

Analysis Report prepared for

## Indoor Environmental Testing, Inc

1213 N Sherman Ave.  
Suite #298  
Madison, WI 53704

Phone: (608) 241-9883

3327-47TH  
Dimension Design

Collected: **August 10, 2021**  
Received: **August 13, 2021**  
Reported: **August 13, 2021**

We would like to thank you for trusting Hayes Microbial for your analytical needs!  
We received 5 samples by FedEx in good condition for this project on August 13th, 2021.

The results in this analysis pertain only to this job, collected on the stated date, and should not be used in the interpretation of any other job. This report may not be duplicated, except in full, without the written consent of Hayes Microbial Consulting, LLC..

This laboratory bears no responsibility for sample collection activities, analytical method limitations, or your use of the test results. Interpretation and use of test results are your responsibility. Any reference to health effects or interpretation of mold levels is strictly the opinion of Hayes Microbial. In no event, shall Hayes Microbial or any of its employees be liable for lost profits or any special, incidental or consequential damages arising out of the use of these test results.



Steve Hayes, BSMT(ASCP)  
Laboratory Director  
Hayes Microbial Consulting, LLC.



EPA Laboratory ID: VA01419



Lab ID: #188863



DPH License: #PH-0198

Sample Number	1	4260179			2	4282558			3	4282554			4	4282553		
Sample Name	Outside Air			LR			MBR			Basement						
Sample Volume	75.00 liter															
Reporting Limit	13 spores/m <sup>3</sup>															
Background	2			2			2			2						
Fragments	ND			ND			ND			ND						
Organism	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total				
Alternaria	2	27	<1%				2	27	15.4%							
Ascospores	162	2160	49.1%	11	147	29.7%	6	80	46.2%	5	67	45.5%				
Aspergillus Penicillium	6	80	1.8%	2	27	5.4%	3	40	23.1%	3	40	27.3%				
Basidiospores	21	280	6.4%													
Bipolaris Drechslera																
Chaetomium																
Cladosporium	133	1773	40.3%	24	320	64.9%	2	27	15.4%	3	40	27.3%				
Curvularia																
Epicoccum	3	40	<1%													
Fusarium																
Memnoniella																
Myxomycetes	1	13	<1%													
Pithomyces	1	13	<1%													
Stachybotrys																
Stemphylium																
Torula																
Ulocladium																
Polythrincium	1	13	<1%													
Total	330	4399	100%	37	494	100%	13	174	100%	11	147	100%				

Water Damage Indicator      Common Allergen      Slightly Higher than Baseline      Significantly Higher than Baseline      Ratio Abnormality



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Project Analyst:  
 Ronzo Lee, *Ronzo Lee*

Date:  
**08 - 13 - 2021**

Reviewed By:  
 Steve Hayes, BSMT *Stephen N. Hayes*

Date:  
**08 - 13 - 2021**

Sample Number	5	4282552			
Sample Name	HVAC AC				
Sample Volume	75.00 liter				
Reporting Limit	13 spores/m <sup>3</sup>				
Background	2				
Fragments	ND				
<b>Organism</b>	<b>Raw Count</b>	<b>Count / m<sup>3</sup></b>	<b>% of Total</b>		
Alternaria					
Ascospores	3	40	100.0%		
Aspergillus Penicillium					
Basidiospores					
Bipolaris Drechslera					
Chaetomium					
Cladosporium					
Curvularia					
Epicoccum					
Fusarium					
Memnoniella					
Myxomycetes					
Pithomyces					
Stachybotrys					
Stemphylium					
Torula					
Ulocladium					
Polythrincium					
<b>Total</b>	<b>3</b>	<b>40</b>	<b>100%</b>		

Water Damage Indicator	Common Allergen	Slightly Higher than Baseline	Significantly Higher than Baseline	Ratio Abnormality
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**Particle Analysis**

Sample Number	1 4260179			2 4282558			3 4282554			4 4282553		
Sample Name	Outside Air			LR			MBR			Basement		
Sample Volume	75.00 liter											
Reporting Limit	13 particles/m <sup>3</sup>											
Particle	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total
Cellulose Fibers	1	13	3.8%	2	27	1.8%	1	13	1.6%	2	27	2.5%
Synthetic Fibers				1	13	<1%	1	13	1.6%	2	27	2.5%
Fiberglass				16	213	14.4%	7	93	11.1%	8	107	10.1%
Dander	3	40	11.5%	72	960	64.9%	44	587	69.8%	48	640	60.8%
Plant Hair												
Talc										3	40	3.8%
Aciniform-like Soot	4	53	15.4%	6	80	5.4%	2	27	3.2%	3	40	3.8%
Animal Hair												
Human Hair												
Wood Fibers												
Feather Barbule	1	13	3.8%									
Pollen	12	160	46.2%									
Gypsum												
Silicates	2	27	7.7%	6	80	5.4%	3	40	4.8%	6	80	7.6%
Carpet Beetle Larvae												
Insect Frass												
Dust Mite Parts												
Insect Parts												
Mineral Salts												
Opaque Particles	2	27	7.7%	8	107	7.2%	5	67	7.9%	7	93	8.9%
Ash and Char-like Soot	1	13	3.8%									
Rust												
<b>Total</b>	<b>26</b>	<b>346</b>	<b>100%</b>	<b>111</b>	<b>1480</b>	<b>100%</b>	<b>63</b>	<b>840</b>	<b>100%</b>	<b>79</b>	<b>1054</b>	<b>100%</b>



