

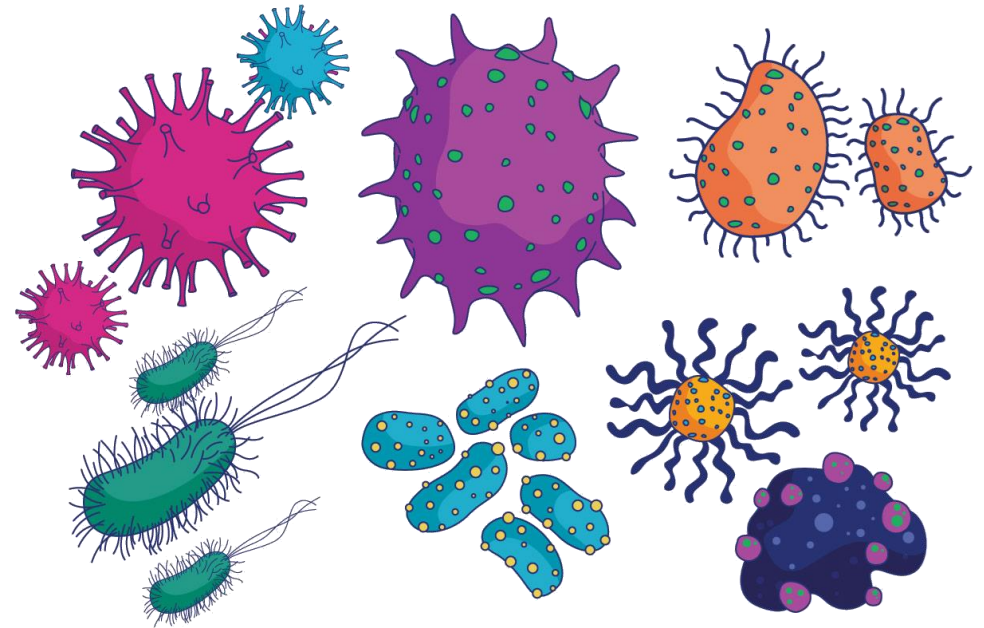


Testing 101

Surface Sampling

WHAT WE WILL COVER TODAY

- Surface sampling.
- Mold is inconspicuous.
- Strengths of surface sampling.
- Limitations of surface sampling.
- When surface samples should be used.
- Review photos and labs verifying unexpected source areas of contamination.



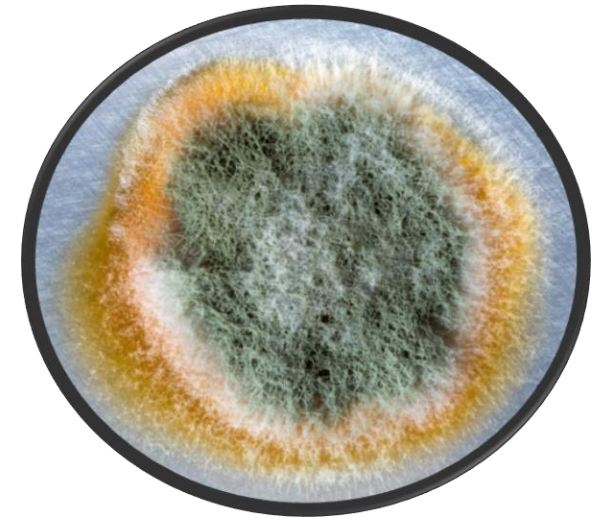
SURFACE SAMPLES



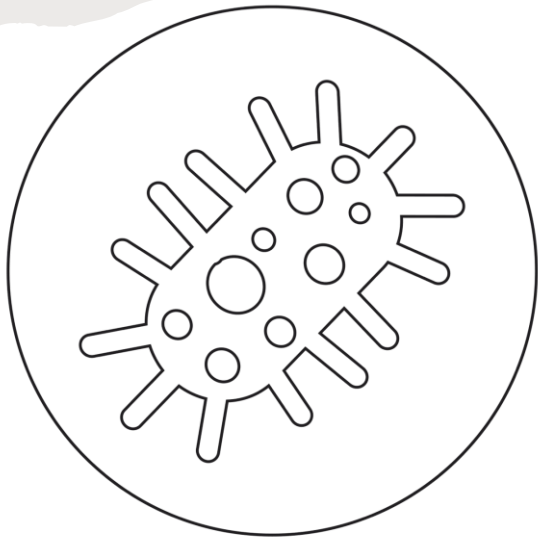
- Surface sampling is:
 - The collection of a limited surface area “typically 1 x 1 square inch”.
- Methods of surface sampling:
 - Tape lift.
 - Swab sample.
 - Bulk sample.

