

## Therm 7.8 and Window 7.8 Simulation Report

### Zero•Net UCW3500 Captured w/ VIG and FortMax™ 2500 Thermal Break and Aluminum Pressure Plate

\* Thermal modeling analysis was performed on FreMarq's UCW3500 framing system with FortMax™ 2500 thermal break and aluminum pressure plate. Analysis of the system was performed using the Therm 7.8 and Window 7.8 computer software developed by Lawrence Berkeley Laboratory.

	U-Factor Center of Glass (Btu/h-ft <sup>2</sup> -F)	U-Factor Assembled (Btu/h-ft <sup>2</sup> -F)	SHGC	VT	CR
NFRC SIZE	0.049	0.150	0.220	0.534	32
5' x 8' Job Size	0.049	0.123	0.227	0.559	30



THERM 7.8 calculates heat loss through frame and edge-of-glazing components using finite element analysis. The program solves for temperature and heat flow distribution throughout the cross section. The temperature distribution can then be used to determine overall heat loss, total and component U-factors, and local temperatures at points of interest.

WINDOW 7.8 calculates U-factor and temperatures for the center-of-glazing using a two-dimensional heat flow analysis.

**Standards:**

NFRC 100-2014: *Procedure for Determining Fenestration Product U-Factors.*

NFRC 200-2014: *Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.*

NFRC 500-2014: *Procedure for Determining Fenestration Product Condensation Resistance Values.*

Standard NFRC environmental conditions were used to analyze the system, which are -0.4°F exterior ambient temperature with a 12.3 mph wind acting perpendicular to the wall. An exterior film coefficient of 4.579 BTU/hr\*ft<sup>2</sup>\*°F was used to represent the exterior wind. Interior conditions were modeled as 69.8°F ambient temperature with natural convection only.

One glass system was used in this analysis. the system consisted of:

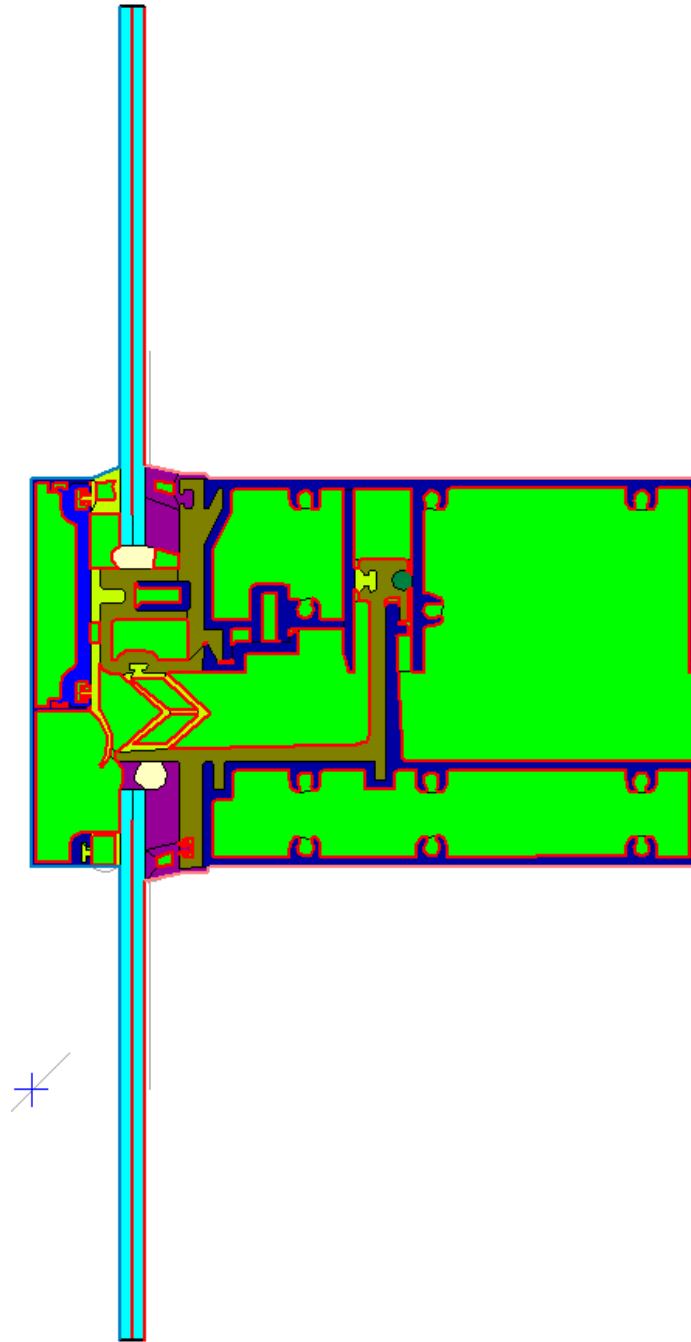
4 mm Solar Ban 70 (2)  
0.010" 50mm VIG Bond Layer  
4mm Clear

