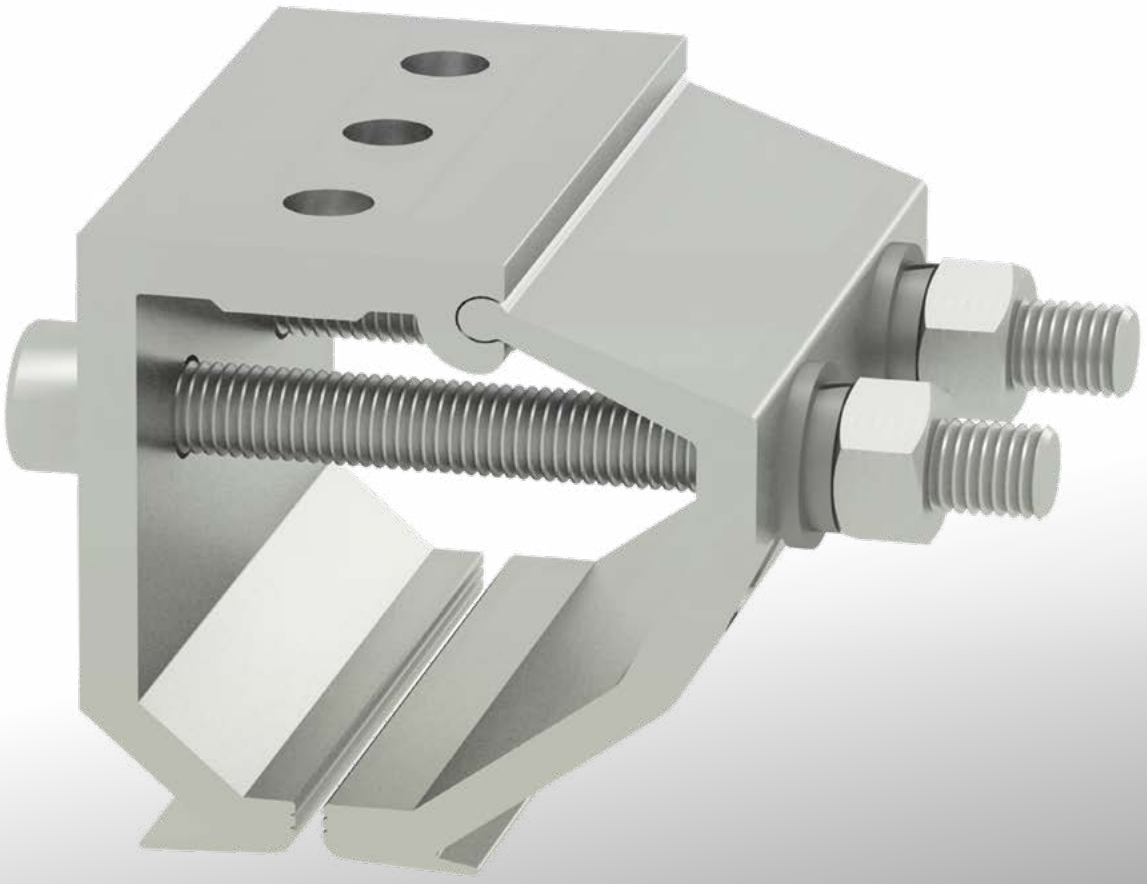
PV-ezRACK®

Non-Penetrative Flush Installation Guide

Code-Compliant Planning and Installation Guide V 4.0
Complying with AS/NZS1170.2-2011 AMDT 2-2016



SOLAR ROOF

Last Updated - Mar. 2022

Introduction

The Clenergy PV-ezRack® SolarRoof has been developed as a universal PV-mounting system for roof-mounting on pitched and flat roofs. The use of patented aluminium base rails and Z-Module technology enables fast and easy installation.

Please review this manual thoroughly before installing PV-ezRack® SolarRoof. This manual provides:

1) Supporting documentation for building permit applications relating to PV-ezRack® SolarRoof Universal PV Module Mounting System,

2) Planning and installation instructions.

List of contents

The PV-ezRack® SolarRoof parts, when installed in accordance with this guide, will be structurally sound and will meet the AS/ NZS1170.2:2011 Amdt 2- 2016 standard. During installation, and especially when working on the roof, please comply with the appropriate Occupational Health and Safety regulations. Please also pay attention to any other relevant State or Federal regulations. Please check that you are using the latest version of the Installation Manual, which you can do by contacting Clenergy Australia via email on tech@clenergy.com.au, or contacting your local distributor in Australia.

Product Warranty:
Please refer PV-ezRack® Product Warranty on our website.

The installer is solely responsible for:

- Complying with all applicable local or national building codes, including any updates that may supersede this manual;
- Ensuring that PV-ezRack and other products are appropriate for the particular installation and the installation environment;
- Using only PV-ezRack parts and installer-supplied parts as specified by PV-ezRack (substitution of parts may void the warranty and invalidate the letter of certification);
- Recycling: Recycle according to the local relative statue;
- Removal: Reverse installation process;
- Ensuring that there are no less than two professionals working on the panel installation;
- Ensuring the installation of related electrical equipment is performed by licenced electricians;
- Ensuring safe installation of all electrical aspects of the PV array. This includes adequate earth bonding of the PV array and PV-ezRack® SolarRoof components as required in AS/NZS 5033: 2021.
- Ensuring that the roof, its rafters/purlins, connections and other structural support members can support the array under building live load conditions;
- Verifying the compatibility of the installation considering preventing electrochemical corrosion between dissimilar metals. This may occur between structures and the building and also between structures, fasteners and PV modules, as detailed in AS/NZS 5033: 2021;
- Verifying atmospheric corrosivity zone of installation site by referring to AS 4312-2008 or consulting local construction business to determine appropriate products and installations.

Planning

Determine the type of concealed roof

The best way to identify the type of concealed roof installed is to check the label normally located underneath the roofing sheet. Otherwise, you can contact the builder or check the building plan to find out the exact type of the roofing sheet.

Notes:

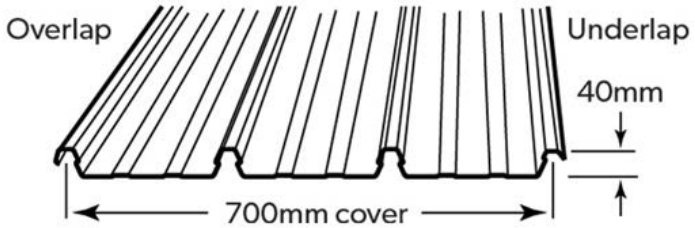
1) Use of the Clenergy Klip-lok brackets is accredited only on the roof sheet types listed below;

2) If the roof sheet type (brand and model) cannot be identified, it is recommended to undertake on-site pull-out capacity test;

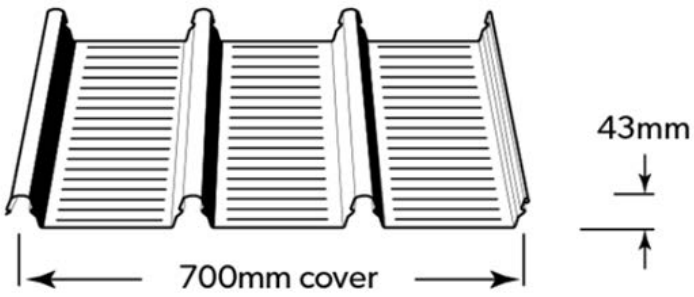
3) Klip-lok bracket can be direct contact with the majority of roof sheet without use of stand-off material between bracket and roof sheet. Please verify the roof sheet material and its compatibility with bracket (material: anodized aluminium) from the roof sheet manufacturer or refer the Clenergy Technical Bulletin of Dissimilar Metals (available on request) for the details.

4) Roof testing of ER-I-34 was completed without using EPDM between roofing sheet and bracket, therefore the generic spacing information for ER-I-34 cannot be applied if EPDM or similar rubber is used between roofing sheet and bracket. In case EPDM or similar rubber is required under Klip-lok bracket for concealed roof installation, please use a different Klip-lok bracket (such as ER-I-09), if this is approved for your specific roofing sheet. An alternative option is to complete a site specific uplift test using ER-I-34 with EPDM based on which a project specific Engineering Certificate can be issued.

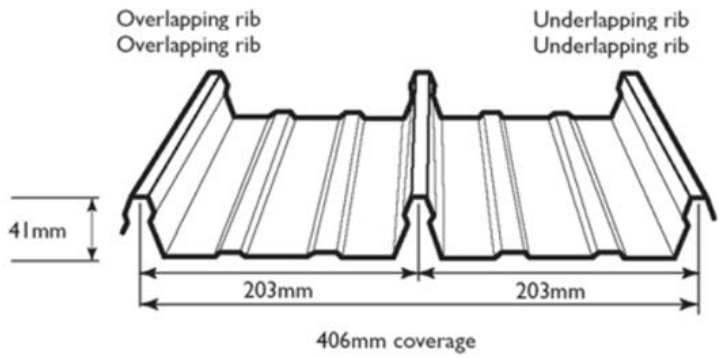
(1) Lysaght Klip Lok 700 Classic (Interface: ER-I-34, ER-I-09)



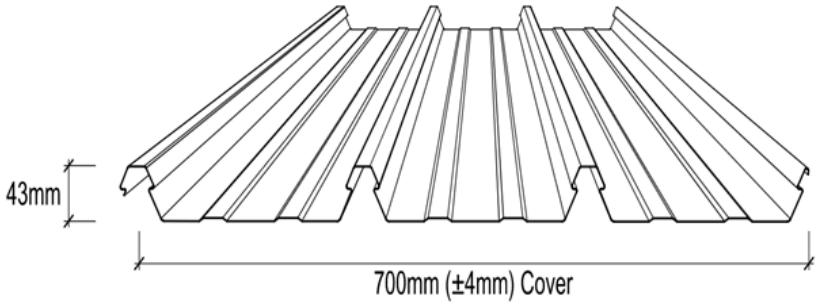
(2) Lysaght Klip-Lok 700 High Strength (Interface: ER-I-34, ER-I-09)



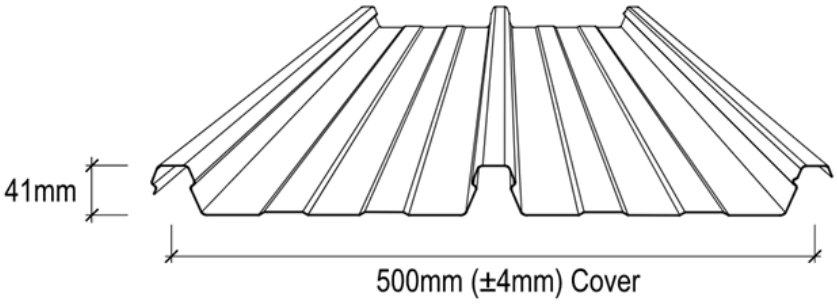
(3) Lysaught Klip-Lok 406 (Interface: ER-I-34, ER-I-32/AU)



