



# GERMICIDAL ULTRAVIOLET LIGHT FREQUENTLY ASKED QUESTIONS

## GENERAL

### ***What is ultraviolet (UV) light?***

Ultraviolet light is a type of electromagnetic radiation that can be transmitted in waves or particles at different wavelengths and frequencies.

### ***What are the different types of UV light?***

The types of UV light include:

- UVA: UVA accounts for approximately 95 percent of the UV radiation reaching the Earth's surface. It is responsible for tanning, skin aging, and wrinkling, and is an effective disinfectant for many common bacteria.
- UVB: Most solar UVB is filtered by the atmosphere and is responsible for delayed skin burn and skin aging. It significantly promotes the development of skin cancer and is a highly effective disinfectant for many common bacteria.
- UVC: This is the most biologically damaging type of UV radiation and is completely filtered by the atmosphere. It does not reach the Earth's surface. It is extremely effective for both bacteria and viruses.

## GERMICIDAL UV LIGHTING

### ***What is germicidal UV light?***

Germicidal ultraviolet light is UV light that inactivates microorganisms by disrupting their DNA. The degree of disinfection is related to the spectrum of UV, the intensity, and the duration.

### ***Can germicidal UV light kill both bacteria and viruses including the coronavirus?***

All types of UV light can inactivate bacteria with the correct direct exposure time and intensity. The UVC spectrum is the only UV light proven to inactivate viruses and is believed to inactivate coronavirus, but can be dangerous to humans when directly exposed.

### ***Are there safety concerns with germicidal UV light?***

There are very serious health conditions that can develop due to exposure to germicidal ultraviolet light if not properly designed, installed, and maintained. Skin exposure to germicidal wavelengths can produce skin reddening and skin cancer and direct exposure of the eye to germicidal wavelengths can produce serious vision problems.

### ***What are the safety guidelines associated with germicidal UV light?***

Safety guidelines can be found from the following sources:

- National Institute for Occupational Safety and Health
- World Health Organization
- The International Commission on Non-Ionizing Radiation Protection
- The Center for Disease Control

### **Where is germicidal ultraviolet light being safely installed?**

In hospitals and healthcare systems that are highly concerned with infections, particularly bacterial infections. These facilities have highly trained maintenance staff and users (doctors and nurses). MEP systems might also have safely installed germicidal UV light to disinfect air and water.

### **UV LIGHT FIXTURES**

#### **What germicidal UV light fixtures are available for general use in the healthcare market?**

UV light fixtures available for general use in the healthcare market produce violet or UVA light and DO NOT inactivate coronavirus or any other virus. They are safe for human exposure and effectively disinfect bacteria on surfaces under long or continuous exposure.

#### **What other germicidal UV light fixtures are available?**

Broad spectrum systems DO inactivate both bacteria and viruses but cannot have any human exposure. It is believed COVID-19 would be included. These fixtures produce a wide range of UVA, UVB, and UVC radiation at high intensity for a short duration and are highly effective for surfaces with direct exposure to the light.

#### **Are there handheld devices and contained sterilization units with UV light available?**

There are a wide variety of these products on the market, but they should be used with caution as they are not well regulated.

#### **Do LED UV lighting fixtures exist?**

Yes, for violet and UVA applications. The efficiency of UVC production and life of these LEDs is lower than that of mercury lamps and thus not currently used in many applications.

#### **What does IEC 62471 mean?**

A European standard for the photobiological safety of lamps and lamp systems. It should be noted that a fixture sold as IEC 62471 compliant does not mean the light is safe for use in all applications.

### **UPPER ROOM/OVERHEAD UV LIGHTING DISINFECTING SYSTEMS**

#### **How do these systems work?**

Upper room or overhead disinfecting systems purify the air above an occupant's head using UV light. It requires a high ceiling, so the light can be safely overhead and has time to expose the air in the space. Coordination of surface finishes and lighting is critical to occupant safety. This type of system is not available in LED. If properly installed and rigorously maintained these systems can be effective, but everyone involved including the designers, contractors, owners, and users must understand the risks and costs involved.

#### **How does this system differ from whole room systems?**

There is no direct exposure of UV light to people or surfaces.

#### **What are the risks?**

- These systems may not be code compliant in many parts of the U.S.
- Spaces should not be occupied until qualified measurements verify radiant exposure does not exceed specified limits
- Incorrect installment could make the system highly unsafe
- Anyone accessing the area in direct view of the radiation is at risk

### **WHAT ELSE SHOULD I KNOW?**

Most plants are negatively impacted by UVB and UVC light. Living walls and other plants must be removed before installation of these types of systems. UV light also leads to rapid aging of plastics, fabrics and other materials.

The Illuminating Engineering Society's photobiology committee has issued guidance on implementation of germicidal UV light in hospitals and healthcare applications only. They currently recommend extreme caution for use in other applications including wands and other UV products.

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*If you have questions about germicidal UV lighting systems, connect with a Brinjac Lighting Studio designer.*

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