

# Unlocking the C&I rooftop market with Sunman's lightweight solar applications



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President

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**MODERATED BY**  
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Editor in Chief



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**SUNMAN**  
Lightweight Solar Pioneer

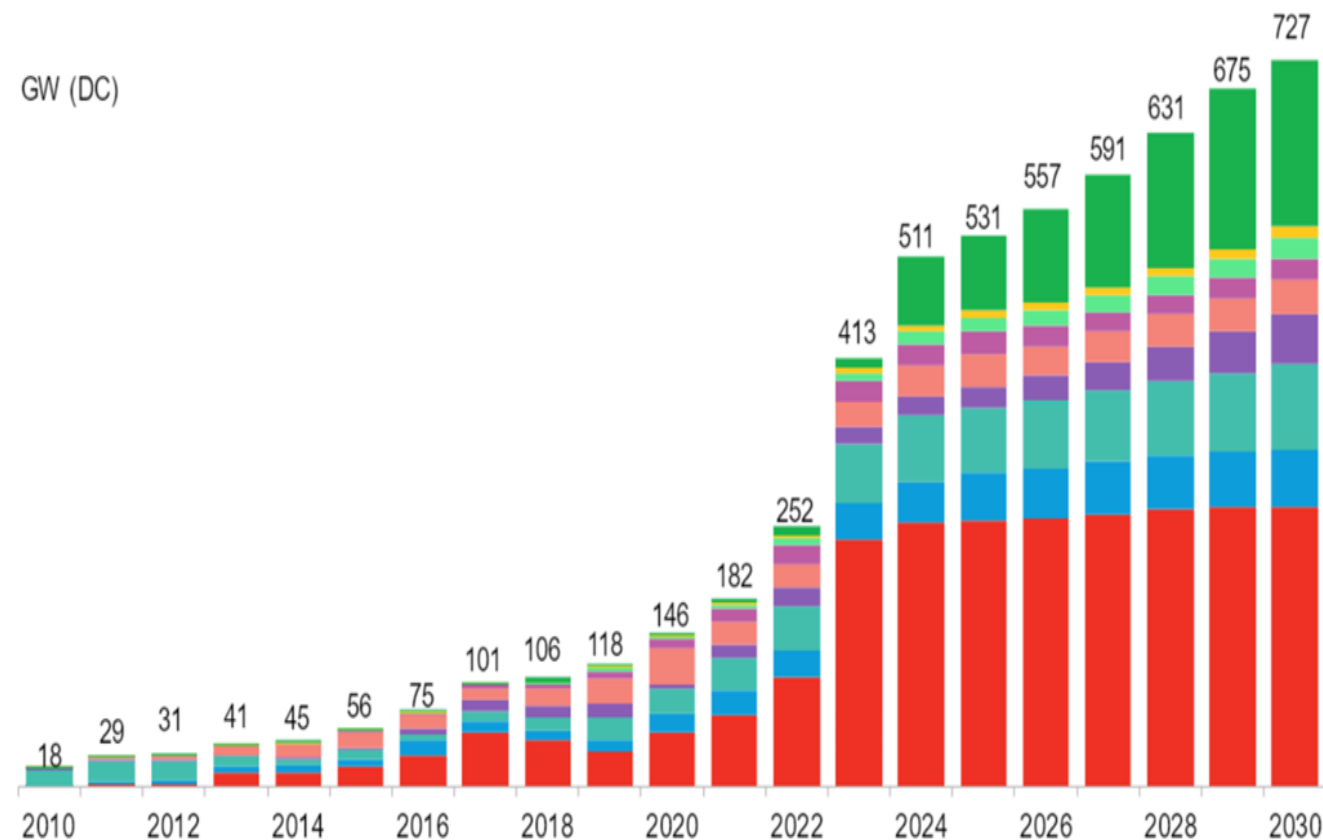
# Unlocking the C&I Rooftop Market with Sunman's Lightweight Solar Applications

**Dennis Shi**  
**20th March 2024**

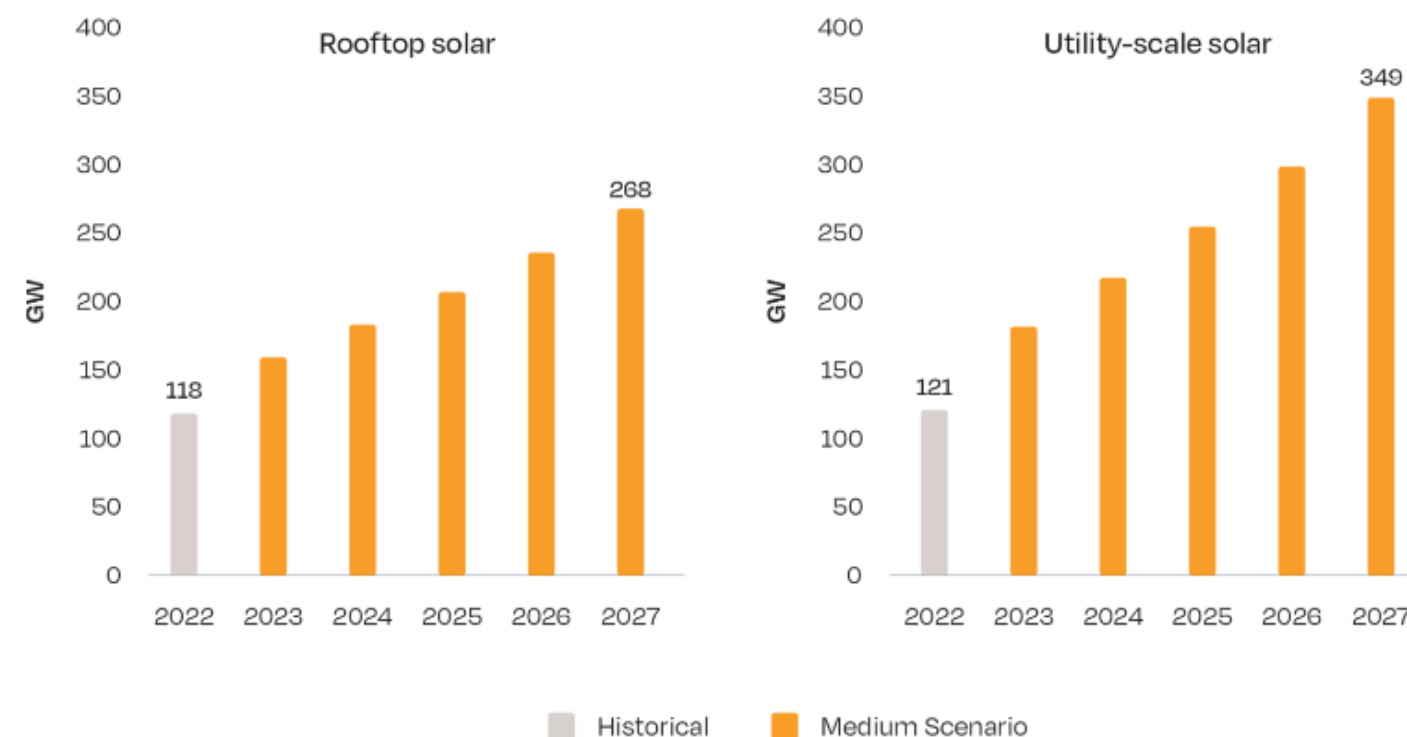


# Annual PV capacity to exceed 500 GW in 2024, estimated >40% annual capacity will come from rooftops

Figure 2: Historical and mid-scenario forecast for global PV installations



SOLAR PV ROOFTOP AND UTILITY-SCALE SEGMENTS SCENARIOS 2023-2027



Source: Global PV Market Outlook, 4Q 2023 Growth, Hangovers and a Game of Chicken – Bloomberg New Energy Finance

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- BNEF: Newly added PV capacity will surpass the 500 GWp mark in 2024.
- Earlier forecast by SolarPower Europe: Rooftop solar will make up >40% of added global capacity each year.

An estimated **40%** of C&I rooftops cannot install glass modules because of structural limitations...



- When buildings fall under the 15 kg/square meter load-bearing threshold, roof reinforcements are required to install solar, which is expensive and disruptive to on-site activities...



# Demand for lightweight solar is Real

## Customer Request #1:



Many thanks for your email. Let me present our project:

1. Our Company is planning to construct solar power plant on our shed roof of the factory (photo attached). Due to the low static bearing capacity we will install ultralight PV modules:



## Customer Request #2:



Overall, the site assessment confirms that the site can accommodate solar PV well in the outlined 4 key areas. The overall infrastructure can accommodate 1,500kW+ Solar PV system with the only limitations being the roof areas, and the structural strength of the roof. There are structural challenges on two of the key roof areas that are limited by roof load. This is due to the complexity in design, and span of these main

## Customer Request #3:



May 20, 2021 18:52



我下午去看这种厂房就是承重不足的



A wide-angle photograph of a rooftop solar installation. In the foreground, several large, dark solar panels are laid out on a corrugated metal roof. The panels are arranged in rows, with some showing white grid lines. In the background, a dense urban skyline is visible under a cloudy sky. A large, white, cylindrical ventilation unit is mounted on the roof to the right. The overall scene suggests a commercial or industrial setting where solar energy is being explored.

