

## Mold Remediation Procedures

These guidelines are important procedures for proper project investigation and mold remediation. These are standard procedures which mold remediation contractors are required to follow with several additions by Summit to help improve the probability of project verification. Given the variability of building microbial projects, some of the procedures may not be specific for the conditions found during the initial assessment, but may be needed after the preliminary investigations are completed. Project conditions can change. The following list of recommendations is not meant to replace the industry guidelines and standards and remediation contractor experience. **If the mold remediation contractor wants to propose alternatives (equal to or better), they should discuss it with the Client and provide specific changes in writing and obtain written approval.**

### Specific Remediation Recommendations

- *Established Guidelines*—The clean-up work should be performed by an experienced mold remediation contractor. The remediation contractor should follow as a minimum, the standard remediation protocols established in the following guidance documents: EPA March 2001 - Mold Remediation in Schools and Commercial Buildings; IICRC 2003 - S520 Standard and Reference Guide for Professional Mold Remediation; and New York City Department of Health 2002 - Guidelines on Evaluation and Remediation of Fungi in Indoor Environments. It would be prudent to keep the affected areas under negative air pressure during building material drying and mold remediation activities to prevent mold contamination from spreading to other areas of the building.
- *Occupant Communication and Protection*—The Client / owner should consult with the remediation contractor and understand the project scope and schedule. The owner should communicate with any building occupants prior to the mold remediation project. The project tasks and timeline should be presented and all occupant concerns addressed. Occupants and visitors should be restricted from the areas being cleaned and repaired. If there have been health complaints, the Client / owner may want to have occupants in adjacent areas relocate if their concerns are reasonable. Vacating people from adjacent non-impacted spaces is generally not necessary if complete and proper procedures are followed. If occupants are to remain in the non-impacted areas, Summit recommends those areas are evaluated and fungal air testing is completed to ensure and document that the areas are not impacted. For individuals with reduced immune systems, infants, recent surgery patients, people with chronic inflammatory lung diseases, or individuals with respiratory health concerns (asthma, hypersensitivity pneumonitis, and severe allergies, etc.), Summit highly recommends that these occupants be relocated (EPA, 2001; US DOL OSHA; 2003; CDC, 2003). If the remediation is complex or within the HVAC system, or activities result in real discomfort to the occupants, Summit highly recommends that the occupants be relocated to reduce potential health problems.

- Isolate Affected Areas and Use PPE*—Microbial remediation work inside affected areas (e.g., bathrooms, laundry, attics, garages, crawlspaces, specific rooms) should be performed inside negative air pressure containment using appropriate engineering controls, personal protective equipment (PPE), and National Institute for Occupational Safety and Health (NIOSH) approved respiratory protective equipment. Negative pressure in the work area should include a HEPA filter exhaust. The exhaust from the negative air machine should be vented to the outdoors. Summit recommends negative air measurements should be documented at least three times a day to verify proper containment (IICRC, 2003). Seal all penetrations to the living envelope, contain the affected area, seal and protect any HVAC system duct work in work areas. If remediating a crawlspace, ensure that large openings below bathroom fixtures are sealed. A decontamination chamber is needed at the entry point to the work areas for equipment and workers. PPE equipment should include full body coveralls, appropriate gloves, and full-face respirators equipped with P-100 high-efficiency filter cartridges (USDOL OSHA, 2003; EPA, 2001). These are industry standard safety protocols; however, the contractor is responsible for evaluating the project and determining the proper work sequencing and worker safety protocol. Protect all non-impacted areas of the building.
- Identify Moisture Source and Properly Dry Materials*—All sources of water leaks and /or high relative humidity must be assessed and repaired / eliminated. Identification of conditions that contribute to microbial growth is an important step in remediation. Affected areas must be dried as quickly as possible and a microbial retardant could be used to limit additional fungal growth during the drying process, if needed (follow all product use requirements and Summit recommends obtaining owner and occupant approval). Water damaged and fungal contaminated materials that obviously require removal should be properly removed as soon as possible, even prior to the drying process, to reduce drying time and limit potential fungal growth and spore generation and spreading (IICRC, 2003; IICRC S500, 2006; EPA, 2001). If possible, the wetted wood should be dried to ~12% wood moisture as soon as possible (2 days is recommended). Consideration should be given to local weather conditions and building occupant activities.
- Complete Visual and Internal Investigation*—An internal investigation, while under negative air pressure containment, must be performed on all suspect areas of the building to determine the extent of mold growth on various materials and inside hidden areas. Inspect all water / moisture affected areas. The areas that will require mold removal must be identified so that the proper methods and sequence of work can be planned. If conditions change or new hidden mold is identified, the remediation plan may require amendment and additional containment installed (ACGIH, 1999; IICRC, 2003).

