THE RESTORATION ACADEMY UK Ltd.
Training and Consultancy for the Insurance Repair Industry

Mould Remediation - Basic Information and a Proposed Procedure for those considering DIY.

This document is primarily aimed at persons who are chemically sensitive or sensitised to mould.

Therefore, some of the procedures described in this document may appear extreme for those who are unaware of any health issues of their own.

Certainly, for small mould problems in, for example, a bathroom, for those unaffected, cleaning the mould up with a cloth and warm soapy water and following up with an appropriate disinfectant, may be adequate.

However, mould (fungi) is listed as an occupational hazard in Health and Safety law (COSHH Regulations 2002) and workers must be protected or protect themselves from exposure to biological hazards. Mould is described by HSE as a biological hazard. Exposure, even to small amounts, over time, may lead to health problems. Think of asbestos, lead and silica.

While The Health and Safety at Work Act 1974 does not apply to an occupant in their own home, exposure to small amounts could nevertheless result in health issues especially if the small exposures are over long periods of time.

Health risks from mould will be dependent on:

- ***The species of mould***
- ***The dose (the amount a person is exposed to)***
- ***The duration of exposure (how long a person is exposed)***
- ***The frequency of exposure***

Please remember mould WILL return no matter how well you clean it up and "kill it" if the underlying damp or humidity issues are not resolved.

Please seek professional help if your mould situation is unmanageable.

Good luck with Mould Remediation DIY

Mould Remediation - Basic Information and a Proposed Procedure for those considering DIY.

Careful consideration should be given as to whether mould that is growing in a residential property should be removed by the homeowner or other untrained persons. Mould (Fungi) falls under the Control of Substances Hazardous to Health Regulations 2002 (COSHH), a regulation under Health and Safety law. Whilst Health and Safety Law does not apply to homeowners in their own home, it helps emphasise the fact that mould is a known hazard. Furthermore, many species of mould are listed as pathogens in "The Approved List of biological agents" published by Health and Safety Executive as guidance for COSHH. (Note: A pathogen is a disease-causing agent). Many more moulds are not listed in this document even though they are known to be toxigenic, allergenic and asthmagenic. (Note: an asthmagen is an agent that can cause asthma or trigger an asthmatic response). This means that those (professionals) who have been adequately trained in mould remediation, will treat mould as a potential hazard to health and implement control measures to prevent spreading it. They will take action to protect themselves and others from inhalation and other routes of exposure. Control measures and safe practices would include:

Containment - (creating enclosures around the work area, usually with polythene sheeting to prevent air exchange with areas with lower levels of contamination from being contaminated).

Pressure differentials - (this is a technique where (AFD's) Air Filtration Devices or (NAM's) Negative Air Machines (often referred to as "air scrubbers") are deployed to clean the air as work is carried out and to eject filtered air to the outside of the building thus reducing the air pressure in the work area and ensure that contaminated air does not flow out of the work area into other areas). Completed (decontaminated) rooms are often pressurised relative to surrounding rooms so contaminants do not float into them from adjacent work areas.

Vacuuming - (professional **H-class vacuum cleaners** with HEPA (High Efficiency Particulate Air) filters would be used to ensure that what is vacuumed up from surfaces with one end of the machine, is not discharged into the atmosphere for recirculation, cross-contamination, inhalation, and other undesired consequences from the other end of the machine. Homeowners will typically not own an adequate HEPA vacuum cleaner never mind an H-Class vacuum cleaner even if the manufacturer claims that their device is of a HEPA standard. Bagless machines, whether "HEPA" or not, are inadequate for biological hazard clean-up.) Vacuuming is the first step of mould remediation.

Demolition and Disposal of Material - (many visually contaminated materials (e.g., plasterboard, wallpaper, textiles etc.) will have to be physically removed, after vacuuming. Such materials would be encapsulated (wrapped or bagged up) and the bag exteriors would be decontaminated before removal from the work area so as not to contaminate surrounding rooms that may not be affected. Once outside the building, mould can be treated like compost.)

PPE (Personal Protective Equipment) – (professional remediators will wear appropriate eye protection, gloves and hooded overalls so as not to contaminate their own clothing and prevent exposure through their own skin, eyes and ears. Shoe covers will also be included for their footwear. The footwear may also be safety footwear in areas where there are hazards which may cause injury to feet.)

RPE (Respiratory Protective Equipment) – (RPE is a subset of PPE but warrants a separate discussion. The minimum standard for a biological hazard will be FFP3 (Filtering Face Piece) which protects the user to from 99% of the particulates in the air. FFP1's and FFP2's give 80% and 94% protection respectively and would not normally be considered as suitable and sufficient for mould remediation. These filtering face pieces are referred to as "close-fitting" or "tight-fitting" and require the wearer to be clean-shaven to the achieve these levels of protection. Furthermore, these protection percentages are also conditional on the wearer having been fit-tested by a professionally certified **fit-tester** to ensure that the style of respirator seals properly to the wearers face. The wearer also needs to be trained on how to put the respirator on and take it off properly. Once fit-tested for a particular type of respirator, the wearer will only purchase the same make and model of respirator or will have to be fit-tested for a different one. Levels of protection greater than FFP3 are possible with full face respirators (also a type of "tight-fitting" respirator) and air-supplied hoods, but the minimum will normally be FFP3.) N95 is a US standard and offers slightly higher protection than UK FFP2 (95%) but not as high as FFP3.

