



屋根材一体型ソーラーパネル



メーカー情報

本社所在地	台北市
工場所在地	桃園市
設立	2011年
資本金	US\$1.5Million(約2億円)

● 沿革

- 2000年 台湾最初のモジュール生産ラインを設置しました。
多数のメーカーの生産ライン設置に手を貸していて、約20MWの販売実績がありました。
- 2011年 正式的に会社設立。建材一体型ソーラーパネルの研究開発を始めました。
- 2015年 UL1703 & IEC61215/61730の認証を取得しました。
- 2019年 台湾の**金属屋根材**の会社とコラボして、台湾市場向けで建材一体型の販売を始めました。
- 2020年 2016バージョンのIEC61215/61730の証明書を取得しました。
- 2023年 アメリカで工場を設立することが決定しました。

● 出展経歴

2018.09 Intersolar, **North America**

2019.05 Intersolar, **Europe**

2019.10 EDIFICA (International Construction Fair Chile), SANTIAGO, **CHILE**

2019.09 SOLAR POWER INTERNATIONAL, Salt Lake City, **USA**

2020.02 Roofing Expo 2020, Dallas, **USA**

2022.10 METALCON **INDIANA**

● 販売先

台湾はもちろん、マレーシア、アメリカ、フランス、ドイツ、コロンビアなど。



2020: 2MW
2021: 10MW
2022: 3MW

屋根材一体型ソーラーパネルの特徴:

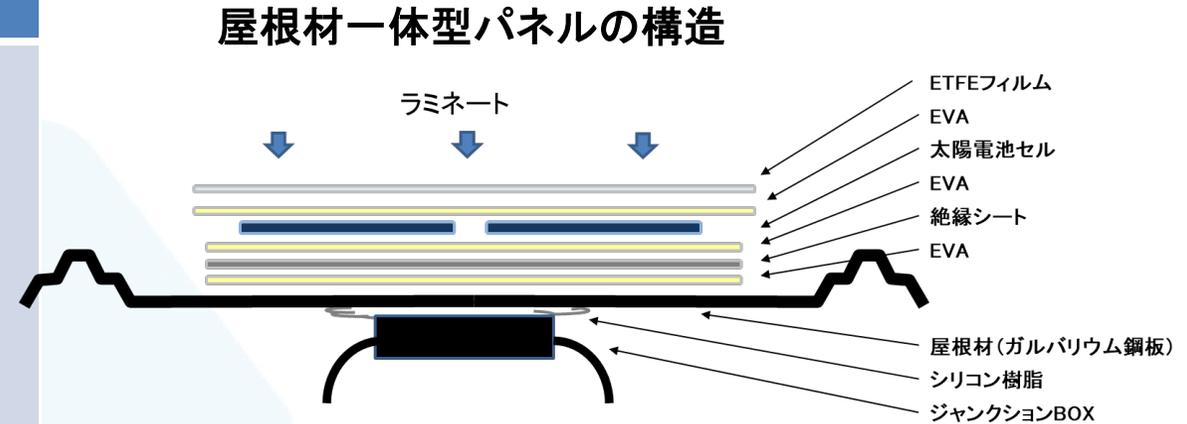
- 単結晶セル(台湾製)を使った太陽光モジュールです
- 表面は高機能フッ素樹脂ETFEフィルムを使用しています
- 現行の太陽光発電システムとも兼用できます
- 材料(架台)費 & 人件費(施工時間2/3短縮)削減
- 軽量なので重量に厳しい屋根にも設置可能
- 屋根材はガルバリウム鋼板(0.75mm)を標準使用(変更可)
- 長期間にわたる安定した出力保証
10年間の90%出力、及び25年間の80%出力が保証
製品保証は10年です



耐荷重: 2400N(240KG/m²)

ガラスタイプと屋根材一体型の違い

	ガラスタイプ	屋根一体型
構造	①耐腐食フレーム ②強化ガラス ③EVA ④セル ⑤EVA ⑥バックシート	①ETFEフィルム ②EVA ③セル ④EVA ⑤絶縁シート ⑥EVA ⑦屋根材
サイズ	400W: 1722x1134mm	300W: 2150x870mm
重量	約21KG/枚	約15.5KG/枚
厚さ	3.5~4.0cm	1.5cm
カバー	強化ガラス	高機能フッ素樹脂フィルム(ETFE)
設置期間	通常3週間程度	従来型より2/3短縮
その他	専用架台が必要です。	屋根材としてそのまま使えます。