Can't install glass modules?  
Uncover the potential of lightweight solar

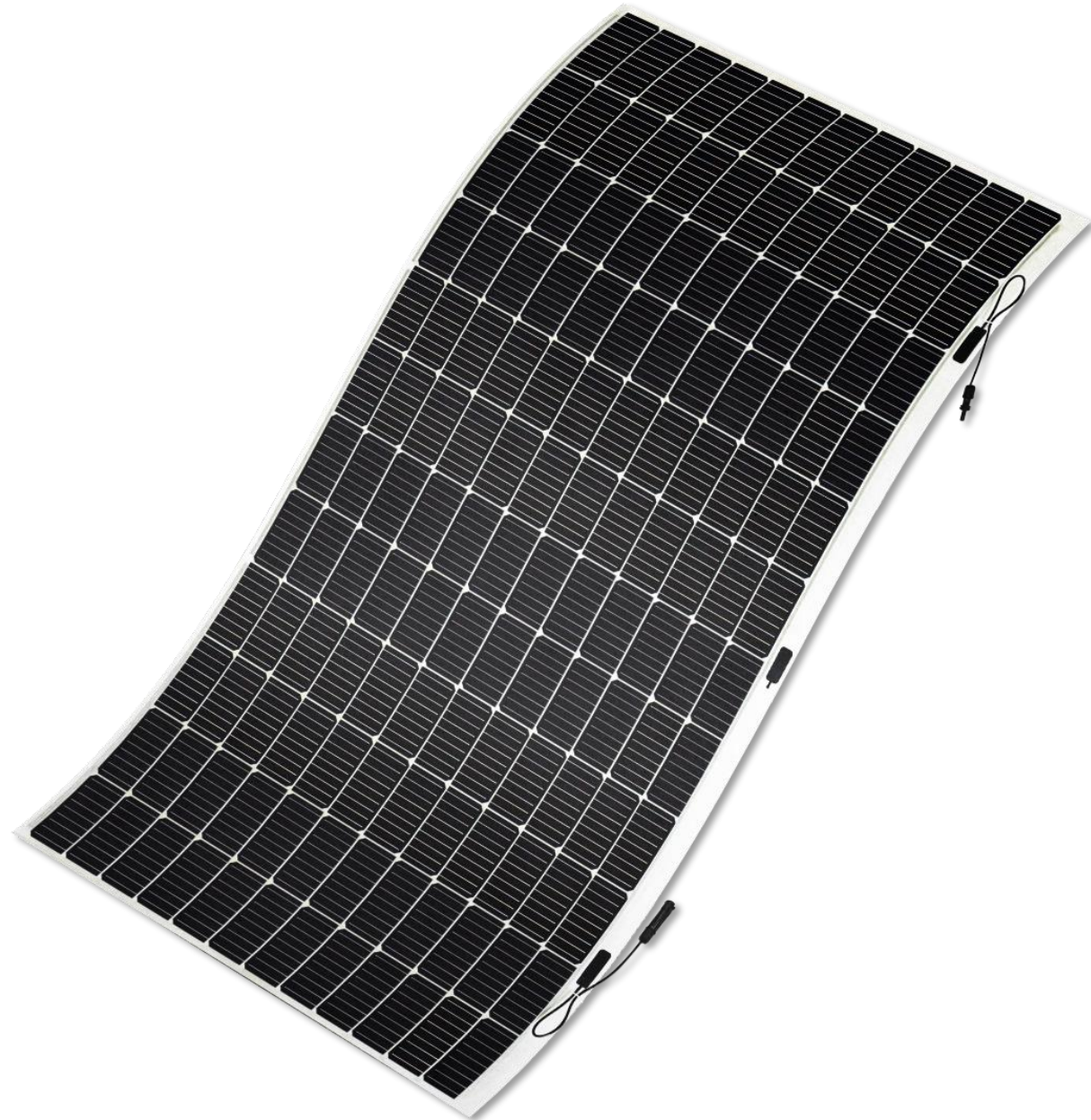


# Sunman at a Glance



- Founded in **2014**, Sunman is an Australian Solar Company.
- Successfully commercialized the world's first ultra-light solar module "**eArc**".
- eArc is based on market-proven **crystalline silicon cell technologies** and innovative in its **patented encapsulation system**.
- Capacity: **1 GWp** in Jiangsu, China (3 GW planned).
- Delivered **600 MWp** shipments since inception.

# eArc at a Glance



**Ultra-Light**



**Flexible**



**Higher Safety**



**Durable**



**Fast-Installation**



**Aesthetic**



**High packing  
density for  
transportation**



# A high-level comparison with glass modules



**Glass**



**eArc**



**Heavy and rigid - 15 kg/m<sup>2</sup>**



**Labor and equipment intensive installation process**



**Significant usage of glass, steel, aluminum exposes to commodity price inflation**

**Ultra-light**

**2.8 kg/m<sup>2</sup>**

**Fast Installation**

**c.50% savings in labor costs**

**Lower commodity usage in module and sub-structure**

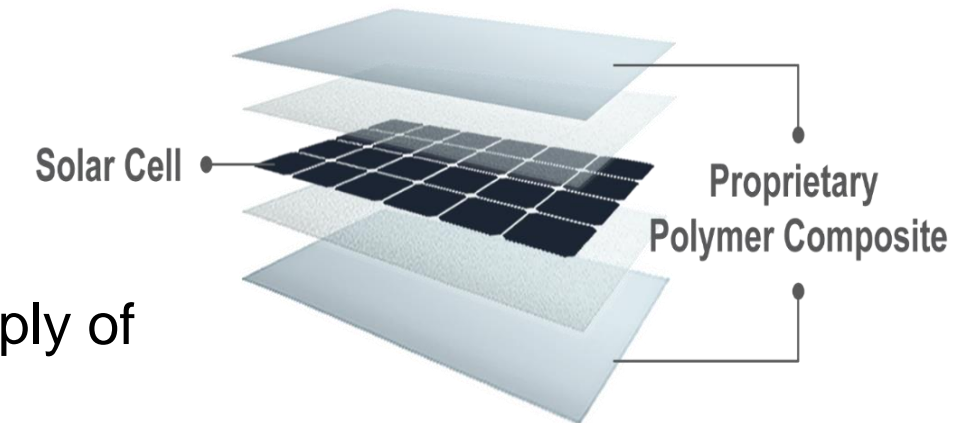
**c.33% savings in structure costs**

# eArc shares the same supply chain as glass modules



- **Cell-agnostic:** **insulated from upstream technology swings**, such as PERC replacing Al-BSF and TOPCon replacing PERC.
- **Highly scalable** with **similar CapEx intensity** as glass modules.
- **Shorter supply chain for non-silicon BOM:** Does not require localized supply of solar grade glass and metal, **facilitates supply chain re-shoring.**

Huge beneficiary of large supply chain Investments. (**~\$130 Billion in 2023**)





# Sunman's "3M" operational model

## Material



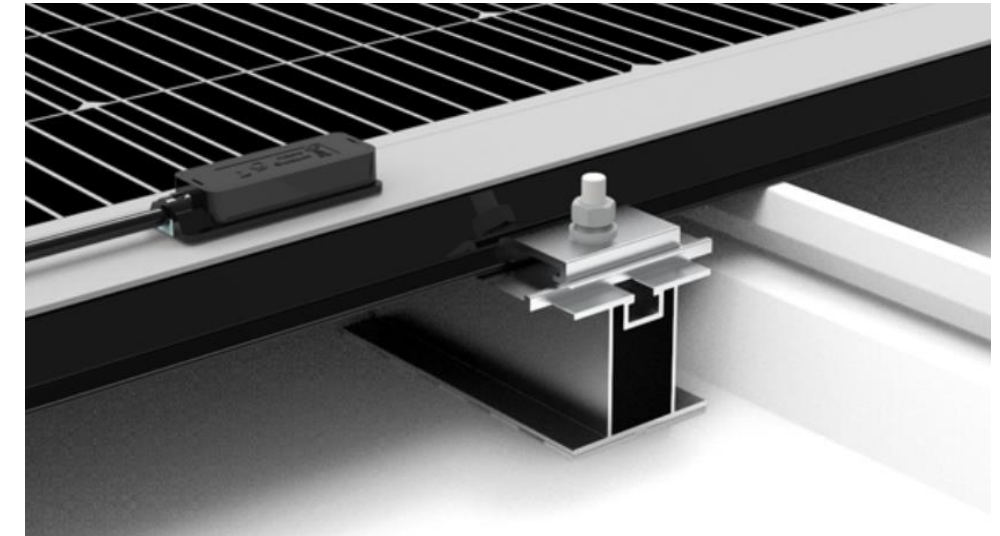
- R&D and mass-production capability for proprietary composite materials (front and back sheet).

## Module



- Automated GW-scale lightweight module manufacturing lines with state-of-the-art equipment and intelligence systems.

## Mounting



- Ability to develop and provide total mounting solutions around lightweight solar modules for various application scenarios.

# Complete Certifications for Global Deployment



eArc is the first module of its kind to pass the IEC 61215:2016, IEC61730:2016, UL61730 (USA) and CGC (China).



# Further Durability Testing

**IEC 60068-2-68**  
**Blowing Sand Test Lc 1**  
Confirmation of test results

**Applicant:** Sunman (Zhenjiang) Company Limited  
No. 1 Mingzhu South Road, Youfang Town, Yangzhong City,  
212218 Zhenjiang, Jiangsu, China

**Product:** Crystalline silicon Photovoltaic (PV)-Modules

**Type:**

A) SMDXXXX-4X120W, D) SMDXXXX-4X240W, E) SMDXXXX-4X360W, F) SMDXXXX-4X480W, G) SMDXXXX-4X600W, H) SMDXXXX-4X720W, I) SMDXXXX-4X840W, J) SMDXXXX-4X960W, K) SMDXXXX-4X1080W, L) SMDXXXX-4X1200W, M) SMDXXXX-4X1320W, N) SMDXXXX-4X1440W, O) SMDXXXX-4X1560W, P) SMDXXXX-4X1680W, Q) SMDXXXX-4X1800W, R) SMDXXXX-4X1920W, S) SMDXXXX-4X2040W, T) SMDXXXX-4X2160W, U) SMDXXXX-4X2280W, V) SMDXXXX-4X2400W, W) SMDXXXX-4X2520W, X) SMDXXXX-4X2640W, Y) SMDXXXX-4X2760W, Z) SMDXXXX-4X2880W, AA) SMDXXXX-4X3000W, AB) SMDXXXX-4X3120W, AC) SMDXXXX-4X3240W, AD) SMDXXXX-4X3360W, AE) SMDXXXX-4X3480W, AF) SMDXXXX-4X3600W, AG) SMDXXXX-4X3720W, AH) SMDXXXX-4X3840W, AI) SMDXXXX-4X3960W, AJ) SMDXXXX-4X4080W, AK) SMDXXXX-4X4200W, AL) SMDXXXX-4X4320W, AM) SMDXXXX-4X4440W, AN) SMDXXXX-4X4560W, AO) SMDXXXX-4X4680W, AP) SMDXXXX-4X4800W, AQ) SMDXXXX-4X4920W, AR) SMDXXXX-4X5040W, AS) SMDXXXX-4X5160W, AT) SMDXXXX-4X5280W, AU) SMDXXXX-4X5400W, AV) SMDXXXX-4X5520W, AW) SMDXXXX-4X5640W, AX) SMDXXXX-4X5760W, AY) SMDXXXX-4X5880W, AZ) SMDXXXX-4X6000W	B) SMDXXXX-4X120W, E) SMDXXXX-4X120W, H) SMDXXXX-4X120W, K) SMDXXXX-4X120W, N) SMDXXXX-4X120W, Q) SMDXXXX-4X120W, R) SMDXXXX-4X120W, S) SMDXXXX-4X120W, T) SMDXXXX-4X120W, U) SMDXXXX-4X120W, V) SMDXXXX-4X120W, W) SMDXXXX-4X120W, X) SMDXXXX-4X120W, Y) SMDXXXX-4X120W, Z) SMDXXXX-4X120W, AA) SMDXXXX-4X120W, AB) SMDXXXX-4X120W, AC) SMDXXXX-4X120W, AD) SMDXXXX-4X120W, AE) SMDXXXX-4X120W, AF) SMDXXXX-4X120W, AG) SMDXXXX-4X120W, AH) SMDXXXX-4X120W, AI) SMDXXXX-4X120W, AJ) SMDXXXX-4X120W, AK) SMDXXXX-4X120W, AL) SMDXXXX-4X120W, AM) SMDXXXX-4X120W, AN) SMDXXXX-4X120W, AO) SMDXXXX-4X120W, AP) SMDXXXX-4X120W, AQ) SMDXXXX-4X120W, AR) SMDXXXX-4X120W, AS) SMDXXXX-4X120W, AT) SMDXXXX-4X120W, AU) SMDXXXX-4X120W, AV) SMDXXXX-4X120W, AW) SMDXXXX-4X120W, AX) SMDXXXX-4X120W, AY) SMDXXXX-4X120W, AZ) SMDXXXX-4X120W	C) SMDXXXX-4X120W, F) SMDXXXX-4X120W, I) SMDXXXX-4X120W, L) SMDXXXX-4X120W, O) SMDXXXX-4X120W, P) SMDXXXX-4X120W, S) SMDXXXX-4X120W, V) SMDXXXX-4X120W, Y) SMDXXXX-4X120W, Z) SMDXXXX-4X120W, AA) SMDXXXX-4X120W, AB) SMDXXXX-4X120W, AC) SMDXXXX-4X120W, AD) SMDXXXX-4X120W, AE) SMDXXXX-4X120W, AF) SMDXXXX-4X120W, AG) SMDXXXX-4X120W, AH) SMDXXXX-4X120W, AI) SMDXXXX-4X120W, AJ) SMDXXXX-4X120W, AK) SMDXXXX-4X120W, AL) SMDXXXX-4X120W, AM) SMDXXXX-4X120W, AN) SMDXXXX-4X120W, AO) SMDXXXX-4X120W, AP) SMDXXXX-4X120W, AQ) SMDXXXX-4X120W, AR) SMDXXXX-4X120W, AS) SMDXXXX-4X120W, AT) SMDXXXX-4X120W, AU) SMDXXXX-4X120W, AV) SMDXXXX-4X120W, AW) SMDXXXX-4X120W, AX) SMDXXXX-4X120W, AY) SMDXXXX-4X120W, AZ) SMDXXXX-4X120W
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**Manufacturer:** Sunman (Zhenjiang) Company Limited  
**Standard:** IEC 60068-2-68, Dust and Sand test Lc1  
**Test sequence:** Based on IEC 61701.2011

