

"Mold Remediation in Schools and Commercial Buildings"

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Investigating, Evaluating, and Remediating Moisture and Mold Problems

Table 2: Guidelines for Remediating Building Materials with Mold Growth Caused by Clean Water

Table 2 presents remediation guidelines for building materials that have or are likely to have mold growth. The guidelines in **Table 2** are designed to protect the health of occupants and cleanup personnel during remediation. These guidelines are based on the area and type of material affected by water damage and/or mold growth. Please note that these are guidelines; some professionals may prefer other cleaning methods.

If you are considering cleaning your ducts as part of your remediation plan, you should consult EPA's publication entitled, *Should You Have the Air Ducts In Your Home Cleaned?*⁽⁸⁾ ([see Resources List](#)). If possible, remediation activities should be scheduled during off-hours when building occupants are less likely to be affected.

Although the level of personal protection suggested in these guidelines is based on the total surface area contaminated and the potential for remediator and/or occupant exposure, professional judgment should always play a part in remediation decisions. These remediation guidelines are based on the size of the affected area to make it easier for remediators 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. The remediation manager will then use professional judgment and experience to adapt the guidelines to particular situations. When in doubt, caution is advised. Consult an experienced mold remediator for more information.

In cases in which a particularly toxic mold species has been identified or is suspected, when extensive hidden mold is expected (such as behind vinyl wallpaper or in the HVAC system), when the chances of the mold becoming airborne are estimated to be high, or sensitive individuals (e.g., those with severe allergies or asthma) are present, a more cautious or conservative approach to remediation is indicated. Always make sure to protect remediators and building occupants from exposure to mold.

Table 2: Guidelines for Remediating Building 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 (ft²)			

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, 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 Surface Area Affected Between 10 and 100 (ft²)

Books and papers	3	Limited or Full	Limited
Carpet and backing	1,3,4	Use professional judgment, consider potential for remediator exposure and size of contaminated area	Use professional judgment, consider potential for remediator/occupant exposure and size of contaminated area
Concrete or cinder block	1,3		
Hard surface, porous	1,2,3		

flooring (linoleum, ceramic tile, vinyl)			
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 Surface Area Affected Greater Than 100 (ft²) or Potential for Increased Occupant or Remediator Exposure During Remediation Estimated to be Significant			
Books and papers	3	Full	Full
Carpet and backing	1,3,4	Use professional judgment, consider potential for remediator/occupant exposure and size of contaminated area	Use professional judgment, consider potential for remediator exposure and size of contaminated area
Concrete or cinder block	1,3		
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	1,2,3,4		
Non- porous, hard	1,2,3		
surfaces (plastics,			

metals)			
Upholstered furniture & drapes	1,2,4		
Wallboard (drywall and gypsum board)	3,4		
Wood surfaces	1,2,3,4		

Table 2 continued

*Use professional judgment 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. Assess the need for increased Personal Protective Equipment, if, during the remediation, more extensive contamination is encountered than was expected. Consult Table 1 if materials have been wet for less than 48 hours, and mold growth is not apparent. These guidelines are for damage caused by clean water. If you know or suspect that the water source is contaminated with sewage, or chemical or biological pollutants, then the Occupational Safety and Health Administration (OSHA) requires PPE and containment. An experienced professional should be consulted if you and/or your remediators do not have expertise in remediating contaminated water situations.

†Select method most appropriate to situation. 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, you may wish to consult a restoration/water damage/remediation expert. Please note that these are guidelines; other cleaning methods may be preferred by some professionals.

Cleanup Methods

- 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 plain water or with water and detergent solution (except wood —use wood floor cleaner); scrub as needed.
- 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 (PPE)

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

Containment

- 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 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 supply and return air vents within containment area.

Table developed from literature and remediation documents including Bioaerosols: Assessment and Control (American Conference of Governmental Industrial Hygienists, 1999) and IICRC S500, Standard and Reference Guide for Professional Water Damage Restoration, (Institute of Inspection, Cleaning and Restoration, 1999); see Resources List for more information

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7. Please note that [Table 1](#) and Table 2 contain general guidelines. Their purpose is to provide basic information for remediation managers to first assess the extent of the damage and then to determine whether the remediation should be managed by in-house personnel or outside professionals. The remediation manager can then use the guidelines to help design a remediation plan or to assess a plan submitted by outside professionals.
 8. Although this document has a residential focus, it is applicable to other building types.

