ati INC
Architecture | Engineering | Construction

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February 26, 2021

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

RE: Indoor Air Quality Assessment, James Duckworth Special Center
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 James Duckworth Special Center on December 8, 2020 and a follow-up assessment on February 23, 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:

Courtney E. McCall
Project Manager

Nate Burgei, CIH, CSP
Certified Industrial Hygienist

Indoor Air Quality Assessment Report

Prince George's County Public Schools
James Duckworth Special Center
11201 Evans Trail #3903
Beltsville, MD 20705

Prepared for:

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

February 26, 2021

Submitted by:

ATI Job # 20-703

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List of Tables

Appendices

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 James Duckworth Special Center, located at 11201 Evans Trail, in Beltsville, Maryland, and a follow-up assessment on February 23, 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. Rooms 1, 5, and 16 had unusual fungal spore concentrations during the initial assessment and were selected for a follow-up assessment on February 23, 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. Two of the tested spaces had a temperature greater than the ASHRAE recommended winter range of 68-75°F, while two rooms had a temperature less than the ASHRAE recommended range during the initial assessment on December 8. At the reassessment in February, the three retested spaces were greater than the recommended range.
2. The relative humidity in all tested spaces was less than the ASHRAE guidelines of <65%, and also <30%, which can cause occupant discomfort. 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 1,075 parts per million (PPM) for the initial assessment in December and 1,076 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 Rooms 1, 5 and 16. ATI recommended reassessing these spaces after cleaning and mold treatment occurred.
6. The February 23, 2021 reassessment showed a reduction in *Aspergillus/Penicillium* ranging from 93-100% in the reassessed rooms. Because the *Aspergillus/Penicillium* concentration in Room 16 was greater than 1,000 spores/m^3 during the reassessment, ATI recommends an additional round of cleaning in this room using HEPA vacuums on floors and surfaces, as well as wet wiping of horizontal surfaces to remove residual spores in the room.

2 Assessment Methods

Mikal Frater, 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. Ms. Frater documented visual observations at the time she collected the air samples. Sama Wanigasundara conducted a follow-up inspection on February 23, 2021 in Rooms 1, 5, and 16 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 five minutes, for a sample volume of 75 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 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
Outdoors – Parking Lot	• Cloudy skies, winds 5 mph from the east • Light vehicle traffic
Main Office	• Complaints of headache and congestion some months ago (per janitorial staff), subdued after carpet cleaning • Door to corridor open at time of assessment • One plant on desktop, in good condition • Two wall units in this space • Space is approximately 360 ft.^{2} • One occupant at time of assessment
Gymnasium	• Outdoor access via emergency exit • Doubles as cafeteria • One occupant at time of assessment • Light brown ceiling tile stain in back corner by pool corridor • No odor or growth observed
Room 1 "Health Room"	• Outdoor access via emergency exit • No stained ceiling tiles, observed odor or visible growth • Door to corridor open at time of assessment • In adjacent bathroom, lightly stained ceiling tile around diffuser • In adjacent room with infirmary bed, lightly stained ceiling tile around diffuser • One air supplier in the form of a wall unit – on during assessment; one air return • Space is approximately 576 ft.^{2}
Room 5	• One occupant at time of assessment • No observed odor or visible growth • One air supplier in the form of a wall unit – on during assessment, one air return • Wall unit rusted • Outdoor access via emergency exit • Few ceiling tiles cracked and peeling • Stained ceiling tile in connecting room; small stain on ceiling tile above wall unit • Space is approximately 912 ft.^{2}

Sample Location	December 8, 2020 Observations
Room 14 "Media Center"	• One occupant at time of assessment • Outdoor access via emergency exit • Three air suppliers, one air return with trace dust accumulation • No odor or visible growth observed • Stained ceiling tile above door to corridor and around diffusers • Space is approximately 896 ft.^{2}
Room 16	• 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}
Sample Location	**February 23, 2021 Reassessment Observations**
Room 1 Health	• No occupants during sampling • No stained ceiling tiles, observed odor or visible growth • In adjacent bathroom diffuser cleaned. • In adjacent room with infirmary bed, no dust around diffuser • One air supplier in the form of a wall unit – on during assessment; one air return
Room 5	• No occupants at time of sampling. • No observed odor or visible growth • One air supplier in the form of a wall unit – on during assessment, one air return • Wall unit rusted and dust • Discoloration or possible mold observed at window frame caulking. • No stained ceiling tiles in room.
Room 16	• No occupants at time of sampling. • Two air suppliers, two air returns no dust. • No stained ceiling tiles • Observed no odor or visible mold growth.

