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March 1, 2021

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

RE: Indoor Air Quality Assessment, High Point High School
Purchase Order: 734977
ATI Project Number: 20-703

Dear Mr. Baylor:

Prince George's County Public Schools requested that ATI, Inc., conduct a proactive indoor air quality (IAQ) assessment at High Point High School on December 8, 2020 and a follow-up assessment on February 24, 2021. The assessments' key findings are enclosed in the Executive Summary on page three, and the official laboratory reports for total fungal spore trap sampling are 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
High Point High School
3601 Powder Mill Road
Beltsville, Maryland 20705

Prepared for:

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

March 1, 2021

Submitted by:

ATI Job # 20-703

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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
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

Spores/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

ATI conducted a proactive Indoor Air Quality (IAQ) assessment on December 8, 2020, at High Point High School, located at 3601 Powder Mill Road, Beltsville, Maryland, and a follow-up assessment on February 24, 2021 in select rooms that had unusual results in the initial inspection.

The initial assessment on December 8, 2020 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. The Auditorium and Room 308 had unusual fungal spore concentrations during the initial assessment and were selected for a follow-up assessment on February 24, 2021 after actions were taken to reduce the presence of mold and repair any water issues discovered. As part of both assessments, 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 these assessments:

1. Six of the tested spaces had a temperature greater than the ASHRAE recommended winter range of 68-75°F, while one rooms had a temperature less than the ASHRAE recommended range during the initial assessment on December 8. At the reassessment in February, the two retested spaces were within the recommended range.
2. The relative humidity in all tested spaces on December 8, 2020 was less than the ASHRAE guidelines of ≤ 65%, and all except one space had a humidity less than 30%, which can cause occupant discomfort. The Auditorium had a humidity less than both the ASHRAE maximum and less than 30%, while Room 308 was less than the ASHRAE maximum, but greater than 30%. The schools were not fully occupied at the assessments, however.
3. Carbon dioxide concentrations in all tested spaces were less than the ASHRAE limit for carbon dioxide, which was 1,092 parts per million (PPM) for the initial assessment in December and 1,127 ppm for the February reassessment.
4. The average carbon monoxide concentrations in all areas, for both assessments, were less than the EPA and ASHRAE recommended limit of 9 ppm.
5. The spore trap sampling results from the December 8, 2020 assessment suggested some level of indoor amplification of mold was present in the Auditorium and Room 308. ATI recommended reassessing these spaces after cleaning and mold treatment occurred.
6. The February 24, 2021 reassessment showed a reduction in *Cladosporium* ranging from 93-96% in the reassessed rooms. The only recommendations ATI has at this time is to fix the leaking roof over the stage to prevent any future water damage and/or mold issues.

2 Assessment Methods

Sama Wanigasundara, IH of ATI, Inc. conducted the initial visual assessment and air sampling on December 8, 2020. Sampled rooms were randomly selected and accounted for approximately 10% of classrooms or a minimum of five samples. Mr. Wanigasundara documented visual observations at the time he collected the air samples. Nate Burgei, CIH, CSP, conducted a follow-up inspection on February 24, 2021 in the Auditorium and Room 308 after the areas were treated for mold presence. 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 (CO_2), 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 a sample volume of 75 liters during the initial assessment and 150 liters for the follow-up assessment. EMSL Analytical, Inc. of Beltsville, MD analyzed the initial assessment and AMA Analytical Services, Inc. of Lanham, MD analyzed the follow-up assessment 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. Both EMSL and 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 EMSL and AMA laboratory reports are included in Appendix A.

3 Visual Observations

Table 1 lists the areas, conditions, observations, and other pertinent details related to the initial and follow-up IAQ assessments. On both dates of sampling, few occupants were present in the school because of the COVID-19 global pandemic.

Table 1: Visual Observations and Sampling Locations

Sample Location	December 8, 2020 Observations
Parking Lot – Outdoors	• Scattered clouds, mostly clear skies • Light foot and vehicle traffic observed
Main Office	• Three occupants in the area during sampling • No odors, stained ceiling tiles, or visible mold growth observed • Door to corridor OPEN during sampling • Oscillating fan OFF during sampling • Room splits into three adjoining office spaces • One air return in this space • No dust accumulation • Space is approximately 790ft.^{2}
Cafeteria	• No odors, stained ceiling tiles or observed mold growth • Two occupants in area during sampling • Two cafeterias separated by pillars. Samples taken between both sides. • No dust accumulation • Eight air returns in this space • Twenty air diffusers in this space • Space is approximately 10,100 ft.^{2}
Gymnasium	• No odors, stained ceiling tiles, or visible mold growth observed • Four fans that let in outside air are OFF • 12 air diffusers, Two air returns • No visual dust accumulation in this space • All the doors closed, No occupants. • Space is approximately 9,357 ft.^{2}
Auditorium	• No odors, stained ceiling tiles, or visible mold growth observed • Two occupants in the area during sampling • Wall unit ON during sampling • Nine air diffusers, nine air returns • No visual dust accumulation in this space

Sample Location	December 8, 2020 Observations
	• Space is approximately 6500 ft.^{2}
Room 22	• Missing ceiling tile in one corner of room • No occupants in the area during sampling • No dust accumulation in this space • Noticeably warmer in this space • Suspect visible mold growth observed • Two air returns, one air diffuser • Printer about 12 ft. from sampling area • Space is approximately 1,344 ft.^{2}
Room 125	• Janitorial staff reports of moldy odor some months ago, not observed by ATI staff • Two air suppliers, two air returns with trace dust accumulation • Various missing ceiling tiles in storage room • No stained ceiling tiles, observed odor or visible growth • Missing ceiling tile in “dark room” • Space is approximately 828 ft.^{2}
Room 237	• No odors, stained ceiling tiles, or visible mold growth observed • Wall unit fan on during sampling, A/C unit off. • No visual air return or diffusers in this space • Space is approximately 768 ft.^{2} • Stacks of books and boxes on the unit.
Room 308	• No odors, stained ceiling tiles • No visible dust on floor or other furniture surfaces • Suspect visible mold growth observed windows sills, wall and on the frames. • Wall unit OFF during sampling • One air return in this space • Space is approximately 1045 ft.^{2}
Room 324	• No odors, stained ceiling tiles, or visible mold growth observed • Wall unit on during sampling • One air return in this space • Space is approximately 1957 ft.^{2}
Room 200	• No odors, stained ceiling tiles • No visible dust on floor or other furniture surfaces • Wall unit OFF during sampling • Daiken ceiling unit cracked and held together by rope- hazard • Two air return in this space • Space is approximately 720 ft.^{2}

