

Efficiency table for the open UVC function SPECTRA Reflect 110W with REFLECTOR									
The table shows the time required to kill different types of bacteria and viruses from different distances									
	Type	Distance in meters						Time	REFERENCE
		1	2	3	4	5	6		
<b>Bacteria</b>									
Aeromonas hydrophila ATCC7966	Bacteria	14,45	48,54	104,17	178,57	277,78	384,62	N e e d  t i m e  i n  s e c o n d s  N e e d e d  †	Wilson et al. 1992
Aeromonas salmonicida	Bacteria	17,05	57,28	122,92	210,71	327,78	453,85		Liltved and Landfald 1996
Bacillus anthracis – Anthrax	Bacteria	52,25	175,53	376,67	645,71	1 004,44	1 390,77		UV-Light.co.UK
Bacillus magaterium sp. (veg.)	Bacteria	15,03	50,49	108,33	185,71	288,89	400,00		UV-Light.co.UK
Bacillus paratyphus	Bacteria	36,99	124,27	266,67	457,14	711,11	984,62		UV-Light.co.UK
Bacillus subtilis	Bacteria	67,05	225,24	483,33	828,57	1 288,89	1 784,62		UV-Light.co.UK
Campylobacter jejuni	Bacteria	11,56	38,83	83,33	142,86	222,22	307,69		Measurement by Grizzly
Campylobacter jejuni ATCC 43429	Bacteria	13,29	44,66	95,83	164,29	255,56	353,85		Wilson et al. 1992
Citrobacter diversus	Bacteria	33,24	111,65	239,58	410,71	638,89	884,62		Giese and Darby 2000
Citrobacter freundii	Bacteria	37,57	126,21	270,83	464,29	722,22	1 000,00		Giese and Darby 2000
Clostridium tetani	Bacteria	63,58	213,59	458,33	785,71	1 222,22	1 692,31		Light Sources Inc. 2014
Corynebacterium diphtheriae	Bacteria	38,96	130,87	280,83	481,43	748,89	1 036,92		UV-Light.co.UK
Ebertelia typhosa	Bacteria	24,74	83,11	178,33	305,71	475,56	658,46		UV-Light.co.UK
Escherichia coli	Bacteria	11,56	38,83	83,33	142,86	222,22	307,69		Measurement by Grizzly
Escherichia coli O157:H7	Bacteria	11,56	38,83	83,33	142,86	222,22	307,69		Yaun et al. 2003
Escherichia coli O157:H7 CCUG 29193	Bacteria	20,23	67,96	145,83	250,00	388,89	538,46		Sommer et al. 2000
Halobacterium elongate ATCC33173	Bacteria	2,89	9,71	20,83	35,71	55,56	76,92		Martin et al. 2000
Halobacterium salinarum ATCC43214	Bacteria	57,80	194,17	416,67	714,29	1 111,11	1 538,46		Martin et al. 2000
<b>Klebsiella pneumoniae</b>	<b>Bacteria</b>	57,80	194,17	416,67	714,29	1 111,11	1 538,46		Giese and Darby 2000
<b>Klebsiella terrigena ATCC33257</b>	<b>Bacteria</b>	31,79	106,80	229,17	392,86	611,11	846,15		Wilson et al. 1992
Legionella pneumophila	Bacteria	20,23	67,96	145,83	250,00	388,89	538,46		Measurement by Grizzly
Legionella pneumophila ATCC33152	Bacteria	22,25	74,76	160,42	275,00	427,78	592,31		Oguma et al.2004
Leptospiracanicola – infectious Jaundice	Bacteria	36,42	122,33	262,50	450,00	700,00	969,23		UV-Light.co.UK
Micrococcus candidus	Bacteria	69,94	234,95	504,17	864,29	1 344,44	1 861,54		UV-Light.co.UK
Micrococcus sphaeroides	Bacteria	11,56	38,83	83,33	142,86	222,22	307,69		UV-Light.co.UK
