

# Scientific Air Solution



airPHX Companies  
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November 9, 2019

## Pre and In-Treatment Air and Surface Report – [REDACTED] Wrestling

### A. Summary – Air Samples

Pre and in-treatment air samples results are given below.

Sample Date	Number of samples	Location	Average (cfu/m <sup>3</sup> )	Range	Standard Deviation	% Reduction
08/23/19	4	Various	600	400/767	135.4	-
10/28/19			25	0/67	27.6	95.8
08/23/19	2	External Air	2,600	2,533/2,667	66.7	-
10/28/19			2,567	2,533/2,600	33.33	1.3

### Background

All air samples were taken via the MB-1 air sampler, 30 liters per sample throughout the various locations given above with results normalized to colony forming units per cubic meter of air (CFU/m<sup>3</sup>).

Given below are the types of airborne organisms found in the above locations excluding the exterior samples during this **pre-treatment** sampling.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	700	<i>Mortierella, spp</i>	205
<i>Aspergillus fumigatus</i>	525	<i>Penicillium purpurogenum</i>	145
<i>Penicillium purpurogenum</i>	440	<i>Basidiospores spp</i>	89
<i>Cladosporium sphaerospermum</i>	230	<i>Absidia, spp</i>	66

Shown below are the types of airborne organisms found in the previous locations excluding the exterior samples during this **in-treatment** sampling.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	77	<i>Mortierella, spp</i>	< 5
<i>Aspergillus fumigatus</i>	23	<i>Penicillium purpurogenum</i>	< 5
<i>Penicillium purpurogenum</i>	< 5	<i>Basidiospores spp</i>	< 5
<i>Cladosporium sphaerospermum</i>	< 5	<i>Absidia, spp</i>	< 5

08/23/19 - Pre-treatment bioburden in the sampled locations are above > **300 cfu/m<sup>3</sup>** which is **not acceptable** and needs corrective action.

10/28/19 - **In-treatment** results show as **95.8% reduction** in bioburden from the sampled locations which are now < **100 cfu/m<sup>3</sup>** which is **clean and acceptable**.

### Observations

Exterior air samples ranged from **2,533 to 2,667 cfu/m<sup>3</sup>** indicating that a significant amount of the inside bioburden is coming from the outside air.

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## Target Air Quality

Air quality scale for workplaces, public buildings, schools, and homes are as follows:

- < 100 cfu/m<sup>3</sup> is considered **clean and acceptable**.
- 100 to 300 cfu/m<sup>3</sup> is **marginal**.
- > 300 cfu/m<sup>3</sup> is **not acceptable** and needs corrective action.

In most cases, air quality < 100 cfu/m<sup>3</sup> has shown a decrease in the overall bioburden and odors.

## Predominant Microorganisms

*Although the predominant organisms noted in this report are fungi, previous testing results show bacteria, viruses and protozoa are eliminated as effectively as fungi. The reactive oxygen species (ROS) generated is effective on gram +, gram – bacteria, protozoa, spores and viruses.*

## B. Summary – Surface Contact Swabs

Pre and in-treatment surface (swab) samples results are given below.

Sample Date	Treatment	Number of samples	Location	Average (cfu/m <sup>3</sup> )	Range	Standard Deviation	% Reduction
08/23/19	Pre	16	Various	52.9	25.0/98.0	20.3	-
10/28/19	In			<b>1.8</b>	<b>0.9/3.8</b>	<b>0.1</b>	<b>96.6</b>
08/23/19	Pre	1	Negative	0	0/0	-	-
10/28/19	In		Control	0	0/0	-	-

**08/23/19** – Pre-treatment contact swab results in the various locations are discernably > **10 cfu/cm<sup>2</sup>** which is **not acceptable** and needs corrective action.

**10/28/19 - In-treatment** results show a **96.6% reduction** in the various locations are now < 5 cfu/cm<sup>2</sup> and now is considered **clean and acceptable**, per the Target Contact Swab Quality guide.

## Target Contact Surface Quality

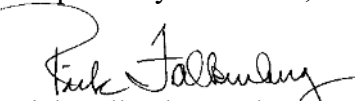
Contact surface quality scale for workplaces, public buildings, schools, and homes are as follows:

- < 5 cfu/cm<sup>2</sup> is considered **clean and acceptable**.
- 5 to 10 cfu/cm<sup>2</sup> is considered **marginal**.
- > 10 cfu/cm<sup>2</sup> is considered **not acceptable** and needs corrective action.

In most cases, surface quality < 5 cfu/cm<sup>2</sup> has shown a decrease in the overall bioburden and odors.

Please contact me if there are questions or if further information is needed.

