

EXPANDED FUNGAL REPORT

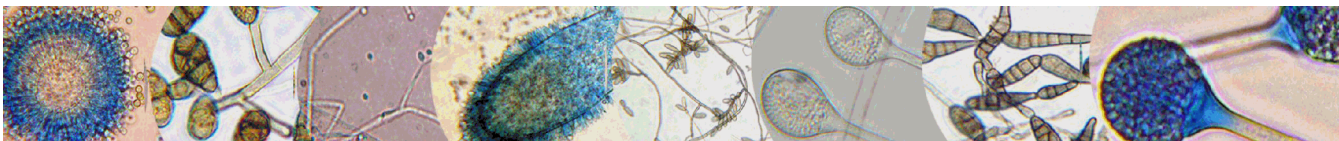
Prepared Exclusively For

Air Care & Restoration
1510 Gary Street
Bethlehem, PA 18018

Report Date: 6/26/2007
Project: Congar
EMSL Order: 370704081



ACCREDITATIONS: AIHA EMLAP
#100194.



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EMSL Analytical, Inc.

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Email: westmontmicro@emsl.com

Attn: Keith Roe
Air Care & Restoration
1510 Gary Street
Bethlehem, PA 18018

EMSL Order: 370704081
Customer ID: AIRC63
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1. Description of Analysis

Analytical Laboratory

EMSL Analytical, Inc. (EMSL) is a nationwide, full service, analytical testing laboratory network providing Asbestos, Mold, Indoor Air Quality, Microbiological, Environmental, Chemical, Forensic, Materials, Industrial Hygiene and Mechanical Testing services since 1981. Ranked as the premier independently owned environmental testing laboratory in the nation, EMSL puts analytical quality as its top priority. This quality is recognized by many well-respected federal, state and private accrediting agencies, such as AIHA's EMLAP and EMPAT programs, and assured by our high quality personnel, including many Ph.D. microbiologists and mycologists.

EMSL is an independent laboratory that performed the analysis of these samples. EMSL did not conduct the sampling or site investigation for this report. The samples referenced herein were analyzed under strict quality control procedures using state-of-the-art microbiological methods. The analytical methods used and the data presented are scientifically and legally defensible.

The laboratory data is provided in compliance with AIHA policy modules and ISO 17025 guidelines for the particular test(s) requested, including any associated limitations for the methods employed. These data are intended for use by professionals having knowledge of the testing methods necessary to interpret them accurately.

Air Samples - Spore traps:

Spore traps are commercially available sampling devices that capture airborne particles on an adhesive slide. Air is pulled through the device using a vacuum pump. Spores, as well as other airborne particles, are impacted on the collection adhesive. Using spore trap collection methods has inherent limitations. These collection methods are biased towards larger spore sizes.

The analysis for total spore counts is a direct microscopic examination and does not include culturing or growing the fungi. Therefore, the results include both viable and non-viable spores. Some fungal groups produce similar spore types that cannot be distinguished by direct microscopic examination alone (i.e., *Aspergillus/Penicillium*, and others). Other spore types may lack distinguishing features that aid in their identification. These types are grouped into larger categories such as Ascospores or Basidiospores.

Fungal spores are identified and grouped by morphological characteristics including color, shape, septation, ornamentation, and fruiting structures (if present) which are compared to published mycological identification keys and texts. EMSL reports provide spore counts per cubic meter of air to three significant figures. Please note that each spore category is reported to three significant figures. Due to rounding and the application of three significant figures the sum



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of the individual spore numbers may not equal the total spore count on the report. EMSL does not maintain responsibility for final volume concentrations (counts/m³) since this volume is provided by the field collector and can not be verified by EMSL.

EMSL analyzes spore traps using phase contrast microscopy. There is a wide choice of collection devices (Air-O-Cell, Micro-5, Burkhard, etc.) on the market. Differences in analytical method may exist between spore trap devices.

Spore trap results are reported in spores per cubic meter of air. Due to the other airborne particles collected with the spores, EMSL reports a background particle density. Background density is an indication of overall particulate matter present on the sample (i.e. dust in the air). High background concentrations may obscure spores such as the *Penicillium/Aspergillus* group. The rating system is from 1-5 with 1 = 1 - 25% of the background obscured by material, 2 = 26 - 50%, 3 = 51 - 75%, 4 = 76% - 99%, 5 = 100% or overloaded. A background rating of 4 or higher should be regarded as a minimum count since the actual concentrations may be higher than those reported. EMSL will not be held responsible for overloading of samples. Sample volumes are left to the discretion of the company or persons conducting the fieldwork.

Skin fragment density is the percentage of skin cells making up the total background material, 1 = 1 - 25%, 2 = 26 - 50%, 3 = 51 - 75%, 4 = 76-100%. Skin fragment density is considered an indication of the general cleanliness in the area sampled. It has been estimated that up to 90% of household dust consists of dead skin cells.

2. Analytical Results

See attached data reports and charts.