表面

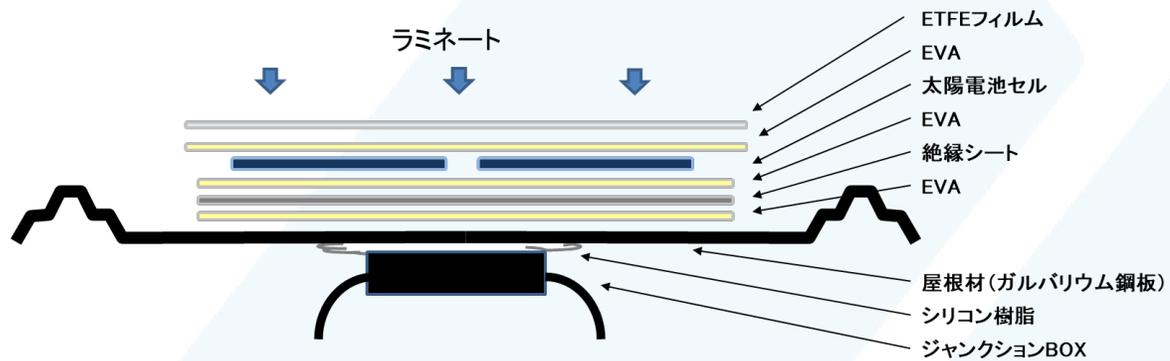


裏面

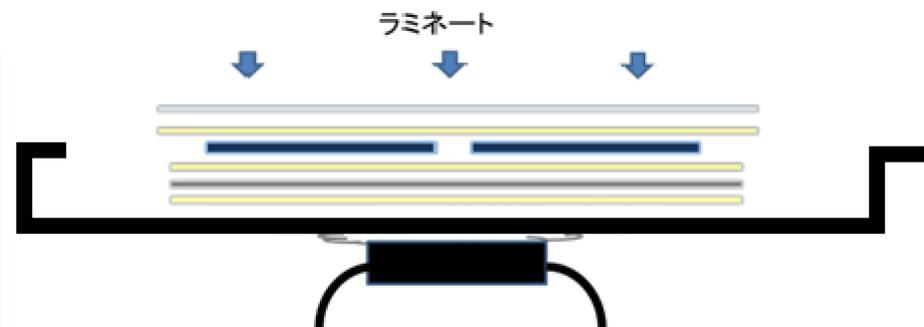


屋根材一体型の種類

アメリカ・台湾 形状



ヨーロッパ 形状

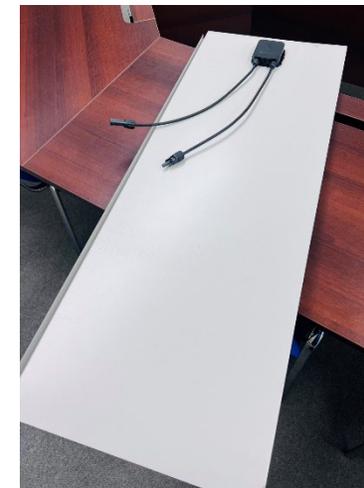


表面

裏面

表面

裏面



屋根材一体型ソーラーパネルの優位性

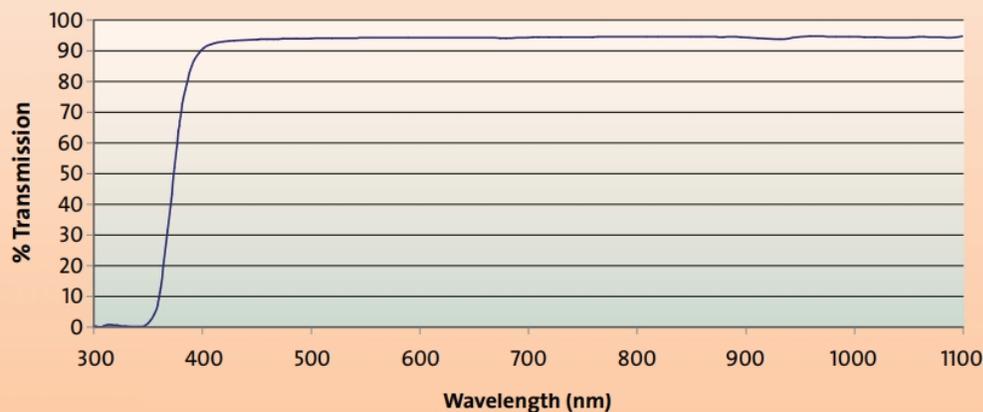
● 太陽光透過率(カバー材)

