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35 Butler St. Richmond VIC 3121. Tel: 03 9543 2211

Our Ref: 9981-02-Flush/BL

4 July 2021

Tradezone Pty Ltd (Brand Name: Powerwave)
PO Box 3137, Helensvale
QLD 4212

PV Array Frame Engineering Certification

RE: Installation of Mibet Roof Mount Solar System on Tin and Tile Roof with MA Pro Rails

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian Building Regulations, have carried out a structural design check of MA Pro Rail Roof Mount Solar System installation on tin and tile roof within Australia. The design check is based on the information and test reports provided by Tradezone Pty Ltd.

This certificate is **only valid** for the MA Pro Rail Mount Solar System itself. The roof structure or the building structure and PV panels shall be assessed separately and accordingly.

This certificate is **only valid** when fixing into minimum 1.9BMT steel or minimum JD4 seasoned timber. If the fixing condition is different from those conditions, interface spacing shall be reviewed and validated.

This certificate is **only valid** as a whole. Any information extracted from this certificate is not valid if standing alone.

We find the Installation of MA Pro Rail Roof Mount Solar System on tin and tile roof for Australian use to be structurally sufficient based on the following conditions:

- Wind loads to AS/NZ1170.2:2011(R2016) Wind actions
- Wind region **A, B, C, D**
- Wind terrain category **2 & 3**
- Wind average recurrence interval of **200 years**
- Maximum building height **20m**
- The maximum assessed PV panel dimensions are **1670mm x 1000mm, 1970mm x 1000mm, 2100mm x 1050mm, 2200mm x 1200mm, 2400mm x 1200mm**
- Weight of the PV panel and array frame to be 15 kg/m²
- Rails to be **MA Pro Rails**
- Material to be **AL6005-T5 UNO**
- Material of Tile bracket to be **SUS304**
- The spacings are determined based on fixings into minimum JD4 seasoned timber and 1.9mm thick steel purlins
- Each PV panel to be installed using **2 rails** minimum in all circumstances

*ISO 9001:2015 Registered Firm
Certificate No: AU1222*

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- No PV panel to be installed within 2xs from edges and ridge. "s" is the maximum gap between the underside of the panel and the roof surface when installed on the roof ($50\text{mm} \leq s \leq 300\text{mm}$)
- Installation of PV panels to be done in accordance with the PV panels installation manual
- The certification **excludes** assessment of roof structure and PV panels

Refer to attached summary table for interface spacing (Unit: mm)

NOTES:

- **The recommended spacing nominated in this certification is based on the capacity of the array frame and the fixing of array frames to the roof, not the roof structure and PV panels. It is the responsibility of the installer to adopt the most critical spacing.**
- **If any of the above conditions cannot be met, the structural engineer must be notified immediately.**
- **Standard Tile Interface is considered reaching its serviceability limit when 3° rotation of the middle plate is observed.**
- **The spacing shown in the interface tables shall be adjusted based on the assessment and requirement of the roof structures**

Construction is to be carried out strictly in accordance with the manufacturers instructions. This work was designed by **Bianca Liu** in accordance with the provisions of Australian Building Regulations and in accordance with sound, widely accepted engineering principles. This certificate is only valid till 05/07/2023. Gamcorp should be contacted for future validation. Contact Gamcorp for customised system or if the site conditions are not covered by this assessment.

Yours faithfully,
Gamcorp (Melbourne) Pty Ltd



L. Van Spaandonk
Principal Engineer
FIEAust CPEng NER 5038980
NT Registration: 244137ES
QLD Registration: 18703
VIC Registration: EC 45972
TAS Registration: CC7366

Attachments:

- Summary table for interface spacing - Flush mount installation on tin and tile roof with MA Pro rails

Structural Design Documentation

Mibet Flush Array Frame System Spacing Table

According to AS/NZS 1170.2-2011 (R2016)

with MA Pro Rail – Tin Roof

within Australia

Terrain Category 2 & 3

For: Tradezone Pty Ltd (Brand Name: Powerwave)
PO Box 3137, Helensvale
QLD 4212

Job Number: 9981-02-Flush
Date: 29/06/2021



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Relationships built on trust

