



OAI UV LED Light Source

OAI introduces our third generation of UV LED Light Sources. Our new line of UV LED Light Sources is built with the same standards of quality and performance as our widely recognized mercury arc light sources.. OAI's UV LED Light Sources have applications in photolithography, curing, micro-fluidics, and biomedical activations. This new line of light sources can be integrated into an OEM application, used with an OAI Mask Aligner, retrofitted onto a legacy mask aligner, or purchased as a stand-alone exposure tool.

ADVANTAGES: Model 32 UV LED Light Source

There are several advantages inherent in a light source powered by UV LED's vs a traditional mercury arc lamp. The two main advantages are energy consumption and cost of ownership. A mercury arc lamp must remain on during the entire time that exposures are being performed. For example, a 1000W m

Mercury arc lamp is consuming even more than 1000W of power. During an 8 hour production cycle, the lamp may remain on for more than 9 hours, thus using more than 9kWH of energy consumption. In contrast, a UV LED Light Source would only be on during the actual exposure time of the process. For example, if the exposure is 10 seconds long, and occurs once per minute over an 8 hour shift, then the total exposure time would be 1.33 hours. At 1000W, the total energy consumption of a UV LED Light Source is only 1.3 kWh resulting in an energy savings of more than 6 times.

The second main advantage of UV LED Lamps is their lifetime. Most mercury arc lamps require changing after about 750 to 1000 hours of use. Lamp changes require the time to be taken offline to facilitate the change. Typically, a recalibration of the intensity control loop is also required potentially leading to process variation. In contrast, a UV LED Light Source requires no lamp change. The UV LED Lamps have a very long life, and are only on during actual exposure time. This allows the light source to be capable of millions of exposures before the end of lifespan is reached.

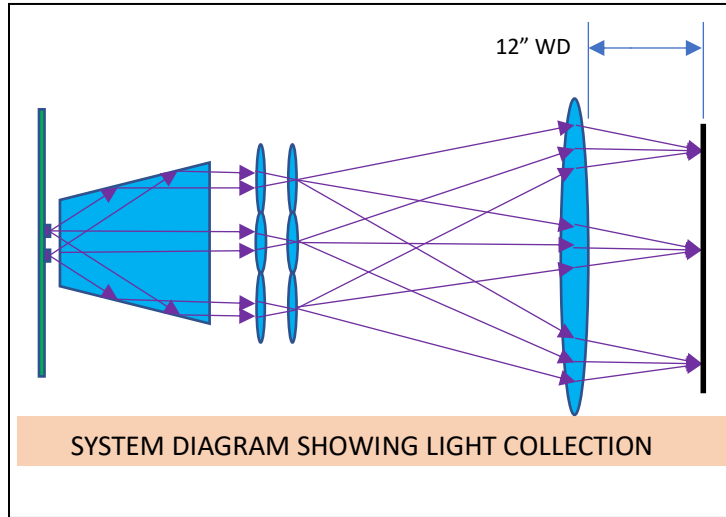




DESIGN: MODEL 32 UV LED Light Source

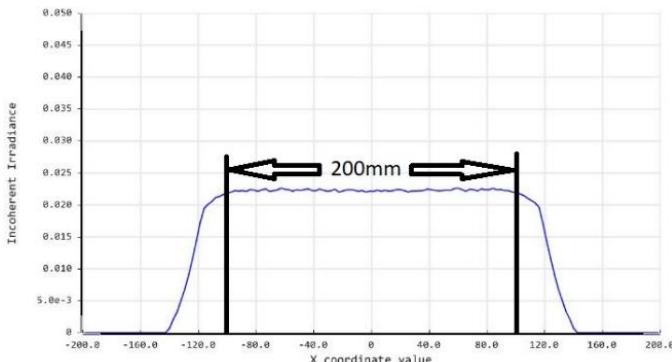
The OAI UV LED Light Source is designed that the natural aging of the individual UV LED's in the system does not impact the quality of the beam coming from the light source. The light is collected from the UV LED's and collimated before passing through a set of micro-lenses, which homogenize the beam. Finally, the light is fully collimated into a very uniform beam with a small divergence angle. This design produces excellent beam quality, enabling users of the OAI UV LED Light Source to achieve the highest performance in contact and proximity photolithography. The

interface is a simple touch screen that gives the user full control over the output power of the light source as well as the ratio of desired wavelengths in the case of a multi-wavelength system.