Sample Location	February 24, 2021 Reassessment Observations
Auditorium	• Approximately nine persons on the stage for pictures, and two others set up for registration in the back of the room • Minor debris on the floors, chairs appear clean • Ceiling panels in front left of the stage appear to have possible water damage – surface is peeling

Sample Location	February 24, 2021 Reassessment Observations
	• Ceiling and HVAC ducts otherwise too high and dark to assess • Stage was not assessed to avoid disturbing pictures, but the escort said the stage often leaks during heavy rain and they have buckets stacked up on the side of the stage to collect leaking water • Auditorium entrance doors from parking lot cracked open to allow student to enter
Room 308	• Unoccupied at the time of the assessment • Ceiling tiles appeared clean and stain free • Eight supply ducts and four returns, all appeared clean • The three sinks accessible underneath had no signs of leaks or water damage • One student sink had a steady drip into the sink, with a few others with minor drips into the sink – unable to access under sinks to check for leaks • Mild dust on desks, floors clean, eyewash station clean and dry • The windows appeared mostly clean, with on window pane being cracked • The window along the back of the room, where the desk meets the plastered wall, had signs of bubbling plaster and pain and suspect biological growth
Outdoors	• Sample collected in the visitors parking space area near auditorium entrance • Some foot traffic in the parking lot for students taking pictures • Sunny, mostly dry with some ice still melting, moderate breeze

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 December 8, 2020 initial assessment and reassessment from February 24, 2021 are summarized in Table 2. As indicated by the data in the table, temperatures in the school on December 8, 2020, averaged between 54°F and 95°F, with one tested location measuring less than the ASHRAE recommended winter range, and six tested locations measuring greater than the ASHRAE recommended winter range.

ATI reassessed select rooms that had unusual fungal spore concentrations on February 24, 2021, after remediation actions were completed. ATI also reassessed the temperature in the reassessed rooms. The average temperatures in the reassessed locations were both 71°F, which all rooms were within the ASHRAE recommended range for winter.

Table 2: Temperature

Sample Location	12/8/2020 Initial Assessment °F			ASHRAE Standard °F
	Min	Max	Average	
Outdoors	48	49	49	N/A
Indoors				
Main Office	76	76	76	68°F - 75°F
Cafeteria	77	79	78	68°F - 75°F
Gymnasium	68	68	68	68°F - 75°F
Auditorium	54	54	54	68°F - 75°F
Room 22	86	87	87	68°F - 75°F
Room 125	94	96	95	68°F - 75°F
Room 200	70	70	70	68°F - 75°F
Room 216	70	70	70	68°F - 75°F
Room 237	76	76	76	68°F - 75°F
Room 308	72	72	72	68°F - 75°F
Room 324	78	80	79	68°F - 75°F
2/24/2021 Reassessment Temperature in °F				
Outdoors	54	55	55	N/A
Indoors				
Auditorium	70	71	71	68°F - 75°F
Room 308	70	71	71	68°F - 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 for December 8, 2020 and February 24, 2021 are summarized in Table 3. As indicated by the data in the table, the average relative humidity on December 8, 2020 ranged between 10% and 32% with all of the tested locations measuring both less than the ASHRAE maximum recommendation of 65% relative humidity, and all tested locations except for one were less than 30% relative humidity.

ATI reassessed select rooms that had unusual fungal spore concentrations on February 24, 2021, after remediation actions were completed. ATI also reassessed the relative humidity in the space on during the reassessment, and the average relative humidity was 27% in the auditorium and 49% in Room 308.

Table 3: Relative Humidity

Sample Location	12/8/2020 Initial Assessment (% RH)			ASHRAE Standard (% RH)
	Min	Max	Average	
Outdoors	24	24	24	N/A
Indoors				
Main Office	15	16	16	≤ 65
Cafeteria	13	13	13	≤ 65

Sample Location	12/8/2020 Initial Assessment (% RH)			ASHRAE Standard (% RH)
	Min	Max	Average	
Gymnasium	21	21	21	≤ 65
Auditorium	32	32	32	≤ 65
Room 22	10	10	10	≤ 65
Room 125	10	11	11	≤ 65
Room 200	16	17	17	≤ 65
Room 216	22	22	22	≤ 65
Room 237	21	21	21	≤ 65
Room 308	17	18	18	≤ 65
Room 324	17	18	18	≤ 65
2/24/2021 Reassessment Relative Humidity (%RH)				
Outdoors	38	40	39	N/A
Indoors				
Auditorium	26	28	27	≤ 65
Room 308	48	49	49	≤ 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 for December 8, 2020 are summarized in Table 4. On the day of the assessment, the average outdoor carbon dioxide concentration was 392 ppm, which calculates to a maximum indoor concentration of 1,092 ppm (700 + 392). All tested locations indoors were less than the recommended maximum for the day of the assessment.

ATI reassessed select rooms that had unusual fungal spore concentrations on February 24, 2021, after remediation actions were completed. The carbon dioxide concentrations measured during the reassessment are included in Table 4. The average outdoor carbon dioxide concentration on February 24, 2021 was 427 ppm, which calculates to a maximum indoor concentration of 1,127 ppm (700 + 427). All tested locations indoors were less than the recommended maximum for the day of the reassessment.