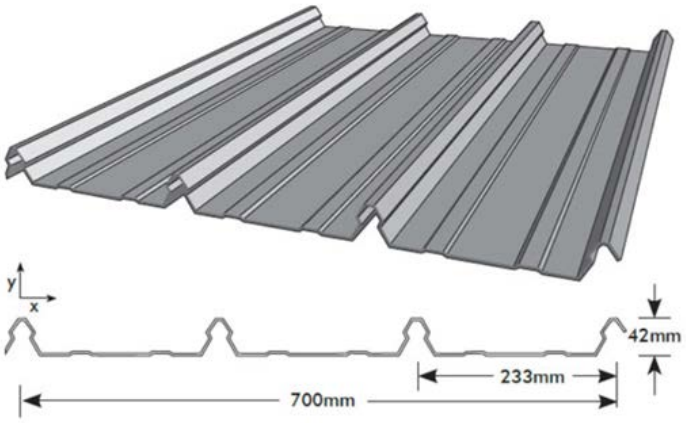
(4) Stramit Speed Deck Ultra (Interface: ER-I-34, ER-I-09)



(5) Stramit Speed Deck 500 (Interface: ER-I-34, ER-I-09)

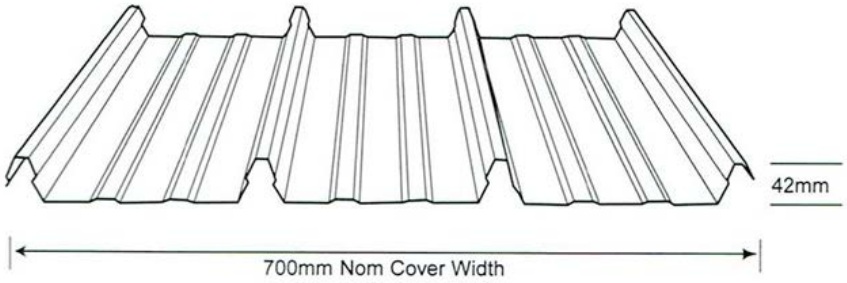


(6) Fielders Kingklip 700 (Interface: ER-I-34, ER-I-09)

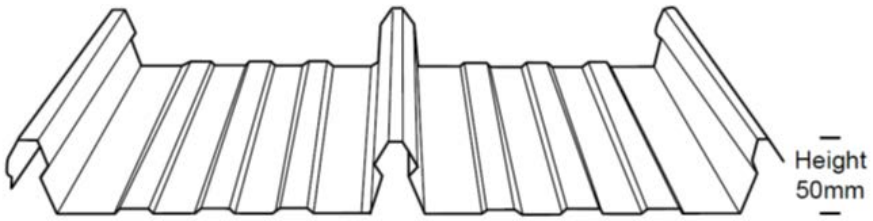


(7) Stratco Topdeck 700 (Interface: ER-I-34, ER-I-09)

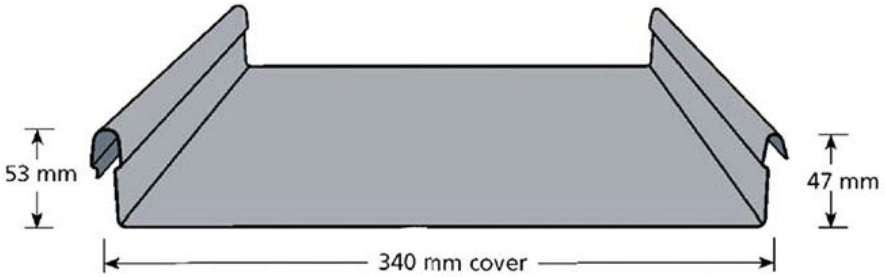
(8) Metroll Metlok 700 (Interface: ER-I-34, ER-I-09)



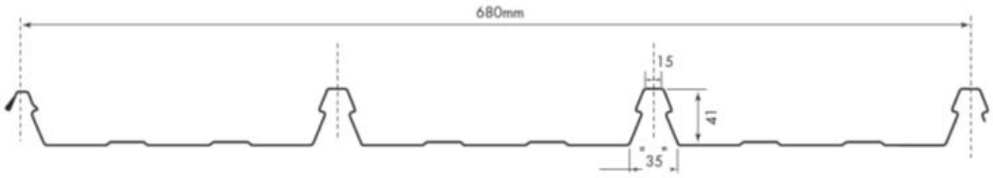
(9) Metroll Metlok 500 (Interface: ER-I-34)



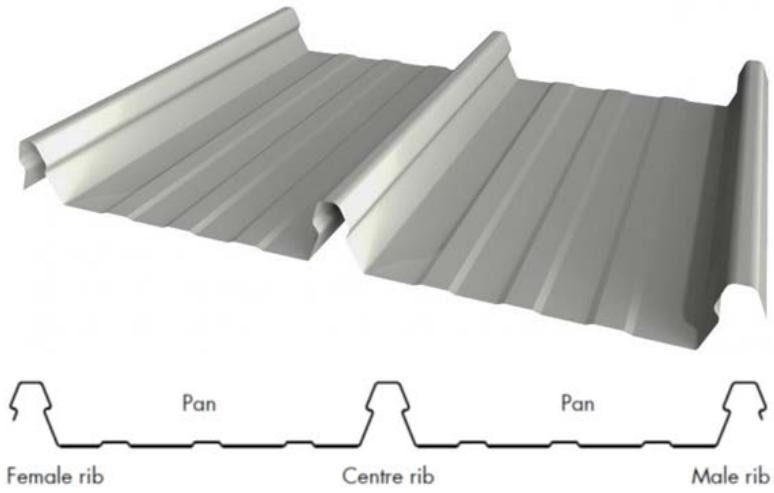
(10) Revolution Maxline 340 (Interface: ER-I-34)



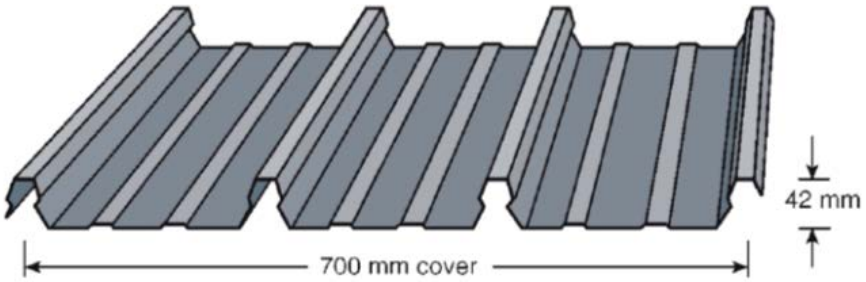
(11) Steeline Lokdek 680 (Interface: ER-I-34)



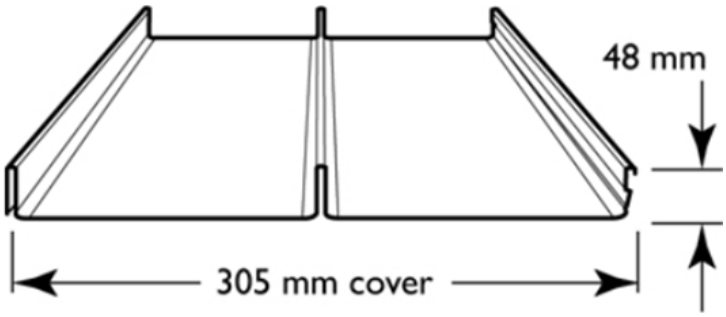
(12) Steeline Steel-Rib 500 (ST28) (Interface: ER-I-34)



(13) Rev-Klip 700 (Interface: ER-I-34)

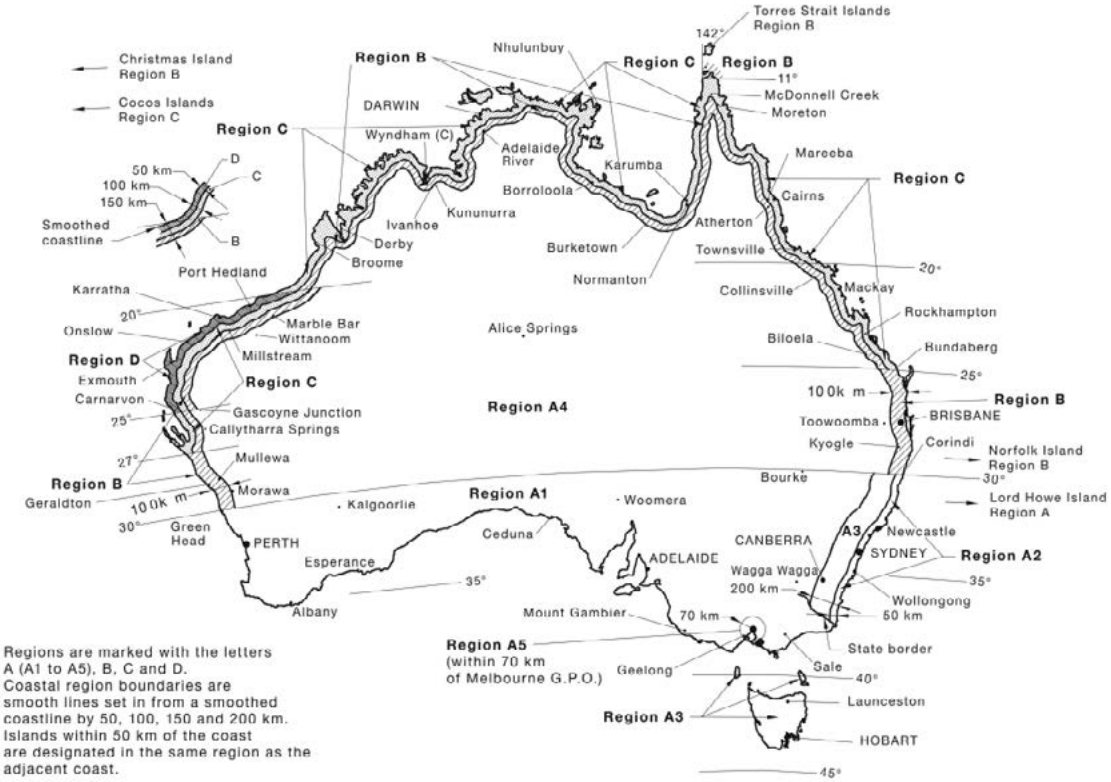


(14) Lysaght LongLine 305 (Interface: ER-I-34, ER-I-29/AU)



Note:
when using ER-I-34 for longline 305 roof sheet installation, please refer to generic note 3 in the engineering letter to apply for interface spacing reduction based on those for ER-I-29/AU.