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MoldSnap(™) Cassette Analysis of Fungal Spores & Other Airborne Particulates by Optical Microscopy (EMSL Method M001)

Lab Sample Number:	370704081-0001			370704081-0002			370704081-0003		
Client Sample ID:	AOC 1			AOC 2			AOC 3		
Volume:	75			75			75		
Sample Location:	Inside/Front			Inside/Rear			Outside		
Spore Types	Raw Count	Count/m ³	% of Total	Raw Count	Count/m ³	% of Total	Raw Count	Count/m ³	% of Total
Agrocybe/Coprinus	-	-	-	-	-	-	-	-	-
Alternaria	-	-	-	-	-	-	2	26	0.6
Ascospores	3	39	2	26	338	18	48	624	16
Aspergillus/Penicillium	117	1520	63	17	221	12	4	52	1
Basidiospores	5	65	3	1	13	0.7	7	91	2
Bipolaris	-	-	-	-	-	-	-	-	-
Chaetomium	18	234	10	26	338	18	-	-	-
Cladosporium	41	533	22	72	936	50	242	3150	79
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	2	26	1	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycete	-	-	-	2	26	1	-	-	-
Paecilomyces	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	1	13	0.7	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Cercospora	1	13	0.5	-	-	-	4	52	1
Pithomyces	-	-	-	-	-	-	1	13	0.3
Total Fungi	187	2430	100	145	1890	100	308	4010	100
Fibrous Particulate	23	299	-	15	195	-	9	117	-
Hyphal Fragment	8	104	-	-	-	-	2	26	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analytical Sensitivity	-	13	-	-	13	-	-	13	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	0	-
Background (1-5)	-	2	-	-	2	-	-	2	-

No discernable field blank was submitted with this group of samples.

ACCREDITATIONS: AIHA EMLAP #100194.

Samples received in good condition unless otherwise noted.

High Levels of background particulate can obscure spores and other particulates leading to underestimation.

Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification.

The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment.

Present= Spores found during additional scan at lower mag. This report relates only to the samples reported and may not be reproduced,

except in full, without written approval by EMSL. Results have not been adjusted for field or laboratory blank unless otherwise noted.

Jason Dobranic, Ph.D., Laboratory Manager
or Other Approved Signatory

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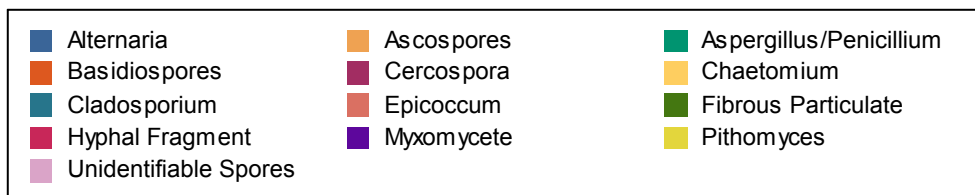
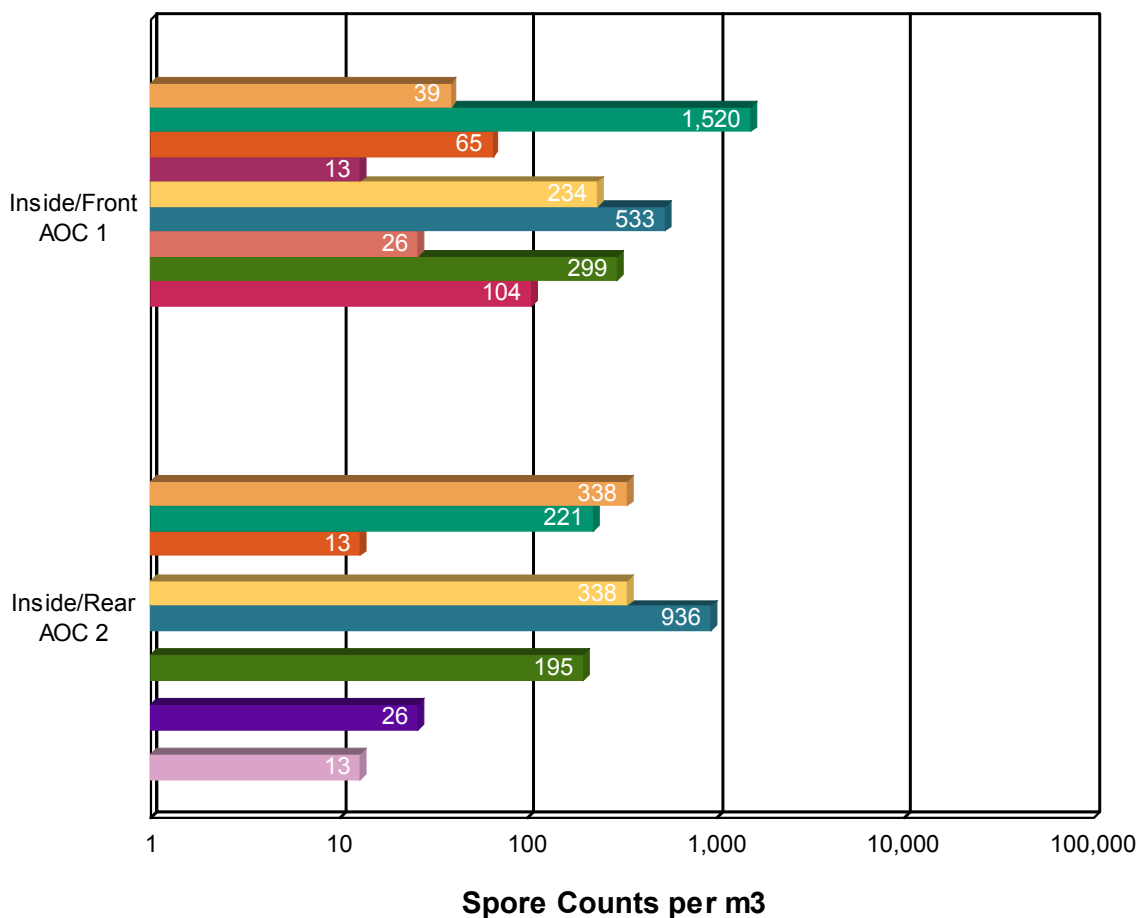
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Spore Trap Report: Total Counts