Table 4: Carbon Dioxide

Sample Location	12/8/2020 Initial Assessment Concentration (parts per million)			ASHRAE Standard (ppm) NTE
	Min	Max	Average	
Outdoors	382	401	392	N/A

Sample Location	12/8/2020 Initial Assessment Concentration (parts per million)			ASHRAE Standard (ppm) NTE
	Min	Max	Average	
Indoors				
Main Office	483	515	495	< 1,092
Cafeteria	431	435	433	< 1,092
Gymnasium	388	386	387	< 1,092
Auditorium	351	359	355	< 1,092
Room 22	450	457	454	< 1,092
Room 125	485	492	489	< 1,092
Room 200	398	403	401	< 1,092
Room 216	418	428	420	< 1,092
Room 237	598	670	634	< 1,092
Room 308	395	397	396	< 1,092
Room 324	405	441	425	< 1,092
2/24/2021 Reassessment Concentration (parts per million)				
Outdoors	424	430	427	N/A
Indoors				
Auditorium	520	535	528	< 1,127
Room 308	493	499	496	< 1,127

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 ± 3% of the reading or three (3) ppm, whichever is greater. As indicated by the data in Table 5, carbon monoxide concentrations for December 8, 2020 were less than the Q-Trak's detection limit throughout the school.

ATI reassessed select rooms that had unusual fungal spore concentrations on February 24, 2021, after remediation actions were completed. The carbon monoxide concentrations measured during the reassessment are included in Table 5. The carbon monoxide concentrations from the reassessment were also less than the Q-Trak's limit of detection and less than the EPA/ASHRAE recommended maximum of 9 ppm.

Table 5: Carbon Monoxide

Sample Location	12/8/2020 Initial Assessment Concentration (parts per million)			ASHRAE Standard (ppm)
	Min	Max	Average	
Outdoors	< 3	< 3	< 3	N/A
Indoors				
Main Office	< 3	< 3	< 3	< 9
Cafeteria	< 3	< 3	< 3	< 9
Gymnasium	< 3	< 3	< 3	< 9
Auditorium	< 3	< 3	< 3	< 9

Sample Location	12/8/2020 Initial Assessment Concentration (parts per million)			ASHRAE Standard (ppm)
	Min	Max	Average	
Room 22	< 3	< 3	< 3	< 9
Room 125	< 3	< 3	< 3	< 9
Room 200	< 3	< 3	< 3	< 9
Room 216	< 3	< 3	< 3	< 9
Room 237	< 3	< 3	< 3	< 9
Room 308	< 3	< 3	< 3	< 9
Room 324	< 3	< 3	< 3	< 9
2/24/2021 Reassessment Concentration (parts per million)				
Outdoors	< 3	< 3	< 3	N/A
Indoors				
Auditorium	< 3	< 3	< 3	< 9
Room 308	< 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 December 8, 2020 and February 24, 2021 mold assessments 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 from December 8, 2020 suggested unusual mold spore concentrations in the Auditorium and Room 308. The total ambient, outdoor spore concentration was 150 spores/m^3, which is on the very low-end range for outdoor spore concentrations. The auditorium had the greatest *Cladosporium* concentration of 1,500 spores/m^3, followed by 680 spores/m^3 in Room 308, which was only 40 spores/m^3 in the outdoor comparison sample. While *Aspergillus/Penicillium*-like is one of the more common indoor spore types attributed to mold growth, *Cladosporium*, while common in lower concentrations outdoors, is also considered primary colonizer of indoor building materials after a water intrusion event. *Aspergillus/Penicillium*-like spore concentrations were typical in all tested spaces. All other tested spaces had indoor spore concentrations typical of occupied spaces and not of concern. ATI recommended evaluating the Auditorium and Room 308 and the surrounding areas to try and identify water sources, abate any mold issues and clean the area before retesting the space.

The Auditorium and Room 308 were reassessed on February 24, 2021 after the initial assessment indicated the unusual presence of airborne mold spores. A decrease in *Cladosporium* spore concentrations ranging from 93% to 96% occurred in these two spaces, respectively. The total spore concentration in the Auditorium was greater than 1,000 spores/m3 on February 24, but the spore types and ratios were very similar to the outdoor control sample. This is to expected since the entrance doors to the parking lot in the Auditorium was open. A single spore of *Stachybotrys/Memnoniella* was observed on the Auditorium sample, which is a mold type associated with chronic water issues, however the concentration was only 27 spores/m^3, and does

not suggest significant mold growth. This low concentration may be either from a trivial amount of mold growth somewhere in the auditorium or residual spores from a past issue. While the school escort on February 24th stated the roof above the stage leaks from time to time, which should be addressed, ATI, Inc., has no other recommendations at this time.

Table 6: *Cladosporium* Concentration Comparison

Sample Location	December 8, 2020 Concentrations	February 24, 2021 Concentrations	% Change
Auditorium	1,500	108	- 93%
Room 308	668	< 27	- 96%

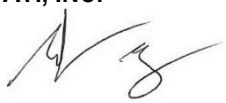
The official laboratory reports with spore trap samples collected on December 8, 2020 and February 24, 2021, are presented in Appendix A.

6 Summary of Findings

1. Six of the tested spaces had a temperature greater than the ASHRAE recommended winter range of 68-75°F, while one rooms had a temperature less than the ASHRAE recommended range during the initial assessment on December 8. At the reassessment in February, the two retested spaces were within the recommended range.
2. The relative humidity in all tested spaces on December 8, 2020 was less than the ASHRAE guidelines of ≤ 65%, and all except one space had a humidity less than 30%, which can cause occupant discomfort. The Auditorium had a humidity less than both the ASHRAE maximum and less than 30%, while Room 308 was less than the ASHRAE maximum, but greater than 30%. The schools were not fully occupied at the assessments, however.
3. Carbon dioxide concentrations in all tested spaces were less than the ASHRAE limit for carbon dioxide, which was 1,092 parts per million (PPM) for the initial assessment in December and 1,127 ppm for the February reassessment.
4. The average carbon monoxide concentrations in all areas, for both assessments, were less than the EPA and ASHRAE recommended limit of 9 ppm.
5. The spore trap sampling results from the December 8, 2020 assessment suggested some level of indoor amplification of mold was present in the Auditorium and Room 308. ATI recommended reassessing these spaces after cleaning and mold treatment occurred.
6. The February 24, 2021 reassessment showed a reduction in *Cladosporium* ranging from 93-96% in the reassessed rooms. The only recommendations ATI has at this time is to fix the leaking roof over the stage to prevent any future water damage and/or mold issues.