Respectfully submitted,

  
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Senior Principal Scientist

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Table #1  
 [REDACTED] Wrestling  
 10/28/19 In-treatment Air Sample Results - CFU/m<sup>3</sup>

In-treatment 10/28/2019 - [REDACTED] Wrestling						
Plate Lot No.	Air Sample Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m <sup>3</sup>
-	Ctrl	Unopened	0	0	0	0
1174	A2	Next to stands	30	0	0	0
1166	A3	Right corner of room	30	2	2	67
1158	A4	Left corner of room	30	0	0	0
1150	A5	Weight/cardio area	30	1	1	33
						Avg 25 High 67
						Low 0 SD 27.6
1126	1	Exterior	30	64	76	2,533
1134	2	Exterior	30	66	78	2,600
						Avg 2,567 High 2,600
						Low 2,533 SD 33.3

Total Adjusted Raw Count 3  
 Total CFU/m<sup>3</sup> 100

Table #1, continued  
 [REDACTED] Wrestling  
 08/23/19 Pre-treatment Air Sample Results - CFU/m<sup>3</sup>

Pre-treatment 08/23/2019 - [REDACTED] Wrestling						
Plate Lot No.	Air Sample Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m <sup>3</sup>
-	Ctrl	Unopened	0	0	0	0
1174	A2	Next to stands	30	16	17	567
1166	A3	Right corner of room	30	12	12	400
1158	A4	Left corner of room	30	19	20	667
1150	A5	Weight/cardio area	30	22	23	767
						Avg 600 High 767
						Low 400 SD 135.4
1126	1	Exterior	30	68	80	2,667
1134	2	Exterior	30	64	76	2,533
						Avg 2,600 High 2,667
						Low 2,533 SD 66.7

Total Adjusted Raw Count 72  
 Total CFU/m<sup>3</sup> 2,400



Table #2  
 [REDACTED] Wrestling  
 10/28/19 In-treatment Surface Sample Results – CFU/cm<sup>2</sup>

In-treatment 10/28/2019 - [REDACTED] Wrestling					
Room	Swab Number	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm <sup>2</sup>
N/A	CTRL	Swab not removed from container	0	0	0
Surface	1	Neck pad on strength machine	10x10x10	115	1.2
Surface	2	Climbing rope	10x10x10	90	0.9
Surface	3	Center wrestling matt - [REDACTED] 1 rt side	10x10x10	195	2.0
Surface	4	Center wrestling matt - [REDACTED] 2 rt side	10x10x10	315	3.2
Surface	5	Center wrestling matt - [REDACTED] 3	10x10x10	225	2.3
Surface	6	Center wrestling matt - [REDACTED] 4 lf side	10x10x10	350	3.5
Surface	7	Wrestling dummy	10x10x10	375	3.8
Surface	8	Stands, mid bottom row seat	10x10x10	112	1.1
Surface	9	Air Dyne bike - 2nd from right	10x10x10	125	1.3
Surface	10	Pullup bar, 5th from left	10x10x10	115	1.2
Surface	11	Floor of Versa climber #1	10x10x10	310	3.1
Surface	12	Versa climber handle rt side #1	10x10x10	110	1.1
Surface	13	Arc trainer handle rt	10x10x10	105	1.1
Surface	14	Arc trainer #2 screen	10x10x10	87	0.9
Surface	15	Woodway TM handle rt	10x10x10	118	1.2
Surface	16	Woodway floor behind deck of TM	10x10x10	125	1.3

Avg 1.8    Max 3.8  
Min 0.9    SD 0.98

Total Adjusted Raw Count 2,872  
 Total CFU/cm<sup>2</sup> 29

Table #2, continued  
 [REDACTED] Wrestling  
 08/23/19 Pre-treatment Surface Sample Results – CFU/cm<sup>2</sup>

Pre-treatment 08/23/2019 - [REDACTED] Wrestling					
Room	Swab Number	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm <sup>2</sup>
N/A	CTRL	Swab not removed from container	0	0	0
Surface	1	Neck pad on strength machine	10x10x10	4,150	41.5
Surface	2	Climbing rope	10x10x10	2,500	25.0
Surface	3	Center wrestling matt - [REDACTED] 1 rt side	10x10x10	5,500	55.0
Surface	4	Center wrestling matt - [REDACTED] rt side	10x10x10	7,250	72.5
Surface	5	Center wrestling matt - [REDACTED] 3	10x10x10	6,800	68.0
Surface	6	Center wrestling matt - [REDACTED] lf side	10x10x10	8,500	85.0
Surface	7	Wrestling dummy	10x10x10	9,800	98.0
Surface	8	Stands, mid bottom row seat	10x10x10	3,750	37.5
Surface	9	Air Dyne bike - 2nd from right	10x10x10	4,650	46.5
Surface	10	Pullup bar, 5th from left	10x10x10	3,900	39.0
Surface	11	Floor of Versa climber #1	10x10x10	7,600	76.0
Surface	12	Versa climber handle rt side #1	10x10x10	3,510	35.1
Surface	13	Arc trainer handle rt	10x10x10	3,950	39.5
Surface	14	Arc trainer #2 screen	10x10x10	3,300	33.0
Surface	15	Woodway TM handle rt	10x10x10	4,500	45.0
Surface	16	Woodway floor behind deck of TM	10x10x10	4,900	49.0

