

# SolarRoof, Brid - Corrugated Profile Roof Adaptor

Code-Compliant Planning and Installation Guide V 1.0  
Complying with AS/NZS1170.2-2021



# Introduction

The Clenergy PVezRack® SolarRoof™ has been developed as a universal PV-mounting system for roof-mounting on pitched and flat roofs. Brid - Corrugated Profile Roof Adaptor is another innovative Tin roof interface, specified for Corrugated Profile Roof.

Please review this manual thoroughly before installing PVezRack® SolarRoof™. This manual provides:

1) Supporting documentation for building permit applications relating to PVezRack® SolarRoof™ Universal PV Module Mounting System.

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The PVezRack® SolarRoof™ parts, when installed in accordance with this guide, will be structurally sound and will meet the AS/NZS1170.2:2021 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 at [tech@clenergy.com.au](mailto:tech@clenergy.com.au) or contacting your local distributor in Australia.

## The installer is solely responsible for:

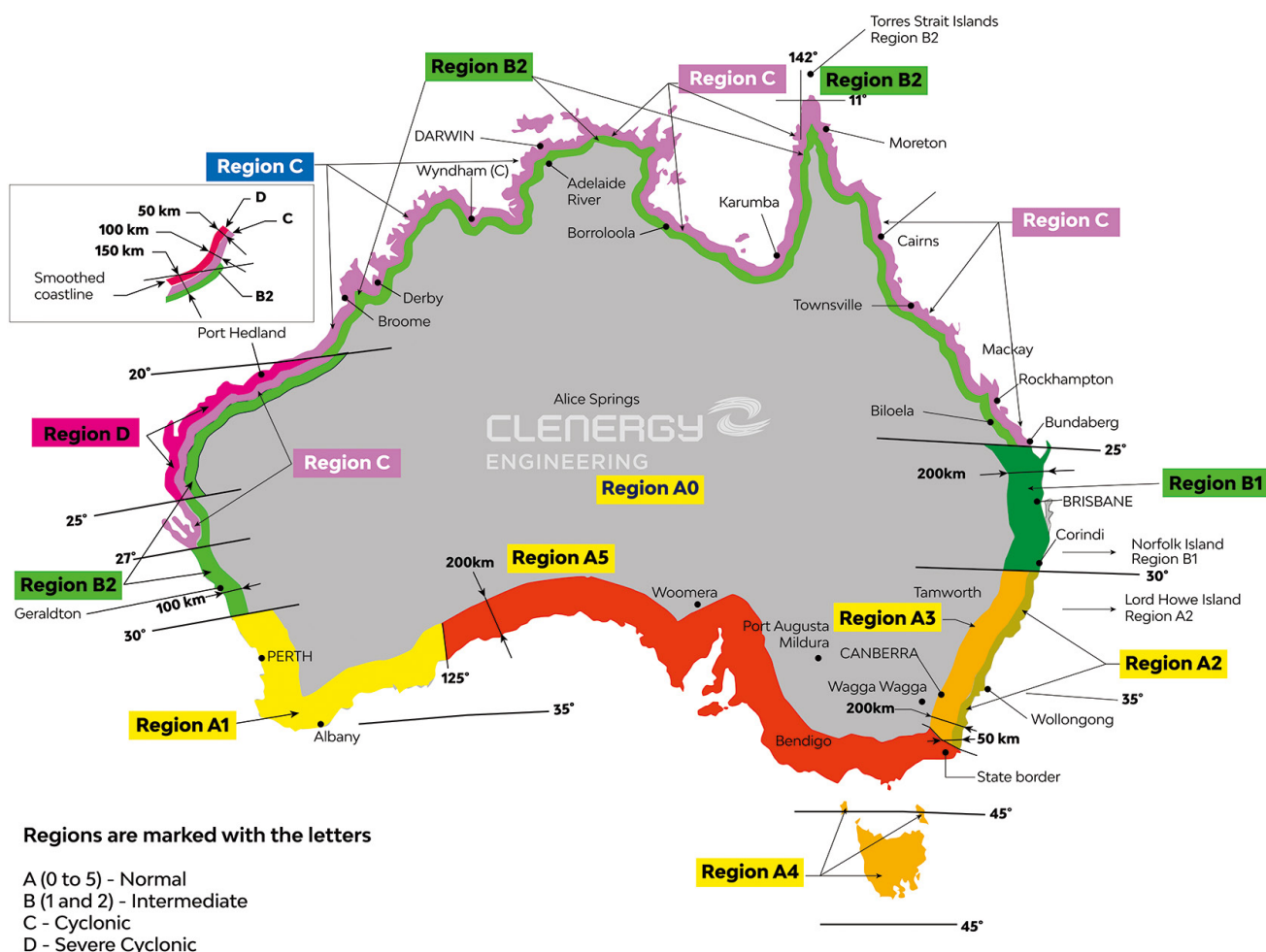
- Complying with all applicable local or national building codes, including any that may supersede this manual.
- Ensuring that PVezRack and other products are appropriate for the installation and the installation environment.
- Using only PVezRack parts and installer-supplied parts as specified by the PVezRack project plan. (substitution of parts may void the warranty and invalidate the letter of certification).
- Recycling: Recycle: according to the local relative statute.
- Removal: Reverse installation process.
- Ensure that there are no less than two professionals working on panel installation.
- Ensure 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 PVezRack® 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.
- Ensuring that screws to fix interfaces have adequate pull-out strength and shear capacities as installed.
- Maintaining the waterproof integrity of the roof, including the selection of appropriate flashing.
- Verifying the compatibility of the installation considering preventing electrochemical corrosion between dissimilar metals. This may occur between structures and the building and 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.

## Product Warranty:

Please refer [PVezRack® Product Warranty](#) on our website.

