

ENVIRONMENTAL AIRBORNE AEROSOL AND FIRE RESIDUE ANALYSIS

Client Name : ABC Environmental

Client Project # : 14-0123

EAA Project# : 14-1000

Project : 123 Elm Street

Date Collected : 01/31/14

Analysis magnification : 200 / 800

Client Sample#	Sample Description / Location	General Analysis Comments
14-0001A	Living room - 5' ft in front of fireplace	Moderate mold, high fiberglass, mineral dust, and fire residue

AIRBORNE MOLD SPORE CONCENTRATIONS (Cts./m ³) -- Spore Trap Sample Analysis	
Category	Sample # --> 14-0001A
Total Mold Spores (Cts/m³)	3360
Alternaria	69
Aspergillus/Penicillium	343
Ascospores	137
Basidiospores	480
Botrytis	
Chaetomium	
Cladosporium	1646
Curvularia	
Drechslera/Bipolaris	
Epicoccum	
Fusarium	
Nigrospora	
Oidium/Peronospora	
Pithomyces	
Rusts	
Smuts / Myxomycetes / Periconia	137
Stachybotrys	343
Stemphylium	
Torula	
Ulocladium	69
Other Hyaline Fungi	
Other Fungi	
Unidentified Fungi	137
Hyphae fragments	
Algal / fern spores	
Insect parts	
POLLEN (Total cts/m³)	40
Not specified	
Pinus	40
COMMON AEROSOLS (cts/m3)	
Skin cell fragments	17143
Fiberglass fibers	549
Cellulosic / fabric fibers	2400
Unidentified opaque	24000
Soil / mineral dust	25714
FIRE RESIDUE (cts/m3)	33737
Aciniform soot-like	4594
Ash-like	343
Char-like	28800
Statistical Parameters	
Vol. analyzed (m ³)--mold/aerosols:	0.015
Detect limit(Cts/m ³)--mold/aerosols:	68.6
% sample analyzed--mold / aerosols:	19%
Volume analyzed (m ³)--pollen only :	0.075
Detection limit (Cts/m ³)--pollen only :	13.3
Sample flow rate (lpm):	15.0
Sample trace length (mm):	14.40
Microscope field diameter (mm):	0.280

General comments : "Low, "moderate", and "high" references to dust loading are qualitative and based on historical experience of EAA

Analyst signature: *Daniel M. Baxter*

Date: 2/4/2014

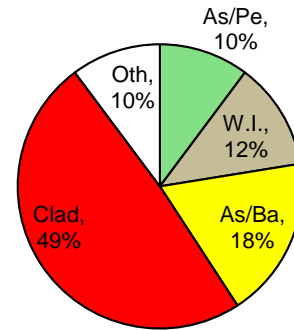
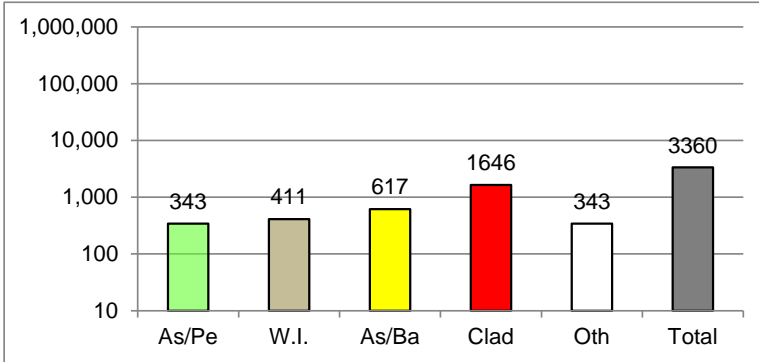
ENVIRONMENTAL AIRBORNE AEROSOL AND FIRE RESIDUE ANALYSIS -GRAPHICAL REPORT

Client Name : ABC Environmental
Client Project # : 14-0123
EAA Project# : 14-1000
Sample # : 14-0001A

Project : 123 Elm Street
Date Collected : 01/31/14

Description : Living room - 5' ft in front of fireplace

The following interpretation guidelines are based on the average mold spore and aerosol concentration ranges historically measured in indoor office, commercial, and "clean" residential environments. Residential environments experience higher variation and concentrations of certain bioaerosols. The ranges are based on publications by EAA, and 25 years experience providing analysis throughout the country from "clean" and "contaminated" residential and commercial buildings. An explanation for the interpretation of data is given in the accompanying information sheet.

