State Claims Agency

Guidelines for School Maintenance Staff on Managing Mould Growth in State Buildings

Prepared by the State Claims Agency

Copyright © State Claims Agency 2006

Index

1. **Background**

2. **What are moulds?**

3. **What are the possible health effects?**

4. **How do you prevent mould growth?**

5. **How do you identify a mould problem?**

6. **Steps in the clean up and remediation process**

7. **Cleaning methods**

8. **Prevention of exposure during remediation**

9. **Personal protective equipment**

10. **How do I ensure the clean up job is complete?**

This Guideline has been produced solely for use by State Authorities that come within the remit of the State Claims Agency, as established by the National Treasury Management Agency (Amendment) Act, 2000. The State Claims Agency does not bear responsibility for use of the guideline or reliance on it in any manner by any other third party.

An Irish Version of these Guidelines is available at http:/www.education.gov.ie or on request from the School Building Section, Department of Education and Science, Portlaoise Road, Tullamore, Co. Offaly. Tel (05793) 24427.

1. Background

In the US and Canada, there have been a significant number of personal injury claims for ill health resulting from toxic mould exposure. In the UK and Europe, claims activity involving toxic mould has been more limited. However insurers, risk managers and others involved in this area are maintaining a watching brief and there is concern that it could be a source of mass action in the future.

In order to be in a strong position to defend any future claims that may be taken against the State, the State Claims Agency (SCA) carried out a survey of moulds in State buildings. The primary purpose of the survey was to quantify the extent of building contamination by mould and to recommend appropriate risk management controls.

The findings of the survey have informed this and other SCA guidelines on mould.

2. What are moulds?

Moulds are part of the natural environment. They are fungi which play an important part in nature by breaking down dead organic matter such as fallen leaves and dead trees. Mould may begin growing indoors when spores land on surfaces that are wet. The individual spores are invisible to the naked eye. However, when they grow en masse they are visible as the black, blue, green etc staining that people associate with mould.

Some moulds can produce vapors, which are detectable by the human nose at very low concentrations. This is what gives the unpleasant 'musty' odour associated with dampness and mould growth.

Most moulds grow well at warm ambient (15^0-25^0C) temperatures, but a few prefer lower or higher temperatures. All moulds require a steady supply of nutrition and moisture to live and grow. Nutrition, in the context of buildings, is provided by flour dust, cooking oil droplets, skin scales, hair, spiders' webs, wall paper, plaster-board, wood etc. Indoors, moisture can result from flooding, leaking pipes, damp etc.

3. What are the possible health effects?

Exposure to mould does not always present a health problem. However, a percentage of the population are sensitive to moulds. The types and severity of symptoms depend on;

- the types of mould present - some moulds are not associated with causing ill health effects
- the extent of the mould growth - ill health effects are usually associated with areas of large mould growth
- the extent of an individual's exposure. There are no occupational exposure limit's (OEL's) set for mould spores, i.e. there is no agreed limit for the number of mould spores that it is safe for an individual to be exposed to over an 8 hour day.
- the ages of the individuals (e.g children, elderly) and their existing sensitivities or allergies.

Mould growth could cause the following ill health effects;

- Allergic Reactions
- Asthma - can trigger attacks or worsen existing conditions
- Irritant Effects of the eyes, skin, nose, throat, and lungs
- Opportunistic Infections - people with weakened immune systems e.g. children, the elderly, ill may be more vulnerable to infections by moulds.

Moulds can also produce toxic substances called mycotoxins. The presence of mould in a building does not necessarily mean that mycotoxins are present or that they are present in large quantities. There is some evidence to suggest that toxic moulds can cause ill-health. However, a causal link between the presence of the toxic mould and these conditions has not been proven and research is on going.

4. How do you prevent mould growth?

Mould spores are ever-present in outdoor air and therefore it is not possible to entirely exclude them from the indoor environment. ***The most important fact about moulds is their need for moisture. If there is no moisture supply they will not grow. The key to the prevention of mould growth is to eliminate all sources of moisture.***

This includes;

- Fixing leaky plumbing immediately
- Preventing water leaking in from the exterior, clearing gutters regularly and repairing any damage to gutters.
- Preventing condensation by increasing the surface temperature or by reducing the humidity in the air. Surface temperature can be increased by insulating or by increasing air circulation. Humidity can be reduced by repairing leaks and increasing ventilation. Ideally humidity should be below 60% relative humidity.
- Venting dryers to the outdoors
- Fixing rising damp problems

5. How do you identify a mould problem?

Early detection and remediation of mould growth is critical. Internal school maintenance staff can deal with smaller areas of growth (<3m^2). Larger areas will have to be dealt with by specialist expertise with significant clean up costs.

Schools are ultimately responsible for the identification of the mould problem. However, in the course of your work, if you suspect mould growth, it must be reported to the Principal immediately. Under no circumstances should you attempt to clean or interfere with the mould growth in any way even if this prevents the completion of your normal duties. The area may have to be fully cleaned before normal duties may resume.

6. Steps in the clean up and remediation process

The School will have assessed the extent of the problem before decisions on clean up and remediation methods are made. In all cases final clean up and remediation can only take place after the source of moisture has been discovered and removed.

For larger areas (>3m^2), a professional cleaning company must be engaged. In most cases where the area affected by the mould is less than 3m^2 then work can be carried out by trained maintenance staff. The appropriate personal protective equipment must be worn by the individual(s) completing the cleaning (see section 7). *As an additional precaution, school maintenance staff with existing respiratory conditions should not take part in cleaning and remediation of moulds. It is important that staff with these conditions notify their manager.*

If work cannot commence immediately to rectify the moisture problem, the mouldy area should be swabbed with 10% bleach and sealed off with a polyethylene membrane at least 450 mm bigger than the patch on all sides.

