

# EzShade 2.0

Installation Guide V2.0







## Introduction

Clenergy PVezRack<sup>®</sup> ezShade 2.0 is a ground mounting system for PV installation in residential or commercial regions, and which is designed to create new spaces for solar energy while also providing shade for parking. The use of patented aluminium base rails, the Z-module technology and the splicing eliminate on site cutting and enables particularly fast installation.

Please review this manual thoroughly before installing ezShade 2.0. This manual provides the following contents: (1) Installation planning; (2) Installation instructions.

The PVezRack<sup>®</sup> ezShade 2.0 parts, when installed in accordance with this guide, will be structurally adequate and meet the GB 50009, JIS 8955, Eurocode 0-9, ASCE 7-10, ISO 14713 and AS/NZS 1170.2 standards. During installation, and especially when working on the ground, please comply with the appropriate occupational health and safety regulations. Please also pay attention to other relevant regulations in your local region. Please check that you are using the latest version of the installation manual by contacting Clenergy or contacting your local distributor.



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#### The installer is solely responsible for:

- Comply with all applicable local or national building codes that may replace this manual;
- Ensure that ezRack and other products are appropriate for the particular installation and installation environment;
- Using only ezRack parts and installer-supplied parts as specified by ezRack (substitution of parts may void the warranty and invalidate the letter of certification);
- During construction, ensure that the foundation anchor bolts have sufficient strength and shear force;
- · How to recycle: according to local regulations;
- · How to disassemble: reverse installation process;
- Ensure that there are no less than two professionals working on the panel installation;
- Ensure the installation of the electrical equipment is performed by a professional and accredited electrician;
- 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 for installations in Australia and New Zealand;
- 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 for installations in Australia and New Zealand.



## Planning



According to the figure above, applying PV module 1855 x 1150mm, tilt angle 5 degree. The MINI height from the ground is 2500mm. The specific installation steps are as follows.



## **Tools and Components**

#### **Tools**

	D. J.			3 Transaction
<b>6mm Allen Key</b> (M8 hex socket screw)	Socket Wrench (M8/M12/M16)	Torque Wrench (M8/M12/M16)	Electric Drill	Marker Pen
String	5m Tape	Rubber Hammer	Caulking Gun	

#### Components

	C	H		
<b>ER-EC-W/OM</b> LS Module End Clamp, with W module	<b>ER-ICII-W</b> Inter Clamp II, with W module	<b>R-SDII/60/XXXX</b> Rail 60*XXXXmm	<b>ER-RC-T/W/G</b> Rail Clamp for T-Rail with W Module with Grounding Pins	<b>R-SDII/168/XXXX</b> Rail 168*XXXXmm
		i.		
SP-SDII/R/168 Splice for Rail 168	G-SDII/150/XXXX Girder 150*XXXXmm	<b>RT-100/90/XXXX</b> Rectangular Tube 100*90*XXXXmm	HJ-SDII/158/130/G H Joint 130 with Grounding	HJ-SDII/158/240/G H Joint 240 with Grounding

3 Code-Compliant Planning and Installation Guide V 2.0 - Complying with AS/NZS 1170.2-2021

- Tools and Components -



#### Components

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<b>BA-SDII/200/G</b> Corrugated T-Base 200 with Grounding	<b>BA-SDII/280/G</b> Corrugated T-Base 280 with Grounding	GU-SDII/22/XXXX Gutter 22*XXXXmm	C-SDII/50/35 Corrugated Clamp	<b>RR-GU/SDII/22</b> Rubber ring for Gutter 22
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<b>GC-LSR</b> Grounding Clip for LS- Rail	<b>EZ-GL-U</b> Rialto Grounding Lug	CAP-R/SDII/168 Cap for Rail 168	CAP-G/SDII/150 Cap for Girder 150	<b>EZ-GB/115</b> Quad 115 Gutter External Bracket



