

# Update For 2007: Standards for Managing Water Damage or Mould Growth in Buildings

**M**ould growth in buildings and the possible adverse health impact on occupants has emerged as one of most pressing health and safety issues of the day. Employers, property managers and contractors understand they are responsible to protect the health and property of employees, clients and occupants. This article and the accompanying flowchart will assist these responsible parties in meeting current standards for managing water damage and mould growth in buildings.

Mould microorganisms are rapidly growing fungi, present throughout the natural world. Mould spores will always be present in buildings, whether blown in through windows or other openings, brought in by ventilation equipment, or tracked in with dust and dirt. Growth of mould can occur when susceptible building materials are wet for long enough to allow the spores to germinate, grow and multiply. Common sites for mould growth include drywall, carpets, ceiling tiles, wood and wood products, and any paper products. Once the mould spores are formed, they are readily airborne and will remain a health hazard until the growth is removed. This is the case even when the mould growth is within wall cavities or other concealed locations. The most common symptoms reported from mould exposure in buildings are running nose, eye irritation, cough, congestion, aggravation of asthma, headache and fatigue. There is also a risk of respiratory infections in occupants who have a compromised immune system. There is no acceptable level of mould

growth in buildings, that is an amount of mould growth that can be present without risking adverse health effects among at least some of the occupants.

Several professional bodies have issued standards in the past few years on the assessment and remediation of mould growth in buildings. The most significant of these are given below.

1. *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*, 2000, New York City Department of Health ([www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html](http://www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html)). The New York City guidelines are widely quoted by public health departments and other regulatory agencies. The Ontario Ministry of Labour refers employers to these guidelines in a Hazard Alert on Mould in Workplace Buildings issued in 2000 ([www.gov.on.ca/lab/ohs/a20e.htm](http://www.gov.on.ca/lab/ohs/a20e.htm)).
2. *Construction – Related Nosocomial Infections in Patients in Health Care Facilities: Decreasing the Risk of Aspergillus, Legionella and Other Infections*, Health Canada, 2001. ([www.hc-sc.gc.ca/pphb/dgspsp/publicat/ccdr-rmtc/01pdf/27s2e.pdf](http://www.hc-sc.gc.ca/pphb/dgspsp/publicat/ccdr-rmtc/01pdf/27s2e.pdf)). This Health Canada standard gives precautions to be taken when performing construction or restoration work in hospitals and health care facilities in order to reduce the risk of patients acquiring mould infections and Legionnaires' disease.
3. *Standard and Reference Guide for Professional Water Damage Restoration*, 3<sup>rd</sup> Edition, 2006, published by the US Institute of

Inspection, Cleaning and Restoration ([www.iicrc.org](http://www.iicrc.org)). The IICRC provides training and certification for restoration contractors. The Second Edition of the S500 standard emphasizes steps to be taken to protect building occupants from harmful microbial growth.

4. *Mold Remediation in Schools and Commercial Buildings*, 2001, US Environmental Protection Agency ([www.epa.gov/mold/mold\\_remediation.html](http://www.epa.gov/mold/mold_remediation.html)). This EPA standard details procedures to be followed in remediating mould growth. It also gives useful advice on the effectiveness of drying building materials and the time that finishes can remain wet before mould growth may occur.
5. *Mold Remediation Procedures*, 2004, Environmental Abatement Council of Ontario. EACO developed a code of practice for mould abatement, drawing on the best points of the New York City guidelines and other standards, in consultation with the Ontario Ministry of Labour. The Ministry of Labour accepts the EACO guidelines as meeting the due diligence requirements of the Occupational Health and Safety Act.

## HIGHLIGHTS

- Managing Water Damage
- Responding to Suspected Mould Growth
- Special Concerns in Health Care Facilities

# DUE DILIGENCE IN MANAGING WATER DAMAGE AND MOULD GROWTH IN BUILDINGS

**WARNING RE. OCCUPANTS AND HEALTH**

- *At any time*, if occupants report significant, potentially-related symptoms, advise them to seek medical attention. It may be necessary to relocate sensitive individuals.<sup>1</sup>
- Evacuation of a building would only be considered in cases of widespread confirmed building-related illness combined with widespread mould contamination.<sup>1</sup>

- New or old water damage is reported or noted, or
- Strong odours consistent with mould are noted, or
- Symptoms potentially related to mould are reported,

Hospital or health care facility?

