



Occupational Health & Safety • Environmental Consultants

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January 8, 2019

City of Peabody
Jim Hafey
Facilities Director
50 Farm Avenue
Peabody, MA 01960

RE: Mold and Indoor Air Quality Assessment
Peabody High School
485 Lowell Street
Peabody, MA

emailed to: james.hafey@peabody-ma.gov

Dear Mr. Hafey:

OccuHealth, Inc. (OHI) is submitting the enclosed report on the Indoor Air Quality (IAQ) and mold assessment conducted on January 3, 2019 at the above referenced location.

Please call either of us at (508) 339-9119 with any questions. Thank you for opportunity to be of service.

Regards,
OCCUHEALTH, INC.

Jay McNeff, Sr. Project Manager

Thomas E. Hamilton, CIH

Enclosure



OccuHealth

**INDOOR AIR QUALITY AND MOLD ASSESSMENT
PEABODY HIGH SCHOOL
485 LOWELL STREET
PEABODY, MASSACHUSETTS**

Prepared for:
**MR. JIM HAFEY
FACILITIES DIRECTORY
CITY OF PEABODY
50 FARM AVENUE
PEABODY, MA 01960**

Conducted by:
**OCCUHEALTH, INC.
44 WOOD AVENUE
MANSFIELD, MA 02048
(508) 339-9119
OHI PROJECT 19-9995**

Report Date:
JANUARY 8, 2019

**INDOOR AIR QUALITY AND MOLD ASSESSMENT
PEABODY HIGH SCHOOL
485 LOWELL STREET
PEABODY, MASSACHUSETTS**

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Attachments

Environmental Airborne Aerosol Analysis Laboratory Report
EAA Chain-of-Custody Form

Report Synopsis: On January 3, 2018, OccuHealth, Inc. (OHI) conducted an indoor air quality and mold assessment in various classrooms in the Peabody High School located at 485 Lowell Street in Peabody, Massachusetts.

During this assessment, OHI collected samples for airborne mold spores in seven classrooms in the high school. Indoor air quality measurements for carbon monoxide, carbon dioxide, temperature and relative humidity were obtained from the same locations.

Based on observed conditions and air quality measurements taken, OHI concludes that airborne mold spore levels are within normal ranges in all locations sampled. Indoor air quality measurements of carbon monoxide, carbon dioxide, temperature and relative humidity were also within normal ranges.

1.0 INTRODUCTION

OccuHealth, Inc. (OHI) was requested to conduct an indoor air quality and mold assessment for the City of Peabody at the Peabody High School located at 485 Lowell Street in Peabody, Massachusetts. This work was requested and authorized by Mr. Jim Hafey, Facilities Director for the City of Peabody. OHI was asked to evaluate seven classroom areas. The assessment was conducted on January 3, 2019 by Mr. Jay McNeff under the supervision of Thomas E. Hamilton, CIH, both of OHI. Mr. Hafey escorted Mr. McNeff for this assessment.

2.0 INSPECTION

OHI did not observe any evidence of water damage or mold growth in any of the classroom areas. All locations appeared clean and very few areas had any visible settled dust. The respective tables below identify the classroom locations sampled and where indoor air quality parameters were measured.

3.0 AIRBORNE MOLD SPORE TESTING

Sampling and Analytical Methodology

OHI collected seven air samples for mold spore analysis in the classrooms as identified in the table below. An outdoor sample was taken for comparison. The air samples were collected using a high volume pump with Zefon Air-O-Cell cassettes. An Air-O-Cell cassette is a spore and dust trap which allows for rapid detection and identification of mold spores using bright light microscopy. Culturable and non-viable mold spores are collected and counted. The analytical results can be compared to data from available studies and to levels seen outdoors.

The sample pump was calibrated to a flow rate of 15 liters per minute and the samples were collected for 5 minutes. The sample pump utilized for the air sampling was calibrated before the sampling event using a precision rotameter. This rotameter was in turn calibrated using a primary standard.

The samples were submitted under chain-of-custody for quantitative analysis to Environmental Analysis Associates, Inc. (EAA) in Bay City, Michigan. Copies of the laboratory report and chain-of-custody form are attached.

Analytical Results

The analytical results are summarized in Table 1 below. To interpret the results, an airborne mold spore concentration of less than 2,000 counts per cubic meter of air (cts/m³) as a total spore count, and less than 1,000 cts/m³ for any one mold genus is considered low or clean for an indoor environment.

The laboratory detected normal mold spore concentrations in all samples.

