



## Advanced UV-LED Light Engine ONE

### ALE/1 – Light Guide-Coupled UV-LED Light Sources



#### Key Applications

- + UV exposure in lithography tools (Mask Aligners, Wafer Steppers, Wafer Edge Exposure)
- + Photomask- and Reticle Inspection
- + Precision UV spot curing in automotive, electronics, medical, and optics manufacturing
- + Highly uniform flood exposure
- + Non-Destructive Testing (NDT)
- + Life Sciences applications

#### ALE/1 UV-LED Light Source Highlights

- + Up to 30 Watts of optical output
- + Fully customizable spectrum (UV, VIS, NIR)
- + Closed-loop-controlled optical output
- + LED process stability and TCO benefits
- + Easy to integrate into new and existing setups
- + No external cooling required
- + No mercury! Save and future-proof LED light source
- + Quality made in Germany

# Modular All-in-One LED Exposure System

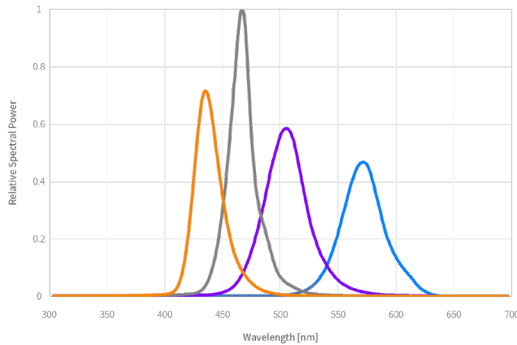
## Broadband Spectra Showcase and Output Performance

### ALE/1.1

1 NUV-LED:  
365, 385,  
405, or 436 nm

Applications:

- + UV-tape debonding
- + Narrowband exposure



Radiation [mW]	ALE/1.1+ Light Guide Active Core		
	Ø5.0	Ø6.5	Ø8.0
CWL 365 nm	7,000	10,000	10,000
CWL 385 nm	10,000	14,000	14,000
CWL 405 nm	10,000	14,000	14,000
CWL 436 nm	7,000	10,000	10,000
Intensity* [mW/cm <sup>2</sup> ]	51,000	42,000	28,000

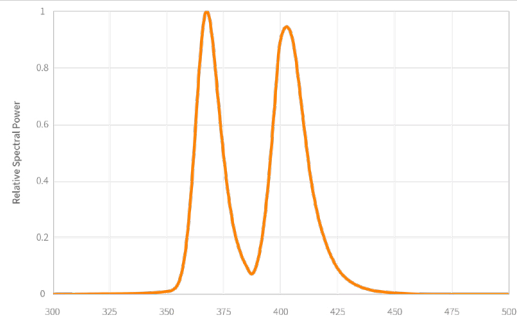
\*Maximum values

### ALE/1.2

2 NUV-LEDs:  
365 / 385 nm,  
365 / 405 nm, or  
385 / 405 nm

Applications:

- + Precision spot curing



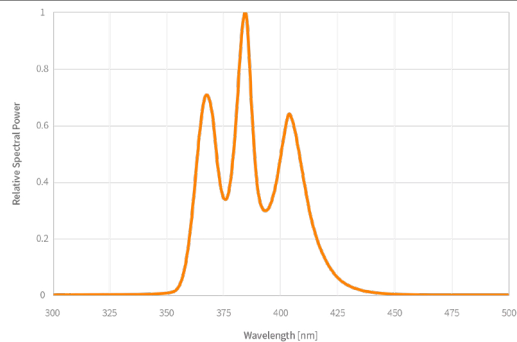
Radiation [mW]	ALE/1.2+ Light Guide Active Core		
	Ø5.0	Ø6.5	Ø8.0
CWL 365 nm	6,000	10,000	10,000
CWL 405 nm	6,500	11,000	11,000
<b>Total</b>	<b>12,500</b>	<b>21,000</b>	<b>21,000</b>
Intensity [mW/cm <sup>2</sup> ]	64,000	63,000	42,000

### ALE/1.3

3 NUV-LEDs:  
365 / 385 /  
405 nm

Applications:

- + Broadband spot curing
- + Material science



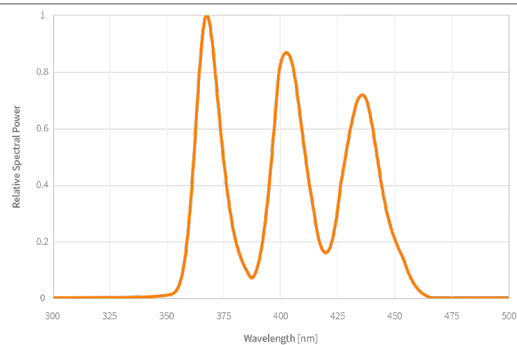
Radiation [mW]	ALE/1.3+ Light Guide Active Core		
	Ø5.0	Ø6.5	Ø8.0
CWL 365 nm	4,000	7,000	7,000
CWL 385 nm	4,500	7,000	7,000
CWL 405 nm	4,500	8,000	8,000
<b>Total</b>	<b>13,000</b>	<b>23,000</b>	<b>23,000</b>
Intensity [mW/cm <sup>2</sup> ]	66,000	69,000	46,000

