UV disinfection for Air and Surface

ALPHA-PURIFY

How to know if your UV device is effectively disinfecting?

The effectiveness of UV disinfection is expressed in terms of dosages.
UV dose is the result of the intensity of UV radiation (W/m2) emitted via the UV lamps and the exposure time (s) to such radiation:

$$D [J/m2] = I [W/m2] \times t [s]$$

Conversion factors between some units of the UV dose:

$$J/m2 = Ws/m2 = 100 \text{ microWs/cm2} = 0,1 \text{ mJ/cm2}$$

We were able to calculate the irradiance distribution of one lamp and the specific irradiance in a target point (at the end of lamp life). Therefore, we can give some general advices on how to install the unit and the minimum disinfection time required per day.
However these are estimates so we want to highlight that users may want to seek confirmation. This can be done via portable UV radiometers with UV sensors.
Users can measure the irradiance in points of the room, then you can work out the disinfection time needed for each microorganisms.

The UV dose for each target microorganism is within the table below:

Microorganisms	1 (90%)	2 (99%)	3 (99,9%)	4 (99.99%)
Cryptosporidium parvum	3,0	4,9	6,4	7,9
Giardia lamblia (cisti)	-	<5	<10	<10
Vibrio cholerae	0,8	1,4	2,2	2,9
Shigella sonnei	3,2	4,9	6,5	8,2
Escherichia coli	1,5	2,8	4,1	5,6
Salmonella enteritidis	5	7	9	10
Legionella pneumophila	3,1	5	6,9	9,4
Virus epatite	4,1 – 5,5	8,2 - 14	12 - 22	16 – 30
Poliovirus tipo	4 – 6	8,7 - 14	14 - 23	21 - 30
Coxsackie virus	6,9	14	22	30
Rotavirus	7,1 – 9,1	15 - 19	23 - 26	31 -36
Aeromonas hydrophila	1,1	2,6	3,9	5
Campylobacter jejuni	1,6	3,4	4	4,6
Staphylococcus aureus	3,9	5,4	6,5	10,4
Adenovirus tipo	30	59	90	170
Cryptosporidium	2,5	5,8	12	-
Giardia	2,1	5,2	11	-

Table 1. Demonstrates the UV dose (mJ/cm2) necessary for the reduction of the listed microorganisms.

UV Sensor

Eg. User measures 0,5 mW/cm2 irradiance in one location radiated by the UV lamp and the target virus is Adenovirus (that the WHO consider more resistant that Covid-19) then the minimum disinfection time is: $t [s] = D [mJ/cm2] / I [mW/cm2] = 170 / 0,5 = 340 \text{ sec}$