



The **DUST** Test Report

Mold Screen

Welcome to The Dust Test

Congratulations on taking your first step towards having a healthy home!

In order to ensure your home supports your health, we first have to find out what may be unhealthy about it. That's why at The Dust Test we made sure to use the right technology to help people identify what they may be exposed to.

On the following pages, you will see data specific to your home. Sometimes, the results prompt a celebration, other times, they can be overwhelming.

Whether you're testing a rental, a home you're considering buying, or a home you currently own, we have you covered. Our goal is to empower you with data so that you can take the best next steps for you and your family.

The Dust Test isn't just a technology, it's a community of professionals that help guide you on your journey. We help you understand what the information means and what steps you need to take, if any, to improve the amount of mold, bacteria, or toxins you may be exposed to.

We want people to leave our service feeling empowered and not lost or confused on what to do next. This is why every purchase of The Dust Test comes with a free consultation, so please be sure to take advantage of it.

Schedule Your
Next Steps Call



<https://TheDustTest.com/call>

Mold

EPA 36 Species Identification Group 1 Sample Size : 5 mg	Spores E/ mg dust
Aspergillus flavus ¹	158
Aspergillus fumigatus ²	ND
Aspergillus niger ²	29
Aspergillus ochraceus ²	14897
Aspergillus penicillioides ¹	ND
Aspergillus restrictus ¹	ND
Aspergillus sclerotiorum ¹	ND
Aspergillus sydowii ¹	7827
Aspergillus unguis ³	121
Aspergillus versicolor ¹	ND
Aspergillus amstelodami (Eurotium amstelodami) ¹	ND
Aureobasidium pullulans ¹	ND
Chaetomium globosum ³	ND
Cladosporium sphaerospermum ²	ND
Paecilomyces variotii ²	5
Penicillium brevicompactum ²	15
Penicillium corylophilum ³	ND
Penicillium crustosum (group2) ¹	1289
Talaromyces purpureogenus (Penicillium purpurogenum) ²	ND
Penicillium spinulosum ¹	579
Talaromyces variabilis (Penicillium variable) ³	ND
Microascus brevicaulis (Scopulariopsis brevicaulis) ²	7
Microascus chartarus (Scopulariopsis chartarum) ¹	8
Stachybotrys chartarum ³	ND
Trichoderma viride ³	39
Walleimia sebi ¹	2
Group 1 Sum of the Logs	25.2

EPA 36 Species Identification Group 2 Sample Size : 5 mg	Spores E/ mg dust
Sarocladium strictum (Acremonium strictum) ³	ND
Alternaria alternata ²	ND
Aspergillus ustus ¹	ND
Cladosporium cladosporioides I ²	1101
Cladosporium cladosporioides II ²	176
Cladosporium herbarum ¹²	ND
Epicoccum nigrum ²	41
Mucor and Rhizopus group ³	ND
Penicillium chrysogenum ²	348
Rhizopus stolonifer ²	ND
Group 2 Sum of the Logs	9.4



10 fold higher than normal*



100 fold higher than normal*



1,000 fold higher than normal*

*Based on research funded and collaborated on by The US Environmental Protection Agency (EPA) through its Office of Research and Development and Housing and Urban Development (HUD).

1. Xerophilic mold species**

2. Mesophilic mold species**

3. Hydrophilic mold species**

**For more information about these mold species see page 4.



Summary

How Your Home Compares to Others

**Your
Mold Code**



Mold Code	Mold Ranking vs Other Homes
Code 1	1st - 9th percentile
Code 2	10th - 25th percentile
Code 3	26th - 50th percentile
Code 4	51st - 90th percentile
Code 5	91st - 100th percentile

Next Steps

How to best move forward

Your sample detected 17 of the 36 most prevalent molds found in homes according to the 2006 Housing and Urban Development’s American Healthy Homes Survey

It also detected 11 mold species that require either damp or wet conditions to grow. Please note, this is not an indication of current active water sources. See page 4 for more information.