MOLD IS INCONSPICUOUS

- Mold is microscopic.
- Appears to be “just dust” BUT it is actually NOT just dust it is a mold colony.
- Variation in color:
 - black, grey, or greenish, brown, purple, orange, pink, yellow, red, white, or even a combination of colors.
- Hidden behind materials:
 - Inside walls.
 - Dry water stains.
 - Wallpaper.



STRENGTHS



- Validation of the presence of mold.
- Quick turnaround times for analyzed results.
- Cost effective method for determining mold.
- Helps identify source areas of mold contamination.
- Identifies viable and nonviable spores.
- A swab sample can be cultured at the lab to determine mold and species:
 - Takes more time at the lab to culture.
 - More costly.
- A helpful component for post remediation verification testing.

LIMITATIONS

- Sampling collection can be overloaded with debris making it difficult for mycologist to identify mold
- Can only analyze to the Genus level not the species level
- Can't distinguish between various mold types
 - Example; Aspergillus and Penicillium
- Hyphal fragments can't be distinguished by the mycologist to determine what mold it is from
- Limited area of where the sample is being collected.
 - May be a large variety of molds that are not being picked up and identified due to the limited surface area being sampled.

Test: S001 Swab Analysis			
Sample ID:	374584-24* **		
Client Sample ID:	Window Tracks Bdrm Downstairs		
Area Swabbed (cm ²):	6.45		
Media:	Swab		
Sample Analysis:	Analyzed at 600X Magnification		
Spore Types	Raw Count	Count/cm ²	%
Alternaria	2	12	1
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	—	—	—
Basidiospores	2	12	1
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	278	1,724	99
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Ophiostoma	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Scopulariopsis	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	—	—	—
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	282	1,749	
Hyphal Fragments	22	136	
Detection Limit	12		

* Bacteria Present.
 ** Yeast Present.
 *** Excessive debris. Reported results may be affected.

WHEN SHOULD SURFACE SAMPLES BE USED

- Sampling vs Not Sampling:
 - We always recommend to sample what you see.
 - Extremely common for contractors not experienced with mold to say it isn't mold or it's nothing to worry about.
 - Bottom line test don't guess!
- With health related issues it's important:
 - To verify if you have mold.
 - Identify what your being exposed to.
- Surface sample are taken when there are indicator molds of water damage:
 - See photos below for examples.
- To establish remediation protocols.



Continued

- Post Remediation Verification testing in contained work areas on cleaned surfaces.
- Legal cases perform surface samples with other sampling methods.
- Surface sampling should always be combined with other types of sampling methods to understand the full impact on the home.
 - Source samples: Air & Swab
 - Dispersion: ERMI & Mycotoxin
 - Progressive samples: Actinomycetes, Endotoxins and when applicable VOC, Formaldehyde.

Post testing contained work areas



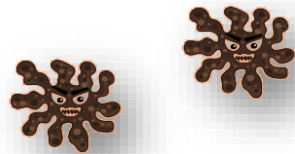
How To Read Surface Sample Lab Reports

- Typically used to identify and qualify that there is mold
- In the report looking for the following molds that are indicator molds for water damage:
 - Example; Aspergillus, Penicillium, Chaetomium, Stachybotrys, Ulocladium, Fusarium
- Looking for concentration levels
 - Rare: 1 to 10
 - Low: 11 to 100
 - Medium: 101 to 1000
 - High: >1000
- Concentration levels of hyphal fragments
 - Indicator of mold growth
- Notification of the following
 - Excess debris
 - Bacteria

Sample ID:	390826-13		
Client Sample ID:	Garage Water Htr/HVAC Platform		
Area Swabbed (cm²):	6.45		
Media:	Swab		
Sample Analysis:	Analyzed at 600X Magnification		
Spore Types	Raw Count	Count/cm ²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	777	4,819	3
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	9,420	58,419	34
Cladosporium	—	—	—
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	17,662	109,532	63
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	27,859	172,769	
Hyphal Fragments	212	1,315	
Detection Limit	73		

WHEN DUST IS ACTUALLY A MOLD COLONY

Master Bedroom Wall



Sample ID:	366939-13
Client Sample ID:	Mstr Bdrm W Wall Under Wndw 5
Area Swabbed (cm²):	6.45
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	2,967	18,400	97
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	94	583	3
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	—	—	—
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	3,061	18,983	
Hyphal Fragments	188	1,166	
Detection Limit	73		



