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9220 Rumsey Road, Suite 100, Columbia, MD 21045
T: 410.992.3424 | F: 410.992.1837

February 25, 2021

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

RE: Indoor Air Quality Assessment, International High School at Langley Park
Purchase Order: 734977
ATI Project Number: 21-623

Dear Mr. Baylor:

Prince George's County Public Schools requested that ATI, Inc., conduct a proactive indoor air quality (IAQ) assessment at International High School at Langley Park on February 23, 2021. 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.

Reviewed By:

Nate Burgei, CIH, CSP
Certified Industrial Hygienist

Courtney E. McCall
Project Manager

Indoor Air Quality Assessment Report

Prince George's County Public Schools
International High School at Langley Park
5150 Annapolis Road
Bladensburg, MD 20710

Prepared for:

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

February 25, 2021

Submitted by:



ATI Job # 21-623

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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
CO₂	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

Spores/m³	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

ATI conducted a proactive Indoor Air Quality (IAQ) assessment on February 23, 2021, at International High School at Langley Park, located at 5150 Annapolis Road in Bladensburg, Maryland.

The assessment included a visual assessment of randomly selected classrooms and other frequently occupied spaces, such as the cafeteria/gym, the main office, and randomly selected classrooms, for potential IAQ contributors and pathways. As part of the assessment, ATI measured common IAQ 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 assessment:

1. Only one of the tested spaces had a temperature within the ASHRAE recommended winter range of 68-75°F, and all other indoor tested spaces were less than the ASHRAE recommended temperature range. This is not unusual for an unoccupied building to keep electricity costs down during the pandemic.
2. The relative humidity in all tested spaces was less than the ASHRAE guidelines of <65%, but two spaces had humidity <30%, which can cause occupant discomfort.
3. Carbon dioxide concentrations in all tested spaces were less than the ASHRAE limit for carbon dioxide, which was 1,098 parts per million (PPM) for the day of the assessment.
4. Carbon monoxide concentrations were less than the IAQ meter's detection limit throughout the tested spaces.
5. The spore trap sampling results suggest that significant indoor amplification of mold was not present. While concentrations of *Aspergillus/Penicillium* were detected in some of the tested locations exceeded the ambient sample, the observed concentrations of these spores indoors do not suggest noteworthy amplification.
6. There were some ceiling tiles around a sprinkler head in the Media Center that had significant water stains and should be replaced after the sprinkler head is inspected to ensure it is not leaking.

2 Assessment Methods

Nate Burgei, CIH, CSP, of ATI, Inc. conducted a visual assessment and air sampling on February 23, 2021. Sampled rooms were randomly selected and accounted for approximately 10% of classrooms or a minimum of five samples. Mr. Burgei documented visual observations at the time he collected the air samples. 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 a typical adult breathing zone, and away from air-supply and return diffusers. Real-time direct readings for temperature, relative humidity, carbon dioxide (CO₂), and carbon monoxide (CO), were measured with a calibrated TSI Q-Trak 7575-X Meter and attached 982 Probe.

Total fungal air samples were collected with a field calibrated Buck BioAire High-Volume Sampling Pump on Zefon Air-O-Cell spore-trap cassettes at a flow rate of 15 liters per minute for ten minutes, for a sample volume of 150 liters. AMA Analytical Services, Inc. of Lanham, MD analyzed the samples using direct microscopic examination per ASTM D7391, which spores both viable and non-viable mold spores and particulates, which combined yields total fungal results. AMA participates in the National Institute of Standards and Technology's (NIST) National Voluntary Laboratory Accreditation Program (NVLAP) for general laboratory performance and management, and the American Industrial Hygiene Association (AIHA) for Environmental Microbial Laboratory Accreditation Program (EMLAP). The AMA laboratory reports are included in Appendix A.

3 Visual Observations

Table 1 lists the areas, conditions, observations, and other pertinent details related to this IAQ assessment. On the date of the sampling event, few occupants were present in the school because of the COVID-19 global pandemic.

