

Visium Clear Optics (CO) Installed at 11'9"

		Calculated Dose for Reduction (mJ/cm <sup>2</sup> )						Time (Minutes) to Needed Dose at 6'0" Above Finished Floor						Time (Minutes) to Needed Dose at 3'0" Above Finished Floor						References
Pathogen		25%	50%	75%	90%	99%	99.9%	25%	50%	75%	90%	99%	99.9%	25%	50%	75%	90%	99%	99.9%	References
Virus	Human Coronavirus 229E	0.1	0.2	0.3	0.6	1.1	1.7	(17 sec)	(42 sec)	(84 sec)	2	5	7	(32 sec)	(78 sec)	3	4	9	13	10, 11, 12
	Influenza A H1N1	0.2	0.4	0.8	1.3	2.6	3.8	(40 sec)	(96 sec)	3	5	11	16	(74 sec)	3	6	10	20	30	2, 13
	A. radioresistens 50v1	2.1	5.0	9.9	16.4	32.9	49.3	9	21	41	68	137	205	16	38	76	127	253	380	3
Bacteria	B. cereus	1.2	2.8	5.6	9.2	18.5	27.7	5	12	23	38	77	115	9	21	43	71	142	213	1, 2, 4
	B. pumilus SAFR-032	1.1	2.6	5.1	8.5	17.1	25.6	4	11	21	35	71	106	8	20	39	66	131	197	3
	B. subtilis	1.0	2.4	4.8	7.9	15.9	23.8	4	10	20	33	66	99	8	18	37	61	122	183	4, 5, 6, 7
	C. sporogenes	0.4	0.9	1.8	3.0	6.0	9.0	(93 sec)	4	8	12	25	37	3	7	14	23	46	69	2
	E. coli	0.5	1.3	2.5	4.2	8.4	12.6	2	5	10	17	35	52	4	10	19	32	64	97	1, 2, 4, 5, 9
	Enterococcus VRE	1.3	3.0	6.0	10.0	20.0	30.0	5	13	25	42	83	125	10	23	46	77	154	231	8
	M. fortuitum	0.7	1.7	3.3	5.5	11.0	16.4	3	7	14	23	46	68	5	13	25	42	84	127	5
	P. aeruginosa	0.6	1.4	2.9	4.8	9.6	14.4	2	6	12	20	40	60	5	11	22	37	74	111	1, 2, 5
	S. aureus	0.8	2.0	4.0	6.6	13.2	19.7	3	8	16	27	55	82	6	15	30	51	101	152	1, 2, 4, 5, 8
	S. enterica serovar Typhimurium	0.8	1.8	3.6	6.0	12.0	18.0	3	8	15	25	50	75	6	14	28	46	92	139	2, 9
Mold	A. niger	12.5	30.1	60.3	100.1	200.2	300.3	52	125	250	416	831	1,247	96	232	464	770	1,540	2,310	1, 2
	C. albicans	1.3	3.0	6.0	10.0	20.0	30.0	5	13	25	42	83	125	10	23	46	77	154	231	2
	T. rubrum	1.6	3.9	7.7	12.8	25.6	38.4	7	16	32	53	106	159	12	30	59	98	197	295	2
Spore	B. cereus	1.5	3.6	7.3	12.1	24.1	36.2	6	15	30	50	100	150	12	28	56	93	185	278	2
	C. difficile	1.9	4.5	9.1	15.0	30.1	45.1	8	19	38	62	125	187	14	35	70	116	232	347	2, 8
	C. sporogenes	0.8	1.8	3.6	6.0	12.0	18.0	3	8	15	25	50	75	6	14	28	46	92	139	2

**Notes:** The presented data in this list are sourced from peer-reviewed research publications or independent laboratory testing reports. See the notated reference for additional information on experimental setup. Designs that differ in application may yield slightly different reduction values based on setup and sensitivity of detection method.