* The chart is displayed using a logarithmic scale. Bar size is not directly proportional to the number of spores.

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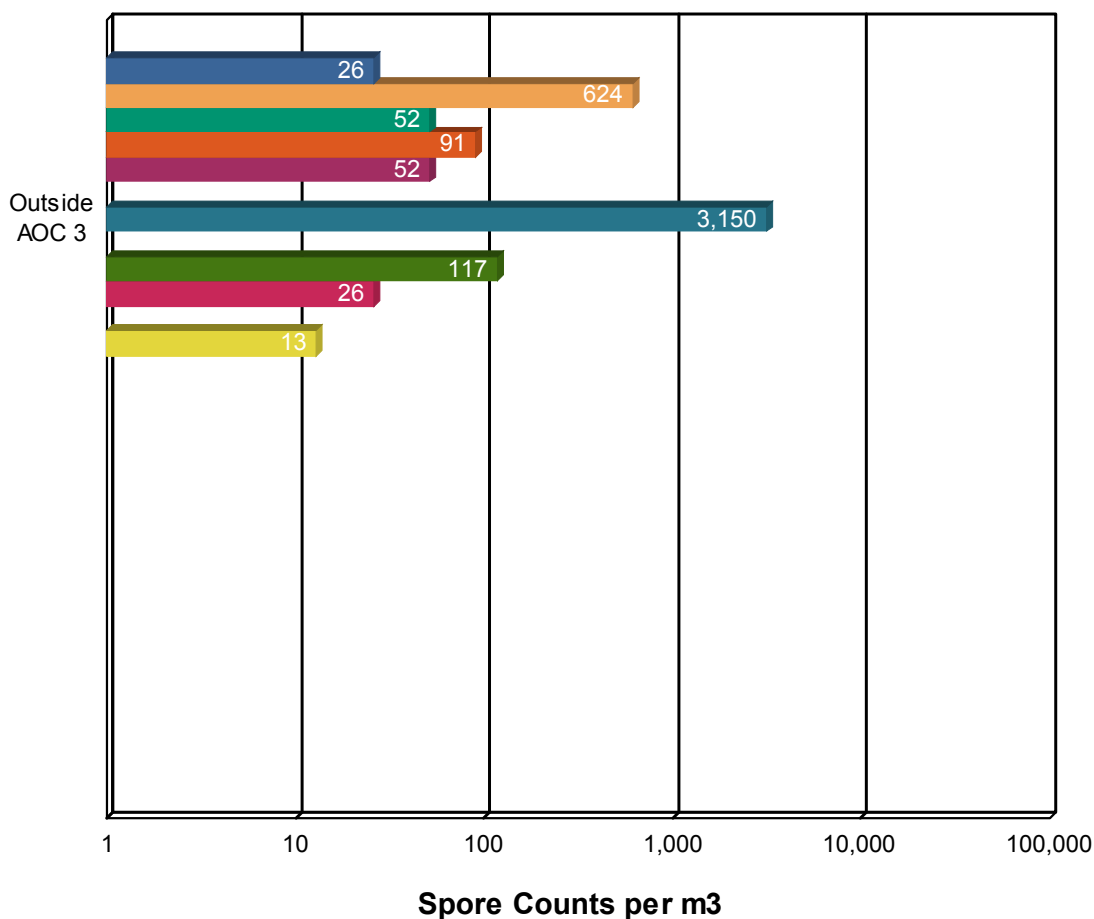
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Spore Trap Report: Total Counts



Alternaria	Ascospores	Aspergillus/Penicillium
Basidiospores	Cercospora	Chaetomium
Cladosporium	Epicoccum	Fibrous Particulate
Hyphal Fragment	Myxomycete	Pithomyces
Unidentifiable Spores		

