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## GREENWORKS IAQ INSPECTION



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This inspection was conducted in accordance with state regulations as well as current industry guidelines and practices. This is not a certificate, assurance, warranty or guarantee of future conditions or performance, but is an inspection of the conditions present and detected on the date of this inspection.

Disclaimer: It is important to note that mold sampling results may yield inconclusive or misleading information. Caution must be used in relying on sampling results to render a conclusion. Concentrations of indoor environments can change dramatically based on a number of factors. Standards or Threshold Limit Values (TLVs) for airborne concentrations of mold, or mold spores, have not been set. Currently, there are no EPA regulations or standards for airborne mold contaminants.

NOTE: Pictures are a representative sample, and may not display every defect.

GreenWorks Inspections was contacted by the Client listed on the report to conduct a mold inspection which includes taking samples within the inspected property to confirm/deny the presence of fungal growth. The purpose of this inspection is to determine if there were any underlying mold and moisture intrusion conditions affecting interior air quality in the inspected property. This report is solely for the benefit of the Client. Any person or party designated by the Client to receive information in this report shall be subject to the TERMS AND CONDITIONS contained herein. Such designation shall be provided in writing to the inspector.

Molds are part of the natural environment and are simple, microscopic organisms whose purpose is to break down dead materials. Molds can be found on plants, dry leaves, and about every other organic material. Mold spores are lightweight and are spread by air currents. If spores land on a suitable surface, they will begin to grow. In order to thrive, mold requires four things to grow: water, organic materials, oxygen, and an optimum temperature. Mold growth is often seen as discoloration and can grow in several different colors. The most common are white, orange, pink, blue, green, black, or brown.

Health problems associated with high levels of airborne mold spores may include allergic reactions, asthma episodes, irritations of the eye, nose, and throat, sinus congestion, and other respiratory problems.

# SUMMARY

- ⊖ 1.1.1 Inspection Details Sample 1: TVOC Levels High
- ⊖ 1.2.1 Inspection Details Sample 2: TVOC Levels High
- ⊖ 1.3.1 Inspection Details Sample 3: TVOC Levels High

# 1: INSPECTION DETAILS

### Information

Foundation Type Slab

Structure Type House

**Air Quality Monitor Temtop** Temtop P100 Air Quaility Monitor

Infrared Flir Infrared Inspection Camera

**Sample 1: Humidity (%)** 47.5 %

Sample 1: PM 2.5 1.1 ug/m3

**Sample 1: HCHO** 0.34 mg/m3

**Sample 2: Humidity (%)** 54.4 %

Sample 2: PM 2.5 1.6 ug/m3

Sample 2: HCHO .33 mg/m3

**Sample 3: Humidity (%)** 56.3

Sample 3: PM 2.5 7.5

Sample 3: HCHO .20 Occupied (Viewing Restricted)

Weather Conditions Clear, Hot

**Temp/Humidity Zenith** Zenith Portable CO2 Detector with Temperature and Humidity

Temtop LKC-1000S+2nd Air Quality Monitor

Sample 1: Carbon Dioxide 1002 ppm

Sample 1: PM 10 2.0 ug/m3

Sample 1: TVOC 1.10 mg/m3

Sample 2: Carbon Dioxide 919 ppm

Sample 2: PM 10 3.0 ug/m3

Sample 2: TVOC 1.09 mg/m3

Sample 3: Carbon Dioxide 426

Sample 3: PM 10 13.5

Sample 3: TVOC .76 In Attendance Client

Zephon Pump Zephon Z-lite Linear pump with Integrated Flow Meter

Allergenco Cassettes

**Allergenco Cassette** 

Sample 1: Temperature (°F) 80.2 Degrees Fahrenheit

Sample 1: Air Quality Index 4

Sample 1: Total Number Of Particles 178 per/L

Sample 2: Temperature (°F) 79.0 Degrees Fahrenheit

Sample 2: Air Quality Index 6

Sample 2: Total Number Of Particles 241 per/L

Sample 3: Temperature (°F) 89.0

Sample 3: Air Quality Index 38

Sample 3: Total Number Of Particles 1126

#### **General Information**

Inspector is not responsible for or liable for the non-discovery of any, water problems, mold contamination, or any other problems that were not discovered due to inadequate sampling in specific areas where sampling was not requested and paid for or where not readily visible clues existed that would have warranted sampling in those areas. Your inspector is unlikely to sample for, or locate mold which may be hidden inside walls, behind wall paper, appliances, furniture or other inaccessible areas.

