



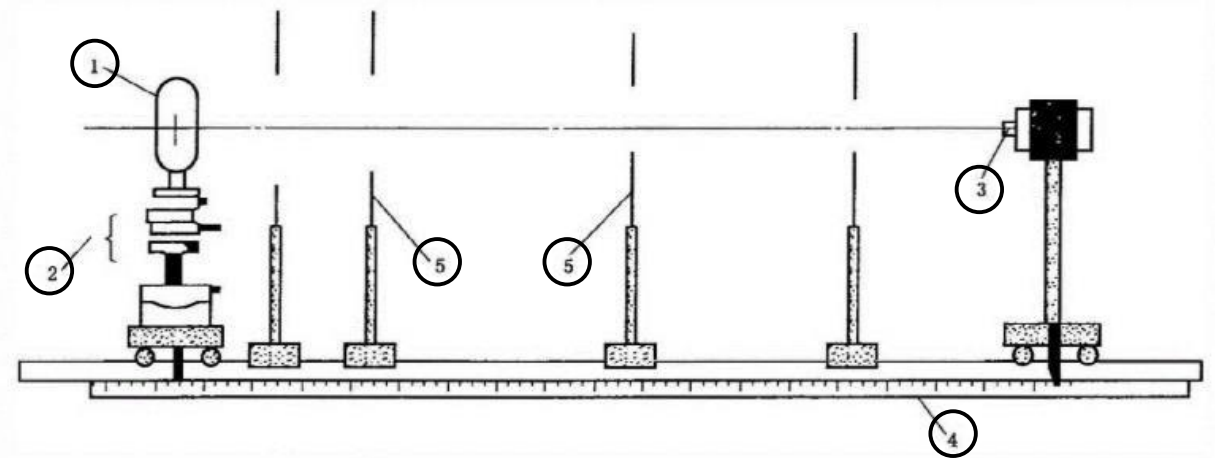
Ultraviolet Intensity Calculation

Ultraviolet Terms

- Dose = Intensity x Time Duration
- Dose, also called Ultraviolet radiation, which unit is $\mu\text{Ws}/\text{sq cm}$ commonly
- $1\text{W}\cdot\text{Sec}/\text{sq cm} = 1,000\text{mW}\cdot\text{Sec}/\text{sq cm} = 1,000,000\mu\text{W}\cdot\text{Sec}/\text{sq cm}$
- 1 sq meter = 10,000 sq centimeter
- $1\text{W}\times 1\text{S}=1\text{J}$, which means $1\text{J}/\text{sq meter} = 10\text{mJ}/\text{sq cm}=10\text{mW}\cdot\text{Sec}/\text{sq cm}$

