Mold and Fungi | Interpretation

Interpretation of Mold Spore Concentrations:

High variability in outdoor mold spore concentrations and distribution exists on a daily to hourly basis and is dependent on local vegetation and micro-climate, the time of year, local weather patterns, and diurnal variation.

As a result, caution must be used when simultaneously comparing limited data sets of inside and outside concentrations over-generalizing any set of data.

***NOTE: Total Fungi Count on your report indicates if your home is considered a "Clean" building**

Typical Outdoor Mold Spore Concentration Ranges

Description	Spores (cts/m^3)	Predominant Types *
Arid / desert regions	50 – 5,000	Cladosporium, asco/basidospores Alternaria, Penicillium, Aspergillus
Urban & coastal strip	200 - 10,000	Cladosporium, asco/basidospores Alternaria, Penicillium, Aspergillus
Inland valley & native vegetation	500 - 20,000	Cladosporium, asco/basidiospores Penicillium, Aspergillus
Farms & heavy forestation	5,000 - 50,000	Cladosporium,asco/basidiospores Alternaria, Penicillium, Aspergillus

•Genus/category listed in order of decreasing concentration frequency

Typical Indoor Mold Spore Concentration Ranges

Description	Spores (cts/m^3)	Predominant Types *
"Clean" building	less than 2,000	Total for all spore types
	less than 700	Penicillium, Aspergillus
Possible Indoor Amplification	1,000 - 5,000	Penicillium, Aspergillus, Cladosporium
Indoor Amplification likely present	5,000 - 10,000	Penicillium, Aspergillus, Cladosporium
Chronic Indoor Amplification	10,000 - 500,000	Penicillium, Aspergillus, Cladosporium
Inadequate flood cleanup or active Indoor demolition of contaminated surfaces	50,000 - 10,000,000	Penicillium, Aspergillus, Stachybotrys, Cladosporium, Chaetomium, Basiomycetes Tricoderma, Ulocladium, etc.

The tables given above can serve as a guide to evaluating the relative degree of indoor airborne mold spore amplification.

Potential health effects from inhalation of mold and fungal spores:

At present, it is generally accepted in the medical community that exposure to mold may result in symptoms consistent with a cold, flu, allergy hay fever, or asthma in some people. Others have no symptoms at all. It is also generally accepted that there are no long term or permanent health effects from exposure to mold once the occupant is removed from the property. It is also generally recognized in the medical community, that those who are known to be allergic to molds and those with asthma may have a higher risk of allergic reactions and should take extra precautions when in such situations

General Rule-

- Total indoor airborne spore concentrations in a typical clean HVAC-supplied building are less than the "average" regional outside concentrations, and/or **less than approximately 1,500 cts/m3**
- Aspergillus /Penicillium and other hyaline spores are on average **less than 700 cts/m3**

Indicator fungi such as Stachybotrys, Chaetomium, Ulocladium are often recovered in low concentrations in indoor samples as a result of normal infiltration, therefore, automatically assuming there is indoor growth when low concentrations of any indicator species are detected is inappropriate.

Remember, there is always a likely exception to every rule or generalization, and because there is no direct relationship between simultaneously collected indoor and outdoor samples, performing a direct comparison with limited sampling is often misleading. The range of expected variability (i.e. a factor of 5 to 10 fold differences) when comparing limited data sets must also be considered.

Outdoor assemblage of molds:

Outdoor assemblages of mold spores are most commonly populated with over 90% of the following spores (listed in approximate order of descending abundance):

- Cladosporium
- Mushroom-like fungi (Ascospores and Basidiospores)
- Alternaria
- Rusts and Smuts (colonizing primary flower and leaf parts)
- Aspergillus & Penicillium (soil and moist cellulosic surfaces).

All of the above-mentioned spores colonize decaying vegetation and/or soil.

