



SOLUTIONS

ADVANCED OPTICAL SOLUTIONS FOR UV SANITIZATION

UV sanitization has become an essential technology for ensuring the safety and cleanliness of various environments, from healthcare facilities to public spaces. The effectiveness of UV sterilization depends on the precision and quality of the optical components used, such as UV filters and mirror reflectors. Omega Optical excels in providing high-performance optical solutions, including the capability to coat in significant batch sizes, offering excellent economy of scale.

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THE ROLE OF UV FILTERS IN SANITATION

UV filters are critical in controlling the specific wavelengths of UV light used in sterilization processes. Omega Optical specializes in manufacturing UV filters that are tailored to meet the stringent requirements of various UV sanitization applications:

222NM FILTERS	These filters are designed to selectively transmit the germicidal wavelength of 222nm, which is highly effective in inactivating pathogens without harming human skin. Our filters provide precise wavelength control and high transmission efficiency, ensuring optimal performance in UV sterilization systems.
DEEP UV BLOCKING	Omega Optical's filters offer deep blocking capabilities, effectively eliminating unwanted wavelengths (UV-A, UV-B, and unwanted portions of UV-C) and enhancing the safety and effectiveness of the sterilization process.

Because human cells are damaged by many UV-C wavelengths, the light sources should be filtered whenever people are present in the illuminated area to prevent damage to skin and eyes.

Wavelengths below about 230 nm show minimal damage to human cells, but significant damage to viruses and bacteria. Why? Very little UV-C will reach the nucleus in a human cell.

- UV-C light scatters (or gets deflected from its original path) as it traverses the larger human cell- scattering increases as wavelength decreases.
- Protein absorbs more light at 230 nm than DNA or RNA.
- Light must pass hundreds or thousands of proteins to reach the DNA in the nucleus of a human cell. Most of the light is absorbed before reaching the DNA. In contrast, viruses have only a very thin layer of protein around the DNA or RNA which affords very little protection.

ECONOMY OF SCALE

One of the significant advantages of choosing Omega Optical for your UV sterilization needs is our ability to coat in significant batch sizes. This capability ensures excellent economy of scale, making our high-quality optical components cost-effective for large-scale applications. Whether you need 222nm filters or mirror reflectors, our production capabilities ensure that you receive the best value for your investment.

MIRROR REFLECTORS FOR LIGHT FIXTURE BALLASTS

Mirror reflectors play a crucial role in enhancing the efficiency of UV sterilization systems by directing and focusing the UV light onto the target area. Omega Optical provides high-quality mirror reflectors that offer:

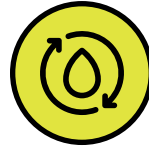
HIGH REFLECTIVITY	Our mirror reflectors are coated with materials that maximize reflectivity, ensuring that the maximum amount of UV light is directed towards the area being sterilized. This high reflectivity enhances the overall efficiency and effectiveness of the UV sterilization system.
DURABILITY	Designed to withstand the harsh conditions of UV light exposure, our mirror reflectors maintain their performance over extended periods, providing reliable and consistent results.

APPLICATIONS OF UV SANITATION

UV sterilization is widely used in various sectors due to its effectiveness in eliminating harmful microorganisms. Some of the key applications include:



HEALTHCARE: Ensuring the sterility of medical equipment, surfaces, and air in hospitals and clinics to prevent the spread of infections.



WATER TREATMENT: Purifying drinking water and wastewater by eliminating bacteria, viruses, and other pathogens.



PUBLIC SPACES: Disinfecting surfaces and air in areas such as airports, train stations, and shopping centers to enhance public safety.



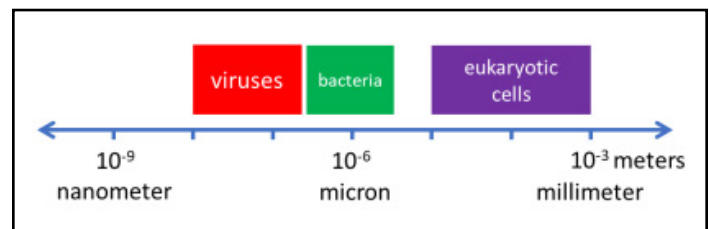
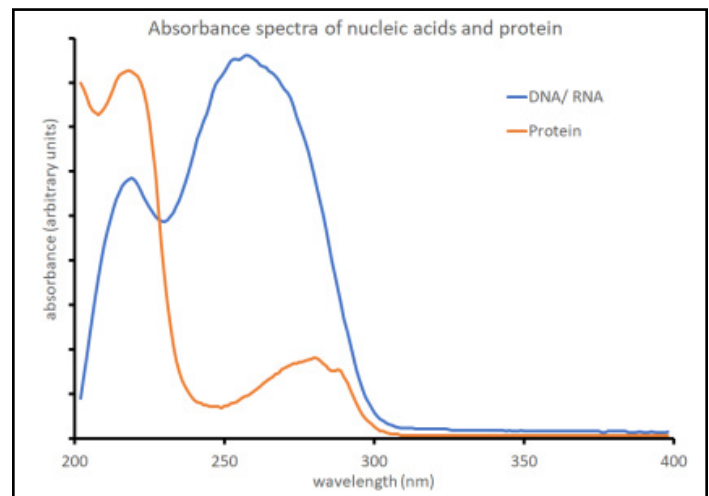
FOOD INDUSTRY: Sterilizing food processing equipment and packaging to ensure the safety and longevity of food products.