How to Measure Ultraviolet Intensity

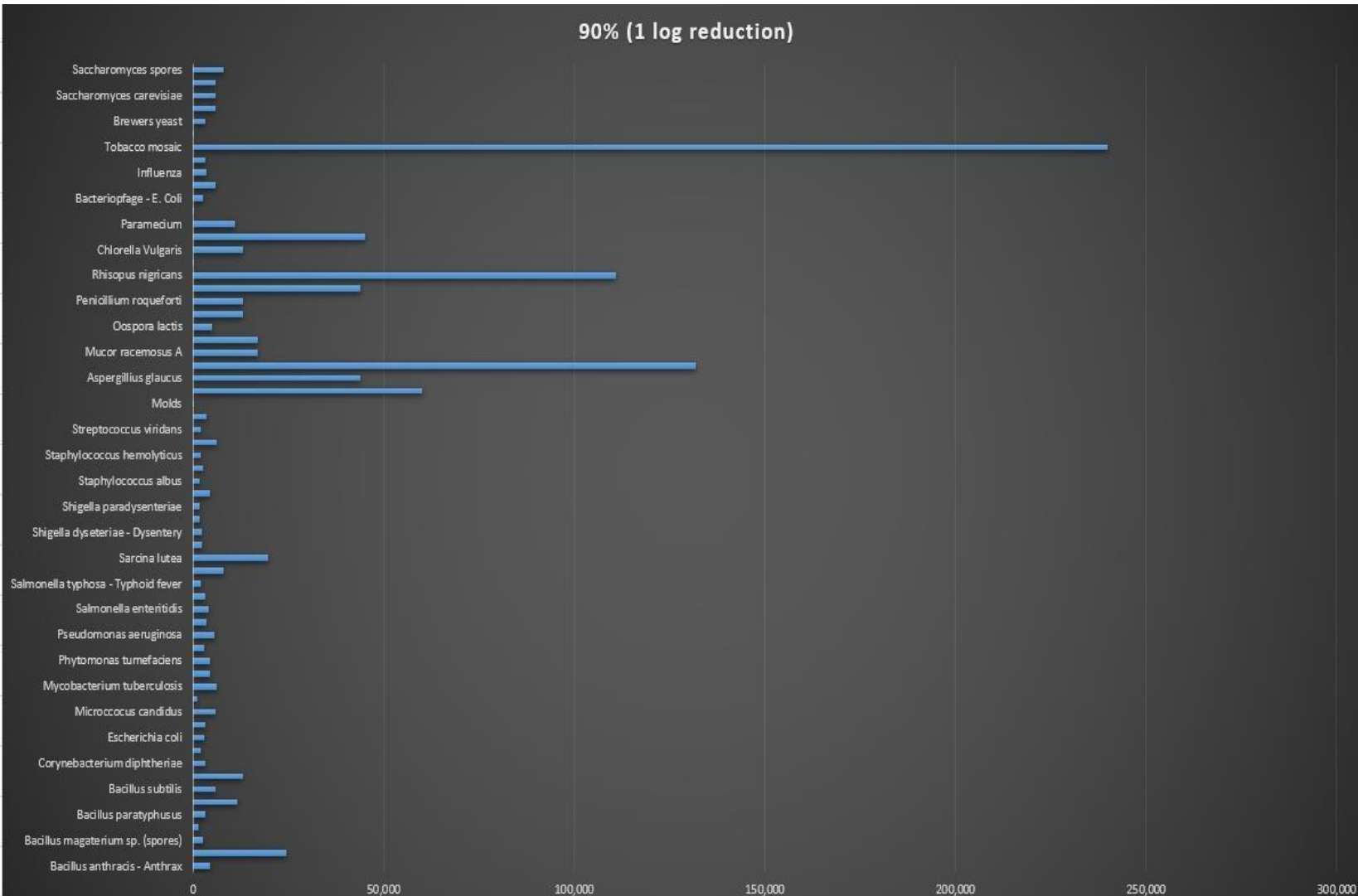
- 1. Ultraviolet light source
- 2. Fixture to place ultraviolet light source
- 3. Ultraviolet Intensity reading meter (253.7nm wavelength)
- 4. Distance meter
- 5. Diaphragm
- Test Setup:
 - i. 1 meter distance
 - ii. Completed Dark Environment



Patriot UVClean UV Lamp Intensity

Model	Power	Dimension	Length	Current	Intensity (uW/sq cm)	Life (Hours)
Tabletop-100	100W	15mm	550mm	800mA	180	8000
Tabletop-120	120W	15mm	550mm	960mA	250	8000
Tabletop-150	150W	15mm	810mm	800mA	360	8000

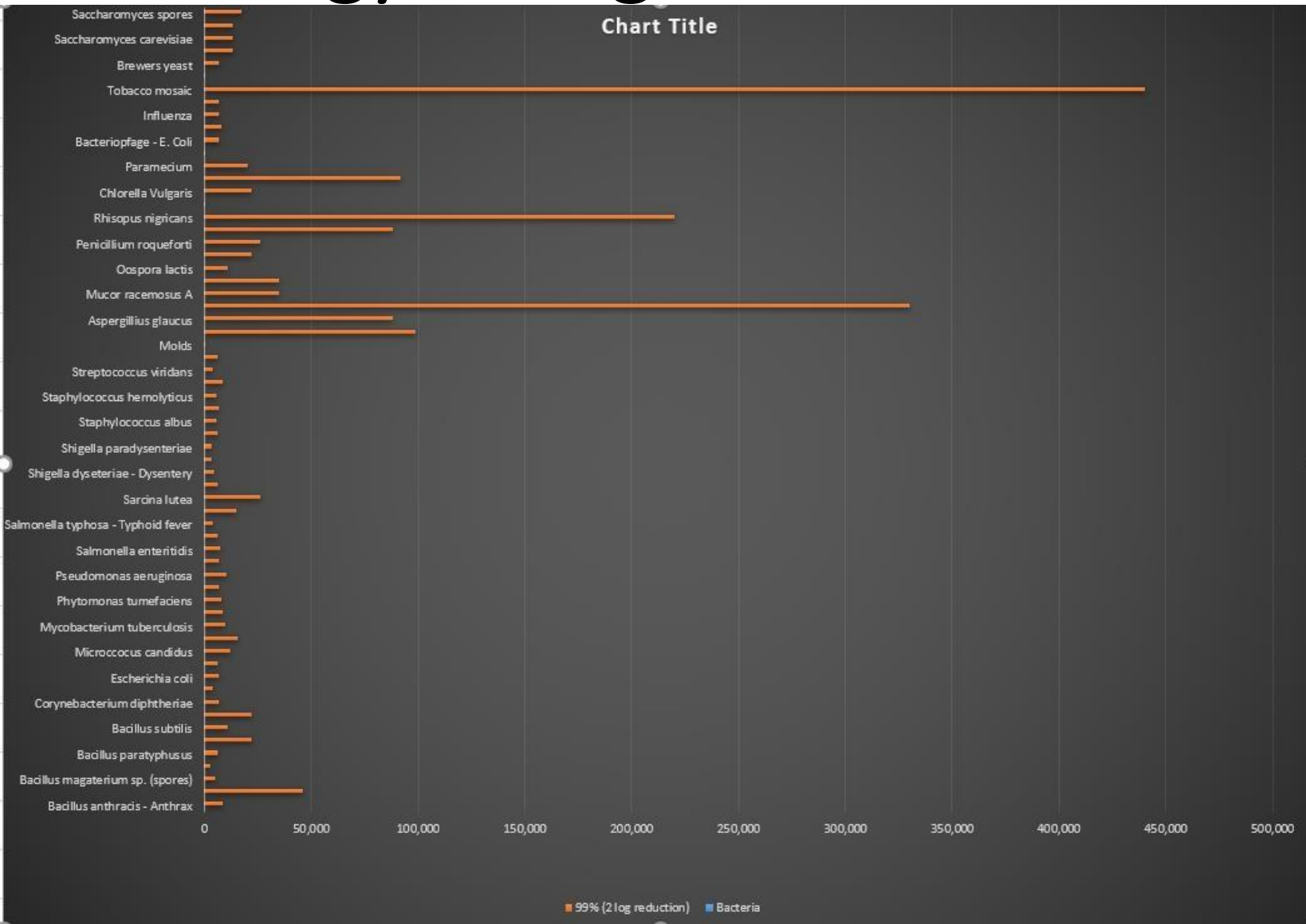
Energy Dosage Needed for Kill Factor (90%)



