



EBULEN CONSULT

SOLAR PV ROOF-MOUNT RACKING FRAME ENGINEERING CERTIFICATE

ANTAI FLUSH-MOUNT SYSTEM WITH 499 RAIL, L-FOOT & SCREW FIXING

Prepared for:

Antai Technology Co., Ltd.

30F, W Squaree,

1801 Huandao East Rd,

Siming District

Xiamen, China

January 19, 2024

Ref: E22110958-Rev.1

OVERVIEW

This structural engineering certificate is issued for Antai Solar Roof Flush-mount racking system with 499 rail, L-foot bracket and penetrative screw fixing, which has been assessed against relevant Australian Standards and regulations. The assessment is carried out based on sound engineering methodologies. Assessment specifications and findings are given in the following sections.

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 1170.2:2021 – Structural design actions, Part 2: Wind actions
- AS/NZS 1664:1997 – Aluminum Structures
- AS/NZS 4600:2018 – Cold-Formed Steel Structures
- AS1720.1:2010 – Timber structures – Design methods
- AS3600:2018 – Concrete Structures
- AS 4312:2019 - Atmospheric corrosivity zones in Australia and detailed calculation referred to:
 - (1) ISO9224:2012 - Corrosion of metals and alloys Corrosivity of atmospheres - Guiding values for the corrosivity categories
 - (2) ISO9223:2012 - Corrosion of metals and alloys - Corrosivity of atmospheres - Classification, determination and estimation

ASSESSED PV RACKING FRAME PARTS

The following products by Antai Technology Co., Ltd. are assessed against relevant Australian Standards and building regulations based on the specified conditions.

Part Category	Included Parts	Part Material
Rail	ATL-TYN-499	AL 6005-T6
Rail Splice	ATL-TYN-304/54	AL 6005-T6
Tin Interface Bracket	ATL-FWNY-05	AL 6005-T6
Tile Hook Bracket	ATL-TYN-HOOK01	SUS 304
Inter/End Panel Clamp Kit	ATL-FWNY-09	AL 6005-T6
	ATL-GN-003	AL 6005-T6
	ATL-CG-018	AL 6005-T6

Note: The rail splice can only be the two separated components with the code name ATL-TYN-304/54, which are fixed both inside and outside of the rail at the connection point. Other types of rail splices are not covered by this certification.

ASSESSMENT CONDITIONS

- Solar PV system design life of 25 years
- Wind region A, B, C, D
- Terrain category 2.0, 2.5, 3.0
- Ultimate wind recurrence interval of 200 years
- Maximum average roof height of 20m
- Solar PV panel assessed: 2300mm x 1200mm, 2100mm x 1100mm, 2000mm x 1100mm, 1800mm x 1200mm, 1700mm x 1100mm
- Self-weight of solar PV panel and racking frame is 0.15kPa-0.18kPa
- Solar PV panel is supported by minimum 2 rails
- The spacing table values given in the Installation Guideline are based on the Corrosivity Category C3
- The racking rail capacity is taken as per the test report: No.XMML23090468_EN by BM Shenghe Testing Technology (Xiamen) Co., Ltd, dated 19/09/2023.
- Screw fixing pull-out has been checked with insert into minimum 35mm JD4 timber structure and steel structure with thicknesses of 1.2mm, 1.5mm, 1.9mm and 2.4mm
- Product details are taken from the drawing set provided by Antai Technology Co., Ltd. as listed in the above component table
- The pull-out capacity is taken as per test report No.MT-14/473 by Melbourne Testing Service Pty Ltd., dated 04/07/2014
- Installation to be carried out strictly in accordance with the manufacturer's installation guidelines

IMPORTANT NOTES

- ***This certification is issued based on assessments of solar PV racking frame system and its fixing connection to building roof. It has not considered the structural capacity of building structure and solar PV panel due to uncertainty of generic application. The installer must use the data tables as references only.***
- ***The attached spacing tables must be read in conjunction with foot notes and general notes.***
- ***The certificate shall be read as a whole. Any section, text, image, table extracted from this certification is not valid stand-alone.***
- ***This certification shall be reviewed and revalidated by the structural engineer after two years from the date of issue or if any applicable standard is updated.***

CONCLUSION

The above-mentioned solar PV roof-mount racking frame system by Antai Technology Co., Ltd. is found structurally sound against relevant Australian Standards following the engineering recommendations in this certification. Installation shall be conducted following the manufacturer's guidelines.

Certified by:



Zhichao Zhang

B.Eng (Civil), M.Eng (Structural)

MIEAust, NER, CPEng, RPEV, RPEQ



ABN: 20 646 315 013
INFO@EBULENCONSULT.COM.AU
C307, LEVEL 3, 175 MAROONDAH HWY,
RINGWOOD, VIC 3134
0452 197 595

APPENDIX A1 - SPACING TABLES FOR TILE HOOK BRACKET (1.8M X 1.2M)