Indoor Assemblage of Molds:

The most common molds susceptible to indoor amplification (over 90% of the typical mold growth) in approximate order of descending abundance include:

- Penicillium
- Aspergillus (flavus, fumigatus, terrus, versicolor, niger)
- Cladosporium
- Stachybotrys
- Alternaria, Chaetomium
- Zygomycetes (Mucor & Rhizopus)
- Ulocladum, Trichoderma
- Basidiomycete fungi

Mold and Fungi

When moisture intrusion becomes chronic and/or involves sewage contamination, tertiary mold growth such as Stachybotrys, Chaetomium, and Ulocladum may become common along with increased concentrations of bacteria. Chronic moisture can also initiate the colonization of wood-destroying fungi. Over time, these kinds of fungi will colonize and destroy structural wood components of a building and can result in very high indoor airborne basidiospore concentrations.

EXAMPLE A:

Fungi type

Spore Trap ASSESSMENTReport™ Air-O-Cell(™) Analysis of Fungal Spores & Particulates (Methods MICRO-SOP-201, ASTM D7391)

	Particle Identification	Raw Count	(Count/m³)	% of Total	Interpretation Guideline
162407022-0001	Alternaria (Ulocladium)	-	-	-	
	Ascospores	2	40	4	
Client Sample ID	Aspergillus/Penicillium++	7	100	10	
37902973	Basidiospores	40	840	84	
	Bipolaris++	-	-	-	
	Chaetomium++	-	-	-	
Location	Cladosporium	1	20	2	
Exterior	Curvularia	-	-	-	
	Epicoccum	-	-	-	
Sample Volume (L)	Fusarium++	-	-	-	
	Ganoderma	-	-	-	
150	Myxomycetes++	-	-	-	
	Pithomyces++	-	-	-	
Sample Type	Rust	-	-	-	
Background	Scopulariopsis/Microascus	-	-	-	
	Stachybotrys/Memnoniella	-	-	-	
Comments	Unidentifiable Spores	-	-	-	
	Zygomycetes	-	-	-	
	Torula++	-	-	-	
	Total Fungi	**50**	**1000**	**100**	
	Hyphal Fragment	-	-	-	
	Insect Fragment	-	-	-	
	Pollen	-	-	-	

Analytical Sensitivity 600x: 21 counts/cubic meter
Analytical Sensitivity 300x *: 7* counts/cubic meter

Skin Fragments: 1 — 1 to 4 (low to high)
Fibrous Particulate: 1 — 1 to 4 (low to high)
Background: 1 — 1 to 4 (low to high); 5 (overloaded)

Not commonly found growing indoors, spores likely come from outside.
Spores reported to be able to cause allergies in individuals.
Potential for mycotoxin production exists with these fungi.
These fungi are considered water damage indicators.

ICON KEY

Spore Trap ASSESSMENTReport™ Air-O-Cell(™) Analysis of Fungal Spores & Particulates (Methods MICRO-SOP-201, ASTM D7391)

	Particle Identification	Raw Count	(Count/m³)	% of Total	Interpretation Guideline
162407022-0002	Alternaria (Ulocladium)	1	40	0.1	Slightly Elevated
	Ascospores	2	80	0.2	Slightly Elevated
Client Sample ID	Aspergillus/Penicillium++	897	37900	91.2	ELEVATED
37902867	Basidiospores	29	1200	2.9	Slightly Elevated
	Bipolaris++	-	-	-	
	Chaetomium++	-	-	-	
Location	Cladosporium	47	2000	4.8	ELEVATED
Bedroom	Curvularia	-	-	-	
	Epicoccum	1	40	0.1	Slightly Elevated
Sample Volume (L)	Fusarium++	-	-	-	
	Ganoderma	-	-	-	
75	Myxomycetes++	4	200	0.5	Slightly Elevated
	Pithomyces++	1	40	0.1	Slightly Elevated
Sample Type	Rust	-	-	-	
Inside	Scopulariopsis/Microascus	-	-	-	
	Stachybotrys/Memnoniella	-	-	-	
Comments	Unidentifiable Spores	-	-	-	
	Zygomycetes	-	-	-	
	Torula++	1	40	0.1	Slightly Elevated
	Total Fungi	**983**	**41540**	**100**	ELEVATED
	Hyphal Fragment	3	100	-	Slightly Elevated
	Insect Fragment	2	80	-	Slightly Elevated
	Pollen	-	-	-	