Table 1: Airborne Mold Spore Testing Results

Location	Sample Number	Total Mold Spores (cts/m ³)	Predominant Mold Genera (cts/m ³)
Classroom A204	27183510	594	Mix tiny hyal, Asco & Basidiospores (274) Aspergillus/Penicillium (183) Cladosporium (91) Pigmented Asco & Basidiospores (46)
Classroom C276	27183460	306	Mix tiny hyal, Asco & Basidiospores (91) Aspergillus/Penicillium (91) Cladosporium (123)
Classroom B354	27183424	548	Mix tiny hyal, Asco & Basidiospores (320) Aspergillus/Penicillium (137) Pigmented Asco & Basidiospores (46) Smuts/Myxomycetes/Periconia (46)
Classroom B360	27183504	320	Mix tiny hyal, Asco & Basidiospores (229) Aspergillus/Penicillium (91)
Classroom C386	26519530	502	Mix tiny hyal, Asco & Basidiospores (274) Aspergillus/Penicillium (137) Cladosporium (91)
Classroom A323	27183865	320	Mix tiny hyal, Asco & Basidiospores (91) Aspergillus/Penicillium (46) Cladosporium (91) Smuts/Myxomycetes/Periconia (46) Pigmented Asco & Basidiospores (46)
Classroom D8	27183860	366	Mix tiny hyal, Asco & Basidiospores (320) Aspergillus/Penicillium (46)
Outdoors	27183473	1,190	Mix tiny hyal, Asco & Basidiospores (1,100) Aspergillus/Penicillium (46) Pigmented Asco & Basidiospores (46)

cts/m³= counts per cubic meter of air

Mold samples alone cannot be used to verify whether a space is safe or unsafe for human occupancy. However, results of air sampling, together with a thorough history of the building's water damage, information obtained from interviews with building occupants and field observations, can help the independent environmental professional develop an opinion on the extent of the mold and the appropriate remediation plan.

4.0 INDOOR AIR QUALITY (IAQ) ASSESSMENT FINDINGS

This section includes a detailed review of the data collected for carbon monoxide (CO), carbon dioxide (CO₂), temperature and relative humidity.

Air Monitoring Techniques

Measurements of routine indoor air quality parameters were taken using real-time direct-reading instrumentation. Measurements were collected for carbon dioxide, carbon monoxide, temperature and relative humidity in the seven classroom locations throughout the occupied sixth floor. The data is presented in Table 2 below.

Levels of carbon dioxide and carbon monoxide were measured using a Fluke 975 Airmeter, which expresses the concentration of each gas in parts per million (ppm). Temperature and relative humidity were measured using specialized probes on this instrument as well. Temperature was recorded in degrees Fahrenheit (EF) and relative humidity was recorded as a percent (%) of saturation.

Table 2: Air Quality Measurements

Floor/Area	CO Level ppm (parts per million)	CO ₂ Level ppm (parts per million)	Temp degrees F	Relative Humidity %	Area Loading (people)	Comments
Classroom A204	0.0	628	68.9	33.5	20	Acceptable
Classroom C276	0.0	701	70.7	32.7	6	Acceptable
Classroom B354	0.0	1118	73.4	36.8	15	Acceptable
Classroom B360	0.0	767	70.7	32.5	16	Acceptable
Classroom C386	0.0	854	70.7	32.7	0	Acceptable
Classroom A323	0.0	828	73.4	30.6	24	Acceptable
Classroom D8	0.0	687	75.2	28.6	0	Acceptable
Outdoors	0.0	420	42.8	42.8		11:00 am

4.1 Fresh Air and Carbon Dioxide Levels

Carbon dioxide (CO₂) in indoor environments is a by-product of human respiration and by itself does not pose an acute health hazard. Elevated levels of CO₂ may serve as an indicator of an insufficient intake of fresh air to the HVAC system or insufficient number of air changes in the environment, and so it is used as a surrogate measurement. The normal ambient (outdoor) level of CO₂ ranges between 325-375 parts per million by volume (ppm). CO₂ concentrations

typically fluctuate according to the population density, with maximum concentrations occurring at times of high population.

The American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) currently recommends that CO₂ levels for occupant comfort, be maintained below a maximum of 700 ppm above outdoor levels (ASHRAE 62-2001, Ventilation for Acceptable Indoor Air Quality). The outdoor carbon dioxide concentration on January 3, 2019 was 420 ppm; consequently, the ASHRAE-recommended maximum indoor carbon dioxide level for the assessment is 1,120 ppm.

Symptoms of inadequate supply of fresh air include headaches, dizziness, lightheadedness, and drowsiness often accompanied by a sensation of stuffiness. These effects vary widely from person to person. However, most individuals do not have measurable effects until CO₂ levels exceed 800 ppm.

The measured carbon dioxide levels in the office areas did not exceed the ASHRAE-recommended maximum of 1,120 ppm.