50,000uW.s/sq cm can kill most of the virus and bacteria in 1 log reduction (90%)

1 meter (8 Cube meter)	Log1 (90%)
100W	277 seconds
120W	200 seconds
150W	138 seconds

Energy Dosage Needed for Kill Factor (99%)



100,000uW.s/sq cm can kill most of the virus and bacteria in 2 log reduction (99%)

1 meter (8 Cube meter)	Log2 (99%)
100W	554 seconds
120W	400 seconds
150W	276 seconds

- Measure the Intensity using the reading meter and desired length
- Assuming a 100 sq meter which is 10x10meter
- Placing the UV lamp in middle which means to capture 5 meters distance UV intensity from the lamp

Model	Intensity @ 1 meter (4 SQ meter)	Intensity @ 2 meters (16 SQ meter)	Intensity @ 3 meters (36 SQ meter)	Intensity @ 4 meters (64 SQ meter)	Intensity @ 5 meters (100 SQ meter)
100W	180uW/sq cm	48uW/sq cm	22uW/sq cm	10uW/sq cm	4.5uW/sq cm
120W	250uW/sq cm	65uW/sq cm	30uW/sq cm	13uW/sq cm	6uW/sq cm
150W	360uW/sq cm	96uW/sq cm	44uW/sq cm	20uW/sq cm	9uW/sq cm

50,000uW.s/sq cm can kill most of the virus and bacteria in 1 log reduction (90%)

100W Tabletop Effective	
Room Size	Time Duration
4 SQ meter (43 SQ feet)	4.6 minutes
16 SQ meter (172 SQ feet)	17.36 minutes
36 SQ meter (387 SQ feet)	37.87 minutes
64 SQ meter (689 SQ feet)	83.33 minutes
100 SQ meter (1076 SQ feet)	180 minutes

Model	Intensity @ 1 meter (4 SQ meter)	Intensity @ 2 meters (16 SQ meter)	Intensity @ 3 meters (36 SQ meter)	Intensity @ 4 meters (64 SQ meter)	Intensity @ 5 meters (100 SQ meter)
100W	180uW/sq cm	48uW/sq cm	22uW/sq cm	10uW/sq cm	4.5uW/sq cm
120W	250uW/sq cm	65uW/sq cm	30uW/sq cm	13uW/sq cm	6uW/sq cm
150W	360uW/sq cm	96uW/sq cm	44uW/sq cm	20uW/sq cm	9uW/sq cm

50,000uW.s/sq cm can kill most of the virus and bacteria in 1 log reduction (90%)