The system being simulated is FreMarq's UCW3500 wall framing system with FortMax™ 2500 thermal break and aluminum pressure plate.

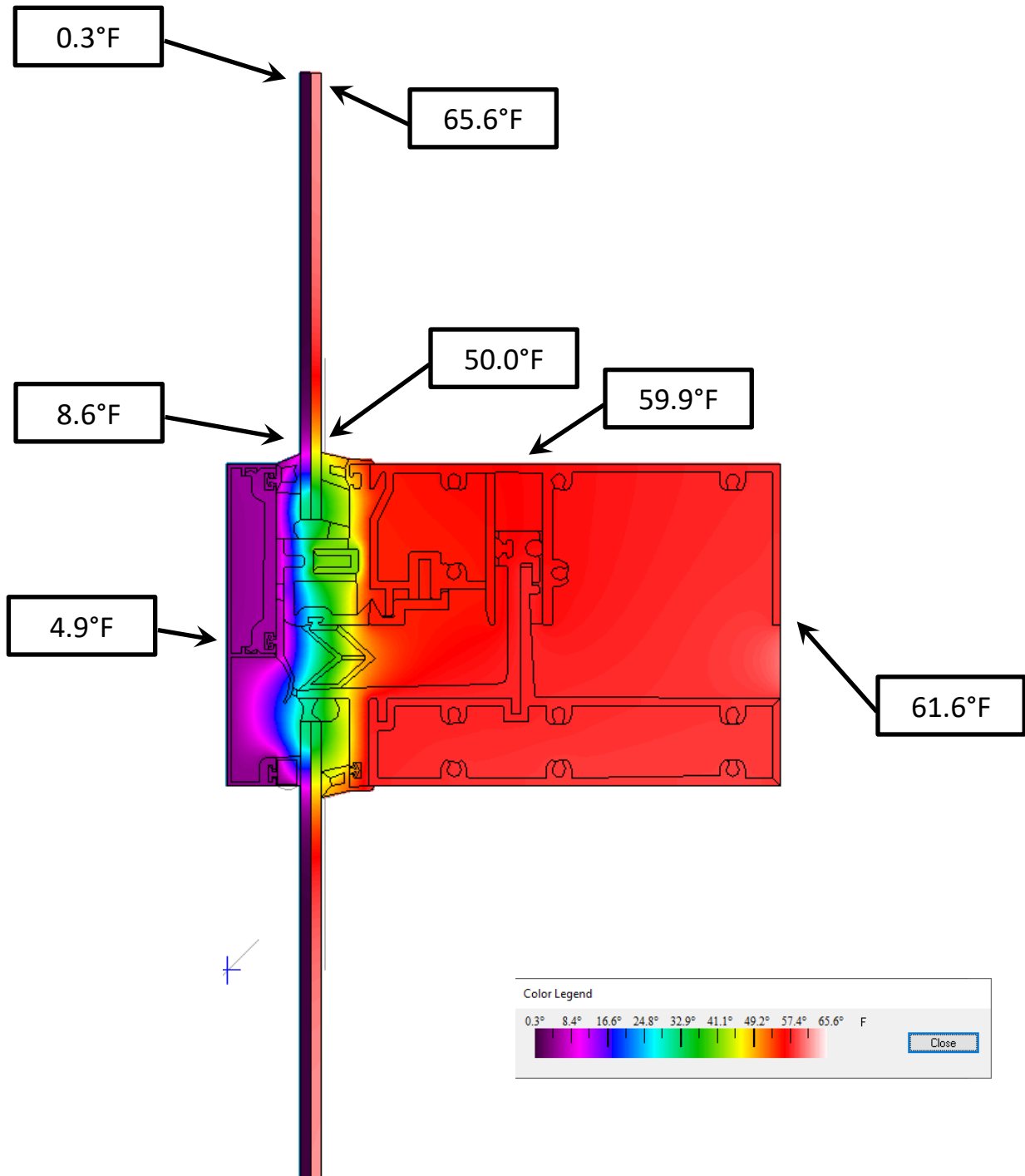
U-factor calculations were performed on standard NFRC rating size consisting of a two lite wide specimen with an overall size of 79" X 79". Job size model was also done at 5' x 8'.