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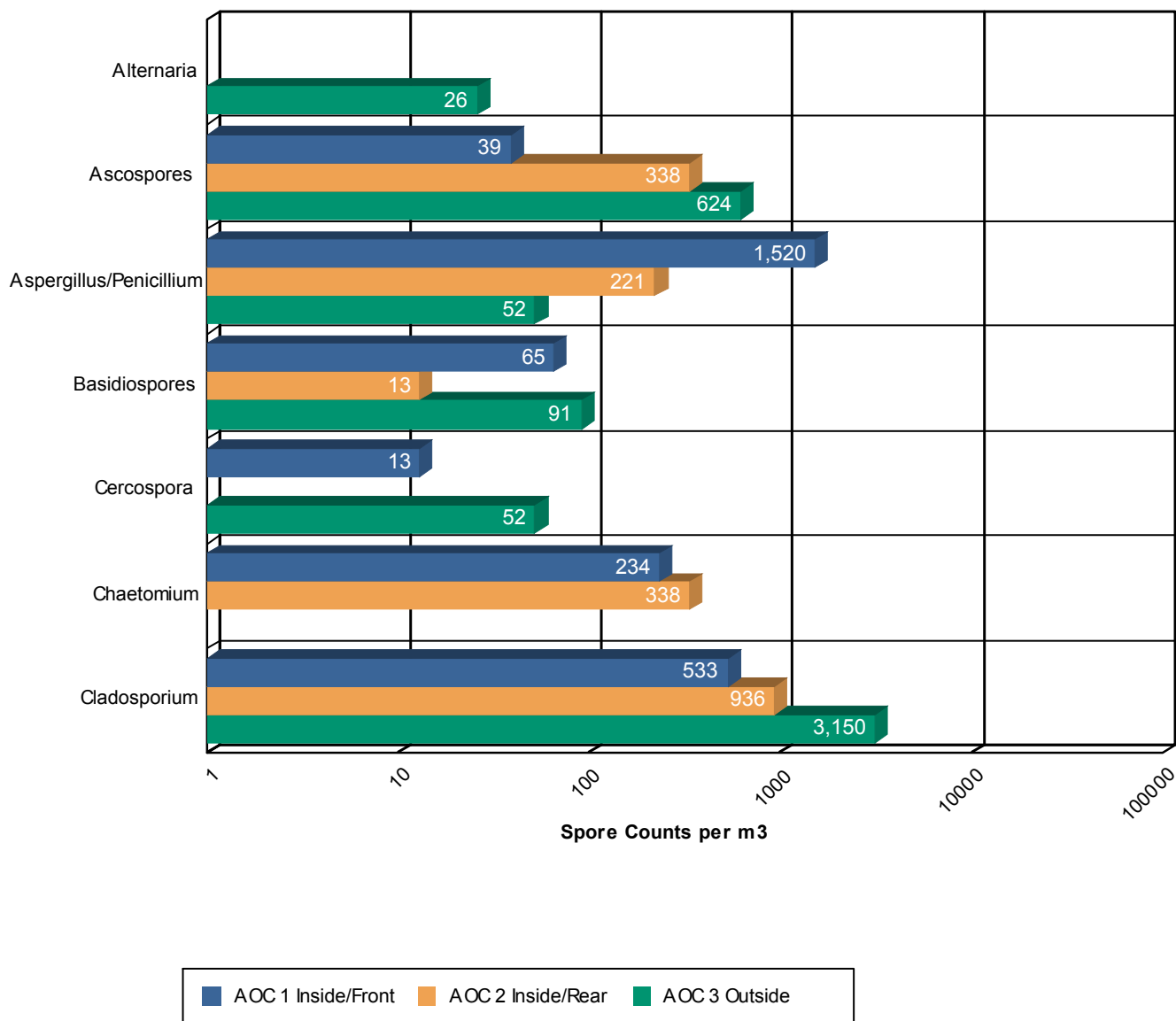
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Background Comparison Chart



