



Introducing The Sierra® F-200 Photovoltaic Module

The first Insulated frameless bifacial module designed to be integrated within Florian's proprietary framing systems. The Sierra PV module will be used within our exclusive line of Solariums, Greenhouses, Skylights and Conservatories. Adding living space to your home and cutting your power bill what better use of space could there be.

INSULATED BIFACIAL MODULE# F-200



High Module Efficiency

Module efficiencies of up to 15.5% are achieved through the use of advanced bifacial cell technology. Unique cells offer equal front and back efficiencies up to 19.1% helping customers capitalize on their solar investment.



Reduced Cell Shading

Minimization of shading is accomplished by a large glass border, increasing the amount of light allowed through so more backlight is allowed through. 25% of the surface of the module is not covered by cells.



Superior Low Light Performance

Modules offer exceptional performance in low light conditions.



Bifacial Technology

Both front and back surfaces of the modules are equally capable of generating electricity. The back surface generates power through the use of light reflected from the surrounding area. Mounting with the Florian system maximizes a site's available albedo light can yield up to 30% or more gain in power generation per square foot.



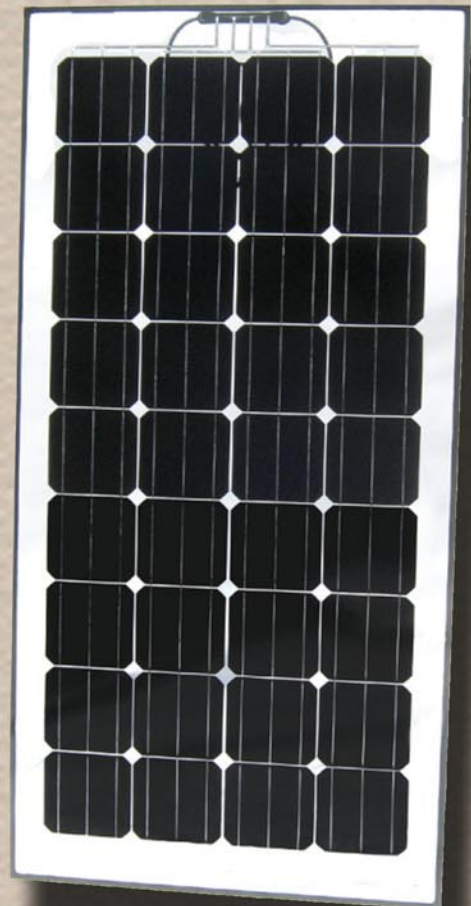
Seamless Integration


Designed exclusively for Florian you can upgrade most existing Sierra Sunroom, Geneva Greenhouse, Monarch Conservatory and Woodhaven Solarium. With over 600 different standard sizes our F-200 module can be added to almost any future project.



Quality and Reliability

Advanced Testing and inspection of every module insures that quality is upheld. Every module produced is tested in the latest Electroluminescence and class A sun simulator technology.



PROUDLY MADE IN AMERICA 

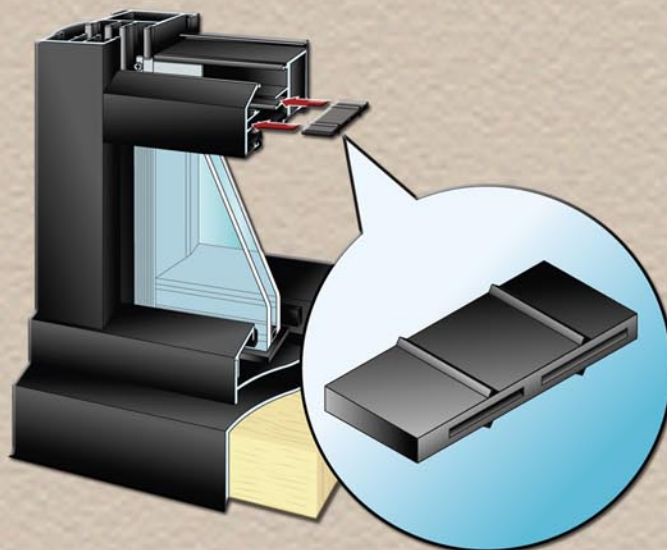
www.FLORIANSolar.com

Florian's Exclusive Nylon Clip Assembly

The Stronger, Longer Lasting, More Efficient Difference!

