IN-HOME VENTILATION SYSTEMS

The recent cold and wet winter has left many homeowners wondering if they should install a ventilation system to help reduce condensation and dampness in their homes. As always, it's a matter of choosing the right system – one that is effective and efficient for your situation.

By Joanna Jackson, BRANZ Project Manager

Moisture generated from inside activities, such as cooking, washing and using unflued gas heaters, gets trapped inside our houses. We notice it more in newer houses, which are more airtight than old draughty villas, when condensation and mould form on surfaces. The first line of defence for any moisture problem is to minimise moisture-generating activities (e.g. by using range hoods, bathroom ventilators, and opening windows). Ventilation combined with heating to maintain an indoor temperature of 18°C (World Health Organization recommendation) is the answer to any residual moisture problem. In most cases, in-home ventilation systems can remove condensation while also circulating warm, dry air, but they can be expensive and may not always be the best option.

A ventilation system can be cheaper, quieter and more efficient than a dehumidifier, and more secure than leaving windows open. But there are costs involved in their purchase, and ongoing running costs to consider, particularly when they incorporate a heating element. The New Zealand Building Code requires the total volume of air in the house to be changed every 3 hours, which is normally covered by opening windows and through natural infiltration from gaps around windows, doors, etc. This requirement must be considered, however, if an automatic system is the *only* means of ventilation, but this is unlikely in New Zealand because most homes have opening windows and are not particularly airtight. The requirements are higher for bathrooms and kitchens.

The following four types of ventilation systems – passive, forced air, heat exchangers and solar powered (see Figures 1–4) – can be considered for homes.

Passive ventilation

This relies on stack and wind pressures and natural infiltration of the building. To achieve adequate air movement to control condensation, small outside air vents can be fitted to external windows to let moist air out.

Forced air

Forced-air ventilation systems blow dry air into the house from the roof space. These work well when there is a large, dry roof space and when the roof is exposed to a reasonable amount of sunshine, particularly in winter. However, when the temperature in the roof space falls below certain levels, some systems will circulate the cooler air, while others slow down or even stop unless there are heaters in the system. If the house is in a cold part of the country or the roof is very shaded, heaters will be essential. Often the heaters within these ventilation systems can be expensive to run.

Heat exchangers

Heat-exchanger ventilation systems extract warm, damp air from living spaces, remove the heat using a heat exchanger, transfer the heat to cold, dry air from outside, and then pump the pre-warmed air back into the house. These systems will work in all sorts of houses and also in apartments, as there is no requirement for a roof space. They run all the time, meaning the Building Code requirement for air changes will be met. The drawback is that these systems can be very expensive, compared with the forced-air systems.

Solar assisted

Solar-assisted ventilation systems use panels on the roof or wall to warm the incoming fresh air. If fans are used they can be powered by solar cells, meaning no running costs. But they can be expensive to set up, and depend on receiving adequate sun, so will not suit all locations. Additional heating will usually also be required at night and on very cold, wet days.

Design for occupant's lifestyle

The choice to install a ventilation system and the type of system will depend primarily upon the location and the size and design of house. Important considerations are also the fan capacity, the filtration of the roof space air, the number of outlets and their location, and ultimately, the budget. For best results the system must be specifically designed for the house and the needs and lifestyle of the occupants. But keep in mind you can ventilate your home for free by opening the windows or providing passive ventilators in new windows. Also by insulating well, we can keep our houses warmer using existing levels of energy input.

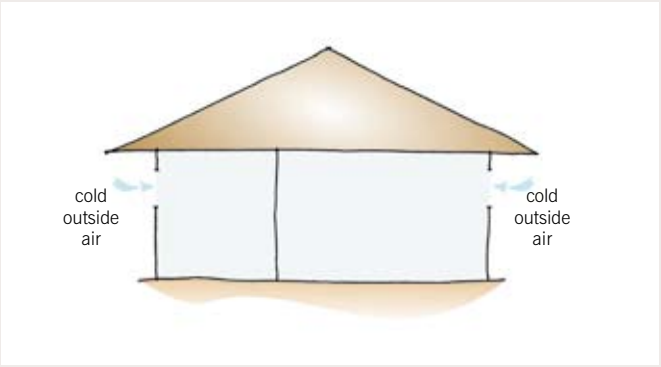

Figure 1: Passive ventilation relies on wind pressures and stack effects to remove moist air.

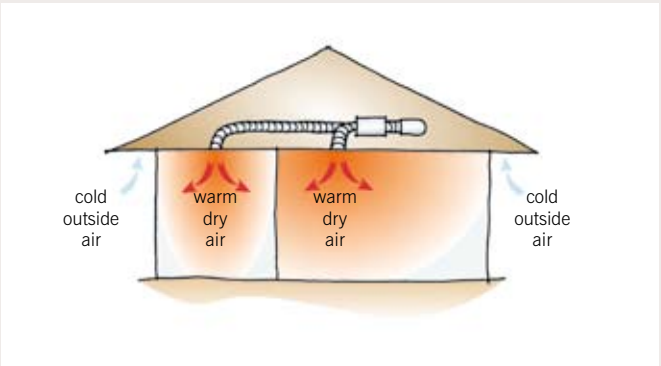

Figure 2: A forced-air system blows air into the house, which dilutes moist air.

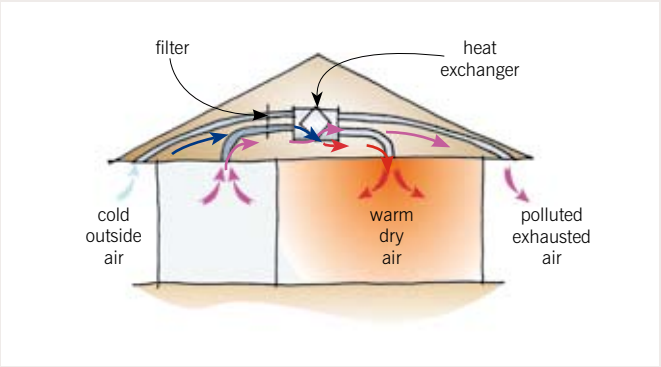

Figure 3: A heat-exchange system takes inside air, and transfers heat to fresh air, which is fed back into the house.

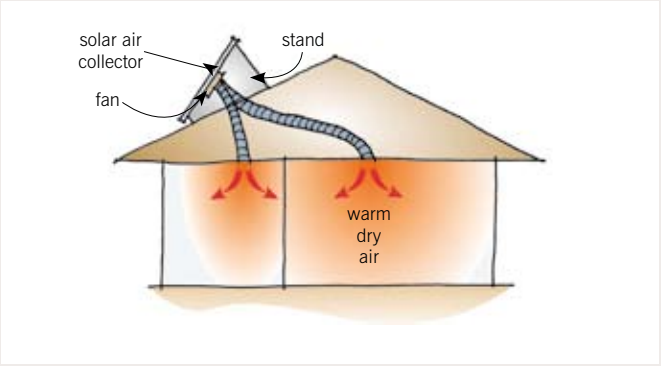

Figure 4: A solar-assisted system blows heated air into the house, which dilutes moist air in the building.