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 23, 2021 are summarized in Table 2. As indicated by the data in the table, temperatures in the school on December

8, 2020, averaged between 64°F and 80°F, with two tested locations measuring less than the ASHRAE recommended winter range, and two tested locations measuring greater than the ASHRAE recommended winter range.

ATI reassessed select rooms that had unusual fungal spore concentrations on February 23, 2021, after remediation actions were completed. ATI also reassessed the temperature in the reassessed rooms. The average temperatures in the reassessed locations ranged from 76°F to 84°F, which all rooms were greater than the ASHRAE recommended range for winter.

Table 2: Temperature

Sample Location	12/8/2020 Initial Assessment °F			ASHRAE Standard °F
	Min	Max	Average	
Outdoors	45	53	49	N/A
Indoors				
Main Office	64	64	64	68-75°F
Gymnasium	67	67	67	68-75°F
Room 1 "Health Room"	71	71	71	68-75°F
Room 5	76	76	76	68-75°F
Room 14 "Media Center"	74	74	74	68-75°F
Room 16	79	80	80	68-75°F
2/23/2021 Reassessment Temperature in °F				
Outdoors	48	49	49	N/A
Indoors				
Room 1 Health	81	81	81	68-75°F
Room 5	83	84	84	68-75°F
Room 16	76	76	76	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 for December 8, 2020 and February 23, 2021 are summarized in Table 3. As indicated by the data in the table, the average relative humidity on December 8, 2020 ranged between 14% and 23% with all tested locations measuring less than the ASHRAE maximum recommendation of 65% relative humidity, as well as less than 30% relative humidity.

ATI reassessed select rooms that had unusual fungal spore concentrations on February 23, 2021, after remediation actions were completed. ATI also reassessed the relative humidity in the space on during the reassessment, and the average relative humidity ranged between 18% and 20% with all of the tested locations measuring both less than the ASHRAE maximum recommendation of 65% relative humidity and less than 30% relative humidity.

Table 3: Relative Humidity

Sample Location	12/8/2020 Initial Assessment (% RH)			ASHRAE Standard (% RH)
	Min	Max	Average	
Outdoors	13	14	14	N/A
Indoors				
Main Office	18	19	19	< 65
Gymnasium	21	21	21	< 65
Room 1 "Health Room"	16	16	16	< 65
Room 5	15	15	15	< 65
Room 14 "Media Center"	22	23	23	< 65
Room 16	14	14	14	< 65
2/23/2021 Reassessment Relative Humidity (%RH)				
Outdoors	41	42	42	N/A
Indoors				
Room 1 Health	19	20	20	< 65
Room 5	16	17	17	< 65
Room 16	18	18	18	< 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 375 ppm, which calculates to a maximum indoor concentration of 1,075 ppm (700 + 375). 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 23, 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 23, 2021 was 376 ppm, which calculates to a maximum indoor concentration of 1,076 ppm (700 + 376). 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	365	385	375	N/A
Indoors				
Main Office	370	377	374	< 1,075
Gymnasium	370	370	370	< 1,075
Room 1 "Health Room"	376	376	376	< 1,075
Room 5	390	390	390	< 1,075
Room 14 "Media Center"	390	397	394	< 1,075
Room 16	423	426	425	< 1,075
2/23/2021 Reassessment Concentration (parts per million)				
Outdoors	372	378	376	N/A
Indoors				
Room 1 Health	490	494	492	<1,076
Room 5	465	467	466	<1,076
Room 16	454	460	456	<1,076

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 23, 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
Gymnasium	< 3	< 3	< 3	< 9
Room 1 "Health Room"	< 3	< 3	< 3	< 9
Room 5	< 3	< 3	< 3	< 9
Room 14 "Media Center"	< 3	< 3	< 3	< 9
Room 16	< 3	< 3	< 3	< 9

2/23/2021 Reassessment Concentration (parts per million)				
Outdoors	< 3	< 3	< 3	N/A
Indoors				
Room 1 Health	< 3	< 3	< 3	< 9
Room 5	< 3	< 3	< 3	< 9
Room 16	< 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 23, 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 three locations: Rooms 1, 5, and 16. The total ambient, outdoor spore concentration was 832 spores/m^3. Room 16 had the greatest total spore concentration of 20,936 spores/m^3, with *Aspergillus/Penicillium*-like spores being the predominant spores present at 20,520 spores/m^3. Rooms 1 and 5 had total spore concentrations of 5,148 spores/m^3 and 4,732 spores/m^3, respectively, with *Cladosporium* being the predominant spore type in each room. *Aspergillus/Penicillium*-like and *Cladosporium*, while occur in relatively low concentrations outdoors, are often considered primary colonizers indoors after a water intrusion event.

