

UV light against COVID-19 – most efficient inactivation method

UV light is used for disinfection of water, surfaces and air since 1878. Wavelength between 200 and 300nm are strongly absorbed by nucleic acids, preventing replication and expression of necessary proteins causing inactivation or death of the organism. The germicidal effectiveness of UV light is illustrated in Fig. 1. Furthermore, studies carried out on SARS-CoV ([1], [2]) proved that UV irradiation is more effective than heating or other methods to inactivate the virus. A similar response is expected for the current COVID-19 virus, although no published data has been found to date.

Traditionally, mercury-based light sources are used for various disinfection application. The hazardous nature of mercury and the desire to eliminate it from use [3], makes mercury-based light source problematic for many applications. High-power Light Emitting Diodes (LED) within the desired wavelength have recently become available opening the possibility of advanced germicidal illumination solutions.

idonus has an extensive experience in designing and manufacturing high-precision UV light exposure systems for micro-fabrication. With the advent of the current crisis, we have learnt that a LED light source we are employing (276-286nm) is particularly suitable for sterilization against COVID-19. Since then, our team has come up with 3 product concepts which we are ready to roll-out in the next months while in the same time we have secured our supply chain.

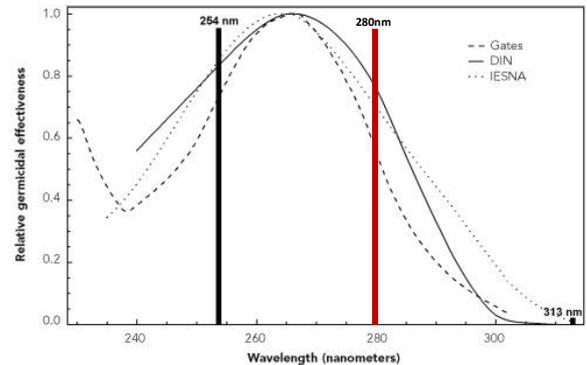
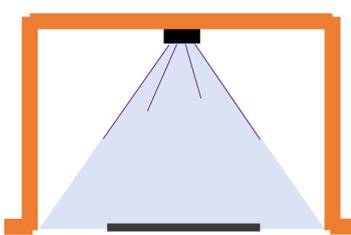
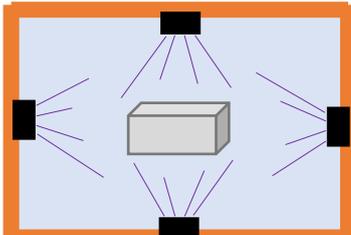
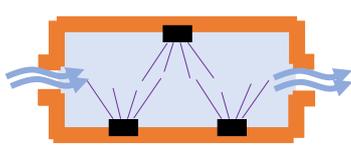


Fig. 1 - Germicidal effectiveness against UV wavelength adapted from [4]: Gates' original bactericidal action spectrum for Bacterium coli; modern germicidal action spectra by Deutsches Institut für Normung (DIN) and Illuminating Engineering Society of North America (IESNA) against Hg-based and LED UV light sources.

For:	Surfaces	Objects	Fluids (liquid / gas)
			
Applications	<ul style="list-style-type: none"> • R&D sterilization • Dose calculations 	<ul style="list-style-type: none"> • (Medical) tools or auxiliary material sterilization 	<ul style="list-style-type: none"> • Sterilization of entry air in ventilators and breathers
Technical features	<ul style="list-style-type: none"> • Closed-loop dose control • High uniformity (<3%, optional) <ul style="list-style-type: none"> • Portable 	<ul style="list-style-type: none"> • Minimum dose control • 360° volumetric exposure • Optimized reflectivity 	<ul style="list-style-type: none"> • Adjustable dose to flow <ul style="list-style-type: none"> • Portable
Benefits	<ul style="list-style-type: none"> • Accurate dose control • No surface wetting • High energy efficiency • No hazardous materials <ul style="list-style-type: none"> • No consumables • First batch in production 	<ul style="list-style-type: none"> • Fast (seconds) • No surface wetting • High energy efficiency • No hazardous materials <ul style="list-style-type: none"> • No consumables 	<ul style="list-style-type: none"> • Add-on to existing equipment <ul style="list-style-type: none"> • High energy efficiency • No hazardous materials <ul style="list-style-type: none"> • No consumables

Please get in touch with us for: • product details • pre-orders • ideas • needs • feedback • partnership

References

- [1] M. Darnell, K. Subbarao, S. Feinstone and D. Taylor, "Inactivation of the coronavirus that induces severe acute respiratory syndrome, SARS-CoV," *Journal of Virological Methods*, vol. 121, p. 85–91, 2004.
- [2] S. Duan, X. Zhao, R. Wen, J. Huang, G. Pi, S. Zhang, J. Han, S. Bi, L. Ruan and X. Dong, "Stability of SARS Coronavirus in Human Specimens and Environment and Its Sensitivity to Heating and UV Irradiation," *Biomedical and Environmental Sciences*, vol. 16, pp. 246-255, 2003.
- [3] European Comission - Science and Environment Policy, "Tackling mercury pollution in the EU and worldwide - IN-DEPTH REPORT 15," 2017.
- [4] N. Reed, "The History of Ultraviolet Germicidal Irradiation for Air Disinfection," *Public Health Rep.*, vol. 125 (1), pp. 15-27, 2010.