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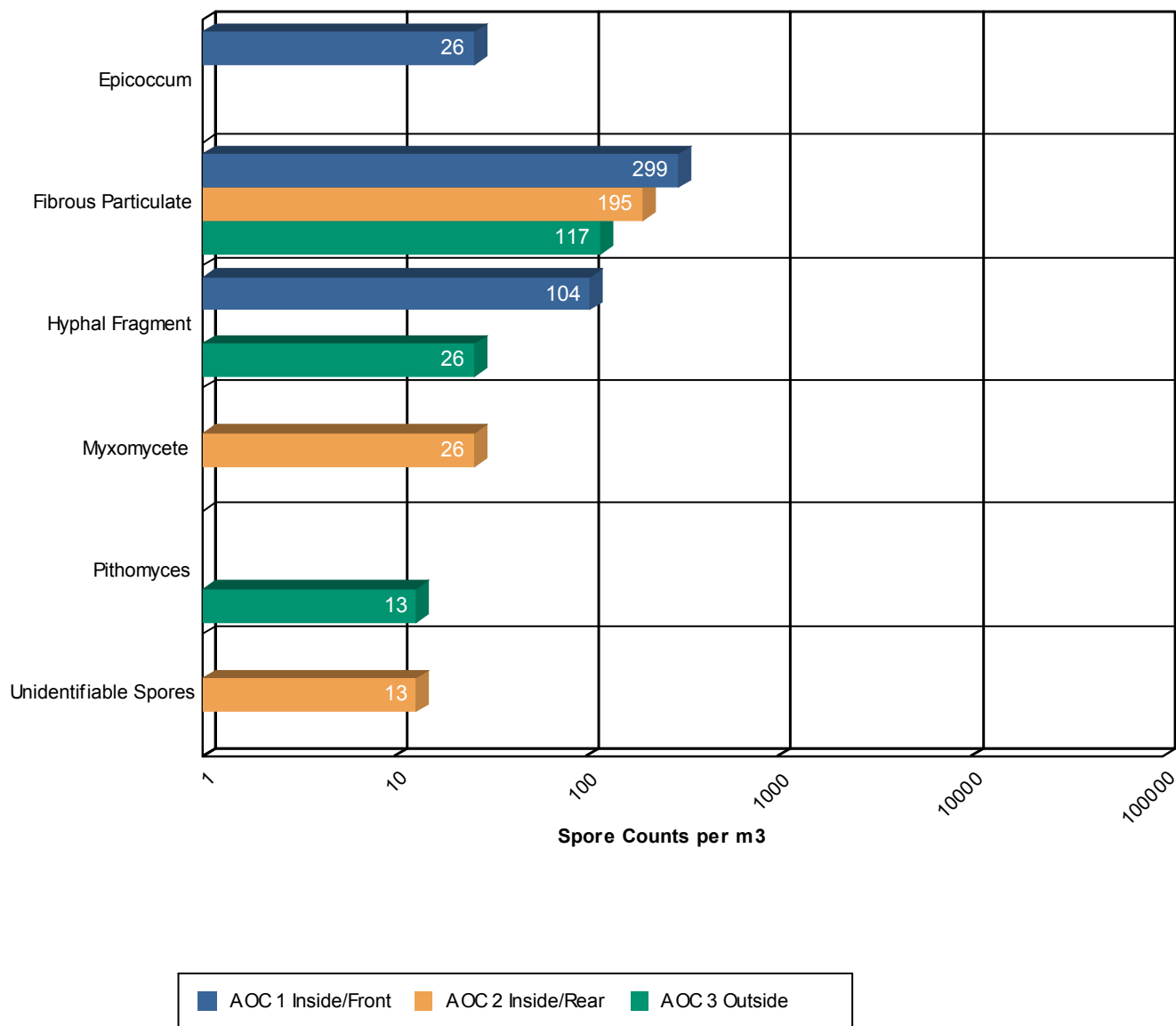
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3. Understanding the Results

EMSL Analytical, Inc. is an independent laboratory, providing unbiased and scientifically valid results. These data represent only a portion of an overall IAQ investigation. Visual information and environmental conditions measured during the site assessment (humidity, moisture readings, etc.) are crucial to any final interpretation of the results. Many factors impact the final results; therefore, result interpretation should only be conducted by qualified individuals. The American Conference of Governmental Industrial Hygienists (ACGIH) has published a good reference book covering sampling and data interpretation. It is entitled, Bioaerosols: Assessment and Control, 1999.

Air Samples:

Air samples are typically evaluated by means of fungal type identified and by comparing indoor and outdoor concentrations, complaint to non-complaint areas, or area of concern to areas of non-concern. In general, the levels and types of fungi in the indoor air (in non-problem buildings) should be similar to or lower than those found in the outdoor air. Higher levels of spores (order of magnitude) found inside may indicate that moisture sources and resultant fungal growth are present. Spore count results are influenced by geographic location, seasonal and diurnal variation, and biotic/abiotic outside conditions. For example, fresh snow cover on the ground will affect the outdoor spore count concentration.

Use the following guidelines when interpreting the results:

1. The composition and diversity of fungi in indoor, non-problem buildings should be similar to that of the outdoor air.
2. Compare spore count concentrations indoors and outdoors. Elevated indoor concentrations may indicate indoor fungal growth. Be aware that this is not always consistent and additional sampling may be needed.
3. Certain fungi are very good indicators of water damage. The presence of these spores, even in small quantities, indicates the presence of water damage. These indicator fungi include, but are not limited to, *Chaetomium*, *Fusarium*, *Stachybotrys* (including *Memnoniella*), and *Ulocladium*.
4. Different types of fungi grow at different levels of biologically available water. These differences in fungal growth suggest the degree of water damage or saturation. For example, *Stachybotrys* is an indication of short term, severe, or prolonged water damage over time.



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Fungal spores are found everywhere. Whether or not symptoms develop in people exposed to fungi depends on the nature of the fungal material (e.g., allergenic, toxic, or infectious), the exposure level, and the susceptibility of exposed persons. Susceptibility varies with the genetic predisposition (e.g., allergic reactions do not always occur in all individuals), age, pre-existing medical conditions (e.g., diabetes, cancer, or chronic lung conditions), use of immunosuppressive drugs, and concurrent exposures. These reasons make it difficult to identify dose/response relationships that are required to establish “safe” or “unsafe” levels (i.e., permissible exposure limits).

