

How wet is too wet?

There are many ways to manage internal moisture in new builds or renovations, and it's not all down to the homeowner. Designers and builders have a role to play.

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Internal moisture has resulted in damage to this window frame.

THE 2010 BRANZ House Condition Survey found that 40% of New Zealand homes had internal moisture problems. Many were cold and damp, with 10% considered very damp. The consequences of this are material deterioration, poor living environments and occupant health issues.

The basics of internal moisture

Homes where internal moisture is managed are likely to be:

- drier, warmer and healthier
- more durable
- much more comfortable to live in.

The amount of moisture in domestic buildings is influenced by:

- how much moisture remains in the building materials and finishes used when a new building is originally occupied

- the design of the building
- how the building is lived in once occupied.

Designer and builder can reduce moisture

While building practices during construction can significantly reduce the amount of moisture contained in materials at handover, it is commonly thought that the designer or builder has little impact on internal moisture levels once the building is finished and occupied.

However, as new homes become increasingly airtight, designers need to design in ventilation with a new build or renovation to reduce the potential impact of elevated internal moisture levels.

By eliminating moisture at the source, a large proportion of the moisture will be removed before issues arise. The balance can then be managed by ventilation, heating and insulation.

Start with the design

Many of the factors that can effectively moderate internal moisture are easy to incorporate into building design, and include:

- maximising insulation to ensure spaces are warmer and reducing the number of thermal bridges within the thermal envelope
- installing double-glazed windows so glass will be warmer, therefore there is less risk of condensation - specifying thermally broken metal joinery also means the frame will be warmer
- using the benefits of the sun by orienting living spaces and bigger glazing areas to the north and providing thermal mass - the easiest way is to expose the concrete floor to the sun

- designing in ventilation, for example incorporate passive ventilators into the windows - while these can be closed off by the occupants, the cost of installing them is small and they retain the security of the building when they are opened
- ensuring that extract systems of sufficient capacity for the situation are specified for spaces where moisture is generated
- isolating spaces where moisture is generated from other areas so that any moisture generated is contained and removed
- using bathroom extractors that are controlled by with a timer attached to the light switch or a humidistat - they will then only operate when needed and remove the risk of switched appliances not being used or left on for too long
- flueing or venting gas appliances that generate moisture to the outside
- making heating appliance selection part of the design rather than leaving it to the owner to sort out afterwards - adding thermostatic control is also recommended
- making the clothes dryer and the vent to the outside part of the building contract
- selecting materials and finishes for wet areas that are suitable for use within that environment
- carefully considering and identifying the consequences to the building owners of design features that can add moisture, such as fish tanks and spas.

Builders also have role

On site, the future risk of condensation will be reduced where:

- materials are allowed to dry fully before the building is occupied, for example, there is 120 litres of water in each cubic metre of concrete that is not required for hydration and that evaporates from the concrete - under good drying conditions, a 100 mm thick



Mould on colder surfaces indicates a problem.

concrete slab will take at least 4 months to dry

- insulation is properly installed with no gaps or folds, which create thermal weak spots.

For renovations

Where an existing timber board floor is retained, ensure that moisture is not migrating from the subfloor through the flooring into the spaces above. Options to minimise the risk include increasing subfloor ventilation and adding an impermeable ground cover.

Ensure ventilation, such as extracts or passive vents, are added where existing older air leaky buildings are made more airtight - typically by adding sheet linings to walls and ceiling.

Also insulate all existing external walls, whether being altered or not.

Design tools and education

BRANZ’s ALF 3.2 is an online tool that allows both the energy performance and the potential risk of high internal moisture and the consequential mould growth to be calculated at design stage.

Educate owners

Designers or builder can also work with clients to explain the basic principles of moisture management in the home and how they might manage the generation of moisture. The key principles to be explained are based around the need to:

- eliminate the source of the moisture - such as not drying clothes indoors
- manage at source through the use of extract ventilation
- ventilate by opening windows, passive ventilators or mechanical ventilation systems
- heat by incorporating continuous rather than spasmodic heating as an integral part of the design
- insulate by maximising, where possible, to retain heat within the building.

Other key points that owners need to be aware of are:

- to actively use the passive or active ventilation features provided
- how their activities will influence the amount of moisture that needs to be removed
- the warning signs that moisture is not being controlled such as condensation and mould
- the fact that renovated houses are more airtight once work is complete so ventilation should be provided
- that thermal mass such as concrete floors should not be covered by carpet, cork or timber overlay floors, but that tiles, stone and slate finishes are OK
- that a reasonable standard of continuous heating in the 18-24°C range is more effective at controlling indoor moisture than intermittent heating. ◀