4221 Forbes Boulevard · Suite 250
Lanham, Maryland 20706
T: 202.558.7487 | http://atiinc.com/

June 18, 2019

Prince George's County Public Schools
13300 Old Marlboro Pike
Upper Marlboro, Maryland 20772
Attention: Mr. Alex Baylor

RE: Indoor Air Quality Screening, Ernest Everett Just Middle School
IFB: 022-19
ATI Project Number: ATI19-676
Revision 1

Dear Mr. Baylor:

Prince George's County Public Schools requested that ATI, Inc., conduct a proactive indoor air quality (IAQ) screening at Ernest Everett Just Middle School. The IAQ screening was conducted on May 24, 2019. Its key findings are enclosed in the Executive Summary on page three, and the official laboratory report for total fungal spore trap sampling is enclosed in Appendix A.

Thank you for the opportunity to provide Industrial Hygiene services for Prince George's County Public Schools. If you have any questions regarding this report, please contact us at (202) 643-4283.

Sincerely,
ATI, INC.

Courtney E. McCall
Project Manager

Sarath Seneviratne
CIH, CSP, CHMM

Indoor Air Quality Screening Report

Prince George's County Public Schools
Ernest Everett Just Middle School
1300 Campus Way N
Mitchellville, Maryland 20721

Prepared for:

Prince George's County Public Schools
13300 Old Marlboro Pike
Upper Marlboro, Maryland 20772

June 18, 2019

Rev. 1

Submitted by:

ATI Job # 19-676

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Table of Contents

Abbreviations and Acronyms

AHU	Air-Handling Unit
AIHA	American Industrial Hygiene Association
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASTM	American Society for Testing and Materials
CO	Carbon Monoxide
CO_2	Carbon Dioxide
EMLAP	Environmental Microbiology Laboratory Accreditation Program
HVAC	Heating, Ventilating, And Air-Conditioning
IAQ	Indoor Air Quality
NIST	National Institute for Standards and Technology
NVLAP	National Voluntary Laboratory Accreditation Program
RH	Relative Humidity
Rev.	Revision

Abbreviations involving scientific volume and measurements involving media or water sampling

Counts/m^3	Mold spores per cubic meter of air
LPM	Liters Per Minute
NTE	Not to exceed
°F	degree Fahrenheit
PPM	Parts Per Million

1. Executive Summary and Key Findings

ATI conducted a proactive Indoor Air Quality (IAQ) screening on May 24, 2019, at Ernest Everett Just Middle School, located at 1300 Campus Way N, Mitchellville, MD 20721.

The screening included a visual assessment of randomly selected classrooms and other frequently occupied spaces, such as the cafeteria, the main office, and classrooms, for potential IAQ contributors and pathways. As part of the screening, ATI collected direct reading measurements for comfort parameters, including temperature, relative humidity, carbon dioxide, and carbon monoxide. Also, ATI collected total fungal air samples on spore trap cassettes for microbiological analysis.

The following is a summary of the key findings from this screening:

1. Temperature measurements were below and on the lower end of the ASHRAE guidelines for summer temperatures, between 73°F and 79°F.
2. Relative humidity measurements were within ASHRAE guidelines, <65%.
3. All tested spaces fell below the recommended ASHRAE limit for carbon dioxide, which was 1,115 parts per million (PPM).
4. Carbon monoxide was not detected throughout the tested spaces.
5. Total spore concentrations detected in each tested space did not exceed the spore counts detected outdoors, 68,790 counts/m^3, which is favorable. Most spore types were detected at levels below the outdoor levels. Low concentrations of Aspergillus/Penicillium and some other spores detected indoors at levels slightly higher than the outdoor sample do not pose a concern.

2. Assessment Methods

Ms. Mikal Frater of ATI, Inc., conducted a visual assessment and air sampling on May 24, 2019. Sampled rooms were randomly selected and accounted for approximately 10% of classrooms or a minimum of five samples. Visual observations were made at the time the samples were collected. ATI references the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) *Standard 62.1 – 2016* and ASHRAE *Standard 55 – 2017* when providing IAQ services to clients. ASHRAE is an industry leader on energy efficiency and indoor air quality.

All measurements and air samples were collected between three-six feet from floor elevation, which represents the breathing zone, and away from air-supply and return diffusers. Real-time direct readings for temperature, relative humidity, carbon dioxide (CO_2), and carbon monoxide (CO), were obtained with a calibrated TSI Q-Trak 7575-X Meter and attached 982 Probe.