The results indicate that a mold source, or multiple sources, are somewhere in the building. Thus, an inspection and further testing should be performed to identify the location of the mold sources and set the appropriate remediation plan.

To discuss next steps specific to your goals based on your results, **schedule your free consultation: <https://TheDustTest.com/call>**

Moisture Requirements For Mold Growth

The purpose of this interpretation is to better understand the conditions required for certain molds to grow so you can think about your environment to try and determine where some of these moisture conditions may be present in your space.

Not All Molds Are Created Equal

Different mold species require different amounts of water to grow. The official measurement for this is called **Water Activity** and the measurement is represented by this symbol a_w

The Water Activity scale for mold growth can be broken up into three categories: Xerophilic ($0.65a_w$), Mesophilic ($0.8a_w - 0.9a_w$), and Hydrophilic ($0.9a_w - 1.0a_w$).

The Water Activity Scale For Mold Growth Ranges From $0.0a_w - 1.0a_w$

The moisture condition in building materials, surfaces and/or dust can be measured and expressed either in decimal form as the **water activity (a_w)** OR a percentage as the **equilibrium relative humidity (ERH)**.

- Xerophilic: $0.65a_w$ OR 65% ERH
- Mesophilic: $0.80a_w - 0.90a_w$ OR 80%-90% ERH
- Hydrophilic: $0.9a_w - 1.0a_w$ OR 90%-100% ERH

Three Very Important Considerations

1. You may discover that you have a number of molds from all three water activity levels present in your home. This doesn't necessarily mean you have multiple moisture problems that are individually creating each of those moisture conditions.
2. One source area of moisture has the potential to create all three water activity environments.
3. The overall number of potential mold / water sources in a home or building cannot be determined by simply counting the number of molds within specific water activity levels.

Final Note

Mold needs water to grow, however it does not need water to remain. This means that once it grows, that mold will remain there until it is removed.

So, as you think about your environment and determine where some of these current and past moisture conditions may be present in your space, remember to consider areas where known water intrusions occurred but mold testing or remediation were not performed.

Mold Species Details

Xerophilic Molds – Primary Colonizers

Time to Colonize: Can grow within 24 – 48 hours

Moisture Requirement: Capable of growth at low moisture levels (65% ERH)

Preferred Environment: Xerophilic molds are dry loving species that continuously colonize relatively dry materials. Keep in mind that "dry" is relative, as it represents the least amount of moisture needed for mold grow.

Commonly Found Areas:

- Areas with little ventilation (ie: closets, attics, etc.) where humidity continuously exceeds 65%
- Near areas with more significant moisture conditions that directly increase the ERH within an adjacent area.

Group 1 molds:

- *Aspergillus flavus*
- *Aspergillus penicillioides*
- *Aspergillus restrictus*
- *Aspergillus sclerotiorum*
- *Aspergillus sydowii*
- *Aspergillus versicolor*
- *Aureobasidium pullulans*
- *Aspergillus amstelodami* (*Eurotium amstelodami*)
- *Penicillium crustosum*
- *Penicillium spinulosum*
- *Microascus chartarus* (*Scopulariopsis chartarum*)
- *Wallemia sebi*

Group 2 molds:

- *Cladosporium herbarum*

Mold Species Details

Mesophilic Molds – Secondary Colonizers

Time to Colonize: Can grow within 3 – 7 days

Moisture Requirement: Capable of growth at moisture levels between 80% – 90% ERH

Preferred Environment: Mesophilic molds are damp loving species that continuously colonize moderately damp materials.

Commonly Found Areas:

- Areas where regular water splashing or dripping occurs (ie: areas around showers and tubs, slow pipe leaks under sink cabinets, etc.) that can create continuously damp building materials.
- Near areas with more significant moisture conditions that directly increase the ERH within an adjacent area.

