REMEDIATION REQUIREMENTS

If visible mold (fungal) growth is identified in an indoor environment, it must be remediated in a way that eliminates the visible mold growth and prevents the spread of mold spores throughout the indoor environment. The Army's recommendation for remediating mold in an indoor environment is based on industry-approved standards, specifically, the American National Standard Institute (ANSI®)/Institute of Inspection Cleaning and Restoration Certification (IICRC) S520 Standard for Professional Mold Remediation and the United Facilities Guide Specifications (UFGS) 02 85 00 Mold Remediation. These standards, along with the U.S. Army Public Health Center (APHC) Technical Guide (TG) 277 (*Army Mold Remediation Guidance*) can be used to: (1) develop customized mold remediation plans that will eliminate visible mold growth, (2) ensure adequate protection is implemented to prevent cross-contamination to unaffected areas, and (3) provide recommendations for remediation safety.

Once remediation for visible mold growth is determined to be necessary, it is important to determine the scope of the remediation plan. Remediation procedures are based on the square footage of visible mold growth and are broken down into three levels. Each level consists of specific requirements to ensure that the remediation is performed appropriately.

Occasionally, mold will be found in the bathroom, on a windowsill, shower curtain, or wall (less than 10 square feet (ft^2)). According to the U.S. Environmental Protection Agency (EPA), homeowners or tenants can conduct their own mold removal for this size of an affected area as long as they follow recommended mold cleanup tips and techniques located at: https://www.epa.gov/mold/mold-cleanup-your-home#TipsandTechniques. This mold can be wiped off the surface with a damp cloth and a cleaning agent (e.g., mild detergent, window cleaner, and bathroom cleaner). Ultimately, preventing mold growth requires controlling the moisture source and resolving the water intrusion.

Level I: Small Isolated Areas – **Total surface area affected is less than 10 ft^2** (e.g., ceiling tiles, small areas on walls)

There is no requirement for containment of mold contaminated surfaces of less than 10 ft^2; however, professional judgement should be used to employ techniques to limit the spread of fungal growth during the remediation process. See APHC TG 277, Appendices C and D, for personal protective equipment (PPE) recommendations.

Level II: Medium – Total Surface Area affected is between 10 and 100 ft^2 (e.g., several wallboard panels).

Containment is required when remediating a surface area between 10 and 100 ft^2 of visible mold growth. The work area and areas directly adjacent should be covered with a single layer

of 6 mil fire-retardant polyethylene sheet(s) and taped before remediation to contain dust/debris. The plastic enclosure should fully contain the work area and have a single slit entry with a cover flap to allow access to the work area. Seal ventilation ducts/grills in the work area and areas directly adjacent with 6 mil polyethylene sheeting. Use an exhaust fan with a high efficiency particulate air (HEPA) filter to generate negative pressurization on the containment area. See APHC TG 277, Appendices C and D, for PPE recommendations.

Level III: Large Area – Total Surface Area affected is greater than 100 ft^2 or potential for increased occupant or remediator exposure during remediation is estimated to be significant.

A containment is required when remediating surface area has greater than 100 ft^2 of visible mold growth. Completely isolate the work area from occupied spaces using double layers of 6 mil fire-retardant polyethylene plastic sheeting, sealed with duct tape (including ventilation ducts/grills, fixtures, and any other openings), similar to that of a level II remediation. Use an exhaust fan with a HEPA filter to generate negative pressurization. Provide airlocks and a decontamination room. See APHC TG 277, Appendices C and D, for PPE recommendations.

HOUSEHOLD CONTENTS CLEANING PROCEDURES

Some mold remediation projects will require the cleaning or disposal of household contents that have visible fungal growth on them. According to the IICRC, contents can be put into three different categories to determine how they can be cleaned:

- **Porous:** Materials that easily absorb or adsorb moisture and, if organic, can easily support fungal growth (e.g., clothing and other textiles, padded or upholstered items, leather, taxidermy, paper goods, many types of fine art);

- **Semi-porous:** Materials that absorb or adsorb moisture slowly and, if organic, can support fungal growth (e.g., unfinished wood or masonry); and

- **Non-porous:** Materials that do not absorb or adsorb moisture or those that have been surface treated and do not easily support fungal growth (e.g., finished wood, glass, metal, plastic).

It is important to note that it may not be possible to clean some household contents due to the composition of the material, amount of fungal contamination/damage, or value in cleaning versus replacing.

