UV Disinfection Pure Water with High Power UVC LEDs

Dr. Olga Stroh-Vasenev| LASER COMPONENTS Germany GmbH

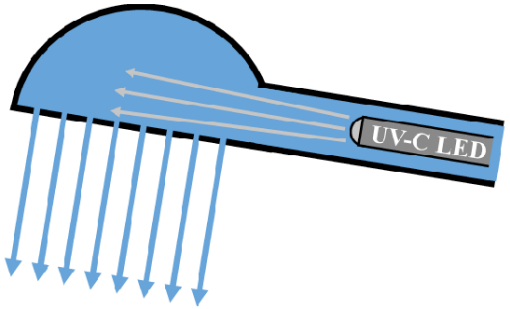
EPIC Online Technology Meeting

Source: Bolb Inc. / © istock.com/pavlinec

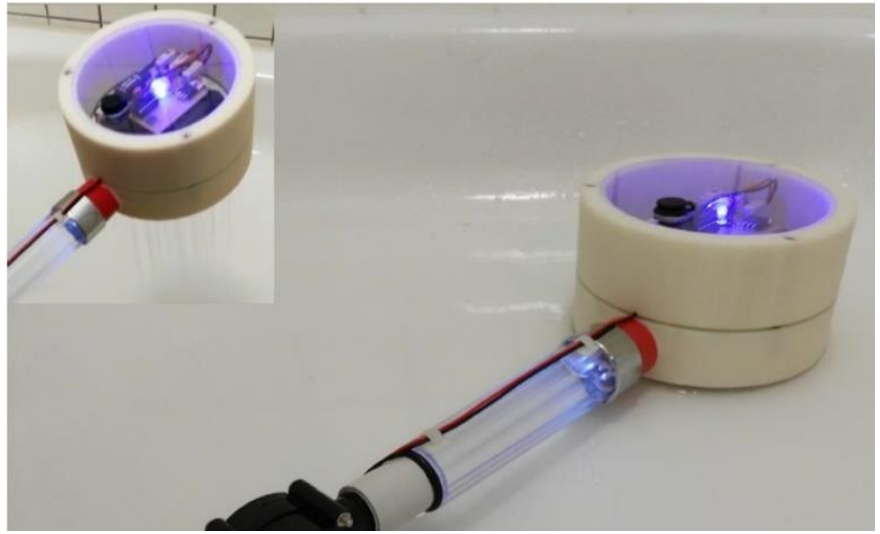
Single 100 mW LED in a Shower Head

UVC LED

- 254 nm UVC hg lamp source publication
  – Legionella rubrilucens 90% reduction with 1.1 mJ/cm²
- Using single 100 mW LED dependent on angle of emission distribution
- 0.01 sec required for 90% reduction
- 0.03 sec for 99.9% reduction
- Driven by water flow turbine



Scheme of a UV-C LED within a Shower Head



SiC Monitor Photodiode
Peak sensitivity at
272nm 0.18A/W

UVC LED
275nm 100mW/chip @ 250mA and 6.5V
265nm 90mW/chip @ 500mA and 6.3V

Source: Martin Hessling, Ph.D., Professor, Institute of Medical Engineering and Mechatronics, Ulm University of Applied Sciences

Exceptional UVC LED Technology at 275 nm

UVC LED

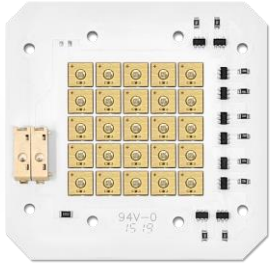
Now

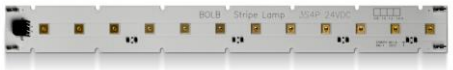
- 100 mW @ 250mA 6.5V
- 6060 SMD
- 5,000 hrs. L70
- at case temp of 38 °C

Throughout 2022

- 160 mW @ 350mA
- 7V 6060 SMD
- 10,000 hrs. L70
- at case temp of 38 °C

WPE = 0.100 W / (0.25 A * 6.5 V) = 6.15%



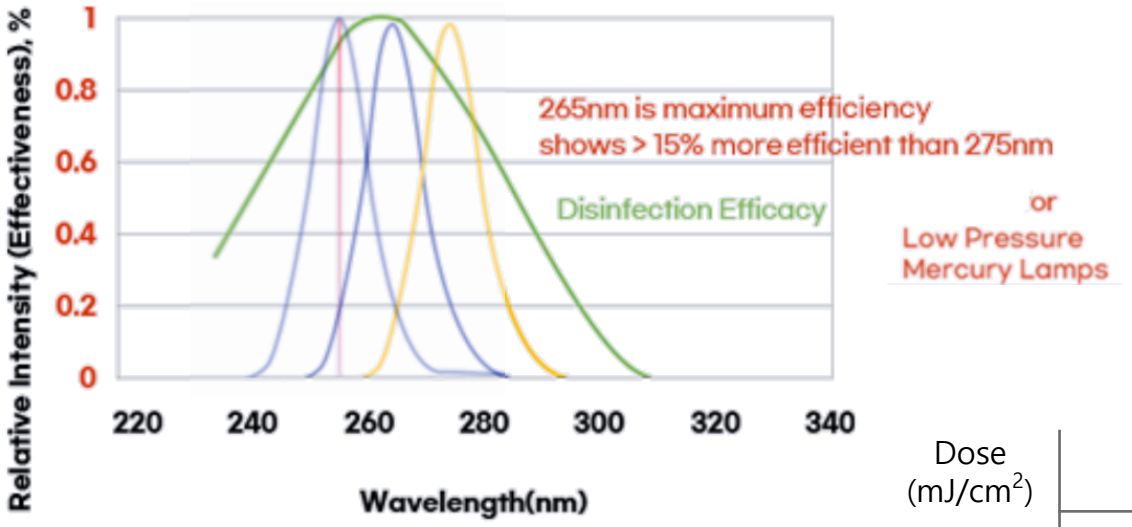


Source: Bolb Inc.

Highest Sterilization Efficacy at 265 nm

UVC LED

Disinfection efficacy curve (E. Coli) and
265 nm vs. 275 nm UVC LED spectrum comparison



Products		Size	Typical Spec			
			Current	255nm	265nm	275nm
CHIP		10 x 20 mil²	20mA	3.2mW, 5.8V	3.5mW, 5.7V	3.5mW, 5.6V
		20 x 20 mil²	100mA	15mW, 5.8V	15mW, 5.8V	15mW, 5.7V
		30 x 30 mil²	150mA	20mW, 5.7V	22mW, 5.7V	22mW, 5.6V
		40 x 40 mil²	350mA	45mW, 5.7V	50mW, 5.7V	50mW, 5.5V
		48 x 48 mil²	500mA	70mW, 6.3V	105mW, 6.3V	110mW, 6.2V

Dose (mJ/cm²)	E Coil		Salmonella		Listeria	
	265nm	**275nm**	**265nm**	**275nm**	**265nm**	**275nm**
0.2	**>99.99%**	>99.96%	98.88%	98.26%	94.11%	79.11%
0.5	**>99.99%**	**>99.99%**	**>99.99%**	**>99.99%**	**>99.99%**	99.89%
0.7	**>99.99%**	**>99.99%**	**>99.99%**	**>99.99%**	**>99.99%**	**>99.99%**

Source: Photon Wave

Your Contact

"We are specialized in
challenging demands and
apparently **impossible inquiries**!"

LASER COMPONENTS Germany GmbH

Dr. Olga Stroh-Vasenev

o.stroh-vasenev@lasercomponents.com
+49 (0)8142 2864-48