WHEN DUST IS ACTUALLY A MOLD COLONY

HVAC AHU 1





Sample ID:	328782-17*
Client Sample ID:	A HVAC #1 Surface
Area Swabbed (cm²):	6.45
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	—	—	—
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	58,875	365,116	100
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Ophiostoma	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	—	—	—
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	58,875	365,116	
Hyphal Fragments	306	1,898	
Detection Limit		73	

WHEN DUST IS ACTUALLY A MOLD COLONY

HVAC Mini Split System



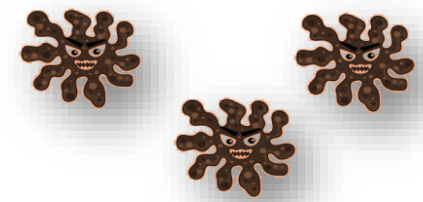
Sample ID:	377034-04
Client Sample ID:	HVAC Mini Split AHU Interior
Area Swabbed (cm²):	6.45
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm ²	%
Alternaria	12	74	<1
Arthriniium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	—	—	—
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	107,152	664,509	100
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	—	—	—
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	107,164	664,583	
Hyphal Fragments	1,884	11,684	
Detection Limit	73		



SUSPECT MOLD GROWTH

Window Tracks





Test: S001 Swab Analysis

Sample ID:	374584-24* **
Client Sample ID:	Window Tracks Bdrm Downstairs
Area Swabbed (cm²):	6.45
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm²	%
Alternaria	2	12	1
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	—	—	—
Basidiospores	2	12	1
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	278	1,724	99
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Ophiostoma	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Scopulariopsis	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	—	—	—
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	282	1,749	
Hyphal Fragments	22	136	
Detection Limit		12	

* Bacteria Present.

** Yeast Present.

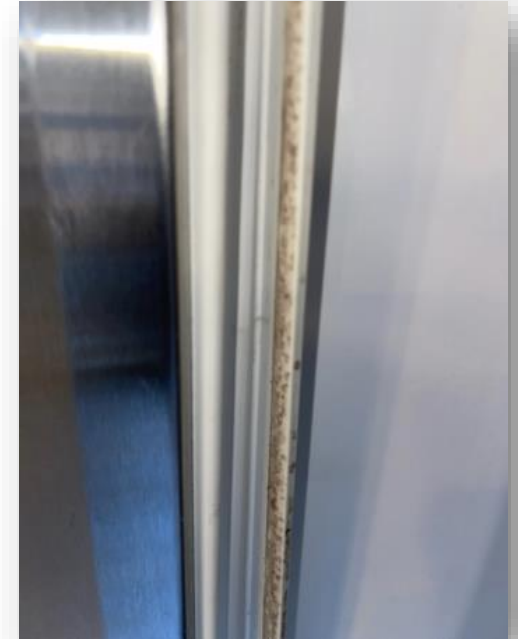
*** Excessive debris. Reported results may be affected.

SUSPECT MOLD GROWTH

Sample ID:	347914-02
Client Sample ID:	F Kitch Fridge Freezer Gasket
Area Swabbed (cm ²):	6.45
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Refrigerator Seal

Spore Types	Raw Count	Count/cm ²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	44,745	277,488	63
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	25,905	160,651	37
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Ophiostoma	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	—	—	—
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	70,650	438,140	
Hyphal Fragments	11,775	73,023	
Detection Limit		73	



SUSPECT MOLD GROWTH

Sample ID:	328782-05
Client Sample ID:	F Master Bathroom Toilet Tank
Area Swabbed (cm ²):	6.45
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm ²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	—	—	—
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	75,360	467,349	100
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Ophiostoma	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	—	—	—
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	75,360	467,349	
Hyphal Fragments	3,250	20,155	
Detection Limit		73	

