Mold Mitigation and Prevention Program Guide

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Introduction

Mold may seem just like a problem that homeowners have to worry about in the dark and dingy parts of their basements, but that's not the case. Mold doesn't have any preference regarding where it lives. It will infest homes, schools, factories, warehouses, office buildings and anywhere else that offers conditions in which it can grow.

While it is often thought of as growing in basements or attics, mold is versatile and can grow almost anywhere, including on wood, paper, carpet and even insulation. In general, if moisture and oxygen are present, mold and its resulting hazards can be too.

Given how diverse the conditions can be in which mold can become a problem, it is important that your organization be educated and cognizant of the risks and consequences associated with mold. Whether it be through harmful health effects on your employees or costly property damage, preventing and managing mold should be one of your organization's top priorities.

About 1,000 species of mold can be found in the United States, with more than 100,000 known species worldwide.

As a business, it is your responsibility to provide a safe and healthy work environment for your employees. Concerns about mold are on the rise as more information becomes available regarding the health problems associated with exposure. For example, mold can trigger allergic reactions such as skin rashes or asthma attacks; irritate the eyes, skin, nose, throat and lungs; and may also lead to an infection, such as hypersensitivity pneumonitis. Some molds are even known to produce toxic substances with fatal consequences, such as lung cancer.

Furthermore, while the health and well-being of your employees should be a constant priority for your organization, these health effects can have serious financial consequences as well. If an employee suffers serious health problems stemming from a mold issue that your organization allowed to exist and neglected to remediate, you may find yourself facing a significant lawsuit.

In addition to the potential health problems that mold can cause for employees, clients and anyone else who may spend time on your premises, mold also causes physical damage to structures themselves. As such, contaminated property can result in considerable unexpected expenses for your company. For instance, consider the costs associated with replacing furniture, or even maintaining the structural integrity of your property.

Mold is a serious issue that can lead to a variety of unforeseen problems and expenses. This mold mitigation and prevention guide will provide general information on mold, employee training suggestions, and guidelines and strategies for helping your organization develop a program for preventing, investigating and, if necessary, remediating mold problems.

It should be noted that this guide is informative in nature and should not be used as a substitute for legal or compliance advice. For additional assistance, seek the help of legal counsel and a qualified insurance broker at Emmanuel Insurance.

The Basics About Mold

In order to confront a problem, the first step is to understand it. There are thousands of types of mold and plenty of variety among them in regard to appearance, growth rate, and potential damage or health detriments.

Prior to jumping into mold mitigation and prevention, we recommend organizations build a general base of knowledge regarding mold and its effects.

What Is Mold?

While it may seem like mold is intrusive, it is a part of the natural environment. In the outdoors, mold plays an important role in ecosystems by helping to decompose organic material, such as fallen trees, dead leaves and animal carcasses. In the grand scheme of things, mold plays a very important role in nature.

All of that being said, indoor mold growth should be deterred and appropriately dealt with as soon as possible after discovery. Outside, mold breaks down dead organisms, but inside, it can break down the structural integrity of your building.

One reason that mold is so common and widespread is how versatile its living conditions are. Although we think of mold as covering a tree stump, peppering a wall or ruining food, it can actually grow on everything from paper to carpet. Mold needs three things in order to decide to set up camp: oxygen, moisture and something to consume. When it comes to consumption, mold isn't picky and will be just as happy to digest dust in the corner of a room as old cheese in a refrigerator.

Because of how diverse the diets of different types of mold can be, it is nearly impossible to eliminate any potential source of nourishment for the organism. The more achievable preventative measure is to proactively manage your environment.

Where Does It Come From?

People are often surprised when discovering mold. After all, it seems like it can come from nowhere; one day everything looks great, and the next there's mold. But nothing comes from nowhere. Even mold has to have a starting point.

Mold reproduces using microscopic spores that act as seeds. These spores are constantly floating through the air both outside and indoors. Eventually, these spores will land somewhere, and, if that particular spot happens to offer the appropriate, simple conditions that allow the spores to grow, they will.

Due to the constant presence of mold spores, the burden falls on your company to discourage them from being able to make your building a suitable home.

In addition to how plentiful and omnipresent mold and its ability to cultivate are, a problem can also sneak up on property owners due to the fact that mold is capable of growing without access to sunlight. As such, it is important that even rarely-visited corners and dark closets be inspected regularly in order to check for mold-related issues.

When it comes to building and workplace maintenance, it may be tempting to procrastinate or shirk certain responsibilities. Maybe it's a busy time of the year for your company, or perhaps you're

undergoing a staff shortage. It's always possible to find reasons not to handle a problem prudently, but when it comes to mold, expediency is of the utmost importance in order to avoid allowing the problem to grow before your eyes.

Effects of Mold

As mold grows, so too do the problems that it can pose for your organization. As was stated above, the negative effects that contamination can bring about for your business are two-fold. An infestation can lead to both immediate and future health problems for your employees and physical damage to your property.

Health Effects

A mold problem can be a serious hazard to the health and well-being of your employees and anyone else who may spend time on your premises.

Scientific research into the many potential health effects of mold is ongoing, but there is already ample evidence to suggest that the presence of mold can lead to a number of different medical issues including, but not limited to:

Hypersensitivity pneumonitis–This disease resembles bacterial pneumonia and can develop due to exposure to mold.

