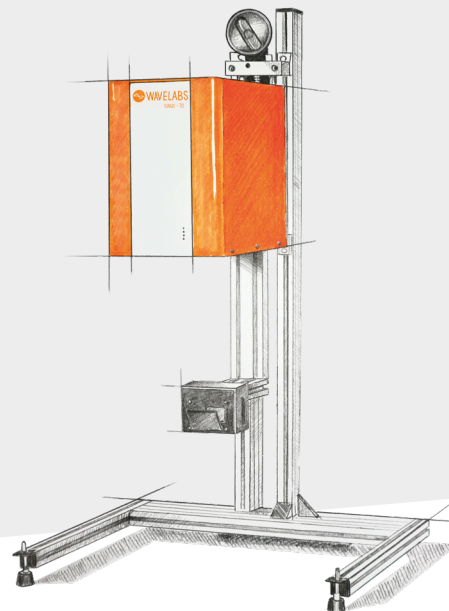




LED solar simulator **SINUS-70**

LED's COPY THE SUN



The **SINUS-70** is the ideal solar simulator for research. With its highly accurate and precise simulation of the sun spectrum, it is suited for solar cell efficiency measurement as well as for experiments in life and materials sciences – just to name a few of the applications possible. The intelligent LED-based light source is what makes this exceptional accuracy possible.

LED's present the new benchmark!

FEATURES



Light engine with multiple LEDs
for a perfect copy of the sun



Exceeds class AAA criteria
(IEC 60904-9, JIS C8912, ASTM E 927-10) for spectral match, non-uniformity and temporal stability



All LEDs can be tuned separately
for user-defined spectra



Wide range of exposure times
from flashes up to continuous illumination



Built-in spectrometer



Reference intensity sensor
in combination with fast feedback loop
for automatic intensity correction



Typical LED lifetime
of 20,000 hrs and more

WAVELABS is a proud partner of:



UNSW
SYDNEY

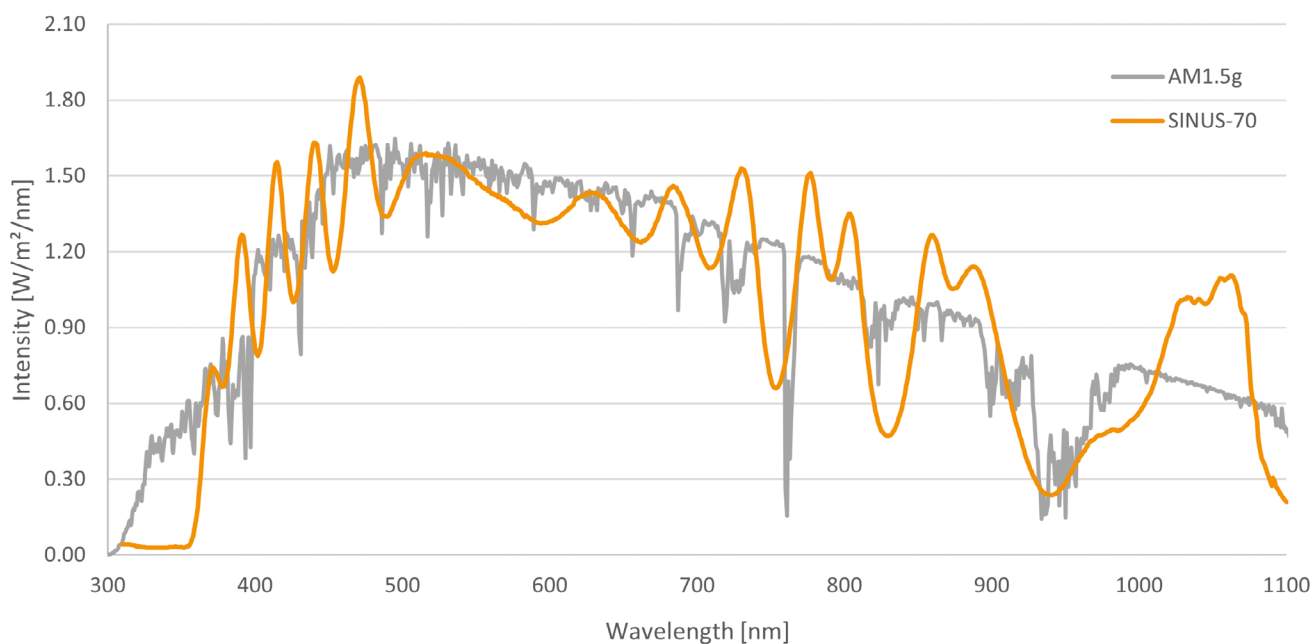


CLASSIFICATION			
	SINUS-70		Class AAA requirements (IEC 60904-9 Ed. 2)
Spectral match	Class A++	0.95 - 1.05	0.75 - 1.25
Nonuniformity of irradiance (25 x 25 mm ²)	Class A+	< 1%	< 2%
Nonuniformity of irradiance (51 x 51 mm ²)	Class A	< 1.8%	< 2%
Long-term instability (LTI) flash length < 0.5 s	Class A++	< 0.5%	< 2%
Long-term instability (LTI) flash length > 0.5 s	Class A+	< 0.6%	< 2%

