



UV-CLEAN™

UV-CLEAN Summary of Safety and Facts

Summary:

UV-CLEAN was specifically created to protect humans from harmful viruses and bacteria while keeping safety as the accompanying goal of all product development. This document will outline the safety/facts regarding the technology and design of UV-CLEAN. Whether it is the most vulnerable of our society such as a newborn baby in the NICU or a shopper at a grocery store, UV-CLEAN is a proven safe product to use in close-proximity to human beings.

Below: UV-CLEAN being utilized in the NICU



Facts:

The National Institute for Occupational Safety and Health (NIOSH) recommends that the time of exposure to an intensity of 100 $\mu\text{W}/\text{cm}^2$ (microwatts per square centimeter) at wavelength 254 nanometers not exceed one minute (60 seconds); and based on the NIOSH recommendation, the maximum time to be exposed of 30 $\mu\text{W}/\text{cm}^2$ should not exceed 200 seconds during an eight-hour period. An exposure of 1 $\mu\text{W}/\text{cm}^2$ should not exceed 6000 seconds (100 minutes) in an eight-hour period.

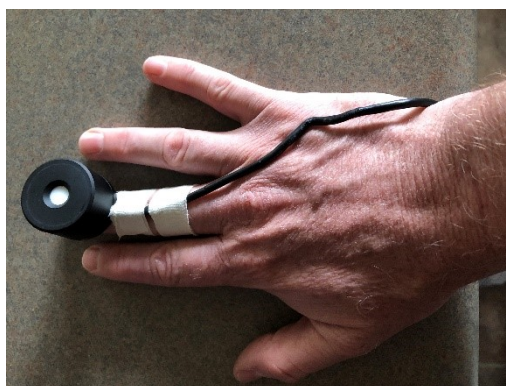
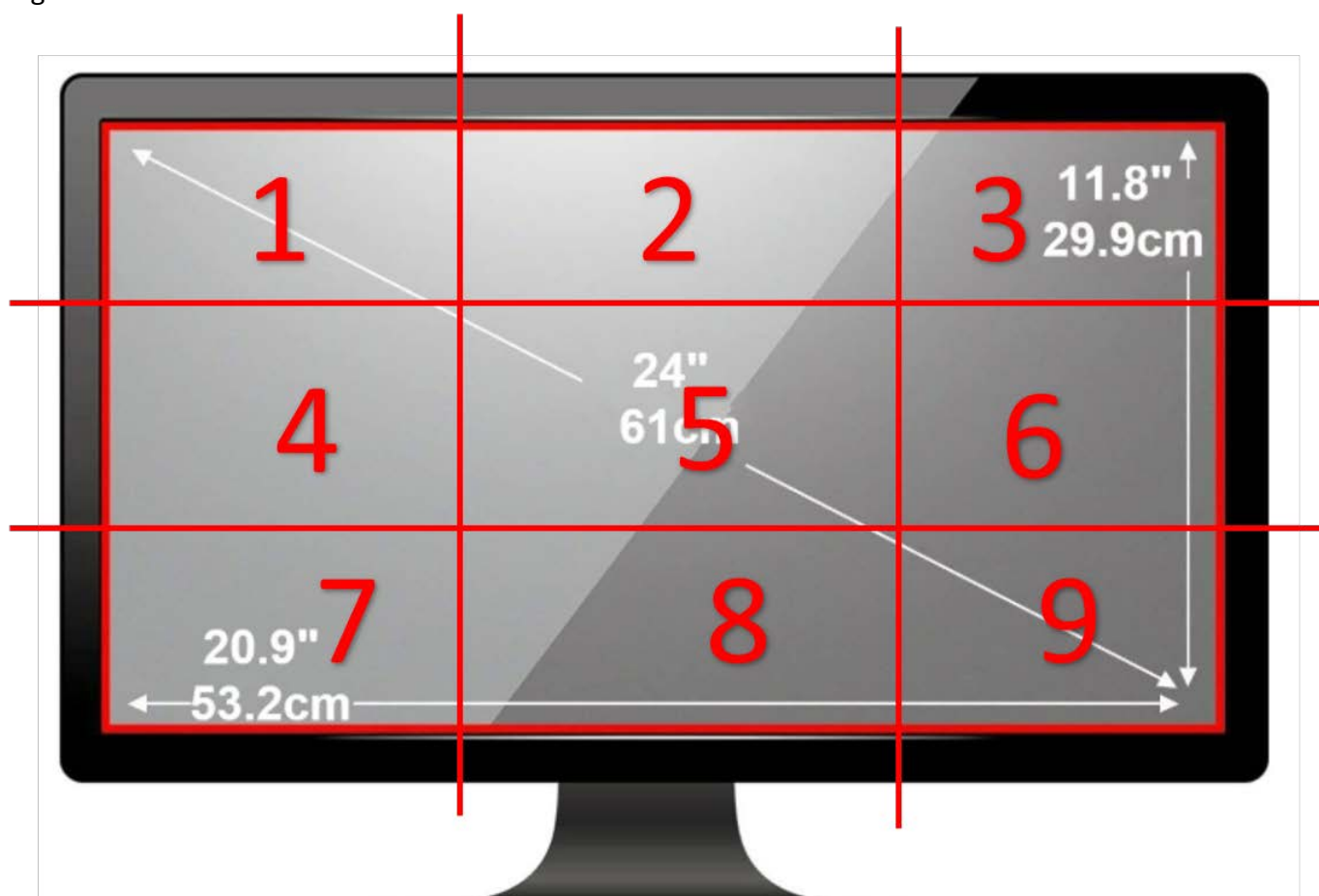


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Testing:

We have tested the UV-CLEAN motion sensor at various heights and angles to determine possible exposure and to test the effectiveness of the motion sensor. The motion sensor is designed to turn off the bulb prior to getting into any area of where there is active disinfection taken place. Tests were performed at 9 different distances (ranging 3" to 14') and 7 different angles of approach to the unit. A UV-C sensor was attached to a hand to measure effective intensity ($\mu\text{w}/\text{cm}^2$) from the UV-C light.