Opportunistic infections–Mold and its spores may become opportunistic and can cause various infections if given the chance, such as yeast infections and athlete's foot. More dire infections are also possible, such as spores entering the lungs of a person with a weakened immune system and beginning to grow inside of them.

Allergic reactions–Coming into contact with mold or inhaling mold spores can cause allergic reactions that can be either immediate or delayed. These reactions include hay fever-type symptoms, such as a runny nose, sneezing and skin rashes.

Asthma–People suffering from asthma may see their condition worsen, or have attacks triggered by the presence of mold.

Some types of mold produce toxins that can cause severe reactions in humans. These toxins are called mycotoxins, which may be either inside of a mold spore or attached to its surface. Moisture-damaged buildings are a common environment for a number of the molds that are known to produce these toxins.

Like the subject of mold as a whole, research into mycotoxins, which molds produce which toxins and how those toxins affect humans is ongoing. However, current research suggests that some of the known effects of mycotoxins include:

Cancer	Immune system suppression	Chronic central nervous system damage
Endocrine effects	Acute or chronic liver damage	Nausea

With so many known potential problems, and the understanding that there is still so much that we don't understand about these toxins, it is clear that, as an organization, it should be one of your top priorities to take precautionary measures in order to avoid exposing your employees to mold, its spores and these toxins.

Property Damage

We have already covered that mold is not a picky eater, and as mold consumes its chosen cuisine for that day, it also slowly, but surely, breaks down whatever material on which it lives.

Given the extreme diversity under which mold can live and grow, it is extremely important that companies stay abreast of how even a small mold problem can eventually cause costly and critical damage to their property.

There are many common building materials that mold can consume, grow upon, or damage. Unexpected expenditures related to a mold problem can include remediation efforts, replacing furniture or property, major building repairs, or even having to temporarily relocate your operations. Because of the potentially budget-busting expenses that an infestation can lead to, it's important to understand how mold reacts with different common building materials:

- **Wood**—Wood is one of the most vulnerable building materials when it comes to mold growth because, since it inherently absorbs moisture, it simultaneously provides both a food source and moisture for mold. It is possible to salvage wood that has been contaminated with mold, but you should consider consulting with a professional to assess the situation.

- **Concrete**—Unlike wood, concrete itself cannot act as a food source for mold; however, due to its porous nature, it can still act as a welcoming environment. Concrete surfaces absorb water slowly, which means that moisture is often present. In addition, concrete can trap dust and dirt, which provide the organic material that mold needs for food. Keeping concrete dry is the key to preventing mold growth, so be sure to routinely check surfaces in high-moisture areas, such as basements.

- **Drywall**—Like concrete, drywall is a porous material that naturally absorbs both water and organic material for mold. Because it is so porous, drywall is generally not salvageable should mold begin to grow, and typically should be removed and replaced.

- **Insulation**—Almost all types of insulation absorb water and organic material for mold. If insulation has become contaminated, it should be removed. Be certain that the area is completely dry before installing new insulation, or the mold may return and you will have to repeat the process.

- **Carpet**—One of the most common spots for mold to grow in secret is under permanent carpeting. Moisture and liquids from spills are absorbed into the carpet and secrete beneath it. Carpets also inherently trap organic materials, making for a perfect environment for an infestation to start. You may also not realize that your carpet is wet because, while the surface may appear dry, the padding underneath can still be wet enough to promote mold growth. If mold begins to grow underneath a carpet, it may be necessary to remove the entire carpet in order to deal with the problem.

In the event that you believe a mold problem may have caused damage to the structural integrity of your building, your company should consult with a structural engineer or other professional with the appropriate expertise to assess the structure's condition.

In addition to the literal structure of your building, mold can also destroy smaller pieces of property, such as furniture. Having to replace items like couches, chairs, desks and even carpet will quickly run up a large bill of unexpected expenses that your company is likely unprepared for.

Prevention

Mold starts to cause damage as soon as spores land in a suitable environment. Even if you catch a mold problem early on, it will likely still cause some measure of damage. That being said, the best way to handle a mold problem is to take proactive steps to ensure that one does not have a chance to start.

In order to grow, mold requires a source of nourishment, oxygen and moisture. The first two of that trio is understandably difficult to control, but the third is at least somewhat manageable. The key to preventing and controlling mold is to prevent moist environments in which it can grow. Leaks and standing water are two ideal starting spots for mold issues, hence why they are so often associated with basements, bathrooms and areas surrounding plumbing.

But when considering potential moist environments in which mold might grow, your company's surveillance has to go beyond obvious problems like a broken or leaking pipe. Smaller problems, like a spill that goes uncleaned or even simply an extremely humid atmosphere, can also give birth to mold problems.

Warning Signs

If mold creeps into your building, it becomes imperative that you detect the problem as quickly as possible in order to limit any property damage or health effects.