**Test conditions**

Dust concentration:	4.8 - 5.3 g/m <sup>3</sup>
Wind velocity:	18.3 - 20.7 m/s
Particle size:	Variant 3, <500 µm
Dust composition:	Quartz, 95% SiO <sub>2</sub>
Testing time:	Front side: 4 h, Rear side: 4 h

File Ref.: 10398/ ET-20210823-165 Page 1 of 2

**IEC 61701:2020**  
**Salt mist corrosion testing of photovoltaic (PV) modules**  
Confirmation of test results

**Applicant:** Sunman (Zhenjiang) Company Limited  
No. 1 Mingzhu South Road, Youfang Town, Yangzhong City, 212218  
Zhenjiang, Jiangsu, China

**Product:** Crystalline silicon Photovoltaic (PV)-Modules

**Type:**

B) SMDXXXX-4X120W, E) SMDXXXX-4X120W, H) SMDXXXX-4X120W, K) SMDXXXX-4X120W, N) SMDXXXX-4X120W, Q) SMDXXXX-4X120W, R) SMDXXXX-4X120W, S) SMDXXXX-4X120W, T) SMDXXXX-4X120W, U) SMDXXXX-4X120W, V) SMDXXXX-4X120W, W) SMDXXXX-4X120W, X) SMDXXXX-4X120W, Y) SMDXXXX-4X120W, Z) SMDXXXX-4X120W, AA) SMDXXXX-4X120W, AB) SMDXXXX-4X120W, AC) SMDXXXX-4X120W, AD) SMDXXXX-4X120W, AE) SMDXXXX-4X120W, AF) SMDXXXX-4X120W, AG) SMDXXXX-4X120W, AH) SMDXXXX-4X120W, AI) SMDXXXX-4X120W, AJ) SMDXXXX-4X120W, AK) SMDXXXX-4X120W, AL) SMDXXXX-4X120W, AM) SMDXXXX-4X120W, AN) SMDXXXX-4X120W, AO) SMDXXXX-4X120W, AP) SMDXXXX-4X120W, AQ) SMDXXXX-4X120W, AR) SMDXXXX-4X120W, AS) SMDXXXX-4X120W, AT) SMDXXXX-4X120W, AU) SMDXXXX-4X120W, AV) SMDXXXX-4X120W, AW) SMDXXXX-4X120W, AX) SMDXXXX-4X120W, AY) SMDXXXX-4X120W, AZ) SMDXXXX-4X120W	B) SMDXXXX-4X120W, E) SMDXXXX-4X120W, H) SMDXXXX-4X120W, K) SMDXXXX-4X120W, N) SMDXXXX-4X120W, Q) SMDXXXX-4X120W, R) SMDXXXX-4X120W, S) SMDXXXX-4X120W, T) SMDXXXX-4X120W, U) SMDXXXX-4X120W, V) SMDXXXX-4X120W, W) SMDXXXX-4X120W, X) SMDXXXX-4X120W, Y) SMDXXXX-4X120W, Z) SMDXXXX-4X120W, AA) SMDXXXX-4X120W, AB) SMDXXXX-4X120W, AC) SMDXXXX-4X120W, AD) SMDXXXX-4X120W, AE) SMDXXXX-4X120W, AF) SMDXXXX-4X120W, AG) SMDXXXX-4X120W, AH) SMDXXXX-4X120W, AI) SMDXXXX-4X120W, AJ) SMDXXXX-4X120W, AK) SMDXXXX-4X120W, AL) SMDXXXX-4X120W, AM) SMDXXXX-4X120W, AN) SMDXXXX-4X120W, AO) SMDXXXX-4X120W, AP) SMDXXXX-4X120W, AQ) SMDXXXX-4X120W, AR) SMDXXXX-4X120W, AS) SMDXXXX-4X120W, AT) SMDXXXX-4X120W, AU) SMDXXXX-4X120W, AV) SMDXXXX-4X120W, AW) SMDXXXX-4X120W, AX) SMDXXXX-4X120W, AY) SMDXXXX-4X120W, AZ) SMDXXXX-4X120W	C) SMDXXXX-4X120W, F) SMDXXXX-4X120W, I) SMDXXXX-4X120W, L) SMDXXXX-4X120W, O) SMDXXXX-4X120W, P) SMDXXXX-4X120W, S) SMDXXXX-4X120W, V) SMDXXXX-4X120W, Y) SMDXXXX-4X120W, Z) SMDXXXX-4X120W, AA) SMDXXXX-4X120W, AB) SMDXXXX-4X120W, AC) SMDXXXX-4X120W, AD) SMDXXXX-4X120W, AE) SMDXXXX-4X120W, AF) SMDXXXX-4X120W, AG) SMDXXXX-4X120W, AH) SMDXXXX-4X120W, AI) SMDXXXX-4X120W, AJ) SMDXXXX-4X120W, AK) SMDXXXX-4X120W, AL) SMDXXXX-4X120W, AM) SMDXXXX-4X120W, AN) SMDXXXX-4X120W, AO) SMDXXXX-4X120W, AP) SMDXXXX-4X120W, AQ) SMDXXXX-4X120W, AR) SMDXXXX-4X120W, AS) SMDXXXX-4X120W, AT) SMDXXXX-4X120W, AU) SMDXXXX-4X120W, AV) SMDXXXX-4X120W, AW) SMDXXXX-4X120W, AX) SMDXXXX-4X120W, AY) SMDXXXX-4X120W, AZ) SMDXXXX-4X120W
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**Manufacturer:** Sunman (Zhenjiang) Company Limited

**Standard:** IEC 61701:2020, Salt mist corrosion test

**Test conditions**

Test method:	8
Testing time:	1440 hrs
Chamber temperature:	35°C
Relative Humidity:	95 %
Mist pH level:	3.5

File Ref.: 10398/ ET-20220711-121 Page 1 of 2

**IEC 62716:2013**  
**Photovoltaic (PV) modules**  
**- Ammonia corrosion testing -**  
Confirmation of test results

**Applicant:** Sunman (Zhenjiang) Company Limited  
No. 1 Mingzhu South Road, Youfang Town, Yangzhong City,  
212218 Zhenjiang, Jiangsu, China

**Product:** Crystalline silicon Photovoltaic (PV)-Modules

**Type:**

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**Manufacturer:** Sunman (Zhenjiang) Company Limited

**Standard:** IEC 62716:2013, Ammonia corrosion testing

**Test conditions**

Hours including heating up:	8 h
NH <sub>3</sub> -concentration (ppm):	6667
Chamber temperature:	80°C
Relative Humidity:	100 %
Hours including cooling:	16 h
NH <sub>3</sub> -concentration (ppm):	0
Chamber temperature:	23°C
Relative Humidity:	75 %

File Ref.: 10398/ ET-20210823-165 Page 1 of 2

**IEC TS 62804-1:2015**  
**Photovoltaic (PV) Modules - Test Methods for the detection of potential-induced degradation**  
Part 1: Crystalline silicon  
Confirmation of test results

**Applicant:** Sunman (Zhenjiang) Company Limited  
No. 1 Mingzhu South Road, Youfang Town, Yangzhong City,  
212218 Zhenjiang, Jiangsu, China

