



Dealing with Condensation?

Condensation is becoming much more of a concern in recent years. New technology and improvements in the thermal performance of buildings means today's homes are becoming more air tight and excess humidity in the air can be trapped inside. Windows are usually blamed for excessive condensation because they are the first place the condensation can be seen, but what about between the walls and in the insulation? The moisture is there too. Your windows may actually be serving as a warning sign.



Household activities create moisture

Air contains moisture vapour, whether indoors or outdoors. Inside the home, in addition to the normal level of moisture in the air, moisture is created by a number of household activities. These typically include cooking, showering, clothes-drying, indoor plants, and unflued gas heaters. Even the simple act of breathing will moisten the air; you can see the moisture vapour your body creates when you breathe out on a cold morning.



Some buildings and some areas have more moisture than others

New houses often have a higher level of internal moisture, as framing timber, concrete floor slabs and other building materials can take many months to stabilise. Moisture levels are also determined by your geographical location and climate, as humidity levels vary across New Zealand.



When the temperature drops, moisture vapour condenses

Moisture becomes visible, and homes feel damp, when the indoor air temperature cools down and the air can no longer hold as much water vapour. The vapour condenses and settles first on colder, non-absorbent surfaces, such as glass. Moisture can be harder to see on other surfaces, but still penetrates carpets, fabrics and any other absorbent surface, often making them feel cold and damp.



External Condensation on Windows

The external condensation on windows is dew—and it's caused by the same thing as dew on the grass. It's what we call night sky cooling. When you have a clear night sky, the grass can see outer space, and gets colder than the surrounding air. Water in the surrounding air then condenses on the grass as dew. Read more here: <https://www.wganz.nz/guides/condensation-exterior>

Where does the moisture come from?

Various household activities affect the average moisture added to the indoor air.



Cooking
3.0 litres/day



Clothes washing
500 mL/day



Showers and baths
1.5 litres/day per person



Dishes
1.0 litre/day



Clothes drying (unvented)
5.0 litres per load



Gas heater (unflued)
1.0 litre/hour



Breathing
20 mL/hour per person



Pot plants
as much as you give them

How to measure Condensation

We can use measurements to pinpoint the exact time condensation will appear. The two common terms we use are Relative Humidity and Dew Point.

Relative Humidity

Relative humidity (RH) is how we can measure the moisture in the air. For example, a room humidity of 80% RH means the ability of the air to hold water is 80% loaded. 100% is saturation point. The higher the temperature, the more moisture the air can hold as water vapour. The lower the temperature, the less moisture it can hold. So the moisture is released at a temperature we call the dew point.



Dew Point

Dew point is the temperature at which the air becomes cool enough to release its moisture. If touching a surface that is cooler than the air temperature, the water vapour appears as condensation. In the home this often means water appearing on windows, mirrors and walls, as well as disappearing into the furnishings and carpet.

How can you tell when condensation will form in your home?

There are online dew point calculators that you can use to help work out when conditions will lead to condensation forming in your home. All you need to know is your room temperature and indoor humidity. Thermometers with accuracy as close as 1%, and electronic hygrometers with accuracy as close as 5%, are available at modest prices from hardware or electronic stores – check the accuracy specifications before buying! When you can measure your humidity, it becomes much easier to start managing it.

The effects of condensation

High indoor humidity and condensation will promote mould growth on walls, ceilings, and materials such as curtains and carpets. This mould growth and moisture is a major cause of deterioration in homes and buildings and can create health problems for people who live there.

Reducing condensation

As condensation is created by household activities, simply installing new windows will not fix the problem. There are a variety of methods to help minimise the chance of condensation.

1.

Ventilation

Ventilation can help make your home drier, healthier and more comfortable. Keeping windows open, even a small amount for some of the daytime, can help reduce condensation.

Some window types allow you to lock your windows and still have ongoing passive ventilation.

Ventilation is especially important in newer homes, because they tend to be more airtight, with less natural air flow.

When cooking, drying laundry, or showering, make sure you let the water vapour escape outside. You can do this by opening windows or vents, or turning on a ventilation fan, or of course using a ducted clothes dryer.

There are several types of domestic ventilation system available (known as HVAC systems) that replace the moisture-laden air in your home with drier air from outside. Some systems have built-in electric heaters that can also warm your home.

2.

Dehumidifiers

Dehumidifiers are useful as their sole purpose is to reduce moisture in the air. A dehumidifier draws in the moisture-laden air from around the room, extract the water and deposit it into an inbuilt container for later disposal.

3.

Double glazed windows

Double glazing helps keep the surface of the inside glass warmer and so reduces the likelihood of condensation forming on windows. Remember that moisture is still present.

4.

Thermally-efficient window frames

Like double glazing, thermally-efficient window frames help prevent the transfer of heat energy through window frames and therefore help reduce the incidence of condensation on windows. Thermally efficient window frames should only be used with double glazing.

Key Facts



Indoor moisture and condensation is **caused by the activities in the home** such as cooking, showering and breathing.



Windows do not cause condensation.



Given the right conditions, **condensation will form on any surface**. That dampness could be right through your home.



High humidity can promote mould growth and deterioration in the home.



Adequate ventilation, dehumidifiers, and double glazing **help reduce condensation**.

Further Reading

Condensation in Buildings: Handbook published by Australian Building Codes Board assist architects, designers and builders in the assessment and the management of the risk of condensation and its consequences.

https://www.wganz.nz/wp-content/uploads/2019/08/Handbook_Condensation_in_Buildings_20191.pdf

Dealing with internal moisture (BRANZ Build 156 Article October 2016)

<https://www.buildmagazine.org.nz/articles/show/dealing-with-internal-moisture>

Combating Internal Moisture (BRANZ Build 151 Article December 2015)

<http://www.buildmagazine.org.nz/articles/show/combating-internal-moisture>

New Homes Dripping (BRANZ Build 151 Article December 2015)

<http://www.buildmagazine.org.nz/articles/show/new-homes-dripping>

Roof Space Moisture (BRANZ Build 151 Article December 2015)

<http://www.buildmagazine.org.nz/articles/show/roof-space-moisture>