Total fungal air samples were collected with a Buck BioAire High-Volume Sampling Pump on Zefon Air-O-Cell spore-trap cassettes at a flow rate of 15 liters per minute for five minutes, for a sample volume of 75 liters. The samples were analyzed by direct microscopic examination (identifies and counts both viable and non-viable spores, which is then considered "total fungal"), via the American Society for Testing and Materials (ASTM) Standard D7391-09 by EMSL Analytical, Inc., (EMSL) located in Beltsville, MD.

EMSL participates in the National Institute of Standards and Technology's (NIST's) National Voluntary Laboratory Accreditation Program (NVLAP) for general laboratory performance and management and the American Industrial Hygiene Association (AIHA) Environmental Microbial Laboratory Accreditation Program (EMLAP, Certificate Number 102891).

Instrument calibration records are included in Appendix B of this report.

3. Visual Observations

Table 1: Visual Observations and Sampling Locations

Sample Location	Observations
Outside	• Children congregating outside school more than 50 ft. from sampling area. • Moderate winds, clear skies. • Moderate vehicle traffic. • Parking lot is surrounded by wooded area. • Buses dropping off children. • Large occupied area. • Sample taken in breathing zone, in middle of parking lot.
Main Office	• Two air returns, and two air diffusers. • Space extends and branches off into additional corridor and offices. • Heavy foot traffic. • Individual oscillating fan in corner – OFF. Fan has heavy dirt load. • Door to corridor occasionally open. • Small water leak stain on ceiling tile above secretary desk. • No observed growth. • Space is approximately 615 ft.^{2}
Cafeteria	• Twelve occupants in area during sampling. • Two large 6'x3' air returns, with heavy dirt load on vents. • Twenty air diffusers. • Custodians using cleaning supplies to clean tabletops and sweep floors. • Moderate foot traffic. • Beige stains on ten ceiling tiles. • Heaters on baseboard under windows. • Samples taken in middle of cafeteria – in breathing zone. • Large occupied area.
Gymnasium	• Staff complains of sinus issues. • Outside access doors not properly insulated – cold and heat comes in year-round. • 54 occupants in room during sampling. • Three large air returns, 28 air diffusers. • Large occupied area. • Samples taken in breathing zone, by locker room.
Room 144	• One air return, one air diffuser. • One wall unit with trace dirt load. • A/C can be felt.

Sample Location	Observations
	• Samples taken in back corner, in breathing zone. • Staff complains of damp smell first thing in the morning. • Stained ceiling tile above the wall unit. • 23 occupants in room during sampling. • Books not directly on wall unit, but very close/surrounding. • Space is approximately 1,064 ft^2
Room 152	• Science lab. • Samples taken in breathing zone, in middle of lab. • Three occupants in sampling area. • Four air returns, eight air diffusers. • One plant in area with dry soil and falling leaves. • Very light brown water stain, indicative of possible past leak toward back of room. • Teachers are handling food during sampling. • Space is approximately 1,408 ft.^{2}
Room 322	• Two air returns, one air diffuser. • One wall unit with trace dirt load. • Can smell air freshener, cannot locate source. • Cleaning products in area. • Many books surrounding wall unit. • 28 occupants in room during sampling. • Bottom of wall unit exposed. • No sign of leak or growth. • Space is approximately 864 ft.^{2}
Room 336	• Four air returns, eight air diffusers. • 24 occupants in area. • A/C turned on previous Tuesday. • Moderate traffic. • Smells of air freshener - cannot locate source. • Science room. • Space is approximately 1,232 ft.^{2}
Room 307	• One air return, one air diffuser with trace dirt load. • One wall unit, clean. • Light brown water stains on ceiling tiles above wall unit. • Containers surrounding wall units. • Front corner of room has a dark brown ceiling tile near return vent. • Diffuser has trace dirt load. • 24 occupants in room during sampling. • Space is approximately 864 ft.^{2}
Computer Lab	• Two air returns, one air diffuser. • One wall unit – clean. • One occupant in area during sampling. • Fax/printer about ten ft. from sampling area. • Very small water stained ceiling tile above printer. • Space is approximately 1,008 ft.^{2}

4. Thermal Environmental Conditions for Human Occupancy

ASHRAE *Standard 55-2017, Thermal Environmental Conditions for Human Occupancy*, addresses thermal comfort in an office environment, which means that an employee wearing a normal amount of clothing feels neither too cold nor too warm. This standard discusses thermal comfort within the context of air temperature, humidity, and air movement and provides recommended ranges for temperature and humidity that are intended to satisfy most building occupants. The recommended ASHRAE ranges are referenced below by each comfort parameter.

