



**AUSTRALIAN
MOULD
GUIDELINE**

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Mycologia Australia Pty Ltd

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Those working in the Mould Industry should read this document in conjunction with the ACMR / ACMI Reference Manual for Australian Certified Mould Remediators and Investigators.

Please note that this is not an Australian Standard as published by Standards Australia. This document is currently a guideline and is intended to become an industry based standard.

This document is in review and its contents will be subject to change.

Positions on the review panel are open for application. Please contact the editors if you feel you can participate by either revising or by contributing further material to this document.

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DISCLAIMER

All mould workers who are using this document must keep in mind that developments in the mould industry are advancing rapidly. It is critical to keep ahead of these developments and modify your practices accordingly. Commonsense, experience and professional judgment should be used at all times to determine that correct levels of PPE, containment and hazard communication are used.

The authors have not personally independently tested and verified all the suggested practices and assessment or judgment strategies described in this document.

This document includes the experience and knowledge of local mould professionals and material and information from a review of current international guidelines and standards on dealing with mould contamination. The reference documents used in the writing of this standard are listed in the bibliography. In cases where information may appear to be similar to that found in other documents, it should be kept in mind that the Authors of this document have participated in the writing of many of these documents. There are basic hazard requirements when dealing with mould that are universal.

While other international standards and guidelines are referred to in this document, this document can be used as a guide that has been tailored to Australian conditions by Australian Professionals and Academics.

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1 PRESCRIBED ILLNESSES & DUTY OF CARE

It is recommended that any area undergoing mould remediation be unoccupied during cleaning or remediation works.

In most cases it should not be necessary to evacuate people from adjacent areas as long as correct containment procedures are adhered to.

However, it is highly recommended that the people with the following health categories should be advised that temporary relocation would be in their best interests:

1. Infants less than 12 months old, and children less than 2 years old
2. People with compromised immune systems
3. People with chronic inflammatory lung disease such as:
 - a. Asthma
 - b. Hypersensitivity pneumonitis, and
 - c. Severe allergies
4. People recovery from recent surgery

Failure to inform or evacuate people in these conditions may lead to a serious breach of your duty of care. The immune system of children less than 2 years old may not be fully developed and there is evidence that Kawasaki syndrome is related to wet cleaning methods on carpets.

1.1 BIOHAZARD COMMUNICATION STRATEGY

When the remediation work involves a Grade 4 Building, then the building's owner, manager or the employer should notify occupants in the affected areas that mould growth requiring remediation has been detected. This should include a description of the basic results from testing and analysis, the type of remedial works that will be performed, and a schedule for completion.

It may be useful to conduct groups meetings to communicate these matters and to allow open discussion with the affected occupants.

Individuals that may have health problems associated with exposure to mould should be advised to seek medical advice from qualified practitioners in occupational or environmental medicine or related disciplines that are knowledgeable about mould health hazards. Any individual that requires medical assessment should be provided with a copy of all inspection and sampling results and interpretations to take with them to their medical practitioners.

1.2 HEALTH SYMPTOMS AND COMPLAINTS RELATED TO MOULD DAMAGE

This section has been provided as a guide to understanding when complaints of odours or health symptoms reported by either occupants or mould remediation workers that may be due to the presence of mould growth. This is particularly useful for Grade 5 Buildings where there is little obvious evidence of mould damage. If any of the following symptoms appear to be related to time spent in the building then they should be duly noted and recorded.

1. Discomfort
2. Eye irritation
3. Runny nose
4. Sneezing
5. Coughing
6. Nausea / Diarrhoea
7. Headaches
8. Fatigue
5. Inability to concentrate
6. Constriction of air passages
7. Skin irritations
8. Congestion
9. Shortness of breath
10. Wheezing
11. Aggravation of asthma

2 MOULD AND INDOOR AIR QUALITY

Normally, our everyday exposure to airborne fungi in the outdoor air presents little or no risk to our health. However, the airborne fungi in the artificial environments of our buildings and dwellings have an altered composition, which can create an environment with the potential to greatly affect human health. This has led to the understanding that fungi can be a major cause of both illness and the severity of general symptoms, such as sick building syndrome (SBS), which are related to the amount of time spent indoors.

All fungi are initially microscopic in size with most spores ranging in size from 2 to 20 µm (microns). There are an enormous number of fungi with over 6000 genera and only 69,000 species have been described out of an estimated total of around 1.5 million species.