Contents cleaning – (whether items can be cleaned or whether they should be disposed of depends on whether there is visible growth on them, whether they are porous type 1, porous type 2, semi-porous or non-porous. If they do not have any visible mould actually growing on them, porous items that may be easy to clean will be things like clothes, bedsheets and curtains if they are machine washable (type 1), but porous items that are likely to have to be disposed of will be items like mattresses, pillows, sofas etc. (type 2)). Non-porous items with visible mould growing on them may be decontaminated. Semi-porous contents would typically be unfished wood items. For the professional cleaner the cost of restoration of any item is calculated against the items replacement value.) Organising decontamination of contents is a complex process. Contents can be cleaned outdoors in the fresh air (usually best but weather dependent).

Chemicals – Most trained mould remediation professionals will not use anti-microbials (e.g., spraying or fogging) before they have removed all physical traces of mould. They would most certainly know not to use chlorine bleach (sodium hypochlorite). Mould is a territorial organism and one of the few on our planet that engages in chemical warfare to defend its territory against other moulds. Applying chemicals designed to "kill" mould is likely to solicit chemical retaliation and sporulation (the release of spores). Including the chemical being used, the combination of chemicals now being released may result in a synergistic effect and make the things much worse. Chlorine bleach must not be used.

The DIY Option

DIY will save a great deal of money but carries risk. Chemically sensitised persons, persons already experiencing any ill-health from mould contamination should not be involved in this work and any work carried out at lower standards than those set out for a professional remediator means that whatever chance there may have been to achieve a good result may be compromised and not improve the indoor air quality as much as may otherwise have been possible. Cross-contamination between rooms and poor decisions on which items of contents to clean or dispose of could be a contributing factor to continued poor indoor air quality and ill-health.

In undertaking mould remediation, the aim is to achieve a Condition 1 in every room in the property. The following are definitions as stated in the **ANSI/IICRC S520 Standard for Professional Mold Remediation: 2015 - 3rd Edition. (Note American spelling of mould – It is their standard.)**

Conditions 1, 2, and 3 are defined for indoor environments relative to mold.

> ***Condition 1 (normal fungal ecology): an indoor environment that may have settled spores, fungal fragments, or traces of actual growth whose identity, location, and quantity are reflective of a normal fungal ecology for a similar indoor environment.***
>
> ***Condition 2 (settled spores or fungal fragments): an indoor environment which is primarily contaminated with settled spores or fungal fragments that were dispersed directly or indirectly from a Condition 3 area, and which may have traces of actual growth.***
>
> ***Condition 3 (actual growth): an indoor environment contaminated with the presence of actual mold growth, associated spores, and fungal fragments. Actual growth includes growth that is active or dormant, visible, or hidden.***

Armed with some of the key background information above, the following is a summary of the main considerations:

1. How much mould growth is there? Some publications suggest that professional help is not required unless the amount of mould growth is over 1 ft.² However, it is not that simple. 1 ft.² of one species of mould could be much more hazardous than another species. How much of any one mould species is enough to trigger a reaction in a person who is sensitised? Small amounts of mould on bathroom tiles and grout may be a perfect opportunity for DIY but you should still exercise caution.

2. Is the person proposing to do the work suffering any ill-health from mould exposure already or chemically sensitised or has any medical condition which defines them as immuno-compromised? Such persons should not undertake the work.

3. Is your vacuum cleaner up to the task? Will it exhaust mould into your airspace instead of capturing it?

4. What level of PPE/RPE is available to you? Remember that a relatively expensive FFP3 respirator may not be much better than a cheaper mask if it does not fit your face properly or you do not wear it correctly. Are you healthy enough to wear a respirator? Respirators DO restrict airflow to the lungs. *Note: All FFP's will be CE marked and will have straps that go around the back of the head. If the markings include the letters NR that also means they are NOT REUSEABLE, i.e., single use only. You should also not wear an FFP continuously for more than an hour.*

5. How will you contain the spread of invisible mould spores and hyphal fragments as you work? Will you make other rooms worse and contaminate more contents as you attempt to make one room better?

6. How do you know if or when you achieve condition 1?

7. Are you going to use an antimicrobial treatment? If so, which one?

The Clean-up Procedure:

If you are determined to do this….

Subject to:

a) all the considerations above and

b) all the control measures you have decided that apply to your own home situation….

…the steps would be as follows:

1. Vacuum all mouldy surfaces using the best HEPA vacuum cleaner you have been able to organise for yourself. Loose spores and hyphal debris should lift from the surface and "fly" into the vacuum. A no-touch technique can be used (keeping the nozzle of your vacuum cleaner hose a few millimetres from the surface without touching the mould). You should not "plough" through the mouldy growth with brushes or other attachments.

