STRUCTURAL ENGINEERING CONSULTANTS AUSTRALIA PTY LTD

ABN 94 606 513 160
Corner Hidden Valley Road & Vigilant Lane, Berrimah
PO Box 2393, Palmerston NT 0831
(08) 89 474 999
seca@secaust.com.au

NORTHERN TERRITORY OF AUSTRALIA

STRUCTURAL ENGINEERING CERTIFICATE OF COMPLIANCE

SECA REFERENCE: 24303 – Walara 415-430 G3P

Date of Issue: 15 November 2024

Tindo Operations Co Pty Ltd
6-8 Park Way
Mawson Lakes SA 5095
Attn: Robert Sporne

robert.sporne@tindosolar.com

The Recommended Ultimate Design Strength of the Tindo **Walara 415-430 G3P - 1722 x 1133 x 35mm** Solar Panel Module can resist vertical wind force at the Limit State Design Capacity for the following support conditions:

When supported at 800mm centres	**5.26 kPa**
When supported at 1200mm centres	**4.51 kPa**

SCOPE

Structural Engineering Consultants Australia (SECA) Pty Ltd were engaged by Robert Sporne of Tindo Operations Co Pty Ltd to carry out and witness two individual mechanical load tests (simulated static, wind load strength test). The test procedure followed was similar to the method outlined in AS4040.2:1992, Static Strength Test Regime. The testing was performed on new panels supplied by the client.

TEST PROCEDURE

The solar panel module(s) were mounted front side up and were free to deflect, this was to imitate a real-world situation. The electrical continuity or the cells themselves were not monitored during or after the tests. The load was applied by an airbag to the back of the panel and the centre deflection was monitored at 1kPa intervals as the load was applied by slowly inflating an air bag. A calibrated digital manometer was used to measure and track the test pressures, while a calibrated digital deflection meter was used to measure the centre (vertical) deflection of the solar panel.

The tests were observed by Ray Colley and Wisnu Lim on behalf of SECA in Darwin, Northern Territory. A total of six panels were tested, three supported at 800mm centres and three supported at 1200mm centres, each test was carried out once on 9th November 2024. The applied factor for variability in accordance with AS/NZS 1170.0 Table B1 when determining the allowable design capacity for 1 test unit is 1.46, 2 test units 1.38 and for 3 test units is 1.33.

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Test Results

Test 1: Model: Walara 425 G3P, Serial Number: 2409509
The panel **1722 x 1133 x 35mm** was mounted to the test rig with support points at **800mm** centres apart on each side with a cantilever/ overhang of approximately **461m** at each end (measured from centre of supports).

The solar panel was observed to be able to support an equivalent design test pressure of **7 kPa** with a centre vertical deflection of **85.4mm.**

Test 2: Model: Walara 425 G3P, Serial Number: 2409345
The panel **1722 x 1133 x 35mm** was mounted to the test rig with support points at **800mm** centres apart on each side with a cantilever/ overhang of approximately **461mm** at each end (measured from centre of supports).

The solar panel was observed to be able to support an equivalent design test pressure of **7 kPa** with a centre vertical deflection of **88.5mm.**

Test 3: Model: Walara 425 G3P, Serial Number: 2409034
The panel **1722 x 1133 x 35mm** was mounted to the test rig with support points at **800mm** centres apart on each side with a cantilever/ overhang of approximately **461mm** at each end (measured from centre of supports).

The solar panel was observed to be able to support an equivalent design test pressure of **7 kPa** with a centre vertical deflection of **82.8mm.**

Test 4: Model: Walara 425 G3P , Serial Number: 2408944
The panel **1722 x 1133 x 35mm** was mounted to the test rig with support points at **1200mm** centres apart on each side with a cantilever/ overhang of approximately **261mm** at each end (measured from centre of supports).

The solar panel was observed to be able to support an equivalent design test pressure of **6 kPa** with a centre vertical deflection of **59.2mm.**

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Test 5: **Model: Walara 425 G3P , Serial Number: 2410575**

The panel **1722 x 1133 x 35mm** was mounted to the test rig with support points at **1200mm** centres apart on each side with a cantilever/ overhang of approximately **261mm** at each end (measured from centre of supports).

The solar panel was observed to be able to support an equivalent design test pressure of **6 kPa** with a centre vertical deflection of **58.2mm.**

Test 6: **Model: Walara 425 G3P , Serial Number: 2412963**

The panel **1722 x 1133 x 35mm** was mounted to the test rig with support points at **1200mm** centres apart on each side with a cantilever/ overhang of approximately **261mm** at each end (measured from centre of supports).

