eArc – Doing more with less

13th Sep 2022

Thomas Bell – Sales Director

SUNMAN
Lightweight Solar Pioneer

Agenda

1. Introduction to eArc
2. Addressable Markets
3. eArc Installation
4. Q & A

IN THE LAST 40 YEARS

solar panels have remained unchanged

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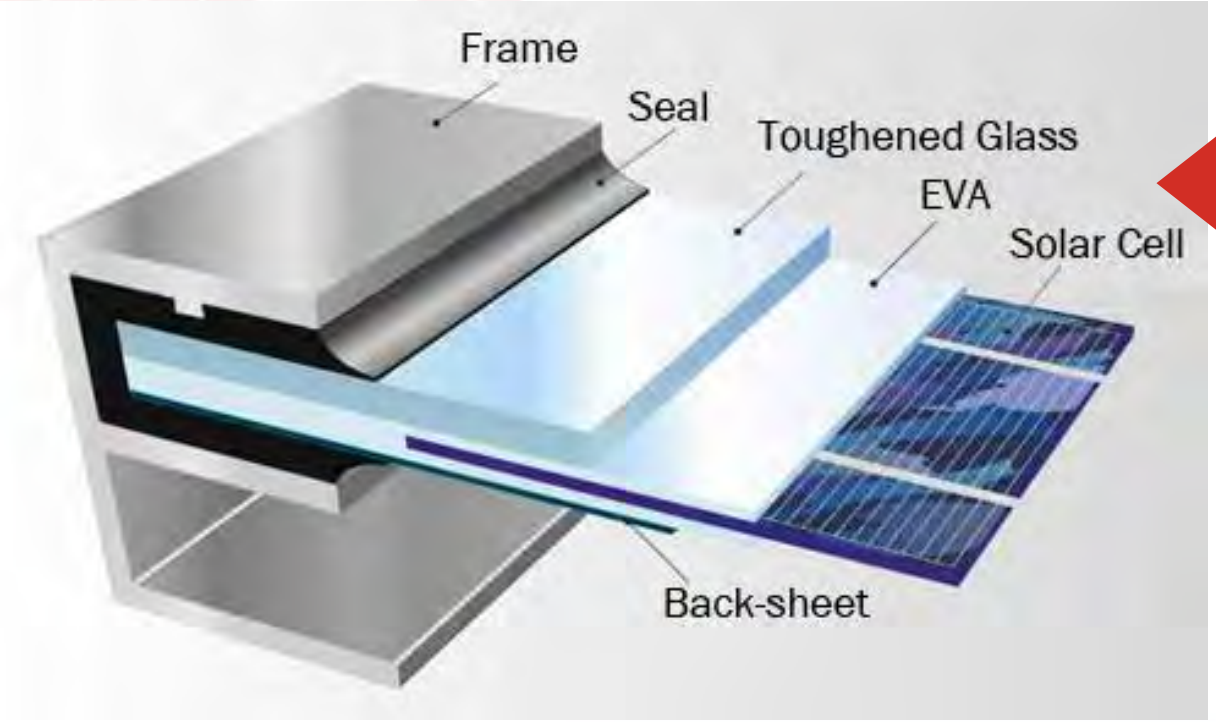
Weight / Thickness – Conventional Solar panel



