



20 October 2020

Clenergy Australia
1/10 Duerdin Street
Clayton, VIC 3168

CERTIFICATION LETTER

Clenergy PV-ezRack Solar Roof Certification – TC2, 2.5, 3 – Wind Region A, B, C, D. Internal REF: **00115**.
Project REF: **CL-10088-SM-REV-H**.

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

- **Wind Loads to AS 1170.2-2011 AMDT 4-2016**
 - o **Wind Terrain Category 2, 2.5 and 3**
 - o **Wind average recurrence of 200 years**
 - o **Wind Region A, B, C, D**
- **Solar panel length up to 2.2m**
- **Solar panel width up to 1.2m**

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

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

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

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

Best Regards,

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STRUCTURAL DESIGN CERTIFICATION

PV-ezRack^R SolarRoof tin and tile flush interface spacing tables according to AS/NZS 1170.2:2011 Amdt 4-2016 Within Australia Terrain Category 2, 2.5 & 3

Client: Clenergy Australia

REF: CL-10088-SM – REV H

Date: OCT 2020

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Internal REF: 00115

Client: Clenergy Australia

Project: PV-ezRack SolarRoof tin and tile flush interface spacing tables

Australian 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

Wind Terrain Category: 2, 2.5 & 3

Wind average recurrence: 200 years

Designed: SM

Date: OCT 2020

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From the date of publication onwards, any amendment made to any of the above-mentioned Standards will make this report outdated and a new one will have to be released, unless the amendment has no implications on this certificate.

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PV-ezRack SolarRoof Interface spacing tables

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	2

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1488	1637	1444	1588	1369	1506	1354	1490	1310	1441
B	1086	1195	997	1097	893	982	819	900	700	769
C	692	761	647	712	566	622	513	565	454	499
D	417	458	402	442	365	401	327	360	290	319

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1459	1604	1415	1556	1342	1476	1327	1460	1284	1412
B	1065	1171	977	1075	875	963	802	882	686	754
C	678	746	634	698	554	610	503	554	445	489
D	408	449	394	433	357	393	321	353	284	313

Roof Angle - $20^\circ < \alpha \leq 30^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1444	1588	1400	1540	1328	1461	1314	1445	1270	1397
B	1054	1159	967	1064	866	953	794	873	679	746
C	671	738	628	691	549	603	498	548	440	484
D	404	445	390	429	354	389	318	349	282	310

PV-ezRack SolarRoof Interface spacing tables (Cont.)

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	2

Roof Angle - $30^\circ < \alpha \leq 60^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1414	1555	1371	1509	1301	1431	1287	1415	1244	1369
B	1032	1135	947	1042	848	933	778	855	665	731
C	657	723	615	677	537	591	488	537	431	474
D	396	435	382	420	346	381	311	342	276	303

PV-ezRack SolarRoof Interface spacing tables

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	2.5

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1560	1717	1514	1665	1436	1579	1420	1562	1373	1511
B	1139	1253	1046	1150	936	1030	858	944	733	807
C	726	798	679	747	593	652	538	592	476	524
D	437	481	421	463	382	421	343	378	304	335

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1529	1682	1483	1632	1407	1548	1392	1531	1346	1480
B	1116	1228	1025	1127	918	1009	841	925	719	791
C	711	782	665	732	581	639	528	580	466	513
D	428	471	413	454	375	412	336	370	298	328

Roof Angle - $20^\circ < \alpha \leq 30^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1514	1665	1468	1615	1393	1532	1377	1515	1332	1465
B	1105	1215	1014	1116	908	999	833	916	711	783
C	704	774	658	724	575	633	522	574	462	508
D	424	466	409	450	371	408	333	366	295	325

PV-ezRack SolarRoof Interface spacing tables (Cont.)

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	2.5

Roof Angle - $30^\circ < \alpha \leq 60^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1482	1631	1438	1582	1364	1500	1349	1484	1305	1435
B	1082	1190	993	1093	889	978	815	897	697	766
C	689	758	645	709	563	620	511	563	452	497
D	415	457	400	440	363	400	326	359	289	318

PV-ezRack SolarRoof Interface spacing tables

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	3

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1665	1832	1615	1777	1532	1685	1515	1667	1465	1612
B	1216	1337	1116	1227	999	1099	916	1008	783	861
C	774	852	724	797	633	696	575	632	508	559
D	466	513	450	495	408	449	366	403	325	357

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1632	1795	1583	1741	1501	1652	1485	1634	1436	1580
B	1191	1311	1093	1203	979	1077	898	987	767	844
C	759	835	710	781	620	682	563	619	498	548
D	457	503	441	485	400	440	359	395	318	350

Roof Angle - $20^\circ < \alpha \leq 30^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1615	1777	1567	1724	1486	1635	1470	1617	1422	1564
B	1179	1297	1082	1191	969	1066	888	977	759	835
C	751	826	703	773	614	675	557	613	493	542
D	452	498	436	480	396	435	355	391	315	346

PV-ezRack SolarRoof Interface spacing tables (Cont.)