The solar panel was observed to be able to support an equivalent design test pressure of **6 kPa** with a centre vertical deflection of **56.8mm.**

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Table 1: Test Summary

Recommended Ultimate Design Strength, Limit Design Capacity

Test	Panel Manufacturer, Model & Size (mm)	Support Points (mm)	Maximum Applied Load (kPa)	Material Variability Factor AS/NZS 1170.0 Table B1 – kt	Recommended Ultimate Design Strength Limit State Design Capacity (kPa)
1	**Walara 425 G3P** 1722 x 1133 x 35mm **Serial Number:** 2409509	800	7	1.33	5.26
2	**Walara 425 G3P** 1722 x 1133 x 35mm **Serial Number:** 2409345	800	7		
3	**Walara 425 G3P** 1722 x 1133 x 35mm **Serial Number:** 2409034	800	7		
4	**Walara 425 G3P** 1722 x 1133 x 35mm Serial Number: 2408944	1200	6	1.33	4.51
5	**Walara 425 G3P** 1722 x 1133 x 35mm Serial Number: 2410575	1200	6		
6	**Walara 425 G3P** 1722 x 1133 x 35mm Serial Number: 2412963	1200	6		

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In accordance with AS/NZS 1170.0 Table B1, where no reliable data for the co-efficient of variation of structural characteristics (Vsc) are available, a value of 10.0% maybe adopted for roof assembly cyclic testing, as recommended in Clause 6.1 of *The Draft Guide to LHL Cyclic Testing (Version 1)*, dated 9 April 2009 and issued by the Cyclone Testing Station.

Mechanical Properties

Cell Type	N type cells
Front glass	3.2mm
Dimensions (L x W x Frame thickness)	1722 x 1133 x 35mm
Weight	22 kg
Frame	Anodised Aluminium Alloy

Summary

The Recommended Ultimate Design Strength of the Tindo **Walara 415-430 G3P - 1722 x 1133 x 35mm** Solar Panel Module can resist vertical wind force at the Limit State Design Capacity for the following support conditions:

When supported at 800mm centres	**5.26 kPa**
When supported at 1200mm centres	**4.51 kPa**

Limitations

This certificate of compliance has been prepared on behalf of and for the exclusive use of Tindo Operations Co Pty Ltd and forms part of the A.I.P certificate of compliance. These design capacities are only applicable for the panel size, model and support spacing as used in these tests. We accept that the wattage of the panel may vary, however this certificate is no longer valid if the any of the applicable Mechanical Properties used in the manufacture of these solar panel module or if the manufacturing processes or techniques is changed or altered in any way. It is the responsibility of the manufacturer to advise or confirm if they are altered in any way as new tests and certification will be required.

Please note: The panel fixing clamps, the support rail or their associated fixings, may limit the structural design for installation.

Ray Colley **Director** **Structural Engineering Consultants Australia Pty Ltd**		**Company NT Registration Number** 169894ES	
I certify that reasonable care has been taken to ensure that the structural engineering aspects of the works as described above have been designed in accordance with the requirements of the Building Code of Australia and the Northern Territory Building Regulations			
Name **Wisnu Lim** Nominee for Structural Engineering Consultants Australia Pty Ltd	**Nominee/Individual NT Registration Number** 145651ES	**Signature**	**Date** 15 November 2024

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Appendix A

Test Results

Test Pressure	Test 1 800mm C/C Supports	Test 2 800mm C/C Supports	Test 3 800mm C/C Supports
Load Applied (kPa)	Recorded Deflection (mm)	Recorded Deflection (mm)	Recorded Deflection (mm)
1	13.1	16.0	14.5
2	25.3	30.8	27.6
3	37.5	44.5	40.7
4	50.0	57.1	51.9
5	62.3	67.7	62.4
6	74.2	78.2	72.5
7	85.4	88.5	82.8

Test Pressure	Test 4 1200mm C/C Supports	Test 5 1200mm C/C Supports	Test 6 1200mm C/C Supports
Load Applied (kPa)	Recorded Deflection (mm)	Recorded Deflection (mm)	Recorded Deflection (mm)
1	14.2	13.8	12.4
2	23.9	23.5	21.2
3	33.0	32.6	29.6
4	41.5	41.1	38.5
5	50.0	49.6	46.9
6	59.2	58.2	56.8