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STRUCTURAL DESIGN CERTIFICATE – No: CSM-SC058-2014 Job No: 14S-391

Plant Description:
Solar Tripod system solar panel mounting structure with fasteners, Base Rail 40 x 40.

Client/Owner:
Suzhou Radiant Photovoltaic Technology Co. Ltd

Site Address:
Locations throughout Mainland Australia (Wind Regions A, B, C and D as Per AS/NZS 1170.2:2011).

Drawings and Documentation Included in this Certificate:

- The following drawings supplied by Suzhou Radiant Photovoltaic Technology Co. Ltd and nominated in the table below are included in this structural certification.

Table 1: Certified Drawings

Solar Tripod, Base Rail 40 x 40		
PC No.	Part Name	Drawing No.
1	Base Rail 40	10-1110-0000
2	Rail 40-60 Splice	10-1410-0101
3	End Clamp 35	10-1210-0101
4	End Clamp 40	10-1210-0401
5	Modules End Clamp Kit	10-1210-0700
6	End Clamp 46	10-1210-0701
7	End Clamp 50	10-1210-0901
8	Adjust End Clamp 35-46	10-1210-1000
9	End Clamp 31	10-1210-1101
10	Adjust End Clamp 30-40	10-1210-1200
11	Inter Clamp 35-52	10-1310-0301
12	Inter Clamp30-39	10-1310-0401
13	Profile Splice	10-1410-0100
14	Preassembly RoofHook45-136-166	10-1510-0100
15	Rail Clamp	10-1510-0104
16	Spring 12	10-1510-0105
17	Preassembly RoofHook45/135	10-1511-0100
18	Preassembly Slate RoofHook-5/75	10-1512-0100
19	Hangbolt M10x200	10-1513-0102
20	Nylon Ring	10-1513-0103
21	EPDM Rubber 78x35x0.5	10-1514-0303
22	Trim dek Support	10-1514-0900
23	Trim Deck Seat	10-1514-0901
24	EPDM Rubber	10-1514-0902
25	Diamond III Clamp Kit	10-1514-1000
26	Klip Lok 406 Clamp Kit	10-1514-1000
27	Klip Lok 406 Clamp-A	10-1514-1001
28	Klip Lok 406 Clamp-B	10-1514-1002
29	Lysaght Klip Lok 700 Clamp - A	10-1514-0101
30	Lysaght Klip Lok 700 Clamp-B	10-1514-0102
31	EPDM Ring	10-1515-0602
32	Kilp Lok 700 Clamp Kit	10-1514-1100

33	Corrugated Lifting Leg	11-1110-0101
34	Trim Dek Lifting Leg	11-1112-0903
35	Base Beam 1440	11-1110-0201
36	Solar Tripod 1400 (10°, 15° Degree)	11-1110-1000
37	Solar Tripod 1400 (20°, 25°, 30° Degree)	11-1110-2000
38	Solar Tripod 1400 (30°, 35°, 40°, 45° Degree)	11-1110-3000
39	Solar Tripod 1400/2000	11-1110-6000
40	Ramp Beam-1400	
41	Supporting Tube -705	
42	Supporting Tube –A-430	
43	Supporting Tube -480	
44	Supporting Tube –A-320	
45	Supporting Tube -250	
46	Supporting Tube –A-210	

NOTE – The Client shall hold all Material Test Certificates for future reference and subsequent design changes.

The Design was carried out based on the following Standards:

AS/NZS 1170.0:2011 – Structural Design Actions Part 0: General Principles
AS/NZS 1170.1:2002 A2-2009 – Structural Design Actions Part 1: Permanent, imposed and other actions
AS/NZS 1170.2:2011A2-2012 – Structural Design Actions Part 2: Wind actions

Exclusions

- Solar Panel/Frame certified by others.
- Earthquake Code (AS/NZS 1170.4) not considered - Solar panel is not a major building structure.
- Set-up, instruction and installation manual.
- 304 Stainless Steel should not be used in a Marine environment or in an environment above 50 – 60 ^{0}C with chlorides present. The use of 316 Stainless Steel is recommended in these conditions.
- This certification does not include loadings for snow or earthquake loads and represent wind loads only.

Specification of this Structural Certificate

- Maximum Solar Panel Size = 2.0m x 1.0m.
- Maximum Tripod Spacing = Refer Table 5.1 & 6.1
- Minimum four support clamps per Solar Panel.
- Solar Panels to be installed on the building roof only.
- External wind uplift and internal positive wind pressures are considered.
- Wind Regions A,B,C & D have been considered
- Regional wind speed for 500 year ARI.
- Building Height (h) conditions based on Terrain Categories TC2.5, TC3 and TC4.
- Maximum Building Height is 20 m.
- Maximum tripod pitch shall be 10^{o} to 45^{0}.
- Maximum purlin spacing 1200mm
- Minimum purlin spacing 800mm
- Minimum Steel Purlin thickness to be 1.5mm for Commercial Buildings.
- Minimum F17 Hardwood timber batten thickness to be 36mm for Residential Buildings.
- Stainless Steel bolts – UNC rolled thread to ASTM A 193 Grade B8 (304 S/S)
  - Material to ASTM A 276 Condition A.
- Stainless Steel nuts – UNC rolled thread to ASTM A 194 Grade 8 (304 S/S)
  - Material to ASTM A 276 Condition A.