### **System Overview**

#### **Overview of PVezRack® ezShade 2.0**



1) ER-EC-W/OM, LS Module End Clamp, with W module

- 2) ER-ICII-W, Inter Clamp II, with W module
- 3) R-SDII/60/XXXX, Rail 60\*XXXXmm
- 4) ER-RC-T/W/G, Rail Clamp for T-Rail with W Module with Grounding Pins
- 5) R-SDII/168/XXXX, Rail 168\*XXXXmm
- 6) SP-SDII/R/168, Splice for Rail 168
- 7) G-SDII/150/XXXX, Girder 150\*XXXXmm
- 8) RT-100/90/XXXX, Rectangular Tube 100\*90\*XXXXmm
- 9) HJ-SDII/158/130/G, H Joint 130 with Grounding
- 10) HJ-SDII/158/240/G, H Joint 240 with Grounding
- 11) BA-SDII/200/G, Corrugated T-Base 200 with Grounding
- 12) BA-SDII/280/G, Corrugated T-Base 280 with Grounding
- 13) GU-SDII/22/XXXX, Gutter 22\*XXXXmm
- 14) C-SDII/50/35, Corrugated Clamp
- 15) RR-GU/SDII/22, Rubber Ring for Gutter 22
- 16) CAP-R/SDII/168, Cap for Rail 168
- 17) CAP-G/SDII/150, Cap for Girder 150
- 18) GC-LSR, Grounding Clip for LS-Rail
- 19) EZ-GL-U, Rialto Grounding Lug
- 20) EZ-GB/115, Quad 115 Gutter External Bracket



#### **Precautions during Stainless Steel Fastener Installation**

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

Reduce the friction coefficient

- (1) Ensure that the thread surface is clean (no dirt or contaminant)
- (2) Apply lubricant (grease or 40# engine oil) to fasteners prior tightening to avoid galling or seizing in the threads;

General installation instructions

- (1) Apply force to fasteners in the direction of thread;
- (2) Apply force uniformly, to maintain required torque;
- (3) Professional tools and tool belts are recommended, avoid using electric tools for final tightening;
- (4) Avoid working at high temperatures,

Safe Torques:



Note: Tighten the bolts after adjusting all components in place. Tightening and loosening bolts repeatedly will lead to deadlock of bolts.

#### **Installation Dimension**

All drawings and dimensions in this installation guide are for a generic reference. The PVezRack<sup>®</sup> ezShade 2.0 is to be optimized to suit specific conditions for each project and documented in a construction drawing. As a result, major components of the PVezRack<sup>®</sup> ezShade 2.0 may be provided in section sizes and lengths that vary from those shown in this guide. The installation process detailed in this instruction guide remains the same regardless of the component size. In case you need to do any on-site modifications or alteration of the system in a way that would be different from the construction drawing please provide marked up drawings/sketches for Clenergy's review prior modification for comment and approval.

- System Overview -



## **Installation Instruction**

#### Post and Girder Installation

Prepare the required installation tools and products before installation.

As per engineering drawings, mark out the positions for bolts and embed 4pcs of M20 bolt in each position as shown in Figure 2.

Make sure all M20 bolts are aligned in both horizontal and vertical direction. All embedded bolts will be revealed 50±5mm above the ground as shown in Figure 1.

Note: The M20 bolts and matching nuts, washers and spring washers are provided by installer.



As shown in Figure 3, place bolts M12\*35 into H Joint (HJ-SDII/158/130/G & HJ-SDII/158/240/G).

According to the engineering drawing, slide H Joint (HJ-SDII/158/130/G and HJ-SDII/158/240/G) to the corresponding position on the Girder (G-SDII/150/XXXX) and lock it as shown in Figure 4.

For sliding smoothly, to ensure the plane of the M12 bolt cap be parallel to the girder slot surface when H Joint (HJ-SDII/158/130/ G & HJ-SDII/158/240/G) slides into the Girder (G-SDII/150/XXXX), as shown in Figure 5.