Many of the visible manifestations of fungi are commonly known and include yeasts, mould growth, mildew, large mushrooms, puffballs and bracket fungi. These are all the result of the convergence of millions of individual fungal units coming together to create larger structures.

The terms mould and fungi are used interchangeably. However that is more to do with their common usage. Normally moulds only refer to those fungi with a mycelial (filamentous) type of growth.

Fungi are eukaryotic organisms and share many basic characteristics of genetic makeup with humans. This is why chemical treatment to control fungal contamination should be very carefully considered before their widespread application is considered.

The study of fungi is called Mycology. A mycologist is one who can identify fungal species and has an understanding of fungal ecology. The two main branches of mycology are Medical mycology and Environmental Mycology. Only an Environmental Mycologist should be consulted for identifying indoor and outdoor fungal species and for understanding the ecology of mould contamination in buildings.

3 IDENTIFYING MOULD GROWTH INDOORS

A methodical approach should be taken towards mould work for reasons include ensuring personal safety, duty of care, and legal requirements. The first step is to gather information from the client and background information on the situation being investigated. Second step will be a site visit and inspection. The third step is to establish what procedures will be required to successfully deal with any moisture or mould damage problems identified.

3.1 GATHERING INFORMATION

The nature of the initial contact will determine the type of the job at hand and will depend on your abilities, experience and your ethics. The profession that was called first will greatly affect the direction and outcomes of the project. It is important to establish at the outset who is legally responsible for the situation at hand.

3.1.1 Health Complaints

In situations where there is a Building of Grade 3, 4 or 5 and the client or occupants complain of health symptoms, a medical assessment or contract the services of an Indoor Air Quality Professional for an indoor environmental assessment (IEA).

3.2 ASSESSING MOULD DAMAGE

The initial inspection will include gathering information, making a visual inspection, and taking moisture readings. From this you will then need to determine which Building Grade of Mould damage is present.

3.2.1 Information Gathering Questionnaire Checklists

To help gather appropriate information and thereby judge the level of a mould situation, it can be useful to use a questionnaire checklist. The essential elements of the questionnaire include property details; use of other professions or services; background information; mouldy odours or visible mould growth; complaints or health symptoms; and major illnesses of occupants. See the reference guideline for a detailed list of information.

3.2.2 Initial Risk Assessment

Anyone dealing with mould on a daily basis needs to tackle each job in a manner. Failure to professional and methodical approach to mould work can result in injury to workers, inspectors and occupant from exposure to mould allergens or toxins. The initial contact with any job is critical in ensuring a safe work environment.

The information you gather from the questionnaire checklist will determine the Building Grade, sampling strategy and OHS issues (PPE and containment). In situations of Building Grade 4 or 5, or where there are severe health symptoms or people at risk, then all work should be directed by an experienced mould inspector or IAQ assessor. Individuals with mould related illnesses may be directed to be evacuated from the building.

3.2.3 PPE for Initial Inspection

An appropriate level of PPE should always be worn by those undertaking inspections or remediation work. This includes guests invited to inspect the damage or remediation works such as building owners or managers etc.

3.2.4 Visual Inspection

An on-site visual inspection is the most important step to identify mould problems and for determining a remediation strategy. Important surfaces to inspect include porous materials. It is important to inspect for hidden growth behind furnishings or in building cavities. Any mechanical ventilation system should be inspected for moisture or mould damage.

Evidence of damaged that should be recognisable during a visual inspection should include visible mould growth; surface condensation; flooding events & accidental spills; and High humidity. In situations where it is not possible to perform extensive inspection there may be "discovery" of hidden mould damage. All parties with vested interests should be made aware that additional inspection may be required. Discover of hidden damage should be documented.

3.2.5 Mould Sampling as Part of an Assessment

There are a number of situations where it would be normal to consider taking mould samples as part of the initial assessment. These include wide spread mould growth; mould odours; wet or damp materials that were not dried within 48 hours; health or symptoms or complaints; for quality control; for health risk assessment; and for species identification.

3.2.6 Basic Sampling Techniques and Principles

Sampling is not always required. Where a situation is driven by medical or legal reasons then mould sampling can be used to establish either exposure or baseline contamination.

Moisture measurements should be the first type of measurements taken. Mould sampling should begin with relatively simple surface samples and can include bulk samples and air samples on larger jobs. All sampling should be done in conjunction with a mycological laboratory as they will have specific handling and shipping requirements.

