



TRIO 3-in-1 Air Purification System – Biological Test ReportMulti-pass Efficiency

Date: January 18, 2024 Test Type: Multi-pass Efficiency Test Requested by: Field Controls

LMS # 8874

SCOPE:

Customer provided a TRIO 3-in-1 air purifier unit for multi-pass efficiency test with MS-2 bacteriophage (ATCC 15597-B1) as the challenge aerosols. Tests were performed in the 4000ft3 chamber at 400 cfm. This translates to 6 air exchanges per hour.

METHOD:

MS-2 was harvested and titrated to 5E7 pfu/ml. Suspensions of the organisms were then aerosolized into the chamber using a nebulizer prior to powering the test device. The test chamber air was sampled at 5-minute intervals using a SKC BioStage cascade impactor for 1-minute sampling periods. The cascade impactors were calibrated to an airflow rate of 28.3 liters/min and the sampling inlet was situated at the midpoint of the test chambers. The recovered organisms were enumerated after 24-48hours of incubation.

Computational Formula

 $Corrected \ Removal \ Efficiency = 1 - \Big(\frac{DevicePFU_{t=x}}{DevicePFU_{t=0}} * \frac{EmptyPFU_{t=0}}{EmptyPFU_{t=x}}\Big)$

RESULTS:

>85% reduction of virus MS-2 bacteriophage in a in a 4000ft3 chamber in less than 20 minutes









Figure 1. Large Testing Chamber



TRIO air Purifier

Data: MS-2







Natural Decay													
Time	0	5	10	15	20		30			45			60
#1	311	257	259	268	223		199			198			154
#2	290	278	271	237	215		202			203			167
#3	255	246	246	250	224		207			200			147
PHC #1	601.2	411.4	417.1	443.5	326.2	0	275.3	0	0	273.3	0	0	194.4
PHC #2	516.4	475	452.6	359.1	308.4	0	281.3	0	0	283.3	0	0	216.2
PHC #3	405.9	381.8	381.8	392.4	328.4	0	291.5	0	0	277.3	0	0	183.2
In(ct/c0)	0	-0.1834	-0.1967	-0.2429	-0.4587		-0.5858			-0.6027			-0.9422
Positive Hole Corrected Average	507.833	422.733	417.167	398.333	321		282.7			277.967			197.933

					Trio Air	Cleaner	MS-2						
Time	0	5	10	15	20		30			45			60
#1	172	82	55	40	13		9			4			0
#2	172	93	58	31	21		2			1			1
#3	195	94	64	40	21		4			0			0
PHC #1	224.8	91.8	59.2	42.2	13.2	0	9.1	0	0	4	0	0	0
PHC #2	224.8	105.8	62.6	32.2	21.6	0	2	0	0	1	0	0	1
PHC #3	267.4	107.2	69.7	42.2	21.6	0	4	0	0	0	0	0	0
In(ct/c0)	0	-0.8554	-1.3202	-1.8163	-2.5426		-3.8604			-4.9656			-6.5751
Positive Hole Corrected Average	239	101.6	63.8333	38.8667	18.8		5.03333			1.66667			0.33333
Time	0	5	10	15	20	30	45	60					
Efficiency %	0	48.93	67.49	79.27	87.56	96.22	98.73	99.64					

Chamber Volume (ft^3)	CADR				
4000	372.98				

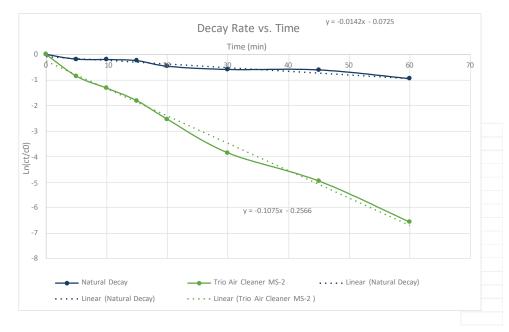










Figure 2: MS-2 at 0 minutes and 60 minutes