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Last updated on Thursday, May 5th, 2005
URL: <http://www.epa.gov/mold/table2.html>

Checklist for Mold Remediation

Investigate and evaluate moisture and mold problems

- Assess size of moldy area (square feet)
- Consider the possibility of hidden mold
- Clean up small mold problems and fix moisture problems before they become large problems
- Select remediation manager for medium or large size mold problem
- Investigate areas associated with occupant complaints
- Identify source(s) or cause of water or moisture problem(s)
- Note type of water-damaged materials (wallboard, carpet, etc.)
- Check inside air ducts and air handling unit
- Throughout process, consult qualified professional if necessary or desired

Communicate with building occupants at all stages of process, as appropriate

- Designate contact person for questions and comments about medium or large scale remediation as needed

Plan remediation

- Adapt or modify remediation guidelines to fit your situation; use professional judgment
- Plan to dry wet, non-moldy materials within 48 hours to prevent mold growth (see [Table 1](#) and text)
- Select cleanup methods for moldy items (see [Table 2](#) and text)
- Select Personal Protection Equipment - protect remediators (see [Table 2](#) and text)
- Select containment equipment - protect building occupants (see [Table 2](#) and text)
- Select remediation personnel who have the experience and training needed to implement the remediation plan and use Personal Protection Equipment and containment as appropriate

Remediate moisture and mold problems

- Fix moisture problem, implement repair plan and/or maintenance plan
- Dry wet, non-moldy materials within 48 hours to prevent mold growth
- Clean and dry moldy materials (see [Table 2](#) and text)
- Discard moldy porous items that can't be cleaned (see [Table 2](#) and text)

* For details, see main text of this publication. Please note that this checklist was designed to highlight key parts of a school or commercial building remediation and does not list all potential steps or problems.

* The printed version of this document has an additional copy of this checklist in a pocket in the back.



Here we have a residual amount of mold remaining in a hard to access area. Some remediators may spray encapsulated materials / paints over the area if they do not see this hidden area. Fortunately, this area was still visible to FunGuy Inspection & Consulting. The test was only re-initiated after the area was properly abated by the remediation company.



This mold is growing in between the drywall and the decorative paneling. High concentrations were found on both sides of the drywall. The remediator removed the next 4' of paneling after FunGuy's Inspection.



This is a post remediation that did not pass due to the residual amounts of fungal spores in the air. After remediation an expected settlement occurs within in the containment without the proper filtering machinery. In the middle of the picture, on top of the bed, a fine layer of soot collected.



Exposed carpeting is having a detrimental effect on the total indoor spore counts. Registering 5 times normal spore counts, this porous material can be problematic by acting as a reservoir if not covered correctly and completely.



This is a picture from post remediation. A high amount of debris was overlooked by the foreman and crew. Unfortunately this was not the only reason the project did not pass. Abnormally high spore counts registered *Stachybotrys* 12,000 spores / meter³. Removing all contaminated debris is vital to obtaining accurate readings.

At this job site, our containment is breached by the outdoor air. An unexpected windy day tore this barrier down in front of the window.





This is a very effective way of cross contaminating the remaining air outside the containment. By leaving this zipper open the remediation company may have opened themselves up to many other problems in the surrounding environment.



Looking for small tears in the plastic upon arrival is the first step of FunGuy Inspection & Consulting. Tears / under taped areas should be considered a major concern.



This room has been covered from wall to wall to protect the carpet beneath. Two layers of tape are securing the plastic to the floor.



A)

B)

A) In this situation another source of indoor contaminants could be originating from the FAU. With this taped off within your containments zones, you can reduce the amount of disturbing air currents and possible contamination from other uninvestigated sources within the property.

B) Here within the containment, all porous materials have been wiped down and sealed from the current quality of air within the room.



This exhaust fan is directed out the window. This method is preferred because it has proven positive results. Inadequate ventilation / exhaust can be detrimental to clearance testing. Negative air machines can be left on within a room, but if there is a window available, then exhaust the air from within the containment outdoors. Be sure to put the machine close enough to the window to allow for stretching and expansion. Falling hoses, delineating window coverings and detached hose / machine bibs are a common occurrence when entering a Post

Remediation work site.



If testing occurs in an area has unknown variables or potential variables, then a simple barrier could look like this.



Above the region of remediated wallboard exists an open cavity into the ceiling. The scope of the project dealt primarily with the walls. Encapsulating this area decrease the chance that extraneous particles may wind up in the sampling media.



Encapsulation is a technique that some remediators may use as a technique. Unfortunately, when the job is not done completely some visible mold is still there to be seen. Painting over mold is not considered proper removal.



Within a containment a closet is sealed from top to bottom. Unknown variables are not to be included when sampling Air for microbial contaminants. Sealing this area reduces variability.



Observe the level of contaminants from the perspective of a microscope. The Air Quality of the room can be compromised by an air current in this attic space. The primary area of concern within the containment is the kitchen, below. This attic space should be sealed and the drywall dust vacuumed.



Thank you,

Robert Santanastasio
Fun Guy Inspection & Consulting Service