#### How to Stop Mold

- To stop mold growth, it is important to first stop water/moisture concerns. Mold spores will not grow if moisture is not present. Indoor mold can and should be prevented or controlled by controlling moisture.
- Look for evidence of water penetrating the structure by locating water stains or moist areas and remedy the water source.
- Look at the plumbing system for any leaks. Common leaks may be caused by a damaged toilet seal or from an original sink or bathtub drain.
- Check out the HVAC system condensation drain lines for any leaks or if they are properly insulated to prevent water dripping from the lines themselves.
- Remember to always vent your clothes dryer directly to the exterior. (If present within the structure)
- Clean out gutters regularly and roof should be monitored for areas of leaking.
- Install exhaust vent fans in recommended areas if the structure was not equipped with them originally. The exhaust vent fans should be vented directly to the exterior.

If mold growth is discovered GreenWorks recommends utilization of a mold remediation contractor to perform any selective demolition of wall materials or removal of visible molds.

Thank you for using GreenWorks Inspections to perform this testing for you.

#### **Carbon Dioxide Levels**

Carbon dioxide levels and potential health problems are indicated below:

- 250-350 ppm: background (normal) outdoor air level
- 350-1,000 ppm: typical level found in occupied spaces with good air exchange
- 1,000-2,000 ppm: level associated with complaints of drowsiness and poor air
- 2,000-5,000 ppm: level associated with headaches, sleepiness, and stagnant, stale, stuffy air; poor concentration, loss of attention, increased heart rate and slight nausea may also be present.
- >5,000 ppm: This indicates unusual air conditions where high levels of other gases also could be present. Toxicity
- or oxygen deprivation could occur. This is the permissible exposure limit for daily workplace exposures.
- >40,000 ppm: This level is immediately harmful due to oxygen deprivation

Carbon dioxide is what living organisms breathe out. Because carbon dioxide is a result of human metabolism, concentrations within a home are often used to indicate whether adequate fresh air is being supplied to the interior space.

## To prevent or reduce high concentrations of carbon dioxide in a home, fresh air should be supplied to the area.

An improper heating, ventilation and air conditioning system (HVAC) can lead to high levels of carbon dioxide. Many HVAC systems are designed to circulate and bring in fresh air because many structures rely totally on the system to recirculate air and the windows are never opened to let in fresh air. If there is any concern about carbon dioxide within the structure, further evaluation by an HVAC technician is recommended.



Living Room

#### **Humidity Levels**

Normal Humidity levels are between 30%- 50%

According to the EPA, high humidity levels, 60% and above, can lead to moisture problems. Condensation can be a sign of high humidity. When warm, humid air contacts a cold surface, condensation may form. Water activity has a profound effect on mold growth. Keeping the humidity level at the surface layer dry is key to prevention. A surface relative humidity of 65%-72% promotes the growth of dry tolerant or xenophobic molds like Aspergillus/Penicillium. One function of the building heating, ventilation, and air conditioning (HVAC) system is to remove moisture from the air before the air is distributed throughout the building. If the HVAC system is turned off during or shortly after major cleaning efforts that involve a lot of water, such as mopping and carpet shampooing or cleaning, the humidity may rise greatly, and moisture or mold problems may develop.

#### **Air Quality Index**

The below table outlines the concentrations and there level of health concerns for the air quality levels taken.

(AQI) values	
When the AQI is in this range:	air quality conditions are:
0 to 50	Good
51 to 100	Moderate
101 to 150	Unhealthy for Sensitive Groups
151 to 200	Unhealthy
201 to 300	Very Unhealthy

#### PM 2.5

Particles that are of the 2.5 micron size. Particles that are around this size, are particles that in high levels and with extended exposure can be unhealthy to people.

The below table shows concentrations and there health affects.

PM <sub>2.5</sub> IAQI	24-hour average ( $\mu$ g/m <sup>3</sup> )	Air quality ranges
0-50	0-35	I (optimal)
50-100	35–75	II (good)
100–150	75–115	III (light pollution)
150-200	115–150	IV (moderate pollution)
200-300	150-250	V (high pollution)
300-500	250-500	VI (severe pollution)

#### PM 10

Particles that are around 10 microns in size. Particle in this size range are particles that in high levels and with extended exposure can be unhealthy to people.

The below table has PM 10 concentrations and their health affects.

	<u>PM 10</u>
0 - 54	Good
55 - 154	Moderate
155 - 254	Unhealthy for Sensitive Groups
255 - 354	Unhealthy
355 - 424	Very Unhealthy
> 424	Hazardous

#### τνος

Total Volatile Organic Compounds. Volatile Organic Compounds (VOCs) are a combination of gases and odors emitted from many different toxins and chemicals found in everyday products.