Items determined to be salvageable should be cleaned within a containment onsite, outdoors, or in an offsite facility specializing in fungal and moisture damage. Household contents should not be cleaned within the home unless a containment already exists. If contents with visible fungal growth are going to be removed for cleaning or disposal, they should be packaged in a way that will prevent the spread of fungal spores and damage to the item during transport to the cleaning or disposal area.

When cleaning household contents PPE should still be used. When selecting the appropriate PPE, follow the guidance provided in APHC TG 277. Cleaning methods will vary and depend on whether the item falls into the porous, semi-porous, or non-porous category. Regardless of the category, the first and last step in the cleaning process should be HEPA vacuuming the item.

Porous: Most porous items can be steam cleaned, air-washed, or laundered according to the manufacturer's recommendations. If the mold has begun to breakdown the materials, items in the category may need to be disposed of rather than cleaned. In this case, the breakdown of materials can be described as the degradation or staining of a material due to moisture or mold damage that cannot be removed through cleaning of the product.

Semi-porous: These items can be cleaned using more aggressive methods, such as, air-washing or abrasive blasting if necessary.

Non-porous: In addition to the required pre- and post-HEPA vacuuming, these materials can be wiped down with a damp cloth or brush to remove fungal growth. Some non-porous materials may have recommendations from the manufacturer for cleaning.

Items that cannot be cleaned to remove all visible mold growth should be discarded in a manner that limits the spread of fungal spores. Items should be wrapped and sealed in plastic prior to disposal.

CLEARANCE PROCEDURES

After a mold remediation has occurred, prior to the containment being taken down and prior to re-occupancy, the following three (3) part process should occur.

- **Post-Remediation Evaluation**

This should be conducted by the remediator as an internal quality control measure. This evaluation may include a visual inspection, an evaluation of musty odors, environmental moisture and temperature measurements, use of imaging cameras, and use of additional equipment/tools that the remediator may deem appropriate to determine that the remediation has been successful according to the statement of work.
Every mold remediation project is unique. The best practice is to apply experience and professional judgment according to an established standard such as the ANSI/IICR S520, (*Standard for Professional Mold Remediation*). For residential housing, clearance involves a visible verification of mold and dust removal. One verification technique routinely used for nonporous and semi-porous surfaces is the "white glove" technique. This involves using a glove or clean white cloth (or dark cloth where appropriate) to wipe surfaces looking for dust as a surrogate for mold contamination. If the dust is visible on the glove or the white cloth, the area is marked for re-cleaning.

If additional mold or moisture damage is found during this evaluation it should be remediated according to the statement of work; the evaluation should reoccur until all visible mold and moisture sources have been remediated.

- **Post-Remediation Verification**

Once the post-remediation evaluation has occurred, a verification should be conducted by a third-party indoor environmental professional meeting the qualifications outlined in the ANSI/IICRC S520. This verification may consist of similar methods to the evaluation. The end goal of this verification is to have a competent third-party verify that the statement of work intent has been met and that the area remediated has been returned to a condition free of visible mold or other moisture induced damage.

If any additional mold or moisture damage is found during this evaluation, it should be remediated according to the statement of work; the evaluation and verification should reoccur until all mold and moisture sources have been remediated.

Once a post-remediation verification has occurred, the containment should be cleaned with a HEPA vacuum and wiped down with a damp cloth or sponge prior to be being evaluated by the remediator. The area must be verified by the third-party indoor environmental professional to be clean before being torn down.

- **Clearance Procedures for High Risk and Sensitive Populations**

If a physician has determined that the occupants are at high risk or sensitive to mold, the remediation may require additional clearance procedures. An occupational medical physician, infection control, industrial hygienist, and a third party indoor environmental professional should develop a sampling strategy, in addition to the regular clearance procedures, to determine if the space is as clean as practical prior to re-occupancy.

The sampling strategy, and subsequent plan, should include a strategy to collect a statistically significant number of both viable and non-viable air samples both indoors and outdoors. It should be noted that tape samples should only be collected in instances that a substance is unknown to be mold and verification is needed. Tape sampling is not an appropriate method for remediation clearance. The sampling itself should be conducted by a third party indoor environmental professional. The samples collected must be analyzed by an American Industrial Hygiene Association Environmental Management Laboratory Accreditation Program accredited laboratory.