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ISO 9001:2015 Registered Firm
Certificate No: AU1222

Job No: 9981-02-Flush
Client: Tradezone Pty Ltd (Brand Name: Powerwave)
Project: Mibet Flush Array Frame System Spacing Table
with MA Pro Rail – Tin Roof
Address: within Australia

Australian Standards

AS/NZS 1170.0:2002 – Structural design actions, Part 0: General principles
AS/NZS 1170.1:2002 (R2016) – Structural design actions, Part 1: Permanent, imposed
and other actions
AS/NZS 1170.2:2011 (R2016) – Structural design actions, Part 2: Wind actions
AS/NZS 1664.1:1997 – Aluminium structures - Limit state design
AS 4100:2020 – Steel Structures
AS/NZS 4600:2018 – Cold-formed Steel Structures

Wind Terrain Category: WTC 2 & 3

Designed: BL
Checked: AA

Mibet Flush Array Frame System Spacing Table - mm

Type of Roof: Tin Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 1.67mx1m
 Terrain category: 3

$h/d \leq 0.5^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	1290	1540	1725	1970	1290	1540	1725	1970	1110	1460	1630	1880	990	1400	1560	1810
B	860	1325	1655	1900	860	1325	1655	1900	745	1140	1555	1815	665	1015	1380	1750
C	450	685	925	1435	450	685	925	1435	--	590	795	1230	--	525	710	1095
D	--	440	595	910	--	440	595	910	--	--	515	785	--	--	460	700

$h/d \geq 1^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	875	1340	1490	1745	875	1340	1490	1745	655	1155	1415	1660	575	1030	1355	1585
B	585	895	1215	1680	585	895	1215	1680	--	775	1050	1590	--	690	935	1440
C	--	465	630	965	--	465	630	965	--	--	540	830	--	--	485	740
D	--	--	--	615	--	--	--	615	--	--	--	535	--	--	--	475

Type of Roof: Tin Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 1.67mx1m
 Terrain category: 2

$h/d \leq 0.5^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	1060	1430	1600	1850	870	1335	1490	1740	785	1200	1430	1680	625	1135	1405	1645
B	715	1090	1485	1790	585	895	1210	1675	530	805	1090	1610	--	760	1025	1575
C	--	565	760	1175	--	465	625	960	--	420	565	865	--	--	530	815
D	--	--	490	750	--	--	--	615	--	--	--	555	--	--	--	525

$h/d \geq 1^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	605	1105	1390	1625	515	905	1225	1510	410	815	1105	1455	--	675	1045	1425
B	--	740	1000	1545	--	610	820	1260	--	550	740	1135	--	520	700	1070
C	--	--	520	795	--	--	425	650	--	--	--	585	--	--	--	555
D	--	--	--	510	--	--	--	420	--	--	--	--	--	--	--	--

*For intermediate values of h/d ratios, linear interpolation shall be used.

Mibet Flush Array Frame System Spacing Table - mm

Type of Roof: Tin Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 1.97mx1m
 Terrain category: 3

h/d ≤ 0.5*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	1095	1455	1635	1890	1095	1455	1635	1890	940	1380	1545	1805	840	1295	1475	1740
B	730	1120	1535	1820	730	1120	1535	1820	630	965	1315	1740	565	860	1170	1670
C	380	580	785	1215	380	580	785	1215	--	500	675	1040	--	445	600	925
D	--	375	505	770	--	375	505	770	--	--	435	665	--	--	390	590

h/d ≥ 1*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	635	1140	1410	1660	635	1140	1410	1660	555	980	1335	1570	505	875	1190	1500
B	495	760	1030	1590	495	760	1030	1590	--	655	890	1375	--	585	790	1220
C	--	395	530	815	--	395	530	815	--	--	460	705	--	--	410	625
D	--	--	--	525	--	--	--	525	--	--	--	455	--	--	--	405