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	3

Roof Angle - $30^\circ < \alpha \leq 60^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1582	1740	1535	1688	1455	1601	1440	1584	1392	1531
B	1155	1270	1060	1166	949	1044	870	957	744	818
C	736	809	688	757	601	661	546	600	483	531
D	443	487	427	470	388	426	348	383	308	339

PV-ezRack SolarRoof Interface spacing tables

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	2

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1579	1737	1496	1646	1469	1616	1432	1575	1377	1515
B	1368	1505	1157	1272	1047	1151	964	1060	900	990
C	890	980	734	808	670	737	624	687	588	646
D	542	596	506	556	431	475	395	434	367	404

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1574	1732	1492	1641	1460	1606	1423	1565	1372	1510
B	1359	1495	1157	1272	1042	1146	955	1050	895	985
C	881	969	730	803	661	727	620	682	583	641
D	532	586	464	510	422	465	386	424	358	394

Roof Angle - $20^\circ < \alpha \leq 30^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1570	1727	1487	1636	1460	1606	1418	1560	1368	1505
B	1359	1495	1148	1262	1037	1141	950	1045	890	980
C	877	964	725	798	661	727	620	682	583	641
D	532	586	464	510	422	465	386	424	353	389

PV-ezRack SolarRoof Interface spacing tables (Cont.)

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	2

Roof Angle - $30^\circ < \alpha \leq 60^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1561	1717	1469	1616	1423	1565	1386	1525	1359	1495
B	1331	1464	1102	1212	1010	1111	936	1030	872	959
C	863	949	707	778	597	656	615	677	578	636
D	532	586	459	505	413	454	376	414	349	384

PV-ezRack SolarRoof Interface spacing tables

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	2.5

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1671	1838	1616	1777	1561	1717	1487	1636	1469	1616
B	1460	1606	1359	1495	1221	1343	1111	1222	1010	1111
C	1001	1101	890	980	789	868	725	798	652	717
D	624	687	569	626	505	555	459	505	422	465

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1666	1833	1611	1772	1551	1707	1478	1626	1460	1606
B	1450	1595	1359	1495	1216	1338	1106	1217	1005	1106
C	996	1096	881	969	780	858	725	798	643	707
D	620	682	565	621	500	550	450	495	418	459

Roof Angle - $20^\circ < \alpha \leq 30^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1662	1828	1607	1767	1551	1707	1473	1621	1455	1601
B	1450	1595	1354	1489	1212	1333	1102	1212	1001	1101
C	987	1086	877	964	776	853	721	793	643	707
D	620	682	565	621	496	545	454	500	413	454

PV-ezRack SolarRoof Interface spacing tables (Cont.)

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	2.5

Roof Angle - $30^\circ < \alpha \leq 60^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1652	1818	1561	1717	1515	1666	1469	1616	1359	1495
B	1395	1535	1304	1434	1193	1313	1092	1202	964	1060
C	955	1050	863	949	771	848	716	788	643	707
D	615	677	551	606	487	535	441	485	404	444

PV-ezRack SolarRoof Interface spacing tables

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	3

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1744	1919	1735	1909	1671	1838	1597	1757	1450	1595
B	1528	1681	1524	1676	1423	1565	1285	1414	1148	1262
C	1102	1212	1092	1202	946	1040	845	929	753	828
D	689	757	679	747	606	666	532	586	468	515

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1735	1909	1726	1898	1666	1833	1588	1747	1446	1590
B	1524	1676	1519	1671	1418	1560	1276	1404	1138	1252
C	1102	1212	1088	1197	936	1030	840	924	748	823
D	684	752	670	737	601	661	523	576	464	510

Roof Angle - $20^\circ < \alpha \leq 30^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1680	1848	1662	1828	1597	1757	1524	1676	1377	1515
B	1515	1666	1423	1565	1368	1505	1248	1373	1102	1212
C	1203	1323	1065	1171	918	1010	826	909	725	798
D	776	853	652	717	588	646	514	565	450	495

PV-ezRack SolarRoof Interface spacing tables (Cont.)