**Product:** Crystalline silicon Photovoltaic (PV)-Modules

**Type:**

B) SMDXXXX-4X120W, E) SMDXXXX-4X120W, H) SMDXXXX-4X120W, K) SMDXXXX-4X120W, N) SMDXXXX-4X120W, Q) SMDXXXX-4X120W, R) SMDXXXX-4X120W, S) SMDXXXX-4X120W, T) SMDXXXX-4X120W, U) SMDXXXX-4X120W, V) SMDXXXX-4X120W, W) SMDXXXX-4X120W, X) SMDXXXX-4X120W, Y) SMDXXXX-4X120W, Z) SMDXXXX-4X120W, AA) SMDXXXX-4X120W, AB) SMDXXXX-4X120W, AC) SMDXXXX-4X120W, AD) SMDXXXX-4X120W, AE) SMDXXXX-4X120W, AF) SMDXXXX-4X120W, AG) SMDXXXX-4X120W, AH) SMDXXXX-4X120W, AI) SMDXXXX-4X120W, AJ) SMDXXXX-4X120W, AK) SMDXXXX-4X120W, AL) SMDXXXX-4X120W, AM) SMDXXXX-4X120W, AN) SMDXXXX-4X120W, AO) SMDXXXX-4X120W, AP) SMDXXXX-4X120W, AQ) SMDXXXX-4X120W, AR) SMDXXXX-4X120W, AS) SMDXXXX-4X120W, AT) SMDXXXX-4X120W, AU) SMDXXXX-4X120W, AV) SMDXXXX-4X120W, AW) SMDXXXX-4X120W, AX) SMDXXXX-4X120W, AY) SMDXXXX-4X120W, AZ) SMDXXXX-4X120W	B) SMDXXXX-4X120W, E) SMDXXXX-4X120W, H) SMDXXXX-4X120W, K) SMDXXXX-4X120W, N) SMDXXXX-4X120W, Q) SMDXXXX-4X120W, R) SMDXXXX-4X120W, S) SMDXXXX-4X120W, T) SMDXXXX-4X120W, U) SMDXXXX-4X120W, V) SMDXXXX-4X120W, W) SMDXXXX-4X120W, X) SMDXXXX-4X120W, Y) SMDXXXX-4X120W, Z) SMDXXXX-4X120W, AA) SMDXXXX-4X120W, AB) SMDXXXX-4X120W, AC) SMDXXXX-4X120W, AD) SMDXXXX-4X120W, AE) SMDXXXX-4X120W, AF) SMDXXXX-4X120W, AG) SMDXXXX-4X120W, AH) SMDXXXX-4X120W, AI) SMDXXXX-4X120W, AJ) SMDXXXX-4X120W, AK) SMDXXXX-4X120W, AL) SMDXXXX-4X120W, AM) SMDXXXX-4X120W, AN) SMDXXXX-4X120W, AO) SMDXXXX-4X120W, AP) SMDXXXX-4X120W, AQ) SMDXXXX-4X120W, AR) SMDXXXX-4X120W, AS) SMDXXXX-4X120W, AT) SMDXXXX-4X120W, AU) SMDXXXX-4X120W, AV) SMDXXXX-4X120W, AW) SMDXXXX-4X120W, AX) SMDXXXX-4X120W, AY) SMDXXXX-4X120W, AZ) SMDXXXX-4X120W	C) SMDXXXX-4X120W, F) SMDXXXX-4X120W, I) SMDXXXX-4X120W, L) SMDXXXX-4X120W, O) SMDXXXX-4X120W, P) SMDXXXX-4X120W, S) SMDXXXX-4X120W, V) SMDXXXX-4X120W, Y) SMDXXXX-4X120W, Z) SMDXXXX-4X120W, AA) SMDXXXX-4X120W, AB) SMDXXXX-4X120W, AC) SMDXXXX-4X120W, AD) SMDXXXX-4X120W, AE) SMDXXXX-4X120W, AF) SMDXXXX-4X120W, AG) SMDXXXX-4X120W, AH) SMDXXXX-4X120W, AI) SMDXXXX-4X120W, AJ) SMDXXXX-4X120W, AK) SMDXXXX-4X120W, AL) SMDXXXX-4X120W, AM) SMDXXXX-4X120W, AN) SMDXXXX-4X120W, AO) SMDXXXX-4X120W, AP) SMDXXXX-4X120W, AQ) SMDXXXX-4X120W, AR) SMDXXXX-4X120W, AS) SMDXXXX-4X120W, AT) SMDXXXX-4X120W, AU) SMDXXXX-4X120W, AV) SMDXXXX-4X120W, AW) SMDXXXX-4X120W, AX) SMDXXXX-4X120W, AY) SMDXXXX-4X120W, AZ) SMDXXXX-4X120W
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XXX in the type replaces the power in watt and can be any number between:  
415 - 440 for C), D), E), F), G), H), I), J), K), L), M), N), O), P), Q), R), S), T), U), V), W), X), Y), Z), AA), AB), AC), AD), AE), AF), AG), AH), AI), AJ), AK), AL), AM), AN), AO), AP), AQ), AR), AS), AT), AU), AV), AW), AX), AY), AZ)

**Manufacturer:** Sunman (Zhenjiang) Company Limited

**Standard:** IEC TS 62804-1:2015

**Test conditions**

Testing time:	96 h
Chamber temperature:	85°C
Relative Humidity:	85 %
Potential to ground:	± 1500 V
Power degradation:	< 5%
Dry Insulation:	> 40 MQm <sup>2</sup>
Wet Insulation:	> 40 MQm <sup>2</sup>

**Pass criteria**

Date	Status	Revision
02-09-2020	Final	02

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**straight forward**

**Bankability Report Sunman eArche modules**

**Sunman(Zhenjiang) Co.,Ltd.**

**Manufacturer:** Sunman (Zhenjiang) Company Limited

**Standard:** IEC TS 62804-1:2015

**Test conditions**

Testing time:	96 h
Chamber temperature:	85°C
Relative Humidity:	85 %
Potential to ground:	± 1500 V
Power degradation:	< 5%
Dry Insulation:	> 40 MQm <sup>2</sup>
Wet Insulation:	> 40 MQm <sup>2</sup>

**Pass criteria**

Date	Status	Revision
02-09-2020	Final	02

File Ref.: 10398/ ET-20230518-116 Page 1 of 2

Dust Testing

Salt Mist Corrosion  
Testing level 8

Ammonia Testing

PID Testing

Straightforward Module  
Bankability Testing

# High performance modules built for the C&I Market



**SMF520J-12X12UW**  
**7.7 KG (2.8 KG/m<sup>2</sup>)**



**SMH520J-12X12UW**  
**11.1 KG (4.1KG/m<sup>2</sup>)**

- 520W 144 half-cut cell
- 182 mm PERC cells
- SMF (frameless) or SMH (pre-integrated with mounting brackets)
- 2.8 kg/m<sup>2</sup> or 4.1 kg/m<sup>2</sup>
- New TOPCon product TBA (2024)



# How to install lightweight solar modules?





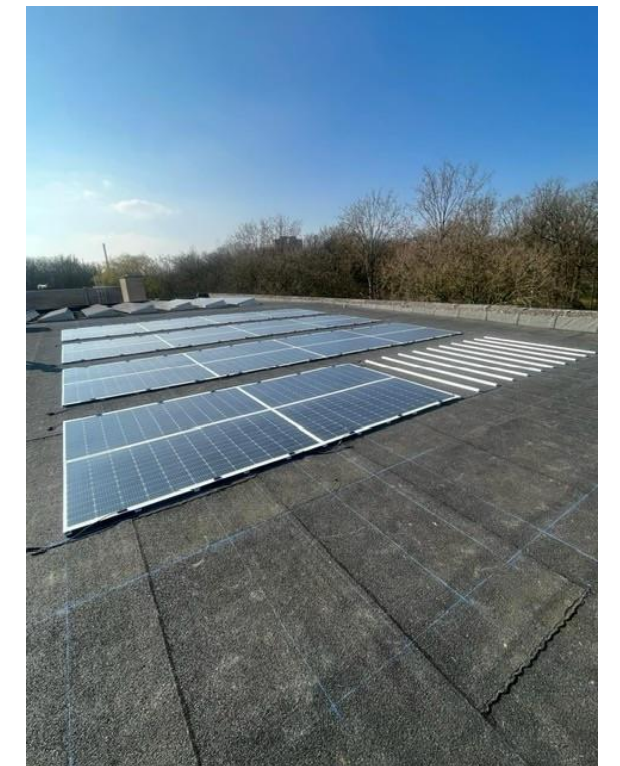
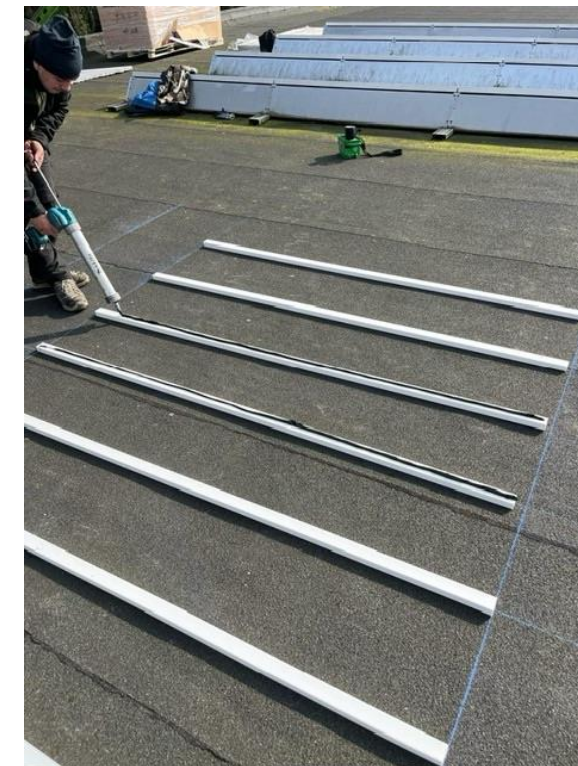
# What is “Quick-Bonding”?



**Quick-Bonding** is a mature construction technique, proven in the building and automotive industry for over 60 years.

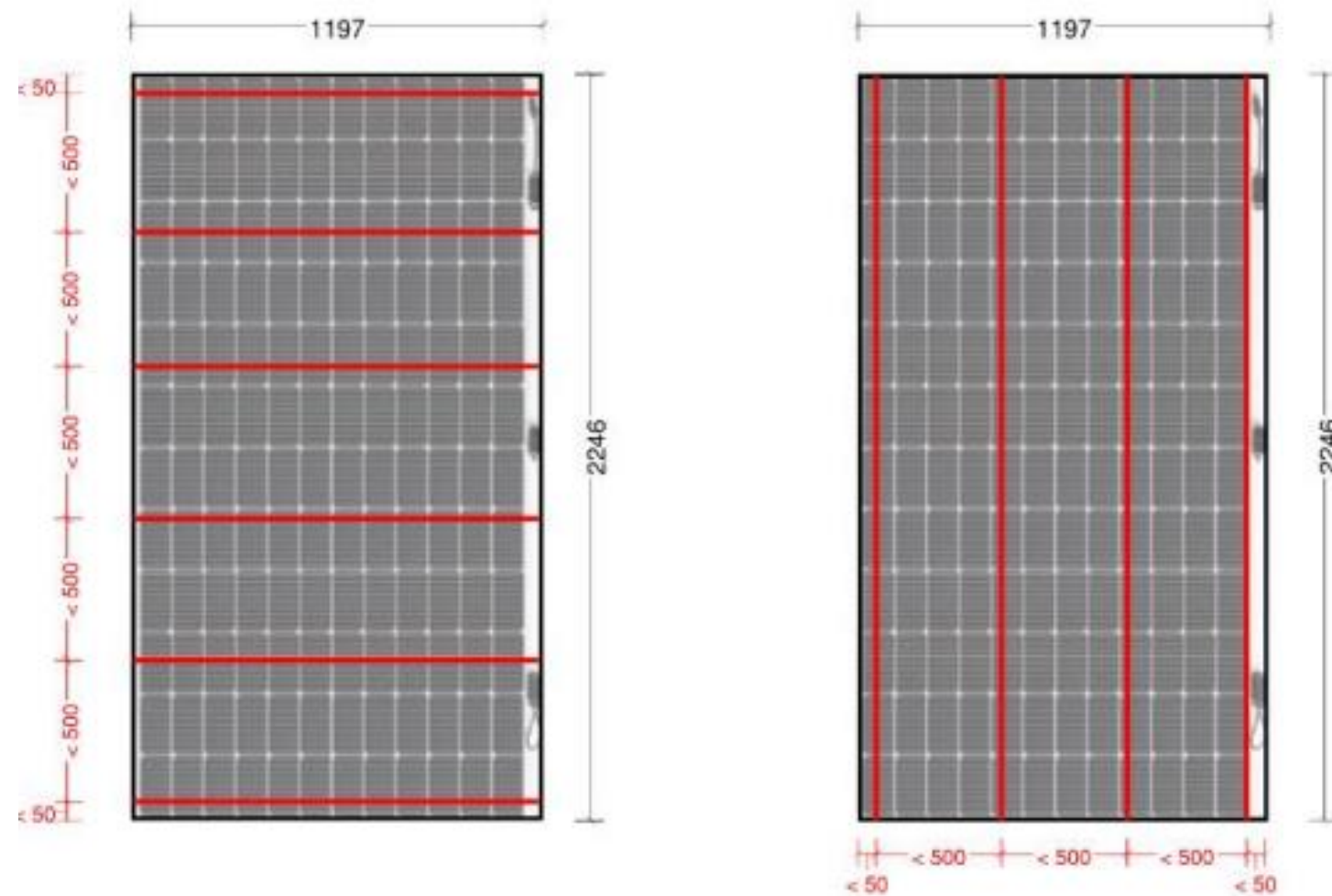
(Similarly, Sunman modules can be glued or “bonded” onto various roof substrates)

- Silicone has the same chemical base as “sand” and “quartz”, thus highly resistant to weathering and UV radiation.
- The global structural silicone market size was valued at \$38.1 billion in 2021, projected to reach \$81.6 billion. (2031)
- All silicones undergo rigorous testing based on mature standards before being introduced into the construction industry.
- Tests focus on adhesion, cohesion, and durability, including weather-resistance, UV, temperature extremes, and chemicals.





