

Gamcorp (Melbourne) Pty Ltd A.C.N 141 076 904 A.B.N 73 015 060 240
www.gamcorp.com.au Email: melbourne@gamcorp.com.au
Suite 4, 346 Ferntree Gully Rd, Notting Hill VIC 3149. Tel: 03 9543 2211 Fax: 03 9543 4046

Our Ref: 5879-C/AA

3 September 2019

Allstar Solutions Pty Ltd
Zhiqian Town Jintan
Changzhou Jiangsu
China

PV Array Frame Engineering Certification

Installation of Roof Mount Flush Array Frame System

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian Building Regulations, have carried out a structural design check of Tile Roof Mount Flush Array Frame System installation within Australia. The design check has been based on the drawings of the system and test report provided by Allstar Solutions Pty Ltd.

Components of the system covered in this certificate shown in the table below:

Component	Part No
Rail	03-ASL01
Rail Splicer	03-ASL16
Tile Hook Kit	03-ASL17

This certificate is only valid for the Tile roof, Allstar Flush Solar Roof Mounted system. The roof structure or the building structure shall be assessed separately and accordingly.

This certificate is only valid when fixing JD4 seasoned timber. If the fixing condition is different from this conditions, interface spacing shall be reviewed and validated.

This certificate is only valid when the roof zone definition falls into D6 of AS1170.2-2011(R2016).

This certificate is only valid as a whole. Any information extracted from this certificate is not valid if standing alone.

We find the Installation of Allstar Tile Roof Mount Flush Array Frame System for Australian use to be structurally sufficient based on the following conditions:

- Wind loads to AS/NZS1170.2:2011 (R2016)
- Wind region A, B, C, D
- Wind terrain category 2 & 3
- Wind average recurrence interval of 200 years
- Maximum building height 20m

Gamcorp (Melbourne) Pty Ltd A.C.N 141 076 904 A.B.N 73 015 060 240
www.gamcorp.com.au Email: melbourne@gamcorp.com.au
Suite 4, 346 Ferntree Gully Rd, Notting Hill VIC 3149. Tel: 03 9543 2211 Fax: 03 9543 4046

- The PV panel dimensions to be 1700mm x 1100mm or 2100mm x 1100mm
- Maximum weight of the PV panel and array frame to be 15 kg/m²
- Material of array frame members to be AL/6005-T5 UNO, Tile hook to be SUS304
- Each PV panel to be installed using 2 rails minimum in all circumstances
- Installation of PV array to be done in accordance with the PV installation manual
- The certification **excludes** assessment of roof structure and PV panels

Refer to attached summary table for interface spacing (Unit: mm)

NOTES:

- **The recommended spacing nominated in this certification is based on the capacity of the array frame and the array frame fixing to the roof, not the roof structure and PV panel. It is the responsibility of the installer to adopt the most critical spacing.**
- **If any of the above conditions cannot be met, the structural engineer must be notified immediately.**
- **The capacity of rail splicer was obtained from test report no. WX181106-008-03 dated 23/11/2018 provided by Allstar Solutions Pty Ltd.**
- **The capacity of Tile hook was obtained from test reports no. WX181106-008-02 dated 23/11/2018 & no. WX190424-010-02 dated 10/05/2019 provided by Allstar Solutions Pty Ltd.**

Construction is to be carried out strictly in accordance with the manufacturers instructions. This work was designed by **Ali Askari** in accordance with the provisions of Australian Building Regulations and in accordance with sound, widely accepted engineering principles.

This certification is applicable for Allstar Tile Roof Mount Flush System with components as specified in this letter and is only valid till 03/09/2021. Gamcorp should be contacted for future validation. Contact Gamcorp for customised system or if the site conditions are not covered by this assessment.

