

     	 <p>STRUCTURAL ENGINEERS NSW VIC QLD WA TAS </p>
<p>DESIGNDEVISE DesignDevise Pty Ltd ABN 40 651 752 260</p>	<p>Level 3, 480 Collins St. MELBOURNE VIC 3000 vic@ddl.com.au</p>
<p>STRUCTURAL CERTIFICATE</p>	

Ref: DD-231246-CERT-C1

13 November 2023

Schletter Australia Pty Ltd
Unit 4, 27 Williamson Road
INGLEBURN NSW 2565

RE: SPAN TABLES FOR SCHLETTER'S KLIPOK EMU FASTENERS

This is to certify that DesignDevise (**DD**) have calculated the span tables for Schletter's high strength (product no. 112012-127) and classic (product no. 112012-117) kliplik EMU fasteners for flush mount solar panels installation over hip and gable roofs of any size.

The span tables are documented in the following drawings (Refer **Appendix A**):

- DD-231246-ST-C1, Sheets S01 to S02, Rev. C1, dated 13.11.2023.

DD confirms that the spans have been calculated using accepted engineering principles and in accordance with the requirements of the following Australian Standards and Specifications:

- AS/NZS 1170.0: 2002 Structural Design Actions – Part 0: General Principles;
- AS/NZS 1170.1: 2002 Structural Design Actions – Part 1: Permanent, Imposed and other Actions;
- AS/NZS 1170.2: 2021 Structural Design Actions – Part 2: Wind Actions;
- AS/NZS 1664.1: 1997 Aluminium Structures - Limit State Design.

Proprietary products, parameters, limitations, and assumptions used to calculate spans are listed in the above-mentioned drawings.

Yours faithfully

RANA WASEEM

Principal Structural Engineer



CPEng MIEAust NER: 5737360 (Structural)
Professional Engineer (NSW) PRE0001775 (Civil/Structural)
Design Practitioner (NSW) DEP0003296 (Structural)
BLA (VIC): PE0002622 (Civil)
RPEQ (QLD): 24524 (Structural)

Enc:

- Appendix A – Span Table Drawing

						
DESIGNDEVISE DesignDevise Pty Ltd ABN 40 651 752 260		Level 3, 480 Collins St. MELBOURNE VIC 3000 vic@ddl.com.au			STRUCTURAL ENGINEERS NSW VIC QLD WA TAS	
STRUCTURAL CERTIFICATE						