# Planning

Determine the wind region of your installation site



Wind regions are pre-defined for the whole of Australia by the Australian Standard 1170.2:2021. Comparing to 1170.2:2011, 2021 version has a lot of changes in wind regions.

- Central Australia is now classified as Wind Region A0 and Terrain Classification 2 instead of Wind Region A4.
- Region A1, previously most of the South coast of Australia, now is divided into Regions A1 and A5.
- Tasmania is now Region A4.
- Region B has been divided into regions B1 and B2. This will affect installations in Northern NSW, Gold Coast, Brisbane, Sunshine Coast, and Gladstone.
- Region B1 was increased to include more inland cities around Brisbane. This will likely mean extra structural requirements such as extra rail for installs.

## 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 very few or no obstructions, and all water surfaces, e.g. flat, treeless, poorly grassed plains; open ocean, rivers, canals, bays and lakes.

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 some trees or isolated obstructions, terrains in developing outer urban areas with scattered houses, or larger acreage developments with more than two and less than 10 buildings per hectare.

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-size obstructions per hectare, e.g. suburban housing, light industrial estates or dense forests.

Terrain Category 4 (TC4) – Terrain with numerous larger, high (10m to 30m tall) and closely-spaced constructions 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.

## Determine the Roof Type

This bracket is suitable for installation of Corrugated Profile Roof only.

Note: Bracket installation is allowed on the full rib of Corrugated roof only. Installation on lap joints must be avoided.

## Verify Atmospheric Corrosivity Zone of Installation Site

Please refer to "AS 4312-2008 Atmospheric Corrosivity Zones in Australia" or consult local construction businesses to verify the corrosivity category of the installation site to determine appropriate products and interface spacing.

Note: Clenergy provided screws for Tin interfaces are suitable for up to C4 corrosive environments only.

## Determine the Height of the Installation Site

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

## Determine Roof Slope

Brid - Corrugated Profile Roof Adaptor installation on Corrugated Roof is certified for roof slopes up to 15°. Please verify that the Installation site roof slope is between 0° and 15°.

## Determine the Installation Area of Roof

Please refer to the generic notes of the Certification Letter to determine the installation area based on building height, length, and width. Please be 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 "2 x s", where "s" is the gap between the underside of the panel and the roof surface.

## 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 the last interface to the end of the panel. The maximum rail end overhang is 40% of the last interface installed spacing. For example, if the max interface spacing in the generic engineering certificate is 1200 mm and installed spacing is 1000 mm, the maximum rail end overhang is 400 mm.

## Acquire PV Modules Clamping Zone Information

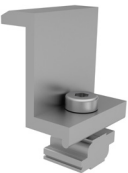
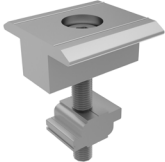







It is important to check PV modules clamping requirements (for example clamp dimensions, clamping distance from the end of the panel) from PV modules manufacturer before installations, which can help to avoid using the incorrect size of clamps and help to plan interface's positions on the roof and rail's orientation and position.

# Tools and Components

## Tools

				
Screwdriver	Marker Pen	Torque Spanner	Tape	String
				
5/16" Hex Socket				

## Components

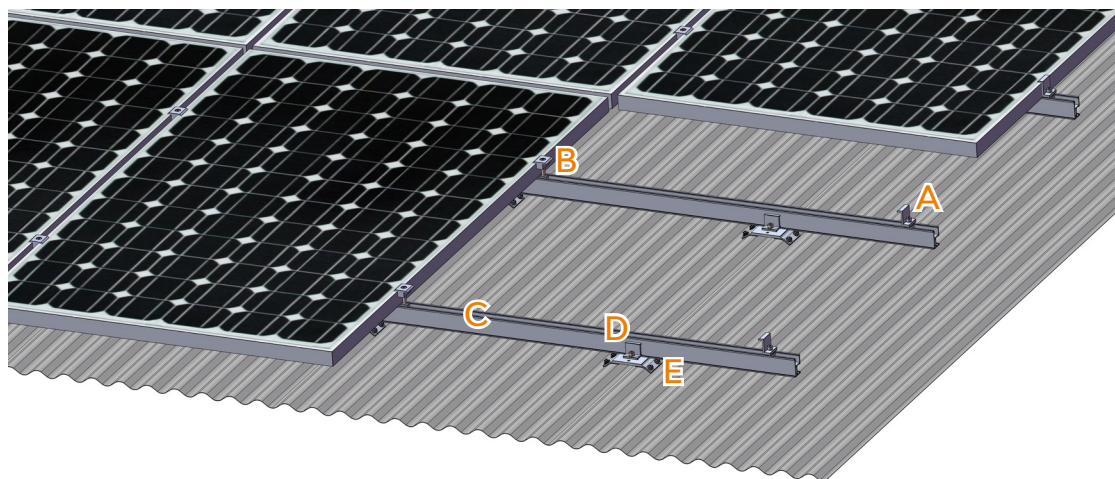
				
ER-EC-ST End Clamp	ER-IC-ST Inter Clamp	C-U/30/46-G Akashi Clamp with grounding clip	C-U/30/46 Akashi Clamp	ER-EC-DU35/40 End Clamp, Dual 35 or 40mm
				
ER-EC-DU40/46 End Clamp, Dual 40 or 46mm	ER-R-ECO ECO Rail	ER-R-ELT Elite Rail	ER-SP-ECO Splice	ER-AD-B2R Brid - Corrugated Profile Roof Adaptor, Bridge Forging 2 x Ribs

			
<p><b>ER-I-05</b> Tin Interface</p>	<p><b>ER-I-05/CM</b> Tin Interface with Click Module</p>	<p><b>ER-I-05A/EZC/ECO</b> Tin Interface A with ezClick connection</p>	<p><b>CRC-R/ECO</b> Cross Connector Clamp</p>