Maximum Panel Size: 1800mm x 1200mm														
Interface Spacing Table for Terrain Category 3, h/d ≤ 0.5 (Unit: mm)														
Wind Region	Height & Roof Pitch Roof Zone		H<5m			5m<H<10m			10m<H<15m			15m<H<20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone		1823	1934	2000	1823	1934	2000	1674	1772	1922	1568	1658	1795
	Intermediate Zone		1437	1511	1632	1437	1511	1632	1354	1409	1503	1292	1345	1421
	Edge Zone		1270	1322	1398	1270	1322	1398	1194	1244	1317	1072	1186	1256
	Corner Zone		906	1001	1152	906	1001	1152	780	862	991	695	767	881
B1	Internal Zone		1453	1534	1657	1453	1534	1657	1369	1424	1525	1306	1359	1436
	Intermediate Zone		1219	1270	1344	1219	1270	1344	1092	1195	1265	970	1073	1206
	Edge Zone		931	1029	1185	931	1029	1185	802	885	1018	714	788	905
	Corner Zone		606	668	766	606	668	766	524	577	661	467	515	590
B2	Internal Zone		1394	1449	1563	1394	1449	1563	1313	1366	1444	1251	1303	1378
	Intermediate Zone		1143	1217	1288	1143	1217	1288	982	1086	1212	874	965	1111
	Edge Zone		838	926	1065	838	926	1065	723	798	917	644	711	816
	Corner Zone		547	603	691	547	603	691	473	521	597	422	465	532
C	Internal Zone		1129	1211	1282	1129	1211	1282	971	1073	1206	863	954	1098
	Intermediate Zone		731	807	927	731	807	927	631	696	799	563	620	711
	Edge Zone		540	596	683	540	596	683	467	515	590	417	460	526
	Corner Zone		355	391	447	355	391	447	308*	339*	387	275*	303*	346*
D	Internal Zone		716	791	908	716	791	908	619	682	783	552	608	697
	Intermediate Zone		469	516	591	469	516	591	406	447	511	362	399	456
	Edge Zone		348*	383	438	348*	383	438	302*	332*	380	270*	297*	339*
	Corner Zone		230*	253*	289*	230*	253*	289*	199*	219*	250*	178*	196*	224*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 1800mm x 1200mm														
Interface Spacing Table for Terrain Category 3, h/d ≥ 1 (Unit: mm)														
Wind Region	Height & Roof Pitch Roof Zone		H<5m			5m<H<10m			10m<H<15m			15m<H<20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone		1463	1548	1823	1463	1548	1823	1376	1434	1674	1313	1369	1568
	Intermediate Zone		1226	1279	1437	1226	1279	1437	1106	1203	1354	983	1092	1292
	Edge Zone		943	1047	1270	943	1047	1270	812	901	1194	723	802	1072
	Corner Zone		614	679	906	614	679	906	530	587	780	473	523	695
B1	Internal Zone		1240	1293	1453	1240	1293	1453	1137	1217	1369	1010	1122	1306
	Intermediate Zone		854	948	1219	854	948	1219	737	816	1092	656	727	970
	Edge Zone		630	698	931	630	698	931	545	603	802	486	537	714
	Corner Zone		413	457	606	413	457	606	358	395	524	320*	353	467
B2	Internal Zone		1188	1239	1394	1188	1239	1394	1023	1137	1313	910	1010	1251
	Intermediate Zone		770	854	1143	770	854	1143	664	736	982	592	656	874
	Edge Zone		569	630	838	569	630	838	492	544	723	439	486	644
	Corner Zone		374	413	547	374	413	547	324*	358	473	289*	320*	422
C	Internal Zone		761	843	1129	761	843	1129	657	727	971	585	648	863
	Intermediate Zone		497	550	731	497	550	731	430	476	631	384	425	563
	Edge Zone		369	408	540	369	408	540	320*	353	467	286*	316*	417
	Corner Zone		244*	269*	355	244*	269*	355	211*	233*	308*	189*	209*	275*
D	Internal Zone		487	539	716	487	539	716	422	466	619	377	416	552
	Intermediate Zone		321*	354	469	321*	354	469	278*	307*	406	249*	274*	362
	Edge Zone		239*	264*	348*	239*	264*	348*	207*	229*	302*	185*	205*	270*
	Corner Zone		158*	175*	230*	158*	175*	230*	137*	151*	199*	123*	136*	178*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 1800mm x 1200mm														
Interface Spacing Table for Terrain Category 2.5, h/d ≤ 0.5 (Unit: mm)														
Wind Region	Height & Roof Pitch		H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Roof Zone													
	Internal Zone		1721	1822	1979	1609	1701	1843	1512	1597	1727	1445	1522	1644
	Intermediate Zone		1381	1436	1543	1316	1370	1447	1257	1309	1384	1213	1263	1337
	Edge Zone		1219	1269	1343	1123	1209	1280	1002	1108	1222	918	1015	1169
Corner Zone		819	905	1040	728	803	923	651	718	824	598	659	756	
B1	Internal Zone		1396	1452	1566	1330	1385	1467	1271	1323	1399	1226	1277	1351
	Intermediate Zone		1147	1219	1290	1016	1124	1229	907	1002	1154	832	919	1057
	Edge Zone		841	930	1069	747	825	948	668	737	846	614	677	777
	Corner Zone		549	605	694	489	538	617	438	482	552	403	443	508
B2	Internal Zone		1339	1393	1479	1275	1328	1404	1217	1268	1342	1159	1224	1296
	Intermediate Zone		1032	1141	1236	915	1011	1164	817	903	1038	750	828	951
	Edge Zone		759	837	963	674	744	854	603	665	763	554	611	701
	Corner Zone		496	546	626	442	486	557	396	436	499	364	401	459
C	Internal Zone		1019	1127	1230	904	999	1150	807	892	1025	741	818	940
	Intermediate Zone		662	730	838	589	649	744	527	581	666	485	534	612
	Edge Zone		490	540	619	436	481	550	391	431	493	360	396	453
	Corner Zone		322*	355	406	288*	316*	362	258*	284*	324*	238*	261*	298*
D	Internal Zone		649	716	821	577	636	730	517	569	653	475	523	599
	Intermediate Zone		425	468	536	379	417	477	340*	374	428	313*	344*	393
	Edge Zone		316*	348*	398	282*	310*	355	253*	278*	318*	233*	256*	293*
	Corner Zone		209*	230*	262*	186*	205*	234*	167*	184*	210*	154*	170*	193*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 1800mm x 1200mm														
Interface Spacing Table for Terrain Category 2.5, h/d ≥ 1 (Unit: mm)														
Wind Region	Height & Roof Pitch		H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Roof Zone													
	Internal Zone		1403	1465	1721	1338	1394	1609	1278	1332	1512	1233	1286	1445
	Intermediate Zone		1163	1228	1381	1030	1144	1316	919	1020	1257	843	935	1213
	Edge Zone		853	946	1219	757	839	1123	677	750	1002	622	689	918
Corner Zone		556	615	819	495	547	728	443	490	651	408	451	598	
B1	Internal Zone		1189	1241	1396	1058	1176	1330	944	1048	1271	866	961	1226
	Intermediate Zone		773	857	1147	687	761	1016	614	680	907	565	625	832
	Edge Zone		571	632	841	508	562	747	455	503	668	419	463	614
	Corner Zone		375	414	549	334*	369	489	300*	331*	438	276*	305*	403
B2	Internal Zone		1075	1189	1339	953	1058	1275	851	944	1217	781	865	1159
	Intermediate Zone		697	772	1032	620	686	915	555	614	817	510	564	750
	Edge Zone		516	571	759	459	508	674	412	455	603	379	418	554
	Corner Zone		339*	375	496	302*	334*	442	271*	300*	396	250*	276*	364
C	Internal Zone		689	763	1019	612	678	904	548	607	807	504	558	741
	Intermediate Zone		451	499	662	402	444	589	360	398	527	332*	366	485
	Edge Zone		335*	370	490	299*	330*	436	268*	296*	391	247*	273*	360
	Corner Zone		221*	244*	322*	198*	218*	288*	177*	196*	258*	163*	180*	238*
D	Internal Zone		442	489	649	394	435	577	353	390	517	325*	359	475
	Intermediate Zone		291*	322*	425	260*	287*	379	233*	257*	340*	215*	237*	313*
	Edge Zone		217*	240*	316*	194*	214*	282*	174*	192*	253*	160*	177*	233*
	Corner Zone		144*	159*	209*	128*	142*	186*	115*	127*	167*	106*	117*	154*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 1800mm x 1200mm													
Interface Spacing Table for Terrain Category 2, h/d ≤ 0.5 (Unit: mm)													
Wind Region	Height & Roof Pitch Roof Zone	H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
		Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone	1630	1724	1869	1459	1540	1664	1398	1455	1570	1365	1420	1519
	Intermediate Zone	1328	1382	1464	1223	1274	1348	1152	1221	1293	1084	1191	1261
	Edge Zone	1150	1220	1292	938	1037	1189	845	934	1074	796	879	1011
	Corner Zone	745	822	944	610	673	772	551	608	697	520	573	656
B1	Internal Zone	1343	1397	1486	1237	1289	1363	1184	1235	1307	1114	1204	1275
	Intermediate Zone	1040	1151	1241	850	939	1080	766	846	972	722	796	915
	Edge Zone	765	844	971	627	691	793	566	624	715	534	588	674
	Corner Zone	500	551	631	411	453	518	372	409	468	351	386	442
B2	Internal Zone	1287	1340	1417	1184	1235	1307	1065	1179	1252	1002	1108	1222
	Intermediate Zone	937	1035	1188	766	846	972	691	762	876	651	718	824
	Edge Zone	690	761	874	566	624	715	511	563	646	482	531	609
	Corner Zone	452	498	570	372	409	468	336*	370	423	317*	349	399
C	Internal Zone	925	1023	1178	757	836	960	683	753	865	643	710	815
	Intermediate Zone	602	664	762	495	545	625	447	492	564	422	464	532
	Edge Zone	446	492	563	367	404	463	332*	366	418	314*	345*	395
	Corner Zone	294*	324*	370	242*	267*	305*	219*	241*	276*	207*	228*	260*
D	Internal Zone	590	651	747	485	534	612	438	483	553	414	455	521
	Intermediate Zone	388	427	488	319*	351	402	289*	318*	363	273*	300*	343*
	Edge Zone	288*	317*	363	238*	261*	299*	215*	237*	270*	203*	223*	255*
	Corner Zone	191*	210*	239*	157*	173*	197*	143*	157*	179*	135*	148*	169*

NOTES:

- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
- Definition of Terrain Category is given in General Note 1.
- Notion of Roof Zone is given in General Note 2.
- The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
- The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 1800mm x 1200mm													
Interface Spacing Table for Terrain Category 2, h/d ≥ 1 (Unit: mm)													
Wind Region	Height & Roof Pitch Roof Zone	H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
		Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone	1350	1407	1630	1244	1298	1459	1192	1244	1398	1129	1213	1365
	Intermediate Zone	1054	1171	1328	861	955	1223	776	860	1152	731	810	1084
	Edge Zone	775	859	1150	635	703	938	573	635	845	541	598	796
	Corner Zone	506	560	745	416	460	610	377	416	551	355	393	520
B1	Internal Zone	1084	1193	1343	885	982	1237	797	884	1184	751	832	1114
	Intermediate Zone	703	779	1040	576	638	850	521	576	766	491	543	722
	Edge Zone	520	575	765	427	473	627	386	427	566	365	403	534
	Corner Zone	342*	378	500	282*	311*	411	255*	281*	372	241*	266*	351
B2	Internal Zone	975	1083	1287	797	884	1184	719	797	1065	678	750	1002
	Intermediate Zone	634	702	937	521	576	766	470	520	691	444	491	651
	Edge Zone	470	519	690	386	427	566	350	386	511	330*	364	482
	Corner Zone	309*	342*	452	255*	281*	372	231*	255*	336*	218*	241*	317*
C	Internal Zone	627	694	925	515	569	757	465	514	683	439	485	643
	Intermediate Zone	411	454	602	338*	374	495	306*	338*	447	289*	319*	422
	Edge Zone	306*	338*	446	252*	278*	367	228*	252*	332*	215*	238*	314*
	Corner Zone	202*	223*	294*	167*	184*	242*	151*	167*	219*	143*	157*	207*
D	Internal Zone	403	445	590	332*	367	485	300*	332*	438	283*	313*	414
	Intermediate Zone	266*	293*	388	219*	242*	319*	198*	219*	289*	187*	207*	273*
	Edge Zone	198*	219*	288*	164*	180*	238*	148*	163*	215*	140*	154*	203*
	Corner Zone	131*	145*	191*	108*	120*	157*	98*	108*	143*	93*	102*	135*

NOTES:

- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
- Definition of Terrain Category is given in General Note 1.
- Notion of Roof Zone is given in General Note 2.
- The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
- The spacing table is based on the fixing condition specified in General Note 7.



