



## U.S. Environmental Protection Agency

# Indoor Air Quality - Mold

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## Mold Resources

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The publication, "[A Brief Guide to Mold, Moisture, and Your Home](#)", is also available in pdf ([PDF](#), 20 pgs., 278KB [About PDF](#)) [EPA 402-K-02-003]

**Una Breve Guía para el Moho, la Humedad y su Hogar** está disponible en el formato PDF ([PDF](#), 20 pgs., 796KB [About PDF](#)). Documento de la agencia EPA número 402-K-03-008.

The publication, "[Mold Remediation in Schools and Commercial Buildings](#)", is also available in pdf ([PDF](#), 54 pgs., 5MB [About PDF](#)) [EPA 402-K-01-001, March 2001]

Order publications from [IAQ INFO](#) and [EPA's NSCEP](#). Use the EPA Document Number when ordering.

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### Introduction to Molds

Molds produce tiny spores to reproduce. Mold spores waft through the indoor and outdoor air continually. When mold spores land on a damp spot indoors, they may begin growing and digesting whatever they are growing on in order to survive. There are molds that can grow on wood, paper, carpet, and foods. When excessive moisture or water accumulates indoors, mold growth will often occur, particularly if the

moisture problem remains undiscovered or un-addressed. 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.

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## Basic Mold Cleanup

The key to mold control is moisture control. It is important to dry water damaged areas and items within 24-48 hours to prevent mold growth. If mold is a problem in your home, clean up the mold and get rid of the excess water or moisture. Fix leaky plumbing or other sources of water. Wash mold off hard surfaces with detergent and water, and dry completely. Absorbent materials (such as ceiling tiles & carpet) that become moldy may have to be replaced.

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## Ten Things You Should Know About Mold

1. Potential health effects and symptoms associated with mold exposures include allergic reactions, asthma, and other respiratory complaints.
2. 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.
3. If mold is a problem in your home or school, you must clean up the mold and eliminate sources of moisture.
4. Fix the source of the water problem or leak to prevent mold growth.
5. Reduce indoor humidity (to 30-60% ) to decrease mold growth by: venting bathrooms, dryers, and other moisture-generating sources to the outside; using air conditioners and de-humidifiers; increasing ventilation; and using exhaust fans whenever cooking, dishwashing, and cleaning.
6. Clean and dry any damp or wet building materials and furnishings within 24-48 hours to prevent mold growth.
7. Clean mold off hard surfaces with water and detergent, and dry completely. Absorbent materials such as ceiling tiles, that are moldy, may need to be replaced.
8. Prevent condensation: Reduce the potential for condensation on cold surfaces (i.e., windows, piping, exterior walls, roof, or floors) by adding insulation.
9. In areas where there is a perpetual moisture problem, do not install carpeting (i.e., by drinking fountains, by classroom sinks, or on concrete floors with leaks or frequent condensation).
10. Molds can be found almost anywhere; they can grow on virtually any substance, providing moisture is present. There are molds that can grow on wood, paper, carpet, and foods.

If you have IAQ and mold issues in your school, you should get a copy of the [IAQ Tools for Schools](#) Kit. Mold is covered in the IAQ Coordinator's Guide under [Appendix H - Mold and Moisture](#).

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## Asthma and Mold

Molds can trigger asthma episodes in sensitive individuals with asthma. People with asthma should avoid contact with or exposure to molds.

EPA's [Asthma web site](#)

EPA's Asthma Brochure ([PDF](#), 2 pgs., 245KB [About PDF](#))

EPA's [Mold page from Asthma web site](#)

- Allergy & Asthma Network/Mothers of Asthmatics (AAN/MA): (800) 878-4403; [www.aanma.org](http://www.aanma.org) [EXIT disclaimer >](#)
- American Academy of Allergy, Asthma & Immunology (AAAAI): [www.aaaai.org](http://www.aaaai.org) [EXIT disclaimer >](#)
- American Lung Association: 1-800-LUNG-USA (1-800-586-4872); [www.lungusa.org](http://www.lungusa.org) [EXIT disclaimer >](#)
- Asthma & Allergy Foundation of America: (800) 7ASTHMA; [www.aafa.org](http://www.aafa.org) [EXIT disclaimer >](#)
- Canada Mortgage & Housing Corporation fact sheets on mold - [www.cmhc-schl.gc.ca/en/burema/gesein/abhose/abhose\\_50.cfm](http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/abhose_50.cfm) [EXIT disclaimer >](#)
- National Institute of Allergy and Infectious Diseases: [www.niaid.nih.gov](http://www.niaid.nih.gov) [EXIT disclaimer >](#)
- National Jewish Medical and Research Center: (800) 222-LUNG (5864); [www.njc.org](http://www.njc.org) [EXIT disclaimer >](#)

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## Floods/Flooding

Mold growth may be a problem after flooding. EPA's Fact Sheet: [Flood Cleanup: Avoiding Indoor Air Quality Problems](#) - discusses steps to take when cleaning and repairing a home after flooding. Excess moisture in the home is cause for concern about indoor air quality primarily because it provides breeding conditions for microorganisms. This fact sheet provides tips to avoid creating indoor air quality problems during cleanup. U.S. EPA, EPA Document Number 402-F-93-005, August 1993.

