






Mold Awareness in Residential Construction






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Pennsylvania Housing Research Center

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- Educational programs and publications by the PHRC address a wide range of topics relevant to the home building industry and are designed to reach a diverse audience: builders, code officials, remodelers, architects, developers, engineers, planners, landscape architects, local government officials, educators, etc. to provide professional development and continuing education



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Program Description


This session will educate construction professionals about the risks, identification, prevention, and remediation of mold in residential buildings. Mold can pose significant health hazards and structural issues if not properly managed. Attendees will learn about the conditions that promote mold growth, methods for identifying mold, strategies for preventing mold in new and existing constructions, and the best practices for remediation when mold issues arise.



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Learning Objectives



- 1. Understand Mold Growth Factors:** Identify the environmental conditions and materials that contribute to mold growth in residential construction.
- 2. Recognize Health Implications:** Understand the potential health risks associated with mold exposure for both construction workers and residents.
- 3. Implement Prevention Strategies:** Learn effective construction practices and design strategies to prevent mold growth in new and existing residential buildings.
- 4. Remediation Techniques:** Gain knowledge on the best practices for safely and effectively remediating mold issues, including proper use of protective equipment and remediation materials.



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Understanding Mold Growth Factors

- Mold is a natural part of the environment and plays a role in breaking down organic matter.
- However, unchecked mold growth can cause damage to buildings and furnishings.
- Mold is within the fungi family but with significant differences.




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What Is Mold? What Is Mildew?



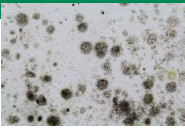
Lower humidity levels



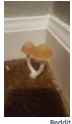
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Hazard Classification of Indoor Molds


- **Hazard A:** Includes fungi or their metabolic products that are highly hazardous to health. These fungi or metabolites should not be present in occupied dwellings. Presence of these fungi in occupied buildings requires immediate attention.
- **Hazard B:** Includes those fungi which may cause allergic reactions to occupants if present indoors over a long period.
- **Hazard C:** Includes fungi not known to be a hazard to health. Growth of these fungi indoors, however, may cause economic damage and therefore should not be allowed.



Black Mold TSC Restoration

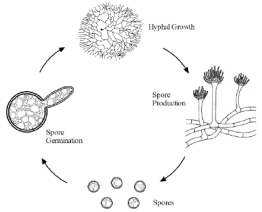



Reddit



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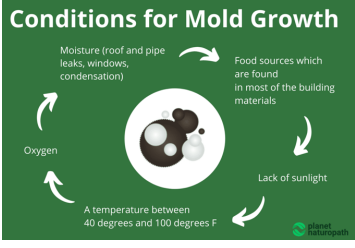
The Mold Life Cycle






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Conditions for Mold Growth




- Moisture
- Temperature
- Nutrients
- Oxygen
- Spores




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Moisture and Humidity Control

- **Moisture:** Mold needs moisture to survive and reproduce, and it can grow in as little as 24–48 hours if the conditions are right. Common sources of moisture include leaking pipes, condensation, and high humidity.
- There are many types of mold, and none of them will grow without water or moisture.



Folgggroup.com




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Keep Construction Site Mold Away with Humidity Control

Out of all the factors that contribute to mold growth, moisture and humidity are what we can control the most.

- Traditional HVAC systems are not meant to, nor are they effective at, drying out construction related moisture load from wet materials is too much.
- Temporary humidity control for construction drying is a better solution because it works faster and is far more effective.




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Temperature

- **Temperature:** Mold can reproduce in temperatures between 40°F and 120°F.
- 60°F to 80°F is ideal and any temperature changes outside of this range can cause it to go dormant.
- Temperature is difficult to control until the HVAC system is installed.




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Poor Ventilation and Airflow

- As the construction process moves forward, there is less airflow in the structure.
- Lack of airflow allows moisture to build up, the air becomes stagnant, and mold can grow.
- Have a plan to help move air during the construction phase, especially when humidity levels are high.



Builder Magazine



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Mold-Friendly Building Materials



Mold-resistant paint

MOLD RESISTANT DRYWALL


Treated lumber for interior spaces



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Identify Areas on a Construction Site Where Mold Might Grow


- Mold can grow in any area that is damp or moist, making construction sites particularly susceptible.
- Here are some common areas where mold might grow:
 - **Basements and crawlspaces** – These areas are often damp and poorly ventilated, which makes them ideal for mold growth.
 - **Bathrooms and kitchens** – These areas have high moisture levels and are prone to mold growth if not properly ventilated.
 - **HVAC systems** – If HVAC systems are not properly maintained, they can become a breeding ground for mold.