EBULEN CONSULT



ABN: 20 646 315 013
INFO@EBULENCONSULT.COM.AU
C307, LEVEL 3, 175 MAROONDAH HWY,
RINGWOOD, VIC 3134
0452 197 595

APPENDIX A2 - SPACING TABLES FOR TILE HOOK BRACKET (2.3M X 1.2M)

Maximum Panel Size: 2300mm x 1200mm														
Interface Spacing Table for Terrain Category 3, h/d ≤ 0.5 (Unit: mm)														
Wind Region	Height & Roof Pitch Roof Zone		H<5m			5m<H<10m			10m<H<15m			15m<H<20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone		1613	1710	1861	1613	1710	1861	1481	1567	1700	1404	1467	1587
	Intermediate Zone		1310	1365	1445	1310	1365	1445	1230	1283	1360	1150	1222	1295
	Edge Zone		1102	1200	1273	1102	1200	1273	945	1047	1195	839	928	1071
	Corner Zone		709	783	902	709	783	902	611	674	775	544	600	689
B1	Internal Zone		1325	1381	1466	1325	1381	1466	1245	1298	1375	1183	1236	1310
	Intermediate Zone		995	1103	1221	995	1103	1221	854	945	1091	759	839	967
	Edge Zone		728	805	927	728	805	927	627	693	797	559	617	708
	Corner Zone		474	523	600	474	523	600	410	451	517	366	403	461
B2	Internal Zone		1268	1322	1400	1268	1322	1400	1191	1242	1317	1062	1177	1254
	Intermediate Zone		894	990	1143	894	990	1143	769	850	980	684	755	870
	Edge Zone		656	725	834	656	725	834	566	624	717	504	556	638
	Corner Zone		428	472	541	428	472	541	370	408	467	330	364	417
C	Internal Zone		883	978	1129	883	978	1129	759	840	968	675	746	859
	Intermediate Zone		572	631	725	572	631	725	494	545	625	440	485	557
	Edge Zone		423	466	534	423	466	534	366	403	461	327	360	412
	Corner Zone		278	306	350	278	306	350	241*	265*	303	215*	237*	271*
D	Internal Zone		561	619	711	561	619	711	484	534	612	432	476	545
	Intermediate Zone		367	404	463	367	404	463	317	349	400	284	312	357
	Edge Zone		272*	300	343	272*	300	343	236*	260*	297	211*	232*	265*
	Corner Zone		180*	198*	226*	180*	198*	226*	156*	172*	196*	140*	153*	175*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 2300mm x 1200mm														
Interface Spacing Table for Terrain Category 3, h/d ≥ 1 (Unit: mm)														
Wind Region	Height & Roof Pitch Roof Zone		H<5m			5m<H<10m			10m<H<15m			15m<H<20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone		1332	1390	1613	1332	1390	1613	1252	1307	1481	1191	1245	1404
	Intermediate Zone		1009	1123	1310	1009	1123	1310	866	962	1230	769	854	1150
	Edge Zone		738	819	1102	738	819	1102	636	705	945	566	627	839
	Corner Zone		480	532	709	480	532	709	415	459	611	370	410	544
B1	Internal Zone		1037	1155	1325	1037	1155	1325	890	989	1245	791	878	1183
	Intermediate Zone		668	741	995	668	741	995	576	639	854	514	569	759
	Edge Zone		493	546	728	493	546	728	426	471	627	380	421	559
	Corner Zone		323	357	474	323	357	474	280	309	410	250*	276	366
B2	Internal Zone		932	1036	1268	932	1036	1268	801	889	1191	712	790	1062
	Intermediate Zone		603	668	894	603	668	894	520	576	769	464	513	684
	Edge Zone		445	493	656	445	493	656	385	426	566	344	380	504
	Corner Zone		292	323	428	292	323	428	253*	280	370	226*	250*	330
C	Internal Zone		595	660	883	595	660	883	514	569	759	458	507	675
	Intermediate Zone		389	430	572	389	430	572	337	372	494	301	332	440
	Edge Zone		289	319	423	289	319	423	250*	276	366	224*	247*	327
	Corner Zone		191*	210*	278	191*	210*	278	165*	182*	241*	148*	163*	215*
D	Internal Zone		381	422	561	381	422	561	330	365	484	295	326	432
	Intermediate Zone		251*	277	367	251*	277	367	217*	240*	317	194*	215*	284
	Edge Zone		187*	206*	272*	187*	206*	272*	162*	179*	236*	145*	160*	211*
	Corner Zone		124*	136*	180*	124*	136*	180*	107*	118*	156*	96*	106*	140*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 2300mm x 1200mm														
Interface Spacing Table for Terrain Category 2.5, h/d <= 0.5 (Unit: mm)														
Wind Region	Height & Roof Pitch		H<5m			5m<H<10m			10m<H<=15m			15m<H<=20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Roof Zone													
	Internal Zone		1522	1612	1750	1431	1505	1631	1366	1423	1527	1318	1373	1455
	Intermediate Zone		1256	1309	1387	1194	1245	1320	1073	1187	1259	981	1087	1214
	Edge Zone		993	1101	1220	879	973	1123	784	867	999	719	794	914
Corner Zone		641	708	814	569	628	722	509	562	645	468	516	592	
B1	Internal Zone		1270	1324	1403	1208	1260	1335	1103	1201	1273	1009	1119	1228
	Intermediate Zone		898	994	1148	795	880	1014	710	784	903	651	719	827
	Edge Zone		658	727	837	585	645	742	523	577	662	480	530	608
	Corner Zone		429	473	543	382	421	483	343	377	432	315	347	397
B2	Internal Zone		1216	1268	1344	1114	1206	1278	991	1098	1219	907	1004	1160
	Intermediate Zone		807	893	1030	716	791	911	639	706	812	587	648	745
	Edge Zone		594	655	753	528	582	668	472	520	597	434	478	548
	Corner Zone		388	427	490	345	381	436	310	341	390	285	314	359
C	Internal Zone		798	882	1017	707	782	900	632	698	802	580	640	735
	Intermediate Zone		518	571	656	461	508	583	412	455	521	379	418	479
	Edge Zone		383	422	484	341	376	431	306	337	386	282	310	355
	Corner Zone		252*	278	317	225*	247*	283	202*	222*	254*	186*	204*	233*
D	Internal Zone		508	560	643	451	498	571	404	445	511	372	409	469
	Intermediate Zone		333	366	419	296	326	373	266*	293	335	245*	269*	308
	Edge Zone		247*	272*	311	221*	243*	277	198*	218*	249*	182*	200*	229*
	Corner Zone		163*	180*	205*	146*	160*	183*	131*	144*	164*	121*	133*	151*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 2300mm x 1200mm														
Interface Spacing Table for Terrain Category 2.5, h/d >= 1 (Unit: mm)														
Wind Region	Height & Roof Pitch		H<5m			5m<H<10m			10m<H<=15m			15m<H<=20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Roof Zone													
	Internal Zone		1277	1334	1522	1215	1269	1431	1119	1210	1366	1023	1139	1318
	Intermediate Zone		910	1012	1256	806	895	1194	719	798	1073	660	732	981
	Edge Zone		667	740	993	592	657	879	530	587	784	487	539	719
Corner Zone		435	481	641	387	428	569	347	384	509	319	353	468	
B1	Internal Zone		935	1040	1270	828	920	1208	739	820	1103	678	752	1009
	Intermediate Zone		605	670	898	537	595	795	481	532	710	442	489	651
	Edge Zone		447	494	658	398	440	585	356	394	523	328	362	480
	Corner Zone		293	324	429	261*	289	382	235*	259*	343	216*	238*	315
B2	Internal Zone		841	935	1216	746	828	1114	666	738	991	611	677	907
	Intermediate Zone		545	604	807	485	537	716	434	480	639	399	441	587
	Edge Zone		404	446	594	359	397	528	322	356	472	296	327	434
	Corner Zone		265*	293	388	237*	261*	345	212*	234*	310	195*	216*	285
C	Internal Zone		539	597	798	479	531	707	429	475	632	394	436	580
	Intermediate Zone		353	390	518	314	347	461	282	311	412	259*	287	379
	Edge Zone		262*	290	383	234*	258*	341	210*	232*	306	193*	213*	282
	Corner Zone		173*	191*	252*	155*	171*	225*	139*	153*	202*	128*	141*	186*
D	Internal Zone		346	382	508	308	341	451	276	305	404	254*	281	372
	Intermediate Zone		228*	252*	333	203*	224*	296	182*	201*	266*	168*	185*	245*
	Edge Zone		170*	187*	247*	152*	167*	221*	136*	150*	198*	125*	138*	182*
	Corner Zone		112*	124*	163*	100*	111*	146*	90*	99*	131*	83*	92*	121*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 2300mm x 1200mm													
Interface Spacing Table for Terrain Category 2, h/d ≤ 0.5 (Unit: mm)													
Wind Region	Height & Roof Pitch Roof Zone	H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
		Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone	1444	1525	1653	1329	1385	1472	1273	1327	1405	1241	1294	1371
	Intermediate Zone	1206	1258	1333	1003	1112	1225	901	998	1153	848	938	1083
	Edge Zone	900	997	1151	734	811	935	661	730	840	623	688	791
	Corner Zone	583	643	739	478	527	604	431	475	545	407	448	514
B1	Internal Zone	1220	1272	1348	1032	1144	1239	927	1026	1186	872	965	1114
	Intermediate Zone	814	901	1039	665	735	845	599	662	761	565	623	716
	Edge Zone	598	661	759	490	541	621	443	488	560	418	460	528
	Corner Zone	391	431	494	322	354	405	291	320	366	274	302	346
B2	Internal Zone	1141	1217	1291	927	1026	1186	833	922	1064	784	867	1000
	Intermediate Zone	733	810	933	599	662	761	541	597	685	509	562	645
	Edge Zone	540	596	684	443	488	560	400	441	505	377	416	476
	Corner Zone	353	389	446	291	320	366	263*	289	331	248*	273	312
C	Internal Zone	724	800	922	592	654	751	534	589	677	503	555	637
	Intermediate Zone	471	520	596	387	426	489	350	385	441	330	363	416
	Edge Zone	349	385	441	287	316	362	260*	286	327	245*	270*	309
	Corner Zone	230*	253*	289	190*	209*	238*	172*	189*	216*	162*	178*	204*
D	Internal Zone	462	509	584	379	418	479	343	378	432	324	356	408
	Intermediate Zone	303	334	382	250*	275	314	226*	249*	284	213*	235*	268*
	Edge Zone	226*	248*	284	186*	205*	234*	168*	185*	211*	159*	175*	200*
	Corner Zone	149*	164*	187*	123*	135*	154*	111*	122*	140*	105*	116*	132*