Thermal model graphical outputs with frame surface temperature identification can be found below.

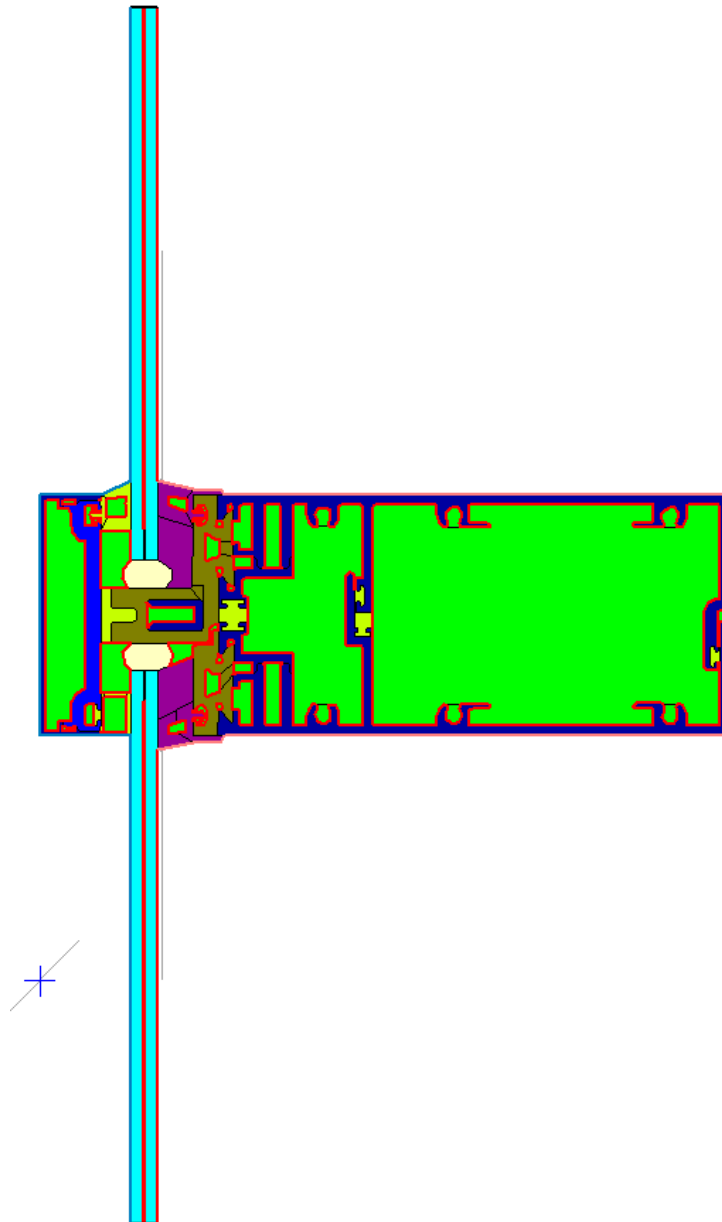
# Typical Horizontal



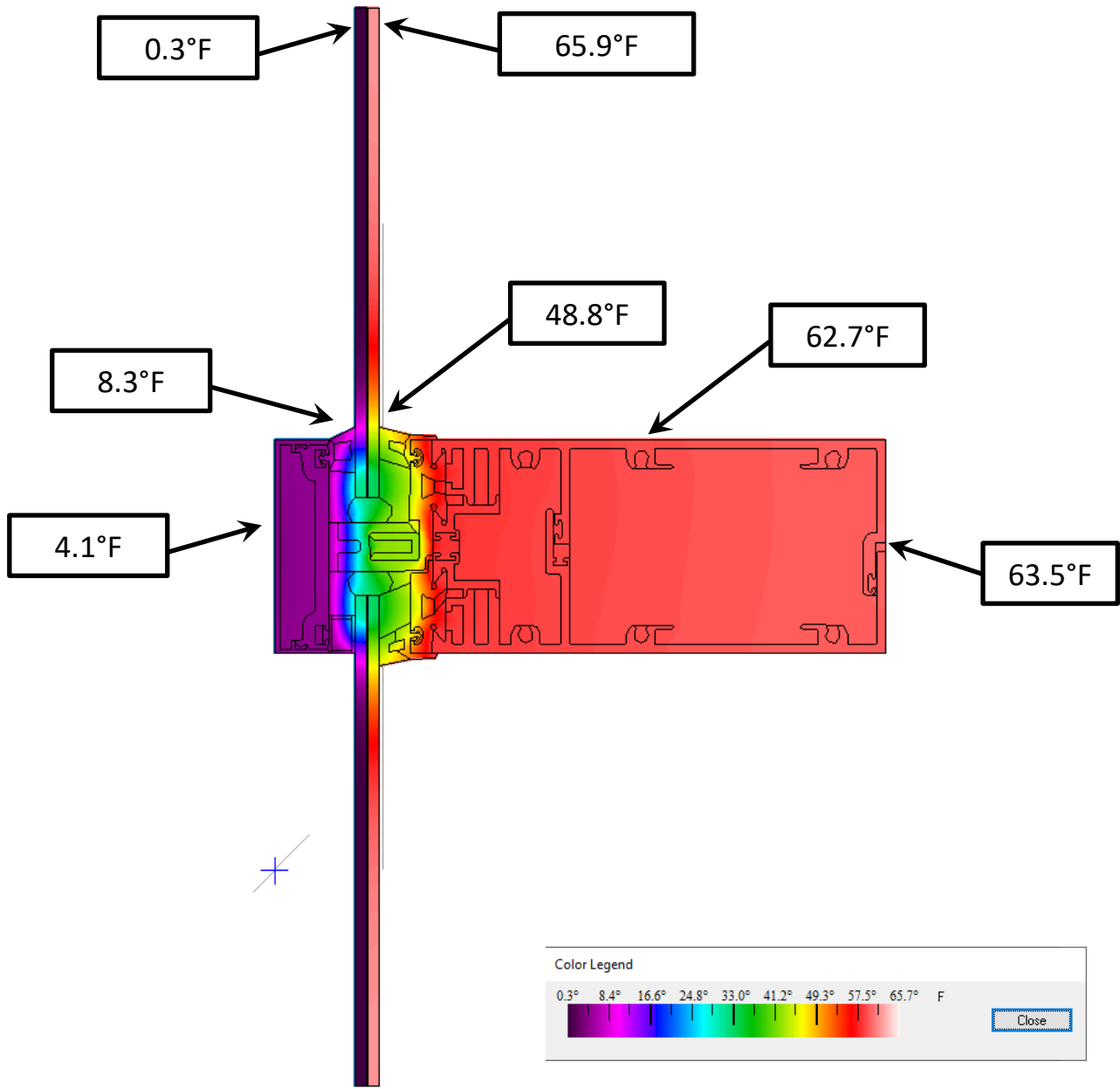
# Typical Horizontal



# Typical Vertical



# Typical Vertical



ID #

Name

Mode

Type  >>

Width  inches

Height  inches

Area  ft2

Tilt

Environmental Conditions

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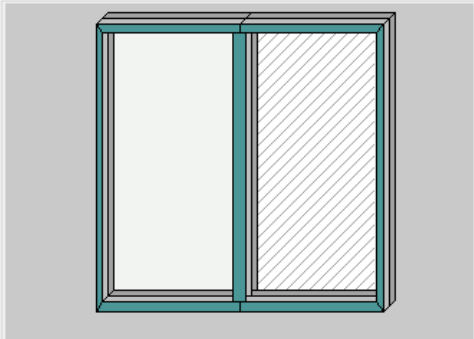
Total Window Results - Normal Incidence

Ufactor  Btu/h-ft2-F

SHGC

VT

CR



Click on a component to display characteristics below

Glazing System

Name  >>

ID  Ucenter  Btu/h-ft2-F

Nlayers  SC

Area  ft2 SHGC

Edge area  ft2 Vtc