- Federal Emergency Management Agency (FEMA): (800) 480-2520; [www.fema.gov](http://www.fema.gov) [EXIT disclaimer >](#) mitigation website: [www.fema.gov/mit](http://www.fema.gov/mit) [EXIT disclaimer >](#) publications on floods, flood proofing, etc.
- U.S. Department of Health and Human Services (HHS), Centers for Disease Control and Prevention's (CDC) Emergency Preparedness and Response page on "Protect Yourself from Mold" - [www.bt.cdc.gov/disasters/mold/protect.asp](http://www.bt.cdc.gov/disasters/mold/protect.asp) [EXIT disclaimer >](#) and **Key Facts About Hurricane Recovery** - [www.bt.cdc.gov/hurricanes/index.asp](http://www.bt.cdc.gov/hurricanes/index.asp) [EXIT disclaimer >](#)
- University of Minnesota, Department of Environmental Health & Safety - [www.dehs.umn.edu/iaq/flood.html](http://www.dehs.umn.edu/iaq/flood.html) [EXIT disclaimer >](#) "Managing Water Infiltration Into Buildings." A Systematized

Approach for Remediating Water Problems in Buildings due to Floods, Roof Leaks, Potable Water Leaks, Sewage Backup, Steam Leaks and Groundwater Infiltration. Questions and comments may be directed to: Neil Carlson, M.S., CIH, Department of Environmental Health & Safety, University of Minnesota, or Arif Quraishi, M.E., Vice President, Special Projects, Indoor Environments Division, Institute for Environmental Assessment, Inc.

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## Health and Mold

### How do molds affect people?

Some people are sensitive to molds. For these people, exposure to molds can cause symptoms such as nasal stuffiness, eye irritation, wheezing, or skin irritation. Some people, such as those with serious allergies to molds, may have more severe reactions. Severe reactions may occur among workers exposed to large amounts of molds in occupational settings, such as farmers working around moldy hay. Severe reactions may include fever and shortness of breath. Some people with chronic lung illnesses, such as obstructive lung disease, may develop mold infections in their lungs.

EPA's publication, [Indoor Air Pollution: An Introduction for Health Professionals](#), assists health professionals (especially the primary care physician) in diagnosis of patient symptoms that could be related to an indoor air pollution problem. It addresses the health problems that may be caused by contaminants encountered daily in the home and office. Organized according to pollutant or pollutant groups such as environmental tobacco smoke, VOCs, biological pollutants, and sick building syndrome, this booklet lists key signs and symptoms from exposure to these pollutants, provides a diagnostic checklist and quick reference summary, and includes suggestions for remedial action. Also includes references for information contained in each section. This booklet was developed by the American Lung Association, the American Medical Association, the U.S. Consumer Product Safety Commission, and the EPA. EPA Document Reference Number 402-R-94-007, 1994.

Allergic Reactions - excerpted from [Indoor Air Pollution: An Introduction for Health Professionals section on: Animal Dander, Molds, Dust Mites, Other Biologicals](#).

"A major concern associated with exposure to biological pollutants is allergic reactions, which range from rhinitis, nasal congestion, conjunctival inflammation, and urticaria to asthma. Notable triggers for these diseases are allergens derived from house dust mites; other arthropods, including cockroaches; pets (cats, dogs, birds, rodents); molds; and protein-containing furnishings, including feathers, kapok, etc. In occupational settings, more unusual allergens (e.g., bacterial enzymes, algae) have caused asthma epidemics. Probably most proteins of non-human origin can cause asthma in a subset of any appropriately exposed population."

Consult the [Centers for Disease Control \(CDC\) website](#) 

- CDC's [National Center for Environmental Health \(NCEH\)](#) [EXIT disclaimer >](#) has a toll-free telephone number for information and FAXs, including a list of publications: NCEH Health Line 1-888-232-6789.
- CDC's "Molds in the Environment" Factsheet - [www.cdc.gov/mold/faqs.htm](http://www.cdc.gov/mold/faqs.htm) [EXIT disclaimer >](#)

Stachybotrys or *Stachybotrys atra (chartarum)* and health effects - [www.cdc.gov/mold/stachy.htm](http://www.cdc.gov/mold/stachy.htm) [EXIT disclaimer >](#)

- CDC's "Questions and Answers on Stachybotrys chartarum and other molds" [EXIT disclaimer >](#)

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## Homes and Molds

The EPA publication, "**A Brief Guide to Mold, Moisture, and Your Home**", is available here in [HTML](#) and PDF formats in **English** ([PDF](#), 20 pgs., 257KB [About PDF](#)) and **Spanish** ([PDF](#), 20 pgs., 796KB [About PDF](#)). This Guide provides information and guidance for homeowners and renters on how to clean up residential mold problems and how to prevent mold growth. A printed version will be available soon.