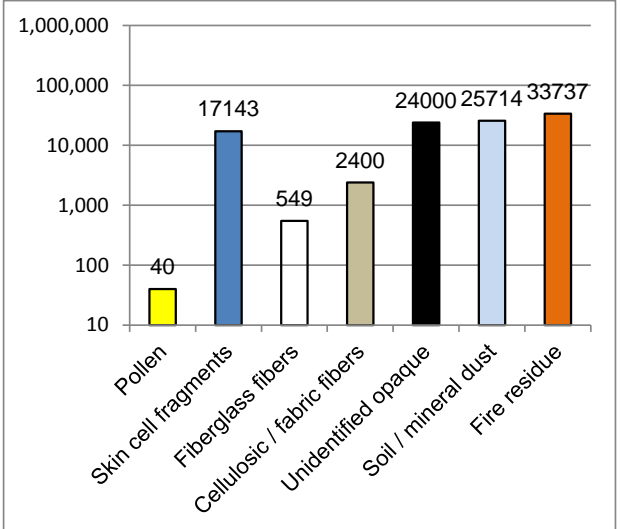


As/Pe = Aspergillus/Penicillium, W.I. = Water indicating fungi (Stachybotrys, Chaetomium, Ulocladium), As/Ba = Asco/Basidiospores, Clad = Cladosporium, Oth = Other

GENERAL AIRBORNE MOLD SPORE INTERPRETATION GUIDELINES		
Mold Spore Category	Concen. Range	Distribution Type
Total Spores	Low - moderate	Not applicable
Aspergillus/Penicillium	Low	Normal / typical
Chronic Water Indicating Fungi	Moderate	Source present
Typical Outdoor Fungi	Moderate	Outdoor distribution

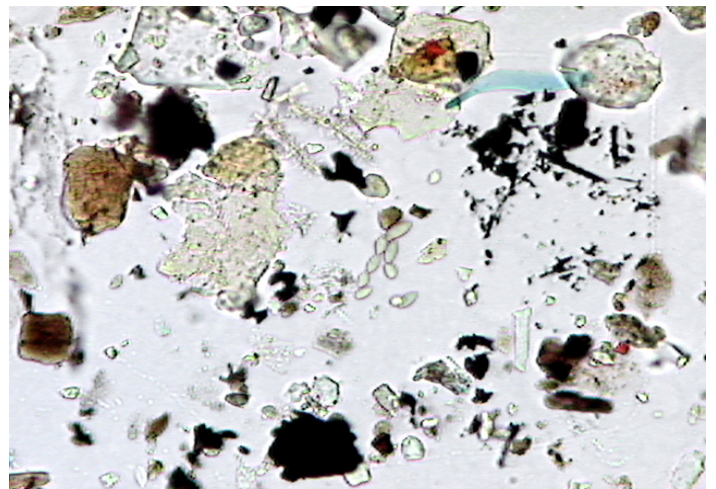
**"Source" refers to the possible presence of a local mold growth source
 All concentrations in particle counts per cubic meter of air (cts/m³)

OTHER AEROSOLS INTERPRETATION GUIDELINES	
Particle Category	Concen. range
Pollen	Normal / typical
Skin cell fragments	Moderate
Fiberglass fibers	High
Cellulosic / fabric fibers	High
Unidentified opaque	High
Soil / mineral dust	Moderate
Fire residue	High



Specific Comments : Moderate mold, high fiberglass, mineral dust, and fire residue