Determine the type of concealed roof



Region Definition

Wind regions are pre-defined for the whole of Australia by the Australian Standard 1170.2. The Wind Region is an independent factor of surrounding topography or buildings.

- Most of Australia is designated Region A which indicates a Regional Wind Velocity of 43 m/s with wind average recurrence of 200 years.
- Some areas are designated Region B (52 m/s). Local authorities will advise if this applies in your area.
- Region C areas (64 m/s) are generally referred to as Cyclonic and are generally limited to northern coastal areas. Most Region C zones end 100km inland.
- Region D (79 m/s) is Australia's most extreme Cyclonic Region, located between the town of Carnarvon and Pardoo Station in Western Australia.

Determine the Terrain Category

You will need to determine the terrain category to ensure the installation meets the required standard: Terrain Category 1 (TC1) – Very exposed open terrain with few or no obstructions and enclosed, limited-sized water surfaces at serviceability and ultimate wind speeds in all wind regions, e.g. flat, treeless, poorly grassed plains; rivers, canals and lakes; and enclosed bays extending less than 10km in the wind direction.

Terrain Category 1.5 (TC1.5) – Open water surfaces subjected to shoaling waves at serviceability and ultimate wind speeds in all wind regions, e.g. near-shore ocean water; larger unenclosed bays on seas and oceans; lakes; and enclosed bays extending greater than 10km in the wind direction. The terrain height multipliers for this terrain category shall be obtained by the linear interpolation between the values for the TC1 and TC2.

Terrain Category 2 (TC2) – Open terrain, including grassland, with well-scattered obstructions having heights generally from 1.5m to 5m, with no more than two obstructions per hectare, e.g. farmland and cleared subdivisions with isolated trees and uncut grass.

Terrain Category 2.5 (TC2.5) – Terrain with a few trees or isolated obstructions. This category is intermediate between TC2 and TC3 and represents the terrain in developing outer urban areas with scattered houses, or larger acreage developments with fewer than ten buildings per hectare. The terrain-height multipliers for this terrain category shall be obtained by linear interpolation between the values for the TC2 and TC3.

Terrain Category 3 (TC3) – Terrain with numerous closely spaced obstructions having heights generally from 3m to 10m. The minimum density of obstructions shall be at least the equivalent of 10 house sized obstructions per hectare, e.g. suburban housing or light industrial estates.

Terrain Category 4 (TC4) – Terrain with numerous larger, high (10m to 30m tall) and closely-spaced buildings, such as large city centers and well-developed industrial complexes.

If your installation site is not at TC 2, 2.5 or 3, please contact Clenergy to obtain a project specific engineering certificate to support your installation.

Verify Atmospheric Corrosivity Zone of Installation Site

Please refer to"AS 4312-2008 Atmospheric Corrosivity Zones in Australia"or consult local construction business to verify corrosivity category of installation site to determine appropriate products and interface spacing. When standard products are installed in high corrosivity zones, like C4/C5, interface spacing reduction factor need to be applied. Please refer to the generic notes of Certification Letter for the details.

Determine the Height of the Installation Site

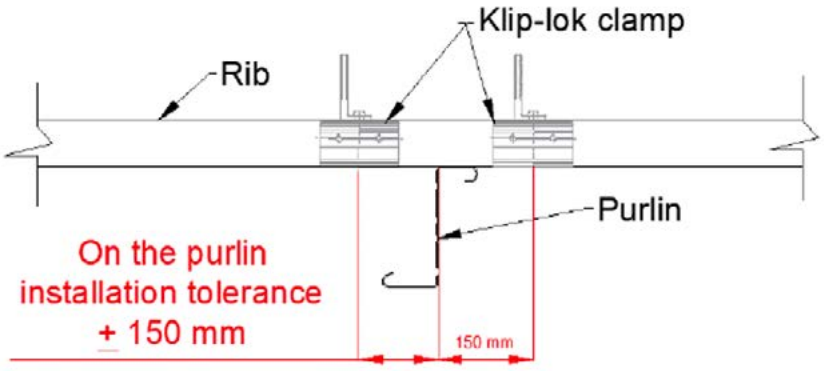
This document provides sufficient information for the PV-ezRack® SolarRoof system installation up to heights of 30 meters. If your installation site is more than 30 meters high please contact Clenergy to obtain project specific engineering certificate to support your installation.

Determine Roof slope

The PV-ezRack® SolarRoof system can be used for roof slopes up to 10°. Please verify that the Installation site roof slope is between 0° and 10°.

Determine the Installation Area of Roof

There is an important change on the installation area of roof based on the certification letter (refer to Note 1), which is installation shall be only on top of the purlins with a maximum tolerance of 150mm. See the sketch below.



Also, the system to be installed when using this generic certification letter is limited up to 100 panels per roof area at a given building height.

For the general installation area of roof, please refer to the notes 6, 24-26 of Certification Letter to determine it based on building height, length and width. Please be also aware at certain building conditions there is an Exclusion Zone for flush installation, which is the minimum distance between PV solar panel and roof edge of "2s", where "s" is the gap between the underside of the panel and the roof surface.

Please refer to note 2 in Certification Letter for roof sheet specific exclusion of installation of the Klip-lok interfaces. For example, for Metroll Metlok 700 roof sheet, Lapjoints installation is excluded.

If your installation does not meet the requirements above, please contact Clenergy to request a project specific engineering certificate to support your installation.

Determine the Maximum Rail Support Spacing

Please refer to the Certification Letter and Interface Spacing Table. If a project specific Certification Letter has been provided, please refer to the support spacing in this letter.

Verify Maximum Rail End Overhang

Rail end overhang is defined as the distance from last interface to the end of panel. Maximum rail end overhang is 40% of the last interface installed spacing. For example, if the max interface spacing in generic engineering certificate is 1800 mm and installed spacing of last interface is 1500 mm, the maximum rail end overhang is 600 mm. Please refer to note 16 of certification letter for the details by sketch.

Determine the Clamping Zone of PV Modules

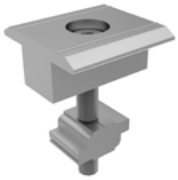
Please refer to the installation manual of the PV module manufacturer for the clamping zone info.

Tools and Components

Tools

				
Screw Driver (for M8 Hexagon Socket Screw)	**String**	**Torque Spanner**	**5m Tape**	**String & Marker Pen**

Components

				
ER-EC-ST End Clamp	**ER-IC-ST** Inter Clamp	**C-U/30/46-G** Universal Clamp	**C-U/30/46** Universal Clamp	**ER-EC-DU35/40** End Clamp, Dual 35 or 40mm
				
ER-EC-DU40/46 End Clamp, Dual 40 or 46mm	**ER-R-ECO** ECO Rail	**ER-SP-ECO** Splice for ECO Rail		

Components

			
CRC-R/ECO Cross Connector Clamp of ECO-Rail	**ER-I-05** Tin Interface	**ER-I-05/CM** Tin Interface with Click Module	**ER-I-05A/EZC/ECO** Tin Interface A with ezClick connection

Applicable Klip-lok Interfaces

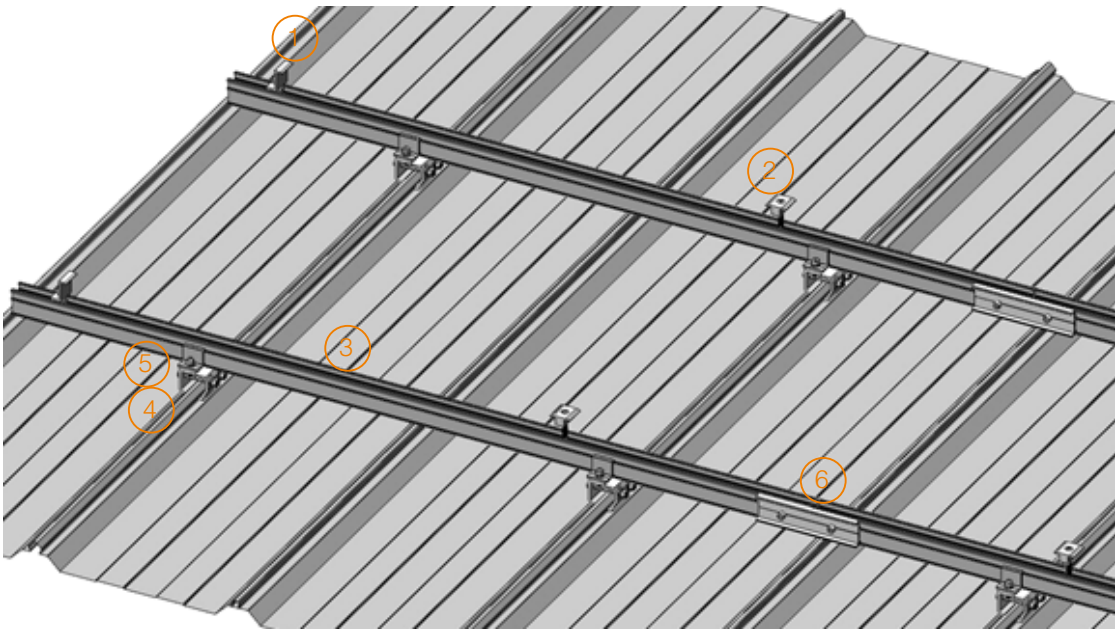
				
ER-I-34 Universal Klip-lok Interface	**ER-I-09** Klip-lok Interface 700	**ER-I-32/AU** Klip-lok Interface 406	**ER-I-29/AU** SolarRoof, Klip-lok Interface for longline 305	**ER-I-34/CRC** Universal Klip-lok Interface pre-assembly with Cross Connector Clamp


ER-I-34/05A/EZC Universal Klip-lok Interface pre-assembly with Tin Interface A with ezClick module