4.1 Temperature

The ASHRAE standard establishes a winter comfort range of between 68°F and 75°F and a summer range of between 73°F and 79°F. The temperature measurements obtained during the May 24, 2019, screening are summarized in Table 2. As indicated by the data in the table, temperatures in the school averaged between 69.3 – 74.7°F, below and on the lower end of the ASHRAE summer comfort range.

Table 2: Temperature Measurements

Sample Location	May 24, 2019 °F			ASHRAE Standard °F
	Min	Max	Average	
Outside	73.4	73.4	73.4	N/A
Indoors				
Main Office	74.7	74.7	74.7	73 – 79
Cafeteria	74.3	74.3	74.3	73 – 79
Gymnasium	74.0	74.2	74.1	73 – 79
Room 144	70.0	70.2	70.1	73 – 79
Room 152	69.3	69.3	69.3	73 – 79
Room 322	69.8	70.0	69.9	73 – 79
Room 336	72.9	72.9	72.9	73 – 79
Room 307	71.3	71.5	71.4	73 – 79
Computer Lab	71.1	71.1	71.1	73 – 79

4.2 Relative Humidity

Relative humidity is a key factor for mold growth. Mold has the potential of growing on suitable surfaces with humidity levels above 65%. ASHRAE *Standard 62.1-2016*, *Ventilation for Acceptable Indoor Air Quality,* recommends a maximum indoor relative humidity of 65% to prevent condensation of moisture on surfaces. Relative humidity below 30% may result in drying of the mucous membranes and skin. Relative humidity measurements are summarized in Table 3. As indicated by the data in the table, relative humidity measurements averaged between 51.95 and 60.5%, below the ASHRAE maximum recommendation of 65% relative humidity.

Table 3: Relative Humidity Measurements

Sample Location	May 24, 2019 (%)			ASHRAE Standard (% RH)
	Min	Max	Average	
Outside	51.8	52.8	52.3	N/A
Inside				
Main Office	55.1	55.3	55.2	< 65
Cafeteria	51.9	52.0	51.95	< 65
Gymnasium	56.5	56.5	56.5	< 65
Room 144	54.6	55.2	54.9	< 65
Room 152	52.0	52.2	52.1	< 65
Room 322	58.3	59.1	58.7	< 65
Room 336	56.2	58.4	57.3	< 65
Room 307	59.7	61.3	60.5	< 65
Computer Lab	52.9	53.3	53.1	< 65

4.3 Carbon Dioxide

Carbon dioxide measurements within an occupied building are a standard method used to gauge the efficiency of ventilation systems. Carbon dioxide is a by-product of human respiration and does not pose an acute health hazard alone. Elevated concentrations may suggest that insufficient fresh air is being supplied to an occupied space and/or that the ventilation system does not provide a sufficient rate of air exchange.

Research has indicated that buildings with adequately operating ventilation systems are able to remove odors generated by activities in an indoor office environment efficiently. ASHRAE *Standard 62.1-2016* states that comfort (odor) criteria with respect to human bioeffluents are likely to be satisfied if the ventilation results indoor carbon dioxide concentrations are less than 700 parts per million (ppm) above the outdoor air concentration.

Carbon dioxide measurements are summarized in Table 4. On the day of the screening, the average outdoor carbon dioxide concentration obtained was 415 ppm, which calculates to a maximum indoor concentration of 1,115 ppm (700 + 415). The carbon dioxide levels inside the school ranged from the average minimum detected, 456 ppm to 1,053 ppm, the average maximum detected, under the ASHRAE maximum recommended concentration of 1,115 ppm.

Table 4: Carbon Dioxide Measurements

Sample Location	May 24, 2019 Concentration (parts per million)			ASHRAE Standard (ppm) NTE
	Min	Max	Average	
Outside	413	417	415	N/A
Inside				
Main Office	610	610	610	1,115
Cafeteria	904	910	907	1,115
Gymnasium	628	704	666	1,115
Room 144	810	860	835	1,115
Room 152	451	461	456	1,115
Room 322	1,044	1,062	1,053	1,115
Room 336	911	951	931	1,115
Room 307	989	1,059	1,024	1,115
Computer Lab	458	478	468	1,115

4.4 Carbon Monoxide

Carbon monoxide is a colorless and odorless gas produced by the incomplete combustion of carbon containing fuels. Oil, gasoline, diesel fuels, wood, coke, and coal are the major sources of carbon monoxide. ASHRAE recommends that carbon monoxide not exceed nine ppm indoors. As indicated by the data in Table 5, carbon monoxide was not detected throughout the school.