Weight of solar panel = 20 kg

Weight of solar cells = 720 g

Only 3.6% makes electricity

Thickness of panel = 40 mm

Thickness of cell = 0.5 mm

Only 1.25% makes electricity

SMF430F-12X12UW

7.3kg, 70% lighter than glass panel

2054 * 1080 * 2 mm

VOC: 46.6

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SMF 215 / SMF 100

215w
1605mm x 710mm x 2mm
VOC:27.4

100w
1093mm x 552mm x 2mm
VOC:25.2

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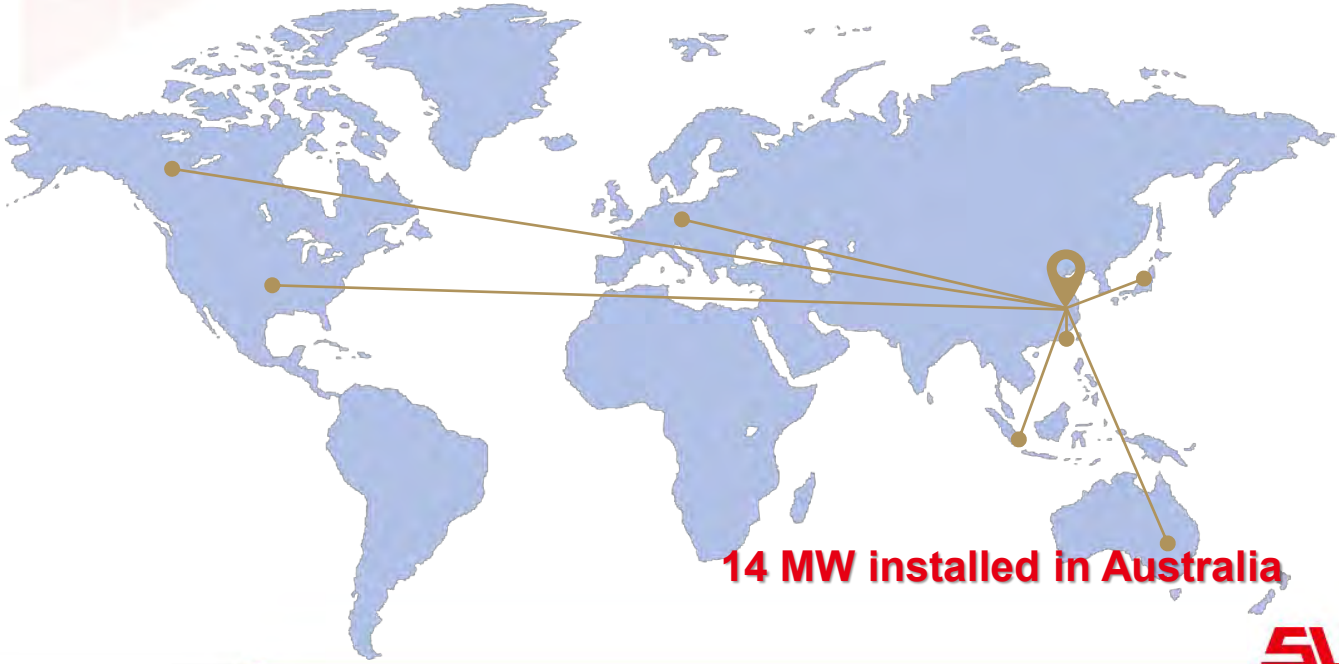
In field performance