Details of the Design

Maximum Solar Panel Size	:	2.0m x 1.0m
Maximum Tripod Angle or Pitch	:	10^{o} to 45 Degrees
Australian Terrain Category	:	Terrain Categories 2.5, 3 and 4
Wind Regions	:	A, B, C & D
Mounting Conditions onto Rails	:	Rail fastened to Tripod then onto Building Purlin at maximum spacing as per Tables 5.1 & 6.1
Maximum Tripod spacing	:	As per Tables 5.1 (Commercial) & Tables 6.1 (Residential) (Based on a maximum pullout force per Tripod)
Mounting Conditions onto Solar Panels	:	Four clamping positions per solar panel back to rails and Two rails per panel
Minimum purlin thickness for Commercial Buildings	:	1.50mm (Steel)
Minimum timber batten thickness for Residential Buildings	:	36.0mm (F17 Hardwood)
Design life of structure	:	20 years

- CSM group has not carried out any inspection of any installed plant being completed, thus this Certificate **Does Not** cover Inspection of the plant for each site location.

- However, specific **building heights over 20m** are **outside these Design parameters within this document** and should be treated as an individual analysis and be verified by the Certifying Engineer.

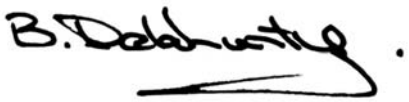
- It is strongly recommended that all the connections and fasteners should be checked against failure or corrosion immediately after **a 5 year ARI** wind event or annually, whichever comes first.

- The roof, on which the solar assembly is to be installed on, must have the capacity to resist the combined dead and live loads per feet.

If manufactured, constructed and installed in accordance with the abovementioned drawings, specifications, details of the design and OEM Installation Manual, the support structure will be capable of sustaining the load conditions as specified in the Australian standards AS1170.2-2011/Amd't 2-2012 and AS1664.

Certifying Engineer

Signature



Date: 19/12/2014

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CSM Group
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1. Determine the wind region for your site location

Using the table below determine the region your site location is in paying particular attention to differing regions within 50 and 100km of the coastal perimeter of the nation. (If in doubt consult your engineer)

Wind regions are pre-defined for all of Australia by Australian Standard 1170.

- Most of Australia is designated in Regions A1-7 which indicates a Regional Ultimate Basic Wind Velocity of 45m/sec.
- Several coastal areas including Brisbane are within Region B (57m/sec).
- Region C areas (69m/sec) are generally referred to as Cyclonic and are generally limited to northern coastal areas. Most Region C zones end 100km inland.
- Region D (88m/sec) Australia's worst Cyclonic Region between Carnarvon and Pardoo in Western Australia.

