

# The truth about UVC

The internet is overflowing with offers for the promotion of ultraviolet devices (UVC) and claims about their ability to sterilize and sanitize. It seems like a great idea: use this device — sometimes for just seconds — to rid your home and personal items from the invisible threat. As you might imagine the real story is a bit more complicated. Here is what you need to know about UVC light.

Ultraviolet (UV) naturally occurs in three types: UVA, UVB, and UVC. Although all three types have certain benefits and pose certain hazards, UVC is the type that has the most germicidal benefits, killing bacteria and deactivating viruses if the exposure dose is high enough. However, any UVC exposure strong enough to kill germs is likely strong enough to be a risk to people, pets and plants.

- “Exposure dose” is based on how strong the UVC source is, how close it is, and how long it is on.
- Overexposure to UVC carries very serious risks, so it is important to know the risks, use products with appropriate safeguards and follow safety precautions.
- In a home environment, the risk is managed with designs in which the UVC is contained inside the equipment to limit access to the UVC.



## **UVC can damage eyes:**

This damage can include pain, light sensitivity, and gritty sensation on the eye that manifest days later. UVC lamps have a pleasing blue tone, so our natural reaction to optical hazards (blinking, squinting, or trying to look away) will not work. Remember that children and pets will not understand the dangers of looking directly at the light!



## **UVC can damage skin**

**(erythema):** Irritation similar to a sunburn can occur on skin exposed to UVC.



## **UVC can damage lungs:**

Some UVC lamps can emit ozone, which can be hazardous especially in an enclosed space. Breathing the ozone may also worsen underlying respiratory conditions.

## **What are risks of using a UVC device?**

UVC can be dangerous if improperly used. Today there are many consumer-oriented products in online marketplaces where the UVC is not contained. Instead, there are instructions and warnings to leave the room and keep children and pets away.

Since your home is not a controlled environment — like a commercial setting or hospital — someone could accidentally be exposed to UVC very easily, causing damage in only a few moments. Timers and other suggestions to leave the room while the device is on are not enough — people and animals could accidentally enter the room and be exposed. Children and pets cannot be expected to follow written warnings.

## **Where can UVC products be safely used?**

UVC has many commercial and healthcare uses, but these products are intended for use by trained professionals who have taken safety training, use protective equipment or safeguards on site and take precautions against UVC overexposure.

In the home, UVC products are safe when the UVC is contained inside the device and will not leak out to expose your eyes or skin.



## Examples of products

Below is a chart of examples of some products commonly seen advertised in the marketplace. Please note that we are not verifying how well these products work in killing germs or recommending any specific brand. We are only showing what types of products that can currently be considered safe or unsafe to use in a home based on the potential for UVC exposure.



Products that UL will certify for safety.



Products that UL is unwilling to certify for safety due to high risk.

Type of product	Sample image	How does it work?	Is it safe to use at home?
<b>Home-use portable sterilizer</b> Marketed to clean a room in the home		Manufacturer's instructions say to turn on the UVC, which will kill germs in the room (everywhere the light touches)	UVC is NOT contained - not safe for a home setting.  There is too great a risk that people and pets could accidentally be exposed to UVC and be injured, and ozone may be emitted. The exposure dose to people can be far above accepted levels and can cause injury. Integral timers or proximity and orientation sensors pose concerns with accuracy and reliability of these safeguards, as well as opportunities for misuse or bypass
<b>Personal portable sterilizer/wand</b> Marketed to be hand held and moved over surfaces to sterilize		Manufacturer's instructions say to turn on the UVC light and pass the wand over surfaces like beds, killing germs (everywhere the light touches)	UVC is NOT contained - not safe for a home setting.  There is too great a risk that people and pets could accidentally be exposed to UVC and be injured, and ozone may be emitted. The exposure dose to people can be far above accepted levels and can cause injury. Integral timers or proximity and orientation sensors pose concerns with accuracy and reliability of these safeguards, as well as opportunities for misuse or bypass
<b>Home use air cleaners with internal (contained) UVC</b> Marketed to homes and offices		Manufacturer's instructions say to turn on the air cleaner, which circulates the air through a UVC on the inside of the product with the use of a fan	UVC is contained.  The UVC source is inside the product enclosure and a safeguard disables the UVC when an access door is opened
<b>Portable and stationary UVC sterilization boxes</b>		Manufacturer's instructions say to put objects into the box, close it, and turn on to expose the interior to UVC, killing germs on the surfaces	UVC is contained.  The UVC source is inside the enclosure; opening the door will disable the UV source. Testing would ensure that any 'UV leakage' will be within safe exposure dose limits

*As the safety science experts, UL applies science and objective authority to help people navigate risk and complexity. The information in this chart has been collected from numerous references. Please visit these links for more information: [EPA.gov](http://EPA.gov), [FDA.gov](http://FDA.gov), [OSHA.gov](http://OSHA.gov) and [WHO.int](http://WHO.int)*

## About UL

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