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Health Implications


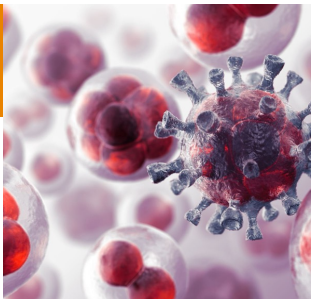
- Molds produce allergens (substances that can cause allergic reactions), irritants, and in some cases, potentially toxic substances (mycotoxins).



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Mold-Related Health Issues



- Respiratory Issues
- Chronic Conditions
- Mold-Induced Toxicity



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Mold Allergies

- Molds produce allergens, 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 nose, red eyes, and skin rash (dermatitis).




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Symptoms of Mold Toxicity

- Chronic Sinusitis
- Muscle Joint Pain
- Fatigue
- Sleep Issues
- Migraine Headaches
- Sever Irritability
- Hormone Disruption

The most common symptoms of mold toxicity are persistent allergies, chronic sinusitis (inflammation in the nasal passage), and nasal infections.




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Some studies suggesting 51% of people exposed to water damaged buildings with mold growth experience muscle and joint pain.




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Another symptom of chronic mold exposure is debilitating fatigue. Mold is not the only cause of chronic fatigue, but it can be one of the causes.




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Symptoms of Mold Toxicity

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Trouble going to and staying asleep.




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Some people may develop “Brain Fog” symptoms similar to dementia.



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Who Is at Risk

People with respiratory conditions:
People with asthma, allergies, or emphysema are more likely to have a severe reaction to mold.




Getty Image

People with compromised immune systems:
People with HIV/AIDS, organ transplants, or chemotherapy are more likely to get lung infections from mold.



Science.org

About 22 to 25% of the US population suffers from some form of asthma.



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MOLD: WORKER AND EMPLOYER GUIDE TO HAZARDS AND RECOMMENDED CONTROLS

https://www.hud.gov/sites/documents/IEPWG_MOLD_WORKER.PDF

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Summary of Health Impacts of Mold

Mold exposure can lead to various health issues, particularly for individuals who are sensitive to mold or have preexisting respiratory conditions. The most common health impacts include:

- 1. Allergic Reactions:** Mold can trigger symptoms like sneezing, runny nose, red eyes, and skin rashes. These reactions are similar to those caused by other airborne allergens.
- 2. Respiratory Issues:** Mold spores can exacerbate conditions like asthma, causing wheezing, coughing, and shortness of breath. Prolonged exposure may lead to chronic respiratory problems.
- 3. Fungal Infections:** In some cases, especially in individuals with weakened immune systems, mold can cause infections such as aspergillosis, which affects the lungs and other organs.
- 4. Toxic Mold Syndrome:** Some molds, like *Stachybotrys chartarum* (black mold), produce mycotoxins, which can potentially lead to more severe symptoms, including headaches, fatigue, and cognitive difficulties, though this is less common.
- 5. Irritation of Eyes, Skin, and Throat:** Mold exposure can irritate the mucous membranes, causing burning sensations in the eyes, throat, and skin, even in non-allergic individuals.

Overall, health impacts depend on the type of mold, the length of exposure, and individual susceptibility. Mold should be promptly addressed to reduce risks, especially in sensitive populations like children, the elderly, and those with respiratory conditions.

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Mold Prevention

- Mold in a home is a relatively new problem. With advanced insulation and air sealing along with new types of building materials like OSB, mold can be a problem facing homeowners and builders.
- Most homes built over 50 years ago consisted of locally-sourced wood, plaster, and stone or concrete.

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Prevention Strategies

- **Moisture – The Primary Culprit:**
- Moisture is the biggest reason mold grows. Without it, mold can't survive.
- Sources of moisture in your home might include leaky pipes, damp basements, lots of humidity, condensation, and flooding.
- Keeping your home dry is one of the best ways to prevent mold.



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Ways to Avoid Mold During Construction

- **Unload lumber to a dry place. Be prepared for a long build time.**
- **Inspect lumber upon delivery to the job site.**
- **Limit storage time.**



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Unprotected lumber is a recipe for disaster.



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If Materials Are Wet, Then What?

- If materials do get wet, which is common due to weather, ensure that they are dry enough to be enclosed before construction progresses by using a moisture meter.
 - Have a moisture meter. Lumber should ideally be 12-14%.
- If you do have high moisture readings once rough-in framing is complete, what are some options for drying the structure?



Fine Homebuilding



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Time

- Once the structure is framed in and the home is protected from bulk water intrusion, it will begin to dry on its own. Although, this can take a long time and is very weather dependent on how long this can take.



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Air Movement

- A simple strategy of moving air within the structure is a simple low-cost way of decreasing drying time.



Fine Homebuilding





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Heat

- As heaters increase temperature, the moisture in the air decreases in comparison to the temperature.
- Using heaters in conjunction with fans will decrease the drying time even more.





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Dehumidify

Commercial dehumidifiers are a good way to quickly lower the moisture level in the structure.

