



5. Guidelines for Cleaning Building Materials with Mold Growth Caused by Clean Water

The purpose of cleaning is to physically remove mold from the affected surface - not just kill the surface mold in place. Some materials may have to be discarded and replaced because they cannot be effectively cleaned. Clean up may be labor intensive and may temporarily disrupt the functional use of the affected space.

Table 2 presents remediation guidelines for building materials that have mold growth. These guidelines are designed to control mold spore and particle exposures for occupants and cleanup personnel during remediation. These guidelines are based on the size of the affected area and type of material(s) with mold growth. USEPA developed these guidelines to make it easier for individuals performing remediation to select appropriate techniques, not on the basis of health effects or research showing there is a specific method appropriate at a certain number of square feet. The guidelines have been designed to help construct a remediation plan and are not regulations.

When planning to clean building materials or contents, use Table 2 to:

- Determine which materials can be cleaned.
- Determine if moldy, porous items can't be cleaned and must be discarded.
- Select cleanup methods for moldy surfaces and materials.
- Select the Personal Protection Equipment needed to help protect personnel doing the cleanup.
- Where needed, determine a containment method or other procedures, such as vacating a buffer zone or conducting cleanup during off-hours, to prevent spreading mold and debris to occupied areas.

In addition to the guidelines in Table 2,

- Provide plastic bags that can be sealed for removing moldy materials from the cleanup area.
- Ensure clean up personnel:
 - have the experience and training needed to implement the cleanup plan
 - maintain the containment or isolation, as appropriate
 - know how to use Personal Protection Equipment
 - have received medical approval from Health Unit to wear respiratory protection.
- Communicate the cleanup plan to occupants.

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Table 2: Guidelines for Cleaning Building Materials with Mold Growth Caused by Clean Water			
Material or Furnishing Affected	Cleanup Methods*	Personal Protective Equipment†	Containment‡
SMALL - Total Continuous Surface Area Affected Less Than 10 square feet (ft²)			
Books and papers	3	Minimum	None recommended
Carpet and backing	1, 3		
Concrete or cinder block	1, 3		
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	1, 2, 3		
Non-porous, hard surfaces (plastics, metals)	1, 2, 3		
Upholstered furniture & drapes	1, 3		
Wallboard (drywall and gypsum board)	3		
Wood surfaces	1, 2, 3		
MEDIUM - Total Continuous Surface Area Affected Between 10 and 100 (ft²)			
Books and papers	3	Limited or Full, depending on potential for cleanup personnel exposure and size of contaminated area	Limited Consider potential for cleanup personnel and occupant exposure and size of contaminated area
Carpet and backing	1,3,4		
Concrete or cinder block	1,3		
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	1,2,3		
Non-porous, hard surfaces (plastics, metals)	1,2,3		
Upholstered furniture & drapes	1,3,4		
Wallboard (drywall and gypsum board)	3,4		
Wood surfaces	1,2,3		
LARGE - Total Continuous Surface Area Affected Greater Than 100 (ft²)			
Books and papers	3	Full Consider potential for cleanup personnel exposure and size of contaminated area Contact OBO/OM/SHEM*	Full Consider potential for cleanup personnel exposure and size of contaminated area Contact OBO/OM/SHEM*
Carpet and backing	1,3,4		
Concrete or cinder block	1,3		
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	1,2,3,4		
Non-porous, hard surfaces (plastics, metals)	1,2,3		
Upholstered furniture & drapes	1,2,4		
Wallboard (drywall and gypsum board)	3,4		
Wood surfaces	1,2,3,4		

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Contact OBO/OM/SHEM to determine prudent levels of Personal Protective Equipment and containment for each situation, particularly as the remediation site size increases and the potential for exposure and health effects rises.

* Cleanup Methods

The goal is to remove the mold from the surface. Select the method most appropriate to the situation and the material to be cleaned. Since molds gradually destroy the things they grow on, if mold growth is not addressed promptly, some items may be damaged such that cleaning will not restore their original appearance. If mold growth is heavy and items are valuable or important, a restoration/water damage/remediation expert may need to be contracted.