Figure 5



According to the engineering drawing, place different length Rectangular Tube (RT-100/90/XXXX) and T-Base (BA-SDII/200/G & BA-SDII/280/G) by below steps, as shown in Figure 6.

(1) Place the Rectangular Tube L1 (RT-100/90/XXXX) horizontally to align with the hole of H Joint (HJ-SDII/158/240/G) near the end of Girder (G-SDII/150/XXXX) , place bushing in one hand and put on bolts M16\*130 in the other hand, then put on flat washers, spring washers, nuts and lock manually.

(2) Laying down the Rectangular Tube L2 (RT-100/90/XXXX), and follow step (1) to complete the other hole installation of Rectangular Tube L2 (RT-100/90/XXXX).

(3) Keep the Rectangular Tube L2 (RT-100/90/XXXX) flat, put the Tube L2 (RT-100/90/XXXX) and Tube L3 (RT-100/90/XXXX) into the T-Base (BA-SDII/280/G), align with the hole position, then put on bolts M16\*150, bushings, flat washers, spring washers and lock manually.

(4) Keep the Tube L1 (RT-100/90/XXXX) flat, install the other hole with T-Base (BA-SDII/200/G).

(5) Laying down the support, rotate Tube L2 (RT-100/90/XXXX) and Tube L3 (RT-100/90/XXXX), align the hole of Tube L3 (RT-100/90/XXXX) with the hole of H Joint (HJ-SDII/158/130/G), put on bolts M16\*130.

The above steps are all locked manually.



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Keep all M16 bolt heads aligned.

The support is completed as shown in Figure 7.

Insert the assembled support into embedded bolts .Align the embedded bolts with the holes on the T-Base (BA-SDII/200/G & BA-SDII/280/G), put on the spring washer, flat washer and nut, manual locking as shown in Figure 8.

After a set of support is completed, lock the M8 screws of H-Joints (HJ-SDII/158/130/G & HJ-SDII/158/240/G) and T-Bases (BA-SDII/200/G & BA-SDII/280/G) to realize the grounding of support, as shown in Figure 9.

After placing an array support. Measure whether all the end faces and top surfaces are on the same plane and whether the installation angle meets the requirements, as shown in Figure 10.

Adjust the slot holes of T-Base (BA-SDII/200/G & BA-SDII/280/G) to meet the requirements if there is deviation. The adjustment range of the slot hole of T-Base (BA-SDII/200/G & BA-SDII/280/G) as shown in Figure 11.

Fasten all bolts after adjustment.

Recommended torque for M16 bolts is 100-105N·m, M20 is 200-220 N·m





#### **Rail 168 Installation**

In order to form a longer section, first insert Splice (SP-SDII/R/168) halfway into end of Rail 168 (R-SDII/168/XXXX), and fasten by self-drilling screws as shown in Figure 12.



Note: The position of self drilling screw ST6.3\*22 for connection as shown in Figure 13(unit:mm), total 16pcs on both sides. Tighten until the plastic pads are slightly compressed.







Figure 14

- Installation Instructions -



According to engineering drawings, repeat the above operations to install the other Rail 168 (R-SDII/168/XXXX) as shown in Figure 15.

Note: Make sure every row of Rail 168 (R-SDII/168/XXXX) is on the same horizontal line and the ends of the Rail 168 (R-SDII/168/ XXXX) are aligned.

#### **Rail 60 Installation**

Place one Rail 60 (R-SDII/60/XXXX) on Rail 168 (R-SDII/168/XXXX) as shown in Figure 16.

Apply Rail Clamp (ER-RC-T/W/G) to fix the Rail 60 (R-SDII/60/ XXXX) on Rail 168 (R-SDII/168/XXXX) and fasten it by Allen Key 6mm as shown in Figure 17.