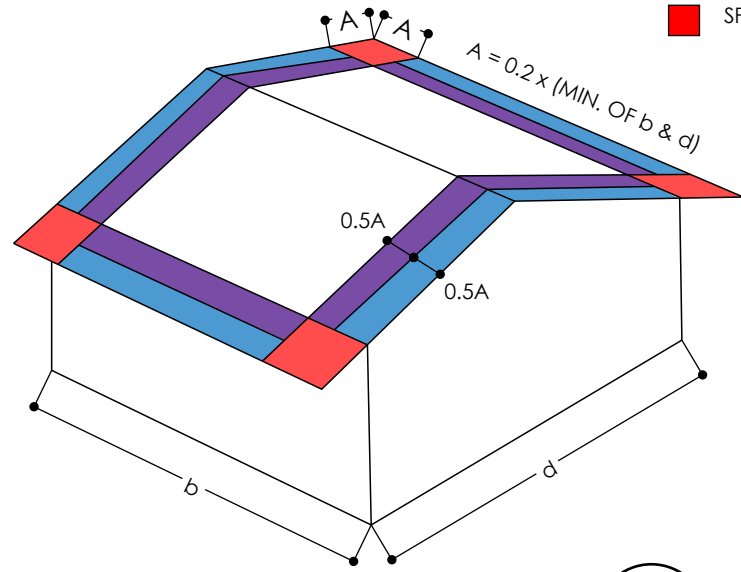
Appendix A

Span Table Drawing

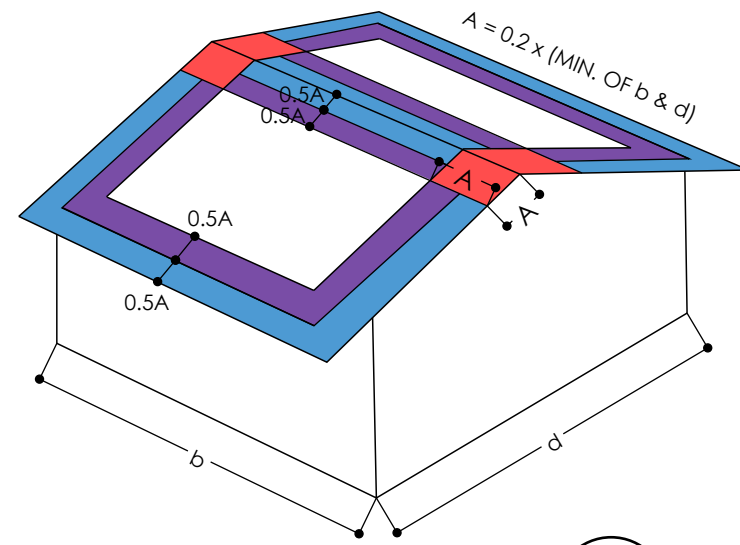
GABLE ROOF ZONES

LEGEND

- INTERIOR ZONE (UNHATCHED)
- INTERMEDIATE ZONES
SPACING = INTERIOR ZONE SPACING / 1.5
- EDGE ZONES
SPACING = INTERIOR ZONE SPACING / 2.0
- CORNER ZONES
SPACING = INTERIOR ZONE SPACING / 3.0



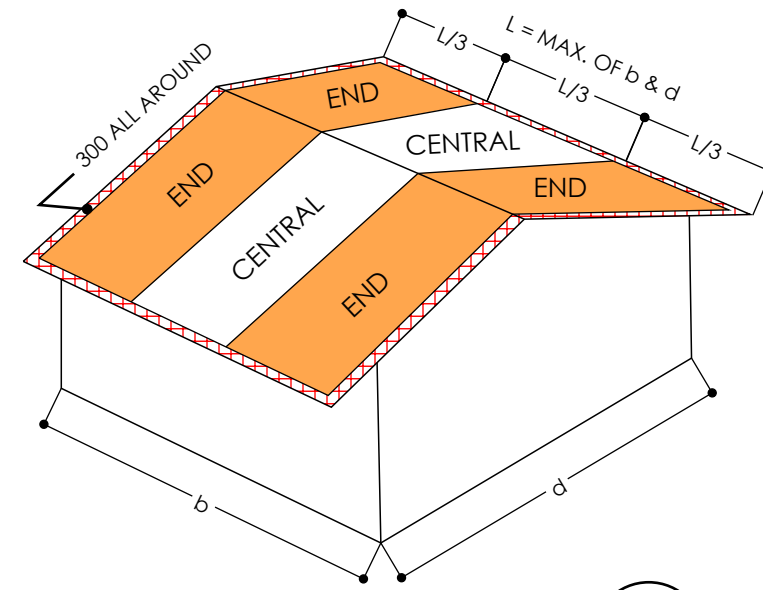
GABLE ROOF ZONES - PITCH < 10°
WHEN ANY OF h/b OR h/d > 0.50



GABLE ROOF ZONES - PITCH ≥ 10°
WHEN ANY OF h/b OR h/d > 0.50

LEGEND

- CENTRAL ZONE (UNHATCHED)
- END ZONES
- EXCLUSION ZONE (DO NOT INSTALL PANELS)



