



# **gako UV-C Air Sterilizer**

UV-C x HEPA Filters

**gako**

## 1. UV-C Filters

Ultraviolet germicidal irradiation (UV-C) is commonly used to disinfect air, water, and other kinds of surfaces due to its high efficiency and relatively low cost. That is because its use for inactivation of bacteria, virus and other microorganisms is well established. A short wave ultraviolet C radiation (UVC), 100-280 nanometers (nm), is commonly used in UVGI as their wavelengths are strongly absorbed by aerosols, causing damage to the microorganism DNA, leading to their inactivation.

## 2. HEPA Filters

High-efficiency particulate air (HEPA) filters are usually manufactured by pleating of microfiber glass or other fibrous media made with multiple layers of randomly arranged fibers, with diameters ranging from 2 to 500nm. As air flows through the filter and between the fibers, small particles will be trapped by one of three mechanisms: impaction, interception and diffusion. To qualify as HEPA grade, filters must remove at least 99.97% of particles that are 0.15 - 0.2µm.

	UV-C	HEPA
<b>What does it do?</b>	Deactivate microorganisms in aerosols such as virus, bacteria, fungi and protozoa.	Capture particles from the air.
<b>How efficient it is?</b>	Over 99.95% of inactivation of microorganisms.	Over 99.95% of particles capture.
<b>Running costs</b>	Periodic lamp change; Modest increase on energy.	Periodic filter change (expensive); Filters must be dispensed on plastic specific bags for contaminated trash; Increased energy use through filters life.
<b>Applications</b>	Dynamic disinfection from air contaminants, such as virus and bacteria, to prevent spreading of diseases through particles such as aerosols. More indicated when you need a disinfected environment.	Cleanse of small particles, specially allergen particles (dust, pollen, pet hairs, acaro). It can capture particles with virus and bacteria, although there will be no inactivation. More indicated when you need to remove particles from the environment.
<b>Point of attention</b>	Avoid direct exposition of UVC light; Ensure that it's real UVC (not UVA or UVB); Ozone free lamps.	The seal between the holding frames of the filters; Ensure that there are no holes that allow particles to slip through; Particles filtered are not disinfected, so they must ensure there is no reverse airflow to put contaminants back in the air; Hard to identify damage on filters before changing time, so particles might pass through them.

Table 1.0: gako UV-C Air Sterilizer x HEPA Filters.

### References

1. Christopherson DA, Yao WC, et al. High efficiency Particulate Air Filters in the Era of COVID-19: Function and Efficacy. American Academy of Otolaryngology-Head and Neck Surgery, 2020. DOI: 10.1177/0194599820941838.
2. Ployadeng M, Rajatanavin N, Rattanakaemakorn P. UVC-C Light: A powerful technique for inactivating microorganisms and the related side effects to the skin. Photodermatol Photoimmunol Photomed. 2020; 00:1-8. DOI: 10.1111/phpp.12605
3. Kitagawa H, Nomura T, et al. Effectiveness of 222-nm ultraviolet light on disinfecting SARS-Cov-2 surface contamination. American Journal of Infection Control 000 (2020) 1-3. DOI:https://doi.org/10.1016/j.ajic.2020.08.022.
4. Buanonno M, Stanislaukas M, et al. 207-nm UV-light - A promising tool for safe low-cost reduction of surgical site infections. II: In vivo safety studies. PLoS ONE 11(6): e0138418. doi:10.1371/journal.pone.0138418.
5. Medical Advisory Secretariat. Air cleaning technologies: an evidence-based analysis. Ontario Health Technology Assessment Series 2005; 5(17).