Type of Roof: Tin Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 1.97mx1m
 Terrain category: 2

h/d ≤ 0.5*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	900	1355	1515	1775	625	1135	1410	1660	565	1020	1355	1590	535	965	1310	1555
B	605	925	1260	1715	495	755	1025	1585	450	685	925	1430	--	645	870	1345
C	--	480	645	995	--	390	530	810	--	355	480	730	--	--	450	690
D	--	--	415	635	--	--	--	520	--	--	--	470	--	--	--	445

h/d ≥ 1*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	525	935	1275	1540	335	675	1040	1430	--	585	935	1375	--	555	885	1345
B	--	630	850	1310	--	515	695	1070	--	465	630	965	--	440	590	905
C	--	--	440	675	--	--	360	550	--	--	--	495	--	--	--	470
D	--	--	--	430	--	--	--	355	--	--	--	--	--	--	--	--

*For intermediate values of h/d ratios, linear interpolation shall be used.

Mibet Flush Array Frame System Spacing Table - mm

Type of Roof: Tin Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.1mx1.05m
 Terrain category: 3

h/d ≤ 0.5*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	1025	1425	1600	1860	1025	1425	1600	1860	875	1350	1510	1775	605	1215	1445	1710
B	685	1050	1435	1795	685	1050	1435	1795	590	905	1235	1715	530	810	1100	1635
C	265	545	735	1140	265	545	735	1140	--	470	635	975	--	415	565	870
D	--	345	470	725	--	345	470	725	--	--	410	625	--	--	365	555

h/d ≥ 1*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	545	1065	1380	1625	545	1065	1380	1625	435	920	1250	1535	--	635	1115	1470
B	370	710	965	1500	370	710	965	1500	--	615	835	1285	--	550	745	1145
C	--	365	500	765	--	365	500	765	--	--	430	660	--	--	385	585
D	--	--	--	490	--	--	--	490	--	--	--	425	--	--	--	380

Type of Roof: Tin Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.1mx1.05m
 Terrain category: 2

h/d ≤ 0.5*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	660	1305	1485	1745	545	1065	1380	1625	450	955	1300	1555	370	905	1230	1520
B	565	865	1180	1680	360	710	965	1495	235	640	865	1340	--	605	815	1260
C	--	450	605	935	--	360	495	760	--	--	450	685	--	--	425	645
D	--	--	390	595	--	--	--	490	--	--	--	440	--	--	--	415

h/d ≥ 1*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	770	1195	1505	--	560	975	1400	--	520	770	1345	--	440	635	1280
B	--	590	795	1230	--	480	655	1000	--	290	590	905	--	225	555	850
C	--	--	415	630	--	--	230	515	--	--	--	465	--	--	--	440
D	--	--	--	405	--	--	--	--	--	--	--	--	--	--	--	--

*For intermediate values of h/d ratios, linear interpolation shall be used.

Mibet Flush Array Frame System Spacing Table - mm

Type of Roof: Tin Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.2mx1.2m
 Terrain category: 3

$h/d \leq 0.5^*$

Wind Region	Building Height - H (m)															
	H \leq 5				5<H \leq 10				10<H \leq 15				15<H \leq 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	605	1405	1575	1840	605	1405	1575	1840	--	1305	1490	1755	--	1160	1425	1685
B	450	1005	1370	1770	450	1005	1370	1770	--	700	1180	1690	--	630	1050	1610
C	--	395	705	1090	--	395	705	1090	--	--	605	935	--	--	535	830
D	--	--	450	690	--	--	450	690	--	--	235	595	--	--	--	530

$h/d \geq 1^*$

Wind Region	Building Height - H (m)															
	H \leq 5				5<H \leq 10				10<H \leq 15				15<H \leq 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	--	620	1360	1600	--	620	1360	1600	--	500	1195	1510	--	--	650	1445
B	--	505	750	1430	--	505	750	1430	--	--	645	1230	--	--	595	1090
C	--	--	295	730	--	--	295	730	--	--	--	630	--	--	--	560
D	--	--	--	470	--	--	--	470	--	--	--	285	--	--	--	--

Type of Roof: Tin Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.2mx1.2m
 Terrain category: 2