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.



Nate Burgei, CIH, CSP
Certified Industrial Hygienist

Appendix A: Laboratory Report and Chain of Custody

EMSL Analytical, Inc.

5221 Militia Hill Road Plymouth Meeting, PA 19462

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

EMSL Order: 182004040
Customer ID: ATII25A
Customer PO:
Project ID:

Attention: Courtney McCall
ATI
4221 Forbes Blvd
Suite 250
Lanham, MD 20706
Project: High Point HS 20-701

Phone: (202) 832-1433
Fax:
Collected Date:
Received Date: 12/10/2020 03:57 PM
Analyzed Date: 12/16/2020

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

Lab Sample Number:	182004040-0001			182004040-0002			182004040-0003		
Client Sample ID:	3146-1937			3146-2002			3146-1931		
Volume (L):	75			75			75		
Sample Location:	Outside Exterior			Auditorium			Main Office		
Spore Types	**Raw Count**	**Count/M³**	**% of Total**	**Raw Count**	**Count/M³**	**% of Total**	**Raw Count**	**Count/M³**	**% of Total**
Alternaria (Ulocladium)	1*	10*	6.7	-	-	-	1*	10*	3.4
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	-	-	-	1	40	2.5	1	40	13.8
Basidiospores	2	80	53.3	-	-	-	1	40	13.8
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	1	40	26.7	35	1500	92.6	4	200	69
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	1*	10*	6.7	1	40	2.5	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	1	40	2.5	-	-	-
Torula-like	1*	10*	6.7	-	-	-	-	-	-
Total Fungi	**6**	**150**	**100**	**38**	**1620**	**100**	**7**	**290**	**100**
Hyphal Fragment	4*	50*	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	1	40	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	2	-	-	2	-
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.

Kevin Ream, Laboratory Manager
or other Approved Signatory

Initial report from: 12/17/2020 10:05 AM

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

EMSL Analytical, Inc.

5221 Militia Hill Road Plymouth Meeting, PA 19462

Tel/Fax: (610) 828-3102 / (610) 828-3122

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

EMSL Order: 182004040
Customer ID: ATII25A
Customer PO:
Project ID:

Attention: Courtney McCall
ATI
4221 Forbes Blvd
Suite 250
Lanham, MD 20706
Project: High Point HS 20-701

Phone: (202) 832-1433
Fax:
Collected Date:
Received Date: 12/10/2020 03:57 PM
Analyzed Date: 12/16/2020

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

Lab Sample Number:	182004040-0004			182004040-0005			182004040-0006		
Client Sample ID:	3146-2205			3146-2015			3146-1924		
Volume (L):	75			75			75		
Sample Location:	Cafeteria Left			Cafeteria Right			Gymnaium		
Spore Types	**Raw Count**	**Count/M³**	**% of Total**	**Raw Count**	**Count/M³**	**% of Total**	**Raw Count**	**Count/M³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	1	40	50	-	-	-	-	-	-
Aspergillus/Penicillium	-	-	-	4	200	41.7	-	-	-
Basidiospores	1	40	50	2	80	16.7	2	80	25
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	-	-	-	4	200	41.7	4	200	62.5
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	1	40	12.5
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	-
Torula-like	-	-	-	-	-	-	-	-	-
Total Fungi	**2**	**80**	**100**	**10**	**480**	**100**	**7**	**320**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	1	40	-
Pollen	-	-	-	1	40	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	1	-
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.

Kevin Ream, Laboratory Manager
or other Approved Signatory

Initial report from: 12/17/2020 10:05 AM

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

EMSL Analytical, Inc.

5221 Militia Hill Road Plymouth Meeting, PA 19462

Tel/Fax: (610) 828-3102 / (610) 828-3122

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

EMSL Order: 182004040
Customer ID: ATII25A
Customer PO:
Project ID:

Attention: Courtney McCall
ATI
4221 Forbes Blvd
Suite 250
Lanham, MD 20706
Project: High Point HS 20-701

Phone: (202) 832-1433
Fax:
Collected Date:
Received Date: 12/10/2020 03:57 PM
Analyzed Date: 12/16/2020

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

Lab Sample Number:	182004040-0007			182004040-0008			182004040-0009		
Client Sample ID:	3146-2195			3146-1939			3146-1935		
Volume (L):	75			75			75		
Sample Location:	Room 125			Room 237			Room 22		
Spore Types	**Raw Count**	**Count/M³**	**% of Total**	**Raw Count**	**Count/M³**	**% of Total**	**Raw Count**	**Count/M³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	-	-	-	-	-	-	7	300	93.8
Basidiospores	1	40	100	4	200	37	-	-	-
Bipolaris++	-	-	-	-	-	-	1*	10*	3.1
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	-	-	-	7	300	55.6	-	-	-
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	1	40	7.4	-	-	-
Pithomyces++	-	-	-	-	-	-	1*	10*	3.1
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	-
Torula-like	-	-	-	-	-	-	-	-	-
Total Fungi	**1**	**40**	**100**	**12**	**540**	**100**	**9**	**320**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	2	-
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.