# Typical fixing methodology



Taken from “Sunman Lightweight PV Solar Module Installation: Desk-study - Structural application guideline for the German market”

Joint study conducted by global structural engineering firm partner:

**ARUP**

Profiled Metal decking – various coating.

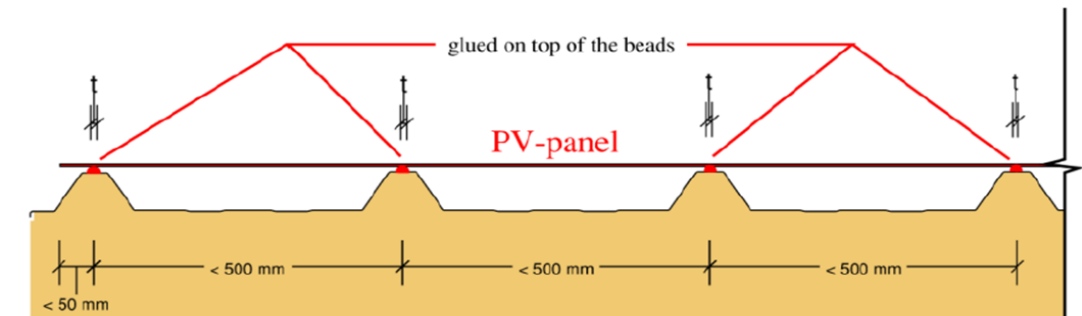


Figure 1 Gluing principle for trapezoidal roof directly

Membranes, PVC or EPDM or other material that are compatible with silicone gluing.

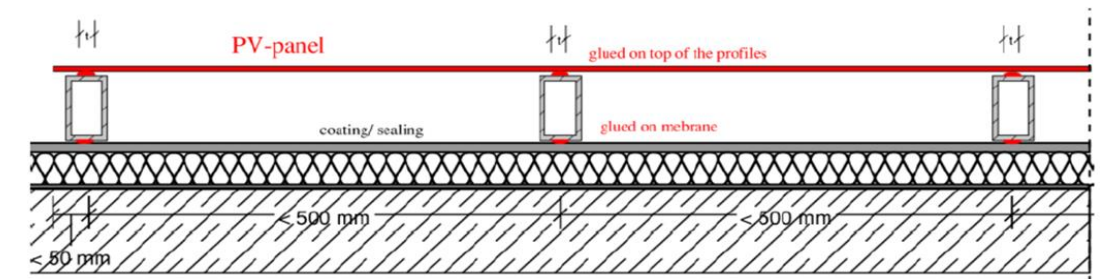
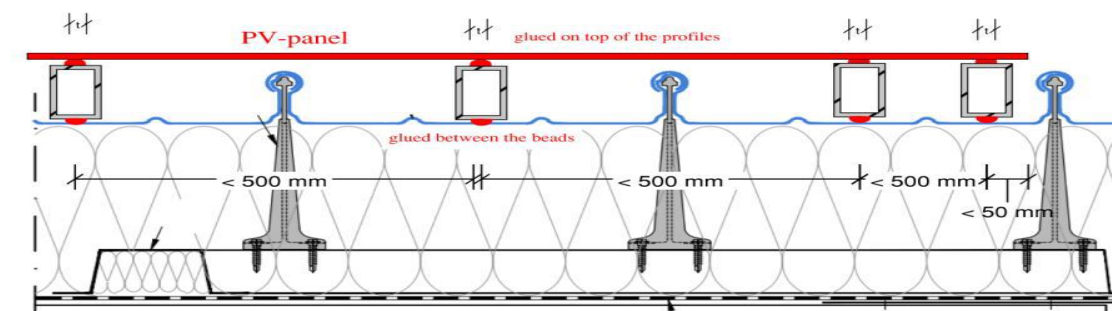


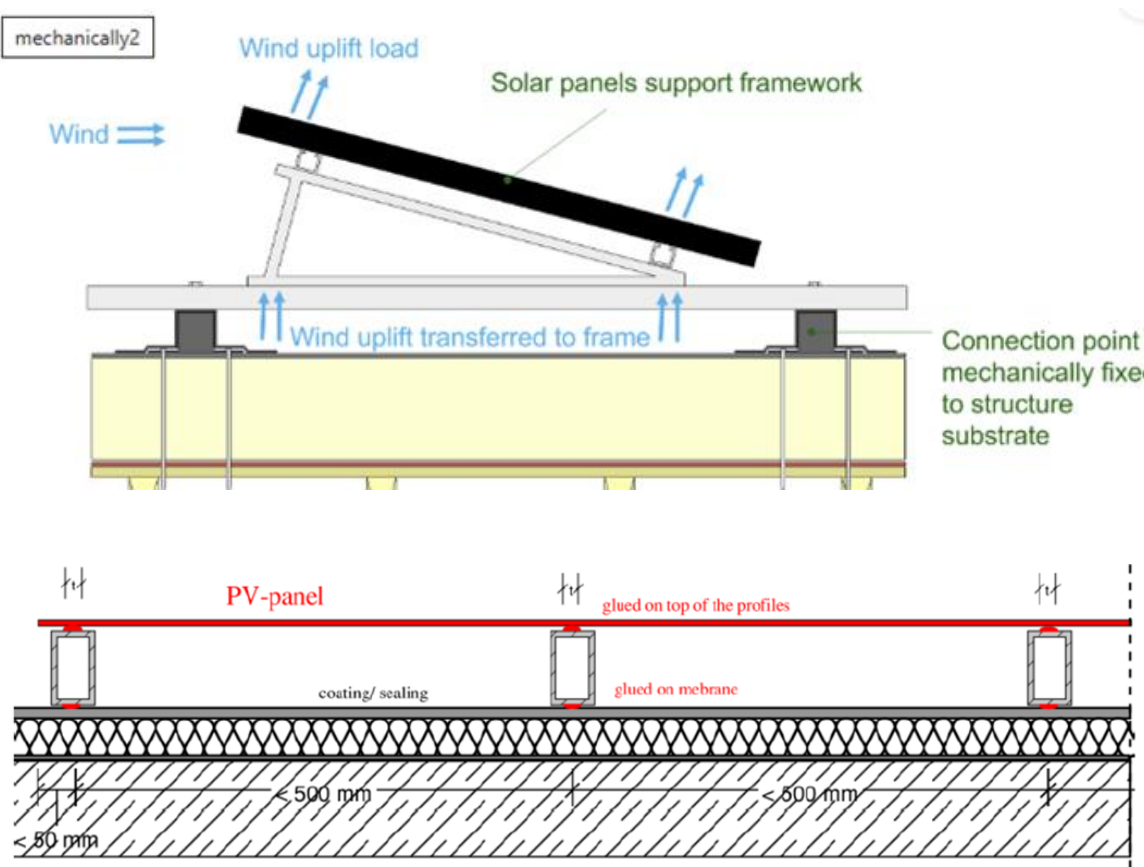
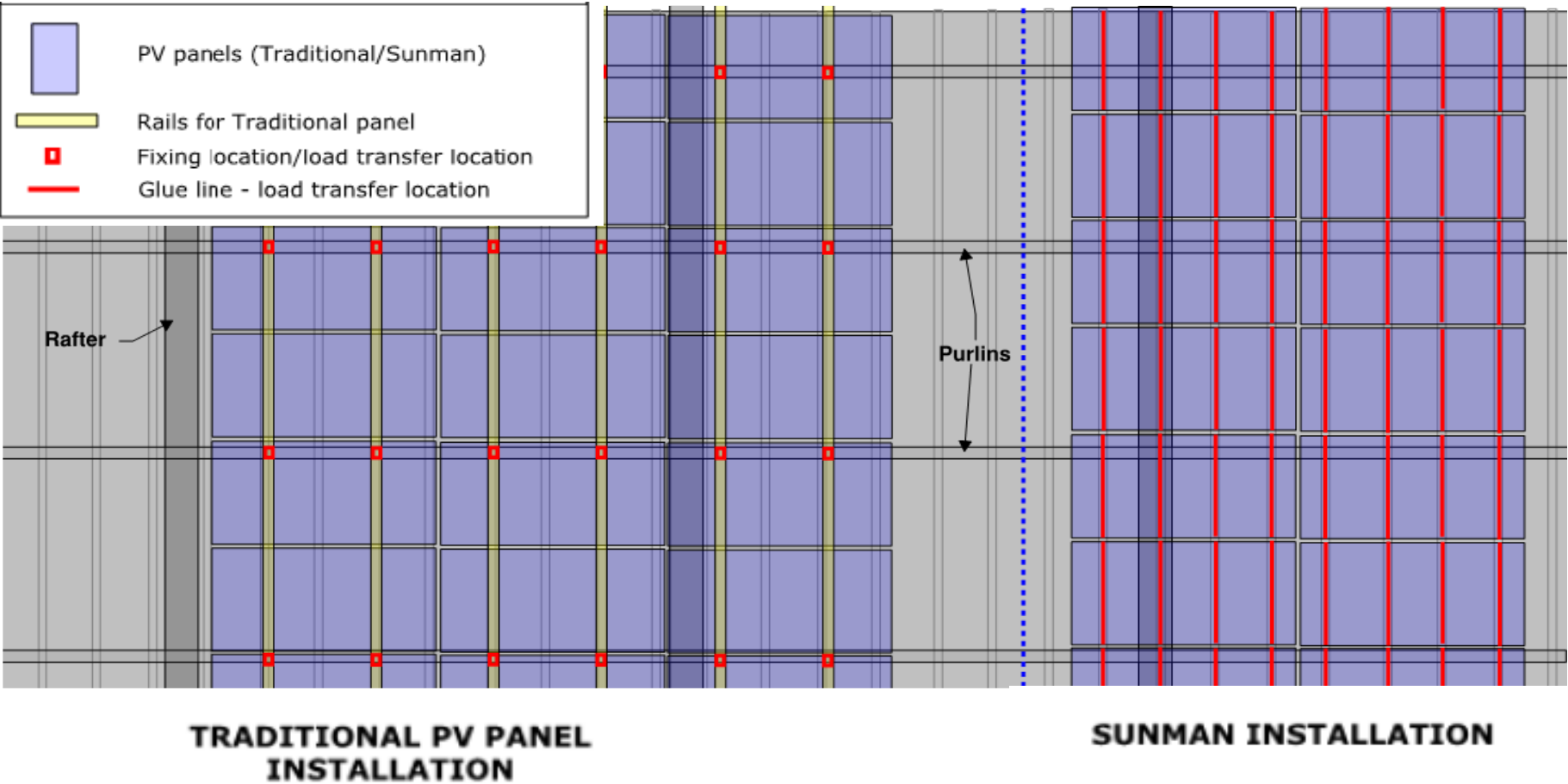
Figure 3 Gluing principle for membrane roof with add. Profiles