3.2.7 Taking Moisture Readings

Only a person trained in moisture measuring techniques should determine the moisture content or moisture profile of a situation. The aim of taking moisture measurement is to establish the extent of moisture damage; to provide an indicator of hidden mould damage; and for quality control.

3.2.8 Surface Sampling

Only a person trained in mycological sampling techniques should perform surface sampling. Surface samples are the next level of testing after moisture readings. They can aid in identifying fungal species especially in cases where spores might be surface bound (not detected by air samples). The basic types of surface samples include Surface Swab samples; RODAC Plate samples; and Tape Lift-off Samples.

Other surface sampling methods may be available through a mycological laboratory. A mycological laboratory should be consulted for specific sampling and delivery instructions.

3.2.9 Bulk Dust and Material Sampling

Only a person trained in mycological sampling techniques should perform bulk sampling. Bulk sampling can be useful in detecting a wide range of fungal species. This method is typically performed either using a vacuum cleaner on carpets and textile surfaces, or to simply scrape off surface material. Small pieces of material can also be removed for analysis. However, local area containment procedures should be followed when removing material from known or suspected mouldy surfaces.

Other bulk sampling methods may be available through your mycological laboratory. They should also be consulted for specific sampling and delivery instructions.

3.2.10 Airborne Sampling

Only a person properly trained in advanced mycological sampling techniques should perform airborne mould sampling. Airborne sampling for mould is not part of a routine assessment. A qualified Mould Inspector or IAQ Assessor should be consulted in situations where health symptoms are related to mould or to time spent in a building.

The reasons for conducting airborne sampling include when the health symptoms are related to either mould exposure or to time spent in a building; as part of a detailed risk assessment; where mouldy odours are present but no apparent visible growth; as a part of clearance testing after remediation works.

Indoor air samples for mould should be conducted together with an outdoor air sample as a reference location. The comparison of species between the indoors and the outdoors is used to determine the source of fungal contamination. The type of fungal contamination whether hydrophilic or xerophilic can also be determined. Other air sampling methods may be available through your mycological laboratory. They should also be consulted for specific sampling and delivery or shipping instructions.

3.2.11 The Importance of Species Identification

The identification of mould species is critical as different species impact on both human health and building infrastructure in different ways and to different degrees. In general, the species in the indoor air should be similar to that in the outdoor air. When the indoors presents a mixture of fungal species that is fundamentally different from the outdoor air, then this represents an altered exposure to fungi and the presence of an interior source of fungi.

3.2.12 Analysis of Mould Samples

Mould samples should only be analyzed for fungal species by an experienced mycologist or microbiologist with training in environmental mycology. A laboratory should have a person that is qualified to analyse fungi; should have quality control data on hand and a written quality assurance plan; and should provide a thorough explanation of the analytical interpretation and results.

4 THE FUNDAMENTALS OF MOULD REMEDIATION

In all situations concerning mould growth indoors that requires remediation, the underlying cause of moisture that is supporting the growth must be repaired or fungal growth will re-occur. There should be an emphasis in the remediation works for the cause of moisture damage to be permanently repaired so that water damage does not re-occur.

It should be kept in mind that the goal of mould remediation is not to sterilise surfaces, but to return surfaces to their normal state before contamination. It should be kept in mind that the containment, PPE, hazard communication, and cleaning guidelines in this document are not definitive. Each remediation job needs to be assessed on its own merits and the persons performing the remediation works should ensure that adequate protection measures are taken.

5 CONTAINMENT PROCEDURES TO PREVENT CROSS CONTAMINATION

The remediation area should not be occupied. Except for large jobs (building Grade 4/5) it should not be necessary to evacuate people from adjacent areas if containment procedures are correctly applied. However it is recommended that persons with Prescribed Illnesses listed on page 4 should be informed or removed from adjacent areas.

5.1 REMOVAL OF CONTAMINATED MATERIALS

Caution to prevent cross contamination is required when handling contaminated materials that are being removed for disposal or for decontamination off-site. Materials should be wrapped in plastic and seal with tape.

Materials and items that are to be retained but require remediation should be transported to an off-site facility wrapped in plastic. The items or materials should then be immediately removed from the plastic wrapping and the plastic discarded in normal waste disposal. Remediation should begin immediately according to the material type being remediated.