Kevin Ream, Laboratory Manager
or other Approved Signatory

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

EMSL Order: 182004040
Customer ID: ATII25A
Customer PO:
Project ID:

Attention: Courtney McCall
ATI
4221 Forbes Blvd
Suite 250
Lanham, MD 20706
Project: High Point HS 20-701

Phone: (202) 832-1433
Fax:
Collected Date:
Received Date: 12/10/2020 03:57 PM
Analyzed Date: 12/16/2020

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

Lab Sample Number:	182004040-0010			182004040-0011			182004040-0012		
Client Sample ID:	3146-1980			3146-1926			3146-2014		
Volume (L):	75			75			75		
Sample Location:	Room 216			Room 200			Room 308		
Spore Types	**Raw Count**	**Count/M³**	**% of Total**	**Raw Count**	**Count/M³**	**% of Total**	**Raw Count**	**Count/M³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	-	-	-	-	-	-	6	300	25.2
Basidiospores	-	-	-	1	40	100	4	200	16.8
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	-	-	-	-	-	-	16	680	57.1
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	1*	10*	0.8
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	-
Torula-like	-	-	-	-	-	-	-	-	-
Total Fungi	**-**	**None Detect**	**-**	**1**	**40**	**100**	**27**	**1190**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	2	-
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.

Kevin Ream, Laboratory Manager
or other Approved Signatory

Initial report from: 12/17/2020 10:05 AM

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EMSL Order: 182004040
Customer ID: ATII25A
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Attention: Courtney McCall
ATI
4221 Forbes Blvd
Suite 250
Lanham, MD 20706
Project: High Point HS 20-701

Phone: (202) 832-1433
Fax:
Collected Date:
Received Date: 12/10/2020 03:57 PM
Analyzed Date: 12/16/2020

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

Lab Sample Number:	182004040-0013			182004040-0014		
Client Sample ID:	3146-1943			3106-0513		
Volume (L):	75					
Sample Location:	Room 324			Field Blank		
Spore Types	**Raw Count**	**Count/M³**	**% of Total**	**Raw Count**	**Count/M³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-
Aspergillus/Penicillium	-	-	-	-	-	-
Basidiospores	2	80	88.9	-	-	-
Bipolaris++	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-
Cladosporium	-	-	-	-	-	-
Curvularia	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-
Myxomycetes++	1*	10*	11.1	-	-	-
Pithomyces++	-	-	-	-	-	-
Rust	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-
Torula-like	-	-	-	-	-	-
Total Fungi	**3**	**90**	**100**	**-**	**No Trace**	**-**
Hyphal Fragment	1	40	-	-	-	-
Insect Fragment	-	-	-	-	-	-
Pollen	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	0	-
Analyt. Sensitivity 300x	-	13*	-	-	0*	-
Skin Fragments (1-4)	-	2	-	-	-	-
Fibrous Particulate (1-4)	-	1	-	-	-	-
Background (1-5)	-	1	-	-	-	-

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

Kevin Ream, Laboratory Manager
or other Approved Signatory

Initial report from: 12/17/2020 10:05 AM

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

OrderID: 182004040

Microbiology Chain of Custody

EMSL Order Number (Lab Use Only): 182004040

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

Company: ATI INC	**EMSL-Bill to:** ■ Same ☐ Different If Bill to is Different note instructions in Comments**
Street: 4221 Forbes Blvd Suite 250	*Third Party Billing requires written authorization from third party*
City: Lanham **State/Province:** MD	**Zip/Postal Code:** 20706 **Country:** USA
Report To (Name): Courtney McCall	**Telephone #:** 703-399-5423
Email Address: courtney@atiinc.com, samappriya@atiinc.com	**Fax #:** 202-905-0335 **Purchase Order:**
Project Name/Number: High Point HS. 20-701	**Please Provide Results:** ☐ Fax ■ Email ☐ Fax
U.S. State Samples Taken:	**Connecticut Samples:** ☐ Commercial ☐ Residential

Turnaround Time (TAT) Options* - Please Check

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

Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide. TATs are subject to methodology requirements

Non Culturable Air Samples (Spore Traps) – Test Codes

- **M001** Air-O-Cell
- **M049** BioSIS
- **M030** Micro 5
- **M173** Allegro M2
- **M003** Burkard
- **M174** MoldSnap
- **M004** Allergenco
- **M043** Cyclex
- **M176** Relle Smart
- **M032** Allergenco-D
- **M002** Cyclex-d
- **M130** Via-Cell
- **M172** Versa Trap

Other Microbiology Test Codes

- **M041** Fungal Direct Examination
- **M005** Viable Fungi ID and Count
- **M006** Viable Fungi ID and Count (Speciation)
- **M007** Culturable Fungi
- **M008** Culturable Fungi (Speciation)
- **M009** Gram Stain Culturable Bacteria
- **M010** Bacterial Count and ID – 3 Most Prominent
- **M011** Bacterial Count and ID – 5 Most Prominent
- **M013** Sewage Contamination in Buildings
- **M014** Endotoxin Analysis
- **M015** Heterotrophic Plate Count
- **M180** Real Time Q-PCR-ERMI 36 Panel
- **M018** Total Coliform (Membrane Filtration)
- **M020** Fecal *Streptococcus* (Membrane Filtration)
- **M210-215** *Legionella* Detection
- **M026** Recreational Water Screen
- **M027** Mycotoxin Analysis
- **M029** *Enterococci*
- **M019** Fecal Coliform
- **M133** MRSA Analysis
- **M028** *Cryptococcus neoformans* Detection
- **M120** *Histoplasma capsulatum* Detection
- **M033-39** Allergen Testing
- **M044** Group Allergen (Cat, Dog, Cockroach, Dustmites)
- **Other** See Analytical Price Guide

Preservation Method (Water):

Name of Sampler: Don Samappriya Wanigasundara

Signature of Sampler: DW

Sample #	Sample Location	Sample Type	Test Code	Volume/Area	Date/Time Collected
Example: A1	Kitchen	Air	M001	75L	1/1/12 4:00 PM
3146-1937	Outside Exterior	Air	M001	75L	12/08/20 01:45PM
3146-2002	Auditorum	Air	M001	75L	12/08/20 01:30PM
3146-1931	Main Office	Air	M001	75L	12/08/20 01:10PM
3146-2205	Cafeteria Left	Air	M001	75L	12/08/20 12: 40PM
3146-2015	Cafeteria Right	Air	M001	75L	12/08/20 12:46PM
3146-1924	Gymnassim	Air	M001	75L	12/08/20 01:25PM
3146-2195	Room 125	Air	M001	75L	12/08/20 11:55AM
3146-1939	Room 237	Air	Moo1	75L	12/08/20 11:40AM
3416-1935	Room 22	Air	Moo1	75L	12/08/20 12:15PM