**Biological Pollutants in Your Home** - This document explains indoor biological pollution, health effects of biological pollutants, and how to control their growth and buildup. One third to one half of all structures have damp conditions that may encourage development of pollutants such as molds and bacteria, which can cause allergic reactions -- including asthma -- and spread infectious diseases. Describes corrective measures for achieving moisture control and cleanliness. This brochure was prepared by the American Lung Association and the U.S. Consumer Product Safety Commission. The publication was updated by CPSC in 1997 [www.cpsc.gov/cpsc/pub/pubs/425.html](http://www.cpsc.gov/cpsc/pub/pubs/425.html) [EXIT disclaimer >](#)

Moisture control is the key to mold control, the Moisture Control Section from *Biological Pollutants in Your Home* follows:

### Moisture Control

Water in your home can come from many sources. Water can enter your home by leaking or by seeping through basement floors. Showers or even cooking can add moisture to the air in your home. The amount of moisture that the air in your home can hold depends on the temperature of the air. As the temperature goes down, the air is able to hold less moisture. This is why, in cold weather, moisture condenses on cold surfaces (for example, drops of water form on the inside of a window). This moisture can encourage biological pollutants to grow.

There are many ways to control moisture in your home:

- Fix leaks and seepage. If water is entering the house from the outside, your options range from simple landscaping to extensive

excavation and waterproofing. (The ground should slope away from the house.) Water in the basement can result from the lack of gutters or a water flow toward the house. Water leaks in pipes or around tubs and sinks can provide a place for biological pollutants to grow.

- Put a plastic cover over dirt in crawlspaces to prevent moisture from coming in from the ground. Be sure crawlspaces are well-ventilated.
- Use exhaust fans in bathrooms and kitchens to remove moisture to the outside (not into the attic). Vent your clothes dryer to the outside.
- Turn off certain appliances (such as humidifiers or kerosene heaters) if you notice moisture on windows and other surfaces.
- Use dehumidifiers and air conditioners, especially in hot, humid climates, to reduce moisture in the air, but be sure that the appliances themselves don't become sources of biological pollutants.
- Raise the temperature of cold surfaces where moisture condenses. Use insulation or storm windows. (A storm window installed on the inside works better than one installed on the outside.) Open doors between rooms (especially doors to closets which may be colder than the rooms) to increase circulation. Circulation carries heat to the cold surfaces. Increase air circulation by using fans and by moving furniture from wall corners to promote air and heat circulation. Be sure that your house has a source of fresh air and can expel excessive moisture from the home.
- Pay special attention to carpet on concrete floors. Carpet can absorb moisture and serve as a place for biological pollutants to grow. Use area rugs which can be taken up and washed often. In certain climates, if carpet is to be installed over a concrete floor, it may be necessary to use a vapor barrier (plastic sheeting) over the concrete and cover that with sub-flooring (insulation covered with plywood) to prevent a moisture problem.
- Moisture problems and their solutions differ from one climate to another. The Northeast is cold and wet; the Southwest is hot and dry; the South is hot and wet; and the Western Mountain states are cold and dry. All of these regions can have moisture problems. For example, evaporative coolers used in the Southwest can encourage the growth of biological pollutants. In other hot regions, the use of air conditioners which cool the air too quickly may prevent the air conditioners from running long enough to remove excess moisture from the air. The types of construction and weatherization for the different climates can lead to different problems and solutions.

### **Moisture On Windows**

Your humidistat is set too high if excessive moisture collects on windows and other cold surfaces. Excess humidity for a prolonged time can damage walls especially when outdoor air temperatures are very low. Excess moisture condenses on window glass because the glass is cold. Other sources of excess moisture besides overuse of a humidifier may be long showers, running water for other uses, boiling or steaming in cooking, plants, and drying clothes indoors. A tight, energy efficient house holds more moisture inside; you may need to run a kitchen or bath ventilating fan sometimes, or open a window briefly. Storm windows and caulking around windows keep the interior glass warmer and reduce condensation of moisture there.

Humidifiers are not recommended for use in buildings without proper vapor barriers because of potential damage from moisture buildup. Consult a building contractor to determine the adequacy of the vapor barrier in your house. Use a humidity indicator to measure the relative humidity in your house. The American Society of Heating and Air Conditioning Engineers (ASHRAE) recommends these maximum indoor humidity levels.

#### Outdoor Recommended Indoor Temperature Relative Humidity

+20° F.	35%
+10° F.	30%
0° F.	25%
-10° F.	20%
-20° F.	15%

Source: Anne Field, Extension Specialist, Emeritus, with reference from the Association for Home Appliance Manufacturers ([www.aham.org](http://www.aham.org) [EXIT disclaimer](#)).

#### How to Identify the Cause of a Mold and Mildew Problem

Mold and mildew are commonly found on the exterior wall surfaces of corner rooms in heating climate locations. An exposed corner room is likely to be significantly colder than adjoining rooms, so that it has a higher relative humidity (RH) than other rooms at the same water vapor pressure. If mold and mildew growth are found in a corner room, then relative humidity next to the room surfaces is above 70%. However, is the RH above 70% at the surfaces because the room is too cold or because there is too much moisture present (high water vapor pressure)?

The amount of moisture in the room can be estimated by measuring both temperature and RH at the same location and at the same time. Suppose there are two cases. In the first case, assume that the RH is 30% and the temperature is 70°F in the middle of the room. The low RH at that temperature indicates that the water vapor pressure (or absolute humidity) is low. The high surface RH is probably due to room surfaces that are "too cold." Temperature is the dominating factor, and control strategies should involve increasing the temperature at cold room surfaces.

