

# FRONTLINE▶ONLINE

Insurance Claims.....That's Our Business

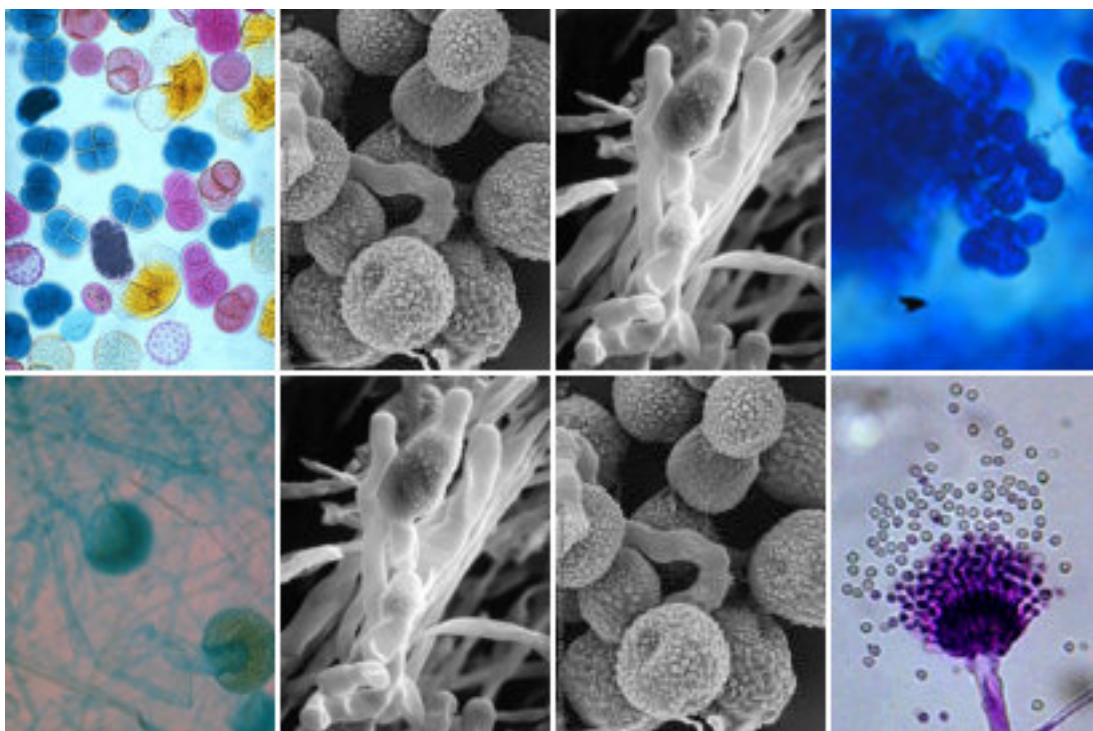
In conjunction with



The National Flood School

Mould Advisory bulletin





This advisory bulletin is not a standard or regulation, and it creates no new legal obligations. The bulletin is advisory in nature, informational in content, and is intended to assist building managers, custodians, and others involved with building maintenance. Contractors and other professionals (e.g., loss adjusters, insurers, and health and safety professionals) who respond to mould and moisture situations in buildings, as well as members of the general public, may want to refer to this bulletin.

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## Understanding mould in the context of water damage restoration in the UK

In the sphere of insurance claims, mould contamination, or the potential for mould contamination, is usually linked to an escape of water or external flood of some description. Incorrect handling of selected claims adversely impacting on an insured's health, coupled with the litigious nature of the United States, has led to law suites with damages in the millions of dollars. The surmise is that mould claims could have serious implications for the UK market if we do not learn from the experiences of our American cousins.

Awareness of mould growth in buildings and its detriment to human health has risen sharply in recent years. Several factors have contributed to this heightened awareness, including: changes in building materials, the use of rapid construction techniques, failure of occupants to manage moisture intrusion and humidity properly and an increased reliance on mechanical (Air-conditioned) systems for comfort control.

This advisory bulletin describes the ecology of mould; its potential impact on the health of people in the indoor environment; an overview of the techniques for removal and a guide which should help identify factors which could lead to litigation if specialist attention is not given. As mould claims must involve a provable degree of negligence, a list of basic facts to remember is also included.

### Where It Comes From

#### *Brief Fungal Ecology*

There are approximately 60,000 to 80,000 described species of fungi (moulds and yeasts). The majority of fungi are saprobes; that is, they utilize non-living organic material for food. Moulds, as referred to in this document, are those commonly described as micro fungi, differentiating them from macro fungi, such as mushrooms and other fleshy organisms. Moulds develop from unique, microscopic seed like structures called spores. Spores are not visible to the unaided eye. When spores settle on a surface under appropriate moisture and temperature conditions, they absorb water, swelling to 2-3 times their original size, and begin to form thread like structures known as hyphae. As the hyphae grow, they interweave to form a tangled mass known as mycelium. With continued growth, a mycelium, unlike a spore becomes visible to the naked eye. The mycelium extends across the surface material, generally in a circular pattern, with hyphae growing above and below the food source. When the fungus matures, spores will form within specialized structures or individually on the aerial hyphae. The spores can then be carried away by air currents, moisture droplets or insects to new environments to start the reproductive cycle all over again (*IICRC S520 p.36*).

