STRUCTURAL ENGINEERING CONSULTANTS AUSTRALIA PTY LTD

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NORTHERN TERRITORY OF AUSTRALIA

STRUCTURAL ENGINEERING CERTIFICATE OF COMPLIANCE

SECA REFERENCE: 24209

Date of Issue: 31 January 2024

Suntech Power ANZ
Attention: Ramsey Shamali
Level 11, 66 Clarence Street
Sydney NSW 2000

Email: ramseyshamali@suntech-power.com.au
Mobile: 0452 240 198

Design Certification for the Suntech Solar Panel Module, Model: STPXXXS-C54/Nshm, Nshb, Umhm, Umhb with support points at 800mm & 900mm

SUMMARY

This Certificate of Compliance verifies that the Suntech Solar Panel Module,
Model: STPXXXS-C54/Nshm, Nshb, Umhm, Umhb - 1722 x 1134 x 30mm can resist vertical loads with the corresponding support points as follows:

Panel 1 Serial: STP 099830032540014623	Supports at: 800mm centres	Design Pressure: 4.45 kPa
Panel 3 Serial: STP 099830032540044623	Supports at: 900mm centres	Design Pressure 4.11 kPa

SCOPE

Structural Engineering Consultants Australia (SECA) Pty Ltd were engaged by Ramsey Shamali of Suntech Power ANZ 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.

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The tests were observed by Ray Colley and Wisnu Lim on behalf of SECA on the 23rd January 2024 in Darwin, Northern Territory. A total of two panels were tested, one supported at 800mm centres and one supported at 900mm centres, each test was carried out once. The applied factor for variability (for 1 test unit) in accordance with AS/NZS 1170.0 Table B1 when determining the allowable design capacity is 1.46.

Test Results

Model: Suntech STP415S-C54/Umhm, Serial Number: STP 099830032540014623

The panel **1722 x 1134 x 30mm** 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 **6.5kPa** with a centre vertical deflection of **94mm** then the glass shattered.

Model: Suntech STP415S-C54/Umhm, Serial Number: STP 099830032540044623

The panel **1722 x 1134 x 30mm** was mounted to the test rig with support points at **900mm** centres apart on each side with a cantilever/ overhang of approximately **411mm** at each end (measured from centre of supports).

The solar panel was observed to be able to support an equivalent design test pressure of **6kPa** with a centre vertical deflection of **84mm** then the load was released.

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Table 1: Test Summary
Recommended Ultimate Design Strength, Limit Design Capacity

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)
Suntech STP415S-C54/Umhm 1722 x 1134 x 30mm Serial Number: STP 099830032540014623	800	6.5	1.46	4.45
Suntech STP415S-C54/Umhm 1722 x 1134 x 30mm **Serial Number:** STP 099830032540044623	900	6.0	1.46	4.11

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

No. of Cells	108 (6 x 18 cells)
Cell Type	Monocrystalline silicon 182 mm
Dimensions (L x W x Frame thickness)	1722 x 1134 x 30mm
Weight	21.0 kg

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Summary

We recommended and certify that the **Suntech STPXXXS-C54**/Nshm, Nshb, Umhm, Umhb * Solar Panel Module, can resist vertical design capacities, Ultimate Strength Limit State, as listed for the following support conditions:

**Refer to Appendix B: Suntech Declaration Letter*
xxx = wattage of panel

When supported on battens at 800mm centres	**4.45 kPa**
When supported on battens at 900mm centres	**4.11 kPa**

Limitations

This certificate of compliance has been prepared on behalf of and for the exclusive use of Suntech Power ANZ 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** 31 January 2024

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Appendix A

Test Results

Test Pressure	800mm C/C Supports	900mm C/C Supports
Load Applied (kPa)	Recorded Deflection (mm)	Recorded Deflection (mm)
1	16.0	14.2
2	31.0	29.1
3	45.3	44.0
4	59.9	58.5
5	73.8	71.8
6	87.0	84.0
6.5	94.0	

Appendix B

Wuxi Suntech Power Co., Ltd.

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Suntech Declaration Letter

RE: Matching mechanical characteristics amongst Suntech C54 mono-facial models

To whom it may concern,

For the purposes of conducting 3rd party static load testing on Suntech's C54 mono-facial PV modules with full model list shown below we hereby declare these models all to share the same mechanical structural components (Frame, glass & adhesives) and therefore testing of 1 of the models can be on behalf of all the others.

We provide consent and confirmation to any 3rd party static load testing facility to list all of the models on the final certificate document.

Full list of C54 Mono-facial models:

- STPXXXS-C54/Nshm, XXX = 415-450
- STPXXXS-C54/Nshb, XXX = 410-440
- STPXXXS-C54/Umhm, XXX = 415-425
- STPXXXS-C54/Umhb, XXX = 405-415

Wuxi Suntech Power Co., Ltd.

25th June 2023