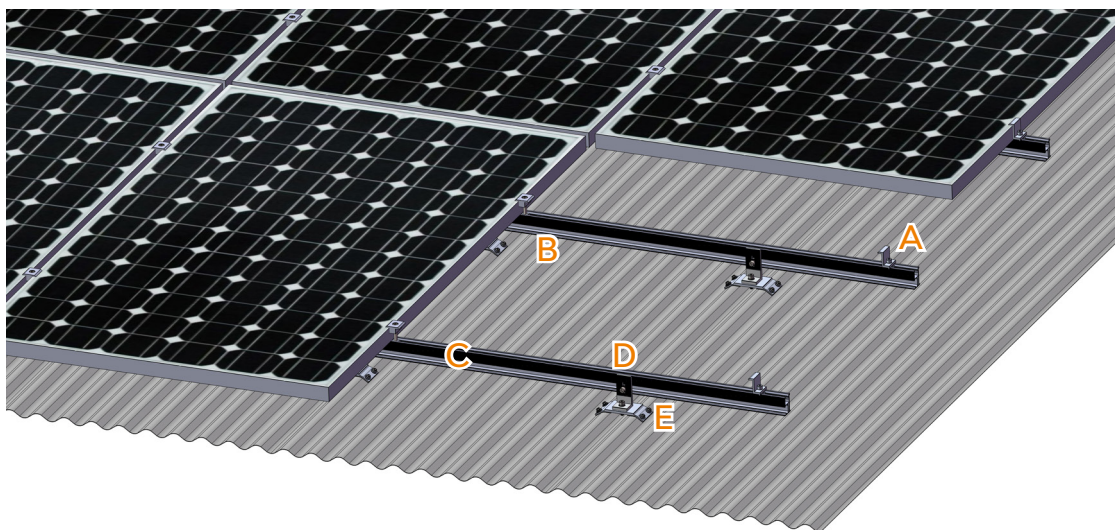
# System Overview

## Overview of Brid - Corrugated Profile Roof Adaptor with Cross Connector Clamp



- A. End Clamp    B. Inter Clamp    C. Elite Rail    D. Cross Connector Clamp  
E. Brid - Corrugated Profile Roof Adaptor

## Overview of Brid - Corrugated Profile Roof Adaptor with Tin Interface



- A. End Clamp    B. Inter Clamp    C. Elite Rail    D. Tin interface  
E. Brid - Corrugated Profile Roof Adaptor

Note: Bracket installation is allowed on full rib of the corrugated roof only. Installation on lap joints must be avoided.



## Precautions during Stainless Steel Fastener Installation

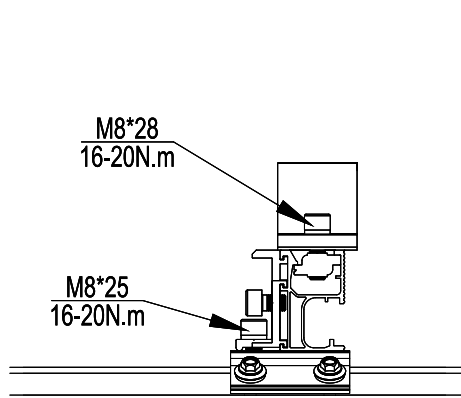
Improper operation may lead to the deadlock of Nuts and Bolts. The steps below should be applied to stainless steel nut and bolt assembly to reduce this risk.

### General installation instructions:

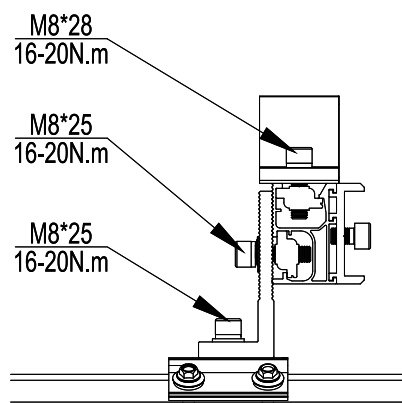
- (1) Apply force to fasteners in the direction of the thread
- (2) Apply force uniformly, to maintain the required torque
- (3) Professional tools and tool belts are recommended
- (4) In some cases, fasteners could be seized over time. As an option, if want to avoid galling or seizing of thread, apply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

### Safe Torques:

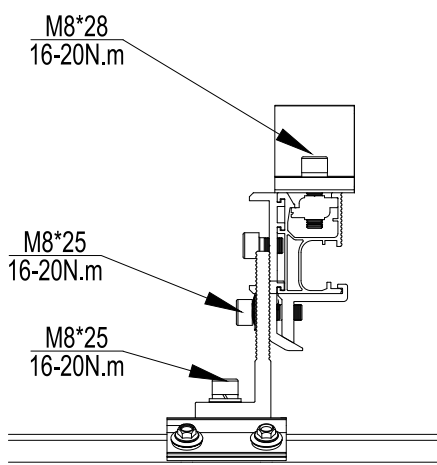
Please refer to safe torques defined in this guide as shown in the figures below. In case power tools are required, Clenergy recommends the use of low speed only. High speed and impact drivers increase the risk of bolt galling (deadlock) If deadlock occurs and you need to cut fasteners, ensure that there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



Brid - Corrugated Profile Roof Adaptor with Cross Connector Clamp



Brid - Corrugated Profile Roof Adaptor with Tin Interface



Brid - Corrugated Profile Roof Adaptor with Tin Interface with ezClick connection

### Note:

Splice Bolt Torques: 10-12 N.m for ECO rail and 2-4 N.m for Elite rail.

