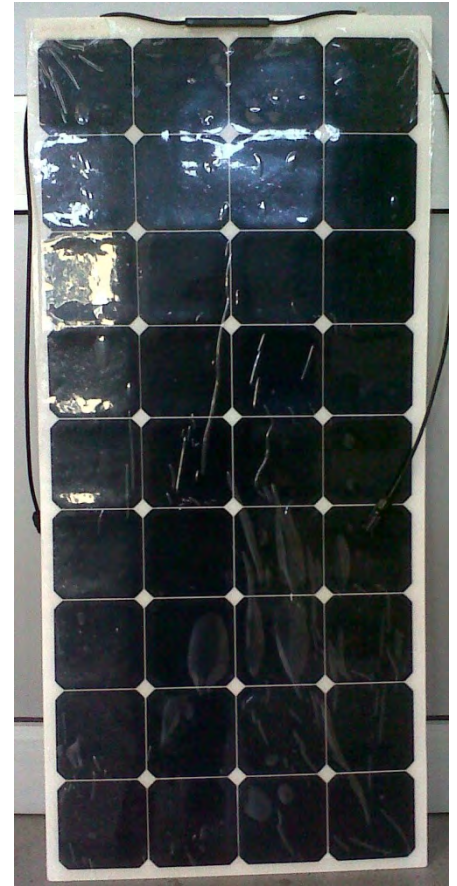
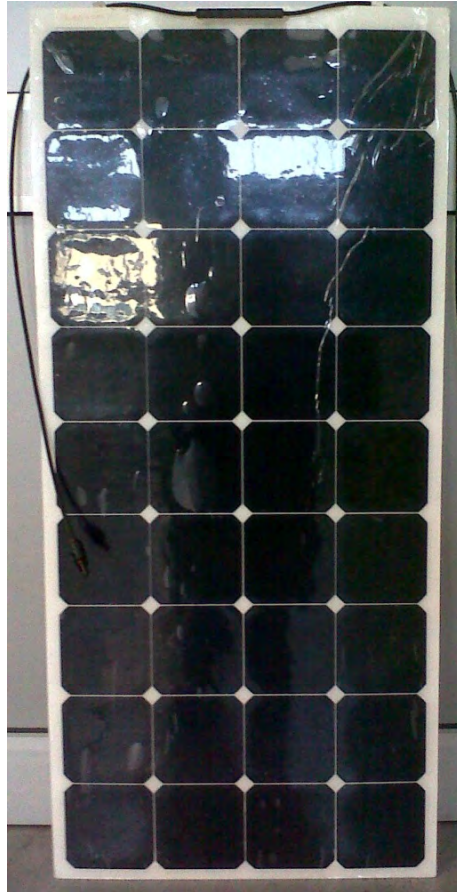
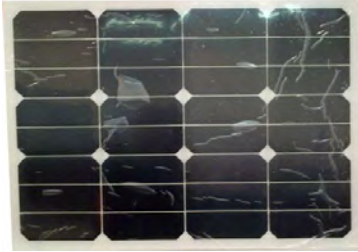


PV PANEL MADE IN CHINA

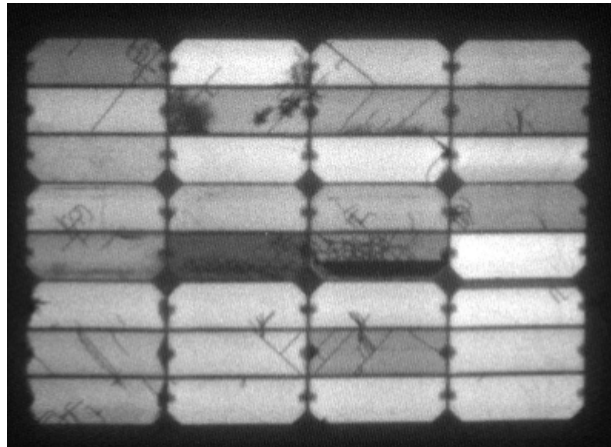
We bought some panels from our competitors in China. A small 30W panel with cut cells, a 100W panel with 32 cells and two 115 W panels (36 cells).



