

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

Our Ref: 9171-Concealed Fix Roof Klip Lok Classic 700 02/AdA
25 January 2021

Innosearch Pty Ltd
22 Charlotte St
Merrylands NSW 2160

PV Array Frame Engineering Certification

RE: AS/NZ 1170.2 Certification for Tilt Mounted System on Lysaght Klip Lok Classic 700 (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 the Tilt Mounted System on Lysaght Klip Lok Classic 700 roof sheeting (Concealed Fix Roof) within Australia. The design check is based on the information provided by Innosearch Pty Ltd and the tests performed by Gamcorp Pty Ltd.

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

Component	Part No
Rail	PV001
Rail Splice	PV-NUT01&B
Tilt Mount Set	Adjustable Rear Leg (15°-30°), Front Leg for Tilt Mounting
Inter Clamp Kit	PV-CLA01&A
End Clamp Kit	PV-CLA40&A
Roof Clamp	KL700 clamp kit

This certificate is **only valid** for the Tilt Mounted System on Lysaght Klip Lok Classic 700 (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 the roof clamp is fixed on the top of the purlins. If the fixing condition is different from those conditions, interface spacing shall be reviewed and validated by Gamcorp.

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

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We find the Installation of Tilt Mounted System on Lysaght Klip Lok Classic 700 (Concealed Fix Roof) for Australian/New Zealand 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, W**
- Wind terrain category **2 & 3**
- Wind average recurrence interval of **200 years**
- Maximum building height **20m**
- The maximum assessed PV panel dimensions are **1840mm x 998mm & 2274mm x 1134mm**
- Weight of the PV panel and array frame to be 15 kg/m²
- Material of Rails to be **AL6005-T5**
- Each PV panel to be installed using **2 rails** minimum in all circumstances
- 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.**
- **The capacity of tilt leg was obtained from test report no. 50394672 001, dated 21.08.2020 and provided by TUV Rheinland.**
- **The capacity of rail was obtained from test report no. 50394672 001, dated 21.08.2020 and provided by TUV Rheinland.**
- **The capacity of roof clamp was obtained from the test no. 9171-KL700/AdA performed by Gamcorp Pty Ltd on 12.01.2021.**
- **The spacing shown in the interface tables shall be adjusted based on the assessment and requirement of the roof structures.**

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Construction is to be carried out strictly in accordance with the manufacturers instructions. This work was designed by **Acha De Alwis** in accordance with the provisions of relevant Building Regulations and in accordance with sound, widely accepted engineering principles. This certificate is only valid till 22/01/2023. 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

A handwritten signature in black ink, appearing to read 'Jianzeng Geng'.

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

Attachments:

- Summary table for interface spacing, Tilt mount - Lysaght Klip Lok Classic 700 (Concealed Fix Roof)

Structural Design Documentation

**Tilt Array Frame System Spacing Table For
LYSAGHT Klip-Lok Classic 700 roof sheeting
According to AS/NZS 1170.2-2011 (R2016)
with Rail PV001
within Australia/New Zealand
Terrain Category 2 & 3**

For: Innosearch Pty Ltd
22 Charlotte St
Merrylands NSW 2160

Job Number: 9171 – 02
Date: 25 January 2021



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Job No: 9171 - 02
Client: Innosearch Pty Ltd
Project: Tilt Array Frame System Spacing Table For
LYSAGHT Klip-Lok Classic 700 roof sheeting
with Rail PV001
Address: within Australia/New Zealand

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 4100:1998 (R2016) – Steel Structures
AS/NZS 4600:2018 – Cold-formed Steel Structures

Wind Terrain Category: WTC 2 & 3

Designed: AdA
Checked: HS

Date: Jan-21

**Tilt Array Frame System Spacing Table For
 LYSAGHT Klip-Lok Classic 700 roof sheeting - mm**

Type of Rail PV001
 Type of Interface Tilt Roof Set with Clamp
 Solar Panel Dimension 1.840m x 0.998m
 Terrain category **2**

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	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	440	675	915	1430	360	550	745	1155	305	495	670	1035	--	470	635	980
B	--	450	610	940	--	370	500	765	--	335	450	690	--	--	425	650
C	--	--	395	605	--	--	285	495	--	--	--	445	--	--	--	420
D	--	--	--	390	--	--	--	220	--	--	--	--	--	--	--	--
W	335	510	690	1065	--	420	565	870	--	380	510	785	--	355	480	740

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

Wind Region	Building Height – H (m)															
	H≤5				5<H≤10				10<H≤15				15<H≤20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	--	335	450	685	--	--	370	560	--	--	335	505	--	--	--	480
B	--	--	--	460	--	--	--	380	--	--	--	340	--	--	--	220
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
W	--	--	340	520	--	--	--	430	--	--	--	385	--	--	--	365

**Tilt Array Frame System Spacing Table For
 LYSAGHT Klip-Lok Classic 700 roof sheeting - mm**

Type of Rail: PV001
 Type of Interface: Tilt Roof Set with Clamp
 Solar Panel Dimension: 1.840m x 0.998m
 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	Intermedate	Internal	Corner	Edge	Intermedate	Internal	Corner	Edge	Intermedate	Internal	Corner	Edge	Intermedate	Internal
A	530	815	1115	1755	530	815	1115	1755	460	705	955	1495	410	630	855	1325
B	355	545	740	1145	355	545	740	1145	--	470	635	985	--	420	570	875
C	--	355	480	735	--	355	480	735	--	--	415	630	--	--	370	560
D	--	--	--	470	--	--	--	470	--	--	--	405	--	--	--	365
W	405	620	840	1305	405	620	840	1305	350	535	725	1125	--	475	645	995