Table 1: Visual Observations and Sampling Locations

Sample Location	Observations
Main Office	<ul style="list-style-type: none"> • Unoccupied during the assessment • A single ceiling tile had water stains near the return vent but no signs of mold • No signs of significant water damage in the space • Horizontal surfaces such as desks were free from dust, mild dust on floor • Heat unit was on, two over head AC supplies and no return vents • Windows appeared well sealed
Cafeteria	<ul style="list-style-type: none"> • This space was unoccupied, except for the adjacent kitchen • No signs of major water damage in space • Doors to outdoors closed, but open gaps between doors and floor visible • Water fountain appeared clean and leak free, however there is bubbling tile in front of the water fountain • Horizontal surfaces were clean and dust free, mild dust on the floor • Thirteen overhead vents, three window AC units and 5 returns, • Air supplies and returns were either dirty or rusty • No signs of water damage or water stains on ceiling tiles
Fitness Center	<ul style="list-style-type: none"> • This space was unoccupied • HVAC window unit was off during the assessment and appeared clean • The ceiling tiles appeared mostly clean and stain free except along the back door, in which they edges of the ceiling tile were dirty or show signs of water stains • Floor had moderate amount of debris including dead insects and dust • Window near back door, had excessive spider webs and dust accumulation • Back door appeared well sealed and no signs of water intrusion • Sink in laundry room was dripping, but no signs of leaks under the sink • Washer and dryer machines appeared new, and clean, no signs of odors
Media Center	<ul style="list-style-type: none"> • The media center was unoccupied during the assessment • The media center was a small room that was the size of a large office • There was crackling plaster along the windows, possibly from water damage • Four ceiling tiles around one of the sprinkler heads were stained • The space had one supply and zero returns • Heat was off during the assessment • Space was approximately 300 ft²
Classroom 115	<ul style="list-style-type: none"> • Space was unoccupied, and door to hallway was closed • Wall mounted air unit was off, appeared clean and new • Windows appeared in good shape with no signs of water intrusion in room • Classroom sink appeared clean and dry, two cleaned out aquariums sat on the sink counter top • There was a single stained ceiling tile near the window

Sample Location	Observations
	<ul style="list-style-type: none"> There was a heavy layer of dust on all horizontal surfaces, and moderate debris on the floor
Classroom 213	<ul style="list-style-type: none"> Space was unoccupied, and door to hallway was closed Wall mounted air unit was on, with significant amount of debris/dust on top Windows appeared in good shape with no signs of water intrusion in the room The ceiling tiles near the window appeared darker than the others but hard to discern if they were just darker, dirty, or were exposed to moisture Mild level of dust on the desk
Classroom 202	<ul style="list-style-type: none"> Space was unoccupied, and door to hallway was cracked open slightly Wall mounted air unit hot to the touch, but not running, appeared clean Windows appeared in good shape with no signs of water intrusion Ceiling tiles appeared to be clean Moderate level of dust on surfaces, but otherwise the room was clean
Outdoors	<ul style="list-style-type: none"> Sampled collected near front entrance, near roadway Sunny, moderate breeze and mostly dry except for some melting ice Heavy road traffic within 20ft of sample location

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 80% of 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 temperatures measured during the February 23, 2021 assessment is summarized in Table 2. As indicated by the data in the table, temperatures in the school averaged between 60°F and 68°F, which all locations except Classroom 202 were less than the ASHRAE winter personal comfort range. With the school being unoccupied, it is not uncommon for the heat to be turned down to save on electricity.

Table 2: Temperature

Sample Location	2/23/2021 °F			ASHRAE Standard °F
	Min	Max	Average	
Outdoors	51	52	52	N/A
Indoors				
Main Office	66	67	67	68-75°F
Cafeteria	66	66	66	68-75°F
Fitness Center	60	60	60	68-75°F
Media Center	63	64	64	68-75°F
Classroom 115	62	62	62	68-75°F
Classroom 213	64	64	64	68-75°F

Sample Location	2/23/2021 °F			ASHRAE Standard °F
	Min	Max	Average	
Classroom 202	68	68	68	68-75°F

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 less than 30% may result in drying of occupants' mucous membranes and skin. Relative humidity measurements are summarized in Table 3. As indicated by the data in the table, the average relative humidity ranged between 28% and 35% with all tested locations measuring less than the ASHRAE maximum recommendation of 65% relative humidity and two locations less than 30% relative humidity.

Table 3: Relative Humidity

Sample Location	2/23/2021 (% RH)			ASHRAE Standard (% RH)
	Min	Max	Average	
Outdoors	38	41	40	N/A
Indoors				
Main Office	29	29	29	< 65
Cafeteria	28	28	28	< 65
Fitness Center	30	33	32	< 65
Media Center	31	32	32	< 65
Classroom 115	30	30	30	< 65
Classroom 213	32	33	33	< 65
Classroom 202	34	35	35	< 65

4.3 Carbon Dioxide

Carbon dioxide concentrations 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 can maintain indoor carbon dioxide concentrations less than 700 parts per million (ppm) greater than the outdoor air concentration. Typically, outdoor carbon dioxide concentrations range from 300 ppm to 450 ppm, with the higher range typically found in urban areas during peak rush hour.

Carbon dioxide concentrations are summarized in Table 4. On the day of the assessment, the average outdoor carbon dioxide concentration was 398 ppm, which calculates to a maximum indoor concentration of 1,098 ppm (700 + 398). All tested locations indoors were less than the recommended maximum for the day of the assessment.

