Safety Spotlight

Common Indoor Molds: Prevention and Remediation

What are Molds? [1]

Molds are fungi that can be found both indoors and outdoors. Molds grow best in warm, damp, and humid conditions, and spread and reproduce by making spores. Mold spores can survive harsh environmental conditions, such as dry conditions, that do not support normal mold growth. Some of the common indoor molds include: Cladosporium, Penicillium, Alternaria, and Aspergillus.

How do Molds Affect People? [1]

For people who are sensitive to molds, exposure can lead to symptoms such as stuffy nose, wheezing, and red or itchy eyes, or skin. Some people, such as those with allergies to molds or with asthma, may have more intense reactions. Severe reactions – such as fever and shortness of breath – may occur among workers exposed to large amounts of molds in occupational settings, such as farmers working around moldy hay.

People with a weakened immune system, such as those receiving treatment for cancer, those who have had an organ or stem cell transplant, and those taking medicines that suppress the immune system, are more likely to get mold infections.

> "*For people who are sensitive to molds,* exposure can lead to symptoms such as stuffy nose, wheezing, and red or itchy eyes and skin.[1]"

Where are Molds Found? [1]

Molds are found in virtually every environment and can be detected year round. Mold growth is encouraged by warm and humid conditions. Indoors, they can be found where humidity levels are high, such as basements or showers.

What Preventative Measures can be Taken? [2]

Since molds require water to grow, it is important to prevent moisture problems in buildings. Moisture problems can have many causes, including uncontrolled humidity. Some moisture problems in buildings have been linked to changes in building construction practices during the 1970s, 80s, and 90s. Some of theses changes have resulted in buildings that are tightly sealed, but may lack adequate ventilation, potentially leading to moisture buildup. Building materials, such as drywall, may not allow moisture to escape easily. Moisture problems may be caused by:

- Roof leaks
- Landscaping or gutters that direct water into or under the building
- Unvented combustion appliances
- Delayed maintenance or insufficient maintenance that cause moisture problems

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[1] *"Mold - General Information - Basic Facts." Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, 20 Dec. 2017, www.cdc.gov/mold/faqs.htm.*

[2] *"Mold Remediation in Schools and Commercial Buildings Guide." EPA, Environmental Protection Agency, 15 Aug. 2018, www.epa.gov/mold/mold-remediation-schools-and-commercial-buildings-guide.*

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The key to mold control is moisture control. Solving moisture problems before they become mold problems by:

- Fixing leaky plumbing
- Watching for condensation and wet spots; promptly fix source(s) of moisture problem(s) as soon as possible
- Preventing moisture due to condensation by increasing surface temperature or reducing the moisture level in the air (humidity); to increase surface temperature, insulate, or increase air circulation; to reduce the moisture level in air, repair leaks, increase ventilation (if outside air is cold and dry), or dehumidify (if outdoor air is warm and humid)
- Keeping heating, ventilation, and air conditioning (HVAC) drip pans clean, flowing properly, and unobstructed
- Venting moisture-generating appliances, such as dryers to the outside where possible
- Maintaining low indoor humidity, below 60% relative humidity (RH), ideally 30-50%, if possible
- Performing regular building/HVAC inspections and maintenance, as scheduled
- Cleaning and drying wet or damp spots within 48 hours
- Not allowing foundations to stay wet by providing drainage and sloping the ground away from the foundation

Table 1: Water Damage – Cleanup and Mold Prevention [2]

The table below presents strategies to respond to water damage within 24-48 hours to help avoid the need for remediation of mold growth by taking quick action before growth starts. If mold growth is found on the materials listed in the table below, please refer to ***Table 2*** for additional guidance on remediation.

Water-Damaged Material	Actions
Books and papers	» For non-valuable items, discard books and papers. » Photocopy valuable and/or important items, discard originals. » Freeze (in frost-free freezer or meat locker) or freeze dry, if possible.
Carpet and backing – dry within 24-48 hrs	» Remove water with water extraction vacuum. » Reduce ambient humidity levels with dehumidifier. » Accelerate drying process with fans.

> *"Watch[ing] for condensation and wet spots;* promptly fix source(s) of moisture problem(s) as soon as possible.[1] "

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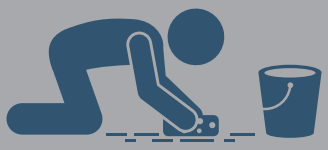
Water-Damaged Material	Actions
Ceiling tiles	» Discard and replace.
Cellulose insulation	» Discard and replace.
Concrete or cinder block surfaces	» Remove water with water extraction vacuum. » Accelerate drying process with dehumidifiers, fans, and/or heaters.
Fiberglass insulation	» Discard and replace.
Hard surface, porous flooring (Linoleum, ceramic tile, vinyl)	» Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary. » Check to make sure underflooring is dry; dry underflooring is necessary.
Non-porous, hard surfaces	» Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary.
Upholstered furniture	» Remove water with water extraction vacuum. » Accelerate drying process with dehumidifiers, fans, and/or heaters. » May be difficult to completely dry within 48 hrs. If the piece is valuable, consult a restoration/water damage professional who specializes in furniture.
Wallboard	» May be dried in place if there is no obvious swelling and the seams are intact. If not, remove, discard, and replace. » Ventilate the wall cavity, if possible.
Window drapes	» Follow manufacturer's laundering or cleaning instructions.
Wood Surfaces	» Remove moisture immediately and use dehumidifiers, gentle heat, and fans for drying. » Treated or unfinished wood may be cleaned with mild detergent and allowed to dry. » Wet paneling should be pried away from wall for drying.