Designed into every Sierra is the highest degree of thermal integrity possible. Which translates into an incredible energy efficiency up to 200% better than other greenhouse type rooms.

Here's why. Most greenhouse manufacturers start with reasonably well-insulated designs, then put their units together with metal screws or bolts! Each of these hundreds of fasteners conduct heat and cold right through the so-called thermally broken frame, and helpless owners lose money trying to stay comfortable.



Moreover if just a few of the screws or bolts are tightened too much or too little, stresses are created in the frame and glazing which can result in drafts or worse.

Sierra's exclusive nylon clip assembly system is proven thermally broken. These clips enable Sierra to go together faster, more easily, and with even pressure between the frame, gasket, and glass. Not only secures the thermal integrity of the room but are actually 30% stronger. In fact each nylon fastener has a pull strength rating of 300 lbs. The thermal break is preserved and your heating bills will reflect it, as demonstrated in the chart above. Heavy gauge, extruded aluminum framework and exclusive nylon clip assembly system give you superior thermal integrity. Extraordinary energy efficiency of up to 200% better than other glass rooms. These features and more add up to a better-looking, better performing room for your money.

GLAZING OPTIONS

BASIC:

Single pane, fully tempered safety glass. Florian gives you a wide range of choices. But no matter which you choose, you can count on it to exceed the specs of our competitors. "Basic," for example, is used for low-budget horticulture greenhouses. Compared to polycarbonate twinwall glazings, it is more aesthetically pleasing and will not yellow from the sun. Also, compared to the competition's dangerous "Double Strength Annealed" glass (that will cut you), our tempered glass is over five times stronger.



BEST: (Recommended to be used in the ROOF areas.) (Florian's "Heat Repellant Series") Super MC Low-E clear tempered over clear tempered safety glass, dual sealed.

Solar Heat Gain Coefficient: no higher than .23
Outdoor Visible Reflectance: no higher than 32%
Visible Light Transmittance: no higher than 47%



Insulated Glazing Performance Types:

All insulated glass units shown below are hermetically sealed against condensation and dirt infiltration. Other greenhouse manufacturers' use what they call an "insulated glass" which uses two panes of glass and a dead air space. This type of glass is NOT hermetically sealed and is subject to infiltration of impurities.

GOOD:

Clear tempered over clear tempered safety glass, dual sealed.

Solar Heat Gain Coefficient: no higher than .70
Outdoor Visible Reflectance: no higher than 15%
Visible Light Transmittance: no higher than 79%



TRIPLE PANE:

(Florian's "Heat Repellant Series") MC Low-E clear tempered / MC Low-E clear tempered / clear tempered safety, dual sealed.

Solar Heat Gain Coefficient: no higher than .33
Outdoor Visible Reflectance: no higher than 15%
Visible Light Transmittance: no higher than 56%



BETTER: (Recommended to be used in the WALLS for high comfort and low reflectance.) (Florian's "Heat Repellant Series") MC Low-E clear tempered over clear tempered safety glass, dual sealed.

Solar Heat Gain Coefficient: no higher than .37
Outdoor Visible Reflectance: no higher than 12%
Visible Light Transmittance: no higher than 69%

The highest insulated glass we offer: Winter value of R-10. Designed for cold climate applications.

HEAT SHIELD HIGH PERFORMANCE GLAZING CHART

A Glazing Code	B Glazing Description	C Upcharge Over Clear Per Sq. Ft.	D Std. Unit Availability	E Shading Coefficient	F Relative Heat Gain	G % Visible Light Trans	H % UV Light Trans	I Inside Glass Temp Winter	J Inside Dew Point	K Winter U-Value	L Winter R-Value
Single Glazing: Tempered safety glass: Mostly used on low budget horticultural greenhouses											
R-W	Clear Tempered	\$0.00	G	1.0	214	90	70	17	52	1.11	.9
Dual Panel Insulated: Increased efficiency over single pane glass. Hermetically sealed against condensation and dirt											
R-W	Clear Tempered/ Clear Tempered	\$7.51 Applies to Geneva Only	All	.89	185	81	52	47	30	.43	2.3
Heat Repellant: series "Better". Tremendously increases energy efficiency and comfort. Higher insulation value without giving up visible light transmittance											
R-W	MC Low-E Temp/ Clear Temp	\$6.83	All	.40	81	69	14	57	-8	.25	4.0
Heat Repellant: series "Best" Not available in curve. Unbeatable light to solar-gain ratio. Recommended to be used in the roof areas for natural light with less reflectivity than the competition, all without using color (tinted) glass											
R-W	Super MC Low-E Temp/Clear Temp	\$13.22	All	.27	32	47	10	57	-8	.25	4.0
Heat Repellant: series "Ultra Triple". The highest insulated glass we offer: Winter value of R-10. Designed for cold climate applications											
R-W	MC Low-E Temp/Clear Temp/ MC Low-E Temp	\$28.41	All	.25	30	42	4	64	-108	.1	10.0

