMINUM)



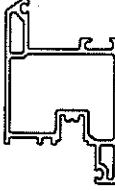
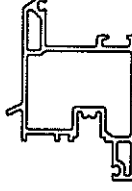
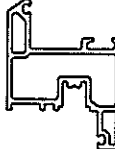
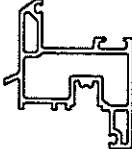
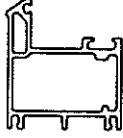
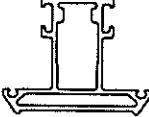
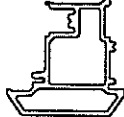
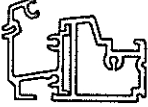


30 Constellation Court  
Toronto, Ontario M9W 1K1

# PARTS LIST

SERIES 300 & SERIES 301  
TILT'N TURN/CASEMENT/AWNING

DR. BY.	
DATE	Feb.2007
SHEET	1 / 6

300-100

Parts #	Description	Colour	Price	Comments
301*		Door sash	Not painted	Fiberglass, S/L=
			White	
			Other	
301D*		Door sash with drip deflector	Not painted	Fiberglass, S/L=
			White	
			Other	
302		Window sash	Not painted	Fiberglass, S/L=
			White	
			Other	
302D		Window sash with drip deflector	Not painted	Fiberglass, S/L=
			White	
			Other	
303*		Perimeter frame	Not painted	Fiberglass, S/L=
			White	
			Other	
304		Mullion / Transom	Not painted	Fiberglass, S/L=
			White	
			Other	
305		Astragal (2 leaf opening)	Not painted	Fiberglass, S/L=
			White	
			Other	
308/309		Patio door sill (Alum. / PVC)	Not painted	Alum. / PVC, S/L=
			White	
			Other	
310		Connecting bar (for frame)		PVC, S/L=
311		Glass stop 22mm(7/8")	Not painted	PVC, S/L=
			White	
			Other	

Report Number  
 ILF701w-0  
 AUG 01 2007  
 Enermodal Engineering Ltd.




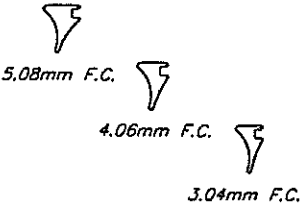







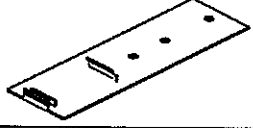
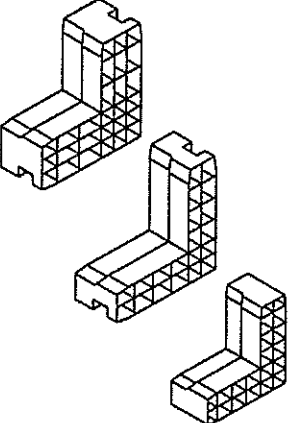
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# PARTS LIST

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DR. BY.	
DATE	Feb.2007
SHEET	2 / 6