In the second case, assume that the RH is 50% and the temperature is 70°F in the middle of the room. The higher RH at that temperature indicates that the water vapor pressure is high and there is a relatively large amount of moisture in the air. The high surface RH is probably due to air that is "too moist." Humidity is the dominating factor, and control strategies should involve decreasing the

moisture content of the indoor air.

**[Should You Have the Air Ducts in Your Home Cleaned?](#)** - excerpt on duct cleaning and mold follows, please review the entire document for additional information on duct cleaning and mold.

You should consider having the air ducts in your home cleaned if:

There is substantial visible mold growth inside hard surface (e.g., sheet metal) ducts or on other components of your heating and cooling system. There are several important points to understand concerning mold detection in heating and cooling systems:

- Many sections of your heating and cooling system may not be accessible for a visible inspection, so ask the service provider to show you any mold they say exists.
- You should be aware that although a substance may look like mold, a positive determination of whether it is mold or not can be made only by an expert and may require laboratory analysis for final confirmation. For about \$50, some microbiology laboratories can tell you whether a sample sent to them on a clear strip of sticky household tape is mold or simply a substance that resembles it.
- If you have insulated air ducts and the insulation gets wet or moldy it cannot be effectively cleaned and should be removed and replaced.
- If the conditions causing the mold growth in the first place are not corrected, mold growth will recur.

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## Indoor Air Regulations and Mold

Standards or Threshold Limit Values (TLVs) for airborne concentrations of mold, or mold spores, have not been set. Currently, there are no EPA regulations or standards for airborne mold contaminants.

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## Large Buildings and Mold

EPA has a number of resources available, you can start with the Indoor Air Quality Building Evaluation and Assessment Model (I-BEAM). I-BEAM updates and expands EPA's existing Building Air Quality guidance and is designed to be comprehensive state-of-the-art guidance for managing IAQ in commercial buildings. This guidance was designed to be used by building professionals and others interested in indoor air quality in commercial buildings. I-BEAM contains text, animation/visual, and interactive/calculation components that can be used to perform a number of diverse tasks. See

[www.epa.gov/iaq/largebldgs/ibeam\\_page.htm](http://www.epa.gov/iaq/largebldgs/ibeam_page.htm)

See also ["Building Air Quality: A Guide for Building Owners and Facility Managers"](#) and the ["Building Air Quality Action Plan"](#)

Excerpt from the [Building Air Quality: A Guide for Building Owners and Facility Managers, Appendix C - Moisture, Mold and Mildew](#):

### **How to Identify the Cause of a Mold and Mildew Problem.**

Mold and mildew are commonly found on the exterior wall surfaces of corner rooms in heating climate locations. An exposed corner room is likely to be significantly colder than adjoining rooms, so that it has a higher relative humidity (RH) than other rooms at the same water vapor pressure. If mold and mildew growth are found in a corner room, then relative humidity next to the room surfaces is above 70%. However, is the RH above 70% at the surfaces because the room is too cold or because there is too much moisture present (high water vapor pressure)?

The amount of moisture in the room can be estimated by measuring both temperature and RH at the same location and at the same time. Suppose there are two cases. In the first case, assume that the RH is 30% and the temperature is 70°F in the middle of the room. The low RH at that temperature indicates that the water vapor pressure (or absolute humidity) is low. The high surface RH is probably due to room surfaces that are "too cold." Temperature is the dominating factor, and control strategies should involve increasing the temperature at cold room surfaces.

In the second case, assume that the RH is 50% and the temperature is 70°F in the middle of the room. The higher RH at that temperature indicates that the water vapor pressure is high and there is a relatively large amount of moisture in the air. The high surface RH is probably due to air that is "too moist." Humidity is the dominating factor, and control strategies should involve decreasing the moisture content of the indoor air.

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## **Schools and Mold and Indoor Air Quality**

The Agency's premier resource on this issue is the *Indoor Air Quality Tools for Schools* kit. Our schools-related resources on the web start at: [epa.gov/iaq/schools](http://epa.gov/iaq/schools).

The asthma companion piece for the *IAQ Tools for Schools* kit, titled *Managing Asthma in the School Environment* ([epa.gov/iaq/schools/asthma](http://epa.gov/iaq/schools/asthma)) has been recently published. This publication has a section entitled *Clean Up Mold and Moisture Control* at: [epa.gov/iaq/schools/asthma/eat-cumcm.htm](http://epa.gov/iaq/schools/asthma/eat-cumcm.htm)

Excerpt from [IAQ Tools for Schools](#) kit companion piece, [Managing Asthma in the School Environment](#):

### **Common Moisture Sources Found in Schools**

Moisture problems in school buildings can be caused by a variety of conditions, including roof and plumbing leaks, condensation, and excess humidity. Some moisture problems in schools have been linked to changes in building construction practices during the past twenty to thirty years. These changes have resulted in more tightly sealed buildings that may not allow moisture to escape easily. Moisture problems in schools are also associated with delayed maintenance or insufficient maintenance, due to budget and other constraints. Temporary structures in schools, such as trailers and portable classrooms, have frequently been associated with moisture and mold problems.