Table 4: Carbon Dioxide

Sample Location	2/23/2021 Concentration (parts per million)			ASHRAE Standard (ppm) NTE
	Min	Max	Average	
Outdoors	380	415	398	N/A
Indoors				
Main Office	465	486	471	< 1,098
Cafeteria	443	445	444	< 1,098
Fitness Center	414	415	415	< 1,098
Media Center	448	452	450	< 1,098
Classroom 115	433	446	440	< 1,098
Classroom 213	438	450	444	< 1,098
Classroom 202	452	454	453	< 1,098

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 over an eight-hour time-weighted average. ATI measured carbon monoxide concentrations using a TSI Q-Trak model number 7575-X with an attached IAQ probe (model number 982). The instrument's carbon monoxide sensor has an error range of $\pm 3\%$ of the reading or three (3) ppm, whichever is greater. As indicated by the data in Table 5, carbon monoxide concentrations were less than the Q-Trak's detection limit throughout the school. The carbon monoxide concentration in Classroom 202 did spike up to 25 ppm when the IAQ meter was first powered on, however, it slowly dropped to 2 ppm by the end of the sampling period. The spike was likely a sensor error and no obvious carbon monoxide sources were observed during sampling.

Table 5: Carbon Monoxide

Sample Location	2/23/2021 Concentration (parts per million)			ASHRAE Standard (ppm)
	Min	Max	Average	
Outdoors	<3	<3	<3	N/A
Inside				
Main Office	<3	<3	<3	< 9
Cafeteria	<3	<3	<3	< 9
Fitness Center	<3	<3	<3	< 9
Media Center	<3	<3	<3	< 9
Classroom 115	<3	<3	<3	< 9
Classroom 213	<3	<3	<3	< 9
Classroom 202	<3	<3	<3	< 9

5 Total Fungal Air Sampling Results

Mold is carried indoors through building entrances, open windows, loading docks, foot traffic into buildings, and the HVAC system. To thrive indoors, mold requires a food source, proper temperature and humidity to foster its growth.

The February 23, 2021 mold assessment 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 results suggest the indoor concentrations were generally favorable compared to the outdoor concentrations. The total ambient, outdoor spore concentration was 1,701 spores/m³, and all tested spaces had total spore concentrations less than the ambient total. The Media Center had the greatest concentrations of *Aspergillus/Penicillium*-like spores with 432 spores/m³, which is not an unusual concentration for an indoor occupied space and does not suggest space has active mold growth due to chronic water intrusion. There was some water-stained ceiling tiles in the Media Center which should be replaced after ensuring the sprinkler head is not leaking. The bubbling plaster should be inspected to ensure the crumbling plaster and paint is not due to outdoor water intrusion.

All other tested spaces had spores concentration ratios similar to the outdoor ambient sample and contained mostly mold spores that are associated with outdoor origin.

The official laboratory report with spore trap samples collected on February 23, 2021, is presented in Appendix A.

6 Summary of Findings

1. Only one of the tested spaces had a temperature within the ASHRAE recommended winter range of 68-75°F, and all other indoor tested spaces were less than the ASHRAE recommended temperature range. This is not unusual for an unoccupied building to keep electricity costs down during the pandemic.
2. The relative humidity in all tested spaces was less than the ASHRAE guidelines of <65%, but two spaces had humidity <30%, which can cause occupant discomfort.
3. Carbon dioxide concentrations in all tested spaces were less than the ASHRAE limit for carbon dioxide, which was 1,098 parts per million (PPM) for the day of the assessment.
4. Carbon monoxide concentrations were less than the IAQ meter's detection limit throughout the tested spaces.
5. The spore trap sampling results suggest that significant indoor amplification of mold was not present. While concentrations of *Aspergillus/Penicillium* were detected in some of the tested locations exceeded the ambient sample, the observed concentrations of these spores indoors do not suggest noteworthy amplification.
6. There were some ceiling tiles around a sprinkler head in the Media Center that had significant water stains and should be replaced after the sprinkler head is inspected to ensure it is not leaking.

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

Best,
ATI, INC.

Reviewed by:



Nate Burgei, CIH, CSP
Certified Industrial Hygienist



Courtney E. McCall
Project Manager

Appendix A: Laboratory Report and Chain of Custody

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody: 324878
Client: ATI, Inc.
Address: 9220 Rumsey Road
 Suite 100
 Columbia, MD 21045
Attention: Nate Burgei

Job Name: International HS at Langley Park
Job Location: Not Provided
Job Number: Not Provided
P.O. Number: Not Provided

Date Submitted: 02/23/2021
Person Submitting: Nate Burgei
Date Analyzed: 02/23/2021
Report Date: 02/23/2021

Spore Comparison Guide

The criteria for these specifications are outlined, but not limited to those listed, below. Final specifications may differ from the listed criteria for certain samples. AMA Analytical Services, Inc. reserves the right to make changes to these criteria at any time without notice.