GLOSSARY OF TERMS FOR GLAZING CHART

A - "Glazing code" - Refers to Florian's recommendation for selecting glass (R) roof, (W) wall.

B - "Glazing description" - A description of the components used to obtain the glazing unit being described.

C - "Upcharge over clear" Insulated - Multiply the number in this column by the total square footage of option desired, and add to the base price of a standard unit with clear glass.

D - "Unit Availability" - Glass is available as a standard in the units specified in this column.

G- Geneva greenhouse and greenhouse kit, S- Sierra sun room, sun room kits and solarium.

W- Woodhaven solarium & sun room.

E - "Shading co-efficient" - Multiplier for the amount of solar gain entering through the glass.

For example: a piece of glass with a shading co-efficient of .85 would let in 85% if the solar gain that would travel through a 1/8" piece of clear glass.

J - "Inside dew point" - The outside temperature in degrees F that will cause condensation on the inside surface of the glass. This number assumes an inside relative humidity of 60% and a temperature of 70 degrees F.

K - "Winter U value" - The total heat transfer co-efficient which is the measure of heat loss through the glass due to a difference between indoor and outdoor air temperatures. The lower the U value, the better the insulating properties of the glass. (BTU/HR/SQFT/F).

F - "Relative heat gain" - The measurable amount of energy which penetrates the glass is expressed in terms of BTU's of heat gain per hour per square foot of glass area.

G - "% Visible light transmittance" - The percentage of light in the visible spectrum, that is directly transmitted through the glass.

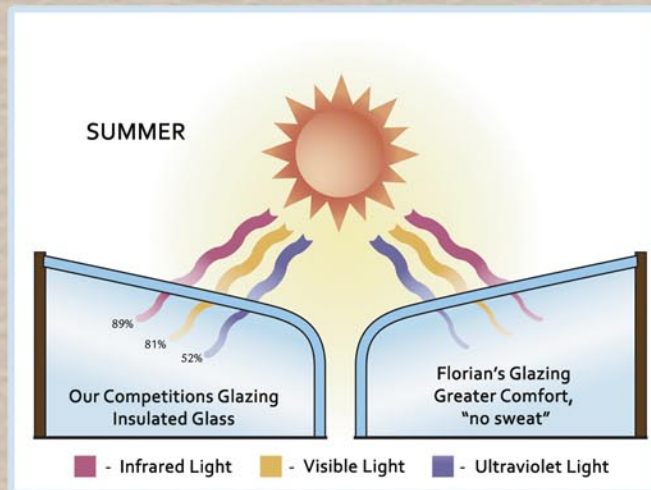
H - "% UV light transmittance" - Percentage of ultra-violet radiation transmitted through the glass.

I - "Inside the glass temp" - The temperature of the inside surface of the glass in degrees F when the following ashrae conditions exist. Outside temperature of 0 degrees F with a 15mph wind, and inside temperature of 70 degrees F.

L - "Winter R value" - The resistance to heat loss through the glass. The higher the R value, The better the insulating properties. (R=1/U).

NOTE:

SUNCLEAN TRADEMARK, AZURLITE TRADEMARK AND SOLARCOOL TRADEMARK ARE TRADEMARKS OF PPG INDUSTRIES. HEAT MIRROR TRADEMARKS, 2ND GENERATION HEAT MIRROR TRADEMARKS AND XUV TRADEMARKS ARE TRADEMARKS OF SOUTHWALL TECHNOLOGIES, INC.



