

QUICK REFERENCE: WATER DAMAGE RESPONSE IN BUILDINGS

Water leaks and floods within a building can result in immediate and long-term damage if moisture is not removed appropriately. A variety of water sources can enter the building. Prior to remediation, the source of water should be identified. Sources of water have been classified as:

- **Category 1:** Clean water from sanitary sources or that does not contain significant microbial contaminants includes water penetrating through roof/walls/windows/doors from precipitation; leaks from HVAC systems or heating systems free of antifreeze; leaks from steam pipes, water heaters, or plumbing.
- **Category 2:** Known typically as gray water, these water sources contain a level of contamination that may cause illness or discomfort if ingested. Sources include dishwasher or washing machine overflow, sump pump failures, and toilet overflow with urine but no fecal matter.
- **Category 3:** Black water sources contain pathogens and are considered highly contaminated and grossly unsanitary. Ingestion can result in severe illness or death. These sources include sewer/toilets, sewage, rising flood water from rivers and streams, ground surface water flowing horizontally into buildings, water from heating systems containing antifreeze, or other unknown sources.

This reference sheet describes best practices for handling building materials damaged by Category 1, Clean Water.

If the flooding incident is from a black water source, additional precautions should be taken to protect occupants and persons providing cleanup from contaminants in the water (IICRC, 2012). Contact a professional flooding cleanup/restoration contractor as soon as possible for the best methods of remediating black water flooding incident. Professional cleanup contractors may also need to be consulted for remediation of larger non-black water flooding events. If the extent of the damage requires remediation by a professional cleanup contractor, make contact as soon as possible to prevent further damage.

The following steps should be taken to assess water damage and reduce occupant exposure:

- Identify and reduce or eliminate the source of water. This may include shutting off plumbing, redirecting water, or collecting infiltration with tarps or buckets.
- If water is still coming into the building (or may return), remove as much material from the location/path as possible, particularly porous items and electronics. Pick up items from floors in/around the flooded area.
- Items that are wet should not be stored where they can moisten other items (e.g., carpet, cloth partitions/walls). Wet materials should be examined promptly. Items that can be remediated should be relocated and allowed to dry; items that cannot be dried should be discarded.
- To the greatest extent possible, move staff, clients, and visitors away from the impacted area. Staff/functions should be moved into alternative workspaces. Barriers (e.g., plastic/tape) and signs should be used to prevent access to wet areas and areas under remediation. Significant flooding may require operations to be relocated to a different site or temporarily suspended.

Once these initial steps are taken, the following actions should be implemented to remove flood-damaged building materials that cannot be cleaned and dried.

- Dry building materials as soon as possible using large fans and heat. In order for fans and heat to operate properly, and for materials to dry, airflow is necessary:
 - Remove furniture in wet area, especially away from walls and off carpet. This may require movers to relocate heavy items such as file cabinets. Items such as area rugs and carpet protectors should also be removed.
 - Remove plastic coving from the base of moistened walls. Coving on wet walls will peel away easily.
 - Remove other items, such as picture frames, that may prevent walls from drying.
- Remove and discard wet ceiling tiles. Leave ceiling tiles out until the water infiltration has been stopped. Examine the ceiling above to see if porous or electrical items may be water damaged.
- The US EPA and the American Conference of Governmental Industrial Hygienists (ACGIH) recommend that porous materials be dried with fans and heating within 24 to 48 hours of becoming wet (US EPA, 2008; ACGIH, 1989). If porous materials are not dried within this time frame, mold growth may occur. Once mold has colonized porous materials, they are difficult to clean and should be removed and discarded. Removal methods include:
 - Cut out and discard wallboard that is not sufficiently dried within 48 hours. Wallboard showing signs of mold growth should also be removed and discarded. Remove at least one foot of additional wallboard beyond the saturation point. For example, if moisture has wicked one-foot up wallboard, remove two feet of wallboard. Examine wall cavity for additional damage, such as wet insulation. Remove any water from the wall cavity, discard wet insulation, and allow the wall cavity to dry thoroughly before reconstructing wall.
 - Remove and discard carpeting that is not sufficiently dried or that shows signs of mold growth. Carpet squares are easier to replace and should be considered if new carpet is reinstalled.
 - Discard and replace porous furniture (e.g., upholstered items) not sufficiently dried or that shows signs of microbial growth.
- Remove water-damaged/mold-colonized building materials in a manner consistent with recommendations found in “Mold Remediation in Schools and Commercial Buildings” published by the US Environmental Protection Agency (US EPA, 2008).
- If asbestos-containing materials are present (e.g., pipe wrap, floor tile, interlocking ceiling tiles), perform any work in accordance with applicable laws and work practices. For more information consult the Massachusetts Department of Labor Standards, Asbestos Program at <https://www.mass.gov/asbestos-safety-program>.
- Non-porous items (e.g., metal, solid wood, plastic) that were in contact with water and items/building materials that dried promptly without obvious signs of water damage should be cleaned before being returned to service.
- Water-damaged items of significant value (e.g., historic documents) may need professional restoration.

The following will mitigate the impact of future water-damage issues in the building:

- Store items above floor level (e.g., on shelves or in cabinets), particularly in below-grade areas. Keep valuable items/files off floors and away from windows and doors leading to the outside. Reduce overall clutter.
- Periodically examine the building envelope and surroundings for damage including poorly sealed windows and doors, damaged siding and roofing, drainage issues (e.g., gutters/downspouts) and other conditions that may lead to water damage during severe weather.
- Ensure HVAC and plumbing systems are in good repair.
- Develop a system to allow employees to report water infiltration/damage rapidly to applicable contacts in building management/maintenance.

- Consider systematically performing building walk-throughs following any severe weather to check for and remediate leaks promptly. If possible, perform these checks during weekends of heavy precipitation to address problems that may arise when the building is unoccupied.

References

American Conference of Governmental Industrial Hygienists (ACGIH). 1989. Guidelines for the Assessment of Bioaerosols in the Indoor Environment. Cincinnati, OH.

Institute of Inspection Cleaning and Restoration Certification (IICRC). 2012. Storm Damage Restoration Recommendations. <https://iicrc.org/flood-resources/>

US EPA. 2008. "Mold Remediation in Schools and Commercial Buildings". EPA 402-K-01-001. United States Environmental Protection Agency, Office of Air and Radiation, Indoor Environments Division, Washington, DC. September 2008. <http://www.epa.gov/mold/mold-remediation-schools-and-commercial-buildings-guide>.

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For more information, contact:

Indoor Air Quality Program
Bureau of Climate and Environmental Health
Massachusetts Department of Public Health
250 Washington Street, 7th Floor
Boston, MA 02108
Phone: 617-624-5757 | Fax: 617-624-5183 | TTY: 617-624-5286
www.mass.gov/dph/iaq