Panels have a nice aesthetic, cells are properly aligned and evenly spaced.

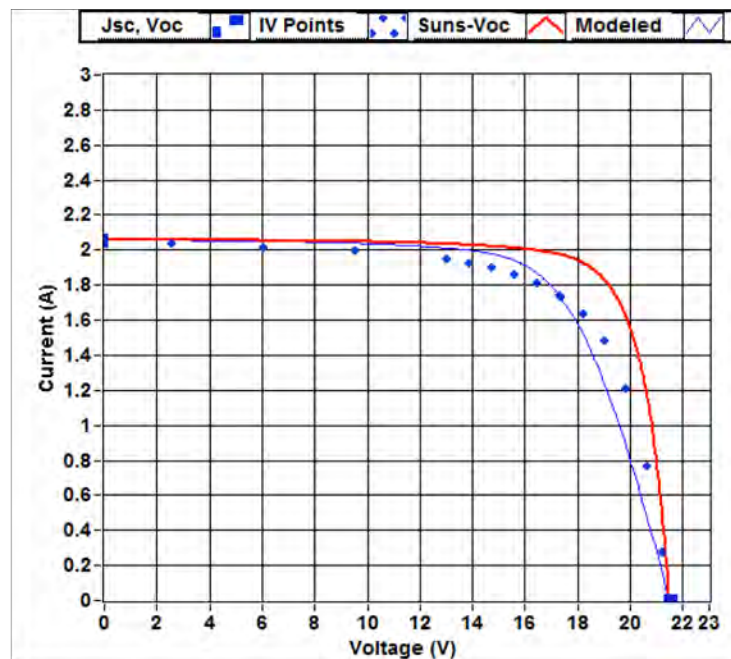
Panels have been tested with Flash test and Electro Luminescence (EL). Here are some results.

