

Ultravation Technical Update

Independent Studies Prove UV-C Destroys Bacteria, Viruses and Fungi in the Air and on Surfaces

UV has been proven in laboratory studies to achieve a **100% kill rate** on static **coronaviruses including SARS-CoV-2 in 15 seconds** (see table below), while in the same study **UV eliminated 99%-99.9% of all bacteria and fungi within 90 seconds**.

Coronaviruses are particularly susceptible to UV because of the vulnerability of their RNA strands.

Summary of Ultraviolet Studies on Coronaviruses

Microbe	D ₉₀ Dose J/m ²	UV k m ² /J	Base Pairs kb	Source
Coronavirus	6.6	0.35120	30741	Walker 2007 ^a
Berne virus (Coronaviridae)	7.2	0.32100	28480	Weiss 1986
SARS-CoV-2 (Italy-INM1)	12.3	0.18670	29811	Bianco 2020
Murine Coronavirus (MHV)	15.0	0.15351	31335	Hirano 1978
SARS Coronavirus (Frankfurt 1)	16.4	0.14040	29903	Eickmann 2020
Canine Coronavirus (CCV)	28.5	0.08079	29278	Saknimit 1988 ^b
Murine Coronavirus (MHV)	28.5	0.08079	31335	Saknimit 1988 ^b
SARS Coronavirus (CoV-P9)	40.0	0.05750	29829	Duan 2003 ^c
SARS-CoV-2 (SARS-CoV-2 Hu/DP/1 ng/19-027)	41.7	0.05524	29811	Inagaki 2020
Murine Coronavirus (MHV)	103.0	0.02240	31335	Liu 2003
SARS Coronavirus (Hanoi)	133.9	0.01720	29751	Kariwa 2004 ^d
SARS Coronavirus (Urbani)	2410	0.00096	29751	Darnell 2004
Average	237	0.00972	including all studies	
Average excluding outliers	47	0.04943	excluding Walker, Weiss & Darnell	
Average for SARS-CoV-2	27	0.08528	two studies, 90% inactivation	

^a (Jingwen 2020)

^b (estimated)

^c (mean estimate)

^d (at 3 logs)

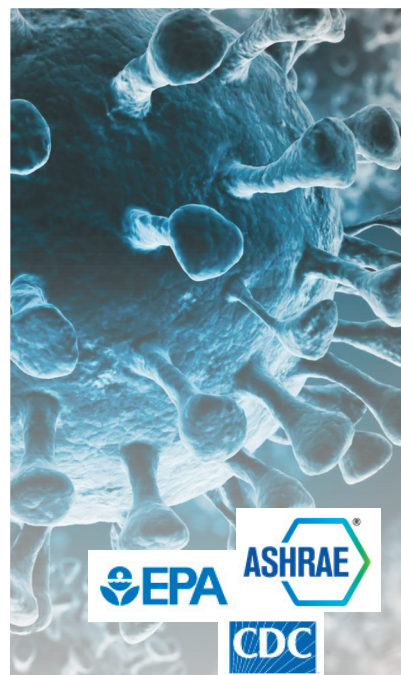
Table 2: Performance of the FMUV System against Bacteria and Vegetative Fungi

Bacteria (Yellow) or Vegetative Fungi (Green)	D90 J/m ²	Survival (CFU) at Exposure Time, seconds						
		0	5	15	30	60	90	120
Multidrug-resistant <i>Pseudomonas aeruginosa</i>	26	1500	400	0				
Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA)	40	8200	1900	0				
ESBL-producing <i>Escherichia coli</i>	26	18000	1000	10	0			
<i>Candida parapsilopsis</i>	98	2300	300	11	0			
Vancomycin-resistant <i>Enterococcus faecium</i> (VRE)*	120	1800	800	100	0			
<i>Fusarium solani</i>	313	1700	1100	300	0			
Carbapenemase-resistant <i>Klebsiella pneumoniae</i> (KPC)	52	7200	2100	28	4	0		
<i>Acinetobacter baumannii</i>	18	4200	1900	38	10	0		
<i>Candida albicans</i>	374	3000	2800	700	32	0		
<i>Clostridioides (Clostridium) difficile</i>	38	2800	2600	1000	20	0		
<i>Aspergillus fumigatus</i>	560	2700	2700	2200	1200	100	10	0

Table Source: Researchgate.net • Wladyslaw J. Kowalski, PurpleSun, Inc.

“... 280 ±5 nm [UV] wavelength rapidly inactivates SARS-CoV-2 obtained from a COVID-19 patient.”

— Hiroko Inagaki, Akatsuki Saito, Hironobu Sugiyama, Tamaki Okabayashi, Shouichi Fujimoto



These governmental, and non-profit engineering organizations either endorse, or recommend consideration of, germicidal UV for reducing biological air contamination

UV is the *only* air disinfection technology that is supported as effective by ASHRAE.

ASHRAE pandemic recommendation:

“Consider adding air treatment and cleaning devices such as **UVGI (ultraviolet germicidal irradiation)** in duct, plenums and air handling units and on the face of cooling coils.”

— ASHRAE's online guide to Pandemic Preparedness - Develop a Preparedness Plan, Item 9

Member:



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