A GUIDE TO PREVENTING MOLD GROWTH AND IMPROVING INDOOR AIR QUALITY

"Promoting Good Health by Improving Indoor Air Quality"

MOLD TESTING
LONG ISLAND NY

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Section 1.0 | Introduction

Through my journey as a home inspector and environmental consultant, I have been asked, so many times, the same two questions in different forms: 1) How do I prevent mold growth? 2) Is mold dangerous? This guide is an attempt to assist people in gaining a basic understanding of mold, mycology and how common sense maintenance can prevent elevated indoor mold levels from creating health challenges for you and your family.

The information provided is a product of my experience and readily available information published by the Environmental Protection Agency (EPA) and other experts in their field.

Preventing mold growth is possible. Living in a house that is completely free of mold is not. As will be discussed further mold is a necessary and essential part of our environment.

Inspecting floor structure for mold.

Section 2.0 | About the Author

Tom earned a Bachelor of Science Degree in Civil Engineering from Villanova University and began a career in construction management. He worked for a real estate developer and managed the renovations of many projects throughout Manhattan and the five boroughs. His “claim to fame” was 589 5th Avenue which is a prominent feature of 5th Avenue and 48th street. The building was owned by a diamond dealer and the renovation was very complex.

After several years of developing his skill set as a construction manager, Tom and his brother formed Faulhaber Construction. The team renovated retail, commercial and residential projects throughout the Tri-state area. As a testament to his past working relationship with his former employer, Faulhaber Construction built most of the tenant space at 589 5th Avenue as it was leased.

Tom is a New York State licensed home inspector and has performed home inspections from Manhattan to Montauk. It was through home inspections that an interest in mycology and allergens developed and the journey to becoming an expert in mold growth and indoor air quality issues originated.

Two personal experiences stimulated an interest in developing an expertise in mold and other allergens that affect indoor air quality:

Tom’s eldest daughter had asthma related symptoms as a very young child. A trigger of that asthma was the mold in her bedroom wall, a result of an improperly functioning air conditioner. Repairing the defect, and remediating the mold brought about swift improvement in his daughter’s health.

Additionally, close friends of Tom and his family had a life changing experience with mold in their newly purchased house. Since move-in day, their young kids were having health issues. They had many tests performed and spent significant resources on remediation. The nightmare ended when they abandoned the house. Why were they not properly informed by their various consultants?

Both the home inspector and mold assessor need to understand the cause and effect of how a structure is built, including all the mechanical systems, the site it is built on, the effect of grade, the impact of trees on sun / shade and how all these factors may contribute towards mold growth. Additionally, an environmental consultant must understand how other allergens such as dust mites and dander can cause health related issues.

Having a thorough understanding of building science coupled with in-depth knowledge of mycology and allergenic triggers enable Tom to properly diagnose the how and why indoor air quality issues originate.

Mold Testing Long Island NY prides itself on having a thorough understanding of how and why mold grows, how and where to properly test for it and many times, the most important aspect of a good quality assessment, how to fix the defect that allowed mold to grow in the first place.

It is Tom's expertise in both building science and mycology that uniquely qualifies him to provide his clients with the absolute best mold testing and indoor air quality consultations. In addition to holding a NYS license in mold assessment, Tom is a NYS licensed home inspector, NYS licensed termite technician and a FHA 203(k) HUD Consultant. Tom has assessed, inspected and managed the renovations of thousands of houses from Manhattan to Montauk.

Section 3.0 | What is Mold?

The following information is sourced from the United States Environmental Protection Agency and the Centers for Disease Control and Prevention.

Mold is a type of fungus and is placed in the fungi kingdom. The fungi kingdom includes mold, yeast, mushrooms, lichens and truffles. There are over 100,000 different species of fungi and thousands of mold species. Mold is considered a natural part of the environment and can be found indoors and outdoors in moist places.

