

LIVING IN THE COMFORT ZONE

While there isn't much we can do to change the weather, better heating choices can help achieve a warmer drier home.

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Moisture and cold temperatures are common conditions in many New Zealand homes. Moisture comes from indoor sources such as showering, cooking and the operation of unflued gas heaters. Outdoor moisture sources include subfloor dampness, ingress through the cladding and humid outdoor air coming into the building.

While complaints about high humidity are most frequently heard in the northern regions during summer, outdoor relative humidity levels close to 100% also occur frequently in cooler weather throughout the country, creating different issues.

Relative and absolute humidity

The two most common terms for describing the amount of water held in the air are relative humidity and absolute humidity. The relationship between the two can be shown on a graph called a psychrometric chart.

Relative humidity refers to the moisture-holding capacity of the air relative to the maximum amount it can hold at a given temperature. The warmer the air, the more moisture it can hold. As air cools, the relative humidity increases until saturation occurs and condensation forms on the nearest cold surface.

Absolute humidity refers to the actual amount of moisture in the air, regardless of the temperature.

Moisture control best defence against fungi

High moisture levels in a building should be avoided, as moisture will prematurely deteriorate building materials and contents. In even the cleanest buildings there are always enough nutrients for fungi spore germination and growth – the only limiting factor is the moisture level.

Naturally ventilated buildings will have the same levels of fungi spores as the outdoor air, and the counts can be high, especially



in autumn. Buildings with good air filtration will have lower levels of spores entering from outside but can still have high levels of fungi if the building is damp.

Fungi spores can remain suspended in the air for long periods and will eventually settle on surfaces. Fungi are not easy to remove once established, so controlling moisture is the best defence.

Homes outside comfort zone

Research has proven the temperature and relative humidity levels that will create comfortable living conditions. Operating a home inside the 'comfort zone' will also limit fungi growth.

But several studies, such as the HEEP study conducted by BRANZ and two housing and health studies led by Otago University, have consistently shown that the environment inside New Zealand homes is too cold and damp. There is a clear pattern of spot heating in one room only and these heaters being used for a limited period of the day. This is not common in other countries where maintaining a warm dry home with sufficient heating in all rooms is viewed as essential.

Unflued gas heater problems

Within Otago University's Housing, Heating and Health study was a subproject where moisture, temperature and heater usage were intensively monitored in 32 homes in 2005. Homes with unflued gas heaters were the most common in the sample, with a few using either a portable electric heater or a woodburner as their main heating source. These homes all received an insulation upgrade, if required, before the study.

The results showed that the homes that used an unflued gas heater as their primary heater type were typically too cold and damp. These homes were only in the comfort zone for 30% of time that they were monitored due to the low heat output, low heater usage and the release of moisture – a byproduct from burning the gas.

These homes would have benefited from extra ventilation to remove the moisture (and also the compounds emitted by the gas combustion), but it is counterintuitive to open a window while operating a heater, especially where the indoor temperatures are below 18°C.

Better choices

The homes that used a portable electric heater or woodburner as their primary heating source were considerably warmer and drier and spent about 60% of the monitored time in the comfort zone. These homes would be less likely than those with unflued gas heaters to have enough moisture for fungi growth. However, they were still too cold in the early hours of the day and would benefit from either better insulation to retain the heat longer or more heater usage.

Several key steps

The key steps to achieve a warmer and drier home are sufficient ventilation to remove moisture, enough insulation and a non-moisture-emitting heater with sufficient heat output capacity. It is also important to use this heater for long enough to maintain the home in a warm dry condition. ◀