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**Spore Trap Information**

<b>Reporting Limit</b>	The Reporting Limit is the lowest number of spores that can be detected based on the total volume of the sample collected and the percentage of the slide that is counted. At Hayes Microbial, 100% of the slide is read so the LOD is based solely on the total volume. Raw spore counts that exceed 500 spores will be estimated.										
<b>Blanks</b>	Results have not been corrected for field or laboratory blanks.										
<b>Background</b>	<p>The Background is the amount of debris that is present in the sample. This debris consists of skin cells, dirt, dust, pollen, drywall dust and other organic and non-organic matter. As the background density increases, the likelihood of spores, especially small spores such as those of Aspergillus and Penicillium may be obscured. The background is rated on a scale of 1 to 5 and each level is determined as follows:</p> <p><b>NBD:</b> No background detected due to possible pump or cassette malfunction. Recollect sample. (Field Blanks will display NBD)</p> <p><b>1 :</b> &lt;5% of field occluded. No spores will be uncountable.</p> <p><b>2 :</b> 5-25% of field occluded.</p> <p><b>3 :</b> 25-75% of field occluded.</p> <p><b>4 :</b> 75-90% of field occluded.</p> <p><b>5 :</b> &gt;90% of field occluded. Suggested recollection of sample.</p>										
<b>Fragments</b>	Fragments are small pieces of fungal mycelium or spores. They are not identifiable as to type and when present in very large numbers, may indicate the presence of mold amplification.										
<b>Control Comparisons</b>	There are no national standards for the numbers of fungal spores that may be present in the indoor environment. As a general rule and guideline that is widely accepted in the indoor air quality field, the numbers and types of spores that are present in the indoor environment should not exceed those that are present outdoors at any given time. There will always be some mold spores present in "normal" indoor environments. The purpose of sampling and counting spores is to help determine whether an abnormal condition exists within the indoor environment and if it does, to help pinpoint the area of contamination. Spore counts should not be used as the sole determining factor of mold contamination. There are many factors that can cause anomalies in the comparison of indoor and outdoor samples due to the dynamic nature of both of those environments.										
<table border="1"> <tr> <td style="background-color: #ADD8E6;">Water Damage Indicator</td> <td><b>Blue:</b> These molds are commonly seen in conditions of prolonged water intrusion and usually indicate a problem.</td> </tr> <tr> <td style="background-color: #90EE90;">Common Allergen</td> <td><b>Green:</b> Although all molds are potential allergens, these are the most common allergens that may be found indoors.</td> </tr> <tr> <td style="background-color: #FFDAB9;">Slightly Higher than Baseline</td> <td><b>Orange:</b> The spore count is slightly higher than the outside count and may or may not indicate a source of contamination.</td> </tr> <tr> <td style="background-color: #FFB6C1;">Significantly Higher than Baseline</td> <td><b>Red:</b> The spore count is significantly higher than the baseline count and probably indicates a source of contamination.</td> </tr> <tr> <td style="background-color: #DDA0DD;">Ratio Abnormality</td> <td><b>Violet:</b> The types of spores found indoors should be similar to the ones that were identified in the baseline sample. Significant increases (more than 25%) in the ratio of a particular spore type may indicate the presence of abnormal levels of mold, even if the total number of spores of that type is lower in the indoor environment than it was outdoors.</td> </tr> </table>	Water Damage Indicator	<b>Blue:</b> These molds are commonly seen in conditions of prolonged water intrusion and usually indicate a problem.	Common Allergen	<b>Green:</b> Although all molds are potential allergens, these are the most common allergens that may be found indoors.	Slightly Higher than Baseline	<b>Orange:</b> The spore count is slightly higher than the outside count and may or may not indicate a source of contamination.	Significantly Higher than Baseline	<b>Red:</b> The spore count is significantly higher than the baseline count and probably indicates a source of contamination.	Ratio Abnormality	<b>Violet:</b> The types of spores found indoors should be similar to the ones that were identified in the baseline sample. Significant increases (more than 25%) in the ratio of a particular spore type may indicate the presence of abnormal levels of mold, even if the total number of spores of that type is lower in the indoor environment than it was outdoors.	
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<b>Color Coding</b>	Fungi that are present in indoor samples at levels lower than 200 per cubic meter are not color coded on the report, unless they are one of the water damage indicators.										