NOTES:

- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
- Definition of Terrain Category is given in General Note 1.
- Notion of Roof Zone is given in General Note 2.
- The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
- The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 2300mm x 1200mm													
Interface Spacing Table for Terrain Category 2, h/d ≥ 1 (Unit: mm)													
Wind Region	Height & Roof Pitch Roof Zone	H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
		Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone	1227	1281	1444	1046	1164	1329	939	1045	1273	883	982	1241
	Intermediate Zone	825	917	1206	674	747	1003	607	673	901	572	634	848
	Edge Zone	606	672	900	497	550	734	449	497	661	423	468	623
	Corner Zone	396	438	583	326	360	478	295	326	431	278	307	407
B1	Internal Zone	848	942	1220	692	768	1032	624	692	927	588	651	872
	Intermediate Zone	550	609	814	451	499	665	407	451	599	384	425	565
	Edge Zone	407	450	598	334	370	490	302	334	443	285	315	418
	Corner Zone	267*	295	391	220*	243*	322	199*	220*	291	188*	208*	274
B2	Internal Zone	763	847	1141	624	692	927	563	623	833	530	587	784
	Intermediate Zone	496	549	733	407	451	599	368	407	541	347	384	509
	Edge Zone	368	406	540	302	334	443	273	302	400	258*	285	377
	Corner Zone	242*	267*	353	199*	220*	291	180*	199*	263*	170*	188*	248*
C	Internal Zone	490	543	724	403	445	592	364	402	534	343	379	503
	Intermediate Zone	322	355	471	265*	292	387	239*	265*	350	226*	250*	330
	Edge Zone	239*	264*	349	197*	218*	287	178*	197*	260*	168*	186*	245*
	Corner Zone	158*	174*	230*	130*	144*	190*	118*	130*	172*	112*	123*	162*
D	Internal Zone	315	348	462	260*	287	379	235*	259*	343	222*	245*	324
	Intermediate Zone	208*	229*	303	171*	189*	250*	155*	171*	226*	147*	162*	213*
	Edge Zone	155*	171*	226*	128*	141*	186*	116*	128*	168*	109*	121*	159*
	Corner Zone	103*	113*	149*	85*	93*	123*	77*	85*	111*	72*	80*	105*

NOTES:

- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
- Definition of Terrain Category is given in General Note 1.
- Notion of Roof Zone is given in General Note 2.
- The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
- The spacing table is based on the fixing condition specified in General Note 7.



ABN: 20 646 315 013
INFO@EBULENCONSULT.COM.AU
C307, LEVEL 3, 175 MAROONDAH HWY,
RINGWOOD, VIC 3134
0452 197 595

APPENDIX B1 - SPACING TABLES FOR PENETRATIVE SCREW (1.8M X 1.2M)