### **Suggestions for Reducing Mold Growth in Schools**

Reduce Indoor Humidity:

- Vent showers and other moisture-generating sources to the outside.
- Control humidity levels and dampness by using air conditioners and de-humidifiers.
- Provide adequate ventilation to maintain indoor humidity levels between 30-60%.
- Use exhaust fans whenever cooking, dishwashing, and cleaning in food service areas.

Inspect the building for signs of mold, moisture, leaks, or spills:

- Check for moldy odors.
- Look for water stains or discoloration on the ceiling, walls, floors, and window sills.
- Look around and under sinks for standing water, water stains, or mold.
- Inspect bathrooms for standing water, water stains, or mold.
- Do not let water stand in air conditioning or refrigerator drip pans.

Respond promptly when you see signs of moisture and/or mold, or when leaks or spills occur:

- Clean and dry any damp or wet building materials and furnishings within 24-48 hours of occurrence to prevent mold growth.
- Fix the source of the water problem or leak to prevent mold growth.
- Clean mold off hard surfaces with water and detergent, and dry completely.
- Absorbent materials such as ceiling tiles, that are moldy, may need to be replaced.
- Check the mechanical room and roof for unsanitary conditions, leaks, or spills.

Prevent moisture condensation:

- Reduce the potential for condensation on cold surfaces (i.e., windows, piping, exterior walls, roof, or floors) by adding insulation.

Floor and carpet cleaning:

- Remove spots and stains immediately, using the flooring manufacturer's recommended techniques.
- Use care to prevent excess moisture or cleaning residue accumulation and ensure that cleaned areas are dried quickly.
- In areas where there is a perpetual moisture problem, do not install carpeting (i.e., by drinking fountains, by classroom sinks, or on concrete floors with leaks or frequent condensation).

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## Other Mold-Related Resources/Links

### U.S. Environmental Protection Agency (EPA)

#### Indoor Air Quality Publications and Resources

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**Una Breve Guía para el Moho, la Humedad y su Hogar** está disponible en el formato PDF ([PDF](#), 20 pgs., 796KB [About PDF](#)). Documento de la agencia EPA número **402-K-03-008**.

The publication, "[Mold Remediation in Schools and Commercial Buildings](#)", is also available in pdf ([PDF](#), 54 pgs., 5MB [About PDF](#)) [EPA 402-K-01-001, March 2001]

An Office Building Occupant's Guide to IAQ - [epa.gov/iaq/pubs/occupgd.html](http://epa.gov/iaq/pubs/occupgd.html)

Biological Contaminants - [epa.gov/iaq/biologic.html](http://epa.gov/iaq/biologic.html)

IAQ Building Education and Assessment Model (I-BEAM) - I-BEAM updates and expands EPA's existing Building Air Quality guidance and is designed to be comprehensive state-of-the-art guidance for managing IAQ in commercial buildings. This guidance was designed to be used by building professionals and others interested in indoor air quality in commercial buildings. I-BEAM contains text, animation/visual, and interactive/calculation components that can be used to perform a number of diverse tasks. [epa.gov/iaq/largebldgs/ibeam\\_page.htm](http://epa.gov/iaq/largebldgs/ibeam_page.htm)

Building Air Quality: *A Guide for Building Owners and Facility Managers* (BAQ Guide) - [epa.gov/iaq/largebldgs/baqtoc.html](http://epa.gov/iaq/largebldgs/baqtoc.html)

Building Air Quality Action Plan (for Commercial Buildings) - [epa.gov/iaq/largebldgs/actionpl.html](http://epa.gov/iaq/largebldgs/actionpl.html)

Floods/Flooding - [epa.gov/iaq/pubs/flood.html](http://epa.gov/iaq/pubs/flood.html)

For more subject-specific links, go to: [epa.gov/iaq/schools/links.html](http://epa.gov/iaq/schools/links.html), or [epa.gov/iaq/asthma/links.html](http://epa.gov/iaq/asthma/links.html), or [epa.gov/iaq/moreinfo.html](http://epa.gov/iaq/moreinfo.html).

Antimicrobial Information Hotline [www.epa.gov/oppad001/](http://www.epa.gov/oppad001/)  
(703) 308-0127/(703) 308-6467(FAX)  
Monday-Friday 8:00 AM - 5:00 PM EST  
email: [Info\\_Antimicrobial@epa.gov](mailto:Info_Antimicrobial@epa.gov)

The Antimicrobials Information Hotline provides answers to questions concerning current antimicrobial issues (disinfectants, fungicides, others) regulated by the pesticide law, rules and regulations. These cover interpretation laws, rules, and regulations, and registration and re-registration of antimicrobial chemicals and products. The Hotline also provide information health & safety issues on registered antimicrobial products, product label and the proper and safe use of these antimicrobial products.

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## Other Links - Alphabetical Listing

The following list of resources includes information created and maintained by other public and private organizations. The U.S. EPA does not control or guarantee the accuracy, relevance, timeliness, or completeness of this outside information. Further, the inclusion of such resources is not intended to endorse any views expressed or products or services offered by the author of the reference or the organization operating the service on which the reference is maintained.

