



13 September 2023

Clenergy Australia
1/10 Duerdin Street
Clayton, VIC 3168

CERTIFICATION LETTER

Clenergy PV-ezRack SolarRoof Tin and Tile penetrative Flush interface certification (Elite Rail)
TC2, 2.5, 3 – Wind Region A, B1, B2, C and D Internal REF: **00689-ELT-1** . Project REF: **CL-1171-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**
 - o **Wind Terrain Category 2, 2.5 and 3**
 - o **Wind average recurrence of 200 years**
 - o **Wind Region A, B1, B2, C and D**
- **Solar panel length up to 2.4 m**
- **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,

Alberto Escobar
Civil/Structural Engineer
BEng MIEAust NER
PE 0003615
RPEQ 18759
BDC 3134
BPB (NT) 262228ES
BSP (TAS) 845530344
info@mwengineering.melbourne

STRUCTURAL DESIGN CERTIFICATION



Tin and Tile Flush
Penetrative Interface spacing tables
(Elite Rail)

Standard: AS/NZS 1170.2:2021

Terrain Category: 2, 2.5 & 3

Topographic Multiplier: 1

Client: Clenergy Australia

REF: 00689 -ELT-1

Date: SEPTEMBER 2023

Copyright: The concepts and information contained in this document are the property of MW Engineering Melbourne. Use or copying of this document in whole or in part without the written permission of MW Engineering Melbourne constitutes an infringement in copyright.

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.

Clenergy reference: CL-1171- Y Rev.1

Project: PV-ezRack SolarRoof Tin and Tile Flush Penetrative 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: ELITE-RAIL

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 table

Type of Rail ER-R-ELT (Refer to Appendix I for other compatible rails)
 Type of Interface ER-I-01 (Tile Interface)
 Solar Panel Dimension 2.1 m x 1 m (Refer to **Note 19** for other panel sizes)

ROOF ANGLE	$0^\circ < \alpha \leq 10^\circ$									
TC	3									
BUILDING HEIGHT (m)	≤ 5		5<H≤10		10<H≤15		15<H≤20		20<H≤30	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1669	1836	1619	1781	1536	1689	1519	1671	1469	1616
B1	1452	1597	1227	1350	1118	1230	1027	1140	955	1050
B2	1002	1102	918	1010	801	881	694	764	651	716
C	951	1047	781	859	709	780	662	728	618	680
D	579	637	532	585	456	501	412	454	391	430

ROOF ANGLE	$0^\circ < \alpha \leq 10^\circ$									
TC	2.5									
BUILDING HEIGHT (m)	≤ 5		5<H≤10		10<H≤15		15<H≤20		20<H≤30	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1569	1726	1522	1674	1444	1588	1428	1571	1381	1519
B1	1365	1502	1153	1269	1051	1157	966	1072	898	987
B2	942	1036	863	949	753	829	653	718	612	673
C	894	984	734	808	666	733	622	684	581	640
D	544	598	500	550	428	471	388	426	367	404

ROOF ANGLE	$0^\circ < \alpha \leq 10^\circ$									
TC	2									
BUILDING HEIGHT (m)	≤ 5		5<H≤10		10<H≤15		15<H≤20		20<H≤30	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1488	1637	1444	1588	1369	1506	1355	1490	1310	1441
B1	1295	1424	1094	1203	997	1097	916	1017	851	937
B2	893	982	819	901	714	786	619	681	581	639
C	848	933	697	766	632	695	590	649	551	607
D	516	568	474	521	406	447	368	404	348	383

PV-ezRack SolarRoof Interface spacing table (Cont.)

Type of Rail	ER-R-ELT (Refer to Appendix I for other compatible rails)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2.1 m x 1 m (Refer to Note 19 for other panel sizes)

ROOF ANGLE	$10^\circ < \alpha \leq 20^\circ$									
TC	3									
BUILDING HEIGHT (m)	≤ 5		5<H≤10		10<H≤15		15<H≤20		20<H≤30	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1635	1798	1586	1744	1504	1654	1488	1636	1438	1582
B1	1422	1564	1201	1322	1095	1205	1006	1116	935	1029
B2	981	1079	899	989	785	863	680	748	638	701
C	932	1025	765	842	694	764	648	713	606	666
D	567	623	521	573	446	491	404	444	383	421