Maximum Panel Size: 1800mm x 1200mm														
Interface Spacing Table for Terrain Category 3, h/d ≤ 0.5 (Unit: mm)														
Wind Region	Height & Roof Pitch Roof Zone		H<5m			5m<H<10m			10m<H<15m			15m<H<20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone		1823	1934	2000	1823	1934	2000	1674	1772	1922	1568	1658	1795
	Intermediate Zone		1432	1511	1632	1432	1511	1632	1322	1394	1503	1244	1310	1411
	Edge Zone		1218	1282	1380	1218	1282	1380	1151	1195	1275	1099	1143	1205
	Corner Zone		1029	1070	1130	1029	1070	1130	968	1008	1066	923	962	1017
B1	Internal Zone		1453	1534	1657	1453	1534	1657	1341	1414	1525	1261	1329	1431
	Intermediate Zone		1173	1218	1309	1173	1218	1309	1107	1151	1214	1057	1100	1161
	Edge Zone		1040	1082	1142	1040	1082	1142	979	1019	1078	934	972	1028
	Corner Zone		855	908	961	855	908	961	739	815	904	660	727	832
B2	Internal Zone		1374	1449	1563	1374	1449	1563	1270	1338	1441	1202	1258	1354
	Intermediate Zone		1127	1171	1240	1127	1171	1240	1063	1105	1166	1014	1055	1115
	Edge Zone		997	1038	1097	997	1038	1097	938	977	1034	894	932	986
	Corner Zone		772	851	921	772	851	921	668	736	843	596	657	752
C	Internal Zone		1149	1196	1265	1149	1196	1265	1080	1126	1191	975	1073	1136
	Intermediate Zone		826	911	1047	826	911	1047	713	786	902	636	701	803
	Edge Zone		610	673	771	610	673	771	528	582	666	471	519	594
	Corner Zone		401	442	505	401	442	505	348*	382*	437	311*	342*	391*
D	Internal Zone		809	893	1026	809	893	1026	698	770	884	623	687	787
	Intermediate Zone		529	583	668	529	583	668	458	504	577	409	451	515
	Edge Zone		393*	433	495	393*	433	495	341*	375*	429	305*	335*	383*
	Corner Zone		260*	286*	326*	260*	286*	326*	225*	248*	283*	202*	222*	253*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 1800mm x 1200mm														
Interface Spacing Table for Terrain Category 3, h/d ≥ 1 (Unit: mm)														
Wind Region	Height & Roof Pitch Roof Zone		H<5m			5m<H<10m			10m<H<15m			15m<H<20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone		1463	1548	1823	1463	1548	1823	1351	1428	1674	1270	1341	1568
	Intermediate Zone		1179	1228	1432	1179	1228	1432	1113	1159	1322	1063	1107	1244
	Edge Zone		1045	1089	1218	1045	1089	1218	984	1026	1151	939	979	1099
	Corner Zone		866	914	1029	866	914	1029	749	826	968	668	739	923
B1	Internal Zone		1191	1246	1453	1191	1246	1453	1125	1171	1341	1074	1119	1261
	Intermediate Zone		1005	1047	1173	1005	1047	1173	946	986	1107	901	940	1057
	Edge Zone		886	925	1040	886	925	1040	769	851	979	686	759	934
	Corner Zone		583	645	855	583	645	855	505	558	739	452*	499	660
B2	Internal Zone		1145	1191	1374	1145	1191	1374	1080	1124	1270	1031	1074	1202
	Intermediate Zone		963	1004	1127	963	1004	1127	906	945	1063	836	901	1014
	Edge Zone		803	886	997	803	886	997	695	768	938	620	686	894
	Corner Zone		528	583	772	528	583	772	457*	505	668	409*	451*	596
C	Internal Zone		859	952	1149	859	952	1149	741	821	1080	661	732	975
	Intermediate Zone		562	621	826	562	621	826	486	537	713	434	480	636
	Edge Zone		417	461	610	417	461	610	361*	399	528	323*	357*	471
	Corner Zone		275*	304*	401	275*	304*	401	239*	263*	348*	214*	236*	311*
D	Internal Zone		551	609	809	551	609	809	476	527	698	426	470	623
	Intermediate Zone		362*	400	529	362*	400	529	314*	347*	458	281*	310*	409
	Edge Zone		270*	298*	393*	270*	298*	393*	234*	258*	341*	209*	231*	305*
	Corner Zone		179*	197*	260*	179*	197*	260*	155*	171*	225*	139*	153*	202*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 1800mm x 1200mm													
Interface Spacing Table for Terrain Category 2.5, h/d ≤ 0.5 (Unit: mm)													
Wind Region	Height & Roof Pitch	H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
		Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Roof Zone												
	Internal Zone	1721	1822	1979	1609	1701	1843	1512	1597	1727	1442	1522	1644
	Intermediate Zone	1357	1431	1543	1274	1342	1446	1206	1265	1361	1167	1212	1300
	Edge Zone	1172	1218	1308	1119	1163	1229	1071	1113	1175	1034	1076	1136
	Corner Zone	988	1028	1087	941	980	1036	898	936	990	844	903	956
B1	Internal Zone	1376	1452	1566	1292	1362	1467	1219	1283	1381	1179	1226	1319
	Intermediate Zone	1128	1173	1242	1077	1120	1181	1029	1071	1131	994	1035	1093
	Edge Zone	999	1039	1098	951	991	1048	908	946	1001	867	913	967
	Corner Zone	775	854	922	690	760	871	618	681	779	569	626	717
B2	Internal Zone	1302	1373	1479	1224	1289	1387	1171	1216	1306	1133	1177	1249
	Intermediate Zone	1083	1126	1188	1033	1075	1135	987	1027	1086	953	992	1049
	Edge Zone	957	997	1054	911	949	1005	852	906	960	783	863	926
	Corner Zone	700	771	883	624	687	786	559	615	704	514	566	648
C	Internal Zone	1102	1148	1215	1021	1093	1157	912	1007	1105	837	924	1061
	Intermediate Zone	748	825	947	665	733	841	595	656	752	547	603	691
	Edge Zone	553	610	699	493	543	621	442	486	557	407	447	512
	Corner Zone	364*	401	458	325*	357*	408	291*	321*	366*	268*	295*	337*
D	Internal Zone	733	808	928	652	718	824	584	643	737	537	591	677
	Intermediate Zone	480	529	605	428	471	539	384*	422	483	353*	389*	444
	Edge Zone	357*	393*	449	318*	350*	400	286*	314*	359*	263*	289*	331*
	Corner Zone	236*	259*	296*	211*	232*	264*	189*	208*	237*	174*	191*	219*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 1800mm x 1200mm													
Interface Spacing Table for Terrain Category 2.5, h/d ≥ 1 (Unit: mm)													
Wind Region	Height & Roof Pitch	H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
		Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Roof Zone												
	Internal Zone	1386	1465	1721	1301	1374	1609	1226	1294	1512	1185	1237	1442
	Intermediate Zone	1134	1180	1357	1082	1127	1274	1035	1078	1206	999	1042	1167
	Edge Zone	1004	1047	1172	956	998	1119	913	953	1071	878	920	1034
	Corner Zone	785	869	988	699	773	941	626	692	898	576	637	844
B1	Internal Zone	1146	1193	1376	1094	1139	1292	1046	1090	1219	1010	1053	1179
	Intermediate Zone	965	1006	1128	918	958	1077	867	915	1029	797	882	994
	Edge Zone	806	887	999	717	794	951	643	711	908	591	654	867
	Corner Zone	529	585	775	472*	521	690	423*	468*	618	390*	430*	569
B2	Internal Zone	1101	1146	1302	1050	1094	1224	1003	1046	1171	969	1010	1133
	Intermediate Zone	924	964	1083	875	918	1033	783	867	987	720	797	953
	Edge Zone	728	806	957	648	717	911	581	642	852	535	591	783
	Corner Zone	479*	529	700	427*	472*	624	383*	423*	559	353*	390*	514
C	Internal Zone	778	862	1102	692	766	1021	619	685	912	569	630	837
	Intermediate Zone	509	563	748	454	502	665	407	450	595	374*	414	547
	Edge Zone	379*	418	553	338*	373*	493	303*	334*	442	279*	308*	407
	Corner Zone	250*	276*	364*	223*	246*	325*	200*	221*	291*	185*	204*	268*
D	Internal Zone	499	552	733	445	492	652	399	441	584	367*	406	537
	Intermediate Zone	329*	363*	480	293*	324*	428	263*	291*	384*	243*	268*	353*
	Edge Zone	245*	271*	357*	219*	242*	318*	197*	217*	286*	181*	200*	263*
	Corner Zone	162*	179*	236*	145*	160*	211*	130*	144*	189*	120*	132*	174*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 1800mm x 1200mm													
Interface Spacing Table for Terrain Category 2, h/d ≤ 0.5 (Unit: mm)													
Wind Region	Height & Roof Pitch Roof Zone	H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
		Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone	1630	1724	1869	1459	1540	1664	1379	1455	1570	1336	1409	1519
	Intermediate Zone	1289	1359	1464	1177	1223	1315	1130	1175	1245	1104	1148	1210
	Edge Zone	1130	1174	1244	1043	1085	1146	1000	1041	1100	976	1016	1074
	Corner Zone	950	989	1046	862	911	964	778	858	924	734	809	901
B1	Internal Zone	1308	1379	1486	1189	1240	1334	1142	1187	1263	1116	1160	1224
	Intermediate Zone	1087	1130	1192	1003	1043	1103	961	1001	1058	938	977	1033
	Edge Zone	960	1000	1057	884	921	975	799	881	934	754	830	911
	Corner Zone	706	778	886	580	639	732	525	578	661	495	545	624
B2	Internal Zone	1238	1305	1405	1142	1187	1263	1097	1140	1203	1071	1114	1175
	Intermediate Zone	1043	1085	1145	961	1001	1058	921	959	1015	898	936	990
	Edge Zone	920	959	1014	799	881	934	722	795	895	681	750	859
	Corner Zone	638	702	804	525	578	661	475*	522	598	448*	493	564
C	Internal Zone	1045	1104	1168	855	944	1076	771	851	977	727	801	920
	Intermediate Zone	680	750	860	559	616	705	505	556	637	476	525	600
	Edge Zone	504	555	636	415	457	523	375*	413	472	354*	390*	446
	Corner Zone	332*	365*	418	274*	301*	344*	248*	273*	311*	234*	257*	294*
D	Internal Zone	667	735	843	548	603	691	495	545	624	467	514	589
	Intermediate Zone	438	482	551	360*	397	454	326*	359*	410	308*	339*	387*
	Edge Zone	326*	358*	409	269*	295*	337*	243*	267*	305*	230*	252*	288*
	Corner Zone	215*	237*	270*	178*	195*	223*	161*	177*	202*	152*	167*	191*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 1800mm x 1200mm													
Interface Spacing Table for Terrain Category 2, h/d ≥ 1 (Unit: mm)													
Wind Region	Height & Roof Pitch Roof Zone	H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
		Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone	1317	1392	1630	1195	1251	1459	1148	1195	1379	1122	1167	1336
	Intermediate Zone	1092	1138	1289	1008	1051	1177	966	1008	1130	943	983	1104
	Edge Zone	966	1007	1130	889	928	1043	810	889	1000	763	845	976
	Corner Zone	715	791	950	588	650	862	532	587	778	502	554	734
B1	Internal Zone	1104	1150	1308	1019	1062	1189	977	1019	1142	953	994	1116
	Intermediate Zone	927	967	1087	814	891	1003	735	813	961	693	767	938
	Edge Zone	734	812	960	604	667	884	546	603	799	515	569	754
	Corner Zone	483*	533	706	398*	439*	580	360*	398*	525	340*	375*	495
B2	Internal Zone	1059	1104	1238	977	1019	1142	936	977	1097	913	953	1071
	Intermediate Zone	888	927	1043	735	813	961	664	735	921	627	693	898
	Edge Zone	663	733	920	546	603	799	494	545	722	466*	515	681
	Corner Zone	437*	482*	638	360*	398*	525	326*	360*	475*	308*	340*	448*
C	Internal Zone	708	784	1045	581	643	855	525	581	771	495	548	727
	Intermediate Zone	464	513	680	382*	422	559	346*	382*	505	326*	360*	476
	Edge Zone	345*	381*	504	285*	314*	415	258*	284*	375*	243*	269*	354*
	Corner Zone	228*	252*	332*	188*	208*	274*	171*	188*	248*	161*	178*	234*
D	Internal Zone	455	503	667	375*	414	548	339*	374*	495	320*	353*	467
	Intermediate Zone	300*	331*	438	248*	273*	360*	224*	247*	326*	212*	234*	308*
	Edge Zone	224*	247*	326*	185*	204*	269*	167*	185*	243*	158*	174*	230*
	Corner Zone	148*	164*	215*	122*	135*	178*	111*	122*	161*	105*	116*	152*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.



