

General Certification for Grace Solar Flush Mounted System on Tin and Tile Roof with GS-SR-L Rail

For: XIAMEN GRACE SOLAR TECHNOLOGY CO.LTD
(BYMEA Group) Building C/D, Vanke Yunxi
Huli Dist, Xiamen, Fujian Province
China

Job No.: 11277
Date: 06/06/2022

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Current Revision		0				

Approval			
Author Signature	<i>baincaliu</i>	Approver Signature	
Name	Bianca Liu	Name	L. Van Spaandonk
Title	Structural Engineer	Title	Principal Engineer

Our Ref: 11277-GS-SR-L/BL
06 June 2022

XIAMEN GRACE SOLAR TECHNOLOGY CO.LTD

(BYMEA Group) Building C/D, Vanke Yunxi
Huli Dist, Xiamen, Fujian Province
China

RE: General Certification for Grace Solar Flush Mounted System on Tin and Tile Roof with GS-SR-L Rail

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian Building Regulations, have carried out a structural design check of Tin and Tile Roof Mount Flush Array Frame System installation within Australia. The design check has been based on the information and test reports provided by XIAMEN GRACE SOLAR TECHNOLOGY Co. Ltd.

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

Component	Part No.
GS Rail	GS-SR-L
Tin Interface Kit 5#	GS-IK-LD05
Stainless Steel Hook 1#	GS-IK-01
Universal Panel Clamp Kit	GS-AC
Inter Clamp Kit	GS-IC-F40; GS-IC-F32.5; GS-IC-F37.5; GS-IC-F30;
End Clamp Kit	GS-EC-F35/40/46; GS-EC-A02; GS-EC-F30; GS-EC-F32;

This certificate is **only valid** for Grace Solar Flush Mounted System on the Tin & Tile roof with GS-SR-L rail. The roof structure or the building structure shall be assessed separately and accordingly.

This certificate is **only valid** when fixing into minimum 1.9mm thick steel purlin or JD4 seasoned timber. If the fixing condition is different from this conditions, interface spacing shall be reviewed and validated.

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 Flush Mounted System on Tin and Tile Roof for Australian use to be structurally sufficient based on the following conditions:

- Wind loads to **AS/NZS1170.2:2021**
- Wind region **A, B1, B2, C & D**
- Wind terrain category **2 & 3**
- Wind average recurrence interval of **200 years**
- Maximum building height **20m**
- The PV panel dimensions to be **1700mm x 1000mm, 2300mm x 1200mm**
- Maximum weight of the PV panel and array frame to be **15 kg/m²**
- Rails to be **GS-SR-L** rails
- Material of rails and other components to be **AL/6005-T5 UNO**
- The spacings are determined based on fixings into minimum JD4 seasoned timber and 1.9mm thick steel purlins
- Each PV panel to be installed using **2 rails** minimum in all circumstances

- No PV panel to be installed within 2xs from edges and ridge. "s" is the maximum gap between the underside of the panel and the roof surface when installed on the roof ($50\text{mm} \leq s \leq 300\text{mm}$)
- Installation of PV panels to be done in accordance with the PV panels 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 fixing of array frames to the roof, not the roof structure and PV panels. 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.**
- **Tile hook uplift capacity has been based on test report No. 291-050 dated 18 November 2013 by Building Research Establishment Ltd.**
- **The spacing shown in the interface tables shall be adjusted based on the assessment and requirement of the roof structures.**

Construction is to be carried out strictly in accordance with the manufacturer's instructions. This work was designed by **Bianca Liu** in accordance with the provisions of Australian Building Regulations and in accordance with sound, widely accepted engineering principles.

This certification is only valid till **06/06/2024**. Gamcorp should be contacted for future validation. Contact Gamcorp for a customised system or if the site conditions are not covered by this assessment.