Since 2014 SunMan have installed over 400 MW of eArc globally



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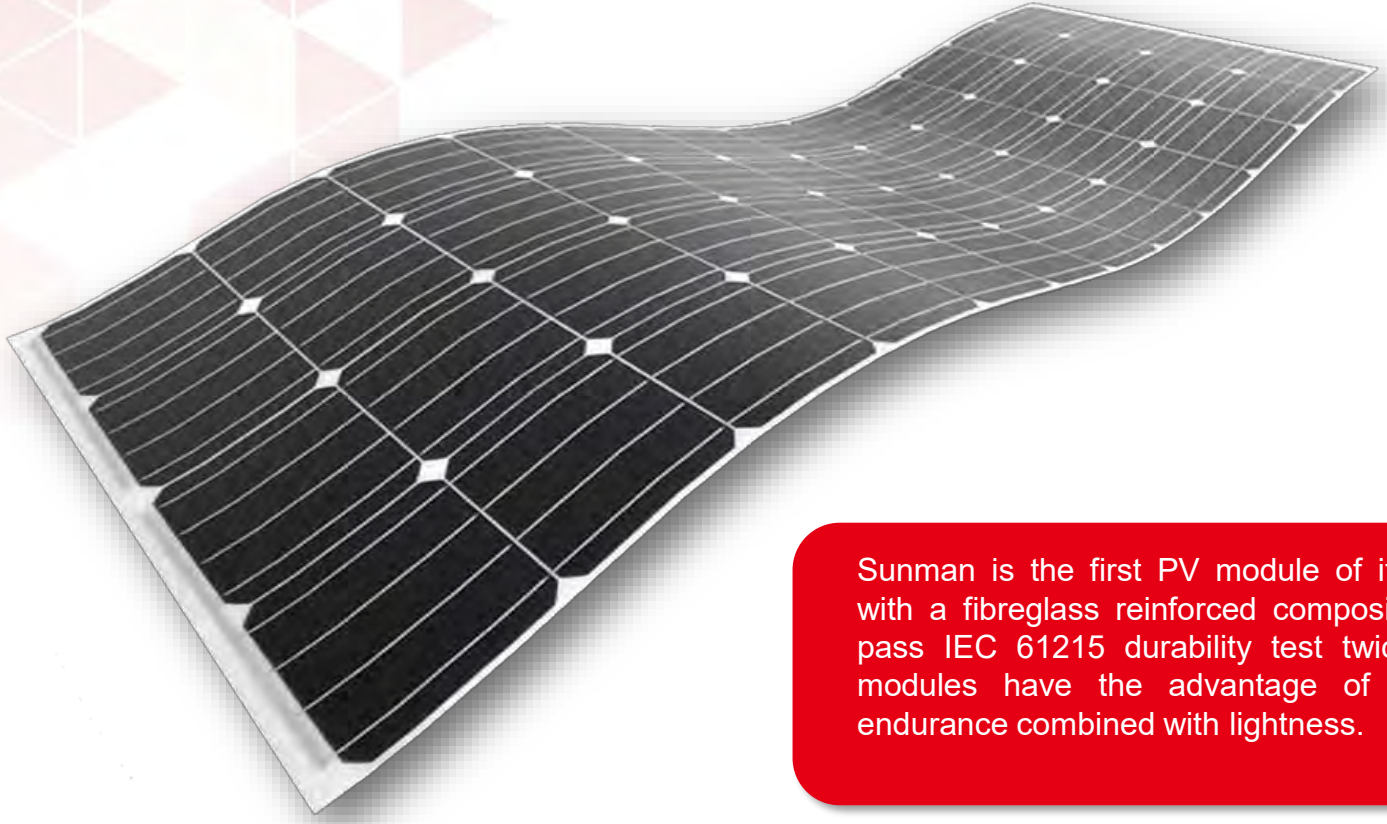

Sunman is the first PV module of its type, made with a fibreglass reinforced composite material to pass IEC 61215 durability test twice – SunMan modules have the advantage of strength and endurance combined with lightness.

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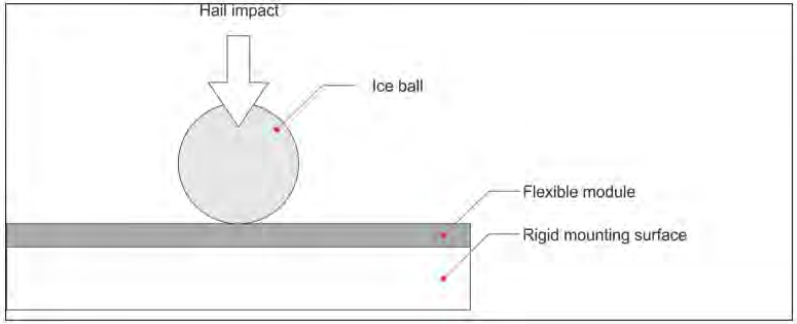
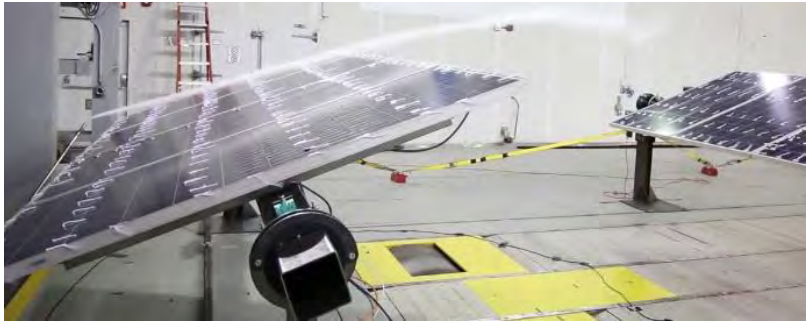
What is the IEC 61215 durability test?