建材一体型ソーラーパネル: ETFEフィルムを使い、透過率は96%以上です。

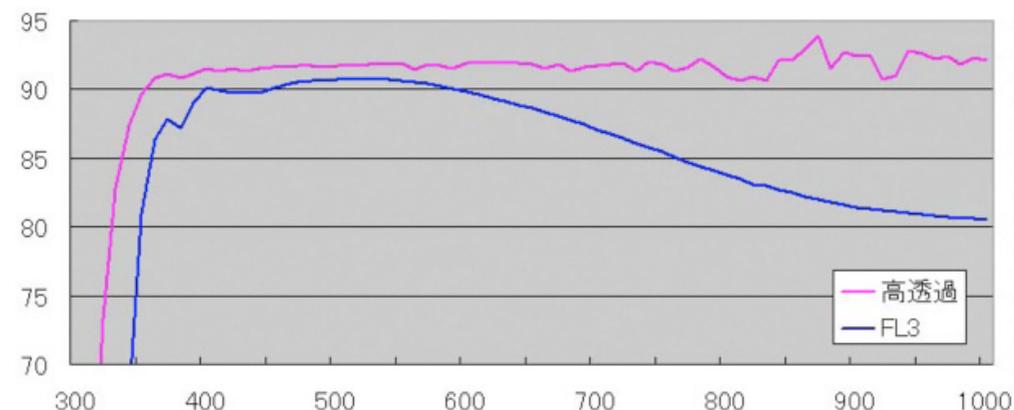
ガラスタイプソーラーパネル: 高透過ガラスを使っても、透過率は95%以下です。

Frontsheet	Light Transmission ASTM E424	Tensile Strength ASTM D882	Elongation ASTM D882
LightSwitch™ Frontsheet ETFE	> 96%	7000 psi (48 MPa)	300%
LightSwitch™ Frontsheet FEP	> 97%	3500 psi (24 Mpa)	300%

LightSwitch™ Encapsulant EVA Light Transmission at 0.660mm Thickness



■ 高透過ガラス



ガラスに含まれる鉄分を排除することにより、透過率を低下させる要因となる建築ガラス特有の色味を除去。太陽光の利用効率を高めます。

AP-PVROOFシリーズ紹介(屋根材一体型)

電気的特性・温度特性

モジュールタイプ	AP-PVROOF-319	AP-PVROOF-315	AP-PVROOF-522
公称最大出力Pmax(W)	150	225	300
公称最大出力動作電圧Vmp(V)	13.9	20.85	27.8
公称最大出力動作電流Imp(A)	10.79	10.79	10.79
公称開放電圧Voc(V)	16.1	24.1	32.8
公称短絡電流Isc(A)	11.33	11.33	11.33
セル枚数	24	36	48
セル変換効率(%)	22.7	22.7	22.7
最大システム電圧(V)	600	600	600
最大直列ヒューズ定格(A)	12	12	12
出力許容差	+3%	+3%	+3%

機械的特性

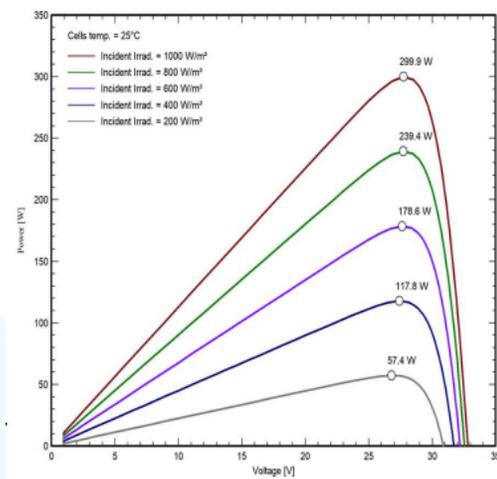
外形寸法(mm)	1200x870x20	1700x870x20	2150x870x20
質量	7	10	15.5
梱包構成	50	50	50
20fitコンテナ	500	500	500

絶対最大定格

パラメーター	定格
使用温度(°C)	-40~+90
防火レベル	C
スチール耐荷重(Lb/ft ²)	33

標準試験条件(STC): AM1.5, 25°C, 1000w/m²

温度係数(Pmax)	-0.4359%/°C
温度係数(Voc)	-0.362%/°C
温度係数(Isc)	0.0686%/°C
公称動作セル温度(NOCT)	43.6+/-1°C



AP-PVROOFシリーズ紹介(屋根材一体型)

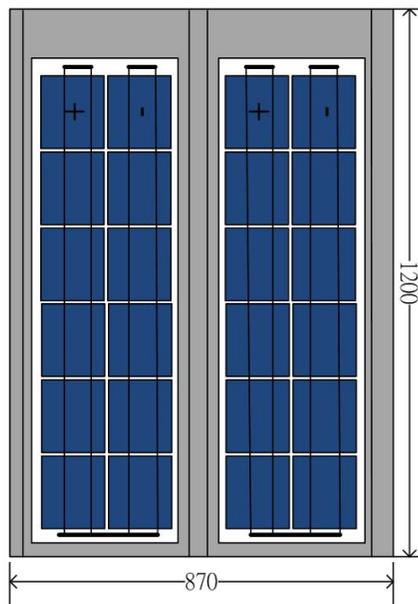


寸法差異(例:300w)