PV 30 EL TEST & FLASH TEST



Cell Area: 5.00 cm²

Number of Cells: 32



$V_{oc} = 21.4851 \text{ V}$

$I_{mp} = 1.75 \text{ A}$

$I_{sc} = 2.06 \text{ A}$

$V_{mp} = 17.26 \text{ V}$

$J_{sc} = 2.06 \text{ A/cm}^2$

$P_{mp} = 30.15 \text{ W}$

Fill Factor = 68.12 %

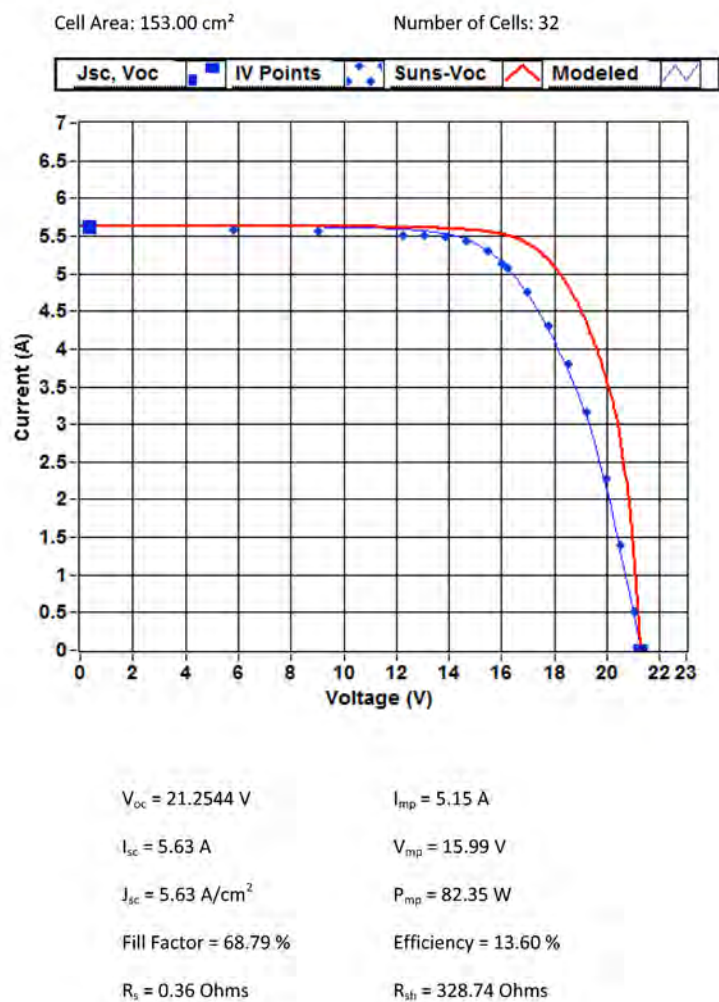
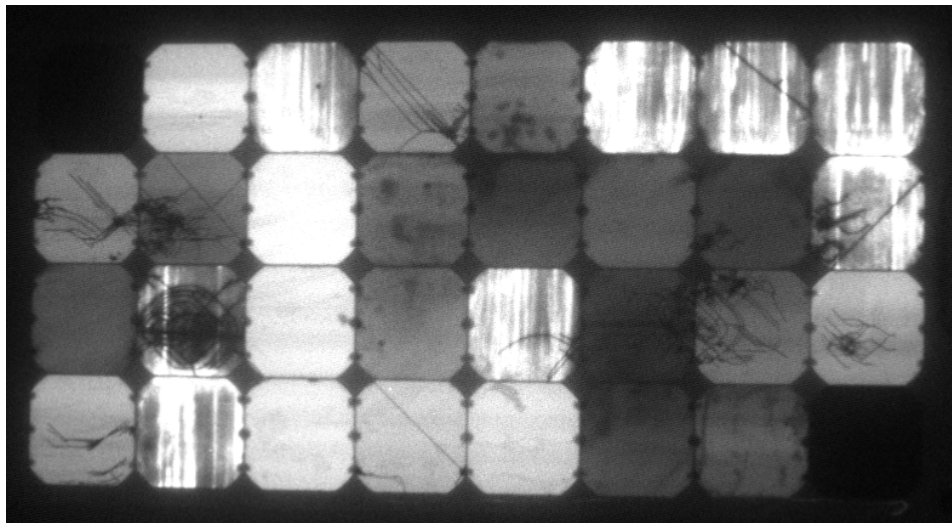
Efficiency = 12.56 %