System Overview

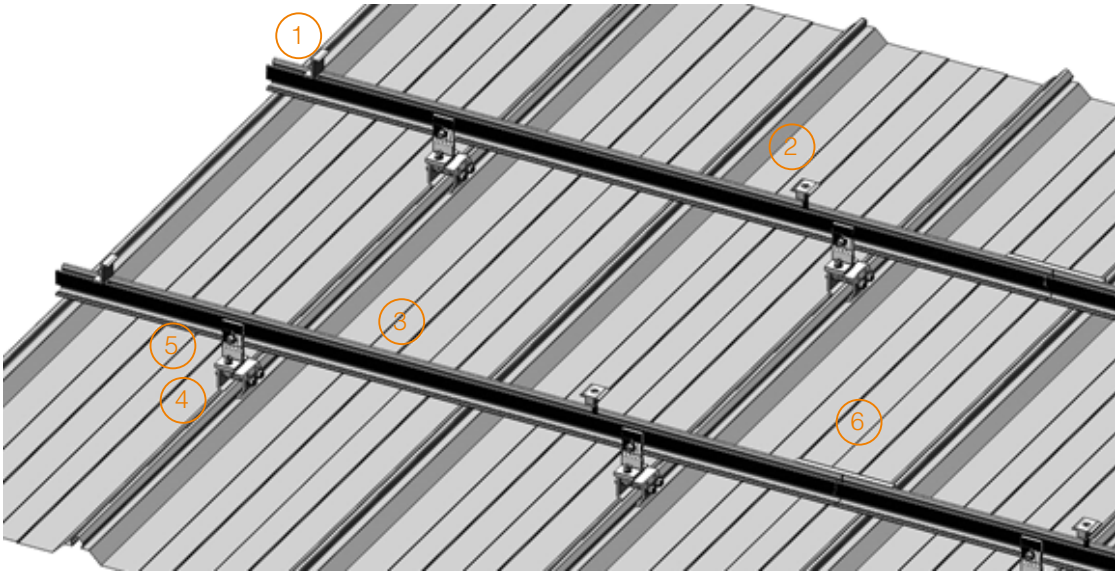
Overview of Klip-lok Interface

With Cross Connector Clamp (use Universal Klip-lok Interface as an exmaple)



1. End Clamp 2. Inter Clamp 3. ECO Rail 4. Universal Klip-lok Interface 5. Cross Connector Clamp
6. Splice for ECO Rail

With Tin Interface (use Universal Klip-lok Interface as an exmaple)



1. End Clamp 2. Inter Clamp 3. ECO Rail 4. Universal Klip-lok Interface 5. Tin Interface
6. Splice for ECO Rail

Precautions during Stainless Steel Fastener Installation

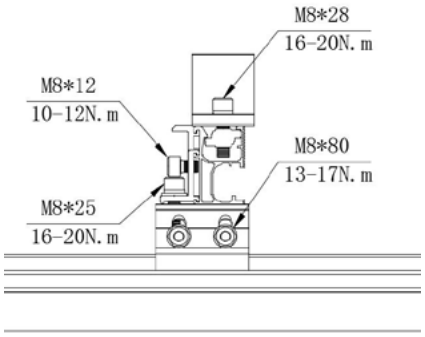
Improper operation may lead to deadlock of Nuts and Bolts. The steps below should be applied to stainless steel nut and bolt assembly to reduce this risk.

General installation instructions

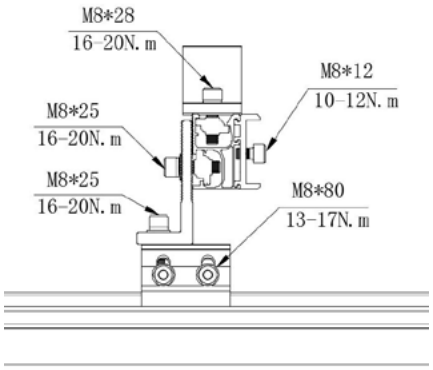
(1) Apply force to fasteners in the direction of thread
(2) Apply force uniformly, to maintain the required torque
(3) Professional tools and tool belts are recommended
(4) In some cases, fasteners could be seized over time. As an option, if want to avoid galling or seizing of thread, apply lubricant (grease or 40# engine oil) to fasteners prior to tightening.

Safe Torques

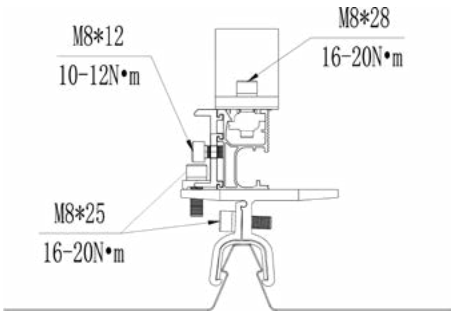
Please refer to safe torques defined in this guide as shown in the figures below. In case power tools are required, Clenergy recommends the use of low speed only. High speed and impact drivers increase the risk of bolt galling (deadlock) If deadlock occurs and you need to cut fasteners, ensure that there is no load on the fastener before you cut it. Avoid damaging the anodized or galvanized surfaces.



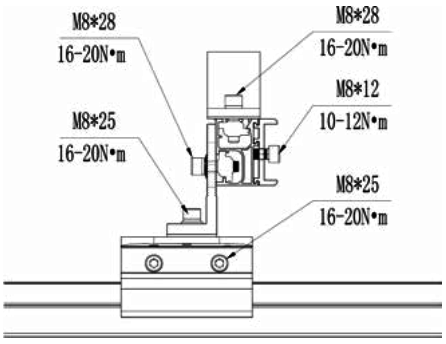
ER-I-34 with Cross Connector Clamp



ER-I-34 with Tin Interface



ER-I-09, ER-I-29/AU or ER-I-32/AU
with Cross Connector Clamp



ER-I-09, ER-I-29/AU or ER-I-32/AU
with Tin Interface

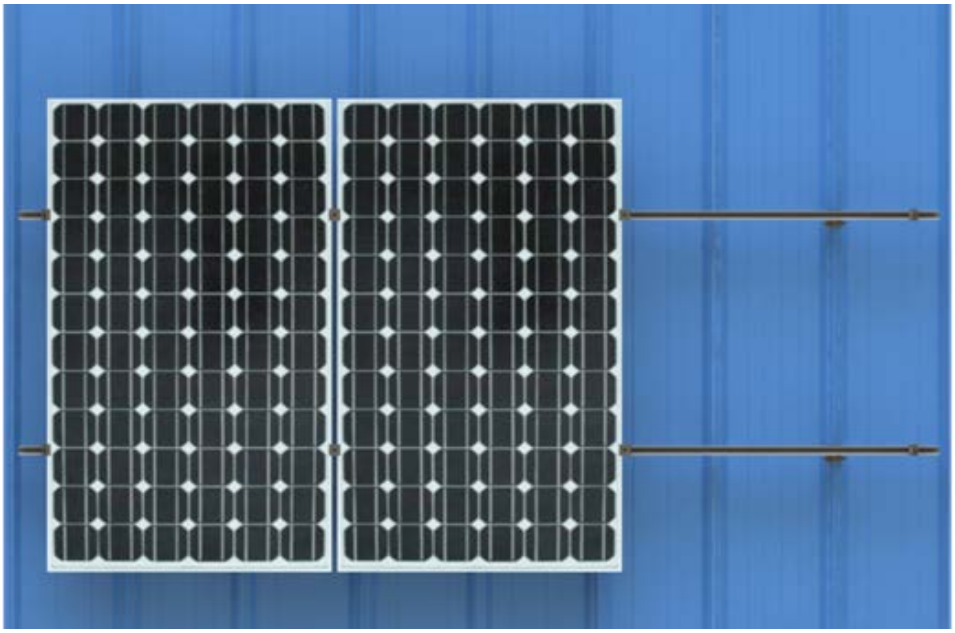
Installation Dimensions

All drawings and dimensions in this Installation Guide are a generic reference only. The PV-ezRack® SolarRoof is to be optimized to suit specific conditions for each project and should be documented in a construction drawing.

Major components of the PV-ezRack® SolarRoof may be provided in section sizes and lengths varying from those shown in this guide. The installation process detailed in this instruction guide remains the same regardless of changes in component size.

If you need to do any on-site modifications or alteration of the system please provide marked up drawings/sketches for Clenergy's review, prior to modification, for comment and approval.

Installation Instructions



- Assess the number of modules in the vertical direction using the module height plus at least 18mm between modules (please check the installation manual of the solar module manufacturer);

- Assess the Number of modules in the horizontal direction using the module width plus 18 mm (20 mm if using Universal Clamps) between the modules. Note: The standard end clamp will also add 20 mm (except for dual end clamps) on each side to the space required;

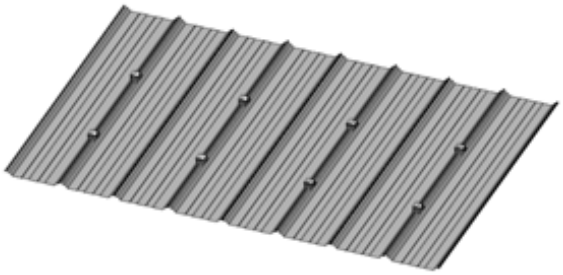
- Assess the horizontal spacing of the Roof Hooks;

- Assess the vertical spacing of the Roof Hooks = approx. 1⁄2 to 3⁄4 of module height;

- Always check the installation manual of the PV-Module you use in order to determine the allowed fixing points on the module frame.

Universal Klip-lok Interface Installation

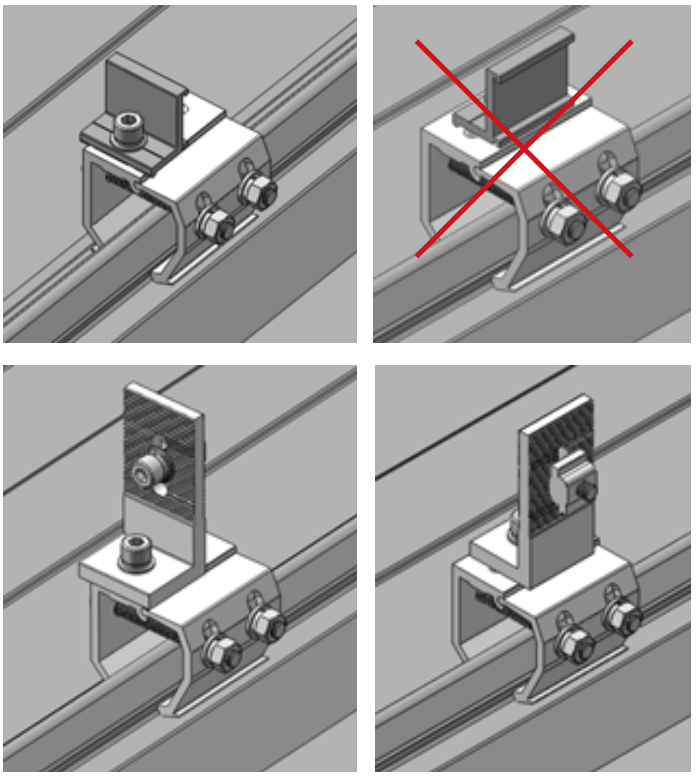
According to your plan, fix the Universal Klip-lok Interface on the ribs of metal sheet. Fasten the bolts of the Universal Klip-lok Interface within 13-17N.m after adjusted properly.