Yours faithfully,
Gamcorp (Melbourne) Pty Ltd



Jianzeng Geng
Principal Engineer
FIEAust CPEng NER 3108316
NT Registration: 239858ES
QLD Registration: 18455
VIC Registration: EC 39483
TAS Registration: CC7263



gamcorp

Relationships built on trust

Gamcorp (Melbourne) Pty Ltd
Consulting Structural & Civil Engineers
A.C.N 141 076 904
A.B.N 73 015 060 240

www.gamcorp.com.au
melbourne@gamcorp.com.au

Structural Design Documentation

Flush Array Frame System Spacing Table According to AS/NZS 1170.2-2011 (R2016)

within Australia
Terrain Category 2 & 3

For: Allstar Solutions Pty Ltd
Zhiqian Town Jintan
Changzhou Jiangsu
China

Job Number: 5879
Date: 3 September 2019



COPYRIGHT: The concepts and information contained in this document are the property of Gamcorp (Melbourne) Pty Ltd. Use or copying of this document in whole or in part without the written permission of Gamcorp constitutes an infringement of copyright.

LIMITATION: This report has been prepared on behalf of and for the exclusive use of Gamcorp (Melbourne) Pty Ltd's Client, and is subject to and issued in connection with the provisions of the agreement between Gamcorp (Melbourne) Pty Ltd and its Client. Gamcorp (Melbourne) Pty Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.



gamcorp

Relationships built on trust

Suite 4, 346 Ferntree Gully Road
Notting Hill VIC 3168
Tel: 03 9543 2211
Fax: 03 9543 4046
melbourne@gamcorp.com.au
www.gamcorp.com.au

ISO 9001:2008 Registered Firm
Certificate No: AU1222

Job No: 5879

Client: Allstar Solutions Pty Ltd

Project: Flush Array Frame System Spacing Table

Address: within Australia

Australian Standards

AS/NZS 1170.0:2002 – Structural design actions, Part 0: General principles

AS/NZS 1170.1:2002 (R2016) – Structural design actions, Part 1: Permanent, imposed
and other actions

AS/NZS 1170.2:2011 (R2016) – Structural design actions, Part 2: Wind actions

AS/NZS 1252:2016 – High-strength steel fastener assemblies for structural engineering

AS/NZS 1664.1:1997 – Aluminium structures - Limit state design

AS 4100:1998 (R2016) – Steel Structures

AS/NZS 4600:2018 – Cold-Formed Steel Structures

Wind Terrain Category:

WTC 2 & 3

Designed: AA

Checked: HS

Date: Sep-19

Relationships built on trust
 Client: **Allstar Solutions Pty Ltd**
 Project: **Solar Array Interface Spacing Table**
 Address: **within Australia**
 Designed: **AA**

Job: **5879**
 Date: **Sep-19**

Checked: **HS**

Flush Array Frame System Spacing Table for Tile Roof (mm)

Type of Rail: 03-ASL01
 Type of Interface: Roof Tile Hook
 Solar Panel Dimension: 1.7mx1.1m
 Terrain category: **2**

Roof Angle (Φ) – $\Phi < 5^\circ$

Wind Region	Building Height – H (m)							
	H≤5		5<H≤10		10<H≤15		15<H≤20	
	End	Central	End	Central	End	Central	End	Central
A	870	1115	690	875	620	775	575	730
B	765	975	615	770	545	680	515	645
C	495	620	405	500	360	450	--	420
D	--	475	--	--	--	--	--	--

Roof Angle (Φ) – $5^\circ \leq \Phi \leq 30^\circ$

Wind Region	Building Height – H (m)							
	H≤5		5<H≤10		10<H≤15		15<H≤20	
	End	Central	End	Central	End	Central	End	Central
A	870	1340	690	1070	620	940	575	875
B	765	1185	615	930	545	820	515	770
C	495	745	405	595	360	530	--	500
D	--	560	--	455	--	410	--	--