$R_s = 1.24 \text{ Ohms}$

$R_{sh} = 406.74 \text{ Ohms}$

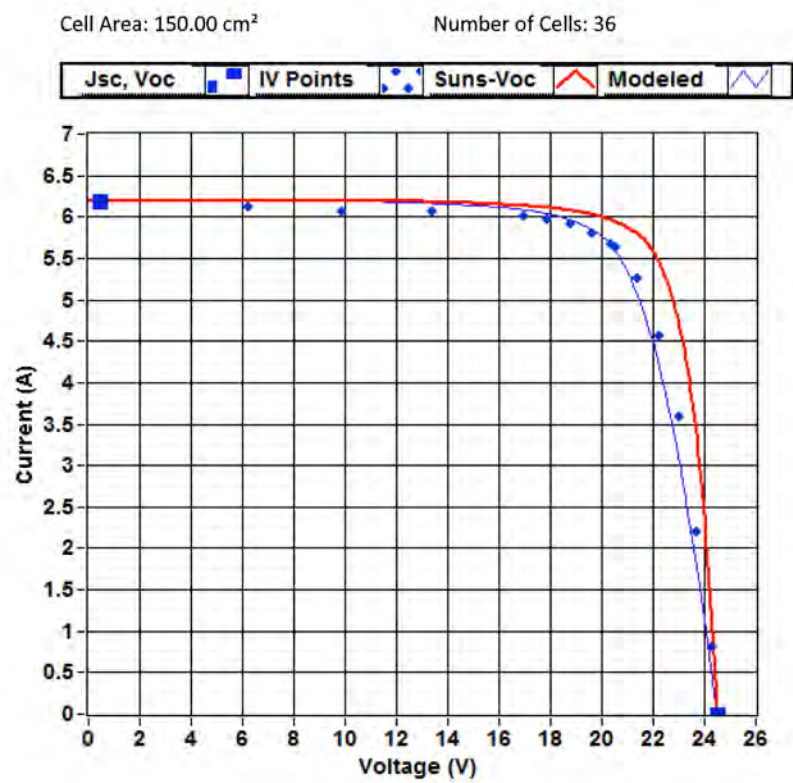
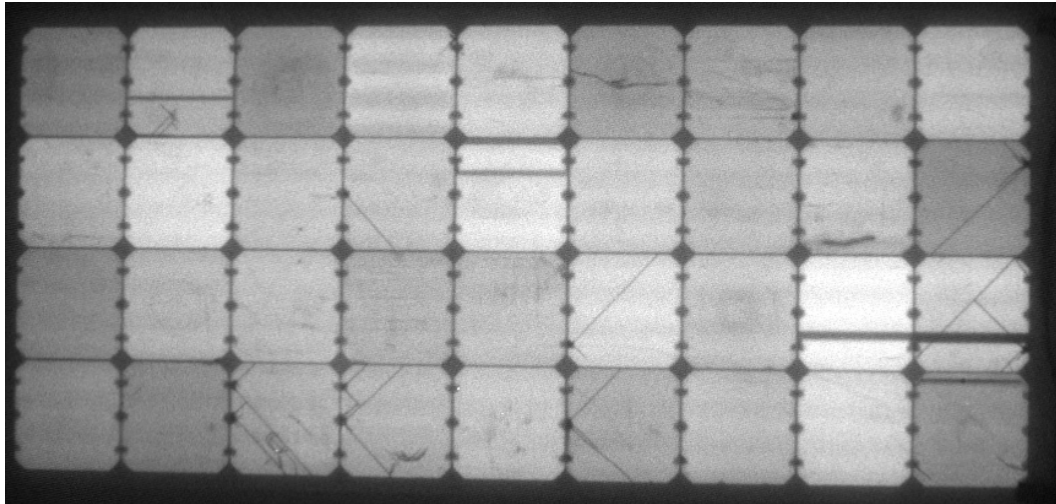
Cells are cracked and marked. The total power is ok but the Fill Factor shows the problem. For SunPower grade A cells the Fill Factor should be close to 80%. Another problem is related to the poor R_{sh} (shunt resistance) measuring the presence of micro-shunts in the cells. The higher R_{sh} the better.

PV 100 EL TEST & FLASH TEST



Cells are severely cracked. Cell type is an old one. The total power is lower than declared.