According to engineering drawings, repeat the above operations to install other Rail 60 (R-SDII/60/XXXX) as shown in Figure 18.

Note: Make sure every row of the Rail 60 (R-SDII/60/XXXX) is on the same vertical line and the ends of the Rail 60 (R-SDII/60/ XXXX) are aligned.

Recommended torque for M8 bolts is 18-20N.m





#### **PV Module Installation**

PV-ezRACK®

Click the pre-assembled End Clamp (ER-EC-W/OM) or Inter Clamp II (ER-ICII-W) into the grooves of the Rail 60 (R-SDII/60/XXXX) as shown in Figure 19.



Figure 19

According to the Figure, place the first row of PV Module on the Rail 60 (R-SDII/60/XXXX) one by one. The order of the PV Module is from low to high, and from left to right as shown in Figure 20.

Note: The distance d between lowest panel end to Rail 60 end is subject to the dimension of panel and the length of Rail 60, normally it is no less than 30mm.



Note: Make sure there is a gap of 2mm between PV Modules, it is recommended to make a T-pate with a thickness of 2mm to measure the gap. The PV Modules are attached closely with the Rails (R-SDII/60/XXXX), and the ends of PV Module are aligned. Then fasten Inter Clamps (ER-ICII-W) and End Clamps (ER-EC-W/OM) as shown in Figure 21.

Recommended torque for M8 bolts is 18-20N.m



Figure 21



#### **Grounding Clip Installation**

Slightly lift the PV module and stick the hook of the Grounding Clip (GC-LSR) onto the Rail 60 (R-SDII/60/XXXX), and then press the PV module on the Groungding Clip (GC-LSR). It is recommended that 2 x Grounding Clip (GC-LSR) per panel are used. (Two at 1/4 of both ends of the PV module as shown in Figure 22.)







#### **Gutter Installation**

Slide two sets of Corrugated Clamp (C-SDII/50/35) into the bottom of the Gutter (GU-SDII/22/XXXX), and do not fasten the bolts as shown in Figure 24.



Figure 24

Put the Rubber Ring (RR-GU/SDII/22) into the Gutter (GU-SDII/22/XXXX) and plug the bottom slot. Ensure the Rubber Ring (RR-GU/SDII/22) is aligned with the ends of Gutter (GU-SDII/22/XXXX). Apply sealant evenly on the connection as shown in Figure 25.





The effect of installation among Gutter (GU-SDII/22/XXXX), Corrugated Clamp (C-SDII/50/35) and Rubber Ring (RR-GU/SDII/22) as shown in Figure 26.





Tilt the Gutter (GU-SDII/22/XXXX) and place it between the bottom of the PV Module and the Rail 60 (R-SDII/60/XXXX) as shown in Figure 27 .The order of the Gutter (GU-SDII/22/XXXX) is the same as the PV Module, from low to high, and from left to right.

Straighten the Gutter (GU-SDII/22/XXXX), make sure the bottom edge of the Gutter (GU-SDII/22/XXXX) is parallel to the lower edge of the bottom frame of the lower PV Module and offset downward by about 10mm as shown in Figure 27.

Note: The distance of the two ends of Gutter (GU-SDII/22/XXXX) over the Rail 60 (R-SDII/60/XXXX) is equal as shown in Figure 28.

After the last step, adjust Corrugated Clamp (C-SDII/50/35) to engage the corrugated surface of Rail 60 (R-SDII/60/XXXX) and the clamp are meshed, then lock the Corrugated Clamp (C-SDII/50/35) as shown in Figure 28.

Recommended torque for M8 bolts is 12-15N.m



Figure 27



Figure 28





#### **Gutter Bracket and Main Gutter Installation**

Insert Quad 115 Gutter External Bracket (EZ-GB/115) into the lower channel of Rail 60 (R-SDII/60/XXXX), fasten it with Bolt M8.