Be aware of the following warning signs when it comes to a potential mold problem on your premises:

- **Odors**—Not all molds produce an odor, but many do. If you detect a consistent, musty smell, it is possible that you have mold growing nearby.
- **Visible signs**—Mold can appear in a wide variety of shapes and colors. Be sure to check in every nook and cranny of your building, and be particularly watchful over areas that may have high moisture levels.
- **Water stains**—A moisture problem left unresolved will eventually lead to a mold issue. Be aware of water stains or discoloration on walls, floors or ceilings. If you notice any bubbling, cracking or peeling paint or wallpaper, you may have a mold issue.
- **Leaks**—A leaky faucet or other appliance may not seem like a big deal, but they create an ideal environment for mold spores to cultivate and contaminate. Leaks can be tricky because they may be behind walls or in hidden areas, so it is important to conduct regular inspections throughout your property.
- **Recent flooding**—If there has been recent flooding or standing water on your premises, it is possible that mold took the opportunity to take up residence. Be particularly watchful in these situations.
- **Health-related signs**—If your employees or others in your building exhibit symptoms possibly related to the presence of mold, it is important to take these concerns seriously and investigate. These symptoms may include, but are not limited to:
    - Coughing
    - Sneezing
    - Sore throat
    - Irritated skin
    - Itchy or watery eyes
    - Difficulty breathing

- Sinus headaches
- Congestion
- Runny nose

Mold is so omnipresent in the environment that sometimes it will find its way into your building even if you take all reasonable precautions to keep it out. If this happens, being aware of the warning signs can help you deal with the problem promptly. Early recognition of contamination can be key in keeping your remediation expenses from rising to extreme levels.

General Prevention Methods

There are a number of practices that your company should be sure to follow in order to limit the possibility of a mold problem happening on your premises.

A large part of preventing a moisture issue in your building is making sure that infrastructure and appliances are set up properly. Some tips for operating normally without creating a friendly environment for mold include:

Keep indoor humidity levels below 70%.

Limit condensation on surfaces by increasing the temperature of the surfaces or reducing humidity.

Make sure that drip pans in HVAC systems are kept clean, flow properly and are unobstructed.

Have appliances that generate moisture, such as dryers, vent outdoors.

Make sure that kitchens and bathrooms are vented according to local code requirements.

Follow local building codes and make sure to provide adequate drainage around buildings, including sloping the ground away from structural foundations.

In addition to setting up a workplace that is not likely to experience a moisture problem, it is also important that your company be proactive and make ongoing efforts to identify and fix any issues, however minor they may be, that could arise.

Fix leaks and plumbing issues as soon as possible.

Be on the lookout for condensation and wet spots, and address their sources as soon as possible.

Regularly perform inspections of your building and HVAC systems.

Clean and dry wet or damp spots as soon as possible, and never wait longer than 48 hours.

Identify and investigate areas where leaks have occurred, and take appropriate actions to prevent future problems.

As the aforementioned points suggest, one of the key elements of preventing a mold problem is being able to identify where moisture issues may be occurring. In order to conduct thorough and accurate investigations into these spots, consider these questions:

Are there any visibly moisture-damaged building materials or furniture?

Have building materials been wet for more than 48 hours?

Are there existing moisture problems in your building?

Has your building's use recently changed, or has there been recent remodeling?

Has there been a change or delay in regular maintenance?

Employee Training

It is understandable that not every company across all industries will have employees who are experts on water leakage or mold growth. Therefore, it is up to you to be even more vigilant and careful. If recognizing a potentially problematic area, or the early stages of mold contamination, is more difficult for your employees, that means that you need to err on the side of caution and conduct more thorough and frequent checks.

Your employees may spot things that you don't or frequent different areas of the building, so they can be invaluable when it comes to finding mold problems or potentially problematic areas.

A Team Effort

Your employees likely are not going to be mold experts on their own, but advise them to be aware of their surroundings. In order to help with overall moisture problems and mold prevention, have your employees do the following:

- Be prompt and responsible in cleaning up any spills or wet spots in common areas or at their desks.
- Make sure that employees are provided with a way to contact building maintenance if a spill or mess goes beyond their ability to handle.
- Educate them on warning signs, and ask that employees keep their eyes and noses open for any potential signs of mold, whether it be a strange-looking substance on a wall or an earthy odor in the air.

Encourage Openness

Because of the health and property risks that a mold issue can inflict on your employees and your company, it is important that your company's management takes any possible moisture or mold issue seriously.

- Encourage your employees to inform their manager or an appropriate person immediately if they notice an issue that could lead to a mold problem, such as a malfunctioning kitchen appliance, leaky faucet or excessive condensation on windows.
- Have employees report any possible health problems that may be related to mold immediately. It is very easy for mold to hide in unseen areas, but that doesn't mean that it isn't potentially causing harm to your employees.

Documentation

When a problem arises, it is important that a paper trail is maintained so that everyone can stay on the same page regarding the severity of the issue and the process that will be taken in order to resolve it.

- Your company should designate a manager or other employee who will be responsible for filling out an incident report form should a moisture or mold issue be discovered.
- Create a formal mold remediation team with each member's specific roles outlined and their contact information readily available.
- If your company does not own your building and is someone else's tenant, the form should be relayed to property management.
- In the event that your company is not directly handling remediation of the issue, a manager or other employee should be charged with continuing regular communications with property management regarding the ongoing status of the problem.

Be Prepared

In order to reinforce that your employees take the threat of moisture problems and mold contamination seriously, your company should have an official mold prevention policy in place that can be referenced by employees and management alike. Consider including the following information in your policy:

The causes of mold and the conditions that allow it to grow

The possible health effects of a mold contamination issue

The damage that mold can do to the structural integrity of a building and other property

Common moisture problems in the workplace

What employees should be on the lookout for in order to detect a potential mold problem

To whom employees should report potential problems

Who will serve as the company's primary officer as it relates to moisture or mold problems

Remediation efforts to be taken in the event that an infestation is discovered

Remediation

In the event that it is up to your company to handle the remediation of a mold issue, there is a vast amount of information and a wide variety of procedures that you should understand.

