

# Selecting HEVAC Equipment with Indoor Air Quality in Mind



HEVAC: The Indoor Air Quality Initiative

The HEVAC Association forms the Building Services Division of the Federation of Environmental Trade Associations (FETA).

When we think about good quality indoor air we think of breathing a fresh, healthy, invigorating atmosphere that makes us feel alert and well. When we are indoors, at home, in a factory, shopping mall, cinema, hospital or any other environment - we should feel as comfortable about the air we breathe as if we were in a meadow. In some ways we should feel better, particularly if the air is maintained at the proper temperature, filtered and suitably humidified.

HEVAC's (Heating, Ventilating and Air Conditioning Manufacturers Association) Indoor Air Quality (IAQ) Initiative has been formed specifically to promote the benefits of good quality indoor air. The initiative is evaluating research on the benefits of good IAQ and on how poor IAQ can be improved. The findings of its research are available to everyone with an interest in IAQ. The initiative's aim is to create a wider understanding of the conditions and constituents of good quality indoor air by underlining the problems that can be encountered if key elements are not employed.

Good Indoor Air Quality is essential for our health and well being, poor quality air can have detrimental effects, not only on people's health, but also on the performance of a business. As much as 80% of our time is spent indoors, either at work or at home or at play and therefore it is necessary to ensure that we have a good supply of fresh clean air at all times. There is a moral and, in many instances, legal obligation on people, from employers to home owners, to provide everyone in their charge with a safe and healthy environment in which to live and work.

A major factor influencing Indoor Air Quality is the equipment installed in the occupied space, and how it is used. As well as air conditioning and ventilation equipment this includes furniture, fixtures and fittings and other operational plant and equipment. The proper consideration of IAQ when selecting equipment can dramatically influence the working environment. Properly designed and maintained equipment and systems can greatly improve efficiency, performance and reduce absenteeism.

## Q : What sort of equipment can affect Indoor Air Quality?

A : Most equipment used in a working environment can have an influence (either good or bad) on Indoor Air Quality to some extent or another. Items that can have a substantial effect on Indoor Air Quality include:

- Office based electrical equipment such as Computers, Printers, Fax Machines, and Photocopiers.
- Supplementary heating systems, Paraffin or Gas heaters.
- Process plant and equipment.
- Heating, Ventilation and Air Conditioning plant.
- Kitchen/cooking equipment, particularly in non-domestic situations.
- Fixtures and fittings such as Furniture, Carpets and Chairs, etc.

## Q : How can equipment affect Indoor Quality?

A :

- All electrical equipment is a source of heat while operating. A high density of such equipment can cause significant increases in ambient temperature.
- Printers, Fax Machines and Photocopiers can produce small quantities of toxic

ozone and may also release unpleasant smells or fumes from solvent based inks.

- Soft furnishings, carpets and furniture constructed from manufactured wood products (such as chipboard, cork tiles and plywood) can produce emissions of volatile organic compounds (VOCs) that can adversely affect Indoor Air Quality.

Q : In what ways can business activities have an impact on Indoor Air Quality?

A :

- Process plant and equipment can produce a variety of fumes and other airborne contaminants such as smoke or dust (either as leakages or as a byproduct). Such equipment can also be a major source of increased temperature. Cleaning equipment (power washers, steam cleaners etc) can introduce moisture vapour into the air and aid the growth of dangerous bacteria and fungi. The size and location of the equipment can also effect the air quality by disrupting or spreading pollution into the airflow.
- Cooking on a commercial scale requires a great deal of heat which can lead to very hot surroundings. The action of heating food also can lead to the release of smells and smoke from equipment.

Q : Can HEVAC (Heating, Ventilation and Air Conditioning) equipment itself have an adverse affect on Indoor Air Quality?

A :

- Incorrectly specified and installed HEVAC equipment can fail to provide sufficient temperature, humidity and fresh air control resulting in poor air quality. In addition, wrongly sited equipment can result in local regions of poor air quality i.e. hot spots, cold spots, unventilated and draughty areas.
- Badly maintained HEVAC equipment can mean blocked filters or incorrect filters which can restrict airflow leading to a build up of contaminants due to inadequate flushing. Uncleaned HEVAC plant and ducting can harbour bacteria and fungi which can cause a number of illnesses, some potentially fatal. Poorly maintained equipment can also use more power which indirectly produces higher levels of CO<sub>2</sub>.

