

HYPERION III

LED SOLAR SIMULATORS



HYPERION III

Hyperion III is a revolutionary LED solar simulator equipped with an innovative LED matrix light source that matches the A+A+A+ Class over a 12 cm X 12 cm area and the A+AA Class over a 23 cm X 23 cm area.

Hyperion III matches the most stringent international standards (ASTM E927-05, IEC 60904-9 2007, and JIS C 8912, Spectral Match 400 – 1100nm wavelength in 100nm bandwidth increments, Non-Uniformity, and Temporal Instability).

The beam intensity is adjustable up to 1 Sun and the emission spectrum can be customised via a dedicated software.



DIMENSIONS

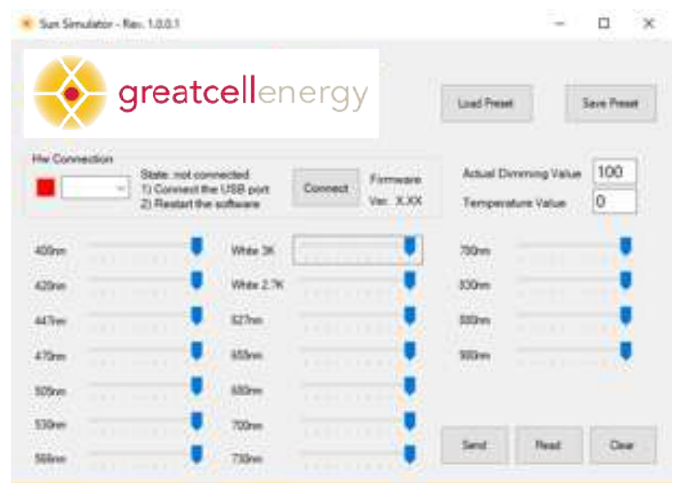
- External chamber at base level: L 41 cm X W 41 cm X H 41 cm
- External chamber at heatsink level L 41 cm X W 46 cm x H 41 cm
- Internal chamber: about L 40 cm X W 40 cm X H 20 m
- Distance from light source to have 1 SUN: 8 cm

SOFTWARE

A dedicated Software enables the customisation of the LED matrix emission spectrum starting from the sun wavelength default value.

The end user can dim a single LEDs family output (the dimming range can vary with different LED types) or the entire spectrum with a 1% (or multiples) step.

Each LED family can be switched off and dimmed individually to simulate scenarios (sunrise, dusk, indoor, etc.), unlike Xenon solar simulators there is no need for expensive filters. Personalised custom spectrums can be stored, retrieved and modified in a repository without any alignment or calibration activities



SOLAR OUTPUT DESCRIPTION:

CLASS A+A+A+

MEETS TÜV Rheinland CLASS A+A+A+ SPECIFICATIONS (2 times better than AAA class) over 12 cm X 12 cm illumination area

CLASS AAA

MEETS IEC, JIS, ASTM CLASS AAA SPECIFICATIONS over 23 cm X 23 cm illumination area

BEAM SIZE

Class AAA over entire 23 cm x 23 cm area

ENERGY LEVEL

Approximately 1 Sun (with power variation depending on LEDs families set values)

SPATIAL UNIFORMITY

≤ 1% over 12 cm x 12 cm area (Class A+)

SPATIAL UNIFORMITY

≤ 2% over 23 cm x 23 cm area (Class A)

SPECTRAL MATCH

Class A+ over 12 cm X 12 cm area; See spectral curve below

SPECTRAL MATCH

Class A over 23 cm X 23 cm area; See spectral curve below

TEMPORAL STABILITY

≤ 1 % (Class A+)

DARK CURRENT MEASUREMENT

No light leakage for best dark current measurement

LAMP SPECIFICATIONS:

LAMP TYPE	LED matrix
WATTAGE	600 W
LAMP LIFE	≥ 25000 hours

POWER SUPPLY SPECIFICATIONS:

SOURCE	100-240 Vac 50-60Hz
RIPPLE	250mVP-P
RFI/EMI	EN55015 , En61000-3-2, EN61000-3-3, EN61547,EN55024
LINE REGULATION	+ 0.5%
CURRENT REGULATION	+ 0.5%,
SAFETY	Isolation resistance 100 Mohm/ 500vdc 25°C/70% RH

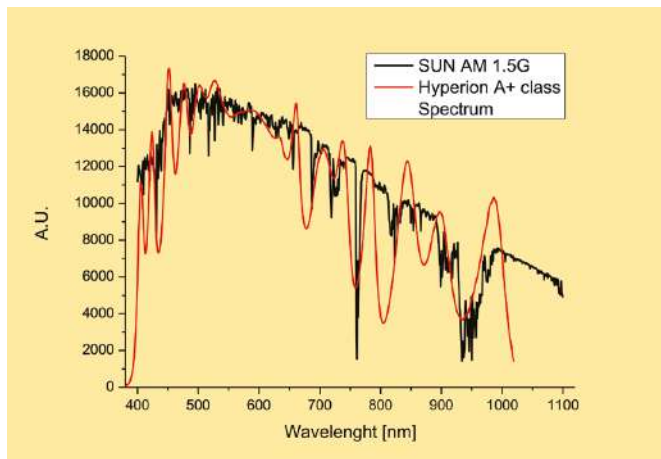
FILTERS:

