



By Tim Pullen

Ventilation and Air Tightness

Obviously the two go hand-in-hand, but there is a conflict. Ventilation is necessary for health and comfort but fresh air needs to be heated. Too much ventilation means that energy is being wasted.

In older properties, with open fire-places, ventilation (or draughts) could account for 30% of the overall heat loss. And draught-proofing is the simplest and cheapest way of reducing your fuel bills.

In a new build the Building Regs call for a maximum permeability of 10m³ per hour at a pressure of 50 Pascals. How much air that is is largely irrelevant. It is a level of ventilation that can be achieved with standard building practices and without the need for mechanical ventilation.

The standard is set to change in the near future; probably to 7m³ by 2011 and something below 5m³ by 2016. At that level a ventilation system will be needed, be it mechanical or passive.

The options available are :

- **Natural** – open windows, trickle vents and the like
- **Passive** – a specifically designed system that allows air to enter at designated points, to flow through the house and for foul air to be extracted by natural means.
- **Mechanical** – as passive but relying on fans and ducting to extract and introduce air. These tend to work at very low pressures, for 24 hours per day and typically filter the incoming air.
- **Heat Recovery** – as mechanical but the incoming air is warmed by the air extracted from bathrooms, kitchen etc.





Passive ventilation System



Heat Recovery Ventilation

The key, in efficiency terms, is to select the type of system that will suit your lifestyle and design it to introduce the right amount of air in the right places – and to extract the right amount of air from the right places too.

Natural ventilation tends to be uncontrolled and therefore energy-expensive.

Passive ventilation works well when it is designed in – usually as part of the original room layout.

Mechanical ventilation and heat recovery ventilation both need low permeability – certainly below $7\text{m}^3/\text{hr}$ and preferably below $5\text{m}^3/\text{hr}$. The system will be extracting air from “wet” rooms (bathroom, utility and kitchen) and use that heat to warm incoming air. If the permeability is too high then the system can actually suck cold air in from the outside, meaning that it will have less warming potential.

This issue can be said to epitomise the sustainability dilemma – the conventional builder will merely want ventilation, there is no decision and it needs to be specified no further than that. The sustainable builder wants the right sort of ventilation system, there are decisions to be made and the final choice needs to be specified and designed in some detail.