Presented dose for reduction values represent amount of light needed to inactivate 90%, 99%, and 99.9% of target pathogens. This value is either taken directly from the reference, interpolated, or extrapolated using the reference data. Interpolated or extrapolated values are based on a calculated k-factor, the UV rate constant, to determine necessary dose based on the logarithmic relationship that pathogen survival as a function of dose follows.

Visium Diffuse Optics (DO) Installed at 8'2"

		Calculated Dose for Reduction (mJ/cm <sup>2</sup> )						Time (Minutes) to Needed Dose at 6'0" Above Finished Floor						Time (Minutes) to Needed Dose at 3'0" Above Finished Floor						References
Pathogen		25%	50%	75%	90%	99%	99.9%	25%	50%	75%	90%	99%	99.9%	25%	50%	75%	90%	99%	99.9%	References
Virus	Human Coronavirus 229E	0.1	0.2	0.3	0.6	1.1	1.7	(18 sec)	(43 sec)	(86 sec)	2	5	7	(96 sec)	4	8	13	26	39	10, 11, 12
	Influenza A H1N1	0.2	0.4	0.8	1.3	2.6	3.8	(41 sec)	(98 sec)	3	5	11	16	4	9	18	29	59	88	2, 13
	A. radioresistens 50v1	2.1	5.0	9.9	16.4	32.9	49.3	9	21	42	70	140	209	47	113	227	377	754	1,131	3
Bacteria	B. cereus	1.2	2.8	5.6	9.2	18.5	27.7	5	12	24	39	78	118	26	64	128	212	424	636	1, 2, 4
	B. pumilus SAFR-032	1.1	2.6	5.1	8.5	17.1	25.6	5	11	22	36	72	109	24	59	118	195	391	586	3
	B. subtilis	1.0	2.4	4.8	7.9	15.9	23.8	4	10	20	34	67	101	23	55	110	182	364	546	4, 5, 6, 7
	C. sporogenes	0.4	0.9	1.8	3.0	6.0	9.0	(95 sec)	4	8	13	25	38	9	21	41	69	138	206	2
	E. coli	0.5	1.3	2.5	4.2	8.4	12.6	2	5	11	18	36	53	12	29	58	96	192	288	1, 2, 4, 5, 9
	Enterococcus VRE	1.3	3.0	6.0	10.0	20.0	30.0	5	13	26	42	85	127	29	69	138	229	459	688	8
	M. fortuitum	0.7	1.7	3.3	5.5	11.0	16.4	3	7	14	23	47	70	16	38	76	126	251	377	5
	P. aeruginosa	0.6	1.4	2.9	4.8	9.6	14.4	3	6	12	20	41	61	14	33	66	110	220	330	1, 2, 5
	S. aureus	0.8	2.0	4.0	6.6	13.2	19.7	3	8	17	28	56	84	19	45	91	151	302	452	1, 2, 4, 5, 8
	S. enterica serovar Typhimurium	0.8	1.8	3.6	6.0	12.0	18.0	3	8	15	25	51	76	17	41	83	138	276	413	2, 9
Mold	A. niger	12.5	30.1	60.3	100.1	200.2	300.3	53	128	256	425	849	1,274	287	691	1,381	2,294	4,589	6,883	1, 2
	C. albicans	1.3	3.0	6.0	10.0	20.0	30.0	5	13	26	42	85	127	29	69	138	229	459	688	2
	T. rubrum	1.6	3.9	7.7	12.8	25.6	38.4	7	16	33	54	109	163	37	88	177	293	586	880	2
Spore	B. cereus	1.5	3.6	7.3	12.1	24.1	36.2	6	15	31	51	102	153	35	83	166	276	553	829	2
	C. difficile	1.9	4.5	9.1	15.0	30.1	45.1	8	19	38	64	128	191	43	104	208	345	690	1,035	2, 8
	C. sporogenes	0.8	1.8	3.6	6.0	12.0	18.0	3	8	15	25	51	76	17	41	83	138	276	413	2