- They can be rented or purchased.
- They can be used even when not trying to remove bulk moisture.
- They have a lower energy cost compared to heating a large uninsulated space.



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Understand Your Materials

- Like any living organism, there needs to be a source of food for the mold to grow.
- Cellulose is a favorite type of food for mold, and there are a lot of materials that contain it.
- Wood
- Drywall
- Insulation
- Carpet





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Non-Toxic Wood Treatment

- There are products in the market that allow for the treatment of wood materials that will inhibit the growth of mold on wood framing materials.
- When choosing to use a product like this, make sure it is rated for indoor use. Some contain chemicals you would not want to use inside the building envelope.



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- Mold-resistant drywall is used to reduce the likelihood of mold growth in areas that are prone to moisture, such as bathrooms, kitchens, laundry rooms, basements, and crawlspaces.
- Mold-resistant drywall is more expensive than standard drywall, but it can save money in the long run by preventing mold damage and health risks.




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Mold on Concrete

- If you see mold growing on concrete, it means there is a food source available beyond the concrete itself. This can be adhesive residue, insulation, dust, and possibly even algae. Any organic matter can be food for mold.
- Make sure what you are seeing is mold and not something like efflorescence, which is confused by some as a type of mold.

Efflorescence	Mold
	



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Crawlspaces

- This is an area of concern for most builders or should be.
- Vented vs. unvented
- These areas will take longer to dry out.



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Speed Is Key

- Speed is key when you are addressing moisture problems in a home.
- The faster you can dry out the affected area and address the reason for the water intrusion, the less damage you will have to repair.

FIX YOUR LEAKS FAST





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Mold Remediation

Mold remediation on a construction site is a process that involves a series of steps to remove mold growth and restore a safe environment.

- Assessment
- Containment
- Mold Removal
- Cleaning and Disinfecting
- Post-Remediation Verification





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Assessing the Severity of Mold Infestation

When assessing the severity of a mold infestation on a construction site, you can:


- Perform a visual inspection.
- Check moisture levels using a moisture meter.
- Use an infrared meter to detect moisture damage.
- Take test samples.
- Survey building materials stored on site for infestation.
- Have a mold specialist help with diagnosing any potential problems.



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Containment: Preventing the Spread of Mold


- The goal of containment is to limit the spread of mold throughout the building in order to minimize the exposure of remediators and building occupants to mold.
- There are two types of containment according to the EPA.
 1. Limited containment are generally areas involving between 10 and 100 square feet of mold contamination.
 2. Full containment are areas larger than 100 square feet of contaminated area and have a higher probability of the contamination spreading during remediation.



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Safe Removal of Mold-Contaminated Materials

- Ensure that the proper PPE is being used when handling mold contaminated materials.
- If you cannot safely and completely remove mold and spores from the material, dispose of it properly.
- Contaminated material should be double-bagged in 6 mil or thicker poly bags.
- Bagged material can be disposed of in ordinary construction waste receptacle or dumpster.
- Large items should be wrapped in poly sheeting before being thrown out.




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**Hidden Mold:
Behind Walls,
Under Floors**

- Moisture meters
- Musty smell
- Thermal camera
- Dark spots

• There are a number of ways to find hidden mold behind walls.


• Mold test: There are a couple ways to conduct a mold test. The simple one is a tape test, and another is an airborne test.



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Cleaning and Disinfecting Mold-Affected Areas

- First is fix the water problem.
- Wear appropriate PPE.
- Invest in a pump sprayer and use a cleaning solution that will kill mold, such as white vinegar, 50/50 ammonia and water, or purchase commercial mold remover solutions.
- Make sure the area is completely dry after cleaning.
- Dispose of rags and all wiping cloths.
- If it is a large and heavily contaminated area, you may want to consult a professional cleaning service.
- If the material is cloth or a very porous material, you may just want to dispose of it rather than cleaning.



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Personal Protective Equipment

• The primary function of personal protective equipment is to limit mold exposure.

• If a remediation job disturbs mold and mold spores then become airborne, the risk of respiratory exposure increases.

PPE includes:

- Gloves
- Goggles
- Respirators
- Disposable clothing



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Ensuring Mold-Free Environment




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Remediation Summary

- The safety and thoroughness of mold remediation are crucial to protect both health and property.
- Mold can cause severe respiratory issues, allergies, and worsen conditions like asthma.
- Proper remediation ensures that all mold is removed and the root cause, such as moisture or leaks, is addressed to prevent recurrence.
- Incomplete or unsafe remediation can lead to ongoing health risks, structural damage, and costly repairs.
- Following strict safety protocols and ensuring thorough cleaning are essential to restoring a healthy, mold-free environment.



This Old House



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Questions?

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Thank you for attending!
Check out the next webinar on:






Tuesday, Oct. 8 @ 1pm ET
*Understanding and Addressing Air Leakage
in Attached Dwellings*



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**Mold Awareness in
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