Materials and items that are to be disposed should be placed gently in a covered disposal unit / bin. Contaminated materials should never be thrown from a distance into a disposal unit.

Disposal units and bins should not be located close to openings such as windows or doors including those of neighbouring properties. There are no requirements for specialised type of disposal unit for mouldy materials.

5.2 REMOVAL OF BUILDING CONTENTS

5.2.1 Assessment

Whether contaminated contents can be restored depends on their condition; material type; the cost of remediation; financial value or cost of replacement; and other types of value such as sentimental, legal, cultural, artistic, or historical etc.

Restore items that can be cleaned and returned to the client. Dispose items that will not be cleaned. Preserve with risk Assignment items that are irreplaceable but cannot be remediate completely.

All those with vested interests should be involved in the decision as to whether contents should be restore or disposed of.

5.2.2 Removal of Contents from Affected Areas

Avoid cross contamination when moving contents. Contaminated contents must be decontaminated or appropriately packaged when moved in or through uncontaminated areas. Contents should never be stored in plastic or sealed containers.

5.2.3 Inventory, Packing, Transport and Storage

A detailed inventory should be made of the contents before removal. Storage conditions should be dry and otherwise minimize conditions favourable to mould growth. Remediation should proceed as soon as practical to avoid further damage and mould growth. The clean contents should not be returned to a contaminated area.

6 MOULD CLEANING PROCEDURES

The goal of mould cleaning is to bring items and materials back to normal (before contamination) conditions. The purpose is not to sterilize an item or necessarily improve its appearance.

6.1 Cleaning Location

On-site cleaning eliminates the cost of packing, transport and storage but may extend the remediation period and has an increased risk of cross-contamination. In-plant cleaning minimizes the time before structural drying work can start, which can drastically reduce the time required to reinstate the property back to conditions prior to the mould contamination.

6.2 Outdoors versus Multi-chamber Cleaning

When cleaning contents outdoors without containment enough distance must be provided to any adjacent buildings, air intakes or unprotected people. Remediation workers must wear appropriate PPE.

6.3 Mould Cleaning & Removal Strategies

A cleaning method should be chosen with the aim of producing the least amount of dust possible to limit workers exposure. More than one method may be necessary. Old buildings potential contain lead based paints and only should be properly assessed and remediate by specially trained personnel in hazardous material handling.

6.3.1 Air-Based Methods (recommended)

Air based methods physically remove contamination by vacuuming off or blasting off with air to dislodge contaminants and include HEPA filter vacuum cleaning; air washing; laminar-flow; and down draft cleaning tables.

6.3.2 Liquid-Based Methods (recommended)

Liquid-Based Methods use water combined with the mechanical action of cleaning and include damp-wiping with a detergent, vinegar solution or alcohol solution; ultrasonic cleaning; steam cleaning; low pressure flushing, and high-pressure washing.

6.3.3 Chemical Based Methods (not recommended)

The use of surface chemical treatments is not recommended as they appear to have limited effect and introduce further chemical pollution into the indoor environment. Chemical Based Methods rely on toxic substances to kill the fungal growth and do not remove the contamination. These include: anti fungal / microbial agents; gaseous, vapour phase or aerosolized biocides; Bleach, Alcohol (100%), quaternary ammonia, formaldehyde etc; and pH changing acidic or alkaloid treatments.

The use of gaseous, vapour phase or aerosolised biocides is not recommended. Using chemicals in this manner can cause adverse health effects in individuals returning to a site and occupants in adjacent areas. The benefits of this treatment are unproven.

6.3.4 Abrasive Methods (not recommended)

These rely on the use of a medium to physically dislodge contaminants. These methods are not recommended in general due to the potential for damaging surface structure, which can aid in degrading the material and thereby aid future fungal attack. Old buildings potential contain lead based paints and only should be remediated by specially trained personnel in hazardous material handling.

6.3.5 Appearance Enhancement (not recommended)

These are not cleaning methods and are not recommended and include polishing, waxing and buffing.

6.3.6 Encapsulation (not recommended)

These are not cleaning methods and are not recommended and include application of coating over porous or semi-porous material; and lamination of irreplaceable documents or photos.

6.4 Remediating Materials

6.4.1 Non Porous and Semi-Porous Materials

Non porous materials and semi porous materials that are visibly mould should be able to be cleaned and reused.

