



Relationships built on trust



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
35 Butler St, Richmond VIC 3121. Tel: 03 9543 2211

Our Ref: 11174-Tilt-TLT/BL

12 May 2022

Broad AUS Pty Ltd
2/48 Boronia Grove,
Doncaster East VIC 3109

PV Array Frame Engineering Certification

Installation of Broad Roof Mount Solar System with Broad Rail 55 and BA-TLT Tilt Legs

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian Building Regulations, have carried out a structural design check of BROAD Roof Mount Tilt Leg Solar System installation on tin roof within Australia. The design check is based on the information and test reports provided by Broad AUS Pty Ltd.

This certificate is **only valid** for the BROAD Roof Mount Tilt Leg Solar System itself. The roof structure or the building structure and PV Panels shall be assessed separately and accordingly.

This certificate is **only valid** when fixing into minimum JD4 seasoned timber and 1.9BMT steel. If the fixing condition is different from this condition, 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.

This certificate is based on the following structural drawing and test reports:

- Structural drawing "Rail 55.dwg" provided by Xiamen Broad New Energy Co.,Ltd, dated on 27/12/2021
- Structural drawing "Drawings of BROAD Solar roof mounting system components.PDF" received on 26/11/18
- Middle and End Panel Clamp test report by Xiamen Broad New Energy Co.,Ltd, dated 11/03/2019
- Tilt leg test report No.: XMIN1903001063ML by SGS, dated 14/03/19

We find the Installation of Broad Roof Mount Tilt Leg Solar System on tin roof for Australian use to be structurally sufficient based on the following conditions:

- Wind loads to AS/NZ1170.2:2021 Wind actions
- Wind region **A, B1, B2, C, D**
- Wind terrain category **2 & 3**
- Wind average recurrence interval of **200 years**
- Maximum building height **20m**

*ISO 9001:2015 Registered Firm
Certificate No: AU1222*



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- The assessed PV Panel dimensions are **2.25mx1.2m, 2mx1m**
- Panels to be tilt-mounted to the roof surface
- Weight of the PV panel and array frame to be 15 kg/m²
- Rails to be **Broad Rail 55**
- Refer to Note 1 for the assessed components and test reports provided
- The spacings are determined based on fixings into minimum JD4 seasoned timber or 1.9BMT steel
- Each PV Panel to be installed using **2 rails minimum**
- 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 specified fixing, 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.**
- **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 manufacturers 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 13/05/2024 and shall seek Gamcorp for re-validation after this date.

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

*ISO 9001:2015 Registered Firm
Certificate No: AU1222*

Structural Design Documentation

Tilt Array Frame System Spacing Table

According to AS/NZS 1170.2-2021
with Broad Rail 55 and BA-TLT Tilt Legs
within Australia
Terrain Category 2 & 3

For: Broad AUS Pty Ltd
2/48 Boronia Grove
Doncaster East VIC 3109

Job Number: 11174
Date: 12 May 2022



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www.gamcorp.com.au solar@gamcorp.com.au
Tel: +61 3 9543 2211



Job No: 11174
Client: Broad AUS Pty Ltd
Project: Tilt Array Frame System Spacing Table
with Broad Rail 55 and BA-TLT Tilt Legs
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: May-22

Relationships built on trust

Client: **Broad AUS Pty Ltd**
Project: **Tilt Array Frame System Spacing Table
with Broad Rail 55 and BA-TLT Tilt Legs**
Address: **within Australia**

Job: **11174**
Date: **May-22**
Designed: **BL**
Checked: **AA**

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

Type of Rail	Broad Rail 55
Type of Interface	BA-TLT Tilt Leg
Solar Panel Dimension	2.25mx1.2m
Terrain category	3

Tilt angle to roof surface (α), $\alpha \leq 15^\circ$

Wind Region	Building Height – h (m)															
	h≤5				5<h≤10				10<h≤15				15<h≤20			
	Corner	Edge	Intermed iate	Internal	Corner	Edge	Intermed iate	Internal	Corner	Edge	Intermed iate	Internal	Corner	Edge	Intermed iate	Internal
A	610	935	1275	1760	610	935	1275	1760	525	805	1095	1665	470	720	975	1520
B1	455	695	945	1470	455	695	945	1470	390	600	815	1260	--	535	725	1120
B2	--	565	765	1180	--	565	765	1180	--	490	660	1015	--	435	590	905
C	--	--	435	670	--	--	435	670	--	--	--	575	--	--	--	515
D	--	--	--	470	--	--	--	470	--	--	--	405	--	--	--	--

Tilt angle to roof surface (α), $15^\circ < \alpha \leq 25^\circ$

[illegible]

Tilt angle to roof surface (α), $25^\circ < \alpha \leq 30^\circ$

[illegible]

Relationships built on trust

Client: **Broad AUS Pty Ltd**
Project: **Tilt Array Frame System Spacing Table
with Broad Rail 55 and BA-TLT Tilt Legs**
Address: **within Australia**

Job: **11174**
Date: **May-22**
Designed: **BL**
Checked: **AA**

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

Type of Rail	Broad Rail 55
Type of Interface	BA-TLT Tilt Leg
Solar Panel Dimension	2.25mx1.2m
Terrain category	2

Tilt angle to roof surface (α), $\alpha \leq 15^\circ$

[illegible]