It is generally accepted in the industry that indoor fungal growth is undesirable and inappropriate, necessitating removal or other appropriate remedial actions. The New York City guidelines and EPA guidelines for mold remediation in schools and commercial buildings define the conditions warranting mold remediation. Always remember that water is the key. Preventing water damage or water condensation will prevent mold growth.

This report is not intended to provide medical advice or advice concerning the relative safety of an occupied space. Always consult an occupational or environmental health physician who has experience addressing indoor air contaminants if you have any questions.



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4. Glossary of Fungi

<i>Alternaria</i>	
Natural Habitat	<ul style="list-style-type: none">• Common saprobe and pathogen of plants. Typically found on plant tissue, decaying wood, and foods.• Soil• Air outdoors
Suitable Substrates in the Indoor Environment	<ul style="list-style-type: none">• Indoors near condensation (window frames, showers)• House dust (in carpets, and air)• Also colonizes building supplies, computer disks, cosmetics, leather, optical instruments, paper, sewage, stone monuments, textiles, wood pulp, and jet fuel
Water Activity	<ul style="list-style-type: none">• $A_w = 0.85-0.88$
Mode of Dissemination	<ul style="list-style-type: none">• Wind
Allergenic Potential	<ul style="list-style-type: none">• Type I allergies (hay fever, asthma)• Type III (hypersensitivity pneumonitis)
Potential Opportunist or Pathogen	<ul style="list-style-type: none">• Phaeohyphomycosis (causing cystic granulomas in the skin and subcutaneous tissue)• In immunocompetent patients, <i>Alternaria</i> colonizes the paranasal sinuses, leading to chronic hypertrophic sinusitis
Industrial Uses	<ul style="list-style-type: none">• Biocontrol of weed plants• Biocontrol fungal plant pathogens
Potential Toxins Produced	<ul style="list-style-type: none">• Alternariol (AOH)• Alternariol monomethylether (AME)• Tenuazonic acid (TeA)• Alternuene (ALT)• Altern toxins (ATX)
Other Comments	<ul style="list-style-type: none">• <i>Alternaria</i> spores are one of the most common and potent indoor and outdoor airborne allergens. Additionally, <i>Alternaria</i> sensitization has been determined to be one of the most important factors in the onset of childhood asthma. Synergy with <i>Cladosporium</i> or <i>Ulocladium</i> may increase the severity of symptoms

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Ascospores	
Natural Habitat	<ul style="list-style-type: none">• Everywhere in nature
Suitable Substrates in the Indoor Environment	<ul style="list-style-type: none">• Depends on genus and species
Water Activity	<ul style="list-style-type: none">• Depends on genus and species
Mode of Dissemination	<ul style="list-style-type: none">• Forcible ejection or passive release and dissemination by wind or insects
Allergenic Potential	<ul style="list-style-type: none">• Depends on genus and species
Potential Opportunist or Pathogen	<ul style="list-style-type: none">• Depends on genus and species
Industrial Uses	<ul style="list-style-type: none">• Depends on genus and species
Potential Toxins Produced	<ul style="list-style-type: none">• Depends on genus and species
Other Comments	<ul style="list-style-type: none">• Ascospores are the result of sexual reproduction and produced in a saclike structure called an ascus. All ascospores belong to members of the Phylum Ascomycota, which encompasses a plethora of genera worldwide.

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<i>Aspergillus/Penicillium</i>	
Natural Habitat	<ul style="list-style-type: none">• Soil• Plant debris• Seed• Cereal crops
Suitable Substrates in the Indoor Environment	<ul style="list-style-type: none">• Grows on a wide range of substrates indoors• Prevalent in water damaged buildings• Foods (blue mold on cereals, fruits, vegetables, dried foods)• House dust• Fabrics• Leather• Wallpaper• Wallpaper glue
Water Activity	<ul style="list-style-type: none">• $A_w=0.75-0.94$
Mode of Dissemination	<ul style="list-style-type: none">• Wind• Insects
Allergenic Potential	<ul style="list-style-type: none">• Type I (hay fever, asthma)• Type III (hypersensitivity)
Potential Opportunist or Pathogen	<ul style="list-style-type: none">• Possible depending on the species.
Industrial Uses	<ul style="list-style-type: none">▪ Many depending on the species.
Potential Toxins Produced	<ul style="list-style-type: none">• Possible depending on the species.
Other Comments	<ul style="list-style-type: none">• Spores of <i>Aspergillus</i> and <i>Penicillium</i> (including others such as <i>Acremonium</i> and <i>Paecilomyces</i>) are small and spherical with few distinguishing characteristics. They cannot be differentiated or speciated by non-viable impaction sampling methods. Some species with very small spores may be undercounted in samples with high background debris.