GABLE ROOF ZONES - ANY PITCH
WHEN BOTH h/b & h/d ≤ 0.5

GENERAL NOTES

1. THESE DRAWINGS PROVIDE THE GENERAL SPAN TABLES FOR SCHLETTER'S KLIPLOK EMU FASTENERS FOR BOTH THE:
 - HIGH STRENGTH KLIPLOK FASTENERS (PRODUCT NO. 112012-127 FOR LYSAGHT HI-STRENGTH@ 700 0.48BMT) AND THE
 - CLASSIC KLIPLOK FASTENERS (PRODUCT NO. 112012-117 FOR LYSAGHT CLASSIC 700@ 0.48BMT)
- FOR FLUSH MOUNT SOLAR PANELS INSTALLATION APPLICATION WITH BUILDINGS LOCATED ON FLAT TERRAINS, WITH OTHER LIMITATIONS LISTED BELOW
2. ALL SPANS ARE IN mm, HEIGHTS IN m, ROOF PITCH IN DEGREES
3. SCHLETTER'S RAILS AND FASTENERS CAPACITIES CALCULATED BASED ON THE SECTION PROPERTIES AND TEST REPORTS PROVIDED BY SCHLETTER
4. FIXINGS CAPACITY BASED ON FIXINGS MANUFACTURER DATA BROCHURES
5. DESIGNDEVISE (DD) HAVE NOT INDEPENDENTLY VERIFIED THE ACCURACY OF THE ABOVE-MENTIONED PROPERTIES AND CAPACITIES
6. BUILDING ROOF INCLUDING METAL SHEET, TOP-HATS/PURLINS, RAFTERS ETC. AND STRUCTURE TO BE CHECKED BY OTHERS FOR ADEQUACY AGAINST THE SOLAR PANEL AND ASSOCIATED WIND LOADS.
7. SOLAR PANELS STRUCTURAL CAPACITIES BY OTHERS
8. ALL COMPONENTS TO BE INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS
9. SITE SPECIFIC CERTIFICATIONS BY OTHERS
10. IT IS ASSUMED THE USERS OF THESE DRAWINGS HAVE SUFFICIENT ENGINEERING KNOWLEDGE TO INTERPRET AND APPLY THESE SPAN TABLES AND LIMITATIONS
11. ROOF ZONING REQUIREMENTS MUST BE FOLLOWED AS DETAILED ON THIS DRAWING
12. LINEAR INTERPOLATIONS FOR TABLE VALUES ARE ALLOWED

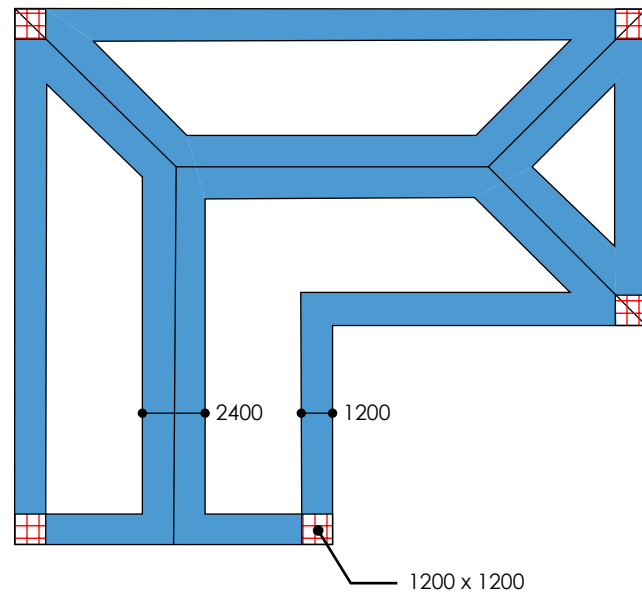
DESIGN CRITERIA

1. WIND PARAMETERS IN ACCORDANCE WITH AS1170.2-2021:
 - FLUSH MOUNTED SOLAR PANELS (PARALLEL TO PITCH)
 - GAP BETWEEN TOP OF ROOF AND UNDER-SIDE OF PANELS TO BE 50mm TO 150mm
 - IMPORTANCE LEVEL 2
 - TERRAIN CATEGORIES 2, 2.5 AND 3 ONLY
 - Ms, Mt, Md, Mc FACTORS TAKEN AS 1.0
 - DESIGN LIFE 25-YEARS
 - ANNUAL PROBABILITY OF EXCEEDANCE FOR ULTIMATE WIND LOADS 200-YEARS
 - MEAN ROOF HEIGHT FROM ROAD LEVEL UP TO 30m
 - ANY BUILDING WIDTH (b) AND BUILDING DEPTH (d)
 - HIP AND GABLE ROOFS WITH PITCHES UP TO 30°
2. A MINIMUM OF 12kg/m² IS CONSIDERED FOR THE SOLAR PANELS, RAILS AND FIXINGS SELF-WEIGHT AGAINST THE UPLIFT. NO OTHER DEAD LOADS CONSIDERED
3. ULTIMATE LOAD COMBINATION OF 0.90 DEAD LOADS + 1.0 ULTIMATE WIND LOADS IS CONSIDERED
4. WATER PONDING, SEISMIC, SNOW, HAIL LOADING AND CORROSION EXCLUDED. PERMANENT WORKS STRUCTURAL ENGINEER TO CONFIRM

HIP ROOF ZONES (RESIDENTIAL)