Yours faithfully,
Gamcorp (Melbourne) Pty Ltd



L. Van Spaandonk

Principal Engineer
FIEAust CPEng NER 5038980
NT Registration: 244137ES
QLD Registration: 18703
VIC Registration: PE0001956
TAS Registration: CC7366

Attachments:

- Summary table for interface spacing - flush mount installation on tin roof with GS-SR-L rail
- Summary table for interface spacing - flush mount installation on tile roof with GS-SR-L rail



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Gamcorp (Melbourne) Pty Ltd
A.C.N 141 076 904 A.B.N 73 015 060 240
www.gamcorp.com.au solar@gamcorp.com.au
Tel: +61 3 9543 2211



Structural Design Documentation

Flush Array Frame System Spacing Table

According to AS/NZS 1170.2-2021

with GS-SR-L Rail – Tin Roof

PV Panel Sizes - 1.7mx1m, 2.3mx1.2m

within Australia

Terrain Category 2 & 3

For: XIAMEN GRACE SOLAR TECHNOLOGY CO. LTD.
(BYMEA Group) Building C/D, Vanke Yunxi
Huli Dist, Xiamen, Fujian Province
China

Job Number: 11277
Date: 2 June 2022



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A.C.N 141 076 904 A.B.N 73 015 060 240
www.gamcorp.com.au solar@gamcorp.com.au
Tel: +61 3 9543 2211



Job No: 11277
Client: XIAMEN GRACE SOLAR TECHNOLOGY CO. LTD.
Project: Flush Array Frame System Spacing Table
with GS-SR-L Rail – Tin Roof
Address: within Australia
Wind Terrain Category: Terrain Category 2 & 3

Australian/New Zealand 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 1170.2:2021	Structural design actions Part 2: Wind actions
AS/NZS 1664.1:1997 (R2020)	Aluminium structures Part 1: Limit state design
AS/NZS 4600:2018	Cold-formed steel structures
AS 4100:2020	Steel structures

Designed: BL
Checked: AA
Date: Jun-22

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Client: **XIAMEN GRACE SOLAR TECHNOLOGY CO. LTD.**
Project: **Flush Array Frame System Spacing Table with GS-SR-L Rail – Tin Roof**
Address: **within Australia**

Job: **11277**
Date: **Jun-22**
Designed: **BL**
Checked: **AA**

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

Type of Rail: GS-SR-L
Type of Interface: Tin Roof L Feet
Solar Panel Dimension: 1.7mx1m
Terrain category: 3

h/d ≤ 0.5 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	1265	1550	1740	2000	1265	1550	1740	2000	1090	1465	1640	1910	975	1405	1570	1840
B1	945	1455	1735	2000	945	1455	1735	2000	815	1250	1640	1905	730	1115	1520	1840
B2	765	1175	1600	1870	765	1175	1600	1870	660	1010	1375	1785	590	900	1225	1705
C	440	670	905	1405	440	670	905	1405	--	580	780	1210	--	515	695	1075
D	--	475	640	985	--	475	640	985	--	410	550	845	--	--	495	755

h/d ≥ 1.0 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	860	1320	1500	1765	860	1320	1500	1765	740	1135	1425	1670	665	1015	1365	1595
B1	640	980	1335	1760	640	980	1335	1760	555	845	1145	1665	--	755	1025	1585
B2	525	795	1080	1625	525	795	1080	1625	--	685	930	1430	--	615	830	1275
C	--	455	615	945	--	455	615	945	--	--	530	815	--	--	475	725
D	--	--	435	665	--	--	435	665	--	--	--	575	--	--	--	510

* For intermediate values of h/d ratios, linear interpolation shall be used. Refer Note 9 for definition h and d.

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Project: **Flush Array Frame System Spacing Table**
with GS-SR-L Rail – Tin Roof
Address: **within Australia**

Job: **11277**
Date: **Jun-22**
Designed: **BL**
Checked: **AA**

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

Type of Rail: GS-SR-L
Type of Interface: Tin Roof L Feet
Solar Panel Dimension: 1.7mx1m
Terrain category: 2

h/d ≤ 0.5 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	1045	1440	1610	1880	855	1315	1495	1760	770	1180	1440	1690	730	1115	1410	1650
B1	775	1190	1610	1880	640	975	1325	1760	575	880	1195	1690	545	830	1125	1650
B2	630	965	1310	1750	520	790	1070	1620	--	715	970	1495	--	675	910	1400
C	--	550	745	1150	--	455	610	940	--	410	550	845	--	--	520	795
D	--	--	525	805	--	--	435	660	--	--	--	595	--	--	--	565

h/d ≥ 1.0 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	710	1085	1400	1635	580	890	1205	1520	525	800	1085	1460	--	755	1025	1430
B1	530	810	1095	1635	--	665	900	1385	--	600	810	1245	--	565	765	1170
B2	--	655	885	1365	--	540	730	1115	--	--	660	1005	--	--	620	945
C	--	--	510	775	--	--	415	635	--	--	--	575	--	--	--	540
D	--	--	--	550	--	--	--	450	--	--	--	405	--	--	--	--

* For intermediate values of h/d ratios, linear interpolation shall be used. Refer Note 9 for definition h and d.