6.4.2 Porous Materials

Porous materials with mould damage to more than a small area ($>1 \text{ m}^2$) should be removed and discarded. Materials that can be cleaned can be remediate if necessary, but should be discarded if possible. Porous materials with mould growth to more than a small area should only be remediate by a professional restoration consultant. All porous materials that are remediate and returned to site should be dry and free of visible contamination and odours and should be periodically inspected to ensure the restoration was successful.

6.4.3 Odour Control

If ozone treatment is to be used for odour control, then the item must first undergo restoration by drying and removing the mould

growth with the recommended cleaning methods. The use of gaseous, vapour phase or aerosolised deodorants is not recommended. Using chemicals in this manner can cause adverse health effects in individuals returning to a site and occupants in adjacent areas.

6.5 Verification of Remediation Effectiveness

The effectiveness of restoration to contents and remediation works to any larger sized job (Building Grade 3 or 4) should be verified by independent mould testing and analysis. In particular, large jobs that require high levels of containment and PPE should not be re-occupied until mycological testing has verified that the area is fit for re-habitation.

7 MOULD DAMAGE CLASSIFICATION SYSTEM

The following classification system is to be used as a guide for mould remediators to help judge whether or not they are competent in managing the full extent of a remediation job. The building classification system includes the following types of mould damage:

1. BUILDING CLASS 1 - Normal
2. BUILDING CLASS 2 - Local Area Less Than 1 m² (Cleaning to Remove Mould)
3. BUILDING CLASS 3 - Limited Visible Mould Growth to Less Than 10 m² (Small Jobs)
4. BUILDING CLASS 4 - Extensive Visible Growth Greater Than 10m² (Large Jobs)
5. BUILDING CLASS 5 - Strong Indication of Mould Contamination but no Visible Evidence
6. BUILDING CLASS 6 - Cross Contamination
7. BUILDING CLASS 7 - Clean Room

7.1 BUILDING GRADE 1 - Normal

Normal situation in most houses and buildings without mould damage. All fungi detected indoors would originally be from the outdoors as no indoor sources of mould should be present. Building Grade 1 situations can be entered using Level 1 PPE.

7.2 BUILDING GRADE 2 - Local Area Less Than 1 m² (Cleaning to Remove Mould)

This level of building class refers to the initial inspection and sample taking process and to very small areas of visible mould growth that can be effectively cleaned using relatively simple methods. In particular this refers to either a small area of visible growth less than 1m² in area, or the conditions normally experienced during an initial site assessment on small jobs when taking samples or drilling inspection holes for borescope etc.

Building Grade 2 situations should only be entered using Level 2 PPE. Containment of the entire work area should not be necessary. The work area should not be occupied during inspections, cleaning or removal of contents or materials. It should not be necessary to evacuate people in adjacent areas except those with prescribed illness listed on page 4.

Local areas for cleaning or removal can be sealed in plastic where required.

Remediation can be performed by normal building maintenance personnel that have been trained in Mould Hazard Awareness, PPE, and effective methods for cleaning mould. The entrance and exit locations used by the remediation / cleaning personnel should be cleaned with a HEPA vacuum cleaner and damp wiped with a cloth and vinegar solution. All areas should be left dry and free from visible mould contamination and debris. No final mould clearance testing would normally be necessary.

7.3 BUILDING GRADE 3 - Limited Visible Mould Growth to Less Than 10 m² (Small Jobs)

This classification concerns an indoor environment that has sustained serious mould damage over a period of time. The visible mould growth would be clearly visible on less than 25% of all surfaces or not greater than 10 m².

Building Grade 3 situations should only be entered using Level 3 PPE. The work area should not be occupied during cleaning or the removal of contents or materials or during inspections. It should not be necessary to evacuate people in adjacent areas except those with prescribed illness listed on page 4.

Containment of the entire work area should be performed before remediation commences. This will include covering the work area with plastic sheeting and sealing the edges with tape to contain dust and remediation debris. Dust suppression methods should be applied to any material before it is disturbed. The waste should be carefully collected and wrapped in plastic and disposed of off-site.

Remediation can be performed by building maintenance personnel that have been trained in Mould Hazard Awareness, PPE, and effective methods for cleaning mould and remediating building materials. The entrance and exit locations used by the remediation / cleaning personnel should be cleaned with a HEPA vacuum cleaner and damp wiped with a cloth and vinegar solution. All areas should be left dry and free from visible mould contamination and debris. Final mould clearance sampling is highly recommended and should include several air and surface sample. Occupants should be cautioned not to return to the remediate area until after mycological analysis has determined that target species have been controlled or eliminated.

