

Mold

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Mold belongs to a group of organisms called fungi. Because mold is found indoors and outdoors, exposure to molds and other fungi and their spores is unavoidable. Mold can trigger allergic reactions or asthma attacks and may produce toxins and irritants — important reasons to prevent mold growth and clean up indoor mold contamination. Mold growth should be considered unacceptable because of potential health effects on building occupants and damage to buildings. Those who investigate, clean up, and repair mold damage should avoid exposing themselves and others to mold-laden dust.

Evaluating Buildings for Mold Growth

Check building materials and spaces for visible mold and signs of moisture damage indicating a history of water leaks and high humidity and condensation levels. Building ventilation systems should also be inspected. Basic precautions should be taken when investigating and evaluating mold and moisture problems.

- Do not touch mold or moldy items with bare hands.
- Do not get mold or mold spores in your eyes.
- Do not breathe mold or mold spores; use personal protective equipment (PPE). At a minimum, use an N-95 NIOSH-approved respirator, gloves, and eye protection.
- Contain or bag debris.

Sampling

Sampling is usually not necessary when visible signs of mold growth are present. However, the American Industrial Hygiene Association (AIHA) indicates that in cases where health concerns are an issue, litigation is involved, or the source(s) of contamination is unclear, sampling may be considered. Professionals experienced with mold issues and familiar with current guidelines should conduct sampling and interpret results, as no threshold or exposure limits have been established. As a general guideline, the types and concentrations of mold in indoor air samples should be similar to those found in the local outdoor air. Samples should be analyzed by a laboratory that participates in proficiency testing such as the Environmental Microbiology Proficiency Analytical Testing Program, EMPAT.

Remediation

Mold remediation prevents further human exposure and damage to building materials and furnishings. You must clean up and remove mold contamination, not just kill the mold. Dead mold is still allergenic; some are potentially toxic. Mold gradually destroys what it grows on; to grow, it needs an organic substrate, moisture, and oxygen. If mold growth is not addressed promptly, materials may be damaged and cleaning cannot restore appearance or integrity. Mold can generally be removed from nonporous (hard) surfaces by wiping or scrubbing with water or water and detergent. The use of disinfectant chemicals (biocides), including chlorine bleach, is not recommended as a routine practice. Biocides are of limited use in mold remediation and are not a substitute for thorough cleaning. Mold-contaminated porous material such as damp insulation in ventilation systems, moldy ceiling tile, and mildewed carpet may need to be removed and discarded.

Remediate means to fix a problem. The first step in mold remediation is to fix the water or humidity problem that contributed to mold growth. Thoroughly clean up mold and dry water-damaged areas, using appropriate cleaning and drying methods. Mold remediation requires some level of isolation of materials or containment and the use of appropriate personal protective equipment (PPE). Remediation decisions should be based on the scope of contamination, size of the area of growth, and potential for occupant exposure or building contamination in the absence of containment. Professional expertise and conservative methods may be needed when the chance of mold becoming airborne is high or mold-sensitive individuals are present.



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EPA's pamphlet, *Mold Remediation in Schools and Commercial Buildings*, can help remediators develop a remediation plan. It provides clean-up methods and remediation techniques and discusses precautions and the impact of mold on HVAC systems. Its guidelines are based on total surface area contamination and potential for remediator and occupant exposure. See the simplified example taken from EPA's Table 2: **Guidelines for Remediating**

Building Materials with Mold Growth Caused by Clean Water. If a water source is contaminated with sewage or other pollutants, additional measures may be required. Professional judgment should always play a key role in remediation decisions, especially in selecting contractors and workers knowledgeable in mold-remediation procedures.

Example

Surface area	PPE*	Containment	Cleanup method**
Small – less than 10 sq. ft.	1) Minimum	None required	Example: Carpet and backing. Wet vacuum. Use high-efficiency particulate air (HEPA) vacuum when thoroughly dry.
Medium – 10 -100 sq. ft.	2) Limited or full	4) Limited	Example: Concrete or cinder block. Wet vacuum. Use HEPA vacuum when thoroughly dry.
Large – greater than 100 sq. ft. or has potential for significant exposure.	3) Full	5) Full	Example: Drywall or gypsum. Use HEPA-vacuum after thoroughly dry. Remove and discard damaged material. HEPA vacuum area.

- 1) **Minimum** – N-95 respirator, gloves, and goggles/eye protection.
 - 2) **Limited** – N-95 respirator or half-face respirator with HEPA filter, disposable overalls, goggles/eye protection.
 - 3) **Full** – Gloves, disposable full-body clothing, headgear, foot covering, full-face respirator with HEPA filter.
- * NOTE: Compliance with 1910.134, Respiratory Protection, is required for respirator users.**
- 4) **Limited** – Use polyethylene sheeting, ceiling to floor, around affected area with a slit entry and covering flap; maintain area under negative pressure with HEPA-filtered fan unit. Block air supply and return vents within containment area.
 - 5) **Full** – Use two layers of fire-retardant polyethylene sheeting with one airlock chamber. Maintain area under negative pressure with HEPA-filtered fan unit. Block air supply and return vents within containment area.

**** NOTE: Conventional vacuums should not be used because of contaminant transfer to the air.**

Mold-contaminated building materials and furnishings that are not salvageable should be double bagged or covered with polyethylene sheeting and sealed with duct tape within the containment area to minimize the dispersion of mold spores. These materials can usually be discarded as ordinary construction waste.



Images: Mycology Online www.mycology.adelaide.edu.au/

Resources

Most of this information is excerpted from the Environmental Protection Agency and the American Industrial Hygiene Association publications. Mold remediation can be complicated. One should become thoroughly familiar with the subject prior to initiating remediation procedures. These and the following sources may be helpful.

- EPA: www.epa.gov/iaq/molds/mold_remediation.html
- EPA: www.epa.gov/iaq/pubs/airduct.html
- OSHA: www.osha.gov/SLTC/molds/index.html#Control
- CROET: www.croetweb.com/links.cfm?topicID=24
- Oregon OSHA: <https://osha.oregon.gov/OSHArules/div2/div2I.pdf>
- Oregon OSHA: <https://osha.oregon.gov/rules/Pages/tech-manual.aspx>