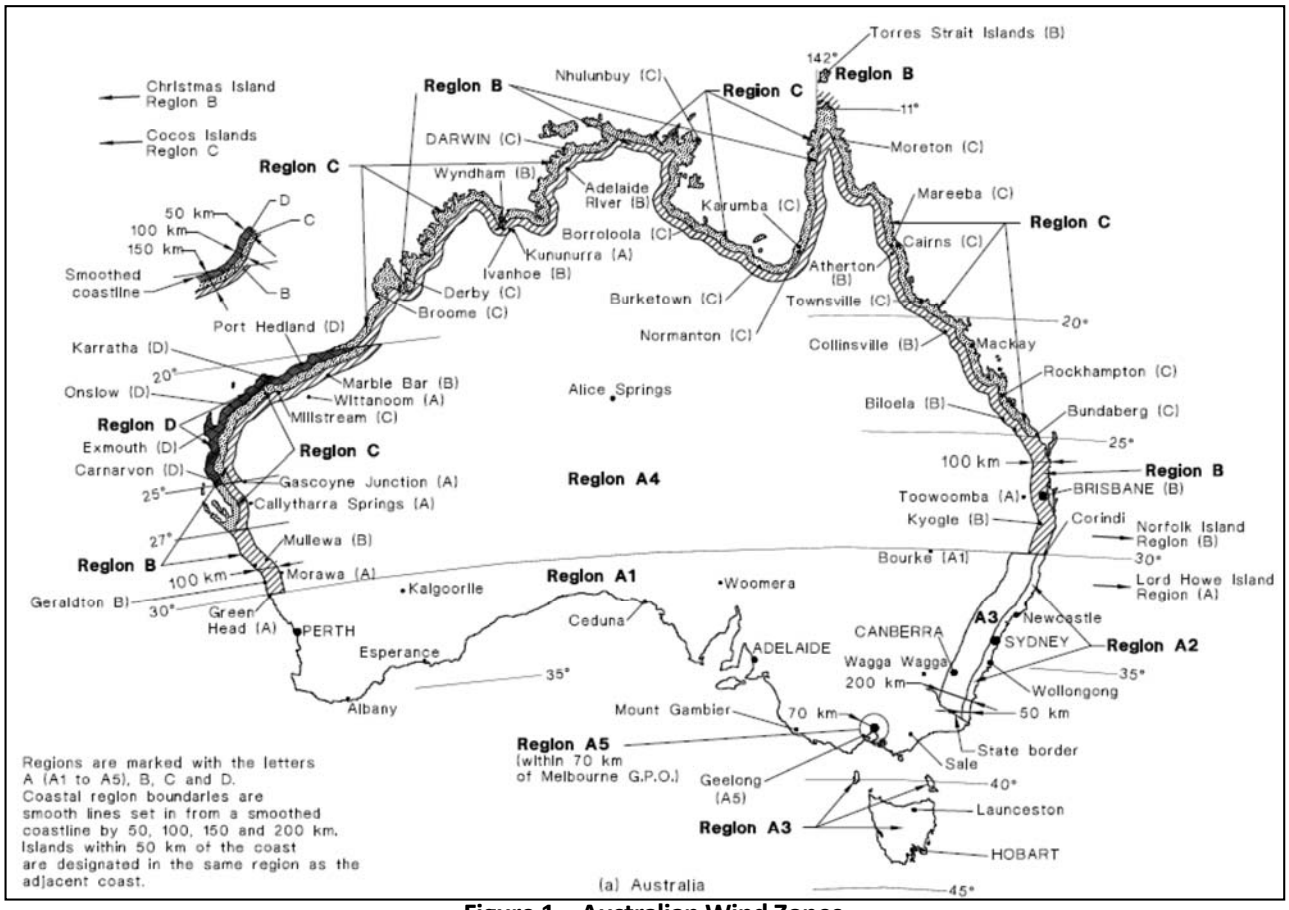


Figure 1 – Australian Wind Zones

2. Determine the building height at your site location

This height 'h' is equal to the distance from ground to the mid height of your roof ie, between the eaves and the roof ridge. Most single storey residential buildings will be less than 10m in height.

Whilst this certification cover building heights to 20m it is important to get special engineering advice for buildings over this maximum height.

3. Determine Roof Installation Area

The solar roof panel system **should not be installed within the 0.5a = half** of the **minimum of 0.2b and 0.2d of a roof edge or ridge, where b and d are the breadth and depth** in plan view of the building.

N.B There is an edge zone around the complete roof = 0.5a in width = min. of 0.1b or 0.1d

Refer the restricted area in Figure 2 below.