AIR MASS No filters needed to match AIR MASS (400 nm -1100 nm)

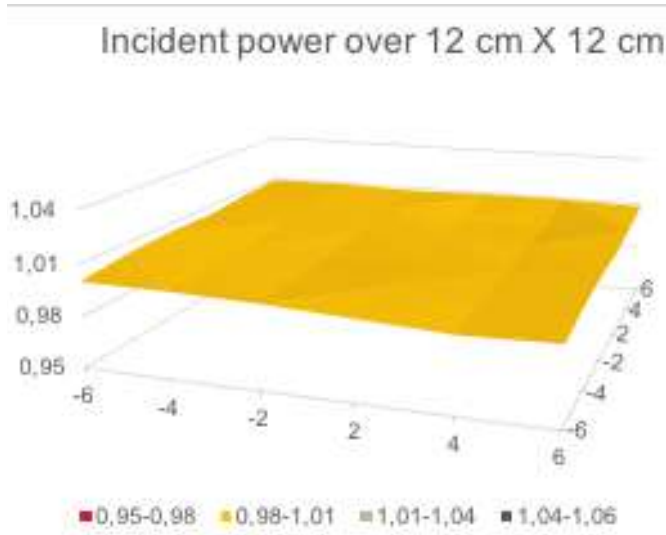
POWER REDUCTION depending on LED family set value, adjustable via SW

SOLAR SIMULATOR SPECIFICATIONS

Class A+ spectral performance 400 nm – 1100 nm band

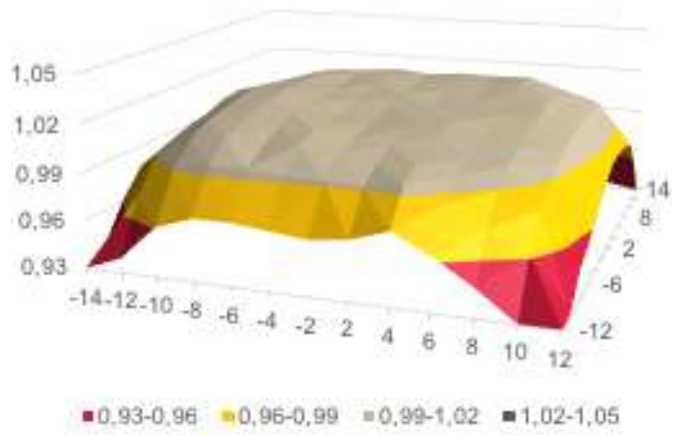


Class A+ Spatial Non-Uniformity Performance



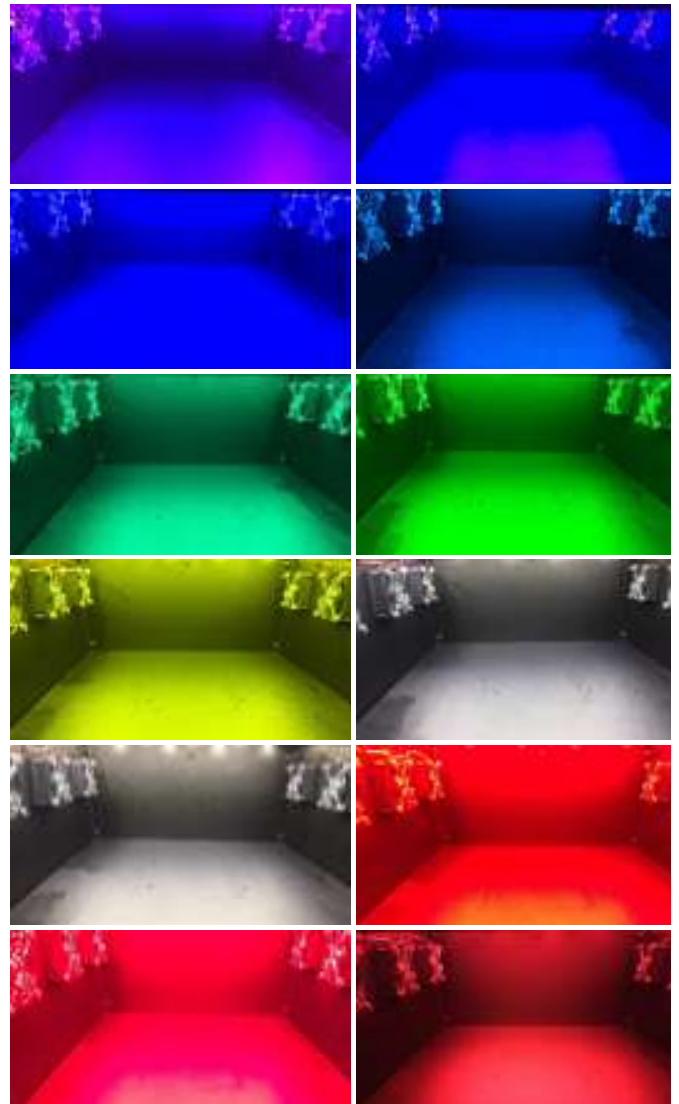
Class A Spatial Non-Uniformity Performance