The fungal spore concentrations in these locations were greater than the typical occupied space, around 1,000 spores/m^3 or less, and suggest at least some level of mold amplification indoors, but does not suggest major growth or major water intrusion. ATI recommended evaluating these tested spaces and the surrounding areas to try and identify water sources, abate any mold issues and clean the area before retesting the space.

Rooms 1, 5 and 16 were reassessed on February 23, 2021 after the initial assessment indicated the unusual presence of airborne mold spores. A decrease in *Aspergillus/Penicillium*-like spores concentrations ranging from 93%-100% occurred in these three spaces. Although *Aspergillus/Penicillium*-like spore concentrations were greater than 1,000 spores/m^3 in Room 16 during the reassessment, an additional round of cleaning including HEPA vacuuming on floors and books, and wet wiping horizontal surfaces should be effective in removing residual spores in the room. Differences in concentrations between both dates of assessment are summarized in Table 6.

Table 6: *Aspergillus/Penicillium* Concentration Comparison

Sample Location	December 8, 2020 Concentrations	February 23, 2021 Concentrations	% Change
Room 1 Health Room	4,264	53	-99%
Room 5*	520	None detected	-100%
Room 16	20,520	1,431	-93%

*Room 5 also had over 3,000 spores/m^3 of *Cladosporium* at the initial assessment. At the reassessment, concentrations decreased to 212 spores/m^3 or by 93%.

The official laboratory reports with spore trap samples collected on December 8, 2020 and February 23, 2021, are presented in Appendix A.

6 Summary of Findings

1. Two of the tested spaces had a temperature greater than the ASHRAE recommended winter range of 68-75°F, while two rooms had a temperature less than the ASHRAE recommended range during the initial assessment on December 8. At the reassessment in February, the three retested spaces were greater than the recommended range.
2. The relative humidity in all tested spaces was less than the ASHRAE guidelines of <65%, and also <30%, which can cause occupant discomfort. 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 1,075 parts per million (PPM) for the initial assessment in December and 1,076 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 Rooms 1, 5 and 16. ATI recommended reassessing these spaces after cleaning and mold treatment occurred.
6. The February 23, 2021 reassessment showed a reduction in *Aspergillus/Penicillium* ranging from 93-100% in the reassessed rooms. Because the *Aspergillus/Penicillium* concentration in Room 16 was greater than 1,000 spores/m3 during the reassessment, ATI recommends an additional round of cleaning in this room using HEPA vacuums on floors and surfaces, as well as wet wiping of horizontal surfaces to remove residual spores in the room.

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:

Courtney E. McCall
Project Manager

Nate Burgei, CIH, CSP
Certified Industrial Hygienist

Appendix A: Laboratory Report and Chain of Custody

AMA Analytical Services, Inc.
Focused On Results.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody: 285310
Client: ATI, Inc.
Address: 9220 Rumsey Road
Suite 100
Columbia, MD 21045
Attention: Mikal Frater

Job Name: James Duckworth Special Center
Job Location: 11201 Evans Trail Beltsville, MD 20705
Job Number: 20-703
P.O. Number: Not Provided

Date Submitted: 12/09/2020
Person Submitting: Mikal Frater
Date Analyzed: 12/15/2020
Report Date: 12/15/2020

AMA Sample #	285310-1
Client ID	20-703-1
Analyst ID	MG
Collection Apparatus	Air-O-Cell
Sample Volume (L)	75
Sample Condition	Acceptable
Debris Loading	1
Location	Outdoors - Parking Lot

	Raw Ct	Trav/Flds	A.S.	sp/m^3	%
Alternaria					
Ascospores	2	23	52	104	12.5%
Basidiospores	9	23	52	468	56.3%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	3	23	52	156	18.8%
Curvularia					
Penicillium / Aspergillus	2	23	52	104	12.5%
Smuts/Periconia/Myxomycetes	Present	23	52	<52	
Stachybotrys/Memnoniella					
Ulocladium					
Unknown					
Epicoccum					
Pithomyces					
Hyphal Fragments*					

Total Raw Ct: 16 **Total sp/m^3:** 832

Comments

AMA Sample #	285310-2
Client ID	20-703-2
Analyst ID	MG
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					
Pithomyces					
Hyphal Fragments*					

Total Raw Ct: 0 **Total sp/m^3:** 0

Comments
No mold spores observed.