**Total Particulate Analysis Information**

Our Total Particulate Analysis test is based on the initial screening procedures from ASTM #D6602. Our Lab only uses light, polarized light, and phase contrast microscopy. No SEM or X-ray defraction is performed. Below are some guidelines to help find totals for the most common particle counts analyzed by light microscopy.

Particle		Air *	Surface *
Dander	Home (Carpeted Areas)	1,000-6,000 / M <sup>3</sup>	10,000-16,000 / cm <sup>2</sup>
	Home (Hard Surface Areas)	500-5,000 / M <sup>3</sup>	5,000-16,000 / cm <sup>2</sup>
	Office or Classroom (Carpeted)	4,000-12,000 / M <sup>3</sup>	14,000-24,000 / cm <sup>2</sup>
	Office or Classroom (Hard Surface Areas)	3,000-10,000 / M <sup>3</sup>	12,000-20,000 / cm <sup>2</sup>
Cellulose Fibers		0-250 / M <sup>3</sup>	0-1,600 / cm <sup>2</sup>
Synthetic Fibers		0-250 / M <sup>3</sup>	0-1,600 / cm <sup>2</sup>
Fiberglass Fibers		0-60 / M <sup>3</sup>	0-400 / cm <sup>2</sup>
Gypsum Fibers		0-400 / M <sup>3</sup>	0-1,800 / cm <sup>2</sup>
Talc		0-250 / M <sup>3</sup>	0-2,000 / cm <sup>2</sup>
Dust Mites (parts)		0-30 / M <sup>3</sup>	0-200 / cm <sup>2</sup>
Insect Parts		0-30 / M <sup>3</sup>	0-200 / cm <sup>2</sup>
Animal Hair		0-30 / M <sup>3</sup>	0-200 / cm <sup>2</sup>
Wood Fibers		0-60 / M <sup>3</sup>	0-200 / cm <sup>2</sup>
Plant Hairs		0-60 / M <sup>3</sup>	0-200 / cm <sup>2</sup>
Human Hair		0-60 / M <sup>3</sup>	0-200 / cm <sup>2</sup>
Carpet Beetle Larvae		0-40 / M <sup>3</sup>	0-200 / cm <sup>2</sup>
Insect Frass		0-40 / M <sup>3</sup>	0-400 / cm <sup>2</sup>
Feather Barbules		0-40 / M <sup>3</sup>	0-200 / cm <sup>2</sup>
Opaque Particles		0-100 / M <sup>3</sup>	0-600 / cm <sup>2</sup>
Starch		0-40 / M <sup>3</sup>	0-200 / cm <sup>2</sup>
Rust		0-60 / M <sup>3</sup>	0-400 / cm <sup>2</sup>
Ash and Char-like Soot		0-100 / M <sup>3</sup>	0-300 / cm <sup>2</sup>
Aciniform-like Soot		0-100 / M <sup>3</sup>	0-800 / cm <sup>2</sup>
Silicates	(Varies greatly depending on area)	0-500 / M <sup>3</sup>	0-2,800 / cm <sup>2</sup>
Pollen	(Varies with outdoor pollen levels and whether there are live indoor plants)	0-500 / M <sup>3</sup>	0-2,800 / cm <sup>2</sup>

\* Estimated Normal Ranges are based on prior experience. There are no standard ranges for this form of testing.

M<sup>3</sup> = Cubic Meter

cm<sup>2</sup> = Square Centimeter

## Organism Descriptions

### Aciniform-like Soot

**Habitat:** Also known as black carbon, aciniform soot comes from the combustion of oil based or hydrocarbon containing materials. This type of soot should not be confused with Carbon Black, which is a manufactured product that has been used in commerce for over a century and consists of a fine black powder of nearly pure elemental carbon.

**Effects:** Sources are from the combustion of waste oil, fuel oil, gasoline fuel, diesel fuel, coal, coal-tar pitch, oil shale, rubber, plastics and resins, natural gas fireplaces and stoves, candles etc.

### Alternaria

**Habitat:** Commonly found outdoors in soil and decaying plants. Indoors, it is commonly found on window sills and other horizontal surfaces.

**Effects:** A common allergen and has been associated with hypersensitivity pneumonitis. Alternaria is capable of producing toxic metabolites which may be associated with disease in humans or animals. Occasionally an agent of onychomycosis, ulcerated cutaneous infection and chronic sinusitis, principally in the immunocompromised patient.

