Special report

Ductwork and ductwork cleaning

Correct procedures make business sense

With the majority of ductwork systems hidden behind panels and ceilings, regular maintenance should not be forgotten

One of the most common causes of system inefficiency within buildings of all types and sizes is that of lack of maintenance.

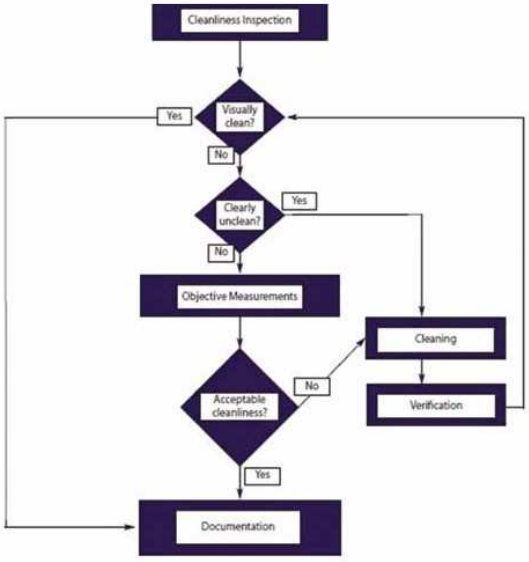
Where ductwork in particular is concerned, this can often be due to the "out of sight, out of mind" effect, in addition to building owners' attempts to save money. The latter can be a particular cause of frustration, especially when it impacts on both health and safety and system operation, with serious potential implications for building users.

Avoidance of these issues can be easily avoided by following British Standard EN 15780: 2011 Ventilation for buildings – Ductwork – Cleanliness of ventilation systems, and the associated B&ES TR/19 Second Edition 2013 Guide to Good Practice: Internal Cleanliness of Ventilation Systems.

System Hygienics technical sales manager Craig Booth says these are both performance-based standards and "do not slavishly insist on cleaning systems unnecessarily, or on a timed basis such as 'every year'.

"They provide measurements of cleanliness to be achieved for various classes of environment and types of ductwork. This means that systems must be cleaned only 'when necessary'," he says.

Similarly, the Protection Delivery and Installation (PDI) advice for new duct installations at the popular Intermediate PDI Level demands pre-commission cleaning of new ductwork only when 'shown to be necessary'. For Advanced PDI, it is assumed that new systems will be cleaned in any event and a decision tree (pictured) is provided to help decide when duct cleaning is necessary.



TR19 cleanliness decision tree

"Much of the time, project members, effectively representing the client and the supplier, will be able to simply agree whether a system is visually clean or clearly unclean. But what happens when agreement cannot be reached?" asks Mr Booth.

In these instances vacuum tests are carried out to precisely compare system cleanliness with the benchmark to be achieved for the project.

"That's why it's wise to allow for a few vacuum tests when specifying and bidding," he continues. "More importantly: it's a good idea to have a cost in the job for possible pre-commission cleaning if protection measures fail – as they so often do – to achieve the required level of cleanliness.

"We've recently increased the size of our estimating department to deal with the growing demand for pre-commission cleaning quotations," says Mr Booth.

Further emphasis on the health and safety aspect is provided by

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Special report

Ductwork and ductwork cleaning (continued)

Mansfield Pollard, which says that most people spend the majority of their time living or working in a built environment, so the quality of the air they breathe is paramount. An essential factor in providing adequate fresh air is that the heating, ventilation and air conditioning ductwork systems must be kept clean.

Dirty systems can affect businesses in a variety of ways, the company states, including reduced productivity, low employee morale, computer downtime, damaged interiors and high capital expenditure to replace prematurely deteriorated air conditioning systems.

"If the ductwork doesn't comply with the regulations of the Health and Safety Commission, then there is the risk of potential prosecution," it continues. Further emphasis is also provided for the B&ES TR/19 Guide and its recommendations for regular cleaning, testing and maintenance to ensure that they are kept free from anything which may contaminate the air.

More specific focus on one of the components within ductwork systems is provided by Airmec's Andrew Steel, who emphasises the importance of fire dampers. "They are generally hidden above ceilings and mounted in a ductwork run. Most people don't know they exist, even though they form a key part of the passive fire protection within a building.

"All too often, our inspectors report that they have seen dampers clogged with debris and not able to close effectively or, because they've once automatically "nuisance closed", they've been rammed open with wood or bricks. Making sure this isn't true of your business is clearly going to be one of your better business decisions," he says.

Fire dampers in ducts prevent the spread of fire and smoke through walls, ceilings and floors and while they are described as passive fire protection, they need active management. Under current legislation, the 'responsible person' (England, Wales and Ireland), 'duty holder' (Scotland), or 'appropriate person' (Northern Ireland) has to undertake a fire risk assessment for their premises. As there is no definition of what level of knowledge such a person should have, it is a brave boss who does not seek professional advice on fire risk assessment and prevention, he continues.

"Do remember that you cannot outsource your legal responsibility: it is still the building owner and operator who would carry the can in court if prevention measures were found to be inadequate. Choose your partner wisely," Mr Steel advises.

Following worldwide steel price rises, Reznor's Joe Kiernan says the cost of galvanised steel ductwork has also risen, resulting in a trend towards increased use of fabric ductwork distribution systems.

While traditional galvanised steel is the norm for most installations, there are numerous installations in modern buildings where the distribution ductwork is exposed within the heated or air conditioned space. For these installations, the fabric distribution duct is ideally suited to provide even air distribution and aesthetics in addition to cost savings, he says.

"The fabric distribution ductwork plenum may be manufactured from a variety of materials to suit different applications and is inflated by the air pressure inside the duct. Modern fabric ductwork systems are far more sophisticated than simple air socks, which diffuse air through the entire surface of the duct," Mr Kiernan continues. "These simple systems are useful for specific applications but lack the versatility and air distribution features of the modern fabric duct."

Computer design technology now allows fabric duct systems to be individually created to match the proposed criteria for heating, air conditioning or ventilation with duct mounting heights between 2m and 15m. Air discharge may be selected from a number of specially designed perforations to promote high levels of air induction and subsequent air mixing.

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The distribution and location of the outlets is unique to each application and depends on the air leaving temperature, mounting height and terminal velocity criteria to be achieved. For open plan areas, air distribution would generally take place along the full length of the duct, but for racked areas the ducts can be manufactured specifically for air discharge between the racks.

The distribution outlets are designed to induce large volumes of secondary air from around the duct into the discharge air stream. The combination of uniform air distribution down the full length of the duct, plus the large volume of induced secondary air, promotes substantial low velocity air movement within the building. This results in very even temperature distribution with little or no discernible air movement at occupancy level.

For ducts installed at high level, the outlets can be designed to increase the amount of air induction to provide auto de-stratification and thereby eliminating excess roof space temperatures and reclaiming heat from lighting, for example.

Fabric ductwork savings are not purely related to material, as installation costs are also reduced. The lightweight systems can be installed quicker than traditional steel ductwork, and since most ductwork installations are at high level and covered by the stringent Working at Height legislation, this can lead to further advantages, Mr Kiernan concludes.