

Application Note

Water Disinfection



Water. That everyone should have access to clean, safe drinking water is without question. Yet even in this seemingly ‘modern’ world, hundreds of millions of people struggle to access safe drinking water and millions suffer needlessly or die from illnesses caused by unclean water.

It’s absurd how many people don’t have access to clean water,”

James Ayre in [Clean Technica](#).

Even people in areas with historically safe water are discovering that existing infrastructure and systems don’t always perform as intended and they too are seeking simple, efficient and economical solutions for ensuring their water is safe from disease.

In much of the world industrial water treatment and delivery infrastructure provides safe drinking water. In countries like the United States, where the vast majority of residents receive their water from industrial systems, the primary disinfectants are [chlorine or chloramine](#), which are added to the water and, in most cases, remain present in the water that is ultimately consumed.

“...even in the U.S., drinking water sources can become contaminated, causing sickness and disease from waterborne germs, such as *Cryptosporidium*, *E. coli*, Hepatitis A, *Giardia intestinalis*, and other pathogens.”

[Centers for Disease Control and Prevention](#)

Even with the standards established by the US Environmental Protection Agency (EPA), contamination of the water supply can occur anywhere from the treatment facility to the actual point of use – like a faucet. Contamination may result from a wide variety of factors including exposure to fertilizers, pesticides, or sewer overflows. In countries or regions without clean water infrastructure, poor sanitation facilities, agricultural practices, and naturally occurring chemicals are primary sources of contamination.

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Top Causes of Outbreaks in Public Water Systems Addressed with RayVio Disinfection Grade UV LEDs¹

- *Giardia*
- *Legionella*
- *Norovirus*
- *Shigella*
- *Campylobacter*
- *Salmonella*
- *Hepatitis A*
- *Cryptosporidium*
- *E. coli*

UV Water Disinfection

The first use of ultraviolet light for water disinfection dates back to the early 1900s. The use of UV light has increased over the decades but the bulb-based solution is bulky, fragile, short-lived and contains mercury that is hazardous for the environment. So for most systems, chemical based solutions are the

norm. But of course many people would prefer not to ingest the chlorine-based chemicals that are in the water. By contrast, RayVio's Disinfection Grade UV LEDs are characterized by their small size, power output and environmental safety – no mercury and no lead. Like other LEDs they are extremely rugged and enable mobile, portable, and battery operated solutions. And for anyone seeking a solution that is chemical free, RayVio's Disinfection Grade UV LEDs are the perfect selection.

RayVio's UV LEDs make entirely new types of products possible, including Industrial products with lower initial and operating costs and personal products that are small enough and portable allowing for disinfection at the point of use.

As we have seen with much of the electronics revolution over the last 50 years, these new 'microchips of health' have the potential to lower solution costs to such a degree that providing personal water disinfection solutions to populations without public systems can become a reality. Just as the mobile phone has become ubiquitous, so will water disinfection solutions.

RayVio's Disinfection Grade UV LEDs emit ultraviolet light in the deep UV range typically 275nm to 285nm. At these wavelengths, and with the power output of RayVio's UV LEDs, the DNA, RNA and proteins of microorganisms absorb the ultraviolet light and in doing so initiate a photochemical reaction that breaks the chemical bonds at a cellular level, thereby killing the bacteria, pathogen, or virus thereby disinfecting the water.

For more information, please visit RayVio.com.

¹ From Centers for Disease Control and Prevention and RayVio.