Representative photos : 340x





AIRBORNE MOLD SPORE INTERPRETATION GUIDELINES

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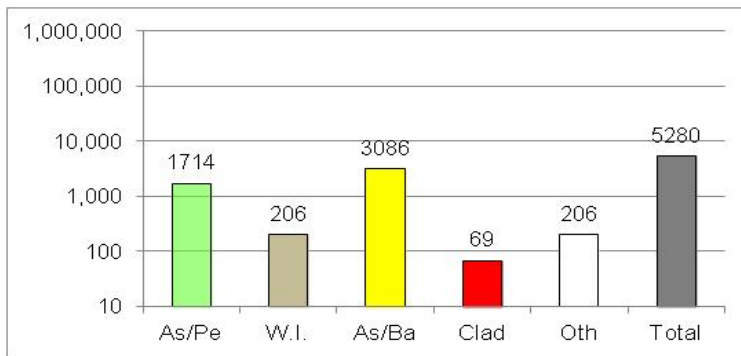
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The air sample interpretation guidelines are based on the average mold spore and aerosol concentration ranges expected indoors. The ranges are based on publications by EAA, and 25 years experience providing analysis throughout the country from "clean" and "contaminated" residential and commercial buildings. Exceptions to any guidelines are always possible, especially in some geographic areas of high vegetation (heavily forested) or low vegetation (desert / snow covered).

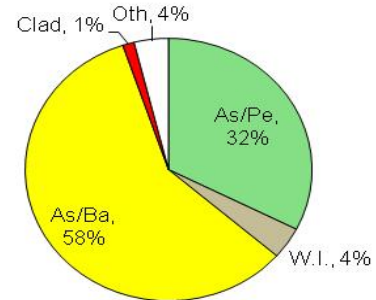
Category	Abbrev.	Description / Definition
Total Spores	Total	Total of all enumerated spores
Aspergillus/Penicillium	As/Pe	Spores with Penicillium or Aspergillus morphology
Chronic Water Indicating Fungi	W.I.	Spores consistent with "chronic" moisture (Stachybotrys, Chaetomium, Ulocladium)
Typical Outdoor Fungi	--	Spores commonly found in outdoor air (Asco/Basidiopores, Cladosporium, Other)

Importantly, there is no simultaneous short-term relationship between indoor and outdoor mold spore concentrations. Existing peer reviewed literature clearly states relying on "single-sample" indoor/outdoor comparisons by themselves without considering both the variability and magnitude of measured concentrations may be scientifically unreliable. Although indoor spore concentrations are typically lower than "average" outdoor levels, measuring higher indoor mold spore concentrations on an individual sample basis, even in the absence of indoor mold growth sources, can be a common and "normal" occurrence. This is especially true in locations where vegetation is minimal. Outdoor measurements are often more useful to help determine if the indoor environment is being impacted by outdoor infiltration.

Example - Spore Concentration Graph (ct/m³)



Example - Genera Distribution Graph (%)



A series of algorithms using baseline research data developed by EAA simultaneously employ both the concentration and distribution of historical mold spore data to classify the results as compared to average "clean" indoor environments. Fundamental threshold limits of concentration (regardless of outdoor concentrations) are first used to categorize Aspergillus & Penicillium, and Chronic Water Indicating (W.I.) fungi categories as "High", "Moderate", "Low-moderate", "Normal / Typical", and "Low". The Genera distribution is further used to indicate potential indoor growth "sources" versus outdoor "infiltration". The determination of an actual indoor or outdoor "source" requires a thorough visual inspection and cannot be determined by a laboratory analysis result alone.

BASIC ALGORITHMS - For Average Buildings

Classification	Concentration (Cts/m ³)			Genera Distribution (Potential Indoor / Outdoor source)			
	As/Pe	W.I.	Outdoor fungi	Classification	As/Pe %	W.I. ct/m ³	Outdoor fungi %
Low	<500	<50	<200	Low (indoor distribution)	<20%	10	<20%
Typical / normal	>500	>50	>200	Normal/typical	>20%	10	>20%
Low - moderate	>1000	>100	>500	Source possible	>30%	100	>50%
Moderate	>1500	>200	>1000	Source present	>50%	300	>70%
High	>5000	>500	>5000	Infiltration Source present			>5000 ct/m ³

Although no classification system used to estimate the potential for "contamination" can be perfect, EAA's system follows the basic guidelines outlined in Chapter 14.2.2 of the ACGIH 1999 document Bioaerosols: Assessment and Control. The calculations use baseline data collected inside buildings, and the variability of concentration and distribution when spore concentrations are relatively low. Importantly, the resulting assessment algorithms eliminate the misuse and reliance on single data point comparisons often used to assess contamination. **These algorithms cannot be used to assess wall cavities or confined spaces.**