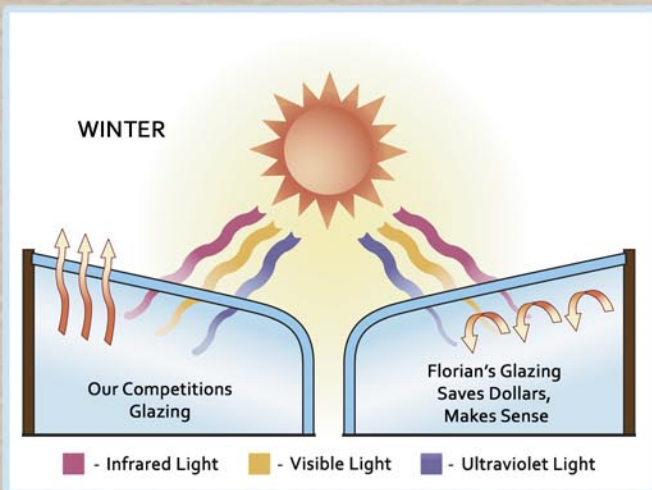
Problems:

- Drafts, cold feeling - winter inside glass temperature (column I)
- Condensation forms on glass - inside dew point (column J)
- Heat escapes with little resistance - winter R-VALUE (column L)

The Solution:

- Drafts eliminated by using a winter inside glass temperature of 57 degrees or higher (column I) (Warmer feeling)
- High resistance to condensation with an inside dew point of -2 or lower (column J)
- Higher insulation R-VALUE keeps heat in Choose an R-VALUE of 4.0 or higher (column L)

Common with the competition's glass, these problems cause drafts, condensation and large amounts of heat loss.



Problems:

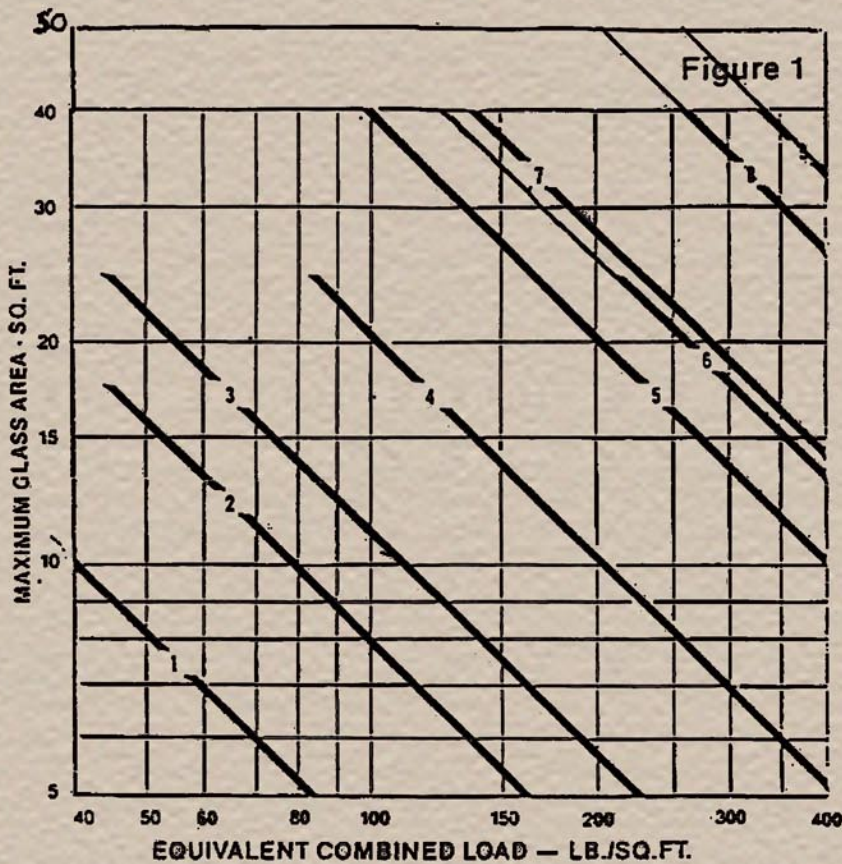
- Overheating-relative heat gain (column F)
- Glare - % visible Light transmittance (column G)
- UV Fading damage - % UV Light transmittance (column H)

The Solution:

- Overheating problems are solved by using a combination of very low relative heat gain glass. We recommend a rating of 45 or lower for roofs, and 90 or lower for walls (column F)
- Glare problem solved by filtering visible light transmittance to a comfortable level of 69 or lower (column G)
- UV Fading damage is tremendously reduced by using a UV Light transmittance of 10 blocking 90% of UV rays

These problems are common when ordinary insulated glass; clear, bronze or regular LOW-E's; is used by our competition in these exposures.