Installation Cross Connector Clamp of ECO-Rail & Tin Interface Installation

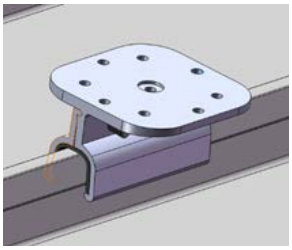
When using Cross Connector Clamp of ECO-Rail, fix the Cross Connector Clamp of ECO-Rail on the top face of the Universal Klip-lok Interface. Fasten the bolt of the Cross Connector Clamp slightly before installing the ECO-Rail. In this case, the PV Modules can be installed in portrait only.

When using Tin Interface, fix the Tin Interface on the top face of the Universal Klip-lok Interface, fasten the Tin Interface and the Universal Klip-lok Interface using M8 bolt within 16-20N.m after adjusted properly.



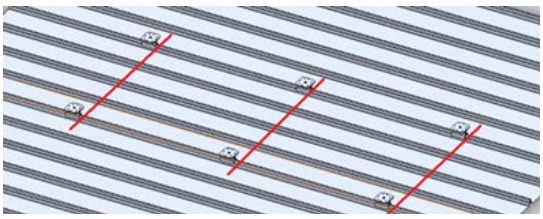
Other Klip-lok Interface Installation

According to the installation plan, after determining the position of the first Klip-lok Interface, fix it on the rib of tin roof and fasten lightly.



Recommended torque for M8 bolts is 16-20N·m.

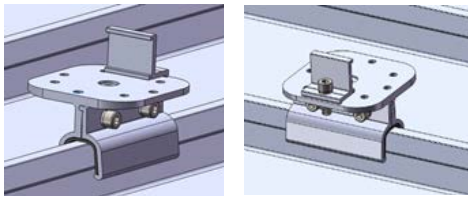
Fix the other Klip-lok Interfaces on the tin roof with the string as shown in the figure on the right.



Cross Connector Clamp of ECO-Rail &Tin Interface Installation

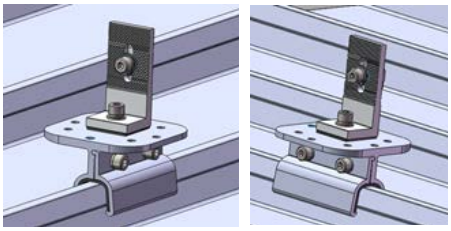
When using the Klip-lok Interface and Cross Connector Clamp with ECO- Rail, please install according to the steps below:

Fix all Cross Connector Clamp of ECO-Rail in the middle hole or side hole of the Klip-lok Interface, do not fasten tightly as shown in the figure on the right.



When using the Klip-lok Interface and Tin Interface with ECO-Rail, please install according to the steps below:

Install all the Tin Interfaces on the middle hole of Klip-lok Interface, do not fasten tightly as shown in the figure on the right.

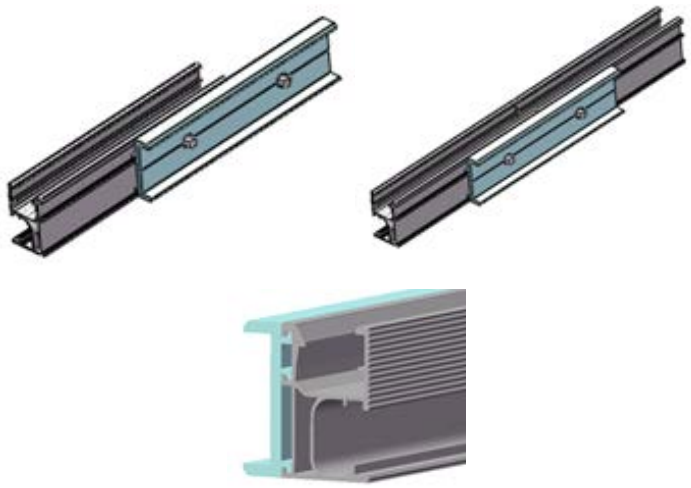


Rail Installation

To connect several rails together, slide half of the splice into the rear side of the rail. Fasten the first M8 Bolt using an Allen key, and slide the next rail into the splice. Tighten the second M8 Bolt using an Allen key.

Splice provides the electrical connection between the 2 rails through the pressure bolts. This eliminates the need of using 2 earthing lugs.

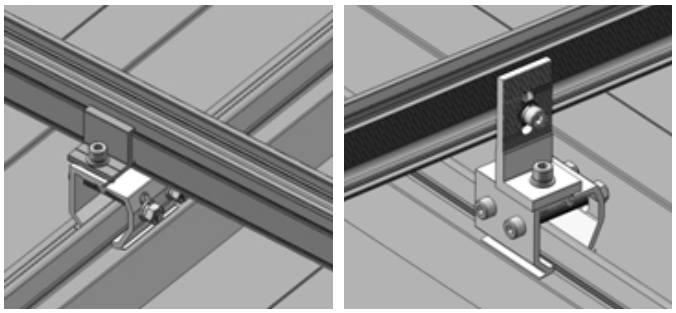
Recommended torque is 10 ~12 Nm.

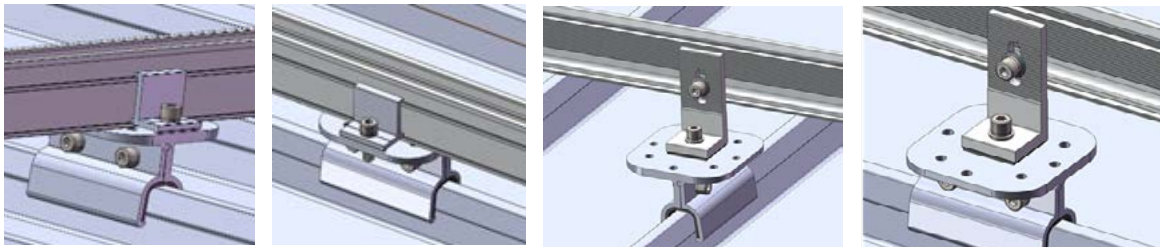


If the rails consist of different lengths, always begin with the shortest piece.

When using Rail Clamp, place the ECO-Rail on the Klip-lok Interface, uplift the Rail Clamp and click it into the side channels of the ECO-Rail as shown in the right figure. Fasten the Rail Clamp within 16-20 N.m after the Rail is positioned properly.

When using Tin Interface, fix the ECO-Rail and Tin Interface as shown in the right figure and then fasten within 16-20 N.m. after Rail is positioned properly.





PV Module Installation

1) Please refer PV-ezRack® Grounding System for PV modules clamps and grounding lugs installations.
2) The installers must ensure panel clamps are installed flush mounted to the panel frame and apply correct torque value of clamp fastener as shown in section "**Safe Torques (Page 13)**".

Certification

STRUCTURAL DESIGN CERTIFICATION

PV-ezRACK®
SOLAR ROOF

Klip-lok Flush
Interface spacing tables

Standard: AS/NZS 1170.2:2011 | Amendment 4-2016 within Australia
Terrain Category: 2, 2.5 & 3

Client: Clenergy Australia

REF: 00249

Date: MAR 2022

Limitation: This report has been prepared for the exclusive use of Clenergy Australia, and is subject to and issued in connection with the provisions of the agreement between MW Engineering Melbourne and Clenergy Australia. MW Engineering Melbourne accepts no liability or responsibility whatsoever for any use of or reliance upon this report by any third party other than Clenergy's clients.

MW Engineering Melbourne

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ABN 37 605 815 585

29 March 2022

Clenergy Australia
1/10 Duerdin Street
Clayton, VIC 3168

CERTIFICATION LETTER

Clenergy PV-ezRack SolarRoof Klip-lok flush interface certification – TC2, 2.5, 3 – Wind Region A, B, C. Internal REF: **00249**. Project REF: **CL-343-S-REV5**.

MW Engineering Melbourne, being Structural Engineers within the meaning of Australian regulations, have calculated the maximum spacings for the PV ez-Rack rail system for the following conditions:

- **Wind Loads to AS 1170.2-2011 AMDT 4-2016**
  - **Wind Terrain Category 2, 2.5 and 3**
  - **Wind average recurrence of 200 years**
  - **Wind Region A, B, and C**
- **Solar panel length up to 2.4 m**

Attached are the tables showing the spacings according to Wind Region, roof pitch, and building height.

The values shown on these tables will be valid unless an amendment is issued on any of the following codes:

- **AS/NZS 1170.0- 2002 AMDT 4-2016** **General Principles**
- **AS/NZS 1170.1- 2002 AMDT 4-2016** **Imposed Loadings**
- **AS/NZS 1170.2- 2011 AMDT 4-2016** **Wind Loadings**
- **AS/NZS 1664.1- 1997 AMDT 1:1999** **Aluminium Code**

Should you have any queries, do not hesitate to contact us.

Best Regards,

Alberto Escobar
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March 2022

REF: 00249

Client: Clenergy Australia

Internal reference: CL- 343-S- REV 5

Project: PV-ezRack SolarRoof Klip-lok flush interface spacing tables

Australian Standards

AS/NZS 1170.0:2002 (R2016)	**General Principles**
AS/NZS 1170.1:2002 (R2016)	**Imposed loadings**
AS/NZS 1170.2:2011 (R2016)	**Wind Loadings**
AS/NZS 1664.1:1997-Amdt 1:1999	**Aluminium**

Wind Terrain Category: 2, 2.5 & 3

Wind average recurrence: 200 years

Designed: SM

Date: MAR 2022

Disclaimer: From the date of publication onwards, any amendment made to any of the above-mentioned Standards will make this report outdated and a new one will have to be released, unless the amendment has no implications on this certificate.

CLENERGY ENGINEERING

MW Engineering Melbourne

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PV-ezRack SolarRoof Interface spacing table for

LYSAGHT KLIP-LOK 700 CLASSIC

Type of Rail	ER-R-ECO (refer to note 9 for other compatible rails)
Type of Interface	ER-I-09 and ER-I-34
Solar Panel Dimension	2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1231	1520	960	1170	872	1064	810	988	673	821
B	878	1140	755	980	711	878	561	684	424	517
C	499	608	273	332	249	304	174	213	162	198

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1359	1637	1155	1391	1046	1261	978	1179	734	884
B	971	1261	825	1071	786	971	620	756	474	571
C	543	655	308	371	272	327	190	229	177	213

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1463	1763	1439	1733	1244	1499	1127	1358	790	952
B	1185	1428	1077	1398	891	1100	761	916	529	638
C	600	723	383	462	340	410	231	278	198	239

Refer to *note 2* to find out installation exclusion zones.