PV115_1 EL TEST & FLASH TEST



$$V_{oc} = 24.4807 \text{ V}$$

$$I_{mp} = 5.64 \text{ A}$$

$$I_{sc} = 6.20 \text{ A}$$

$$V_{mp} = 20.45 \text{ V}$$

$$J_{sc} = 6.20 \text{ A/cm}^2$$

$$P_{mp} = 115.37 \text{ W}$$

$$\text{Fill Factor} = 76.03 \%$$

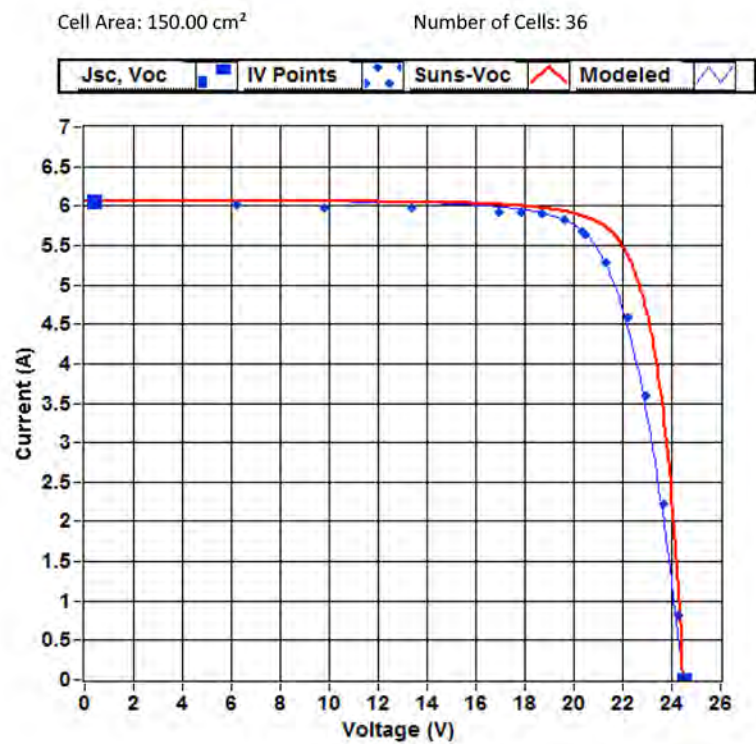
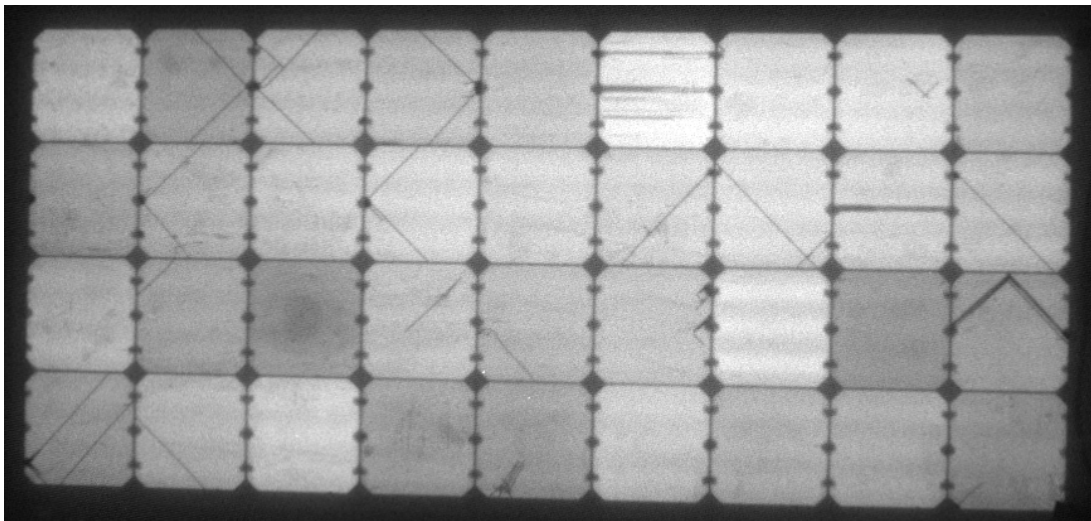
$$\text{Efficiency} = 17.10 \%$$

$$R_s = 0.26 \text{ Ohms}$$

$$R_{sh} = 309.59 \text{ Ohms}$$

Cells show cracks and marks. The total power and Fill Factor are ok. Rsh is low.