AIRBORNE DUST INTERPRETATION GUIDELINES

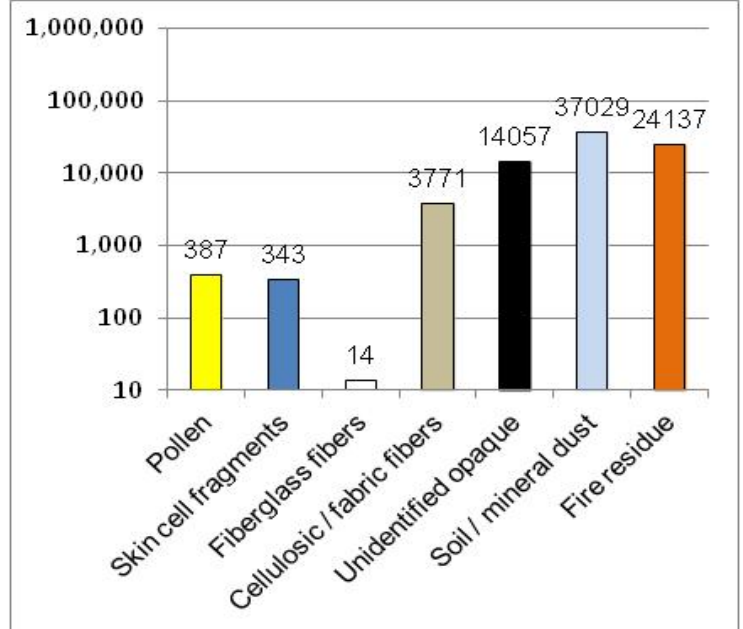
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The aerosol categories used by EAA provide an assessment of the most common airborne dust contaminants within buildings. These indicator categories measure the impact of occupant activity, building maintenance, and dust generated from HVAC systems, building furnishings, or renovation activities. The measured concentrations and assessment of "high" or "moderate" or "low" levels should not be used as indicators of "safe" or "unsafe" conditions, nor should they be confused with EPA or OSHA exposure guidelines. These guidelines are useful as relative comparison criteria in the assessment of buildings. The relevance with building conditions of each aerosol category are illustrated in the EAA Method guide online on the "News and Information Page" at ealab.com

CATEGORY	DESCRIPTION
Pollen	Reproductive spores of flowers
Skin cell fragments	Epithelial cells / dander
Fiberglass	Man-made fibrous glass fibers
Cellulose	Cellulosic, fabric, & synthetic fibers
Uniden. Opaque	Opaque debris biogenic decay / corrosion
Soil / mineral	Crystalline minerals & construction particles
Fire residue	Combustion soot, ash, & char
* Other	Specific unusual / atypical particles (Concentration range similar to cellulose range)
No quantitative assessment or graphical criteria used:	
Insect parts	Concentration range similar to cellulose range
Algae/Fern spores	Concentration range similar to cellulose range

Example - Dust Concentration Graph (ct/m³)



BASIC ALGORITHMS - For Average Buildings

Concentration (Cts/m³)

Classification	Skin Cell				Unidentified Opaque	Soil / Minerals	Fire Residue	* Other
	Pollen	Fragments	Fiberglass	Cellulose				
Low	<30	<1000	<10	<100	<1000	<4000	<500	<100
Typical / normal	>30	>1000	>10	>100	>1000	>4000	>500	> 100
Low - moderate	>50	>5000	>20	>500	>2000	>10000	>1000	> 500
Moderate	>75	>10000	>50	>1000	>5000	>20000	>2500	> 1000
High	>150	>20000	>100	>1500	>10000	>100000	>10000	> 1500

* Reported individually under the Special Comments Section - Concentration ranges may vary by type of particle

Note: Pollen level assessment criteria are based on the prevalence of pollen encountered by EAA in indoor environments and not by the general assessment criterion published by the National Allergy Bureau for outdoor levels.

Although no classification system used to estimate potential contamination can cover all conditions, EAA's system follows the basic guidelines outlined in Chapter 14.2.2 of the ACGIH 1999 document Bioaerosols: Assessment and Control by accounting for average baseline data inside buildings. Average levels measured inside buildings without routine HVAC supplied air, or residential dwellings may be higher. **These concentration levels should not be used to assess wall cavities or confined spaces.**