

Bioaerosol Chamber Test March 28, 2015

What was tested?

Scientific Air Management LLC contracted to have 4 bacterial pathogens tested to validate the efficacy of their air disinfection devices. The SAM400 was the model that was used in the testing.

What were the pathogens that were chosen for the testing?

Table 1: Bacterial Organisms Selected For This Experiment

Sl. Number	Organism Description	Source
1	<i>Enterococcus faecalis</i> ATCC® 29212™	Catalog # 0366P Lot No. 366-181-Microbiologics®
2	<i>Pseudomonas aeruginosa</i> ATCC® 27853™	Catalog # 0353P Lot No. 353-174-1 Microbiologics®
3	<i>Staphylococcus aureus</i> ATCC® 700699™	Catalog # 0158MRSA Lot No. 158-47-2 Microbiologics®
4	<i>Streptococcus species</i> ATCC® 9884™	Catalog # 01096P Lot No. 1096-03-3 Microbiologics®

What size chamber was used in the test?

Testing was conducted in an 800 cubic foot chamber to best simulate a hospital room, or other health care office. The goal was to be able to induct air from within an open room in a 360-degree perspective.

What were the conclusions from the test?

The goal of this study was to examine the unit performance in eliminating the 4 selected airborne bacterial organisms. The results (table 8 and 10) indicate that the S400 has a strong antimicrobial capability on all tested organisms with a kill rate of 99.99% and a **4 log reduction across the board.**

Table 8: Qualitative Estimation of Isolated Bioaerosols

Treatment	Hour	Temperature	Growth Media	Incubation Period	Sample Set	<i>Enterococcus faecalis</i>	<i>Pseudomonas aeruginosa</i>	<i>Staphylococcus aureus</i>	<i>Streptococcus species</i>	Remarks
Pre	0	30°± 2°C	TSA	112 hours	I	++++	++++	++++	++++	
					II	++++	++++	++++	++++	
	1				I	++++	++++	++++	++++	
					II	++++	++++	++++	++++	
	2				I	+++	+++	+++	+++	
					II	+++	+++	+++	+++	
Post	0	30°± 2°C	TSA	112 hours	I	++++	++++	++++	++++	
					II	++++	++++	++++	++++	
	1				I	-	-	-	-	-
					II	-	-	-	-	-
	2				I	-	-	-	-	-
					II	-	-	-	-	-

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Table 10: Environmental Parameters and Airborne Bacterial Concentrations

Treatments	Sampling Hour	Temperature (°F)	Relative Humidity (%)	Particulate (count/L)	ETC Pressure (Pa)	CO ₂ (ppm)	Bacteria (CFU/m ³)
Baseline	0	79.0	63.2	52	3.7	488	0
	1	79.7	61.8	29	3.1	486	0
	2	79.7	61.7	35	3.2	485	0
Pretreatment	0	76.6	80.6	110,800	3.0	1,116	42200000
	1	77.1	81.5	34,772	3.1	1053	9685000
	2	77.5	78.3	23,979	2.9	1021	2465000
Post treatment	0	78.0	85.8	236,176	2.5	512	41685000
	1	81.8	81.3	151	2.7	511	0
	2	82.8	75.8	108	2.5	522	0

A clear trend has been observed in the elimination of airborne bacteria from the test chamber under laboratory conditions. The following points summarize our findings.

- 1** The technique used in this system contains very strong antimicrobial properties and is revealed to be capable in eliminating the population of all the bacterial organisms tested in this experiment.
- 2** This experiment also reveals that the SAM400 significantly reduces the particulate ranges between 0.3 μ to 1.0 μ from the ambient air.
- 3** The findings suggest that the bacterial Kill rate (99.99%) of this system are excellent on Enterococcus faecalis, Pseudomonas aeruginosa, Staphylococcus aureus (MRSA) and Streptococcus species.