MICROBIOLOGY REPORT

LMS
TECHNOLOGIES,
INC.

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Date: July 12, 2023
Test Requested By: Innova Nano Jet
Test Type: Impinger Multi-Pass Efficiency
LMS #

Scope

Customer provided a unit for multi-pass efficiency testing with MS-2 bacteriophage (ATCC 15597-B1) as the challenge aerosol. Testing was performed in a 4000 ft^3 stainless-steel chamber. The collection device was a SKC Bio Sampler(impinger)

Method

Part A

Organisms were harvested and titrated, and suspensions of the organisms were then aerosolized into the chamber for 60 minutes using a nebulizer prior to powering the test device. The test chamber air was sampled at different intervals time using a SKC Bio Stage cascade impactor for 1-minute sampling periods. The cascade impinger was calibrated to an airflow rate of 12.5 liters/min and the sampling inlet was situated at the off midpoint of the test chambers. The recovered organisms were enumerated after 24-48hours of incubation.

Microbiologists:
John Cherne
Autumn Stivers-Biscuso
KoKoe Noutepe

Testing Approval
Al Vatine, CEO

The corrected removal efficiencies for the air cleaner uses the empty chamber data from time as follows:

$$Corrected\ Removal\ Efficiency = 1 - \left(\frac{DeviceCFU_{t=60}}{DeviceCFU_{t=0}} * \frac{EmptyCFU_{t=0}}{EmptyCFU_{t=60}}\right)$$

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Part A data:

Natural Decay								N.D.			Log (PFU/ft^3)	Sampling Time (min)
	1.00E+00	1.00E-01	1.00E-02	1.00E-03	1.00E-04	1.00E-05	1.00E-06		Concentration	1st readable Dilution	Natural Decay	1
0 min				180	15	3	1	0 min	180	0.001	8.166451428	
5 min				124	9	2	0	5 min	124	0.001	8.004600608	
10 min				113	8	2	0	10 min	113	0.001	7.964257367	
15 min				93	4	1	0	15 min	93	0.001	7.879661872	
20 min				91	3	1	0	20 min	91	0.001	7.870220316	
30 min				76	1	0	0	30 min	76	0.001	7.791992516	
45 min				49	0	0	0	45 min	49	0.001	7.601375003	
60 min				26	0	0	0	60 min	26	0.001	7.326152271	
Device									Device			
	1.00E+00	1.00E-01	1.00E-02	1.00E-03	1.00E-04	1.00E-05	1.00E-06		Concentration	1st readable Dilution	Device	
0 min				116	17	6	1	0 min	116	0.001	7.975636913	
0 min*				103	12	4	0	0 min	103	0.001	7.924016148	
5 min				98	11	3	0	5 min	98	0.001	7.902404999	
10 min				83	9	1	0	10 min	83	0.001	7.830257016	
15 min				44	4	0	0	15 min	44	0.001	7.5546316	
20 min			65	8	1	0	0	20 min	65	0.01	6.72409228	
30 min			63	3	0	0	0	30 min	63	0.01	6.710519473	
45 min			33	3	0	0	0	45 min	33	0.01	6.429692863	
60 min			23	1	0	0	0	60 min	23	0.01	6.272906759	

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Natural Decay								N.D.			Log (PFU/ft^3)	Sampling Time (min)
	1.00E+00	1.00E-01	1.00E-02	1.00E-03	1.00E-04	1.00E-05	1.00E-06		Concentration	1st readable Dilution	Natural Decay	1
0 min				180	15	3	1	0 min	180	0.001	8.166451428	
5 min				124	9	2	0	5 min	124	0.001	8.004600608	
10 min				113	8	2	0	10 min	113	0.001	7.964257367	
15 min				93	4	1	0	15 min	93	0.001	7.879661872	
20 min				91	3	1	0	20 min	91	0.001	7.870220316	
30 min				76	1	0	0	30 min	76	0.001	7.791992516	
45 min				49	0	0	0	45 min	49	0.001	7.601375003	
60 min				26	0	0	0	60 min	26	0.001	7.326152271	
Device + LMS desinfectant									Device			
	1.00E+00	1.00E-01	1.00E-02	1.00E-03	1.00E-04	1.00E-05	1.00E-06		Concentration	1st readable Dilution	Device	
0 min				122	31	6	5	0 min	122	0.001	7.997538754	
0 min*			90	24	5	0	0	0 min	90	0.01	6.865421433	
5 min			60	13	5	0	0	5 min	60	0.01	6.689330174	
10 min		102	12	6	9	1	0	10 min	102	0.1	5.919779095	
15 min	81	21	0	0	0	0	0	15 min	81	1	4.819663942	
20 min	73	13	0	0	0	0	0	20 min	73	1	4.774501783	
30 min	48	11	0	0	0	0	0	30 min	48	1	4.592420161	
45 min	36	10	0	0	0	0	0	45 min	36	1	4.467481424	
60 min	24	4	0	0	0	0	0	60 min	24	1	4.291390165	

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	Natural Decay	Nano Jet device	Nano Jet device + LMS disinfectant
Pfu/Ft3 at 0 min	1.44E+08	9.33E+07	9.77E+07
Pfu/Ft3 at 60 min	2.08E+07	1.86E+06	1.95E+04
Log Pfu/Ft3 at 0 min	8.16	7.97	7.99
Log Pfu/Ft3 at 60 min	7.32	6.27	4.29
Removal Efficient		86.19%	99.86%

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