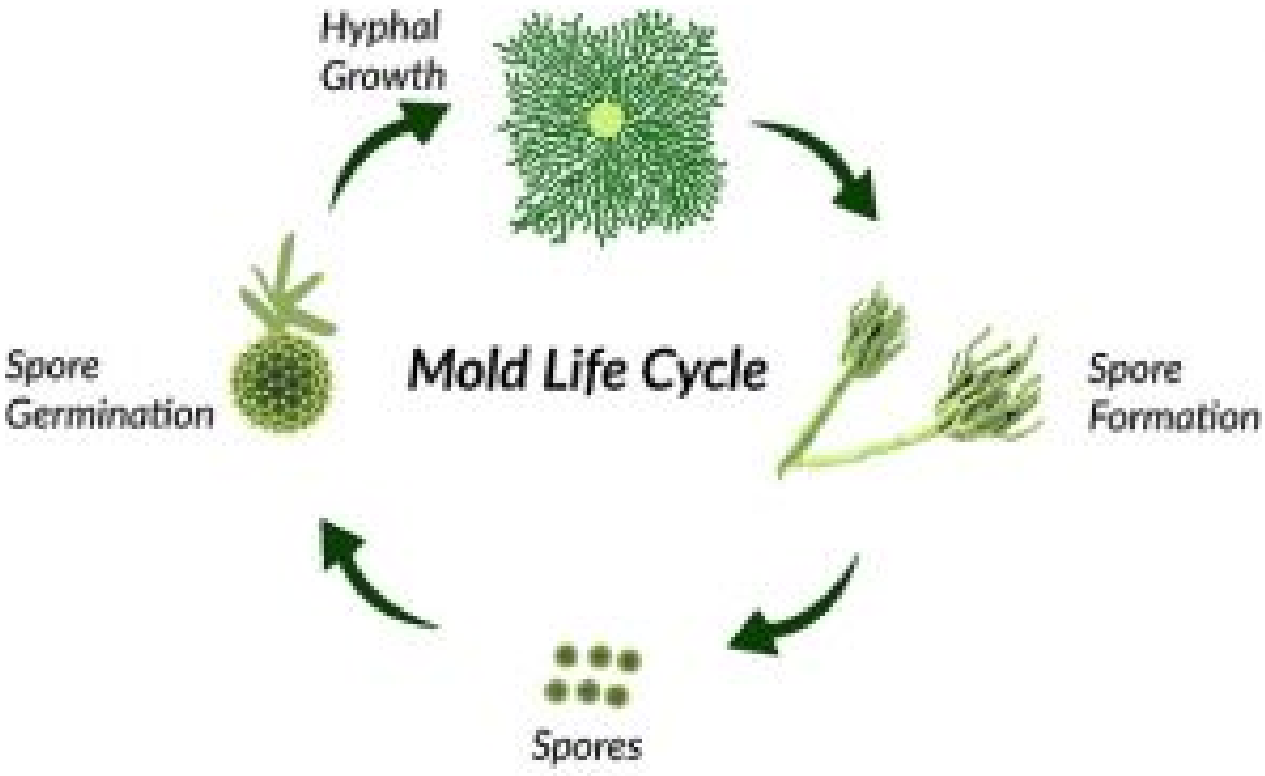
These organisms are much different than plants both in their structure and how they obtain energy. Unlike plants, fungi secrete enzymes that break down organic substances. They absorb these organic substances and use them for energy.

Mold is a fungal growth that forms and spreads on various kinds of damp or decaying organic matter. There are many different mold species that come in many different colors. Molds are sometimes referred to as mildew. They are found both indoors and outdoors in all climates, during all seasons of the year. Outdoors, molds survive by using plants and decaying organic matter such as fallen leaves as a source of nutrition. Indoors, molds need moisture and a carbon source from building materials or building contents to grow.

Molds produce tiny spores to reproduce. Mold spores waft through the indoor and outdoor air continually. When mold spores land on a damp spot indoors, they may begin growing and digesting whatever they are growing on in order to survive. There are molds that can grow on wood, paper, carpet and foods. When excessive moisture or water accumulates indoors, mold growth will often occur, particularly if the moisture problem remains undiscovered or unaddressed. There is no practical way to eliminate all mold and mold spores in the indoor environment. The way to control indoor mold growth is to control moisture.

4.0 | Structure of Mold and How Mold Travels

Structure of Mold: Molds are filamentous fungi. Mycelium is composed of fine, branching filaments called hyphae (singular hypha). Hyphae perform a variety of roles, including releasing enzymes to break down organic molecules, absorbing nutrients from the environment and transporting nutrients through the thallus (body). Molds reproduce by means of tiny spores; the spores are invisible to the naked eye and float through outdoor and indoor air. Mold may begin growing indoors when mold spores land on wet surfaces. There are many types of mold, and none of them will grow without water or moisture.