The purpose of mold remediation is to remove mold and any contaminated materials, and correct the moisture problem that created suitable conditions for mold to grow in the first place. Simply killing the existing mold is not enough. It must be completely removed, as chemicals and proteins in the mold can still cause health defects for people exposed to them.

If you are hiring an outside contractor to handle the process, be sure to do extensive research into their experience and check for references about similar situations that they have been hired for.

Planning Ahead

Early steps for remediating a mold problem should include identifying how severe the problem is and its cause.

It is not always necessary that you know exactly what type of mold you are dealing with in order to fix the problem, but there are times when contaminated building materials and air should be tested. You should consult with an experienced professional with experience in mold projects in order to determine your first steps and overall remediation plan.

If it is determined that the type of mold should be identified, it becomes necessary to perform sampling and testing. This process should be conducted by an indoor environmental quality professional. For suggestions, consult the American Industrial Hygiene Association (AIHA) or the American Society of Cleaning Restorers (ASCR). Consider establishing a relationship with an appropriate professional before a problem occurs in order to be able to respond to a future issue more promptly. Testing may involve sampling an actual piece of the mold or, if mold is suspected but has not been found, taking a sample of the air.

Remediation Equipment

There is a variety of equipment that can be useful in assessing and remediating your mold problems. Some common examples that you may consider using include:

- **Moisture meters**—These meters measure and monitor the moisture levels inside building materials, such as carpet, wallboard, wood, brick and concrete. They can also help measure the drying progress of damaged materials.
- **Humidity gauges or meters**—Humidity meters are used to monitor indoor humidity and can help detect a moisture problem.
- **Humidistat**—These control devices can be connected to an HVAC system and adjusted so that the system will automatically turn on if humidity levels rise to a certain point.
- **Borescope**—Borescopes are hand-held tools consisting of a video camera on the end of a flexible “snake” that helps users to see potential mold problems inside walls, ceilings, crawl spaces or other confined spaces.
- **HVAC system filters**—High-quality filters must be used for HVAC systems during remediation because conventional filters are generally not effective in stopping the spread of mold spores.

Personal Protective Equipment (PPE)

Be sure that whoever is handling the remediation process is making proper use of personal protective equipment (PPE).

The extent of the health problems that can be caused by mold has already been noted within this guide, and those who are being tasked with taking care of the contamination are just as vulnerable. Additionally, the process of remediation disturbs mold and can cause mold spores to become airborne, increasing the degree of respiratory exposure.

There are a number of different types of PPE that may be necessary during the remediation process, such as:

- **Hand protection**—When handling mold, use long gloves to protect the skin from direct contact with the mold, as well as any cleaning materials that might be used. Gloves should extend to the middle of the forearm with the material based on what type of substance or chemical is being used.
- **Eye protection**—Use properly fitted goggles or a full-face respirator in order to protect your eyes from becoming exposed and irritated. Safety glasses or goggles should be designed to prevent the entry of dust and small particles. Equipment with vent holes is not adequate.
- **Respiratory protection**—Air-purifying respirators protect cleanup workers from inhaling airborne mold, mold spores and contaminated dust. A full-face respirator can serve as both respiratory and eye protection, while a half-face mask will require additional protection, such as safety glasses or goggles. Respirators must be certified by the National Institute for Occupational Safety and Health (NIOSH). The type of respirator needed may vary based on the level of remediation, or whether other harmful contaminants are encountered, such as asbestos or lead.
- **Protective clothing**—It is important that appropriate precautions are taken in wearing either reusable or disposable garments during remediation work in order to minimize the chance of spreading mold to unaffected areas. Protective clothing also serves as another safeguard when working with chemicals.

Mold Remediation Guidelines

OSHA measures the seriousness of mold problems with four different levels of severity. These levels provide guidance in order to protect the health of cleanup personnel and other employees. Circumstances may vary based on the preferences of some professionals or other circumstances. These guidelines are based on the estimated size of the affected area, and your manager or another person in charge should rely on the judgment of a qualified professional in order to adapt to your particular situation.

- Level I: Small Isolated Areas (10 square feet or less) such as ceiling tiles or small areas on walls
    - Remediation can be conducted by the regular building maintenance staff, as long as they are trained on proper cleanup methods, personal protection and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.122).

- Respiratory protection should be used. Respirators must be used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134). Gloves and eye protection should also be used.
- The work area should be unoccupied. Removing people from adjacent areas is not necessary but is recommended for vulnerable people, such as infants less than 12 months old, people recovering from recent surgery, immune-suppressed people and people with chronic inflammatory lung diseases such as asthma, hypersensitivity pneumonitis or severe allergies.
- Containment of the work area is not necessary, but it is recommended that dust suppression methods, such as misting (but not soaking) surfaces, are used prior to remediation efforts.
- Contaminated materials that are unsalvageable should be removed in impermeable bags or containers.
- The work area and areas used by remediation employees for egress should be cleaned with a damp cloth or mop and a detergent solution.
- All areas should be thoroughly dried and left visibly free of contamination or debris.