4.2 Carbon Monoxide Levels

Carbon monoxide is a by-product of (incomplete) combustion, and is often associated with improperly vented space heaters, boilers, and hot water heaters. Carbon monoxide may also occur from combustion of tobacco products. The current Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) for carbon monoxide is 50 ppm, expressed as an eight-hour, time-weighted average exposure. The EPA standard for CO is 9 ppm based on a 24-hour period. Outdoor levels of 0-4 ppm are frequently measured in the outdoor ambient urban environments.

During the assessment, the outdoor carbon monoxide level was 0.0 ppm. The measured carbon monoxide levels in the office areas were 0.0 ppm. In our opinion, elevated carbon monoxide levels are not an indoor air quality concern in the office areas tested.

4.3 Temperature and Relative Humidity

Background

As stated in ASHRAE Standard 55-2004, there are no established lower humidity limits for thermal comfort; consequently, this standard does not specify a minimum relative humidity level. Non-thermal comfort factors, such as skin drying, irritation of mucus membranes, dryness of the eyes, and static electricity generation, may place limits on the acceptability of very low humidity environments.

Monitoring Results

During the assessment, the measured temperature ranged from 68.9EF to 75.2EF. The recorded relative humidity level ranged from 28.6% to 36.8%. These readings are within the “acceptable range of operative temperature and humidity” as defined in the ASHRAE document 55-2004, Thermal Environmental Conditions for Human Occupancy. OHI recommends maintaining relative humidity below 60% for the human comfort factor as well as keeping the air dry enough to not support the possibility of mold growth. OHI also recommends maintaining relative humidity levels above 20%.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on observed conditions and air quality measurements taken, OHI concludes that airborne mold spore levels were acceptable in all locations sampled. Indoor air quality measurements of carbon monoxide, carbon dioxide, temperature and relative humidity were within normal ranges. OccuHealth has no recommendations to offer at this time.

6.0 LIMITATIONS

The contents of this report are based on OccuHealth, Inc.'s best professional judgement, comparison of collected data with established industry guidelines, and information obtained from our client.



AIRBORNE MOLD SPORE ANALYSIS

EAA Method #: MOLD-A01

Data Page 1 of 2

Client Name : OccuHealth, Inc.

Client Project # : 11936

Requested by : Jay McNeff

EAA Project# : 19-0010

Project description : City of Peabody, High School

Date collected : 1/3/19

Sample received : 1/4/19

Sample condition : Acceptable as received

Client Sample#	Sample Description / Location	General Comments
27183510	Classroom A204	Low dust & mold spore concentrations
27183460	Classroom C276	Low dust & mold spore concentrations
27183424	Classroom B354	Low-moderate dust, low mold spore concentrations
27183504	Classroom B360	Low dust & mold spore concentrations
26519530	Classroom C386	Low dust & mold spore concentrations

AIRBORNE MOLD SPORE CONCENTRATIONS (Cts./m ³) -- Spore Trap Sample Analysis High mag. used 500X						
Category	Sample # -->	27183510	27183460	27183424	27183504	26519530
Total Mold Spores (Cts/m³)		594	306	548	320	502

Alternaria						
Aspergillus/Penicillium	183	91	137	91	137	
Pigmented Asco & Basidio	46		46			
Mix tiny, hyal Asco & Basidio	274	91	320	229	274	
Botrytis						
Chaetomium						
Cladosporium	91	123			91	
Curvularia						
Drechslera/Bipolaris						
Epicoccum						
Fusarium						
Nigrospora						
Oidium/Peronospora						
Pithomyces						
Rusts						
Smuts / Myxomycetes / Periconia			46			
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Other Hyaline Fungi						
Other Fungi						
Unidentified Fungi						
Hyphae fragments						
Algal / fern spores						
Insect parts						

POLLEN (Total cts/m³)	not analyzed	not analyzed	not analyzed	not analyzed	not analyzed
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Not specified					
Pinus					

COMMON AEROSOLS (cts/m3)	not analyzed	not analyzed	not analyzed	not analyzed	not analyzed
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Skin cell fragments					
Fiberglass fibers					
Cellulosic / fabric fibers					
Unidentified opaque					
Soil / mineral dust					

OTHER PARTICLES (cts/m3)	not analyzed	not analyzed	not analyzed	not analyzed	not analyzed
---------------------------------	---------------------	---------------------	---------------------	---------------------	---------------------

Statistical Parameters

Vol. analyzed (m3)-high mag - 500x :	0.022	0.022	0.022	0.022	0.022
Detect limit(Cts/m ³)-high magnification:	45.7	45.7	45.7	45.7	45.7
% sample analyzed-high magnification:	29%	29%	29%	29%	29%
Vol. analyzed(m ³)/entire sple 150-300x:	0.075	0.075	0.075	0.075	0.075
* Detection limit (Cts/m ³)/entire sple:	13.3	13.3	13.3	13.3	13.3
* Note: The "entire sample" detection limit applies to the "large" particle categories analyzed during the low magnification examination of the entire sample					
Sample flow rate (lpm):	15.0	15.0	15.0	15.0	15.0
Sample trace length (mm):	14.40	14.40	14.40	14.40	14.40
Microscope field diameter (mm):	0.420	0.420	0.420	0.420	0.420

Note: Sample results are only applicable to the items or locations tested

Raw/extrapolated count data are given on a separate page.

