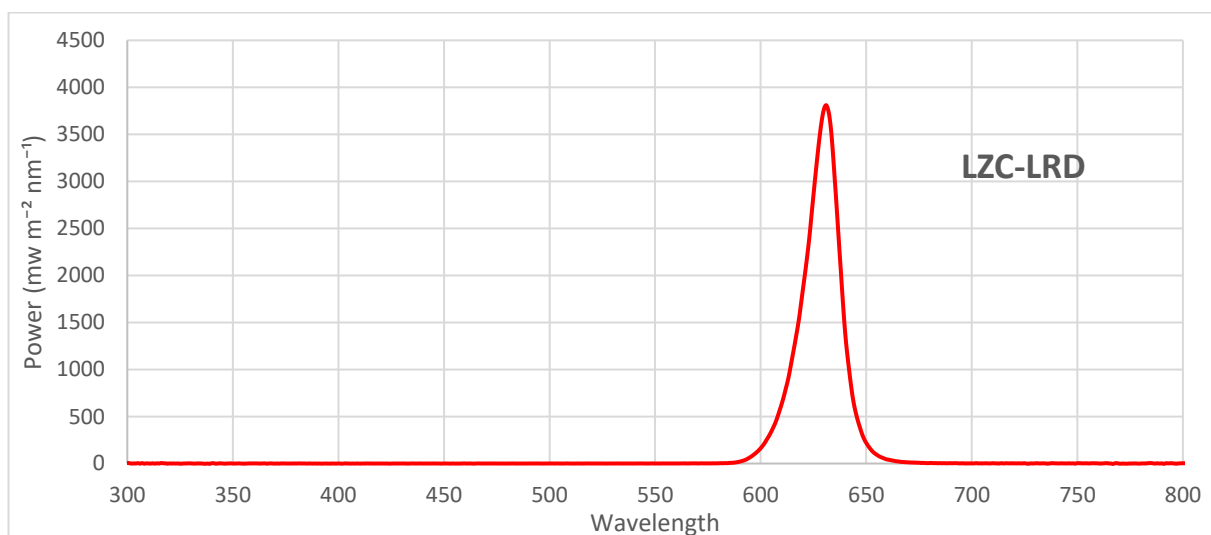


TECHNICAL RELEASE
LUZCHEM EXPOSURE STANDARD: LES-LRD-22

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 on Luzchem's website. References to our standards can be used to define conditions of exposure and should allow other scientists to readily replicate irradiation conditions. Luzchem has used a calibrated Luzchem SPR-4001 (s/n 047) spectroradiometer calibrated on November 10, 2021. The SPR-4001 is calibrated using NIST traceable lamps: Spectra Physics Deuterium Lamp (UV) Model 63945 Serial # 667172 Calibrated September 2013, and Spectra Physics Tungsten Halogen Lamp (VIS) Model 63355 Serial #7-1769R2 Recalibrated November 2013 and to the best of our knowledge spectral information is accurate within the experimental bandwidth of 2 nm.

Lamp Type	Luzchem LZC-LRD	Internal surface	Unpolished scattering aluminum
Filter	None, direct and reflected exposure	Measurement Temperature	25 °C
Filter effect	N/A	Measurement date	October 28, 2022
Photoreactor model	LZC-ICH2	Monitored range	235 to 850 nm
Number of lamps	8 overhead lamps, side lamps not used.	Harmonic peak interference	None observed
Measurement distance	~ 18 cm lamp to target	Resolved peaks	632 nm



Region	Range, nm	Dose mw*m ⁻²	% energy
UVA	315-400	32	<1%
UVB	280-315	36	<1%
UVC	235-280	48	<1%
Visible	400-700	81368	99.6%
NIR	700-850	211	<1%

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

- (1) The same spectral information should also apply to other photoreactors constructed of the same materials, including all Luzchem models.
- (2) For details of Luzchem's spectra determinations see Technical Release: Recording of Luzchem Exposure Standards.

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