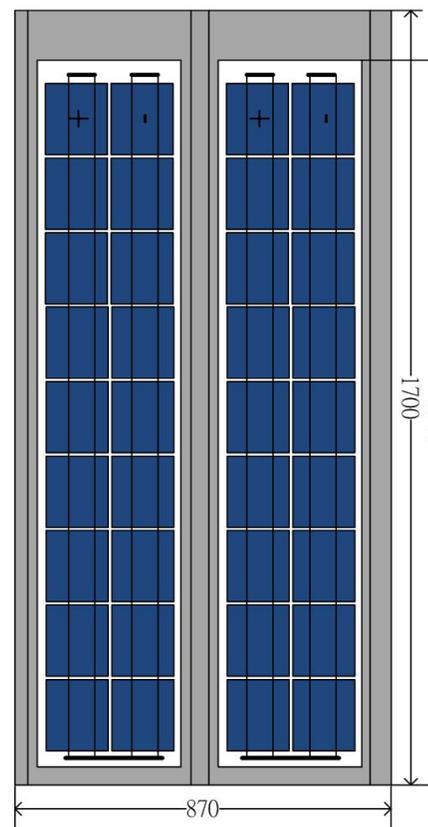
製品寸法:長さ2,200x幅870

設置寸法:長さ2,060x幅810

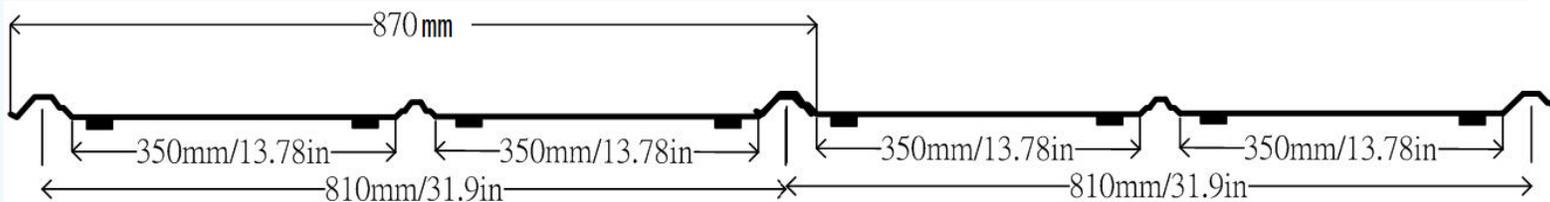
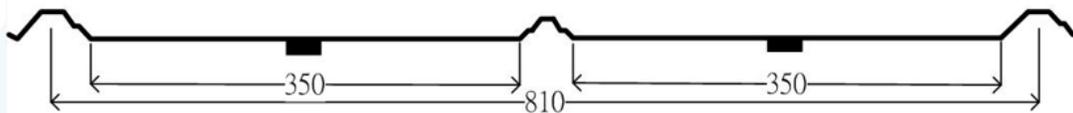
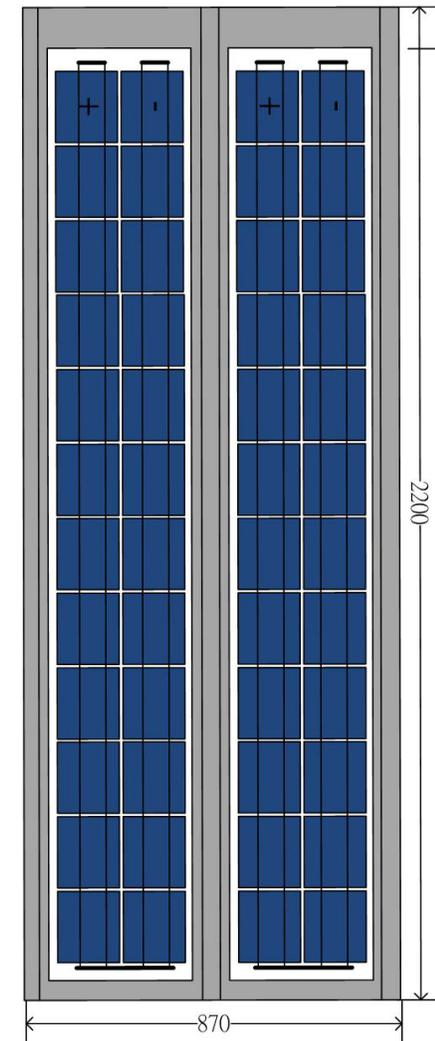
AP-PVROOF-319
150w