General Notes

- Note 1 Spacing calculated based on 35mm screw embedment length into timber.
- Note 2 Recommended screws
- | Timber Purlins/Battens | Fasteners to use |
|--|-----------------------|
| Softwood / Hardwood (35mm embedment and above) | 14g-10 TPI T17 screws |
- Note 3 "--" states NOT SUITABLE FOR INSTALLATION.
- Note 4 Maximum uplift wind pressure is limited to 5 kPa.
- Note 5 Deflection is limited to Minimum of L/120 and 15mm
- Note 6 Refer Figure D9 of AS/NZS 1170.2:2011 (R2016) for definition of (End/Central) roof zones.
- Note 7 Terrain Category 2 (TC2) refers to open terrain, including grassland, with well-scattered obstructions having heights generally from 1.5 m to 5 m, with no more than two obstructions per hectare, e.g. farmland and cleared subdivisions with isolated trees and uncut grass.

Relationships built on trust
 Client: **Allstar Solutions Pty Ltd**
 Project: **Solar Array Interface Spacing Table**
 Address: **within Australia**
 Designed: **AA**

Job: **5879**
 Date: **Sep-19**

Checked: **HS**

Flush Array Frame System Spacing Table for Tile Roof (mm)

Type of Rail: 03-ASL01
 Type of Interface: Roof Tile Hook
 Solar Panel Dimension: 1.7mx1.1m
 Terrain category: **3**

Roof Angle (Φ) – $\Phi < 5^\circ$

Wind Region	Building Height – H (m)							
	H≤5		5<H≤10		10<H≤15		15<H≤20	
	End	Central	End	Central	End	Central	End	Central
A	1105	1395	1105	1395	920	1180	800	1020
B	960	1225	960	1225	805	1030	705	895
C	615	770	615	770	525	655	465	570
D	465	575	465	575	--	495	--	440

Roof Angle (Φ) – $5^\circ \leq \Phi \leq 30^\circ$

Wind Region	Building Height – H (m)							
	H≤5		5<H≤10		10<H≤15		15<H≤20	
	End	Central	End	Central	End	Central	End	Central
A	1105	1690	1105	1690	920	1420	800	1240
B	960	1475	960	1475	805	1250	705	1090
C	615	930	615	930	525	785	465	685
D	465	690	465	690	--	585	--	520

General Notes

- Note 1 Spacing calculated based on 35mm screw embedment length into timber.
- Note 2 Recommended screws
- | Timber Purlins/Battens | Fasteners to use |
|--|-----------------------|
| Softwood / Hardwood (35mm embedment and above) | 14g-10 TPI T17 screws |
- Note 3 "--" states NOT SUITABLE FOR INSTALLATION.
- Note 4 Maximum uplift wind pressure is limited to 5 kPa.
- Note 5 Deflection is limited to Minimum of L/120 and 15mm
- Note 6 Refer Figure D9 of AS/NZS 1170.2:2011 (R2016) for definition of (End/Central) roof zones.
- Note 7 Terrain Category 3 (TC3) refers to terrain with numerous closely spaced obstructions having heights generally from 3 m to 10 m. The minimum density of obstructions shall be at least the equivalent of 10 house-size obstructions per hectare, e.g. suburban housing, light industrial estates or dense forests.

Relationships built on trust
 Client: **Allstar Solutions Pty Ltd**
 Project: **Solar Array Interface Spacing Table**
 Address: **within Australia**
 Designed: **AA**

Job: **5879**
 Date: **Sep-19**

Checked: **HS**

Flush Array Frame System Spacing Table for Tile Roof (mm)

Type of Rail: 03-ASL01
 Type of Interface: Roof Tile Hook
 Solar Panel Dimension: 2.1mx1.1m
 Terrain category: **2**

Roof Angle (Φ) – $\Phi < 5^\circ$

Wind Region	Building Height – H (m)							
	H≤5		5<H≤10		10<H≤15		15<H≤20	
	End	Central	End	Central	End	Central	End	Central
A	690	885	555	695	495	620	465	580
B	615	775	495	620	440	545	415	515
C	400	495	--	405	--	360	--	--
D	--	385	--	--	--	--	--	--