$h/d \leq 0.5^*$

Wind Region	Building Height - H (m)															
	H \leq 5				5<H \leq 10				10<H \leq 15				15<H \leq 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	--	1245	1460	1725	--	620	1360	1595	--	530	1245	1530	--	--	1175	1500
B	--	670	1125	1655	--	505	740	1425	--	--	670	1280	--	--	635	1205
C	--	--	580	890	--	--	280	725	--	--	--	655	--	--	--	615
D	--	--	--	565	--	--	--	465	--	--	--	300	--	--	--	260

$h/d \geq 1^*$

Wind Region	Building Height - H (m)															
	H \leq 5				5<H \leq 10				10<H \leq 15				15<H \leq 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	--	--	1140	1485	--	--	545	1380	--	--	--	1295	--	--	--	1225
B	--	--	620	1175	--	--	--	825	--	--	--	700	--	--	--	665
C	--	--	--	600	--	--	--	355	--	--	--	--	--	--	--	--
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

*For intermediate values of h/d ratios, linear interpolation shall be used.

Mibet Flush Array Frame System Spacing Table - mm

Type of Roof: Tin Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.4mx1.2m
 Terrain category: 3

$h/d \leq 0.5^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	525	1365	1530	1800	525	1365	1530	1800	--	1195	1445	1715	--	650	1385	1635
B	--	750	1260	1735	--	750	1260	1735	--	645	1080	1640	--	595	840	1500
C	--	295	645	995	--	295	645	995	--	--	555	855	--	--	355	760
D	--	--	300	630	--	--	300	630	--	--	--	545	--	--	--	485

$h/d \geq 1^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	590	1275	1555	--	590	1275	1555	--	--	680	1470	--	--	605	1405
B	--	--	690	1310	--	--	690	1310	--	--	605	1125	--	--	440	1000
C	--	--	--	670	--	--	--	670	--	--	--	575	--	--	--	395
D	--	--	--	315	--	--	--	315	--	--	--	--	--	--	--	--

Type of Roof: Tin Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.4mx1.2m
 Terrain category: 2

$h/d \leq 0.5^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	1140	1420	1680	--	555	1270	1550	--	--	1140	1490	--	--	650	1455
B	--	620	1035	1605	--	--	690	1305	--	--	620	1175	--	--	595	1100
C	--	--	460	815	--	--	--	665	--	--	--	600	--	--	--	565
D	--	--	--	520	--	--	--	315	--	--	--	--	--	--	--	--

$h/d \geq 1^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	--	635	1440	--	--	--	1325	--	--	--	1185	--	--	--	1120
B	--	--	580	1075	--	--	--	715	--	--	--	640	--	--	--	615
C	--	--	--	550	--	--	--	235	--	--	--	--	--	--	--	--
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

*For intermediate values of h/d ratios, linear interpolation shall be used.

General Notes

Note 1 Following components are satisfied to use according to AS/NZS 1170.2-2011(R2016)

Components	Part Number	Description
MA Pro Rail	MA Pro Rail	as per drawing provided by client
Inter Clamp Kit (MA Pro)	Inter Clamp Kit (MA Pro)	as per drawing provided by client
End Clamp Kit (MA Pro)	End Clamp Kit (MA Pro)	as per drawing provided by client
Standard Tile Interface	Standard Tile Interface	as per drawing provided by client
L Feet Set	L Feet Set	as per drawing provided by client

Note 2 Spacing calculated based on 1.9mm steel purlin or 35mm screw embedment length into timber (JD4 seasoned timber).

Note 3 Recommended screws

Metal Purlins/Battens	Fasteners to use
1.9mm	M6-11 TPI RoofZips or 14g-10 TPI Tek screws
2.4mm above	14g-10 TPI Tek screws
Timber Purlins/Battens	Fasteners to use
Softwood/Hardwood (35mm embedment and above)	14g-10 TPI T17 screws

Note 4 Maximum uplift wind pressure is limited to 5 kPa. -- states more uplift pressure.

Note 5 Deflection is limited to Minimum of L/120 and 15mm

Note 6 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 obstructions per hectare, e.g. farmland and cleared subdivisions with isolated trees and uncut grass.
 Terrain Category 3 (TC3) refers to terrain with numerous closely spaced obstructions having heights generally from 3 m to 10 m. The minimum density of obstructions shall be at least the equivalent of 10 house-size obstructions per hectare, e.g. suburban housing, light industrial estates or dense forests.

