

The truth about Ultraviolet-C (UVC)

The internet is overflowing with offers promoting ultraviolet devices and claims about their ability to sterilize and sanitize. It seems like a great idea — use the device, sometimes for just a few seconds — and rid your home and personal items of any 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 have certain benefits and pose certain hazards, UVC is the type with 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 the UVC source's strength, proximity and time of exposure.
- 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, risk is managed with designs in which the UVC is contained inside the equipment to limit exposure to the UVC.



UVC can damage eyes –

This damage can include pain, light sensitivity and gritty sensation in the eye that manifest days later. UVC lamps have a pleasing blue tone, so our natural reaction to optical hazards, e.g., blinking, squinting, looking away, do 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 emit ozone, which can be hazardous, especially in an enclosed space. Breathing in ozone may also worsen underlying respiratory conditions.

What are the 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. In addition, the UL 8803 Outline of Investigation has been developed to address consumer portable products with uncontained UV sources.

Where can UVC products be safely used?

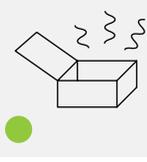
UVC has many commercial and healthcare uses, but these products are intended for use by trained professionals who have taken safety training, use protective equipment or safeguards on site and take precautions against UVC overexposure.

In the home, UVC products are safe if the UVC is contained inside the device and cannot leak out and harm your eyes or skin.



Examples of products

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

| Type of product | Sample image | How does it work? | Is it safe to use at home? |
|--|---|---|--|
| Home-use portable sterilizer Marketed to clean a room in the home |  | Intended treatment area is vacated, allowing UV emissions to expose line of sight surfaces. | Portable equipment with uncontained UV source. UV overexposure risk is addressed via integral safeguards; <ol style="list-style-type: none"> 1. motion detection as a critical control function, and 2. activation cycle requirements and operating time limits. |
| Personal portable sterilizer/wand Marketed to be handheld and moved over surfaces to sterilize |  | Manufacturer's instructions say to turn on the UVC light and pass the wand over surfaces, such as 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. |
| Home-use air cleaners with internal (contained) UVC 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 using 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. |
| Portable and stationary UVC sterilization boxes |  | 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](https://www.epa.gov), [FDA.gov](https://www.fda.gov), [OSHA.gov](https://www.osha.gov) and [WHO.int](https://www.who.int).

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

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