Stachybotrys / Memnoniella, and Chaetomium	Other Spores* (Control Present)	Other Spores* (No Control)
1-4 Spores: Yellow 5-9 Spores: Orange 10+ Spores: Red	< 10 Spores: Insignificant (no color) <= Control's spore count: Green Between Control and 2x Control: Yellow Between 2x Control and 3x Control: Orange 3x+ Control: Red	< 10 Spores: Insignificant (no color) 10-20 Spores: Yellow 20-50 Spores: Orange 50+ Spores: Red

*No evaluation is provided for the following spore types: Other, Other Colorless, and Unknown Fungi, and Misc

Interpretation of the data contained in this report is the sole responsibility of the client or the persons who conducted the field work. There are no federal or national standards for the number of fungal spores that may be present in the indoor environment. As a general rule and guideline that is widely accepted in the indoor air quality field, the numbers and types of spores that are present in the indoor environment should be comparable to those that are present outdoors at any given time. There will always be some mold spores present in "Normal" indoor environments. The purpose of sampling and counting spores is to help determine whether an abnormal condition exists within the indoor environment and if it does, to help pinpoint the area of contamination. Spore counts should not be used as the sole determining factor of mold contamination. There are many factors that can cause anomalies in the comparison of indoor and outdoor samples due to the dynamic nature of both of those environments.

This report is provided for informational and comparative purposes only and should not be relied upon for any other purpose. Sampling techniques, possible contaminants, unrepresentative samples and other similar or dissimilar factors may affect these results. With the statistical evaluation provided, as with all statistical comparisons and analyses, false-positive and false-negative results can and do occur. AMA Analytical Services, Inc. hereby disclaims any liability for any and all direct, indirect, punitive, incidental, special or consequential damages arising out of the use or interpretation of the data contained in, or any actions taken or omitted in reliance upon, this report.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody: 324878
Client: ATI, Inc.
Address: 9220 Rumsey Road
Suite 100
Columbia, MD 21045
Attention: Nate Burgei

Job Name: International HS at Langley Park
Job Location: Not Provided
Job Number: Not Provided
P.O. Number: Not Provided

Date Submitted: 02/23/2021
Person Submitting: Nate Burgei
Date Analyzed: 02/23/2021
Report Date: 02/23/2021

General Comments, Disclaimers, and Footnotes

Analytical Method: Sample are analyzed following the instructions and guidelines outlined in ASTM 7391-09.

Sample Condition: Acceptable: The sample was collected and delivered to the our location without disturbing the material on the sampling media.
Unacceptable: 1. The sample trace (TR) has been disturbed. 2. The sample was damaged or otherwise unsuitable for analysis.
0 = No particulate matter detected; 1 = >nd-~5% Particulate Loading; 2 = ~5%-25% Particulate Loading; 3 = ~25%- 75% Particulate Loading; 4 = ~75%-90% Particulate Loading; 5 = >90% Particulate Loading

Spore Notes: Based on their small size and very few distinguishing characteristics, Aspergillus and Penicillium cannot be differentiated by non-viable sampling methods. There are other types of spores whose morphology is similar to Aspergillus and Penicillium and cannot be differentiated by non-viable sampling methods. Examples of these similar spores are Acremonium, Paecilomyces, Wallemia, Trichoderma, Scopulariopsis, and Gliocladium.
Smuts, Periconia and Myxomycetes are three different types of genera that have similar morphological characteristics.
Bipolaris/Dreschlera/Helm: Bipolaris / Dreschlera / Helminthosporium are three different types of genera that have smiliar morphological characteristics.
Other Colorless represents all colorless spores that are non-distinctive and unidentifiable.
*Hyphal Fragments: A portion of the mycelium that becomes separated from the remainder of the thallus (vegetative body), each of which has the capacity to grow and form new individuals.
Results for hyphal fragments are in fragments/m3 and are not incorporated in the total spore concentration.
The droplet symbol (💧) refers to water-intrusion indicator spores. These fungal spores, when found on indoor air samples, can be an indication of moisture sources and resultant fungal growth that may be problematic.

Quantification: Analytical Sensitivity (A.S.): This is dependent on the volume of air collected, size of the trace, ocular diameter, and the amount of the trace that was analyzed.
The value of "Present" indicated in the Raw Count column represents the presence of this spore type during the preliminary exam at 400x. The Raw Count converts to a whole number if the spore type is encountered again during the 600x-1,000x enumeration. The sp/m3 concentration will be reported as less than the analytical sensitivity if "Present" is reported in the Raw Count.
Results are reported to 3 significant figures. sp/m3: Spores per cubic meter.
Uncertainty: for raw count in the range of 0-50 the SR is 0.375, 51-100 SR=0.333, 101-200 SR=0.257, >200 SR=0.245
All results are to be considered preliminary and subject to change unless signed by the Technical Director or Deputy.
Analyst(s): Tristan Ward



Technical Director Tristan Ward

This report applies only to the sample, or samples, investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these Laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from us. Sample types, locations, and collection protocols are based upon the information provided by the persons submitting them and, unless collected by personnel of these Laboratories, we expressly disclaim any knowledge and liability for the accuracy and completeness of this information. Residual sample material will be discarded in accordance with the appropriate regulatory guidelines, unless otherwise requested by the client.