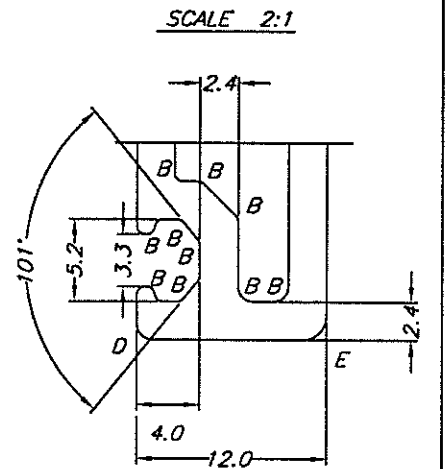
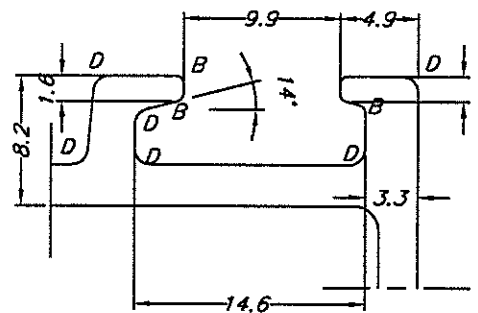
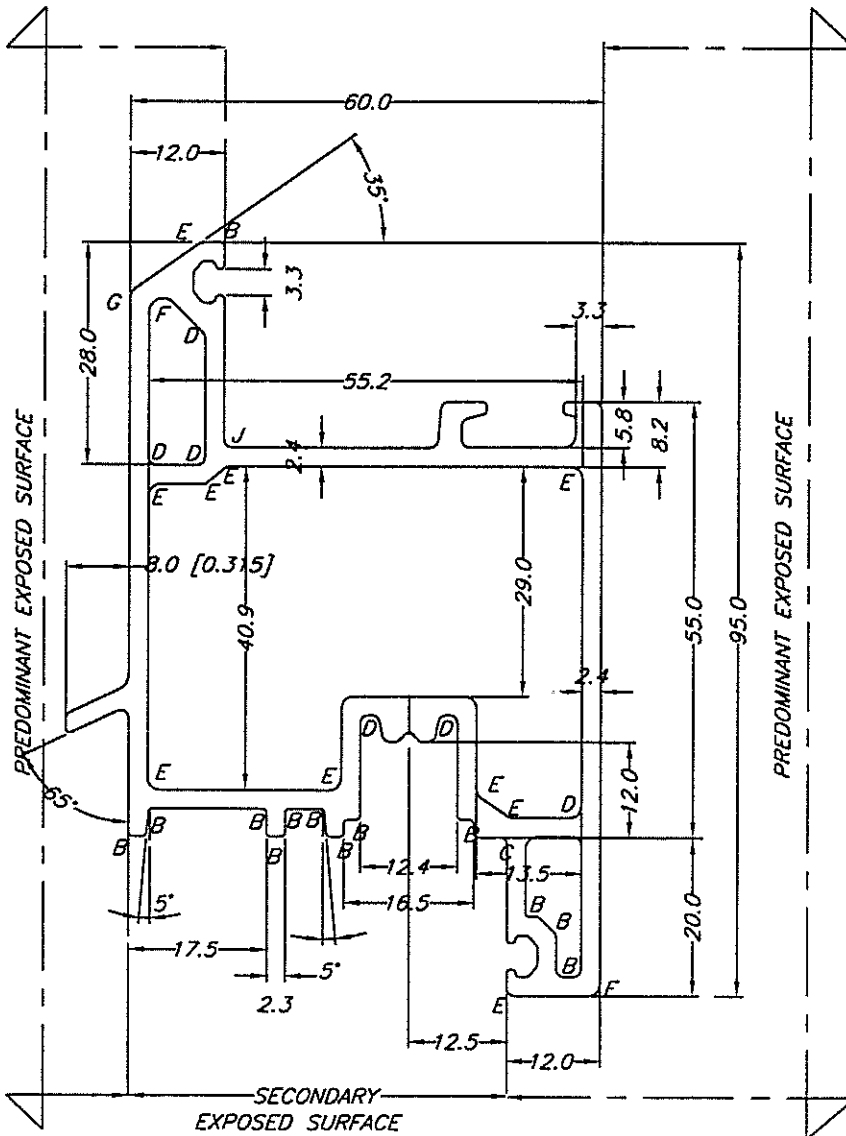
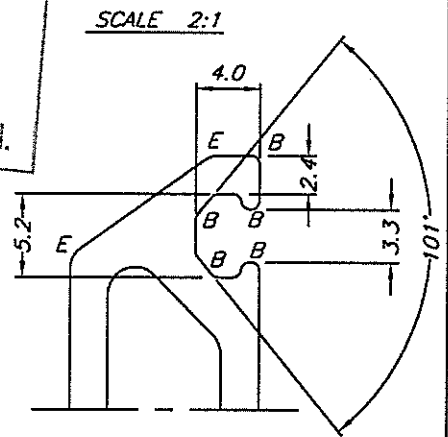
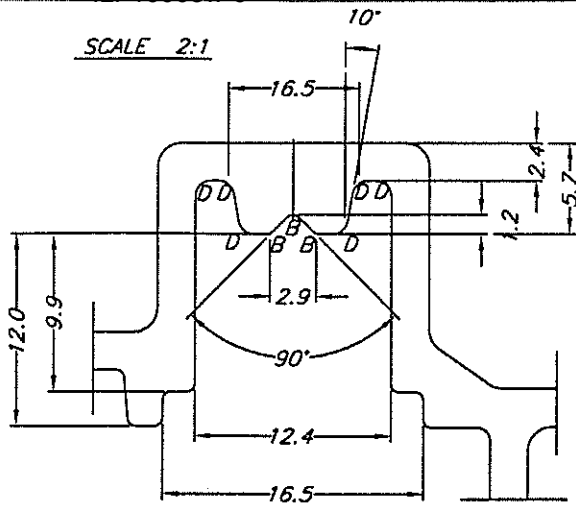
## 300-100

Parts #	Description	Colour	Price	Comments
312		Glass stop 35mm(1 3/8")	Not painted	Aluminum, S/L=
			White	
			Other	
		Glazing wedge		Neoprene, /roll
313		Air seal plug left or right (for astragal)		PVC, / per carton
315		Door sash riding block		PVC, S/L=
319		Glass setting block		PVC, S/L=
320		Glazing pocket filler		2000'/roll
321		Adhesive glazing tape 1/8" x 1/2"		Neoprene, 100'/roll
113		Bulb-type gasket		Rubber /roll
323		Bulb-type gasket		Rubber /roll
324		Window sash riding block		PVC, S/L=
737B		Strap anchor	Report Number: ILF701W-0	Galv. steel, / per carton
325		Door sash shearblock	AUG 01 2007 Enermodal Engineering Ltd.	Nylon+30% glass filled /per carton
326		Window sash shearblock		Nylon+30% glass filled /per carton
327		Perimeter frame shearblock		Nylon+30% glass filled /per carton