ROOF ANGLE	$10^\circ < \alpha \leq 20^\circ$									
TC	2.5									
BUILDING HEIGHT (m)	≤ 5		5<H≤10		10<H≤15		15<H≤20		20<H≤30	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1531	1684	1485	1633	1408	1549	1393	1532	1347	1482
B1	1332	1465	1125	1238	1026	1128	942	1046	876	963
B2	918	1010	842	926	735	808	637	700	597	657
C	873	960	716	788	650	715	607	668	567	624
D	531	584	488	536	418	460	378	416	358	394

ROOF ANGLE	$10^\circ < \alpha \leq 20^\circ$									
TC	2									
BUILDING HEIGHT (m)	≤ 5		5<H≤10		10<H≤15		15<H≤20		20<H≤30	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1462	1608	1418	1559	1345	1479	1330	1463	1286	1415
B1	1272	1399	1074	1182	979	1077	899	998	836	920
B2	877	965	804	884	702	772	608	669	570	627
C	833	916	684	752	621	683	580	637	542	596
D	507	557	466	512	399	439	361	397	342	376

PV-ezRack SolarRoof Interface spacing tables (Cont.)

Type of Rail	ER-R-ELT (Refer to Appendix I for other compatible rails)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2.1 m x 1 m (Refer to Note 19 for other panel sizes)

ROOF ANGLE	20° < α ≤ 30°									
TC	3									
BUILDING HEIGHT (m)	≤ 5		5<H≤10		10<H≤15		15<H≤20		20<H≤30	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1615	1777	1567	1724	1486	1635	1470	1617	1422	1564
B1	1405	1546	1187	1306	1082	1191	994	1103	924	1016
B2	969	1066	888	977	775	853	672	739	630	693
C	921	1013	756	832	686	755	641	705	599	658
D	560	616	515	566	441	485	399	439	378	416

ROOF ANGLE	20° < α ≤ 30°									
TC	2.5									
BUILDING HEIGHT (m)	≤ 5		5<H≤10		10<H≤15		15<H≤20		20<H≤30	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1515	1667	1470	1617	1394	1534	1379	1517	1334	1467
B1	1318	1450	1114	1225	1015	1117	932	1035	867	953
B2	909	1000	833	917	727	800	630	693	591	650
C	864	950	709	780	644	708	601	661	561	618
D	525	578	483	531	414	455	374	412	355	390

ROOF ANGLE	20° < α ≤ 30°									
TC	2									
BUILDING HEIGHT (m)	≤ 5		5<H≤10		10<H≤15		15<H≤20		20<H≤30	
	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central	UW & DW	Central
A	1446	1591	1403	1543	1330	1464	1316	1448	1273	1400
B1	1258	1384	1063	1169	969	1066	890	988	827	910
B2	868	954	795	875	694	764	602	662	564	620
C	824	907	677	744	614	676	573	631	536	589
D	501	551	461	507	395	434	357	393	338	372

PV-ezRack SolarRoof Interface spacing table

Type of Rail ER-R-ELT (Refer to Appendix I for other compatible rails)
 Type of Interface ER-I-05 (Tin Interface)
 Solar Panel Dimension 2.1 m x 1 m (Refer to **Note 19** for other panel sizes)

Angle		$0^\circ < \alpha \leq 30^\circ$									
TC	3										
Building Height (m)	≤ 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	1515	1805	1505	1850	1500	1750	1427	1484	1365	1417	
B1	1415	1492	1315	1492	1347	1468	1296	1411	1152	1350	
B2	1367	1439	1270	1439	1302	1416	1252	1362	1114	1303	
C	1237	1399	1237	1399	1179	1331	1135	1281	1087	1227	
D	1103	1244	1103	1244	989	1185	884	1141	778	1094	

Angle		$0^\circ < \alpha \leq 30^\circ$									
TC	2.5										
Building Height (m)	≤ 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	1510	1800	1474	1700	1396	1550	1356	1407	1310	1358	
B1	1369	1441	1227	1389	1268	1379	1232	1340	1106	1295	
B2	1322	1391	1185	1341	1225	1332	1191	1295	1070	1251	
C	1197	1353	1156	1305	1111	1253	1072	1218	970	1178	
D	1036	1204	934	1163	828	1117	763	1086	691	987	