MRSA	Bacteria	36,99	124,27	266,67	457,14	711,11	984,62		UV-Light.co.UK
Mycobacterium tuberculosis	Bacteria	71,68	240,78	516,67	885,71	1 377,78	1 907,69		UV-Light.co.UK
Neisseria catarrhalis	Bacteria	50,87	170,87	366,67	628,57	977,78	1 353,85		UV-Light.co.UK
Phytomonas tumefaciens	Bacteria	50,87	170,87	366,67	628,57	977,78	1 353,85		UV-Light.co.UK
Proteus vulgaris	Bacteria	34,68	116,50	250,00	428,57	666,67	923,08		UV-Light.co.UK
Pseudomonas aeruginosa	Bacteria	63,58	213,59	458,33	785,71	1 222,22	1 692,31		UV-Light.co.UK
Pseudomonas fluorescens	Bacteria	40,46	135,92	291,67	500,00	777,78	1 076,92		UV-Light.co.UK
Pseudomonas stutzeri	Bacteria	664,74	2 233,01	4 791,67	8 214,29	12 777,78	17 692,31		Joux et al. 1999
Salmonella typhi	Bacteria	18,50	62,14	133,33	228,57	355,56	492,31		Measurement by Grizzly
Salmonella paratyphi – Enteric fever	Bacteria	36,99	124,27	266,67	457,14	711,11	984,62		UV-Light.co.UK
Salmonella anatum	Bacteria	43,35	145,63	312,50	535,71	833,33	1 153,85		Measurement by Grizzly
Salmonella anatum (from human feces)	Bacteria	43,35	145,63	312,50	535,71	833,33	1 153,85		Tosa and Hirata 1998
Salmonella derby (from human feces)	Bacteria	21,68	72,82	156,25	267,86	416,67	576,92		Tosa and Hirata 1998
Salmonella enteritidis	Bacteria	26,01	87,38	187,50	321,43	500,00	692,31		Measurement by Grizzly
Salmonella enteritidis	Bacteria	46,24	155,34	333,33	571,43	888,89	1 230,77		UV-Light.co.UK
Salmonella infantis (from human feces)	Bacteria	17,34	58,25	125,00	214,29	333,33	461,54		Tosa and Hirata 1998
Salmonella typhimurium	Bacteria	14,45	48,54	104,17	178,57	277,78	384,62		Measurement by Grizzly
Salmonella typhimurium	Bacteria	92,49	310,68	666,67	1 142,86	1 777,78	2 461,54		UV-Light.co.UK
Salmonella typhosa – Typhoid fever	Bacteria	24,86	83,50	179,17	307,14	477,78	661,54		UV-Light.co.UK
Sarcina lutea	Bacteria	227,75	765,05	1 641,67	2 814,29	4 377,78	6 061,54		UV-Light.co.UK
Serratia marcescens	Bacteria	27,98	93,98	201,67	345,71	537,78	744,62	UV-Light.co.UK	
Shigella dysenteriae	Bacteria	5,78	19,42	41,67	71,43	111,11	153,85	Measurement by Grizzly	
Shigella dysenteriae – Dysentery	Bacteria	25,43	85,44	183,33	314,29	488,89	676,92	UV-Light.co.UK	
Shigella flexneri – Dysentery	Bacteria	19,65	66,02	141,67	242,86	377,78	523,08	UV-Light.co.UK	
Shigella paradysenteriae	Bacteria	19,42	65,24	140,00	240,00	373,33	516,92	UV-Light.co.UK	
Shigella sonnei	Bacteria	18,79	63,11	135,42	232,14	361,11	500,00	Measurement by Grizzly	
Shigella sonnei ATCC9290	Bacteria	23,70	79,61	170,83	292,86	455,56	630,77	Chang et al. 1985	
Spirillum rubrum	Bacteria	50,87	170,87	366,67	628,57	977,78	1 353,85	UV-Light.co.UK	

