

Post-Hurricane and Flood Mold Clean-Up – Do It Once, Do It Right

(current as of August 30, 2017)

Cardinal Principles:

1. Do no additional harm!

Ensure that building occupants are not exposed to contamination during remediation. Ensure that “clean” (non-impacted) indoor spaces are not contaminated during remediation. Protect worker/volunteer safety and health during remediation.



2. Ensure that there are no continuing sources of unwanted moisture.

3. Determine whether sewage contamination is present. If so, alternative remediation methods will apply.

4. Environmental sampling is usually not necessary in post-flood response. Avoid sampling unless there is a valid technical or medical reason for it.

5. Use exhaust ventilation from the “dirty” (impacted) space to the outside. Avoid introducing outside air with high humidity or weather-related moisture.



6. Use containment and isolation to prevent or reduce the movement of airborne mold and dust from the “dirty” (impacted) space to “clean” (non-impacted) spaces of the building.

7. Use “wet methods” (misting) to minimize airborne dust. Avoid dry sweeping. Use HEPA (high efficiency particulate air) vacuums.

8. Remove and dispose of porous materials (wallboard, paper, carpets, upholstery, ceiling tiles, etc.) that have visible mold or that were in a soaked condition for 24 to 48 hours or longer. Evaluate semi-porous (wood) materials for cleaning or disposal.

9. Properly clean recoverable non-porous materials and recoverable semi-porous structural materials with detergent and water.

10. Avoid routine use of biocides (chemical products that kill mold). Use only if absolutely necessary as determined by expert site assessment or by occupant medical necessity.



11. Rapidly and completely dry impacted areas. Check with a moisture meter.

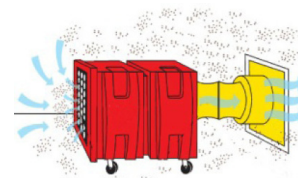
12. Check the effectiveness of cleanup by monitoring health status and symptoms after re-occupancy.

When is it safe to re-occupy a mold-contaminated indoor space?

Indoor spaces impacted by flood damage are likely to be contaminated with both visible mold growth and hidden mold growth. In general, **flood-impacted buildings should not be re-occupied until appropriate mold remediation work has been completed.** (Note: this fact sheet does not address the wide range of other flood-related hazards that may be present.)

If evacuation and temporary relocation are not possible,

impacted spaces (such as basements) should be *contained and isolated* from non-impacted spaces that will continue be occupied (such as upper floors). *This should be done by professional mold remediation contractors* who may use barriers of plastic sheeting and a “negative air machine” as well as other methods.



NYCOSH strongly recommends that mold remediation work be conducted by qualified, experienced professionals. This will make it more likely that workers and occupants are properly protected and that mold remediation is effective and complete.

If this must be a do-it-yourself (DIY) project, use heavy plastic sheeting and duct tape to construct physical barriers at most openings between the impacted space and the non-impacted space. Run a strong exhaust fan in a window in the impacted space. The goal is to ensure that air movement will always be from a clean area of the building to the dirty area rather than from the dirty area to a clean area. If done properly, this can effectively eliminate or reduce the amount of airborne mold that travels to non-impacted areas of the building.

(For guidance see www.epa.gov/iedmold1/pdfs/moldremediation.pdf & www.hud.gov/offices/lead/library/misc/HUD_CSS_Booklet.pdf.)

Before entering a moldy home for the first time, open the windows and doors. Allow the house to air out for at least 30 minutes before entering. This will permit odors and volatile organic compounds (VOCs) that may be produced by mold to be diluted, reducing exposure to entrants.

Who should (and should not) perform mold clean-up work?

Persons with allergies, asthma, or other respiratory conditions, or who are immuno-compromised should not participate in or be around mold remediation or removal of water-damaged materials.

There are no legal requirements that govern who can conduct mold remediation. Government agencies generally agree that small jobs (10 ft. X 10 ft. or smaller) can be done on an intermittent basis by maintenance workers who have received basic mold training. Larger jobs should be done by professional remediators with more extensive training, qualifications, and experience.

Property owners, residents, and volunteers are not prohibited from engaging in DIY remediation. However, remediation may not be effective and property owners, residents, and volunteers may be unnecessarily exposed to harmful contaminants if they have not been properly trained and do not use appropriate protective equipment and safe work practices.

In particular, "gutting" (complete removal of sheetrock, underlying insulation, plaster walls and ceilings, wood lath (behind plaster) with visible mold, non-structural wood studs



and joists with visible mold, wood flooring laid on sub-flooring, sub-flooring, cabinetry and trim, vinyl flooring, submerged windows, and water-damaged ductwork and air handling units) should be conducted by qualified, experienced professionals.

What Personal Protective Equipment (PPE) is needed?

Always assume that water-damaged buildings, materials, and furnishings are contaminated with mold. Use proper personal protective equipment and safe work practices:

- **Protect mouth and nose** against inhalation of mold or mold spores.
- **Protect skin**; do not touch mold or moldy items with bare hands.
- **Protect eyes** from contact with mold or mold spores.

Using a respirator, even the right respirator, is unlikely to provide proper protection unless you have been fit-tested, trained, and qualified to use a respirator.

For initial inspection and removal of salvageable possessions, use at least a NIOSH-certified **N-95 disposable respirator** and protective gloves (non-latex, vinyl, nitrile, or rubber). (Disposable N95 respirators do *not* protect against harmful chemicals like asbestos, lead, or petroleum products.) Limit time spent in indoor areas with severe mold growth to 15 minute intervals. Minimize disturbance of materials and debris to avoid the release of dust into the air.