1. Accelerated UV testing
2. Thermal cycling: -40 ◦C to + 85 ◦C - 250 cycles
3. Humidity Freeze: -40 ◦C to + 85 ◦C at relative humidity of 85%
4. Damp heat test: + 85 ◦C at relative humidity of 85% for 1000 hours
5. Hail test : stones 35mm in diameter mass of 200g @ 39.5 m/s
6. Mechanical load / wind test

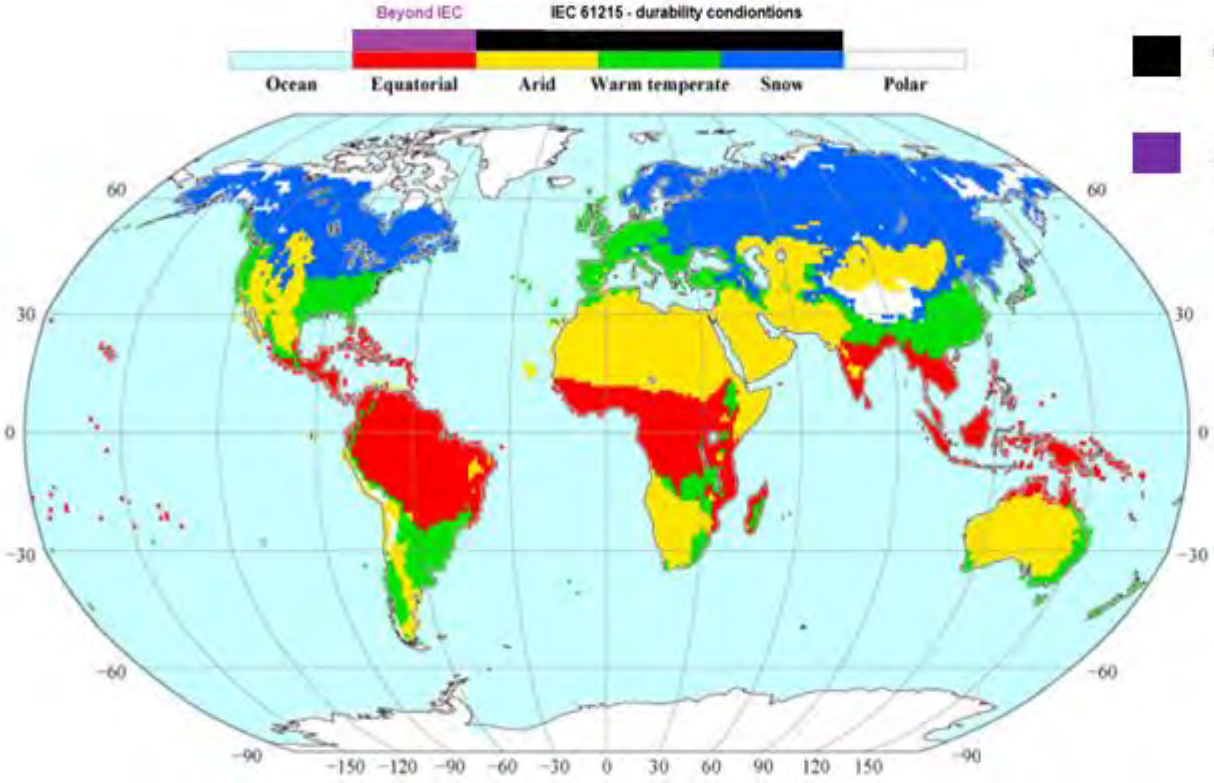
How to test?





-40 ◦C to + 85 ◦C

IEC61215 has been designed to test for “General Open-air Climates”



Coved as part of IEC test program

Additional testing completed by SunMan

– extending climate zones

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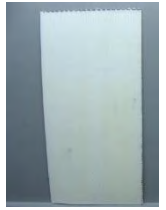
SunMan going beyond IEC61215

eArche
Enabling Green Energy Freedom

Independent Extended UV Exposure

Extended UV exposure testing to insure polymer material longevity for 25 years



3000 Hours of Damp Heat Testing

85 ◦C at relative humidity @ 85% passed with no new failure modes identified
Proven performance in extended damp heat makes product suitable for use in hotter and more extreme climatic zones