# Installation Instructions

## Brid - Corrugated Profile Roof Adaptor Installation

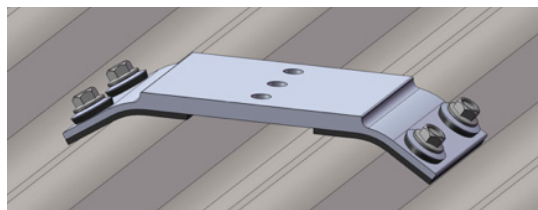
Position the adaptor on two Corrugated roof ribs correctly according to layout plan and press the adaptor down to make sure EPDM pad each side well touch on roof ribs, release adaptor after installing 4 screws.

Screw installation instruction:

1. Use a 5/16" Hex Socket.
2. Use a mains powered or cordless screwdriver with a drive speed of 3,000 RPM maximum.
3. Fit the driver bit into the screw and place it at the fastening position.
4. Apply consistently firm pressure (end load) to the screwdriver until the screw has fastened.

Note:

Screws not exposed to frequent rain should be washed down with fresh water at least every 6 months to meet the warranty conditions of Buildex Screws.

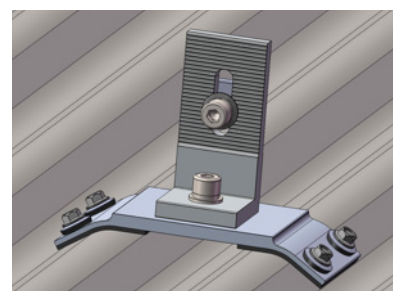


## Tin Interface Installation

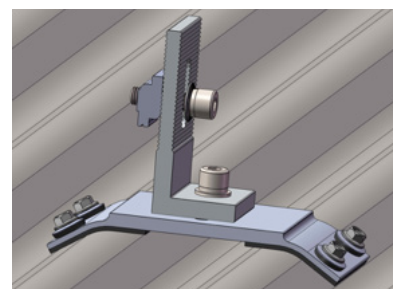
According to the installation plan, determine the mounting position and orientation of the Tin Interface depending on rails running parallel or perpendicular to the roof rib, then fasten the bolt with 16-20 N•m torque.

Note:

Pre-fitted rubber pad (if applicable) at the bottom surface of Tin Interface shall be taken off to avoid rubber aging effect on fastener torque.



Rail running perpendicular to roof rib

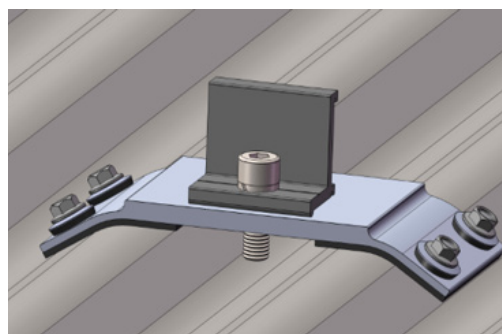


Rail running parallel to roof rib

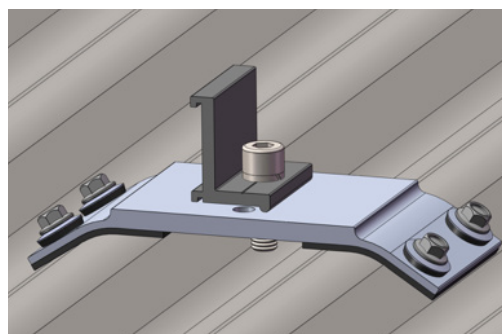
## Cross Connector Clamp Installation

According to the installation plan, determine the mounting position and orientation of the Cross Connector Clamp depending on rails running parallel or perpendicular to the roof rib, then fasten the bolt with 16-20 N·m torque.

Note: A side hole of adaptor must be used to fasten cross connector clamp to keep rail fully sit on the adaptor without overhang when rails running perpendicular to the roof rib.



Rail running perpendicular to roof rib

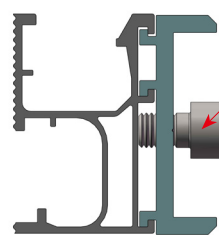
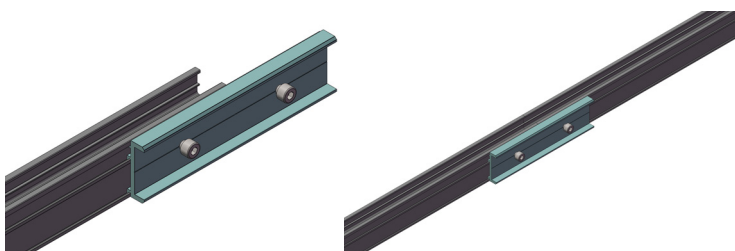


Rail running parallel to roof rib

## Rail Installation

When connecting ECO rails if necessary, slide half of the splice into the rear side of the rail, and fasten the first M8 bolt. Slide the next rail into the splice and tighten the second M8 bolt. Splice provides the electrical connection between the 2 rails through the pressure bolts. This eliminates the need of using 2 earthing lugs.

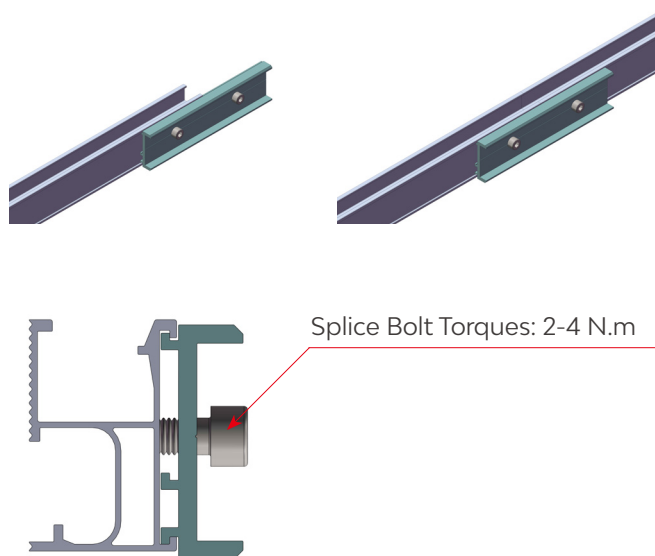
Required torque is 10 ~12 Nm.



