TATTVAM ENVIRONMENTAL AND ENGINEERING SOLUTIONS, LLC

Indoor Air Quality Report
for
Weston Public Schools
Weston, CT

prepared for:

Weston Public Schools
25 School Road
Weston, CT

November 17th, 2016

Tattvam IAQ Project # 16-101

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Introduction

Tattvam Environmental and Engineering Solutions, LLC (Tattvam Environmental) was retained by Weston Public Schools to conduct Indoor Air Quality and Mold Testing at the four (4) schools at Weston, CT. The schools include the Elementary School, Intermediate School, the Middle School and Weston High School

Assessment and Monitoring

On November 5th 2016, Tattvam Environmental performed an indoor air quality assessment at the above referenced facilities. As requested by the client, the assessment included sampling for Temperature, Relative Humidity, Concentration of Carbon Dioxide, and Concentration of Carbon Monoxide, in accordance with ASHRAE 113 standards. The assessment also included a collection of mold samples, airborne particulates and real time measurement of Volatile Organic Compounds.
The following sampling scheme was employed:

- Monitoring baseline indoor air quality parameters including temperature, relative humidity, carbon monoxide, and carbon dioxide. Monitoring for these parameters was conducted with a Supco IAQ55 Monitor.

- Airborne mold testing was performed utilizing Zefon International Incorporated's Air-O-Cell sampling device following manufacture supplied recommended sampling procedures.

- Monitor airborne respirable particulate (PM10), This testing was done using an MIE PDR-1000 personal data RAM.

- Monitor total Volatile Organic Compounds (VOC's). This testing was done using an Industrial Scientific VX500 Photo Ionization Detector.