PID Free

Independently tested eArche is PID free in all fielded situations

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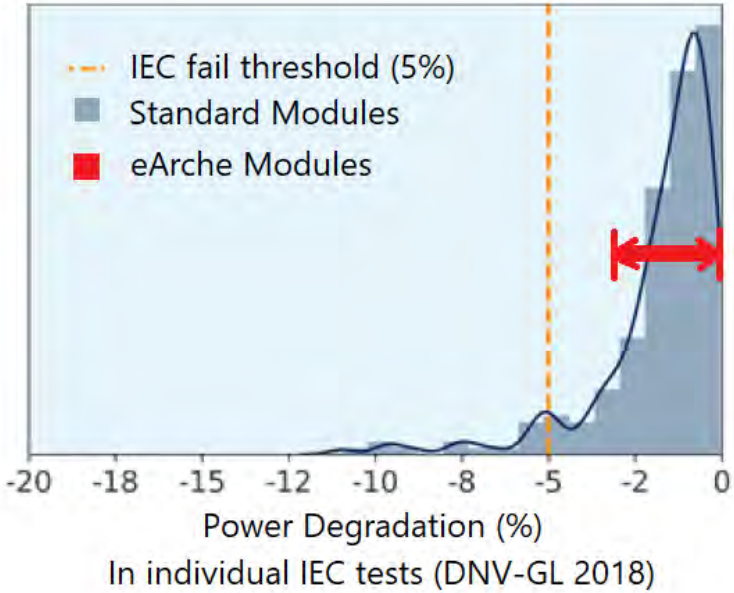
Benchmarking IEC 61215: glass modules Vs eArc

eArche compared to expected behaviour of conventional glass modules from the published scientific literature.

eArche compared to expected and best in class behaviour of conventional glass modules as documented in the “PVEL module reliability scorecard 2019”



Performance changes for the eArche modules during IEC tests are well below the pass / fail threshold and solidly within the expected range for standard glass modules with well-established durability.

Certifications and Award

認　証　書
Certificate

JET PVm認証業務規程第７項の規定により、認証登録の要件に適合しているものと認められますので認証します。
I hereby certify that the product mentioned below complies with the Requirements for the Registration of Certification in the Rules for Operation of JET PVm Certification, Section 7.

認証書番号 Certificate Number: PV190−53201−1002
認証登録日 Date of Issue: 平成29年 9月 4日 September 4, 2017
有効期限 Date of Validity: 平成34年 9月 3日 September 3, 2022
認証取得者 Certificate Recipient: SUNMAN (HONG KONG) LIMITED ROOM1401, 14/F, WORLD COMMERCE CENTRE, HARBOUR CITY, 7-11 CANTON ROAD, TSIMSHATSUI, KOWLOON, HONG KONG, P.R.CHINA
認証製品製造工場 Factory of Certified Product: (PV190-a) ZHENJIANG FENGYUAN NEW ENERGY TECHNOLOGY CO., LTD. NO.1, MINGZHU SOUTH ROAD, YOUFANG TOWN, ZHENJIANG, JIANGSU, 212218, CHINA

試験基準 Applied Standard for Testing: IEC61215 Second edition 2005-04, IEC61730-1 First edition 2004-10, IEC61730-2 First edition 2004-10

製品の型名等 Type Name of Product:
認証モデルの名称 Name of Certified Model: 太陽電池モジュール（単結晶） PV module (single crystal)
認証モデルの型名 Type of Certified Model: SM310M-6X12 etc. As shown in the attachment for details
認証モデルの仕様: 附属書１のとおり

一般財団法人 電気安全環境研究所
Japan Electrical Safety & Environment Technology Laboratories
理事長 President 鳥田 陽久 Yasuhisa Komoda

東京都渋谷区代々木5-14-12
5-14-12 Yoyogi, Shibuya-ku, Tokyo

VDE Prüf- und Zertifizierungsinstitut

ZEICHENGENEHMIGUNG
MARKS APPROVAL

Sunman (Hong Kong) Limited
Room 1401, 14/F., World Commerce Centre
Harbour City, 7-11 Canton Road,
TSIMSHATSUI
Kowloon
HONG KONG

ist berechtigt, für ihr Produkt /
is authorized to use for their product

Terrestrische Photovoltaik-Module mit Silizium-Solarzellen
Crystalline silicon terrestrial photovoltaic modules