Splice Bolt Torques: 10-12 N.m

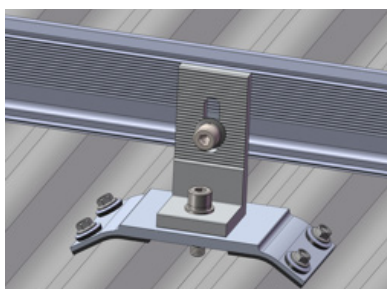
ECO-rail Installation

When connecting Elite rails, fasten the first M8 bolt with torque of 2 ~ 4 Nm and slide the next rail into the splice and fasten the second M8 bolt with torque of 2 ~ 4 Nm. The low torque is not to impact the structural integrity of the system as the defined 2 ~ 4 N.m. torque is sufficient to secure the required positioning of the splice for the design life of the system, and can provide the earthing continuity between two rails through the bolts and splice. This eliminates the need of using 2 grounding lugs.



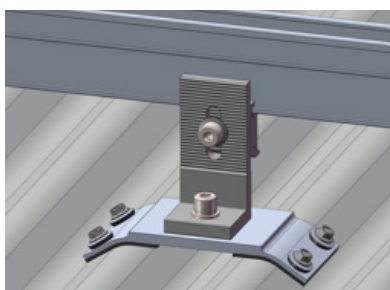
**Elite-rail Installation**

For installations using ER-I-05. Install the Z module into the side channel of ECO Rail and Elite Rail as shown in the figure below.

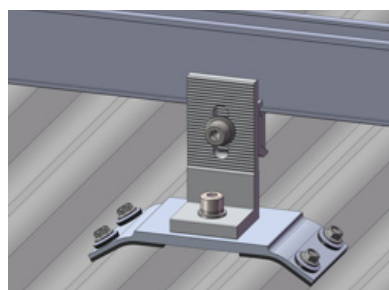


**ER-I-05 with ECO Rail and Elite Rail**

For installations using ER-I-05A/EZC/ECO. Clip the ECO Rail and Elite Rail into the ezClick connection as shown in the figures below.

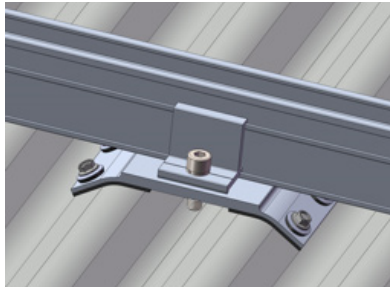


**ER-I-05A/EZC/ECO with ECO Rail**

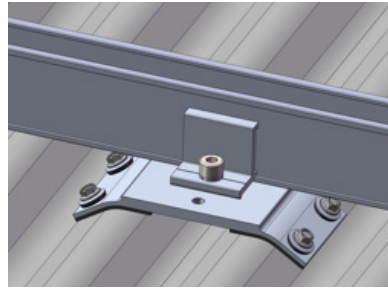


**ER-I-05A/EZC/ECO with Elite Rail**

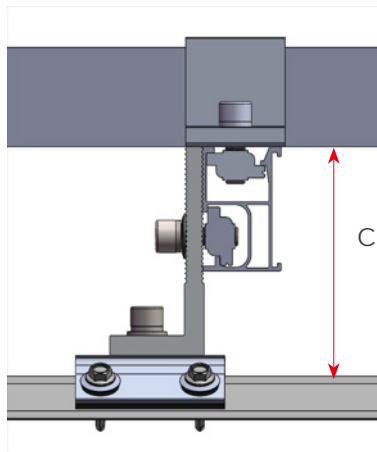
For installations using CRC-R/ECO. Clip the ECO Rail and Elite Rail into the cross connector clamp as shown in the figures below.



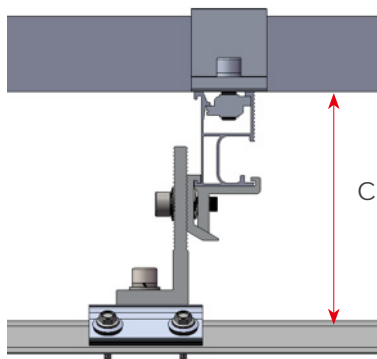
CRC-R/ECO with ECO Rail



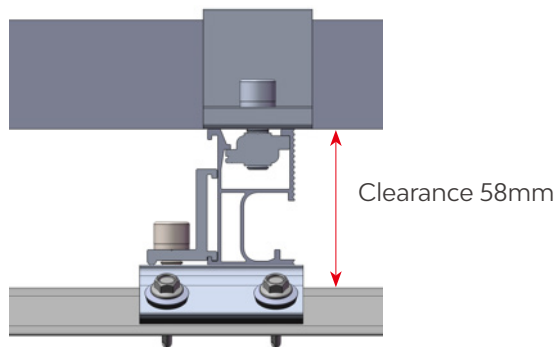
CRC-R/ECO with Elite Rail



Clearance 92-109mm



Clearance 108-133mm



## PV Module Installation

Please refer to the [PVezRack Grounding System](#) Installation Guide for PV modules clamps and grounding lugs installations.