MOLD SPORE DESCRIPTIONS

Ascospores

Ascospores are spores formed inside an ascus (asci-plural) or sac-like cell which is contained inside a fruiting body called an ascocarp or an ascoma (ascomata-plural). An ascus typically contains a definite number of ascospores, usually eight. Ascospores are unique in shape, size, and color as to the Genus/species they represent. These spores are specific to fungi classified as Ascomycetes. They are ubiquitous in nature. Many decay organic matter, others are plant or animal pathogens. They can grow indoors on damp materials. Release of ascospores are released by forcible ejection and dispersed by wind, water, animals and other agents. Health Effects: Depending on the Genera, Ascospores may be allergenic.

Basidiospores

Basidiospores are reproductive spores produced by a group of fungi called basidiomycetes. This group includes the mushrooms, shelf fungi and various other macrofungi. Basidiospores serve as the main air (wind) dispersal units for the fungi and their release is dependent upon moisture. The structure of the spore complex can develop in various manners resulting in different appearances. It is often found growing in soil, decaying plant debris, compost piles and fruit rot. Indoors, it can be found on water damaged building materials (chipboard /OSB, plywood, wallpaper, and glue) as well as on food items (dried foods, cheeses, fruits, herbs, spices, cereals). Health effects: Some basidiospores may produce toxins and can act as allergens. They have not been reported to be pathogens.

Cladosporium

Cladosporium is the most common indoor and outdoor mold. The spores are wind dispersed and are often extremely abundant in outdoor air. Many species are commonly found on living and dead plant material. Indoors, they may grow on surfaces with high moisture or high humidity levels such as damp window sills, poorly ventilated bathrooms and soiled refrigerators. It produces powdery or velvety olive-green to brown or black colonies. The conidia (spores) vary depending on the species and are formed in simple or branching chains with multi-attachment points. Health Effects: Cladosporium species are rarely pathogenic to humans, but have been reported to occasionally cause sinusitis and pulmonary infections as well as infections of the skin and toenails. The airborne spores are significant allergens, and in large amounts they may severely affect asthmatics and people with respiratory diseases.

Epicoccum

Epicoccum is a cosmopolitan fungus that is often found growing outside in soil, plant litter, decaying plants, and damaged plant tissue. Indoors, it can be found growing on a variety of building materials including paper and textiles. Colonies have a rapid growth rate with cottony texture, initially yellow or orange becoming brown to black in color. Conidiophores or fruiting bodies produce dense masses where conidia (spores) arise. Spores are round to pear-shaped, smooth to warty, brown to black in color and muriform (partitioned in both directions, like a soccer ball). Health Effects: This mold can act as a potential allergen. Some people may experience hay fever and or asthma. This mold has not been linked to any human or animal infection.

Hyphal Fragments

Hyphal Fragments are segments or pieces of hyphae or mycelium that may have broken off during sampling (air, tape, dust). The mycelium is the entire mass of hyphae that makes up the vegetative body of a fungus. The presence of hyphal fragments may indicate the presence of viable mold.

Other Colorless

- "Other Colorless" are all non-distinctive, unidentifiable, colorless spores seen on spore trap samples and include all the genera that do not have distinguishing morphology to belong to any of the other defined categories."

Penicillium/Aspergillus Like

Penicillium and Aspergillus are ubiquitous, filamentous fungi that are found in soil, decaying plant debris, compost piles, and in the air. Indoors, spores are commonly found in house dust, in water-damaged buildings (wallpaper, wallpaper glue, decaying fabrics, moist chipboards, and behind paint) as well as fruit and grains. They are the most common fungal genera, worldwide. Both produce chains of spores that are small, round to oval, colorless or slightly pigmented, and smooth to rough walled. These spores are indistinguishable between the two as well as other genera, such as Gliocladium, Trichoderma, Paecilomyces, and Scopulariopsis. They differ as to their conidiophores or fruiting bodies. While, Aspergillus spores are produced from phialides supported on conidia heads or swollen vesicles, Penicillium spores are produced on finger-like projections. Depending on species, typical colonies of Aspergillus are initially white and later turn to either shades of green, yellow, orange, brown or black. Texture is usually velvety to cottony. Typical colonies of Penicillium, other than Penicillium marneffeii (yeast-like at 37oC), grow rapidly, white in color at first, later becoming bluish green with white borders with velvety to powdery textures depending on species. Some species produce radial patterns. Health Effects: Both Aspergillus and Penicillium are potential allergens. Several species of Aspergillus (*A. flavus* and *A. parasiticus*) produce aflatoxins or naturally occurring mycotoxins that are toxic and carcinogenic. These are found in contaminated foodstuff and are hazardous to consumers. Penicillium has only one known species that is pathogenic to humans (*P. marneffeii*) that causes lethal systemic infection (Penicilliosis) in immunocompromised individuals.