Persons, other than maintenance staff, should be excluded from the area being remediated while work is on going and for 24 hours after.

The approach to clean up depends on the surface area affected by the mould, and the material to be cleaned.

7. Cleaning methods

Damp wipe
This method can only be used on hard surfaces by wiping or scrubbing with water and detergent.

Wet vacuum
Vacuum cleaners can be used to remove water from hard surfaces and carpets. They should not be used on porous materials or if there is insufficient water present. Where there is insufficient water the vacuum may spread spores. The vacuum and all its attachments must be cleaned and dried after use otherwise spores may stick to it.

Dry vacuum with High Efficiency Particulate Air (HEPA) filter
During final clean up a dry vacuum with a HEPA filter can be used to clean up dust that may have settled in the vicinity of the remediation area. Care must be taken when changing the filter and contents.

Disposal of damaged material
Building materials e.g. wall board and furnishings that cannot be salvaged must be removed for disposal.

Use of chemicals and biocides
Generally the use of chemicals or biocides does not provide a solution to mould problems. The chemicals may kill the spores but dead mould may still be allergenic. A level of spores will still remain in the air (similar to the level in the air outside). The spores will not grow if there is insufficient moisture present.

However in some cases it may not always be possible to solve the moisture problem immediately in which case the patches of mould can be sponged with a 10% solution of bleach (sodium hypochlorite) and allowed to dry. Note that some domestic bleaches have lower concentrations of sodium hypochlorite. Bleach must not be mixed with any other ammonia-containing or acidic detergents as toxic chlorine gas will be produced. Fungicides developed for use on soil, outdoor plants and grains should not be used indoors.

If the patch is so damp as to make drying impossible , the first application should be followed by another after approximately 30 minutes. The patch should then be scrubbed to remove adhering growth, loose paint and other debris which might provide nutrition to the mould. The area should then be painted with a good quality fungicidal paint that will maintain a fungicidal surface even when damp and will delay recolonisation of the surface.

Any generated waste materials e.g. removed damaged material, vacuum filters, PPE, cleaning materials, etc, must be disposed of. This requires them to be placed in strong (e.g. 6 mm) sealable polyethylene bags. Larger items can be

covered with sheeting and sealed with duct tape to protect those carrying the waste.

The following table shows the recommended methods for cleaning/remediating mould growth on different surfaces.

Table A. Total area of mould growth less than 3 m^2

Material or Furnishing Affected	Damp wipe	Wet vacuum	Hepa vacuum after drying
Books and papers			✓
Carpet and backing	✓	✓	
Concrete or cinder block		✓	✓
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	✓	✓	✓
Non-porous, hard surfaces (plastics, metals)	✓	✓	✓
Upholstered furniture & drapes		✓	✓
Wallboard (drywall and gypsum board)			✓
Wood surfaces	✓	✓	✓

8. Prevention of exposure during remediation

Containment
The purpose of containment during remediation activities is to limit release of spores into the air and surroundings, in order to minimize the exposure of cleaners, teachers, students etc to mould. Mould and mouldy debris should not be allowed to spread to areas in the building beyond the contaminated site.

The size of the area determines the degree of containment required while carrying out the remediation work.

Surface area of mould growth <3m^2
If the area affected is approximately 3m^2 or less then the work could be undertaken without containment. However, persons, other than the school maintenance staff, should be excluded from the area being remediated while work is on going and for 24 hours after. Appropriate signage and/or barriers should be erected.

If work cannot commence immediately the area should be swabbed with 10% bleach and sealed off with a polyethylene membrane at least 450 mm bigger than the patch on all sides.

Surface area of mould growth >3m^2
As previously stated, areas larger than 3m^2 must be remediated by specialist contractors who are responsible for the specification and provision of their own containment.

9. Personal protective equipment (PPE)

Remediation is likely to disturb the mould and spores will become airborne. The risk of respiratory exposure therefore increases. Skin and eyes must also be protected from contact with mould. Table B summaries the type of PPE that must be worn during the assessment and clean up process.

As previously stated, areas larger than $3m^2$ must be remediated by specialist contractors who are responsible for the specification and supply of their own PPE.

Respirators
Respirators are filtering devices that will protect cleaners from inhaling airborne moulds, mould spores and dust.

- Cleaning small areas $<3m^2$
  A FFP3 (high efficiency to EN 149 standard) half mask should be worn.

Protective clothing
- For small jobs overalls can be worn. For medium or large clean up/remediation jobs a disposable overall with hood is recommended such as a Tyvek suit. This prevents the spread of mould spores on clothing and prevents skin contact.
- Long rubber or nitrile gloves should be worn.

Eye Protection
- Eyes should be protected by wearing fitted goggles, which comply to standard EN 166, or a full face respirator. Safety glasses or goggles with vent holes will allow mould spores contact with eyes and should not be worn.

Table B. Type of PPE that must be worn during various stages of remediation

	Half mask (FFP3 to EN 149)	Full face respirator with a P3 filter	Tyvek suit (hooded)	Overalls	Rubber or nitrile gloves	Eye goggles
Assessors	✓				✓	✓
Maintenance - smaller area	✓			✓	✓	✓
Contractors - large area		✓	✓		✓	

10. How do I ensure that the clean up job is complete?

Mould will not be eliminated unless the source of moisture is removed. If the moisture problem is not rectified repeat clean up visits will be required on an on-going basis.

If the clean up is complete visible signs of mould, mould damaged materials and a musty odour should not be evident.

Schools must revisit the area after approximately two weeks, four weeks and again after 8 weeks. There should be no sign of mould growth or water damage.