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Data:

Quadrant	Exposure in uw/cm2										SUM	Average
1	9	5	6	4	0	2	3	4	5	6	44	4.4
2	2	0	5	2	5	8	1	5	7	2	37	3.7
3	0	6	3	4	5	4	6	7	5	1	41	4.1
4	1	3	1	5	4	3	2	3	3	0	25	2.5
5	5	7	2	0	1	3	0	4	4	2	28	2.8
6	5	5	0	5	5	5	4	4	5	5	43	4.3
7	2	1	2	5	1	0	2	4	3	1	21	2.1
8	1	1	5	2	2	7	3	4	0	1	26	2.6
9	1	1	1	5	0	1	2	4	6	3	24	2.4

Below is the Sum and Average of total exposure for each quadrant in uw/cm2

Sum of 10 touches. uw/cm2		
44	37	41
25	28	43
21	26	24

Average of 10 touches. uw/cm2		
4.4	3.7	4.1
2.5	2.8	4.3
2.1	2.6	2.4

The results show that the maximum intensity from the never exceeded 9 uw/cm2 and there were only two occurrences of an intensity equal or above 8 uw/cm2.

The average intensity of the 90 occurrences was 3.21 uw/cm2.

Based on the average the maximum number of interruptions during an 8 hour period, to stay below the recommended exposure levels, is 1869.

In a retail setting we recommend the following setting:

- 3 minutes clean time
- 15 seconds no motion time
- 60 minutes wait time

In an office setting we recommend the following setting:

- 5 minutes clean time
- 4 minutes of no motion time
- 60 minutes wait time

Based on our testing these setting do not allow for anyone to exceed the NIOSH limits.



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Facts:

It is important to note that exposure to UV-C will only happen if the unit is actively disinfecting. Any motion within the field of disinfection will prevent the unit from turning on. In addition, if there is a 3.25 minute lag after the last usage, the unit will not be running and no exposure will occur.

Percentage of NIOSH Recommended Dosage	Number of interruptions / 8 hours	Number of interruptions / hours	Interruptions / minute
10%	186.9	23.4	0.4
20%	373.8	46.7	0.8
30%	560.7	70.1	1.2
40%	747.7	93.5	1.6
50%	934.6	116.8	1.9
60%	1121.5	140.2	2.3
70%	1308.4	163.6	2.7
80%	1495.3	186.9	3.1
90%	1682.2	210.3	3.5
100%	1869.2	233.6	3.9

The table above shows the exposure likelihood if the unit. Based on the testing the chances of exposure above 20% during an 8-hour period is extremely unlikely. This would involve an average over 47 interruptions in 1 hour and during all those engagements, the UV-CLEAN would need to be actively disinfecting.

Key Safety Results:

1. Any human exposure to UV-C light via UV-CLEAN is **substantially** below any dangerous levels to human beings.
2. The UV-CLEAN motion detector is effective in preventing even **minimal** exposure to UV-C light.
3. The **angle of the UV-CLEAN solution** is pointed **down** and safely away from the human eye.
4. If for any reason the UV-CLEAN solution malfunctions for any reason, the bulb will stop working and the front logo will start flashing alternately blue/white.



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While this document is meant to address the facts/safety surrounding the UV-CLEAN solution and the utilization of UV-C light to eradicate harmful viruses and bacteria, additional scientific studies can be provided upon request.

The CDC supports UV-C disinfection in Hospitals and has sponsored/published various studies and articles on the subject [i].

In March 2020 the FDA released Guidance for Industry and Food and Drug Administration Staff where they identify UV-C light to produce a germicidal effect [ii].

UV-CLEAN, and all UV disinfection devices, are regulated by the Environmental Protection Agency (EPA).

The content of this document has been verified and all information is accurate as of April 2020.

We are proud to contribute valuable technology in the fight against COVID-19 along with other harmful pathogens. We look forward to helping you keep you and your loved ones safe.

Sincerely,

STEVE REINECKE, MT(CLS), CPHIMS
Clinical Scientist - UV-CLEAN

References

[i] Anderson DH, et al., 2013. New CDC Study Confirms Effectiveness of UV-C Disinfection to Combat Harmful Pathogens. <https://www.infectioncontroltoday.com/environmental-hygiene/new-cdc-study-confirms-effectiveness-uv-c-disinfection-combat-harmful>

[ii] U.S. Department of Health and Human Services Food and Drug Administration. Enforcement Policy for Sterilizers, Disinfectant Devices, and Air Purifiers During the Coronavirus Disease 2019 (COVID-19) Public Health Emergency. March 2020 <https://www.fda.gov/media/136533/download>

UV-CLEAN IS JUST WHAT THE DOCTOR ORDERED.

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