Type of Rail	ER-R-ECO (Refer to Note 7 for other compatible rails)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m (Refer to Note 13 for other panel sizes)
Terrain Category	3

Roof Angle - $30^\circ < \alpha \leq 60^\circ$

Wind Region	Building Height (m)									
	$H \leq 5$		$5 < H \leq 10$		$10 < H \leq 15$		$15 < H \leq 20$		$20 < H \leq 30$	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1671	1838	1662	1828	1597	1757	1524	1676	1377	1515
B	1441	1585	1423	1565	1368	1505	1248	1373	1102	1212
C	1074	1181	1065	1171	918	1010	826	909	725	798
D	661	727	652	717	588	646	514	565	450	495

General Notes

Note 1. Tile Roof Interface Spacing tables based on a minimum depth into F7 (Pine) timber of 25mm and Tin Roof Interface Spacing tables based on a minimum depth into F7 (Pine) timber of 35mm and Steel Purlins G450 1.5mm thick.

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

Metal Purlins/Battens	Fasteners to use
0.75 mm	Buildex- 14 - 11 x 70 Hex Head Zips Climaseal 3 with 16 mm ABW on G550 Steel Battens
1.5 mm - 2.4 mm	Buildex- 14 - 11 x 70 Hex Head Zips Climaseal 3 with 16 mm ABW
Wood Purlins and Rafters	Fasteners to be used
Timber F7 (Pine) and Timber I7 (Hardwood).	Tin Interface: Buildex- 14 - 11 x 70 Hex Head Zips Climaseal 3 with 16 mm ABW or 14g (6.3 mm)
	Tile Interface: Buildex- 14 - 11 x 70 Hex Head Zips Climaseal 3 with 16 mm ABW 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 3. Tin and tile spacings were calculated based on Steel Purlins G450 1.5mm and Timber F7 (Pine). For 0.75 mm thick steel battens and 1.2mm thick purlins, all the fixing spacings shall be reduced as follows:

Wind Region A	Wind Region B	Wind Region C	Wind Region D
- 28 %	- 40 %	- 40 %	- 40 %

Note 4. For 1.9 mm and 2.4 mm thick purlins, all the fixing spacings shall be increased as follows:

Wind Region A	Wind Region B	Wind Region C	Wind Region D
-	-	+ 5 %	+ 10 %

Note 5. If reducing screw embedment by using EZ-AD-C43 adaptor or if attaching to a smaller timber batten/purlin, fixing spacing to be reduced/increased to timber purlins as per below:

Batten type	Batten-Purlin Depth / Screw embedment	
	25 mm	30 mm
Timber F7	Reduction of 35%	Reduction of 25%
Timber F17	Spacings remain the same	Increase of 20%

Note 6. 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 7. The following components are satisfied for use according to AS/NZS 1664.1:1997-Amdt 1:1999 and AS/NZS 1170.2:2011 Amdt 4-2016

Components	Part No.	Description
ECO-Rail	ER-R-ECO/XXXX	ECO Rail
Splice	ER-SP-ECO	PV-ezRack Splice for ECO rail
Australian Made Mill Finish ECO Rail	R-ECO/XXXX/AUMF	PV-ezRack Australian Made Mill Finish ECO Rail
ST-Rail	ER-R-STXXXX	Standard Rail
Splice	ER-SP-ST	PV-ezRack Splice for Standard Rail 200mm
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	Universal Clamp for Frame Height 30-46mm with Grounding Clip
Clamp	C-U/30/46	Universal Clamp for Frame Height 30-46mm
End Clamp	ER-EC-DU35/40	End Clamp dual 35 or 40mm
End Clamp	ER-EC-DU40/46	End Clamp dual 40 or 46mm
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

Components	Part No.	Description
Interface	ER-I-01, 02, 04, 23, 26 and 51	Tile Interface
Interface	ER-I-01/CS	Carbon Steel Tile Interface
Tile Interface with ezClick connection for ECO-Rail	ER-I-01/EZC/ECO	PV-ezRack SolarRoof, Tile Interface with ezClick connection for ECO-Rail
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-I-25	Tin Interface with curved Base for corrugated Roof
Black Interface	ER-I-25/BA	Black Tin Interface with curved Base for corrugated Roof
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)