Group 1 molds:

- *Aspergillus fumigatus*
- *Aspergillus niger*
- *Aspergillus ochraceus*
- *Cladosporium*
- *Paecilomyces variotii*
- *Penicillium brevicompactum*
- *Talaromyces purpureogenus* (*Penicillium purpurogenum*)
- *Microascus brevicaulis* (*Scopulariopsis brevicaulis*)

Group 2 molds:

- *Alternaria alternata*
- *Cladosporium cladosporioides* I
- *Cladosporium cladosporioides* II
- *Cladosporium herbarum*
- *Epicoccum nigrum*
- *Penicillium chrysogenum*

Mold Species Details

Hydrophilic Molds – Tertiary Colonizers

Time to Colonize: Can grow within 1 – 2 weeks

Moisture Requirement: Capable of growth at moisture levels above 90% ERH

Preferred Environment: Hydrophilic molds are moisture loving species that tend to colonize continuously wet materials.

Commonly Found Areas:

- Areas of continuous leaks or water intrusion (ie: toilet leaks, appliance leaks, etc.)
- Areas impacted by a more significant water event or flood.

Group 1 molds:

- Chaetomium globosum
- Penicillium corylophilum
- Talaromyces variabilis (Penicillium variabile)
- Stachybotrys
- Trichoderma
- Aspergillus unguis

Group 2 molds:

- Acremonium strictum
- Aspergillus ustus
- Mucor recemosus
- Rhizopus
- Rhizopus stolonifer

Appendix

Mold

A relatively new water damage event with ensuring mold growth may not be detected by the ERMI as the spores must undergo an equilibration period and collect in household dust. Other changes in the home, such as new carpets, must be interpreted in conjunction with the ERMI result.

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. The reasons make it difficult to identify dose/response relationships that are required to establish "safe" or "unsafe" levels (i.e., permissible exposures 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.

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 molecular methods.

Analytical Method

Mold specific quantitative polymerase chain reactions (MSQPCR) was developed by a team of EPA researchers. MSQPCR utilizes EPA-patented molecular diagnostics methods for detecting and quantifying species of mold. The benefits of this technology include:

- A fast, accurate, and sensitive DNA-based analytical method for identifying and quantifying molds to the species level.
- Looks for the presence of DNA sequences that are unique to a particular mold species.
- Utilizes a DNA sequence detection system to monitor the presence and concentration of a specific mold in "REAL TIME." As a mold-unique sequence is detected and amplified, fluorescent signal molecules are simultaneously released and measured. No fluorescence = no target mold. Real-Time PCR is a DNA-based analytical method. What is DNA?
- DNA is a nucleic acid that carries the genetic information that is unique to every organism. DNA sequences determine individual hereditary characteristics.
- DNA can be found in every cell in every living (or previously living) organism. For example, humans have DNA in their skin cells and blood cells and fungi have DNA in their spores and hyphae.

Endotoxin samples are analyzed using the Kinetic Chromogenic LAL method.

Mycotoxin samples are analyzed using the LC-MS (liquid chromatography-mass spectrometry) method.

The results herein do not denote or represent a medical or clinical diagnosis or conclusion. Interpretation of the data is the responsibility of the client.

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 be conducted with caution.

Detection of multiple organisms in real-time q-PCR assays:

Certain species of mold are too genetically similar to be distinguished by MSQPCR. Thus positive or negative detection of any of these molds also suggests positive or negative detection of their genetically similar counterparts.

Eurotium (*Aspergillus*) *amstelodami* / *chevalieri* / *herbariorum* / *rubrum* / *repens*
Aspergillus flavus / *oryzae*
Aspergillus fumigatus, *Neosartorya fischeri*
Aspergillus niger / *foetidus* / *phoenicus*
Aspergillus restrictus / *caesillus* / *conicus*
Mucor and Rhizopus group / *Mucor amphibiorum* / *circinelloides* / *heimalis* / *indicus* / *mucedo* / *racemosus* / *ramosissimus* and *Rhizopus*
Penicillium chrysogenum / *griseofulvum* / *glandicola* / *coprophilum* / *expansum* and
Eupenicillium crustaceum / *egyptiacum*
Penicillium crustosum / *camembertii* / *commune* / *echinulatum* / *solitum*
Penicillium spinulosum / *glabrum* / *lividum* / *thomii* / *purpurescens*
Scopulariopsis brevicaulis / *fusca*
Trichoderma viride / *atroviride* / *koningii*

All result interpretations, estimations and considerations are provided by The Dust Test. This information does not guarantee the same results for your home or building. There could be significantly more or less mold/biotoxin issues that can only be identified through a comprehensive inspection.