SLOPED GLAZING SPECIFICATION

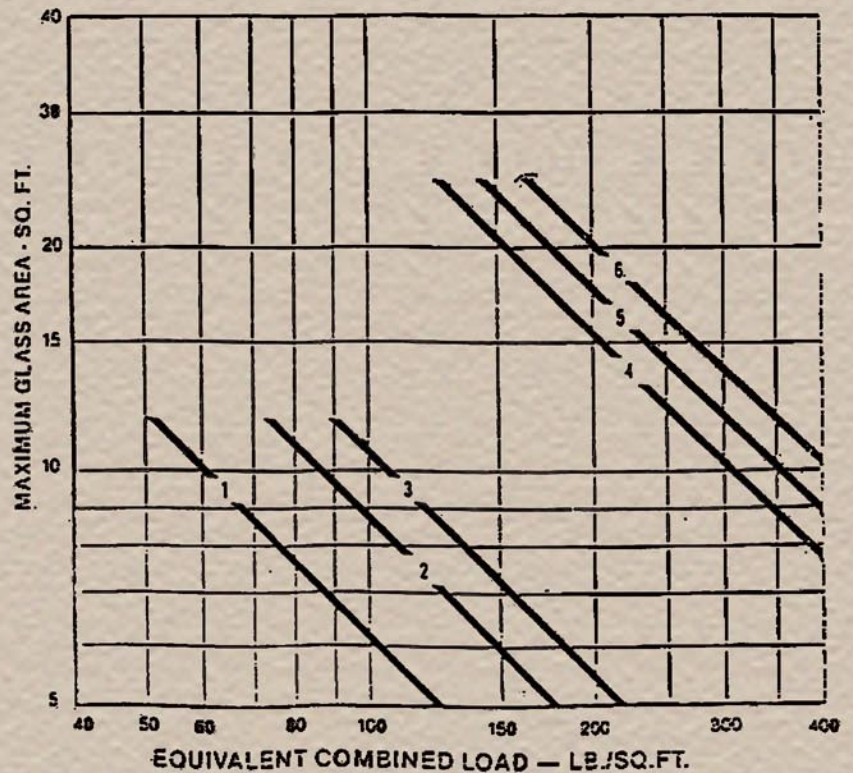


Single Laminated Glass

Curve	Laminated Glass	
	Ply Thickness	Type
1 2 3	1/8" 3/16" 1/4"	Annealed
4 5 6	1/8" 3/16" 1/4"	Heat-Strengthened
7 8 9	1/8" 3/16" 1/4"	Fully Tempered

- Use graph only as directed in AAMA "Glass Design for Sloped Glazing"
- Do not use glass sizes beyond limits of lines.
- Probability of breakage: 1:1000

Figure 2



Insulating Glass

Curve	Heat-Strengthened Outboard Pane Thickness	Laminated Inboard Pane	
		Ply Thickness	Type
1 2 3	1/8" 3/16" 1/4"	1/8"	Annealed
4 5 6	1/8" 3/16" 1/4"	1/8"	Heat-Strengthened or Fully Tempered

- Use graph only as directed in AAMA "Glass Design for Sloped Glazing"
- Do not use glass sizes beyond limits of lines
- Probability of breakage: 1:1000

INSULATED BIFACIAL MODULE# F-200

Electrical Data

		Projected specifications including additional backside irradiation contribution in Isc as a percent of STC.			
		STC*	10%	20%	30%
Rated Power	Pmax (W)	147	162	177	191
Rated Voltage	Vmp (V)	18.4	18.3	18.3	18.3
Rated Current	Imp (A)	8.00	8.89	9.65	10.46
Open Circuit Voltage	Voc (V)	23.1	23.2	23.4	23.5
Short Circuit Current	Isc (A)	8.72	9.59	10.46	11.34
Module Efficiency	(%)	12.0	13.2	14.4	15.5
Max System Voltage	UL	600V			
Series Fuse Rating		15A			
Temperature Coefficients	Power	-0.466 %/°C			
	Voltage (Voc)	-0.320 %/°C			
	Current (Isc)	0.100 %/°C			
NOCT (C°)		47.1°C**			

