FLATCON® Module
Fresnel Lens All-Glass Tandem Cell Concentrator Module

The FLATCON® module technology has been designed to meet the world’s highest conversion efficiencies from sunlight to electricity while being manufacturable in large volumes.

**FLATCON® Standard Configuration**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lens aperture</td>
<td>22.7 cm²</td>
</tr>
<tr>
<td>Primary optics</td>
<td>Silicone-on-Glass</td>
</tr>
<tr>
<td>Secondary optics</td>
<td>Reflective</td>
</tr>
<tr>
<td>Geometrical concentration factor</td>
<td>321</td>
</tr>
<tr>
<td>Module dimensions</td>
<td>Approx. 21 x 60 x 12 cm³</td>
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</tbody>
</table>

**Rated module efficiency** of FLATCON® module with state-of-the-art triple-junction solar cells⁴.

**High performance** of FLATCON® CPV modules measured outdoors at Fraunhofer ISE for several months.

**Proven reliability** by outdoor performance tests since 2008 (example FLATCON® test module with 6 cell-lens units). Observed average degradation: 0.25 %rel/year (±0.18%)²

**Electrical efficiency** of FLATCON® module with concentrator standard operating conditions (CSOC), concentrator standard test conditions (CSTC) according to IEC 62670-3.
The FLATCON® CPV module technology has been developed at Fraunhofer ISE for more than two decades. We have gained experience in designing, manufacturing and characterization of all components from the solar cell to optics, and assemblies as well as investigation of reliability. We operate the unique Con-TEC (Concentrator Technology and Evaluation Center) laboratory which allows for the manufacturing of prototype modules, including new components and manufacturing processes. We also have significant experience in industrial manufacturing requirements.

We support the entire process chain for manufacturing FLATCON® modules:

**Components**
- Concentrator solar cell
- Bypass diode
- Heat distributor
- Solder paste / adhesive
- Soldering / gluing
- Gold wire
- Front contacting
- Secondary optics
- Riveting

**Quality Assurance (QA)**
- Process parameters

**Base Plate**
- Bottom glass
- Adhesive
- Heavy wire
- Assembly
- El. interconnection

**FLATCON® Module**
- Lens plate
- Frame
- Sealing
- Electrical terminal
- Housing

**Requirements for outdoor operation:**
- Mounting to precise 2-axis tracking system (accuracy ±0.1°)
- Dry air ventilation to protect from humidity
- Respect for local safety and disposal requirements (contains III-V semiconductor materials)

**Commercial components to build FLATCON® modules are available from:**
- Concentrator solar cell (AZUR SPACE Solar Power GmbH)
- Silicone-on-Glass (SoG) Fresnel lens (ORAFOL Fresnel Optics GmbH)
- Contact us for further supplier details for: substrates, reflective secondary optics, production equipment

**At Fraunhofer ISE we offer:**
- Transfer of the FLATCON® technology to local industrial production
- Adaptation of the module design to customer requirements
- Characterization and analysis of components and module performances
- Reliability testing indoor and outdoor
- Prototype manufacturing and development of components (concentrator solar cells, optics) and modules