Table 5: Carbon Monoxide Measurements

Sample Location	May 24, 2019 Concentration (parts per million)			ASHRAE Standard (ppm)
	Min	Max	Average	
Outside	0	0	0	N/A
Inside				
Main Office	0	0	0	< 9
Cafeteria	0	0	0	< 9
Gymnasium	0	0	0	< 9
Room 144	0	0	0	< 9
Room 152	0	0	0	< 9
Room 322	0	0	0	< 9
Room 336	0	0	0	< 9
Room 307	0	0	0	< 9
Computer Lab	0	0	0	< 9

5. Total Fungal Air Sampling Results

Mold needs a food source, moisture, proper temperature and humidity, and at times, a source of light, to grow in an environment. Air infiltration through building entrances and exits, open windows and loading docks, and foot traffic into buildings, including the HVAC system all serve as primary pathways that can carry fungi indoors. Water leaks and humid conditions inside of buildings provide the moisture that fosters mold growth. The May 24, 2019 mold screening sampled air using spore trap cassettes in randomly selected classrooms and other areas throughout the facility. These cassettes collect both viable spores, those capable of producing more fungal colonies, and non-viable spores, which cannot reproduce. Based upon recognized industry practices, indoor mold concentrations are compared with those detected outdoors, which are also known as ambient or baseline samples.

In normal circumstances, the diversity of spores identified indoors and outdoors should be similar with some exceptions. The high concentration of one or two species of fungal spores identified indoors and the absence of the same species outdoors can indicate a moisture problem with the potential to degrade the air quality. Fungi species present indoors are typically found at levels ranging from approximately 10-50% of their levels in the outdoor air, reflecting the filtering by the building's HVAC system.

The official laboratory report with spore trap samples collected on May 24, 2019, is presented in Appendix A. The findings indicated that the total indoor concentrations were favorable compared to the total outdoor concentrations. Total concentrations detected in each tested space did not exceed the spore counts detected outdoors, 68,790 counts/m^3.

Ascospores, Basidiospores and Cladosporium had the highest concentrations, although they did not exceed those detected outdoors. These three spore types are commonly found indoors. Each are known to cause allergies yet are not associated with water damaged materials in buildings.

Aspergillus/Penicillium, also known to cause allergies, was detected indoors elevated over the outdoor sample but at low concentrations. These concentrations do not pose a concern. Low concentrations of other spores, such as Myxomycetes and Arthrinium, were also detected indoors but not outdoors. These low concentrations do not pose a concern either.

6. Summary of Findings

Temperature measurements were below and on the lower end of the ASHRAE guidelines for summer temperatures, 73°F and 79°F. Relative humidity measurements were within ASHRAE guidelines, <65%. All tested locations fell below the ASHRAE limit for carbon dioxide, which was 1,115 parts per million (PPM). Carbon monoxide was not detected throughout the tested spaces.

Total spore concentrations detected in each tested space did not exceed the spore counts detected outdoors, 68,790 counts/m^3, which is favorable. Most spore types were detected at levels below the outdoor levels. Low concentrations of Aspergillus/Penicillium and some other spores detected indoors at levels slightly higher than the outdoor sample do not pose a concern.

We appreciate the opportunity to provide these IAQ testing services for you. If you have any questions, please contact us at (202) 643-4283.

Sincerely,
ATI, INC.

Courtney E. McCall
Project Manager

Sarath Seneviratne
CIH, CSP, CHMM

Appendix A:
Laboratory Report and Chain of Custody

EMSL Analytical, Inc.

10768 Baltimore Avenue Beltsville, MD 20705

Tel/Fax: (301) 937-5700 / (301) 937-5701

http://www.EMSL.com / beltsvillelab@emsl.com

EMSL Order: 191905959
Customer ID: ATII25A
Customer PO:
Project ID:

Attn: Brian Chapman
ATI
4221 Forbes Blvd
Suite 250
Lanham, MD 20706
Project: 19-676-PGCPS-Ernest Everett Just MS

Phone: (202) 368-1376
Fax:
Collected: 05/24/2019
Received: 05/24/2019
Analyzed: 05/28/2019

