



SOLARONIX



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## UV-Rad-1525-V

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

## UV-rad A-1525-V Specifications

The UV-rad 1525-V is a complete UV tester unit having a total sample area of 1.5x2.5m. It consists of three main components:

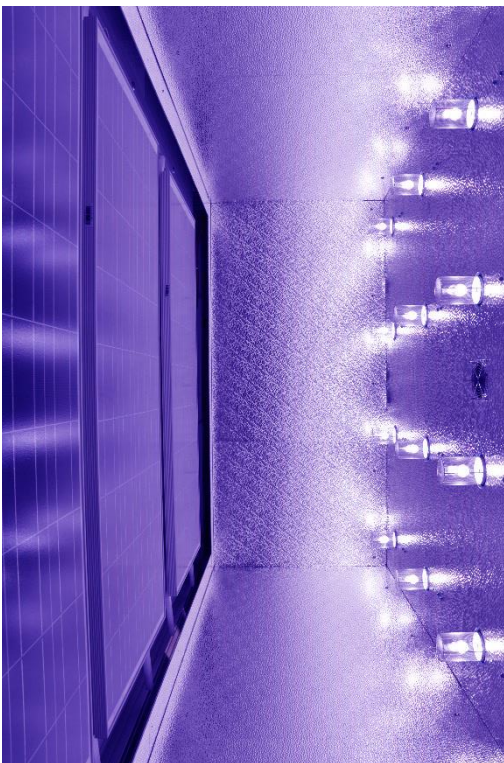
- A high efficiency Lumixo plasma light engines array fitted with bulbs giving a UVA and UVB sun spectrum. No light emission under 280nm.

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.

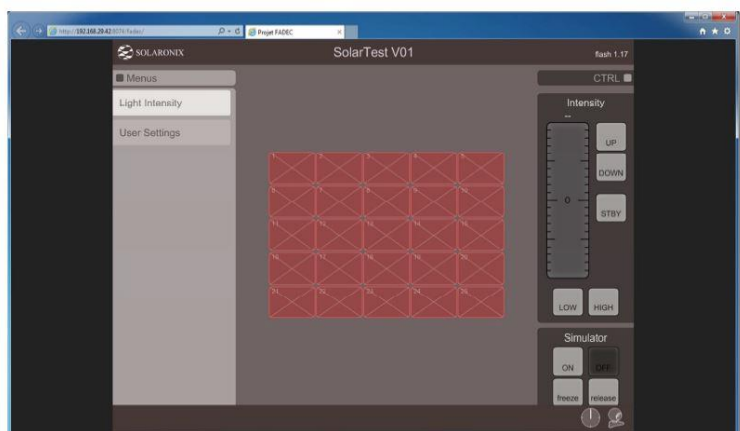
- A reflector box homogenizing the diffuse light from the light sources, in a way to ensure uniformity and proper spectrum on the sample area. The reflector box consists of a mechanical structure and its cabling elements dedicated to the light-engine array. The sample surface is placed 20-50 mm under the reflector edge.

The light-engines array and its reflector with the associated mechanics forms the complete illuminating unit. An instrumentation capable of measuring the irradiation of UV light produced by light-engines at the test plane of the module is provided. The instrumentation wavelength range is between 280nm to 385nm with an uncertainty less than  $\pm 15\%$ .