Mechanical Data

Glass, Front & Back	2 x 3.2mm Tempered
Frame Type	Frameless
Bypass Diodes	2
Junction Box	Back Mounted
Cable Length	900mm
Connectors	Amphenol Helios H4
Dimensions	1613mm X 762mm X 7.2mm*** (63.50in X 30.00in X 0.28in)
Weight	45.5 lbs. (20.6kg)

Operating Conditions

Temperature	-40°C to 85°C (-40°F to 185°F)
Max Load	Standard 4-point mount: 57 psf Continuous perimeter mounting (non-BIPV): 170 psf** BIPV: 30 psf
Impact Resistance	25mm (1") Hail at 23m/s (52 mph)

Certifications & Warranty

Certifications	UL 1703 & ULC/ORD-C1703 Fire Rating: Class C
Warranty	See Prism module warranty certificate

* Measured at Standard Testing Conditions: cell temp 25°C, AM1.5, 1000W/m². Tolerance +/- 5%.

** Pending

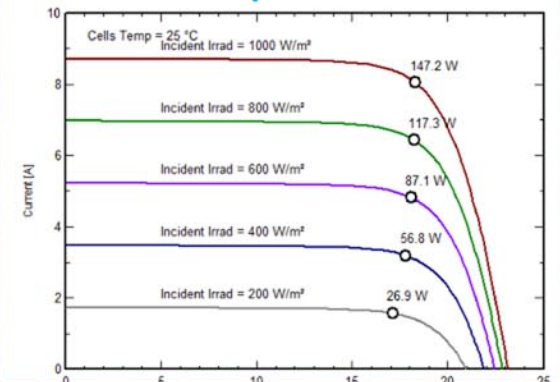
*** Length and width dimensions are +/- 5mm.

IMPORTANT: Prism modules are rated at STC conditions. These ratings do not account for additional power produced from the back of the module. Under certain mounting conditions, Prism modules could produce up to 30% more power than their STC rating. This additional power should be accounted for when sizing and selecting system components.

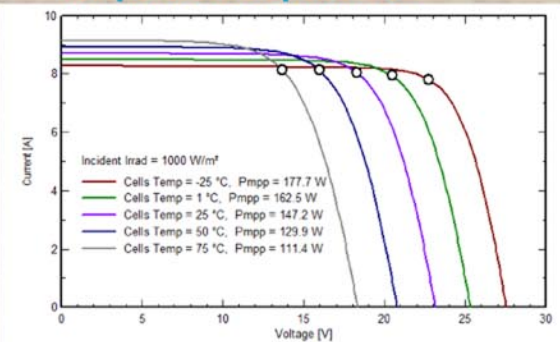
CAUTION: Read the Installation Manual carefully before using this product. All specifications are subject to change without notice.

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Irradiance Dependence

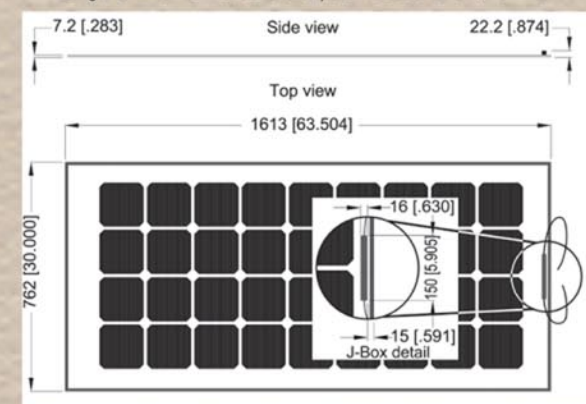


Temperature Dependence



Dimensions, mm (in)

Length & width dimensions and j-box location are +/- 5mm.



TO MAXIMIZE POWER

- Avoid shading the back side of the module by the support rack.
- Mount modules over highly reflective surfaces, such as a white roof or crushed white stone.
- Elevate modules above the mounting surface as much as possible.

Florian®

Improve Your Outlook

www.FLORIANSolar.com