ABN: 20 646 315 013
INFO@EBULENCONSULT.COM.AU
C307, LEVEL 3, 175 MAROONDAH HWY,
RINGWOOD, VIC 3134
0452 197 595

APPENDIX B2 - SPACING TABLES FOR PENETRATIVE SCREW (2.3M X 1.2M)

Maximum Panel Size: 2300mm x 1200mm														
Interface Spacing Table for Terrain Category 3, h/d ≤ 0.5 (Unit: mm)														
Wind Region	Height & Roof Pitch Roof Zone		H<5m			5m<H<10m			10m<H<15m			15m<H<20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone		1613	1710	1861	1613	1710	1861	1481	1567	1700	1387	1467	1587
	Intermediate Zone		1266	1337	1443	1266	1337	1443	1183	1233	1329	1130	1175	1248
	Edge Zone		1111	1156	1221	1111	1156	1221	1046	1089	1151	997	1039	1099
	Corner Zone		931	970	1027	931	970	1027	862	911	966	768	847	920
B1	Internal Zone		1285	1357	1466	1285	1357	1466	1196	1251	1349	1142	1188	1266
	Intermediate Zone		1068	1111	1174	1068	1111	1174	1005	1046	1107	957	998	1056
	Edge Zone		941	981	1038	941	981	1038	884	922	977	789	871	930
	Corner Zone		669	738	846	669	738	846	578	637	730	516	569	651
B2	Internal Zone		1217	1282	1383	1217	1282	1383	1148	1193	1275	1095	1140	1204
	Intermediate Zone		1023	1066	1127	1023	1066	1127	962	1003	1061	917	956	1012
	Edge Zone		901	939	995	901	939	995	799	881	935	712	785	891
	Corner Zone		604	666	764	604	666	764	523	576	659	467	514	588
C	Internal Zone		997	1084	1149	997	1084	1149	858	948	1079	763	843	970
	Intermediate Zone		646	713	819	646	713	819	558	615	706	497	548	629
	Edge Zone		478	526	603	478	526	603	413	455	521	369	406	465
	Corner Zone		314	345	395	314	345	395	272*	299*	342	243*	267*	306*
D	Internal Zone		633	699	803	633	699	803	547	603	692	487	537	616
	Intermediate Zone		414	456	523	414	456	523	358	395	452	320	353	403
	Edge Zone		308*	339	387	308*	339	387	267*	293*	335	238*	262*	300*
	Corner Zone		203*	223*	255*	203*	223*	255*	176*	194*	221*	158*	173*	198*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 2300mm x 1200mm														
Interface Spacing Table for Terrain Category 3, h/d ≥ 1 (Unit: mm)														
Wind Region	Height & Roof Pitch Roof Zone		H<5m			5m<H<10m			10m<H<15m			15m<H<20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone		1294	1370	1613	1294	1370	1613	1202	1263	1481	1148	1196	1387
	Intermediate Zone		1074	1119	1266	1074	1119	1266	1010	1054	1183	963	1005	1130
	Edge Zone		946	988	1111	946	988	1111	889	928	1046	799	884	997
	Corner Zone		678	750	931	678	750	931	586	648	862	523	578	768
B1	Internal Zone		1085	1131	1285	1085	1131	1285	1022	1065	1196	974	1016	1142
	Intermediate Zone		908	948	1068	908	948	1068	814	891	1005	725	803	957
	Edge Zone		696	771	941	696	771	941	602	666	884	537	594	789
	Corner Zone		457	505	669	457	505	669	395	437	578	353*	390	516
B2	Internal Zone		1040	1085	1217	1040	1085	1217	979	1021	1148	932	973	1095
	Intermediate Zone		851	908	1023	851	908	1023	734	813	962	655	725	917
	Edge Zone		629	696	901	629	696	901	543	601	799	485	536	712
	Corner Zone		413	456	604	413	456	604	358*	395	523	320*	353*	467
C	Internal Zone		672	745	997	672	745	997	580	643	858	517	573	763
	Intermediate Zone		439	486	646	439	486	646	380	420	558	340	375	497
	Edge Zone		326	361	478	326	361	478	283*	312	413	253*	279*	369
	Corner Zone		215*	238*	314	215*	238*	314	187*	206*	272*	167*	184*	243*
D	Internal Zone		431	476	633	431	476	633	373	412	547	333	368	487
	Intermediate Zone		283*	313	414	283*	313	414	246*	271*	358	220*	243*	320
	Edge Zone		211*	233*	308*	211*	233*	308*	183*	202*	267*	164*	181*	238*
	Corner Zone		140*	154*	203*	140*	154*	203*	121*	134*	176*	109*	120*	158*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 2300mm x 1200mm														
Interface Spacing Table for Terrain Category 2.5, h/d ≤ 0.5 (Unit: mm)														
Wind Region	Height & Roof Pitch Roof Zone		H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone		1522	1612	1750	1423	1505	1631	1337	1412	1527	1276	1347	1455
	Intermediate Zone		1206	1266	1365	1150	1196	1279	1100	1144	1208	1062	1106	1168
	Edge Zone		1067	1111	1174	1016	1058	1119	970	1011	1070	936	975	1033
	Corner Zone		892	930	985	804	885	938	719	793	894	660	728	835
B1	Internal Zone		1218	1284	1386	1163	1209	1298	1112	1157	1221	1074	1118	1181
	Intermediate Zone		1025	1067	1129	976	1017	1076	931	970	1027	898	936	992
	Edge Zone		902	941	996	826	895	948	738	815	905	678	748	858
	Corner Zone		606	668	766	540	595	681	484	533	610	445	490	561
B2	Internal Zone		1170	1216	1309	1116	1161	1227	1066	1110	1173	1029	1072	1133
	Intermediate Zone		982	1023	1082	935	974	1031	891	929	984	829	896	950
	Edge Zone		838	901	954	745	822	908	666	735	843	612	675	774
	Corner Zone		548	604	692	488	537	615	437	481	551	402	443	507
C	Internal Zone		901	996	1101	799	883	1016	713	788	906	655	723	831
	Intermediate Zone		585	645	741	520	574	658	466	513	588	428	472	540
	Edge Zone		433	477	547	386	425	486	346	381	436	318	350	400
	Corner Zone		285*	314	358	254*	279*	319	228*	251*	287*	210*	231*	264*
D	Internal Zone		573	632	726	510	562	645	457	503	577	420	462	530
	Intermediate Zone		376	414	474	335	369	422	300*	330	378	276*	304*	348
	Edge Zone		279*	307*	351	249*	274*	313	224*	246*	281*	206*	226*	259*
	Corner Zone		185*	203*	232*	165*	181*	207*	148*	163*	186*	136*	150*	171*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 2300mm x 1200mm														
Interface Spacing Table for Terrain Category 2.5, h/d ≥ 1 (Unit: mm)														
Wind Region	Height & Roof Pitch Roof Zone		H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
			Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone		1226	1296	1522	1169	1217	1423	1118	1165	1337	1080	1125	1276
	Intermediate Zone		1031	1075	1206	981	1024	1150	936	977	1100	903	943	1062
	Edge Zone		907	947	1067	836	901	1016	748	829	970	687	761	936
	Corner Zone		614	680	892	547	605	804	490	542	719	451	498	660
B1	Internal Zone		1042	1087	1218	992	1035	1163	947	988	1112	913	954	1074
	Intermediate Zone		854	909	1025	759	840	976	679	752	931	624	690	898
	Edge Zone		631	698	902	561	621	826	503	556	738	463	511	678
	Corner Zone		414	458	606	369*	408	540	331*	366*	484	305*	337*	445
B2	Internal Zone		998	1042	1170	950	992	1116	907	947	1066	862	913	1029
	Intermediate Zone		770	853	982	685	758	935	613	678	891	563	623	829
	Edge Zone		570	630	838	507	561	745	455	503	666	418	462	612
	Corner Zone		375*	414	548	334*	369*	488	300*	331*	437	276*	305*	402
C	Internal Zone		609	674	901	541	599	799	484	536	713	445	493	655
	Intermediate Zone		398	441	585	355	392	520	318	352	466	293*	324	428
	Edge Zone		296*	327	433	264*	292*	386	237*	262*	346	218*	241*	318
	Corner Zone		196*	216*	285*	175*	193*	254*	157*	173*	228*	144*	159*	210*
D	Internal Zone		391	432	573	348	385	510	312	345	457	287*	317	420
	Intermediate Zone		257*	284*	376	230*	253*	335	206*	227*	300*	190*	209*	276*
	Edge Zone		192*	212*	279*	171*	189*	249*	154*	170*	224*	142*	156*	206*
	Corner Zone		127*	140*	185*	113*	125*	165*	102*	112*	148*	94*	103*	136*