Angle		$0^\circ < \alpha \leq 30^\circ$									
TC	2										
Building Height (m)	≤ 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	1461	1700	1382	1480	1319	1368	1292	1340	1260	1305	
B1	1326	1394	1152	1304	1199	1303	1176	1278	1065	1245	
B2	1281	1347	1114	1259	1159	1260	1137	1235	1030	1204	
C	1161	1310	1087	1227	989	1186	934	1163	867	1134	
D	944	1167	778	1094	704	1007	665	950	618	882	

General Notes

Note 1. Tile roof interface spacing tables are based on a minimum depth into **F7 (Pine) timber of 25mm** (using two screws) whereas **Tin roof interface** spacing tables based on a minimum depth into **F7 (Pine) timber of 35mm** and **Steel Purlins G450 1.5mm thick** (using one screw)

Note 2. 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 3. Standard screws shipped for tin and tile Roof Interfaces

Metal Purlins/Battens	Fasteners to be used
0.42 mm to 0.75 mm	Buildex- 14 - 11 x 70 Hex Head Zips with 16 mm Aluminium Bonded Washer on G550 Steel Battens or a screw that has an equal or a higher pullout capacity.
1.2 mm to 2.4 mm	Buildex- 14 - 11 x 70 Hex Head Zips with 16 mm Aluminium Bonded Washer or a screw that has an equal or a higher pullout capacity.
Wood Purlins and Rafters	Fasteners to be used
Timber F7 (Pine) and Timber 17 (Hardwood).	Tin Interface: Buildex- 14 - 11 x 70 Hex Head Zips with 16 mm Aluminium Bonded Washer or a screw that has an equal or a higher pullout capacity.
	Tile Interface: Buildex- 14 - 11 x 70 Hex Head Zips with 16 mm Aluminium Bonded Washer or a screw that has an equal or a higher pullout capacity or 14-10 x 50 Hex Head T17 with 16mm ABW Climaseal 3 or 14-10 x 65 Hex Head T17 Climaseal 3 or other screw of pullout value not less than screws above.

Note 4. The **Tin interface** increase, or reduction factors are listed below. These are depending on the type of tophat, purlin or batten as per the below table.

Purlin Material	Purlin thickness (mm)	Min. embedment (mm)	Spacing +/- (WR A)	Spacing +/- (WR B1)	Spacing +/- (WR B2)	Spacing +/- (WR C)	Spacing +/- (WR D)
Timber (Pine F7)	-	25	-25%	-35%	-35%	-35%	-35%
Timber (Pine F7)	-	30	-20%	-25%	-25%	-25%	-25%
Timber (Pine F7)	-	35	-	-	-	-	-
Timber (Hardwood F17)	-	25	-	-	-	5%	10%
Timber (Hardwood F17)	-	30	-	-	-	10%	15%
Timber (Hardwood F17)	-	35	-	-	-	10%	20%
Metal (G550)	0.42	-	-75%	-80%	-80%	-80%	-80%
Metal (G550)	0.48	-	-60%	-70%	-70%	-70%	-70%
Metal (G550)	0.55	-	-50%	-65%	-65%	-65%	-65%
Metal (G550)	0.75	-	-25%	-30%	-30%	-30%	-30%
Metal (G450)	1.2	-	-20%	-30%	-30%	-30%	-30%
Metal (G450)	1.5	-	-	-	-	-	-
Metal (G450)	1.9	-	-	-	-	5%	10%
Metal (G450)	2.4	-	-	-	-	5%	10%

Note 5. Minimum number of screws to be used when installing **tile** (ER-I-01) interface to be two (2) and when installing **tin** (ER-I-05) interface to be one (1).

Note 6. Spacings on tile interfaces will be reduced as follows:

Interface	% of Reduction
ER-I-01/CS, ER-I-51, ER-I-01/EZC/ECO & ER-I-71	-
ER-I-02	-50%
ER-I-04	-50%
ER-I-23	-28%
ER-I-26	-28%

Note 7. The more conservative spacing has to be used if one panel or panel row falls between two roof zones.

Note 8. The components list mentioned on the Appendix I are satisfied for use according to AS/NZS 1664.1:1997-Amdt 1:1999 and AS/NZS 1170.2:2021

Note 9. For Terrain Category (TC) definition, please refer to clause 4.2.1 of AS/NZS 1170.2:2021.