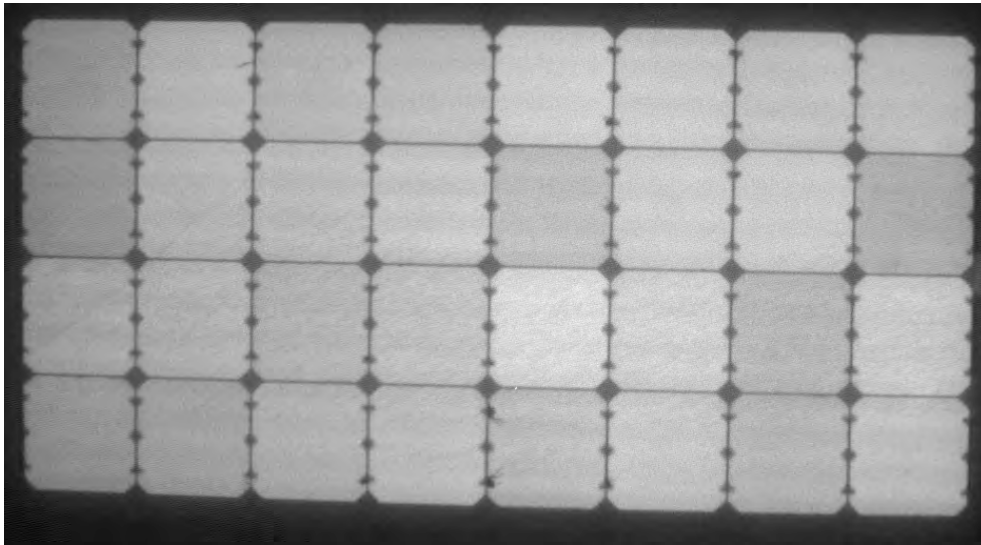
PV115_2 EL TEST & FLASH TEST



$V_{oc} = 24.4696 \text{ V}$ $I_{mp} = 5.65 \text{ A}$
 $I_{sc} = 6.06 \text{ A}$ $V_{mp} = 20.45 \text{ V}$
 $J_{sc} = 6.06 \text{ A/cm}^2$ $P_{mp} = 115.63 \text{ W}$
Fill Factor = 77.97 % Efficiency = 17.13 %
 $R_s = 0.20 \text{ Ohms}$ $R_{sh} = 504.69 \text{ Ohms}$

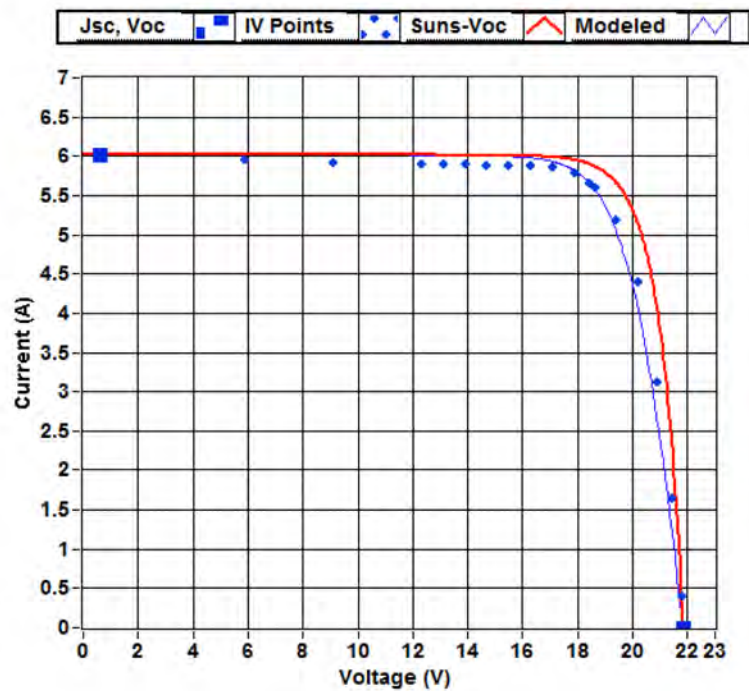
Cells show cracks and marks. The total power and Fill Factor are ok. Rsh is low.

SOLBIAN SP100 EL TEST & FLASH TEST



Cell Area: 153.00 cm²

Number of Cells: 32



$V_{oc} = 21.8391 \text{ V}$

$I_{mp} = 5.61 \text{ A}$

$I_{sc} = 6.02 \text{ A}$

$V_{mp} = 18.63 \text{ V}$

$J_{sc} = 6.02 \text{ A/cm}^2$

$P_{mp} = 104.45 \text{ W}$

Fill Factor = 79.43 %

Efficiency = 17.25 %

$R_s = 0.18 \text{ Ohms}$

$R_{sh} = 1553.43 \text{ Ohms}$

Some minor micro-cracks in the bottom-middle cell. Compare Fill Factor and especially Rsh.