**INLINE**  
FIBERGLASS LTD.

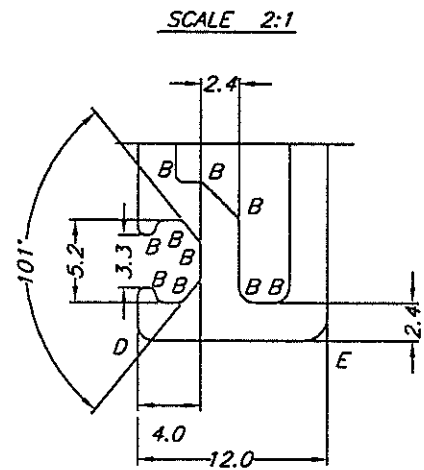
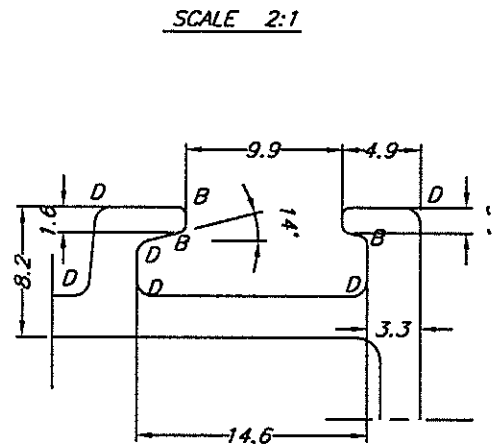
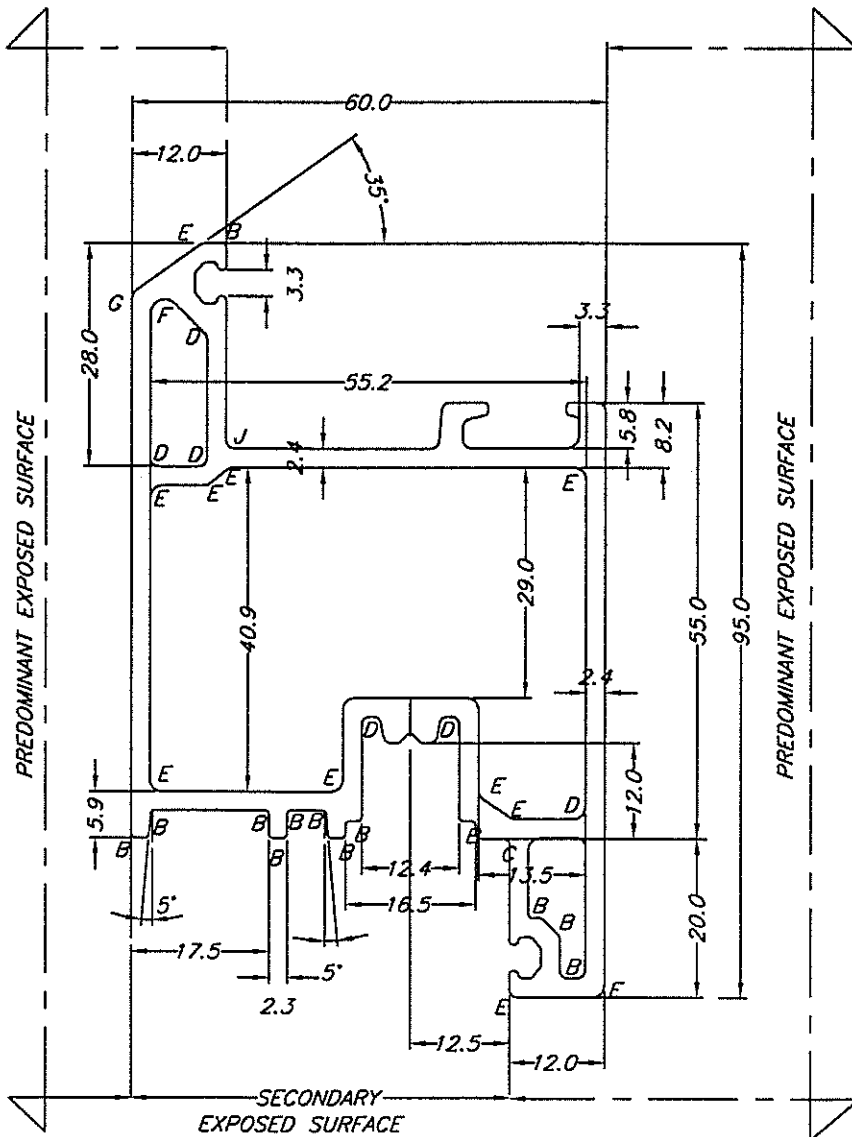
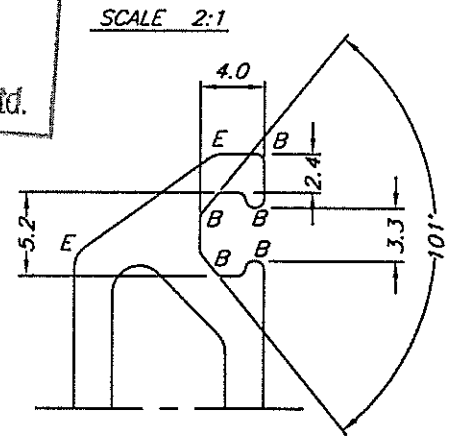
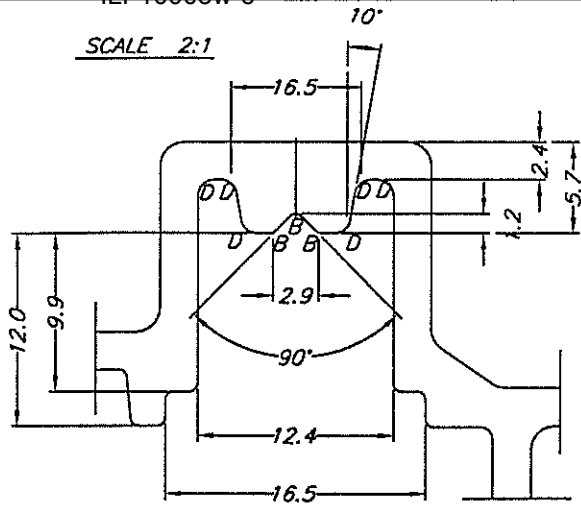
Report Number:  
**ILF701W-0**  
AUG 01 2007  
Enermodal Engineering Ltd.



A	0.25	Inline Fiberglass Ltd.		CUSTOMER	INLINE FIBERGLASS O.K. TEAM		DESCRIPTION		DOOR SASH	
B	0.50									
C	0.75									
D	1.00	DWG #	301D	CUSTOMER DWG #		DATE	02.Nov.'99	TOL.	SCALE	1 : 1
E	1.50	WEIGHT	kg/m	AREA	mm <sup>2</sup>	PERIM.	mm	WALL THK.	mm	2.4
F	1.75	DRWN BY	R.N.	MAT'L	Fiberglass					
G	2.00	WEIGHT	lb/ft	AREA	in <sup>2</sup>	PERIM.	in	WALL THK.	in	(.095)
H	2.50	CHK'D BY	M.P.	DIRECT#	/300N					
I	3.00	REV.	DATE	NOTES	REV.	DATE	NOTES			