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	191905959-0001			191905959-0002			191905959-0003		
Client Sample ID:	19-676-01			19-676-02			19-676-03		
Volume (L):	75						75		
Sample Location	Outside Parking Lot			Field Blank			Main Office		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	616	26900	39.1	-	-	-	6	300	28.6
Aspergillus/Penicillium	-	-	-	-	-	-	-	-	-
Basidiospores	924	40300	58.6	-	-	-	16	700	66.7
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	31	1400	2	-	-	-	1	40	3.8
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	1*	10*	0	-	-	-	1*	10*	1
Scopulariopsis/Microascus	1	40	0.1	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Arthrinium	-	-	-	-	-	-	-	-	-
Bispora	3	100	0.1	-	-	-	-	-	-
Pestalotia/Pestalotiopsis	-	-	-	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-	-	-	-
Sporidesmium-like	1	40	0.1	-	-	-	-	-	-
Total Fungi	**1577**	**68790**	**100**	**-**	**No Trace**	**-**	**24**	**1050**	**100**
Hyphal Fragment	1	40	-	-	-	-	1*	10*	-
Insect Fragment	1	40	-	-	-	-	-	-	-
Pollen	15	660	-	-	-	-	1*	10*	-
Analyt. Sensitivity 600x	-	44	-	-	0	-	-	44	-
Analyt. Sensitivity 300x	-	13*	-	-	0*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	-	-	-	4	-
Fibrous Particulate (1-4)	-	1	-	-	-	-	-	1	-
Background (1-5)	-	1	-	-	-	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Stefanie Schneider

Stefanie Schneider, Microbiology Laboratory Manager
or other approved signatory

Initial report from: 05/30/2019 13:04:01

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.

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Phone: (202) 368-1376
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Collected: 05/24/2019
Received: 05/24/2019
Analyzed: 05/28/2019

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	191905959-0004			191905959-0005			191905959-0006		
Client Sample ID:	19-676-04			19-676-05			19-676-06		
Volume (L):	75			75			75		
Sample Location	Cafeteria			Gymnasium			Room 144		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	1	40	0.2	-	-	-
Ascospores	17	740	34.1	93	4100	20.5	32	1400	24.1
Aspergillus/Penicillium	12	520	24	-	-	-	2	90	1.5
Basidiospores	11	480	22.1	344	15000	75.1	88	3800	65.4
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	7	300	13.8	14	610	3.1	10	440	7.6
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	2	90	0.5	1	40	0.7
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	2	90	4.1	2	90	0.5	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	1*	10*	0.1	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Arthrinium	-	-	-	-	-	-	1	40	0.7
Bispora	-	-	-	-	-	-	-	-	-
Pestalotia/Pestalotiopsis	1	40	1.8	-	-	-	-	-	-
Polythrincium	-	-	-	1	40	0.2	-	-	-
Sporidesmium-like	-	-	-	-	-	-	-	-	-
Total Fungi	**50**	**2170**	**100**	**458**	**19980**	**100**	**134**	**5810**	**100**
Hyphal Fragment	3	100	-	2	90	-	1*	10*	-
Insect Fragment	-	-	-	1	40	-	-	-	-
Pollen	-	-	-	3	100	-	1	40	-
Analyt. Sensitivity 600x	-	44	-	-	44	-	-	44	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	4	-	-	4	-	-	3	-
Fibrous Particulate (1-4)	-	2	-	-	1	-	-	1	-
Background (1-5)	-	2	-	-	2	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Stefanie Schneider

Stefanie Schneider, Microbiology Laboratory Manager or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Beltsville, MD AIHA-LAP, LLC --EMLAP Accredted #102891

Initial report from: 05/30/2019 13:04:01

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

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Phone: (202) 368-1376
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Collected: 05/24/2019
Received: 05/24/2019
Analyzed: 05/28/2019

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	191905959-0007			191905959-0008			191905959-0009		
Client Sample ID:	19-676-07			19-676-08			19-676-09		
Volume (L):	75			75			75		
Sample Location	Room 152			Room 322			Room 336		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	31	1400	19.7	15	660	16	17	740	12.5
Aspergillus/Penicillium	1	40	0.6	12	520	12.6	2	90	1.5
Basidiospores	123	5370	75.5	53	2300	55.7	92	4000	67.7
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	8	300	4.2	14	610	14.8	22	960	16.2
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	1	40	0.7
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	1	40	1	1	40	0.7
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Arthrinium	-	-	-	-	-	-	1	40	0.7
Bispora	-	-	-	-	-	-	-	-	-
Pestalotia/Pestalotiopsis	-	-	-	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-	-	-	-
Sporidesmium-like	-	-	-	-	-	-	-	-	-
Total Fungi	**163**	**7110**	**100**	**95**	**4130**	**100**	**136**	**5910**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	2*	30*	-
Analyt. Sensitivity 600x	-	44	-	-	44	-	-	44	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	3	-	-	3	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Stefanie Schneider

Stefanie Schneider, Microbiology Laboratory Manager
or other approved signatory

Initial report from: 05/30/2019 13:04:01

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.