Source: Themoldinsider.com.

5.0 | Can Mold Cause Health Problems?

The following information is sourced from the United States Environmental Protection Agency.

Mold is usually not a problem indoors, unless mold spores land on a wet or damp spot and begin to grow. Molds have the potential to cause health problems. **Molds produce allergens (substances that can cause allergic reactions), irritants, and in some cases, potentially toxic substances (mycotoxins).** Inhaling or touching mold or mold spores may cause allergic reactions in sensitive individuals. Allergic responses include hay fever-type symptoms such as sneezing, runny noses, red eyes and skin rashes (dermatitis). Allergic reactions to mold are common and can be immediate or delayed. **Molds can also cause asthma attacks in people with asthma who are allergic to mold.** In addition, mold exposure can irritate the eyes, skin, nose, throat and lungs of both mold-allergic and non-allergic people. **Symptoms other than the allergic and irritant types are not commonly reported as a result of inhaling mold. Research on mold and health effects is ongoing. A connection with mold and Chronic Fatigue Syndrome is often debated.**

Source: Science Photo Library.

6.0 | Building Science 101

Now that we understand, and hopefully accept, that mold is everywhere, we need to learn how to live with and control mold.

Building science entails understanding proper building techniques. As it relates to minimizing mold growth, we want to build a framework for properly maintaining the house, condo, commercial structure etc. so that mold does not have the opportunity to grow and travel, potentially causing health hazards.

This entire guide can be summarized in the following four statements:

1. **Remove any existing mold from the structure.**
2. **Do not allow water to penetrate the structure.**
3. **Do not allow water leaks, condensation or standing water inside the structure.**
4. **Maintain relative humidity at 60% or less inside the structure.**

Understanding building science enables us to make the needed repairs and develop a maintenance protocol for the unique property at hand to satisfy the four conditions mentioned above.

Elevated moisture meter reading on a foundation wall with efflorescence.

7.0 | Preventing Water Penetration From the Exterior

Over the years it has never ceased to amaze me how very minor, easily fixed repairs can cause such enormous damage. I have seen firsthand the effects of each of the following defects in contributing towards mold growth in an interior space.

As a general rule, you want to ensure that water is flowing five feet away from the structure at hand on all four sides.

a. Gutter System:

i. Maintain clean gutters. If the property is surrounded by trees, install gutter guards.
ii. Ensure gutters are properly pitched towards the downspouts so that the gutters do not overflow in torrential downpours.
iii. Ensure gutters are properly attached to downspouts.
iv. Ensure downspouts are directing water away from the structure.

Clogged gutter system.

b. Irrigation System:

i. Ensure sprinkler heads are directed away from the structure.

ii. Ensure there are no compromised lines underground adjacent to the structure.

c. Grading:

i. Many landscapers create berms for planting beds. Water should be pitched away from the structure. A berm can direct water towards the structure.

d. Water Table Issues:

i. An elevated water table can lead to chronic water penetration in the basement or crawlspace. Improvements can be costly. There are two prevailing schools of thought. The first is to keep the water from coming in. This is usually facilitated through foundation insulation and drainage. The second school of thought is to allow the water to come in, then remove it. This is accomplished through the installation of french drains and a sump pump.

e. Exterior Caulking:

i. Water penetration through the joint where the siding meets the window or door can be substantial. Every joint on every door and window should be properly sealed.

Proper flashing is critical to preventing water penetration and possible mold growth.

f. Window Wells:

i. Maintain proper drainage and install window well covers.

g. Basement Walkouts:

i. Install a drain at the base of the steps if needed. If a drain exists then confirm its functionality.

h. Soffits:

i. Ice damming can cause serious water penetration and related damages. Maintain clean and firmly attached gutters, remove snow from the roof and ventilate the attic.

8.0 | Preventing Elevated Moisture in the Interior

a. Crawlspaces:

i. *Vented or Non-Vented:* Ensure there is never any standing water after storms. If the area is prone to elevated water levels, then a sump pump or multiple sump pumps should be installed.

Non-Vented: This crawlspace is essentially part of the building envelope. Install a crawl space dehumidifier.

b. **Insulation:** Install closed cell spray foam insulation if feasible. This will help prevent any mold spores from penetrating the living space.