Toilet Tank



SUSPECT MOLD GROWTH

In Wall Coffee Maker



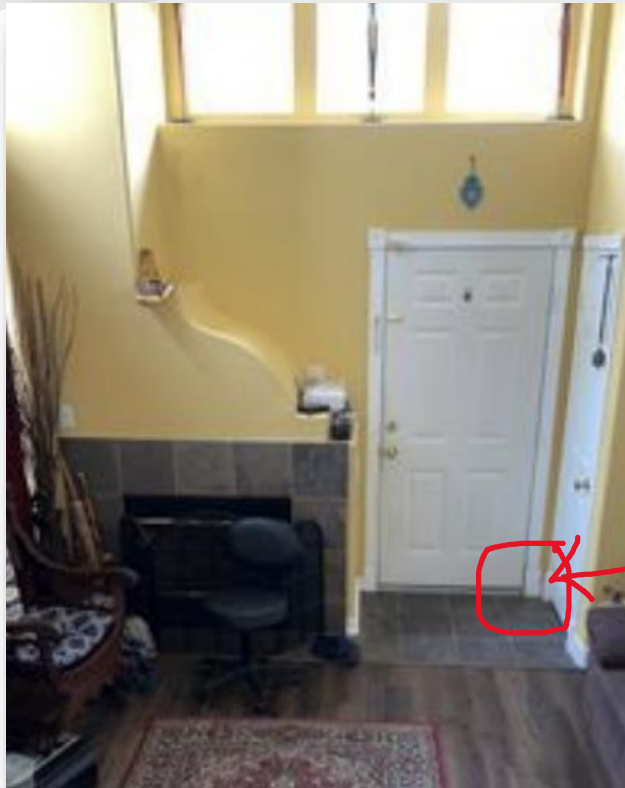
Sample ID:	385940-16
Client Sample ID:	Kitchen (Coffee Maker)
Area Swabbed (cm²):	6.45
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm ²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	—	—	—
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	1,908	11,833	100
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	—	—	—
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	1,908	11,833	
Hyphal Fragments	283	1,755	
Detection Limit		73	



WATER DAMAGE

Wall Behind Baseboard

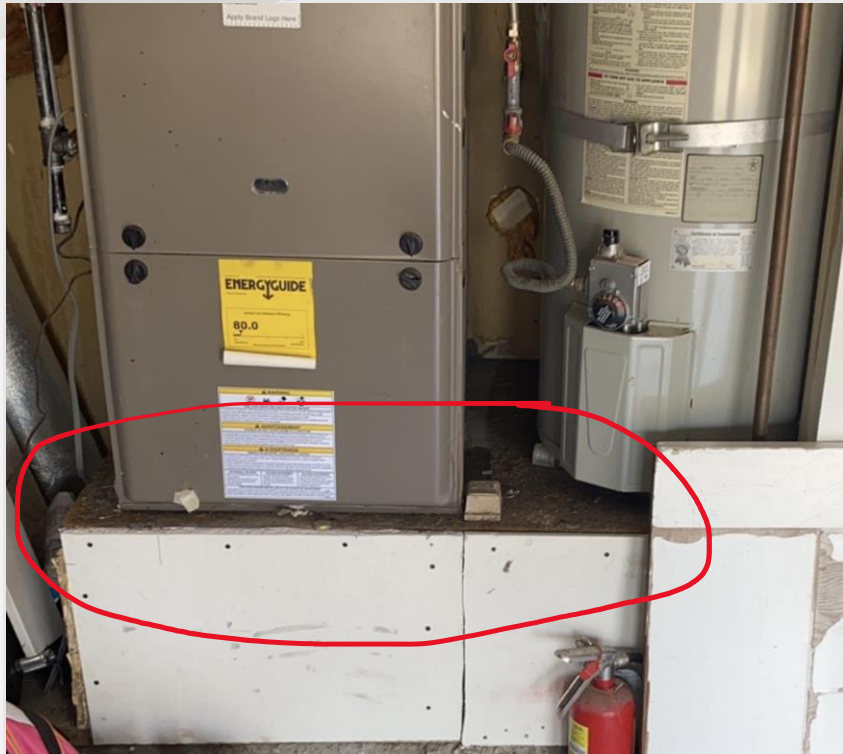


Sample ID:	389650-07
Client Sample ID:	Foyer R Wall Front Door B
Area Swabbed (cm ²):	6.45
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm ²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	—	—	—
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	—	—	—
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Ophiostoma	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	17,662	109,532	100
Torula	—	—	—
Ulocladium	59	366	<1
Unidentified Spores	—	—	—
Total Spores	17,721	109,898	
Hyphal Fragments	1,519	9,420	
Detection Limit		73	

WATER DAMAGE

HVAC platform



WATER DAMAGE



Sample ID:	390826-13
Client Sample ID:	Garage Water Htr/HVAC Platform
Area Swabbed (cm²):	6.45
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm ²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	777	4,819	3
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	9,420	58,419	34
Cladosporium	—	—	—
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	17,662	109,532	63
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	27,859	172,769	
Hyphal Fragments	212	1,315	
Detection Limit		73	

