

# Special report

Air movement & ventilation

## Compliance crucial to maintaining standards

The need to keep up with changing legislation in the air movement and ventilation sector is paramount, reports Deven Pamben

With regulatory updates resulting in buildings becoming increasingly airtight, the subject of air movement and ventilation is gaining importance, to ensure that comfort levels are maintained.

While this can be viewed as requiring additional expense, the correct choice of system will provide a number of benefits, including rapid payback times, cost-effective integration with other systems and adherence to legislation.

The safety aspect is also important, especially where the risk of fire in public buildings is concerned. When firefighters were called to a hotel blaze on 18 May 2008, three guests were forced to flee, with one climbing out of the window. Inspections found defective fire doors, blocked escape routes and guest rooms without fire alarms. Staff had not been given adequate fire safety training, which breaches the Regulatory Reform (Fire Safety) Order 2005.

### Substantial fines

Last month, Chumleigh Lodge Hotel in Finchley, London, and its director Michael Wilson were fined £210,000 after being found guilty of 12 breaches relating to the incident. The hotel was ordered to pay £30,000, while Mr Wilson was hit with an £180,000 fine.

The case highlights the importance of adhering to legislation, as it can be a matter of life or death.

Bilco UK general manager James Fisher (pictured) says: "Adequate smoke control and ventilation in a building is paramount in preserving lives in the event of a fire. When designing buildings, specifiers and architects have to meet the stringent legal requirements that have been set out regarding fire safety."

### Specific regulation

The air movement and ventilation industry has its part to play in meeting legislative requirements. Ventilation manufacturers and distributors provide educational, healthcare, commercial and retail facilities with products that comply with regulations, ensuring adequate provision of ventilation in buildings, good air quality and the avoidance of overheating.

There are specific regulations for different environments. In schools, ventilation should be provided to limit the concentration of CO<sub>2</sub> in learning spaces that can affect concentration levels of the people inside.

Another key indicator of building design is its environmental efficiency and effectiveness. The Building Research Establishment's BREEAM scheme is an environmental assessment that ensures the environmental performance of buildings.

A rating is given based on the environmental and sustainable effectiveness of the buildings. Conserving energy and minimising



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James Fisher, Bilco UK

carbon emissions, the improvements to building insulation have been welcomed by the industry.

As Building Regulations have become more stringent with regard to energy efficiency, buildings become more airtight.

This is where health and wellbeing comes in. Soler & Palau managing director Eugene Scotcher says improvements are being made but without consideration to ventilation requirements, particularly when existing buildings are being 'improved'.

He says: "Frequently this results in a fall in indoor air quality [IAQ], damaging the health of both the building and its occupants."

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It is accepted that mechanical ventilation with heat recovery (MVHR) offers a solution to this problem, but in energy conservation terms there is clearly some conflict with the purpose of the tighter insulation.

Mr Scotcher says: "It is vital to ensure that the level of ventilation is aligned to the need for ventilation by using demand controlled ventilation [DCV]. To that end we would certainly like to see greater recognition for DCV in Parts F (means of ventilation) and L (conservation of fuel and power) of the Building Regulations."

Mr Scotcher says there are many causes of poor IAQ, which can vary from one building to another. They include excess CO<sub>2</sub> from the exhalations of occupants, high humidity, volatile organic compounds from soft furnishings and pollutants from office machinery.

He says: "The only way to be more definitive on this issue, and win greater recognition for DCV in the Building Regulations, is to carry out meaningful and

independent case studies. While it's unclear where the funding will come from, it is certainly clear this work needs to be done."

Part F and Part L of the Building Regulations have been seen as essential and a key stage in reaching zero-carbon targets in buildings. Changes to Part F and Part L set out to make companies adopt low-carbon ventilation as an industry standard. The changes set a target of zero net emissions from new domestic buildings from 2016 and from non-domestic buildings from 2019.

### DCV efficiencies

The emergence of DCV has signified a shift in the ventilation industry and a commitment to producing systems that save energy in use and reduce carbon emissions, while not compromising on IAQ, according to Xpelair Ventilation Solutions head of marketing Steve Mongan.