Note 10. 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 installation in 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 11. Shielding Multiplier (Ms) taken as 1.0. Refer to clause 4.3 of AS/NZS 1170.2:2021 for more information.

Note 12. Wind Direction Multiplier (Md) taken as 1.0. Refer to clause 3.3 of AS/NZS 1170.2:2021 for more information.

Note 13. 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 14. 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 15. This certificate only covers the assessment of the Clenergy PV-ezRack mounting system, including the components listed on note 3 and 8. The assessment of the roof structure, PV panels and other fixings are to be checked by the installer/contractor, if necessary.

Note 16. 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 bin, silo, tank, pitched free, troughed free, hyper free, canopy, awning and cantilvered roof.

Note 17. 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.

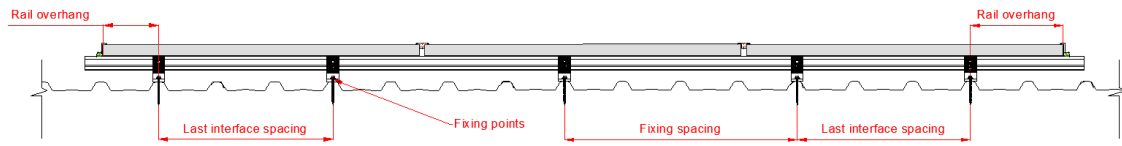
Note 18. No consideration has been taken on the effect of earthquake loads.

Note 19. This Engineering report is based on 2.1 m x 1 m panels and two rails per panel. However, a percentage increase could be applied on all interface spacings as shown on the following table.

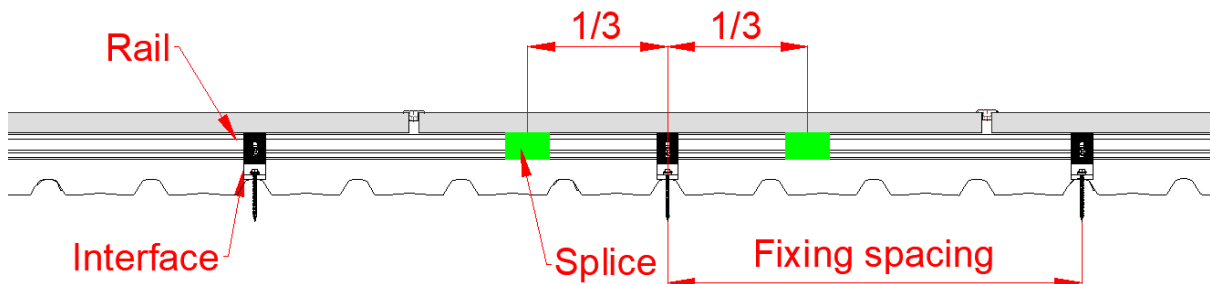
Number of rails per panel	Panel length (mm)	Spacing +/-	Spacing +/-
		W.R – A & B1	W.R –B2 C & D
2 rails	≤ 1700	6%	10%
3 rails	≤ 1700	12%	18%
4 rails	≤ 1700	15%	20%
2 rails	≤ 1800	4%	7%
3 rails	≤ 1800	12%	18%
4 rails	≤ 1800	15%	20%
2 rails	≤ 1900	4%	7%
3 rails	≤ 1900	10%	15%
4 rails	≤ 1900	12%	18%
2 rails	≤ 2100	0%	0%
3 rails	≤ 2100	10%	15%
4 rails	≤ 2100	12%	18%
2 rails	≤ 2200	-12%	-12%
3 rails	≤ 2200	7%	12%
4 rails	≤ 2200	12%	18%
2 rails	≤ 2300	-16%	-12%
3 rails	≤ 2300	5%	12%
4 rails	≤ 2300	10%	15%
2 rails	≤ 2400	-19%	-15%
3 rails	≤ 2400	5%	10%
4 rails	≤ 2400	8%	12%

Note 20. Panel width cannot exceed 1.20 m for any of the above panel length dimensions and panel weight cannot exceed 15 kg/m².

Note 21. Rail overhang ends where the panel finishes, and it should be less than 40% of the last installed interface spacing.



Note 22. ER-R-ECO rail splice can only be installed within 1/3 of the fixing spacing (centre to centre) from the nearest interface when fixing spacing is over 1700 mm.



