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Suite 4, 346 Ferntree Gully Rd, Notting Hill VIC 3149. Tel: 03 9543 2211

Our Ref: 9171-Concealed Fix Roof Klip Lok Classic 700 01/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 Flush 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 Flush 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
Roof Clamp	KL700 clamp kit
Inter Clamp Kit	PV-CLA01&A
End Clamp Kit	PV-CLA40&A

This certificate is **only valid** for Flush 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 Flush 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
- 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 (50mm ≤ s ≤ 300mm)
- 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 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, Flush mount - Lysaght Klip Lok Classic 700 (Concealed Fix Roof)



gamcorp

Relationships built on trust

Gamcorp (Melbourne) Pty Ltd
Consulting Structural & Civil Engineers
A.C.N 141 076 904
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Structural Design Documentation

**Flush 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 – 01
Date: 25 January 2021



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Job No: 9171 - 01
Client: Innosearch Pty Ltd
Project: Flush 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

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

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

Wind Region	Building Height – H (m); Aspect ratio H/d ≤ 0.5 & H/b ≤ 0.5															
	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	685	1060	1460	1955	560	865	1180	1840	505	775	1060	1660	480	735	1000	1565
B	460	705	960	1500	375	575	780	1215	340	520	705	1090	--	490	665	1025
C	--	455	615	950	--	375	505	775	--	340	455	695	--	--	430	655
D	--	--	395	605	--	--	--	495	--	--	--	445	--	--	--	425
W	520	800	1090	1715	425	655	890	1385	385	590	800	1240	365	555	755	1170

Wind Region	Building Height – H (m); Aspect ratio H/d > 0.5 or H/b > 0.5															
	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	465	715	970	1525	385	585	795	1230	345	525	715	1105	--	500	675	1040
B	--	480	645	1000	--	395	530	815	--	355	480	735	--	335	450	690
C	--	--	420	640	--	--	345	525	--	--	--	475	--	--	--	445
D	--	--	--	410	--	--	--	340	--	--	--	--	--	--	--	--
W	355	540	735	1135	--	445	600	925	--	400	540	830	--	380	510	785

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

Type of Rail PV001
 Type of Interface Roof Clamp
 Solar Panel Dimension 1.840m x 0.998m
 Terrain category 3

Wind Region	Building Height – H (m); Aspect ratio H/d ≤ 0.5 & H/b ≤ 0.5															
	H≤5				5<H≤10				10<H≤15				15<H≤20			
	Corner	Edge	Interme date	Internal	Corner	Edge	Interme date	Internal	Corner	Edge	Interme date	Internal	Corner	Edge	Interme date	Internal
A	835	1295	1795	2000	835	1295	1795	2000	715	1110	1525	1985	640	985	1355	1910
B	555	855	1170	1845	555	855	1170	1845	480	735	1005	1575	430	655	890	1390
C	360	550	745	1160	360	550	745	1160	--	475	645	995	--	425	575	885
D	--	355	480	735	--	355	480	735	--	--	415	635	--	--	370	565
W	630	970	1335	1880	630	970	1335	1880	545	840	1145	1800	485	745	1015	1590

Wind Region	Building Height – H (m); Aspect ratio H/d > 0.5 or H/b > 0.5															
	H≤5				5<H≤10				10<H≤15				15<H≤20			
	Corner	Edge	Interme date	Internal	Corner	Edge	Interme date	Internal	Corner	Edge	Interme date	Internal	Corner	Edge	Interme date	Internal
A	565	865	1185	1840	565	865	1185	1840	485	745	1015	1595	435	665	905	1415
B	380	580	785	1220	380	580	785	1220	--	500	675	1045	--	445	605	930
C	--	375	505	780	--	375	505	780	--	--	435	670	--	--	390	595
D	--	--	--	500	--	--	--	500	--	--	--	430	--	--	--	385
W	430	655	890	1390	430	655	890	1390	370	565	770	1195	330	505	685	1055

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

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

Wind Region	Building Height – H (m); Aspect ratio H/d ≤ 0.5 & H/b ≤ 0.5															
	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	855	1180	1850	455	700	955	1510	335	625	855	1345	270	595	810	1265
B	370	570	775	1215	--	465	630	980	--	420	570	880	--	395	535	830
C	--	265	500	765	--	--	405	625	--	--	265	565	--	--	--	530
D	--	--	--	490	--	--	--	400	--	--	--	250	--	--	--	--
W	310	645	880	1385	--	530	720	1120	--	475	645	1005	--	450	610	945