Moulds are microorganisms that utilize organic substrates as nutrient sources in the presence of moisture. Their spores germinate, grow and amplify when indoor moisture is uncontrolled through chronic water damage (intrusion or condensation), catastrophic flooding or simple neglect (lack of routine maintenance and cleaning). Under such circumstances, moulds can grow and produce massive numbers of spores on a variety of surfaces such as wood, gypsum board and paint. Additionally, many soil bacteria thrive in damp indoor conditions and are routinely found in environments where mould amplification is identified.

Availability of moisture, the presence of organic substrates, and time are the factors necessary for the germination of mould spores. In uncontrolled situations, such as flooding, undetected or neglected roof and/or plumbing leaks, and high relative humidity resulting in condensation and films of surface moisture, germinated spores will grow and begin to amplify. Fungal amplification is typically characterized by the predominance of moulds that are recognised as potentially allergenic, toxigenic, and/or opportunistic. Examples include *Aspergillus*, *Penicillium*, *Alternaria*, *Fusarium*, *Aureobasidium* and *Stachybotrys*, among others. These types of moulds, in elevated concentrations and often in combination with other associated biological pollutants, present recognised human health risks.

### ***Easiest way of detection***

In addition to visible mould growth and the detection of moisture in porous materials, an obvious indicator of microbial amplification is an odour that may be described as musty, mouldy or mildewy. Fungi and bacteria produce a variety of volatile organic compounds (VOC's) during active growth. The microbial volatile organic compounds (MVOC's) we detect through our olfactory senses are generated by a variety of many moulds and also by actinomycete bacteria, such as *Streptomyces* and related organisms.

## **Health Issues**

### ***Potential effects on human & animal health***

National and international scientific, research and regulatory organizations have published consensus statements regarding the relationship between water damage in buildings, resultant microbial amplification on wet building materials, and human health risk from exposure to mould spores and related spore by-products in the indoor living or work environment. (*IICRC S520 p40*)

Moulds can produce adverse health effects through inflammation, allergy, or infection. Allergic reactions (often referred to as hay fever) are most common following mould exposure. Typical symptoms that mould-exposed persons report (alone or in combination) include:

- Respiratory problems, such as wheezing, difficulty breathing, and shortness of breath
  - Nasal and sinus congestion
  - Eye irritation (burning, watery, or reddened eyes)
  - Dry, hacking cough
  - Nose or throat irritation
  - Skin rashes or irritation
- 
- Headaches, memory problems, mood swings, nosebleeds, body aches and pains, and fever are occasionally reported in mould cases, but their cause is not understood.

### ***How much mould can produce adverse health effects?***

Allergic persons vary in their sensitivity to mould, both as to the amount and the types to which they react. For some people, a relatively small number of mould spores can trigger an asthma attack or lead to other health problems. For others, symptoms may occur only when exposure levels are much higher.

### ***Who is most at risk?***

Exposure to mould is not healthy for anyone inside buildings. Therefore, it is always best to identify and correct high moisture conditions quickly (within 24-48 hours) before mould grows and health problems develop. Some people may have more severe symptoms or become ill more rapidly than others:

- Individuals with existing respiratory conditions, such as allergies, chemical sensitivities, or asthma.
- Persons with weakened immune systems (such as people with HIV infection, cancer chemotherapy patients, and so forth)
- Infants and young children
- The elderly

Identifying residents within the above categories should be carried out as part of a risk assessment procedure.

## **Mould Remediation**

### ***Remediation methods – principles of mould remediation***

There are five general principles used in the remediation of mould-contaminated structures and materials:

1. Provide for the health and safety of workers and occupants
2. Document the conditions and work processes
3. Control the contaminant at its source
4. Physically remove the contamination (source removal)
5. Correct the moisture problem to prevent recontamination

### ***Provide for the health and safety of workers and occupants***

Prior to and during activities that disturb mould, engineering controls and work practises must be implemented to prevent mould contamination from spreading. The spread of contamination has the potential to expose remediation workers or occupants to contaminants and create the need for additional removal work.

Appropriate engineering controls, such as source isolation (using polythene sheeting) and creating pressure differentials to control the flow of air reduces the quantity of spores and fragments that become airborne, or reduce the time they remain in the air.

Appropriate respiratory protection, as well as other appropriate PPE, must be used by remediation workers to prevent exposure to the contaminants that cannot be reduced through proper engineering controls.