> "*Clean[ing] and dry[ing]* wet or damp spots within 48 hours [to prevent moisture problems].[1]"



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Mold Remediation Step-by-Step List [2]

Below is a list of steps to take before beginning the mold remediation process. These should be used in conjunction with the information found in ***Table 2***.

Investigate and Evaluate Moisture and Mold Problems

- Assess total size of moldy area (square feet)
- Consider the possibility of hidden mold
- Clean up small mold problems and fix moisture problems before they become large problems
- Select a remediation manager for medium or large size mold problems
- Investigate areas associated with occupant complaints
- Note type of water-damaged materials (wallboard, carpeting, etc.)
- Check inside air ducts and air handling units
- If necessary, consult a qualified professional

Communicate with Building Occupants at all Stages of Process, as Appropriate

- Designate a contact person for questions and comments about medium or large scale remediation, as needed

Plan Remediation

- Adapt or modify remediation guidelines to fit your situation; use professional judgment
- Plan to dry wet, non-moldy materials within 48 hours to prevent mold growth (*see **Table 1** for more information*)
- Select cleanup methods for moldy items (*see **Table 2** for more information*)
- Select appropriate personal protective equipment to protect remediators (*use **Table 2***)
- Select appropriate containment equipment to protect the building and its occupants (*use **Table 2***)
- Select remediation personnel who have the experience and training needed to implement the remediation plan and use personal protective equipment and containment as appropriate

Remediate Moisture and Mold Problems

- Fix moisture problem(s), implement repair plan and/or maintenance plan
- Dry wet, non-moldy materials within 48 hours to prevent mold growth
- Clean and dry moldy materials (*use **Table 2***)
- Discard moldy porous items that cannot be cleaned (*use **Table 2***)

> *Designate a **contact person*** for questions and comments about medium or large scale remediation, as needed.[2]

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> *"Plan to dry wet, non-moldy materials* within 48 hours to prevent mold growth.[2]"

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Table 2: Mold Remediation Guidelines [2]

The table below presents remediation guidelines for building materials that have or are likely to have mold growth. The guidelines are designed to protect the health of occupants and cleanup personnel during remediation and are based on the area and type of material affected by water damage and/or mold growth.

The table utilizes the following cleanup methods:

- **Method 1**: Wet vacuum (in the case of porous materials, some mold spores/fragments will remain in the material but will not grow if the material is completely dried). Steam cleaning may be an alternative for carpets and some upholstered furniture.
- **Method 2**: Damp-wipe surfaces with plain water or with water and detergent solution (except wood - use floor cleaner); scrub as needed.
- **Method 3**: High-efficiency particulate air (HEPA) vacuum after material has been dried. Dispose of the contents of the HEPA vacuum in well-sealed plastic bags.
- **Method 4**: Discard - remove water-damaged materials and seal in plastic bags while inside of containment. Dispose of as normal waste. HEPA vacuum area after it is dried.

Material/Furnishing Affected	Cleanup Methods	Protective Personal Equipment	Containment
SMALL – Total Surface Area Affected Less than 10ft²			
Books and papers	3	**Minimum:** N-95 respirator, gloves, and goggles/ eye protection	None required
Carpet and backing	1, 3		
Concrete or cinder block	1, 3		
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	1, 2, 3		
Non-porous, hard surfaces (plastics, metals)	1, 2, 3		
Upholstered furniture and drapes	1, 3		
Wallboard (drywall and gypsum board)	3		
Wood Surfaces	1, 2, 3		

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Material/Furnishing Affected	Cleanup Methods	Protective Personal Equipment	Containment
MEDIUM – Total Surface Area Affected Between 10ft² and 100ft²			
Books and papers	3	**Limited:** Gloves, N-95 respirator or half-face respirator with HEPA filter, disposable overalls, and goggles/eye protection *or* **Full:** Gloves, disposable full body clothing, head gear, foot coverings, and full-face respirator with HEPA filter	**Limited:** Use polyethylene sheeting ceiling to floor around affected area with a slit entry and covering flap; maintain area under negative pressure with HEPA filtered fan unit; block supply and return air vents within containment area
Carpet and backing	1, 3, 4		
Concrete or cinder block	1, 3		
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	1, 2, 3		
Non-porous, hard surfaces (plastics, metals)	1, 2, 3		
Upholstered furniture and drapes	1, 3, 4		
Wallboard (drywall and gypsum board)	3, 4		
Wood surfaces	1, 2, 3		
Large – Total Surface Area Affected Greater than 100ft² or Estimated Exposure During Remediation is Significant			
Books and papers	3	**Full:** Gloves, disposable full body clothing, head gear, foot coverings, and full face-respirator with HEPA filter	**Full:** Use two layers of fire-retardant polyethylene sheeting with one airlock chamber; maintain area under negative pressure with HEPA filtered fan exhausted outside of building; block supply and return air vents within containment area
Carpet and backing	1, 3, 4		
Concrete or cinder block	1, 3		
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	1, 2, 3, 4		
Non-porous, hard surfaces (plastics, metals)	1, 2, 3		
Upholstered furniture and drapes	1, 2, 4		
Wallboard (drywall and gypsum board)	3, 4		
Wood surfaces	1, 2, 3, 4		

> *Select appropriate personal protective equipment* (PPE) to protect remediators.[2]

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