Incident Power over 26 cm X 26 cm



LED MATRIX

Hyperion III LED Matrix is equipped with 18 LED families (basic configuration) to provide a class A mapping of the AM1.5G spectrum between 390 nm and 1020 nm. The spectrum can be extended between 350 nm and 1100 nm (optional) band or customised to specific emission bands in the 350 nm – 1100 nm range.



SOLAR SIMULATOR	SPECIFICATION COMPLIANCE	
Type of Solar Simulator	1) Steady State Continuous 2) Pulsed up to 100 Hz with trigger output reference signal (optional)	
Filter	No Filter required	
Maximum Illumination Area	35 cm X 40 cm	
Typical Power Output	1000 W/m ² (adjustable)	
Class	A+A+A+ over 12 cm X 12 cm area A A A over 23 cm X 23 cm area	
Class A+A+A+ (Spectral Match, Spatial Non-Uniformity and Temporal Instability) classifications over 12 cm X 12 cm area Class AAA (Spectral Match, Spatial Non-Uniformity and Temporal Instability) classifications over 23 cm X 23 cm area	Complies with TÜV Rheinland specifications Complies with IEC 60904-9-2007, JIS C89927-05	
Spectral Match over 12 cm X 12 cm area Spectral Match over 23cm X 23 cm area	≤ 12.5 % ≤ 25 %	
Min/Max limits of Irradiance	Over 12 cm X 12 cm Area Range A+ class (Typical value)	Over 23 cm X 23 cm Area Range A class (Typical value)
400 - 500 nm	16.1% - 20.7% (Typical: 18.2%)	13.8% - 23.0% (Typical: 18.0%)
500 - 600 nm	17.4% - 22.4% (Typical: 21.7%)	14.9% - 24.9% (Typical: 22.5%)
600 - 700 nm	16.1% - 20.7% (Typical: 18.4%)	13.8% - 23.0% (Typical: 18.8%)
700 - 800 nm	13.0% - 16.7% (Typical: 15.5%)	11.2% - 18.6% (Typical: 15.8%)
800 - 900 nm	10.9% - 14.1% (Typical: 11.1%)	9.4% - 15.6% (Typical: 10.5%)
900 - 1100 nm	13.9% - 17.9% (Typical: 14.9%)	11.9% - 19.9% (Typical: 14.0%)
Spatial Non-uniformity of irradiance over 12cm X 12cm area Spatial Non-uniformity of irradiance over 23cm X 23cm area	≤ 1% ≤ 2%	
Temporal Instability	≤ 0.5% STI ≤ 1.0% LTI	
Type of Solar Simulator Lamp	LED Matrix	
LED Matrix life	≥ 25000 h	
Emission Band	390 nm - 1020 nm (customizable from 350 nm to 1100 nm)	

OPTIONAL

SPECTROMETER

A fiber optically coupled portable instrument for measurements in the 350 nm- 1150nm range can be coupled with Hyperion III. Its innovative electronics with a high speed 16-bit digitizer allows for fast data acquisition and a signal to noise of 1000:1. It can be powered directly from a PC USB-2 port.

The fiber optic cable or probe assembly delivers its input via a standard SMA 905 fiber optic connector. The spectrograph optics are exceptionally robust in a vibration tolerant modular design, with no moving parts. An onboard Memory with pre-set Calibrations, spectrometer settings and a snap shot memory provides an instantaneous spectral image from the highly sensitive CCD.

REFERENCE CELL

High efficiency Greatcell Energy monocrystalline silicon solar reference cells guarantee the most precise and long-term stable certified reference cells available (each of our reference cells are certified by Fraunhofer institute to guarantee top quality calibration). For different photovoltaic cell technologies and other applications, custom solutions can be provided. The reference cell is fundamental to check the incident power value at the DUT level and it is an essential piece of equipment if measurements at incident power with values different from 1 SUN are required. The Greatcell Solar's reference cell is equipped with a Pt100 embedded thermocouple to monitor the temperature variation.