### Ascospores

**Habitat:** A large group consisting of more than 3000 species of fungi. Common plant pathogens and outdoor numbers become very high following rain. Most of the genera are indistinguishable by spore trap analysis and are combined on the report.

**Effects:** Health affects are poorly studied, but many are likely to be allergenic.

### Ash and Char-like Soot

**Habitat:** Ash-like soot is formed from the combustion of wood and paper products. Char-like soot comes from the incomplete combustion of wood and paper products.

**Effects:** Sources are wood fireplaces, house fires, forest fires, and burning of leaves and other yard debris.

### Aspergillus|Penicillium

**Habitat:** The most common fungi isolated from the environment. Very common in soil and on decaying plant material. Are able to grow well indoors on a wide variety of substrates.

**Effects:** This group contains common allergens and many can cause hypersensitivity pneumonitis. They may cause extrinsic asthma, and many are opportunistic pathogens. Many species produce mycotoxins which may be associated with disease in humans and other animals. Toxin production is dependent on the species, the food source, competition with other organisms, and other environmental conditions.

### Basidiospores

**Habitat:** A common group of Fungi that includes the mushrooms and bracket fungi. They are saprophytes and plant pathogens. In wet conditions they can cause structural damage to buildings.

**Effects:** Common allergens and are also associated with hypersensitivity pneumonitis.

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**Cellulose Fibers**      **Habitat:** Cellulose fibers are natural fibers from plant material.  
**Effects:** Sources of cellulose fibers are paper, cardboard, insulation material.

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**Cladosporium**      **Habitat:** One of the most common genera worldwide. Found in soil and plant debris and on the leaf surfaces of living plants. The outdoor numbers are lower in the winter and often relatively high in the summer, especially in high humidity. The outdoor numbers often spike in the late afternoon and evening. Indoors, it can be found growing on textiles, wood, sheetrock, moist window sills and in HVAC supply ducts.  
**Effects:** A common allergen, producing more than 10 allergenic antigens and a common cause of hypersensitivity pneumonitis.

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**Dander**      **Habitat:** Dander is dead skin cells. The average person sheds about 600,000 skin cells per day.  
**Effects:** Sources are people and animals.

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**Epicoccum**      **Habitat:** It is found in soil and plant litter and is a plant pathogen. It can grow indoors on a variety of substrates, including paper and textiles and is commonly found on wet drywall.  
**Effects:** It is a common allergen. No cases of infection have been reported in humans.

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**Feather Barbule**      **Habitat:** Any of the individual parts that make up a feather.  
**Effects:** Sources are birds.

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**Fiberglass**      **Habitat:** Fiberglass Glass or Glass wool is an insulating material made from fibers of glass arranged using a binder into a texture similar to wool. The process traps many small pockets of air between the glass, and these small air pockets result in the thermal insulation properties.  
**Effects:** Insulation

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<b>Myxomycetes</b>	<b>Habitat:</b> Found on decaying plant material and as a plant pathogen. <b>Effects:</b> Some allergenic properties reported, but generally pose no health concerns to humans.
<b>Opaque Particles</b>	<b>Habitat:</b> Particles that are not characteristic of other opaque particles that can be identified such as soot. If significant amounts are present, further analysis by SEM and Xray Diffraction are suggested to help determine the makeup and possible sources. <b>Effects:</b> Unknown until characterization is determined.
<b>Pithomyces</b>	<b>Habitat:</b> Common fungus isolated from soil, decaying plant material. Rarely found indoors. <b>Effects:</b> Allergenic properties are poorly studied. No cases of infection in humans.
<b>Pollen</b>	<b>Habitat:</b> Reproductive structures of trees, grasses and plants. <b>Effects:</b> Trees, grasses and plants.
<b>Polythrincium</b>	<b>Habitat:</b> Found in soil and occasionally on plants. <b>Effects:</b> No known health effects. Allergenic properties are poorly studied.
<b>Silicates</b>	<b>Habitat:</b> Silicates comprise the majority of the Earth's crust. Sand, Portland cement, and thousands of minerals are examples of silicates. Also includes quartz. <b>Effects:</b> Sources are sand, cement and drywall.

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**Synthetic Fibers**

**Habitat:** Synthetic fibers are man-made fibers such as nylon, polyester, and polyolefin.

**Effects:** Sources of synthetic fibers are carpet, upholstery and clothing.

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**Talc**

**Habitat:** Talc is a mineral composed of hydrated magnesium silicate.

**Effects:** Sources of talc are powder, personal hygiene and cosmetics products, and in powdered laundry detergents and carpet cleaners.

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