- Level II: Mid-sized isolated areas (10 to 30 square feet) such as individual wallboard panels
  - Remediation can be conducted by the regular building maintenance staff, as long as they are trained on proper cleanup methods, personal protection and potential health hazards.
  - Respiratory protection is recommended and must be used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134). Gloves and eye protection should also be used.
  - The work area should be unoccupied. It is not necessary to remove everyone from adjacent areas, but it is recommended for vulnerable people, such as infants less than 12 months old, people recovering from recent surgery, immune-suppressed people and people with chronic inflammatory lung diseases such as asthma, hypersensitivity pneumonitis or severe allergies.
  - Dust-suppression methods, such as misting (but not soaking) surfaces are recommended prior to remediation efforts.
  - Contaminated materials that are unsalvageable should be removed in impermeable bags or containers.
  - The work area and areas used by remediation workers for egress should be cleaned with a damp cloth or mop and a detergent solution, as well as a HEPA vacuum.
  - All areas should be thoroughly dried and left visibly free of contamination or debris.

- Level III: Large isolated areas (30 to 100 square feet) such as several wallboard panels
  - Consult with industrial hygienists or other environmental health and safety professionals with the proper experience performing microbial investigations or mold remediation before attempting to remediate.
  - It is recommended that remediation workers be trained in the handling of hazardous materials and equipped with respiratory protection. Respirators must be used in

accordance with the OSHA respiratory protection standard (29 CFR 1910.134), and glove and eye protection should also be worn.
    - Surfaces in the work area and areas directly adjacent should be covered with secured plastic sheets before remediation in order to contain dust and debris and prevent further contamination.
    - Seal ventilation ducts and grills in the work area and areas directly adjacent.
    - The work area and all areas directly adjacent should be unoccupied. Additional precautions should be taken for vulnerable people, such as infants, people having recently undergone surgery, immunosuppressed people or people with chronic inflammatory lung diseases.
    - Dust-suppression methods, such as misting (but not soaking) surfaces are recommended prior to remediation efforts.
    - Contaminated materials that are unsalvageable should be removed in impermeable bags or containers.
    - The work area and areas used by remediation workers for egress should be cleaned with a damp cloth or mop and a detergent solution, as well as a HEPA vacuum.
    - All areas should be thoroughly dried and left visibly free of contamination or debris.

- Level IV: Extensive contamination (greater than 100 contiguous square feet in an area)
    - Consult with industrial hygienists or other environmental health and safety professionals with experience performing microbial investigations or mold remediation prior to starting remediation efforts.
    - Use personnel trained in the handling of hazardous materials and equip them with:
        - Full-face respirators with HEPA cartridges
        - Disposable protective clothing covering their entire body, including head and shoes
        - Gloves

    - Contain the area by:
        - Completely isolating the work area from occupied spaces using plastic sheets sealed with duct tape
        - Sealing ventilation ducts/grills, fixtures and other openings
        - Using an exhaust fan with a HEPA filter to generate negative pressurization
        - Using airlocks and a decontamination room

    - If contaminant practices effectively prevent mold from migrating from affected areas, it may not be necessary to remove people from nearby areas; however, removal is recommended for vulnerable people, such as infants, people having recently undergone surgery, immunosuppressed people or people with chronic inflammatory lung diseases.
    - Unsalvageable contaminated materials should be removed in impermeable bags or containers. The outside of these bags or containers should be cleaned with a damp cloth and a detergent solution, or HEPA vacuumed in the decontamination chamber, prior to being transported to other areas of the building.

- The remediation area should be cleaned with a damp cloth or mopped with a detergent solution as well as a HEPA vacuum. It should be visibly clean prior to the removal of any isolation barriers.

(Source: Occupational Health and Safety Administration)

Cleanup Methods

When conducting the initial cleanup of mold, there are a number of different methods that can be used. The ideal one will vary based on what materials are contaminated, but common methods include:

- **Damp wipe**—Mold can sometimes be removed from nonporous surfaces by simply scrubbing it with water and detergent. When using liquid to aid in mold removal, it is important to dry the surfaces quickly afterward in order to keep mold from growing back. Be sure to consult product labels to know how to clean different surfaces.
- **Wet vacuum**—These vacuum cleaners are designed to remove water. They can collect water from floors, carpets and hard surfaces, but should not be used to vacuum porous materials. This equipment should only be used on wet materials. If there is not sufficient liquid present, the vacuum may spread mold spores. Be sure to clean the tanks, hoses and any attachments thoroughly after each use, as mold spores may simply attempt to use the equipment's surfaces as a new home.
- **HEPA vacuum**—HEPA vacuums are recommended for the final cleanup of areas that were affected by the contamination. These machines should be used after all other materials have been thoroughly cleaned and dried and all contaminated materials have been removed. HEPA vacuums should also be used for collecting dust that may have settled on surfaces outside the remediation area. HEPA vacuum filters must be seated properly so that all air must pass through them. When changing filters, use appropriate PPE, such as respirators, gloves and eye protection, and dispose of filters in impermeable bags or containers.
- **Biocides**—Using biocides, such as chlorine bleach, is not recommended for most remediation processes. Biocides kill mold but are also toxic to humans and animals. When using a biocide, be sure to ventilate the area and exhaust the air outdoors. Be careful not to push mold spores into previously unaffected areas. Never mix a chlorine bleach solution with other cleaning solutions or detergents that contain ammonia, as this may produce highly toxic vapors. Be sure that you are aware of state and local laws regarding the use of biocides, as some may be considered pesticides and can only be applied by licensed applicators. Additionally, do not use fungicides, as they are intended for outdoor use and can be extremely toxic to both humans and animals in an enclosed environment. Be sure to follow instructions on product labels and wear appropriate PPE when using biocides.

