

NORTHERN TERRITORY OF AUSTRALIA

STRUCTURAL ENGINEERING CERTIFICATE OF COMPLIANCE

SECA REFERENCE: 22094 – REPORT 2

Date of Issue: 20 May 2022
Jinko Solar Australia Holdings CO Pty Ltd
Attention: Dan Su
Suite 26, Level 2, 152 Marsden Street
Parramatta NSW 2150

Email: dan1.su@jinkosolar.com
Mob: 0404 981 064

**Design Certification for the Jinko Solar Panel Module, Model: Jinko JKM470N-60HL4
with a centre support point at 1200mm**

SUMMARY

This Certificate of Compliance verifies that the Jinko Solar Panel Module, **Model: Jinko JKM470N-60HL4 - 1903 x 1134 x 30mm** panel can resist vertical loads with the corresponding support points as follows:

Panel 1 Serial: 65FXS1220213110561340104	Supports at: 1200mm centres	Design Pressure 3.77 kPa
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SCOPE

Structural Engineering Consultants Australia (SECA) Pty Ltd were engaged by Dan Su of Jinko Solar Australia Holdings 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 on the 28th April 2022 in Darwin, Northern Territory. A total of one panel was tested and supported at 1200mm centres and 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

Test No.1 - Model: Jinko JKM470N-60HL4, Serial Number: 65FXS1220213110561340104

The panel **1903 x 1134 x 30mm** was mounted to the test rig with support points at **1200mm** centres with a cantilever/ overhang of approximately **351.5mm** at each end (measured from centre of supports).

The solar panel was observed to be able to support an equivalent design test pressure of **5.5 kPa** with a centre vertical deflection of **82mm**. The end rail and glass failed at approximately 5.7 kPa.

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)
No.1	Jinko JKM470N-60HL4 1903 x 1134 x 30mm Serial Number: 65FXS1220213110561340104	1200	5.5	1.46	3.77

In accordance with AS/NZS 1170.0 Table B1, where no reliable data for the co-efficient of variation of structural characteristics (V_{sc}) 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	120 (6 x 20 cells)
Cell Type	N type monocrystalline
Dimensions (L x W x Frame thickness)	1903 x 1134 x 30mm
Weight	24.2 kg
Frame	Anodised Aluminium Alloy

Summary


We recommended and certify that the **Jinko JKM470N-60HL4** Solar Panel Module, can resist vertical design capacities, Ultimate Strength Limit State, as listed for the following support conditions:

When supported at 1200mm centres (600mm each side of centre) 3.77 kPa

Limitations

This certificate of compliance has been prepared on behalf of and for the exclusive use of Jinko Solar Australia Holdings 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 <i>Ray Colley</i> 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 20 May 2022

Appendix A

Test Results:

Jinko JKM470N-60HL4 - 1903 x 1134 x 30mm panel

Test Pressure	Test 1 1200mm C/C Supports
Load Applied (kPa)	Recorded Deflection (mm)
1	23.0
2	36.5
3	52.0
4	65.0
5	76.0
5.5	82.0
	End rail and glass failure at approximately 5.7 kPa