Authorized / data reviewed by :

Report date: 1/7/19

Analyst : jh



AIRBORNE MOLD SPORE ANALYSIS

EAA Method #: MOLD-A01

Client Name : OccuHealth, Inc.

Data Page 2 of 2

Client Project # : 11936

Project description : City of Peabody, High School

(end of data report)

Requested by : Jay McNeff

Date collected : 1/3/19

EAA Project#: 19-0010

Sample received : 1/4/19

Sample condition : Acceptable as received

Client Sample#	Sample Description / Location	General Comments
27183865	Classroom A323	Low-moderate dust, low mold spore concentrations
27183860	Classroom D8	Low dust & mold spore concentrations
27183473	Outdoors	Low dust, low-moderate mold spore concentrations

AIRBORNE MOLD SPORE CONCENTRATIONS (Cts./m³) -- Spore Trap Sample Analysis

High mag. used 500X

Category	Sample # -->	27183865	27183860	27183473
Total Mold Spores (Cts/m³)		320	366	1190
Alternaria				
Aspergillus/Penicillium		46	46	46
Pigmented Asco & Basidio		46		46
Mix tiny, hyal Asco & Basidio		91	320	1100
Botrytis				
Chaetomium				
Cladosporium		91		
Curvularia				
Drechslera/Bipolaris				
Epicoccum				
Fusarium				
Nigrospora				
Oidium/Peronospora				
Pithomyces				
Rusts				
Smuts / Myxomycetes / Periconia		46		
Stachybotrys				
Stemphylium				
Torula				
Ulocladium				
Other Hyaline Fungi				
Other Fungi				
Unidentified Fungi				
Hyphae fragments				
Algal / fern spores				
Insect parts				
POLLEN (Total cts/m³)		not analyzed	not analyzed	not analyzed
Not specified				
Pinus				
COMMON AEROSOLS (cts/m³)		not analyzed	not analyzed	not analyzed
Skin cell fragments				
Fiberglass fibers				
Cellulosic / fabric fibers				
Unidentified opaque				
Soil / mineral dust				
OTHER AEROSOLS (cts/m³)		not analyzed	not analyzed	not analyzed
Statistical Parameters				
Vol. analyzed (m ³)-high mag - 500x :		0.022	0.022	0.022
Detect limit(Cts/m ³)-high magnification:		45.7	45.7	45.7
% sample analyzed-high magnification:		29%	29%	29%
Vol. analyzed(m ³)/entire sple 150-300x:		0.075	0.075	0.075
* Detection limit (Cts/m ³)/entire sple:		13.3	13.3	13.3
* Note: The "entire sample" detection limit applies to the "large" particle categories analyzed during the low magnification examination of the entire sample				
Sample flow rate (lpm):		15.0	15.0	15.0
Sample trace length (mm):		14.40	14.40	14.40
Microscope field diameter (mm):		0.420	0.420	0.420

Note: Sample results are only applicable to the items or locations tested

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Raw/extrapolated count data are given on a separate page.

Authorized / data reviewed by :

Report date: 1/7/19

Analyst : jh

19-0010

Chain-of-Custody and Analytical Request Form

EAA

306 5th Street, Suite 400
Bay City, MI 48708
(989) 895-4447

Email results to:
results@occuhealth.com

Client: OccuHealth, Inc.
44 Wood Avenue
Mansfield, MA 02048

Date Sampled: 01/03/2019
508-339-9119 voice
508-339-2893 fax

Project ID: City of Peabody, High School
P.O.#: 11936
Date Submitted: 01/03/2019

Sample #	Sample Type: air, wipe, bulk, dust	Sample Volume Liters	Sample Location	Analysis Requested	Special Instructions & Comments
27183510	Air	75	Classroom A204	Fungi	
27183460	Air	75	Classroom C276	Fungi	
27183424	Air	75	Classroom B354	Fungi	
27183504	Air	75	Classroom B360	Fungi	
26519530	Air	75	Classroom C386	Fungi	
27183865	Air	75	Classroom A323	Fungi	
27183860	Air	75	Classroom D8	Fungi	
27183473	Air	75	Outdoors	Fungi	

Submitted By: (Sign) _____ Contact Person: Jay McNeff

Received by: (Sign)  (print) Emmalee Griswold Date & Time Received: 1/4/19 10:30am

(For lab use only) Samples processed by: _____ Date: _____