### ***Document the conditions and work processes***

An effective mould remediation plan cannot be developed without first determining the extent of contamination to be removed. Mould remediators should establish, implement and consistently follow methods and procedures for project administration, including but not limited to, business systems, operational plans and method statements (see BSi PAS64 for examples relating to water damage).

Competent project administration promotes the delivery of high-quality remediation projects and increases the likelihood of success for all involved.

### ***Control the contaminant at it's source***

Control of the mould can be accomplished through the use of containment measures. Using self-adhesive plastic over mould growth on plasterboard to inhibit dispersal is an example. During remediation, control of the contaminant may be accomplished through proper engineering controls and work practises such as, minimising dust generation, using vacuum-assisted power tools and locating an air filtration device close to the work area.

### ***Physically remove the contamination (source removal)***

It is highly recommended that mould contamination be physically removed from the structure and contents, usually by controlled demolition. Attempts to kill or encapsulate mould are not adequate to solve the problem.

### ***Correct the moisture problem to prevent recontamination***

Since mould spores are present at background levels in a normal fungal ecology, mould growth is virtually inevitable if moisture is not controlled. To prevent this, moisture problems must be identified, located and corrected or controlled as soon as possible. Successful mould remediation results in the return of the remediated structure and conditions to that of the surrounding, yet unaffected area. Reconstruction does not normally begin until moisture is controlled, mould remediation is complete and building materials are dry.

### ***Dealing with contents***

The restorability of contents contaminated by mould or mould spores is dependant on the following factors:

- Condition of the item
- Basic material composition of the item
- Cost of remediation/restoration
- Financial value or cost of replacement
- Other types of value e.g. sentimental, legal, artistic, cultural, historical

The type of service required for each content item may be categorised in one of three ways:

Restore – items that will be cleaned and returned to customers

Dispose – items that will not be cleaned because the insured does not want them or the value does not outweigh the restoration costs.

Preserve with Risk Assessment – Items that are irreplaceable but cannot be decontaminated. This category only applies to irreplaceable porous or semi-porous items e.g. high value antique furniture.

It is highly recommended that all interested parties participate in the decision about whether to restore or dispose of contents.

The techniques for restoring different contents items is outside the scope of this bulletin and will be addressed at a latter date.

### **Summary**

Although mould does grow on the surface film of solid material such as plaster and brick, it is far more prevalent on more porous material such as plasterboard, fibre-board, wallpaper etc. The use of less porous material in the construction of properties in the UK prohibits the widespread occurrence of dangerous moulds; increasingly however, the fast building techniques and materials prevalent in America are being used in this country. If correct risk assessments are carried out by competent, trained personal, the factors which can create mould problems should be recognised, identified and dealt with at an early stage. Drying regimes should be implemented by technically competent persons to ensure the property is dried using a methodology which inhibits the spread of mould and the fast removal of unwanted moisture. These processes should be thoroughly documented, to aid transparency should doubt arise. The adherence to BSi PAS 64 is highly recommended to all contractors undertaking restorative drying works.

### ***Dealing with mould – some basic points to remember***

1. Currently there is no standard or recommendations for airborne concentrations of mould or mould spores – individuals react differently to density and types of mould.
2. For moulds to colonise and reproduce, they need only a food source – any organic material such as wood, paper or dirt - and moisture. Check inside that partition wall.
3. Time is an important factor, moulds can colonise within 2-3 days, but generally will take longer than this. Therefore long-term water leaks/ingresses have a higher potential for mould, alter your survey according to the type and nature of the loss.
4. While drying a property ensure your drying contractor is maintaining a surface humidity or ERH (Equilibrium Relative Humidity) of less than 61%. Moulds cannot grow below this level of moisture.

***Mould cannot grow if the material is clean and dry***

5. Spraying the mould with an anti-microbial, water or bleach solution may amplify the release of spores – don't spray it! Dead hyphae can still adversely affect humans.
6. Identify those who are in high risk categories early - infants, the elderly, the infirm and the allergic.
7. Isolate high risk people from exposure by removing them from site or by engineering the site conditions in an appropriate way.
8. If you are entering an area with the risk of mould contamination, ensure you are wearing the appropriate PPE especially a fit-tested respirator. Inhalation is the most common route to exposure.

**Further advice****National Flood School**

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**Further reading**

Institute of Inspection, Cleaning and Restoration Certification (IICRC) (2003) Standard and reference guide for professional mould remediation S520, Washington, USA – *Copies are available from the National Flood School*

BSI, PAS 64, Professional water damage mitigation and initial restoration of domestic dwellings, 2005 - *Copies are available from the National Flood School*

Bioaerosols: Assessment and control, American conference of governmental industrial hygienists, 1999

A guide for Mould remediation in schools and commercial buildings, US Environmental Protection Agency, 2001