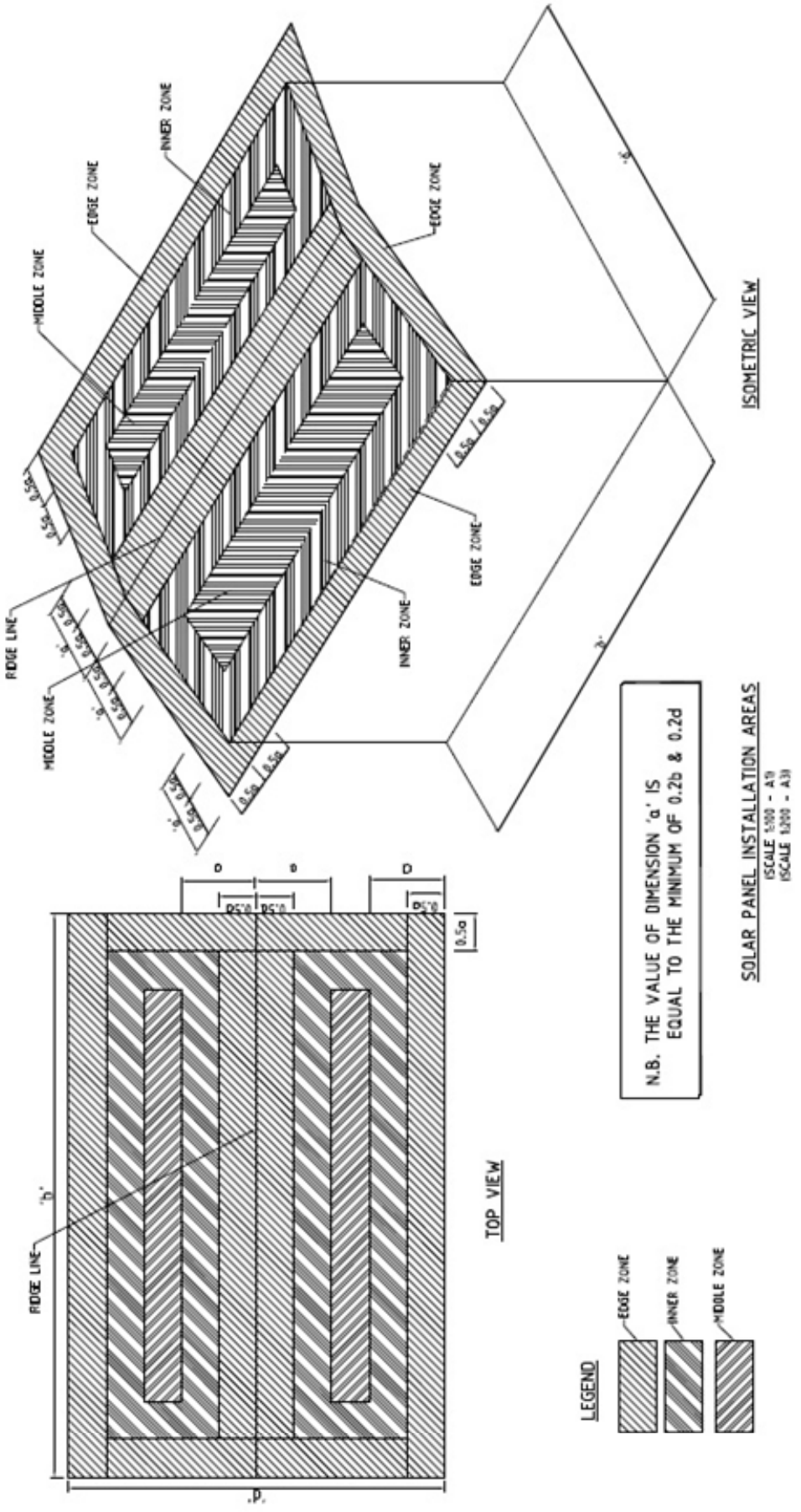


Figure 2 – Roof Installation Areas

4. Determine whether your solar layout is in Portrait or Landscape Orientation

Portrait orientation is only applicable for tripod series installations.

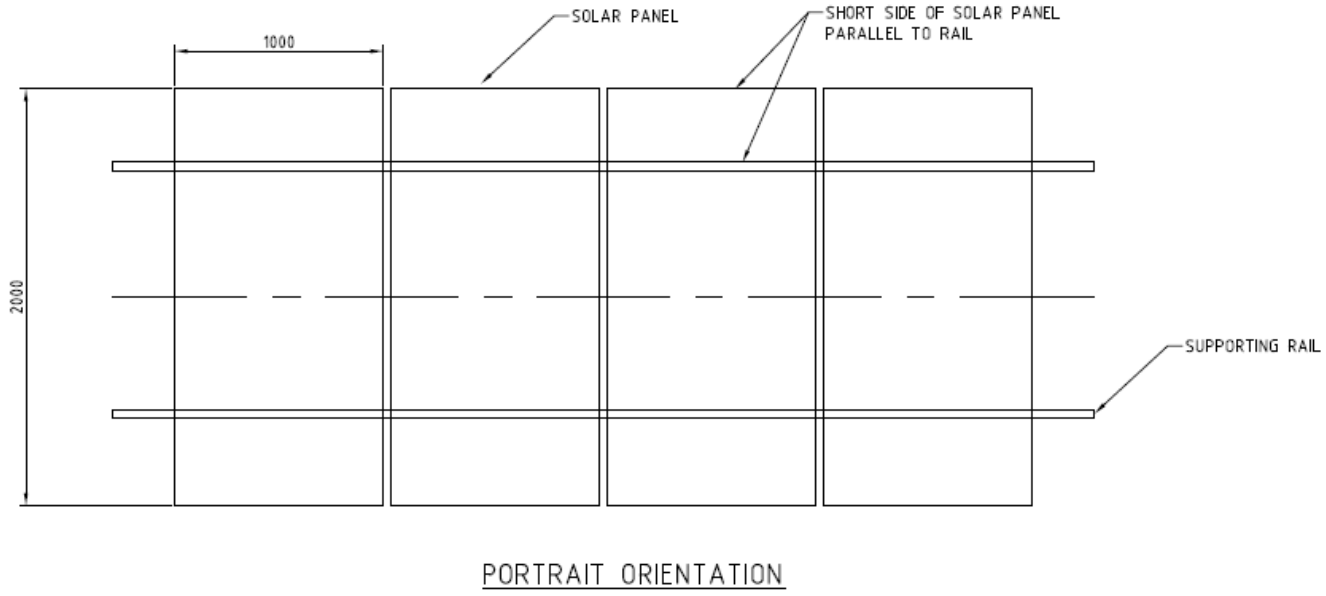


Figure 3 – Example Portrait Orientation

5. Determine the Maximum Support Spacing for the Base Rail 40 for a Commercial Buildings – Drawing No. 10-1110-0000

The following tables 5.1 is used to determine the maximum rail support spacing of Tripod system **(within the middle, inner and end zones of the roof as per Figure 2 above)** for a roof for a solar panel of maximum dimensions 2.0m length x 1.0m width with a hold down fastener on each leg with a **minimum pull-out strengths** of **4.68kN** per fastener for 1.5mm thick steel purlin. Should this differ please advise the consultant.