Geprüft und zertifiziert nach /
Tested and certified according to

VDE

CSA Group

Certificate of Compliance

Certificate: 70133275
Master Contract: 269671
Project: 70133275
Date Issued: 2017-05-04
Issued to: Sunman (Hong Kong) Limited
Room 1401, 14/F., World Commerce Centre, Harbour City,
7-11 Canton Road, Tsimshatsui, Kowloon, Hong Kong
Attention: Ted Kong

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US (indicating that products have been manufactured to the requirements of both Canadian and US Standards) or with adjacent indicator 'US' for US only or without either indicator for Canada only.

Issued by: Qiang (Sean) Jiang

PRODUCTS
CLASS - C531110 - POWER SUPPLIES-Photovoltaic Modules and Panels
CLASS - C531190 - POWER SUPPLIES-Photovoltaic Modules and Panels - Certified to US Standards

Urkunde

pv magazine HIGHLIGHT top innovation

Die unabhängige Jury von pv magazine Deutschland verleiht Sunman für die Entwicklung der „eArche"-Module aus glasfaserverstärktem Kunststoff das Prädikat "pv magazine top innovation".

Begründung der Jury

Wenn es gelingt, haltbare und wettbewerbsfähige Solaranlagen zu bauen, die leichter sind als heute, ist das Potenzial riesig. Sowohl für die Energiewende, für die viele Photovoltaikflächen nötig sind, als auch für die Anbieter. Das ist schon lange bekannt, doch die damit zusammenhängenden Herausforderungen wurden noch nicht zufriedenstellend gelöst. Sunman ist eine der Firmen, die nun wieder einen vielversprechenden Anlauf unternehmen. Sie hat ein leichtes Modul entwickelt, das auf Dächern, die nur wenig Gewicht aushalten, verklebt oder mit Rahmen montiert werden kann. Das Unternehmen legt etliche Tests vor, um die Leistungsgarantie über 25 Jahre zu untermauern. Jetzt muss sich das Produkt in der Realität beweisen. Die Jury hält es für eine wichtige Innovation und zeichnet es mit dem Prädikat „pv magazine top innovation" aus.

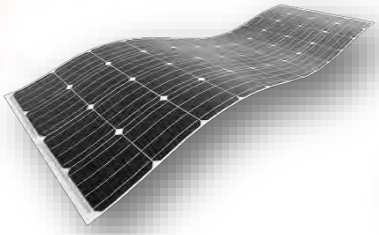
Berlin, Mai 2018

Michael Fuhs
Chefredakteur
www.pv-magazine.de/awards

The science and technology of composite materials

- Composite materials have been used in a wide range of applications for the past 30 years – Proven real world performance
- The greatest advantage of composite materials is strength and endurance combined with lightness. Composite materials also stand up well to heat and corrosion
- Products used every day with composites

More than just strength - The Solar Skin



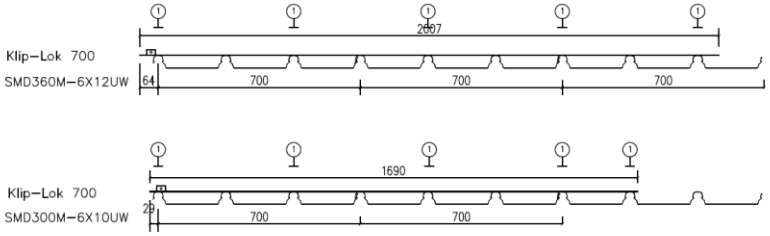
1. Innovation in module construction allows the eArche module to be semi flexible
2. Crystalline silicon solar cells do have a small bending tolerance
3. Module design allows for the module to bend rather than the cells
4. Fibreglass reinforced composite material applies equal load across the cell when flexed

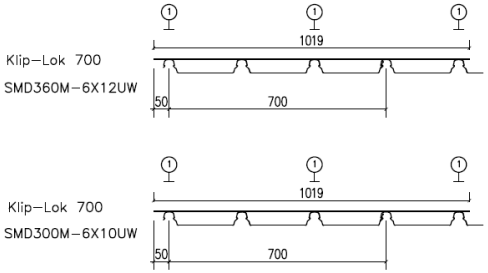
SMF / Installation method – Quick Bonding