LEGEND

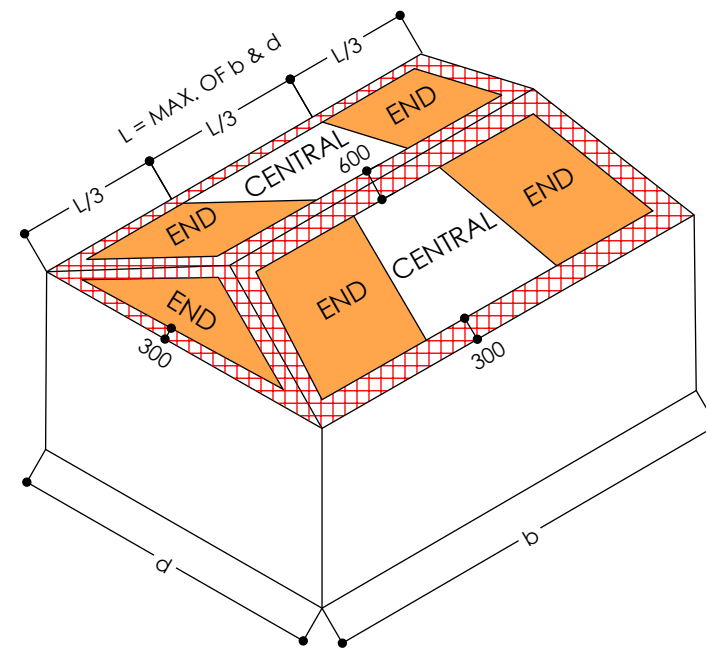
- CENTRAL ZONE (UNHATCHED)
- END ZONES
- EXCLUSION ZONE (DO NOT INSTALL PANELS)



HIP ROOF ZONES
WHEN ANY OF h/b OR h/d > 0.50

LEGEND

- INTERIOR ZONE (UNHATCHED)
- EDGE ZONES
SPACING = INTERIOR ZONE SPACING / 2.0
- EXCLUSION ZONE (DO NOT INSTALL PANELS)



HIP ROOF ZONES
WHEN BOTH h/b & h/d ≤ 0.5

PRINT IN COLOUR

- WHITE
- BLUE
- VIOLET
- RED

CLIENT	SCHLETTER GROUP
PROJECT	KLIPLOK EMU FASTENERS
231246	SPAN TABLES

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DESIGNER - **AA**
APPROVED - **RW**
SCALE - NTS - A3