AMA Sample #	285310-3
Client ID	20-703-3
Analyst ID	MG
Collection Apparatus	Air-O-Cell
Sample Volume (L)	75
Sample Condition	Acceptable
Debris Loading	1
Location	Main Office

	Raw Ct	Trav/Flds	A.S.	sp/m^3	%
Alternaria					
Ascospores	1	23	52	52	4.5%
Basidiospores	11	23	52	572	50%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	8	23	52	416	36.4%
Curvularia					
Penicillium / Aspergillus	2	23	52	104	9.1%
Smuts/Periconia/Myxomycetes	Present	23	52	<52	
Stachybotrys/Memnoniella					
Ulocladium					
Unknown					
Epicoccum	Present	23	52	<52	
Pithomyces					
Hyphal Fragments*					

Total Raw Ct: 22 **Total sp/m^3:** 1144

Comments

AMA Analytical Services, Inc.
Focused On Results.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody: 285310
Client: ATI, Inc.
Address: 9220 Rumsey Road
Suite 100
Columbia, MD 21045
Attention: Mikal Frater

Job Name: James Duckworth Special Center
Job Location: 11201 Evans Trail Beltsville, MD 20705
Job Number: 20-703
P.O. Number: Not Provided

Date Submitted: 12/09/2020
Person Submitting: Mikal Frater
Date Analyzed: 12/15/2020
Report Date: 12/15/2020

AMA Sample #	285310-4
Client ID	20-703-4
Analyst ID	MG
Collection Apparatus	Air-O-Cell
Sample Volume (L)	75
Sample Condition	Acceptable
Debris Loading	1
Location	Gymnasium

	Raw Ct	Trav/Flds	A.S.	sp/m^3	%
Alternaria					
Ascospores	1	23	52	52	5.3%
Basidiospores	9	23	52	468	47.4%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	2	23	52	104	10.5%
Curvularia					
Penicillium / Aspergillus	7	23	52	364	36.8%
Smuts/Periconia/Myxomycetes	Present	23	52	<52	
Stachybotrys/Memnoniella					
Ulocladium					
Unknown					
Epicoccum					
Pithomyces					
Hyphal Fragments*					

Total Raw Ct: 19 **Total sp/m^3:** 988

Comments

AMA Sample #	285310-5
Client ID	20-703-5
Analyst ID	MG
Collection Apparatus	Air-O-Cell
Sample Volume (L)	75
Sample Condition	Acceptable
Debris Loading	1
Location	Room 1 - Health Room

	Raw Ct	Trav/Flds	A.S.	sp/m^3	%
Alternaria					
Ascospores	3	23	52	156	3%
Basidiospores	10	23	52	520	10.1%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	82	23	52	4264	82.8%
Curvularia					
Penicillium / Aspergillus	3	23	52	156	3%
Smuts/Periconia/Myxomycetes					
Stachybotrys/Memnoniella					
Ulocladium					
Unknown					
Epicoccum	1	23	52	52	1%
Pithomyces					
Hyphal Fragments*	1	23	52	52	1%

Total Raw Ct: 99 **Total sp/m^3:** 5148

Comments

AMA Sample #	285310-6
Client ID	20-703-6
Analyst ID	MG
Collection Apparatus	Air-O-Cell
Sample Volume (L)	75
Sample Condition	Acceptable
Debris Loading	1
Location	Room 5

	Raw Ct	Trav/Flds	A.S.	sp/m^3	%
Alternaria					
Ascospores	2	23	52	104	2.2%
Basidiospores	20	23	52	1040	22%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	58	23	52	3016	63.7%
Curvularia					
Penicillium / Aspergillus	10	23	52	520	11%
Smuts/Periconia/Myxomycetes	1	23	52	52	1.1%
Stachybotrys/Memnoniella					
Ulocladium					
Unknown					
Epicoccum					
Pithomyces					
Hyphal Fragments*	4	23	52	208	4.4%