7.4 BUILDING GRADE 4 - Extensive Visible Growth Greater Than 10m² (Large Jobs)

This classification concerns an indoor environment that has sustained severe mould damage that has affected the structural integrity of building materials such as wall and ceiling linings. Visible mould growth occurs on greater than 25% or more than 10 m² on interior surfaces. Structural materials most likely have high moisture contents and will require specific drying.

Building Grade 4 situations should only be performed using Level 4 PPE. The work area should be clearly marked with a sign stating "Biohazard Do Not Enter" during the entire remediation period. A list of remediation works and a completion schedule should be posted near the Biohazard sign. Hazard communication measures listed in page 4 should be made available to all people in adjacent areas.

Containment of the entire work area should be performed before remediation commences. This will include covering the work area and immediate adjacent areas with plastic sheeting and sealing the edges with tape to contain dust and remediation debris. HVAC, ventilation and exhaust ducts should be sealed with plastic and the edges taped to prevent remediation dust from further contaminating them.

The area should be placed under negative pressure by using an exhaust fan with a HEPA filter. Air scrubbers can be used as an area dust and spore suppression method. The entrance to the work area should be controlled through an air lock and decontamination room. These can be constructed from plastic sheeting over a demountable frame. All edges should be sealed with tape.

The work area should not be occupied during cleaning, removal of contents or materials or during inspections. It may be necessary to evacuate people in adjacent areas especially those with prescribed illness listed on page 4.

Any materials or contents that cannot be cleaned should be removed by wrapping in plastic bags. The outside of the plastic bags should be HEPA vacuum cleaned in the decontamination chamber before transporting through uncontaminated areas for disposing off-site in normal rubbish disposal. Dust suppression methods should be applied to any material before it is disturbed.

Remediation should be performed by personnel that have been trained in handling hazardous materials. The remediation area and the air lock and decontamination chamber and their immediate surrounds should be left dry and free from visible mould contamination and debris.

Extensive air and surface monitoring should be conducted in the remediate area. Occupants should only be allowed to return to the remediate area until after mycological analysis has determined that the area is fit to re-occupy.

7.5 BUILDING GRADE 5 - Strong Indication of Mould but no Visible Evidence

Remediation should not commence until the building has been properly assessed. This class of mould damage might be characterised by any of the following situations:

1. Complaints of health symptoms with no visible growth,
2. Complaints of obnoxious mouldy odours with no visible growth,
3. Signs of structural weakness such as visible destruction to timber or dry rot,
4. Evidence of previous moisture damage that was dried but there are complaints of odours or symptoms but no visible growth
5. Other consultants have measured high concentrations of parameters such as MVOCs or VOCs without any obvious source.

The source for symptoms in this situation needs to be thoroughly investigated.

The level of PPE required to enter a Building Grade 5 for investigation will vary according to the situation at hand.

- Level 2 PPE should be used where there is little evidence of widespread damage and no health complaints,
- Level 3 PPE should be used where there have been some health symptoms reported by individuals or mouldy odours etc.
- Level 4 PPE should be used if there have been serious symptoms or strong odours reported or where the investigator is to remain in the building for more than 30 minutes.

The work area should not be occupied during inspections. It may be necessary to warn people in adjacent areas of the potential

hazards especially those with prescribed illness listed on page 4.

No remediation should proceed until the building has been thoroughly assessed by a qualified Mould Inspector or IAQ Assessor.

7.6 BUILDING GRADE 6 - CROSS CONTAMINATION

This classification concerns an indoor environment that was Building Grade 1, but has been contaminated by spores and dust that originated from a Building Grade 2, 3 or 4. This can occur where remediation has been performed to adjacent areas and the containment procedures have not been followed, or where containment barriers have failed.

This may include small areas of visible growth (colonies less than 1mm diameter) that have occurred from the recent settling of spores, which have encountered sufficient moisture to begin growth.

This situation can only be returned to Building Grade 1 if the cross contamination is dealt with in a timely manner. If this situation is left for a period greater than 48 hours, or when widespread visible mould growth occurs, then the remediation works will need to be conducted as either Building Grade 2, 3 or 4 depending on the extent of the damage.