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Client: **XIAMEN GRACE SOLAR TECHNOLOGY CO. LTD.**
Project: **Flush Array Frame System Spacing Table**
with GS-SR-L Rail – Tin Roof
Address: **within Australia**

Job: **11277**
Date: **Jun-22**
Designed: **BL**
Checked: **AA**

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

Type of Rail: GS-SR-L
Type of Interface: Tin Roof L Feet
Solar Panel Dimension: 2.3mx1.2m
Terrain category: 3

h/d ≤ 0.5 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	935	1400	1570	1860	935	1400	1570	1860	805	1245	1485	1760	720	1110	1420	1675
B1	695	1075	1475	1855	695	1075	1475	1855	600	925	1260	1760	540	825	1125	1675
B2	565	870	1185	1715	565	870	1185	1715	490	745	1015	1585	435	665	905	1405
C	--	495	670	1035	--	495	670	1035	--	425	580	890	--	--	515	795
D	--	--	475	725	--	--	475	725	--	--	410	625	--	--	--	555

h/d ≥ 1.0 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	635	975	1335	1595	635	975	1335	1595	545	840	1145	1510	490	750	1020	1440
B1	475	725	985	1535	475	725	985	1535	410	625	845	1315	--	560	755	1170
B2	--	590	795	1230	--	590	795	1230	--	510	685	1060	--	455	615	940
C	--	--	455	695	--	--	455	695	--	--	390	600	--	--	--	535
D	--	--	--	490	--	--	--	490	--	--	--	425	--	--	--	--

* For intermediate values of h/d ratios, linear interpolation shall be used. Refer Note 9 for definition h and d.

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Project: **Flush Array Frame System Spacing Table**
with GS-SR-L Rail – Tin Roof
Address: **within Australia**

Job: **11277**
Date: **Jun-22**
Designed: **BL**
Checked: **AA**

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

Type of Rail: GS-SR-L
Type of Interface: Tin Roof L Feet
Solar Panel Dimension: 2.3mx1.2m
Terrain category: 2

h/d ≤ 0.5 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	770	1190	1455	1725	630	970	1325	1595	570	870	1190	1530	540	825	1125	1495
B1	575	880	1200	1725	470	720	980	1530	425	650	880	1370	400	610	830	1285
B2	465	710	970	1505	--	585	790	1225	--	530	715	1105	--	495	670	1035
C	--	405	550	850	--	--	450	690	--	--	410	625	--	--	--	590
D	--	--	340	595	--	--	--	490	--	--	--	440	--	--	--	415

h/d ≥ 1.0 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	525	800	1090	1480	430	655	890	1375	--	590	800	1240	--	560	755	1170
B1	365	595	810	1250	--	490	665	1020	--	445	600	920	--	420	565	865
B2	--	485	655	1010	--	395	540	825	--	--	485	745	--	--	455	700
C	--	--	--	575	--	--	--	470	--	--	--	425	--	--	--	400
D	--	--	--	405	--	--	--	--	--	--	--	--	--	--	--	--

* For intermediate values of h/d ratios, linear interpolation shall be used. Refer Note 9 for definition h and d.

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Client: **XIAMEN GRACE SOLAR TECHNOLOGY CO. LTD.**
Project: **Flush Array Frame System Spacing Table**
with GS-SR-L Rail – Tin Roof
Address: **within Australia**

Job: **11277**
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General Notes

Note 1 Following components are satisfied to use according to AS/NZS 1170.2:2021

Components	Part Number	Description
GS Rail	GS-SR-L	As per drawing or test report provided by client
Tin Interface Kit 5#	GS-IK-LD05	
Universal Panel Clamp Kit	GS-AC	
Inter Clamp Kit	GS-IC-F40; GS-IC-F32.5; GS-IC-F37.5; GS-IC-F30	
End Clamp Kit	GS-EC-F35/40/46; GS-EC-A02; GS-EC-F30; GS-EC-F32;	

Note 2 Spacing calculated based on 1.9mm steel purlin or 35mm screw embedment length into timber (JD4 seasoned timber).