Staphylococcus albus	Bacteria	21,27	71,46	153,33	262,86	408,89	566,15	i m e n s e c o n d s  N e e d e d  t i m e j n s e c o n d s  N	UV-Light.co.UK
Staphylococcus aureus	Bacteria	18,79	63,11	135,42	232,14	361,11	500,00		Measurement by Grizzly
Staphylococcus aureus	Bacteria	30,06	100,97	216,67	371,43	577,78	800,00		UV-Light.co.UK
Staphylococcus faecalis	Bacteria	28,90	97,09	208,33	357,14	555,56	769,23		Measurement by Grizzly
Staphylococcus hemolyticus	Bacteria	24,97	83,88	180,00	308,57	480,00	664,62		UV-Light.co.UK
Staphylococcus lactis	Bacteria	71,10	238,83	512,50	878,57	1 366,67	1 892,31		UV-Light.co.UK
Streptococcus faecalis ATCC29212	Bacteria	32,37	108,74	233,33	400,00	622,22	861,54		Chang et al. 1985
Streptococcus viridans	Bacteria	23,12	77,67	166,67	285,71	444,44	615,38		UV-Light.co.UK
Vibrio anguillarum	Bacteria	5,78	19,42	41,67	71,43	111,11	153,85		Liltved and Landfald 1996
Vibrio comma – Cholera	Bacteria	39,02	131,07	281,25	482,14	750,00	1 038,46		UV-Light.co.UK
Vibrio cholerae	Bacteria	6,36	21,36	45,83	78,57	122,22	169,23		Measurement by Grizzly
Vibrio natriegens	Bacteria	375,72	1 262,14	2 708,33	4 642,86	7 222,22	10 000,00		Joux et al. 1999
Yersinia enterocolitica ATCC27729	Bacteria	13,29	44,66	95,83	164,29	255,56	353,85		Wilson et al. 1992
Yersinia enterocolitica	Bacteria	10,69	35,92	77,08	132,14	205,56	284,62		Measurement by Grizzly
Yersinia ruckeri	Bacteria	14,45	48,54	104,17	178,57	277,78	384,62		Liltved and Landfald 1996
Aspergillus flavus	Molds	693,64	2 330,10	5 000,00	8 571,43	13 333,33	18 461,54		UV-Light.co.UK
Aspergillus glaucus	Molds	508,67	1 708,74	3 666,67	6 285,71	9 777,78	13 538,46		UV-Light.co.UK
Aspergillus niger	Molds	1 526,01	5 126,21	11 000,00	18 857,14	29 333,33	40 615,38		UV-Light.co.UK
Mucor racemosus A	Molds	196,53	660,19	1 416,67	2 428,57	3 777,78	5 230,77		UV-Light.co.UK
Mucor racemosus B	Molds	196,53	660,19	1 416,67	2 428,57	3 777,78	5 230,77		UV-Light.co.UK
Oospora lactis	Molds	57,80	194,17	416,67	714,29	1 111,11	1 538,46		UV-Light.co.UK
Penicillium digitatum	Molds	508,67	1 708,74	3 666,67	6 285,71	9 777,78	13 538,46		UV-Light.co.UK
Penicillium expansum	Molds	150,29	504,85	1 083,33	1 857,14	2 888,89	4 000,00		UV-Light.co.UK
Penicillium roqueforti	Molds	150,29	504,85	1 083,33	1 857,14	2 888,89	4 000,00		UV-Light.co.UK
Rhizopus nigricans	Molds	1 283,24	4 310,68	9 250,00	15 857,14	24 666,67	34 153,85		UV-Light.co.UK
B-40	Phage	66,47	223,30	479,17	821,43	1 277,78	1 769,23		Measurement by Grizzly
MS-2	Phage	150,29	504,85	1 083,33	1 857,14	2 888,89	4 000,00		Measurement by Grizzly
PRD-1	Phage	69,36	233,01	500,00	857,14	1 333,33	1 846,15		Measurement by Grizzly
X174	Phage	34,68	116,50	250,00	428,57	666,67	923,08	Measurement by Grizzly	
Cryptosporidium hominis	Protozoan	16,76	56,31	120,83	207,14	322,22	446,15	Johnson et al. 2005	