- **Method 1:** Wet vacuum (in the case of porous materials, some mold spores/fragments will remain in the material but will not grow if the material is completely dried). Steam cleaning may be an alternative for carpets and some upholstered furniture.
- **Method 2:** Damp-wipe surfaces with clean water or with water and detergent solution (except wood—use wood floor cleaner); scrub as needed. Use of bleach or other biocides is not necessary, but may help remove stains and delay new mold growth if the area is not dried out quickly. Since killed mold and spores are still allergenic, removal of the mold is the goal, not just killing it.
- **Method 3:** High-efficiency particulate air (HEPA) vacuum after the material has been thoroughly dried. Dispose of the contents of the HEPA vacuum in well-sealed plastic bags.
- **Method 4:** Discard - remove water-damaged materials and seal in plastic bags while inside of containment, if present. Dispose of as normal waste. HEPA vacuum area after it is dried.

† Personal Protective Equipment

- **Minimum:** Impermeable gloves, N-95 respirator, goggles/eye protection
- **Limited:** Impermeable gloves, N-95 respirator or half-face respirator with HEPA filter, disposable overalls, goggles/eye protection
- **Full:** Impermeable gloves, disposable full body clothing, head gear, foot coverings, full-face respirator with HEPA filter

‡ Containment

- **Limited:** Use polyethylene sheeting from ceiling to floor around affected area with a slit entry and covering flap; maintain area under negative pressure with HEPA filtered fan unit. Block supply and return air vents within containment area.
- **Full:** Use two layers of fire-retardant polyethylene sheeting with one airlock chamber. Maintain area under negative pressure with HEPA filtered fan exhausted outside of building. Block off any supply and return air vents within containment area.

Depending on the location, size and scope of the cleanup task, full containment methods described above may not be needed. Protection of building occupants can also be provided by (1) performing work off-hours, with cleaning of the surrounding areas, or (2) vacating a buffer area around the work area, accompanied by appropriate engineering controls, and cleaning before re-occupancy. Appropriate engineering controls include using dust suppression, removing material from the work area in sealed bags, shutting down or sealing building ventilation, keeping the work area and surrounding area clean and leaving the work area clean and dry.

About biocides and cleaners: Biocides and cleaners may be used with Method 2 as long as the surface is still being wiped or scrubbed clean. A mild bleach solution is recommended by US Centers for Disease Control and Prevention's National Center for Environmental Health – 1 cup of bleach per gallon of water. **DO NOT mix this formula with ammonia or any ammonia-containing products.** Some household disinfecting cleaners also contain anti-mold agents, although the disinfecting agents are

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usually added to kill bacteria. Check the label before assuming that 'disinfecting' means the cleaner can kill mold.

Without removing or scrubbing the mold away, cleaners and biocides alone will not remove the mold spores and mold fragments that are allergenic. Simply spraying with a biocide is not a substitute for damp wiping, scrubbing, or vacuuming.

A number of commercial products are listed as EPA "anti-microbials" which kill bacteria, mold and viruses. Many are intended for institutional use, not routine cleaning in homes and offices. They may require trained personnel and special handling, and contain substances that are more irritating and corrosive to skin than regular detergents. Never use an EPA-registered fungicide approved for outdoor use, indoors.



6. References and Additional Information

Residential Mold Issues

<http://www.cdc.gov/nceh/airpollution/mold/moldfacts.htm>

Molds in the Environment, US Centers for Disease Control

<http://www.epa.gov/mold/moldguide.html>

A Brief Guide to Mold, Moisture and Your Home, USEPA

Building Mold Issues

http://www.epa.gov/mold/mold_remediation.html

Mold Remediation in Schools and Commercial Buildings, USEPA

<http://www.cdc.gov/niosh/pdfs/appenc.pdf>

Moisture, Mold & Mildew; Appendix C in Building Air Quality: A Guide for Building Owners and Facility Managers, USEPA

<http://www.aiha.org>

Assessment, Remediation and Post-Remediation Verification of Mold in buildings, American Industrial Hygiene Association Guideline 3-2004

Moisture Meter Information

<http://www.tramexltd.com/page/moist.html>

Tramex Moisture Encounter Meter for Non-Destructive Moisture Testing

Other Health Studies on Mold and Indoor Dampness

<http://www4.nationalacademies.org/news.nsf/isbn/0309091934?OpenDocument>

The National Academies Press Release on Indoor Mold, Building Dampness