C1	ISSUED FOR CONSTRUCTION	RW	13.11.23
REV	DESCRIPTION	APP'D	DATE

STATUS - **ISSUED FOR CONSTRUCTION**

DRAWING NUMBER & TITLE - **S01 - NOTES & ROOF ZONES**

COLOUR NAMES

REV
C1

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WIND REGION	REGION	PITCH	WIND REGION A - KLIPOK FASTENERS SPAN TABLE								
			H	h/d & h/b	ZONE	PRO 35		PRO 50			
						ON-FURLIN	OFF-FURLIN	ON-FURLIN	OFF-FURLIN		
6000-5F	TC3	5000-5F	0 to 5m	h/d & h/b ≤ 0.5	ENDS 1,141	595	1,141	595			
				h/d & h/b > 0.5	CENTRAL 1,408	735	1,408	735			
			>5m to 10m	h/d & h/b ≤ 0.5	ENDS 933	487	933	487			
				h/d & h/b > 0.5	CENTRAL 1,148	599	1,148	599			
			>10m to 15m	h/d & h/b ≤ 0.5	ENDS 842	439	842	439			
				h/d & h/b > 0.5	CENTRAL 1,034	540	1,034	540			
			>15m to 20m	h/d & h/b ≤ 0.5	ENDS 1,290	637	1,290	637			
				h/d & h/b > 0.5	CENTRAL 974	508	974	508			
			>20m to 30m	h/d & h/b ≤ 0.5	ENDS 1,148	599	1,148	599			
				h/d & h/b > 0.5	CENTRAL 902	470	902	470			
			6000-5F	TC2	5000-5F	0 to 5m	h/d & h/b ≤ 0.5	ENDS 1,062	554	1,062	554
							h/d & h/b > 0.5	CENTRAL 1,339	669	1,339	669
>5m to 10m	h/d & h/b ≤ 0.5	ENDS 932				487	932	487			
	h/d & h/b > 0.5	CENTRAL 1,355				707	1,355	707			
>10m to 15m	h/d & h/b ≤ 0.5	ENDS 841				439	841	439			
	h/d & h/b > 0.5	CENTRAL 1,219				636	1,219	636			
>15m to 20m	h/d & h/b ≤ 0.5	ENDS 1,193				614	1,193	614			
	h/d & h/b > 0.5	CENTRAL 1,147				599	1,147	599			
>20m to 30m	h/d & h/b ≤ 0.5	ENDS 734				383	734	383			
	h/d & h/b > 0.5	CENTRAL 1,147				599	1,147	599			
6000-5F	TC1	5000-5F				0 to 5m	h/d & h/b ≤ 0.5	ENDS 1,130	590	1,130	590
							h/d & h/b > 0.5	CENTRAL 1,291	669	1,291	669
			>5m to 10m	h/d & h/b ≤ 0.5	ENDS 926	483	926	483			
				h/d & h/b > 0.5	CENTRAL 1,341	699	1,341	699			
			>10m to 15m	h/d & h/b ≤ 0.5	ENDS 1,524	852	1,524	852			
				h/d & h/b > 0.5	CENTRAL 1,208	630	1,208	630			
			>15m to 20m	h/d & h/b ≤ 0.5	ENDS 1,446	766	1,446	766			
				h/d & h/b > 0.5	CENTRAL 1,137	593	1,137	593			
			>20m to 30m	h/d & h/b ≤ 0.5	ENDS 730	381	730	381			
				h/d & h/b > 0.5	CENTRAL 1,053	549	1,053	549			
			6000-5F	TC2	5000-5F	0 to 5m	h/d & h/b ≤ 0.5	ENDS 1,278	647	1,278	647
							h/d & h/b > 0.5	CENTRAL 1,251	636	1,251	636
>5m to 10m	h/d & h/b ≤ 0.5	ENDS 1,619				962	1,619	962			
	h/d & h/b > 0.5	CENTRAL 1,619				962	1,619	962			
>10m to 15m	h/d & h/b ≤ 0.5	ENDS 1,115				582	1,115	582			
	h/d & h/b > 0.5	CENTRAL 1,522				849	1,522	849			
>15m to 20m	h/d & h/b ≤ 0.5	ENDS 1,522				849	1,522	849			
	h/d & h/b > 0.5	CENTRAL 996				519	996	519			
>20m to 30m	h/d & h/b ≤ 0.5	ENDS 1,436				756	1,436	756			
	h/d & h/b > 0.5	CENTRAL 1,436				756	1,436	756			
6000-5F	TC3	5000-5F				0 to 5m	h/d & h/b ≤ 0.5	ENDS 914	477	914	477
							h/d & h/b > 0.5	CENTRAL 1,327	692	1,327	692
			>5m to 10m	h/d & h/b ≤ 0.5	ENDS 1,195	624	1,195	624			
				h/d & h/b > 0.5	CENTRAL 1,195	624	1,195	624			
			>10m to 15m	h/d & h/b ≤ 0.5	ENDS 1,256	655	1,256	655			
				h/d & h/b > 0.5	CENTRAL 1,418	761	1,418	761			
			>15m to 20m	h/d & h/b ≤ 0.5	ENDS 1,618	961	1,618	961			
				h/d & h/b > 0.5	CENTRAL 1,521	848	1,521	848			
			>20m to 30m	h/d & h/b ≤ 0.5	ENDS 945	519	945	519			
				h/d & h/b > 0.5	CENTRAL 1,435	755	1,435	755			
			6000-5F	TC2	5000-5F	0 to 5m	h/d & h/b ≤ 0.5	ENDS 1,435	755	1,435	755
							h/d & h/b > 0.5	CENTRAL 913	474	913	474