Components	Part No.	Description
Adapter for Corrugated Roof	EZ-AD-C43	Adapted for Corrugated Iron Roof for Tin interface ER-I-05
Black Adapter for Corrugated Roof	EZ-AD-C43/BA	Black Adapted for Corrugated Iron Roof for Tin interface ER-I-05
Corrugated Adapter	EZ-AD-C110	PV-ezRack Adapter for Corrugated Iron Roof.
Roof Extender (Reduction Factor)	ER-RE-200	Roof Hook Extender, Suitable for ER-I-01,02,04,05,23,26, 51 and 01/CS
Connector Clamp	CRC-R/ECO-ZBW	Cross Connector Clamp for ECO-Rail
Hanger Bolt	ER-HB-10/200A	PV-ezRack, Hanger Bolt M10*200mm
Hanger Bolt	ER-HB-MP/8/150EP	PV-ezRack Hanger Bolt for metal purlin M8*150mm
Hanger Bolt	ER-HB-8/150	Hanger bolt without mounting plate M8x150. Fixed to timber purlin only
Mid Clamp XX Black	ER-IC-STXXB	Inter Clamp XX Black
End Clamp XX Black	ER-EC-STXXB	End Clamp XX Black
Black Universal Clamp	C-U/30/46-BA	Black Universal Clamp
Black Universal Clamp	C-U/30/46-G-BA	Black Universal Clamp with grounding clip

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

Note 8. For Terrain Category (TC) definition, please refer to clause 4.2.1 of AS/NZS 1170.2:2011 (R2016).

Note 9. The installed frame must comply with the clamping zone of the PV Panel.

Note 10. Capacities checked and compared against testing data from Clenergy Australia and MTS (NATA certified).

Note 11. Maximum permitted rail overhang of 40%.

Note 12. For the definition of roof zones, refer to Appendix D6 of the AS/NZS 1170.2:2011 (R2016) standard.

Note 13. This Engineering report is based on 2 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 / width (mm)	Spacing +/-
2 rails	$\leq 1700 / \leq 1100$	+ 8 %
3 rails	$\leq 1700 / \leq 1100$	+ 12 %
4 rails	$\leq 1700 / \leq 1100$	+ 15 %
2 rails	$\leq 2000 / \leq 1100$	0 %
3 rails	$\leq 2000 / \leq 1100$	+ 10 %
4 rails	$\leq 2000 / \leq 1100$	+ 12 %
2 rails	$\leq 2100 / \leq 1100$	- 10 %
3 rails	$\leq 2100 / \leq 1100$	+ 6 %
4 rails	$\leq 2100 / \leq 1100$	+ 10 %
2 rails	$\leq 2200 / \leq 1100$	- 13 %
2 rails	$\leq 2200 / \leq 1200$	- 20 %

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. No consideration has been taken on the effect that the solar panel will have over the roof structure. It has been assumed that the roof will be able to resist the additional loadings imposed by the installation of the solar panels in conjunction with the Clenergy Mounting System.

Note 16. 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 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. 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 19. Neither Clenergy nor MW Engineering Melbourne are not to be responsible for external factors leading to compression of the tile interfaces.

Note 20. Topographic Multiplier (Mt) taken as 1.0. Refer to clause 4.4 of AS/NZS 1170.2:2011 (R2016) for more information.

Note 21. Shielding Multiplier (Ms) taken as 1.0. Refer to clause 4.3 of AS/NZS 1170.2:2011 (R2016) for more information.

Note 22. Wind Direction Multiplier (Md) taken as 1.0. Refer to clause 3.3 of AS/NZS 1170.2:2011 (R2016) for more information.

Note 23. General conditions

Note 23.1 Minimum grade for steel purlins/battens of 450 Mpa.

Note 23.2 Timber Grade members: F7 (Pine) and F17 (Hardwood).

Note 23.3 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 24. 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-02	-50%
ER-I-04	-50%
ER-I-23	-28%
ER-I-26	-28%

Note 25. A minimum of two (2) screws per Tile Interface will be required for installation.