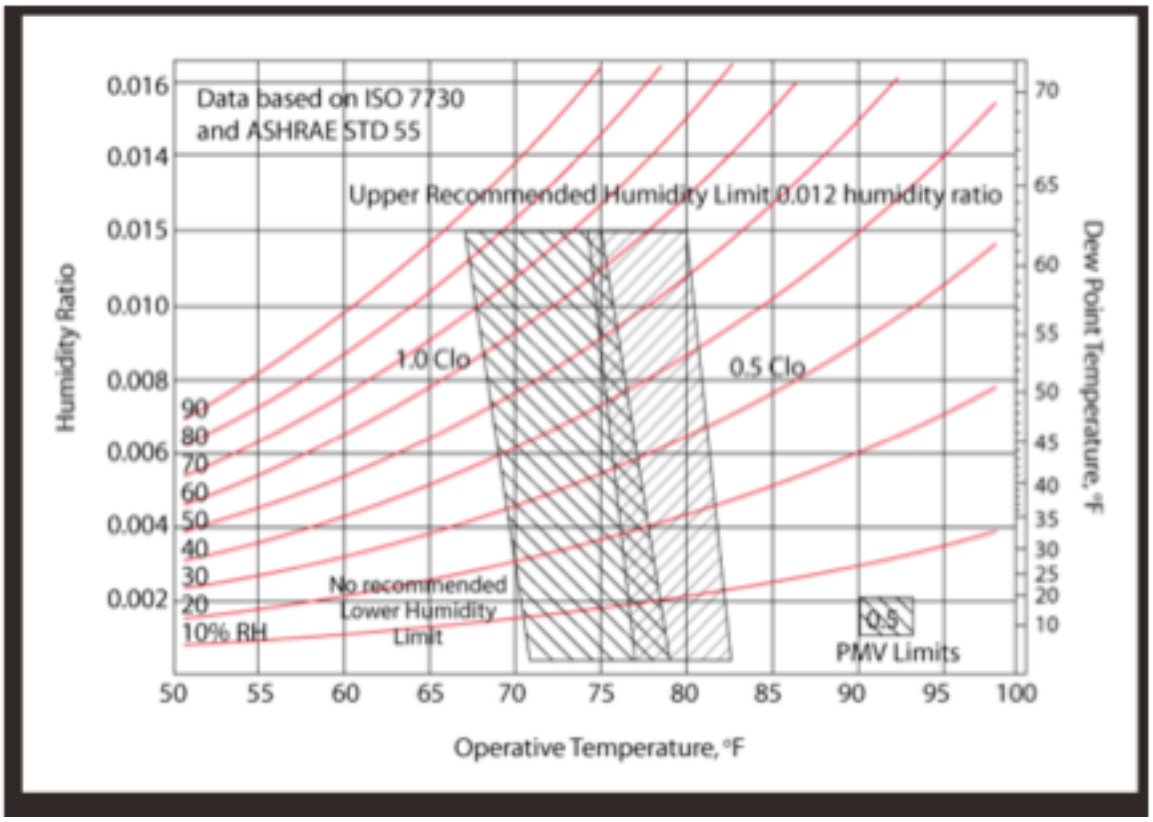
Results of Sampling

The following air quality parameters were measured during the testing.

Baseline Indoor Air Quality Parameters

- ***Temperature:*** The indoor temperatures ranged from are tabulated in **Appendix A**. In comparing this data to the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) guidelines for thermal environmental conditions for Human Occupancy, it is determined that the indoor temperature data was within the acceptable range of operative temperature and humidity.

- ***Relative Humidity:*** The indoor relative humidity readings are tabulated in **Appendix A.** The relative humidity was within the ASHRAE acceptable range of operative temperature and humidity as outlined in ASHRAE Standard 55-2004.



- ***Carbon Monoxide:*** The indoor carbon monoxide concentration reading on this day was **0 ppm**. LEED EQc3.2 IAQ Management Plan for Testing Before Occupancy and U.S. Environmental Protection Agency National Ambient Air Quality Standard outlines the maximum limit as 9 ppm.

- ***Carbon Dioxide:*** According to the ASHRAE Standard 62-2001, Ventilation for Acceptable Indoor Air Quality, the difference between the indoor and outdoor concentrations **should be less than 700 ppm**. The concentrations observed were well within recommended range.

- ***Volatile Organic Compounds (VOC's):*** The indoor VOC concentration readings below the allowable maximum concentration limit of 500 µg/m3 the LEED Green Building Rating System for Existing Buildings required by the U.S. Green Building Council.

Mold Assessment

The inspection involved a walk-through of the buildings to visually look for potential sources of biological agents (mold) and evidence of current or past water damage or excessive moisture. Evidence that active mold (fungal) growth is occurring is most often sensory (visual identification or odor perception) and may be confirmed by source sampling.

There was no visual mold observed or water damage observed. There was no condensate or moisture observed on indoor surfaces or walls of the areas that were inspected.

Destructive methods were not used to investigate for mold. Generally, destructive methods are only used when conditions indicate that mold may be present in an inaccessible area.

Mold Spore Air Sampling

Background Information on Mold

According to the US EPA Office of Air and Radiation, Indoor Environments Division (6609-J) EPA 402-K-Ol-00l, March 2001: Molds can be found almost anywhere; they can grow on virtually any organic substance, as long as moisture and oxygen are present. There are molds that can grow on wood, paper, carpet, foods, and insulation. When excessive moisture accumulates in buildings or on building materials, mold growth will often occur, particularly if the moisture problem remains undiscovered or unaddressed. It is impossible to eliminate all mold and mold spores in the indoor environment. However, mold growth can be controlled indoors by controlling moisture.

Sampling Method

Sampling for airborne mold spores was conducted in all the buildings using Air-O-Cell Air Sampling cassettes.

Air-O-Cell Air Sampling cassettes are a sampling device designed for the rapid collection and analysis of a wide range of airborne aerosols. Air was sampled at a flow rate of 15 liters per minute (Ipm). Samples were then analyzed by microscopic examination at a certified lab and the results have been reported in fungal spores per cubic meter of air (spores/m3).

