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 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.

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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 glasings, 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 Repellent 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 dust 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%

**BEETTER:** (Recommended to be used in the WALLS for high comfort and low reflectance.) (Florian’s “Heat Repellent 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%

**TRIPLE PANE:**
(Florian’s “Heat Repellent 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%

Highly recommended: This choice provides optimum balance among visible light transmittance and glare control, along with superior solar control. This new glazing technology is produced by the world’s largest glass manufacturer and has a Light-To-Solar Gain Ratio of an UNBEATABLE 2.04, placing it at the top of its class.

Warning: Using the competition’s higher reflectance glazing may cause damage to sidings, veneers, fascias, etc.

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The highest insulated glass we offer: Winter value of R-10. Designed for cold climate applications.
## HEAT SHIELD HIGH PERFORMANCE GLAZING CHART

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>R-W</td>
<td>Clear Tempered</td>
<td>$0.00</td>
<td></td>
<td>G</td>
<td>1.0</td>
<td>214</td>
<td>90</td>
<td>70</td>
<td>17</td>
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<td>1.11</td>
<td>.9</td>
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<td></td>
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</tr>
<tr>
<td>R-W</td>
<td>Clear Tempered</td>
<td>$7.51</td>
<td>Applies to Genus Only</td>
<td>All</td>
<td>.89</td>
<td>185</td>
<td>81</td>
<td>52</td>
<td>47</td>
<td>30</td>
<td>.43</td>
<td>2.3</td>
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<td></td>
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<td></td>
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<tr>
<td>R-W</td>
<td>MC Low-E Temp/Clear Temp</td>
<td>$6.83</td>
<td></td>
<td>All</td>
<td>.40</td>
<td>81</td>
<td>69</td>
<td>14</td>
<td>57</td>
<td>8</td>
<td>.25</td>
<td>4.0</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-W</td>
<td>Supor MC Low-E Temp/Clear Temp</td>
<td>$13.22</td>
<td></td>
<td>All</td>
<td>.27</td>
<td>32</td>
<td>47</td>
<td>10</td>
<td>57</td>
<td>8</td>
<td>.25</td>
<td>4.0</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
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<td>All</td>
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<td>30</td>
<td>42</td>
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<td></td>
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<td></td>
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</tbody>
</table>

### 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 - Genus greenhouse and greenhouse kit, S - Sierra sun room, room kit and solaria, W - Woodhaven solarium & sun room.**
- **E - "Shading co-efficient"** - Multiplier for the amount of solar gain entering through the glass.
- **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 ambient conditions exist. Outside temperature of 0 degrees F with a 15 mph wind, and inside temperature of 70 degrees F.
- **J - "Winter R value"** - The resistance to heat loss through the glass. The higher the R value, The better the insulating properties. (R=1/U).

### 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.

### SUMMER

- **Infrared Light**
- **Visible Light**
- **Ultra violet Light**

**Our Competitions Glazing Insulated Glass**

**Florian’s Glazing Greater Comfort, "no sweat"**

### WINTER

- **Infrared Light**
- **Visible Light**
- **Ultra violet Light**

**Our Competitions Glazing**

**Florian’s Glazing Saves Dollars, Makes Sense**

### 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

Figure 1

Single Laminated Glass

<table>
<thead>
<tr>
<th>Curve</th>
<th>Ply Thickness</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/8&quot;</td>
<td>Annealed</td>
</tr>
<tr>
<td>2</td>
<td>3/16&quot;</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1/8&quot;</td>
<td>Heat-Strengthened</td>
</tr>
<tr>
<td>5</td>
<td>3/16&quot;</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1/8&quot;</td>
<td>Fully Tempered</td>
</tr>
<tr>
<td>8</td>
<td>3/16&quot;</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1/4&quot;</td>
<td></td>
</tr>
</tbody>
</table>

* 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

<table>
<thead>
<tr>
<th>Curve</th>
<th>Heat-Strengthened Outboard Pane Thickness</th>
<th>Laminated Inboard Pane Thickness</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/8&quot;</td>
<td>1/8&quot;</td>
<td>Annealed</td>
</tr>
<tr>
<td>2</td>
<td>3/16&quot;</td>
<td>1/8&quot;</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1/4&quot;</td>
<td>1/8&quot;</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1/8&quot;</td>
<td>1/8&quot;</td>
<td>Heat-Strengthened</td>
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<tr>
<td>5</td>
<td>3/16&quot;</td>
<td>1/8&quot;</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1/4&quot;</td>
<td>1/8&quot;</td>
<td></td>
</tr>
</tbody>
</table>

* 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

www.FLORIANSSOLAR.com
# Insulated Bifacial Module # F-200

## Electrical Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>STC*</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
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</thead>
<tbody>
<tr>
<td>Rated Power (P&lt;sub&gt;max&lt;/sub&gt; (W))</td>
<td>147</td>
<td>162</td>
<td>177</td>
<td>191</td>
</tr>
<tr>
<td>Rated Voltage (V&lt;sub&gt;mp&lt;/sub&gt; (V))</td>
<td>18.4</td>
<td>18.3</td>
<td>18.3</td>
<td>18.3</td>
</tr>
<tr>
<td>Rated Current (I&lt;sub&gt;mp&lt;/sub&gt; (A))</td>
<td>8.00</td>
<td>8.89</td>
<td>9.65</td>
<td>10.46</td>
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<tr>
<td>Open Circuit Voltage (V&lt;sub&gt;oc&lt;/sub&gt; (V))</td>
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<td>23.2</td>
<td>23.4</td>
<td>23.5</td>
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<tr>
<td>Short Circuit Current (I&lt;sub&gt;sc&lt;/sub&gt; (A))</td>
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<td>9.59</td>
<td>10.46</td>
<td>11.34</td>
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<tr>
<td>Module Efficiency (%)</td>
<td>12.0</td>
<td>13.2</td>
<td>14.4</td>
<td>15.5</td>
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<tr>
<td>Max System Voltage (V)</td>
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</tr>
<tr>
<td>Series Fuse Rating</td>
<td>15A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Coefficients</td>
<td>Power: -0.466 %/°C; Voltage (V&lt;sub&gt;oc&lt;/sub&gt;): -0.320 %/°C; Current (I&lt;sub&gt;sc&lt;/sub&gt;): 0.100 %/°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOCT [°C]</td>
<td>47.1°C**</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 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***
- 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

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*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.

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

[www.FLORIANsolar.com](http://www.FLORIANsolar.com)