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# Structural Design Documentation

## PV-eZRack® SolarRoof Interface spacing Table According to AS 1170.2011 for all wind region All around Australia

For:

Clenergy Australia

Job Number: 23939
Date: 4 September 2012

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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:** **According to AS 1170.2011 for all wind region**

**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:** **M.S**

**Date:** **Sep-12**

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Client: **Clenergy Australia** Job: **23939**
Project: **PV-eZRack® SolarRoof Interface spacing Table** Date: **Sep-12**
Address: **All around Australia**
Designed: **M.S** REV G

## PV-eZRack® SolarRoof Interface spacing Table for Tile Roof

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

Roof Angle (Φ) – 20° - 25°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1775** | **1875** | **1700** | **1825** | **1575** | **1775** | **1500** | **1775** | | |
| B | **1550** | **1850** | **1325** | **1725** | **1200** | **1600** | **1150** | **1525** | | |
| C | **1100** | **1450** | **925** | **1250** | **850** | **1150** | **800** | **1075** | | |
| D | **750** | **1025** | **625** | **850** | **575** | **775** | **550** | **750** | | |

Roof Angle (Φ) – 25° - 30°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1550** | **1800** | **1325** | **1750** | **1200** | **1725** | **1150** | **1650** | | |
| B | **1175** | **1675** | **1000** | **1450** | **925** | **1325** | **875** | **1275** | | |
| C | **825** | **1200** | **700** | **1025** | **625** | **925** | **600** | **875** | | |
| D | **550** | **825** | **475** | **700** | **425** | **625** | **400** | **600** | | |

Roof Angle (Φ) – ≥ 30°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1325** | **1775** | **1125** | **1675** | **1025** | **1550** | **975** | **1475** | | |
| B | **1000** | **1500** | **850** | **1275** | **775** | **1175** | **750** | **1125** | | |
| C | **700** | **1050** | **575** | **900** | **525** | **825** | **500** | **775** | | |
| D | **475** | **725** | **400** | **600** | **350** | **550** | **350** | **525** | | |

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Client: **Clenergy Australia** Job: **23939**
Project: **PV-eZRack® SolarRoof Interface spacing Table** Date: **Sep-12**
Address: **All around Australia**
Designed: **M.S** REV G

## PV-eZRack® SolarRoof Interface spacing Table for Tin Roof

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

Roof Angle (Φ) – ≤10°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1575** | **2000** | **1500** | **1850** | **1450** | **1800** | **1425** | **1775** | | |
| B | **1550** | **1950** | **1475** | **1825** | **1425** | **1775** | **1400** | **1725** | | |
| C | **1425** | **1750** | **1350** | **1650** | **1300** | **1600** | **1250** | **1575** | | |
| D | **1200** | **1600** | **1100** | **1525** | **1025** | **1475** | **1000** | **1450** | | |

Roof Angle (Φ) – 10° - 20°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1725** | **2225** | **1625** | **2075** | **1575** | **2000** | **1550** | **1950** | | |
| B | **1700** | **2175** | **1600** | **2025** | **1575** | **1950** | **1525** | **1925** | | |
| C | **1550** | **1925** | **1450** | **1800** | **1425** | **1750** | **1400** | **1700** | | |
| D | **1400** | **1750** | **1275** | **1650** | **1200** | **1600** | **1175** | **1575** | | |

Roof Angle (Φ) – 20° - 30°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1675** | **1800** | **1600** | **1750** | **1575** | **1725** | **1550** | **1700** | | |
| B | **1650** | **1800** | **1600** | **1725** | **1550** | **1700** | **1550** | **1675** | | |
| C | **1550** | **1675** | **1475** | **1625** | **1450** | **1575** | **1425** | **1575** | | |
| D | **1450** | **1600** | **1400** | **1525** | **1350** | **1500** | **1325** | **1475** | | |

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Client: **Clenergy Australia** Job: **23939**
Project: **PV-eZRack® SolarRoof Interface spacing Table** Date: **Sep-12**
Address: **All around Australia**
Designed: **M.S** REV G

## PV-eZRack® SolarRoof Frame spacing Table for Adjustable Tilt Leg

Type of Rail ER-R
Solar Panel Dimension 2mx1m
Terrain category 2

Type of Interface 10°-15° Adjustable Tilt Leg
Roof Angle (Φ) – ≤10°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1500** | **1725** | **1400** | **1600** | **1350** | **1550** | **1325** | **1525** | | |
| B | **1325** | **1675** | **1200** | **1525** | **1125** | **1425** | **1100** | **1375** | | |
| C | **1075** | **1325** | **950** | **1200** | **900** | **1125** | **875** | **1100** | | |
| D | **850** | **1050** | **775** | **950** | **725** | **900** | **700** | **875** | | |

