

APPENDIX B. EPA’s Investigating, Evaluating, and Remediating Moisture and Mold Problems (see EPA website for complete details)

Table 1: Water Damage - Cleanup and Mold Prevention

Table 1 presents strategies to respond to water damage within 24-48 hours. These guidelines are designed to help avoid the need for remediation of mold growth by taking quick action before growth starts. If mold growth is found on the materials listed in Table 1, refer to Table 2 for guidance on remediation. Depending on the size of the area involved and resources available, professional assistance may be needed to dry an area quickly and thoroughly.

| Table 1: Water Damage - Cleanup and Mold Prevention | |
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| Guidelines for Response to Clean Water Damage within 24-48 Hours to Prevent Mold Growth* | |
| Water-Damaged Material† | Actions |
| Books and papers | <ul style="list-style-type: none"> • For non-valuable items, discard books and papers. • Photocopy valuable/important items, discard originals. • Freeze (in frost-free freezer or meat locker) or freeze-dry. |
| Carpet and backing - dry within 24-48 hours§ | <ul style="list-style-type: none"> • Remove water with water extraction vacuum. • Reduce ambient humidity levels with dehumidifier. • Accelerate drying process with fans. |
| Ceiling tiles | <ul style="list-style-type: none"> • Discard and replace. |
| Cellulose insulation | <ul style="list-style-type: none"> • Discard and replace. |
| Concrete or cinder block surfaces | <ul style="list-style-type: none"> • Remove water with water extraction vacuum. • Accelerate drying process with dehumidifiers, fans, and/or heaters. |
| Fiberglass insulation | <ul style="list-style-type: none"> • Discard and replace. |
| Hard surface, porous flooring§ (Linoleum, ceramic tile, vinyl) | <ul style="list-style-type: none"> • Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary. • Check to make sure underflooring is dry; dry underflooring if necessary. |
| Non-porous, hard surfaces (Plastics, metals) | <ul style="list-style-type: none"> • Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary. |
| Upholstered furniture | <ul style="list-style-type: none"> • Remove water with water extraction vacuum. • Accelerate drying process with dehumidifiers, fans, and/or heaters. • May be difficult to completely dry within 48 hours. If the piece is valuable, you may wish to consult a restoration/water damage professional who specializes in furniture. |

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| Wallboard (Drywall and gypsum board) | <ul style="list-style-type: none"> • May be dried in place if there is no obvious swelling and the seams are intact. If not, remove, discard, and replace. • Ventilate the wall cavity, if possible. |
| Window drapes | <ul style="list-style-type: none"> • Follow laundering or cleaning instructions recommended by the manufacturer. |
| Wood surfaces | <ul style="list-style-type: none"> • Remove moisture immediately and use dehumidifiers, gentle heat, and fans for drying. (Use caution when applying heat to hardwood floors.) • Treated or finished wood surfaces may be cleaned with mild detergent and clean water and allowed to dry. • Wet paneling should be pried away from wall for drying. |
| <p>* If mold growth has occurred or materials have been wet for more than 48 hours, consult Table 2 guidelines. Even if materials are dried within 48 hours, mold growth may have occurred. Professionals may test items if there is doubt. Note that mold growth will not always occur after 48 hours; this is only a guideline.</p> <p>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 OSHA requires Personal Protective Equipment and containment. An experienced professional should be consulted if you and/or your remediators do not have expertise remediating in contaminated water situations. Do not use fans before determining that the water is clean or sanitary.</p> <p>† If a particular item(s) has high monetary or sentimental value, you may wish to consult a restoration/water damage specialist.</p> <p>§ The subfloor under the carpet or other flooring material must also be cleaned and dried. See the appropriate section of this table for recommended actions depending on the composition of the subfloor</p> | |

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 on EPA website). 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* | | | |
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| 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) | | | |

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|---|-------|--|---|
| Books and papers | 3 | Limited or Full Use professional judgment, consider potential for remediator exposure and size of contaminated area | Limited Use professional judgment, consider potential for remediator/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 Surface Area Affected Greater Than 100 (ft²) or Potential for Increased Occupant or Remediator Exposure During Remediation Estimated to be Significant

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| Books and papers | 3 | Full Use professional judgment, consider potential for remediator/occupant exposure and size of contaminated area | Full Use professional judgment, consider potential for remediator 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) | 1,2,3,4 | | |
| 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 | | |

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

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.