American College of Occupational and Environmental Medicine (ACOEM)  
(847) 818-1800 [www.acoem.org](http://www.acoem.org) [EXIT disclaimer >](#)  
Referrals to physicians who have experience with environmental exposures (this is a members only service).

American Conference of Governmental Industrial Hygienists, Inc. (ACGIH)  
(513) 742-2020 [www.acgih.org](http://www.acgih.org) [EXIT disclaimer >](#)  
Occupational and environmental health and safety information

American Industrial Hygiene Association (AIHA)  
(703) 849-8888 [www.aiha.org](http://www.aiha.org) [EXIT disclaimer >](#)  
Information on industrial hygiene and indoor air quality issues including mold hazards and legal issues. See also their "[Facts About Mold: A Glossary](#)" [EXIT disclaimer >](#) and [General Mold Information](#) [EXIT disclaimer >](#)

American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE)  
(800) 527-4723 [www.ashrae.org](http://www.ashrae.org) [EXIT disclaimer >](#)  
Information on engineering issues and indoor air quality

Association of Occupational and Environmental Clinics (AOEC)  
(202) 347-4976 [www.aoec.org](http://www.aoec.org) [EXIT disclaimer >](#)  
Referrals to clinics with physicians who have experience with

environmental exposures, including exposure to mold; maintains a database of occupational and environmental cases

Association of Specialists in Cleaning and Restoration (ASCR)  
 (800) 272-7012 [www.ascr.org](http://www.ascr.org) [EXIT disclaimer >](#)  
 Disaster recovery, water and fire damage, emergency tips, referrals to professionals

### Asthma and Allergic Diseases

American Academy of Allergy, Asthma & Immunology (AAAAI)  
 (800) 822-2762  
[www.aaaai.org](http://www.aaaai.org) [EXIT disclaimer >](#)  
 Physician referral directory, information on allergies and asthma

Asthma and Allergy Foundation of American (AAFA)  
 (800) 7-ASTHMA (800-727-8462)  
[www.aafa.org](http://www.aafa.org) [EXIT disclaimer >](#)  
 Information on allergies and asthma

American Lung Association (ALA)  
 (800) LUNG-USA (800-586-4872)  
[www.lungusa.org](http://www.lungusa.org) [EXIT disclaimer >](#)  
 Information on allergies and asthma

Asthma and Allergy Network/Mothers of Asthmatics, Inc. (AAN\*MA)  
 (800) 878-4403 or (703-641-9595)  
[www.aanma.org](http://www.aanma.org) [EXIT disclaimer >](#)  
 Information on allergies and asthma

National Institute of Allergy and Infectious Diseases (NIAID)  
 (301) 496-5717  
[www.niaid.nih.gov](http://www.niaid.nih.gov) [EXIT disclaimer >](#)  
 Information on allergies and asthma

National Jewish Medical and Research Center  
 (800) 222-LUNG (800-222-5864)  
[www.njc.org](http://www.njc.org) [EXIT disclaimer >](#)  
 Information on allergies and asthma

Canada Mortgage and Housing Corporation (CMHC)  
 (613) 748-2003 [International]  
[www.cmhc-schl.gc.ca/en/index.cfm](http://www.cmhc-schl.gc.ca/en/index.cfm) [EXIT disclaimer >](#)

Several documents on mold-related topics available and a discussion on mold at - [http://www.cmhc-schl.gc.ca/en/imquaf/hehosu/hoast/hoast\\_001.cfm](http://www.cmhc-schl.gc.ca/en/imquaf/hehosu/hoast/hoast_001.cfm) [EXIT disclaimer >](#) including

- ["Fighting Mold - The Homeowner's Guide"](#) [EXIT disclaimer >](#)
- ["The Condominium Owners' Guide to Mold"](#) [EXIT disclaimer >](#)

Carpet and Rug Institute (CRI)

(800) 882-8846

[www.carpet-rug.com](http://www.carpet-rug.com) [EXIT disclaimer >](#)

Carpet maintenance, restoration guidelines for water-damaged carpet, other carpet-related issues

Centers for Disease Control and Prevention (CDC)

(800) 311-3435

[www.cdc.gov](http://www.cdc.gov) [EXIT disclaimer >](#)

CDC's National Center for Environmental Health (NCEH)

(888) 232-6789

[www.cdc.gov/nceh](http://www.cdc.gov/nceh) [EXIT disclaimer >](#)

Information on health-related topics including asthma, molds in the environment, and occupational health

- "Molds in the Environment" Factsheet - [www.cdc.gov/mold/faqs.htm](http://www.cdc.gov/mold/faqs.htm) [EXIT disclaimer >](#)
- Stachybotrys or *Stachybotrys atra* (*chartarum*) and health effects - [www.cdc.gov/mold/stachy.htm](http://www.cdc.gov/mold/stachy.htm) [EXIT disclaimer >](#)

U.S. Department of Housing and Urban Development, Office of Native

American Programs - [www.codetalk.fed.us/](http://www.codetalk.fed.us/) [EXIT disclaimer >](#)