AP-PVROOF-315
225w



AP-PVROOF-522
300w



- 屋根材一体型太陽光モジュール(BIPV) Steel Roof PV



- 屋根材一体型太陽光モジュール(BIPV) Steel Roof PV



- 屋根材一体型太陽光モジュール(BIPV) Steel Roof PV



- 屋根材一体型太陽光モジュール(BIPV) Steel Roof PV

■ Solar Roof, North CA



- 屋根材一体型太陽光モジュール(BIPV) Steel Roof PV
■ Solar Cabin, North CA



- 屋根材一体型太陽光モジュール(BIPV) Steel Roof PV



- 地面型発電設置事例



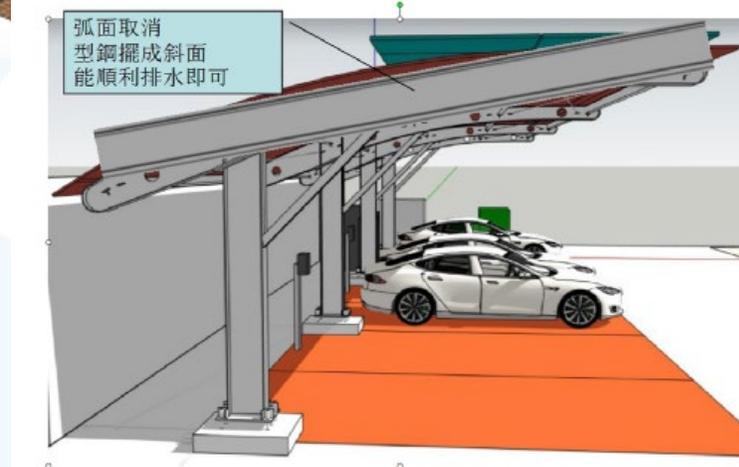
● カーポート



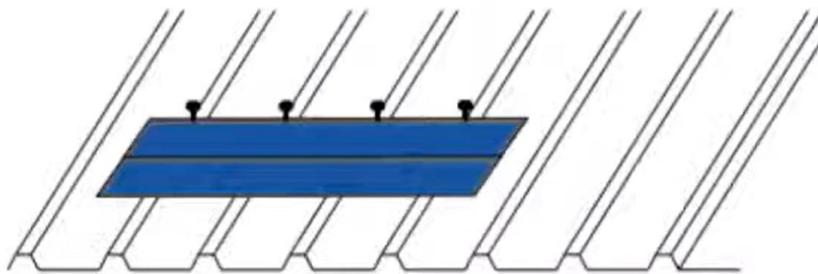
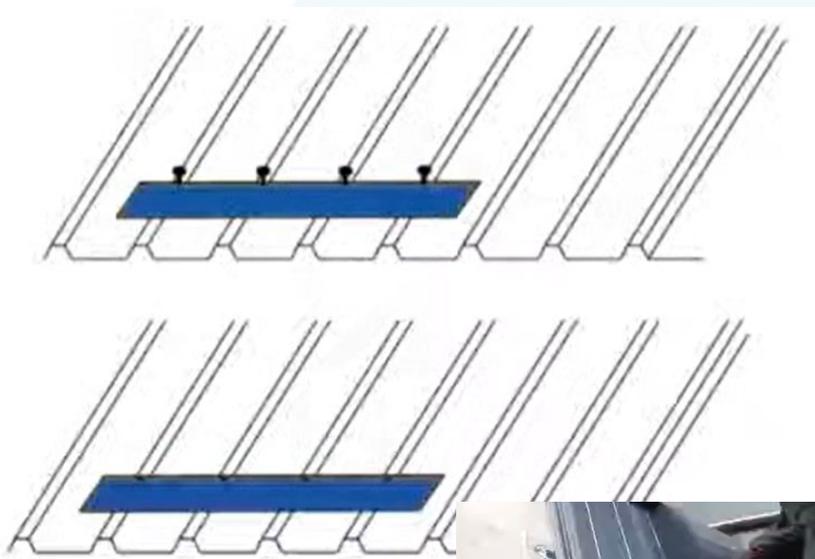
多結晶ソーラーパネル
220w x 30set = 6.6kw

他の台湾事例: 4台置きカーポート
単結晶ソーラーパネル
300w x 36set = 10.8kw

● EV充電ステーション(提案)



- Step 1. 建材一体型パネルを設置して、電気ドリルでネジを締めます。
- Step 2. 続けて2枚目の建材一体型パネルを設置して、Step 1を繰り返します。



