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Cells Tester A-1525

Based on Solaronix' exclusive light engine, our solar simulation equipment delivers a perfect and continuous artificial sunlight 24/7, allowing for accurate stability and performance assessments of solar

INNOVATIVE SOLUTIONS FOR SOLAR PROFESSIONALS

Cells Tester A-1525 Specifications

The Cells Tester A-1525 is a complete light soaking unit having a total sample area of 1.5 x 2.5m (array of 9 x 15 Si wafers 6 inches). It consists of three main components:

- A high efficiency Lumixo plasma light engines array (20 lamps) fitted with bulbs giving a Class A spectrum when operated between 800 and 1100 W/m².

At the heart of our simulators stand Solaronix' exclusive Lumixo light-engines (Xenonless xenon lamp), 1kW electrode-less discharge lamps with a lifetime up to 20'000 hours. All parts of the light engines can be refurbished or replaced.

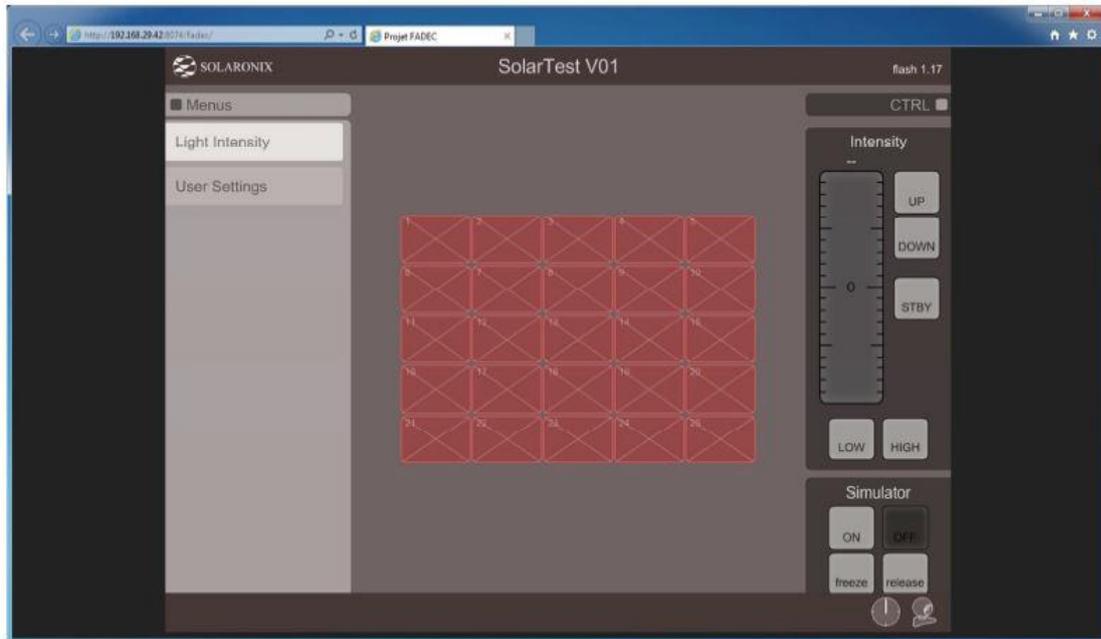
- A reflector box homogenizing the diffuse light from the light sources, in a way to ensure uniformity and proper spectrum on the sample area. The reflector box consists of a mechanical structure and its cabling elements dedicated to the light-engine array. The sample surface is placed 20-50 mm under the reflector edge. A door gives the user full access to the illuminating chamber when the system is non-operating.

The light-engines array and its reflector with the associated mechanics forms the complete illuminating unit. A traceable and calibrated reference cell is provided with the unit.

- The system has an air cooled sample holder to control the sample temperature during the illumination tests. The sample holder uses a chiller unit to maintain air temperature steady during illumination.



Cells Tester A-1525 (array of 9 x 15 Si wafers 6 inches)



Example of lamps array remote control

Illuminating unit specifications

Total Class AAA area: 1.5 x 2.5 m

Irradiance level: The nominal central irradiance measured with a reference silicon solar cell is 1000W/m² adjustable from 500W/m² to 1100W/m².

The lowest achievable irradiance (500W/m² or lower) acts as the standby mode, used for sample cooling down.

No shutter is necessary, nor provided with the system. If no light is needed, the light-engines array can be switched off.

Homogeneity over the sample area (within 800-1100 W/m² operating range):

The class ABB adjustment and characterization is provided by Solaronix, the specification is a class B uniformity ($\pm 5\%$ as per IEC 60904-9) on the complete sample area.