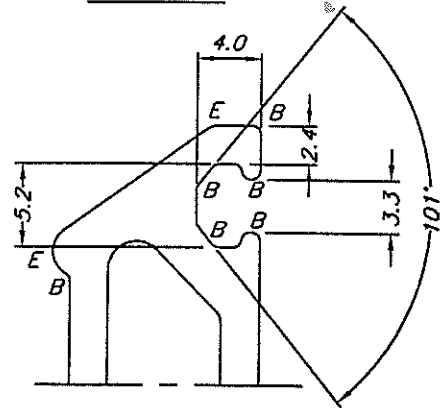
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**ILF 701W-0**  
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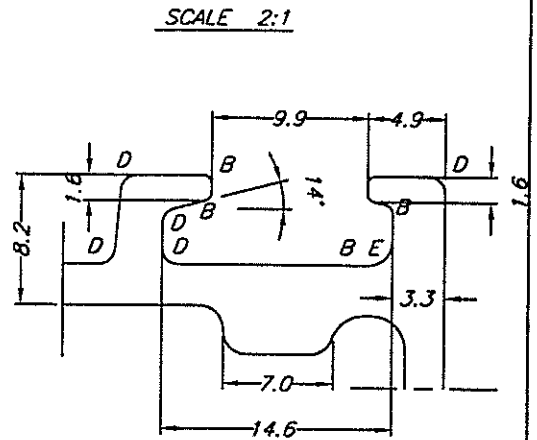
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B	0.50			O.K. TEAM		DOOR SASH			
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D	1.00			DWG #		02.Nov.'99		SCALE 1 : 1	
E	1.50	WEIGHT	AREA	PERIM.	WALL	DRWN	MAT'L		
F	1.75	kg/m	mm <sup>2</sup>	mm	THK. mm	BY	Fiberglass		
G	2.00	lb/ft	in <sup>2</sup>	in	WALL	CHK'D	DIRECT#		
H	2.50	REV.	DATE	NOTES	REV.	DATE	NOTES		
I	3.00								



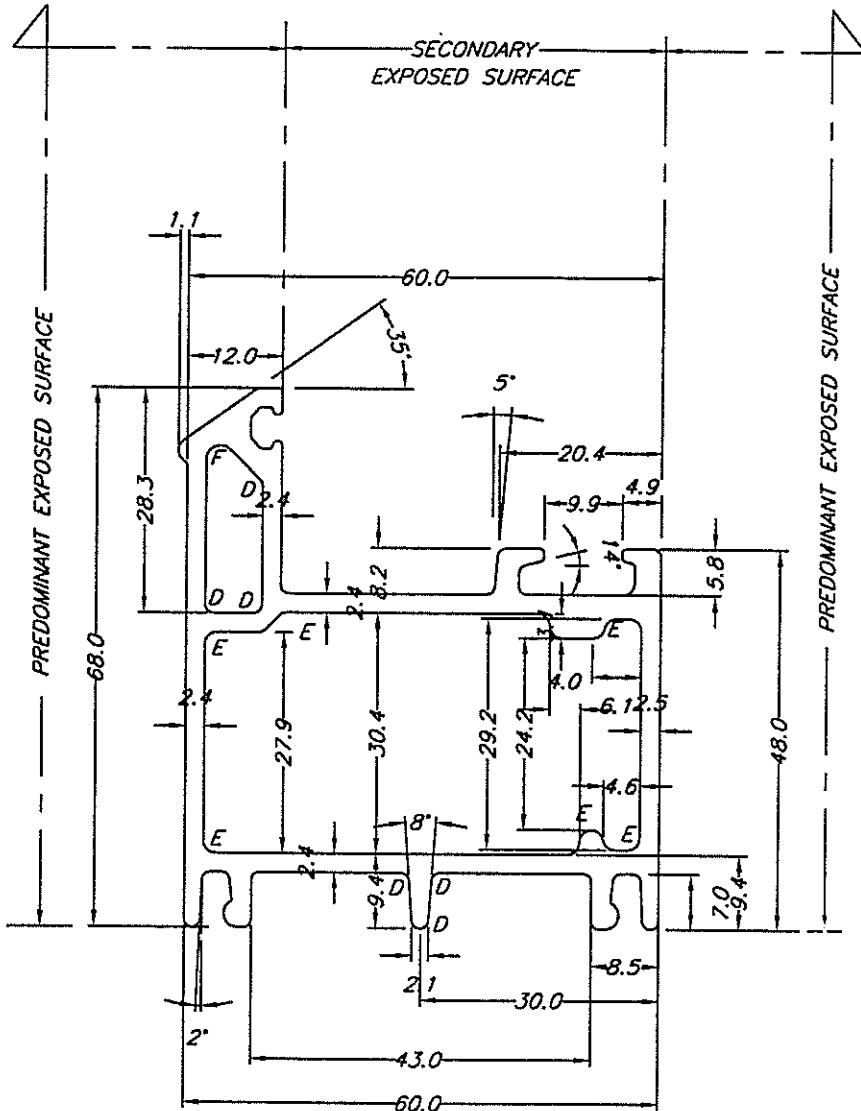
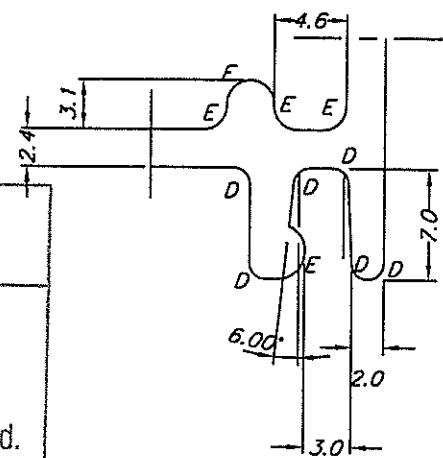
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SCALE 2:1



