

Case Study

Rev. 0.2 2016.06.07

Water Bottle with UV LED Disinfection



Company: Large Consumer Appliance Brand

Location: China

Application: Water Bottle with UV LED Disinfection

Solution: RayVio UV LED Light Engine

Results: 99.2% disinfection of *E. Coli* in 90 seconds with a single RayVio UV LED

Bacterial contamination of drinking water is a major contributor to water-borne diseases such as diarrhea, nausea, gastroenteritis, typhoid dysentery and other health-related problems, especially in children and persons with weak immune systems. ^[1]

A leading large consumer appliance brand needed a solution to develop its next generation purifying drinking water bottle product, particularly targeted at students and travelers in emerging markets.

RayVio's novel UV LED technology makes possible the highest performance and portable solutions for UV disinfection of water, air and medical devices.

99.2% disinfection of *E. Coli* was achieved in 90 seconds with a single RayVio UV LED. This performance was enabled by RayVio's powerful UV LED light engine and electrical, mechanical, thermal and optical solution, custom designed for the 600ml container.

The RayVio Solution

Based on the customer's disinfection target, RayVio recommended a high performance UV LED light engine. This configuration offers easy integration into widely used driver technology, with standardized star PC board for robust thermal and mechanical attachment. With its peak emitting wavelength at 285 nm nominal, RayVio's UV emitter produces germicidal optical power well suited for deactivation of commonly found bacteria and viruses in drinking water like *Shigella*, *E. Coli*, *Salmonella* and *Legionella*.

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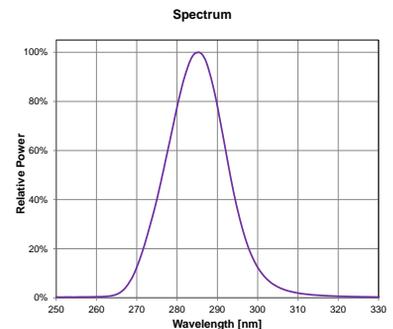
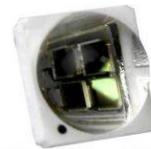
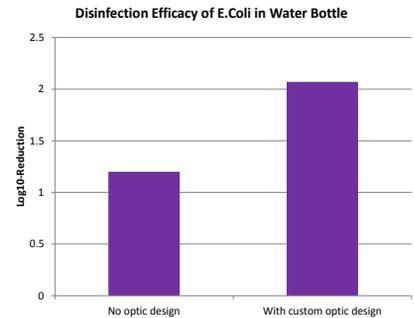
RayVio also provided the improved application reference design where the container’s entire base incorporates all portable elements including the UV disinfection unit, optics, thermal management and a USB rechargeable battery sized for more than one week of use per charge. This application increased the germicidal efficacy by 0.9 log10 reduction or almost 2x over the previous solution while using the same power. Even higher efficacies or shorter disinfection times are possible with more devices.

The RayVio SMD UV Emitter on MCPCB Hex Star

The RayVio SMD UV LED enables higher UV radiation density for disinfection applications in an easy to use format. Spectral output of 285nm nominal inside the deep UV range enables powerful and compact applications in water treatment, surface cleaning and environmental disinfection.

Features and Benefits

- UV power output up to 40mW enables higher output, more compact applications
- 285 nm UV spectrum with proven germicidal efficacy
- Industry standard surface mount device (SMD) package to lower integration costs
- Small, bolt-down package with metal core enables simple assembly and high thermal conductivity



About RayVio Corp

RayVio Corporation is an advanced health and hygiene company that delivers clean water and environments. RayVio helps protect billions from germs and creates new markets and revenue streams by enabling a new class of products. Its powerful and efficient UV LED technology can be integrated into a variety of applications, powering versatile on-demand solutions that give consumers control over health without chemicals or costly consumables. To learn more, please visit www.rayvio.com.