

# Like a breath of fresh air

Most people will spend the majority of their time living or working in a built environment and the quality of the air they breathe is paramount in maintaining their health and safety

**W**hether you work in a manufacturing or service industry, the majority of time for most of us is likely to be spent indoors. The quality of the indoor environment is therefore important to us and it is also the environment over which building owners, managers and engineers have the greatest control.

An essential factor in providing adequate fresh air is that the heating, ventilation and air conditioning ductwork systems must be kept clean.

Two examples of instances where fresh air and clean ductwork are paramount are in commercial kitchens and hospital buildings. The health and performance of kitchen staff can be badly affected when heat, cooking and combustion products, such as unburnt gases and carbon monoxide, are not effectively removed. In such an atmosphere, the risk of accidents – in an already high-risk environment – is significantly increased. Add to this the likelihood of grease, oil and fat deposits building up in the kitchen extract system if it is not regularly cleaned, and there is a potentially explosive situation should a fire occur.



In healthcare environments, the control of infection is a daily battle. The disinfection of wards, equipment and linen can be made ineffective if the unseen ventilation ductwork surfaces are not equally well cleaned. The dust and dirt that builds up in ductwork can contain a high proportion of organic compounds such as skin and hair, which are nutrients for micro-organisms that can easily become airborne and would be an ideal home for harmful germs such as the dangerous superbugs MRSA and clostridium difficile.

Inevitably, all duct systems, however well designed, become fouled over a period of

time. The rate and severity of contamination can be attributed to a number of factors. The quality of filters and their ongoing maintenance is crucial to the rate of fouling in supply air systems. The location of the building and its plant rooms also has a direct bearing on the air quality provided through the HVAC system. Each environment will be affected by its own peculiarities, from combustion products to allergenic organic matter and high humidity. For buildings in which air is recirculated, a further range of contaminants will affect air quality including skin flakes, textile fibres, paper dust and other pollutants

specific to any work process. The HVAC system itself can generate its own contaminants such as rust, insulation materials and micro-organisms associated with moisture sources like moulds and fungi.

It sounds a daunting task to eliminate such a wide range of contaminants but demand from occupiers for a clean, safe environment and an increasingly coherent body of health, welfare and safety legislation is highlighting the need to introduce more effective programmes of hygiene maintenance.

Modern technological advancements are making it easier and quicker to carry out effective cleaning of ventilation systems with little disruption to building occupants and the business operation. To maximise efficiency, it is important that the cleaning process can be achieved with minimal access to ductwork, that the operation is spark-free and that there is no possible leakage of contaminants. The cleaning process must meet internationally recognised standards, such as the Department of Health guidelines on the operational management and performance verification of specialised ventilation systems (Health Technical Memorandum 03-01: Specialist Ventilation for Healthcare Premises, published December 2007) and the Heating and Ventilation Contractors' Association (HVCA) Specification for Kitchen Ventilation Systems (DW/172).

It is easier today than it has ever been to ensure HVAC ductwork is clean and safe and, where proper cleaning regimes are in place, there is no excuse for building occupants not to be confident that the air they breathe is fresh, invigorating and healthy.

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## Ductwork's green credentials

Andy Watton explains the contribution that self-sealing, high-performance circular ductwork can make to reducing energy consumption

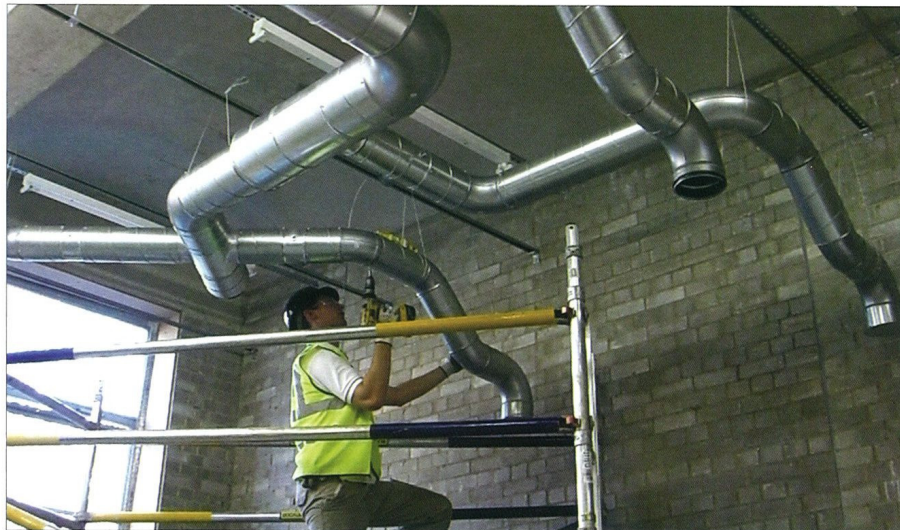
**W**ith Britain set steady on a course to a low carbon future, the ingenuity of the building services industry has been tested as never before. Biomass boilers, variable speed pumps and fans, wind turbines, solar panels, ground source heat pumps – the list of carbon reducing solutions is a long one. And yet it's a list that never seems to include ductwork.

Although ductwork is a major component of the ventilation and air conditioning systems serving our hospitals, office buildings, shopping centres and so on, it is not regarded as making a positive contribution to a 'green' solution.

It doesn't have to be that way, as more and more consultants and contractors are coming to realise. Self-sealing circular ductwork can play an active role in reducing the carbon footprint of the building by improving its air tightness and actually reducing the fan power required to serve its environmental control systems.

System designers face a dilemma. Although the pressure is on to save energy, there's also a pressing demand for a closely controlled, comfortable working environment – especially in premium office developments. Until now a certain amount of duct leakage has been taken for granted and plant has been oversized to allow for the inevitable losses. With new airtight systems, it is possible to size the fans exactly to the required performance with little or no 'overspec' to allow for leakage.

Part L of Building Regulations stipulates that any new building must be demonstrated at the planning stage to meet a minimum energy performance requirement in the form of a Target Emission Rating (TER) for CO<sub>2</sub>. For non-domestic



buildings designers use SBEM, TASS or other BRE approved modeling tools to meet this requirement. On completion of the project it must be demonstrated that the actual Building Emission Rate (BER) is equal or better than the TER.

Airtight systems make it far easier to satisfy the regulations. A recent test programme conducted by Bsrta on the Lindab Safe product cut installation time in half and cost was 20 per cent less when compared to the traditional approach. Crucial savings in air leakage were just as significant. At a static duct pressure of 500Pa, the air leakage rate was 43.8 per cent of

that from the system constructed with traditional components. The tests showed that Lindab Safe achieved better than Air Tightness Class C (EN 12237) while the conventional approach achieved only Class B.

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