All results, interpretations, estimations and considerations herein do not denote or represent a medical or clinical diagnosis or conclusion. Interpretation of the data is the responsibility of the client.

Articles

Quantification of *Stachybotrys chartarum* conidia in indoor dust using real time, fluorescent probe-based detection of PCR products. 2001. Jennie D Roe, Richard A Haugland, Stephen J Vesper and Larry J Wymer. JEAEE Vol.11.

Rapid Monitoring by Quantitative Polymerase Chain Reaction for Pathogenic *Aspergillus* During Carpet Removal From a Hospital. 2004. Alice N. Neely, PhD, Vince Gallardo, MS, Ed Barth, MS, Richard A. Haugland, PhD, Glenn D. Warden, MD, and Stephen J. Vesper, PhD. *Infection Control and Hospital Epidemiology*, Vol. 25.

Quantitative Polymerase Chain Reaction Analysis of Fungi in Dust From Homes of Infants Who Developed Idiopathic Pulmonary Hemorrhaging. 2004. Vesper, Stephen J. PhD; Varma, Manju PhD; Wymer, Larry J. MS; Dearborn, Dorr G. MD, PhD; Sobolewski, John MS; Haugland, Richard A. PhD. *Journal of Occupational & Environmental Medicine*. 46(6):596-601.

Real-time PCR analysis of molds is performed at EMSL Analytical, Inc. in agreement with the Patent License Agreement between EMSL Analytical, Inc. and the United States Environmental Protection Agency's National Exposure and Research Laboratory-CI as well as the Patent License Agreement between EMSL Analytical, Inc. and Applied Biosystems.

Books

Bioaerosols: Assessment and Control. Janet Macher, Ed., American Conference of Governmental Industrial Hygienists, Cincinnati, OH 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/news-pubs/newsroom/Documents/Facts%20About%20Mold%20December%202011.pdf>

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/mold/stachy.htm>

IOM, NAS: Clearing the Air: Asthma and Indoor Air Exposures

<http://fermat.nap.edu/books/0309064961/html/index.html>

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/mold/about-mold>

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://conyers.house.gov/index.cfm?FuseAction=Issues.Home&Issue_id=061bf20d-19b9-b4b1-12a3-6089055e7c99

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/mold/moldresources.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/mold/mold_remediation.html

FEMA

"Homes That Were Flooded May Harbor Mold Problems" – Information and tips for cleaning mold.

<http://www.fema.gov/news/newsrelease.fema?id=6927>

"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/news/newsrelease.fema?id=6358>

"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/news/newsrelease.fema?id=3652>

Important Terms, Conditions & 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 The Dust Test. If requested changes result in a change in cost the client must accept payment responsibility. In the event work is cancelled by a client, The Dust Test will complete work in progress and invoice for work completed to the point of cancellation notice. The Dust Test 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 The Dust Test 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 The Dust Test and whether The Dust Test has been informed of the possibility of such damages, arising out of or in connection with The Dust Test'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. The Dust Test 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 sampling conditions to insure that a valid sample is taken for analysis. Any resampling performed will be at the sole discretion of The Dust Test, the cost of which shall be limited to the reasonable value of the original sample delivery group (SDG) samples.

In no event shall The Dust Test or 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 The Dust Test by client thereunder.

E. Indemnification

Client shall indemnify The Dust Test and their 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 The Dust Test's services, the test result data or its use by client.

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