# Structural Benefits: Sunman Modules VS Traditional Modules



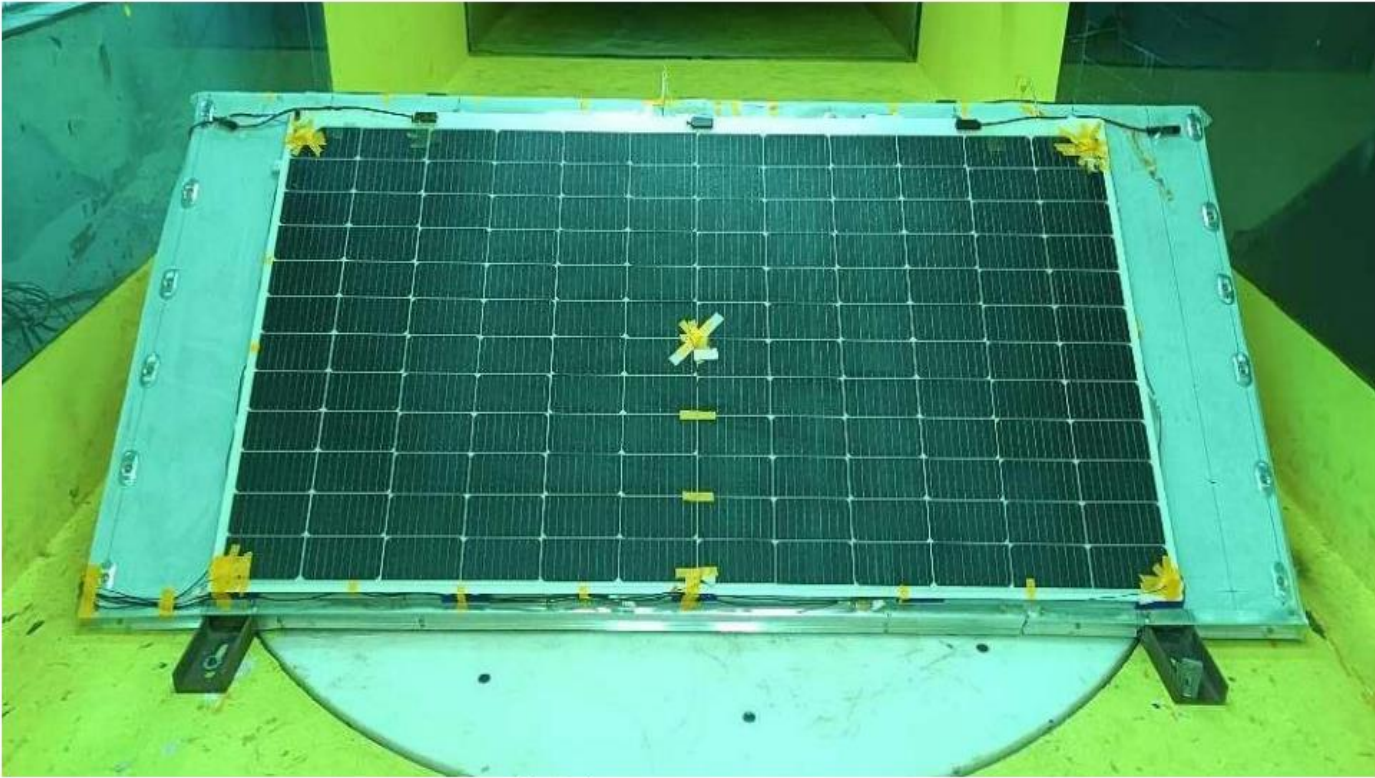
In contrast, Sunman panels offer a distinct advantage. Their design ensures a more even distribution of load across the panel due to the evenly dispersed glue lines. This characteristic minimises the risk of localised stress on the roof, particularly in critical areas like edges and corners. Consequently, Sunman panels are a preferred choice for installations in such regions, eliminating potential concerns associated with traditional panel installations.



“Sunman Structure process assessment and methodology”: Technical white paper conducted by Australian Structural Engineering Partner Relationships built on trust



# System Level Durability: 160 km/h wind-tunnel test



迎风坡照片 Photo of windward slope

子样编号 Sample No.	检测参数及结果 Test parameters and results				结果 Result
	安装角度(°) Installation angle	管道风速 [V <sub>Pipeline</sub> ](m/s) Pipeline wind speed	换算风速[V <sub>Conversion</sub> ] (m/s) Converted wind speed	持续时间[s] Duration	
PVT2250501	45	17.86	25	120	组件以及安装系统完好 The components and mounting system are intact
PVT2250502	145	17.86	—	120	
PVT2250501	45	21.44	30	120	
PVT2250502	145	21.44	—	120	
PVT2250501	45	25.01	35	120	
PVT2250502	145	25.01	—	120	
PVT2250501	45	28.58	40	120	
PVT2250502	145	28.58	—	120	
PVT2250501	45	32.15	45	600	
PVT2250502	145	32.15	—	600	

- Module glued on substrate at 45 degree slope.
- Build up of windspeed from 25 m/s to 45 m/s.
- Wind tunnel test peak at 45 m/s for continuous 10 minutes.
- **No failure or detachment of glue and module from substrate.**



# Market Applications



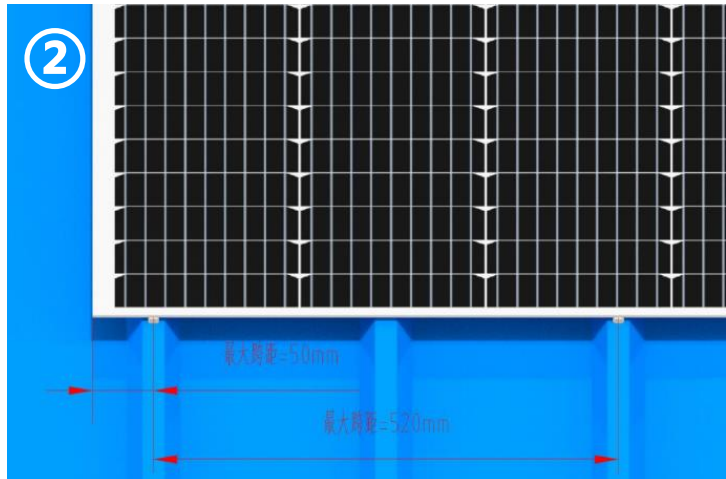


# C&I Applications (SMF)

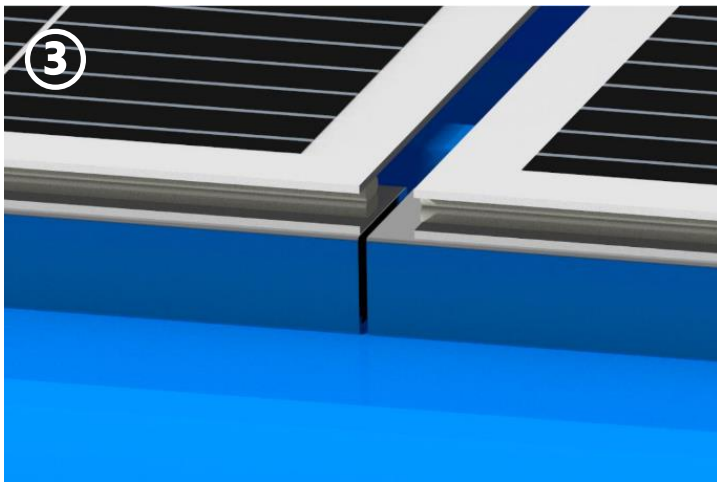
## Metal Roofs – Quick-Bonding



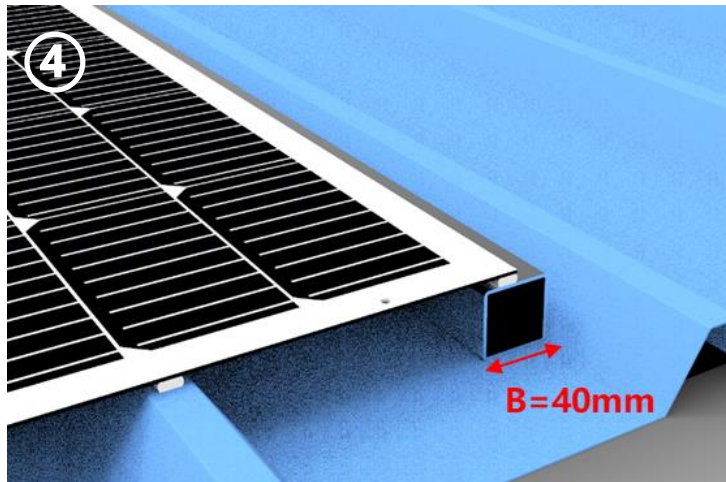
Evenly apply glue to the peaks of metal roof profile (>10mm width).



The spacing between lines of glue is  $\leq 520\text{mm}$ , and when the overhanging part of the module is  $>50\text{mm}$ , use aluminum square tube.



Ensure that the ends of aluminum tubes lay between panels.