Sampling Interpretation

At this time there are no U.S. Environmental Protection Agency, OSHA or other Federal standards or threshold limits for mold or mold spores in an indoor environment. This is due to naturally diverse and variable exposure, the absence of measurement and health response data, and differing immunogenic susceptibilities

of individuals. Relationships between health effects and environmental microorganisms must be determined through the combined contributions of medical, epidemiological, and environmental evaluations.

Air sampling for mold and mold spores is interpreted by:

- Comparing indoor airborne concentrations to outdoor mold spore concentrations. Total indoor airborne concentration levels higher than levels outside the building would indicate the possible presence of a fungal reservoir and amplification inside the building.
- Comparing species of mold inside and outside the building. Mold spores found inside and not outside the building could indicate a possible fungal reservoir and amplification inside the building.
- The presence of high airborne concentrations of indicator species, such as stachbotrys, which can indicate an excessive moisture problem or a possible health hazard that should not typically be present in healthy indoor environments.

Mold Analysis:

Laboratory results indicated the presence of certain fungi however, the spores/m3 observed were less than the outside ambient. In general, indoor levels of molds are usually 30-80% of outdoor levels and the distribution of spore types should be similar, which is the case in all schools.

Conclusion

Based upon the assessment and inspection in these facilities, Tattvam Environmental has made the following conclusion:

√ The indoor air quality at the Weston Public School buildings meets the requirements in the applicable standards of ASHRAE Standards for Acceptable Indoor Air quality and OSHA Permissible Exposure limits (PEL'S). All readings observed were within acceptable range.

Respectfully Submitted,
Tattvam Environmental and Engineering Solutions, LLC.

Indu Nambiar
Environmental Engineer

APPENDIX A

IAQ PARAMETERS						
Room/ Area	Temp-erature °F	Relative Humidity %	Carbon dioxide (ppm)	Carbon monoxide (ppm)	Volatile Organic Compounds (ppm)	Respirable Particulates (mg/m³)
Elementary School						
Main Lobby	68.3	29.8	504	0.0	0.0	0.001
South	68.6	29.1	490	0.0	0.0	0.000
Cafeteria	67.4	30.9	469	0.0	0.2	0.000
S-38	68.9	30.6	469	0.0	0.0	0.001
S-44	69.9	28.7	466	0.0	0.1	0.000
S-40	71.5	29.4	470	0.0	0.0	0.000
S-43	71.4	26.6	484	0.0	0.0	0.000
Library	69.5	29.0	466	0.0	0.0	0.001
Gym	70.0	28.7	458	0.0	0.0	0.000
N-24	71.3	28.4	536	0.0	0.3	0.012
N-21	72.0	27.6	478	0.0	0.1	0.000
Training Rm	75.5	27.8	463	0.0	0.0	0.000
N-10	74.4	27.5	475	0.0	0.0	0.000
N-8	75.6	30.9	459	0.0	0.0	0.002
N-6	74.5	30.7	496	0.0	0.0	0.000
E-35	70.5	29.6	470	0.0	0.0	0.002
E-32	71.2	28.0	469	0.0	0.0	0.000
E-31	72.2	28.8	472	0.0	0.0	0.000
West -	70.4	27.0	485	0.0	0.2	0.000
Intermediate School						
Main Lobby	71.1	31.8	489	0.0	0.0	0.001
School Nurse	71.0	29.9	461	0.0	0.0	0.000
18	70.6	29.3	459	0.0	0.0	0.000
D-136	71.3	29.0	452	0.0	0.0	0.000
Main office	71.5	29.7	463	0.0	0.0	0.000
Library	71.6	29.2	440	0.0	0.0	0.004
Gym	69.5	30.1	440	0.0	0.0	0.000
Room 121	70.1	29.4	451	0.0	0.0	0.000
Copy Area	71.4	28.3	447	0.0	0.0	0.000
Room 213	71.7	27.4	409	0.0	0.0	0.000
Room 219	72.4	27.8	462	0.0	0.0	0.000
Custodial	72.4	27.1	449	0.0	0.0	0.000
Room 215	71.6	27.5	454	0.0	0.0	0.000