This certificate document is only valid for installations on top of the purlins up to 100 panels per roof area at a given building height. Contact engineering@clenergy.com.au for installations that exceed the above requirement.

CLENERGY ENGINEERING

MW Engineering Melbourne

PV ez-Rack SolarRoof Interface spacing table for

LYSAGHT KLIP-LOK 700 HI-STRENGTH

Type of Rail	ER-R-ECO (refer to note 9 for other compatible rails)
Type of Interface	ER-I-09 and ER-I-34
Solar Panel Dimension	2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1134	1400	884	1078	804	980	746	910	620	756
B	838	1022	712	869	645	787	464	566	369	450
C	517	630	282	344	258	315	181	221	168	205

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1267	1526	1077	1297	975	1175	912	1099	684	824
B	905	1190	840	1012	761	917	547	659	509	613
C	633	763	359	432	317	382	222	267	206	248

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1436	1730	1411	1700	1258	1471	1106	1332	776	934
B	1120	1350	1095	1320	930	1120	648	799	493	594
C	718	865	462	557	407	490	276	333	237	286

Refer to *note 2* to find out installation exclusion zones.

This certificate document is only valid for installations on top of the purlins up to 100 panels per roof area at a given building height. Contact engineering@clenergy.com.au for installations that exceed the above requirement.

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CLENERGY ENGINEERING

MW Engineering Melbourne

PV ez-Rack SolarRoof Interface spacing table for

LYSAGHT KLIP-LOK 406

Type of Rail — ER-R-ECO (refer to note 9 for other compatible rails)

Type of Interface — ER-I-32/AU and ER-I-34

Solar Panel Dimension — 2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1030	1320	953	1162	866	1056	812	990	584	713
B	721	924	597	785	541	711	512	665	333	407
C	455	554	249	303	227	277	159	194	148	180

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1267	1584	1157	1394	1052	1267	986	1188	710	855
B	865	1109	716	942	649	854	615	798	411	495
C	552	665	313	377	276	333	193	233	179	216

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1373	1716	1399	1686	1253	1510	1097	1321	769	927
B	937	1201	878	1171	776	1021	740	925	439	529
C	612	738	392	472	347	418	236	284	202	244

Refer to *note 2* to find out installation exclusion zones.

This certificate document is only valid for installations on top of the purlins up to 100 panels per roof area at a given building height. Contact engineering@clenergy.com.au for installations that exceed the above requirement.

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PV ez-Rack SolarRoof Interface spacing table for

STRAMIT SPEED DECK ULTRA

Type of Rail — ER-R-ECO (refer to note 9 for other compatible rails)

Type of Interface — ER-I-09 and ER-I-34

Solar Panel Dimension — 2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1215	1500	947	1155	861	1050	800	975	664	810
B	898	1095	763	931	691	843	497	606	395	482
C	554	675	303	369	277	338	194	236	180	219

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1357	1635	1153	1390	1045	1259	977	1177	733	883
B	969	1275	900	1084	815	982	586	706	546	657
C	679	818	384	463	339	409	237	286	221	266

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1539	1854	1514	1824	1347	1576	1185	1428	831	1001
B	1200	1446	1175	1416	996	1200	694	857	528	636
C	769	927	496	598	436	525	296	357	254	306

Refer to *note 2* to find out installation exclusion zones.

This certificate document is only valid for installations on top of the purlins up to 100 panels per roof area at a given building height. Contact engineering@clenergy.com.au for installations that exceed the above requirement.

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CLENERGY ENGINEERING

MW Engineering

PV ez-Rack SolarRoof Interface spacing table for

FIELDERS KINGKLIP 700

Type of Rail — ER-R-ECO (refer to note 9 for other compatible rails)

Type of Interface — ER-I-09 and ER-I-34

Solar Panel Dimension — 2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	810	1000	631	770	574	700	533	650	443	540
B	599	730	509	621	461	562	332	404	263	321
C	369	450	202	246	185	225	129	158	120	146

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	905	1090	769	927	697	839	651	785	489	589
B	646	850	600	723	543	655	391	471	364	438
C	452	545	256	309	226	273	158	191	147	177

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1026	1236	1001	1206	898	1051	790	952	554	667
B	800	964	775	934	664	800	463	571	352	424
C	513	618	325	392	291	350	197	238	169	204

Refer to *note 2* to find out installation exclusion zones.

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CLENERGY ENGINEERING

MW Engineering Melbourne

PV ez-Rack SolarRoof Interface spacing table for

STRATCO TOPDECK 700

Type of Rail — ER-R-ECO (refer to note 9 for other compatible rails)

Type of Interface — ER-I-09 and ER-I-34

Solar Panel Dimension — 2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H < 5		5 ≤ H < 10		10 ≤ H < 15		15 ≤ H < 20		20 ≤ H < 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	842	1040	657	801	597	728	554	676	461	562
B	486	593	413	504	374	456	269	328	214	261
C	341	416	186	227	171	208	119	146	111	135

TC	2.5									
Wind Region	Building Height (m)									
	H < 5		5 ≤ H < 10		10 ≤ H < 15		15 ≤ H < 20		20 ≤ H < 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	930	1120	790	952	716	862	669	806	502	605
B	586	706	498	600	451	543	324	391	262	315
C	372	448	211	254	186	224	130	157	121	146

TC	3									
Wind Region	Building Height (m)									
	H < 5		5 ≤ H < 10		10 ≤ H < 15		15 ≤ H < 20		20 ≤ H < 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1001	1206	976	1176	851	1025	771	929	541	651
B	621	748	596	718	528	636	368	443	273	329
C	411	495	297	357	233	280	158	190	135	163

Refer to *note 2* to find out installation exclusion zones.

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CLENERGY ENGINEERING

MW Engineering Melbourne

PV ez-Rack SolarRoof Interface spacing table for

LYSAGHT LONGLINE 305

Type of Rail	ER-R-ECO (refer to note 9 for other compatible rails)
Type of Interface	ER-I-29 and ER-I-34 (Refer to Note 21 for ER-I-34 reduction factors)
Solar Panel Dimension	2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1142	1410	890	1086	809	987	752	917	624	761
B	844	1029	717	875	650	793	467	570	371	453
C	520	635	284	347	260	317	182	222	169	206

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1276	1537	1084	1306	982	1183	918	1107	689	830
B	911	1199	846	1019	766	923	551	664	513	618
C	638	768	361	435	319	384	223	269	207	250

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1446	1743	1422	1713	1267	1481	1114	1342	781	941
B	1128	1359	1103	1329	936	1128	652	805	496	598
C	723	871	466	561	410	494	278	335	239	288

Refer to *note 2* to find out installation exclusion zones.

This certificate document is only valid for installations on top of the purlins up to 100 panels per roof area at a given building height. Contact engineering@clenergy.com.au for installations that exceed the above requirement.

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CLENERGY ENGINEERING

MW Engineering

PV ez-Rack SolarRoof Interface spacing table for

METROLL METLOK 700

Type of Rail — ER-R-ECO (refer to note 9 for other compatible rails)

Type of Interface — ER-I-09 and ER-I-34

Solar Panel Dimension — 2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1215	1500	947	1155	861	1050	800	975	664	810
B	767	1095	652	931	590	843	425	606	337	482
C	554	675	303	369	277	338	194	236	180	219

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1357	1635	1153	1390	1045	1259	977	1177	733	883
B	893	1275	759	1084	687	982	494	706	399	570
C	679	818	384	463	339	409	237	286	221	266

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1539	1854	1514	1824	1347	1576	1185	1428	831	1001
B	1012	1446	991	1416	840	1200	600	857	528	636
C	769	927	496	598	436	525	296	357	254	306

Refer to *note 2* to find out installation exclusion zones.

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CLENERGY ENGINEERING

MW Engineering

PV ez-Rack SolarRoof Interface spacing table for

STRAMIT SPEED DECK 500

Type of Rail — ER-R-ECO (refer to note 9 for other compatible rails)

Type of Interface — ER-I-09 and ER-I-34

Solar Panel Dimension — 2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	972	1200	758	924	689	840	640	780	531	648
B	613	876	521	745	472	675	340	485	270	385
C	443	540	242	295	221	270	155	189	144	176

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1086	1308	923	1112	836	1007	782	942	586	706
B	714	1020	607	867	550	786	396	565	319	456
C	543	654	308	371	271	327	190	229	176	213

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1231	1483	1163	1453	1009	1261	914	1142	641	801
B	810	1157	789	1127	672	960	480	685	422	509
C	616	742	394	474	349	420	237	286	203	245

Refer to *note 2* to find out installation exclusion zones.

This certificate document is only valid for installations on top of the purlins up to 100 panels per roof area at a given building height. Contact engineering@clenergy.com.au for installations that exceed the above requirement.

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CLENERGY ENGINEERING

MW Engineering

PV ez-Rack SolarRoof Interface spacing table for

REV-KLIP 700

Type of Rail — ER-R-ECO (refer to note 9 for other compatible rails)

Type of Interface — ER-I-34

Solar Panel Dimension — 2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1021	1260	796	970	723	882	672	819	558	680
B	754	920	641	782	581	708	418	509	332	405
C	465	567	254	310	232	284	163	198	151	184

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1140	1373	969	1167	878	1058	821	989	616	742
B	814	1071	756	911	685	825	492	593	458	552
C	570	687	323	389	285	343	199	240	185	223

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1293	1557	1268	1527	1132	1324	995	1199	698	841
B	1008	1215	983	1185	837	1008	583	720	444	534
C	646	779	414	499	366	441	249	300	213	257

Refer to *note 2* to find out installation exclusion zones.

This certificate document is only valid for installations on top of the purlins up to 100 panels per roof area at a given building height. Contact engineering@clenergy.com.au for installations that exceed the above requirement.

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CLENERGY ENGINEERING

MW Engineering Melbourne

PV ez-Rack SolarRoof Interface spacing table for

METROLL METLOK 500

Type of Rail: ER-R-ECO (refer to note 9 for other compatible rails)

Type of Interface: ER-I-34

Solar Panel Dimension: 2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	729	900	568	693	517	630	480	585	399	486
B	460	657	391	558	354	506	255	364	202	289
C	332	405	182	221	166	203	116	142	108	132

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	814	981	692	834	627	755	586	706	440	530
B	536	765	455	650	412	589	297	424	239	342
C	407	491	231	278	204	245	142	172	132	159

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	923	1112	866	1082	756	946	685	857	481	601
B	607	868	586	838	504	720	360	514	317	382
C	462	556	291	351	262	315	178	214	152	184

Refer to *note 2* to find out installation exclusion zones.