10768 Baltimore Avenue Beltsville, MD 20705

Tel/Fax: (301) 937-5700 / (301) 937-5701

http://www.EMSL.com / beltsvillelab@emsl.com

EMSL Order: 191905959
Customer ID: ATII25A
Customer PO:
Project ID:

Attn: Brian Chapman
ATI
4221 Forbes Blvd
Suite 250
Lanham, MD 20706
Project: 19-676-PGCPS-Ernest Everett Just MS

Phone: (202) 368-1376
Fax:
Collected: 05/24/2019
Received: 05/24/2019
Analyzed: 05/28/2019

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	191905959-0010			191905959-0011		
Client Sample ID:	19-676-10			19-676-11		
Volume (L):	75			75		
Sample Location	Room 306			Room 302		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-
Ascospores	16	700	35.9	17	740	18.8
Aspergillus/Penicillium	-	-	-	3	100	2.5
Basidiospores	24	1000	51.3	67	2900	73.6
Bipolaris++	1*	10*	0.5	-	-	-
Chaetomium	-	-	-	-	-	-
Cladosporium	4	200	10.3	4	200	5.1
Curvularia	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-
Myxomycetes++	1	40	2.1	-	-	-
Pithomyces++	-	-	-	-	-	-
Rust	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-
Arthrinium	-	-	-	-	-	-
Bispora	-	-	-	-	-	-
Pestalotia/Pestalotiopsis	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-
Sporidesmium-like	-	-	-	-	-	-
Total Fungi	**46**	**1950**	**100**	**91**	**3940**	**100**
Hyphal Fragment	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-
Pollen	2	90	-	-	-	-
Analyt. Sensitivity 600x	-	44	-	-	44	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-
Background (1-5)	-	2	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Stefanie Schneider

Stefanie Schneider, Microbiology Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Beltsville, MD AIHA-LAP, LLC --EMLAP Accredted #102891

Initial report from: 05/30/2019 13:04:01

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

OrderID: 191905959

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*):

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX:(856) 786-0262

Company Name: ATI, Inc	**EMSL-Bill to:** ☐ Same ☐ Different If Bill to is Different note instructions in Comments
Street: 4221 Rumsey Road, Suite 250	*Third Party Billing requires written authorization from third party.*
City: Lanham **State/Province:** MD	**Zip/Postal Code:** 20706 **Country:**
Report To (Name): Brian Chapman / Mikal Frater	**Telephone #:** 202-558-7489
Email Address: Brian@atiinc.com & Mikal@atiinc.com	**Fax #:** **Purchase Order:**
Project Name/Number: 19-676- PGCPS - Ernest Everett Just MS	**Please Provide Results:** ☐ Fax ☒ Email

U.S. State Samples Taken: **Project Zip Code:** **Connecticut Samples:** ☒ Commercial ☐ Residential

Sterile, Sodium Thiosulfate Preserved Bottle Used: ☐ **Biocide Used in Source (specify):** ☐

Public Water Supply Samples: ☐ **Note: All results may automatically be reported to DOH if required by state.**

Turnaround Time (TAT) Options - Please Check

☐ 3 Hour	☐ 6 Hour	☐ 24 Hour	☐ 48 Hour	☐ 72 Hour	☐ 96 Hour	☒ 1 Week	☐ 2 Week

Microbiology Test Codes

M001 Air-O-Cell
M174 MoldSnap
M030 Micro 5
M032 Allergenco-D
M041 Fungal Direct Examination
M169 Pollen ID & Enumeration
M280 Dust Characterization Level-1
M281 Dust Characterization Level-2
M005 Viable Fungi- Air Samples (Genus ID & Count)
M006 Viable Fungi- Air Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M007 Culturable fungi - Surface Samples (Genus ID & Count)
M008 Culturable fungi - Surface Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M009 Bacteria Culture Gram Stain & Count
M010 Bacteria Count & ID - 3 Most Prominent
M011 Bacteria Count & ID - 5 Most Prominent

M012 *Pseudomonas aeruginosa* (P/A***)
M024 *Pseudomonas aeruginosa* (MFT*)
M015 Heterotrophic Plate Count
M017 Total Coliform & *E. coli* (Colilert P/A***)
M018 Total Coliform & *E. coli* (MFT*)
M114 Total Coliform & *E. coli* Enumeration (Colilert MPN**)
M019 Fecal Coliform (MFT*)
M020 Fecal *Streptococcus* (MFT*)
M029 *Enterococci* (MFT*)
M129 *Enterococci* (Enterolert P/A***)
M180 Real Time qPCR-ERMI 36 Panel
M025 Sewage Screen –Water (MFT*)