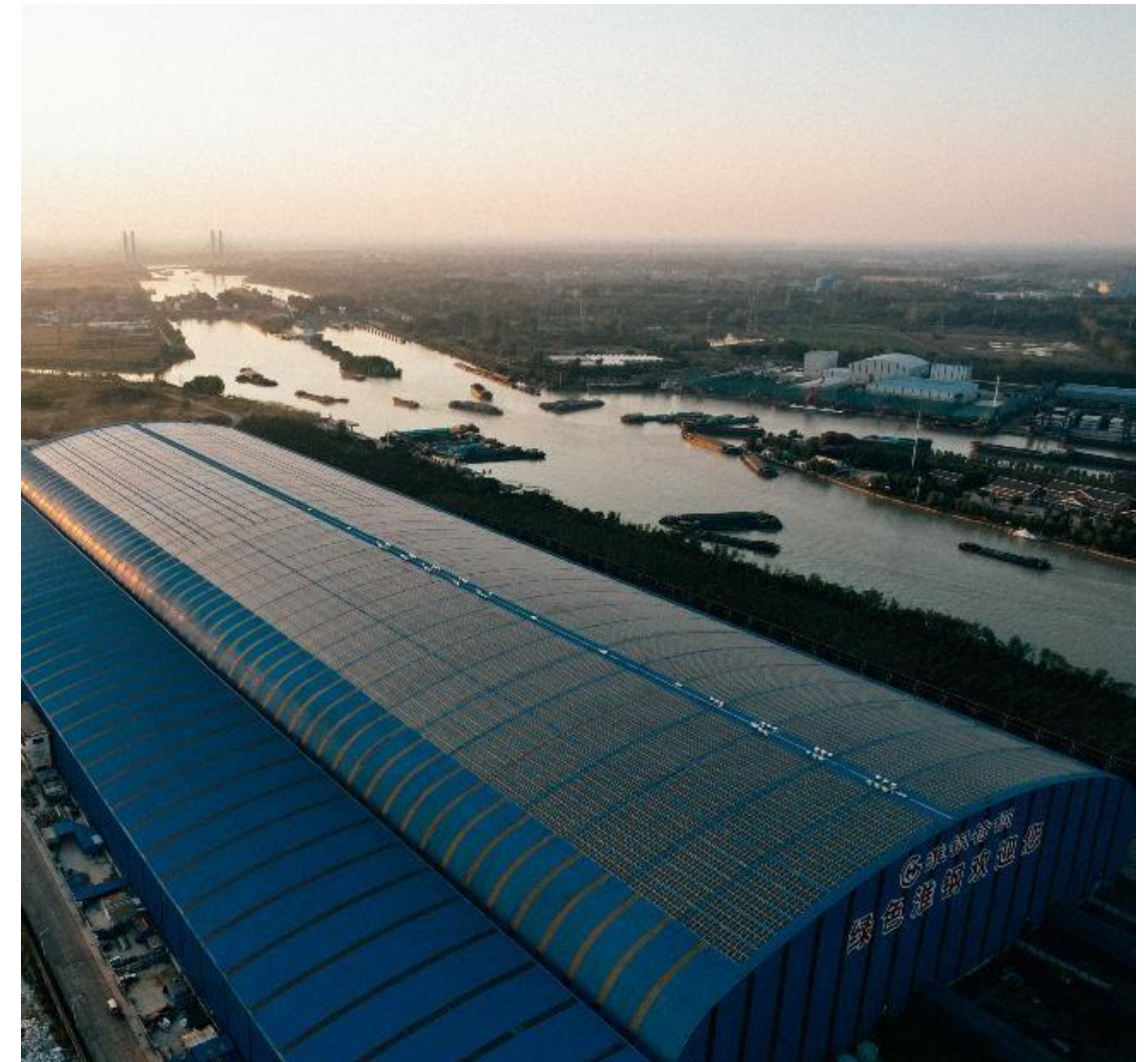


Aluminum square tube is required to be aluminum profile 6063-T5/T6, anodized AA10 or above.



# C&I Applications

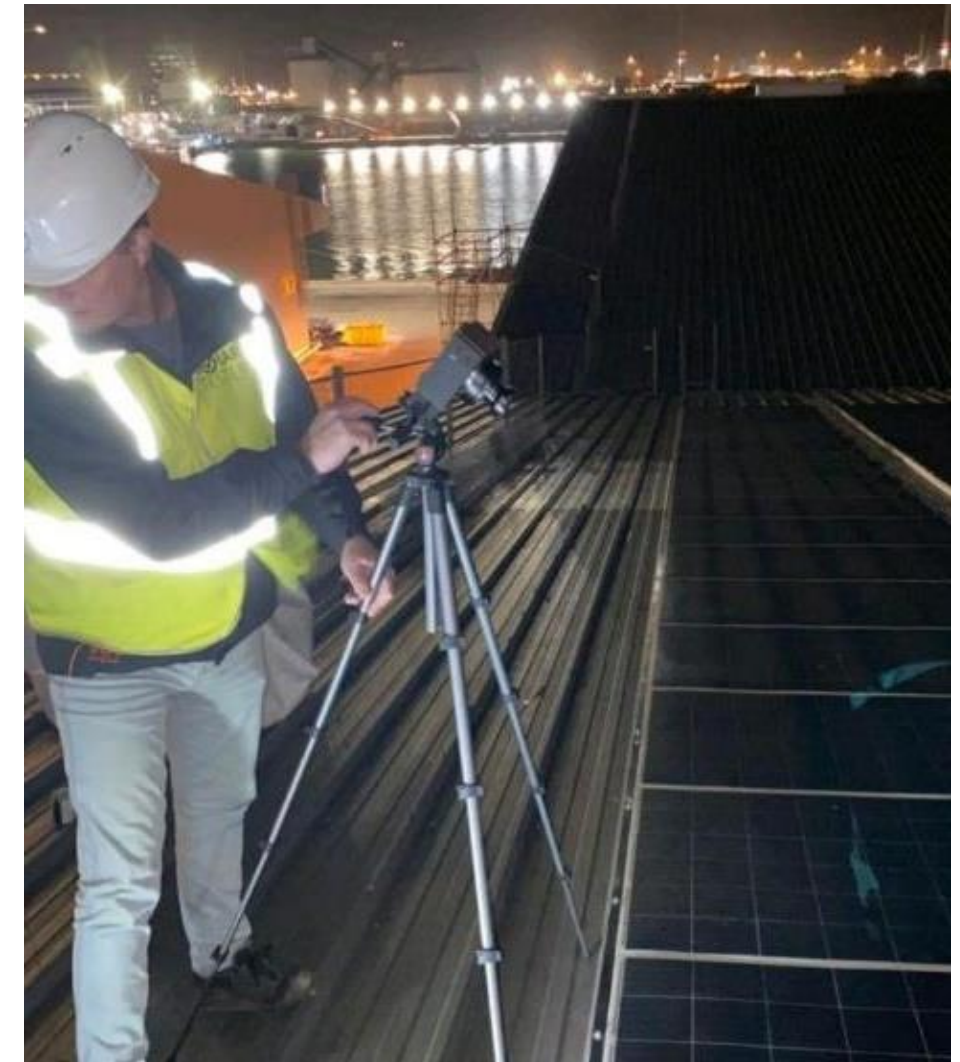
## Metal Roofs – Quick-Bonding





# C&I Applications

## Metal Roofs – Quick-Bonding





# C&I Applications

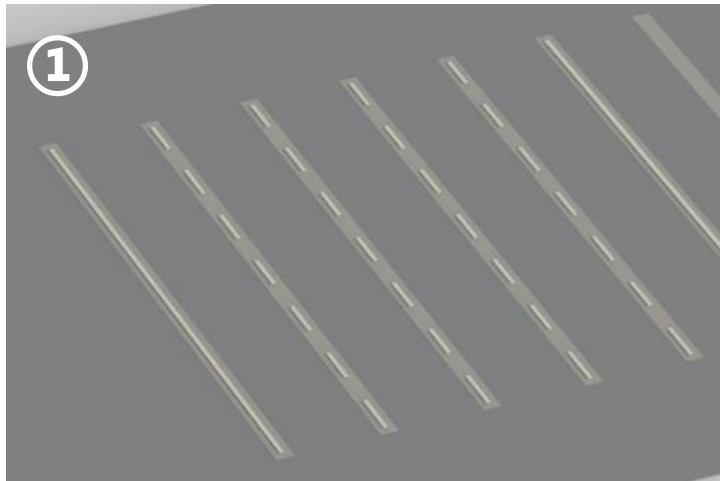
## Metal Roofs – Quick-Bonding



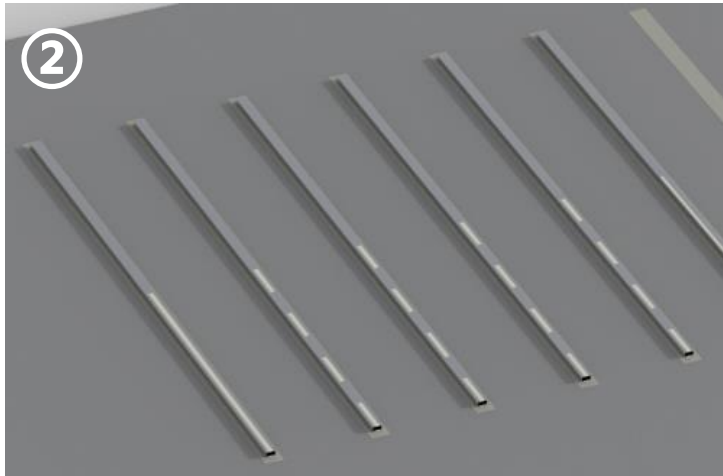


# C&I Applications

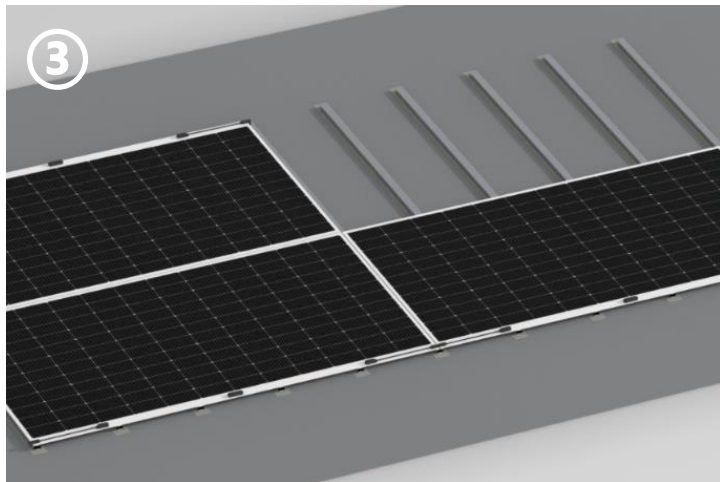
## Membranes and Flat Roofs – Quick-Bonding



Clean the roof with the cleaning agent specified by Sunman. Apply the recommended glue that is appropriate for the roofing material.



Place tube onto the glue lines and put another layer of glue on the top side of the tube.



Place panels in the manner displayed in the diagram.(430W correspond to 5 tubes, 520W correspond to 7 tubes)



Ensure a single panel is not mounted on two tubes – expansion and contraction of the tubes may cause issues, such as deformation of the panels.