施工方法②

- Step 3. MC4ケーブルを接続すれば完成です。



- 火災が発生しても、周囲に影響は与えません。



Produkte
Products



Prüfbericht-Nr.: 60375176 001
Test Report No.: Seite 92 von 116
Page 92 of 116

Absatz	Photovoltaic (PV) modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

12.35 Fire test – MST 23 (acc. to UL ANSI/UL 790)

12.35.1 Spread of flame test

Test date (DD/MM/YYYY)	23/03/2020
Sample no.	S1910-039-17; S1910-039-18; S1910-039-19, S1910-039-24; S1910-039-25; S1910-039-26
Fire class test specification	C

Test results

Did any portion of the module blow off or fall off the test deck in the form of flaming / glowing brands?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	P
Did any portion of the roof desk fall away in the form of glowing particles?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Was the flame spread beyond 1.82m for Class A, 2.40m for Class B or 3.96m for Class C?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Was there a significant lateral spread-of-flame from the path directly exposed to the test flame?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	

Supplementary information:
Short module edges were mounted end-to-end.

12.35.2 Burning brand test

Test date (DD/MM/YYYY)	23/03/2020
Sample no.	S1910-039-24; S1910-039-25; S1910-039-26
Fire class test specification	C

Test results

Did any portion of the module blow off or fall off the test deck in the form of flaming / glowing brands?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	P
Did any portion of the roof desk fall away in the form of glowing particles?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Did the brand burn a hole through the roof covering or through any part of the module?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Did any sustained flaming of the module occur?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	

Supplementary information:

Produkte
Products



Prüfbericht-Nr.: 60375176 001
Test Report No.: Seite 93 von 116
Page 93 of 116

Absatz	Photovoltaic (PV) modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

12.35.3 Fire type classification result

Module type	AP-PVROOF-520
Thickness of front cover (superstrate) [mm]	ETFE-E2: 0.05
Thickness of back cover (substrate) [mm]	50µm Polyurethane Pre-painted Steel Sheet: 0.9
Material of back cover (substrate)	Steel
Pre-lamination thickness of encapsulant (front cover / cell) [µm]	F406PS: 0.45±0.05mm
Pre-lamination thickness of encapsulant (cell / back cover) [µm]	F406PS: 0.45±0.05mm
Frame material	N/A
Best passed class of Spread of flame test	C
Best passed class of Burning brand test	C
Fire type classification	C

Supplementary information:

TUV認証要点

試験項目	試験数値/ 合格	備考
屋外暴露試験	P	総照射量>60
湿潤漏れ電流試験	P	絶縁抵抗測定: 500VDC 液体の抵抗値: $\leq 3500[\Omega / \text{cm}]$ 液体の温度: $22 \pm 2^\circ\text{C}$
紫外線前処理試験	P	
温度サイクル試験	P	50cycles、200cycles
湿度凍結試験	P	
湿熱試験	P	1,000時間
静的機械荷重試験	P	2400Pa
降雹の耐性試験	P	直径25mm 重量 $7.53 \pm 2\%$ 速度 $23 \pm 5\%$

Zertifikat

Zertifikat Nr. Certificate No.
PV 50470884

Certificate

Blatt Sheet
0001



TÜVRheinland®

Ihr Zeichen Client Reference	Unser Zeichen Our Reference	Ausstellungsdatum Date of Issue
238008997	ZTW2-LeeT-60375176 001	12.06.2020 <i>(day/month)</i>

Genehmigungsinhaber License Holder
Aplus Energy Co., Ltd.
2F. No. 54-5, Bainian Rd.
Longtan, Taoyuan 325
Taiwan, R.O.C.

Fertigungsstätte Manufacturing Plant
Refer to latest revision
of the annex list of factories

Prüfzeichen Test Mark



Geprüft nach Tested acc. to

IEC 61215-1:2016
IEC 61215-1-1:2016
IEC 61215-2:2016
IEC 61730-1:2016
IEC 61730-2:2016
EN 61215-1:2016
EN 61215-2:2017
EN 61215-1-1:2016
EN IEC 61730-1:2018
EN IEC 61730-2:2018

Zertifiziertes Produkt (Geräteidentifikation)
Certified Product (Product Identification)

PV Module

Type Designation:
AP-PVRODF-312 (12 cells)
AP-PVRODF-520 (24 cells)
Remarks:
Class II acc. to IEC 61140
Max. System Voltage: up to 300 VDC (Voc at STC)
Fire Rating: Class C (ANSI/UL 790)
Pollution Degree: 2
Safety Factors: 1.5
Design Load (Refer to test report for details of corresponding material and installation method.):
1600 Pa (downward) / 1600 Pa (upward)
Conditions:
The product test is voluntarily according to technical regulations. Any change of the design, materials, components or processing may require the repetition of some of the qualification tests in order to retain type approval.
Validity: 5 years counting from date of issue.

