

CIVIL & STRUCTURAL ENGINEERS
RESIDENTIAL - INDUSTRIAL - COMMERCIAL - PRODUCT DEVELOPMENT
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Clenergy Engineering Certificate Solar Roof Array Installation

Aus Solar
111 Northgate Drive
Thomastown VIC 3074,
Australia

Reference Number: **CL-656-Y REV.2**

Date: 21 June 2021

MW Engineering Melbourne, being Structural Engineers within the meaning of Australian Building Regulations, have carried out structural computations for a Clenergy PV-ezRack SolarRoof flush system installation at **23 Riverbanks Road, Angle Vale SA 5117**. The assessment has been completed based on the information given by the client.

Independent Technical Expert: **Alberto Escobar**
Category / Class: Engineer (Civil)
MIEAust, BRP NPER RPEQ 18579. BRP EC 46542

1. Site conditions

Design life:	25 years
Wind Region:	A
Terrain Category:	2
Wind avg recurrence:	500 years
Maximum building height:	8.1 m
Maximum building length:	19.1 m
Maximum building width:	93.3 m
Maximum roof pitch:	10 degrees
Roof type:	Tin roof
Purlin type:	40 mm top hat sections
Purlin thickness:	0.55 BMT
Maximum purlin spacing:	900 mm

2. Mounting system solution

MW Engineering Melbourne, hereby certify that the Structural Components and Installation comply with the structural requirements of the Building Code of Australia and Australian standards, subject to conditions:

- Panel dimensions: 2094 mm x 1038 mm x 35 mm (23.5 kg)
- Rail Type: ER-R-ECO
- Rail orientation: Perpendicular to purlins
- Panel tilt: flush to roof
- Maximum rail overhang: 40% of end bay spacing
- PV panels to be fixed using one screw per fixing point to purlins using M6.5 – 12 x 70 Hex Washer Cyclonic RoofZips (by Buildex or similar).
- Mximum fixing spacing to be 900 mm on top of the purlins.
- Number of rails per panel: 3
- Exclusion zone to be "2s" where "s" is the gap between the underside of the panel and the roof. Exclusion zone should be taken from edge of the roof inwards.
- Refer to figure 2 to find proposed panel layout.

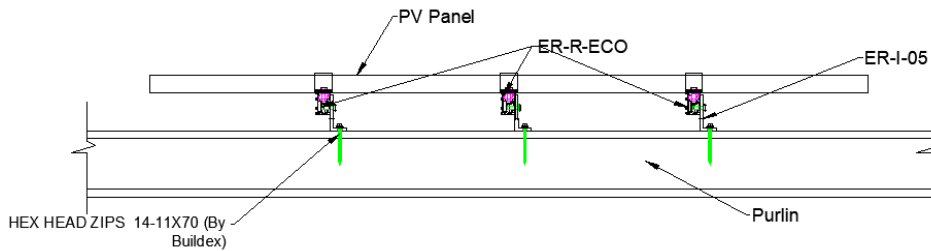


Figure 1. Installation Perpendicular to purlins- 3 rails per panel (Reference only)

3. Design Standards

AS/NZS 1170.0:2002 (R2016)
AS/NZS 1170.1:2002 (R2016)
AS/NZS 1170.2:2011 (R2016)
AS/NZS 1664.1:1997-Amdt 1:1999

General Principles
Imposed loadings
Wind Loadings
Aluminium

4. Assumptions and Methodology

- The assessment is based on the capacity of the solar array frame. This document does not include or certify the PV panel; however, both the panel weight and geometry have been considered when designing the array frame.
- Neither Clenergy nor MW Engineering Melbourne are responsible for the integrity of the roof during and after the installation. Roof structure to be checked by others.
- It is recommended to check the length of the screws that are on site prior carrying the installation. Contact Clenergy if the on-site screw length exceeds 70 mm.
- It has been assumed there is no insulation layer between the roof sheet and the purlins. Contact Clenergy if otherwise.
- If fixing to pre-existing holes, screws shall be a size up (diameter) from the present roof screws.
- Clamping zone of the PV panels should be according to the manufacturer's specifications.
- The more conservative outcome has to be used if one panel or panel row fall between two roof zones.
- Proposed panel layout given by the client as per Figure 4. As long as the panel layout conforms with the exclusion zone and roof zone definition, the certification will be valid.
- Construction is to be carried out strictly in accordance with the instruction manual and this design certificate.
- This work was designed in accordance with the provision of Australian Building Regulations and in accordance with sound, widely accepted engineering principles.
- All work is to be undertaken in accordance with the requirements of relevant OHS.
- If required, all the penetrations, waterproofing and factory applied finishes requirements to be done by contractor.



