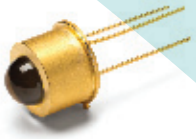
Crystal IS™
High Performance UVC LEDs



UVC LEDs Provide More Benefits than Traditional UV Lamps in Instrumentation

Design engineers across industries—from life sciences to environmental monitoring—are turning to UVC LEDs to overcome the challenges of traditional UV lamps.

Single Peak—Accurate Measurements with Reduced System Costs

Traditional UV lamps, such as xenon, mercury or deuterium, generate ample light across multiple wavelengths. However, in many spectroscopic applications light at a discrete wavelength is required. Thus filters are used to suppress the undesired wavelengths. This approach can diminish intensity at all wavelengths, affecting the quality and accuracy of measurements. Moreover, these filters add to the overall system cost.

UVC LEDs are monochromatic—so filters are not needed to remove undesired wavelengths. This allows instruments using UVC LEDs to only measure a specific wavelength—leading to a less expensive instrument built to measure very specific parameters.

Instantaneously Stable

UVC LEDs can be switched on and off instantly, conserving energy and resulting in longer replacement cycles. Once turned on, UVC LEDs reach their full brightness and stability in under a microsecond and do not have a prolonged glow when turned off. The main factors which affect light stability in UVC LEDs are junction temperature and power supply performance—both of which can be easily managed.

UV lamps have longer on/off cycles and more variables impacting the stability of light output. Warm up times can range from several minutes for xenon or mecury-xenon lamps to 20-30 minutes for deuterium lamps.

For xenon, mercury-xenon and deuterium lamps, light stability is impacted by temperature, power supply performance, housing design and position within the arc. Furthermore, cathode erosion in xenon and mercury-xenon lamps causes the arc point to fluctuate and move gradually with operating time which affects stability. In xenon flash lamps, lamp discharge voltage, operating frequency, the main discharge capacitance and position within the arc affect light stability.

With fewer factors impacting their stability coupled with instant on/off times, LEDs offer more benefits to applications which require quick, stable measurements.

UVC LEDs offer:

- > A SINGLE PEAK
- > STABLE LIGHT OUTPUT
- > NO FORWARD HEAT RADIATION
- > SIMPLE ELECTRONICS
- > INSTANT ON/OFF
- > COMPACT DESIGN

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Heat Leaves the Back—Not the Front

Conventional UV lamps radiate forward heat, which can damage or interfere with heat-sensitive samples and affect measurement outcomes. Also, forward heat radiation in arc-based lamps can damage essential optical filters if heat filters are not also used.

LEDs radiate a minimal amount of heat from the front side. Instead, most of the heat generated in the chip is extracted out of the backside of the LED through conduction and/or convection. Thermal management can be accomplished through simple passive and active cooling techniques, making LEDs the ideal choice for heat sensitive applications.

Simple Electronics—Low Voltage for Safer Operation

LEDs require lower currents and the required drivers are relatively inexpensive, unlike more traditional light sources. The current driver regulates current through the LED regardless of variations in power supply or changes in forward voltage. This driver also ensures that the current does not exceed the maximum current rating of the LED.

In contrast to LEDs, traditional UV light sources require higher voltages to increase light output and have more complex requirements for power supplies and ancillary electronics. This has implications for safety, cost, thermal management and ease of operation.

COMPARISON OF LEDs WITH TRADITIONAL LAMPS

	LED	Deuterium lamp	Xenon flash lamp	Mercury Lamp
Spectrum	Single Peak	Broad spectrum	Broad spectrum	Broad spectrum
Stability of Light Output	Excellent	Good	Relatively Poor	Relatively Poor
Warm Up Time	Instantaneous	20-30 minutes	Instantaneous	1-15 minutes
Thermal Effect on Samples	None*	Heat sensitive samples can be affected	None	Heat sensitive samples can be affected
Overall Cost of Ownership	Low**	High	High	Low
Drive Electronics	Simple	Complex	Complex	Complex
Safety	Low voltage, cold light source with shock resistant construction	Hot bulb surface with high voltage power supply	High voltage supply with ignition and sparking risk	High voltage supply and contains mercury in fragile quartz envelope

** LEDs do not emit forward heat*

*** Lowered cost of ownership due to cost savings on power supply and housing, and lack of filters required*

UVC LEDs are paving the way for new applications and product designs. With Crystal IS, design engineers can leverage these benefits for new product innovations.

We invite you to learn more about our UVC LEDs.

Crystal IS™
High Performance UVC LEDs

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