Lizenzentgelte - Einheit
License Fee - Unit

5

Das Zertifikat liegt unsere Prüf- und Zertifizierungsordnung zugrunde.
Das Produkt entspricht den z.g. Anforderungen, die Herstellung wird überwacht.
This certificate is based on our Testing and Certification Regulation. The product fulfills above mentioned requirements, the production is subject to surveillance.



Zertifizierungsstelle



Dipl.-Ing. Th. Illing

TÜV Rheinland LGA Products GmbH, Tillystraße 2, 90431 Nürnberg
Tel.: +49 221 920-1371 e-mail: cert-wildly@tuev.com
Fax: +49 221 800-3935 http://www.tuev.com/en



Zertifizierungsstelle



Dipl.-Ing. Th. Illing

Zertifikat

Zertifikat Nr. Certificate No.
PV 50470884

Certificate

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0002



TÜVRheinland®

Ihr Zeichen Client Reference	Unser Zeichen Our Reference	Ausstellungsdatum Date of Issue
238039834	ZTW2-BSL-60375176 002	16.07.2020 <i>(day/month)</i>

Genehmigungsinhaber License Holder
Aplus Energy Co., Ltd.
2F. No. 54-5, Bainian Rd.
Longtan, Taoyuan 325
Taiwan, R.O.C.

Fertigungsstätte Manufacturing Plant
Refer to latest revision
of the annex list of factories

Prüfzeichen Test Mark



Geprüft nach Tested acc. to

IEC 61215-1:2016
IEC 61215-1-1:2016
IEC 61215-2:2016
IEC 61730-1:2016
IEC 61730-2:2016
EN 61215-1:2016
EN 61215-2:2017
EN 61215-1-1:2016
EN IEC 61730-1:2018
EN IEC 61730-2:2018

Zertifiziertes Produkt (Geräteidentifikation)
Certified Product (Product Identification)

PV Module

An Page 01
Addition

Type Designation:
AP-PVRODF-315 (12 cells)
AP-PVRODF-522 (24 cells)
Remarks:
CLASS II acc. to IEC 61140
Max. System Voltage: up to 300 VDC (Voc at STC)

Conditions:
The product test is voluntarily according to technical regulations. Any change of the design, materials, components or processing may require the repetition of some of the qualification tests in order to retain type approval.
Validity: 5 years counting from date of issue of page 1.

Lizenzentgelte - Einheit
License Fee - Unit

2

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Zertifikat

Zertifikat Nr. Certificate No.
PV 50470884

Certificate

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0001



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Fertigungsstätte Manufacturing Plant
Refer to latest revision
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Prüfzeichen Test Mark



Geprüft nach Tested acc. to

IEC 61215-1:2016
IEC 61215-1-1:2016
IEC 61215-2:2016
IEC 61730-1:2016
IEC 61730-2:2016
EN 61215-1:2016
EN 61215-2:2017
EN 61215-1-1:2016
EN IEC 61730-1:2018
EN IEC 61730-2:2018

Zertifiziertes Produkt (Geräteidentifikation)
Certified Product (Product Identification)

PV Module

Type Designation:
AP-PVRODF-312 (12 cells)
AP-PVRODF-520 (24 cells)
Remarks:
Class II acc. to IEC 61140
Max. System Voltage: up to 300 VDC (Voc at STC)
Fire Rating: Class C (ANSI/UL 790)
Pollution Degree: 2
Safety Factors: 1.5
Design Load (Refer to test report for details of corresponding material and installation method.):
1600 Pa (downward) / 1600 Pa (upward)
Conditions:
The product test is voluntarily according to technical regulations. Any change of the design, materials, components or processing may require the repetition of some of the qualification tests in order to retain type approval.
Validity: 5 years counting from date of issue.

Lizenzentgelte - Einheit
License Fee - Unit

5

Das Zertifikat liegt unsere Prüf- und Zertifizierungsordnung zugrunde.
Das Produkt entspricht den z.g. Anforderungen, die Herstellung wird überwacht.
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Zertifizierungsstelle



Dipl.-Ing. Th. Illing

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Tel.: +49 221 920-1371 e-mail: cert-wildly@tuev.com
Fax: +49 221 800-3935 http://www.tuev.com/en



Zertifizierungsstelle



Dipl.-Ing. Th. Illing

Zertifikat

Zertifikat Nr. Certificate No.
PV 50470884

Blatt Sheet
0002

Ihr Zeichen Client Reference
238039834

Genehmigungsinhaber License Holder
Aplus Energy Co., Ltd.
2F. No. 54-5, Bainian Rd.
Longtan, Taoyuan 325
Taiwan, R.O.C.