STRESS TESTS

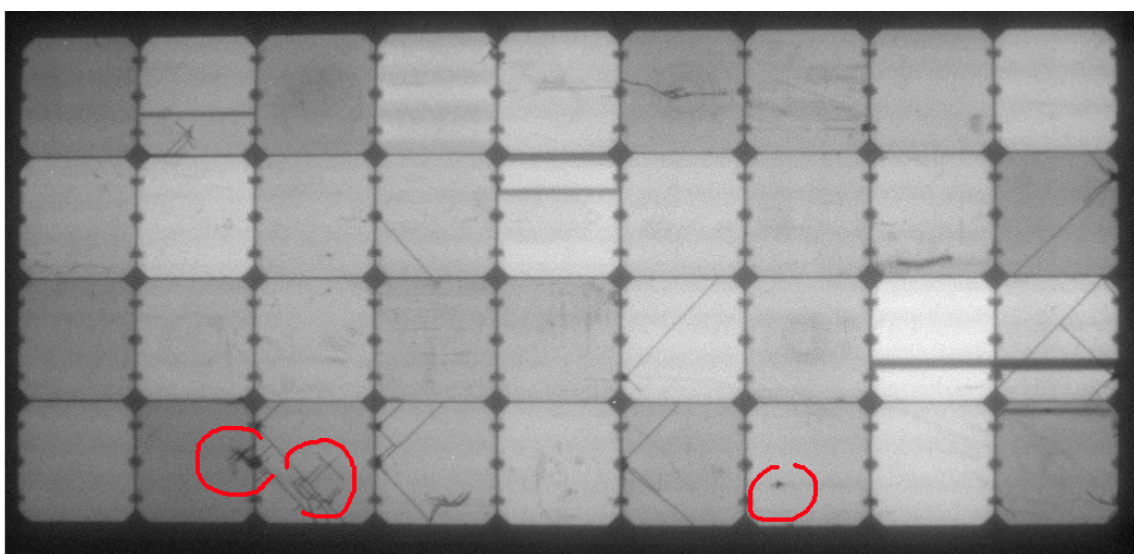
We performed some stress tests on PV115_1 and Solbian SP100

BENDING

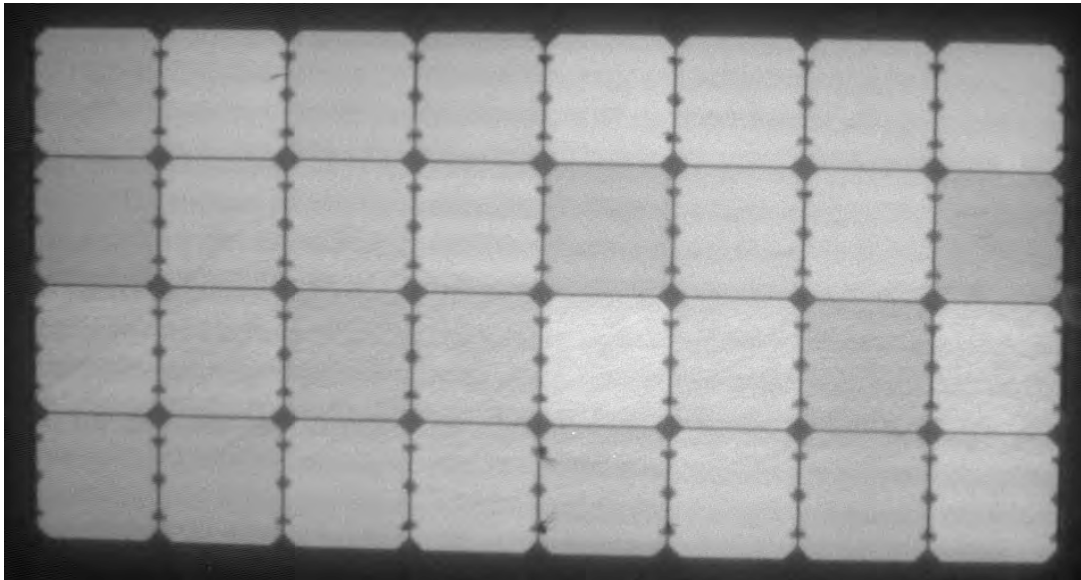
The panels have been bended for ten times as in the following picture:



After the bending EL and Flash test have been repeated.



PV 125_1 after bending shows some increase of cracks (marked in red)



SP100 after bending shows no change

Flash test have been repeated, showing some changes.

PV125_1	Before	After
Pmax	115,4 W	112,9 W
Fill Factor	76,0 %	75,3 %

SP100	Before	After
Pmax	104,5 W	103,6 W
Fill factor	79,4 %	78,9 %

Some comment: the Sun Simulator accuracy is about 1%. This means that the values of electrical parameters before and after the bending, for the SP100 are "the same" under the instrumental accuracy.