

2019 PV Module Reliability Scorecard



Our Scorecards are the most comprehensive PV module benchmarking reports available to the public. To date, we have tested over 300 unique Bills of Material (BOMs) from 50+ manufacturers. They include 75% of Bloomberg NEF Tier 1 manufacturers and 9 out of 10 of the top manufacturers worldwide

The Four PVEL Tests

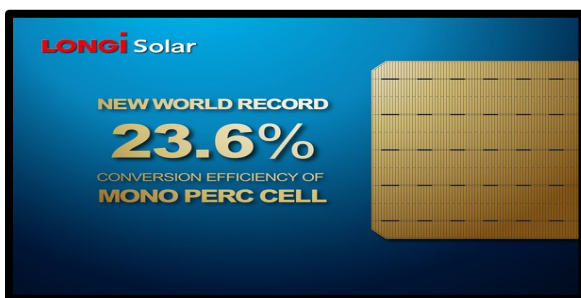
PVEL subjected solar panels to 4 tests:

- Thermal Cycling: Determines the effects of temperature change.
- Damp Heat: How well a solar panel handles hot and humid environments.
- Dynamic Mechanical Load Sequence: How well they handle flexing from wind or snow.
- Potential Induced Degradation: How well they resist deterioration from stray currents.

Manufacturers have to pay for these tests and decide which types of panels they produce undergo which tests. What they can't do is decide which specific panels get tested. PVEL is very careful to ensure only solar panels made for normal use are selected to prevent companies handing over high quality ring-ins.

Thermal Cycling Testing

Stuff expands when heated and contracts when cooled. Because this happens at different rates to different materials it puts stress and strain on joins and connections and can damage and break them. To test resistance to this, PVEL shoves panels into a combination freezer/oven, cools them down to -45 degrees, and then heats them up to 40 degrees. This is done 400 times over a month and a half. It's important for solar panels to do well on this test no matter where they are installed. But it is especially important for inland Australia where the temperature differential between day and night can be extreme. Top Performers — those that suffered less than a 2% decline in output — are shown in this chart:



2019 - LONGi in the top 10 PERFORMERS	
Manufactures	Model Number
LONGi	LR6 - 72PG – xxxM/ LR6 - 60PB-xxxM

Damp Heat Testing

It gets hot here in Adelaide in the summer, but it's a dry heat. Places like Darwin and Townsville have damp heat and nobody likes that. Not even solar panels. It's the sort of environment that can cause the glue⁵ holding solar panels together to degrade and — in the case of the cheapest and shoddiest panels — can cause them to fall apart.

Provided you stay away from crappy solar panels you are not likely to get one that goes to pieces. But in PERC solar panels heat and humidity can cause a type of deterioration in called LeTID. Because of this and because PERC panels are now so common, it has caused the average result on this test to go backwards instead of following the general trend of improving quality.

The good news is there are PERC panels that are resistant to this and some are included among the Top Performers:



2019 - LONGi & Phono Solar in the top 10 PERFORMERS	
Manufactures	Model Number
LONGi	LR6 - 72PG - xxxM/ LR6 - 60PB-xxxM
Phono Solar	PS xxxP-24/T/ PS xxxP-20/U