Total Raw Ct: 91 **Total sp/m^3:** 4732

Comments

AMA Analytical Services, Inc.
Focused On Results.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody:	285310	**Job Name:**	James Duckworth Special Center	**Date Submitted:**	12/09/2020
Client:	ATI, Inc.	**Job Location:**	11201 Evans Trail Beltsville, MD 20705	**Person Submitting:**	Mikal Frater
Address:	9220 Rumsey Road Suite 100 Columbia, MD 21045	**Job Number:**	20-703	**Date Analyzed:**	12/15/2020
		P.O. Number:	Not Provided	**Report Date:**	12/15/2020
Attention:	Mikal Frater				

AMA Sample #	285310-7	**AMA Sample #**	285310-8
Client ID	20-703-7	**Client ID**	20-703-8
Analyst ID	MG	**Analyst ID**	MG
Collection Apparatus	Air-O-Cell	**Collection Apparatus**	Air-O-Cell
Sample Volume (L)	75	**Sample Volume (L)**	75
Sample Condition	Acceptable	**Sample Condition**	Acceptable
Debris Loading	1	**Debris Loading**	2
Location	Room 14	**Location**	Room 16

	Raw Ct	Trav/Flds	A.S.	sp/m^3	%
Alternaria					
Ascospores					
Basidiospores	5	23	52	260	20.8%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	11	23	52	572	45.8%
Curvularia					
Penicillium / Aspergillus	8	23	52	416	33.3%
Smuts/Periconia/Myxomycetes					
Stachybotrys/Memnoniella					
Ulocladium					
Unknown					
Epicoccum					
Pithomyces	Present	23	52	<52	
Hyphal Fragments*					
Total Raw Ct:	24		**Total sp/m^3:**	1248	

Comments

	Raw Ct	Trav/Flds	A.S.	sp/m^3	%
Alternaria					
Ascospores					
Basidiospores	4	23	52	208	3.1%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	4	23	52	208	3.1%
Curvularia					
Penicillium / Aspergillus	120	7	171	20520	93.8%
Smuts/Periconia/Myxomycetes					
Stachybotrys/Memnoniella					
Ulocladium					
Unknown					
Epicoccum					
Pithomyces					
Hyphal Fragments*					
Total Raw Ct:	128		**Total sp/m^3:**	20936	

Comments

AMA Analytical Services, Inc.
Focused On Results.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody:	285310	**Job Name:**	James Duckworth Special Center	**Date Submitted:**	12/09/2020
Client:	ATI, Inc.	**Job Location:**	11201 Evans Trail Beltsville, MD 20705	**Person Submitting:**	Mikal Frater
Address:	9220 Rumsey Road Suite 100 Columbia, MD 21045	**Job Number:**	20-703	**Date Analyzed:**	12/15/2020
		P.O. Number:	Not Provided	**Report Date:**	12/15/2020
Attention:	Mikal Frater				

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

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AMA Analytical Services, Inc.
Focused On Results.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody:	285310	**Job Name:**	James Duckworth Special Center	**Date Submitted:**	12/09/2020
Client:	ATI, Inc.	**Job Location:**	11201 Evans Trail Beltsville, MD 20705	**Person Submitting:**	Mikal Frater
Address:	9220 Rumsey Road Suite 100 Columbia, MD 21045	**Job Number:**	20-703	**Date Analyzed:**	12/15/2020
		P.O. Number:	Not Provided	**Report Date:**	12/15/2020
Attention:	Mikal Frater				

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): Michael Greenberg

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.

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.

Pithomyces

Pithomyces is a cosmopolitan, dark-walled fungus often found growing outside in soil, decaying leaves, and grasses. It is rarely found growing indoors, but will grow on paper given the right conditions. Colonies grow rapidly, cottony in texture with light to dark brownish black surface color. Spores are single, oval yellow to dark brown, multi-celled, and usually rough. One identification feature of the spores is the resemblance to barrels. Another identifying character is beak-like structures on young spores. Spores of Pithomyces chartarum are most common and are identified by distinctive tranverse septa. This species has been linked to facial eczema in sheep. Health Effects: It is a potential but not well-studied allergen or human pathogen.

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.

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) 285310

Mailing/Billing Information:

1. Client Name: ATI, Inc.
2. Address 1: 9221 Forbes Blvd
3. Address 2: Suite 250
4. Address 3: Lanham, MD 20706
5. Phone #: _____ Fax #: _____

Submittal Information:

1. Job Name: James Duckworth Special Center
2. Job Location: 11201 Evans Trail Beltsville, MD 20705
3. Job #: 20-703 P.O. #: _____
4. Contact Person: Mikal Frater Cell: (848) 702-8621
5. Collected by: " 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/fax to contacts on file.