Refer Appendix 'A' for a table of pull-out strengths for roof fasteners to confirm the fastener to be used

N.B

1. **Portrait orientation denotes the short side of the solar panel (1.0m) is installed parallel the supporting rail and for landscape orientation the long side of the solar panel (2.0m) is installed parallel the supporting rail. However for this particular site all panels shall be mounted in portrait orientation.**
2. **These tables are based on AS1170.2-2011 (A2) Table 5.3.**

Table 5.1 – Maximum Rail Support Spacing of Tripod frame for Commercial Buildings (1.5mm thick steel purlin)

Maximum Rail Support Spacing for Roofs (mm)												
Building height (h)	Wind Region A			Wind Region B			Wind Region C			Wind Region D		
	Middle	Inner	Edge	Middle	Inner	Edge	Middle	Inner	Edge	Middle	Inner	Edge
<5m	2000	1400	1000	1300	800	600	900	600	400	500	300	200
5 to 10m	1900	1200	900	1200	800	600	800	500	400	500	300	200
10 to 15m	1700	1100	800	1000	700	500	700	400	300	400	300	200
15 to 20m	1500	1000	700	900	600	400	600	400	300	400	200	200

Table 5.1 is used for portrait orientation as per Figure 2 above.

6. Determine the Maximum Support Spacing for the Base Rail 40 for a Residential Buildings – Drawing No. 10-1110-0000

The following tables 6.1 is used to determine the maximum rail support spacing of Tripod system **(within the middle, inner and end zones of the roof as per Figure 2 above)** for a roof for a solar panel of maximum dimensions 2.0m length x 1.0m width with a hold down fastener on each leg with **minimum pull-out strengths** of **6.98kN** per fastener for 36.0mm thick F17 Hardwood timber batten. Should this differ please advise the consultant.

Refer Appendix 'A' for a table of pull-out strengths for roof fasteners to confirm the fastener to be used

N.B

1. **Portrait orientation denotes the short side of the solar panel (1.0m) is installed parallel the supporting rail and for landscape orientation the long side of the solar panel (2.0m) is installed parallel the supporting rail. However for this particular site all panels shall be mounted in portrait orientation.**
2. **These tables are based on AS1170.2-2011 (A2) Table 5.3.**

Table 6.1 – Maximum Rail Support Spacing of Tripod frame for Residential Buildings (F17 Hardwood timber batten)

Maximum Rail Support Spacing for Roofs (mm)												
Building height (h)	Wind Region A			Wind Region B			Wind Region C			Wind Region D		
	Middle	Inner	Edge	Middle	Inner	Edge	Middle	Inner	Edge	Middle	Inner	Edge
<5m	2000	1600	1400	1500	1300	900	1300	900	600	800	500	400
5 to 10m	1900	1500	1300	1500	1200	900	1200	800	600	700	500	300
10 to 15m	1800	1400	1200	1400	1000	800	1000	700	500	600	400	300
15 to 20m	1700	1400	1100	1300	900	700	1000	600	500	600	400	300

Table 6.1 is used for portrait orientation as per Figure 2 above.

7. Check Acceptable End of Rail Overhang

Rail End Overhang must not equal greater than 30 percent or less of the Tripod spacing. Thus, if the tripod spacing is 1200mm, the Rail End Over hang can be up to 400mm ie, 1200/3 = 400mm.

8. Confirm Roof slope

The Base Rail and Solar Tripod solar roof system can be used for any roof pitch angle up to 45 degrees maximum.

9. Determine the Type of Fastener and Minimum Number of Fasteners to be used

The following table 9.1 determines the correct fasteners to attach the tripod to the roof supports being a timber rafter or truss and or a minimum 1.5mm thick steel purlin or truss. The length of the fastener will vary according to the roofing profile; however the 65mm length should be applicable for most installations.

Table 9.1 – Fasteners used to attach Tripod through Tin Roof into either Timber or Steel Rafters/Trusses or Purlins

Storm-Tite Roofing Fasteners – (for use greater than 1000m from the coast)

– Dual Point for Timber and Steel Drilling (min.1.5mm thk steel purlin - max. 2.0mm thick steel purlin)

Code	Point	Gauge	TPI	Length	Finish
C14-1465-D4Z	Dual	14	10	65mm	Class 4
C14-14125-D4Z	Dual	14	14	125mm	Class 4
C14-14150-D4Z	Dual	14	14	150mm	Class 4

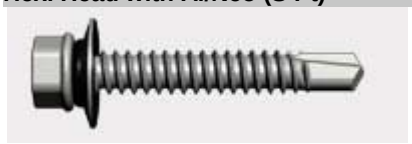
– Steel Drilling Point (above 2.0mm thick steel)