Roof Angle (Φ) – $5^\circ \leq \Phi \leq 30^\circ$

Wind Region	Building Height – H (m)							
	H≤5		5<H≤10		10<H≤15		15<H≤20	
	End	Central	End	Central	End	Central	End	Central
A	690	1085	555	850	495	750	465	695
B	615	945	495	745	440	660	415	620
C	400	590	--	480	--	430	--	405
D	--	455	--	370	--	--	--	--

General Notes

- Note 1 Spacing calculated based on 35mm screw embedment length into timber.
- Note 2 Recommended screws
- | Timber Purlins/Battens | Fasteners to use |
|--|-----------------------|
| Softwood / Hardwood (35mm embedment and above) | 14g-10 TPI T17 screws |
- Note 3 "--" states NOT SUITABLE FOR INSTALLATION.
- Note 4 Maximum uplift wind pressure is limited to 5 kPa.
- Note 5 Deflection is limited to Minimum of L/120 and 15mm
- Note 6 Refer Figure D9 of AS/NZS 1170.2:2011 (R2016) for definition of (End/Central) roof zones.
- Note 7 Terrain Category 2 (TC2) refers to open terrain, including grassland, with well-scattered obstructions having heights generally from 1.5 m to 5 m, with no more than two obstructions per hectare, e.g. farmland and cleared subdivisions with isolated trees and uncut grass.

Relationships built on trust
 Client: **Allstar Solutions Pty Ltd**
 Project: **Solar Array Interface Spacing Table**
 Address: **within Australia**
 Designed: **AA**

Job: **5879**
 Date: **Sep-19**

Checked: **HS**

Flush Array Frame System Spacing Table for Tile Roof (mm)

Type of Rail: 03-ASL01
 Type of Interface: Roof Tile Hook
 Solar Panel Dimension: 2.1mx1.1m
 Terrain category: **3**

Roof Angle (Φ) – $\Phi < 5^\circ$

Wind Region	Building Height – H (m)							
	H≤5		5<H≤10		10<H≤15		15<H≤20	
	End	Central	End	Central	End	Central	End	Central
A	875	1130	875	1130	735	945	640	810
B	765	980	765	980	645	815	565	710
C	495	620	495	620	425	525	375	465
D	380	465	380	465	--	400	--	265

Roof Angle (Φ) – $5^\circ \leq \Phi \leq 30^\circ$

Wind Region	Building Height – H (m)							
	H≤5		5<H≤10		10<H≤15		15<H≤20	
	End	Central	End	Central	End	Central	End	Central
A	875	1370	875	1370	735	1150	640	995
B	765	1195	765	1195	645	1000	565	865
C	495	745	495	745	425	630	375	550
D	380	555	380	555	--	475	--	420

General Notes

- Note 1 Spacing calculated based on 35mm screw embedment length into timber.
- Note 2 Recommended screws
- | Timber Purlins/Battens | Fasteners to use |
|--|-----------------------|
| Softwood / Hardwood (35mm embedment and above) | 14g-10 TPI T17 screws |
- Note 3 "--" states NOT SUITABLE FOR INSTALLATION.
- Note 4 Maximum uplift wind pressure is limited to 5 kPa.
- Note 5 Deflection is limited to Minimum of L/120 and 15mm
- Note 6 Refer Figure D9 of AS/NZS 1170.2:2011 (R2016) for definition of (End/Central) roof zones.
- Note 7 Terrain Category 3 (TC3) refers to terrain with numerous closely spaced obstructions having heights generally from 3 m to 10 m. The minimum density of obstructions shall be at least the equivalent of 10 house-size obstructions per hectare, e.g. suburban housing, light industrial estates or dense forests.