Tilt angle to roof surface (α), $15^\circ < \alpha \leq 25^\circ$

[illegible]

Tilt angle to roof surface (α), $25^\circ < \alpha \leq 30^\circ$

[illegible]

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Client: **Broad AUS Pty Ltd**
Project: **Tilt Array Frame System Spacing Table
with Broad Rail 55 and BA-TLT Tilt Legs**
Address: **within Australia**

Job: **11174**
Date: **May-22**
Designed: **BL**
Checked: **AA**

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

Type of Rail	Broad Rail 55
Type of Interface	BA-TLT Tilt Leg
Solar Panel Dimension	2mx1m
Terrain category	3

Tilt angle to roof surface (α), $\alpha \leq 15^\circ$

Wind Region	Building Height – h (m)															
	h≤5				5<h≤10				10<h≤15				15<h≤20			
	Corner	Edge	Intermed iate	Internal	Corner	Edge	Intermed iate	Internal	Corner	Edge	Intermed iate	Internal	Corner	Edge	Intermed iate	Internal
A	685	1050	1435	1825	685	1050	1435	1825	590	905	1230	1735	530	810	1100	1655
B1	515	785	1065	1655	515	785	1065	1655	445	675	915	1415	--	605	820	1260
B2	--	635	860	1330	--	635	860	1330	--	550	740	1140	--	490	660	1015
C	--	365	490	750	--	365	490	750	--	--	425	650	--	--	380	580
D	--	--	350	530	--	--	350	530	--	--	--	460	--	--	--	410

Tilt angle to roof surface (α), $15^\circ < \alpha \leq 25^\circ$

[illegible]

Tilt angle to roof surface (α), $25^\circ < \alpha \leq 30^\circ$

[illegible]

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

Type of Rail	Broad Rail 55
Type of Interface	BA-TLT Tilt Leg
Solar Panel Dimension	2mx1m
Terrain category	2

Tilt angle to roof surface (α), $\alpha \leq 15^\circ$

[illegible]

Tilt angle to roof surface (α), $15^\circ < \alpha \leq 25^\circ$

[illegible]

Tilt angle to roof surface (α), $25^\circ < \alpha \leq 30^\circ$

[illegible]

Client: **Broad AUS Pty Ltd**
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Address: **within Australia**

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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
Broad Rail	Broad Rail 55	As per drawing Rail 55 provided by Xiamen Broad New Energy Co.,Ltd, dated on 27/12/2021
Mid Clamp		As per Middle and End Panel Clamp test report by Xiamen Broad New Energy Co.,Ltd, dated 11/03/2019
End Clamp		As per test report No.: XMIN1903001063ML by SGS, dated 14/03/2019
Broad Tilt Leg	BA-TLT	

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 Tilt angle is measured from 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.

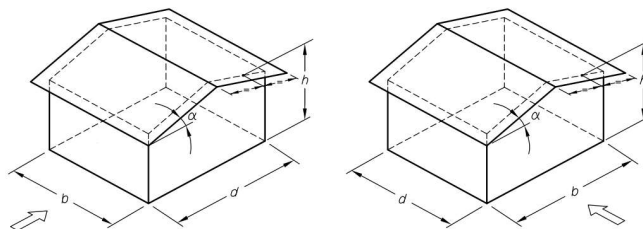
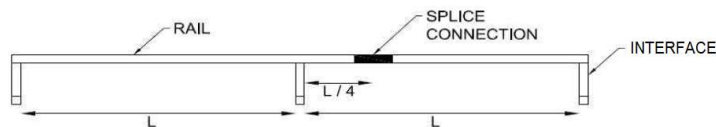


Figure 1 – h, d and b definition

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.

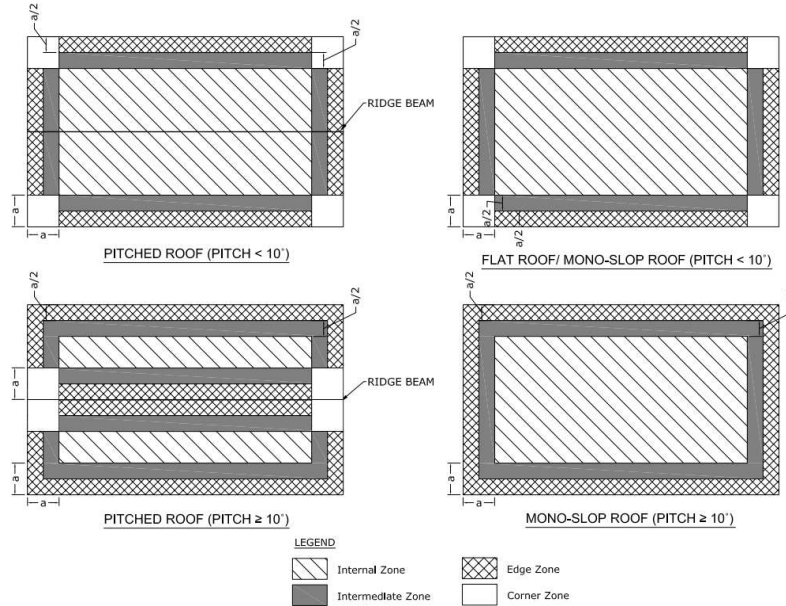


Figure2- Roof Zones Definition

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)