LEARN MORE ABOUT UV SANITATION

HOW DOES UV SANITATION WORK?

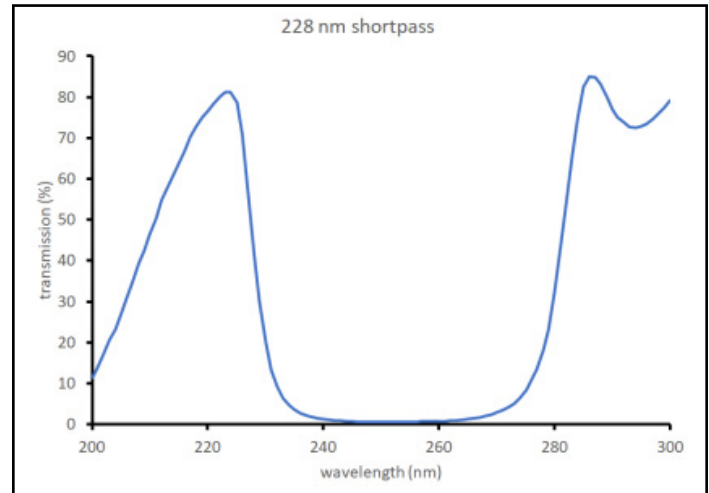
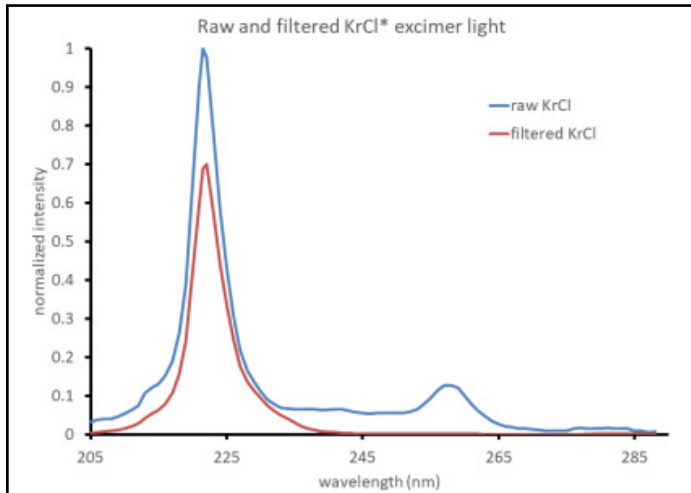
UV light in the 200–300 nm range (UV-C) is absorbed by DNA (and RNA) and proteins present in every living cell. As seen below, the DNA absorbs the most light at about 260 nm and proteins absorb the most light at about 220 nm. Maximal damage occurs at the wavelengths where the most light is absorbed. The light absorbed at these wavelengths breaks (and sometimes makes new) chemical bonds in the DNA (or RNA) and protein. When the DNA (or RNA) is altered, it cannot be replicated and the cells die. Protein damage to viruses can also affect their structural integrity, whereas in a human cell, protein recycling and repair mechanisms clean up most of the damage.

All cells and viruses contain DNA, RNA and protein, but the size of these cells and virus particles vary a lot! Note that in the figure to the right, there are factors of 10 between each tick-mark. A virus is 100–1000 times smaller than a human, eukaryotic (nucleus-containing) cell!



HOW TO BLOCK POTENTIALLY HARMFUL UV LAMP EMISSIONS?

An example- filtered KrCl* excimer lamp:



The KrCl* excimer emission spectrum is dominated by a large peak at about 222 nm, but there is also emission up to about 280 nm. Research has shown that light in the 230-300 nm region is damaging to human cells, so Omega designed the following solution to block light in that region. The red curve above shows the KrCl* excimer lamp emission with a filter present.

WHY CHOOSE OMEGA OPTICAL?

Omega Optical is dedicated to advancing the field of UV sterilization through our innovative optical solutions. Our expertise in designing and manufacturing high-performance UV filters and mirror reflectors ensures that your UV sterilization systems operate with the highest levels of efficiency, reliability, and cost-effectiveness.

Discover how Omega Optical can enhance your UV sterilization applications. Contact us today to learn more about our products and services.