

## NORTHERN TERRITORY OF AUSTRALIA

### STRUCTURAL ENGINEERING CERTIFICATE OF COMPLIANCE

SECA REFERENCE: 20372 Report 4

Date of Issue: 3 November 2020

Jinko Solar Australia Holdings CO Pty Ltd  
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**Design Certification for the Jinko Solar Panel Module, Model: JKM390N-6RL3  
with support points 800 mm & 1200 mm using the Clenergy PV-EZ Rack Solar Mounting System**

Dear Sir,

This Certificate of Compliance verifies that the Jinko Panel Module, **Model: JKM390N-6RL3 (Tiger Mono-facial)** can resist vertical loads with the corresponding support points as listed in Table 1.

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.

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 each of 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 Darryl Robinson on behalf of SECA on the 29<sup>th</sup> October in Darwin, Northern Territory. A total of two panels were tested, one supported at 800mm centres and one supported at 1200mm 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.

Table 1 outlines the Test Summary. Appendix A lists the Test Results and Test Set Arrangement.

**Test No.1- Model: JKM390N-6RL3, Serial Number: C4GHB2200323150009311053**

The panel (1842 x 1024 x 35mm) was mounted to the test rig with support points at 1200mm centres apart on each side with a cantilever/ overhang of approximately 321mm at each end (measured from centre of supports).

The solar panel was observed to be able to support an equivalent design test pressure of 8.9kPa with a centre vertical deflection of 71.4mm. The panel began to slip away from the fixing clamps due to the excessive deflection. Maximum deflection reached so pressure was released.

**Test No.2- Model: JKM390N-6RL3 , Serial Number: C4GHB2200323150009310962**

The panel (1842 x 1024 x 35mm) was mounted to the test rig with support points at 800mm centres apart on each side with a cantilever/ overhang of approximately 521mm at each end (measured from centre of supports).

The solar panel was observed to be able to support an equivalent design test pressure of 7kPa with a centre vertical deflection of 69.7mm. The panel began to slip away from the fixing clamps due to the excessive deflection. Maximum deflection reached so pressure was released.

Please refer to Appendix A for Test Results & Test Set Arrangements

**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	<b>JKM390N-6RL3</b> 1842 x 1024 x 35mm Serial Number: C4GHB2200323150009311053	1200	8.9	1.46	6.09
No.2	<b>JKM390N-6RL3</b> 1842 x 1024 x 35mm Serial Number: C4GHB2200323150009310962	800	7.0	1.46	4.79

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	132 (2 x 66)
Cell Type	N type Mono-crystalline
Dimensions	1842mm x 1024mm x 35mm
Weight	21.9 kg
Front glass	Glass 3.2mm, Anti-Reflection Coating, High transmission, Low Iron, Tempered Glass
Frame	Anodised Aluminium Alloy

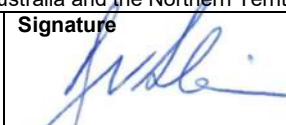
## Summary

We recommended and certify that the **JKM390N-6RL3** Solar Panel Module, can resist vertical design capacities, Ultimate Strength Limit State, as listed for the following support conditions:

<b>When supported on battens at 1200mm centres</b>	<b>6.09 kPa</b>
<b>When supported on battens at 800mm centres</b>	<b>4.79 kPa</b>

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 spacings as used in these tests. It is no longer valid if the any of the applicable Mechanical Properties used in the manufacture of these solar panel modules or if the manufacturing processes or techniques is changed or altered in any way. It is the responsibility of the manufacturer to confirm if they are altered in any way.

**Please note: The panel fixing clamps, the support rail or their associated fixings, although not found to be a failure made in these test runs, may limit the structural design.**

Company Name if certification issued on behalf of a corporation 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 Darryl Robinson Nominee for Structural Engineering Consultants Australia Pty Ltd	Nominee/Individual NT Registration Number 204699ES	Signature 	Date 3 November 2020

## Appendix A: Test Results & Test Set Arrangement

Test Pressure	Test 1 1200mm C/C Supports	Test 2 800mm C/C Supports
Load Applied (kPa)	Recorded Deflection (mm)	Recorded Deflection (mm)
1	11.6	12
2	20.1	242
3	28.2	35
4	35.4	45.1
5	42.6	54
6	49.6	63.4
7.0	56.9	69.7 Maximum deflection, pressure released
8	64	NA
8.9	71.4 Maximum deflection, pressure released	NA
9	NA	NA