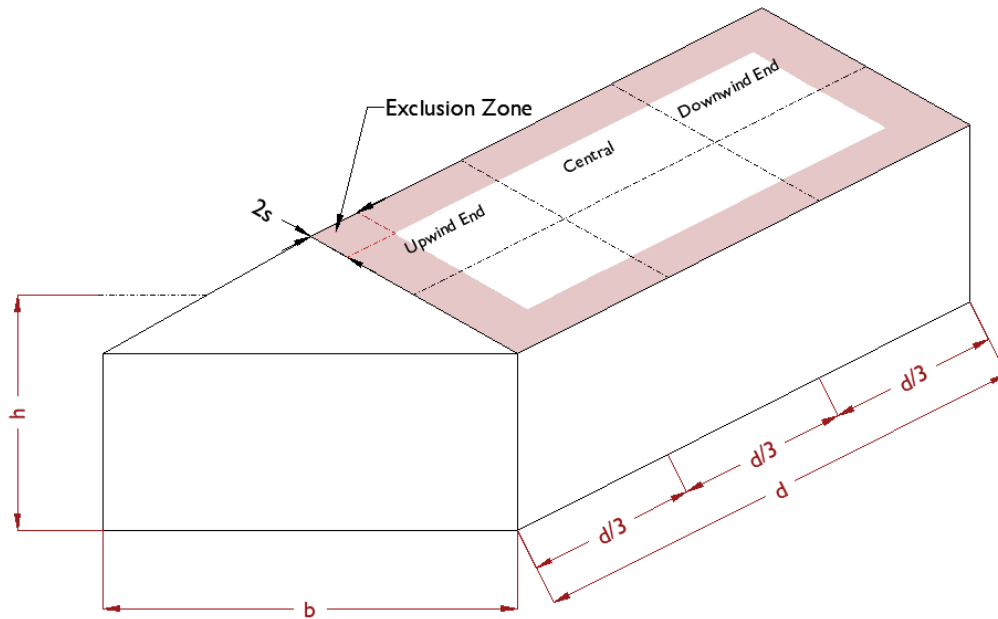
Note 26. For installations on the Central Zone increase ER-I-01 & ER-I-05 Interface Spacings by 10%.

Note 27. Use the same spacing listed on the tables of this certificate for panels installed in landscape.

Note 28. When using Roof Extender (ER-RE-200), reduce interface spacings by 15% on Wind Region A and B and 30% on Wind Region C and D.

Note 29. Conditions for flush mounted systems installed on flat and pitched roofs according to the D6 Appendix of the AS/NZS 1170.2:2011 (R2016).

- Roof pitch to be between 1° and 30°.
- $h/d \leq 0.5$ 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 30. Exclusion zone for flush installation to be the minimum distance from the edge of the roof "2s", where "s" is the gap between the underside of the panel and the roof.

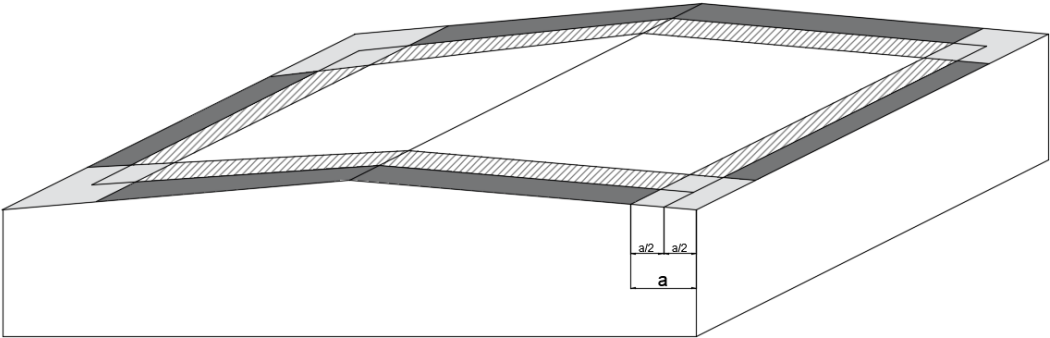
Note 31. If the installation is located in ISO corrosivity category C4 reduce the interface spacing by 5%. If the installation is located in ISO corrosivity category C5 reduce the interface spacing by 25%.

Note 32. Roof Zone definition when the installation doesn't meet the parameter on section D6 part (d) of the AS/NZS 1170.2:2011 (R2016) standard for roof angle is between 1° to 30°.

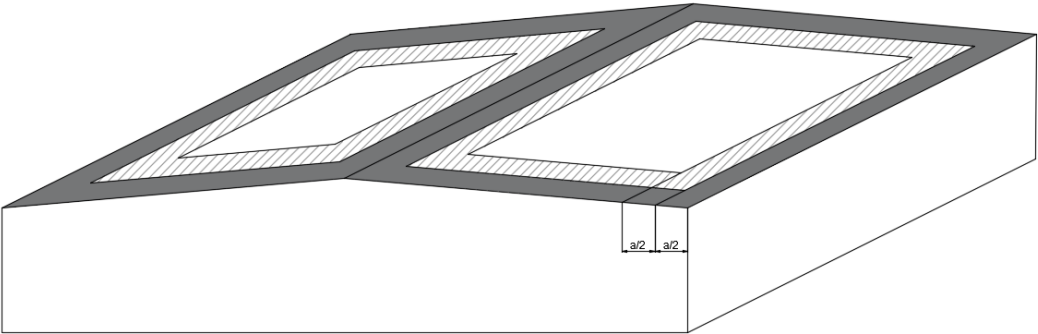
Step 1. Determine building height (h), width (b) and length (d).