Cryptosporidium parvum	Protozoan	14,45	48,54	104,17	178,57	277,78	384,62	Measurement by Grizzly	
Cryptosporidium parvum	Protozoan	27,46	92,23	197,92	339,29	527,78	730,77	Craik et al. 2001	
Cryptosporidium parvum, oocysts, tissue cultur	Protozoan	9,25	31,07	66,67	114,29	177,78	246,15	Shin et al. 2000	
Encephalitozoon cuniculi,microsporidia	Protozoan	37,57	126,21	270,83	464,29	722,22	1 000,00	Marshall et al. 2003	
Encephalitozoon hellem,microsporidia	Protozoan	52,02	174,76	375,00	642,86	1 000,00	1 384,62	Marshall et al. 2003	
Encephalitozoon intestinalis,microsporidia	Protozoan	17,34	58,25	125,00	214,29	333,33	461,54	Huffman et al. 2002	
Giardia lamblia	Protozoan	57,80	194,17	416,67	714,29	1 111,11	1 538,46	Campbell et al. 2002	
Giardia lamblia	Protozoan	17,34	58,25	125,00	214,29	333,33	461,54	Measurement by Grizzly	
Giardia muris	Protozoan	173,41	582,52	1 250,00	2 142,86	3 333,33	4 615,38	Belosevic et al. 2001	
Chlorella Vulgaris	Protozoan	150,29	504,85	1 083,33	1 857,14	2 888,89	4 000,00	UV-Light.co.UK	
Nematode Eggs	Protozoan	520,23	1 747,57	3 750,00	6 428,57	10 000,00	13 846,15	UV-Light.co.UK	
Paramecium	Protozoan	127,17	427,18	916,67	1 571,43	2 444,44	3 384,62	UV-Light.co.UK	
Bacillus subtilis spores	Spores	176,30	592,23	1 270,83	2 178,57	3 388,89	4 692,31	Measurement by Grizzly	
Bacillus anthracis spores – Anthrax spores	Spores	281,16	944,47	2 026,67	3 474,29	5 404,44	7 483,08	UV-Light.co.UK	
Bacillus magaterium sp. spores	Spores	31,56	106,02	227,50	390,00	606,67	840,00	UV-Light.co.UK	
Bacillus subtilis ATCC6633(spores)	Spores	225,43	757,28	1 625,00	2 785,71	4 333,33	6 000,00	Chang et al. 1985	
<b>Clostridioides difficile (C. diff) spores</b>	<b>Spores</b>	69,36	233,01	500,00	857,14	1 333,33	1 846,15	UV-Light.co.UK	
Adenovirus Type 40	Virus	260,12	873,79	1 875,00	3 214,29	5 000,00	6 923,08	Measurement by Grizzly	
Adenovirus Type 41	Virus	231,21	776,70	1 666,67	2 857,14	4 444,44	6 153,85	Measurement by Grizzly	
Coxsackievirus B5	Virus	60,69	203,88	437,50	750,00	1 166,67	1 615,38	Measurement by Grizzly	
Hepatitis A	Virus	43,35	145,63	312,50	535,71	833,33	1 153,85	Measurement by Grizzly	
Hepatitis A, HM175	Virus	63,58	213,59	458,33	785,71	1 222,22	1 692,31	Measurement by Grizzly	
Influeza	Virus	19,65	66,02	141,67	242,86	377,78	523,08	Measurement by Grizzly	
Poliovirus Type 1	Virus	66,47	223,30	479,17	821,43	1 277,78	1 769,23	Measurement by Grizzly	
Rotavirus SA11	Virus	66,47	223,30	479,17	821,43	1 277,78	1 769,23	Measurement by Grizzly	

Adenovirus type 15 / A549 cell line (ATCC CCL21)	Virus/Host	476,88	1 601,94	3 437,50	5 892,86	9 166,67	12 692,31
Adenovirus type 2 / PLC / PRF / 5	Virus/Host	462,43	1 553,40	3 333,33	5 714,29	8 888,89	12 307,69
