Advanced UV-LED Light Engine TWO

ALE/2 – Lithography UV-LED Exposure Systems

Key Applications

+ Mask Aligners for 8" and 12" wafers
+ Large-substrate lithography tools
+ Highly uniform precision flood exposure

ALE/2 UV-LED Light Source Highlights

+ Built-in solution for maximum exposure efficiency and performance
+ Up to 70 Watts of i-line exposure (CWL 365 nm)
+ Up to 80 Watts of broadband exposure (350 - 450 nm)
+ Closed-loop controlled optical output
+ LED process stability and TCO benefits
+ No external cooling required
+ No mercury! Save and future-proof LED light source
+ Quality made in Germany

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ALE/2 UV-LED Exposure Systems Replace Conventional 2 - 5 kW Lamps

Output Spectrum and Performance

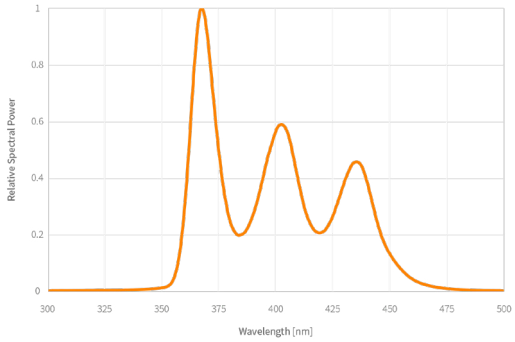
ALE/2

4 NUV-LEDs:

365 / 405 /
436 nm

Application:

+ Large substrate lithography setups using i-, h-, g-line exposure



Radiation [W]

ALE1/C	i-line CWL 365 nm	Broadband 350 - 450 nm
Standard Mode	35	80
Performance Mode	38	90
Mercury Discharge Lamp		
1,000 W	20	40
5,000 W	75	150

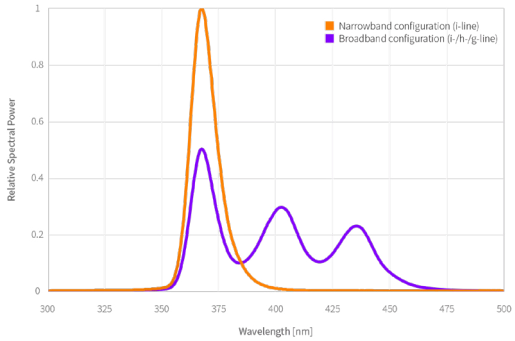
ALE/2

4 NUV-LEDs:

365 nm

Application:

+ Large substrate lithography setups using narrowband i-line exposure



Radiation [W]

ALE1/C	i-line CWL 365 nm
Standard Mode	70
Performance Mode	80
Mercury Discharge Lamp	
1,000 W	20
5,000 W	75

CWL of emitters: 367.5±2.5 nm, 387.5±2.5 nm, 402.5±2.5 nm, and 435.0±2.5 nm.
Output power deviation of ±10% possible.

Integration of ALE/2 UV-LED Exposure Systems in Mask Aligners

ALE/2 Distributed Design Approach (ESS / CSS)

Our High-Power UV-LED Exposure System ALE/2 follows a distributed design approach with a Control Subsystem (CSS) separated from an Exposure Subsystem (ESS) to be directly integrated into the lithography tool.

Control Subsystem (CSS)

+ 4U 19" rack mount system
+ Includes power supply, cooling system, and control interfaces

Exposure Subsystem (ESS)

+ Compact design for direct integration into exposure tool
+ Includes i-, h-, and g-line LED Modules and drivers

ALE/2: There Is No More Powerful UV-LED Spot Light Source

System Properties and Specifications

Emitter Options	4 LEDs with CWL 365 nm, 385 nm, 405 nm, and 436 nm		
Numerical Aperture	NA 0.3 (2α ~35°) with standard condenser		
Output Control	+ Individual LED power management and presets + High-resolution intensity adjustment (10 - 100%) + LED rise time under 1 millisecond + Continuous monitoring of optical output and feedback control		
Communication interfaces	+ Discrete PLC interface (TTL) + USB (serial) + Ethernet / Modbus (optional)		
Thermal Management	+ Liquid cooling with internal radiator + Optional thermoelectric chiller (required for performance mode operation)		
Dimensions (W H D)	ESS CSS (Rack)	21 X 21 X 36 cm 44 X 18 X 37 cm	(8.3 X 8.3 X 14.2") (17.3 X 7.1 X 14.6")
Weight	ESS CSS (Rack)	4 kg 10 kg	(9 lbs) (22 lbs)
Power Supply	110 - 240 VAC / 50 - 60 Hz / 1,500 W		

Accessories for the ALE/2

Performance Optics

Our Advanced Light Engine TWO features a square 16 X 16 mm light exit with a NA 0.3 aspherical condenser. The clear aperture is Ø50 mm. This setup is already very efficient in combination with many existing field lens designs to expose Ø200, Ø300, Ø400, 300 X 300 mm, and even larger substrates with excellent collimation and uniformity.

However, this standard condenser setup is easily exchangeable if other lens properties fit your optical setup better. Primelite's engineering team can support you in finding an economical and efficient solution for your individual application. Over the years, we have helped many customers with custom LED exposure solutions tailored to their specific needs.