Code	Point	Gauge	TPI	Length	Finish
C14-1025-S4Z	SD	14	10	25mm	Class 4
C14-1050-S4Z	SD	14	10	50mm	Class 4
C14-1070-S4Z	SD	14	10	70mm	Class 4
C141080-S4Z	SD	14	10	80mm	Class 4
C14-10100-S4Z	SD	14	10	100mm	Class 4
C14-10125-S4Z	SD	14	20	125mm	Class 4
C14-20150-S4Z	SD	14	20	150mm	Class 4

Buildex- Stainless Steel Roofing Fasteners

– (for use within 1000m of the coast into steel purlins) (min.1.5mm thk steel purlin - max. 2.0mm thick steel purlin)

Hex. Head with Al/Neo (S Pt)



Gauge	T.P.I	Length	Pack	Part Number	Pack Type	Finish
14	**14**	**31**	500	6-397-0107-7	Bulk	Grade 305
14	**14**	**52**	500	6-397-0108-8	Bulk	Grade 305
14	**14**	**70**	500	6-397-0109-9	Bulk	Grade 305
14	**14**	**80**	500	6-397-0110-1	Bulk	Grade 305
14	**14**	**90**	500	6-397-0111-1	Bulk	Grade 305

– (for use within 1000m of the coast into timber rafters/trusses) (min.1.5mm thk steel purlin - max. 2.0mm thick steel purlin)

Hex. Head with 16mm aluminium bonded washer

Gauge	T.P.I	Length	Pack	Part Number	Pack Type	Finish
14	**10**	**25**	500	6-037-0022-4	Bulk	Grade 304
14	**10**	**50**	500	6-037-0023-2	Bulk	Grade 304
14	**10**	**65**	500	6-037-0024-1	Bulk	Grade 304
14	**10**	**75**	500	6-037-0025-9	Bulk	Grade 304
14	**10**	**90**	500	6-037-0026-7	Bulk	Grade 304

Fastener Notes:

1. Minimum embedment length into timber to be not less than 35mm.
2. Never set drill on impact when installing screws, otherwise fastener warranties are void
3. Use Dual Point screws up to 2.0mm thick steel purlins or rafters
4. Use Steel Point screws over to 2.0mm thick steel purlins or rafters
5. Use Stainless Steel screws within 1000m of the coast
6. Use a Minimum 2 off 14gx10 TPI (T17s) roofing fasteners per Tripod Frame to a minimum 36.0mm thick F17 hardwood timber batten for a residential building;
7. Use a Minimum 2 off 14gx10 TPI Teks roofing fasteners per Tripod Frame to a minimum 1.5mm thick steel purlin for commercial building;

Note: The installer is solely responsible for:

- Complying with all applicable local or national building codes.
- Ensuring that the Solar Tripod and fasteners used and or other products are appropriate for the particular installation at the particular installation environment;
- Ensuring that the roof and its components ie, rafters, connections, and other structural support members can support the solar array assembly under building live load conditions;
- Using only Solar Tripod parts and installer-supplied parts as specified by Suzhou Radiant Photovoltaic Technology Co. Ltd
- Ensuring that roof screws have adequate pullout strength and shear capacities as installed and nominated above and that the minimum purlin thickness is achieved
- Maintaining the waterproof integrity of the roof, including selection of appropriate flashing and fasteners;
- Ensuring safe installation of all electrical components of the PV solar assembly.
- Ensuring that dissimilar metals have a rubber pad between them such as aluminium and galvanised steel.

APPENDIX 'A'

FASTENER PULLOUT STRENGTHS

Buildex®

One of the world's leading manufacturers and suppliers of self-drilling screws and fasteners.

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- Screw Selection Chart

Pullout Values (Newtons) - Buildex Fasteners into Steel

Screw Gauge/TPI	Steel Thickness								
	0.55mm Batten	0.75mm Batten	1.2mm Stud	1.5mm Purlin	1.9mm Purlin	2.4mm Purlin	6.0mm Hot Roll Steel	8.0mm Hot Roll Steel	12mm Hot Roll Steel
10g - 16 TPI Teks®	-	1,860	2,320	4,200	5,500	7,820	-	-	-
10g - 24TPI Teks®	-	-	2,320	4,280	5,820	7,680	-	-	-
M6 RoofZips®	1,520	2,480	3,280	5,240	5,940	-	-	-	-
12g - 24 TPI Teks® *Hex + Wafer Series 500*	-	-	-	-	-	6,260	16,700*	16,700*	16,700*
12g - 14 TPI Teks® *Screw length longer than 20mm*	-	-	1,980	3,040	5,160	6,960	-	-	-
12g - 14 TPI Teks® *Screw length 20mm or shorter*	-	-	2,200	4,080	5,420	7,360	-	-	-
12g - 24 TPI Teks®	-	-	-	-	-	7,780	-	-	-
14g - 10 TPI Teks®	-	-	2,600	4,680	6,500	8,100	-	-	-
14g - 20 TPI Teks®	-	-	2,400	4,200	5,500	7,700	19,860	-	-

* Axial tensile value of screw

Note: Appropriate safety factors should be applied for design purposes.