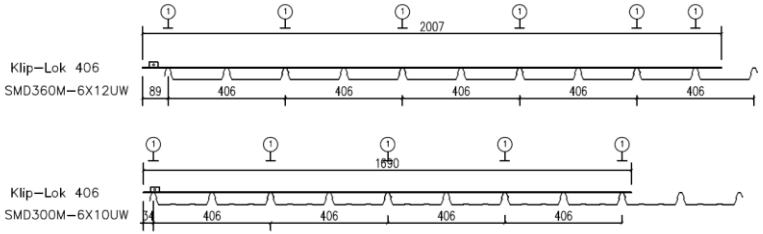
SMF: Quick Bonding – No mounting hardware – Installed weigh @ 3.3 kg /m2

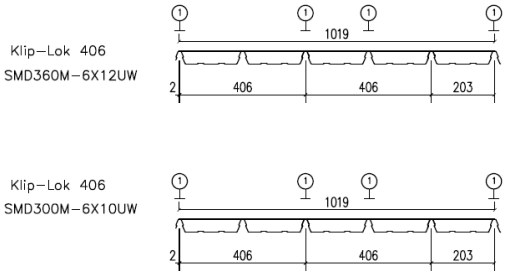
Installation Method: Quick Bonding

Quick Bonding – CEC approved. Certified to wind region D 30m high









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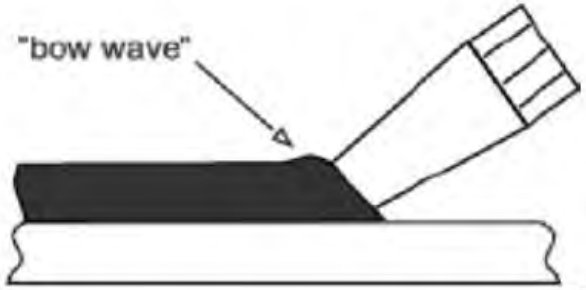
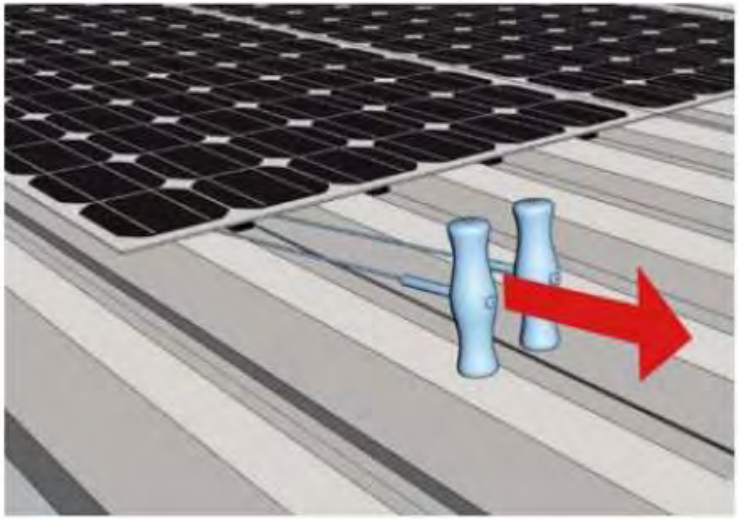
Installation Method: Quick Bonding

