

14 August 2014

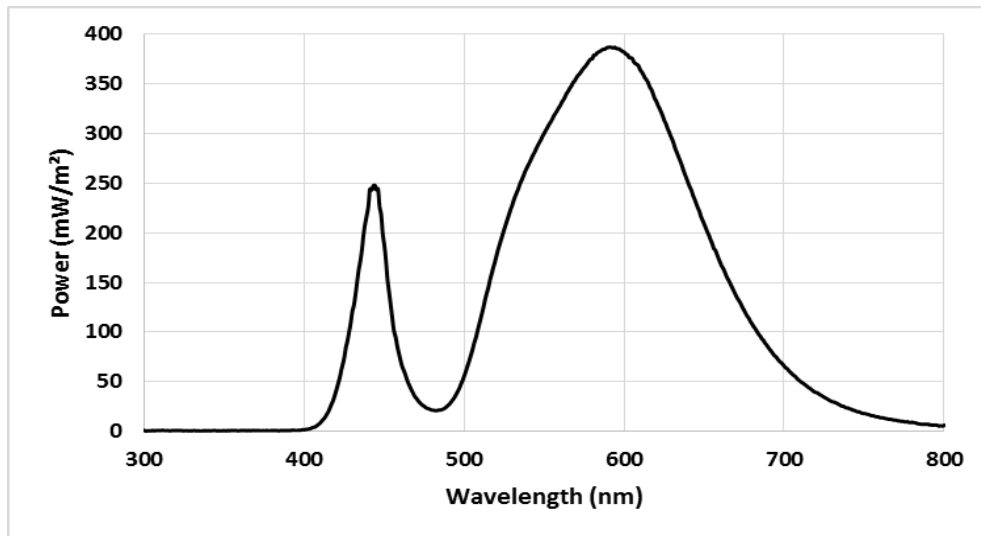
**TECHNICAL RELEASE**

**LUZCHEM EXPOSURE STANDARD: LES-LEDWW-14**

**General information:** Luzchem Research, Inc. produces and distributes freely these standards as a service to scientists involved in research in photochemistry, photobiology and photostability. These standards are available in Luzchem's website so that references to any of our standards can be used to define conditions of exposure, and should allow other scientists to readily replicate irradiation conditions. Luzchem has measured these exposure standards using a Luzchem SPR-4001 spectroradiometer calibrated against traceable NIST standards within the 6 months preceding the determination. To the best of our knowledge spectral information is accurate within the experimental bandwidth of 2 nm.

Lamp part number	Luzchem LED-WW	Measurement temperature	23 °C
Filter	None, direct exposure	Measurement date	14-August-2014
Filter effect determined by	Not applicable	Spectral range monitored	240 to 880 nm
Photoreactor model	EXPO-LED	Harmonic peak interference	None observed
Number of lamps and location	5 overhead lamps, approx 10 cm from target	Lamp type:	T5 Broadband
Colour Temperature	3000-3500 K	Resolved peaks	444,591 nm

# LED lamps start at a shorter wavelength than their stabilized temperature and take about 5 min to equilibrate.



Region	Range nm <sup>a</sup>	Dose mW/m <sup>2</sup>	% Energy <sup>b</sup>
UVA	316-400	58	<0.1%
Wavelength Range Peak 1	400-482	7059	12%
Wavelength Range Peak 2	482-700	49838	83%
Visible	400-700	56918	>95%
NIR	701-850	2549	4%

The table to the left shows the energy distribution at the target, expressed as total irradiance and as a percentage of the total energy. The calculations refer to the monitored range indicated.

<sup>a</sup> Integration range. <sup>b</sup> Within experimental error.