SCALE 2:1

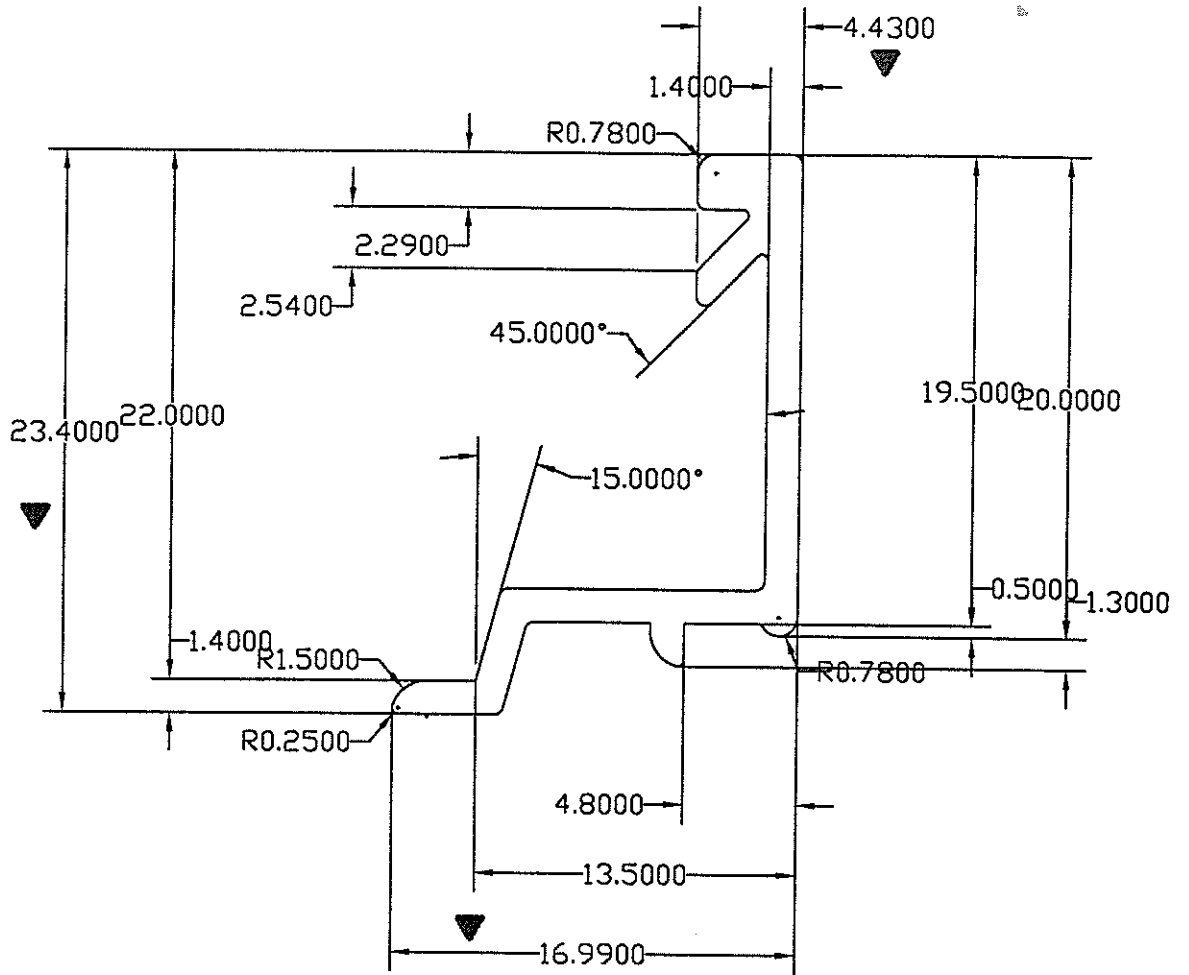


Report Number:  
ILF 701w-0

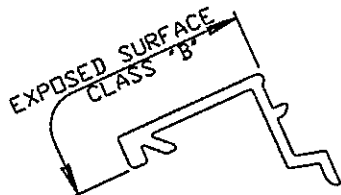
AUG 0 1 2007

Enermodal Engineering Ltd.

A	0.25	Inline Fiberglass Ltd.			CUSTOMER		INLINE FIBERGLASS		DESCRIPTION	
B	0.50				O.K. TEAM		FRAME			
C	0.75	DWG # 303			CUSTOMER		DATE		TOL.	
D	1.00				DWG #		01.Oct..'99		SCALE	
E	1.50	WEIGHT	AREA	923.9	PERIM.	476.6	WALL	2.4	DRWN	R.N.
F	1.75	kg/m	mm <sup>2</sup>		mm		THK.		BY	
G	2.00	WEIGHT	AREA	30.0	PERIM.	6.00	WALL	(.095)	CHK'D	M.P.
H	2.50	lb/ft	in <sup>2</sup>		in		THK.		BY	
I	3.00	REV.	DATE	NOTES	REV.	DATE	NOTES			
		1.	Oct. 13 '99							