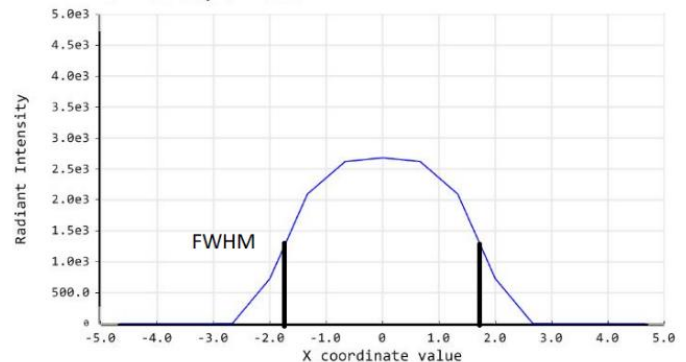


PERFORMANCE: MODEL 32 UV LED Light Source

The OAI UV LED Light Source has excellent performance characteristics. Typical irradiance uniformity is +/- 4%, and the collimation angle is $<2.5^\circ$. In order to achieve precise and repeatable exposures, all OAI LED Light Sources come equipped with intensity and dose control. Beam characteristics of a typical 8" square UV LED Light Source are shown below with a flat spatial uniformity intensity profile and a FWHM radiant intensity as a function of collimation half angle of 1.8° .



CROSS-SECTION OF BEAM SHOWING USABLE AREA



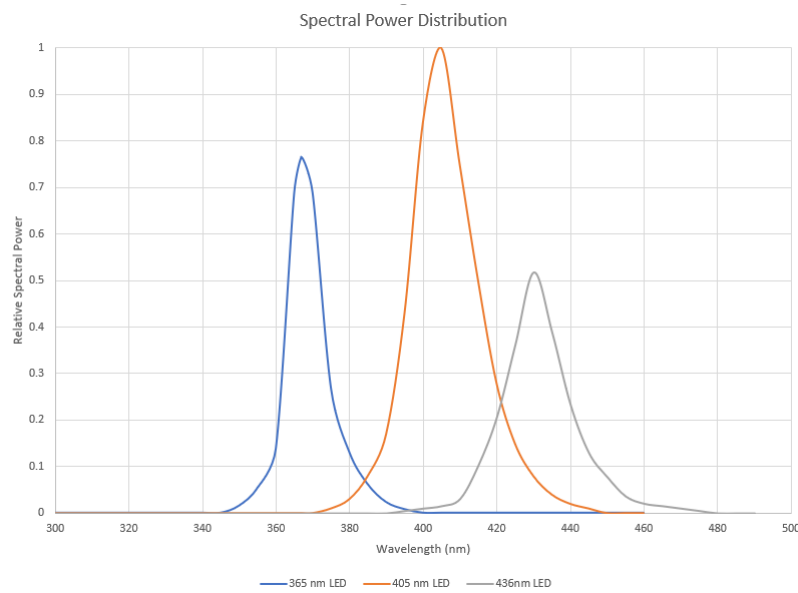
RADIANT INTENSITY AS A FUNCTION OF INCIDENT ANGLE



CONFIGURATIONS: Model 32

UV LED Light Source

The UV LED Light Source comes in uniform beam sizes of 4" square, 6" square, 8" square and 12" square. It can be configured as a single wavelength system or a dual wavelength system. Available standard wavelengths are 365nm, 405nm, and 436nm. These wave lengths are the same as the mercury arc lamp spectrum for which photoresists have been optimized. Other wavelengths are available upon request. Spectrums of each standard wavelength and their relative integrated power are shown below.



Specifications/Model #	LS 32-4	LS 32-6	LS 32-8	LS 32-12
Beam Size	4in x 4in	6in x 6in	8in x 8in	12" X 12"
Intensity @365nm	80mw/cm2	40mw/cm2	20mw/cm2	10 mw/cm2
Spatial Uniformity	+/-4%	+/-4%	+/-4%	+/- 4%
Collimation Half Angle	2.4°	2.2°	1.8°	1.8
Wavelengths Available	365nm, 405nm, 436nm or any pair combination			

