



Exploring Germicidal Ultraviolet (GUV):

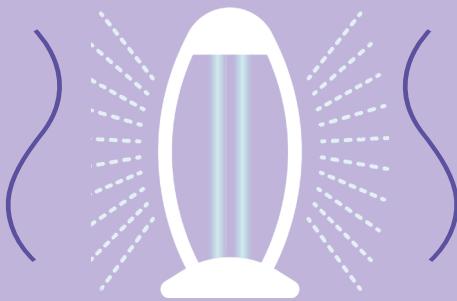
Benefits, Risks, and Applications

Types of GUV

- 1 **UV-A**
With wavelengths from 315 to 400 nm, is mainly linked to skin aging.
- 2 **UV-B**
Spanning 280 to 315 nm, can cause sunburn and, with long-term exposure, skin cancer.
- 3 **UV-C**
Ranging from 100 to 280 nm, is effective in inactivating microorganisms, making it crucial for disinfection and infectious disease prevention.

What is GUV?

Germicidal UV, also known as GUV or UV-C, is a particular type of ultraviolet light that can help reduce the number of airborne infectious disease particles. It emits radiation with wavelengths between 100 and 280 nm, with 254 nm being the most common.



How do GUV devices disinfect the air?

GUV works by emitting short-wavelength ultraviolet light, which damages the genetic material of microorganisms such as viruses, bacteria, and fungi. This damage renders it unable to reproduce, reducing the concentration of viable particles in the air.

How are GUV devices applied for air disinfection?


- 1 As ceiling units in rooms.
- 2 In-air stream disinfection in central HVAC systems.
- 3 In enclosed in-room air cleaners.


Determining the effectiveness of a GUV device

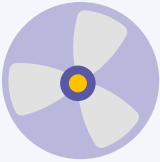
You need to consider:


- The UV source.
- How long UV is applied to the particles.
- How far away the UV light is from the particles.
- Things that might block or reflect the UV light.


NIOSH recommends these other considerations¹:

1  **Irradiation and dose:**
It is crucial to consider the microorganisms' susceptibility to GUV and the amount of GUV exposure that a microorganism or a group of microorganisms receive.

2  **Mechanical ventilation:**
When mechanical ventilation is increased in a room where an upper-room UVGI system has been deployed, the effectiveness of the UVGI system may be reduced because the residence time of the bacteria in the irradiated zone decreases.

3  **Air mixing:**
You should improve air quality by adding a fan or repositioning the supply diffusers and exhaust grills if there are areas of air stagnation. Better air mixing also exposes more pathogens to the GUV, improving effectiveness in the area.

4  **Humidity:**
If you have installed GUV devices, you should control relative humidity (RH) to 60% or less for optimal efficiency.

5  **Temperature:**
Temperatures from 68°F to 75 °F (20 °C to 24 °C) are optimal for the use of GUV systems.

¹ NIOSH (2009) Environmental control for tuberculosis: Basic upper-room ultraviolet germicidal irradiation guidelines for healthcare settings. [Preprint]. doi:10.26616/nioshpub2009105.



Important note

These same guidelines apply to all indoor spaces, not just healthcare settings. They assist with ensuring that the GUV device helps reduce the transmission of airborne diseases while keeping all workers and visitors safe.

Are there any risks involved with UV devices?

Direct short-term exposure to UV can cause temporary eye and skin damage. Similarly, limits on extended exposure help keep people safe.

Be aware that many UV systems come to market every day and are being sold faster than ever since the outbreak of the COVID-19 pandemic. While many new technologies showcase supporting laboratory findings, not everything that happens in a lab can be replicated in real life, and not all studies are independently verified.

Ensure the device is specified to produce only 200-280nm UV output:

- ✓ Wavelengths longer than 280nm (UV-A and UV-B) can cause skin cancer and permanent eye damage.
- ✓ Wavelengths shorter than 280nm can produce significant amounts of ozone, a lung irritant and potential health hazard.

How to be safe



To ensure you select the safest and most effective solution for your facility, work with an experienced **HVAC professional** or reputable UV device manufacturer. These will help you protect your employees and the community at large from the spread of infectious diseases.



Are UV devices all I need to reduce the spread of airborne viruses in my facility?

NO

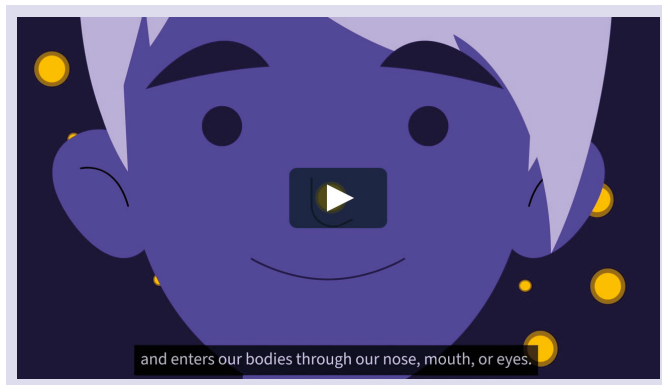
While UV can be a useful tool in reducing the spread of airborne viruses, it should be used to support other measures, such as ventilation, filtration, and other proven occupational health practices, to create a comprehensive approach to reducing the risk of infection in indoor spaces.

Looking for other measures to reduce the spread of airborne viruses from your facility?

Consider the 4Ds

Reducing exposure to an infectious disease is the most important thing you can do to reduce its spread.

Watch this video to understand and assess your risk:



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