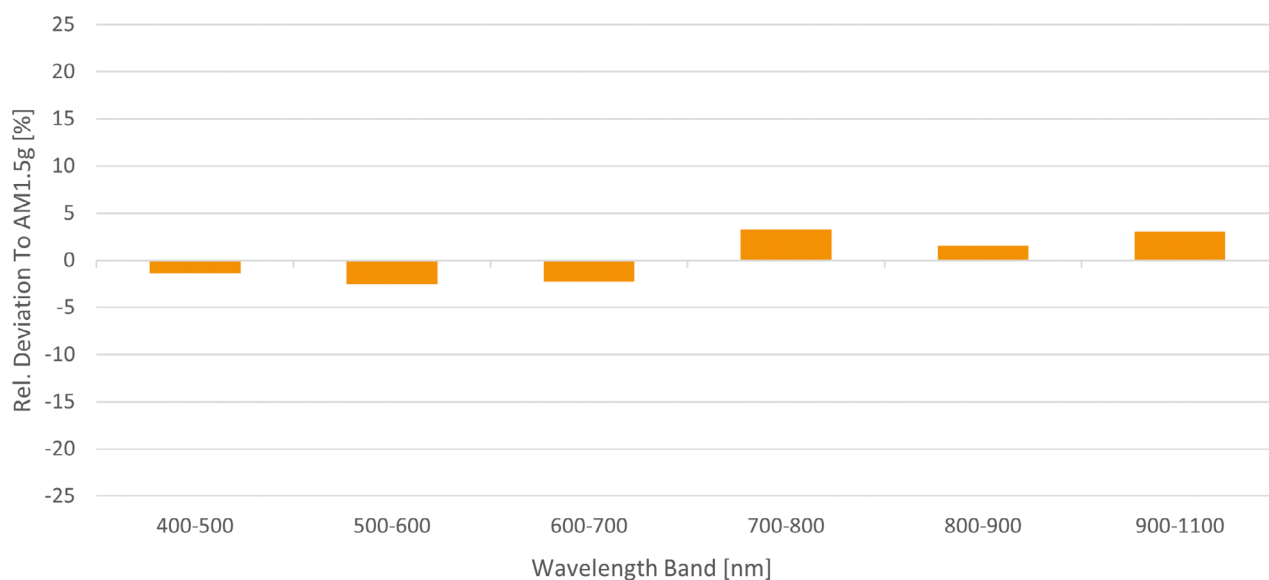
Validity of classification: WPVS cell ISE021/030-2014, 1 sun, AM1.5g, 250 ms, 51 x 51 mm², 335 mm distance between light engine and test plane

SPECTRAL QUALITY

Typical spectrum of LED solar simulator SINUS-70



Typical spectral deviation



PRODUCT FEATURES

Light source	Multiple individually controlled sets of LEDs with different peak wavelengths
Spectral range	Modular system allows for spectral range from 350 nm up to 1,100 nm or 1,260 nm (IR booster)
Intensity range	From 0.2 up to 1.3 sun
Spectrum	Comes with AM1.5g spectrum. User can easily define other spectra including illumination by single LEDs or a combination of various LEDs
Irradiance time	From 10 ms up to continuous illumination (continuous illumination requires water-cooling of LEDs)
Special optical lens system	The multilevel special optical lens system ensures that all LEDs/colors are perfectly mixed so that each spot in the test plane is illuminated with an identical spectrum
Feedback system	Monitor cell and spectrometer measure intensity and spectrum during each single flash multiple times. Intensity adjustments, if necessary, are made on the fly
Active cooling	A special temperature cooling unit ensures that all LEDs are run at the perfect operating temperature. As a result, intensity and spectrum are perfectly stable for highly accurate measurements. For long exposure times and high repetition rates or continuous light, water-cooling is necessary for the best stability and life span
Test area	51 x 51 mm ²
Distance light engine – sample	335 mm is the designated operating distance; the rack allows for easy height adjustment if sample thickness varies, for example
Light engine orientation	Rack allows for flexible head orientation for sunny side up, sunny side down and various other angles

System control	Software runs on conventional Windows PC or laptop. GUI can be controlled via mouse and keyboard. Connection to SINUS-70 via USB. Remote control via TCP/IP commands using LabVIEW or Python routine possible
Spectral calibration	Factory-calibrated
Recipe management	User can save different settings each with different spectral composition and intensity

PRODUCT REQUIREMENTS

Power	270 W @ 1 sun, 110 VAC or 230 VAC, 50/60 Hz, 1 phase
Environment	Noncondensing ambient humidity with relative humidity less than 80%
Chiller	Required for long flash times, 350 W, 4 l/minute, 0.5 - 1 bar

SCOPE OF DELIVERY

- Light engine (L x D x H) 330 x 180 x 270 mm³, 24.5 kg incl. rack
- Vertical stand (L x D x H) 560 x 600 x 980 mm³
- Controller incl. power supply (L x D x H) 172 x 460 x 462 mm³, 9 kg
- Laptop with software
- All cables
- CE certificate
- User manuals

CONTACT

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