Recommended screws

Metal Purlins/Battens	Fasteners to use
1.9mm and above	14g-10 TPI Tek screws or approved equivalent
Timber Purlins/Battens/Rafters	Fasteners to use
Softwood / Hardwood (35mm embedment and above)	14g-10 TPI T17 screws or approved equivalent

Note 3 Maximum uplift wind pressure is limited to 5kPa.

Note 4 Deflection is limited to Minimum of L/120 and 15mm.

Note 5 Panels to be installed parallel to roof surface.

Note 6 "--" states NOT SUITABLE FOR INSTALLATION.

Note 7 Refer section 4.2.1 of AS/NZS 1170.2:2021 for terrain category definition.

Note 8 Wind regions are shown in Figure 3.1(A) of AS/NZS 1170.2:2021.

Note 9 Building height is average roof height of structure above ground. Refer Figure 1 for definition of h, d and b.

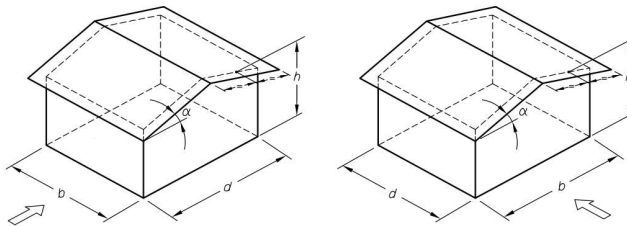
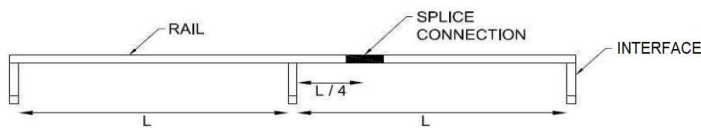


Figure 1 – h, d and b definition

Note 10 Rail splice connection must be placed a quarter length of the spacing of interface. No Splice connection should be placed at the centre of spacing or over the interface.



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Note 11 Refer Figure 2 for definition of roof zones.

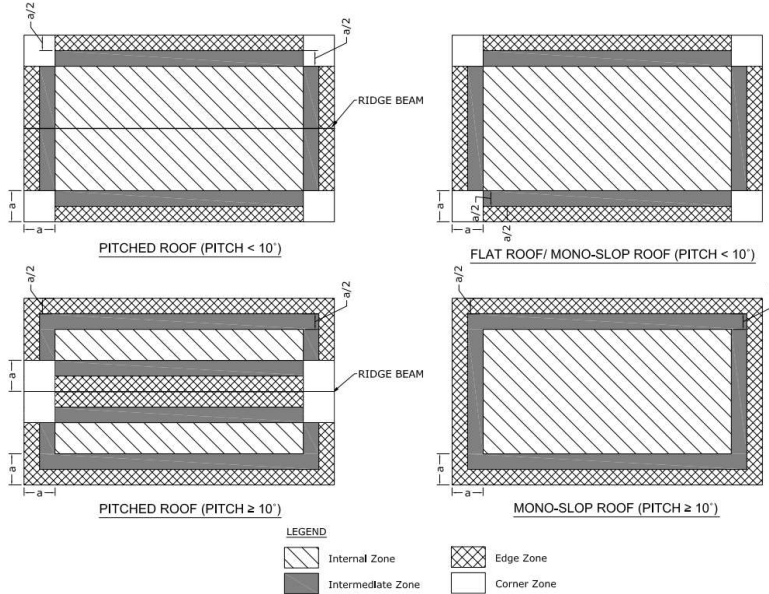


Figure2- Roof Zones Definition

In Figure 2, the value of dimension "a" is the minimum of 0.2b or 0.2d, if (h/b) or (h/d) ≥ 0.2; or 2h if both (h/b) and (h/d) < 0.2 (b & d are building dimensions and h is average roof height, see Figure 1)