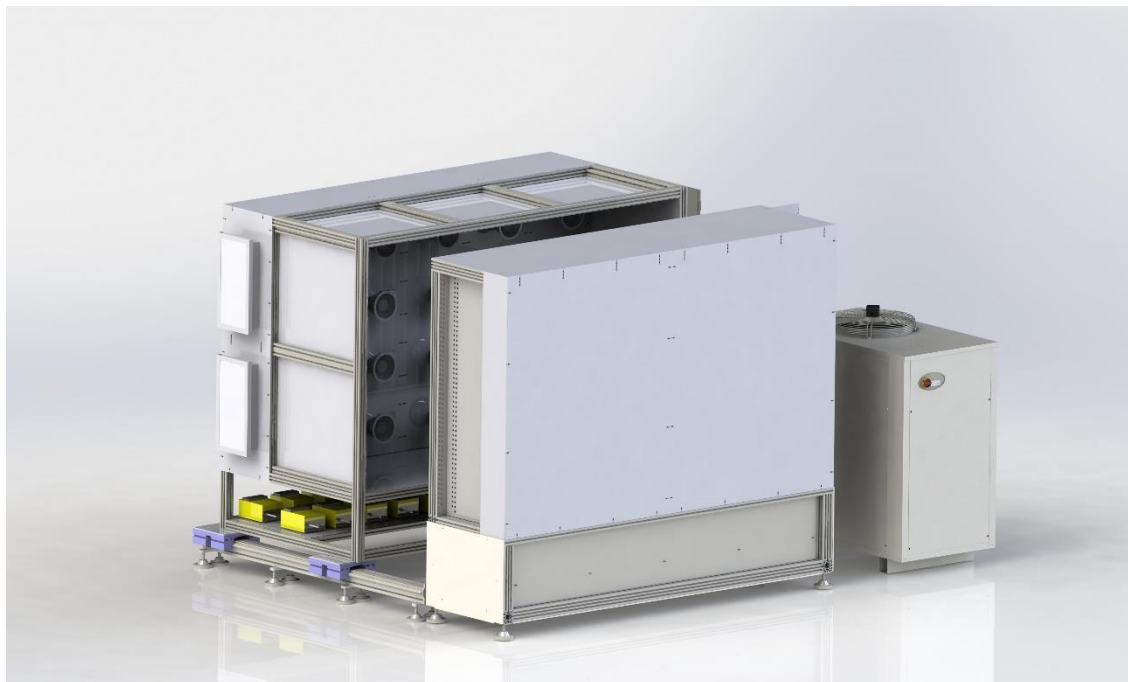
- The system has an air cooled sample holder to control the sample temperature during the illumination tests. The sample holder uses a chiller unit to maintain air temperature steady during illumination.



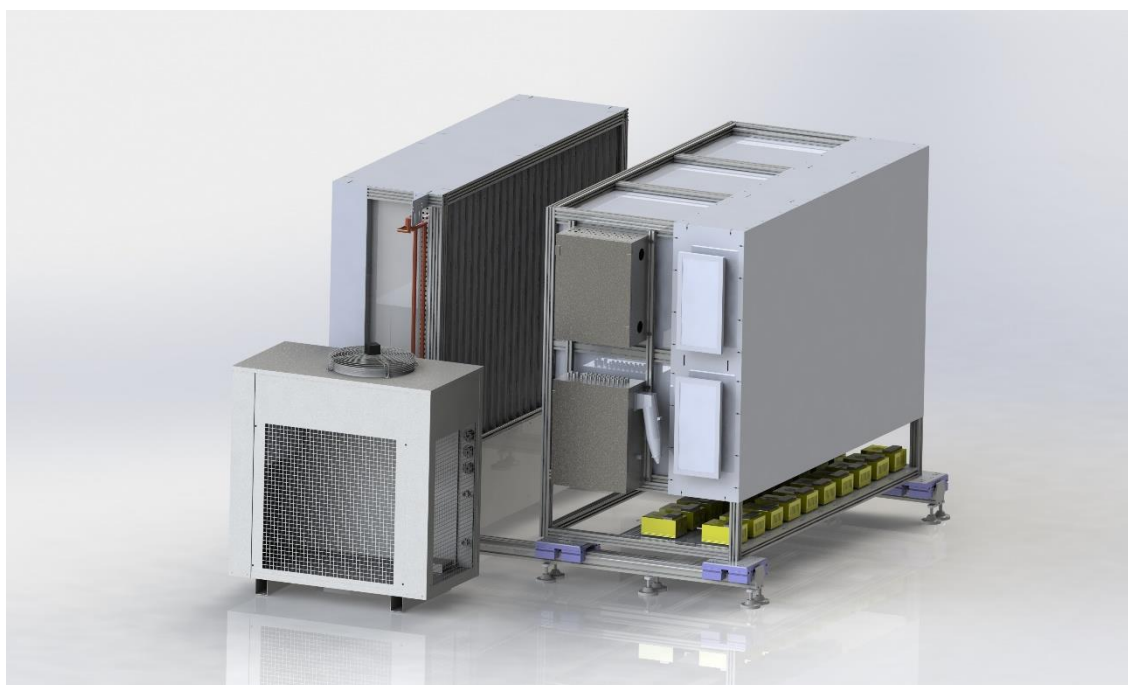
Illuminating chamber



Lamp array remote control



UV-rad 1525-V



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## **Illuminating unit specifications**