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Basidiospore	
Natural Habitat	<ul style="list-style-type: none">• Forest floors• Lawns• Plants (saprobes or pathogens depending on genus)
Suitable Substrates in the Indoor Environment	<ul style="list-style-type: none">• Depends on genus• Wood products
Water Activity	<ul style="list-style-type: none">• Unknown
Mode of Dissemination	<ul style="list-style-type: none">• forcible ejection• Wind currents
Allergenic Potential	<ul style="list-style-type: none">• Type I allergies (hay fever, asthma)• Type III (hypersensitivity pneumonitis)
Potential Opportunist or Pathogen	<ul style="list-style-type: none">• Depends on genus
Industrial Uses	<ul style="list-style-type: none">• Edible mushrooms are used in the food industry
Potential Toxins Produced	<ul style="list-style-type: none">• Amanitins• monomethyl-hydrazine• muscarine• ibotenic acid• psilocybin.
Other Comments	<ul style="list-style-type: none">• Basidiospores are the result of sexual reproduction and formed on a structure called the basidium. Basidiospores belong to the members of the Phylum Basidiomycota, which includes mushrooms, shelf fungi, rusts, and smuts

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<i>Chaetomium</i>	
Natural Habitat	<ul style="list-style-type: none">▪ Dung▪ Seeds• Soil• Straw
Suitable Substrates in the Indoor Environment	<ul style="list-style-type: none">• Paper• Sheetrock• Wallpaper
Water Activity	<ul style="list-style-type: none">• Aw=0.84-0.89
Mode of Dissemination	<ul style="list-style-type: none">• Wind• Insects• Water splash
Allergenic Potential	<ul style="list-style-type: none">• Type I (asthma and hay fever)
Potential Opportunist or Pathogen	<ul style="list-style-type: none">• Onychomycosis• <i>C. perucidum</i> recognized as a new agent of cerebral phaeohyphomycosis.
Industrial Uses	<ul style="list-style-type: none">• Cellulase production▪ Textile testing
Potential Toxins Produced	<ul style="list-style-type: none">• Chaetomin• Chaetoglobosins A,B,D and F are produced by <i>Chaetomium globosum</i>• Sterigmatocystin is produced by rare species

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<i>Cladosporium</i>	
Natural Habitat	<ul style="list-style-type: none">• Dead plant matter• Straw• Soil• Woody plants
Suitable Substrates in the Indoor Environment	<ul style="list-style-type: none">• Fiberglass duct liner• Paint• Textiles• Found in high concentration in water-damaged building materials
Water Activity	<ul style="list-style-type: none">• Aw 0.84-0.88
Mode of Dissemination	<ul style="list-style-type: none">• Air
Allergenic Potential	<ul style="list-style-type: none">• Type I (asthma and hay fever)
Potential Opportunist or Pathogen	<ul style="list-style-type: none">• Edema• keratitis• onychomycosis• pulmonary infections• Sinusitis
Industrial Uses	<ul style="list-style-type: none">• Produces 10 antigens
Potential Toxins Produced	<ul style="list-style-type: none">• Cladosporin• Emodin

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Attn: Keith Roe
Air Care & Restoration
1510 Gary Street
Bethlehem, PA 18018

EMSL Order: 370704081
Customer ID: AIRC63
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<i>Myxomycetes</i>	
Natural Habitat	<ul style="list-style-type: none">• Decaying logs• Dead leaves• Dung• Lawns• Mulched flower beds
Suitable Substrates in the Indoor Environment	<ul style="list-style-type: none">• Rotting lumber
Water Activity	<ul style="list-style-type: none">• Unknown
Mode of Dissemination	<ul style="list-style-type: none">• Insects• Water• Wind
Allergenic Potential	<ul style="list-style-type: none">• Type I
Potential Opportunist or Pathogen	<ul style="list-style-type: none">• Unknown
Industrial Uses	<ul style="list-style-type: none">• Unknown
Potential Toxins Produced	<ul style="list-style-type: none">• Unknown
Other Comments	<ul style="list-style-type: none">• Young sporophores of one genera (<i>Enteridium lycoperdon</i>) are fried and eaten in Mexico, and the dish is called caca de luna• Myxomycetes are not members of the Kingdom Fungi. This is due to morphological differences and DNA evidence

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5. References and Informational Links

Books

- Bioaerosols: Assessment and Control. Janet Macher, Ed., American Conference of Governmental Industrial Hygienists, Cincinnati, OH 1999.
- Exposure Guidelines for Residential Indoor Air Quality. Environmental Health Directorate, Health Protection Branch, Health Canada, Ottawa, Ontario, 1989.
- Fungal Contamination in Public Buildings: Health Effects and Investigation Methods. Health Canada, Ottawa, Ontario, 2004.
- IICRC: S500 Standard and Reference Guide for Professional Water Damage Restoration. 3rd Edition, Institute of Inspection, Cleaning, and Restoration Certification, Vancouver, WA, 2006
- IICRC: S520 Standard and Reference Guide for Professional Mold Remediation. 1st Edition, Institute of Inspection, Cleaning, and Restoration Certification, Vancouver, WA, 2004
- Field Guide for the Determination of Biological Contaminants in Environmental Samples. 2nd Edition, American Industrial Hygiene Association, 2005.