Structural Design Documentation

Flush Array Frame System Spacing Table

According to AS/NZS 1170.2-2021

with GS-SR-L Rail – Tile Roof

PV Panel Sizes - 1.7mx1m, 2.3mx1.2m

within Australia

Terrain Category 2 & 3

For: XIAMEN GRACE SOLAR TECHNOLOGY CO. LTD.
(BYMEA Group) Building C/D, Vanke Yunxi
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Job Number: 11277
Date: 2 June 2022



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A.C.N 141 076 904 A.B.N 73 015 060 240
www.gamcorp.com.au solar@gamcorp.com.au
Tel: +61 3 9543 2211

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with GS-SR-L Rail – Tile Roof
Address: within Australia
Wind Terrain Category: Terrain Category 2 & 3

Australian/New Zealand 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 1170.2:2021	Structural design actions Part 2: Wind actions
AS/NZS 1664.1:1997 (R2020)	Aluminium structures Part 1: Limit state design
AS/NZS 4600:2018	Cold-formed steel structures
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Address: **within Australia**

Job: **11277**
Date: **Jun-22**
Designed: **BL**
Checked: **AA**

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

Type of Rail: GS-SR-L
Type of Interface: Tile Roof Tile Hook
Solar Panel Dimension: 1.7mx1m
Terrain category: 3

h/d ≤ 0.5 *

Wind Region	Building Height – h (m)															
	h≤5				5<h≤10				10<h≤15				15<h≤20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	625	995	1410	2000	625	995	1410	2000	540	850	1190	1910	475	745	1040	1720
B1	625	990	1400	2000	625	990	1400	2000	535	840	1180	1905	475	745	1040	1720
B2	500	785	1100	1825	500	785	1100	1825	430	675	935	1530	385	595	825	1330
C	335	520	715	1140	335	520	715	1140	--	445	610	970	--	395	540	855
D	--	400	545	860	--	400	545	860	--	345	470	735	--	--	415	650

h/d ≥ 1.0 *

Wind Region	Building Height – h (m)															
	h≤5				5<h≤10				10<h≤15				15<h≤20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	420	655	905	1480	420	655	905	1480	360	560	775	1245	--	495	680	1085
B1	415	650	900	1465	415	650	900	1465	360	555	770	1240	--	495	680	1085
B2	335	520	720	1150	335	520	720	1150	--	450	615	980	--	400	545	860
C	--	350	475	745	--	350	475	745	--	--	410	640	--	--	365	565
D	--	--	365	570	--	--	365	570	--	--	--	490	--	--	--	435

* For intermediate values of h/d ratios, linear interpolation shall be used. Refer Note 9 for definition h and d.

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Client: **XIAMEN GRACE SOLAR TECHNOLOGY CO. LTD.**
Project: **Flush Array Frame System Spacing Table**
with GS-SR-L Rail – Tile Roof
Address: **within Australia**

Job: **11277**
Date: **Jun-22**
Designed: **BL**
Checked: **AA**

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

Type of Rail: GS-SR-L
Type of Interface: Tile Roof Tile Hook
Solar Panel Dimension: 1.7mx1m
Terrain category: 2

h/d ≤ 0.5 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	510	805	1120	1865	415	650	900	1470	375	580	805	1295	355	545	755	1210
B1	510	805	1120	1865	415	645	895	1460	375	580	805	1295	355	545	755	1210
B2	410	640	885	1440	335	520	715	1140	--	465	640	1020	--	440	605	955
C	--	425	580	920	--	345	470	740	--	--	425	665	--	--	400	625
D	--	--	450	700	--	--	365	565	--	--	--	510	--	--	--	480

h/d ≥ 1.0 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	345	530	735	1175	--	435	595	940	--	390	535	840	--	365	500	785
B1	345	530	735	1175	--	430	590	935	--	390	535	840	--	365	500	785
B2	--	425	585	925	--	350	475	745	--	--	430	670	--	--	405	630
C	--	--	390	605	--	--	--	490	--	--	--	445	--	--	--	415
D	--	--	--	465	--	--	--	380	--	--	--	345	--	--	--	--

* For intermediate values of h/d ratios, linear interpolation shall be used. Refer Note 9 for definition h and d.