When disposing of contaminated materials, place unsalvageable material or disposable protective clothing in impermeable bags or containers while still in the remediation area in order to limit the possibility of dispersing mold spores. Larger items should be covered with polyethylene sheeting and sealed with duct tape before being removed from the area. In some cases, the use of a dust-tight chute may be needed in order to properly move large quantities of contaminated material from the remediation area directly into a dumpster.

Table 1: Response to Clean Water Damage Within 24 to 48 Hours

Material	Actions
Books and papers	• For non-valuable items, discard books and papers. • Photocopy valuable or important items and discard originals. • Freeze (in frost-free freezer or meat locker) or freeze-dry.
Carpet and backing—dry within 24-48 hours	• Remove water with a water extraction vacuum. • Reduce ambient humidity levels with a dehumidifier. • Accelerate the drying process with fans.
Ceiling tiles	• Discard and replace.
Cellulose insulation	• Discard and replace.
Concrete or cinder block surfaces	• Remove water with a water extraction vacuum. • Accelerate the drying process with dehumidifiers, fans, and/or heaters.
Fiberglass insulation	• Discard and replace.
Hard surface, porous flooring (linoleum, ceramic tile or 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 if necessary.
Nonporous, hard surfaces (plastics and metals)	• Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary.
Upholstered furniture	• Remove water with a water extraction vacuum. • Accelerate the drying process with dehumidifiers, fans, and/or heaters. • Keep in mind that it may be difficult to completely dry within 48 hours. If the piece is valuable, consult a restoration/water damage professional who specializes in furniture.
Wallboard (drywall and gypsum board)	• 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 laundering or cleaning instructions recommended by the manufacturer.
Wood surfaces	• Remove moisture immediately and use dehumidifiers, gentle heat and fans for drying. (Use caution when applying heat to hardwood floors.) • Treated or finished wood surfaces may be cleaned with mild detergent and clean water and allowed to dry. • Wet paneling should be pried away from the wall for drying.

If mold growth is discovered, consult Table 2 for guidelines regarding specific remediation procedures.

(Source: United States Environmental Protection Agency)

Table 2: Remediating Materials With Mold Growth Caused by Clean Water

Material or Furnishing Affected	Cleanup Methods	Personal Protective Equipment	Containment
SMALL – Total Surface Area Affected Less Than 10 Square Feet			
Books and papers	3	• Minimum • N-95 respirator, gloves and goggles	• None required
Carpet and backing	1, 3		
Concrete or cinder block	1, 3		
Hard surface, porous flooring (linoleum, ceramic tile or vinyl)	1, 2, 3		
Nonporous, hard surfaces (plastics and metals)	1, 2, 3		
Upholstered furniture and drapes	1, 3		
Wallboard (drywall and gypsum board)	3		
Wood surfaces	1, 2, 3		
MEDIUM – Total Surface Area Affected Between 10 and 100 Square Feet			
Books and papers	3	• Limited or full • Use professional judgment. Consider the potential for remediator exposure and the size of the contaminated area.	• Limited • Use professional judgment. Consider the potential for remediator/occupant exposure and the size of the contaminated area.
Carpet and backing	1, 3, 4		
Concrete or cinder block	1, 3		
Hard surface, porous flooring (linoleum, ceramic tile or vinyl)	1, 2, 3		
Nonporous, hard surfaces (plastics and 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 Greater Than 100 Square Feet or Potential for Increased Occupant or Remediator Exposure During Remediation Estimated to Be Significant			
Books and papers	3		
Carpet and backing	1, 3, 4		

(Source: United States Environmental Protection Agency)

Concrete or cinder block	1, 3	• Full • Use professional judgment. Consider the potential for remediator exposure and the size of the contaminated area.	• Full • Use professional judgment. Consider the potential for remediator/occupant exposure and the size of the contaminated area.
Hard surface, porous flooring (linoleum, ceramic tile or vinyl)	1, 2, 3, 4		
Nonporous, hard surfaces (plastics and metals)	1, 2, 3		
Upholstered furniture and drapes	1, 3, 4		
Wallboard (drywall and gypsum board)	3, 4		
Wood surfaces	1, 2, 3, 4		

Consult a professional in order to determine the appropriate levels of personal protective equipment and containment for each situation. As the remediation site increases in size and the potential for exposure or health effects rises, the need for a professional opinion becomes more urgent.

These guidelines are intended for damage caused by clean water. If the water that led to your mold problem is contaminated with sewage, chemicals or biological pollutants, OSHA has strict personal protective equipment and containment requirements. Consult an experienced professional who has knowledge of and experience with remediating contaminated water situations.

The cleanup methods mentioned in Table 2 are as follows:

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.

2. Damp-wipe surfaces with plain water or with water and detergent solution (When working with wood, use wood floor cleaner); scrub as needed.

3. Use a HEPA vacuum after the material has been thoroughly dried. Dispose of the contents of the HEPA vacuum in well-sealed plastic bags.

4. Discard water-damaged materials and seal in plastic bags or containers while inside of containment, if present. Dispose as normal waste, and use a HEPA vacuum in the area after it is dried.