Smuts/Periconia/Myxomycetes

Smuts, Periconia, and Myxomycetes spores are grouped together due to their similar round, brown morphology. Smuts are outdoor parasitic plant pathogens. They rarely grow indoors but may grow on host plants if appropriate conditions are present. They are parasitic plant pathogens. They can be found on cereal crops, grasses, flowering plants, weed, and other fungi. They can cause allergies. Periconia are found in soils, dead herbaceous stems and leaf spots, and grasses. They have wind dispersed dry spores. Their spores are abundant in the air but it is not known if they are allergenic. Myxomycetes are found on decaying logs, stumps and dead leaves. They have wind-dispersed dry spores and wet motile (amoebic phase) spores. During favorable conditions they move about like amoebae. They form dry airborne spores when conditions are unfavorable. They are rarely found indoors. Health Effects: They may cause Type 1 allergies (hay fever, asthma). No human infections have been reported.



AMA Analytical Services, Inc.

Focused on Results www.amalab.com
AIHA-LAP (#100470) NVLAP (#101143-0) NY ELAP (10920)
4475 Forbes Blvd. • Lanham, MD 20706
(301) 459-2640 • (800) 346-0961 • Fax (301) 459-2643

(Please Refer To This Number For Inquires) 324878

CHAIN OF CUSTODY

Mailing/Billing Information:

- Client Name: ATI Inc
- Address 1: 4221 Forbes Blvd STE 250
- Address 2: Lanham, MD
- Address 3: _____
- Phone #: 614 286 5919 Fax #: _____

Submittal Information:

- Job Name: International HS at Langley Park
- Job Location: _____
- Job #: N/A P.O. #: _____
- Contact Person: Nate Burgei Cell: 614-286-5919
- Collected by: Nate Burgei Cell: _____

Reporting Info (Results provided as soon as technically feasible). If no TAT/Reporting Info is provided, AMA will assign defaults of 5-Day and email to contacts on file.

AFTER HOURS (must be pre-scheduled) <input type="checkbox"/> 4 Hours <input type="checkbox"/> Late/Night <input type="checkbox"/> Immediate Date Due: _____ <input type="checkbox"/> 24 Hours Time Due: _____ Comments: _____		NORMAL BUSINESS HOURS <input type="checkbox"/> 4 Hours <input type="checkbox"/> 3 Day <input type="checkbox"/> Same Day <input type="checkbox"/> 5 Day + <u>2/24/21</u> <input checked="" type="checkbox"/> Next Day Date Due: _____ <input type="checkbox"/> 2 Day		REPORT TO: <input type="checkbox"/> Email: <u>nate.burgei@atinc.com</u> <input type="checkbox"/> Email 2: <u>Courtney@atinc.com</u> <input type="checkbox"/> Verbals: _____	
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Asbestos Analysis

*PCM Air - Please Indicate Filter Type: _____

- NIOSH 7400 (QTY)
- Fiberglass (QTY)

TEM Air* - Please Indicate Filter Type: _____

- AHERA (QTY)
- NIOSH 7402 (QTY)
- Other (specify _____) (QTY)

PLM Bulk

- EPA 600 - Visual Estimate (QTY) Pos Stop
- EPA Point Count (QTY)
- NY State Friable 198.1 (QTY)
- Grav. Reduction ELAP 198.6 (QTY)
- Other (specify _____) (QTY)

MISC

- Asbestos Soil ASTM D7521 PLM (Qual) PLM (Quan) PLM/TEM (Qual) PLM/TEM (Quan)

*It is recommended that blank samples be submitted with all air and surface samples

TEM Bulk

- ELAP 198.4/Chatfield (QTY)
- NY State PLM/TEM (QTY)
- Residual Ash (QTY)
- Vermiculite (QTY)

TEM Dust*

- Qual. (pres/abs) Vacuum/Dust (QTY)
- Quan. (s/area) Vacuum D5755-95 (QTY)
- Quan. (s/area) Dust D6480-99 (QTY)

TEM Water

- Qual. (pres/abs) (QTY)
- ELAP 198.2/EPA 100.2 (QTY)
- EPA 100.1 (QTY)

All samples received in good condition unless otherwise noted.
Lab use only (TEM Water samples _____ °C)

If field data sheets are submitted, there is no need to complete bottom section.