Mold Prevention and Detection: A Guide for Housing Authorities in Indian

Country - [www.codetalk.fed.us/MoldDetection.pdf](http://www.codetalk.fed.us/MoldDetection.pdf) [EXIT disclaimer >](#)

Mold and Mildew Taking Control -

[www.codetalk.fed.us/Mold\\_and\\_Mildew\\_Information\\_Taking\\_Control.htm](http://www.codetalk.fed.us/Mold_and_Mildew_Information_Taking_Control.htm)

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Energy and Environmental Building Association

(952) 881-1098

[www.eeba.org](http://www.eeba.org) [EXIT disclaimer >](#)

Information on energy-efficient and environmentally responsible buildings, humidity/moisture control/vapor barriers

### Floods/Flooding

Federal Emergency Management Agency (FEMA)

(800) 480-2520

[www.fema.gov/mit](http://www.fema.gov/mit) [EXIT disclaimer >](#)

Publications on floods, flood proofing, etc.

University of Minnesota, Department of Environmental Health & Safety

(612) 626-5804

[www.dehs.umn.edu/remanagi.html](http://www.dehs.umn.edu/remanagi.html) [EXIT disclaimer >](#)

Managing water infiltration into buildings

University of Wisconsin-Extension, The Disaster Network

(608) 262-3980

[www.uwex.edu/ces/news/handbook.html](http://www.uwex.edu/ces/news/handbook.html) [EXIT disclaimer >](#)

Information on floods and other natural disasters

Western Wood Products Association

A trade association representing softwood lumber manufacturers in the 12 Western states.

"Mold and Wood Products" -

[www.wwpa.org/index\\_lumberandmold.htm](http://www.wwpa.org/index_lumberandmold.htm) [EXIT disclaimer >](#)

[info@wwpa.org](mailto:info@wwpa.org)

Health Canada, Health Protection Branch, Laboratory Centre for Disease Control, Office of Biosafety  
(613) 957-1779

[www.hc-sc.gc.ca/main/lcdc/web/biosaftey/msds/index.html](http://www.hc-sc.gc.ca/main/lcdc/web/biosaftey/msds/index.html) [EXIT disclaimer >](#)

Material Safety Data Sheets with health and safety information on infectious microorganisms, including Aspergillus and other molds and airborne biologicals

Institute of Inspection, Cleaning and Restoration Certification (IICRC)  
(360) 693-5675

[www.iicrc.org](http://www.iicrc.org) [EXIT disclaimer >](#)

Information on and standards for the inspection, cleaning, and restoration industry

International Sanitary Supply Association (ISSA)  
(800) 225-4772

[www.issa.com](http://www.issa.com) [EXIT disclaimer >](#)

Education and training on cleaning and maintenance

International Society of Cleaning Technicians (ISCT)  
(800) WHY-ISCT (800-949-4728)

[www.isct.com](http://www.isct.com) [EXIT disclaimer >](#)

Information on cleaning, such as a stain removal guide for carpets

Material Safety Data Sheets (MSDSs) - Cornell University Department of Environmental Health and Safety

<http://msds.ehs.cornell.edu/msdssrch.asp> [EXIT disclaimer >](#)

MSDSs contain information on chemicals or compounds including topics such as health effects, first aid and protective equipment for people who work with or handle these chemicals. The ~ 250,000 MSDS files contained in this database are derived from :

- the U.S. Government Department of Defense MSDS database available for purchase from [Solutions Software](#) [EXIT disclaimer >](#)
- a mirror of data from [siri.uvm.edu](http://siri.uvm.edu). [EXIT disclaimer >](#)
- MSDS sheets maintained by Cornell University Environmental Health and Safety and other Cornell departments.

Medical College of Wisconsin  
Healthlink  
Office of Clinical Informatics  
9200 West Wisconsin Ave, Suite 2975  
Milwaukee, Wisconsin 53226 USA  
E-mail: [healthlink@mcw.edu](mailto:healthlink@mcw.edu)  
Fax: (414) 805-7967

"Molds in the (Indoor) Environment -

<http://healthlink.mcw.edu/article/1031002357.html> [EXIT disclaimer >](#)

Mid Atlantic Environmental Hygiene Resource Center (MEHRC)  
University City Science Center  
3701 Market Street, 1st Floor, Philadelphia, PA 19104  
(215) 966-6191/(215) 387-6321 (fax)

Indoor environmental quality training on topics such as mold remediation  
Go to [http://www.mgi.org/n\\_mehrc.shtml](http://www.mgi.org/n_mehrc.shtml) [EXIT disclaimer >](#) for a list of  
MEHRC course listings.

