

AIR CONDITIONING & INDOOR AIR QUALITY

Temperature and humidity have a significant effect on human comfort and health. The most comfortable humidity range is 40-60%, but air temperature and humidity are related in respect to comfort or perceived temperature. The combinations of temperature and humidity where people report comfort is termed the "comfort zone".

Heat related stress can result in increased fatigue, caused by increases in heart rate, blood pressure, sweat production, dehydration and collapse. The body becomes increasingly devoted to remaining cool, resulting in a reduced capacity for physical and mental work. The environments you provide for your staff, customers or guests should therefore aim to be within the comfort zone.

Indoor Air Quality

Indoor Air Quality is an important issue in any workplace and public environment. The quality of indoor air has, in recent years, become of increasing concern. In an increasing effort to reduce construction and maintenance costs, the building industry has been developing cheaper and more effective products. Unfortunately, some of these, such as particle board, flooring surfaces and new adhesives release "off-gas" chemical compounds that pollute indoor air. Photocopying and laser printing processes release quantities of ozone. Cigarette smoke exposes not just the smoker, but also those in the vicinity of the contaminated area. Add to this the trend to recycle air through air conditioners and you have a cocktail that may affect the health of building occupants. This is particularly important when considering how much time is spent indoors.

Not all indoor air pollution is chemical in nature. Biological contaminants such as dust mites, moulds, fungi, spores, pollen and bacteria can also cause health problems, including allergic reactions and infections.

Prevention and problem solving of indoor air quality problems involves two main actions - the management of pollutant sources and the use of ventilation to control pollutants. Many problems can be prevented and solved using the skills of members of the staff of your workplace.

Legionella

Legionella is a form of microbial contamination. Other microbes can contaminate air-conditioning units and cooling towers which can result in other health problems for workers and visitors such as respiratory sensitisation and building related illness, or 'sick building syndrome'. It is essential to maintain good indoor air quality at all times. ([see attached legionella fact sheet](#))

Mould – The New Asbestos??

Until recently, the effects of mould spores on humans was thought to be minor. Even though the symptoms of mould allergies, including runny nose, eye irritation, coughing, congestion, asthma aggravation, headache and fatigue, have caused some illnesses and missed work days, these symptoms could be managed with minimal medical intervention. In short, the symptoms have been known, but their effects have not significantly impacted business with any financial burdens.

However, over the last couple of years, much more serious health effects have been attributed to mould. Severe health effects believed to be associated with the toxins produced by these moulds have become part of tort litigation. A prominent LA lawyer, Alexander Robertson (who represents about 1,000 clients), says that he believes toxic mould cases are the fastest growing area of both toxic tort litigation and construction defect litigation.



Mould related insurance claims have risen dramatically in the US over the past 2 years, and continue to rise exponentially. In the Australian market we can expect a similar trend to emerge as the public become more aware of the potential health effects of indoor mould growth. Those in the insurance business who deal with **personal injury and property damage** cover should be aware of the possible claim implications.

Mould exposure takes many forms; first-party claims by home and building owners, as well as third-party liability actions against landlords, strata plan associations, builders, contractors, architects, real estate agents and virtually any party connected with the construction or maintenance process.

Typical commercial property policies in Australia usually cover direct physical loss of, or damage to, insured property caused by or resulting from an insured peril. The issue to be determined is whether mould is simply a condition of the property or whether it constitutes direct physical loss or damage.

Mould remediation has become as comprehensive as asbestos remediation. This exposure has driven up the costs associated with water damage. Mould growth and amplification can occur as quickly as 48 hours after a water or moisture intrusion event if quick drying measures are not taken.

- What is mould?

Mould is a type of microscopic fungus that grows naturally indoors, and is grouped with other microbes such as mildews, yeasts and mushrooms. The most common types of moulds which grow well indoors include *Aspergillus*, *Cladosporium*, *Penicillium* and *Alternaria*. Mould spores can be found in the air and on nearly every surface in a home, but generally a consistent source of moisture is required for mould to grow. There are over 200,000 species of fungi and microbes known, of which approximately 60 to 100 are a cause of concern in the indoor environment.

Mould and humans have co-existed for thousands of years, and most people have developed a tolerance to mould exposure. We can't actually see mould – which is essentially very fine, micron size, hair-like filaments. What we see is what mould excretes. A mass of interwoven filaments (hyphae) is a mycelium, or one colony of mould. Reproduction of mould can take place both sexually and asexually.