>5m to 10m	h/d & h/b ≤ 0.5	ENDS 1,326				692	1,326	692			
	h/d & h/b > 0.5	CENTRAL 1,326				692	1,326	692			
>10m to 15m	h/d & h/b ≤ 0.5	ENDS 824				430	824	430			
	h/d & h/b > 0.5	CENTRAL 1,194				623	1,194	623			
>15m to 20m	h/d & h/b ≤ 0.5	ENDS 1,194				623	1,194	623			
	h/d & h/b > 0.5	CENTRAL 1,244				649	1,244	649			
>20m to 30m	h/d & h/b ≤ 0.5	ENDS 1,607				947	1,607	947			
	h/d & h/b > 0.5	CENTRAL 1,279				1,160	1,279	1,160			
6000-5F	TC1	5000-5F				0 to 5m	h/d & h/b ≤ 0.5	ENDS 1,104	576	1,104	576
							h/d & h/b > 0.5	CENTRAL 1,511	838	1,511	838
			>5m to 10m	h/d & h/b ≤ 0.5	ENDS 1,671	1,024	1,671	1,024			
				h/d & h/b > 0.5	CENTRAL 987	515	987	515			
			>10m to 15m	h/d & h/b ≤ 0.5	ENDS 1,427	747	1,427	747			
				h/d & h/b > 0.5	CENTRAL 1,576	911	1,576	911			
			>15m to 20m	h/d & h/b ≤ 0.5	ENDS 907	473	907	473			
				h/d & h/b > 0.5	CENTRAL 1,312	685	1,312	685			
			>20m to 30m	h/d & h/b ≤ 0.5	ENDS 1,508	834	1,508	834			
				h/d & h/b > 0.5	CENTRAL 819	427	819	427			
			6000-5F	TC2	5000-5F	0 to 5m	h/d & h/b ≤ 0.5	ENDS 1,183	617	1,183	617
							h/d & h/b > 0.5	CENTRAL 1,431	761	1,431	761
>5m to 10m	h/d & h/b ≤ 0.5	ENDS 1,393				727	1,393	727			
	h/d & h/b > 0.5	CENTRAL 1,708				1,070	1,708	1,070			
>10m to 15m	h/d & h/b ≤ 0.5	ENDS 1,708				1,070	1,708	1,070			
	h/d & h/b > 0.5	CENTRAL 1,708				1,070	1,708	1,070			
>15m to 20m	h/d & h/b ≤ 0.5	ENDS 1,579				914	1,579	914			
	h/d & h/b > 0.5	CENTRAL 1,579				914	1,579	914			
>20m to 30m	h/d & h/b ≤ 0.5	ENDS 1,065				555	1,065	555			
	h/d & h/b > 0.5	CENTRAL 1,486				810	1,486	810			
6000-5F	TC3	5000-5F				0 to 5m	h/d & h/b ≤ 0.5	ENDS 1,486	810	1,486	810
							h/d & h/b > 0.5	CENTRAL 933	487	933	487
			>5m to 10m	h/d & h/b ≤ 0.5	ENDS 1,356	708	1,356	708			
				h/d & h/b > 0.5	CENTRAL 1,356	708	1,356	708			
			>10m to 15m	h/d & h/b ≤ 0.5	ENDS 1,706	1,068	1,706	1,068			
				h/d & h/b > 0.5	CENTRAL 1,391	726	1,391	726			
			>15m to 20m	h/d & h/b ≤ 0.5	ENDS 1,706	1,068	1,706	1,068			
				h/d & h/b > 0.5	CENTRAL 1,706	1,068	1,706	1,068			
			>20m to 30m	h/d & h/b ≤ 0.5	ENDS 1,196	624	1,196	624			
				h/d & h/b > 0.5	CENTRAL 1,578	913	1,578	913			
			6000-5F	TC2	5000-5F	0 to 5m	h/d & h/b ≤ 0.5	ENDS 1,064	555	1,064	555
							h/d & h/b > 0.5	CENTRAL 1,485	809	1,485	809
>5m to 10m	h/d & h/b ≤ 0.5	ENDS 1,485				809	1,485	809			
	h/d & h/b > 0.5	CENTRAL 1,355				707	1,355	707			
>10m to 15m	h/d & h/b ≤ 0.5	ENDS 1,376				718	1,376	718			
	h/d & h/b > 0.5	CENTRAL 1,376				718	1,376	718			
>15m to 20m	h/d & h/b ≤ 0.5	ENDS 1,876				1,091	1,876	1,091			
	h/d & h/b > 0.5	CENTRAL 1,876				1,091	1,876	1,091			
>20m to 30m	h/d & h/b ≤ 0.5	ENDS 1,376				718	1,376	718			
	h/d & h/b > 0.5	CENTRAL 1,493				1,051	1,493	1,051			
6000-5F	TC1	5000-5F				0 to 5m	h/d & h/b ≤ 0.5	ENDS 1,876	1,091	1,876	1,091
							h/d & h/b > 0.5	CENTRAL 1,876	1,091	1,876	1,091
			>5m to 10m	h/d & h/b ≤ 0.5	ENDS 1,185	618	1,185	618			
				h/d & h/b > 0.5	CENTRAL 1,567	901	1,567	901			
			>10m to 15m	h/d & h/b ≤ 0.5	ENDS 1,734	1,103	1,734	1,103			
				h/d & h/b > 0.5	CENTRAL 1,065	550	1,065	550			
			>15m to 20m	h/d & h/b ≤ 0.5	ENDS 1,477	800	1,477	800			
				h/d & h/b > 0.5	CENTRAL 1,632	976	1,632	976			
			>20m to 30m	h/d & h/b ≤ 0.5	ENDS 926	483	926	483			
				h/d & h/b > 0.5	CENTRAL 1,341	699	1,341	699			