Prüfzeichen Test Mark


Zertifiziertes Produkt (Geräteidentifikation)
Certified Product (Product Identification)
PV Module
As Page 01
Addition
Type Designation:
AP-PVROOF-31X (32 cells)
AP-PVROOF-522 (24 cells)
Remarks:
Class II acc. to IEC 61340
Max. System Voltage: up to 300 VDC (Voc at STC)
Conditions:
The product test is voluntarily according to technical regulations. Any change of the design, materials, components or processing may require the repetition of some of the qualification tests in order to retain type approval.
Validity: 5 years counting from date of issue of page 1.

Das Zertifikat liegt unsere Prüf- und Zertifizierungsanweisung zugrunde. Das Produkt entspricht den u.g. Anforderungen, die Herstellung wird überwacht. This certificate is based on our Testing and Certification Regulation. The product fulfills above-mentioned requirements, the production is subject to surveillance.

TÜV Rheinland LGA Products GmbH, Tillystraße 2, 90431 Nürnberg
Tel.: +49 (0) 91 394-1373 e-mail: cert-wa@tuev.com
Fax: +49 (0) 91 394-3035 http://www.tuev.com/safety

Certificate



US 82140019 01

Test report no.: USA-31340016 001
Tested to: UL 1703:2002 R5.12

Client Reference: Louisa Huang

Certified Product: Flat-Plate Photovoltaic Modules
License Fee - Units
7

Model Designation:
AP-PVROOF-52X (X=0-9),
AP-PVROOF-31X (X=0-9)

Maximum System Voltage: 600 V DC
Fire Safety Class: C

Electrical ratings are provided at Standard Test Conditions (STC) 1000W/m2, AM1.5 spectrum, 25°C cell temperature.
Measured values at STC are within +/- 10% of ratings.

Appendix: 1, 1-5

Licensed Test mark:


Date of Issue (day/mo/yr)
22/09/2014

TÜV Rheinland PTL, LLC, 2210 South Riverwood Street, Tempe, Arizona 85282, Tel (888) 966-1700, Fax (772) 314-6628

Zertifikat

Zertifikat Nr. Certificate No.
PV 50470884

Blatt Sheet
0002

Ihr Zeichen Client Reference
238039834

Genehmigungsinhaber License Holder
Aplus Energy Co., Ltd.
2F. No. 54-5, Bainian Rd.
Longtan, Taoyuan 325
Taiwan, R.O.C.

Prüfzeichen Test Mark


Zertifiziertes Produkt (Geräteidentifikation)
Certified Product (Product Identification)
PV Module
As Page 01
Addition
Type Designation:
AP-PVROOF-31X (32 cells)
AP-PVROOF-522 (24 cells)
Remarks:
Class II acc. to IEC 61340
Max. System Voltage: up to 300 VDC (Voc at STC)
Conditions:
The product test is voluntarily according to technical regulations. Any change of the design, materials, components or processing may require the repetition of some of the qualification tests in order to retain type approval.
Validity: 5 years counting from date of issue of page 1.

Das Zertifikat liegt unsere Prüf- und Zertifizierungsanweisung zugrunde. Das Produkt entspricht den u.g. Anforderungen, die Herstellung wird überwacht. This certificate is based on our Testing and Certification Regulation. The product fulfills above-mentioned requirements, the production is subject to surveillance.

TÜV Rheinland LGA Products GmbH, Tillystraße 2, 90431 Nürnberg
Tel.: +49 (0) 91 394-1373 e-mail: cert-wa@tuev.com
Fax: +49 (0) 91 394-3035 http://www.tuev.com/safety

Certificate



US 82140019 01

Test report no.: USA-31340016 001
Tested to: UL 1703:2002 R5.12

Client Reference: Louisa Huang

Certified Product: Flat-Plate Photovoltaic Modules
License Fee - Units
7

Model Designation:
AP-PVROOF-52X (X=0-9),
AP-PVROOF-31X (X=0-9)

Maximum System Voltage: 600 V DC
Fire Safety Class: C

Electrical ratings are provided at Standard Test Conditions (STC) 1000W/m2, AM1.5 spectrum, 25°C cell temperature.
Measured values at STC are within +/- 10% of ratings.

Appendix: 1, 1-5

Licensed Test mark:


Date of Issue (day/mo/yr)
22/09/2014

TÜV Rheinland PTL, LLC, 2210 South Riverwood Street, Tempe, Arizona 85282, Tel (888) 966-1700, Fax (772) 314-6628

Thanks For Your Time

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