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STRUCTURAL ENGINEERS
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STRUCTURAL CERTIFICATE

Ref: DD-231232-CERT-C1

9 November 2023

Schletter Australia Pty Ltd

Unit 4, 27 Williamson Road

INGLEBURN NSW 2565

RE: SPAN TABLES FOR SCHLETTER FASTENERS WITH FIX-Z PRO SYSTEM FOR TILT SOLAR PANELS INSTALLATION OVER ROOVES

This is to certify that DesignDevise (**DD**) have calculated the span tables for Schletter's fasteners with Fiz-Z Pro rail system for tilt solar panels installation over rooves.

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

- DD-231232-ST-C1, Sheet S01, Rev. C1, dated 09.11.2023.

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

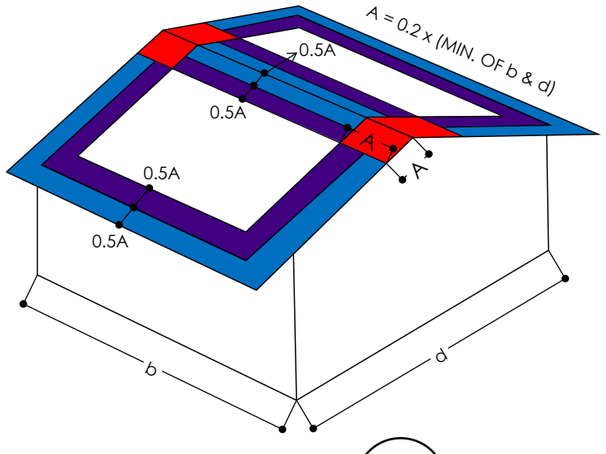
Appendix A
Span Table Drawing

WIND REGION A - FIX-Z PRO SPAN TABLES FOR CENTRAL ZONE
V200 = 43m/s
(* denotes not suitable due to force exceeding 2.43kN in the elevation parts)

TC	PITCH	H	ω = 5°			ω = 10°			ω = 15°		
			RAPID²⁺ PRO SML	KLIPLOK EMU		RAPID²⁺ PRO SML	KLIPLOK EMU		RAPID²⁺ PRO SML	KLIPLOK EMU	
				ON-PURLIN	OFF-PURLIN		ON-PURLIN	OFF-PURLIN		ON-PURLIN	OFF-PURLIN
TC2	0° to <7°	0 to 5m	1,722	1,722	1,086	1,558	1,558	888	1,439	1,439	758
		>5 to 10m	1,551	1,551	881	1,406	1,387	723	1,253	1,186	619
		>10 to 15m	1,471	1,471	792	1,319	1,249	651	1,129	1,069	558
		>15 to 20m	1,427	1,427	745	1,242	1,176	613	1,064	1,007	525
	7° to 15°	0 to 5m	1,587	1,587	923	1,422	1,420	741	1,259	1,192	622
		>5 to 10m	1,432	1,432	751	1,226	1,160	605	1,031	976	509
		>10 to 15m	1,359	1,296	676	1,105	1,046	546	930	881	459
		>15 to 20m	1,290	1,221	637	1,041	986	514	877	830	433
TC2.5	0° to <7°	0 to 5m	1,800	1,800	1,202	1,637	1,637	981	1,511	1,511	836
		>5 to 10m	1,701	1,701	1,060	1,539	1,539	867	1,422	1,418	740
		>10 to 15m	1,604	1,604	942	1,453	1,453	773	1,337	1,266	660
		>15 to 20m	1,535	1,535	862	1,391	1,357	708	1,227	1,161	606
	7° to 15°	0 to 5m	1,668	1,668	1,019	1,493	1,493	817	1,367	1,312	685
		>5 to 10m	1,568	1,568	901	1,406	1,387	724	1,230	1,164	607
		>10 to 15m	1,480	1,480	802	1,308	1,238	646	1,099	1,041	543
		>15 to 20m	1,417	1,409	735	1,200	1,136	593	1,010	956	499
TC3	0° to <7°	0 to 5m	1,800	1,800	1,338	1,725	1,725	1,089	1,591	1,591	926
		>5 to 10m	1,800	1,800	1,338	1,725	1,725	1,089	1,591	1,591	926
		>10 to 15m	1,766	1,766	1,142	1,596	1,596	933	1,474	1,474	795
		>15 to 20m	1,661	1,661	1,010	1,503	1,503	827	1,389	1,354	707
	7° to 15°	0 to 5m	1,758	1,758	1,131	1,572	1,572	905	1,438	1,438	758
		>5 to 10m	1,758	1,758	1,131	1,572	1,572	905	1,438	1,438	758
		>10 to 15m	1,627	1,627	969	1,457	1,457	777	1,320	1,250	652
		>15 to 20m	1,532	1,532	859	1,374	1,324	691	1,175	1,112	580