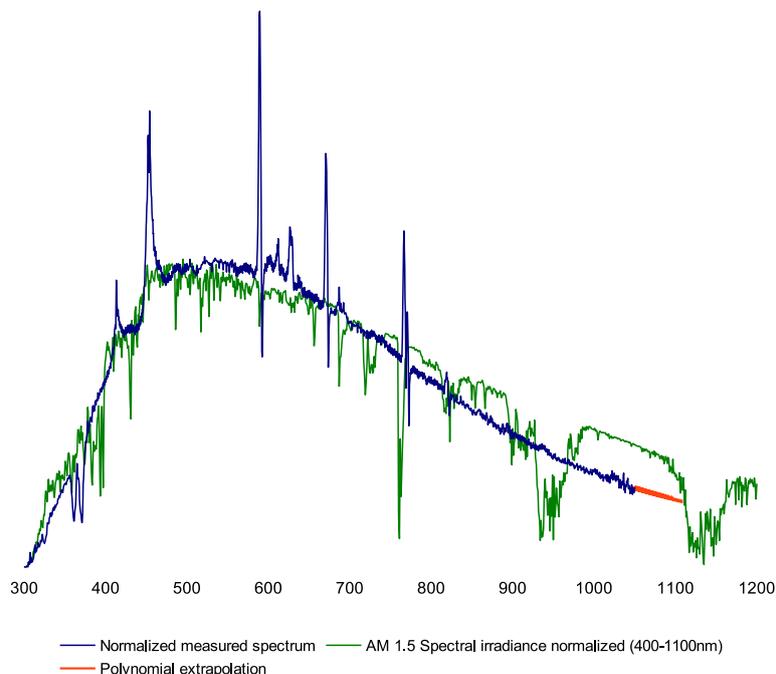
Temporal stability (within 800-1100 W/m² operating range):

The irradiance stability (LTI and STI as per IEC 60904-9) is defined as per IEC 60904-9, 5.4.1.3.c. The system is built to ensure $B < \pm 2\%$ temporal stability). Class A available with additional option.

Spectrum (within 800-1100 W/m² operating range): class A (as per IEC 60904-9)

Wavelentgh range	AM1.5 ratio	Spectrum ratio	Mismatch	Class
400-500 nm	18.4	17.9	0.97	A
500-600 nm	19.91	20.9	1.05	A
600-700 nm	18.36	19.6	1.07	A
700-800 nm	14.92	15.8	1.06	A
800-900 nm	12.46	11.5	0.92	A
900-1100 nm	15.94	14.4	0.90	A

Class A	Class B	Class C
0.75	0.60	0.40
1.25	1.40	2.00



Warm up time for stabilization of irradiance: ~150 s

Warm up time for stabilization of I-V measurements: ~150 s

Maximum angle subtended by the light source (including reflected light) in the test plane: 90°

Changes that may require verification of the classification:

Any lamp unit or power supply replacement may change the irradiance uniformity specification.

Any change of the system settings in the operating software may change the irradiance uniformity specification.

Temporal stability and spectrum should not be affected by such changes.

Operating conditions:

Ambient temperature +15°C to +35°C, relative humidity < 50%, non-condensing.

As no dust filter is provided on the air cooling system, the system has to operate in a clean, with no dust or fumes emitting process nearby.

Maximal power requirement: 35kW, nominal 25kW, 230VAC 60Hz; 3P/N/PE.

Required flow of cooling air:

System consumption (intake): 6000 m³/H at 25°C via multiple Ø250mm pipes on the system left & right side.

System exhaust: 6000 m³/H at 45-50°C via multiple Ø250mm pipes on the system front and/or back.

The cooling air unit must install following the requirements provide by the manufacturer.

Light engine

The light engine is a Xenonless Xenon lamp system. The light engine is based on plasma lamp. This new lamp equip the new generation of light soaker maintenance free.

The advantages of plasma lamp are:

- Sun spectrum class A according IEC60904-9 **without filter**
 - o Reduce maintenance cost
- Life time up to **40'000 hours** (warranty 20'000 hours)
 - o Reduce maintenance cost
- No shift spectrum
 - o Increase quality test
- No light flux reduction
 - o Increase quality test

Sample holder specification

Four air-to-water chiller unit provides water flow from 0°C to 80°C with stability of ±0.2°C to the sample holder unit placed under the samples. Sample holder is constituted by flat metal part including water circuit and vacuum chuck to warranty good contact on the back silicon cells. The sample holder is designed to install 135 cells of 15.6 x 15.6 cm size (array of 9 x 15 cells).

The user sets the water temperature on the chiller control unit, and he is also responsible for adjusting the water temperature according to the measured sample temperature.

The chiller units are connected to the computer to monitor the intake and outtake water temperature of the sample holder during the test.

Sample area: 1.5 x 2.5m

Cooling capacity:

The system is designed to cool or warm the sample holder between 15°C and 70°C (under light load and wafers loaded) to warranty a large rang or temperature test. Such a system has demonstrated its ability to cool down a crystalline silicon solar cell back face down to 20°C.

The sample temperature can be adjusted, by changing the cooling air unit temperature set point or by changing the ventilators speed.

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Required flow of cooling air: none, the cooling water is recirculating in close circuit inside the sample holder and the chiller.

Size of equipment

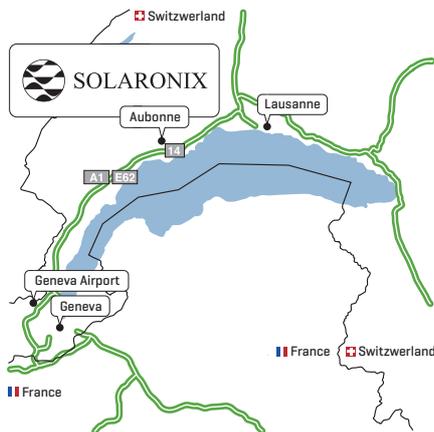
Simulator with drawer closed: 2.5m x 3m x h2.3m

System overall footprint, including service access: 3.5m x 4.5m x h2.3m

Weight: ~980 kg (illuminating unit and sample holder) + 264 kg (4 x Chiller units)



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