Note 7 Refer to Figure 1 for definition of h and d.

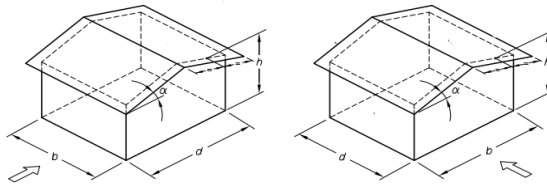
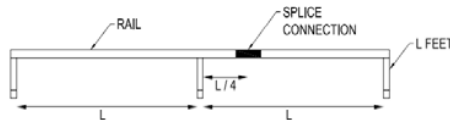


Figure 1 - h and d definition

Note 8 The optimised location of rail splice connection is at quarter length of the spacing of the interface. No Splice connection should be placed at the centre of spacing or over the interface.



Note 9 Refer Figure 2 for definition of roof zones.

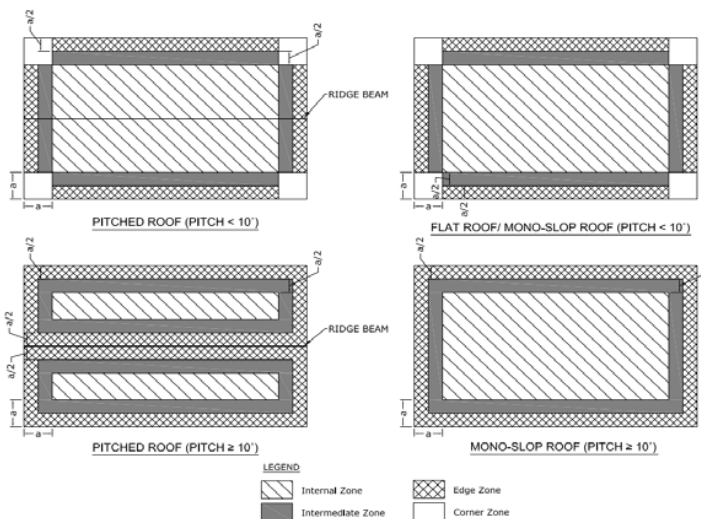


Figure 2 - Roof Zones Definition

In Figure 1, the value of dimension "a" is the minimum of 0.2b, 0.2d and h. (b & d are building dimensions and h is its height)



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Structural Design Documentation

Mibet Flush Array Frame System Spacing Table

According to AS/NZS 1170.2-2011 (R2016)

with MA Pro Rail – Tile Roof

within Australia

Terrain Category 2 & 3

For: Tradezone Pty Ltd (Brand Name: Powerwave)
PO Box 3137, Helensvale
QLD 4212

Job Number: 9981-02-Flush
Date: 29/06/2021



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Job No: 9981-02-Flush
Client: Tradezone Pty Ltd (Brand Name: Powerwave)
Project: Mibet Flush Array Frame System Spacing Table
with MA Pro Rail – Tile Roof
Address: within Australia

Australian Standards

AS/NZS 1170.0:2002 – Structural design actions, Part 0: General principles
AS/NZS 1170.1:2002 (R2016) – Structural design actions, Part 1: Permanent, imposed
and other actions
AS/NZS 1170.2:2011 (R2016) – Structural design actions, Part 2: Wind actions
AS/NZS 1664.1:1997 – Aluminium structures - Limit state design
AS 4100:2020 – Steel Structures
AS/NZS 4600:2018 – Cold-formed Steel Structures

Wind Terrain Category: WTC 2 & 3

Designed: BL
Checked: AA

Mibet Flush Array Frame System Spacing Table - mm

Type of Roof: Tile Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 1.67mx1m
 Terrain category: 3

$h/d \leq 0.5^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	590	940	1330	1970	590	940	1330	1970	505	800	1120	1875	450	705	980	1615
B	525	825	1165	1900	525	825	1165	1900	450	710	990	1630	400	625	865	1415
C	350	545	755	1215	350	545	755	1215	--	470	645	1025	--	415	570	900
D	--	420	575	910	--	420	575	910	--	--	490	775	--	--	435	685

