primelite
ALE/1

Advanced UV-LED Light Engine ONE

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

Key Applications

- Semiconductor manufacturing (mask aligners, advanced packaging stepper, wafer edge exposure, photomask inspection, etc.)
- Spot curing applications in the automotive, electronics, optoelectronics, pharma and other industries
- Quality assurance and inspection (NDT)
- Life sciences applications

ALE/1 Solution Highlights

- Intensities up to 95,000 mW/cm^2
- Optical output up to 30 Watts
- Customized spectral composition (UV, VIS, NIR)
- Future-proof mercury-free light source with significant Cost of Ownership advantages
- Closed-loop controlled output for maximum process stability
- Easy to integrate into new and existing setups with no external cooling required

primelite
Advanced Light Engines

MADE
IN
GERMANY

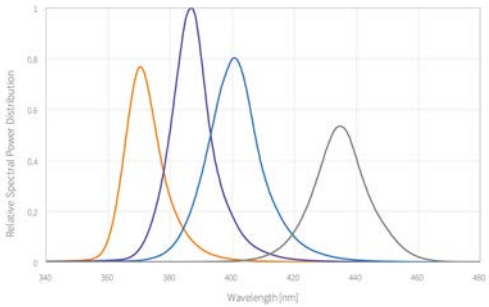
Multispectral Modularity for Highest Intensities

Potential Wavelength Combinations and Output Performance

ALE/1.1

1 NUV-LED (365, 385, 405, or 435 nm)

Single wavelength exposure, e.g., de-bonding of UV-tape, i-line only applications.

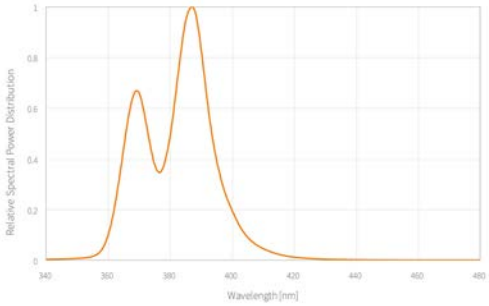


Radiation output in mW	ALE/1.1	ALE/1.1+	
Light guide	Ø5 mm	Ø6.5 mm AR	Ø8 mm
365 nm	7,000	10,000	10,500
385 nm	10,000	14,000	14,000
405 nm	10,000	14,000	14,000
435 nm	7,000	10,000	10,500
Intensity in mW/cm	50,000	40,000	30,000

ALE/1.2

2 NUV-LEDs (e.g., 365 and 385 nm)[1]

Particularly popular in industrial UV-LED spot curing applications. Other setups like 385/405 nm or 365/435 nm available.

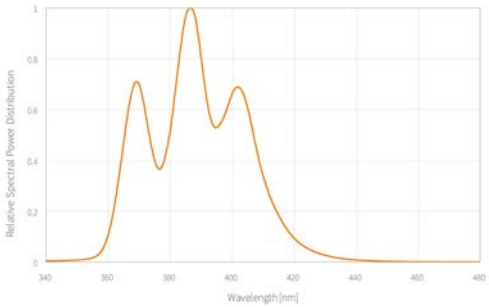


Radiation output in mW	ALE/1.2	ALE/1.2+	
Light guide	Ø5 mm	Ø6.5 mm AR	Ø8 mm
365 nm	4,500	6,500	6,500
385 nm	8,000	12,500	12,500
Total	12,500	19,000	19,000
Intensity in mW/cm²	65,000	55,000	40,000

ALE/1.3

3 NUV-LEDs (365, 385, and 405 nm)

Full flexibility to combine and select the wavelengths available in order to profit from a broad NUV spectrum exposure for curing.

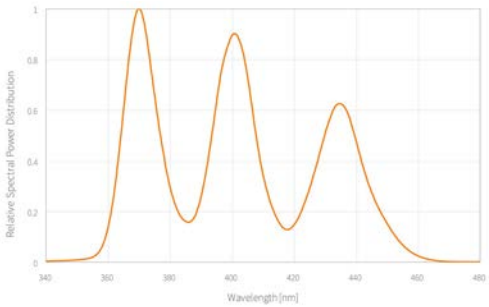


Radiation output in mW	ALE/1.3	ALE/1.3+	
Light guide	Ø5 mm	Ø6.5 mm AR	Ø8 mm
365 nm	4,500	6,500	6,500
385 nm	6,000	9,000	9,000
405 nm	4,500	8,000	8,000
Total	15,000	23,500	23,500
Intensity in mW/cm²	75,000	70,000	45,000

ALE/1.3

3 NUV-LEDs (365, 405, and 435 nm)[1]

Broad band lithography applications using i-, h-, and g-line in the semiconductor industry (e.g., mask aligners, steppers and wafer edge exposure)