Step 2. Choose the lowest value between " h ", " $b \times 0.2$ " and " $d \times 0.2$ ".

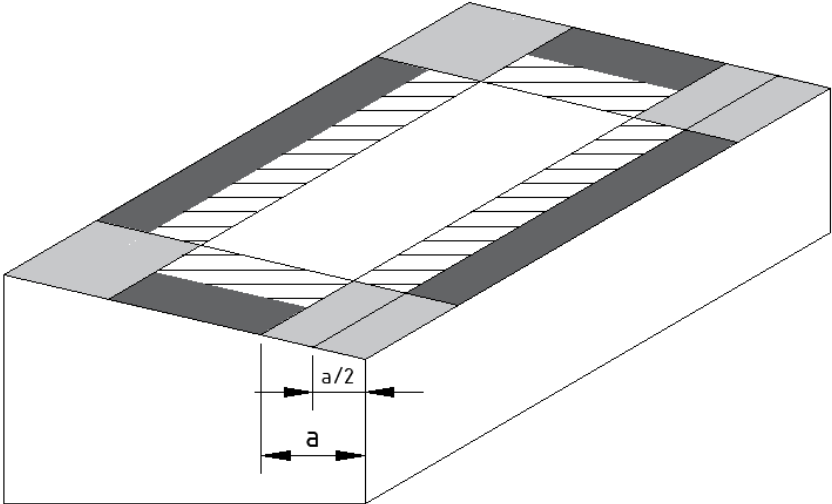
Step 3. The lowest value on Step 2, equates to a .



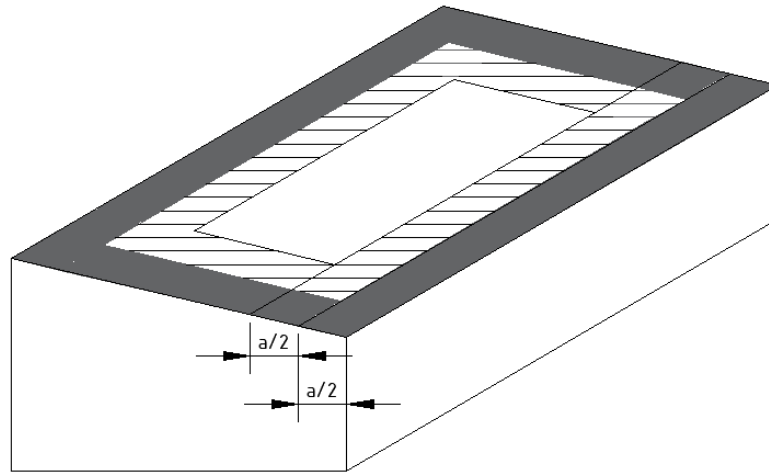
Roof Pitch <math>< 10^\circ</math>







Roof Pitch $\geq 10^\circ$



Flat/Mono – Slope Roof <math>< 10^\circ</math>



Legend:

-  Internal Zone
-  Intermediate Zone
-  Edge Zone
-  Corner Zone

Flat/Mono – Slope Roof $\geq 10^\circ$

Note 33. Zone reduction factors to be the following:

Internal: Use the same spacings as central zone.

Intermediate: Divide central zone spacings by 1.5.

Edge: Divide central zone spacings by 2.

Corner: Divide central zone spacings by 3.

Note 34. For Hanger Bolt installation on either tin or tile roof, the spacing to apply with a minimum embedment depth of 25mm into F7 (Pine) 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.

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

Tin roof

Wind Region A

Terrain Category: 3

Building height: 5m

Roof pitch: less than 10°

Panel dimension: 2 m x 1 m

Installation on intermediate zone to be:

- Central spacing: 1919 mm
- Intermediate zone: 1279 mm

Reduction for corrosion category C4 (-5% - Note 31)

- Central spacing: 1820 mm
- Intermediate zone: 1215 mm