$h/d \geq 1^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	395	615	855	1395	395	615	855	1395	340	530	730	1175	--	470	645	1025
B	350	545	755	1220	350	545	755	1220	--	470	645	1035	--	415	570	905
C	--	365	500	785	--	365	500	785	--	--	430	670	--	--	380	595
D	--	--	--	600	--	--	--	600	--	--	--	515	--	--	--	455

Type of Roof: Tile Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 1.67mx1m
 Terrain category: 2

$h/d \leq 0.5^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	480	755	1060	1760	395	615	850	1385	355	550	755	1220	335	515	710	1140
B	430	675	935	1535	350	545	755	1215	--	490	670	1075	--	460	635	1010
C	--	445	610	970	--	365	495	780	--	325	445	695	--	--	420	655
D	--	--	470	735	--	--	--	595	--	--	--	535	--	--	--	505

$h/d \geq 1^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	230	500	690	1105	--	410	560	885	--	365	500	790	--	345	475	740
B	--	450	615	980	--	365	500	785	--	325	445	700	--	--	425	660
C	--	--	410	635	--	--	335	515	--	--	--	465	--	--	--	435
D	--	--	--	490	--	--	--	400	--	--	--	--	--	--	--	--

*For intermediate values of h/d ratios, linear interpolation shall be used.

Mibet Flush Array Frame System Spacing Table - mm

Type of Roof: Tile Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 1.97mx1m
 Terrain category: 3

h/d ≤ 0.5*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	500	795	1125	1890	500	795	1125	1890	430	675	950	1590	380	595	830	1375
B	445	700	985	1655	445	700	985	1655	385	600	835	1380	340	530	735	1200
C	295	460	640	1030	295	460	640	1030	--	395	545	870	--	350	480	765
D	--	355	485	770	--	355	485	770	--	--	415	655	--	--	370	580

h/d ≥ 1*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	335	525	725	1180	335	525	725	1180	--	450	620	995	--	395	545	870
B	--	465	640	1035	--	465	640	1035	--	400	550	875	--	355	485	765
C	--	310	425	665	--	310	425	665	--	--	365	570	--	--	320	500
D	--	--	--	505	--	--	--	505	--	--	--	435	--	--	--	385

Type of Roof: Tile Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 1.97mx1m
 Terrain category: 2

h/d ≤ 0.5*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	405	640	895	1495	335	520	720	1175	--	465	640	1035	--	435	600	970
B	365	570	795	1300	--	460	640	1030	--	415	570	910	--	390	535	855
C	--	375	515	825	--	310	420	660	--	275	375	590	--	--	355	555
D	--	--	400	625	--	--	--	505	--	--	--	450	--	--	--	425

h/d ≥ 1*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	--	425	585	940	--	345	475	755	--	--	425	670	--	--	400	630
B	--	380	520	830	--	--	425	665	--	--	380	595	--	--	360	560
C	--	--	345	540	--	--	285	440	--	--	--	395	--	--	--	370
D	--	--	--	415	--	--	--	335	--	--	--	--	--	--	--	--

*For intermediate values of h/d ratios, linear interpolation shall be used.

Mibet Flush Array Frame System Spacing Table - mm

Type of Roof: Tile Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.1mx1.05m
 Terrain category: 3

h/d ≤ 0.5*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	470	745	1055	1805	470	745	1055	1805	405	635	890	1490	355	560	780	1285
B	415	660	925	1555	415	660	925	1555	360	565	785	1295	--	495	690	1125
C	265	435	600	965	265	435	600	965	--	370	510	815	--	330	450	715
D	--	335	455	720	--	335	455	720	--	--	390	615	--	--	345	545

h/d ≥ 1*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	--	490	680	1110	--	490	680	1110	--	420	580	935	--	370	510	815
B	--	435	600	970	--	435	600	970	--	375	515	820	--	--	455	720
C	--	290	395	625	--	290	395	625	--	--	340	535	--	--	300	470
D	--	--	--	475	--	--	--	475	--	--	--	405	--	--	--	360