2. Wash down any mould that has not flown into the vacuum with clean water. De-Ionised water is best (if available) as tap water is chlorinated. Tap water is acceptable if de-ionised water is an issue. Cloths are usually disposed of.

3. Any residual surface staining can then be washed with warm soapy water.

4. Unfinished wood may be sanded. (Mould (also known as "surface fungi") only grows to a depth of about 100-200 microns (0.1mm to 0.2mm)) on wood. Other types of fungi (rots) are responsible for decay.

5. Vacuum ALL remaining surfaces – building and contents. If contents have been removed from a room, they should not be returned until they and the room are clean.

6. Decisions relating to dealing with contents is given on page 3. Ideally, contents should be removed and should be cleaned in a controlled area or outdoors and returned to their location, clean, avoiding cross-contamination.

7. When all removal has been completed, an antimicrobial (disinfectant) product may be used. A pump-up sprayer (the kind that might be used for spraying the roses in the garden) could be used. Alternatively, a hand trigger spray would do but then the repetitive squeezing action with the trigger may get a bit tiring on the hand. However, the use of such products may still be a problem for chemically sensitive persons. The safest antimicrobial that could be used would be Hydrogen Peroxide (H_2O_2). Hydrogen Peroxide is an oxygenating bleach. It is only different to water (H_2O) by one oxygen atom, and it is sufficiently unstable that it easily loses that extra oxygen atom. An application of hydrogen peroxide at 6% to 8% is enough to destroy mould residues but the chemical residues from the peroxide itself reverts to water and oxygen. No rinsing is required. Just a light spray for coverage and let it dry on its own.

However, please remember that hydrogen peroxide is a bleach. While it can be used as a mouthwash at lower strengths, it is used by hairdressers to lighten hair. Hydrogen peroxide should only be used on colourfast surfaces, or they may be bleached to a lighter colour.

The above process will probably be as close as you can get to a professional job. Success will depend on the degree to which you pay attention to detail and the cross-contamination that you manage to avoid.

However, mould growth will return if you have not dealt with the source of the excess moisture in your home. If your home is damp, then you need to address the reasons for the damp. Common causes are:

- Rising damp
- Penetrating damp
- Leaks
- Water ingress
- Condensation from a lack of ventilation

Final word: Be wary of products claiming to be “mould killers” and solutions like ozone and fogging. None of these are likely to work unless you have carried out a thorough job in physically removing the mould. Even then you still need to stop the moisture problem.

If you have a dry home, you will have a home free of mould growth.

FFP1 example

FFP2 example
(FFP2 is closest UK equivalent to USA N95)

FFP3 example

Full face respirator with HEPA filters
(example)

These respirators (“masks”) only meet their design protection levels if the wearer is clean shaven, fit-tested, and puts them on and wears them correctly. Other types or respirators are available for persons with facial hair.

References

Most of the information is provided in this document is from knowledge acquired over many years in the cleaning and remediation industry. However, the foundation of this knowledge and some of the references made, comes mainly from the following documents:

- **ANSI/IICRC S500:2021 Standard for Professional Water Damage Restoration 5th Edition**
- **ANSI/IICRC S520:2015 Standard for Professional Mold Remediation 3rd Edition**
- **ANSI/IICRC R520:2015 Reference Guide for Professional Mold Remediation 3rd Edition**
- **BS: PAS 64:2013 Mitigation and recovery of water damaged buildings – Code of practice**
- **The Health and Safety at Work Act 1974**
- **The Control of Substances Hazardous to Health Regulations 2002**
- **Personal Protective Equipment at Work Regulations 1992**
- **HSE: Respiratory Protective Equipment - HSG53**
- **HSE: The Approved List of biological agents: 2021**

Acronyms:

ANSI = American National Standards Institute (USA equivalent of BSI)
IICRC = Institute of Inspection Cleaning and Restoration Certification
BS(I) = British Standards (Institute)
HSE = Health and Safety Executive

Adam Jankowski MBICSc MISSE Tech IOSH
Director
The Restoration Academy UK Limited

Institute of Specialist Surveyors and Engineers – Member
Institute of Safety and Health – Technical Member
WoolSafe Registered Carpet Inspector
WoolSafe Certified Instructor
WoolSafe Fibre-Care Specialist
IICRC Standards Consensus Body Member
Institute of Inspection, Cleaning and Restoration Certification (IICRC) – Master Textile Restorer
Institute of Inspection, Cleaning and Restoration Certification (IICRC) – Master Water Damage Restorer
Institute of Inspection, Cleaning and Restoration Certification (IICRC) – Master Fire & Smoke Restorer
IICRC Approved Instructor in eight subjects including:

- Water Damage Restoration
- Applied Structural Drying
- Applied Microbial Remediation
- Fire and Smoke Restoration
- Health and Safety

British Damage Management Association Tech level 1
National Carpet Cleaners Association – Corporate Member
Indoor Air Quality UK - member
International Society of Indoor Air Quality and Climate – member
Cleaning Industry Research Institute – member