### ALE/1.3

3 NUV-LEDs:  
365 / 405 /  
436 nm

Applications:

- + Broadband lithography
- + Collimated flood exposure
- + Reticle inspection



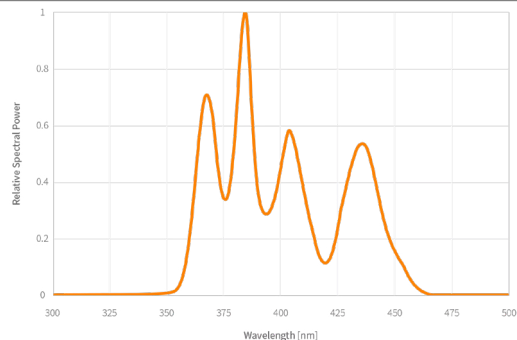
Radiation [mW]	ALE/1.3+ Light Guide Active Core		
	Ø5.0	Ø6.5	Ø8.0
CWL 365 nm	6,000	10,000	10,000
CWL 405 nm	6,000	10,000	10,000
CWL 436 nm	6,000	10,000	10,000
<b>Total</b>	<b>18,000</b>	<b>30,000</b>	<b>30,000</b>
Intensity [mW/cm <sup>2</sup> ]	92,000	90,000	60,000

### ALE/1.4

4 NUV-LEDs:  
365 / 385 /  
406 / 436 nm

Applications:

- + Broadband spot curing
- + Material science



Radiation [mW]	ALE/1.4+ Light Guide Active Core		
	Ø5.0	Ø6.5	Ø8.0
CWL 365 nm	4,000	7,000	7,000
CWL 385 nm	4,500	8,000	8,000
CWL 405 nm	4,000	7,000	7,000
CWL 436 nm	4,500	8,000	8,000
<b>Total</b>	<b>17,000</b>	<b>30,000</b>	<b>30,000</b>
Intensity [mW/cm <sup>2</sup> ]	87,000	90,000	60,000

CWL of emitters: 367.5±2.5 nm, 387.5±2.5 nm, 402.5±2.5 nm, and 435.0±2.5 nm.  
Full spectrum of each emitter measured at end of light guide (length 1.5 m); deviation of ±10% possible.  
Ø6.5 mm light guide with antireflective coating.

# ALE/1: Versatility Meets Performance

## System Properties and Specifications

Emitter Options	Up to 5 installed LED Modules (CWL 365 to 1,050 nm)	
Numerical Aperture	NA 0.6 ( $2\alpha \sim 70^\circ$ )	
Output Control	<ul style="list-style-type: none"> <li>+ Individual LED power management and presets</li> <li>+ High-resolution intensity adjustment (10 - 100%)</li> <li>+ LED rise time under 1 millisecond</li> <li>+ Continuous monitoring of optical output and feedback control</li> </ul>	
Communication interfaces	<ul style="list-style-type: none"> <li>+ Touch display</li> <li>+ Discrete PLC interface (TTL)</li> <li>+ AUX (debounced)</li> <li>+ USB (serial)</li> <li>+ Ethernet / Modbus (optional)</li> </ul>	
Thermal Management	Liquid cooling with internal radiator	
Dimensions (W H D)	28 X 23 X 40 cm	(11.0 X 9.1 X 15.7")
Weight	15 kg	(33 lbs)
Power Supply	110 - 240 VAC / 50 - 60 Hz / 1,000 W	
Light Guide Options	<ul style="list-style-type: none"> <li>+ Liquid light guides only!</li> <li>+ Single and multi-pole options</li> <li>+ Active core <math>\varnothing 5.0</math>, <math>\varnothing 6.5</math>, and <math>\varnothing 8.0</math> mm</li> <li>+ Standard length 1.5 m; custom lengths 0.5 - 20 m</li> <li>+ Custom end fittings available on request</li> </ul>	





## Accessories for the ALE/1

### Performance Optics

We offer single- and multi-pole liquid LED Light Guides that perfectly fit our UV-LED Light Engine ALE/1. Our LED Light Guides are made in Germany, meeting the highest quality, durability, and efficiency standards. In addition to LED Light Guides, we also provide standard and customized homogenizing, condensing, and focussing optics, which can be an economical add-on to improve exposure uniformity or efficiency of the whole optical setup.



#### Single-pole Liquid Light Guides

- + Three active core sizes:  
Ø5.0, Ø6.5, and Ø8.0 mm
- + Standard length: 1.5 m; custom lengths of 0.5 to 20 m available on request



#### Multi-pole Liquid Light Guides

- + 4-pole LED Light Guides
- + Active core: Ø3.0 mm
- + Standard length: 1.5 m; other length available on request



#### Condensing / Focussing Optics

- + Standard condensing and focussing LED Light Guide adapters available
- + Custom optics available on request