Type of Roof: Tile Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.1mx1.05m
 Terrain category: 2

h/d ≤ 0.5*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	385	600	840	1400	--	485	675	1100	--	435	600	970	--	410	565	905
B	245	535	745	1220	--	435	600	965	--	390	535	855	--	365	505	805
C	--	355	485	770	--	290	395	620	--	--	355	555	--	--	335	520
D	--	--	375	585	--	--	--	475	--	--	--	425	--	--	--	400

h/d ≥ 1*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal	Corner	Edge	Interme diate	Internal
A	--	400	550	880	--	--	445	705	--	--	400	630	--	--	375	590
B	--	355	490	775	--	--	395	625	--	--	355	555	--	--	230	525
C	--	--	325	505	--	--	--	410	--	--	--	370	--	--	--	345
D	--	--	--	390	--	--	--	315	--	--	--	--	--	--	--	--

*For intermediate values of h/d ratios, linear interpolation shall be used.

Mibet Flush Array Frame System Spacing Table - mm

Type of Roof: Tile Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.2mx1.2m
 Terrain category: 3

h/d ≤ 0.5*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	450	710	1010	1725	450	710	1010	1725	260	605	850	1420	--	535	745	1230
B	275	630	885	1485	275	630	885	1485	--	535	750	1240	--	475	655	1070
C	--	305	570	920	--	305	570	920	--	--	490	780	--	--	425	685
D	--	--	425	690	--	--	425	690	--	--	--	585	--	--	--	520

h/d ≥ 1*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	470	650	1055	--	470	650	1055	--	290	555	890	--	--	485	775
B	--	305	575	925	--	305	575	925	--	--	490	785	--	--	425	685
C	--	--	250	595	--	--	250	595	--	--	--	510	--	--	--	450
D	--	--	--	455	--	--	--	455	--	--	--	275	--	--	--	--

Type of Roof: Tile Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.2mx1.2m
 Terrain category: 2

h/d ≤ 0.5*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	575	805	1335	--	465	645	1050	--	305	575	925	--	275	540	865
B	--	510	710	1165	--	305	570	920	--	--	510	815	--	--	480	765
C	--	--	465	735	--	--	235	595	--	--	--	530	--	--	--	495
D	--	--	--	560	--	--	--	450	--	--	--	290	--	--	--	260

h/d ≥ 1*

Wind Region	Building Height – H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	--	525	840	--	--	425	675	--	--	260	600	--	--	--	565
B	--	--	465	745	--	--	--	595	--	--	--	530	--	--	--	500
C	--	--	--	485	--	--	--	275	--	--	--	--	--	--	--	--
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

*For intermediate values of h/d ratios, linear interpolation shall be used.

Mibet Flush Array Frame System Spacing Table - mm

Type of Roof: Tile Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.4mx1.2m
 Terrain category: 3

$h/d \leq 0.5^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	290	655	925	1580	290	655	925	1580	--	555	780	1305	--	490	680	1125
B	--	575	810	1360	--	575	810	1360	--	490	685	1135	--	425	600	985
C	--	250	525	845	--	250	525	845	--	--	445	715	--	--	275	625
D	--	--	275	630	--	--	275	630	--	--	--	535	--	--	--	475

$h/d \geq 1^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	425	595	970	--	425	595	970	--	--	505	815	--	--	445	715
B	--	--	525	845	--	--	525	845	--	--	450	720	--	--	275	630
C	--	--	--	545	--	--	--	545	--	--	--	465	--	--	--	300
D	--	--	--	305	--	--	--	305	--	--	--	--	--	--	--	--

Type of Roof: Tile Roof
 Type of Rail: MA Pro Rail
 Type of Interface: L Feet Set
 Solar Panel Dimension: 2.4mx1.2m
 Terrain category: 2

$h/d \leq 0.5^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	525	735	1225	--	425	590	965	--	260	525	850	--	--	495	795
B	--	465	650	1070	--	--	525	845	--	--	465	745	--	--	440	705
C	--	--	410	675	--	--	--	545	--	--	--	485	--	--	--	455
D	--	--	--	515	--	--	--	305	--	--	--	--	--	--	--	--

$h/d \geq 1^*$

Wind Region	Building Height - H (m)															
	H ≤ 5				5 < H ≤ 10				10 < H ≤ 15				15 < H ≤ 20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	--	--	480	770	--	--	275	615	--	--	--	550	--	--	--	515
B	--	--	425	680	--	--	--	545	--	--	--	485	--	--	--	460
C	--	--	--	440	--	--	--	--	--	--	--	--	--	--	--	--
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

*For intermediate values of h/d ratios, linear interpolation shall be used.