**Follow Health Canada Guidelines for Prevention of Nosocomial Infections, for all recovery and re-build work<sup>2</sup>**

- Evaluate susceptibility of occupants in and around work area and potentially relocate
- Classify work as Class 1-4
- Assign precautions adequate to protect adjacent occupants
- Work should be performed under direction of physician or Infection Control personnel

NO

Water source with high level of bio-contaminants (sewage, river flood, etc.)?

**Follow IICRC Category 3 Procedures<sup>3</sup>**

- Use trained, qualified, protected, insured workforce
- Consider evacuation of occupants
- Shut down HVAC equipment
- Containment is strongly recommended
- Dispose of all absorbent finishes, contents (carpet, drywall, etc.)
- Disinfect, detail clean, 2<sup>nd</sup> disinfection
- Dry structure to 30-50% RH
- Document drying process, RH
- Consider 3<sup>rd</sup> party evaluation of completion, if
  - Harmful microbial contamination
  - High risk occupants
  - Public health issues

YES

NO

New water source (reported within 24-48 hours of wetting)?

**Most finishes and contents can be saved. Proceed with effective structural drying<sup>3</sup>**

- Use trained, qualified, insured, protected workforce and certified technicians
- Dry structure and contents to 30-50% RH in space within 48 hours of flood. Check moisture content of finishes and contents.
- **Document** the drying process, and dryness of all surfaces including inside cavities
- May not be able to save ceiling tiles, fiberglass and cellulose insulations. Consider pro-active removal.<sup>4</sup>

YES

NO

**Investigate for mould growth**

- Use qualified, insured investigator
- *In a workplace*, inform JHSC, who has a right to witness investigation. Forward report to JHSC
- Consider history of water damage and of health complaints
- Perform physical inspection, may require intrusive inspection<sup>7</sup>
- Perform air and bulk sampling as required

**Perform Mould Remediation<sup>1, 4, 5, 6, 7</sup>**

- In cases of widespread mould contamination with linked illness throughout the building, consider evacuation<sup>1</sup>
- Engage qualified, trained contractor, with insurance coverage including mould remediation
- Assign Level I, II or III procedures, depending on extent
- Remove occupants from work area and consider removal of susceptible occupants from adjacent areas<sup>1</sup>
- For Level III work, engage EH&S professional, qualified and insured for mould work, to oversee and perform final inspection and possibly testing<sup>7</sup>
- Document the project

YES

Mould growth confirmed?

Review the Operations and Maintenance program to prevent future water events

NO

Consider other indoor air contaminants

**References : see guidelines in text**

**6. *Mould Guidelines for the Canadian Construction Industry*, 2004.** Canadian Construction Association ([www.cca-acc.com/documents/electronic/cca82/cca82.pdf](http://www.cca-acc.com/documents/electronic/cca82/cca82.pdf)). The CCA guidelines give advice on prevention of mould growth on construction projects, demolition precautions and legal and insurance considerations, among other issues. They also give precautions for mould remediation (Levels I, II and III plus HVAC abatement) that are more similar to the EACO guidelines.

**7. *Fungal Contamination in Buildings: Health Effects and Investigation Methods*, 2004.** Health Canada. This Health Canada update of a 1995 guideline presents a literature review on health effects of indoor mould and concludes that living or working in mouldy buildings is harmful to health. It gives detailed recommendations for mould investigations and provides general advice for abatement and supervision of abatement.

The attached flowchart summarizes the major requirements of the standards listed above, as well as some general responsibilities for employers under the Ontario Occupational Health and Safety Act.

## Occupants experiencing adverse health effects?

At the outset, the responsible party should be attentive to the health status of the occupants. The New York City protocol recommends that occupants who are experiencing significant adverse health effects that may be related to mould exposure be advised to see a doctor. It may be necessary to re-locate susceptible persons. In a workplace building, the Ministry of Labour sensitive worker policy might be applied in such a case. Evacuation of a building would only be warranted in cases of widespread mould-related symptoms (preferably physician-confirmed) and widespread mould contamination. In most cases, occupants can safely remain in the building during remediation. However, both the New York City Protocol and the IICRC S500 standard state it may be necessary to re-locate susceptible individuals until the remediation is complete.