Client Sample # (s): - **Total # of Samples:** 14

Relinquished (Client): DW **Date:** 12/10/20 **Time:**

Received (Client): L. Howarth, Drop Box **Date:** **Time:**

Comments:

RECEIVED
2020 DEC 10 P 3:51
EMSL ANALYTICAL, INC.
BELTSVILLE, MD
PTC

OrderID: 182004040

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*):

182004040

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	Sample Type	Test Code	Volume/Area	Date/Time Collected
3146-1980	Room 216	Air	M001	75L	12/08/20 11:15AM
3146-1926	Room 200	Air	M001	75L	12/08/20 10:45AM
3146-2014	Room 308	Air	M001	75L	12/08/20 10:25AM
3146-1943	Room 324	Air	M001	75L	12/08/20 10:05AM
3106-0513	Field Blank	Air	M001	-	12/08/20

****Comments/Special Instructions:**

Page _____ of _____ pages

182004040

GEN-FM-10-1: Sample Transfer-One Time
Revision 4.2
Revision Date: 1/05/2016
Effective Date: 1/05/2016

EMSL Analytical, Inc.

Sample Transfer Form

Receiving Lab:	EMSL- BELTSVILLE	**Phone Number:**	3019375700
		Fax Number:	3019375701
Relinquished to:	EMSL- Plymouth Mtg.	**Phone Number:**	8002203675
		Fax Number:	8567860262
Does new lab hold equivalent or additional accreditation? *		☒ Yes ☐ No	
EMSL Customer ID # (if known):	ATII25A		
Client Name:	ATI INC		
Client Project:	HIGH POINT HS 20-701		
Tests to be Performed:	MOLD		
Date Received:	12/10/20		
Date Relinquished:	12/14/20		
Date Due:	1 WEEK - DUE 12/17		
Special Instructions: (e.g. Work Order # , required qualifications, project specific procedures/modifications)			

Relinquished by (Signature): L. Bosworth	**Date:** 12/14/20	**Received by (Signature):**	**Date:** 12.15.20
Relinquished by (Signature):	**Date:**	**Received by (Signature):**	**Date:**

Customer Agreement- Please sign form and send to the receiving laboratory. By signing below, you agree to permit the above named receiving lab to transfer samples to a separate EMSL lab with equivalent qualifications* for analysis. The final report will be issued from the analyzing laboratory. Ensure any requirements are listed in special instructions.

Name (please print):	**Signature:**	**Agent of:**	**Date:**

If this is a recurring project or sample type that may require samples to be relinquished on a regular basis, a Standing Agreement form must be completed.

* Receiving and analyzing labs shall be aware of required qualifications of project prior to transfer of samples.

Note: If customer has been notified and approved this transfer verbally or by e-mail, the receiving lab must sign for the customer above. EMSL employee filling out form on behalf of customer shall print name of person to whom they spoke, date agreement was received, and then sign under Signature.

AMA Analytical Services, Inc.
Focused On Results.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody:	324879	**Job Name:**	High Point High School	**Date Submitted:**	02/24/2021
Client:	ATI, Inc.	**Job Location:**	MD	**Person Submitting:**	Nate Burgei
Address:	9220 Rumsey Road Suite 100 Columbia, MD 21045	**Job Number:**	20-701	**Date Analyzed:**	02/25/2021
		P.O. Number:	Not Provided	**Report Date:**	02/25/2021
Attention:	Nate Burgei				

AMA Sample #	324879-1	**AMA Sample #**	324879-2	**AMA Sample #**	324879-3
Client ID	31569807	**Client ID**	31569809	**Client ID**	31569793
Analyst ID	TLW	**Analyst ID**	TLW	**Analyst ID**	TLW
Collection Apparatus	Air-O-Cell	**Collection Apparatus**	Air-O-Cell	**Collection Apparatus**	Air-O-Cell
Sample Volume (L)	150	**Sample Volume (L)**	150	**Sample Volume (L)**	150
Sample Condition	Acceptable	**Sample Condition**	Acceptable	**Sample Condition**	Acceptable
Debris Loading	3	**Debris Loading**	2	**Debris Loading**	3
Location	Auditorium	**Location**	RM 308	**Location**	Outdoors

	Raw Ct	Trav/Flds	A.S.	sp/m³	%
Alternaria					
Ascospores	14	15	27	378	33.3%
Basidiospores	7	15	27	189	16.7%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	4	15	27	108	9.5%
Curvularia					
Penicillium / Aspergillus	11	15	27	297	26.2%
Smuts/Periconia/Myxomycetes	2	15	27	54	4.8%
Stachybotrys/Memnoniella	1	15	27	27	2.4%
Ulocladium					
Unknown					
Epicoccum	1	15	27	27	2.4%
Nigrospora	1	15	27	27	2.4%
Other Colorless	1	15	27	27	2.4%
Hyphal Fragments*					
Total Raw Ct:	42	**Total sp/m³:**	1134		

Comments

	Raw Ct	Trav/Flds	A.S.	sp/m³	%
Alternaria					
Ascospores	2	15	27	54	10.5%
Basidiospores	4	15	27	108	21.1%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	Present	15	27	<27	
Curvularia					
Penicillium / Aspergillus	12	15	27	324	63.2%
Smuts/Periconia/Myxomycetes					
Stachybotrys/Memnoniella					
Ulocladium					
Unknown	1	15	27	27	5.3%
Epicoccum					
Nigrospora					
Other Colorless					
Hyphal Fragments*					
Total Raw Ct:	19	**Total sp/m³:**	513		