AFTER HOURS (must be pre-scheduled)	NORMAL BUSINESS HOURS	REPORT TO:
☐ 4 Hours ☐ Immediate Date Due: _____ ☐ 24 Hours Time Due: _____ Comments: _____	☐ 4 Hours ☐ Same Day ☐ Next Day ☐ 2 Day ☐ 3 Day ■ 5 Day + Date Due: 12/16/20 ☐ Results Required By Noon	■ Email: mikal@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
- ☐ Vermiculite
- ☐ Asbestos Soil 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)

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.
(TEM Water samples _____ °C)

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

Metals Analysis
- ☐ Pb Paint Chip _____ (QTY)
- ☐ *Pb Dust Wipe (wipe type _____) _____ (QTY)
- ☐ *Pb Air _____ (QTY)
- ☐ Pb Soil/Solid _____ (QTY)
- ☐ Pb TCLP _____ (QTY)
- ☐ Drinking Water ☐ Pb _____ (QTY) ☐ Cu _____ (QTY) ☐ As _____ (QTY)
- ☐ Waste Water ☐ Pb _____ (QTY) ☐ Cu _____ (QTY) ☐ As _____ (QTY)
- ☐ Pb Furnace (Media _____) _____ (QTY)

Fungal Analysis

Collection Apparatus for Spore Traps/Air Samples: _____
Collection Media _____
- ■ *Spore-Trap 8 (QTY)
- ☐ *Surface Swab _____ (QTY)
- ☐ *Surface Tape _____ (QTY)
- ☐ Other (Specify _____) _____ (QTY
- ☐ Surface Vacuum Dust _____ (QTY)
- ☐ Culturable ID Genus (Media _____) _____ (QTY)
- ☐ Culturable ID Species (Media _____) _____ (QTY)

CLIENT ID #		SAMPLE INFORMATION SAMPLE LOCATION/ ID	DATE/ TIME (12/8/20)	VOL (L)/ Wipe Area	ANALYSIS: TEM	PCM	PLM	LEAD	MOLD	MATRIX: AIR	BULK	DUST	WATER AND OTHER	SPORE TRAP	TAPE	SWAB	CLIENT CONTACT (LABORATORY STAFF ONLY)
20-703	1	Outdoors- parking lot	11:42	75L													Date/Time: Contact:By:
20-703	2	field blank	—	75L													
20-703	3	main office	11:54	75L													
20-703	4	gymnasium	12:02	75L													
20-703	5	Room 1-health room	12:10	75L													Date/Time: Contact:By:
20-703	6	room 5	12:17	75L													
20-703	7	Room 14	12:24	75L													
20-703	8	room 16	12:31	75L													
																	Date/Time: Contact:By:

	Print Name	Signature	Date	Time	Shipping Information
Relinquished by:	Mikal Frater	mikal Frater	12.09.20	1:45 PM	☐ UPS ☐ In-Person ☐ Other ☐ FedEx ☐ Drop Box ☐ USPS ☐ Courrier Airbill/Tracking No: _____
Received by:					
Relinquished by:					
Received for Lab by:			12/9/20	9:00	

AMA Analytical Services, Inc.
Focused On Results.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody: 327012
Client: ATI, Inc.
Address: 9220 Rumsey Road
Suite 100
Columbia, MD 21045
Attention: Courtney McCall

Job Name: Ductworth School Center
Job Location: Classrooms
Job Number: 20-703
P.O. Number: Not Provided

Date Submitted: 02/23/2021
Person Submitting: Sama W.
Date Analyzed: 02/25/2021
Report Date: 02/25/2021

AMA Sample #	327012-1
Client ID	3157-0023-A1
Analyst ID	TLW
Collection Apparatus	Air-O-Cell
Sample Volume (L)	75
Sample Condition	Acceptable
Debris Loading	1
Location	Classroom 1 / Health

	Raw Ct	Trav/Flds	A.S.	sp/m³	%
Alternaria					
Ascospores					
Basidiospores	1	15	53	53	25%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium					
Curvularia					
Penicillium / Aspergillus	1	15	53	53	25%
Smuts/Periconia/Myxomycetes					
Stachybotrys/Memnoniella					
Ulocladium					
Unknown					
Other Colorless	2	15	53	106	50%
Hyphal Fragments*	1	15	53	53	25%
Total Raw Ct:	4		**Total sp/m³:**		212