## Is the building a hospital or health care facility?

Any work in a hospital or other health care facility has the potential to release settled mould spores or bacteria in plumbing systems during removal and repair of ceilings, walls, and other finishes. If these spores or bacteria are not contained, susceptible patients might develop fungal infections or Legionnaires' disease, a bacterial pneumonia. Note that mould spores will be present in all settled dust in such a facility so that a risk of infection is present even if there is no visible mould growth. If mould growth is present, the risk is much greater. Any such work in a health care facility should be performed under the direction of the infection control personnel, following the 2001 Health Canada guidelines set to prevent hospital-acquired infections.

## Contamination with sewage or other highly contaminated water?

Where a building has been contaminated with water containing a high level of pathogens (sewage, and also flooding from rivers and streams), Category 3 work practices described by the IICRC S500 standard apply. The contractor should be trained and experienced in such work and preferably would have liability insurance that includes coverage for mould remediation. The contaminated area should be enclosed, the ventilation systems turned off and sealed, and the work area put under negative pressure by use of filtered exhaust ventilators. All finishes and contents affected by the flood should be sealed in plastic bags and disposed of. The structure should be disinfected and dried as quickly as possible, and the contractor should provide a written report documenting the success of the water restoration including both relative humidity and surface moisture readings. The IICRC Standard recommends a 3rd party health and safety consultant to oversee the work, at least where harmful microbial contamination is present, where there are susceptible individuals present, or where there are public health issues.

## Newly reported water damage?

Where a water episode is reported soon enough, an immediate response and the use of professional water restoration practices can prevent or limit mould growth and allow most of the finishes and contents to be saved. Both the New York City protocol and the US EPA standard quote a 24–48 hour grace period during which effective drying will prevent mould growth. Contractors trained in structural drying methods should be employed and should provide written proof of a dry condition at completion. Note that some porous materials may not be able to be successfully dried, even with the best of efforts. The EPA standard advises that ceiling tiles, cellulose and fiberglass insulations cannot be reliably dried with currently methods. Once wetted, they should be discarded.

## Report of old water episode or signs of mould growth present?

Signs of water damage not properly corrected, musty odours, or reports of potentially mould-related health effects should prompt an investigation for possible mould growth. A professional experienced in mould investigations, preferably with liability insurance including mould hazards, should perform the investigation. The investigation will include an inspection of the property, often with intrusive testing to examine hidden areas, and in some cases might involve air sampling. The investigation should report on the presence and extent of mould, if found, and where possible comment on the likely cause of the growth.

## Is the property a workplace?

In Ontario, the Ministry of Labour considers mould growth in general buildings to be a workplace hazard. The Ontario Occupational Health and Safety Act requires that the Joint Health and Safety Committee or the Safety Representative representing the workers be informed of any investigation for health and safety, including testing for mould growth. The Act also allows

a representative of the Committee to observe the beginning of such testing and the JHSC must be copied with all reports of mould investigations provided to the employer. Similar legislative requirements apply in most other Canadian jurisdictions.

### Once mould growth is confirmed?

Once mould growth is confirmed, remediation should begin as soon as possible. The CCA and EACO guidelines are recommended as the most up-to-date and detailed procedures. Susceptible occupants (infants, elderly, immunocompromised, etc.) should be relocated from the area of work and perimeter of the work area during abatement. The occupants should be informed of the work to be performed and given information on the methods to be used. In a workplace building, it would be advisable to have the JHSC informed of the remediation work and copied with testing reports. The abatement contractor should be trained, experienced and carry mould-inclusive insurance. Health Canada recommends that quality assurance measures be applied,

which usually requires an independent health and safety professional to oversee the work. Environmental testing, usually air sampling, is typically applied at completion as part of the quality assurance measures.

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Bruce Stewart CIH, ROH, is a Senior Vice President at Pinchin Environmental Ltd. of Mississauga, Ontario (bstewart@pinchin.com).

Further internet links for additional information on mould can be found at [www.pinchin.com](http://www.pinchin.com).

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Pinchin Environmental Ltd.  
2470 Milltower Court,  
Mississauga, ON L5N 7W5

Tel: 905-363-0678

Toll Free: 1-888-767-3330

Fax: 905-363-0681

E-Mail: [info@pinchin.com](mailto:info@pinchin.com)

Web Site: [www.pinchin.com](http://www.pinchin.com)

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Toll Free 1-888-767-3330 ext. 3021  
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2470 Milltower Court  
Mississauga, ON L5N 7W5