#	Citation
1	Clauß M. 2006. Higher effectiveness of photoinactivation of bacterial spores, UV resistant vegetative bacteria and mold spores with 222 nm compared to 254 nm wavelength. <i>Acta hydrochimica et hydrobiologica</i> 34:525-532.
2	Narita K, Asano K, Naito K, Ohashi H, Sasaki M, Morimoto Y, Igarashi T, Nakane A. 2020. Ultraviolet C light with wavelength of 222 nm inactivates a wide spectrum of microbial pathogens. <i>Journal of Hospital Infection</i> 105:459-467.
3	Seuylemezian A, Buonanno M, Guan L, Brenner DJ, Welch D. 2021. Far-UVC light as a new tool to reduce microbial burden during spacecraft assembly. <i>Advances in Space Research</i> 67:496-503.
4	Matafonova GG, Batoev VB, Astakhova SA, Gomez M, Christofi N. 2008. Efficiency of KrCl excilamp (222 nm) for inactivation of bacteria in suspension. <i>Lett Appl Microbiol</i> 47:508-13.
5	Sun W, Jing Z, Zhao Z, Yin R, Santoro D, Mao T, Lu Z. 2023. Dose-Response Behavior of Pathogens and Surrogate Microorganisms across the Ultraviolet-C Spectrum: Inactivation Efficiencies, Action Spectra, and Mechanisms. <i>Environ Sci Technol</i> 57:10891-10900.
6	Wang D, Oppenländer T, El-Din MG, Bolton JR. 2010. Comparison of the Disinfection Effects of Vacuum-UV (VUV) and UV Light on <i>Bacillus subtilis</i> Spores in Aqueous Suspensions at 172, 222 and 254 nm. <i>Photochemistry and Photobiology</i> 86:176-181.
7	Pennell KG, Naunovic Z, Blatchley ER. 2008. Sequential Inactivation of <i>Bacillus Subtilis</i> Spores with Ultraviolet Radiation and Iodine. <i>Journal of Environmental Engineering</i> 134:513-520.
8	Nerandzic MM, Cadnum JL, Eckart KE, Donskey CJ. 2012. Evaluation of a hand-held far-ultraviolet radiation device for decontamination of <i>Clostridium difficile</i> and other healthcare-associated pathogens. <i>BMC Infectious Diseases</i> 12:120.
9	Kang JW, Kim WJ, Kang DH. 2020. Synergistic effect of 222-nm krypton-chlorine excilamp and mild heating combined treatment on inactivation of <i>Escherichia coli</i> O157:H7 and <i>Salmonella</i> Typhimurium in apple juice. <i>Int J Food Microbiol</i> 329:108665.
10	Ma B, Gundy PM, Gerba CP, Sobsey MD, Linden KG. 2021. UV Inactivation of SARS-CoV-2 across the UVC Spectrum: KrCl* Excimer, Mercury-Vapor, and Light-Emitting-Diode (LED) Sources. <i>Appl Environ Microbiol</i> 87:e0153221.
11	Kitagawa H, Nomura T, Nazmul T, Omori K, Shigemoto N, Sakaguchi T, Ohge H. 2020. Effectiveness of 222-nm ultraviolet light on disinfecting SARS-CoV-2 surface contamination. <i>American Journal of Infection Control</i> doi:10.1016/j.ajic.2020.08.022.
12	Buonanno M, Welch D, Shuryak I, Brenner DJ. 2020. Far-UVC light (222 nm) efficiently and safely inactivates airborne human coronaviruses. <i>Scientific Reports</i> 10:10285.
13	Welch D, Buonanno M, Grilj V, Shuryak I, Crickmore C, Bigelow AW, Randers-Pehrson G, Johnson GW, Brenner DJ. 2018. Far-UVC light: A new tool to control the spread of airborne-mediated microbial diseases. <i>Scientific Reports</i> 8:2752.
14	Hull NM, Linden KG. 2018. Synergy of MS2 disinfection by sequential exposure to tailored UV wavelengths. <i>Water Research</i> 143:292-300.