Note 23. ER-R-ECO rail splice cannot be installed on rail overhangs.

Note 24. Neither Clenergy nor MW Engineering Melbourne are responsible for external factors leading to compression of the tile interfaces.

Note 25. 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 26. Capacities checked and compared against testing data from Clenergy Australia and MTS (NATA certified).

Note 27. General conditions

Note 27.1 Minimum steel purlin strength of 450 MPa and 550 MPa for tophats.

Note 27.2 Timber Grade members: F7 (Pine) and F17 (Hardwood).

Note 27.3 If any of the screws of the interfaces go into pre-existing holes, they will have to be one size up compared to the screws that were previously installed. This is to ensure that the pullout capacity remains the same or higher.

Note 28. Clamping zone of the PV panels should be according to the manufacturer's specifications.

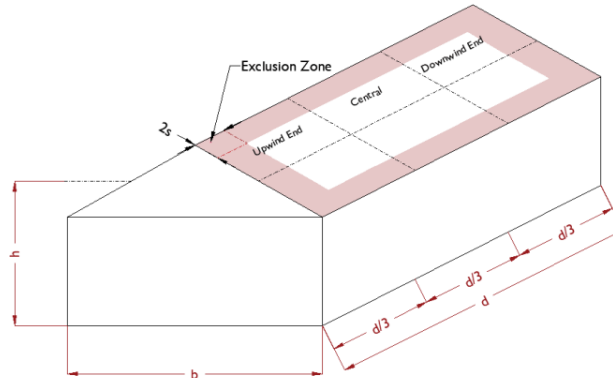
Note 29. When using Roof Extender (ER-RE-200), reduce interface spacings by 15% on Wind Region A and B1 and 30% on Wind Region B2, C and D.

Note 30. Please refer to AS 4312 to find out about corrosion categories.

Note 31. Conditions for flush mounted systems installed on flat and pitched roofs are according to the B6 Appendix of the AS/NZS 1170.2:2021. Where the following conditions need to be met:

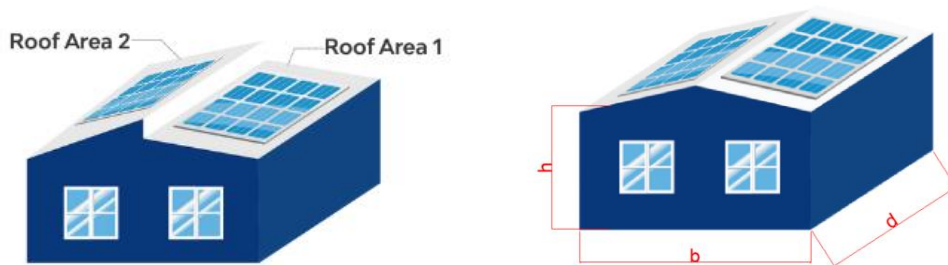
- Roof pitch to be between 1° and 30°.

- $h/d \leq 0.5$ and $h/b \leq 0.5$. Being h = height, b = width and d = length of the building as per the below picture.
- Gap between the underside of the panel and the roof to be no less than 50mm and no more than 300mm.



Note 32. 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.

Note 33. Refer to the latest commercial certificate when the conditions from Note 31 and 32 doesn't meet the conditions on section B6 part (d) of the AS/NZS 1170.2:2021 standard for roof angle is between 1° to 30°.



Note 34. For Hanger Bolt installation on either tin or tile roof, the spacing to apply with a minimum embedment depth of 25mm into F17 (Hardwood) timber or fixing to metal purlin with 1.5 mm thickness is the same as the tin roof interface spacing (ER-I-05). The Hanger Bolts for wood purlin/rafter installation are ER-HB-8/150 and ER-HB-10/200A. The Hanger Bolt for metal purlin/rafter is ER-HB-MP/8/150EP. Contact Clenergy if your project doesn't meet the above requirements.

Note 35. Neither Clenergy nor MW Engineering Melbourne will be responsible for the integrity of the roof tiles when using hanger bolts for the solar installation. It will be the clients' responsibility to check the hanger bolt installation feasibility.

Example

Project Address: 10 May, Falls, VIC.

Roof Type: Tin roof

Building height: 5 m

Building dimensions: 90 x 30 m

Roof pitch: less than 10°

Panel dimension: 2 m x 1 m
Purlin spacing: 1500 mm.
Rail running perpendicular to purlins.