All values are averages obtained under laboratory conditions.

These figures apply to Buildex® (BX Head marked) products only.

Pullout Loads (Kilo Newtons kN)
The load required to pull the fastener out of the material it is screwed into.

Pullout Values (Newtons) - Buildex Fasteners into Timber, Lightweight Battens & Steel

Screw Gauge/TPI	Thickness							
	0.55mm Batten	0.75mm Batten	1.2mm Stud	1.5mm Purlin	1.9mm Purlin	F7 Pine Timber	F17 Hard Wood	Ultra Hard Timber
10g - 12 TPI (T17s)	1,320	2,220	-	-	-	5,700	6,000	-
12g - 11 TPI (T17s)	1,510	2,400	-	-	-	3,900	6,460	-
14g - 10 TPI (T17s)	1,740	2,860	-	-	-	3,820	6,980	-
M5.5 - 11 Batten Zips®	1,540	2,420	2,680	-	-	5,710	6,460	6,960
M6 RoofZips®	1,520	2,480	3,280	5,240	5,940	4,300	6,570	-

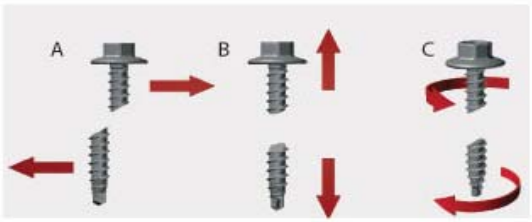
* Pullout values at 36mm embedment into timber

Note: Appropriate safety factors should be applied for design purposes.
All values are averages obtained under laboratory conditions.
These figures apply to Buildex® (BX Head marked) products only.

Mechanical Properties

Screw Gauge/TPI	Single Shear Strength (N)	Axial Tensile Strength (N)	Torsional Strength (Nm)
M6 RoofZips®	8,500	15,400	14.0
10g - 16 TPI	6,800	11,900	8.4
10g - 24 TPI	6,200	11,400	8.6
12g - 11 TPI	8,400	13,900	13.5
12g - 14 TPI	8,800	15,300	13.2
12g - 24 TPI	9,000	16,700	13.5
14g - 10 TPI	10,900	19,700	18.5
14g - 20 TPI	11,200	21,200	20,400

Note: Appropriate safety factors should be applied for design purposes.
All values are averages obtained under laboratory conditions.
These figures apply to Buildex® (BX Head marked) products only.



A. Single Shear Strength (N)
The shear load required to break the screw

B. Axial Tensile Strength (N)
The tensile load required to break the screw

C. Torsional Strength (Nm)
The torque required to break the screw

APPENDIX 'B'

COMMERCIAL BUILDINGS

MAXIMUM RAIL SUPPORT SPACING FOR DIFFERENT PURLINS THICKNESS & KLIP LOK

The following Tables B.1 is used to determine the maximum rail support, i.e. spacing of Tripod frame for a Commercial Buildings roof for a solar panel of maximum 2.0m long x 1.0m wide, **using 1.0mm steel Purlin**.

Table B.1 – Maximum Rail Support spacing of Tripod frame for 1.0mm Steel Purlin

Maximum Rail Support Spacing (mm) for 1.0mm steel Purlin (Portrait Orientation) (2 Screws per frame)												
Building height (h)	Wind Region A			Wind Region B			Wind Region C			Wind Region D		
	Middle	Inner	Edge	Middle	Inner	Edge	Middle	Inner	Edge	Middle	Inner	Edge
<5m	1100	700	500	700	400	300	500	300	200	300	200	100
5 to 10m	1000	700	500	600	400	300	400	300	200	200	100	100
10 to 15m	900	600	400	500	300	200	400	200	200	200	100	100
15 to 20m	800	500	400	500	300	200	300	200	100	200	100	100

Table B.1 is used for portrait orientation as per Figure 2 above.

The following Tables B.2 is used to determine the maximum rail support, i.e. spacing of Tripod frame for a Commercial Buildings roof for a solar panel of maximum 2.0m long x 1.0m wide, **using Klip Lok Clamp 700.**

Table B.2 – Maximum Rail Support spacing of Tripod frame for Klip Lok Clamp 700

Maximum Rail Support Spacing (mm) for Klip Lok Clamp 700 (2 Screws per frame)												
Building height (h)	Wind Region A			Wind Region B			Wind Region C			Wind Region D		
	Middle	Inner	Edge	Middle	Inner	Edge	Middle	Inner	Edge	Middle	Inner	Edge
<5m	1600	1000	800	1000	600	500	600	400	300	400	200	200
5 to 10m	1400	900	700	900	600	400	600	400	300	300	200	100
10 to 15m	1300	800	600	800	500	400	500	300	200	300	200	100
15 to 20m	1200	800	600	700	500	300	500	300	200	300	200	100

Table B.2 is used for portrait orientation as per Figure 2 above.

