



Report no. 959809

Modelled theoretical effect of virus UV-susceptibility and room size

Jimco MAC500



**DANISH
TECHNOLOGICAL
INSTITUTE**



**DANISH
TECHNOLOGICAL
INSTITUTE**

Modelled theoretical effect of virus UV- susceptibility and room size

Jimco MAC500



Prepared for:

Jimco A/S
Mjølbyvej 7
DK-5900 Rudkøbing

Prepared by:

Teknologisk Institut
Kongsvang Allé 29
8000 Aarhus C
Bioengineering and Environmental Technology

December 2020

Author: Casper Laur Byg, PhD, Specialist,
+45 7220 1929, cby@teknologisk.dk

Summary

The purpose of this report is to evaluate the reduction rate at increased room size and UV susceptibility based on the reduction rate determined in report no. 933322. The air purifier test determined the efficiency of the air purifier to reduce the concentration of active and aerosolized MS2 bacteriophages. The tested air purifier was a Jimco MAC500.

The theoretical reduction rates of the concentration of aerosolized and active MS2 caused by the air purifier are calculated for increasing room size and UV-susceptibilities and are shown in Table 5. The log-reduction (decay constant) is assumed to decrease linearly with the increasing room size, hence the log-reduction is halved for a double size room. This is valid when the air is well-mixed in the room.

The equivalent air exchange per hour is also calculated under the assumption that the air is well-mixed, i.e. the concentration is halved for each air exchange.

The calculations are based on measured log-reduction for MS2 of 0.97 log/hour/20m³.

MS2 susceptibility: 0.97 log/hour/20m3			
Room size, m3	Reduction, % 60 minutes	Log-reduction per hour	Equivalent air exchange per hour
20	89.3	0.97	3.2
40	67.3	0.49	1.6
60	52.5	0.32	1.1
80	42.8	0.24	0.8
100	36.0	0.19	0.6
3 times more susceptible than MS2: 2.91 log/hour/20m3			
Room size, m3	Reduction, % 60 minutes	Log-reduction per hour	Equivalent air exchange per hour
20	99.88	2.91	9.7
40	96.5	1.46	4.8
60	89.3	0.97	3.2
80	81.3	0.73	2.4
100	73.8	0.58	1.9
5 times more susceptible than MS2: 4.85 log/hour/20m3			
Room size, m3	Reduction, % 60 minutes	Log-reduction per hour	Equivalent air exchange per hour
20	99.999	4.85	16.1
40	99.6	2.43	8.1
60	97.6	1.62	5.4
80	93.9	1.21	4.0
100	89.3	0.97	3.2

Table 5: Reduction after 60 minutes, log-reduction per hour and equivalent air exchange per hour for increasing room size and UV susceptibility.



**DANISH
TECHNOLOGICAL
INSTITUTE**