The installers must ensure panel clamps are installed flush mounted to the panel frame and apply the correct torque value of the clamp fastener as shown in this guide.



# Certification



**CIVIL & STRUCTURAL ENGINEERS**  
RESIDENTIAL - INDUSTRIAL - COMMERCIAL - PRODUCT DEVELOPMENT

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20 September 2023

Clenergy Australia  
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Clayton, VIC 3168

## CERTIFICATION LETTER

Clenergy PV-ezRack Corrugated Profile Roof Adaptor Interface spacing tables (ECO and Elite rails)  
Solar Roof Certification – TC2, 2.5, 3 – Wind Region A, B1, B2, C, D. Internal REF: **00695**. Project REF: **CL-1151-Y**

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 1170.2-2021**
  - o Wind Terrain Category 2, 2.5 and 3
  - o Wind average recurrence of 200 years
  - o Wind Region A, B1, B2, C, D
- Solar panel length up to 2.4m
- Solar panel width up to 1.2 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- 2021             | 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,



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STRUCTURAL DESIGN CERTIFICATION



# Corrugated Profile Roof Adaptor Flush Mounting spacing tables

Standard: AS/NZS 1170.2:2021

Terrain Category: 2, 2.5 & 3

**Client: Clenergy Australia**

**REF: 00695**

**Date: September 2023**

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**Project: PV-ezRack SolarRoof Corrugated Profile Roof Adaptor interface spacing tables**

**Australian Standards**

**AS/NZS 1170.0:2002 (R2016)**

**General Principles**

**AS/NZS 1170.1:2002 (R2016)**

**Imposed Loadings**

**AS/NZS 1170.2:2021**

**Wind Loadings**

**AS/NZS 1664.1:1997-Amdt 1:1999**

**Aluminium**

**Rail type: ECO-RAIL and ECO-Elite**

**Wind Terrain Category: 2, 2.5 & 3**

**Wind average recurrence: 200 years**

This engineering document was designed to cater for most common installation scenarios defined with an importance level 2 (200 years wind average recurrence) such as residential shed or garage, small - isolated warehouses and farm sheds, residential carports, and one or double storey dwelling. If the project conditions do not fit on the above criteria, please contact Clenergy for an assessment.

From 1 May 2023 installers must follow AS/NZS 1170.2:2021 only.

**Designed: AE**

**Date: SEPTEMBER 2023**

**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.**

## PV-ezRack SolarRoof Interface spacing tables

Type of Rail	ER-R-ECO & ER-R- ELITE (Refer to <b>Note 6</b> for other compatible rails)
Type of Interface	ER-AD-B2R
Solar Panel Dimension	1.8 m x 1.2 m (Refer to <b>Note 19</b> for other panel sizes)

### Terrain Category 3 - Roof Angle - $0^\circ < \alpha \leq 15^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1139	1703	1139	1703	1032	1446	944	1276	826	1109
B1	851	1161	791	1161	733	1029	652	912	531	798
B2	766	1040	712	1040	660	924	588	821	479	718
C	553	801	553	801	477	689	426	614	374	539
D	391	562	391	562	338	486	302	433	266	381

### Terrain Category 2.5 - Roof Angle - $0^\circ < \alpha \leq 15^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1121	1524	1015	1357	882	1188	808	1084	728	974
B1	769	1045	641	935	610	852	560	781	470	704
B2	693	938	578	840	550	767	506	703	424	634
C	501	724	450	650	399	574	367	528	332	477
D	354	509	319	458	283	406	261	373	236	338

### Terrain Category 2- Roof Angle - $0^\circ < \alpha \leq 15^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1015	1374	836	1109	743	995	699	935	647	863
B1	698	946	531	771	515	718	486	676	418	626
B2	630	850	479	694	466	647	439	609	378	564
C	456	658	374	539	338	486	319	458	296	425
D	323	464	266	381	241	344	227	325	211	301

## General Notes

**Note 1.** This engineering document was designed to cater for most common installation scenarios however, it does not cater for all of them. Contact Clenergy if you are unable to comply with any of the installation specifications listed on this document.

**Note 2.** Maximum roof pitch of 15°.

**Note 3.** Installation on lapjoints must be avoided. Being the lapjoints the intersection between 2 roof sheets.

**Note 4.** This certificate only covers the assessment of Clenergy's PV mounting system, including the components listed on note 6 and 7. Assessment of the roof structure, PV panels and other fixings are to be checked by the installer/contractor.

**Note 5.** Corrugated Roof Profile Adaptor shall be installed using 4 x M6-11 x 25 Hex Head Roofzips with 16 mm ABW per clamp or screw with an equal or a higher capacity.

**Note 6.** The following components are satisfied for use according to AS/NZS 1664.1:1997-Amdt 1:1999 and AS/NZS 1170.2:2021.

Components	Part No.	Description
ECO-Rail	ER-R-ECO/XXXX	All ECO rails
Splice	ER-SP-ECO	PV-ezRack Splice for ECO rail
Elite rail	ER-R-ELT/XXXX	Elite rail
ECO Rail Black	ER-R-ECO/XXXX/BA	ECO Rail Black
Black Splice ECO Rail	ER-SP-ECO/BA	Splice ECO Rail Black
Inter Clamp	ER-IC-STXX	Inter Clamp = clamp + Z-Module + Bolt.
End Clamp	ER-EC-STXX	End Clamp = clamp + Z-Module + bolt
Clamp	C-U/30/46-G	Akashi Clamp for Frame Height 30-46mm with Grounding Clip

Clamp	C-U/30/46	Akashi 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
Inter Security Clamp	ER-IC-STXX/S	Inter Clamp = Clamp + Z-Module + Security Bolt
End Security Clamp	ER-EC-STXX/S	End Clamp = Clamp + Z-Module + Security Bolt
Interface	ER-I-05	Tin Interface
Black Interface	ER-I-05/BA	Black Tin Interface
Interface	ER-I-05/CM	Tin Interface with Click Module
Interface	ER-I-05A/EZC/ECO	ezClick connection for ECO-Rail
Interface	ER-AD-B2R	Corrugated Profile Roof Adaptor
Interface	CRC-R/ECO	Cross connector clamp
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



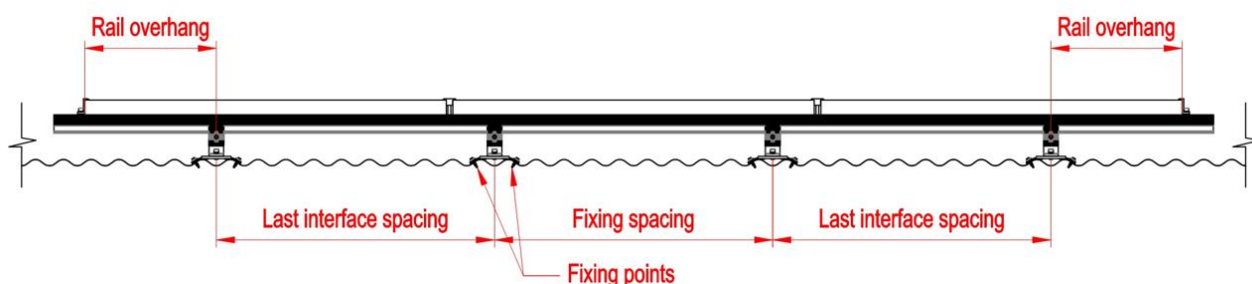
Inter Clamp (*)	ER-IC-FL/XX/XX	Inter Clamp for Frameless Module
Black End Clamp (*)	EC-FL/GE/XX/XX/B	Black End Clamp for Frameless Module (glued EPDM)
Black Inter Clamp (*)	IC-FL/GE/XX/XX/B	Black Inter Clamp for Frameless Module (glued EPDM)
Mid Clamp XX Black	ER-IC-STXXB	Inter Clamp XX Black
End Clamp XX Black	ER-EC-STXXB	End Clamp XX Black
Black Akashi Clamp	C-U/30/46-BA	Black Akashi Clamp
Black Akashi Clamp	C-U/30/46-G-BA	Black Akashi Clamp with grounding clip

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

**Note 7.** Clamping zone of the PV panels should be according to the manufacturer's specifications.

**Note 8.** Capacities checked and compared against testing data from Clenergy Australia and MTS (NATA certified).

**Note 9.** Rail overhang ends where the panel finishes and this should be less than 40% of the last installed interface spacing.



**Note 10.** 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 11.** 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 12.** No consideration has been taken on the effect of snow loads. In case the roof is located in a snow prone area, a special design must be made.

**Note 13.** No consideration has been taken on the effect of earthquake loads.

**Note 14.** For Terrain Category (TC) definition. Refer to clause 4.2.1 of AS/NZS 1170.2:2021 for more information.

**Note 15.** For topographic Multiplier (Mt) more than 1.0 (installations on a mountain, hilly or sloped terrain) please refer to clause 4.4 of AS/NZS 1170.2:2021 to define appropriate Topographic multiplier value.

The below table provides a reduction factor applied for topographic multipliers greater than 1 (installation on a slope, hill on mountain). To achieve a more accurate and cost-effective design and installations on wind region C & D, please contact Clenergy Engineering department.

Mt	A, B1, B2	
	U.W & D. W	Central
1	1	1
1.01	1.00	1.00
1.02	1.00	1.00
1.03	0.92	0.94
1.04	0.92	0.94
1.06	0.92	0.88
1.08	0.85	0.88
1.09	0.85	0.81
1.1	0.85	0.81
1.2	0.69	0.69
1.3	0.54	0.56
1.4	0.46	0.50
1.5	0.38	0.44

**Note 16.** Shielding Multiplier (Ms) taken as 1.0. Refer to clause 4.3 of AS/NZS 1170.2:2021 for more information.

**Note 17.** Wind Direction Multiplier (Md) taken as 1.0. Refer to clause 3.3 of AS/NZS 1170.2:2021 for more information.

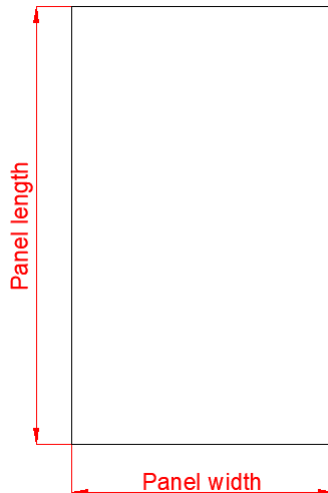
**Note 18.** Contact Clenergy if you are planning to install on a curved, multi-span (pitched and saw-tooth), mansard, circular bin, silo, tank, pitched free, troughed free, hypar free, canopy, awning or cantilivered roofs.

**Note 19.** This Engineering report is based on 1.8 m x 1.2 m panels and two rails per panel. However, a percentage increase could be applied on all interface spacings as shown on the following table.

