

## Water Damage | Mould - What the terms mean?

**It's essential! Eliminate all moisture issues, address the source, control moisture to prevent mould.**

**If you ...**

**Water Damage:** According to Dr. Shoemaker's studies a building is considered water-damaged when it has any one of the following - a musty odour and or visible mould growth or overgrowth and or HERTSMI-2 score > 11 (derived from the ERMI test which is qPCR test based on household dust co-developed by the EPA). In terms of health, there is an increase in symptoms when in the building compared to outside the building compared to outside or another mould free zone according to Toxic Mould Support Australia.

**Mould:** is a microorganism found in nature that breaks down and decomposes organic matter. Includes all species of microscopic fungi that grow in the form of multicellular filaments, called hyphae. Although the terms 'mould' and 'fungi' are often used interchangeably mould is only one of the many organisms that make up the kingdom, Fungi. The number of mould species is large and diverse.

**Moisture:** can be either (1) water vapour and/or (2) condensed liquid on the surface of objects. It refers to small amounts of liquid, sufficient to moisten or dampen the air or a surface.

**Dampness:** is the consequence of excess moisture in buildings.

**Condensation:** when water changes from a gas to a liquid phase ... when air comes into contact with a surface that has a temperature below the dew point, the moisture that condenses out of the air onto the cold surface is called condensation. We see clouds, condensation on windows and less so on walls. Typically occurs on cold building materials such as single paned windows, walls that lack insulation in temperate climates, concrete slabs, metal frames ... when moisture formation on a surface as a result of moist air coming into contact with a cold surface. As cool air is unable to retain the same amount of water vapour as warm air, excess moisture is released as condensation. Factors that contribute to condensation include high humidity of indoor air, low temperature of the walls/surfaces, and inadequate ventilation.

**Dew point temperature:** is also referred to as the condensation point, it is the temperature at which water condenses out of the air that is when the air can no longer hold moisture. This is why it is so important that the surface temperature of the building materials in the home are similar in temperature to the air in the building. Walk you through:

- Concrete slabs are cold because the temperature of their surface is at dew point. This makes it difficult for moisture to evaporate which is why drying a concrete slab is difficult and time consuming.
- Single paned glass windows, especially those on the south facing walls in temperate climates like Melbourne and Sydney during winter, are commonly below the dew point of the air in the home, which is why they have condensation on them.

**Evaporation:** When water goes from a liquid to a gas phase. EG boiling water on a stove. Wet objects will become cooler as the moisture evaporates from the surface and the surrounding air consequently becomes warmer. The rate of evaporation is determined by humidity, temperature and air movement. The higher the rate of evaporation, the quicker a material will dry.

**Humidity:** The amount of water in the air

Relative humidity (Rh): Ratio (%) of water vapour in the air compared to the maximum amount of water vapour the air can hold at a given temperature. When air cannot contain any more water vapour, the Rh is 100%, that is, 70% Rh implies that the air is holding 70% of what it could hold before reaching saturation. Optimum comfort Rh for indoors is between 30 to 50% (ASHRAE). Rh changes with temperature as warm air holds more moisture than cold air.

**Hygroscopicity:** is the ability of a material to absorb moisture. Hygroscopic materials like raw timber, will absorb moisture more readily. If the RH exceeds 60%, these materials get wet more quickly.

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**Absolute humidity (SH):** also referred to as Specific humidity and the Humidity Ratio, it is the amount of water vapour (by weight) in the air. It is measured in grains per pound (GPP) or grams per kilogram (GPK) of dry air. It is the most critical factor to compare outside levels with inside to determine the drying time. Unlike relative humidity, specific humidity does not change with temperature, however SH decreases with dehumidification (as it removes water vapour out of the air).

**Vapour pressure:** water vapour in the air. This pressure can range from 0 pascals (Pa) if there is no water vapour, to several thousand pascals of pressure. There will be a high vapour pressure in a bathroom after everybody showers which will dissipate through the house as it moves from high to low pressure until it is removed to the outdoors by ventilation.

**Water Incursion:** if the mould is caused by the incursion of water, either from an outdoor or indoor source, the type of water may also be important in both identifying the source as well as determining the level of remediation required. Water incursion can be categorised as follows:

- Category 1: Clean water. Water from a source that are not harmful to humans, including broken water supply lines, water from taps, clean groundwater and rainwater.
- Category 2: Grey water. This may contain a certain level of chemical, biological and/or physical contamination. It includes dishwasher or washing machine water, drain water, and water from fire hydrants. Category 2 Water may cause illness or discomfort if consumed.
- Category 3: Black water. This is considered extremely unsanitary water that contains pathogenic agents. It includes toilet overflow water containing faeces and urine, sewage water and floodwater from rivers or streams.

**Dehumidification:** is the removal of water vapour from the air when using an air conditioner or dehumidifier.

**Ventilation:** process of supplying or removing air by natural or mechanical means to or from any space; the air may or may not have been conditioned. There is always some mould everywhere – in the air and on many surfaces. Moulds have been on the Earth for millions of years. Mould grows where there is moisture.

**Air movement:** you can't dry anything without air movement. Rapid air movement over wet materials will cool these materials, promote faster drying and reduce the growth rate of microorganisms.

**Micron** One millionth of a meter.

**mVOC Microbial VOCS** are gaseous waste by-products released by growing fungi and bacteria. Causes irritation—burning throat and eyes, prickly skin... Indicative of active and past fungal growth. Causes damp, earthy, musty odour. Other sources are reactivated pet urine, bacteria and off gassing from wet materials EG Penicillium, Aspergillus, Fusarium, Alternaria.

**Mycelium:** A visible mass of interwoven hyphae referred to as a colony. They can appear cottony, velvety, leathery and maybe white, grey, brown, black, yellow, greenish or other colours.

**Mycotoxins Toxic chemicals** found on the inside and outside of spores and hyphae that are released by some fungi under certain conditions and are associated with serious health effects (skin rashes, Ha, pulmonary haemosiderosis, lung probs, fatigue...). They are released as a defence mechanism to provide a competitive advantage over other microbes competing for the same environment

**Viable spores:** Can germinate under optimum conditions. Can be dormant for years.

**Non-viable spores:** Cannot grow into the mould phase, however they still contain mycotoxins.