Modules in Australia: What are we really buying?

December, 2019
PV Lab Australia

An independent and specialised laboratory for PV modules

- Focus: Quality assurance and risk assessment for PV modules
- Founded: late 2013, acquired equipment, setup space 2014, small-scale tests 2015, large volume tests 2016
- Managed by: Dr. Michelle McCann and Lawrence McIntosh
- Location: The Australian National University, Canberra
Our Equipment / Tests

- Sun simulator (AAA h.a.l.m.)
  - STC measurement
  - Low light power measurement
- Electroluminescence
- Wet leakage
- Insulation test
- Visual inspection
- PID
- Thermographic imaging
Outcomes of Module Testing - CEC

- Testing for the Clean Energy Council
  - 6 of 15 found substituted materials outside certification
  - 5 of 15 tested below their stated power rating
  - Round Robin testing at CSIRO and SERIS showed $P_{\text{max}}$ at STC within 1%.
Electroluminescence test

- Shows micro-cracks and other features not visible to the naked eye
STC - Sample Results

- Measures power output under standard test conditions
  % Deviation from nameplate power

- Manufacturers can choose where to ship certain product
- Quality in Australia reflects lack of culture of testing
- How you buy seems to be important
Case Study #1

Performance relative to nameplate (bin)

Percent of batch

-2.5%  -1.5%  -0.5%  0.5%  1.5%  2.5%

Making quality visible.
Case Study #2

Performance relative to nameplate (bin)
Blue Reports

TALESUN
October 2018
Model: Talesun TP660P-275
Power: 275W  Power class: 0~+3%
Polycrystalline  60 Cells

Power Measurement
MEASURED POWER VS LABEL
Label value: 275W
Average result
99.2%
Individual results
94.7%
99.8%
94.7%

The power output of three solar panels from Talesun, shown as %relative to the manufacturer's labeled value.

AVERAGE MEASURED POWER
262W
AVERAGE RESULT
95.2%
% Relative to label value

A result of 100% means the average power output of the panels matches manufacturer's stated power.

Manufacturing and Shipping Defects

AVERAGE GRADE
B
INDIVIDUAL GRADES
Panel 1: A
Panel 2: A
Panel 3: A

This grading, from A to E, assesses the panel for defects which are likely to have originated in the manufacturing process and/or during shipping and handling.

Visual inspection
PASSED

Wet leakage test
SAFE TEST: PASSED

PASS: There were no visual defects that may cause a risk of reliability loss or power output.

QCELLS
October 2018
Model: Q Cells
Power: 270W  Power class: +0 to +5W
Polycrystalline  60 Cells

Power Measurement
MEASURED POWER VS LABEL
Label value: 270W
Average result
99.7%
Individual results
99.7%
100.0%
99.9%

The power output of three solar panels from Q cells, shown as %relative to the manufacturer's labeled value.

AVERAGE MEASURED POWER
269W
AVERAGE RESULT
99.7%
% Relative to label value

A result of 100% means the average power output of the panels matches manufacturer's stated power.

Manufacturing and Shipping Defects

AVERAGE GRADE
A
INDIVIDUAL GRADES
Panel 1: A
Panel 2: A
Panel 3: A

This grading, from A to E, assesses the panel for defects which are likely to have originated in the manufacturing process and/or during shipping and handling.

Visual inspection
PASSED

Wet leakage test
SAFE TEST: PASSED

PASS: There were no visual defects that may cause a risk of reliability loss or power output.
Thank you for listening!