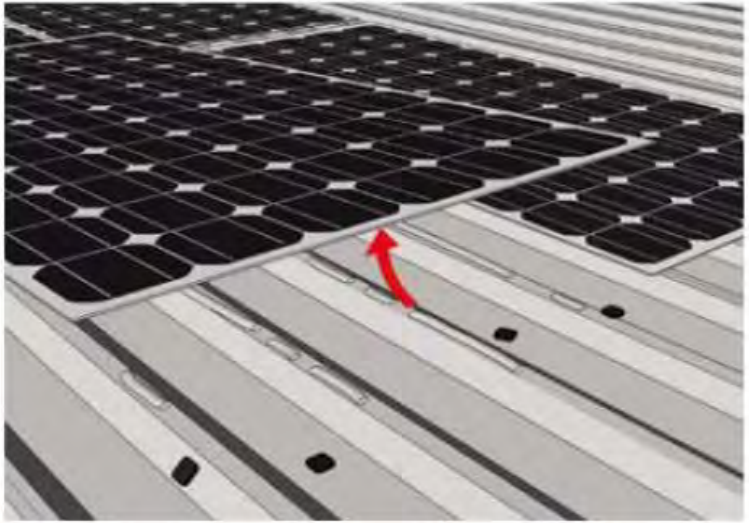
	
Correct dimension (h ≈ 5 mm)	Too flat
	
Too high, too small	Poor wetting



Installation Method: Quick Bonding

SMD : Quick Bonding – Uninstall





Off Grid Installation: Recent case studies


ACTIVE CAMPERS
KINGS

Off Grid Installation: Recent case studies

Australia | SMF35M-2x6UW | Gluing via silicone sealant for PV modules

The world's first solar-powered train, blending heritage with modern technology.

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Recent case studies

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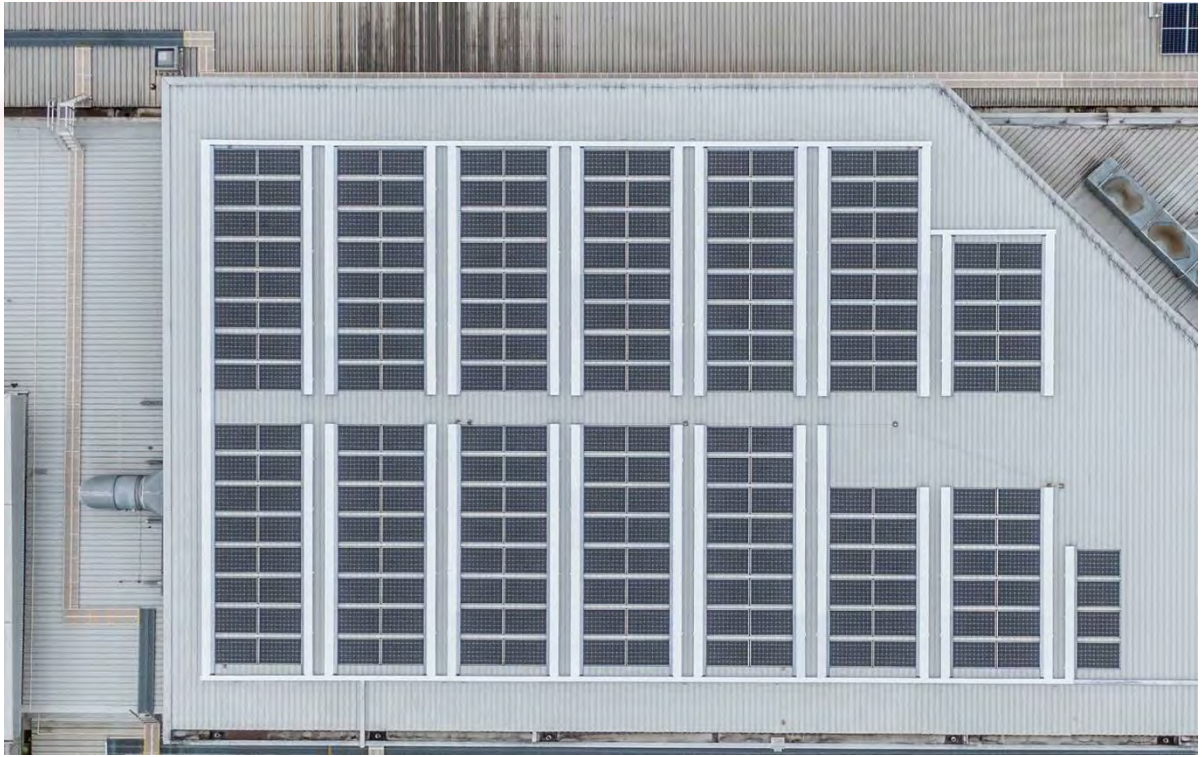
Installation method: Recent case studies

Installation method: Recent case studies

SMD Installation method: Recent case studies



SMD Installation method: Recent case studies

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SMD Installation method: Recent case studies

THANKS!

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