Recommended torque for M8 bolts is 15-18N.m



Figure 30



Install Main Gutter (not provided by the Clenergy) on the Quad 115 Gutter External Bracket (EZ-GB/115) as Shown in Figure 31.

Note: Quad 115 Gutter Bracket is suitable for a lot of brands of Quad 115 mm standard and high front gutter.

Install a downpipe (not provided by the Clenergy) at an appropriate place according to rainwater drainage system design.



Figure 31

Figure 32

After the installation is completed, check to ensure all bolts are locked, and the installation is completed as shown in Figure 32.



#### How to Achieve Earthing for ezShade 2.0 System

How to Achieve Earthing for ezShade 2.0 System



Figure 33

M8 bolts on H Joint (HJ-SDII/158/130/G & HJ-SDII/158/240/ G) and T-Bases (BA-SDII/200/G & BA-SDII/240/G) are preassembled and need to tightened with recommended torque 5.5-6.5 N.m to create earthing continuity between them and rectangular tubes.

OR V V



Grounding lug can be installed front and back as shown in Figure 34.



## Certification



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

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5 October 2023

Clenergy Australia 1/10 Duerdin Street Clayton, VIC 3168

#### **CERTIFICATION LETTER**

Clenergy PV-ezRack ezShade certification – TC 1,1.5,2, 2.5, 3 – Wind Region A, B1, B2, C & D Internal REF: **00646**. Project REF: **CL-1083-Y.REV.1**.

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
  - Wind Terrain Category 1, 1.5, 2, 2.5 and 3
  - Wind average recurrence of 200 years
  - Wind Region A, B1, B2, C and D
  - Panel Length 2.4 m
  - Panel Width 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
- AS/NZS 1170.1- 2002 AMDT 4-2016

AS/NZS 1664.1- 1997 AMDT 1:1999

AS/NZS 1170.2- 2021

General Principles Imposed Loadings Wind Loadings Aluminium Code

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

Best Regards,

Alberto Escobar Civil/Structural Engineer BEng MIEAust NER PE 0003615

- Certification -





#### STRUCTURAL DESIGN DOCUMENTATION

#### ezShade®2.0 Solar Design Tables According to AS/NZS 1170.2:2021 Terrain Category 1, 1.5, 2, 2.5 & 3

Client : Clenergy Australia

REF:

Date: 05/10/2023

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CL-1083-Y

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Internal REF: 00646

Client: Clenergy Australia

Project:

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 1252.2:2016	Bolting
AS/NZS 1664.1:1997-Amdt	Aluminium

ezShade 2.0 Certificate

W ind Terrain Category1, 1.5, 2, 2.5 and 3Topographic multiplier (Mt)1.0Designed:AEDate:Oct 23

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.







ezShade Type
Maximum bay spacing
Minimum soil capacity
ezShade type

3 m 100 kPa

PZ59-0-023-10

Continuous

Wind Region	Terrain Category	Minimum Sab Thickness required (mm)	Minimum depth for a 300mm diameter Pad (mm)	Minimum depth for a 450mm diameter Pad (mm)	Minimum chemical ancho tension capacit per bolt (kN)
А	3	100	500	400	7.97
А	2.5	100	500	400	8.93
А	2	100	500	400	9.92
А	1.5	100	550	400	10.96
А	1	100	550	400	12.05
B1	3	100	600	450	13.80
B1	2.5	100	650	450	15.33
B1	2	100	650	500	16.92
B1	1.5	100	700	500	18.59
B1	1	100	750	550	20.34
B2	3	100	650	450	15.38
B2	2.5	100	700	500	17.07
B2	2	100	700	500	18.83
B2	1.5	100	750	550	20.67
B2	1	100	750	550	22.59
С	3	100	750	550	21.19
С	2.5	100	800	600	23.45
С	2	100	800	600	25.81
С	1.5	100	850	650	28.28
С	1	100	900	700	30.85
D	3	100	900	700	31.92
D	2.5	125	950	750	35.23
D	2	150	1200	900	38.70







ezShade Type	PZ59-0-023-10
Maximum bay spacing	3 m
Minimum soil capacity	250 kPa
ezShade type	Continuous