Metals Analysis

- Pb Paint Chip % by Weight _____ (QTY) mg/cm² _____ (QTY)
- *Pb Dust Wipe (wipe type _____) _____ (QTY)
- *Pb Air _____ (QTY)
- Pb Soil/Solid _____ (QTY)
- Pb TCLP _____ (QTY)
- Drinking Water Pb _____ (QTY) Cu _____ (QTY)
- Waste Water Pb _____ (QTY) Cu _____ (QTY)
- Pb Furnace (Media _____) _____ (QTY)

Fungal Analysis

- Collection Apparatus for Spore Traps/Air Samples: Beck Bioaire
- Collection Media: MR-O-CELL
- *Spore-Trap 9 (QTY) Surface Vacuum Dust _____ (QTY)
- *Surface Swab _____ (QTY)
- *Surface Tape _____ (QTY)
- Other (Specify _____) _____ (QTY)

CLIENT ID #	SAMPLE INFORMATION SAMPLE LOCATION/ ID	DATE/ TIME	VOL (L)/ Wipe Area	ANALYSIS							MATRIX					COMMENTS / SPECIAL INSTRUCTIONS	
				TEM	PCM	PLM	LEAD	MOLD	AIR	BULK	DUST	WATER AND OTHER	SPORE TRAP	TAPE	SWAB		
31638791	MAIN OFFICE	2/23 9:08	150L														
31561327	Cafeteria	2/23 9:20	150L														
31561395	FITNESS CENTER	2/23 9:33	150L														
31561353	MEDIA CENTER	2/23 9:46	150L														
31561366	Classroom 115	2/23 9:50	150L														
31561386	Classroom 213	2/23 10:10	150L														
31561543	Classroom 202	2/23 10:25	150L														
31570074	OUTDOORS	2/23 10:36	150L														
	Blank	2/23 10:30	0L														

Relinquished by: <u>Nate Burgei</u>	Print Name		Signature	Date: <u>2/23/21</u>	Date	Time: <u>11:00AM</u>	Time	<input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> USPS	<input checked="" type="checkbox"/> In-Person <input type="checkbox"/> Drop Box <input type="checkbox"/> Courier	<input type="checkbox"/> Other
Received by:				Date: <u>2/23/21</u>		Time: <u>1110</u>				

Appendix B: Instrument Calibration Records

Certificate of Calibration

(✓) Buck™ BioAire Pump Calibration Rotameter

() Buck™ BioSlide Pump Calibration Rotameter

Serial number: R15046

Date Calibrated: 11/12/2020

Calibration Due Date: 11/12/2021

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 $\pm 5\%$ of the actual flow rate.

AMBIENT CONDITIONS: Temperature $74 \pm 3^{\circ}$ F Relative Humidity $50 \pm 10\%$

Description	MFR.	Model	Serial #
Primary Calibrator	A.P. Buck Inc.	M30B	<input type="checkbox"/> A40020 <input checked="" type="checkbox"/> A40021

QA Approval By: *Moreni Munk*

Information contained in this document should not be reproduced in any form without the written consent of A.P. Buck, Inc. It is for reference only and cannot be used as a form of endorsement by any private or governmental regulatory body.

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





CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

ENVIRONMENT CONDITIONS			MODEL	7575-X
TEMPERATURE	70.72 (21.5)	°F (°C)	SERIAL NUMBER	7575X1711006
RELATIVE HUMIDITY	39.0	%RH		
BAROMETRIC PRESSURE	29.15 (987.1)	inHg (hPa)		

<input checked="" type="checkbox"/> AS LEFT	<input checked="" type="checkbox"/> IN TOLERANCE
<input type="checkbox"/> AS FOUND	<input type="checkbox"/> OUT OF TOLERANCE

- CALIBRATION VERIFICATION RESULTS -

THERMO COUPLE				SYSTEM PRESSURE01-02			Unit: °F (°C)
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	70.9 (21.6)	70.8 (21.6)	68.9-72.9 (20.5-22.7)				

BAROMETRIC PRESSURE				SYSTEM PRESSURE01-02			Unit: inHg (hPa)
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	29.22 (989.5)	29.23 (989.8)	28.64-29.80 (969.9-1009.1)				

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system is registered to ISO-9001:2015.