To remove moldy materials with less than 100 square feet of mold, use a half-face air purifying respirator with replaceable HEPA cartridges (N100, R100, or P100), tight-fitting goggles designed to keep out dust (no holes or vents), protective gloves (non-latex, vinyl, nitrile, or rubber), and disposable protective clothing.



For removal of large areas of moldy sheetrock (more than 100 square feet), scraping large areas of moldy plaster, or removing mold from wood framing, joists, sheathing and sub-flooring, use a full-face air purifying respirator with replaceable HEPA cartridges (N100, R100, or P100), and disposable protective clothing that covers the entire body,



including head and shoes. This work should be performed by trained mold remediation personnel.

Certain types of “disturbance” tasks are more likely to stir up mold. These include: breaking up moldy porous materials like sheetrock; invasive procedures used to examine or remediate mold growth in wall cavities; stripping or peeling wallpaper to remove it; and using fans to dry wet items. The maximum respiratory protection and PPE described above should be used when engaging in any of these or similar activities.

If you are a paid worker, the OSHA Respiratory Protection Standard requires your employer to:

- assess hazards,
- provide a respirator at no cost if one is necessary,
- conduct annual fit-testing, medical evaluation, and training, and
- maintain records

If your respirator does not fit correctly, it will not protect you. There are 2 ways to make sure that your respirator fits properly:

- You should be *fit-tested* by a qualified person at least once a year. This will identify the respirator make, model, style, and size that is best for you. (Your employer is required by law to provide fit-testing.)
- You should conduct a “seal check” *every time* you put on a respirator. This will help you make sure it fits and is properly positioned on your face.

If you are a homeowner, resident, or volunteer, these legal requirements do not apply to you. However, you should ensure that you are trained and fit-tested and that you conduct a seal check every time you wear a respirator, or the respirator may not provide the protection you need.

How can salvageable possessions be recovered?

Non-porous items (china, glass, jewelry, porcelain, metal, etc.) can be hand-washed with a mild dishwashing detergent solution or washed in a dishwasher.



Wood furnishings with visible mold growth, but otherwise in good condition, *may* be salvageable by cleaning with a

mild detergent solution and a stiff nylon bristle brush. They may then require refinishing or professional restoration.

What about porous items?

Porous items (upholstery, clothing, carpeting/padding, etc.) that were soaked or that have visible mold growth should be disposed of. To avoid release of mold, seal in plastic bags before removal. Anyone performing this work should use at least a half face air purifying respirator with replaceable HEPA cartridges, tight-fitting goggles without holes or vents, protective gloves, and disposable protective clothing that covers the entire body, including head and shoes.

How should damaged non-structural building materials be removed?

Sheetrock that was soaked or with visible mold growth on the front or back must be removed. To minimize airborne mold and dust, mist with water or cover with poly-sheeting secured with duct tape. Remove with minimum possible disturbance – score (make a shallow cut) with a utility knife; use a crowbar instead of a hammer. Remove at least 6 inches to 2 feet beyond visible mold growth or water stains on front and back sides. Double bag for safe disposal.



Remove all **insulation** material in wall and ceiling cavities where sheetrock is removed. Bag for safe disposal. Remove and dispose of **non-structural wood studs/floor sills**. Wet scrape **plaster**. Remove **wood lath boards** that were submerged and have visible mold growth.

CAUTION: Asbestos is a carcinogen (cancer-causing). Asbestos-containing materials such as pipe insulation, floor tile, roofing shingles, etc. should not be disturbed and may require the use of licensed contractors for safe removal and proper disposal.

Remove any **cabinetry** that impedes access to affected walls. Remove and dispose of fiberboard or plywood cabinetry that was partially or fully submerged or has visible mold. Solid hardwood cabinetry may be recoverable with removal, cleaning, and professional restoration.

Finished **floorboards** that were submerged should generally be removed and disposed of. If the underlying sub-flooring is plywood, it should be removed and disposed of. If sub-floors are wood boards rather than plywood, it may be possible to clean the top surfaces and the accessible portions of the bottom surfaces. Single-layer wood plank floors nailed directly to joists may be salvageable by cleaning the top surfaces and the accessible portions of the bottom surfaces. For constructions on slabs, remove and dispose of flooring and sub-flooring that were submerged.

What about structural wood?

Structural wood (studs, sill plates, floor and ceiling joists, sheathing) with mold growth should be HEPA vacuumed, then bristle-brushed with a mild dishwashing detergent. Some experts suggest adding a borate-containing product such as 20-Mule Team



Borax to the detergent solution. Use a moisture meter (reading of 15-17% or less) and visual inspection to ensure that cleaned structural wood is dry before re-enclosing in new sheetrock or other materials. (Technical guidance on drying methods is beyond the scope of this fact sheet.)

This document is intended for educational purposes only. It should not be used for technical guidance in the design or application of actual mold remediation, for which site-specific professional assistance should be obtained from industrial hygienists and qualified environmental experts.

NYCOSH thanks Microecologies, Inc. (www.microecologies.com) for its publication "Mold Clean-up Guidance for Residents Whose Homes Have Been Flooded During Hurricane Sandy and Other Natural Disasters" from which this fact sheet was adapted, in part.



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