Standing water in a crawlspace will promote mold growth and likely cross contamination to the living area above.

c. Basement:

i. Cut drywall 1 inch above slab and use composite base trim.
ii. Look for efflorescence. This indicates moisture from the exterior. Make needed repairs.
iii. Avoid carpeting. Ceramic tile flooring in the basement is ideal.
iv. Spray foam around sill plates and rim joists.
v. Caulk around all the windows.
vi. Seal any cracks in the foundation.

Mold and wood deterioration in basement floor structure.

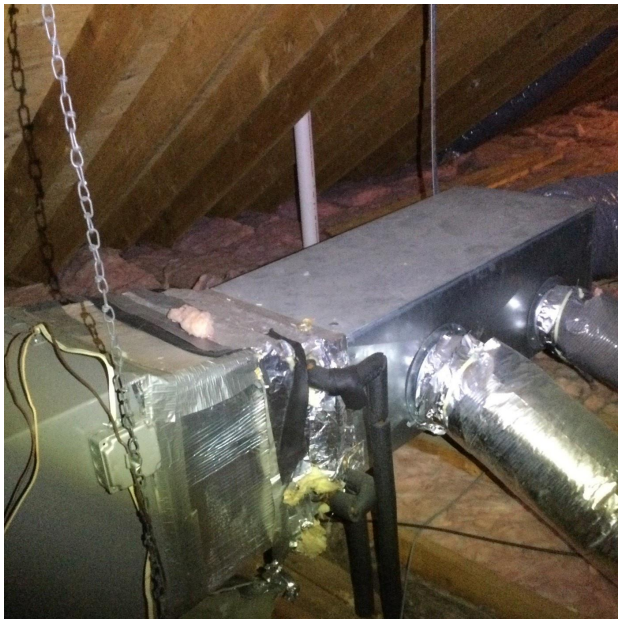
d. HVAC: ***Condensation due to improper insulation can cause water damage.***

i. Insulate all ducts in non-conditioned space.

ii. Insulate all boots/collars serving registers.

iii. Insulate all refrigerant lines.

iv. Clean condensate trap at air handler.



Ductwork not insulated in a vented attic.

e. Plumbing Lines:

I. Insulate all cold water lines.

f. Attic:

i. Ventilate all soffits.
ii. Extend exhaust ducts to the exterior.
iii. Install an insulation tent at pulldown steps or hatch.
iv. Properly insulate ceiling structure minimizing voids.
v. Install ridge vent if possible.
vi. A “hot roof” or non-vented attic is a good solution.

g. Bathrooms:

i. Install exhaust vents that terminate to the exterior.
ii. Keep the shower door open after showering.
iii. Install timer switch for bath fan and turn on for 20 minutes after showering.
iv. Open the window after showering if the bathroom does not have an exhaust fan.

Exhaust fans NOT ducted to the exterior can promote mold growth.

Mold on sheathing due to improper ventilation.

Condensation on nails in the attic can promote mold growth.

Rodents pushed insulation for nesting. This caused condensation and mold in the bedroom below.

A defective evaporator coil in the attic can cause water damage leading to mold growth.

9.0 | General Maintenance

1. Maintain humidity in the home during the months of April – late October between 40% – 50%. Mold grows at 60% and above. If you are not occupying the home during the warmer summer humid months, you must leave the air conditioner on to remove humidity and / or run a whole-house dehumidifier.
2. Maintain outside gutters and downspouts so that water is diverted away from the building's foundation walls.
3. Maintain proper HVAC filter changes as per the manufacturer's instructions. Do not use inexpensive, inefficient fiberglass filters.
4. Reduce clutter in the basement so that surfaces can be properly cleaned.
5. Direct basement dehumidifier and HVAC system discharge into an external pump to exterior.
6. Use bathroom exhaust fans when bathing / showering to remove moisture.
7. Using fans to circulate air is always beneficial and assists in reducing humidity levels and stagnant air. Open windows during comfortable climate days as fresh air dilutes stagnant air.
8. Leave closet doors ajar slightly to avoid stagnant air.
9. Leave dry, rain-soaked jackets outside closets prior to storing them in closed areas.
10. Use Swiffers, microfiber cloths and free-floating vacuums to reduce airborne and settled particulates. Dust / particulates are a major source of asthma exacerbation.
11. Wash sheets and pillowcases once a week in hot water to reduce dust mites and biologicals associated with dust mites and airborne allergens.
12. Never go to bed with wet hair. Dampness in pillows promotes dust mites.
13. If your pillows are more than two years old, replace them and install allergen-proof covers over the pillows. Place your comforter in the dryer once a month for 10 minutes on medium-high settings to reduce particulates.

