

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**

REPORT PREPARED FOR:

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

REPORT NUMBER:

ILF10003w-f

PRODUCT LINE:

400 Commercial Strip

August 23 , 2010

**Enermodal Engineering Ltd.
582 Lancaster St. W.
Kitchener ON
N2K 1M3
(519) 743-8777
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Manufacturer: Great Land Windows
Report Number: ILF10003w-f
Product Line: 400 Commercial Strip

Frame: Fiberglass with Styrofoam

Sash: N/A

Thermal Break: N

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

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

Spacer: Steel: CS-D

Weatherstripping: N/A

Simulations: Performed using WINDOW 5, and THERM 5.

General: This product line includes the 400 Commercial Strip manufactured by Great Land Windows.

This is a reissued report of ILF701w-p.

Michael Barclay, P.Eng.

Simulator

Michael Barclay, P.Eng.

Simulator in Responsible Charge

WINDOW SIMULATION REPORT

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.

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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

- 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: 400 Commercial Strip
 Product Type: FIXD
 Frame: Fiberglass with Styrofoam

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

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

Product Description	272-kry-TC88-kry-272, bsl	
Glass Thick 1 (in)	0.154	
Glass Thick 2 (in)	0.003	
Glass Thick 3 (in)	0.154	
Glass Thick 4 (in)	0.154	
Glass Thick 5 (in)		
# of Glazing Layers	3	
Surface #2 Emissivity	0.04	
Surface #3 Emissivity	0.13	
Surface #4 Emissivity	0.11	
Surface #5 Emissivity	0.04	
Surface #6 Emissivity		
Surface #7 Emissivity	0.04	
Surface #8 Emissivity		
Gap 1	0.283	
Gap 2	0.283	
Gap 3	0.372	
Gap 4		
Validation Size	1200 x 1500 mm	
	47.244 x 59.055 in	
Spacer Type	CS-D	
Grid	N	
Gap Fill	Air (10%) / Krypton (90%) Mix	
U-Value	0.17	

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	0.013	0.989	0.169	0.509	0.650
14	272-kry-TC88-kry-272	3	#	90	NFRC 100-2002	0.006	0.885	0.118	0.329	0.499

NFRC Simulation Data – Summary

Manufacturer: Great Land Windows
 Series/Model #: 400 Commercial Strip

Spacer: Steel: CS-D

Operator Type: FIXD Sim Lab Code: SEEL
 Model Size: 1200 x 1500 Report number: ILF10003w-f
 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 ²)	SHGC	VT	*CR
cl-arg-TC88-arg-Cl, sl	0001	0.38	0.38	ARG	ARG		0.13	0.11		CL	CS-D	N		0.23	0.45	0.56	62

*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

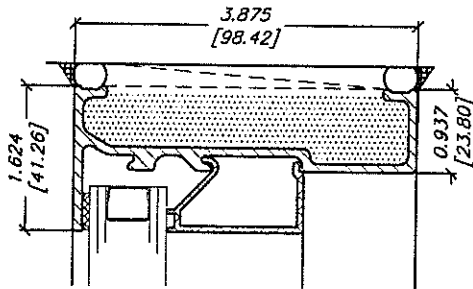
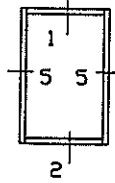
Product Drawings



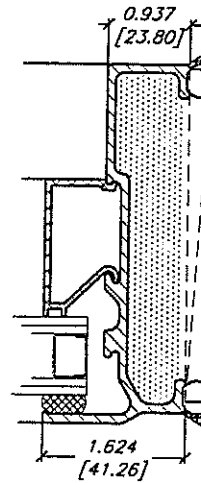
SERIES 400 COMMERCIAL STRIP WINDOW



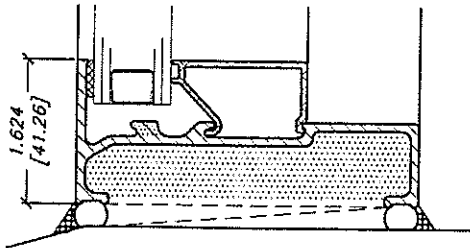
STYROFOAM



1 HEAD



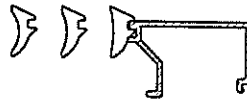
5 JAMB



2 SILL



PVC STOPS
USE WITH GLASS OF LESS
THAN 2.7 SQ.M at 1.2 kPa
(30 SQ. FT. at 25 psf)