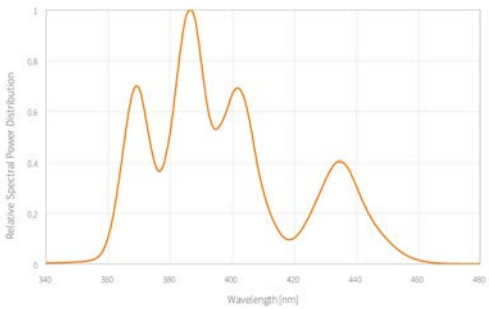


Radiation output in mW	ALE/1.3	ALE/1.3+	
Light guide	Ø5 mm	Ø6.5 mm AR	Ø8 mm
365 nm	6,500	10,000	10,000
405 nm	6,500	10,500	10,500
435 nm	6,000	9,500	9,500
Total	19,000	30,000	30,000
Intensity in mW/cm²	95,000	90,000	60,000

ALE/1.4

4 NUV-LEDs (365, 385, 405, and 435 nm)

Covering the entire spectrum from 350 to 450 nm with high radiation power.



Radiation output in mW	ALE/1.4	ALE/1.4+	
Light guide	Ø5 mm	Ø6.5 mm AR	Ø8 mm
365 nm	4,500	6,500	6,500
385 nm	6,000	9,000	9,000
405 nm	4,500	7,500	7,500
435 nm	4,000	7,000	7,000
Total	19,000	30,000	30,000
Intensity in mW/cm²	95,000	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 (“AR”)

Modular Technology Platform

System Properties and Specifications

Included emitters	Up to 5 LEDs ranging from 365 nm to 970 nm
Total radiation output	Up to 30 W
Output intensity	Up to 95,000 mW/cm²
Numerical aperture	▪ 0.6/70° (2α) using liquid light guide ▪ Alternative output optics available
Control configurations	▪ Individual LED power management and presets ▪ High-resolution intensity adjustment (20-100%) ▪ LED rise time <1 millisecond ▪ Continuous monitoring of optical output and feedback control via internal or external signal
Communication interfaces	▪ Touch display ▪ AUX: External switching device ▪ USB and Ethernet (optional): ALE/remote (ALE PC-Software) ▪ PLC: Discrete interface
Heat management	Internal liquid cooling
Dimensions (W H D)	28 cm X 23 cm X 40 cm (11.0″ X 9.1″ X 15.7″)
Weight	15 kg (33 lbs)
Power supply input	110-240 VAC / 50-60 Hz / 1,000 W
Light Guide Options	▪ Active core Ø [mm]: 5.0, 6.5 and 8.0 ▪ Single or multi-pole options ▪ Standard length 1.5 m; custom sizes (0.5-20 m) available on request ▪ Custom end fittings available on request

Full spectrum radiation output measured at the end of light guide (standard length 1.5m) / ±10% deviation possible

Accessories for the ALE/1

Primelite Performance Optics

We offer single- and multi-pole liquid light guides, which are a perfect fit for our light guide coupled LED light source ALE/1. Our liquid light guides are German made, meeting the highest standards in terms of quality, durability, and efficiency. In addition to liquid light guides we also provide standard and customized homogenizing, condensing and focussing optics. All our Performance Optics are optimized for transmitting high-power radiation in the NUV (350-450 nm) spectral ranges. Liquid light guides for UVC or VIS are also part of our product portfolio.

Single-pole Liquid Light Guides

- Three different diameter sizes available: Ø5.0, 6.5, and 8.0 mm.
- Standard length of 1,500 mm. Other sizes between 500 and 20,000 mm on request.

Multi-pole Liquid Light Guides

- 2- and 4-pole liquid light guides available.
- Diameter size of light exit: Ø3.0 mm.
- Standard length of 1,500 mm. Other sizes on request.

Condensing/Focussing Optics

- Various condensing and focussing optics available for square, hex or round exposure.
- Additionally homogenizing light pipes for enhanced uniformity on request.

About Primelite

History and Guiding Principles

History

- Primelite GmbH was founded in Munich, Germany, in 2016 by a team of experienced engineers and managers.
- A prototype of our first high-power UV-LED light engine, the versatile, fiber-coupled ALE/1, was presented at the SEMICON Japan end of 2016. Series production started in 2017.
- In 2018, we added the ALE/1C to our product portfolio: A UV-LED exposure solution with standard-setting output performance, which you can directly integrate into semiconductor manufacturing equipment. Additional to that we have just recently developed and introduced an even stronger collimated exposure solution – the ALE/2.
- Providing superior value, we can now call some of the biggest names in the semiconductor, pharma, and automotive industries our customers.

Guiding Priciples

- We have committed ourselves to develop advanced UV-LED light sources which are best-in-class solutions for our customers.
- Perfect quality is our aspiration: We design and manufacture our UV-LED systems in Munich, Germany. To achieve industry-leading product reliability, we rely on carefully selected suppliers of critical components. These include propriatary optics from semiconductor-grade glass and superior LED emitter technology.
- To stay way ahead of our competition, we continually advance our core know-how on optical and mechanical design. Additionally, improving our electronic hardware and software architecture is just as essential.
- We enable product innovation as well as fast-track development and product rollout by having a lean organization, deep market insight, customer-focus, and dynamic business culture at Primelite.

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