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. $5/30 = 0.16 \leq 0.5$ ✓ and $5/90 = 0.05 \leq 0.5$ ✓
- 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:

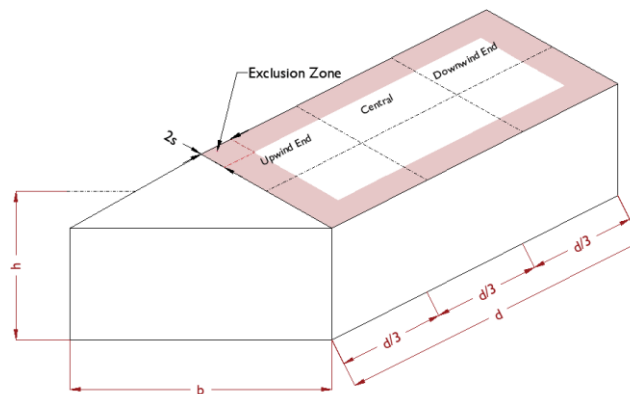
- Central zone: 1805 mm
- Upwind & Downwind: 1515 mm

Installation to be done as per following fixing spacings:

- Central zone: 1500 mm
- Upwind & Downwind: 1500 mm

Step 4: Define roof zone definition as per image below.

$d = 90 \text{ m}$
 $b = 30 \text{ m}$
 $d/3 = 90/3 = 30 \text{ m}$



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. Refer to the exclusion zone (red area) on the above image.

Appendix I – Component list

Components	Part No.	Description
Elite Rail	ER-R-ELT/XXXX	Elite Rail
Splice	ER-SP-ECO	Splice
Elite Rail Black	ER-R-ELT/XXXX/BA	Elite-Rail Black
Splice	ER-SP-ECO/BA	Splice, Black
Tile Interfaces	ER-I-01, 02, 04, 23, 26, 51 and 71	Tile Interfaces
Tile Interface	ER-I-01/CS	Carbon Steel Tile Interface
Tile Interface	ER-I-01/EZC/ECO	Tile Interface with ezClick connection
Tin Interface	ER-I-05	Tin Interface
Tin Interface	ER-I-05/BA	Tin Interface Black
Tin Interface	ER-I-05/CM	Tin Interface with click module
Tin Interface	ER-I-05A/EZC/ECO	Tin Interface with ezClick connection
Tin Interface	ER-I-05/C5	Tin Interface with C5 rated Screw
Tin Interface	ER-I-25	Tin Interface with Curved Base
Tin Interface	EZ-AD-C43	Adapter (Puck) for Corrugated Roof
Tin Interface	ER-I-25/BA	Black Tin Interface with Curved Base
Tin Interface	EZ-AD-C43/BA	Black Adapter (Puck) for Corrugated Roof
Tin Interface	EZ-AD-C110	Adapter for Corrugated Roof
Roof Extender	ER-RE-200	Roof Hook Extender (Reduction Factor)
Hanger Bolt	ER-HB-10/200A	Hanger Bolt M10*200mm
Hanger Bolt	ER-HB-MP/8/150EP	Hanger Bolt for metal purlin M8*150mm
Hanger Bolt	ER-HB-8/150	Hanger Bolt for timber purlin M8*150mm
Inter Clamp	ER-IC-STXX	Inter Clamp = clamp + Z-Module + bolt
End Clamp	ER-EC-STXX	End Clamp = clamp + Z-Module + bolt
Inter Clamp	ER-IC-STXX/G	Inter Clamp with Grounding Pins
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	Akashi Clamp for Frame Height 30-46mm with Grounding Clip
Clamp	C-U/30/46	Akashi Clamp for Frame Height 30-46mm
Inter Clamp	ER-IC-STXXB	Inter Clamp XX Black
End Clamp	ER-EC-STXXB	End Clamp XX Black
Inter Clamp	ER-IC-STXXB/G	Black Inter Clamp with Grounding Pins
Clamp	C-U/30/46-G/BA	Black Akashi Clamp with grounding clip
Clamp	C-U/30/46/BA	Black Akashi Clamp
End Clamp	ER-EC-DU35/40	End Clamp dual 35 or 40mm
End Clamp	ER-EC-DU40/46	End Clamp dual 40 or 46mm
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)

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