



**HAYES**

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Analysis Report prepared for

## Sample Company

123 Main Street  
Midlothian, VA 23112  
Ph.: 804-562-3534 Fax.: 804-447-5562

Job Number: 110412-2  
Job Name: Expanded Spore Trap  
Date Sampled: 11-04-2012  
Date Analyzed: 11-05-2012 15:36:58  
Report Date: 11-05-2012 16:01:44

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AIHA EMPAT Laboratory ID# 188863



AIHA Accredited  
Environmental Microbiology



Certified Clinical Microbiologist



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HMC #12009001

**Sample Company**  
**123 Main Street**  
**Midlothian, VA 23112**

November 5, 2012

Client Job Number: 110412-2  
Client Job Name: Expanded Spore Trap

Dear Sample Company,

We would like to thank you for trusting Hayes Microbial for your analytical needs. On November 5, 2012 we received 4 samples by FedEx for the job referenced above. 4 samples were received in good condition.

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. In no event, shall Hayes Microbial Consulting or any of its employees be liable for lost profits or any special, incidental or consequential damages arising out of your use of the test results.

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



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Spore Trap Analysis  
SOP #HMC101

HMC #12009001

Job Number: <b>110412-2</b>	Job Name: <b>Expanded Spore Trap</b>	Date Collected: <b>11/04/2012</b>
Collected by: <b>John Doe</b>		Date Received: <b>11/05/2012</b>
Email: <b>jdoe@hayesmicrobial.com</b>		Date Reported: <b>11/05/2012</b>

HMC ID Number	12009001 - 1	12009001 - 2	12009001 - 3	12009001 - 4
Sample ID#	ST-1	ST-2	ST-3	ST-4
Sample Name	Exterior	Basement	Family Room	Master Bathroom
Sample Volume	75 liters	75 liters	75 liters	75 liters
Limit of Detection	13 spores/M3	13 spores/M3	13 spores/M3	13 spores/M3
Background	1	3	2	2
Fragments	13 /M3	80 /M3	27 /M3	120 /M3
Fibers	13 /M3	360 /M3	200 /M3	147 /M3
Dander	187 /M3	5227 /M3	3093 /M3	4107 /M3
Pollen	80 /M3	ND	13 /M3	ND

Organism	Raw Count	Count / M3	% of Total	Raw Count	Count / M3	% of Total	Raw Count	Count / M3	% of Total	Raw Count	Count / M3	% of Total
Alternaria	4	53	< 1%				2	27	< 1%			
Ascospores	420	5600	51.0%	124	1653	16.8%	108	1440	40.4%	82	1093	12.9%
Aspergillus Penicillium	63	840	7.7%	518	6907	70.1%	118	1573	44.2%	94	1253	14.8%
Basidiospores	128	1707	15.6%	21	280	2.8%	39	520	14.6%	19	253	3.0%
Bipolaris Drechslera												
Chaetomium				13	173	1.8%						
Cladosporium	196	2613	23.8%	27	360	3.7%				438	5840	68.9%
Curvularia												
Epicoccum												
Fusarium												
Memnoniella												
Myxomycetes	7	93	< 1%				2	27	< 1%	1	13	< 1%
Pithomyces												
Stachybotrys				36	480	4.9%						
Stemphylium												
Torula	5	67	< 1%									
Ulocladium												
Unspecified Spore												
Total	823	10973		739	9853		267	3560		636	8479	

Water Damage Indicator    Common Allergen    Slightly Higher than Outside Air    Significantly Higher than Outside Air    Ratio Abnormality

Signature: Stephen N. Hayes

Date: 11/05/2012

Reviewed by: Chris Schubert

Date: 11/05/2012



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## Spore Trap Information

HMC #12009001

<b>Limit of Detection</b>	The Limit of Detection 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 4 and each level is determined as follows:</p> <p><b>ND</b> : No background detected. (Pump or cassette malfunction.) Recollect sample.  <b>1</b> : &lt;5% of field occluded. No spores will be uncountable.  <b>2</b> : 5-25% of field occluded.  <b>3</b> : 25-75% of field occluded.  <b>4</b> : 75-90% of field occluded.  <b>5</b> : &gt;90% of field occluded. Suggest 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>Indoor/Outdoor 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.
<b>Water Damage Indicators</b>	These molds are commonly seen in conditions of prolonged water intrusion and usually indicate a problem.
<b>Common Allergens</b>	Although all molds are potential allergens, these are the most common allergens that may be found indoors.
<b>Slightly Higher than Outside Air</b>	The spore count is slightly higher than the outside count and may or may not indicate a source of contamination.
<b>Significantly Higher than Outside Air</b>	The spore count is significantly higher than the outdoor count and probably indicates a source of contamination.
<b>Ratio Abnormality</b>	The types of spores found indoors should be similar to the ones that were identified in the outdoor 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.
<b>Color Note</b>	Fungi that are present in indoor samples at levels lower than 200 per cubic meter are considered insignificant. Insignificant spore counts are not color coded on the report.



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#### Alternaria

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

**Health 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.

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#### 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.

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

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#### 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.

**Health 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 and on the food source for the fungus. Some of these toxins have been found to be carcinogenic.

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#### 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.

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

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#### Chaetomium

**Habitat:** Ascomycete fungus, commonly isolated from soil and decaying plant materials. It is cellulolytic and grows well indoors on damp sheetrock and other paper substrates. It is often found growing with Stachybotrys.

**Health Effects:** It is reported to be allergenic and may produce toxins.

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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.

**Health Effects:** A common allergen, producing more than 10 allergenic antigens and a common cause of hypersensitivity pneumonitis.

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#### Myxomycetes

**Habitat:** Found on decaying plant material and as a plant pathogen.

**Health Effects:** Some allergenic properties reported, but generally pose no health concerns to humans.

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Organism Descriptions

HMC #12009001

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## Stachybotrys

**Habitat:** Commonly found in soil and on decaying plant material. It is cellulolytic, and can be found indoors on wet materials containing cellulose, such as wallboard, ceiling tile, and other paper-based materials. It is found outdoors on decaying plant material although it is rarely detected on outdoor air samples.

**Health Effects:** Allergenic properties are poorly studied and no cases of infection have been reported in humans. They do however produce potent tricothecene mycotoxins. The toxins produced by this fungus can suppress the immune system affecting the lymphoid tissue and the bone marrow. The mycotoxin is also reported to be a liver and kidney carcinogen.

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## Torula

**Habitat:** Found in soil and on wood and grasses. Occasionally found growing indoors on cellulose containing materials.

**Health Effects:** A known allergen. No known cases of human infection.

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