Relationships built on trust

Client: **XIAMEN GRACE SOLAR TECHNOLOGY CO. LTD.**
Project: **Flush Array Frame System Spacing Table
with GS-SR-L Rail – Tile Roof**
Address: **within Australia**

Job: **11277**
Date: **Jun-22**
Designed: **BL**
Checked: **AA**

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

Type of Rail: GS-SR-L
Type of Interface: Tile Roof Tile Hook
Solar Panel Dimension: 2.3mx1.2m
Terrain category: 3

h/d ≤ 0.5 *

Wind Region	Building Height – h (m)															
	h≤5				5<h≤10				10<h≤15				15<h≤20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	465	735	1040	1780	465	735	1040	1780	395	625	880	1470	--	550	770	1270
B1	460	730	1035	1770	460	730	1035	1770	390	620	875	1460	--	550	770	1270
B2	--	580	815	1350	--	580	815	1350	--	500	690	1130	--	440	605	980
C	--	--	525	840	--	--	525	840	--	--	450	715	--	--	400	630
D	--	--	405	635	--	--	405	635	--	--	--	545	--	--	--	480

h/d ≥ 1.0 *

Wind Region	Building Height – h (m)															
	h≤5				5<h≤10				10<h≤15				15<h≤20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	485	670	1090	--	485	670	1090	--	415	570	920	--	--	505	805
B1	--	480	665	1080	--	480	665	1080	--	410	570	915	--	--	505	805
B2	--	--	530	850	--	--	530	850	--	--	455	725	--	--	400	635
C	--	--	--	550	--	--	--	550	--	--	--	470	--	--	--	415
D	--	--	--	420	--	--	--	420	--	--	--	--	--	--	--	--

* For intermediate values of h/d ratios, linear interpolation shall be used. Refer Note 9 for definition h and d.

Relationships built on trust

Client: **XIAMEN GRACE SOLAR TECHNOLOGY CO. LTD.**
Project: **Flush Array Frame System Spacing Table with GS-SR-L Rail – Tile Roof**
Address: **within Australia**

Job: **11277**
Date: **Jun-22**
Designed: **BL**
Checked: **AA**

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

Type of Rail: GS-SR-L
Type of Interface: Tile Roof Tile Hook
Solar Panel Dimension: 2.3mx1.2m
Terrain category: 2

h/d ≤ 0.5 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	590	830	1380	--	480	665	1085	--	430	595	960	--	405	555	895
B1	--	590	830	1380	--	475	660	1080	--	430	595	960	--	405	555	895
B2	--	470	655	1065	--	--	525	840	--	--	475	755	--	--	445	705
C	--	--	430	680	--	--	--	545	--	--	--	490	--	--	--	460
D	--	--	--	515	--	--	--	420	--	--	--	--	--	--	--	--

h/d ≥ 1.0 *

Wind Region	Building Height – h (m)															
	h ≤ 5				5 < h ≤ 10				10 < h ≤ 15				15 < h ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	390	540	870	--	--	440	695	--	--	390	620	--	--	--	580
B1	--	390	540	870	--	--	435	690	--	--	390	620	--	--	--	580
B2	--	--	430	685	--	--	--	550	--	--	--	495	--	--	--	465
C	--	--	--	450	--	--	--	--	--	--	--	--	--	--	--	--
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* For intermediate values of h/d ratios, linear interpolation shall be used. Refer Note 9 for definition h and d.

Relationships built on trust

Client: **XIAMEN GRACE SOLAR TECHNOLOGY CO. LTD.**
Project: **Flush Array Frame System Spacing Table**
with GS-SR-L Rail – Tile Roof
Address: **within Australia**

Job: **11277**
Date: **Jun-22**
Designed: **BL**
Checked: **AA**

General Notes

Note 1 Following components are satisfied to use according to AS/NZS 1170.2:2021

Components	Part Number	Description
GS Rail	GS-SR-L	As per drawing or test report provided by client
Stainless Steel Hook 1#	GS-IK-01	
Universal Panel Clamp Kit	GS-AC	
Inter Clamp Kit	GS-IC-F40; GS-IC-F32.5; GS-IC-F37.5; GS-IC-F30	
End Clamp Kit	GS-EC-F35/40/46; GS-EC-A02; GS-EC-F30; GS-EC-F32;	

Note 2 Spacing calculated based on 1.9mm steel purlin or 35mm screw embedment length into timber (JD4 seasoned timber).