WIND REGION B1, B2 - FIX-Z PRO SPAN TABLES FOR CENTRAL ZONE
V200 = 52m/s
(* denotes not suitable due to force exceeding 2.43kN in the elevation parts)

TC	PITCH	H	ω = 5°			ω = 10°			ω = 15°		
			RAPID²⁺ PRO SML	KLIPLOK EMU		RAPID²⁺ PRO SML	KLIPLOK EMU		RAPID²⁺ PRO SML	KLIPLOK EMU	
				ON-PURLIN	OFF-PURLIN		ON-PURLIN	OFF-PURLIN		ON-PURLIN	OFF-PURLIN
TC2	0° to <7°	0 to 5m	1,398	1,372	716	1,193	1,129	589	1,023	968	505
		>5 to 10m	1,184	1,121	585	977	925	483	839	794	414
		>10 to 15m	1,068	1,011	527	882	835	436	*	*	*
		>15 to 20m	1,006	952	497	832	787	411	*	*	*
	7° to 15°	0 to 5m	1,239	1,173	612	1,001	947	494	843	798	416
		>5 to 10m	1,015	960	501	821	777	406	*	*	*
		>10 to 15m	916	867	452	*	*	*	*	*	*
		>15 to 20m	863	817	426	*	*	*	*	*	*
TC2.5	0° to <7°	0 to 5m	1,468	1,468	789	1,313	1,243	649	1,125	1,064	555
		>5 to 10m	1,382	1,340	699	1,166	1,103	576	999	946	493
		>10 to 15m	1,264	1,196	624	1,042	986	515	894	846	442
		>15 to 20m	1,160	1,098	573	957	906	473	822	778	406
	7° to 15°	0 to 5m	1,356	1,291	674	1,101	1,042	543	926	877	458
		>5 to 10m	1,210	1,146	598	978	926	483	824	780	407
		>10 to 15m	1,082	1,024	534	875	829	432	*	*	*
		>15 to 20m	994	940	491	*	*	*	*	*	*
TC3	0° to <7°	0 to 5m	1,545	1,545	874	1,400	1,376	718	1,243	1,176	614
		>5 to 10m	1,545	1,545	874	1,400	1,376	718	1,243	1,176	614
		>10 to 15m	1,432	1,432	751	1,251	1,184	618	1,072	1,014	529
		>15 to 20m	1,350	1,279	668	1,114	1,054	550	955	904	472
	7° to 15°	0 to 5m	1,427	1,427	745	1,216	1,151	601	1,023	968	505
		>5 to 10m	1,427	1,427	745	1,216	1,151	601	1,023	968	505
		>10 to 15m	1,299	1,230	642	1,049	993	518	883	836	436
		>15 to 20m	1,156	1,095	571	935	885	462	788	746	389



ROOF ZONES

LEGEND

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

GENERAL NOTES

1. THESE DRAWINGS PROVIDE THE GENERAL SPAN TABLES FOR SCHLETTER FIX-Z PRO RAIL SYSTEM, WITH OTHER LIMITATIONS LISTED BELOW
2. ALL SPANS ARE IN mm, HEIGHTS IN m, ROOF PITCH IN DEGREES
3. SCHLETTER FIX-Z RAIL, RAPID2+ PRO SML FASTENERS, KLIPLOK FASTENERS CAPACITIES CALCULATED BASED ON THE SECTION PROPERTIES AND TEST REPORTS PROVIDED BY SCHLETTER
4. DESIGNDEVISE (**DD**) HAVE NOT INDEPENDENTLY VERIFIED THE ACCURACY OF THESE PROPERTIES AND CAPACITIES
5. 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
6. SOLAR PANELS STRUCTURAL CAPACITIES BY OTHERS
7. ALL COMPONENTS TO BE INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS
8. SITE SPECIFIC CERTIFICATIONS BY OTHERS
9. IT IS ASSUMED THE USERS OF THESE DRAWINGS HAVE SUFFICIENT ENGINEERING KNOWLEDGE TO INTERPRET AND APPLY THESE SPAN TABLES AND LIMITATIONS
10. ROOF ZONING REQUIREMENTS MUST BE FOLLOWED AS DETAILED ON THIS DRAWING
11. LINEAR INTERPOLATIONS FOR TABLE VALUES ARE ALLOWED