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E004626	02-14-20	02-28-21	Pressure	E005254	10-10-19	10-31-20
Pressure	E003982	01-24-20	07-31-20	DC Voltage	E003493	08-14-19	08-31-20

Chao Yang

June 15, 2020

CALIBRATED

DATE

Doc ID: CERT_GEN_WCC



CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

ENVIRONMENT CONDITIONS			MODEL	982
TEMPERATURE	74.0 (23.3)	°F (°C)	SERIAL NUMBER	P17100007
RELATIVE HUMIDITY	34	%RH		
BAROMETRIC PRESSURE	29.20 (988.8)	inHg (hPa)		

AS LEFT IN TOLERANCE
 AS FOUND OUT OF TOLERANCE

- CALIBRATION VERIFICATION RESULTS -

GAS CO ₂ AS FOUND				SYSTEM G-101			Unit: ppm
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	0	0	0~50	4	3015.3	* 2902.7	2924.9~3105.8
2	499	458	449~549	5	5056	* 4859.6	4904.3~5207.7
3	1002	963	952~1052				

GAS CO AS FOUND				SYSTEM G-101			Unit: ppm
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	35.1	* 29.5	32.1~38.1	2	100.5	* 84.8	97.5~103.5

TEMPERATURE AS FOUND				SYSTEM T-101			Unit: °F (°C)
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	32.1 (0.0)	32.8 (0.4)	31.1~33.1 (-0.5~0.6)	2	140.02 (60.01)	* 141.31 (60.73)	139.02~141.02 (59.45~60.57)

HUMIDITY AS FOUND				SYSTEM H-102			Unit: %RH
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	10.0	10.4	7.0~13.0	4	70.0	67.1	67.0~73.0
2	30.0	29.3	27.0~33.0	5	90.01	* 85.88	87.01~93.01
3	50.0	48.5	47.0~53.0				

*Indicates Out-of-Tolerance Condition

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system is registered to ISO-9001:2015.

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
5000 CO ₂	14A044095	04-06-20	04-06-25	200 CO	149886	04-30-20	03-24-28
N ₂	T-0608	05-19-20	05-19-28	Air	T17939	04-09-20	04-09-28
Flow	E003341	09-03-19	09-30-20	Flow	E003980	04-22-20	04-30-21
Flow	E003525	01-06-20	01-31-21	Flow	E003342	09-03-19	09-30-20
2000 C4H8	EB0054467	08-13-19	08-12-22	100 C4H8	CC507339	03-24-20	03-24-28
Temperature	E010657	02-14-20	02-28-21	Temperature	E010658	02-14-20	02-28-21
Temperature	E010655	01-21-20	01-31-21	Humidity	E003539	02-26-20	08-31-20

Chimera Use
VERIFIED

June 15, 2020

DATE

Doc ID CERT_GEN_WCC



CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
 Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 <http://www.tsi.com>

ENVIRONMENT CONDITIONS			MODEL	982
TEMPERATURE	70.41 (21.3)	°F (°C)	SERIAL NUMBER	P17100007
RELATIVE HUMIDITY	50.3	%RH		
BAROMETRIC PRESSURE	29.15 (987.1)	inHg (hPa)		

<input checked="" type="checkbox"/> AS LEFT	<input checked="" type="checkbox"/> IN TOLERANCE
<input type="checkbox"/> AS FOUND	<input type="checkbox"/> OUT OF TOLERANCE

- CALIBRATION VERIFICATION RESULTS -

TEMPERATURE VERIFICATION				SYSTEM T-101				Unit: °F (°C)
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE	
1	22.1 (9.0)	31.9 (-0.1)	31.1-33.1 (-0.5-0.6)	2	140.0 (60.0)	140.5 (60.3)	139.0-141.0 (59.5-60.6)	

HUMIDITY VERIFICATION				SYSTEM H-102				Unit: %RH
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE	
1	10.0	9.0	7.8-12.2	4	70.0	69.5	67.8-72.2	
2	30.0	29.1	27.8-32.2	5	90.0	88.7	87.8-92.2	
3	50.0	49.6	47.8-52.2					

CO2 GAS VERIFICATION				SYSTEM G-101				Unit: ppm
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE	
1	0	0	0-50	4	3016	3012	2926-3107	
2	502	502	452-552	5	5056	5032	4904-5208	
3	1005	1019	955-1055					

CO GAS VERIFICATION				SYSTEM G-101				Unit: ppm
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE	
1	35	36	32-38	2	101	100	98-104	

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Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E010657	02-14-20	02-28-21	Temperature	E010658	02-14-20	02-28-21
Temperature	E010655	01-21-20	01-31-21	Humidity	E003539	02-26-20	08-31-20
5000 CO2	14A044095	04-06-20	04-06-25	200 CO	149886	04-30-20	03-24-28
N2	T-0608	05-19-20	05-19-28	Air	117939	04-09-20	04-09-28
Flow	E003341	09-03-19	09-30-20	Flow	E003980	04-22-20	04-30-21
Flow	E003525	01-06-20	01-31-21	Flow	E003342	09-03-19	09-30-20
2000 C4H8	EB0054467	08-13-19	08-12-22	100 C4H8	CC507339	03-24-20	03-24-28

ChaoVang

CALIBRATED

June 16, 2020

DATE

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