

Structural Design Documentation

PV-ezRack® SolarRoof Interface Spacing Table **According to AS/NZS 1170.2-2011 Amdt 2-2012** **Within Australia** **Terrain Category 3**

For:

Clenergy Australia



Job Number: 23939

Date: 23 April 2013

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ISO 9001:2008 Registered Firm
Certificate No: AU1222

Job No: 23939

Client: Clenergy Australia

Project: PV-ezRack® SolarRoof Interface Spacing Table

Address: Within Australia

Australian Standards

AS 1170. 2011 – Structural Design Actions

Part 0 – General Principles

Part 1 – Permanent imposed and other actions

Part 2 – Wind Actions

Part 3 – Snow and Ice Actions

AS 1252 – High Strength Structural Bolting

AS 3600 – Concrete Structures

AS 4055 – Wind Loads for Housing

AS 4100 – Steel Structures

AS 4600 – Cold-Formed Steel Structures

Wind Terrain Category:

WTC 3

Designed: B.C

Date: Apr-13

Client: **Clenergy Australia**
 Project: **PV-ezRack® SolarRoof Interface Spacing Table**
 Address: **Within Australia**
 Designed: **B.C**

Job: **23939**
 Date: **Apr-13**

REV H

PV-ezRack® SolarRoof Interface spacing Table for Tile Roof

Type of Rail ER-R-ST
 Type of Interface ER-I-01
 Solar Panel Dimension 2mx1m
 Terrain category 3

Roof Angle (Φ) – 5° - 10°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle		
A	1673	1856	1602	1771	1463	1710		
B	1353	1674	1151	1604	1016	1468		
C	853	1222	731	1042	649	921		
D	539	761	465	654	414	581		

Roof Angle (Φ) – 10° - 20°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle		
A	1476	1724	1253	1650	1105	1596		
B	1025	1514	877	1285	777	1132		
C	655	948	563	812	501	720		
D	418	597	361	514	322	458		

Roof Angle (Φ) – 20° - 30°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle		
A	1589	1673	1366	1602	1203	1463		
B	1115	1353	952	1151	843	1016		
C	710	853	610	731	543	649		
D	452	539	390	465	348	414		

D.W & U.W – Downwind and Upwind refer to note 6.

Client: **Clenergy Australia**
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 Address: **Within Australia**
 Designed: **B.C**

Job: **23939**
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Roof Angle (Φ) – 30° - 60°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	Edge	Middle	Edge	Middle	Edge	Middle	Edge	Middle
A	1536	1685	1383	1646	1270	1615		
B	1205	1596	1077	1481	984	1363		
C	862	1205	746	1076	662	983		
D	550	850	474	733	422	651		

Middle and Edge – Please refer to the figure 2 below.

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REV H

PV-ezRack® SolarRoof Interface spacing Table for Tin Roof

Type of Rail ER-R-ST
 Type of Interface ER-I-05
 Solar Panel Dimension 2mx1m
 Terrain category 3

Roof Angle (Φ) - 5° - 10°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle
A	1673	1856	1602	1771	1551	1710		
B	1521	1674	1461	1604	1416	1552		
C	1355	1483	1304	1425	1266	1382		
D	1208	1317	1164	1268	1131	1231		

Roof Angle (Φ) - 10° - 20°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle
A	1554	1724	1492	1650	1446	1596		
B	1419	1564	1365	1501	1324	1455		
C	1269	1392	1222	1339	1187	1299		
D	1134	1240	1093	1194	1062	1160		

Roof Angle (Φ) - 20° - 30°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle
A	1589	1673	1525	1602	1477	1551		
B	1449	1521	1393	1461	1351	1416		
C	1294	1355	1246	1304	1210	1266		
D	1156	1208	1114	1164	1083	1131		

D.W & U.W - Downwind and Upwind refer to note 6.