ACTUAL SIZE



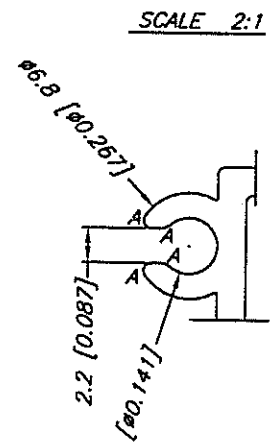
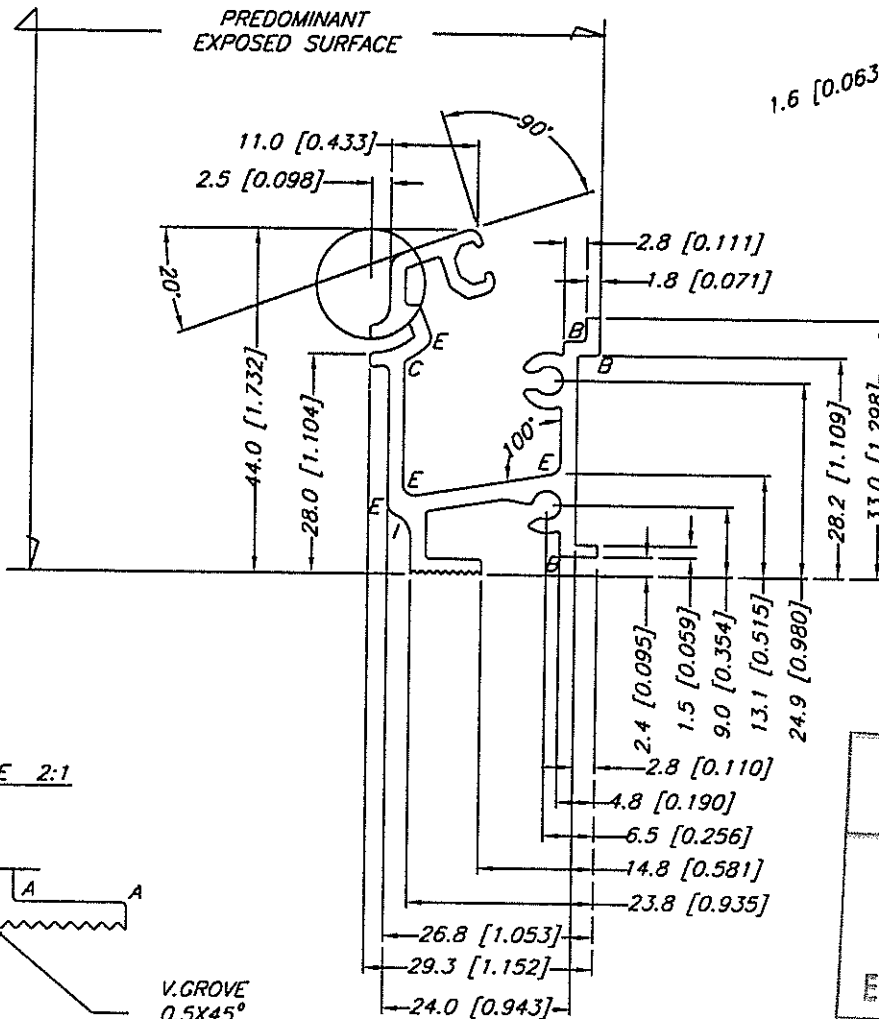
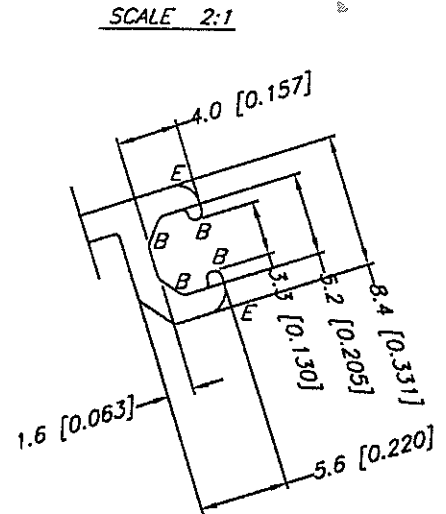
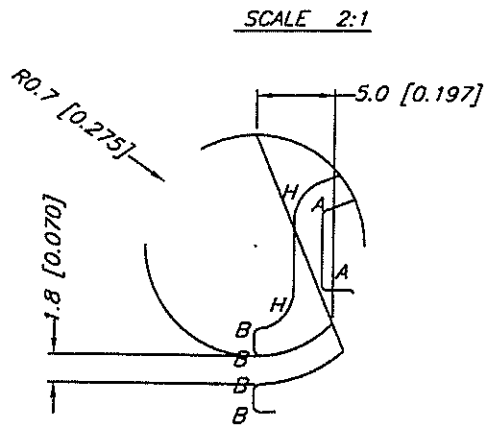
RUNOUT PLAN

Painted Aluminum

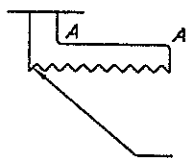
Report Number:  
ILF701w-0  
AUG 01 2007  
Enermodal Engineering Ltd.

ITEM.	QTY.	DWG.NO./CAT.NO.	DESCRIPTION	MATERIAL		
 <b>INLINE</b> FIBERGLASS 30 Constellation Court Toronto, Ontario M9W 1K1	SHEET 1/1		GLASS STOP (FOR 1 3/8" GALSS)	DR. BY.	K.C.	
	NO.	REVISION		DATE	DATE	MAY 07
					SCALE	
					<b>312</b>	