Comments

	Raw Ct	Trav/Flds	A.S.	sp/m³	%
Alternaria					
Ascospores	29	15	27	783	38.7%
Basidiospores	29	15	27	783	38.7%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	1	15	27	27	1.3%
Curvularia					
Penicillium / Aspergillus	14	15	27	378	18.7%
Smuts/Periconia/Myxomycetes	2	15	27	54	2.7%
Stachybotrys/Memnoniella					
Ulocladium					
Unknown					
Epicoccum					
Nigrospora					
Other Colorless					
Hyphal Fragments*	1	15	27	27	1.3%
Total Raw Ct:	75	**Total sp/m³:**	2025		

Comments

AMA Analytical Services, Inc.
Focused On Results.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody:	324879	**Job Name:**	High Point High School	**Date Submitted:**	02/24/2021
Client:	ATI, Inc.	**Job Location:**	MD	**Person Submitting:**	Nate Burgei
Address:	9220 Rumsey Road Suite 100 Columbia, MD 21045	**Job Number:**	20-701	**Date Analyzed:**	02/25/2021
		P.O. Number:	Not Provided	**Report Date:**	02/25/2021
Attention:	Nate Burgei				

AMA Sample #	324879-4
Client ID	31569720
Analyst ID	TLW
Collection Apparatus	Air-O-Cell
Sample Volume (L)	0
Sample Condition	Acceptable
Debris Loading	1
Location	Field Blank

	Raw Ct	Trav/Flds	A.S.	sp/m^3	%
Alternaria					
Ascospores					
Basidiospores					
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium					
Curvularia					
Penicillium / Aspergillus					
Smuts/Periconia/Myxomycetes					
Stachybotrys/Memnoniella					
Ulocladium					
Unknown					
Epicoccum					
Nigrospora					
Other Colorless					
Hyphal Fragments*					
Total Raw Ct:	0		**Total sp/m^3:**	0	

Comments

No mold spores observed.

AMA Analytical Services, Inc.
Focused On Results.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody:	324879	**Job Name:**	High Point High School	**Date Submitted:**	02/24/2021
Client:	ATI, Inc.	**Job Location:**	MD	**Person Submitting:**	Nate Burgei
Address:	9220 Rumsey Road Suite 100 Columbia, MD 21045	**Job Number:**	20-701	**Date Analyzed:**	02/25/2021
		P.O. Number:	Not Provided	**Report Date:**	02/25/2021
Attention:	Nate Burgei				

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.

Normal ecology	Slightly above normal ecology	Moderately above normal ecology	Substantially above normal ecology

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 evalutation 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.

AMA Analytical Services, Inc.
Focused On Results.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody:	324879	**Job Name:**	High Point High School	**Date Submitted:**	02/24/2021
Client:	ATI, Inc.	**Job Location:**	MD	**Person Submitting:**	Nate Burgei
Address:	9220 Rumsey Road Suite 100 Columbia, MD 21045	**Job Number:**	20-701	**Date Analyzed:**	02/25/2021
		P.O. Number:	Not Provided	**Report Date:**	02/25/2021
Attention:	Nate Burgei				

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/m3concentration 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

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 nuimber 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. Basidipspores 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 occassionally 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.

Memnoniella

Memnoniella is closely related Stachybotrys and they are often found growing together. Like Stachybotrys, it is a cosmopolitan fungus and commonly found in soil, plant debris as well as plants and trees. It is also cellulolytic or has the capacity to degrade cellulose and found on wet materials containing cellulose as well as other substrates. Unlike Stachybotrys, the spores form chains and not aggregated in slimy heads. Spores are spherical to sub-spherical, gray, dark brown or black in color, and smooth to rough walled. Colonies are black to blackish-green. Health Effects: Some species may produce mycotoxins with similar toxicities as some species of Stachybotrys. These mycotoxins may have the ability to infect humans and animals after ingestion, inhalation or absorption through unbroken skin.

Nigrospora

Nigrospora is a ubiquitous, filamentous, dark colored fungus commonly isolated from soil, decaying plants, and seeds. Indoors, it is considered a laboratory contaminant. Colonies grow rapidly, initially white and woolly, later turning gray with black areas, and eventually turning black (both front and reverse). Its conidia are black, solitary, unicellular, slightly flattened horizontally, and have a thin equatorial germ slit. Health Effects: This mold may be a potential allergen. It is uncertain whether it is pathogenic to humans.

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 marneffei (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 natually 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. marneffei) 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, flowing 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.

Stachybotrys

Stachybotrys is known as black mold or toxic black mold. It is a worldwide, filamentous fungus that is commonly found growing on water damaged materials such as ceiling tiles, insulation, wallpaper, wood, and sheetrock. It is highly cellulolytic (has the capacity to degrade cellulose) and commonly isolated on wet materials containing cellulose, such as wallboard, jute carpet backing along with associated glues, straw baskets, and paper materials. The spores are slimy, ellipsoidal to, sub-spherical in shape, single-celled, gray to black in color, and smooth to rough walled. They usually form in clusters on the phialides. Colonies have a powdery to cottony texture and white in color at first, later turning dark gray to black. Health Effects: Certain species of Stachybotrys produce mycotoxins that may be harmful to human and animal after ingestion. They can cause allergic and asthmatic reactions in sensitive individuals.

Unknown Fungi

“Unknown Fungi” are spores that cannot be identified under direct microscopic analysis. This includes partial spores. This category also includes spores that are hidden or hard to see during microscopic examination due to heavy presence of particulate.

