

# Product Data Sheet

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## SOLAR PV<sub>FLEX</sub>

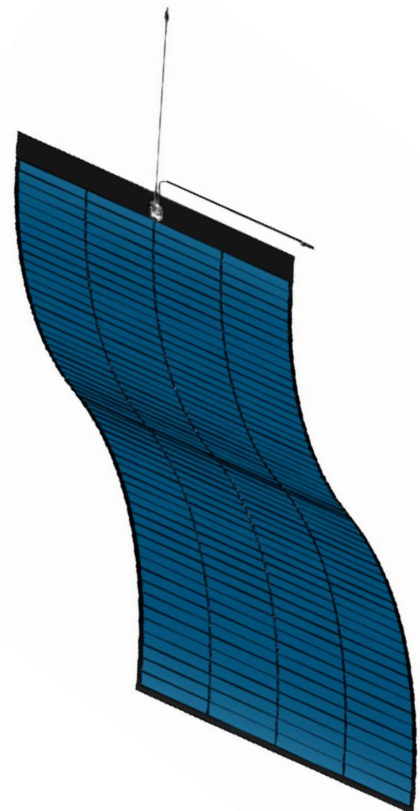
### Flexible thin-film photovoltaic CIGS (Copper Indium Gallium Selenide) modules

Axter SOLAR PV<sub>FLEX</sub> 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<sub>FLEX</sub> 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<sub>FLEX</sub> 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/m<sup>2</sup> (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 18.3%.
- 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<sub>ROOF</sub>(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. [technical@axterltd.co.uk](mailto:technical@axterltd.co.uk)

## Performance

Axter SOLAR PV<sub>FLEX</sub> is a flexible polymer encapsulated thin-film solar PV module based on advanced CIGS (Copper Indium Gallium Selenide) technology. The photovoltaic modules are lightweight (2.0kg/m<sup>2</sup>), 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<sub>FLEX</sub> 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<sub>FLEX</sub> thin-film solar PV modules have an energy production efficiency 10-12% greater than rigid panel systems, resulting in like for like higher annual productivity. The consistent degradation rate for SOLAR PV<sub>FLEX</sub> panels is estimated between 0.5% and 0.8%/year.

## Installation

SOLAR PV<sub>FLEX</sub> 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.

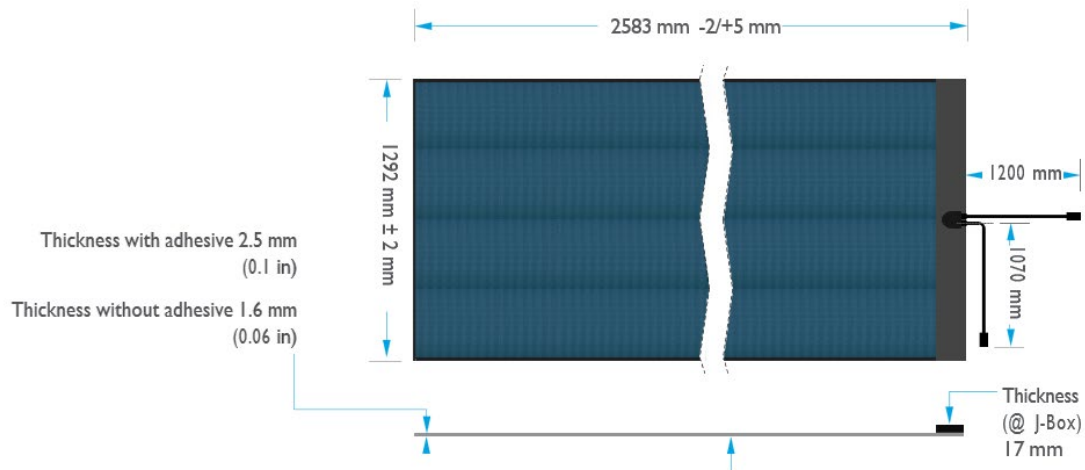
## Technical Specification

Physical and Mechanical 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)	6.6kg
Weight / area (module without adhesive)	1.7kg/m <sup>2</sup>
Weight / area (module with adhesive)	2.0kg/m <sup>2</sup>
Junction box type	IP68
Cable connections	MC4 Compatible
Cell type	Copper Indium Gallium Diselenide

\*2.5mm for the rest of the module with adhesive

\*1.6mm for the rest of module without adhesive

## Solar PV FLEX



Thermal Characteristics		
NOCT	[°C]	48
Temperature Coefficient of P <sub>MPP</sub>	[%°C]	-0.38
Temperature Coefficient of VOC	[%°C]	-0.28
Temperature Coefficient of I <sub>SC</sub>	[%°C]	0.008

**Solar PV<sub>FLEX</sub> Electrical Performance at STC\***

			470W	480W	490W	500W
Nominal Power	$P_{max}$	[W]	470	480	490	500
Aperture Efficiency	$\eta$	[%]	15.4%	15.7%	16.0%	16.4%
Power Output Tolerance		[W]	+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)	[V]	1000/1000			

\* Standard Test Conditions (STC): 1000 W/m<sup>2</sup> , 25°C cell temperature, AM 1.5 spectrum.

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