

“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.”

—U.S. Environmental Protection Agency



## Fighting Mold in Your Home or Office: Controlling Moisture through Better Building Practices

Helpful information on how to avoid mold in your home or office is published by the *Responsible Solutions to Mold Coalition (RSMC)*, an industry group devoted to educating the public and the building industry about effective ways to combat mold in residential and commercial construction. RSMC wishes to communicate three important points concerning mold:

- Moisture causes mold—if you control moisture, you can control mold. There are no “silver bullet” solutions to mold control.
- The only way to control moisture is to construct buildings—or renovate buildings—that incorporate:
  - Good design
  - Good building practices
  - Good maintenance
- Finally, for those involved in the building trades, it is always less expensive to take steps during construction to prevent moisture intrusion—not after moisture and mold have gained a foothold in a building.



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## What is mold and why is it an issue today?

Molds are a type of fungi that are ubiquitous in nature. We come in contact with molds on a daily basis and they serve many vital and useful roles in our world. The antibiotic penicillin is derived from mold. Molds are critical to many other useful products and, in fact, our ecosystem would not function without mold—mold turns grass, leaves and other yard waste into topsoil. There are thousands of species of mold (most of them are harmless), but none of them will grow in the absence of moisture.



“A visual inspection is the most important initial step in identifying a possible contamination problem. The extent of any water damage and mold growth should be visually assessed. This assessment is important in determining remedial strategies.”

—New York City Department of Health and Mental Hygiene

Mold has become an issue today because it’s more prevalent, particularly in structures built during the past 25 years. The focus on improving energy efficiency resulted in more airtight homes that don’t breathe like older structures. More complex home designs create increased potential for moisture intrusion. In addition, under today’s accelerated building schedules, buildings are subjected to the elements during all phases of construction, which can introduce and trap moisture within a building. It’s important to note, however, that an energy-efficient home is not necessarily susceptible to mold. With proper design and construction, a home can be both energy efficient and free from moisture-related problems.



“Molds can be found almost anywhere; they can grow on virtually any substance, providing moisture is present.”

—U.S. Environmental Protection Agency



## What causes mold?

Mold spores waft through the air continually—indoors and out. When mold spores land on a damp spot, they begin digesting available nutrients to survive. Three conditions must always be present for mold to grow: 1) mold spores; 2) moisture; and 3) a food source upon which it can feed. Mold can grow on any surface—including steel, plastic and glass. A layer of dust provides enough nutrients to support mold growth. Of the three requirements to grow mold, only moisture can be controlled. Eliminating mold spores and all nutrients would require “clean room” technology, something that cannot be duplicated easily in spaces where we live and work.

**Common causes of moisture and mold in buildings once they are completed include:**

- Plumbing system leaks
- Air conditioning condensation
- Flooding
- Inadequate or incorrectly installed flashing around doors and windows
- Poor roof design (shallow overhangs or unprotected gable ends)

- Inadequate grading leading to poor site drainage
- Incorrectly installed insulation
- High indoor humidity exacerbated by inadequate ventilation
- Condensation caused by moist air moving in and out of the building envelope
- Large temperature differences
- Leaking ductwork

“While it is impossible to eliminate all molds and mold spores, controlling moisture can control indoor mold growth.”

— U.S. Occupational Safety and Health Administration

## Can mold cause health problems?

The focus of the *Responsible Solutions to Mold Coalition* is to prevent mold growth by advising those involved in the building trades, as well as homeowners, about how to avoid moisture intrusion. As a result, we suggest that people who are concerned about the health effects of mold refer to the Institute of Medicine’s report *Damp Indoor Spaces and Health*. (<http://www.iom.edu/CMS/3793/4703/20223.aspx>) If you are experiencing a major mold infestation, we also encourage you to contact a Certified Industrial Hygienist, who can fully assess your situation and suggest possible remedies. You can locate a Certified Industrial Hygienist in your area through the Web site of the American Board of Industrial Hygienists (<http://www.abih.org>).

While research is ongoing and the effects of mold are yet to be determined, if you encounter excessive moisture in the building in which you live or work, we encourage you to locate the source of the moisture and correct it. Excessive moisture in a building not only causes mold, but also encourages the growth of dust mites and bacteria and attracts cockroaches and rodents. Ultimately, moisture will shorten the useful life of any building. So, not only will it make it a less comfortable space in which to live or work, but excessive moisture ultimately will diminish the value of your home, office or commercial building.



“Excessive indoor dampness should be addressed through a broad range of public health initiatives and changes in how buildings are designed, constructed and maintained.”

—Institute of Medicine of the National Academies (U.S.)

## How to effectively control mold by controlling moisture

It takes good building practices, which include:

- Good architectural design
- Quality building materials
- Manufacturing, shipping and storing building materials in a manner that keeps them dry before and during construction
- Building materials that are more susceptible to water damage should not be delivered to the construction site until they are ready to be installed
- Once building materials are delivered to the construction site, they should be covered by waterproof tarps
- In addition, it is important to keep building materials clean and dry. Soiled building materials provide a ready place for mold to grow
- Attention to the order in which building materials are installed so that items susceptible to moisture are not installed until the building is sufficiently enclosed

- Installation of insulation without gaps, folds or voids
- Using a continuous weather-resistant barrier with exterior walls
- Covering crawlspaces to control moisture
- Using exhaust fans to control moisture in bathrooms and kitchens
- Good maintenance procedures to keep dry buildings dry, which means that when a leak or a source of moisture is identified, it should be addressed as soon as possible

## Are mold-resistant products the answer?

Mold-resistant materials play an important role in minimizing mold growth. The RSMC encourages everyone who is about to build or remodel a home to visit the Web sites of various building material manufacturers to read about innovative new mold-fighting products. However, if mold-resistant products are installed improperly—or substituted for good building practices—they offer little protection from the eventual growth of mold. Mold will grow on anything. It has nothing to do with whether the surface in question is organic (paper or wood, for example) or inorganic (glass, fiberglass or steel).