SCALE 2:1

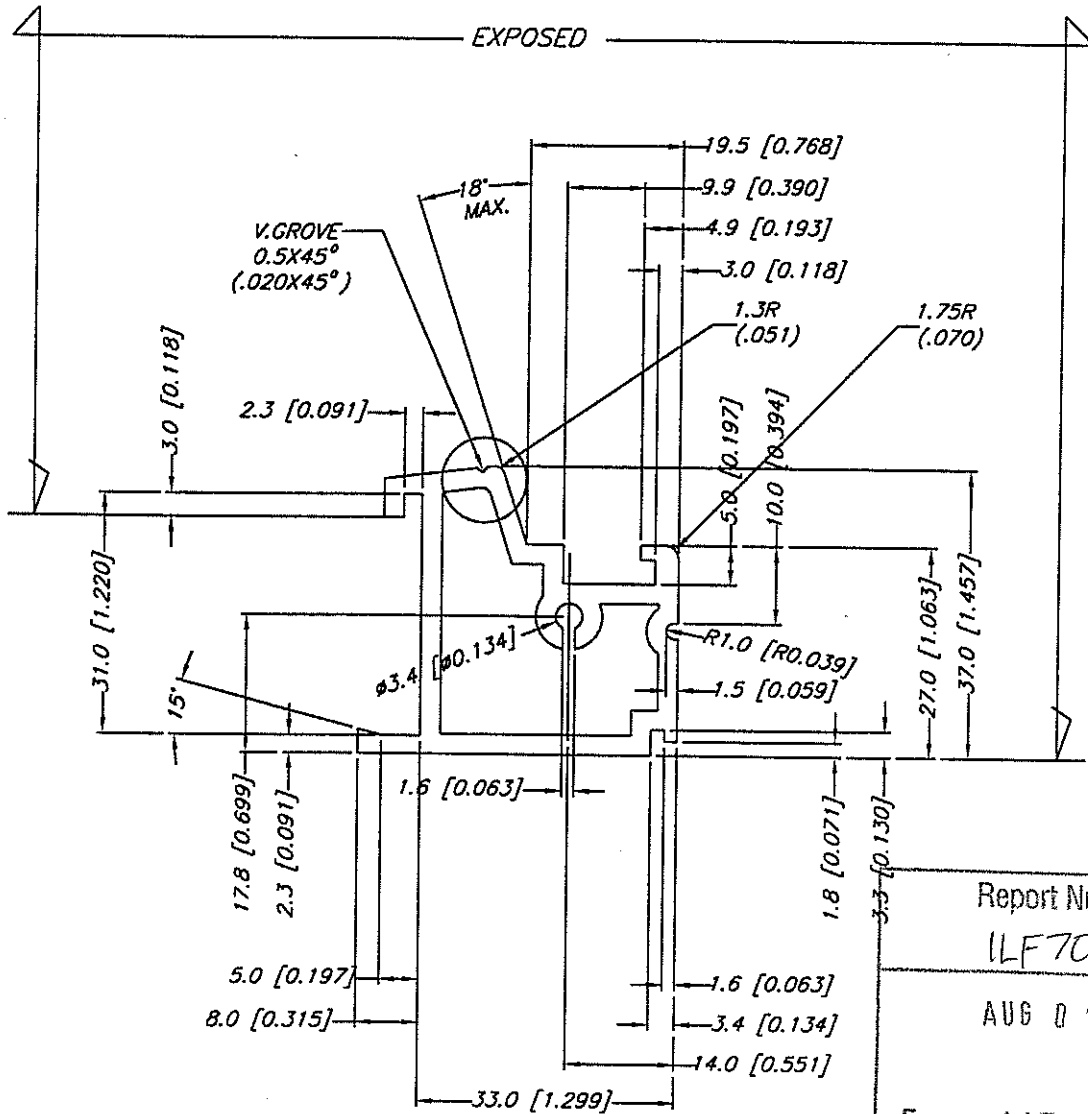
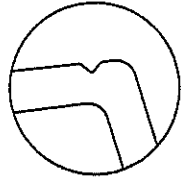


Report Number:  
ILF70(w)-D  
AUG 01 2007  
Enermodal Engineering Ltd.

UNMARKED WALLS 2.0mm (.079)

A	0.25	Inline Fiberglass Ltd.		CUSTOMER	INLINE FIBERGLASS		DESCRIPTION	
B	0.50					300A SERIAL SILL-C		
C	0.75	DWG #		CUSTOMER		DATE		TOL.
D	1.00	308		DWG #		Sep.08.'00		SCALE 1:1
E	1.50	WEIGHT	AREA	PERIM.	WALL	DRWN	MAT'L	
F	1.75	kg/m	mm <sup>2</sup>	mm	THK. mm	BY R.N.	ALUMINUM	
G	2.00	lb/ft	in <sup>2</sup>	in	THK. in	CHK'D	DIRECT	
H	2.50	REV.	DATE	NOTES	REV.	DATE	NOTES	
I	3.00	1.						
J	3.50							