ID #

Name

Mode

Type  >>

Width  inches

Height  inches

Area  ft2

Tilt

Environmental Conditions

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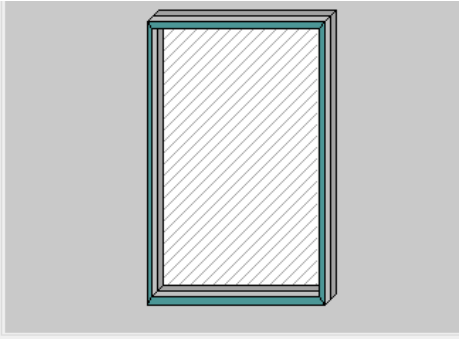
Total Window Results - Normal Incidence

Ufactor  Btu/h-ft2-F

SHGC

VT

CR



Click on a component to display characteristics below

Glazing System

Name  >>

ID  Ucenter  Btu/h-ft2-F

Nlayers  SC

Area  ft2 SHGC

Edge area  ft2 Vtc

## Window Data



ID #: 103 Name: LUX VIG ONLY 50MM  
 # 2 Tilt: 90° IG Height: 39.37 inches  
 Environmental Conditions: NFRC 100-2010 IG Width: 39.37 inches  
 Comment:  
 Overall thickness: 0.32496 inches Mode: #

	ID	Name	Mode	Thick	Flip	Tsol	Rsol1	Rsol2	Tvis	Rvis1	Rvis2	Tir	E1	E2	Cond	Comment
▼	Glass 1 ▶▶	5433 SB70 Clear_4.VTA	#	0.157	<input type="checkbox"/>	0.262	0.392	0.572	0.693	0.084	0.068	0.000	0.840	0.018	0.578	
	Gap 1 ▶▶	304 0.25mm Radius at 50mm		0.010												
▼	Glass 2 ▶▶	3014 Clear_40.GRD	#	0.157	<input type="checkbox"/>	0.844	0.078	0.078	0.900	0.084	0.084	0.000	0.840	0.840	0.578	

Center of Glass Results | Temperature Data | Optical Data | Angular Data | Color Properties | Radiance Results

Ufactor	SC	SHGC	Rel. Ht. Gain	Tvis	Keff	Layer 1 Keff	Gap 1 Keff	Layer 2 Keff
Btu/h-ft <sup>2</sup> -F			Btu/h-ft <sup>2</sup>		Btu/h-ft-F	Btu/h-ft-F	Btu/h-ft-F	Btu/h-ft-F
0.04923	0.28528	0.24820	57.80	0.62741	0.0014	0.5778	0.0000	0.5780

## Glass Data