Wind Region	Terrain Category	Minimum Sab Thickness required (mm)	Minimum depth for a 300mm diameter Pad (mm)	Minimum depth for a 450mm diameter Pad (mm)	Minimum chemical anchor tension capacity per bolt (kN)
А	3	100	450	300	7.97
А	2.5	100	500	350	8.93
А	2	100	550	400	9.92
А	1.5	100	600	400	10.96
А	1	100	650	450	12.05
B1	3	100	700	500	13.80
B1	2.5	100	750	550	15.33
B1	2	100	800	600	16.92
B1	1.5	100	850	650	18.59
B1	1	100	850	650	20.34
B2	3	100	750	550	15.38
B2	2.5	100	800	600	17.07
B2	2	100	850	650	18.83
B2	1.5	100	900	650	20.67
B2	1	100	950	700	22.59
С	3	100	900	700	21.19
С	2.5	100	950	750	23.45
С	2	100	1000	800	25.81
С	1.5	100	1050	850	28.28
С	1	100	1100	850	30.85
D	3	100	1100	900	31.92
D	2.5	125	1150	950	35.23
D	2	150	1200	1000	38.70







ezShade Type	PZ59-0-022-10
Maximum bay spacing	5.5 m
Minimum soil capacity	100 kPa
ezShade type	Continuous

Wind Region	Terrain Category	Minimum Sab Thickness required (mm)	Minimum depth for a 300mm diameter Pad	Minimum depth for a 450mm diameter Pad (mm)	Minimum chemical anchor tension capacity per bolt (kN)
А	3	100	650	450	7.97
А	2.5	100	650	500	8.93
А	2	100	700	500	9.92
А	1.5	100	750	550	10.96
А	1	100	750	550	12.05
B1	3	100	800	600	13.80
B1	2.5	100	850	650	15.33
B1	2	100	900	700	16.92
B1	1.5	100	950	700	18.59
B1	1	100	950	750	20.34
B2	3	100	850	650	15.38
B2	2.5	100	900	700	17.07
B2	2	100	950	700	18.83
B2	1.5	100	950	750	20.67
B2	1	100	1000	800	22.59
С	3	100	1000	750	21.19
С	2.5	100	1050	800	23.45
С	2	100	1100	850	25.81
С	1.5	125	1100	900	28.28







ezShade Type	PZ59-0-022-10
Maximum bay spacing	5.5 m
Minimum soil capacity	250 kPa

ezShade type

acity 250 kPa Continuous

Wind Region	Terrain Category	Minimum Sab Thickness required (mm)	Minimum depth for a 300mm diameter Pad	Minimum depth for a 450mm diameter Pad (mm)	Minimum chemical anchor tension capacity per bolt (kN)
А	3	100	450	300	7.97
А	2.5	100	500	350	8.93
А	2	100	550	400	9.92
А	1.5	100	600	400	10.96
А	1	100	650	450	12.05
B1	3	100	700	500	13.80
B1	2.5	100	750	550	15.33
B1	2	100	800	600	16.92
B1	1.5	100	850	650	18.59
B1	1	100	850	650	20.34
B2	3	100	750	550	15.38
B2	2.5	100	800	600	17.07
B2	2	100	850	650	18.83
B2	1.5	100	900	650	20.67
B2	1	100	950	700	22.59
С	3	100	900	700	21.19
С	2.5	100	950	750	23.45
С	2	100	1000	800	25.81
С	1.5	125	1050	850	28.28







ezShade Type	PZ59-0-020-10
Maximum bay spacing	3 m
Minimum soil capacity	100 kPa
ezShade type	Single