M115 Sewage Screen - Water (P/A***)
M116 Sewage Screen - Water (MPN**)
M117 Sewage Screen - Swab (P/A***)
M013 Sewage Screen - Swab (MFT*)
M133 *Methicillin-resistant Staph. aureus* (MRSA)
M031 Rapid-growing non-TB *Mycobacteria* Detection & Enumeration
M014 Endotoxin Analysis
M044 Group Allergen (Cat, Dog, Cockroach, Dust Mite)
Other See Analytical Price Guide
***Legionella* Analysis** Please use EMSL *Legionella* COC

*MFT= Membrane Filtration Technique
**MPN= Most Probable Number
***P/A= Presence/Absence

Name of Sampler: Mikal Frater **Signature of Sampler:** Mikal Frater

Sample #	Sample Location/Description	Sample Type	Potable/ NonPotable (Only for Waters)	Test Code	Volume/ Area	Date/Time Collected	Temperature (°C) (Lab Use Only)
Example A1	Kitchen Sink/Tap	Water	☒ P ☐ NP	M017	100 mL	9/1/13 4:00 PM	
19-676-01	Outside Parking Lot	Air	☐ P ☐ NP	M001	75L	05-24-19 8:18	
19-676-02	Field Blank	Air	☐ P ☐ NP	M001	75L	05-15-19 -	
19-676-03	Main Office	Air	☐ P ☐ NP	M001	75L	05-24-19 8:41	
19-676-04	Cafeteria	Air	☐ P ☐ NP	M001	75L	05-24-19 9:01	
19-676-05	Gymnasium	Air	☐ P ☐ NP	M001	75L	05-24-19 9:14	

Client Sample # (s): - 11 **Total # of Samples:** 11 **Samples Received Chilled?** Yes / No (Lab Use Only)

Relinquished (Client): Mikal Frater **Date:** 5-24-19 **Time:** 3:05pm

Received (Lab): Thomas Calkins **Date:** 5/24/19 **Time:** 309 pm

Comments/Special Instructions:

Controlled Document – COC-34 Micro R8 11/14/2017

191905959

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*):

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX:(856) 786-0262

Additional pages of the chain of custody are only necessary if needed for additional sample information.

Sample #	Sample Location/Description	Sample Type	Potable/ NonPotable (Only for Waters)	Test Code	Volume/ Area	Date/Time Collected	Temperature (°C) (Lab Use Only)
19-676-06	Room 144	Air	☐P ☐NP	M001	75L	05-24-19 9:31	
19-676-07	Room 152	Air	☐P ☐NP	M001	75L	05-24-19 9:40	
19-676-08	Room 322	Air	☐P ☐NP	M001	75L	05-24-19 9:56	
19-676-09	Room 336	Air	☐P ☐NP	M001	75L	05-24-19 10:09	
19-676-10	Room 307	Air	☐P ☐NP	M001	75L	05-24-19 10:27	
19-676-11	Rom 302	Air	☐P ☐NP	M001	75L	05-24-19 10:36	
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				

Comments/Special Instructions:

Controlled Document – COC-34 Micro R8 11/14/2017

Appendix B:
Instrument Calibration Records

Certificate of Calibration

(✓) ~~Buck™~~ BioAire Pump Calibration Rotameter

( ) Buck™ BioSlide Pump Calibration Rotameter

Serial number: R14057

Date Calibrated: 1/22/19 **Calibration Due Date:** 1/22/20

Flow Calibration

This is to certify that the rotameter listed above has been calibrated using a Buck Primary calibrator listed below which is calibrated according to A.P. Buck, Inc. calibration procedure APB-1, Ver. 6.2 and is traceable to the National Institute of Standards & Technology (N.I.S.T). A.P. Buck guarantees the accuracy of the rotameter to be within ± 5% of the actual flow rate.

AMBIENT CONDITIONS: Temperature 74±3° F Relative Humidity 50±10%

Description	MFR.	Model	Serial #
Primary Calibrator	A.P. Buck Inc.	M30B	☐ A40020 ☑ ~~A40021~~

QA Approval By:

A.P. BUCK, INC.
7101 Presidents Drive, Suite 110
Orlando, FL 32809
Phone: 407-851-8602
Fax: 407-851-8910

BUCK
A.P. BUCK, INC.

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
798 Cromwell Park Dr.
Suite R & S
Glen Burnie, MD 21061

Pine Environmental Services, Inc.