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- **Why is mould harmful?**

As mentioned before, there are over 200,000 species of fungus and microbes, including moulds, which exist, and of these about 100 have been related to extremely adverse health effects. There are 4 basic ways in which various moulds can affect people's health:

1. Allergic reactions, which usually affect between 10-20% of victims. Skin and/or blood tests are required to determine whether any individual is susceptible to this form of illness.
2. "Ergosterol" or "glucan" in the walls of the mould cell can cause hay-fever like symptoms, itchy, red & watery eyes and nasal congestion. These effects can be suffered by anyone who is exposed.
3. Some moulds release trace quantities of organic compounds such as benzene or acetone, which are linked to nausea, dizziness and headaches.
4. Moulds, like other organisms, don't particularly want to compete for food and nurturing, and as such they expel mycotoxins to kill competitors such as bacteria. Mycotoxins are chemicals which cause some sort of toxic response in humans. In the case of helpful mycotoxins, such as various antibiotics, these are not harmful. In the case of some moulds, such as "stachybotrys", the mycotoxins target cells within humans and cause problems such as cancer, stillbirths and bleeding in infants.

Killing the spores will not disable the toxicity of mycotoxins. These toxins are present in the spores whether they are dead or alive. The only way to remove the health hazard is to physically remove all spores from the contaminated area.

From a purely property perspective, un-actioned mould spread can lead to cosmetic or structural damage to building elements, due to the mould's reliance on the building materials as a nutrient or food source.

- **How does mould propagate?**

Mould and humans have co-existed for thousands of years, and most people have developed a tolerance to mould exposure. Mould has really only become problematic from a property and liability point of view in the past 30 years. The drive towards energy efficiency in buildings has had the unintended effect of sealing off indoor air flow so moisture doesn't evaporate very well.

Mould spores and microbes are present throughout the environment, indoors and outdoors, and there is virtually no way of eliminating these from the air.

Mould growth can begin within 48 hours where the following 3 criteria are satisfied:

1. Temperature typically greater than 21C, but ideally in the range between 15-30C.
2. Existence of a nutrient source, including many types of building construction materials, such as drywall, wood, insulation, ceiling tiles and carpet. Building materials are now more cellulose based with higher paper content, which mould thrives on.
3. Presence of moisture, in the form of high humidity (greater than 60%) rather than puddles or pools.

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- **A few examples.....**

At the moment, there are few actual examples of mould-related claims, either property or liability related, and there are virtually none in Australia. The main reason so far that there have been so few successful liability cases, for example, is due to plaintiffs and the 4 burdens of proof.

Firstly, have to prove that the building owners and other responsible parties have a duty of care responsibility to the occupants.

Secondly, they have to prove that a breach of this duty of care has occurred. So far, in a number of cases, the plaintiffs' lawyers have reached stage 2. Stage 3 means that the plaintiff has to prove causation. For someone to be found liable for falling below an applicable standard of care, the breach must be the proximate cause of the claimed injury. The plaintiff must show that the breach produced the claimed injury by a natural and continuous sequence, unbroken by any efficient intervening cause, and they must establish that the claimed injury would not have occurred without the breach.

Up till now, showing causation has been troublesome.

A US court has awarded US\$32 to Texas resident Melinda Ballard after her insurer failed to recognise the mould problem, or to realise its policy covered mould. The issue here was related to adverse health effects from mould, where copper piping leaked underneath their 22 room mansion. Whereas the court threw out all claims associated with the toxic effects of the mould, the jury established that the insurer should pay the family the \$32 million for their (the insurer's) bad faith, including their failure to assign a competent independent claims appraiser.

A California mould related case was settled for US\$18.5 million.

A New York employee has initiated an action for workplace mould for US\$65 million.

Richard Kramer filed a complaint in December 2002 against 28 defendants, which include all parties that designed, sponsored or managed the expensive residential building in which his apartment is situated. Kramer alleges that water infiltration and the passage of time 'have rendered apartments in the building uninhabitable and put the health of the building's residents seriously at risk' because the building is contaminated with fungus moulds, including *Stachybotrys*. "That mould infestation has resulted from massive leaks and other water problems throughout the building, which defendants knew about for well over a year, but concealed from apartment owners and failed to remedy." The lawsuit seeks more than US\$2 billion in compensatory and punitive damages and rescission of the sale contract. 3 year old Alana Kramer has developed severe and disabling respiratory and other illnesses attributable to toxic mould exposure as well as Mrs Kramer, who has developed severe allergic reactions to this toxic mould.

In November 2002 almost all of the walls and ceilings at the Newmarket courthouse in Ontario, Canada, had to be removed and replaced to eliminate every trace of mould growth. Some buildings with extensive mould in NZ have had to be demolished.

- **Helpful websites**

<http://www.esemag.com/1100/mould.html>

<http://www.epa.gov/iaq/molds/index.html>

<http://www.osha-slc.gov/SLTC/indoorairquality/>

<http://www.cal-iaq.org//iaqsheets.htm#Mold>

http://www.casanz.org.au/Documents/Clean_Air_summary.htm

<http://www.tdi.state.tx.us/consumer/cb075.html>

<http://www.fmlink.com/ProfResources/Magazines/article.cgi?Journal%20of%20Property%20Management:jpm0503d.htm>

<http://www.fmlink.com/Search/exp-search.noarch.pl>

LINK TO LEGIONELLA FACT SHEET

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