	1				
Wind Region	Terrain Category	Minimum Sab Thickness required (mm)	Minimum depth for a 300mm diameter Pad (mm)	Minimum depth for a 450mm diameter Pad (mm)	Minimum chemical anchor tension capacity per bolt (kN)
Α	3	100	500	400	3.99
А	2.5	100	500	400	4.46
А	2	100	500	400	4.96
Α	1.5	100	500	400	5.48
Α	1	100	500	400	6.02
B1	3	100	500	400	6.90
B1	2.5	100	500	400	7.66
B1	2	100	500	400	8.46
B1	1.5	100	500	400	9.30
B1	1	100	500	400	10.17
B2	3	100	500	400	7.69
B2	2.5	100	500	400	8.53
B2	2	100	500	400	9.41
B2	1.5	100	500	400	10.33
B2	1	100	550	400	11.29
С	3	100	550	400	10.60
С	2.5	100	550	400	11.72
С	2	100	550	400	12.91
С	1.5	100	600	450	14.14
С	1	100	600	450	15.43
D	3	100	650	450	15.96
D	2.5	125	650	500	17.62
D	2	150	700	500	19.35







ezShade Type	PZ59-0-020-10
Maximum bay spacing	3 m
Minimum soil capacity	250 kPa
ezShade type	Single

Wind Region	Terrain Category	Minimum Sab Thickness required (mm)	Minimum depth for a 300mm diameter Pad (mm)	Minimum depth for a 450mm diameter Pad (mm)	Minimum chemical anchor tension capacity per bolt (kN)
Α	3	100	300	200	3.99
Α	2.5	100	350	200	4.46
А	2	100	350	250	4.96
Α	1.5	100	400	250	5.48
А	1	100	450	300	6.02
B1	3	100	450	300	6.90
B1	2.5	100	500	350	7.66
B1	2	100	550	350	8.46
B1	1.5	100	600	400	9.30
B1	1	100	600	450	10.17
B2	3	100	500	350	7.69
B2	2.5	100	550	400	8.53
B2	2	100	600	400	9.41
B2	1.5	100	600	450	10.33
B2	1	100	650	450	11.29
С	3	100	650	450	10.60
С	2.5	100	650	500	11.72
С	2	100	700	500	12.91
С	1.5	100	750	550	14.14
С	1	100	800	600	15.43
D	3	100	800	600	15.96
D	2.5	100	850	650	17.62
D	2	100	900	650	19.35

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ezShade Type	PZ59-0-021-10
Maximum bay spacing	5.5 m
Minimum soil capacity	100 kPa
ezShade type	Single

Wind Region	Terrain Category	Minimum Sab Thickness required (mm)	Minimum depth for a 300mm diameter Pad	Minimum depth for a 450mm diameter Pad (mm)	Minimum chemical anchor tension capacity per bolt (kN)
А	3	100	550	450	3.99
А	2.5	100	550	450	4.46
А	2	100	550	450	4.96
А	1.5	100	550	450	5.48
А	1	100	550	450	6.02
B1	3	100	550	450	6.90
B1	2.5	100	600	450	7.66
B1	2	100	600	450	8.46
B1	1.5	100	650	450	9.30
B1	1	100	700	500	10.17
B2	3	100	600	400	7.69
B2	2.5	100	650	450	8.53
B2	2	100	650	450	9.41
B2	1.5	100	700	500	10.33
B2	1	100	700	550	11.29
С	3	100	700	500	10.60
С	2.5	100	750	550	11.72
С	2	100	750	550	12.91
С	1.5	125	800	600	14.14







ezShade Type	PZ59-0-021-10
Maximum bay spacing	5.5 m
Minimum soil capacity	250 kPa
ezShade type	Single