WIND REGION	REGION	PITCH	WIND REGION B - KLIPOK FASTENERS SPAN TABLE								
			H	h/d & h/b	ZONE	PRO 35		PRO 50			
						ON-FURLIN	OFF-FURLIN	ON-FURLIN	OFF-FURLIN		
6000-5F	TC3	5000-5F	0 to 5m	h/d & h/b ≤ 0.5	ENDS 762	398	762	398			
				h/d & h/b > 0.5	CENTRAL 936	488	936	488			
			>5m to 10m	h/d & h/b ≤ 0.5	ENDS 1,103	575	1,103	575			
				h/d & h/b > 0.5	CENTRAL 626	327	626	327			
			>10m to 15m	h/d & h/b ≤ 0.5	ENDS 1,148	599	1,148	599			
				h/d & h/b > 0.5	CENTRAL 902	471	902	471			
			>15m to 20m	h/d & h/b ≤ 0.5	ENDS 566	295	566	295			
				h/d & h/b > 0.5	CENTRAL 692	361	692	361			
			>20m to 30m	h/d & h/b ≤ 0.5	ENDS 534	278	534	278			
				h/d & h/b > 0.5	CENTRAL 653	341	653	341			
			6000-5F	TC2	5000-5F	0 to 5m	h/d & h/b ≤ 0.5	ENDS 762	398	762	398
							h/d & h/b > 0.5	CENTRAL 1,102	575	1,102	575
>5m to 10m	h/d & h/b ≤ 0.5	ENDS 626				327	626	327			
	h/d & h/b > 0.5	CENTRAL 902				470	902	470			
>10m to 15m	h/d & h/b ≤ 0.5	ENDS 566				295	566	295			
	h/d & h/b > 0.5	CENTRAL 813				424	813	424			
>15m to 20m	h/d & h/b ≤ 0.5	ENDS 533				278	533	278			
	h/d & h/b > 0.5	CENTRAL 767				400	767	400			
>20m to 30m	h/d & h/b ≤ 0.5	ENDS 495				258	495	258			
	h/d & h/b > 0.5	CENTRAL 710				371	710	371			
6000-5F	TC1	5000-5F				0 to 5m	h/d & h/b ≤ 0.5	ENDS 758	395	758	395
							h/d & h/b > 0.5	CENTRAL 1,093	570	1,093	570
			>5m to 10m	h/d & h/b ≤ 0.5	ENDS 1,328	693	1,328	693			
				h/d & h/b > 0.5	CENTRAL 895	467	895	467			
			>10m to 15m	h/d & h/b ≤ 0.5	ENDS 1,085	566	1,085	566			
				h/d & h/b > 0.5	CENTRAL 808	422	808	422			
			>15m to 20m	h/d & h/b ≤ 0.5	ENDS 531	277	531	277			
				h/d & h/b > 0.5	CENTRAL 762	398	762	398			
			>20m to 30m	h/d & h/b ≤ 0.5	ENDS 493	257	493	257			
				h/d & h/b > 0.5	CENTRAL 707	369	707	369			
			6000-5F	TC2	5000-5F	0 to 5m	h/d & h/b ≤ 0.5	ENDS 838	437	838	437
							h/d & h/b > 0.5	CENTRAL 1,215	634	1,215	634
>5m to 10m	h/d & h/b ≤ 0.5	ENDS 1,215				634	1,215	634			
	h/d & h/b > 0.5	CENTRAL 745				389	745	389			
>10m to 15m	h/d & h/b ≤ 0.5	ENDS 1,077				562	1,077	562			
	h/d & h/b > 0.5	CENTRAL 667				348	667	348			