This certificate document is only valid for installations on top of the purlins up to 100 panels per roof area at a given building height. Contact engineering@clenergy.com.au for installations that exceed the above requirement.

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CLENERGY ENGINEERING

MW Engineering

PV ez-Rack SolarRoof Interface spacing table for

STEELINE STEEL-RIB 500 (ST28)

Type of Rail — ER-R-ECO (refer to note 9 for other compatible rails)

Type of Interface — ER-I-34

Solar Panel Dimension — 2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	891	1100	695	847	631	770	586	715	487	594
B	658	803	560	683	507	618	365	445	290	353
C	406	495	222	271	203	248	142	173	132	161

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	995	1199	846	1019	766	923	717	863	537	647
B	711	935	660	795	598	720	430	518	400	482
C	498	600	282	340	249	300	174	210	162	195

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1128	1360	1104	1330	988	1156	869	1047	609	734
B	880	1060	855	1030	731	880	509	628	387	467
C	564	680	360	433	320	385	217	262	186	224

Refer to *note 2* to find out installation exclusion zones.

This certificate document is only valid for installations on top of the purlins up to 100 panels per roof area at a given building height. Contact engineering@clenergy.com.au for installations that exceed the above requirement.

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PV ez-Rack SolarRoof Interface spacing table for

REVOLUTION MAXLINE 340

Type of Rail — ER-R-ECO (refer to note 9 for other compatible rails)

Type of Interface — ER-I-34

Solar Panel Dimension — 2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1150	1420	897	1093	815	994	757	923	629	767
B	850	1037	723	881	655	798	471	574	374	456
C	524	639	286	349	262	320	183	224	170	208

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1285	1548	1092	1316	989	1192	925	1114	694	836
B	918	1207	852	1026	772	930	555	669	516	622
C	642	774	364	439	321	387	225	271	209	252

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1457	1755	1432	1725	1276	1492	1122	1351	787	948
B	1136	1369	1111	1339	943	1136	657	811	500	602
C	728	878	469	565	413	497	280	338	240	290

Refer to *note 2* to find out installation exclusion zones.

This certificate document is only valid for installations on top of the purlins up to 100 panels per roof area at a given building height. Contact engineering@clenergy.com.au for installations that exceed the above requirement.

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PV ez-Rack SolarRoof Interface spacing table for

STEELINE LOKDECK 680

Type of Rail: ER-R-ECO (refer to note 9 for other compatible rails)

Type of Interface: ER-I-34

Solar Panel Dimension: 2 m x 1 m (Refer to note 22 for other panel sizes)

Roof Angle - 0° < α < 10°

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	567	700	442	539	402	490	373	455	310	378
B	419	511	356	434	323	393	232	283	184	225
C	258	315	141	172	129	158	90	110	84	102

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	633	763	538	649	488	588	456	549	342	412
B	452	595	420	506	380	458	274	330	255	307
C	317	382	179	216	158	191	111	134	103	124

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	718	865	693	835	629	735	553	666	388	467
B	560	675	535	645	465	560	324	400	246	297
C	359	433	223	268	203	245	138	167	118	143

Refer to *note 2* to find out installation exclusion zones.

This certificate document is only valid for installations on top of the purlins up to 100 panels per roof area at a given building height. Contact engineering@clenergy.com.au for installations that exceed the above requirement.

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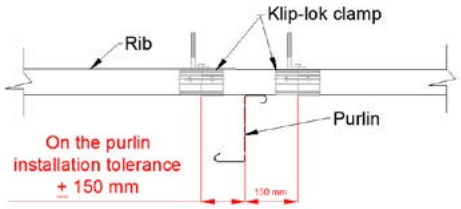
General Notes

Note 1. Installation to be done only on top of the purlins with a maximum tolerance of 150 mm.

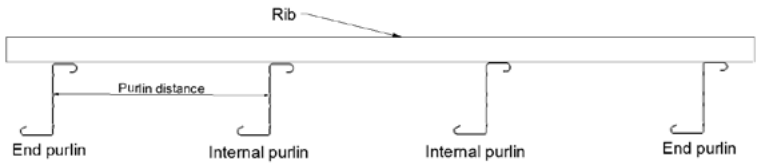


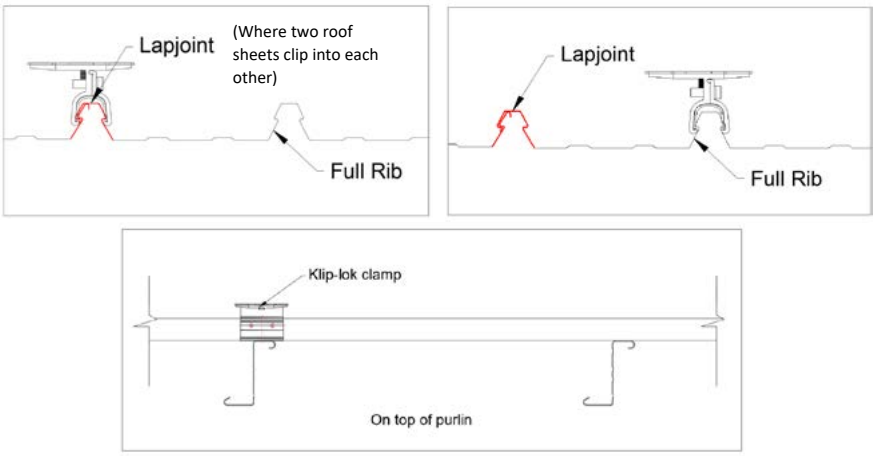
Note 2. Exclusion for installation of klip-lok clamps depending on the roof sheet type to be as per the following table.

Roof Sheet type	Exclusions	Test Repot No.
Lysaght KLIP-LOK 700 Classic	N/A	MT-19/0633-A
Lysaght KLIP-LOK 700 Hi-Strength	N/A	MT-11/023
Lysaght KLIP-LOK 406	N/A	MT-17/001-A
Stramit Speed Deck Ultra	N/A	MT-11/023
Fielders Kingklip 700	N/A	MT-11/280
Stratco Topdeck 700	N/A	MT-17/001-B and MT-19/1007
Lysaght Longline 305	N/A	MT-13/133
Metroll Metlok 700	· Exclude lapjoints	MT-19/0633-B
Stramit Speed Deck 500	N/A	MT-19/0762
Rev-klip 700	N/A	MT-19/1018-A
Metroll Metlok 500	· Exclude lapjoints	7530/MJ
Steeline Steel-Rib 500	N/A	MT-19/1090-B
Revolution Maxline 340	N/A	MT-19/1018-B
Steeline Lokdeck 680	N/A	20-0028

Contact Clenergy for a project specific assessment if you cannot comply the above exclusions.

Refer to the below pictures to find clamp position, rib type and location on respective roof sheet.





Note 3. Lysaght Longline 305 fixing spacings were calculated based on the capacity of Clenergy's ER-I-29 clamp and the roof sheet. When using Clenergy's ER-I-34 clamp, Longline 305 fixing spacings shall be reduced as follows:

Wind Region A	Wind Region B	Wind Region C
-80%	-80%	-70%

Note 4. Exclusion for installation of Clenergy's ER-I-34 on Lysaght Longline 305 roof sheet to be as per the below table

Roof Sheet type	Exclusions	Test Repot No.
Lysaght Longline 305	• Exclude lapjoints	MT- 20-0661

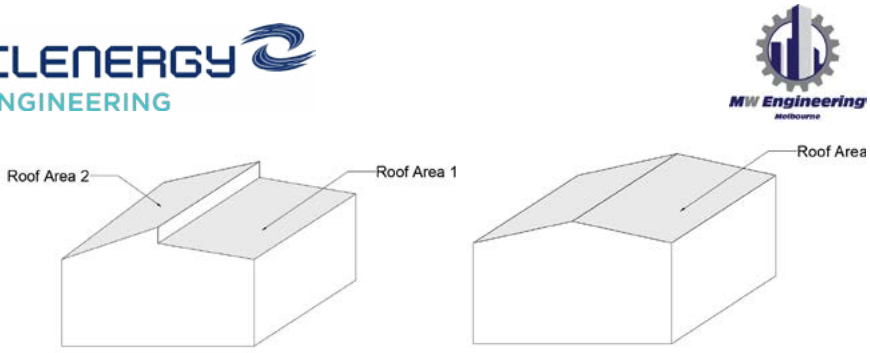
Note 5. Rails cannot run parallel to the ribs unless the applicable table spacings are equal or larger the purlin distance. Contact Clenergy if you are unable to comply with this condition or any of the installation specifications listed on this document.

Note 6. The spacing information in this document has been designed to be compliant with the capacity of the below items per roof area:

- Klip-lok clamp
- Roofing sheet
- Fixing clip between roofing sheet to purlin

Prior to carrying the PV installation, it is recommended to check that the roof sheet has been installed according to the manufacturers specifications and there are no missing clips.

Roof area is defined as a single surface that has no height variance.



Note 7. This document does not cover the following:

- Building frame capacity
- Off the purlin installation

Note 8. This certificate only covers the assessment of the Clenergy PV mounting system, including the components listed on note 4. Assessment of the roof structure, PV panels and other fixings are to be checked by the installer/contractor.

Note 9. The following components are satisfied for use according to AS/NZS 1664.1:1997-Amdt 1:1999 and AS/NZS 1170.2:2011 Amdt 4-2016.