WATER DAMAGE

HVAC AHU



Area tested is inside this panel and underneath the HVAC AHU on the Plenum

Plenum under HVAC AHU



Plenum under HVAC AHU



Sample ID:	392059-25*
Client Sample ID:	HVAC Closet South Plenum
Area Swabbed (cm ²):	6.45
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm ²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	2,590	16,062	46
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	—	—	—
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidiodendron	—	—	—
Oidium/Peronospora	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Scopulariopsis	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	3,014	18,691	54
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	5,604	34,753	
Hyphal Fragments	1,036	6,425	
Detection Limit		73	

HIGH RELATIVE HUMIDITY



Kitchen Cabinet Tape Lift





Sample ID:	343403-02*
Client Sample ID:	A Kitchen Cabinetry South Wall
Detection Limit:	15
Media:	Tape
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm ²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	17,000	261,800	72
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	6,500	100,100	28
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	—	—	—
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	23,500	361,900	
Hyphal Fragments	5,500	84,700	

* Bacteria Present.

** Excessive debris. Reported results may be affected.

HIGH RELATIVE HUMIDITY

Sample ID:	371574-27
Client Sample ID:	Master Bedroom West Wall B
Area Swabbed (cm ²):	6.45
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm ²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	3,132	19,423	10
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	—	—	—
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Spegazzinia	—	—	—
Stachybotrys	29,438	182,561	90
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	32,570	201,984	
Hyphal Fragments	7,065	43,814	
Detection Limit		73	

Wallpaper



WOOD FUNGUS

Attic Wood Frame



Sample ID:	386909-04*
Client Sample ID:	Attic (Framing Composite) A
Area Swabbed (cm ²):	25.81
Media:	Swab
Sample Analysis:	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm ²	%
Alternaria	—	—	—
Arthrinium	—	—	—
Ascospores	—	—	—
Aspergillus/Penicillium-Like	65,940	102,193	100
Basidiospores	—	—	—
Bipolaris/Dreschlera	—	—	—
Botrytis	—	—	—
Chaetomium	—	—	—
Cladosporium	—	—	—
Curvularia	—	—	—
Epicoccum	—	—	—
Fusarium	—	—	—
Ganoderma	—	—	—
Memnoniella	—	—	—
Nigrospora	—	—	—
Oidium/Peronospora	—	—	—
Pithomyces	—	—	—
Rust	—	—	—
Smut/Myxomyces/Periconia	—	—	—
Stachybotrys	—	—	—
Torula	—	—	—
Ulocladium	—	—	—
Unidentified Spores	—	—	—
Total Spores	65,940	102,193	
Hyphal Fragments	436	676	
Detection Limit	18		

* Bacteria Present.

WOOD FUNGUS

New Home





Sample ID:	394563-02	394563-03
Client Sample ID:	Exterior (4X4 Wood Beams)	Exterior (3X4 Wood Beams)
Area Swabbed (cm²):	25.81	25.81
Media:	Swab	Swab
Sample Analysis:	Analyzed at 600X Magnification	Analyzed at 600X Magnification

Spore Types	Raw Count	Count/cm²	%	Raw Count	Count/cm²	%
Alternaria	—	—	—	—	—	—
Arthrinium	—	—	—	—	—	—
Ascospores	—	—	—	—	—	—
Aspergillus/Penicillium-Like	165	256	8	1,648	2,554	11
Basidiospores	—	—	—	—	—	—
Bipolaris/Dreschlera	—	—	—	—	—	—
Botrytis	—	—	—	—	—	—
Chaetomium	—	—	—	—	—	—
Cladosporium	1,896	2,938	91	13,188	20,439	89
Curvularia	—	—	—	—	—	—
Epicoccum	—	—	—	—	—	—
Fusarium	—	—	—	—	—	—
Ganoderma	—	—	—	—	—	—
Memnoniella	—	—	—	—	—	—
Nigrospora	—	—	—	—	—	—
Oidium/Peronospora	—	—	—	—	—	—
Pithomyces	24	37	1	—	—	—
Rust	—	—	—	—	—	—
Smut/Myxomyces/Periconia	—	—	—	—	—	—
Stachybotrys	—	—	—	—	—	—
Torula	—	—	—	—	—	—
Ulocladium	—	—	—	—	—	—
Unidentified Spores	—	—	—	—	—	—
Total Spores	2,085	3,231		14,836	22,993	
Hyphal Fragments	12	19		1,860	2,883	
Detection Limit	18			18		



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