Comments

AMA Sample #	327012-2
Client ID	3156-9996-A2
Analyst ID	TLW
Collection Apparatus	Air-O-Cell
Sample Volume (L)	75
Sample Condition	Acceptable
Debris Loading	1
Location	Classroom 5

	Raw Ct	Trav/Flds	A.S.	sp/m³	%
Alternaria					
Ascospores	3	15	53	159	30%
Basidiospores	2	15	53	106	20%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	4	15	53	212	40%
Curvularia					
Penicillium / Aspergillus					
Smuts/Periconia/Myxomycetes	1	15	53	53	10%
Stachybotrys/Memnoniella					
Ulocladium					
Unknown					
Other Colorless					
Hyphal Fragments*					
Total Raw Ct:	10		**Total sp/m³:**		530

Comments

AMA Sample #	327012-3
Client ID	3156-9951-A3
Analyst ID	TLW
Collection Apparatus	Air-O-Cell
Sample Volume (L)	75
Sample Condition	Acceptable
Debris Loading	2
Location	Classroom 16

	Raw Ct	Trav/Flds	A.S.	sp/m³	%
Alternaria					
Ascospores	2	15	53	106	5.3%
Basidiospores	2	15	53	106	5.3%
Bipolaris/Drechslera/Helm.					
Chaetomium					
Cladosporium	2	15	53	106	5.3%
Curvularia					
Penicillium / Aspergillus	27	15	53	1431	71.1%
Smuts/Periconia/Myxomycetes	3	15	53	159	7.9%
Stachybotrys/Memnoniella					
Ulocladium					
Unknown	1	15	53	53	2.6%
Other Colorless	1	15	53	53	2.6%
Hyphal Fragments*					
Total Raw Ct:	38		**Total sp/m³:**		2014

Comments

AMA Analytical Services, Inc.
Focused On Results.

CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody:	327012	**Job Name:**	Ductworth School Center	**Date Submitted:**	02/23/2021
Client:	ATI, Inc.	**Job Location:**	Classrooms	**Person Submitting:**	Sama W.
Address:	9220 Rumsey Road Suite 100 Columbia, MD 21045	**Job Number:**	20-703	**Date Analyzed:**	02/25/2021
		P.O. Number:	Not Provided	**Report Date:**	02/25/2021
Attention:	Courtney McCall				

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CERTIFICATE OF ANALYSIS

ASTM D7391-09 Spore Trap Analysis Report

Chain of Custody:	327012	**Job Name:**	Ductworth School Center	**Date Submitted:**	02/23/2021
Client:	ATI, Inc.	**Job Location:**	Classrooms	**Person Submitting:**	Sama W.
Address:	9220 Rumsey Road Suite 100 Columbia, MD 21045	**Job Number:**	20-703	**Date Analyzed:**	02/25/2021
		P.O. Number:	Not Provided	**Report Date:**	02/25/2021
Attention:	Courtney McCall				

General Comments, Disclaimers, and Footnotes

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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.

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 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.

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) 327012

Mailing/Billing Information:
1. Client Name: ATI Inc.
2. Address 1: 4221 Forbes Blvd.
3. Address 2: Lanham MD 20706
4. Address 3:
5. Phone #: 202-643-4281 Fax #:

Submittal Information:
1. Job Name: Duckworth School Center.
2. Job Location: Class rooms.
3. Job #: 20-703 P.O. #:
4. Contact Person: Courtney McCalla Cell: 703-399-4282
5. Collected by: Sana - ws. Cell: 240-413-3728

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: 02/25/21
☒ 2 Day
☐ Results Required By Noon (Additional fee may apply)

REPORT TO:
☒ Email: Courtney@ativie.com
☐ Email 2:
☐ 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)

A 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: Air-O-Cell
Collection Media Cassette
☒ *Spore-Trap 3 (QTY) ☐ Surface Vacuum Dust (QTY)
☐ *Surface Swab (QTY)
☐ *Surface Tape (QTY)
☐ Other (Specify) (QTY)

CLIENT ID #	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
								✓					✓			
3157-0023-A1	class room 1/Health	02/23/21	75 L					✓					✓			
3156-9996-A2	class room 5	"	"					✓					✓			
3156-9951-A3	Class room 16	"	"					✓					✓			

	Print Name	Signature	Date	Time
Relinquished by:	Don Sana W.		02/23/21	1.30 pm
Received by:			2/23/21	1330