The levels of personal protective equipment listed in Table 2 are as follows:

- **Minimum:** Gloves, N-95 respirator and goggles/eye protection
- **Limited:** Gloves, N-95 respirator or half-face respirator with HEPA filter, disposable overalls and goggles/eye protection
- **Full:** Gloves, disposable full-body clothing, headgear, foot coverings and a full-face respirator with HEPA filter

The levels of containment in Table 2 can be described as follows:

- **Limited:** Use polyethylene sheeting from ceiling to floor around the remediation area with a slit entry and covering flap. Maintain negative pressure in the area with HEPA-filtered fan units. Block the air supply and direct air vents to return within the remediation area.
- **Full:** Use two layers of fire-retardant polyethylene sheeting with an airlock chamber in between. Maintain negative pressure within the area with HEPA-filtered fans that are exhausted outside of the building. Block the air supply and direct air vents to return within the remediation area.

Finishing Up

The first step of finishing any project or process is being sure that you are actually finished. When it comes to mold, it is of the utmost importance to be thorough and certain that you have remediated your problem. If you haven't, the mold will be back and you'll have to start all over.

When you think you're ready to take down the plastic sheets, pack up the gear, and get back to normal, make sure that you've done the following:

1. Fixed the water or moisture problem that led to the contamination in the first place.
2. Received professional approval that the cleanup is sufficient and that the mold has been completely removed. No visible mold, mold-damaged materials or moldy odors should be present.
3. If air sampling was performed before remediation, acquire another sample. The types and concentration levels of mold and mold spores found in the building should now be similar to those found in the outside air.
4. Revisit the contaminated area soon after remediation and observe if there are any new or recurring signs of water damage or mold growth.
5. Be observant of those who spend time in the area following remediation, and observe any possible health problems or symptoms.

In the end, mold is such a tricky issue to deal with, that it is difficult to know for sure when the job is truly finished. But, once you are satisfied with your effort, you must assess any structural damage and repair damaged portions as soon as possible.

In addition, be sure to communicate with your employees and any other building occupants regarding the results of the remediation. Remind people of the possible health effects that could result from the problem and what symptoms to be on the lookout for.

Appendix

Mold Prevention Team Contact Information

In order to stay vigilant in preventing a mold issue and responding to one effectively, maintain roles, responsibilities and contact information for all persons who will be involved in your prevention and remediation efforts.

Name	Business phone	After-hours phone	Responsibilities	Alternate

Mold Prevention Checklist

This checklist is designed to help you evaluate your risk for developing a mold problem through prevention and inspection tips. For more information on mold prevention and remediation, and to secure the proper coverage, to transfer your risk, contact your insurance broker today.

Moisture Prevention Checklist	YES	NO	N/A
Have you created a mold prevention policy and communicated the signs and dangers of mold to your employees?	☐	☐	☐
Do you have someone who you can contact promptly in the event that a leak or plumbing issue needs to be fixed?	☐	☐	☐
Do you regularly check the conditions of your HVAC systems, including drip pans?	☐	☐	☐
Do you perform regular inspections of your building?	☐	☐	☐
Do you have measures in place in order to ensure that indoor humidity levels remain below 70%?	☐	☐	☐
Have you made sure that appliances that generate moisture, such as dryers, vent outdoors?	☐	☐	☐
Have you checked local code requirements to make sure that kitchens and bathrooms vent properly?	☐	☐	☐
Are you aware of local building codes, and does the drainage around your building adhere to them?	☐	☐	☐

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Inspection Checklist	YES	NO	N/A
Are there any visibly moisture-damaged building materials or furniture?	☐	☐	☐
Have any building materials or furniture been wet for more than 48 hours?	☐	☐	☐
Are there existing moisture problems in your building?	☐	☐	☐
Are your employees reporting musty or earthy odors?	☐	☐	☐
Are your employees reporting health problems that may be the symptoms of a reaction to mold in the workplace?	☐	☐	☐
Has your building's use recently changed, or has there been recent remodeling?	☐	☐	☐
Has there been a change or delay in regular maintenance?	☐	☐	☐
Have you established contact with an appropriate professional who can serve as a consultant in the event that you suspect or discover a mold problem?	☐	☐	☐

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Mold Prevention Tips

A large part of preventing a moisture issue in your building is making sure that infrastructure and appliances are set up properly. Some tips for operating normally without creating a friendly environment for mold include:

- Keep indoor humidity levels below 70%.
- Limit condensation on surfaces by increasing the temperature of the surfaces or reducing humidity.
- Make sure that drip pans in HVAC systems are kept clean, flow properly and are unobstructed.
- Have appliances that generate moisture, such as dryers, vent outdoors.
- Make sure that kitchens and bathrooms are vented according to local code requirements.
- Follow local building codes and make sure to provide adequate drainage around buildings, including sloping the ground away from structural foundations.

In addition to setting up a workplace that is not likely to experience a moisture problem, it is also important that your company be proactive and make ongoing efforts to identify and fix any issues, however minor they may be, that could arise.

- Fix leaks and plumbing issues as soon as possible.
- Be on the lookout for condensation and wet spots and address their sources as soon as possible.
- Regularly perform inspections of your building and HVAC systems.
- Clean and dry wet or damp spots as soon as possible, and never wait longer than 48 hours.
- Identify and investigate areas where leaks have occurred, and take appropriate actions to prevent future problems.

As the aforementioned points suggest, one of the key elements in preventing a mold problem is being able to identify where moisture issues may be occurring. In order to conduct thorough and accurate investigations into these spots, consider these questions:

- Are there any visibly moisture-damaged building materials or furniture?
- Have building materials been wet for more than 48 hours?
- Are there existing moisture problems in your building?
- Has your building's use recently changed, or has there been recent remodeling?
- Has there been a change or delay in regular maintenance?

