



Understanding Condensation

Condensation in the home can lead to cosmetic and structural damage, and affect your family's health. Here are some notes on how it is caused, and tips on reducing it.

Condensation is becoming much more of a concern in recent years. With new technology and improvements in the thermal performance of buildings, today's homes are becoming more airtight, and excess humidity in the air can be trapped inside, leading to a damp home, mould growth, and more.

Windows are usually blamed for causing excessive condensation because they are the first place the problem can be seen. In practice, however, if your windows are suffering from condensation, they are giving you a warning that moisture is present throughout your interior, and the solution may not be window-related. If your interior wall surfaces are often damp, for instance, and mould is developing, then you may have insufficient wall insulation, or there is a ventilation issue.

Nonetheless, there are steps you can take to ensure your windows and doors are doing their bit to minimise condensation in your home. Reducing condensation will also help lower your heating bills.

Where does condensation come from?

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 household activities such as cooking, showering and clothes-drying. Indoor plants and unflued gas heaters are additional sources of moisture. Even the simple act of breathing will moisten the air.

Dealing with Condensation?

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. So if your home is damp, that's because it's cold – rather than the other way around.

New houses often have a higher level of indoor 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.



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 gets colder than the surrounding air. Water in the surrounding air then condenses on the grass as dew.



How condensation is measured

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

We use relative humidity (RH) to measure the moisture in the air. The higher the indoor temperature, the more moisture the air can hold as water vapour. The lower the temperature, the less moisture it can hold. A value of 100% means the air is at saturation point.

The ideal indoor RH is around 40–60%; this is moist enough to inhibit dermatological problems and slow the spread of airborne viruses, but dry enough to inhibit mould growth and to avoid triggering asthma or allergies (to, for instance, dust mites or mould)

Dew point

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

How to measure condensation 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 manage.



How to tackle condensation

Since condensation is created by household activities, simply installing new windows will not fix the problem. Listed below are a variety of methods to help minimise the risk of condensation. If you have timber frames, remember to keep paintwork in good condition to prevent pooling condensation from soaking in and causing rot.

Ventilation

Ventilation can help make your home drier, healthier and more comfortable. Ventilation is especially important in newer homes, as noted above, because they tend to be more airtight, and their materials have yet to settle and stabilise.

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.

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 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.



Dehumidifier

The sole purpose of a dehumidifier is to reduce moisture in the air. It draws in the moisture-laden air from around the room, extracts the water and deposits it into an inbuilt container for later disposal. A dehumidifier can be useful if you have problems with damp, or are simply trying to dry out your home after a flood or heavy rainfall, but it can be noisy, and prolonged use will push up your electric bill. They treat the symptoms, not the problem.



Double glazing

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.



Thermally efficient window frames

Like double glazing, thermally efficient window frames (such as aluminium frames containing thermal breaks) help prevent the transfer of heat energy, and therefore help reduce the incidence of condensation on windows. Thermally efficient window frames should only be used with double glazing.

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