Alberto Escobar

Category/Class: Engineer (Civil)

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Date: 21/06/2021

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Appendix 1 - Panel Layout

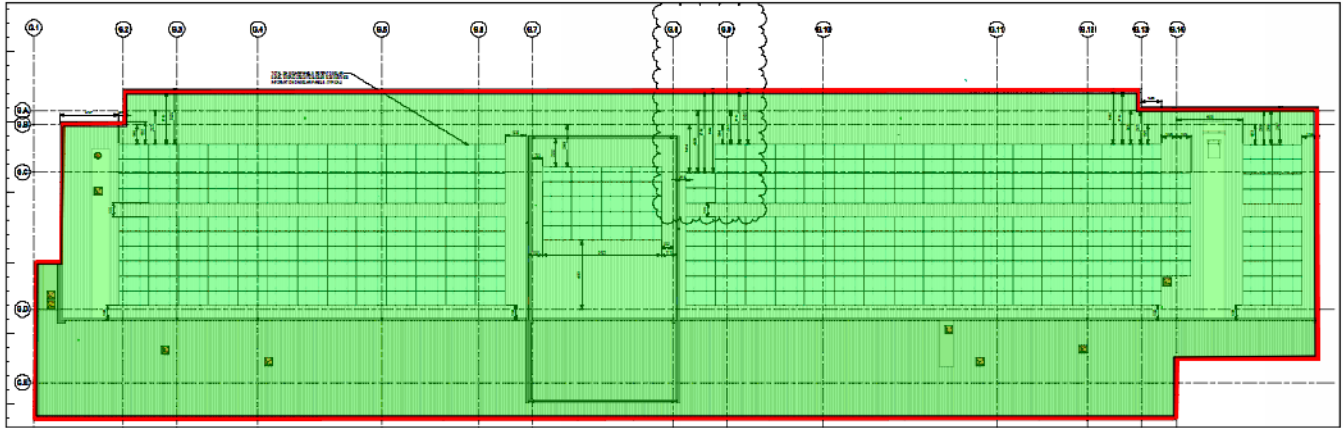


Figure 2. Panel layout (Provided by the client) and roof zone definition



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Appendix II - EzChecklist

ez-Checklist Site Assessment – Roof Mount		
PROJECT DETAILS:		
Distributor <i>Clenergy direct supplier:</i>	Tradezone	
Project Lead Time:	May -June 2021	
Project Name & Location <i>Full Address:</i>	23 RIVERBANKS ROAD ANGLE VALE SA 5117	
Terrain Category <i>TC 1, 1.5, 2, 2.5, 3, 4:</i>	Angle Vale 2 Aldinga 2	
Wind Region <i>A, B, C or D:</i>	Angle Vale A1	
Project Size <i>kW:</i>	150KW	
Mounting Interface Type <i>Flush or Tilt (mention angle*):</i> <i>*angle with horizontal plane</i>	Flush Tin Interface	
Rail Running <i>parallel or perpendicular to purlins:</i>	Perpendicular	
Type of Roof Sheet <i>Tin, Tile or Concrete*:</i> <i>*if concrete please provide concrete compressive strength</i>	TIN	
Type of Fixing <i>Penetrative or Non-Penetrative*:</i>	Penetrative	
BUILDING INFORMATION:		
Building Use <i>such as residential, hospital, education etc:</i>	Education	
Building Dimensions:	Length x Width (m):	93.3m x 19.1m
	Height (m):	8.1m
Roof Pitch:	7.5, 10	
Purlin Type:	40mm top hat sections	
Purlin Thickness:	0.55 BMT	
Purlin Spacing:	900mm	
PV MODULE INFORMATION:		
Panel Dimensions <i>Length x Width x Thickness (mm)*:</i>	1338 x 2054 x 35	
Panel Weight <i>kg:</i>	23.5kg	
Panel Power <i>Wp:</i>	450	