120W Tabletop Effective	
Room Size	Time Duration
4 SQ meter (43 SQ feet)	3.33 minutes
16 SQ meter (172 SQ feet)	12.82 minutes
36 SQ meter (387 SQ feet)	27.77 minutes
64 SQ meter (689 SQ feet)	64.1 minutes
100 SQ meter (1076 SQ feet)	138 minutes

Model	Intensity @ 1 meter (4 SQ meter)	Intensity @ 2 meters (16 SQ meter)	Intensity @ 3 meters (36 SQ meter)	Intensity @ 4 meters (64 SQ meter)	Intensity @ 5 meters (100 SQ meter)
100W	180uW/sq cm	48uW/sq cm	22uW/sq cm	10uW/sq cm	4.5uW/sq cm
120W	250uW/sq cm	65uW/sq cm	30uW/sq cm	13uW/sq cm	6uW/sq cm
150W	360uW/sq cm	96uW/sq cm	44uW/sq cm	20uW/sq cm	9uW/sq cm

50,000uW.s/sq cm can kill most of the virus and bacteria in 1 log reduction (90%)

150W Tabletop Effective	
Room Size	Time Duration
4 SQ meter (43 SQ feet)	2.3 minutes
16 SQ meter (172 SQ feet)	8.68 minutes
36 SQ meter (387 SQ feet)	18.93 minutes
64 SQ meter (689 SQ feet)	41.66 minutes
100 SQ meter (1076 SQ feet)	92.4 minutes

Model	Intensity @ 1 meter (4 SQ meter)	Intensity @ 2 meters (16 SQ meter)	Intensity @ 3 meters (36 SQ meter)	Intensity @ 4 meters (64 SQ meter)	Intensity @ 5 meters (100 SQ meter)
100W	180uW/sq cm	48uW/sq cm	22uW/sq cm	10uW/sq cm	4.5uW/sq cm
120W	250uW/sq cm	65uW/sq cm	30uW/sq cm	13uW/sq cm	6uW/sq cm
150W	360uW/sq cm	96uW/sq cm	44uW/sq cm	20uW/sq cm	9uW/sq cm

100,000uW.s/sq cm can kill most of the virus and bacteria in 2
log reduction (99%)

100W Tabletop Effective	
Room Size	Time Duration
4 SQ meter (43 SQ feet)	9.25 minutes
16 SQ meter (172 SQ feet)	34.72 minutes
36 SQ meter (387 SQ feet)	75.57 minutes
64 SQ meter (689 SQ feet)	166.2 minutes
100 SQ meter (1076 SQ feet)	370.2 minutes

Model	Intensity @ 1 meter (4 SQ meter)	Intensity @ 2 meters (16 SQ meter)	Intensity @ 3 meters (36 SQ meter)	Intensity @ 4 meters (64 SQ meter)	Intensity @ 5 meters (100 SQ meter)
100W	180uW/sq cm	48uW/sq cm	22uW/sq cm	10uW/sq cm	4.5uW/sq cm
120W	250uW/sq cm	65uW/sq cm	30uW/sq cm	13uW/sq cm	6uW/sq cm
150W	360uW/sq cm	96uW/sq cm	44uW/sq cm	20uW/sq cm	9uW/sq cm

100,000uW.s/sq cm can kill most of the virus and bacteria in 2
log reduction (99%)

120W Tabletop Effective	
Room Size	Time Duration
4 SQ meter (43 SQ feet)	6.66 minutes
16 SQ meter (172 SQ feet)	25.64 minutes
36 SQ meter (387 SQ feet)	55.55 minutes
64 SQ meter (689 SQ feet)	127.8 minutes
100 SQ meter (1076 SQ feet)	277.2 minutes

Model	Intensity @ 1 meter (4 SQ meter)	Intensity @ 2 meters (16 SQ meter)	Intensity @ 3 meters (36 SQ meter)	Intensity @ 4 meters (64 SQ meter)	Intensity @ 5 meters (100 SQ meter)
100W	180uW/sq cm	48uW/sq cm	22uW/sq cm	10uW/sq cm	4.5uW/sq cm
120W	250uW/sq cm	65uW/sq cm	30uW/sq cm	13uW/sq cm	6uW/sq cm
150W	360uW/sq cm	96uW/sq cm	44uW/sq cm	20uW/sq cm	9uW/sq cm

100,000uW.s/sq cm can kill most of the virus and bacteria in 2
log reduction (99%)

150W Tabletop Effective	
Room Size	Time Duration
4 SQ meter (43 SQ feet)	4.62 minutes
16 SQ meter (172 SQ feet)	17.36 minutes
36 SQ meter (387 SQ feet)	37.87 minutes
64 SQ meter (689 SQ feet)	82.8 minutes
100 SQ meter (1076 SQ feet)	184.8 minutes