

# TEST REPORT - UV-C STERILISATION



**TEST SITE: GLENFIELDS CARE HOME  
DRIFFLEILD  
EAST YORKSHIRE**

**DATE: 27th JANUARY 2021**

## TEST OVERVIEW

A test was undertaken to measure the levels of UV-C radiation delivered within specific rooms within the Glenfields Care Home, by the 1000W UV-C Mobile Sterilisation unit.

The UV-C unit is being used at the care home to sterilise surfaces in rooms from the SARS-CoV2 virus, which is responsible for the Covid-19 pandemic.

Testing undertaken by establishments such as Boston University during 2020, have shown the levels of energy required to kill the SARS-CoV2 virus; i.e. 50 J/m<sup>2</sup> to 99% and 220 J/m<sup>2</sup> to 99.999%. From this information we can calculate the time required to sterilise a given area.

The brief of this metering was to prove in practice the calculations undertaken.

The rooms where metering took place were the Medium Dining Room, a resident bedroom Room 20 and the Staff Room.

## METHODS OF TRANSMISSION OF VIRUSES AND BACTERIA

The Covid virus is spread in three main ways: via contaminated surfaces; via small droplets from speaking or coughing; and transmission by aerosols – the inhalation of invisible particles exhaled by an infected person. UV-C Clean Light therefore have various products to support sterilisation accordingly.

Glenfields Care Home are using Sterilon Flow units to undertake sterilisation of airborne germs, and the 1000W Mobile unit to sterilise surfaces within rooms between uses.

## METERING RESULTS AND CALCULATIONS

The attached sheet shows the readings taken using a Linshang LS126C UV-C meter calibrated to the measurement of a standard glass UV-C lamp at 254nm with a relative indication error of 0.06% at 154.5 µW/cm<sup>2</sup> at 50cm.

Measurements were taken in µW/cm<sup>2</sup>. These results can be converted into J/m<sup>2</sup>.

$$100 \mu\text{W}/\text{cm}^2 = 1 \text{ J}/\text{m}^2$$

We can calculate the exposure time to kill SARS CoV-2 to 99.999% (D99.999) e.g. at a distance of 2.5m

Exposure time = Desired UV dose x 4 x pi x UV lamp distance / UV lamp power

e.g. 220 J/m<sup>2</sup> x 4 x 3.14 x (2.5)<sup>2</sup> / 1000 = 17 seconds.

## CONCLUSION

The UV-C metering undertaken meets expectations and hence demonstrates the germs, specifically the SARS CoV-2 virus will be killed as within the times calculated.

It is known that UV-C is not reflected and also does not travel well over distance. The intensity and hence power drop reduces in line with the “Inverse Square Law”, as is evidenced by the calculations below:

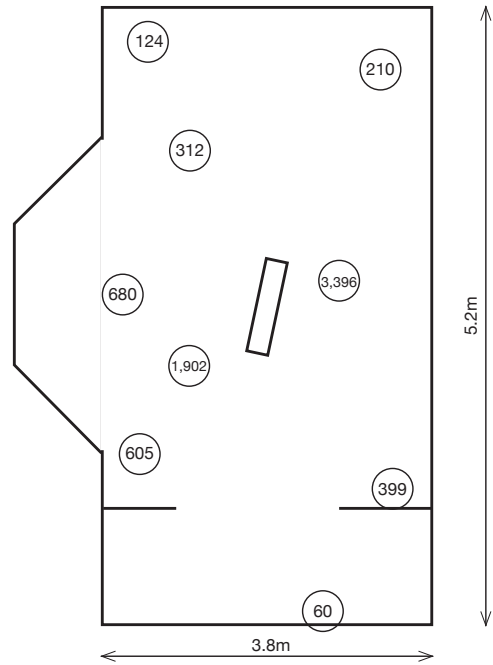
Distance	Exposure Time	Calculation
0.5m	0.69 s	$220 \text{ J/m}^2 \times 4 \times 3.14 \times (0.5)^2 / 1000$
1m	2.7 s	$220 \text{ J/m}^2 \times 4 \times 3.14 \times (1)^2 / 1000$
2.5m	17 s	$220 \text{ J/m}^2 \times 4 \times 3.14 \times (2.5)^2 / 1000$
5m	44 s	$220 \text{ J/m}^2 \times 4 \times 3.14 \times (4)^2 / 1000$

We therefore can make recommendations for the time that the mobile 1000W unit should be switched on in a given room to ensure a high level of sterilisation.

These figures for Glenfield are:

Room	Dimensions m (L x W)	Area m <sup>2</sup>	Suggested 1000W Mobile Unit Running Time
Medium Dining Room	7.6 x 5.9 / 3,8	37	6 mins
Room 6	5.2 x 4.9	25.5	4 mins
Room 13	4.6 x 2.8	12.9	2 mins
Room 20	5.2 x 2.7	14	2 mins
Staff Room	4.7 x 3.7	17.4	3 mins
Sun Lounge	5.6 x 3.9	21.8	4 mins
Main Lounge	10 x 5.4	54	5 mins in 2 positions

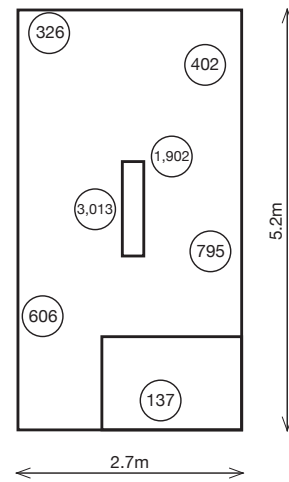
Medium Dining Room



UV-C Readings -  $\mu\text{W}/\text{cm}^2$



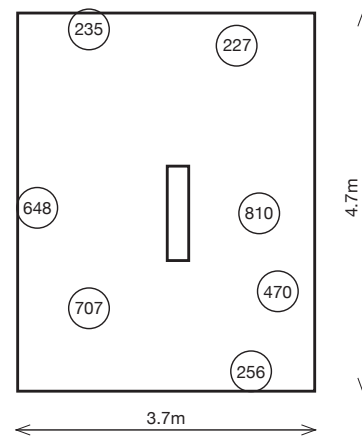
Room 20



UV-C Readings -  $\mu\text{W}/\text{cm}^2$



Staff Room



UV-C Readings -  $\mu\text{W}/\text{cm}^2$