Wind Region	Building Height – H (m); Aspect ratio H/d > 0.5 or H/b > 0.5															
	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	260	575	785	1230	--	470	640	995	--	425	575	890	--	295	545	840
B	--	385	525	805	--	--	430	660	--	--	385	595	--	--	250	560
C	--	--	--	520	--	--	--	425	--	--	--	385	--	--	--	250
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
W	--	435	595	920	--	--	485	750	--	--	435	670	--	--	305	635

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

Type of Rail PV001
 Type of Interface Roof Clamp
 Solar Panel Dimension 2.274m x 1.134m
 Terrain category 3

Wind Region	Building Height – H (m); Aspect ratio H/d ≤ 0.5 & H/b ≤ 0.5															
	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	675	1050	1450	1975	675	1050	1450	1975	580	895	1235	1880	515	800	1095	1745
B	450	690	945	1490	450	690	945	1490	390	595	815	1275	--	530	720	1125
C	--	445	605	935	--	445	605	935	--	385	520	805	--	--	465	715
D	--	--	385	595	--	--	385	595	--	--	--	515	--	--	--	455
W	510	785	1080	1715	510	785	1080	1715	440	675	925	1460	280	600	820	1285

Wind Region	Building Height – H (m); Aspect ratio H/d > 0.5 or H/b > 0.5															
	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	455	700	960	1515	455	700	960	1515	285	605	825	1290	--	540	735	1145
B	--	465	635	985	--	465	635	985	--	405	545	845	--	250	485	750
C	--	--	410	630	--	--	410	630	--	--	--	540	--	--	--	485
D	--	--	--	405	--	--	--	405	--	--	--	--	--	--	--	--
W	--	530	720	1125	--	530	720	1125	--	460	620	965	--	295	555	855

General Notes

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

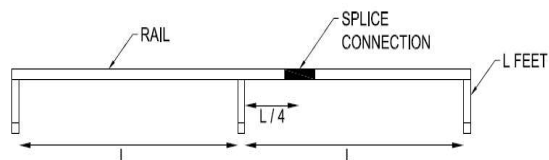
Components	Part Number	Description
Rail	PV001	As per drawing& test report provided by client
Splice	PV-NUT01&B	
Roof Clamp	KL700 Clamp kit	

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

Note 3 Deflection is limited to Minimum of L/120 and 15mm

Note 4 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 5 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 6 Refer Figure 1 for definition of roof zones.

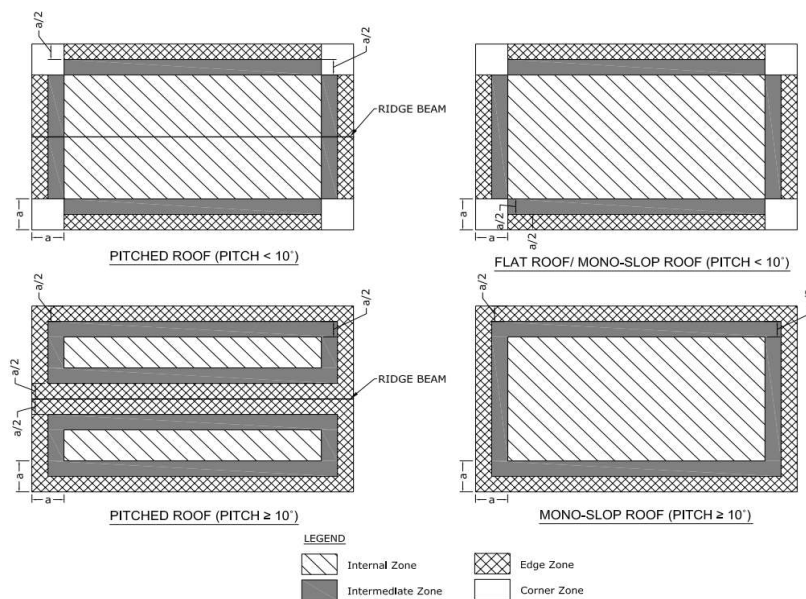


Figure 1 - Roof Zones Definition

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)