ALUM STOP with
WEDGE SPACERS

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




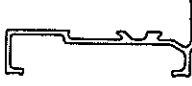
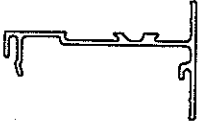
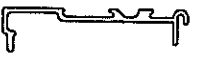
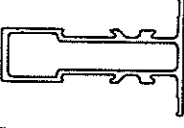



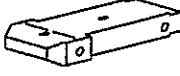

30 Constellation Court
Toronto, Ontario M9W 1K1

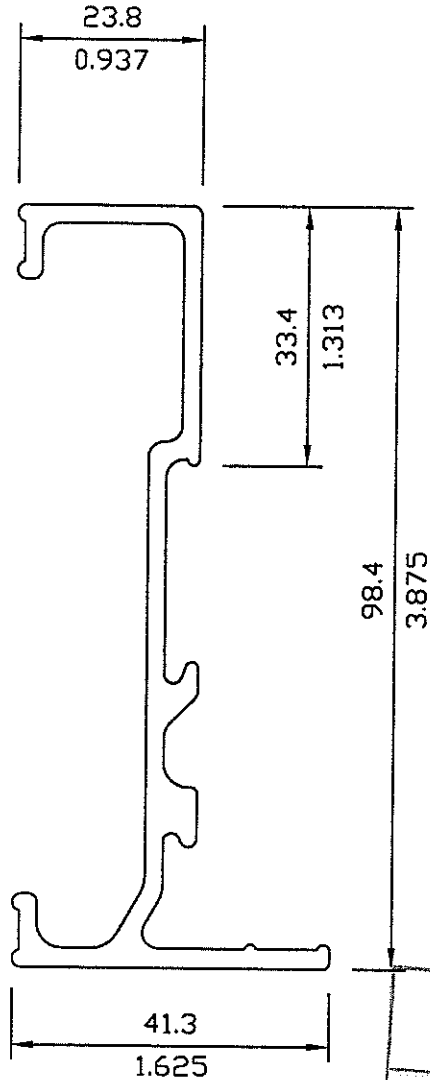
PARTS LIST

SERIES 400 COMMERCIAL STRIP WINDOW

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


400-100

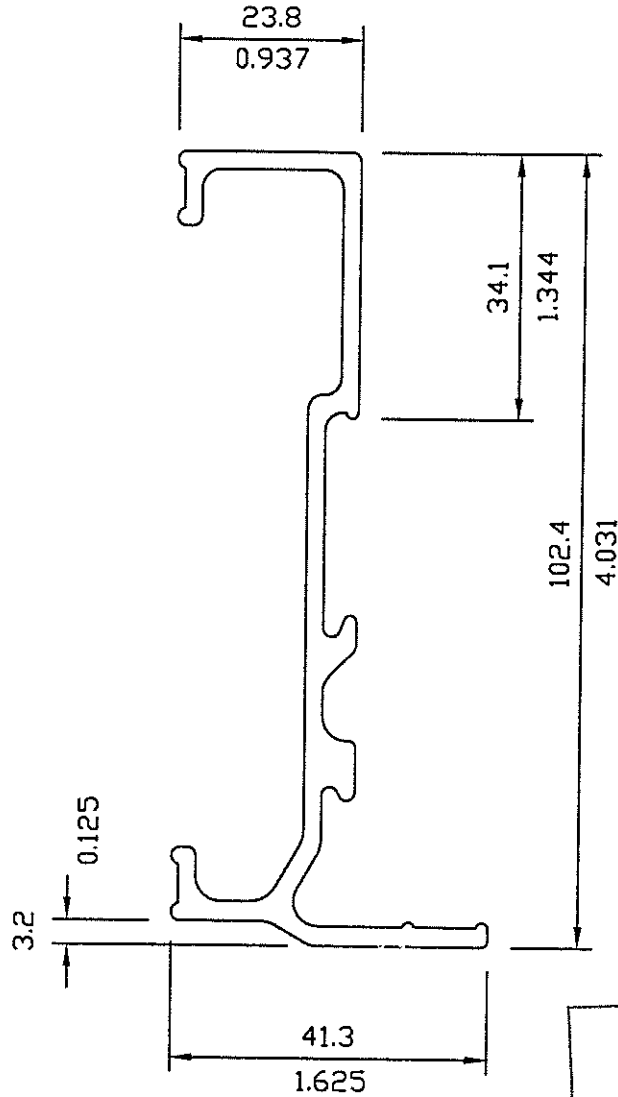
Parts #	Description	Colour	Price	Comments
401		Head and sill	Not painted	Fiberglass, S/L=
			White	
			Other	
402		Jamb	Not painted	Fiberglass, S/L=
			White	
			Other	
403		Coupling mullion (female)	Not painted	Fiberglass, S/L=
			White	
			Other	
404		Coupling mullion (male)	Not painted	Fiberglass, S/L=
			White	
			Other	
405		Mullion	Not painted	Fiberglass, S/L=
			White	
			Other	
410		Glass stop 22mm(7/8")		PVC, S/L=
428		Glass stop 22mm(7/8") & 24mm(15/16")		Aluminum, S/L=
	<ul style="list-style-type: none"> ∩ (22mm glass) ∩ (24mm glass) ∩ (25mm glass) 	Glazing wedge with aluminum glass stop 22mm(7/8") 24mm(15/16") 25mm(1")		/roll
GL-Tape		Glazing tape 1/8" x 3/8"		/roll
412		Shearblock (for perimeter & mullion)		/per carton
719A		Setting block A) 3/16" x 1" x 2"		/per carton
				Report Number: ILF701w-p AUG 01 2007 Enermodal Engineering Ltd.