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

Appendix B: Instrument Calibration Records

Certificate of Calibration

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

Serial number: R15042
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: Moroni 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	71.33 (21.9)	°F (°C)
RELATIVE HUMIDITY	53.9	%RH
BAROMETRIC PRESSURE	28.81 (975.6)	inHg (hPa)

MODEL	7575-X
SERIAL NUMBER	7575X1711004

☒ AS LEFT ☐ AS FOUND

☒ IN TOLERANCE ☐ 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)	71.1 (21.7)	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	28.82 (976.0)	28.82 (976.0)	28.24~29.40 (956.3~995.6)				

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	07-21-20	01-31-21	DC Voltage	E003493	06-17-20	06-30-21

CALIBRATED

August 31, 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	71.24 (21.8)	°F (°C)
RELATIVE HUMIDITY	54.8	%RH
BAROMETRIC PRESSURE	28.74 (973.2)	inHg (hPa)

MODEL	7575-X
SERIAL NUMBER	7575X1711004

☐ 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)	70.5 (21.4)	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	28.75 (973.6)	28.84 (976.6)	28.17~29.33 (953.9~993.2)				

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	07-21-20	01-31-21	DC Voltage	E003493	06-17-20	06-30-21

VERIFIED

August 31, 2020
DATE

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ENVIRONMENT CONDITIONS		
TEMPERATURE	75.8 (24.3)	°F (°C)
RELATIVE HUMIDITY	48	%RH
BAROMETRIC PRESSURE	28.72 (972.6)	inHg (hPa)

MODEL	982
SERIAL NUMBER	P17100006

☐ 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	3020.5	* 2874.5	2929.9~3111.1
2	504	460	454~554	5	5037	* 4771.8	4885.9~5188.1
3	1008	964	958~1058				

GAS CO AS FOUND — SYSTEM G-101 — *Unit: ppm*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	35.3	* 30.8	32.3~38.3	2	100.7	* 87.7	97.7~103.7

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

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	32.0 (0.0)	32.6 (0.3)	31.0~33.0 (−0.5~0.6)	2	139.8 (59.9)	140.6 (60.3)	138.8~140.8 (59.4~60.5)

HUMIDITY AS FOUND — SYSTEM H-102 — *Unit: %RH*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	10.0	10.5	7.0~13.0	4	70.0	69.6	67.0~73.0
2	30.0	30.4	27.0~33.0	5	90.0	88.9	87.0~93.0
3	50.0	50.4	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	T-0660	07-15-20	07-15-28	200 CO	149848	03-24-20	03-24-28
N2	CT308798	06-28-20	06-28-28	Air	T608955	06-17-20	06-17-28
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
Temperture	E010655	01-21-20	01-31-21	Humidity	E003539	08-21-20	02-28-21

ChaoVang
VERIFIED

August 31, 2020
DATE

DOC ID CERT_GEN_WCC

TSI P/N 2300157

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Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

ENVIRONMENT CONDITIONS		
TEMPERATURE	71.33 (21.9)	°F (°C)
RELATIVE HUMIDITY	53.9	%RH
BAROMETRIC PRESSURE	28.81 (975.6)	inHg (hPa)

MODEL	982
SERIAL NUMBER	P17100006

☒ 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	32.0 (0.0)	32.6 (0.3)	31.0~33.0 (−0.5~0.6)	2	139.8 (59.9)	140.6 (60.3)	138.8~140.8 (59.4~60.5)

HUMIDITY VERIFICATION — SYSTEM H-102 — *Unit: %RH*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	10.0	10.5	7.0~13.0	4	70.0	69.6	67.0~73.0
2	30.0	30.4	27.0~33.0	5	90.0	88.9	87.0~93.0
3	50.0	50.4	47.0~53.0				

CO_2 GAS VERIFICATION — SYSTEM G-101 — *Unit: ppm*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	0	0	0~50	4	3020	3025	2929~3110
2	504	501	454~554	5	5037	5026	4886~5188
3	1008	1027	958~1058				

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 CO_2	T-0660	07-15-20	07-15-28
N_2	CT308798	06-28-20	06-28-28
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	08-21-20	02-28-21
200 CO	149848	03-24-20	03-24-28
Air	T608955	06-17-20	06-17-28
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

Bao Yang
CALIBRATED

August 31, 2020
DATE

Doc. ID. CERT_GEN_WCC

TSI P/N 2300157