Avg 52.9    Max 98.0  
Min 25.0    SD 20.26

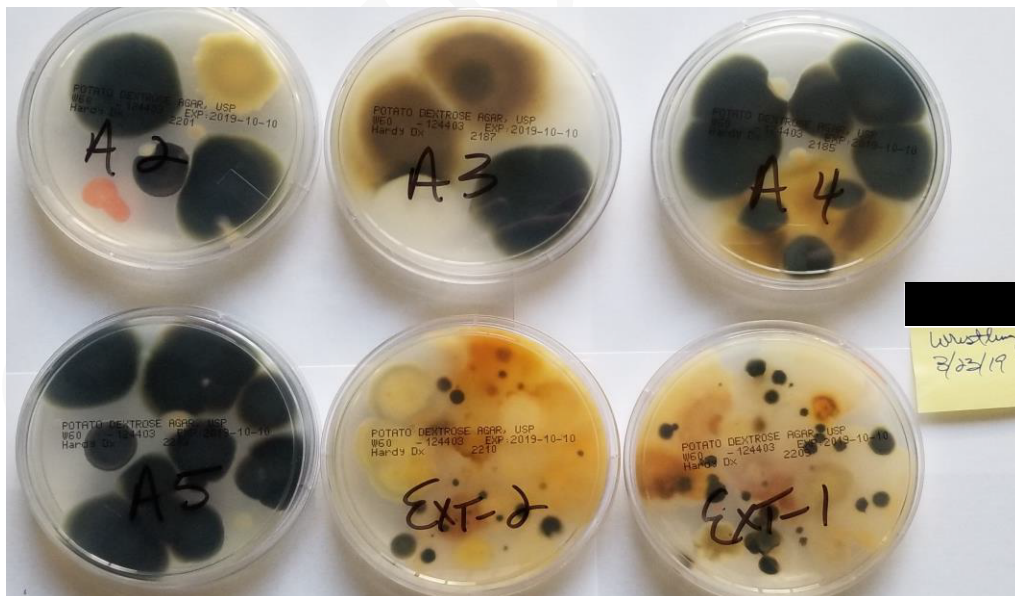
Total Adjusted Raw Count 84,560  
 Total CFU/cm<sup>2</sup> 846



Table #3  
[REDACTED] Wrestling  
10/28/19 In-treatment Air Sample Pictures



Table #3, continued  
[REDACTED] Wrestling  
08/23/19 Pre-treatment Air Sample Pictures



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Table #4  
 [REDACTED] Wrestling  
 10/28/19 In and 08/23/19 Pre-treatment Air and Swab Sample Locations

Air PHX Sampling Form				
Facility:		[REDACTED] University Wrestling Room [REDACTED]		Pre-Treatment Form
Date: 08/23/19				
Air Sample				
Lot #	Plate #	Room	Test Location	Notes.
	1126	Ext - 1		
	1134	Ext - 2		
	1174	A2		next to Stands
	1166	A3		Right Corner of Room
	1158	A4		Left Corner of Room
	1150	A5		Weight/Cardio Area

Air PHX Sampling Form				
Facility:		[REDACTED] University Wrestling Room [REDACTED]		Pre-Treatment Form
Date: 08/23/2019				
Surface Sample				
Lot #	Plate #	Room	Test Location	Notes.
		S1		Neck Pad on Strength Machine
		S2		Climbing Rope
		S3		Center Wrestling Matt - [REDACTED] 1 (R side c
		S4		Center Wrestling Matt - [REDACTED] 2
		S5		Center Wrestling Matt - [REDACTED] 3
		S6		Center Wrestling Matt - [REDACTED] 4 (L side o
		S7		Wrestling Dummy
		S8		Stands (middle bottom row seat)
		S9		Air Dyne Bike - 2nd from right
		S10		Pullup bar (5th from Left)
		S11		Floor of Versa Climber (#1)
		S12		Versa Climber handle R Side (#1)
		S13		Arc Trainer handle (R)
		S14		Arc Trainer #2 Screen
		S15		Woodway TM Handle - R
		S16		Woodway Floor behind deck of TM

COIN