Fixed ventilation is set to a constant ventilation rate based on the perceived maximum occupancy of a space and treated,

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Soler & Palau

heated or cooled, to suit particular requirements. However, the system does not take into account actual building occupancy and fan usage wastes both energy and money, as well as the heating or cooling energy required to match the room temperature control requirements.

Mr Mongan says: "Unlike fixed ventilation, DCV has a number of sensors that continuously measure the conditions within a specific area and feed back to the zone controller in real time, adjusting the ventilation requirements to suit the actual occupancy, ensuring no under or over ventilation occurs.

"Studies have shown that DCV can offer significant energy and cost savings by eliminating wastage from excessive fan usage, heating and cooling. The constantly adapting nature of DCV results in subtle continual changes to meet the needs of the environment, producing savings while ensuring optimal air quality."

### Productivity boost

DCV can also improve productivity of those occupying buildings. A study from the International Center for Indoor Environment and Energy (ICIEE) indicated that improved thermal comfort, reduction in indoor pollutants and enhanced ventilation rates can increase productivity by 5-10 per cent, showing that DCV has wider implications.

Other improvements are being made to ensure greater energy efficiency. The ventilation industry is creating systems that are more efficient at extracting stale, moist air from wet rooms to prevent condensation and mould developing and are more effective at supplying clean, fresh air to habitable rooms.

Vortice general manager Kevin Hippey hails the benefits of heat recovery in combination with ventilation methods: "The benefit of heat recovery systems is that they reduce energy consumption

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by working alongside heating systems to pre-warm filtered fresh air into a building using energy taken from stale, warm air, which is released into the atmosphere.”

The principles are the same for domestic and commercial applications – new-build commercial premises are covered by approved document L2A and L2B and BREEAM.

Every public building must exhibit an energy performance certificate, and these incorporate points ratings. Energy efficiency accounts for 19 per cent of BREEAM ratings and health and wellbeing 15 per cent.

### Natural benefits

GDL Air Systems commercial director Paul Callaghan highlights the need to use natural ventilation methods to reduce energy bills and reliance on complex systems.

He says the challenge has been to develop a ventilation range that is applicable for all building types, that allows the correct ventilation rates in both summer and winter for varying occupation rates,

while being cost-effective, energy efficient and sustainable. Natural ventilation is seen as one of the most efficient ways in cooling a building, he says.

He extols the virtues of using systems that are driven by wind and stack effects based on outdoor wind speed and indoor air temperature and pressure differences. “Harnessing wind and solar power to ventilate buildings means no fossil fuels are needed to run mechanical fans, which contributes significantly to energy conservation,” says Mr Callaghan.

The energy debate is expected to run and run. Mr Hippey says: “The drive for energy efficiency is unlikely to abate, ensuring that the ventilation industry remains a vital player in the market.

“The next set of Building Regulations comes out in 2013 and the consultation process for these starts this spring.”

With such a considerable amount of legislation in place, severe penalties – and even prison sentences – await companies and individuals who fail to comply

**The Morrisons distribution warehouse in Bridgwater, Somerset, uses a natural ventilation system**

“The balance between efficiency percentage and efficiency capital cost is a constant battle”

Kevin Feeney, VES

with the law relating to their duty towards occupiers of buildings. The case of Chumleigh Lodge Hotel is an example of this.

VES controls executive Kevin Feeney says: “We have seen the effect of legislation on heat recovery demands, which has targeted building standards and places a high emphasis on minimising energy consumption and reducing carbon emissions.

“This has stimulated growth and the trend towards decentralisation has positioned smaller volume heat recovery units as product leaders for many OEM companies.

### Tough choices

“The balance between efficiency percentage and efficiency capital cost is a constant battle that is playing out between conventional counterflow and crossflow heat exchanger products for volumes between 0.1 cu m/s and 1 cu m/s.

“This, coupled with the blurring divide between products aimed at the domestic market focusing on the SAPQ [Standard Assessment Procedure – Appendix Q of the Building Regulations] league table and the industrial market aiming for Part L compliance, means that choosing the right product for the right application is ever more difficult for the specifier.

“Producing heat recovery products that end-users want, and can be responsible for, is the fast track way not only to comply with current legislation but also to ensure optimal product performance for the entire product lifecycle.

“By giving accurate and transparent data at the front end, the focus of continuous effective user control means the emphasis on efficiency and energy consumption is in harmony rather than conflict with comfort.”



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