- NOTES:
- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
 - Definition of Terrain Category is given in General Note 1.
 - Notion of Roof Zone is given in General Note 2.
 - The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
 - The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 2300mm x 1200mm													
Interface Spacing Table for Terrain Category 2, h/d ≤ 0.5 (Unit: mm)													
Wind Region	Height & Roof Pitch Roof Zone	H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
		Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone	1442	1525	1653	1291	1363	1472	1220	1287	1389	1192	1246	1344
	Intermediate Zone	1161	1207	1295	1071	1115	1178	1027	1069	1131	1002	1043	1104
	Edge Zone	1026	1068	1130	944	984	1042	904	942	998	879	919	974
	Corner Zone	823	894	947	674	744	853	609	671	770	574	633	725
B1	Internal Zone	1174	1220	1315	1083	1127	1191	1038	1081	1143	1013	1055	1116
	Intermediate Zone	985	1026	1086	906	945	1000	846	904	958	797	880	935
	Edge Zone	845	904	958	693	764	876	625	689	790	590	650	745
	Corner Zone	552	608	697	454	500	572	411	452	517	388	427	488
B2	Internal Zone	1126	1171	1243	1038	1081	1143	995	1036	1096	970	1011	1070
	Intermediate Zone	944	983	1041	846	904	958	763	842	918	719	793	895
	Edge Zone	762	841	917	625	689	790	565	622	713	533	587	672
	Corner Zone	499	550	629	411	452	517	371*	409	468	351*	386	441
C	Internal Zone	818	904	1041	669	738	849	603	666	764	569	627	720
	Intermediate Zone	532	587	673	437	482	552	395	435	498	373	410	470
	Edge Zone	394	434	497	325	357	409	294*	323	370	277*	305*	349
	Corner Zone	260*	286*	327	214*	236*	269*	194*	213*	244*	183*	201*	230*
D	Internal Zone	522	575	660	429	472	541	387	427	488	365	402	461
	Intermediate Zone	342	377	431	282*	310	355	255*	281*	321	241*	265*	303*
	Edge Zone	255*	280*	320	210*	231*	264*	190*	209*	239*	180*	197*	225*
	Corner Zone	168*	185*	211*	139*	153*	174*	126*	138*	158*	119*	131*	149*

NOTES:

- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
- Definition of Terrain Category is given in General Note 1.
- Notion of Roof Zone is given in General Note 2.
- The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
- The spacing table is based on the fixing condition specified in General Note 7.

Maximum Panel Size: 2300mm x 1200mm													
Interface Spacing Table for Terrain Category 2, h/d ≥ 1 (Unit: mm)													
Wind Region	Height & Roof Pitch Roof Zone	H<5m			5m<H<10m			10m<H≤15m			15m<H≤20m		
		Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°	Φ < 10°	10° ≤ Φ ≤ 25°	Φ > 25°
A	Internal Zone	1180	1231	1442	1089	1135	1291	1044	1088	1220	1018	1062	1192
	Intermediate Zone	991	1034	1161	911	951	1071	857	911	1027	808	888	1002
	Edge Zone	856	910	1026	702	777	944	633	701	904	597	661	879
	Corner Zone	559	619	823	460	509	674	416	460	609	393	434	574
B1	Internal Zone	1002	1045	1174	922	962	1083	881	921	1038	830	898	1013
	Intermediate Zone	776	860	985	637	705	906	575	636	846	542	600	797
	Edge Zone	574	635	845	472	522	693	427	472	625	403	445	590
	Corner Zone	378*	417	552	311*	344*	454	282*	311*	411	266*	294*	388
B2	Internal Zone	960	1001	1126	881	921	1038	794	880	995	748	829	970
	Intermediate Zone	701	776	944	575	636	846	520	575	763	490	542	719
	Edge Zone	519	574	762	427	472	625	386	427	565	364*	403	533
	Corner Zone	342*	377*	499	282*	311*	411	255*	281*	371*	241*	266*	351*
C	Internal Zone	554	613	818	455	503	669	411	454	603	388	428	569
	Intermediate Zone	363	401	532	299*	330	437	270*	299*	395	255*	282*	373
	Edge Zone	270*	298*	394	223*	246*	325	202*	222*	294*	190*	210*	277*
	Corner Zone	178*	197*	260*	147*	163*	214*	133*	147*	194*	126*	139*	183*
D	Internal Zone	356	393	522	293*	324	429	265*	293*	387	250*	276*	365
	Intermediate Zone	235*	259*	342	194*	214*	282*	175*	193*	255*	166*	183*	241*
	Edge Zone	175*	193*	255*	144*	159*	210*	131*	144*	190*	124*	136*	180*
	Corner Zone	116*	128*	168*	96*	106*	139*	87*	96*	126*	82*	90*	119*

NOTES:

- * denotes the situations where the wind load is more than 5KPa and the installation safety is compromised.
- Definition of Terrain Category is given in General Note 1.
- Notion of Roof Zone is given in General Note 2.
- The Roof pitch angle is given in reference to horizontal. The value of Φ shall be determined and measured by following the figure in Note 3
- The spacing table is based on the fixing condition specified in General Note 7.

General Notes

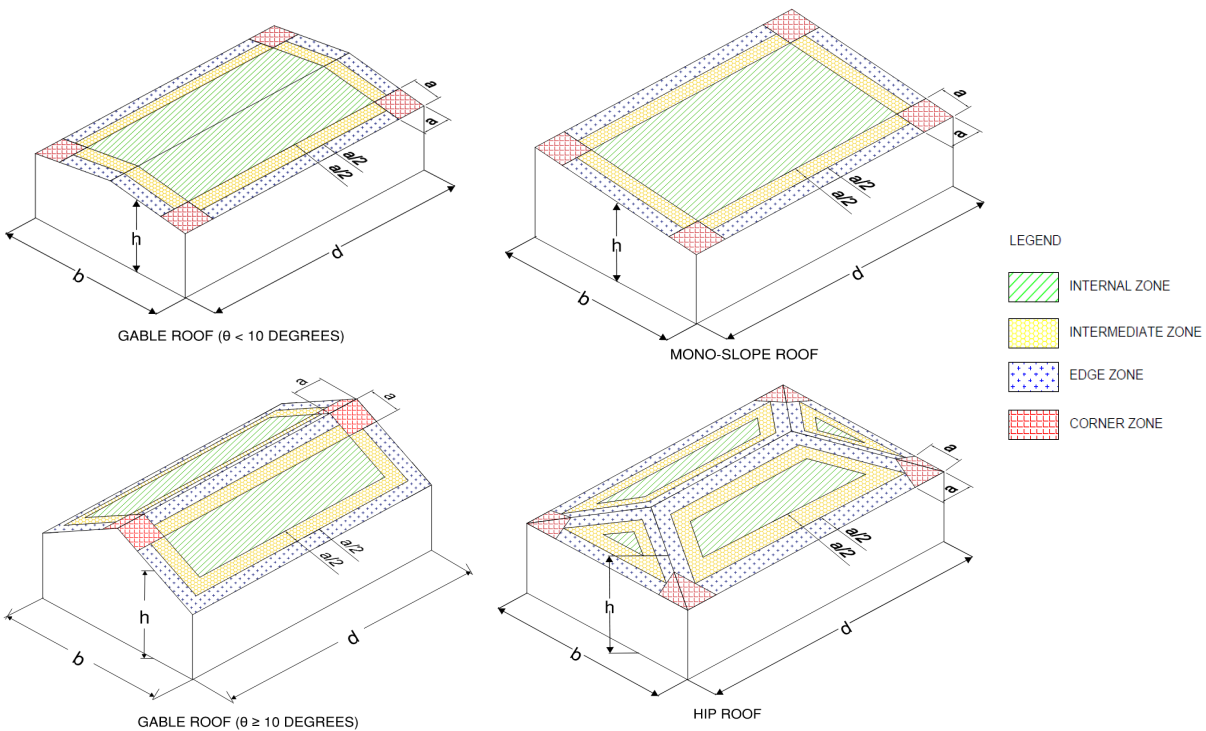
Note 1 Terrain Category 3 (TC 3) denotes terrain with numerous closely spaced obstructions having heights generally from 3m to 10m. The minimum density of obstructions shall be at least the equivalent of 10 house-size obstructions per hectare.