10.0 | Dehumidification

Mold thrives in environments with relative humidity above 60%

Enough can NOT be said about maintaining humidity levels below 60%. I have been in countless houses that had elevated mold levels simply due to lack of dehumidification. Ideally, a properly sized dehumidifier in the basement and crawlspace, if applicable, should be set around 50% relative humidity. A unit with a pump draining into a sink makes maintenance easy.

Aprilaire makes several whole house dehumidifiers that are tied into the ductwork. If resources allow, this is an ideal installation.

Dehumidifiers are classified based on the number of pints of water they can remove in a 24 hour period. Look for a dehumidifier with a 10 pint removal capacity for a 500 square foot room. If your room exceeds 500 square feet, you will want an additional 4 pints for every 500 square feet. If your room is 1,000 square feet, for example, you want at least a 14 pint removal capacity to maximize moisture removal.

Air conditioning assists in removing water from the air but many times it does not suffice. Purchase a hygrometer and confirm the entire space has a relative humidity below 60%.

A hygrometer reading above 60% indicates an environment that mold can thrive in.

A basement with no step down, requires special attention.

It is not uncommon to see this type of mold growth due to lack of proper dehumidification.

Mold on the basement ceiling due solely to lack of dehumidification.

Mold can grow on organic substances embedded on concrete.

11.0 | Common Myths

1. **The mold is not black so it is not harmful.** All molds can be allergenic. Certain “black” molds have been tested and shown to be more toxic than other molds. Allergic reactions vary by individual.
2. **Mold is everywhere so why bother to prevent its growth.** Mold levels inside a structure are measured relative to a control (exterior) sample. Elevated mold levels relative to the exterior are to be prevented.
3. **All basements have a “musty” odor.**
    a. Some compounds produced by molds have strong smells and are volatile and quickly released into the air. These compounds are known as microbial volatile organic compounds (mVOCs). Because mVOCs often have strong or unpleasant odors, they can be the source of the "moldy odor" or musty smell frequently associated with mold growth. A moldy odor suggests that mold is growing in the building and should be investigated.
    b. The health effects of inhaling mVOCs are largely unknown, although exposure to mVOCs has been linked to symptoms such as headaches, nasal irritation, dizziness, fatigue and nausea. More research is needed to determine whether there are any human health effects from non-occupational indoor exposures to mVOCs.
4. **Mold takes weeks to grow after a water leak.** Mold can grow within 24 - 48 hours after a water event.
5. **Use bleach to kill mold.** Bleach quickly dries off on the surface and will not reach into the deeper part of the material to the mold's root. Additionally, the high water content in bleach will moisten the wood, therefore prompting mold growth.
6. **All mold is bad.**
    a. Mold is everywhere and not all molds are dangerous to our health. Certain types of molds are used in medicines and foods.
        i. *Medicine:* Penicillium mold naturally produces the antibiotic Penicillin which people use every day.
        ii. *Food:* Mold / fungus is an active ingredient in many soft and semi-soft cheeses such as Blue Cheese, Camembert, Brie and Gorgonzola.

7. **There are federal guidelines as to what is considered elevated mold levels.**
    a. There are currently no federal guidelines on what is considered elevated mold levels. The EPA simply states that if you see or smell mold, you have mold and corrective action is warranted.

Taking a swab sample on basement drywall.

Section 12.0 | Certifications

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Department of Labor

NEW YORK STATE - DEPARTMENT OF LABOR

DIVISION OF SAFETY AND HEALTH
LICENSE AND CERTIFICATE UNIT
STATE CAMPUS BUILDING 12

Mold Assessor Company License

Mold Testing Long Island NY Inc.
516 Long Beach Road
SAINT JAMES, NY 11780

LICENSE NUMBER: 01789
DATE OF ISSUE: 10/7/2022
EXPIRATION DATE 10/31/2024

This license is valid only for the contractor named above.

Amy Phillips, Director
FOR THE COMMISSIONER OF LABOR

EXCELSIOR

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NY STATE MOLD ASSESSOR COMPANY LICENSE #01789

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