Bacteriophage – E. Coli / -----	Virus/Host	300,58	1 009,71	2 166,67	3 714,29	5 777,78	8 000,00
Calicivirus canine / MDCK cell line	Virus/Host	86,71	291,26	625,00	1 071,43	1 666,67	2 307,69
Calicivirus feline / CRFK cell line	Virus/Host	86,71	291,26	625,00	1 071,43	1 666,67	2 307,69
Coxsackievirus B3 / BGM cell line	Virus/Host	93,93	315,53	677,08	1 160,71	1 805,56	2 500,00
Coxsackievirus B5 / BGM cell line	Virus/Host	104,05	349,51	750,00	1 285,71	2 000,00	2 769,23
Echovirus I / BGM cell line	Virus/Host	95,38	320,39	687,50	1 178,57	1 833,33	2 538,46
Echovirus II / BGM cell line	Virus/Host	80,92	271,84	583,33	1 000,00	1 555,56	2 153,85
Hepatitis A HM175 / FRhK-4 cell	Virus/Host	85,55	287,38	616,67	1 057,14	1 644,44	2 276,92
Infectious Hepatitis / -----	Virus/Host	670,52	2 252,43	4 833,33	8 285,71	12 888,89	17 846,15
Influenza / -----	Virus/Host	393,06	1 320,39	2 833,33	4 857,14	7 555,56	10 461,54
MS2 (Phage) / E. coli	Virus/Host	289,02	970,87	2 083,33	3 571,43	5 555,56	7 692,31
Norovirus / -----	Virus/Host	75,14	252,43	541,67	928,57	1 444,44	2 000,00
Parvovirus / -----	Virus/Host	13,29	44,66	95,83	164,29	255,56	353,85
PHI X 174 (Phage) / E. coli WG 5	Virus/Host	28,90	97,09	208,33	357,14	555,56	769,23
Poliovirus – Poliomyelitis / -----	Virus/Host	364,16	1 223,30	2 625,00	4 500,00	7 000,00	9 692,31
Poliovirus 1 / CaCo2 cell-line (ATCC HTB37)	Virus/Host	106,94	359,22	770,83	1 321,43	2 055,56	2 846,15
PRD-1 (Phage) / S. typhimurium	Virus/Host	86,99	292,23	627,08	1 075,00	1 672,22	2 315,38
Reovirus Type 1 Lang strain / N/A	Virus/Host	104,05	349,51	750,00	1 285,71	2 000,00	2 769,23
Reovirus-3 / Mouse L-60	Virus/Host	64,74	217,48	466,67	800,00	1 244,44	1 723,08
Rotavirus / MA104 cells	Virus/Host	578,03	1 941,75	4 166,67	7 142,86	11 111,11	15 384,62
Rotavirus SA-11 / MA-104 cell	Virus/Host	104,05	349,51	750,00	1 285,71	2 000,00	2 769,23
<b>SARS-CoV-2 / N/A 99%</b>	<b>Virus/Host</b>	11,56	38,83	83,33	142,86	222,22	307,69
<b>SARS-CoV-2 / N/A 99,9999%</b>	<b>Virus/Host</b>	63,58	213,59	458,33	785,71	1 222,22	1 692,31
Staphylococcus aureus phage A / Staphylococcus aureus	Virus/Host	104,05	349,51	750,00	1 285,71	2 000,00	2 769,23
Tobacco mosaic / N/A	Virus/Host	1 271,68	4 271,84	9 166,67	15 714,29	24 444,44	33 846,15
Brewers yeast	Yeasts	38,15	128,16	275,00	471,43	733,33	1 015,38
<b>Candida auris</b>	<b>Yeasts</b>	554,91	1 864,08	4 000,00	6 857,14	10 666,67	14 769,23
Common yeast cake	Yeasts	69,36	233,01	500,00	857,14	1 333,33	1 846,15
Saccharomyces carevisiae	Yeasts	69,36	233,01	500,00	857,14	1 333,33	1 846,15
Saccharomyces ellipsoideus	Yeasts	69,36	233,01	500,00	857,14	1 333,33	1 846,15
Saccharomyces spores	Yeasts	92,49	310,68	666,67	1 142,86	1 777,78	2 461,54

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