Terrain Category 2.5 (TC 2.5) denotes terrain with some trees or isolated obstructions, terrain in developing outer urban areas with scattered houses, or large acreage developments with more than two and less than 10 buildings per hectare.

Terrain Category 2 (TC 2) denotes open terrain, including grassland, with well-scattered obstructions having heights generally from 1.5m to 5m, with no more than two obstructions per hectare.

Refer to AS/NZS 1170.2:2021 - 4.2.1 for Terrain Category definitions.

Note 2 Notion of Roof Zone examples are shown in the following figures. (Note: As specified by Antai Technology Co., Ltd., this certificate is limited to 4-zone scenario only and it is not applicable for 2-zone scenarios. Refer to AS/NZS 1170.2:2021 section B6.1 for 2 zone scenario)



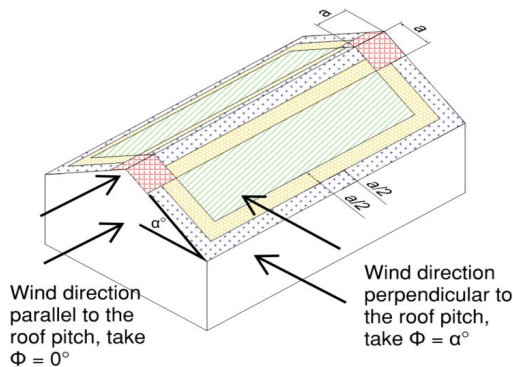
Refer to AS/NZS 1170.2:2021 – Chapter 5.4.4 for more accurate Roof Zone notion and cases.

To determine the zone dimension "a", follow the steps:

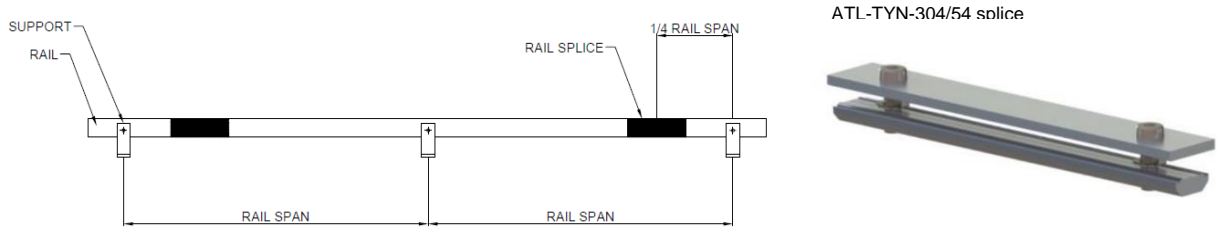
- 1) Determine building height (h), building length (b) and building width (d).
- 2) Determine (h/d) and (h/b)
- 3) If (h/b) or (h/d) ≥ 0.2 , a is the minimum of 0.2b or 0.2d
- 4) If (h/b) and (h/d) < 0.2 , a is equal to 2h

Note: "h" represents the average roof height. Average roof height = (pitch height - gutter height)/2

Note 3 The pitch angle Φ in the spacing table shall be determined based on the wind direction and the roof pitch angle by following the figure illustration below.



Note 4 To ensure the fixing spacing in above tables are valid, rail splice connectors must not be installed at the support point or at the middle span point between two adjacent supports. It is recommended to install the connector at 1/4 span points from the supports. The rail splice can only be the two separated components with the code name ATL-TYN-304/54, which are fixed both inside and outside of the rail at the connection point as shown below. Other types of rail splices are not covered by this certification.



Note 5 Number of panel clamps required per panel for installation:

		TC3			TC2.5			TC2		
		H≤10m	10m<H≤15m	15m<H≤20m	H≤10m	10m<H≤15m	15m<H≤20m	H≤10m	10m<H≤15m	15m<H≤20m
Region A	Internal	4	4	4	4	4	4	4	4	4
	Intermediate	4	4	4	4	4	4	4	4	4
	Edge	4	4	4	4	4	4	4	6	6
	Corner	4	6	6	6	6	6	6	8	8
Region B1&B2	Internal	4	4	4	4	4	4	4	4	4
	Intermediate	4	4	4	4	4	6	6	6	6
	Edge	6	6	6	6	6	8	8	8	8
Region C	Internal	4	4	4	4	4	6	6	6	6
	Intermediate	6	6	6	6	6	8	8	8	8
	Edge	6	8	8	8	8	10	10	10	10
	Corner	10	10	NA	NA	NA	NA	NA	NA	NA
Region D	Internal	6	6	6	6	6	8	8	8	8
	Intermediate	8	8	10	8	10	10	10	NA	NA
	Edge	10	10	NA	NA	NA	NA	NA	NA	NA
	Corner	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1. NA denotes the situations where an excessive amount of panel clamps are required and the installation is no longer practical.
2. A site-specific engineering assessment must be carried out to determine the number of panel clamps required for situations not covered in this table.

Note 6 The provided installation spacing tables are based on maximum PV panel size of 2300mm x 1200mm with 2 rails per panel array. For other panel sizes and more rails, refer the below table for adjustment factors based on the given spacing tables for 2300mm x 1200mm.

Maximum Panel Size	Number of Rails	Spacing Adjustment Factor
2300x1200	3 rails	118%
2300x1200	4 rails	131%
2100x1100	2 rails	104%
2100x1100	3 rails	123%
2100x1100	4 rails	138%
2000x1100	2 rails	105%
2000x1100	3 rails	124%
2000x1100	4 rails	140%
1700x1100	2 rails	113%
1700x1100	3 rails	132%
1700x1100	4 rails	152%

Note: The maximum allowable fixing spacing shall not exceed 2000mm after applying the adjustment factors.

Note 7 Fixing spacing in the above tables are based on 1 x 14 gauge penetrative screw fixing pull-out capacity into 1.9BMT steel and 35mm embedded into JD4 seasoned timber. The fixing spacing must be adjusted if the roof structure being fixed into a different substructure. Minimum 2 screw fixings are required for each tile hook bracket. The recommended typical penetrative fixings to be adopted are as following:

Steel purlin/batten	-	14g-10TPI Self-drilling Tek Metal Screw (Buildex recommended)
Timber purlin/batten	-	14g-10TPI Self-drilling T17s Timber Screw (Buildex recommended)

Larger diameter new screws (14 gauge typical) shall be used for solar installation to replace the old roof screws (12 gauge typical). All self-drilling penetrative fixing must be in compliance with AS3566-2002 (R2015).

For fixing into steel roof structure with different thicknesses, refer below for adjustment factors based on the given spacing tables.

- 1) 1.2mm BMT: 63%
- 2) 1.5mm BMT: 79%
- 3) 2.4mm BMT: 100% for region A and B, 126% for region C and D

When installing on concrete roof, adopt concrete chemical or mechanical anchor as per the anchor manufacturer's specifications. The recommended concrete fixing anchors are as below:

- Chemical anchor - M8/M10 G5.8 galvanised anchor stud with Chemset Reo502 PLUS or approved equivalent; Minimum embedment depth 70mm
- Mechanical anchor - M8/M10 DynaBolt PLUS DP08065SS or DP10075GH or approved equivalent; Minimum embedment depth 35mm/45mm

For fixing into concrete roofs, refer below for adjustment factors based on the given spacing tables. 100% for Region A&B; 154% for Region C&D

Note 8 Linear interpolation can be used for determining the spacing values between $h/d > 0.5$ and $h/d < 1$:

Example for $h/d=0.75$:

1. Find fixing spacing **S1** from " $h/d > 1$ " table
2. Find fixing spacing **S2** from " $h/d < 0.5$ " table
3. **Final Fixing Spacing for $h/d=0.75$:**

$$= S1 + \frac{0.75-0.5}{1-0.5} \times (S2 - S1)$$

Note: Linear interpolation can only be used between tables with the same Terrain Category and Roof Zone.

Note 9

	Adjustment factor based on Corrosivity Category C3
Corrosivity Category C4	95%
Corrosivity Category C5	80%

Note 10

All above-mentioned adjustment factors from different notes shall not be applied together to determine the final installation spacing. Factors from each note shall be applied independently. For example, when installing the racking frame with 2300mm x 1200mm panels and 3 rails fixed to 2.4mm BMT purlins in Region C, it is incorrect that spacing = original spacing x 122% x 126%. For multiple installation conditions change, please seek for the engineer's advice.