Analytical Sensitivity 600x: 42 counts/cubic meter
Analytical Sensitivity 300x *: 13* counts/cubic meter

Skin Fragments: 2 — 1 to 4 (low to high)
Fibrous Particulate: 2 — 1 to 4 (low to high)
Background: 2 — 1 to 4 (low to high); 5 (overloaded)

Identifies the level of the spore type in your building (key located at bottom left)

This line will identify if your home is considered a "Clean Home"

Acceptable — Concentration at or below background
Slightly Elevated — Concentration above background
ELEVATED — Concentration 10X or more above background

Not commonly found growing indoors, spores likely come from outside.
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EXAMPLE B:

Fungi type

Spore Trap ASSESSMENTReport™ Air-O-Cell(™) Analysis of Fungal Spores & Particulates (Methods MICRO-SOP-201, ASTM D7391)

	Particle Identification	Raw Count	(Count/m³)	% of Total	Interpretation Guideline
162408996-0001	Alternaria (Ulocladium)	9	200	1.3	
	Ascospores	204	4300	27.5	
Client Sample ID	Aspergillus/Penicillium++	6	100	0.6	
3790 2790	Basidiospores	325	6860	43.8	
	Bipolaris++	-	-	-	
	Chaetomium++	-	-	-	
Location	Cladosporium	182	3840	24.5	
Exterior	Curvularia	-	-	-	
	Epicoccum	2	40	0.3	
Sample Volume (L)	Fusarium++	-	-	-	
	Ganoderma	1	20	0.1	
150	Myxomycetes++	10	210	1.3	
	Pithomyces++	-	-	-	
Sample Type	Rust	-	-	-	
	Scopulariopsis/Microascus	-	-	-	
Background	Stachybotrys/Memnoniella	-	-	-	
Comments	Unidentifiable Spores	-	-	-	
	Zygomycetes	-	-	-	
	Cercospora++	3	60	0.4	
	Nigrospora	1	20	0.1	
	Total Fungi	**743**	**15650**	**100**	
	Hyphal Fragment	2	40	-	
	Insect Fragment	-	-	-	
	Pollen	24	510	-	

Analytical Sensitivity 600x: **21** counts/cubic meter
Analytical Sensitivity 300x *: 7* counts/cubic meter

Skin Fragments: 1 — 1 to 4 (low to high)
Fibrous Particulate: 1 — 1 to 4 (low to high)
Background: 2 — 1 to 4 (low to high); 5 (ove ed)

ICON KEY

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	Particle Identification	Raw Count	(Count/m³)	% of Total	Interpretation Guideline
162408996-0002	Alternaria (Ulocladium)	-	-	-	
	Ascospores	-	-	-	
Client Sample ID	Aspergillus/Penicillium++	89	3800	90	ELEVATED
3790 2952	Basidiospores	7	300	7.1	Acceptable
	Bipolaris++	-	-	-	
	Chaetomium++	-	-	-	
Location	Cladosporium	2	80	1.9	Acceptable
Living Room	Curvularia	-	-	-	
	Epicoccum	-	-	-	
Sample Volume (L)	Fusarium++	-	-	-	
	Ganoderma	-	-	-	
75	Myxomycetes++	1	40	0.9	Acceptable
	Pithomyces++	-	-	-	
Sample Type	Rust	-	-	-	
	Scopulariopsis/Microascus	-	-	-	
Inside	Stachybotrys/Memnoniella	-	-	-	
Comments	Unidentifiable Spores	-	-	-	
	Zygomycetes	-	-	-	
	Cercospora++	-	-	-	
	Nigrospora	-	-	-	
	Total Fungi	**99**	**4220**	**100**	Acceptable
	Hyphal Fragment	2	80	-	Slightly Elevated
	Insect Fragment	-	-	-	
	Pollen	-	-	-	

Analytical Sensitivity 600x: **42** counts/cubic meter
Analytical Sensitivity 300x *: **13*** counts/cubic meter

Skin Fragments: 1 — 1 to 4 (low to high)
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