Client: **Clenergy Australia**
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 Address: **Within Australia**
 Designed: **B.C**

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 REV H

Roof Angle (Φ) – 30° - 60°

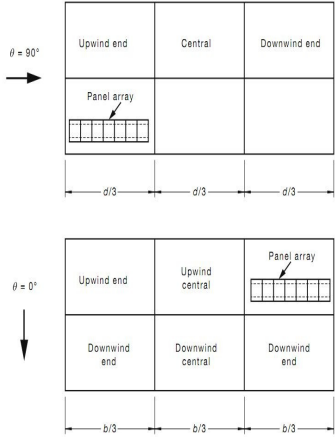
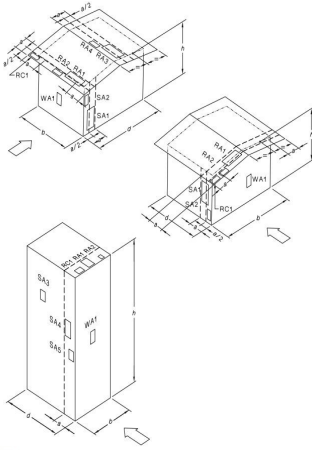
Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	Edge	Middle	Edge	Middle	Edge	Middle	Edge	Middle
A	1570	1685	1529	1621	1497	1615		
B	1478	1596	1436	1556	1404	1524		
C	1359	1477	1311	1436	1272	1404		
D	1214	1357	1170	1305	1137	1267		

Middle and Edge – Please refer to the figure 2 below.

Client: **Clenergy Australia**
 Project: **PV-ezRack® SolarRoof Interface Spacing Table**
 Address: **Within Australia**
 Designed: **B.C**

Job: **23939**
 Date: **Apr-13**

REV H

General Notes					
Note 1	Screws minimum embedment length into timber 35 mm				
Note 2	Recommended screws				
	Metal Purlins/Battens	Fasteners to use			
	0.55 mm – 1.5 mm	M6-11 TPI RoofZips			
	1.9 mm	M6-11 TPI RoofZips OR 12g-14 TPI Tek screws			
	2.4 mm and Above	12g-24 TPI Tek screws			
Note 3	Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood For Wind region C & D spacing for Tin Roof should be reduced as follows,				
	Material	Wind Region C		Wind Region D	
		Middle	D.W & U.W	Middle	D.W & U.W
	0.55 mm steel Batten	22%	25%	30%	42%
	0.75 mm steel Batten	0%	0%	10%	5%
Note 4	Following components are satisfied to use according to AS1170.2011				
	Components	Part Number	Description		
	MT-base Rail	ER-R-MT2560	MT-Rail 2560 mm		
	Corrugated Adapter	ER-AD-C110	Adapter for corrugated iron roof		
	Tilt Legs	ER-TL-30	Tilt Legs Kit fixed 30° (front and back leg)		
	Hanger Bolt	ER-HB-200/WOMP	Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only		
	Roof extender	ER-RE-200	Roof Hook Extender 200mm		
Note 5	Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.				
Note 6	For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.				
Note 7	Figure 2: Shows building dimensions (b,h,d)				
					
Figure 1					
					
Figure 2					
<p>NOTES</p> <p>1 The value of dimension a is the minimum of 0.2b, 0.2d and h.</p> <p>2 The slope ratio of any local pressure factor area on the roof shall not exceed 4.</p>					

Structural Design Documentation

PV-ezRack® SolarRoof Interface Spacing Table **According to AS/NZS 1170.2-2011 Amdt 2-2012** **Within Australia** **Terrain Category 2**

For:

Clenergy Australia



Job Number: 24888

Date: 23 April 2013

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Client: Clenergy Australia

Project: PV-ezRack® SolarRoof Interface Spacing Table

Address: Within Australia

Australian Standards

AS 1170. 2011 – Structural Design Actions

Part 0 – General Principles

Part 1 – Permanent imposed and other actions

Part 2 – Wind Actions

Part 3 – Snow and Ice Actions

AS 1252 – High Strength Structural Bolting

AS 3600 – Concrete Structures

AS 4055 – Wind Loads for Housing

AS 4100 – Steel Structures

AS 4600 – Cold-Formed Steel Structures

Wind Terrain Category:

WTC 2

Designed: B.C

Date: Apr-13

Client: **Clenergy Australia**
 Project: **PV-ezRack® SolarRoof Interface Spacing Table**
 Address: **Within Australia**
 Designed: **B.C**

Job: **24888**
 Date: **Apr-13**

REV H

PV-ezRack® SolarRoof Interface spacing Table for Tile Roof

Type of Rail ER-R-ST
 Type of Interface ER-I-01
 Solar Panel Dimension 2mx1m
 Terrain category 2

Roof Angle (Φ) – 5° - 10°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle		
A	1265	1645	1131	1596	1060	1535		
B	885	1270	794	1135	747	1064		
C	568	803	512	722	482	679		
D	364	509	329	459	310	432		

Roof Angle (Φ) – 10° - 20°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle		
A	961	1414	862	1262	810	1182		
B	679	984	611	883	575	829		
C	440	630	397	567	374	534		
D	283	402	256	363	241	342		

Roof Angle (Φ) – 20° - 30°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle		
A	1045	1265	936	1131	879	1060		
B	736	885	662	794	623	747		
C	476	568	429	512	404	482		
D	306	364	276	329	261	310		

D.W & U.W – Downwind and Upwind refer to note 6.