Components	Part No.	Description
ECO-Rail	ER-R-ECO/XXXX	ECO-Rail
Splice	ER-SP-ECO	PV-ezRack Splice for ECO-Rail
Australian Made Mill Finish ECO-Rail	R-ECO/XXXX/AUMF	PV-ezRack Australian Made Mill Finish ECO-Rail
ST-Rail	ER-R-STXXXX	Standard Rail
Splice	ER-SP-ST	PV-ezRack Splice for Standard Rail 200mm
Roof bracket	ER-I-09	Klip-lok bracket
Roof bracket	ER-I-09/100/45	Klip-lok bracket
Roof bracket	ER-I-29/AU	Klip-lok bracket
Roof bracket	ER-I-32/AU	Klip-lok bracket

Components	Part No.	Description
Roof bracket	ER-I-34	Universal Klip-lok clamp
Inter Clamp	ER-IC-STXX	Inter Clamp = clamp + Z-Module + bolt
End Clamp	ER-EC-STXX	End Clamp = clamp + Z-Module + bolt
Security Inter Clamp	ER-IC-STXX/S	Security Inter Clamp
Security End Clamp	ER-EC-STXX/S	Security End Clamp
Clamp	C-U/30/46-G	Universal Clamp for Frame Height 30-46mm with Grounding Clip
Clamp	C-U/30/46	Universal Clamp for Frame Height 30-46mm
End Clamp	ER-EC-DU35/40	End Clamp dual 35 or 40mm
End Clamp	ER-EC-DU40/46	End Clamp dual 40 or 46mm
Cross Connection Clamp	CRC-R/ECO CRC-R/ECO-ZBW	Cross Connection Clamp
Interface	ER-I-05	Tin Interface
Interface	ER-I-05/BA	Tin Interface Black
Interface	ER-I-05A/EZC/ECO	ezClick connection for ECO-Rail
Interface	ER-I-05A/EZC/ECO	ezClick connection for ECO-Rail

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Components	Part No.	Description
End Clamp (*)	EC-FL/GE/XX/XX	End Clamp for Frameless Module (glued EPDM)
Inter Clamp (*)	IC-FL/GE/XX/XX	Inter Clamp for Frameless Module (glued EPDM)
End Clamp (*)	ER-EC-FL/XX/XX	End Clamp for Frameless Module
Inter Clamp (*)	ER-IC-FL/XX/XX	Inter Clamp for Frameless Module
ECO-Rail Black	ER-R-ECO/4200/BA	ECO-Rail Black
Splice ECO-Rail Black	ER-SP-ECO/BA	Splice ECO-Rail Black
Mid Clamp XX Black	ER-IC-STXXB	Inter Clamp XX Black
End Clamp XX Black	ER-EC-STXXB	End Clamp XX Black
Black Universal Clamp	C-U/30/46/BA	Black Universal Clamp
Black Universal Clamp	C-U/30/46-G/BA	Black Universal Clamp with grounding clip
Roof bracket	ER-I-34/CRC	Universal Klip-lok Bracket Pre-assembly with Cross Connection Clamp
Roof bracket	ER-I-34/05A/EZC	Universal Klip-lok Bracket Pre-assembly with Tin Interface
Roof bracket	ER-I-34/CRC/BA	Black Universal Klip-lok Bracket Pre-assembly with Cross Connection Clamp
Roof bracket	ER-I-34/05A/EZC/BA	Black Universal Klip-lok Bracket Pre-assembly with Tin Interface

(*) Subject to the panel manufacturer's installation guide.

Note 10. For Terrain Category (TC) definition, please refer to clause 4.2.1 of AS/NZS 1170.2:2011 (R2016).

Note 11. Wind Direction Multiplier (Md) taken as 1.0. Refer to clause 3.3 of AS/NZS 1170.2:2011 (R2016) for more information.

Note 12. Shielding Multiplier (Ms) taken as 1.0. Refer to clause 4.3 of AS/NZS 1170.2:2011 (R2016) for more information.

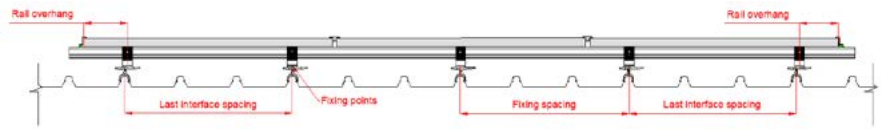
Note 13. Topographic Multiplier (Mt) taken as 1.0. Refer to clause 4.4 of AS/NZS 1170.2:2011 (R2016) for more information.

Note 14. This certificate cannot be used if the site is located on a hill, ridge or escarpment. Contact Clenergy if the aforementioned condition is met on site.

Note 15. Clamping zone of the PV panels shall be according to the manufacturer's specifications.

Note 14. Capacities checked and compared against testing data from Clenergy Australia and MTS (NATA certified).

Note 16. Rail overhang ends where the panel finishes and this should be less than 40% of the last installed interface spacing.



Note 17. From the date of publication onwards, any amendment made to any of the above-mentioned Standards will make this report outdated and a new one will have to be released, unless the amendment has no implications on this certificate.

Note 18. All components from Clenergy must be installed according to manufacturer's specification and the instructions shown in the relevant installation manual. Please check the Clenergy Australia website or contact them for access to the most recent installation manuals.

Note 19. Only hip and gable roofs installations are covered on this certificate. Contact Clenergy if you are planning to install on a different roof type such as curved, multi-span (pitched and saw-tooth), mansard, circular bins, silos, tanks, pitched free roofs, troughed free roofs, hypar free roos, canopies, awnings and cantilevered roofs.

Note 20. No consideration has been taken on the effect of snow loads. In case the roof is located in a snow prone area, a project specific design must be completed.

Note 21. If the installation is located in ISO corrosivity category C4 reduce the interface spacing by 5%. If the installation is located in ISO corrosivity category C5 reduce the interface spacing by 25%.

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Note 22. This Engineering report is based on 2 m x 1 m panels and two rails per panel. However, for different panel sizes a percentage increase or decrease can be applied on all interface spacings as shown on the following table.

Number of rails per panel	Panel length (mm)	Spacing +/- W.R – A & B	Spacing +/- W.R – C & D
2 rails	≤ 1700	+ 10 %	+ 12 %
3 rails	≤ 1700	+ 12 %	+ 18 %
4 rails	≤ 1700	+ 15 %	+ 20 %
2 rails	≤ 1800	+ 4 %	+ 7 %
3 rails	≤ 1800	+ 12 %	+ 18 %
4 rails	≤ 1800	+ 15 %	+ 20 %
2 rails	≤ 1900	0 %	+ 5 %
3 rails	≤ 1900	+ 10 %	+ 15 %
4 rails	≤ 1900	+ 12 %	+ 18 %
2 rails	≤ 2000	0 %	0 %
3 rails	≤ 2000	+ 10 %	+ 15 %
4 rails	≤ 2000	+ 12 %	+ 18 %
2 rails	≤ 2100	- 10 %	- 6 %
3 rails	≤ 2100	+ 10 %	+ 15 %
4 rails	≤ 2100	+ 12 %	+ 18 %
2 rails	≤ 2200	- 18 %	- 12 %
3 rails	≤ 2200	+ 7 %	+ 12 %
4 rails	≤ 2200	+ 12 %	+ 18 %
2 rails	≤ 2300	- 20 %	- 12 %
3 rails	≤ 2300	+ 5 %	+ 12 %
4 rails	≤ 2300	+ 10 %	+ 15 %
2 rails	≤ 2400	- 25 %	- 15 %
3 rails	≤ 2400	+ 5 %	+ 10 %
4 rails	≤ 2400	+ 8 %	+ 12 %

Note 23. Panel width cannot exceed 1.20 m for any of the above panel length dimensions and panel weight cannot exceed 15 kg/m².

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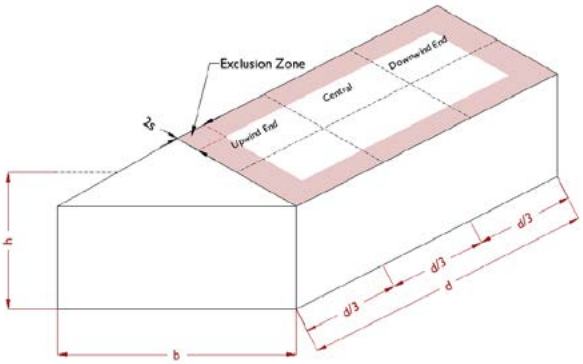
Note 24. Conditions for flush mounted systems installed on flat and pitched roofs according to the D6 Appendix of the AS/NZS 1170.2:2011 (R2016).

- Roof pitch to be between 1° and 30°.
- h/d ≤ 0.5 and h/b ≤ 0.5. Being h= height, b= width and d= length of the building as per the below picture.
- Gap between the underside of the panel and the roof to be no less than 50 mm and no more than 300 mm.
- Minimum distance from the edge of the roof to be "2s" where "s" is the gap between the underside of the panel and the roof.

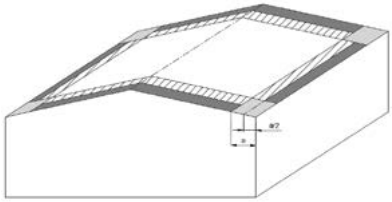


Note 25. Roof Zone definition when the installation doesn't meet the parameter on section D6 part (d) of the AS/NZS 1170.2:2011 (R2016) standard for roof angle is between 1° to 10° (not inclusive).

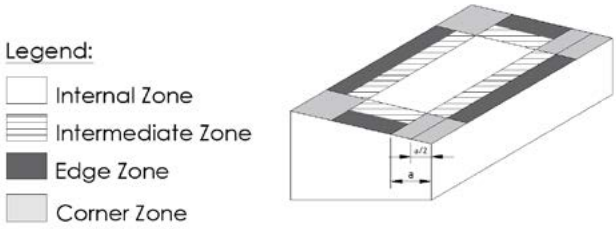
Step 1. Determine building height (h), width (b) and length (d).

Step 2. Choose the lowest value between "h", "b x 0.2" and "d x 0.2".

Step 3. The lowest value on Step 2, equates to a.



Roof Pitch < 10°



Flat/Mono – Slope Roof < 10°

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Note 26. Zone reduction factors to be the following:

- **Internal:** Use the same table spacings as central zone.
- **Intermediate:** Divide central zone spacings by 1.5.
- **Edge:** Divide central zone spacings by 2.
- **Corner:** Divide central zone spacings by 3.

Note 27. The more conservative outcome has to be used if one panel or panel row fall between two roof zones.

Example when building parameters fall outside section D6 of the AS/NZS 1170.2:2011 (R2016) standard.

- Wind Region A
- Terrain Category: 3
- Building height: 5m
- Roof pitch: less than 3°
- Roof Sheet: Lysaght Klip-lok 700 Classic
- Panel rail type: ER-R-ECO
- Panel rail orientation: perpendicular to purlins
- Purlin spacing: 1500 mm
- Panel dimension: 2 m x 1 m
- Central spacing from the tables: 1763 mm
- Fixing spacings as per below
    - Internal zone: 1763 mm
    - Intermediate zone: 1175 mm
    - Edge zone: 881 mm
    - Corner zone 587mm

Installation only feasible on top of the purlins, therefore:

- Internal zone: 1500 mm (with a maximum tolerance of 150 mm)
- Intermediate zone: Not feasible
- Edge zone: Not feasible
- Corner zone Not feasible

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