DESIGN CRITERIA

1. WIND PARAMETERS IN ACCORDANCE WITH AS1170.2-2021:
   - IMPORTANCE LEVEL 2
   - WIND REGIONS A AND B ONLY
   - 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 20m
   - ANY BUILDING WIDTH (b) AND BUILDING DEPTH (d)
   - HIP AND GABLE ROOVES WITH PITCHES UP TO 15°
3. A MINIMUM OF 12kg/m² IS CONSIDERED FOR THE SOLAR PANELS, RAILS AND FIXINGS SELF-WEIGHT AGAINST THE UPLIFT. NO OTHER DEAD LOADS CONSIDERED
4. ULTIMATE LOAD COMBINATION OF 0.90 DEAD LOADS + 1.0 ULTIMATE WIND LOADS IS CONSIDERED
5. WATER PONDING, SEISMIC, SNOW, HAIL LOADING AND CORROSIVITY EXCLUDED. PERMANENT WORKS STRUCTURAL ENGINEER TO CONFIRM

SPAN TABLE MODIFICATION FACTORS

SPAN TABLES ARE BASED ON A PANEL SIZE OF 1,000mm x 2,000mm SUPPORTED ON A MINIMUM OF TWO RAILS WITH THREE OR MORE CONTINUOUS RAIL SPANS (MINIMUM 4 CONNECTION POINTS). FOR DIFFERENT PANEL SIZE, ADDITIONAL RAILS AND/OR SPANS LESS THAN THREE, VALUES READ FROM THE SPAN TABLES MUST BE MULTIPLIED BY THE 'f' FACTORS AS GIVEN BELOW (NOTE: MAX. SPACING MUST NOT EXCEED 1800mm BEFORE OR AFTER APPLICATION OF ANY MODIFICATION FACTOR)

A. SOLAR PANEL SIZE

$f = \sqrt{\frac{2000}{y}}$ PROVIDED AN ADDITIONAL CHECK IS PERFORMED SUCH THAT THE ULTIMATE LOAD AT EACH ELEVATION PART MUST NOT EXCEED 2.43kN

WHERE Y IS SOLAR PANEL DIMENSION PERPENDICULAR TO RAILS

B. ADDITIONAL ELEVATION UNITS WITH ADDITIONAL RAILS

f = 1.20 FOR 3 RAILS (6 ELEVATION UNITS PER PANEL)
f = 1.30 FOR 4 RAILS (8 ELEVATION UNITS PER PANEL)
THIS IS BASED ON THE ASSUMPTION THAT SOLAR PANEL WILL OVERHANG BY 20% OF PANEL DIMENSION PERPENDICULAR TO RAILS

C. LESS THAN THREE RAIL SPANS

f = 0.90

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CLIENT	**SCHLETTER GROUP**	THIS DESIGN AND DRAWING, IN ANY FORM, ARE THE EXCLUSIVE PROPERTY OF THE DESIGNDEVISE PTY LTD AND SHALL NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WITHOUT THE WRITTEN CONSENT OF DESIGNDEVISE PTY LTD. THESE DESIGNS AND DRAWINGS ARE TO BE USED SOLELY FOR THE PROJECT LISTED ON THIS DRAWING AND MAY NOT BE USED BY OR DISCLOSED TO ANY OTHER PERSON OR ORGANIZATION FOR ANY PURPOSE WITHOUT THE WRITTEN CONSENT OF THE DESIGNDEVISE PTY LTD.	DESIGNER - **AA**				STATUS - **ISSUED FOR CONSTRUCTION**
PROJECT	**FIX-Z PRO SPAN TABLES**		APPROVED - **RW**				DRAWING NUMBER & TITLE - **S01 - NOTES & ROOF ZONES**	REV **C1**
231232	**SPAN TABLES**		SCALE - **NTS - A3**	C1	ISSUED FOR CONSTRUCTION	RW	09.11.23	
				REV	DESCRIPTION	APP'D	DATE	

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