General Notes

Note 1 Following components are satisfied to use according to AS/NZS 1170.2-2011(R2016)

Components	Part Number	Description
MA Pro Rail	MA Pro Rail	as per drawing provided by client
Inter Clamp Kit (MA Pro)	Inter Clamp Kit (MA Pro)	as per drawing provided by client
End Clamp Kit (MA Pro)	End Clamp Kit (MA Pro)	as per drawing provided by client
Standard Tile Interface	Standard Tile Interface	as per drawing provided by client
L Feet Set	L Feet Set	as per drawing provided by client

Note 2 Spacing calculated based on 1.9mm steel purlin or 35mm screw embedment length into timber (JD4 seasoned timber).

Note 3 Recommended screws

Metal Purlins/Battens	Fasteners to use
1.9mm	M6-11 TPI RoofZips or 14g-10 TPI Tek screws
2.4mm above	14g-10 TPI Tek screws
Timber Purlins/Battens	Fasteners to use
Softwood/Hardwood (35mm embedment and above)	14g-10 TPI T17 screws

Note 4 Maximum uplift wind pressure is limited to 5 kPa. -- states more uplift pressure.

Note 5 Deflection is limited to Minimum of L/120 and 15mm

Note 6 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 obstructions per hectare, e.g. farmland and cleared subdivisions with isolated trees and uncut grass.
 Terrain Category 3 (TC3) refers to terrain with numerous closely spaced obstructions having heights generally from 3 m to 10 m. The minimum density of obstructions shall be at least the equivalent of 10 house-size obstructions per hectare, e.g. suburban housing, light industrial estates or dense forests.

Note 7 Refer to Figure 1 for definition of h and d.

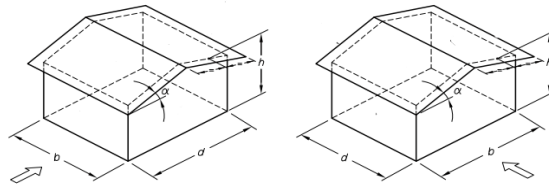
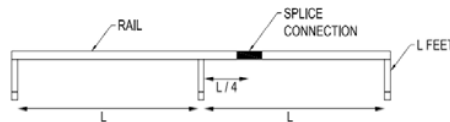


Figure 1 - h and d definition

Note 8 The optimised location of rail splice connection is at quarter length of the spacing of the interface. No Splice connection should be placed at the centre of spacing or over the interface.



Note 9 Refer Figure 2 for definition of roof zones.

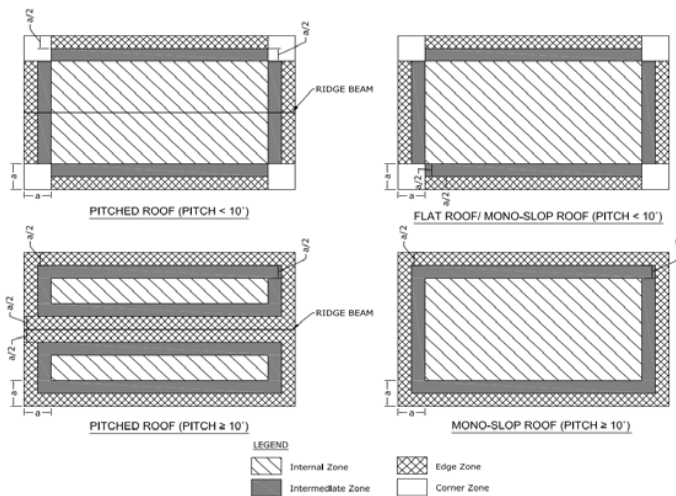


Figure 2 - Roof Zones Definition

In Figure 1, the value of dimension "a" is the minimum of 0.2b, 0.2d and h. (b & d are building dimensions and h is its height)