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

Wind Region	Building Height – H (m)															
	H≤5				5<H≤10				10<H≤15				15<H≤20			
	Corner	Edge	Intermedate	Internal	Corner	Edge	Intermedate	Internal	Corner	Edge	Intermedate	Internal	Corner	Edge	Intermedate	Internal
A	--	400	545	835	--	400	545	835	--	345	470	720	--	--	420	640
B	--	--	365	555	--	--	365	555	--	--	--	480	--	--	--	430
C	--	--	--	360	--	--	--	360	--	--	--	--	--	--	--	--
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
W	--	--	415	630	--	--	415	630	--	--	360	545	--	--	220	485

**Tilt Array Frame System Spacing Table For
 LYSAGHT Klip-Lok Classic 700 roof sheeting - mm**

Type of Rail PV001
 Type of Interface Tilt Roof Set with Clamp
 Solar Panel Dimension 2.274m x 1.134m
 Terrain category **2**

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	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	--	545	740	1155	--	445	605	935	--	295	545	840	--	270	515	795
B	--	250	495	760	--	--	405	620	--	--	250	560	--	--	--	525
C	--	--	--	490	--	--	--	400	--	--	--	250	--	--	--	--
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
W	--	305	560	865	--	--	455	705	--	--	305	635	--	--	270	595

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

Wind Region	Building Height – H (m)															
	H≤5				5<H≤10				10<H≤15				15<H≤20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	--	--	--	555	--	--	--	455	--	--	--	365	--	--	--	270
B	--	--	--	370	--	--	--	--	--	--	--	--	--	--	--	--
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
W	--	--	--	310	--	--	--	--	--	--	--	--	--	--	--	--

Tilt Array Frame System Spacing Table For
LYSAGHT Klip-Lok Classic 700 roof sheeting - mm

Type of Rail PV001
 Type of Interface Tilt Roof Set with Clamp
 Solar Panel Dimension 2.274m x 1.134m
 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	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	430	660	900	1420	430	660	900	1420	245	570	775	1210	--	510	690	1075
B	--	440	595	925	--	440	595	925	--	380	515	795	--	--	460	705
C	--	--	385	595	--	--	385	595	--	--	--	510	--	--	--	455
D	--	--	--	380	--	--	--	380	--	--	--	--	--	--	--	--
W	--	500	680	1055	--	500	680	1055	--	425	585	910	--	245	520	805

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

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	--	--	440	675	--	--	440	675	--	--	270	580	--	--	--	520
B	--	--	--	450	--	--	--	450	--	--	--	390	--	--	--	--
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
W	--	--	--	510	--	--	--	510	--	--	--	440	--	--	--	280

General Notes

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

Components	Part Number	Description
Rail	PV001	As per drawing& test report provided by client
Splice	PV-NUT01&B	
Standard Tilt System	Adjustable Rear Leg (15°-30°), Front Leg for Tilt Mounting, KL700 clamp kit	

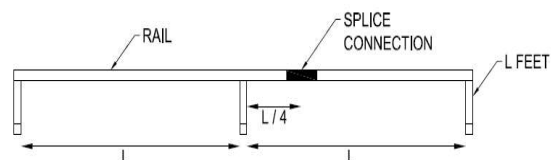
Note 2 Maximum uplift wind pressure is limited to 5 kPa. "--" states more uplift pressure.

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.

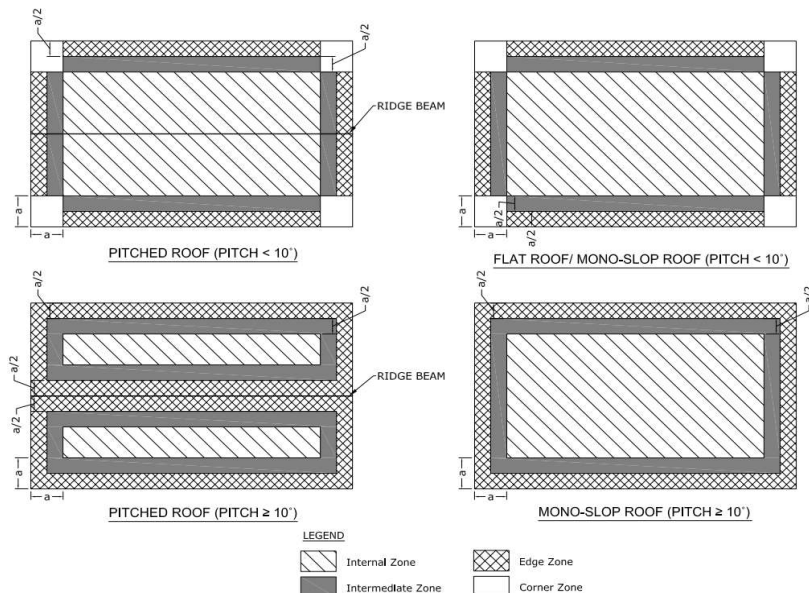


Figure 1 - Roof Zones Definition

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)