Type of Interface 15°-30° Adjustable Tilt Leg
Roof Angle (Φ) – ≤10°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1150** | **1400** | **1025** | **1300** | **975** | **1225** | **950** | **1175** | | |
| B | **975** | **1200** | **875** | **1075** | **825** | **1025** | **800** | **1000** | | |
| C | **775** | **950** | **700** | **875** | **675** | **825** | **650** | **800** | | |
| D | **625** | **775** | **575** | **700** | **525** | **650** | **525** | **650** | | |

Type of Interface 30°-60° Adjustable Tilt Leg
Roof Angle (Φ) – ≤10°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1025** | **1275** | **925** | **1150** | **875** | **1100** | **850** | **1050** | | |
| B | **875** | **1075** | **775** | **975** | **750** | **925** | **725** | **900** | | |
| C | **700** | **875** | **625** | **775** | **600** | **750** | **575** | **725** | | |
| D | **550** | **700** | **500** | **625** | **475** | **600** | **475** | **575** | | |

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Designed: **M.S** REV G

**PV-eZRack® SolarRoof Frame spacing Table for Adjustable Reverse Tilt Leg**

Type of Rail ER-R
Solar Panel Dimension 2mx1m
Terrain category 2

Type of Interface 30°-65° Adjustable Tilt Leg
Roof Angle (Φ) – ≤10°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1025** | **1275** | **925** | **1150** | **875** | **1100** | **850** | **1050** | | |
| B | **875** | **1075** | **775** | **975** | **750** | **925** | **725** | **900** | | |
| C | **700** | **875** | **625** | **775** | **600** | **750** | **575** | **725** | | |
| D | **550** | **700** | **500** | **625** | **475** | **600** | **475** | **575** | | |

Type of Interface 30°-65° Adjustable Tilt Leg
Roof Angle (Φ) – ≤20°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1150** | **1400** | **1025** | **1300** | **975** | **1225** | **950** | **1175** | | |
| B | **950** | **1200** | **875** | **1075** | **825** | **1025** | **800** | **1000** | | |
| C | **775** | **950** | **700** | **875** | **675** | **825** | **650** | **800** | | |
| D | **625** | **775** | **575** | **700** | **525** | **650** | **525** | **650** | | |

Type of Interface 30°-65° Adjustable Tilt Leg
Roof Angle (Φ) – ≤30°

| Wind Region | Building Height – H (m) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H≤5 | | 5<H≤10 | | 10<H≤15 | | 15<H≤20 | | | |
| | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | **Edge** | **Middle** | | |
| A | **1475** | **1675** | **1400** | **1575** | **1350** | **1525** | **1300** | **1500** | | |
| B | **1325** | **1650** | **1200** | **1500** | **1125** | **1425** | **1100** | **1375** | | |
| C | **1050** | **1325** | **950** | **1200** | **900** | **1125** | **875** | **1100** | | |
| D | **850** | **1050** | **775** | **950** | **725** | **900** | **700** | **875** | | |

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**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 Teks screws |
| 2.4 mm and Above | 12g-24 TPI Teks screws |
| **Wood purlins and Rafter** | **Fasteners to use** |
| Pine and Hardwood (35mm embedment and above) | M6 (12g) with 10 TPI |

Note 3 Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood

For Wind region C & D spacing for Tin Roof can be reduced as follows,

| **Material** | **Wind Region C** | | **Wind Region D** | |
|---|---|---|---|---|
| | Middle | Edge | Middle | Edge |
| 0.55 mm steel Batten | 18% | 54% | 64% | 45% |
| 0.75 mm steel Batten | 0% | 24% | 10% | 43% |
| 1.2 mm steel purlin | 0% | 0% | 0% | 25% |
| F7 pine timber | 0% | 0% | 0% | 13% |

Note 4 ER-R-ST railing also can be used. Spacing need to be reduced as follows,

| **Material** | **Region A** | | **Region B** | |
|---|---|---|---|---|
| | Middle | Edge | Middle | Edge |
| Tile roof interface | 7.0% | 7.0% | 7.0% | 7.0% |
| Tin roof interface | 7.0% | 7.0% | 7.0% | 7.0% |
| Adjustable tilt leg | 7.0% | 7.0% | 7.0% | 7.0% |

Note 5 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 6 For adjustable tilting leg,
Maximum back leg angle to horizontal - 90°
Minimum back leg angle to horizontal - 30°

Note 7 Figure shows the building dimension (b,d & h)