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

CHAIN OF CUSTODY

(Please Refer To This Number For Inquires) 324879

Mailing/Billing Information:
1. Client Name: ATI, Inc
2. Address 1: 4221 Forbes BLVD STE 250
3. Address 2: LANHAM, MD
4. Address 3:
5. Phone #: 614-286-5919 Fax #:

Submittal Information:
1. Job Name: HIGH POINT HS
2. Job Location: MD
3. Job #: 20-701 P.O. #:
4. Contact Person: Nate Burgei Cell: 614-286-5919
5. 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)
☐ 4 Hours ☐ Late Night
☐ Immediate Date Due:
☐ 24 Hours Time Due:
Comments:

NORMAL BUSINESS HOURS
☐ 4 Hours ☐ 3 Day
☐ Same Day ☐ 5 Day +
☒ Next Day Date Due: 2/25/21
☐ 2 Day
☐ Results Required By Noon (Additional fee may apply)

REPORT TO:
☐ Email: nate.burgei@atiinc.com
☐ Email 2: courtney@atiinc.com
☐ Verbals:

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: BUCK BIOAIR
Collection Media AIR-O-CELL
☐ *Spore-Trap 4 (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: TEM	PCM	PLM	LEAD	MOLD	MATRIX: AIR	BULK	DUST	WATER AND OTHER	SPORE TRAP	TAPE	SWAB	COMMENTS / SPECIAL INSTRUCTIONS
31569807	AUDITORIUM	2/24 9:41	150L										X			
31569809	ROOM 308	2/24 9:58	150 L										X			
31569793	OUTDOORS	2/24 10:15	150 L										X			
31569720	Blank	2/24 10:15	OC										X			

	Print Name	Signature	Date	Time
Relinquished by:	Nate Burgei		2/24/21	11:58
Received by:			2/24/21	1210

Shipping Information
☐ UPS ☐ FedEx ☐ USPS ☒ In-Person ☐ Drop Box ☐ Courier ☐ Other

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 ± 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: Moran Menk

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

BUCK

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		
TEMPERATURE	70.72 (21.5)	°F (°C)
RELATIVE HUMIDITY	39.0	%RH
BAROMETRIC PRESSURE	29.15 (987.1)	inHg (hPa)

MODEL	7575-X
SERIAL NUMBER	7575X1711006

☒ AS LEFT ☒ IN TOLERANCE
☐ AS FOUND ☐ 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

ChaoVang
CALIBRATED

June 15, 2020
DATE

DOC ID: CERT_GEN_V02

TSI P/N 2300157

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		
TEMPERATURE	70.68 (21.5)	°F (°C)
RELATIVE HUMIDITY	38.0	%RH
BAROMETRIC PRESSURE	29.16 (987.5)	inHg (hPa)

MODEL	7575-X
SERIAL NUMBER	7575X1711006

☐ AS LEFT ☒ IN TOLERANCE
☒ AS FOUND ☐ OUT OF TOLERANCE

– CALIBRATION VERIFICATION RESULTS –

THERMO COUPLE — SYSTEM PRESSURE01-02 — *Unit: °F (°C)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	70.8 (21.6)	71.1 (21.7)	68.8~72.8 (20.4~22.7)				

BAROMETRIC PRESSURE — SYSTEM PRESSURE01-02 — *Unit: inHg (hPa)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	29.22 (989.5)	29.17 (987.8)	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

ChaoVang
VERIFIED

June 15, 2020
DATE

Doc ID: CERT_GEN_WCC

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
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ENVIRONMENT CONDITIONS		
TEMPERATURE	74.0 (23.3)	°F (°C)
RELATIVE HUMIDITY	34	%RH
BAROMETRIC PRESSURE	29.20 (988.8)	inHg (hPa)

MODEL	982
SERIAL NUMBER	P17100007

☐ AS LEFT ☒ AS FOUND

☐ IN TOLERANCE ☒ 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
5000 CO_2	14A044095	04-06-20	04-06-25
N2	T-0608	05-19-20	05-19-28
Flow	E003341	09-03-19	09-30-20
Flow	E003525	01-06-20	01-31-21
2000 C4H8	EB0054467	08-13-19	08-12-22
Temperature	E010657	02-14-20	02-28-21
Temperture	E010655	01-21-20	01-31-21

Measurement Variable	System ID	Last Cal.	Cal. Due
200 CO	149886	04-30-20	03-24-28
Air	T17939	04-09-20	04-09-28
Flow	E003980	04-22-20	04-30-21
Flow	E003342	09-03-19	09-30-20
100 C4H8	CC507339	03-24-20	03-24-28
Temperature	E010658	02-14-20	02-28-21
Humidity	E003539	02-26-20	08-31-20

Chimouva Vue
VERIFIED

June 15, 2020
DATE

Doc. ID: CERT_GEN_WCC

TSI P/N 2300157

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		
TEMPERATURE	70.41 (21.3)	°F (°C)
RELATIVE HUMIDITY	50.3	%RH
BAROMETRIC PRESSURE	29.15 (987.1)	inHg (hPa)

MODEL	982
SERIAL NUMBER	P17100007

☒ AS LEFT ☐ AS FOUND

☒ IN TOLERANCE ☐ OUT OF TOLERANCE

– CALIBRATION VERIFICATION RESULTS –

TEMPERATURE VERIFICATION — SYSTEM T-101 — *Unit: °F (°C)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	32.1 (0.0)	31.9 (-0.1)	31.1~33.1 (-0.5~0.6)	2	140.0 (60.0)	140.3 (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

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
Temperature	E010657	02-14-20	02-28-21
Temperture	E010655	01-21-20	01-31-21
5000 CO2	14A044095	04-06-20	04-06-25
N2	T-0608	05-19-20	05-19-28
Flow	E003341	09-03-19	09-30-20
Flow	E003525	01-06-20	01-31-21
2000 C4H8	EB0054467	08-13-19	08-12-22

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E010658	02-14-20	02-28-21
Humidity	E003539	02-26-20	08-31-20
200 CO	149886	04-30-20	03-24-28
Air	T17939	04-09-20	04-09-28
Flow	E003980	04-22-20	04-30-21
Flow	E003342	09-03-19	09-30-20
100 C4H8	CC507339	03-24-20	03-24-28

Chao Vang
CALIBRATED

June 16, 2020
DATE

Doc ID: CERT_GEN_WCC

TSI P/N 2300157