Building Grade 6 situations should only be remediate according to the level of contamination:

- Level 2 PPE should be used where there is minor evidence such as low concentrations of target species detected on surface or airborne samples.
- Level 3 PPE should be used if there is moderate or high evidence such as high levels of target species from the adjacent remediation area in surface and/or airborne samples.

The work area should not be occupied during remediation. In cases of high evidence of cross contamination, it may be necessary to warn or evacuate people in adjacent areas due to potential hazards especially those with prescribed illness listed on page 4.

Large areas with high concentrations of target species should be sealed with plastic and taped at the edges to prevent further cross contamination during cleaning. All cleaning should be thorough or meticulous with a high

efficiency vacuum cleaner with a HEPA filter and a damp cloth and vinegar solution.

Remediation should be a thorough or meticulous cleaning with a high efficiency vacuum cleaner with a HEPA filter and a damp cloth and vinegar solution on all surfaces to removed settled spores and dust.

The entrance and exit locations used by the remediation / cleaning personnel should be thoroughly or meticulously cleaned with a high efficiency vacuum cleaner with a HEPA filter and a damp cloth and vinegar solution.

7.7 BUILDING GRADE 7 HVAC Systems

This section is in review and will be available soon. In principle the remediation should be performed according to the amount of fungal contamination as described in Building Grades 1 through 6. Extra PPE requirements may be required if workers are to be working in confined spaces.

7.8 BUILDING GRADE 7 - CLEAN ROOM

This classification is for absolute sterilised clean room environments such as those used in pharmaceuticals and computer component manufacture. Only highly qualified and experienced Engineers and IAQ experts should only be consulted in these situations. Protocols for handling Building Grade 4 Remediation work should be followed.

8 PPE CLASSIFICATION SYSTEM

This classification system details the personal protection equipment (PPE) required to minimise exposure to fungal spores and/or fungal gaseous by-products during inspections and remediation works.

The person performing an inspection or in charge of remediation works should use their judgment and increase their level of PPE to suit the conditions at hand.

8.1 PPE LEVEL 1

This level of PPE is intended for initial inspections or sampling regimes in Grade 1 buildings where there is no visible mould growth; health complaints; mould odours; cross contamination; or any known or obvious moisture damage. A breathing mask should not be required. No protective clothing should be required.

8.2 PPE LEVEL 2

This level of PPE is intended for initial inspections or sampling regimes where mould growth is suspected due to known water damage or limited visible growth. There should be no serious health complaints related to mould or time spent in the building. A minimum of a half face respirator mask with disposable HEPA filters is recommended for extended periods. Where there are strong or obnoxious odours, then an activated carbon or organic vapour filter should be used in addition to the HEPA filter. No protective clothing such as overalls should be required. Breathing mask and gloves should be taken off outdoors.

8.3 PPE LEVEL 3

This level of PPE is for small fungal contamination that relates to Building Grade 3 mould damage. The objective of this level of PPE is to limit exposure to fungal spores and gaseous by-products. A half face respirator mask with HEPA filters and splash goggles should be worn at all times. Where there are strong or obnoxious odours, then a full face mask should be used with an activated carbon or organic vapour filter in addition to the HEPA filter. PPE should include disposable overalls and gloves.

8.4 PPE LEVEL 4

This level of PPE is for a maximum of 2 hour exposure to large area of fungal contamination that relates to Building Grade 4 mould damage. This level of PPE should eliminate exposure to fungal spores and gaseous by-products. PPE should include disposable overalls, gloves and shoe protectors. All joins at ankles and wrists where gloves and shoe protectors meet the disposable overalls should be sealed with tape. Full face respirator mask with HEPA filtration with an activated carbon or organic vapour filter should be used at all times.