## What are some mold-avoidance strategies?

First, keep the humidity level within your home or office in a range of 30 to 60 percent. Inexpensive devices that measure humidity can be purchased at electronics stores. Reducing humidity can be accomplished by venting to the outdoors bathrooms, dryers and other moisture-generating sources such as showers, stoves and dishwashers. During the summertime, air conditioners and dehumidifiers can make a difference. If you live in a cooler, less humid environment, you can also minimize mold by opening doors and windows to increase airflow whenever practical. Also, reduce the potential for condensation on cold surfaces by adding insulation around windows, piping, exterior walls,



“Fix the source of the water problem or leak to prevent mold growth.”

—U.S. Environmental Protection Agency

roofing and floors. Don’t install carpeting in areas where there is perpetual moisture, such as bathrooms, kitchens or on concrete floors that may become damp. If you have a humidifier on your furnace, be sure to turn it off during the summer months.

## What should I do if I find mold in my home or office?

It is important to rub vigorously with water and detergent any small areas containing mold in order to remove mold spores, which if left in place, can encourage the return of mold. The area should be rinsed with clear water and then dried thoroughly. It’s also important to avoid soaking the damaged area, thereby setting the stage for the return of mold. Absorbent materials such as ceiling tiles, wallboard and carpet that become moldy may need to be replaced. If you decide to tackle the job yourself, wear rubber gloves and discard both the gloves and your cleaning cloths when you’re done. If you discover that mold has grown across large areas, you should contact a Certified Industrial Hygienist in your area through the Web site of the American Board of Industrial Hygienists (<http://www.abih.org>). These experts can help eradicate the mold, as well as identify and eliminate the source of moisture that is causing the problem.



“Moisture and mold problems stem from building design, construction and maintenance practices, and building materials in which wetness lingers.”

—Institute of Medicine of the National Academies (U.S.)

## Good Design, Good Building Practices and Good Maintenance Are Key in Avoiding Mold

At the end of the day, there are three keys to avoiding mold. The first includes good architectural design that keeps water out and doesn't allow it to accumulate on roofs. Second, good building practices must be employed—from how the building materials are stored on the job site to the sequence in which building materials are installed to making sure all windows and doors have flashing. Finally, building owners and homeowners play a role as well in maintaining their buildings and homes. If you see water or moisture collecting, find out the source and correct it as quickly as possible. If you are a homeowner, when you go into your basement or attic, pay attention to all surfaces to see if moisture is making its way into your home. The same goes for owners of commercial buildings. Be attentive to your environment. Look for problems and correct them when they occur. Mold-resistant products can be helpful, but when the unexpected leak or flood occurs, there are no “silver bullet” solutions to avoiding or eradicating mold. Buildings must be well built and well maintained to eliminate mold.

## Myths about Mold

### 1. Mold grows only on paper, wood and other organic material

Mold will grow on any surface, including glass, fiberglass and even steel. Mold needs three things to grow:

1) mold spores (which are almost always in the air); 2) moisture; and 3) a food source. Houses are constructed using a wide variety of organic materials; therefore, the only effective strategy to control mold is to control moisture.

### 2. Mold can be eliminated

Only “clean room” technologies—which are too expensive and unnecessary for the home or office—can eliminate mold spores. Therefore, the only thing you can control in your home or office is moisture. And we all benefit from some molds such as the species that led to the development of penicillin.

### 4. Only experts can clean mold

Homeowners can clean small patches of mold using household detergents and warm water. After cleaning, rinsing and drying the spot where mold has grown, rubber gloves and cleaning cloths used in the process should be discarded. Larger patches of mold may need to be eliminated by trained professionals.

### 5. Once mold starts, it will always be present

Mold can be stopped in its tracks, but only if moisture is minimized or eliminated. Therefore, leaks should be corrected as soon as they become apparent. Building experts urge homeowners to be aware of some of the telltale signs of mold, which include dampness, odors, discoloration, peeling paint, condensation, compacted insulation and actual mold outbreaks.



“The key to mold control is moisture control.”

—U.S. Environmental Protection Agency

Please consult the following Web sites and resources for more information on mold and mold abatement:

U.S. Environmental Protection Agency:  
[www.epa.gov/iaq/molds](http://www.epa.gov/iaq/molds)

New York City Department of Health and Mental Hygiene:  
[www.nyc.gov/html/doh/html/epi/moldrpt1.shtml](http://www.nyc.gov/html/doh/html/epi/moldrpt1.shtml)

U.S. Occupational Safety & Health Administration:  
[www.osha.gov/dts/shib/shib101003.html](http://www.osha.gov/dts/shib/shib101003.html)

National Institute of Medicine of the National Academies:  
[www.iom.edu/object.file/master/25/863/0.pdf](http://www.iom.edu/object.file/master/25/863/0.pdf)

California Energy Commission  
California Builder’s Guide to Reducing Mold Risk  
<http://www.energy.ca.gov>

Public-Private Partnership for Advancing Housing Technology (PATH) Moisture Resistant Homes  
A Practical Guide and Plan Review Tool for Builders and Designers  
<http://www.pathnet.org/sp.asp?id=18574>

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