

Product Data Sheet

SOLAR PV_{FLEX}

Flexible thin-film photovoltaic CIGS (Copper Indium Gallium Selenide) modules

Axter SOLAR PV_{FLEX} thin-film photovoltaic modules are a lightweight integrated solution where the solar PV module and the waterproofing system are combined, and the PV module is fully adhered to the roof waterproofing system without the need for mechanical restraint and penetration of the waterproof layer.

Recent technological advances have resulted in the development of Axter's Solar PV_{FLEX} module that utilises CIGS (Copper Indium Gallium Selenide) technology. Our next generation thin-film solar PV module achieves record production efficiency levels for thin-film solar technology.

As a result, Axter SOLAR PV_{FLEX} modules are the solar industry's most efficient flexible, lightweight, integrated thin-film solution and now provide the specifier with a clear alternative to traditional rigid panel systems.

Thin-film solar technology is more than 60% lighter than the closest rigid panel competitor and designed for use with Axter Excel® Solar roof waterproofing systems.



Key benefits

- Lightweight, less than 2.0kg/m2 (6.6kg/module).
- No roof penetrations; waterproofing integrity maintained as installation requires no mechanical restraint.
- Bitumen compatible.
- High efficiency solar thin-film technology up to 16.4%.
- Can be installed on curved surfaces not suitable for rigid panels.
- Shade tolerant CIGS technology with superior low light performance.
- Building Integrated Photovoltaics (BIPV) system integrated to 1:80 roof slope; ideal for areas with restrictive planning conditions.
- Flexible modules adaptable to a wide range of applications.
- Hail resistant and shatter proof.
- Low maintenance anti-glare module surface.
- Fire Classification B_{ROOF}(t4) when tested as part of an Excel Solar warm roof system assembly. Fire Classification report number: 20295K. Please contact Axter technical support for further information. <u>technical@axterltd.co.uk</u>

Performance

Axter SOLAR PV_{FLEX} is a flexible polymer encapsulated thin-film solar PV module based on advanced CIGS (Copper Indium Gallium Selenide) technology. The photovoltaic modules are lightweight (2.0 kg/m²), shatterproof, hail resistant, compatible with bitumen waterproofing systems and being flexible are suitable for all roof shapes with no requirement for orientation, plinths, or ventilation.

Increased energy output is achieved when compared to rigid panel systems in low level light or indirect light conditions.

Axter SOLAR PV_{FLEX} thin-film solar cells also have a small temperature coefficient (-0.24%), which means every 1% increase in temperature will result in a 0.24% decrease in energy conversion efficiency. When the ambient temperature is 28°C, the operating temperature of the solar PV system will increase to approximately 75°C. During this temperature range, Axter SOLAR PV_{FLEX} thin-film solar PV modules have an energy production efficiency 10-12% greater than ridged panel systems, resulting in like for like higher annual productivity. The consistent degradation rate for SOLAR PV_{FLEX} panels is estimated between 0.5% and 0.8%/year.

Installation

SOLAR PV_{FLEX} modules use self adhesive application methods. This eliminates penetration of the waterproofing, simplifies installation on the roof and eliminates the use of torch-on application techniques. The modules are flexible, therefore suitable for installation on curved surfaces where traditional rigid solar panels are not suitable.

Reliability and safety

- BS EN IEC 61215 Series (Terrestrial Photovoltaic (PV) Modules)
- BS EN 61730 Photovoltaic (PV) Module Safety Qualification
- BS EN 62446 Grid Connected Photovoltaics
- BS EN 61853-1 Defining Solar Photovoltaic Power
- BS EN 1991-1-4 Wind Actions on Structures

Product Warranty

- Product warranty against defects for 5 years after shipment.
- Performance warranty : at least 90% of the nominal power (STC) after 10 years and at least 80% at 25 years.

Technical Specification

| Length | 2585mm |
|---|--|
| Width | 1292mm |
| Module thickness | 2.5mm, with adhesive |
| Maximum thickness at J-box* | 17mm, including output cable on the upper side |
| Weight (module without adhesive) | 5.5kg |
| Weight (module with adhesive) | 6.6 kg |
| Weight / area (module without adhesive) | 1.7kg/m ² |
| Weight / area (module with adhesive) | 2.0kg/m ² |
| Junction box type | IP68 |
| Cable connections | Amphenol H_4 |
| Cell type | Copper Indium Gallium Diselenide |

 $^{\ast}2.5$ mm for the rest of the module with adhesive

*1.6 mm for the rest of module without adhesive



Solar PV_{FLEX} Electrical Performance at STC*

| | | | 470W | 480W | 490W | 500W | | |
|----------------------------|------------------|------|-----------|--------|--------|--------|--|--|
| Nominal Power | P _{max} | [VV] | 470 | 480 | 490 | 500 | | |
| Aperture Efficiency | η | [%] | 15.4% | 15.7% | 16.0% | 16.4% | | |
| Power Output Tolerance | | [VV] | +10/-0 | +10/-0 | +10/-0 | +10/-0 | | |
| Maximum Power Voltage | V _{MP} | [V] | 59.6 | 60.5 | 61.4 | 62.4 | | |
| Maximum Power Current | I _{MP} | [A] | 7.91 | 7.95 | 7.99 | 8.03 | | |
| Open Circuit Voltage | V _{oc} | [V] | 74.8 | 75.6 | 76.4 | 77.2 | | |
| Short Circuit Current | I _{sc} | [A] | 9.19 | 9.15 | 9.11 | 9.07 | | |
| Maximum Series Fuse Rating | | [A] | 25 | | | | | |
| Maximum System Voltage | (IEC/UL) | [M] | 1000/1000 | | | | | |

* Standard Test Conditions (STC): 1000 W/m2 , 25°C cell temperature, AM 1.5 spectrum

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