SCALE 2:1

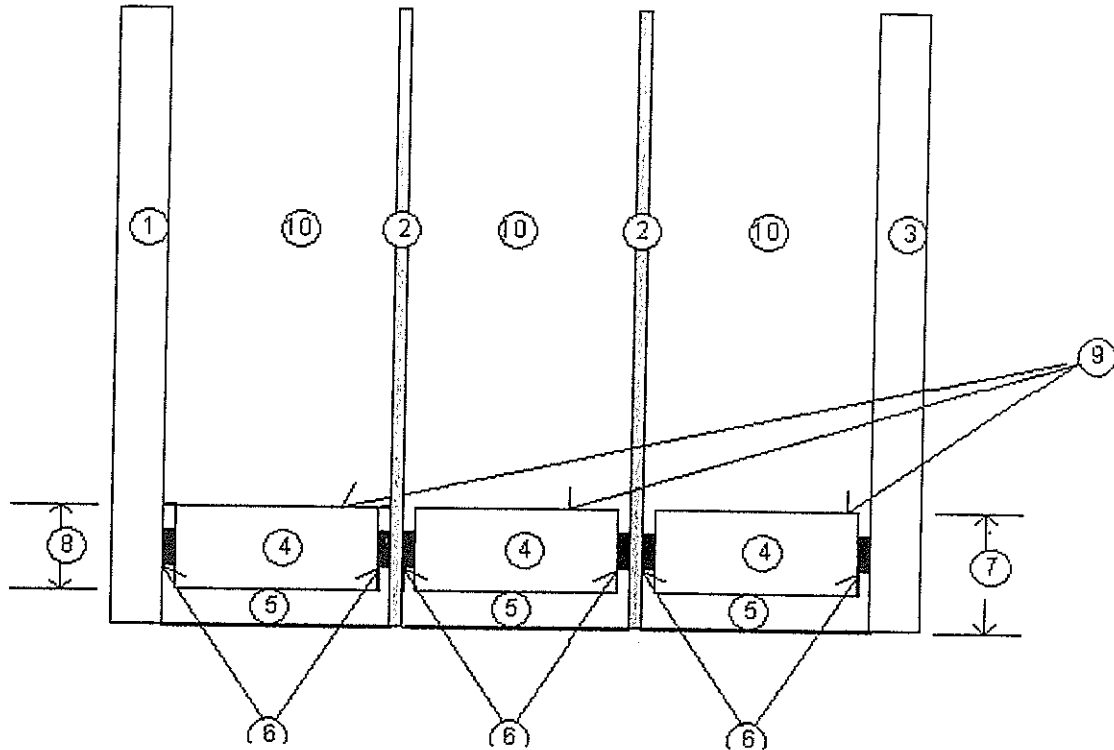


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 Enermodal Engineering Ltd.

UNMARKED WALLS 2.54 (.100)  
 COLOUR - LIGHT GRAY

A	0.25	Inline Fiberglass Ltd.		CUSTOMER INLINE FIBERGLASS		DESCRIPTION LOW THRESHOLD	
B	0.50						
C	0.75	DWG # 309		CUSTOMER DWG #		TOL.	
D	1.00			DATE Sep.07.'00		SCALE 1 : 1	
E	1.50	WEIGHT kg/m	AREA mm <sup>2</sup> 418.9	PERIM. mm	WALL THK. mm	DRWN BY R.N.	MAT'L PVC
F	1.75	WEIGHT lb/ft	AREA in <sup>2</sup>	PERIM. in	WALL THK. in	CHK'D BY M.P.	DIRECT# /300N
G	2.00	REV.	DATE	NOTES	REV.	DATE	NOTES
H	2.50						
I	3.00	1.					
J	3.50						

## Edge of Glass Detail (Double Heat Mirror)



Location	Detail	Description	Size
1	Glass Type	clear	3 mil
2	Heat Mirror Type	HMTC88	.076 mil
3	Glass Type	clear	3 mil
4	Dessicant	Molecular Sieve Type 3A	
5	2nd Seal	Polyurethane (PRC)	
6	Primary Seal	P.I.B. (Polyisobutylene)	0.5 mil
7	Bite		12.7 mil
8	Spacer Height	allmetal steel	7.9 mil
9	Spacer Type	allmetal steel	
10	Gas Fill	Krypton 95%, 5% air	

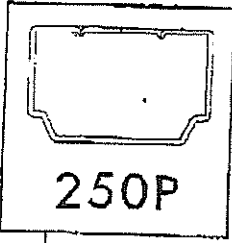
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Steel - ~~for~~ heat mirror

Att: Khet

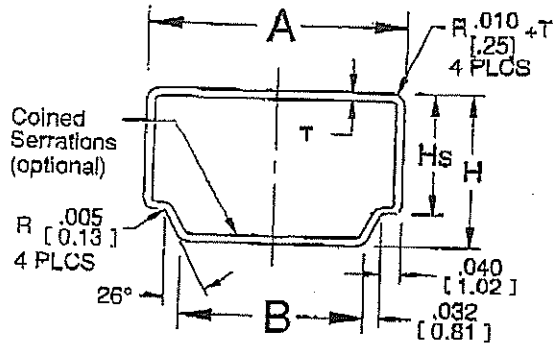


250P

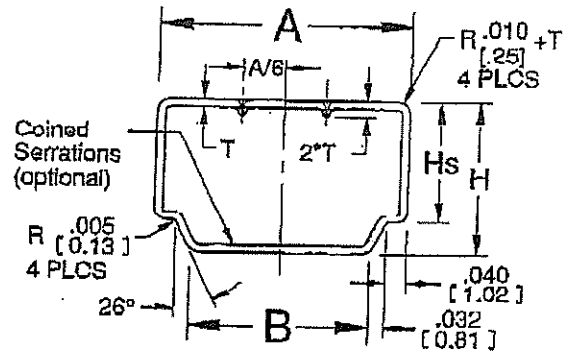
**ALLMETAL®**

250P Air Spacer

This is in EG Steel



Zippered  
(all sizes)



Perforated  
(1/4" [6.5mm] and wider)

Tolerance: All dimensions  $\pm 0.005$  [.13mm] unless otherwise specified

Material	H		Hs		T	
	IN	MM	IN	MM	IN	MM
.008" [.20mm] Hi-Q Steel	.302	7.67	.240	6.10	.008	.20
.010" [.25mm] Anodized Aluminum	.305	7.75	.244	6.20	.010	.25
.012" [.30mm] Hi-Q Steel	.307	7.80	.246	6.25	.012	.30
.014" [.36mm] EG Steel	.311	7.90	.248	6.30	.014	.36
.014" [.36mm] Anodized Aluminum	.311	7.90	.248	6.30	.014	.36
.015" [.38mm] Black Steel	.313	7.95	.249	6.32	.015	.38
.016" [.41mm] Anodized Aluminum	.315	8.00	.250	6.35	.016	.41
.016" [.41mm] Mill Finish Aluminum	.315	8.00	.250	6.35	.016	.41
.0185" [.47mm] Mill Finish Aluminum	.320	8.13	.252	6.40	.019	.47

Notes:

1. Dimensions are in decimal inches; dimensions in [ ] brackets are in mm.
2. Available with serrations at no extra charge on inside of Aluminum spacer at location indicated above; not recommended for spacer to be used for bending.
3. Material tolerances can be found on Material Specifications Data page (ii).
4. Thermal properties can be found on Thermal Performance Data page (iii).

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