Recommended screws

Metal Purlins/Battens	Fasteners to use
1.9mm and above	14g-10 TPI Teks screws or approved equivalent
Timber Purlins/Battens/Rafters	Fasteners to use
Softwood / Hardwood (35mm embedment and above)	14g-10 TPI T17 screws or approved equivalent

- Note 3 Maximum uplift wind pressure is limited to 5kPa.
- Note 4 Deflection is limited to Minimum of L/120 and 15mm.
- Note 5 Panels to be installed parallel to roof surface.
- Note 6 "--" states NOT SUITABLE FOR INSTALLATION.
- Note 7 Refer section 4.2.1 of AS/NZS 1170.2:2021 for terrain category definition.
- Note 8 Wind regions are shown in Figure 3.1(A) of AS/NZS 1170.2:2021.
- Note 9 Building height is average roof height of structure above ground. Refer Figure 1 for definition of h, d and b.

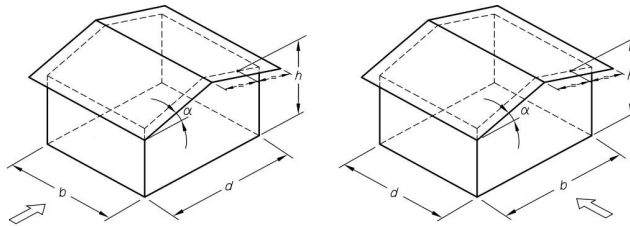
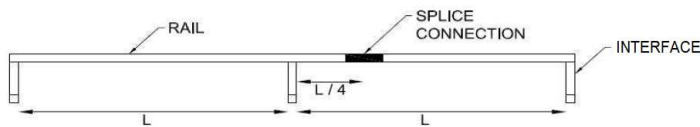


Figure 1 – h, d and b definition

Note 10 Rail splice connection must be placed a quarter length of the spacing of interface. No Splice connection should be placed at the centre of spacing or over the interface.



Relationships built on trust

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Note 11 Refer Figure 2 for definition of roof zones.

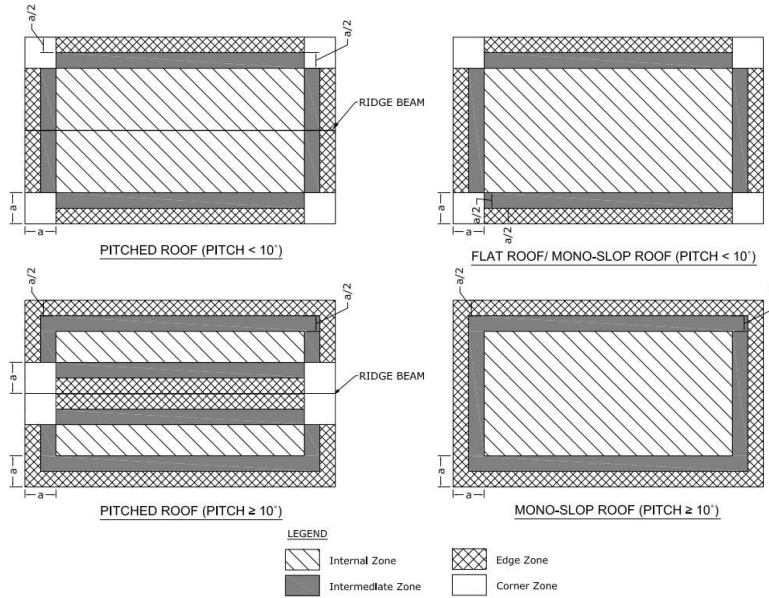


Figure2- Roof Zones Definition

In Figure 2, the value of dimension "a" is the minimum of 0.2b or 0.2d, if (h/b) or (h/d) ≥ 0.2; or 2h if both (h/b) and (h/d) < 0.2 (b & d are building dimensions and h is average roof height, see Figure 1)