VOCs can cause serious health effects in both the short and long term. Health effects vary from minor eye, nose and throat irritations all the way to liver and kidney damage or cancer, depending on the level of exposure.

TVOC Level mg/m3	
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**Level of Concern** 

Less than 0.3 mg/m3	Low
0.3 to 0.5 mg/m3	Acceptable
0.5 to 1 mg/m3	Marginal
1 to 3 mg/m3	High

#### нсно

This is formaldehyde. Formaldehyde is an important chemical used widely by industry to manufacture building materials and numerous household products. It is also a by-product of combustion and certain other natural processes. Thus, it may be present in substantial concentrations both indoors and outdoors.

Formaldehyde can cause irritation of the skin, eyes, nose and throat. High levels of exposure may cause some types of cancers.

	нсно
0 - 0.1	Healthy
> 0.1	Unhealthy

#### Epithelial Cells and Fibers

The levels for epithelial cells and fibers in the exterior environment are typically low to zero. So on the report they may show up as elevated. The environmental specialist compares these numbers to a standard set for air quality to make their determination.

High levels of these two things are a sign of poor air quality.

#### **Bug Parts**

Concentrations of bug parts in the exterior environment is typically low to zero. The environmental specialist will compare the interior level observed to standards to determine the level of potential health effects. High levels in the indoor air is a sign of poor indoor air quality.

#### Sample 1: Location of Sample

Right side hallway



## Sample 2: Location of Sample



### Sample 3: Location of Sample Exterior (Comparison)



### Observations

1.1.1 Sample 1 TVOC LEVELS HIGH TVOC can be measured in micrograms per cubic meter (μg/m3) of air (or milligrams per cubic meter (mg/m3), parts per million (ppm) or parts per billion (ppb)). The table below shows that less than 0.3 mg/m3 are considered low TVOC concentration levels. And levels between 0.3 mg/m3 to 0.5 mg/m3 are acceptable.

TVOC Level mg/m3	Level of Concern
Less than 0.3 mg/m3	Low
0.3 to 0.5 mg/m3	Acceptable
0.5 to 1 mg/m3	Marginal
1 to 3 mg/m3	High
Recommendation Contact a qualified professional.	

#### 1.2.1 Sample 2

### **TVOC LEVELS HIGH**

TVOC can be measured in micrograms per cubic meter (μg/m3) of air (or milligrams per cubic meter (mg/m3), parts per million (ppm) or parts per billion (ppb)). The table below shows that less than 0.3 mg/m3 are considered low TVOC concentration levels. And levels between 0.3 mg/m3 to 0.5 mg/m3 are acceptable.

Recommendation Contact a qualified professional.	
1 to 3 mg/m3	High
0.5 to 1 mg/m3	Marginal
0.3 to 0.5 mg/m3	Acceptable
Less than 0.3 mg/m3	Low
TVOC Level mg/m3	Level of Concern

1.3.1 Sample 3 TVOC LEVELS HIGH TVOC can be measured in micrograms per cubic meter ( $\mu$ g/m3) of air (or milligrams per cubic meter (mg/m3), parts per million (ppm) or parts per billion (ppb)). The table below shows that less than 0.3 mg/m3 are considered low TVOC concentration levels. And levels between 0.3 mg/m3 to 0.5 mg/m3 are acceptable.

TVOC Level mg/m3	Level of Concern
Less than 0.3 mg/m3	Low
0.3 to 0.5 mg/m3	Acceptable
0.5 to 1 mg/m3	Marginal
1 to 3 mg/m3	High
Recommendation	

Contact a qualified professional.

# 2: CONDUCIVE CONDITIONS

Information

#### **Interior:** General Interior Photos



Piano room

Piano room

Piano room





### **Exterior: Exterior Photos**



# **3: RECOMMENDATIONS**

### Information

#### Summary

Client booked the Indoor Air Quality inspecting for peace of mind. The Inspector started with an air quality monitor test in each room to determine which rooms should have air cassette tests performed. The right side hallway and master bedroom were chosen for air cassette samples. The lab results came back with low levels of mold indicating no significant concern at this time. The air quality monitor did indicate a high TVOC levels, an air quality solutions company or solutions specialist is recommended at this time.

#### **No Concern**

The molds listed in the samples were equal to, slightly elevated, or lower than the outside comparison sample. Indicating no significant concern in the samples areas at the time of inspection.

# STANDARDS OF PRACTICE