Report Number:
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PART NUMBER - 401
MATERIAL - FIBERGLASS
WALL THICKNESS - 0.090 /2.25/

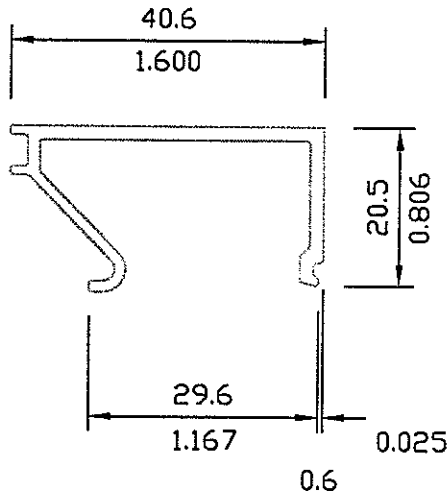
ITEM.	QTY.	DWG.NO./CAT.NO.	DESCRIPTION	MATERIAL														
INLINE FIBERGLASS LTD SHEET 1\1 30 Constellation Court Toronto, Ontario M9W 1K1 			HEAD & SILL	DR. BY: J.L.														
<table border="1"> <thead> <tr> <th>NO.</th> <th>REVISION</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>				NO.	REVISION	DATE												
NO.	REVISION	DATE																
				SCALE: _____														
				401														



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



PART NUMBER - 402
MATERIAL - FIBERGLASS
WALL THICKNESS - 0.090 /2.25/

ITEM.	QTY.	DWG.NO./CAT.NO.	DESCRIPTION	MATERIAL															
INLINE FIBERGLASS LTD. 30 Constellation Court Toronto, Ontario M9W 1K1  INLINE FIBERGLASS LTD.		DWG. NO. / CAT. NO. TDSHEET 1\1 <table border="1"> <thead> <tr> <th>NO.</th> <th>REVISION</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	NO.	REVISION	DATE													JAMB	DR. BY: J.L. DATE: FEB.98. SCALE: _____ <div style="font-size: 2em; font-weight: bold; text-align: center;">402</div>
NO.	REVISION	DATE																	