Wind Region	Terrain Category	Minimum Sab Thickness required (mm)	Minimum depth for a 300mm diameter Pad	Minimum depth for a 450mm diameter Pad (mm)	Minimum chemical anchor tension capacity per bolt (kN)
А	3	100	300	200	3.99
А	2.5	100	350	200	4.46
А	2	100	350	250	4.96
А	1.5	100	400	250	5.48
А	1	100	450	300	6.02
B1	3	100	450	300	6.90
B1	2.5	100	500	350	7.66
B1	2	100	550	350	8.46
B1	1.5	100	600	400	9.30
B1	1	100	600	450	10.17
B2	3	100	500	350	7.69
B2	2.5	100	550	400	8.53
B2	2	100	600	400	9.41
B2	1.5	100	600	450	10.33
B2	1	100	650	450	11.29
С	3	100	650	450	10.60
С	2.5	100	650	500	11.72
С	2	100	700	500	12.91
С	1.5	100	750	550	14.14







#### **General Notes**

- Note 1 Minimum Soil capacity for Slabs and Pads to be 100kPa and 250 kPa. Installer must verify capacity or contact a Geotechnical Engineer for the assessment
- Note 2 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 3Single ezShade: Carport with only 2 framesContinuous ezShade: Carport with more than 2 frames
- Note 4 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
168 rail	R-SDII/168/XXXX	168 rail
168 rail splice	SP-SDII/R/168	168 rail splice
60 rail	R-SDII/60/XXXX	60 rail
End clamp	ER-EC-W	End clamp
Inter clamp	R-ICII-W	Inter clamp
Rail clamp for T rail	ER-RC-T/W/G	Rail clamp for T rail
Rectangular Tube	RT-100/90/XXXX	Rectangular Tube 100*90
Girder	G-SDII/150/XXXX	Girder
H Joint 130	HJSDII/158/130/G	H Joint 130
H Joint 240	HJSDII/158/240/G	H Joint 240
T base 200	BA-SDII/200/G	T base 200
T base 280	BA-SDII/280/G	T bæe 280

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







- Note 5 Topographic Multiplier (Mt) taken as 1.0. Refer to clause 4.4 of AS/NZS 1170.2:2021 for more information.
- Note 6 For Terrain Category (TC) definition, please refer to clause 4.2.1 of AS/NZS 1170.2:2021.
- Note 7 Shielding Multiplier (Ms) taken as 1.0. Refer to clause 4.3 of AS/NZS 1170.2:2021 for more information.
- Note 8 Wind Direction Multiplier (Md) taken as 1.0. Refer to clause 3.3 of AS/NZS 1170.2:2021 for more information.
- Note 9Maximum T168 rail spacing is 2100 mm and Maximum overhang for T168 rail is 1500 mm.<br/>Maximum permitted rail overhang of T60 is 40%. Minimum 2 rails per panel.
- Note 10 The tables in this certificate are for a single bay ezShade. For continuous bay installation, please contact Clenergy.
- Note 11 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 12 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 13 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 14 Minimum concrete compressive strength for pads to be 25 MPa.
- Note 15 Pad reinforcement to be as per Figure 1 and Figure 2.



Figure 1. Reinforcement for 300 mm Pad foundation



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Note 16 Slab reinforcement to be as per Figure 3.



- Note 17 If pads are less than a meter deep, no reinforcement is required.
- Note 18 For fixings to concrete footing, it is recommended using M20 (Grade 5.8 carbon steel anchor stud or similar). Adopt minimum embedment according to anchor manufacturer's manual. Minimum tension capacity per bolt as per schedule shall be met.
- Note 19 This engineering document was designed to cater for the 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 or refer to the latest light commercial certificate.
- Note 20 Footings can be above ground as long as they are reinforced and not over 500 mm above ground. Total embedment length from tables do not take into consideration distance above ground.













Front View – 3 m Concrete pad



ezShade Type: Single Maximum bay spacing: 3 m & 5.5 m



Side View - Concrete Pad Foundation









## PV-ezRACK<sup>®</sup>

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