National Air Duct Cleaners Association (NADCA)  
(202) 737-2926  
[www.nadca.com](http://www.nadca.com) [EXIT disclaimer >](#)  
Duct cleaning information

National Association of the Remodeling Industry (NARI)  
(847) 298-9200  
[www.nari.org](http://www.nari.org) [EXIT disclaimer >](#)  
Consumer information on remodeling, including help finding a  
professional remodeling contractor

National Center for Housing and the Environment (NCHE)  
Stop Mold Public Service Announcement  
[www.stopmold.org](http://www.stopmold.org) [EXIT disclaimer >](#)

National Institute of Building Sciences (NIBS)  
(202) 289-7800  
[www.nibs.org](http://www.nibs.org) [EXIT disclaimer >](#)  
Information on building regulations, science, and technology

National Institute for Occupational Safety and Health (NIOSH)  
(800) 35-NIOSH (800-356-4674)  
[www.cdc.gov/niosh](http://www.cdc.gov/niosh) [EXIT disclaimer >](#)  
Health and safety information with a workplace orientation

National Paint & Coatings Association  
1500 Rhode Island Ave., NW  
Washington, DC 20005  
Phone: (202) 462-6272  
Fax: (202) 462-8549  
[npc@paint.org](mailto:nzca@paint.org)  
How-To Brochures: Preventing Moisture Damage  
[www.paint.org/con\\_info/moisture.cfm](http://www.paint.org/con_info/moisture.cfm) [EXIT disclaimer >](#)

National Pesticide Telecommunications Network (NPTN)  
(800) 858-7378  
[ace.orst.edu/info/nptn](http://ace.orst.edu/info/nptn) [EXIT disclaimer >](#)  
Information on pesticides/antimicrobial chemicals, including safety and  
disposal information

The New York City Department of Health and Mental Hygiene  
[Guidelines on Assessment and Remediation of Fungi in Indoor  
Environments](#) [EXIT disclaimer >](#)

This document revises and expands the original guidelines to include all fungi (mold). It is based both on a review of the literature regarding fungi and on comments obtained by a review panel consisting of experts in the fields of microbiology and health sciences. It is intended for use by building engineers and management, but is available for general distribution to anyone concerned about fungal contamination, such as environmental consultants, health

professionals, or the general public. For further information regarding this document please contact the New York City Department of Health at (212) 788-4290 / 4288.

Occupational Safety & Health Administration (OSHA)  
(800) 321-OSHA (800-321-6742)

[www.osha.gov](http://www.osha.gov) [EXIT disclaimer >](#)

OSHA Mold page - [www.osha.gov/SLTC/molds/](http://www.osha.gov/SLTC/molds/) [EXIT disclaimer >](#)

Information on worker safety, including topics such as respirator use and safety in the workplace

Sheet Metal & Air Conditioning Contractors' National Association (SMACNA)  
(703) 803-2980

[www.smacna.org](http://www.smacna.org) [EXIT disclaimer >](#)

Technical information on topics such as air conditioning and air ducts

Smithsonian Center for Materials Research and Education (SCMRE)  
(301) 238-3700

[www.si.edu/scmre](http://www.si.edu/scmre) [EXIT disclaimer >](#)

Guidelines for caring for and preserving furniture and wooden objects, paper-based materials; preservation studies

University of Michigan Herbarium  
(734) 764-2407

[www.herb.lsa.umich.edu](http://www.herb.lsa.umich.edu) [EXIT disclaimer >](#)

Specimen-based information on fungi; information on fungal ecology

University of Minnesota  
Department of Environmental Health and Safety

Fungi in Buildings - [www.dehs.umn.edu/iaq/fungus/](http://www.dehs.umn.edu/iaq/fungus/) [EXIT disclaimer >](#)

See - The Fungal Glossary -

[www.dehs.umn.edu/iaq/fungus/glossary.html](http://www.dehs.umn.edu/iaq/fungus/glossary.html) [EXIT disclaimer >](#)

University of Tulsa Indoor Air Program  
(918) 631-5246

[www.utulsa.edu/iaqprogram](http://www.utulsa.edu/iaqprogram) [EXIT disclaimer >](#)

Courses, classes, and continuing education on indoor air quality

Water Loss Institute, an Institute of the Association of Specialists in Cleaning and Restoration (ASCR) - [www.ascr.org](http://www.ascr.org) [EXIT disclaimer >](#)  
(800) 272-7012 or (410) 729-9900

<http://www.ascr.org/institutes/wli/index.cfm> [EXIT disclaimer >](#)

Information on water and sewage damage restoration

Western Wood Products Association

A trade association representing softwood lumber manufacturers in the 12 Western states.

"Mold and Wood Products" - [www.wwpa.org/index\\_lumberandmold.htm](http://www.wwpa.org/index_lumberandmold.htm)

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[info@wwpa.org](mailto:info@wwpa.org)

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## How to Order Publications

These indoor air quality publications are also available through the IAQ INFO Clearinghouse.

### **IAQ INFO**

P.O. Box 37133, Washington, DC 20013-7133

**1-800-438-4318/703-356-4020**

(fax) 703-356-5386

[iaqinfo@aol.com](mailto:iaqinfo@aol.com)

or, you can order these publications directly via EPA's **National Service Center for Environmental Publications (NSCEP)**

(<http://www.epa.gov/ncepihom/>). web site. Your publication requests can also be mailed, called or faxed directly to:

U.S. Environmental Protection Agency

**National Center for Environmental Publications (NSCEP)**

P.O. Box 42419

Cincinnati, OH 42419

1-800-490-9198/(513) 489-8695 (fax)

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URL: <http://www.epa.gov/mold/moldresources.html>