9 GLOSSARY

µg	micrograms	Fungi	any microorganisms belonging to the Kingdom Fungi including mould and yeast, commonly referred to as mould, though mould only refers to mycelial growing fungi
µm	micrometers or microns	g	grams
µg/m³	micrograms per cubic metre	Genera	part of the taxonomic description of a group of fungi
AC	air conditioner	HEPA	High Efficiency Particulate Filtration: 99% efficiency of particles larger than 0.3 microns
agar	an extract of the cell walls of certain red algae that produces a jelly when dissolved in hot water	HEPA vacuum	A high efficiency vacuum cleaner with a HEPA filter, check that the HEPA filter holder is well designed sealed and does not allow bypass.
AIHA	American Industrial Hygiene Association	Hg	mercury
ASHRAE	American Society Of Heating Refrigerating And Air-conditioning Engineers	HVAC	heating ventilation and air conditioning system
a_w	water activity	hyphae	a part of filamentous growing fungi that is able to elongate
Bulk Sample	taking a material samples from a surface either by scraping a hard surface or by vacuuming carpets or textiles	IA	indoor air
CBS	Centraalbureau voor Schimmelcultures	IAP	Indoor air pollution
CFU	colony forming unit	IAQ	indoor air quality
CFU/m²	colony forming units per square metre	IAQ Assessor	An air quality or indoor environmental professional with training and extensive experience with indoor air quality (IAQ), sick building syndrome (SBS) and building related illness (BRI), may include and IAQ consultant, Industrial Hygienist, Occupational hygienist, or similar.
CFU/m³	colony forming units per cubic metre	IEA	indoor environmental assessment
chlamyospore	resting spores that are formed from parts of vegetative hyphae	IEQ	indoor environment Quality
CIH	Certified Industrial Hygienist	IICRC	Institute Of Inspection Cleaning And Remediation Certification
cm	centimetre	MEA	malt extract agar
CO²	carbon dioxide	MEA+40	malt extract agar + 40% Sucrose, a true xerophilic agar
colony	a consistent mycelium (mould) or a mass of cells (yeasts) that are of one origin	mg	milligram
conidia	An exclusive form of reproduction only found in fungi that is not produced by cytoplasmic cleavage or free cell formation, commonly referred to as spores.	MLA	Mycologia Australia Pty Ltd
contamination	fungal growth that is considered detrimental to materials or human health	mm	millimetre
CzD	Czapek-Dox agar	Mould	Common description of visible fungal colonies with mycelial growth form
DG 18	dichloran-18% glycerol agar, often misquoted as a xerophilic agar	Mould Inspector	A qualified Mycologist with special training or experience in diagnosing building related mould problems.
DNA	deoxyribonucleic acid	MSDS	manufacturer safety data sheet
DRBC	dichloran rose Bengal chloramphenicol agar		

MVOC	microbial volatile organic compound	substrate	the space in which a fungus grows and the material filling this space that provides nutrients for the fungus
mycelia	a single fungal hyphae	Surface Swab	Usually a sterile cotton tip swab dipped in sterile water and rubbed on a surface to pick up fungal spores and then transferred them to a nutrient agar.
mycelium	a mat of many individual hyphae woven together, often visible	Taxa	A term used in the systematic categorisation of fungal genera and species.
Mycologist	A person who works with fungi, similar to a microbiologist (who work mainly with bacteria)	TSP	total suspended particulates
Mycology	The study of fungi	UV	ultra violet
mycotoxin	A secondary metabolite produced by fungi as a normal part of respiration.	VC	vacuum cleaner
n	sample number	vegetative state	mycelium that have no reproductive structures
NIOSH	National Institute Of Occupation Safety And Health	VOC	volatile organic compound
nutrient media	an agar with nutrients added to promote fungal growth and sporulation	WME	Wood Moisture Equivalent
NYC	New York City Department of Health and Mental Hygiene	Yeast	Fungi that produce distinct cells and that reproduce by budding or dividing cells
DOHMH		μ	micro
OA	outdoor air	μm	micrometre
°C	degrees Celsius		
PCR	polymerase chain reaction		
PM₁₀	particulate matter with an effective aerodynamic diameter of 10 microns or smaller		
PPE	personal protective equipment		
ppm	parts per million		
RH	relative humidity		
RODAC	A type of surface sampling where a modified agar plate is overfilled with nutrient agar so that the agar is sits proud and can be contacted with a surface and fungal spores.		
RSP	respirable particulate matter		
SBS	sick building syndrome		
SNA	synthetic low-nutrient agar		
sp.	Several species belonging to that genus.		
spec.	A single fungal species was differentiated but not identified.		
Species	the specific taxonomic description of a fungus		
Spore	A general term referring to all fungal reproductive structures including the spores from sexual reproduction and conidia from asexual reproduction and resting sclerota.		
sporulation	the process where a fungus produces spores or conidia		
sterile mycelia	A fungal colony containing fungi growing in a vegetative state.		

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