Number of rails per panel	Panel length (mm)	Spacing +/- W.R – A & B1	Spacing +/- W.R –B2, C & D
2 rails	≤ 1700	0%	0%
3 rails	≤ 1700	10%	12%
4 rails	≤ 1700	12%	15%
2 rails	≤ 1800	0%	0%
3 rails	≤ 1800	5%	7%
4 rails	≤ 1800	8%	10%
2 rails	≤ 2000	0%	0%
3 rails	≤ 2000	8%	10%
4 rails	≤ 2000	10%	12%
2 rails	≤ 2100	-5%	-3%
3 rails	≤ 2100	8%	10%
4 rails	≤ 2100	10%	12%
2 rails	≤ 2200	-8%	-5%
3 rails	≤ 2200	6%	8%
4 rails	≤ 2200	8%	10%
2 rails	≤ 2300	-8%	-5%
3 rails	≤ 2300	6%	8%
4 rails	≤ 2300	8%	10%
2 rails	≤ 2400	-10%	-6%
3 rails	≤ 2400	5%	7%
4 rails	≤ 2400	7%	10%

**Note 20.** Panel width cannot exceed 1.20 m for any of the above panel length dimensions and panel weight cannot exceed 15 kg/m<sup>2</sup>.

Panel width is defined as the shortest side of the panel, as per the below picture depicts.



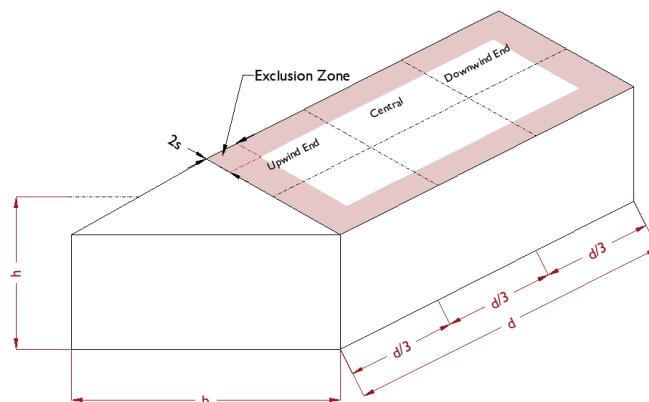
**Note 21.** Contact Clenergy if you are planning to install into pre-drilled holes.

**Note 22.** This document does not cover the building frame capacity. It has been assumed that the building frame will be able to resist the additional loadings imposed by the installation of the solar panels in conjunction with the Clenergy mounting system.

**Note 23.** The most conservative spacing has to be used if one panel or panel row fall between two roof zones.

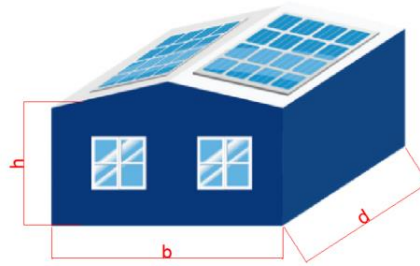
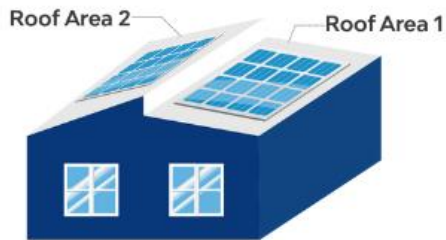
**Note 24.** Conditions for flush mounted systems installed on flat and pitched roofs according to the B6 Appendix of the AS/NZS 1170.2:2021.

- Roof pitch to be between 1° and 15°.
- $h/d \leq 0.5$  and  $h/b \leq 0.5$ . 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 50mm and no more than 300mm.



**Note 25.** Exclusion zone for flush installation to be the minimum distance from the edge of the roof "2 x s", where "s" is the gap between the underside of the panel and the roof.

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



### Example

Building height: 5 m

Building dimensions: 15 x 11 m

Roof pitch: less than 3°

Panel dimension: 1.8 m x 1 m

**Step 1:** Define wind region, terrain category and topographic multiplier based on the project address. Please refer to AS/NZS 1170.2:2021 to define Wind regions, terrain category and topographic multiplier. If the site has a topographic multiplier > 1 refer to note 10.

For this example:

Wind region: A

Terrain category: 3

Topographic multiplier: 1

**Step 2:** Check if the Flush system meets the conditions on the B6 Appendix of the AS/NZS 1170.2:2021. Where the following conditions need to be met:

- Roof pitch to be between 1° and 30°. ✓
- $h/d \leq 0.5$  and  $h/b \leq 0.5$ . Being h= height, b= width and d= length of the building as per the below picture.  $5/11 = 0.45 \leq 0.5$  ✓ and  $5/15 = 0.33 \leq 0.5$  ✓
- Gap between the underside of the panel and the roof to be no less than 50mm and no more than 300mm. ✓

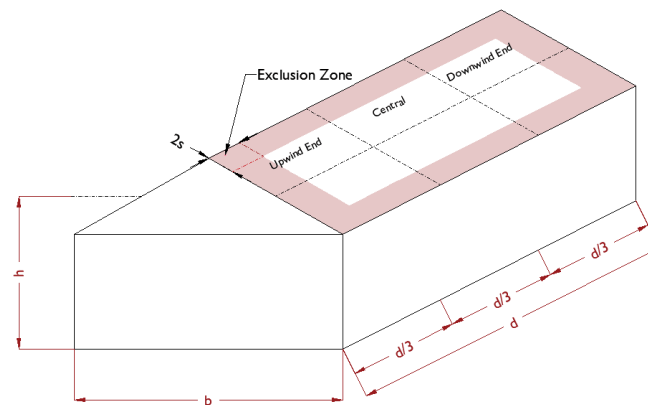
**Step 3:** According to the spacing tables shown on this document:

Installation conditions to be as per below:

- U.W and D.W spacing: 1139 mm
- Central spacing: 1703 mm

**Step 4:** Define your roof zone definition, where exclusion zone for flush installation to be the minimum distance from the edge of the roof "2 x s", where "s" is the gap between the underside of the panel and the roof.

- $d = 15 \text{ m}$
- $b = 11 \text{ m}$
- $d/3 = 15/3 = 5 \text{ m}$











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