- *Remove Organic Debris and Mold Impacted Porous Materials*—Remove and bag porous items that contain fungal growth (i.e., sheetrock, insulation paper, carpet, card board, wood scraps) that cannot be properly cleaned. Sheetrock should be removed at least two feet past the visible growth. Attic insulation should be removed at least five feet past the water affected area. Do not release affected area dust, fiberglass, and debris into uncontaminated areas. Disposal of the moldy materials should be completed consistent with local and State requirements. Be sure to assess whether a building material has structural functions and property repair / clean those items. Contact a structural engineer if there is any question of whether remediation work may adversely impact structural design.
- *Mold Growth-Impacted Semi-porous Material*—All exposed semi-porous materials with mold growth must be properly cleaned to remove mold or removed and replaced. If the materials cannot be cleaned or if there is structural damage, it must be removed and disposed. Semi-porous material includes organic materials that absorb water slowly, but still provide a possible food source for molds, and inorganic and synthetic materials that absorb water slowly (e.g., unfinished wood, masonry, concrete). Initial cleaning should be aggressive HEPA vacuuming of all surfaces in the affected area to remove mold components as best as possible; aggressive surface cleaning to remove growth, which may include wire brushing, and / or sanding, scraping, ice blasting or other appropriate methods. Aggressive cleaning should always be done after initial HEPA vacuuming. Cleaning must extent past the depth of the microbial growth, with a second HEPA vacuuming to remove dust and debris. If wood dust / powder remains on the impacted wood after the final cleaning, Summit recommends and expects a brief final detergent and water wipe down. The contractor should document that the structure / building materials are appropriately dry. The contractor should understand that the White Glove Test will apply to wood, plastic, and steel surfaces to evaluate the dust removal effectiveness.
- *Mold Growth-Impacted Non-Porous Materials*—Non-porous materials with mold growth must be properly cleaned or replaced. Non-porous items are metal ducts, plastic piping, electrical wiring, etc. An initial aggressive HEPA vacuuming can be followed with a water and appropriate detergent wet wipe with rags or sponges to remove mold and cleaning dust / debris. Soiled rags or sponges should be disposed when they are too dirty to use again. After cleaning, the non-porous surfaces should be kept dust free. The contractor should understand that the White Glove Test will apply. Do not forget the supply and waste piping, tops of duct work, and electrical wiring.
- *Crawlspace Vapor Barrier*—When mold remediation is being completed in a crawlspace, a working sealed vapor barrier (6 mil plastic) should be installed as soon as possible after the debris is removed, if the soil is not muddy.

If the existing vapor barrier is in reasonable condition and can be used during remediation, ensure that it covers the crawlspace soil and has overlapping seams. If the existing vapor barrier is in poor condition or is heavily impacted by water, yeast, bacteria, or mold, it should be removed and bagged (or pulled through a crawlspace vent) and a new temporary vapor barrier installed for remediation (overlap and seal seams).

Mold impacted exposed soils that show significant heavy (>100 ft<sup>2</sup>) suspect fungal growth should be properly managed or skimmed off and disposed, and then the working or temporary vapor or new / completed vapor barrier (depending on stage of the project) installed. Small areas may not be of concern if they are not disturbed prior to vapor barrier installation and the negative air is working correctly. All large rocks and organic debris on the soil must be removed to allow for a good vapor barrier installation. A good tight working vapor barrier should then be installed to work on.

After mold remediation in the crawlspace, the existing or temporary vapor barrier should be removed or properly cleaned. The final vapor barrier should cover all soil, fit properly, and be secure. Seams should overlap 2 feet and be sealed with an appropriate adhesive and extend onto the sides of the footings and approximately 10 – 12 inches up the foundation. Do not staple the plastic vapor barrier to any wood framing.

- *Area Cleaning for Settled Fungi*—It is recommended that all flooring (i.e., carpet, vinyl, and wood) and horizontal surfaces in the entire building be HEPA vacuumed and wiped if impermeable after the remediation is completed.
- *HVAC System*—The mold remediation contractor should secure all the connections and disable the systems prior to mold remediation. It is critical that the HVAC system be protected from mold and debris. If the duct work is not sealed, it should be properly sealed by a professional HVAC contractor. The sealing work should target the requirements of the Energy Star Program. The HVAC system should be cleaned by a professional HVAC company after repair and remediation.
- *Contractor Review and Documentation*—The contractor must review and inspect final remediation measures and ensure moisture sources are corrected and all fungal growth has been removed. Contractor is to document final moisture testing and all work to include in the final report. Upon completion, the mold remediation supervisor should certify in writing that the work has been completed according to guidelines and as agreed with the Client / owner.
- *Third Party Post Remediation Verification*—It is highly recommended that visual inspection and additional fungal sampling be conducted after remediation and repairs are completed. If the area passes visual inspection (no visible mold and little or no dust), then surface sampling of the affected areas and fungal

environmental air samples (total spore and culturable) can be collected. The contained area(s) or in some situations, the whole building, must pass the visual, white glove, and air testing prior to tear down of the containment(s) and prior to any encapsulation or rebuild of affected areas. Summit recommends that the post remediation testing should be done with the HVAC system on or some air movement, windows closed, and the negative air off for at least 24 hours. Remediated areas should at least be returned to a “Class I” conditions (see IICRC S520). Comparative air sampling between locations should indicate typical regional and seasonal outdoor levels or better because the affected area was remediated under controlled conditions.