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REV H

Roof Angle (Φ) - 30° - 60°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	Edge	Middle	Edge	Middle	Edge	Middle	Edge	Middle
A	1151	1574		1063	1464		1015	1402
B	886	1237		810	1144		762	1093
C	580	886		522	810		492	761
D	371	570		335	513		316	483

Middle and Edge – Please refer to the figure 2 below.

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REV H

PV-ezRack® SolarRoof Interface spacing Table for Tin Roof

Type of Rail ER-R-ST
 Type of Interface ER-I-05
 Solar Panel Dimension 2mx1m
 Terrain category 2

Roof Angle (Φ) - 5° - 10°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle
A	1496	1645		1454	1596		1431	1570
B	1368	1497		1331	1455		1311	1432
C	1224	1335		1193	1300		1175	1280
D	1095	1191		1068	1161		1052	1144

Roof Angle (Φ) - 10° - 20°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle
A	1396	1538		1359	1495		1338	1470
B	1280	1405		1247	1367		1228	1346
C	1148	1256		1119	1224		1103	1205
D	1029	1123		1003	1095		989	1079

Roof Angle (Φ) - 20° - 30°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle	D.W & U.W	Middle
A	1426	1496		1387	1454		1365	1431
B	1306	1368		1272	1331		1253	1311
C	1171	1224		1141	1193		1124	1175
D	1049	1095		1022	1068		1008	1052

D.W & U.W - Downwind and Upwind refer to note 6.

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 Address: **Within Australia**
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REV H

Roof Angle (Φ) – 30° - 60°

Wind Region	Building Height - H (m)							
	H≤10		10<H≤15		15<H≤20			
	Edge	Middle	Edge	Middle	Edge	Middle	Edge	Middle
A	1461	1579	1432	1551	1415	1535		
B	1368	1487	1338	1458	1317	1442		
C	1230	1368	1199	1338	1181	1317		
D	1100	1225	1073	1194	1057	1176		

Middle and Edge – Please refer to the figure 2 below.

Client: **Clenergy Australia**
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REV H

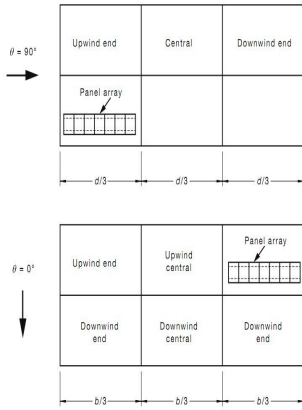
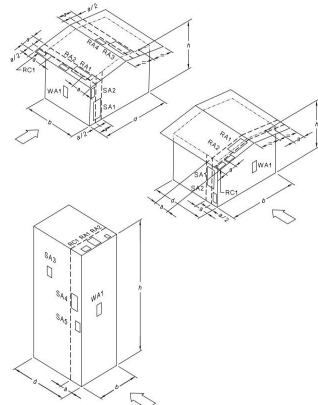
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Note 2	Recommended screws				
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	Corrugated Adapter	ER-AD-C110	Adapter for corrugated iron roof		
	Tilt Legs	ER-TL-30	Tilt Legs Kit fixed 30° (front and back leg)		
	Hanger Bolt	ER-HB-200/WOMP	Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only		
	Roof extender	ER-RE-200	Roof Hook Extender 200mm		
Note 5	Terrain category 2 (TC2) refers to open terrain, including grassland, with well-scattered obstructions having heights generally from 1.5 m to 5 m, with no more than two obstruction per obstructions per hectare.				
Note 6	For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.				
Note 7	Figure 2: Shows building dimensions (b,h,d)				
					
					
<p>NOTES:</p> <p>1 The value of dimension α is the minimum of 0.2b, 0.2d and h.</p> <p>2 The side ratio of any local pressure factor area on the roof shall not exceed 4.</p>					

Figure 1

Figure 2