IAQ PARAMETERS						
Room/ Area	Temp-erature °F	Relative Humidity %	Carbon dioxide (ppm)	Carbon monoxide (ppm)	Volatile Organic Compounds (ppm)	Respirable Particulates (mg/m³)
Middle School						
A06	69.3	31.9	451	0.0	0.0	0.000
A03	69.5	31.8	450	0.0	0.0	0.000
A05	66.5	32.5	447	0.0	0.0	0.001
A04	66.8	33.4	446	0.0	0.0	0.022
A07	67.7	34.6	443	0.0	0.0	0.000
A09	69.9	32.3	486	0.0	0.0	0.000
B-11	68.2	31.6	452	0.0	0.0	0.001
B-09	67.1	32.5	448	0.0	0.2	0.000
B-05	67.0	35.8	442	0.0	0.0	0.000
B-07	67.8	35.2	522	0.0	0.0	0.000
C-24	68.3	34.4	506	0.0	0.0	0.003
C-21	69.3	33.3	474	0.0	0.0	0.000
Cafeteria	69.6	33.1	467	0.0	0.0	0.000
H-3 Tech	70.3	33.2	460	0.0	0.0	0.003
H-8	70.5	32.4	462	0.0	0.0	0.000
H-6	70.0	32.8	469	0.0	0.0	0.000
G-8	69.7	33.6	452	0.0	0.0	0.000
G-7	70.4	33.8	454	0.0	0.0	0.000
G-5	69.2	33.7	476	0.0	0.0	0.000
G-3	69.8	33.4	465	0.0	0.1	0.017
F-8	71.9	33.1	476	0.0	0.0	0.000
F-5	72.1	31.0	465	0.0	0.0	0.000
F-3	70.8	31.8	456	0.0	0.0	0.004
O/S Ambient	66.4	35.7	423	0.0	0.0	0.000
O/S Bathroom	70.9	33.2	468	0.0	0.0	0.000
High School						
Library	72.3	28.7	455	0.0	0.0	0.00
o/s Cafeteria	70.5	30.0	481	0.0	0.0	0.000
Gym 1A	71.2	33.1	491	0.0	0.0	0.000
O/S Basketball training area	75.7	37.3	479	0.0	0.0	0.000
F6 Training Room	72.6	28.8	477	0.0	0.0	0.001
C-12	71.3	29.4	444	0.0	0.0	0.000
C- Hallway	71.5	29.4	440	0.0	0.0	0.000

IAQ PARAMETERS						
Room/ Area	Temp-erature °F	Relative Humidity %	Carbon dioxide (ppm)	Carbon monoxide (ppm)	Volatile Organic Compounds (ppm)	Respirable Particulates (mg/m³)
High School (Contd.)						
B-10	70.5	29.1	441	0.0	0.1	0.000
B-6	68.0	28.6	464	0.0	0.0	0.001
O/S Office	71.0	30.3	489	0.0	0.0	0.000
Girl's bathroom O/S	70.3	31.5	436	0.0	0.0	0.000
B- Hallway	68.6	33.6	452	0.0	0.0	0.000
B-1		30.1		0.0	0.0	0.000
C-2	70.5	31.5	448	0.0	0.0	0.000
Auditorium	68.0	32.2	445	0.0	0.0	0.004
C-15	71.5	30.1	441	0.0	0.0	0.000
C-3	71.4	29.1	462	0.0	0.0	0.000
D7	75.3	25.7	458	0.0	0.0	0.000
D- Hallway	74.0	27.4	449	0.0	0.0	0.000
D-6	72.8	27.8	445	0.0	0.2	0.000
C-5	71.6	28.7	443	0.0	0.0	0.000
Main Lobby	70.9	33.2	468	0.0	0.0	0.000
G-4	69.3	31.9	451	0.0	0.0	0.000
G-5	69.5	31.8	450	0.0	0.0	0.000
G-7	66.5	32.5	447	0.0	0.0	0.000
E- Hallway	68.2	30.2	446	0.0	0.0	0.000
Locker Area	67.6	30.8	489	0.0	0.0	0.000