Instrument ID 27136
Description TSI 982 Probe
Calibrated 5/28/2019 12:36:30PM

Manufacturer Tsi
Model Number 982
Serial Number/ Lot Number p13220024
Location Maryland
Department

State Certified
Status Pass
Temp °C 22
Humidity % 53

Calibration Specifications

Group # 1
Group Name CO
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.0 / 100.0	PPM	100.0	PPM	108.0	100.0	0.00%	Pass

Group # 2
Group Name CO2
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1000 / 1000	PPM	1000	PPM	982	1,000	0.00%	Pass

Test Instruments Used During the Calibration

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	(As Of Cal Entry Date) Last Cal Date/ Opened Date	Next Cal Date / Expiration Date
MD 2GAS CO 100PPM/CO2 1000PPM	MD 2GAS CO 100PPM/CO2 1000PPM - LBI-375-2	Pine Environmental Services, Inc.	31657	LBI-375-2		11/21/2022
MD ZERO AIR FBI-1-25	MD ZERO AIR	Pine Environmental Services, Inc.	34LS-1	FBI-1-25		

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Ryan Armstrong

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
798 Cromwell Park Dr.
Suite R & S
Glen Burnie, MD 21061

Pine Environmental Services, Inc.

Instrument ID 27136
Description TSI 982 Probe
Calibrated 5/28/2019 12:36:30PM

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 27136
Description TSI 982 Probe
Calibrated 12/12/2018

Manufacturer TSI
Model Number 982
Serial Number P13220024
Location New Jersey
Temp 71

Classification
Status pass
Frequency Yearly EOM
Department Lab
Humidity 22

Calibration Specifications

Group # 1
Group Name Carbon Dioxide
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	ppm	0.00	ppm	0.00	0.00	0.00%	Pass
1000.00 / 1000.00	ppm	1000.00	ppm	1,009.00	1,002.00	0.20%	Pass

Group # 2
Group Name Carbon Monoxide
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	ppm	0.00	ppm	4.60	0.00	0.00%	Pass
100.00 / 100.00	ppm	100.00	ppm	96.00	100.10	0.10%	Pass

Group # 3
Group Name Relative Humidity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
50.00 / 30.80	%	30.80	%	31.00	30.80	0.00%	Pass

Group # 4
Group Name Temperature
Stated Accy Plus / Minus
Range Acc % 0.0000
Reading Acc % 0.0000
Plus/Minus 1.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
65.00 / 72.30	°F	72.30	°F	69.80	72.30	0.00%	Pass

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
CO/CO2_34LS-375	100 ppm CO, 1000 ppm CO2	Calgaz	MAO-375-1		6/9/2019
MICHELL DM-509-TX-01	Relative Humidity Meter	Michell	273296	9/17/2018	9/17/2019
NITROGEN	Nitrogen 99.999%	Liquid Technology	7727-37-9	6/1/2016	6/1/2019
ZERO_AIR_105	Zero Grade Air THC <1.0 PPM	Liquid Technology	KAP-A-10	10/1/2015	10/20/2019
L-1					

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 27136
Description TSI 982 Probe
Calibrated 12/12/2018

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Kevin Cole

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID R20401
Description TSI 7575 -X Q-Trak
Calibrated 8/22/2018

Manufacturer TSI
Model Number 7575-X
Serial Number 7575X1130009
Location New Jersey
Temp 77

Classification
Status pass
Frequency Yearly EOM
Department Lab
Humidity 41

Calibration Specifications

Group # 1
Group Name Barometric Pressure
Stated Accy Pct of Reading

Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
30.000 / 29.610	inHg	29.610	inHg	29.620	29.610	0.00%	Pass

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
OMEGA HX93AC/DP25-E	Omega HX93AC/DP25-E	Omega Engineering	1010368 035025 035026	9/15/2016	9/15/2018
OMEGA PX02K1-16A5T /DP25-E-A	Omega PX02K1-16A5T/DP25-E-A	Omega Engineering	168377/8375030	9/15/2016	9/15/2018
OMEGA WT4401-D	Omega WT4401-D	Omega Engineering	101105	9/15/2016	9/15/2018

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Kevin Cole

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
798 Cromwell Park Dr.
Suite R & S
Glen Burnie, MD 21061

Pine Environmental Services, Inc.

Instrument ID R20401
Description TSI 7575 Q-Trak
Calibrated 5/28/2019 12:35:31PM

Manufacturer Tsi
Model Number 7575
Serial Number/ Lot Number 7575X1130009
Location Maryland
Department

State Certified
Status Pass
Temp °C 22
Humidity % 53

Calibration Specifications

Group # 1
Group Name Functional Test
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	(As Of Cal Entry Date) Last Cal Date/ Opened Date	Next Cal Date / Expiration Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Ryan Armstrong

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance