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Array Frame Engineering Certification

For: ANTAI SOLAR AUSTRALIA
 PTY LTD
 Level 1 suite 1.02/309 Pitt
 St, Sydney NSW 2000

Job No.: 10166
Date: 24/08/2021

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Approval			
Author Signature		Approver Signature	
Name	Yesim Kocabalkan	Name	L. Van Spaandonk
Title	Structural Engineer	Title	Principal Engineer

Our Ref: 10166-08-03/YK
24 August 2021

ANTAI SOLAR AUSTRALIA PTY LTD
Level 1 suite 1.02/309 Pitt St
Sydney NSW 2000

PV Array Frame Engineering Certification

RE: AS/NZ 1170.2 Certification for Tilt Mounted System on Lysaght Longline 305 (Concealed Fix Roof)

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian Building Regulations, have carried out a structural design check of Tilt Mounted System on Lysaght Longline 305 (Concealed Fix Roof). The design check is based on the information and test reports provided by ANTAI SOLAR AUSTRALIA PTY LTD.

For a definition of a **lapped joint** in the roof sheeting, please see **Figure 1**.

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

Component	Part No
Rail	ATL-TYN-355A(ATL-DR-355A); ATL-TYN-355B (ATL-DR-355B)
Rail Splice	ATL-TYN-304/54(ATL-DR-JOINER)
Tilt Mount Set	ATL-TYN-07; ATL-TYN-57; ATL-TYN-58; ATL-TYN-71; ATL-TYN-329; (ATL-AD-FL; ATL-AD-RL)
Inter Clamp Kit	ATL-FWNY-09(ATL-IC-30/35, ATL-IC-35/40)
End Clamp Kit	ATL-CG-018(ATL-EC-30/35, ATL-EC-35/40)
Roof Clamp	ATL-TYN-307/ 308(ATL-IK-305)

This certificate is **only valid** for Tilt Mounted System on Lysaght Longline 305(Concealed Fix Roof) itself. The roof structure or the building structure and PV panels shall be assessed separately and accordingly.

This certificate is **only valid** when roof clamp fixing to the **lapped joints** of roof sheeting on top of the purlins. If the fixing condition is different from those 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 Tilt Mounted System on Lysaght Longline 305 (Concealed Fix Roof) for Australian use to be structurally sufficient based on the following conditions:

- Wind loads to AS/NZ1170.2:2011(R2016) Wind actions
- Wind region **A, B, C, D**
- Wind terrain category **2 & 3**
- Wind average recurrence interval of **200 years**
- Maximum building height **20m**
- The maximum assessed PV panel dimensions are **2300mm x 1200mm**
- Weight of the PV panel and array frame to be 15 kg/m²
- Material of Rails to be **AL6005-T6**
- Each PV panel to be installed using **2 rails** minimum in all circumstances
- Roof clamps to be fixed only to the **lapped joints** of roof sheeting on top of the purlins (See **Figure 1**)
- 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
- For Corrosivity Category C4, decrease the spacing to 92%
- For Corrosivity Category C5, decrease the spacing to 84%

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.**
- **The capacity of tilt leg was obtained from test report No. XMIN2004002012ML, XMIN2004002014ML and XMIN2004002015ML by SGS-CSTC Standards Technical Services Co., Ltd Xiamen Branch Testing Center, dated 30.04.2020.**
- **The capacity of rail was obtained from test report no. 20-0249- A and 20-0249- B, dated 27th May 2020 and provided by Melbourne Testing Services.**
- **The capacity of roof clamp was obtained from test report no. MT-15/317, dated 26th May 2015 and provided by Melbourne Testing Services.**
- **The spacing shown in the interface tables shall be adjusted based on the assessment and requirement of the roof structures.**

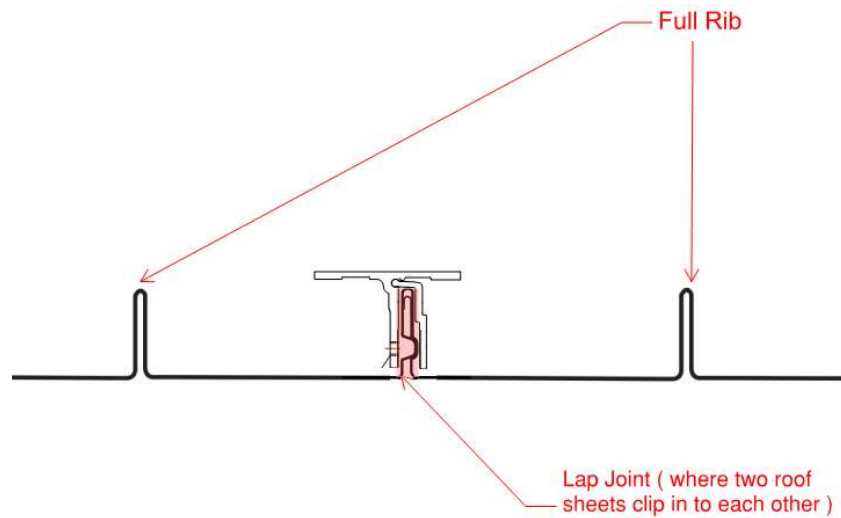


Figure 1 - Lapped Joint Definition

Construction is to be carried out strictly in accordance with the manufacturers instructions. This work was designed by **Yesim Kocabalkan** in accordance with the provisions of Australian Building Regulations and in accordance with sound, widely accepted engineering principles. This certificate is only valid till 24/08/2023. 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



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, Tilt mount - Lysaght Longline 305;

Structural Design Documentation

Tilt Array Frame System Spacing Table For Concealed Fix Roof – Lysaght Longline 305 According to AS/NZS 1170.2-2011 (R2016) with Rail ATL-TYN-355A (ATL-DR-355A) within Australia Terrain Category 2 & 3

For: ANTAI SOLAR AUSTRALIA PTY LTD
Level 1 suite 1.02/309 Pitt St
Sydney NSW 2000

Job Number: 9670-08-03
Date: 7 May 2021



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melbourne@gamcorp.com.au

Job No: 9670-08-03
Client: ANTAI SOLAR AUSTRALIA PTY LTD
Project: Tilt Array Frame System Spacing Table For Concealed Fix Roof – Lysaght Longline
305 with Rail ATL-TYN-355A(ATL-DR-355A)
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 1664.1:1997 – Aluminium structures - Limit state design
AS 4100:2020 – Steel Structures
AS/NZS 4600:2018 – Cold-formed Steel Structures

Wind Terrain Category: WTC 2 & 3

Designed: JD
Checked: AA

Date: May-21

Type of Rail	ATL-TYN-355A(ATL-DR-355A)
Type of Interface	Tilt Roof Set
Solar Panel Dimension	2.3mx1.2m
Terrain category	2

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

[illegible]

Tilt angle to roof surface (α) – $15^\circ < \alpha \leq 30^\circ$

[illegible]

Tilt angle to roof surface (α) – $30^\circ < \alpha \leq 60^\circ$

[illegible]

General Notes

Note 1 Following components are satisfied to use according to AS/NZS 1170.2-2011(R2016)

Components	Part Number	Description
Rail	ATL-TYN-355A	As per drawing& test report provided by client
Splice	ATL-TYN-304/54	
Standard Tilt System	ATL-TYN-07; ATL-TYN-57; ATL-TYN-58; ATL-TYN-71; ATL-TYN-329;	
Roof Clamp	ATL-TYN-307/308	

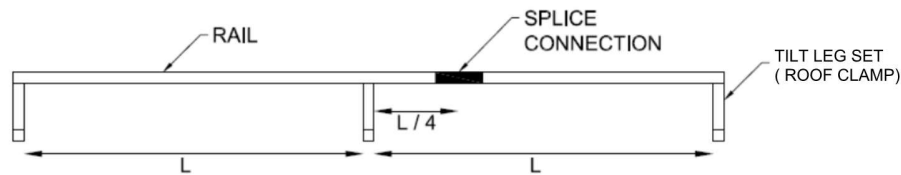
Note 2 Maximum uplift wind pressure is limited to 5 kPa. "--" states more uplift pressure.

Note 3 Tilt angle is measured from roof surface.

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

Note 5 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.
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.

Note 6 The optimised location of rail splice connection is at quarter length of the spacing of the interface. No Splice connection should be placed at the centre of spacing or over the interface.



Note 7 Refer Figure 1 for definition of roof zones.

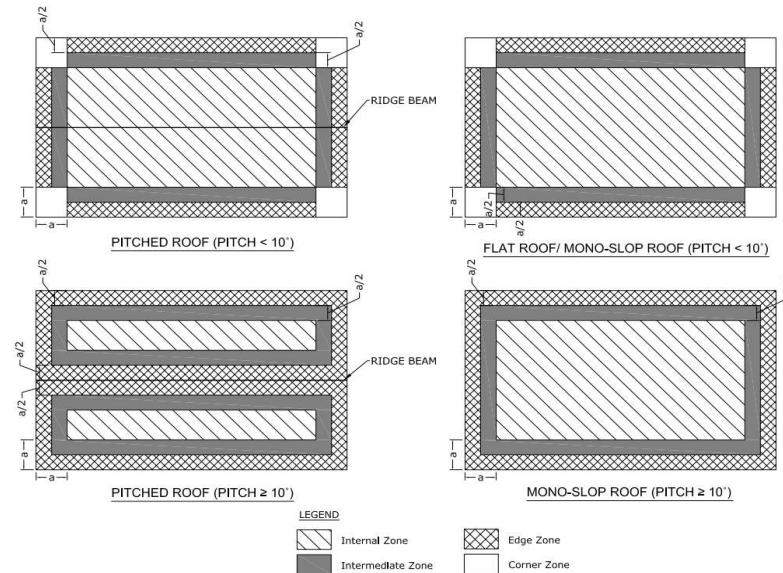


Figure 1 - Roof Zones Definition

In Figure 1, the value of dimension "a" is the minimum of 0.2b, 0.2d and h. (b & d are building dimensions and h is its height)

Structural Design Documentation

**Tilt Array Frame System Spacing Table For Concealed Fix Roof –
Lysaght Longline 305
According to AS/NZS 1170.2-2011 (R2016)
with Rail ATL-TYN-355B (ATL-DR-355B)
within Australia
Terrain Category 2 & 3**

For: ANTAI SOLAR AUSTRALIA PTY LTD
Level 1 suite 1.02/309 Pitt St
Sydney NSW 2000

Job Number: 9670-08-03
Date: 7 May 2021



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Job No: 9670-08-03
Client: ANTAI SOLAR AUSTRALIA PTY LTD
Project: Tilt Array Frame System Spacing Table For Concealed Fix Roof – Lysaght Longline
305 with Rail ATL-TYN-355B (ATL-DR-355B)
Address: within Australia

Australian Standards

AS/NZS 1170.0:2002 – Structural design actions, Part 0: General principles
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AS 4100:2020 – Steel Structures
AS/NZS 4600:2018 – Cold-formed Steel Structures

Wind Terrain Category: WTC 2 & 3

Designed: JD
Checked: AA

Date: May-21

Type of Rail	ATL-TYN-355B(ATL-DR-355B)
Type of Interface	Tilt Roof Set
Solar Panel Dimension	2.3mx1.2m
Terrain category	2

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

[illegible]

Tilt angle to roof surface (α) – $15^\circ < \alpha \leq 30^\circ$

[illegible]

Tilt angle to roof surface (α) – $30^\circ < \alpha \leq 60^\circ$

[illegible]

General Notes

Note 1 Following components are satisfied to use according to AS/NZS 1170.2-2011(R2016)

Components	Part Number	Description
Rail	ATL-TYN-355B	As per drawing& test report provided by client
Splice	ATL-TYN-304/54	
Standard Tilt System	ATL-TYN-07; ATL-TYN-57; ATL-TYN-58; ATL-TYN-71; ATL-TYN-329;	
Roof Clamp	ATL-TYN-307/308	

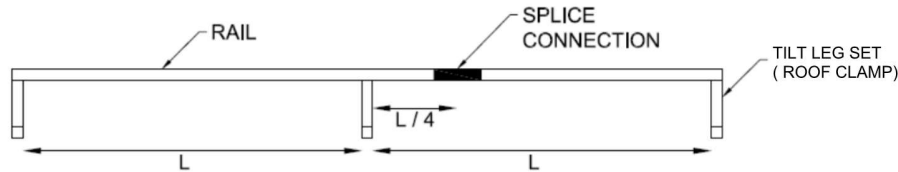
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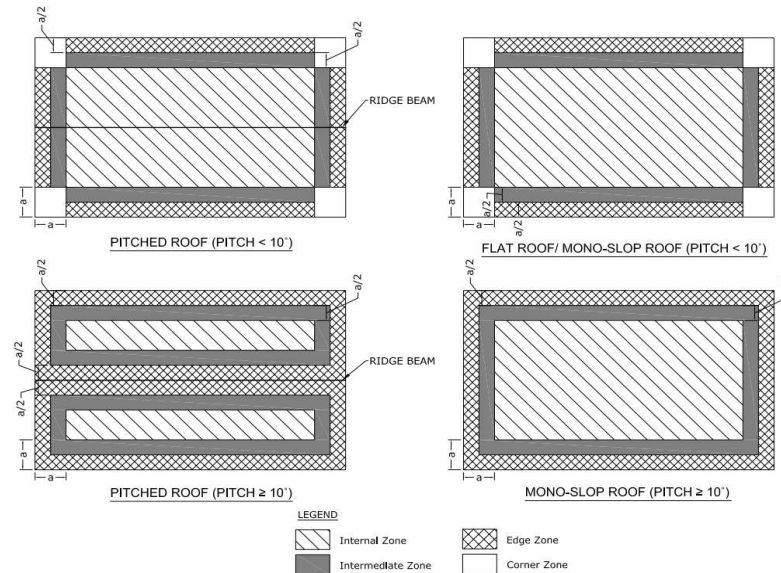


Figure 1 - Roof Zones Definition

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