# C&I Applications

## Membranes and Flat Roofs – Quick-Bonding





# C&I Applications

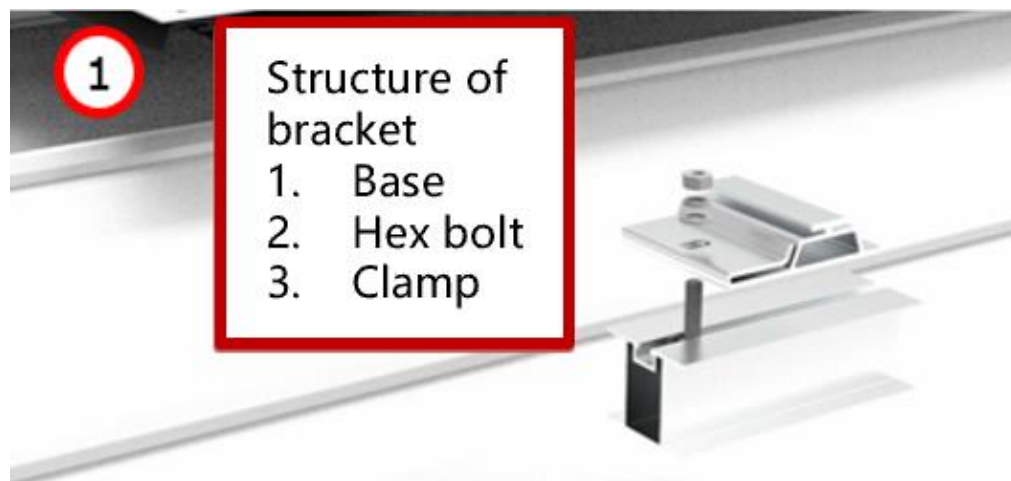
## Membranes and Flat Roofs – Quick-Bonding



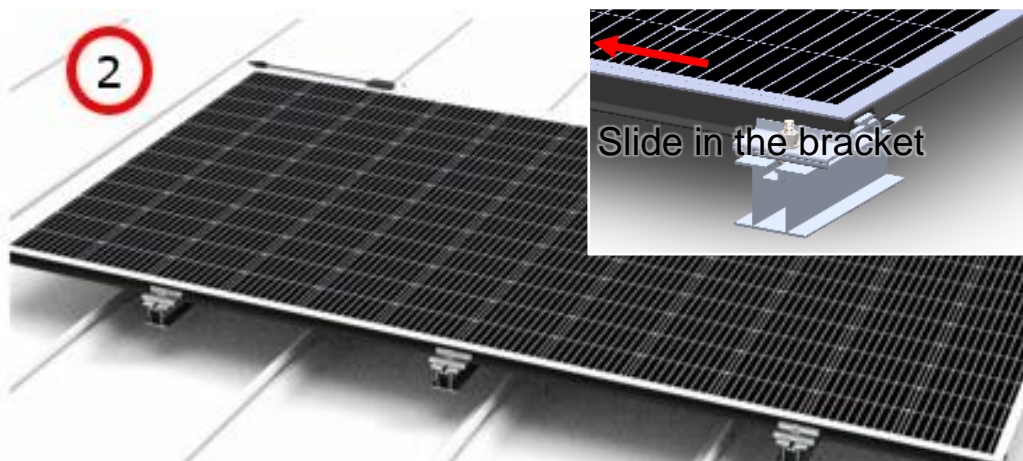


# C&I Applications (SMH)

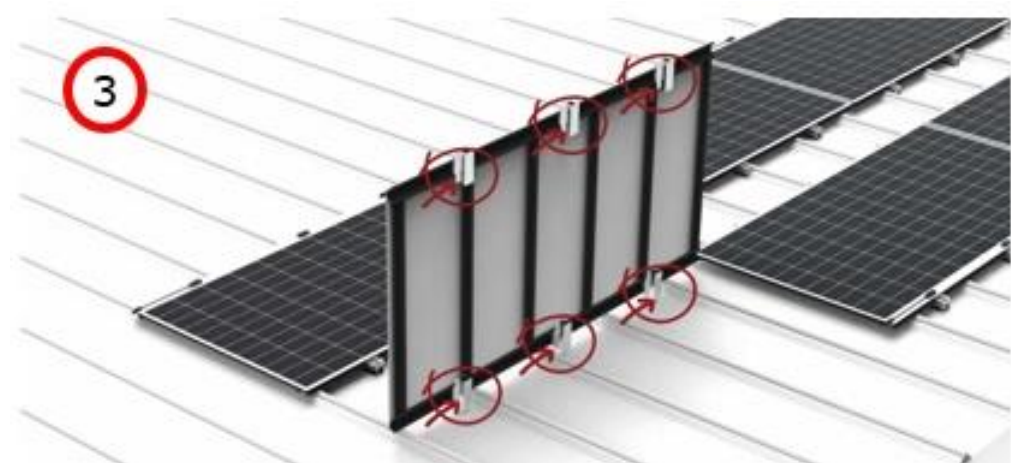
## Metal / Membrane Roofs – Mechanical Fixation



Assemble the bracket.



Install the bracket onto the prefabricated panel.



Apply glue to the base.



Paste the modules.



# C&I Applications (SMH)

## Metal / Membrane Roofs – Mechanical Fixation





## Other Applications

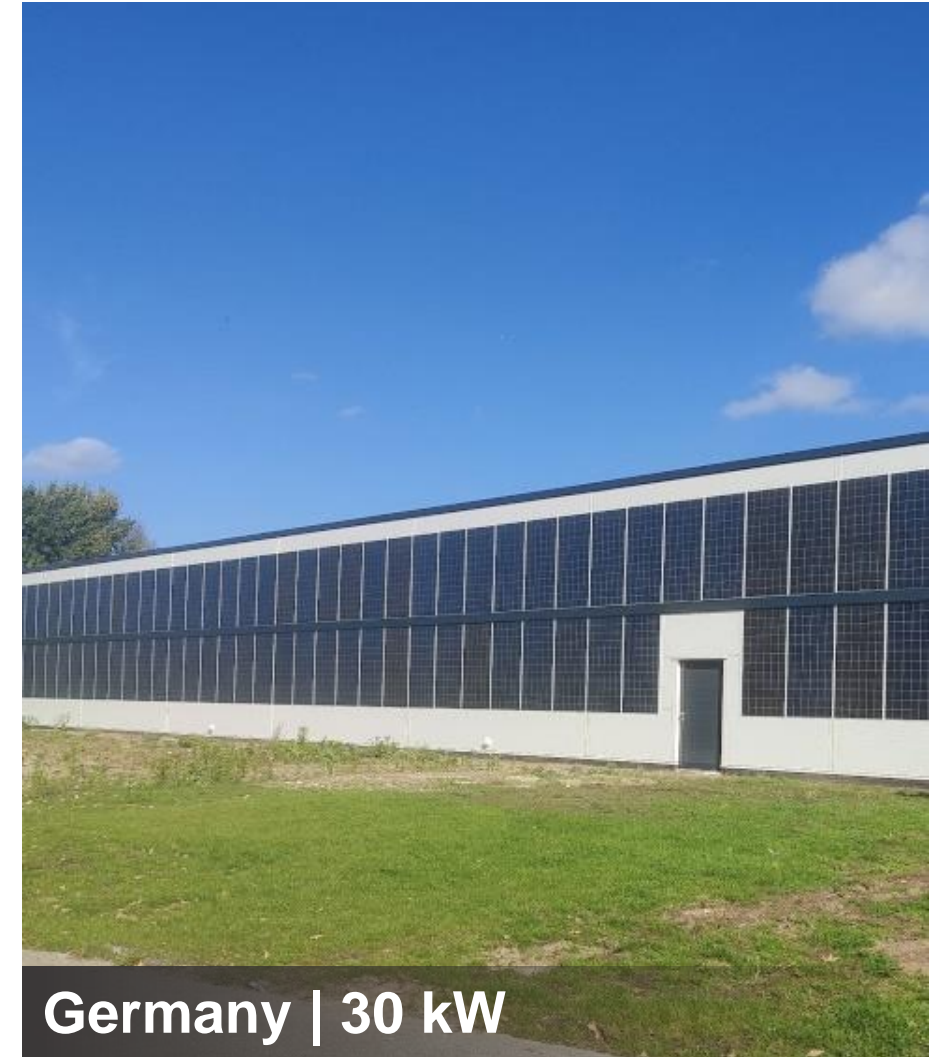
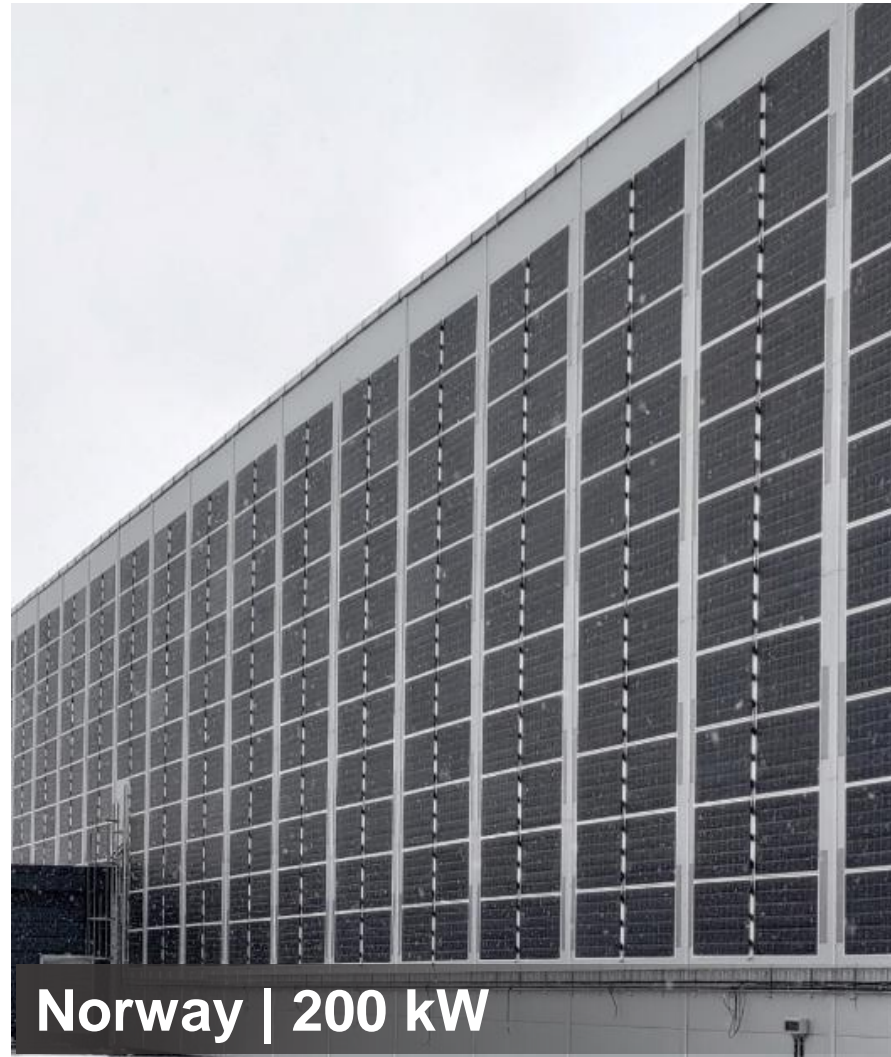
### EV Charging Infrastructure and PV Carports





# Other Applications

## Facades





# Other Applications

## Vehicle Integrated Photovoltaics





# How to install “PV Everywhere?”

40% of the built environment in C&I cannot install glass panels due to structural limitations. Lightweight solar offers an opportunity to target new applications in a homogenous market.

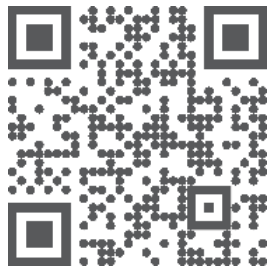
Lightweight solar modules can be differentiated product in your portfolio to expand your business....



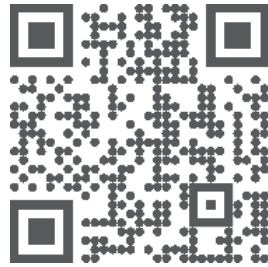
# Thank You



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