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Mold Remediation Checklist

The following checklists are designed to help you assess your mold problem and provide guidance as to how you plan to remediate the situation.

Investigation and Evaluation	
Assessed the size of the contaminated area.	☐
Considered that there may be hidden mold.	☐
Cleaned up smaller mold problems and fixed moisture problems before they become larger.	☐
Selected a remediation manager for medium or larger-size mold issues.	☐
Investigated areas associated with occupant complaints.	☐
Identified sources or causes of moisture problems.	☐
Noted the type of water-damaged materials.	☐
Checked inside air ducts and air-handling units.	☐
Consulted a qualified professional.	☐
Designated a contact person for questions about the remediation process.	☐

Planning Remediation	
Consulted with a professional about how to adapt or modify remediation guidelines for your situation.	☐
Planned how to dry non-moldy materials within 48 hours. (See Table 1 of the Mold Remediation Guidelines.)	☐
Selected cleanup methods for moldy items. (See Table 2 and accompanying text in the Mold Remediation Guidelines.)	☐
Selected the appropriate personal protective equipment for remediations. (See Table 2 and accompanying text below.)	☐
Selected the appropriate containment equipment to protect building occupants. (See Table 2 and accompanying text below.)	☐
Selected remediation personnel who have the proper training and experience to implement a remediation plan and use equipment appropriately.	☐

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Remediation	
Fixed the original moisture problem that led to mold growth.	☐
Implemented a maintenance plan in order to make sure the problem does not return.	☐
All non-moldy materials are properly dried within 48 hours. (See Table 1 below.)	☐
Moldy materials are properly cleaned and dried. (See Table 2 and accompanying text below.)	☐
Moldy, porous items that cannot be cleaned have been properly disposed of. (See Table 2 and accompanying text below.)	☐
No visible mold, moldy materials or moldy odors are present.	☐
Consulted with a qualified professional that cleanup is complete.	☐
Performed air sampling to compare mold types and concentrations from inside the building to the outside (if applicable).	☐
Advised employees of the results of the remediation and to report any recurring signs of the problem or any ongoing health issues.	☐
Assessed structural damage caused by the mold and planned repairs.	☐

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Moisture and Mold Remediation Guidelines

Table 1: Response to Clean Water Damage within 24 to 48 Hours

(Source: United States Environmental Protection Agency)

Material	Actions
Books and papers	• For non-valuable items, discard books and papers. • Photocopy valuable or important items and discard originals. • Freeze (in frost-free freezer or meat locker) or freeze-dry.
Carpet and backing—dry within 24-48 hours	• Remove water with a water extraction vacuum. • Reduce ambient humidity levels with a dehumidifier. • Accelerate the drying process with fans.
Ceiling tiles	• Discard and replace.
Cellulose insulation	• Discard and replace.
Concrete or cinder block surfaces	• Remove water with a water extraction vacuum. • Accelerate the drying process with dehumidifiers, fans, and/or heaters.
Fiberglass insulation	• Discard and replace.
Hard surface, porous flooring (linoleum, ceramic tile or 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 if necessary.
Nonporous, hard surfaces (plastics and metals)	• Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary.
Upholstered furniture	• Remove water with a water extraction vacuum. • Accelerate the drying process with dehumidifiers, fans, and/or heaters. • Keep in mind that it may be difficult to completely dry within 48 hours. If the piece is valuable, consult a restoration/water damage professional who specializes in furniture.
Wallboard (drywall and gypsum board)	• 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 laundering or cleaning instructions recommended by the manufacturer.
Wood surfaces	• Remove moisture immediately and use dehumidifiers, gentle heat and fans for drying. (Use caution when applying heat to hardwood floors.) • Treated or finished wood surfaces may be cleaned with mild detergent and clean water and allowed to dry. • Wet paneling should be pried away from the wall for drying.

If mold growth is discovered, consult Table 2 for guidelines regarding specific remediation procedures.

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Nonporous, hard surfaces (plastics and metals)	1, 2, 3		
Upholstered furniture and drapes	1, 3		
Wallboard (drywall and gypsum board)	3		
Wood surfaces	1, 2, 3		
MEDIUM – Total Surface Area Affected Between 10 and 100 Square Feet			
Books and papers	3	• Limited or full • Use professional judgment. Consider the potential for remediator exposure and the size of the contaminated area.	• Limited • Use professional judgment. Consider the potential for remediator/occupant exposure and the size of the contaminated area.
Carpet and backing	1, 3, 4		
Concrete or cinder block	1, 3		
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Nonporous, hard surfaces (plastics and metals)	1, 2, 3		
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Books and papers	3	• Full • Use professional judgment. Consider the potential for remediator exposure and the size of the contaminated area.	• Full • Use professional judgment. Consider the potential for remediator/occupant exposure and the size of the contaminated area.
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3. Use a HEPA vacuum after the material has been thoroughly dried. Dispose of the contents of the HEPA vacuum in well-sealed plastic bags.

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- **Full:** Gloves, disposable full-body clothing, headgear, foot coverings and a full-face respirator with HEPA filter

The levels of containment in Table 2 can be described as follows:

- **Limited:** Use polyethylene sheeting from ceiling to floor around the remediation area with a slit entry and covering flap. Maintain negative pressure in the area with HEPA-filtered fan units. Block the air supply and direct air vents to return within the remediation area.

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