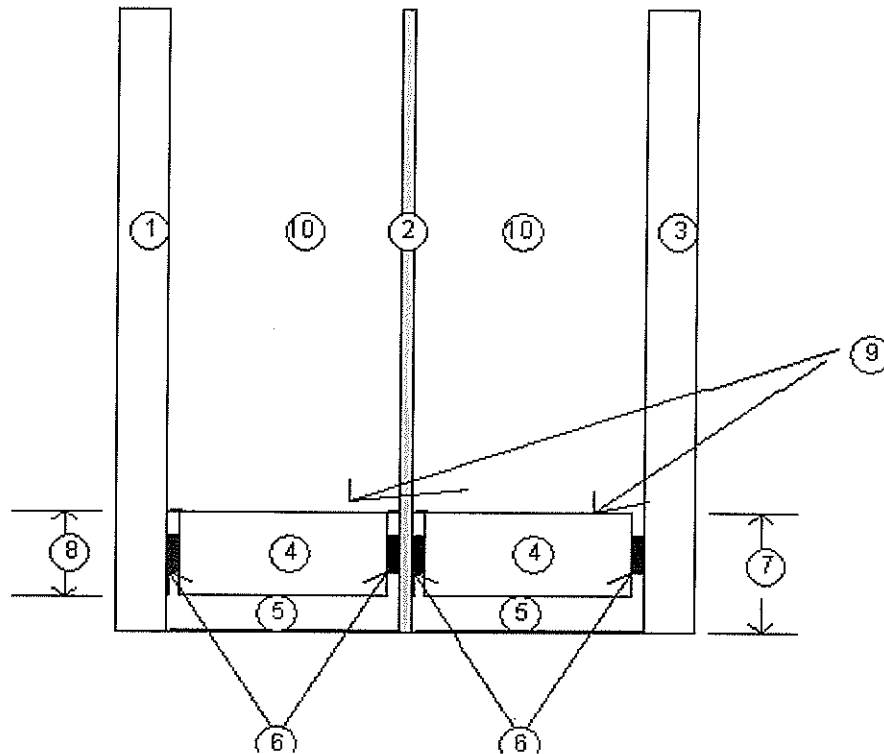


Report Number:
ILF701w-P
AUG 01 2007
Enermodal Engineering Ltd.

PVC STOPS
USE WITH GLASS OF LESS
THAN 2.7 SQ.M at 1.2 kPa
(30 SQ. FT. at 25 psf)

ITEM.	QTY.	DWG.NO./CAT.NO.	DESCRIPTION	MATERIAL															
INLINE FIBERGLASS LTD. 30 Constellation Court Toronto, Ontario M9W 1K1		DWG. NO. / CAT. NO. SHEET 1 \ 1	PVC GLASS STOP	DR. BY: J.L. DATE: FEB. 98. SCALE:															
		<table border="1"> <thead> <tr> <th>NO.</th> <th>REVISION</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>		NO.	REVISION	DATE													
NO.	REVISION	DATE																	
																			
			410																

Edge of Glass Detail (Single 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	

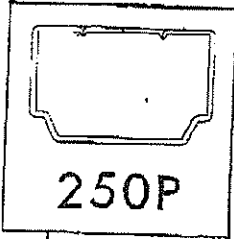
Report Number:
ILF 701 w-p

AUG 01 2007

Enermodal Engineering Ltd.

Steel - for heat mirror

Att: Mark

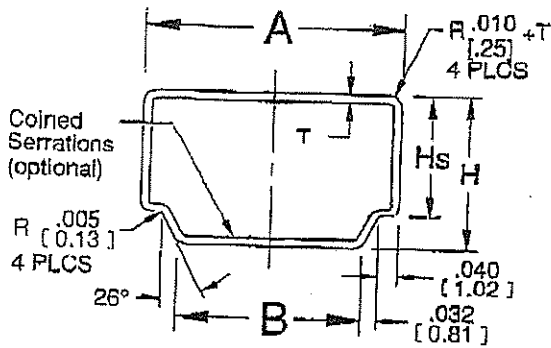


250P

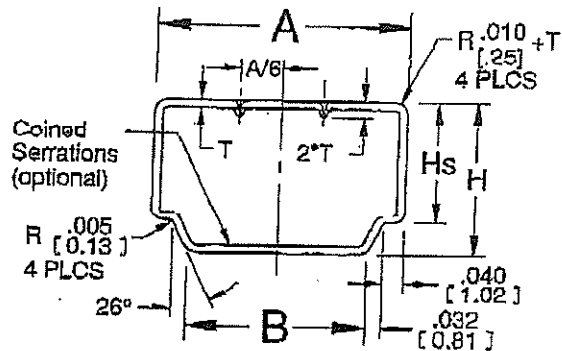
ALLMETAL

This is in EG Steel

250P Air Spacer



Zippered
(all sizes)



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

Tolerance: All dimensions $\pm .005$ [.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).

Report Number:
ILF 70/w-p

AUG 01 2007

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