**Total active area:** 1.5 x 2.5 m

**Irradiance level:** The nominal central irradiance measured is adjustable between 125 W/m<sup>2</sup> (62.5% of maximum power) and 200 W/m<sup>2</sup> (100% of maximum power) in the wavelength range between 280 nm and 385 nm. The system is designed to provide total UV irradiation of 15 kWh/m<sup>2</sup> in the wavelength range between 280 nm and 385 nm, with at least 7.5 kWh/m<sup>2</sup> in the wavelength band between 280nm and 320nm according IEC61215-2:2015 (4.10).

**Safety first:** The light-engines are automatically switched OFF if an operator open the illuminator during operation. The safety lock is made by Sick i110 model.

### **Non-uniformity over the sample area:**

The non-uniformity adjustment and characterization is provided by Solaronix; the specification is less than ±10% non-uniformity (minimum ± 15% as per IEC 61215-2:2015 & IEC61646:2008) on the complete sample area.

### **Temporal stability** (within 200-250 W/m<sup>2</sup> operating range):

The irradiance stability (LTI and STI as per IEC 60904-9:2007) is defined as per IEC 60904-9:2007, 5.4.1.3.c. The system is built to ensure a < ± 1% temporal stability.

### **Spectrum** (within 150-200 W/m<sup>2</sup> operating range)

**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 non-uniformity specification.

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

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

**Operating conditions:**

Ambient temperature +15°C to +25°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.

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

**Maximal power requirement:** 30kW, nominal 20kW, 230VAC 60Hz; 3P/N/PE.

**Required flow of cooling air:**

System consumption (intake): 6000 m<sup>3</sup>/H at 25°C via multiple Ø250mm pipes on the system left & right side.

System exhaust: 6000 m<sup>3</sup>/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:

- UV Sun spectrum according IEC61215-2:2015 & IEC61646:2008 **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**

An air-to-water chiller provides water flow from 5°C to 20°C to a water-to-air exchanger placed under the samples. Recirculating air is blown trough this exchanger toward the samples to remove 10 kW of heat at an air temperature down to 7°C.

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.

**Sample area:** 1.5 x 2.5m

**Cooling capacity:**

The system is designed to provide 7°C air with an average velocity of 2m/s on the sample back face. Such a system has demonstrated its ability to cool down a crystalline silicon solar panel back face down to 60°C ± 5°C.

The user sets the water temperature on the chiller control unit, and he is also responsible for adjusting the water temperature range according to the requested sample temperature. A regulation loop makes the fine tuning of sample temperature to keep the PV panel at the desired temperature during the test. The regulation loop can keep the temperature of sample inside the range define by the chiller water temperature.

A manual with all parameters of the equipment will provided to use the equipment following the norms procedure.

**Operating conditions:**

**Ambient temperature +15°C to +25°C, humidity < 40%, non-condensing.**

**Maximal power requirement:** ~8.1 kW, 230VAC 60Hz; 3P/N/PE.

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

**Electronic load:** System is equipped with electronic load of 500W with barcode scanner to scan serial number of PV modules.

**Measurements capabilities**

The system is compliant to produce the next measurements:

- UV preconditioning test (MQT 10) IEC61215-2:2015 (4.10) & IEC61646:2008 (10.10)
  - o I-V measurement system included in quotation QUO120116LC01

**Size of equipment**

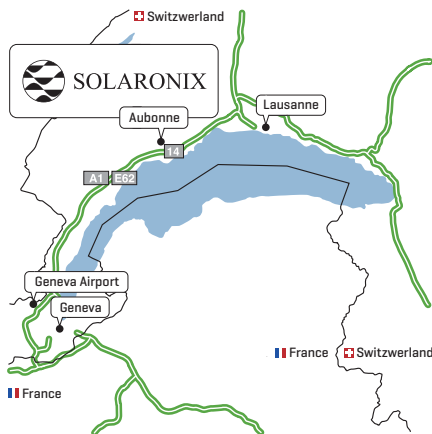
Simulator with drawer closed: 2m x 3m x h2.3m (without rails)

System overall footprint, including service access: 4m x 4.2m x h2.3m

Weight: ~910 kg (illuminating unit) + 420 kg (sample holder) + 280 kg (Chiller unit)



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