The following Tables B.3 is used to determine the maximum rail support, i.e. spacing of Tripod frame for a Commercial Buildings roof for a solar panel of maximum 2.0m long x 1.0m wide, **using Lysaght Klip Lok Clamp 406.**

Table B.3 – Maximum Rail Support spacing of Tripod frame for Lysaght Klip Lok Clamp 406

Maximum Rail Support Spacing (mm) for Lysaght Klip Lok Clamp 406 (2 Screws per frame)												
Building height (h)	**Wind Region A**			**Wind Region B**			**Wind Region C**			**Wind Region D**		
	Middle	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**
<5m	400	300	200	200	100	100	200	100	100	100	N/A	N/A
5 to 10m	400	200	200	200	100	100	100	100	N/A	100	N/A	N/A
10 to 15m	300	200	100	200	100	100	100	100	N/A	100	N/A	N/A
15 to 20m	300	200	100	200	100	100	100	100	N/A	N/A	N/A	N/A

Table B.3 is used for portrait orientation as per Figure 2 above.

The following Tables B.4 is used to determine the maximum rail support, i.e. spacing of Tripod frame for a Commercial Buildings roof for a solar panel of maximum 2.0m long x 1.0m wide, **using Lysaght Klip Lok Clamp 700.**

Table B.4 – Maximum Rail Support spacing of Tripod frame for Lysaght Klip Lok Clamp 700

Maximum Rail Support Spacing (mm) for Lysaght Klip Lok Clamp 700 (2 Screws per frame)												
Building height (h)	**Wind Region A**			**Wind Region B**			**Wind Region C**			**Wind Region D**		
	Middle	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**
<5m	800	500	400	500	300	200	300	200	100	200	100	100
5 to 10m	700	500	300	400	300	200	300	200	100	200	100	100
10 to 15m	600	400	300	400	200	200	200	100	100	100	100	N/A
15 to 20m	600	400	300	400	200	200	200	100	100	100	100	N/A

Table B.4 is used for portrait orientation as per Figure 2 above.

APPENDIX 'C'

Residential Buildings

MAXIMUM RAIL SUPPORT SPACING FOR DIFFERENT STEEL & TIMBER BATTENS THICKNESS

The following Tables C.1 is used to determine the maximum rail support, i.e. spacing of Tripod frame for a Commercial Buildings roof for a solar panel of maximum 2.0m long x 1.0m wide, **using 0.75mm steel batten**.

Table C.1 – Maximum Rail Support spacing of Tripod frame for 0.75mm Steel Purlin

Maximum Rail Support Spacing (mm) for 0.75mm steel batten (Portrait Orientation) (2 Screws per frame)												
Building height (h)	**Wind Region A**			**Wind Region B**			**Wind Region C**			**Wind Region D**		
	Middle	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**
<5m	1300	800	600	800	500	400	500	300	200	300	200	100
5 to 10m	1100	700	500	700	400	300	500	300	200	300	200	100
10 to 15m	1000	700	500	600	400	300	400	200	200	200	100	100
15 to 20m	900	600	400	600	400	300	400	200	200	200	100	100

Table C.1 is used for portrait orientation as per Figure 2 above.

The following Tables C.2 is used to determine the maximum rail support, i.e. spacing of Tripod frame for a Commercial Buildings roof for a solar panel of maximum 2.0m long x 1.0m wide, **using 0.55mm steel batten**.

Table C.2 – Maximum Rail Support spacing of Tripod frame for 0.55mm steel batten

Maximum Rail Support Spacing (mm) for 0.55mm steel batten. (2 Screws per frame)												
Building height (h)	**Wind Region A**			**Wind Region B**			**Wind Region C**			**Wind Region D**		
	Middle	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**
<5m	700	400	300	400	300	200	300	200	100	100	100	N/A
5 to 10m	600	400	300	400	200	200	200	100	100	100	100	N/A
10 to 15m	500	300	200	300	200	100	200	100	100	100	100	N/A
15 to 20m	500	300	200	300	200	100	200	100	100	100	N/A	N/A

Table C.2 is used for portrait orientation as per Figure 2 above.

The following Tables C.3 is used to determine the maximum rail support, i.e. spacing of Tripod frame for a Commercial Buildings roof for a solar panel of maximum 2.0m long x 1.0m wide, **using F7 Pine timber batten.**

Table C.3 – Maximum Rail Support spacing of Tripod frame for F7 Pine timber batten

Maximum Rail Support Spacing (mm) for F7 Pine timber batten (2 Screws per frame)												
Building height (h)	**Wind Region A**			**Wind Region B**			**Wind Region C**			**Wind Region D**		
	Middle	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**	**Middle**	**Inner**	**Edge**
<5m	1700	1100	800	1000	700	500	700	400	300	400	300	200
5 to 10m	1500	1000	700	900	600	400	600	400	300	400	200	200
10 to 15m	1400	900	700	800	500	400	500	300	200	300	200	100
15 to 20m	1200	800	600	800	500	400	500	300	200	300	200	100

Table C.3 is used for portrait orientation as per Figure 2 above.