

## Scientific Approval

**Background Information:** In order to reduce the germ load in the air and thus the risk of infection in closed rooms, disinfection by means of UVC radiation offers the highest application potential in addition to air filtration or chemical disinfection. The disinfection effect of UV radiation is based on the law of Grotthus-Draper ("Grotthus-Draper-Law") whereby chemical bonds such as carbon single and double bonds can be broken by absorption. UVC radiation is therefore particularly effective in proteins and nucleic acids, as these have an absorption maximum at 260nm. DNA and other cell structures can thus be irreparably damaged.

In scientific studies on this topic, the so-called UV dose value is used. The dose value is the product of irradiation time and irradiation intensity. This value, usually defined as D90, describes the necessary UV dose to inactivate 90% of the examined germ in a sample with a defined initial germ count.

This value exists for all relevant germs related to surface, air and water and has already been determined in various studies, especially with regard to coronaviruses.

### Summary of relevant studies

#### Inactivation studies on SURFACES

*2019, University of Frankfurt, Dr. Hönle AG, Experimental series on the inactivation of SARS-CoV-2 by UV radiation.*

*2020, Boston University: Rapid and complete inactivation of SARS-CoV-2 by ultraviolet-C irradiation*

#### Inactivation studies in AEROSOLS

*2020, Columbia University of New York, Buonanno, Manuela & Welch, David & Shuryak, Igor & Brenner, David. Far-UVC light (222 nm) efficiently and safely inactivates airborne human coronaviruses.*

*2007, Walker, Chris & Ko, Gwangpyo Effect of Ultraviolet Germicidal Irradiation on Viral Aerosols. Environmental science & technology.*

*2012, Harvard School of Public Health Boston, Mcdevitt, James & Rudnick, Stephen & Radonovich, Lewis. (2012). Aerosol Susceptibility of Influenza Virus to UV-C Light.*

**Results:** Dr. Hönle AG commissioned a study at the virological institute of the University of Frankfurt in which we determined the dose value for SARS-CoV2 on surfaces. The results show that, using special Hönle UV lamps, the new Coronavirus can be killed reliably within seconds. An inactivation rate of 99,99% (log4) was confirmed in the laboratory. We use this value as a basis for the design of our devices.

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Further studies on this matter confirm the achieved results and moreover proof the higher effectiveness for inactivation of viruses in aerosols.

According to current scientific studies, germs cannot build up resistance to UV light and thus mutations of coronaviruses will also be very sensitive to UV radiation.

*2020, University of Applied Sciences, Hessler, Martin & Hönes, Katharina & Vatter, Petra & Lingenfelder, Christian: Ultraviolet irradiation doses for coronavirus inactivation.*

**Summary:** The disinfection performance of UV radiation has been scientifically proven and has already been comprehensively demonstrated with regard to its effectiveness on coronaviruses.

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