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**Attention: Mr Mark Legge**

**RE: Wind Pressure Testing of JA Solar Crystalline Silicon Photovoltaic Modules  
Type JAM60S01 – 300/PR (300 W)  
Design Certification**

Dear Sir,

This Report certifies the Design Wind Pressure for the JA Solar Type JAM60S01 – 300/PR PV Module for wind loads including Cyclonic Regions (C & D). We verify that the PV Module can withstand an ultimate design wind pressure as specified in Table 1 for use by Structural Engineers.

A pressure test was conducted and observed by this office on the 14<sup>th</sup> June 2018 in Darwin, Northern Territory. The testing officer was Michael Hatton from this office.

The test module (serial number 17BM6K6022037803) was mounted front side up in a test bed. The size of the module was measured as 1.0 m wide x 1.65 m long. The fixing of the module was fixed using the Clenergy mounting brackets and rails. The fixings were spaced at 800 mm centres giving a maximum cantilever overhang of 425 mm of the module. The rails were fixed to the test bed.

An air bag was used to apply constant pressure to the back of the module. The air bag was inflated with pressure to the required design pressure and held for 1 minute at maximum pressure.

A calibrated deflection meter was used to measure deflection at mid panel and was recorded at 1 kPa intervals. The electrical continuity of the panels was not measured during the pressure test. The behaviour of the module and supporting fixtures were observed and recorded. Photographs were taken before and at maximum pressure of the test.

Design maximum pressure that was adopted at 12 kPa. This figure was chosen on past tests and it also allows the modules to be placed on the roofs of multi storey buildings subject to the variability factor. The applied factor of variability, for single test specimen and adopting a coefficient of variation of structural characteristics of 10 percent, from AS 1170.0 Table B1 when applying to the allowable design wind capacity is 1.46.


The module sustained the Design Test Pressure and showed no signs of failure or cracking of the polycarbonate protective covering glazing. A deflection of 52.5 mm was recorded at mid panel at the 12 kPa test pressure. The load was released, and the module was removed from the test bed for further inspection. The module passed without structural failure at 12 kPa.

**Table 1**

Module Sn	Support Points	Max Applied Load	Variability Factor AS 1170.0 Table B1	Ultimate Strength Limit State Design Capacity
17BM6K6022037803	800 mm	12 kPa	1.46	8.22 kPa

We hereby certify the JA Solar Type JAM60S01 – 300/PR PV Module with support points located at 800 mm is suitable for a cyclonic design wind pressure of 8.22 kPa. It is our technical opinion that the same pressure can be maintained with support points at 900 mm. Note that the test is for the PV module only and its support fixings and rails are not part of this test.

**This certification excludes the module fixing clamps, the support rail or fixing to the roof as this may limit the maximum design wind pressure.**

<b>CERTIFICATION BY STRUCTURAL ENGINEER</b>			
<b>Company Name</b> if certification issued on behalf of a corporation Asset Services Pty Ltd		<b>Company NT Registration Number</b> 152941ES	
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.			
<b>Name</b> (see *below) Michael Hatton Nominee for Asset Services Pty Ltd	<b>Nominee/Individual NT Registration Number</b> 14704ES	<b>Signature</b> 	<b>Date</b> 16/06/2020

Should you require any further information in relation to this report please contact this office.

Yours faithfully,



Michael Hatton  
Senior Structural Engineer | Senior Building Surveyor  
**Asset Services Pty Ltd**