Consumer Links

- Read the full text of AIHA's "The Facts About Mold" consumer brochure.
<http://www.aiha.org/content/accessinfo/consumer/factsaboutmold.htm>
- The Occupational Safety and Health Administration (OSHA)
<http://www.osha.gov/SLTC/molds/index.html>
- CDC Mold Facts
<http://www.cdc.gov/mold/faqs.htm>
- CDC Stachybotrys - Questions and answers on Stachybotrys chartarum and other molds
<http://www.cdc.gov/nceh/airpollution/mold/stachy.htm>
- IOM, NAS: Clearing the Air: Asthma and Indoor Air Exposures
<http://fermat.nap.edu/books/0309064961/html/index.html>

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- National Library of Medicine-Mold website
<http://www.nlm.nih.gov/medlineplus/molds.html>
 - California Department of Health Services (CADOHS)
<http://www.cal-iaq.org/mold0107.htm>
 - Minnesota Department of Health
<http://www.health.state.mn.us/divs/eh/indoorair/mold/index.html>
 - New York City Department of Health and Mental Hygiene
<http://www.nyc.gov/html/doh/html/epi/moldrpt1.shtml>
 - H.R.: The United States Toxic Mold Safety and Protection Act
<http://www.house.gov/conyers/mold.htm>

EPA

- "Should You Have the Air Ducts in Your Home Cleaned?"
<http://www.epa.gov/iaq/pubs/airduct.html>
- "Fact Sheet: Flood Cleanup - Avoiding Indoor Air Quality Problems"
<http://www.epa.gov/iaq/pubs/flood.html>
- General information about molds and actions that can be taken to clean up or prevent a mold problem.
<http://www.epa.gov/iaq/asthma/triggers/molds.html>
- "A Brief Guide to Mold, Moisture, and Your Home" - Includes basic information on mold, cleanup guidelines, and moisture and mold prevention.
<http://www.epa.gov/iaq/molds/moldguide.html>
- "Mold Remediation in Schools and Commercial Buildings" - Information on remediation in schools and commercial property, references for potential mold and moisture remediators.
<http://www.epa.gov/iaq/molds/mold-remediation.html>

FEMA

- "Homes That Were Flooded May Harbor Mold Problems" - Information and tips for cleaning mold.
<http://www.fema.gov/diz01/d1364n18.shtml>

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- “Mold Can Damage Home and Health” - How to check for mold, potential health effects of mold, and how to treat mold in the home.
<http://www.fema.gov/diz01/d1379n41.shtm>
 - “Prompt Flood Cleanup Can Help Prevent Health Problems” - How to clean up in-house mold problems (not large or serious exposures).
<http://www.fema.gov/diz99/d1279n09.shtm>



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6. Important Terms, Conditions, and Limitations

A. Sample Retention

Samples analyzed by EMSL will be retained for 60 days after analysis date. Storage beyond this period is available for a fee with written request prior to the initial 30 day period. Samples containing hazardous/toxic substances which require special handling will be returned to the client immediately. EMSL reserves the right to charge a sample disposal fee or return samples to the client.

B. Change Orders and Cancellation

All changes in the scope of work or turnaround time requested by the client after sample acceptance must be made in writing and confirmed in writing by EMSL. If requested changes result in a change in cost the client must accept payment responsibility. In the event work is cancelled by a client, EMSL will complete work in progress and invoice for work completed to the point of cancellation notice. EMSL is not responsible for holding times that are exceeded due to such changes.

C. Warranty

EMSL warrants to its clients that all services provided hereunder shall be performed in accordance with established and recognized analytical testing procedures and with reasonable care in accordance with applicable federal, state and local laws. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. EMSL disclaims any other warranties, express or implied, including a warranty of fitness for particular purpose and warranty of merchantability.

D. Limits of Liability

In no event shall EMSL be liable for indirect, special, consequential, or incidental damages, including, but not limited to, damages for loss of profit or goodwill regardless of the negligence (either sole or concurrent) of EMSL and whether EMSL has been informed of the possibility of such damages, arising out of or in connection with EMSL's services thereunder or the delivery, use, reliance upon or interpretation of test results by client or any third party. We accept no legal responsibility for the purposes for which the client uses the test results. EMSL will not be held responsible for the improper selection of sampling devices even if we supply the device to the user. The user of the sampling device has the sole responsibility to select the proper sampler and

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sampling conditions to insure that a valid sample is taken for analysis. Any resampling performed will be at the sole discretion of EMSL, the cost of which shall be limited to the reasonable value of the original sample delivery group (SDG) samples. In no event shall EMSL be liable to a client or any third party, whether based upon theories of tort, contract or any other legal or equitable theory, in excess of the amount paid to EMSL by client thereunder.

E. Indemnification

Client shall indemnify EMSL and its officers, directors and employees and hold each of them harmless for any liability, expense or cost, including reasonable attorney's fees, incurred by reason of any third party claim in connection with EMSL's services, the test result data or its use by client.