

Good solution for air tight buildings

Aereco, the French manufacturer of humidity sensitive demand controlled systems, is highlighting a number of independent studies that back its claims that such products offer a more effective and energy efficient alternative to mechanical heat recovery ventilation.

Today's energy efficient air-tight homes require a ventilation system that can guarantee the best possible Indoor Air Quality (IAQ) at all times. According to 'Energy efficient ventilation in dwellings – a guide for specifiers' published by the Energy Saving Trust: 'All dwellings need a supply of fresh air, not just for the health and comfort of the occupants, but also to control condensation, remove pollutants, and to ensure the safe and efficient operation of some combustion appliances. Moisture is probably the most significant element because of the high rates generated by activities such as cooking and bathing, and because of the problems associated with condensation and mould growth'.

Research has shown that if relative humidity levels exceed 70% for prolonged periods, there is a high probability that the condensation occurring on cold surfaces will lead to mould growth, but a ventilation rate of between 0.5 and 1.5 air changes per hour for the whole dwelling will usually be sufficient to control condensation.

Sensitive response

According to Aereco, a manufacturer of humidity sensitive Demand Controlled Ventilation (DCV) systems, people are most comfortable at a relative humidity level of between 40 and 50%. The human respiratory process produces CO₂ along with water vapour which, unless extracted and replaced with fresh air, will linger indoors with detrimental effects on inhabitants' health and on the fabric of the building itself. DCV helps to eliminate these as well as other airborne pollutants such as carbon dioxide, carbon monoxide, oxides of nitrogen, tobacco smoke, allergens and other bio-contaminants.

The company argues that the recent trend in the UK to install Mechanical Heat Recovery Ventilation (MHRV) systems may actually increase the risk of health and respiratory problems in tenants and householders if not installed and maintained properly. According to Aereco, the alternative is to adopt DCV systems that include humidity sensors on the grilles that automatically react to occupancy – so if the adults have gone to work and the kids are at school the system operates on minimum, producing a constant trickle of air. When the house is occupied the humidity sensitive grilles are able sense an increase in activity and boost ventilation. There are no filters to change and the system is virtually maintenance free.

It is argued that tenants and homeowners might be tempted to cut corners with MHRV systems and isolate fans to save money and to cut down on noise levels. Filters need to be changed annually, but there are fears that tenants and homeowners will not invest the time and money to have them changed. Another concern is that social housing tenants are

likely to worry about energy costs and may be worried about fans being switched on all the time.

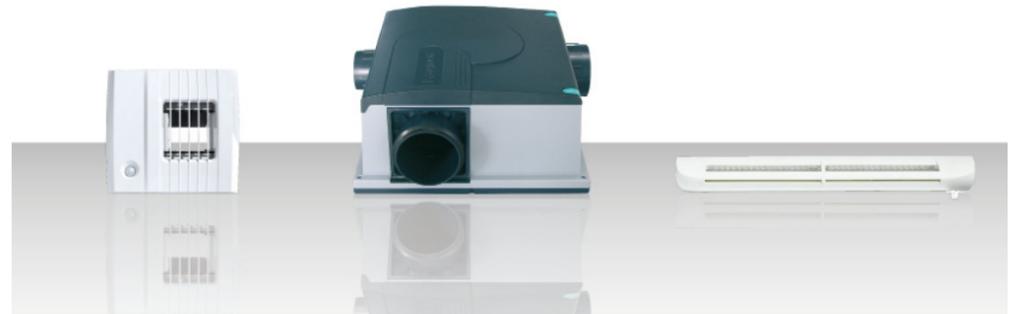
Aereco has highlighted independent reports that confirm that humidity sensitive DCV is proven to have much lower energy usage than MHRV systems whilst providing greater levels of comfort in living areas and eliminating the problems of mould and condensation in wet rooms. A 2008 study by the Fraunhofer Institut Bauphysik in Germany shows that DCV is a more cost effective and reliable method of providing the optimum indoor environment. The Institute found that a humidity sensitive DCV system offers an excellent method of staying below 1200 ppm CO₂, which guarantees optimal indoor air quality in the dwelling.

French test

In France, where DCV is major player in new build, another test bed, the Performance project, allowed testing in-situ of mechanical ventilation systems from two manufacturers, including Aereco. The Performance project monitored demand controlled MEV on two large apartment blocks. The project, supported by the French Environment and Energy Management Agency, concentrated on two buildings erected in 2007 – one in Paris and one in Lyons – and the efficiency of humidity controlled MEV in general and the Aereco DCV system in particular.

A total of 30 occupied dwellings were monitored over two years from November 2007 to measure representative parameters for energy consumption and IAQ. Measurements of CO₂ concentrations over that time show indoor air quality is ensured in a low occupied bedroom with one adult present as well as for one with high occupancy (four adults). The peak of CO₂ concentration shifts from 700 ppm in the low occupancy bedroom, to 950 ppm in the latter, but even there the 1500 ppm level was not exceeded for more than just a few hours in the heating season.

The fan was stopped for maintenance for one month, and CO₂ concentrations were compared with the other months in the heating season when the fan was on. When the fan was stopped, a strong rise in CO₂ concentrations (above 1900 ppm most of the time) could be observed. However, there was no particular reaction from the occupants to compensate for the lack of air renewal. This, says Aereco, illustrates the high



Aereco's DCV range includes a humidity sensitive extract unit, constant pressure fan and humidity sensitive air inlet

performance of DCV systems in providing high levels of indoor air quality and demonstrates that occupants are unaware of poor ventilation and don't compensate, for instance, by opening windows.

Airflow data

In another French test, Aereco monitored retrofitted blocks of flats (55 dwellings in five blocks) over two years. In this case a humidity sensitive ventilation system assisted by a low-pressure fan with intermittent operation was installed. Relative humidity, temperature, pressure and extracted airflow data were recorded every minute in each wet room of each dwelling, using specifically developed sensors.

Measurements confirmed the performances of the humidity sensitive ventilation system, in particular, its capacity to improve indoor air quality, to decrease condensation risks and to limit thermal losses. Its stabilising role has been highlighted: it attenuates airflow imbalances between floors and limits airflow variations over the year by offering a real control of the natural 'engines' (wind and stack effect). With a consumption of only 5W per dwelling, the fan increases the pressure levels and thus ensures healthy airflows and avoids reverse airflow.

Coupled with humidity sensitive ventilation, the low pressure mechanical assistance was seen to optimise the use of natural forces: average airflows are limited in winter, contributing to energy savings, and positive airflows are assured when needed most. For renovation projects, the hybrid humidity sensitive ventilation system offers comparable airflows with those required by French regulations for new buildings.

Find out more

For more details on the range Demand Controlled Ventilation, please visit www.aereco.co.uk or enter the number below on the freepost reader enquiry card inside this issue.

"Humidity sensitive grilles respond to an increase in activity levels"