Q : Can we simply install more heating and ventilating systems with better filters and bigger fans?

A : Yes, as a last resort, however, prevention is better than cure, i.e. it is better to install office or factory equipment that has the minimum effect on Indoor Air Quality than to try and counteract any unwanted effects.

Q : How is prevention cost effective?

A : Sourcing equipment which has minimum impact on Indoor Air Quality will reduce the load on HEVAC plant required to maintain a good level of Indoor Air Quality. This leads to a requirement for smaller HEVAC plant which is less expensive to purchase and cheaper to run and maintain.

Q : In what ways can business activities have an impact on Indoor Air Quality?

A :

- Consider the heat output of office equipment. All electrical equipment is marked with the electrical power it uses, which gives an indication of the amount of heat

it will generate while in use. If possible select equipment that has a 'sleep' mode which automatically reduces power consumption during periods of inactivity.

Other Fact Sheets in the series:

Fact Sheet 1  
Indoor Air Quality and Productivity in the Workplace.

Fact Sheet 2  
Indoor Air Quality and Health and the Indoor Environment.

Fact Sheet 3  
Indoor Air Quality and Asthma.

Fact Sheet 4  
Indoor Air Quality, Global Warming and Energy Efficiency.

Fact Sheet 6  
Sick Building Syndrome and the importance of maintaining IAQ equipment correctly.

- Make sure that ozone filters are fitted to equipment where appropriate
- Specify soft furnishing and carpets with low emissions of volatile organic compounds
- Dedicated extraction equipment should be used to control fumes and emissions. The location of the exhaust vents should ensure that the fumes are not drawn back in to the building through the ventilation system. Consider using printing equipment that can use reduced solvent or solvent free inks.
- Ensure any HEVAC plant that recycles air is fitted with suitable filters to remove any pollutants that could have a detrimental effect on Indoor Air Quality
- When specifying equipment consider the ease of access for cleaning and maintenance, and also the 'cleanability' of the equipment. Follow the manufacturer's instructions and recommendations with regard to maintenance and cleaning

Q : How can Outdoor Air Quality affect Indoor Air Quality?

A : External air quality can vary with a wide range of factors: time of day, day of week, time of year, wind speed and direction, air temperature, discharges from other businesses nearby, proximity of major roads, etc. Ensure filter and ventilation systems are specified to handle all outdoor air quality conditions.

Q : In simple terms what steps can be taken to improve Indoor Air Quality?

A : Make use of HEVAC plant to provide filtration, ventilation, temperature control and humidity control. Remove pollution as close to the source as possible through extraction, ventilation and filtration.

- Maintain all equipment in strict accordance with the manufacturer's recommendations, and make sure that proper maintenance records are kept.

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Indoor Air Quality is a major factor influencing the comfort and efficiency of us all. Some of the factors which influence Indoor Air Quality are not easily detected, such as fungi or bacteria living in ventilation ducts, but never the less can still cause major problems. It is only through the selection of the proper equipment and using and maintaining it as per the manufacturer's instructions and recommendations that Indoor Air Quality can be maintained at approved standards.

There is a responsibility on employers to maintain good Indoor Air Quality by reducing the number of potential sources of pollutants and by eliminating as much pollution as possible as close to its source through adequate indoor air treatment.

## Further Reading

'Indoor Air Quality: a comprehensive reference book.' Maroni Seifert & Lindvall (editors). Elsevier, 1995. ISBN: 0 444081642 9

Proceedings of the 'Fourth Indoor Air Quality Conference' 20th June 1996. Mid Career College Press, 1996. ISBN: 0 9524553 4X

'Workplace (Health, Safety and Welfare) Regulations 1992'. Health and Safety Commission. ISBN: 0 7176 0413 6

'Air Filters Application Guide 8/97', P Pike. BSRIA 1997. ISBN 0 86022 460 0

'VOC Emissions from Cork Products for Indoor Use'. W Horn, D Ullrich, B Seifert. Indoor Air 1998 No 8.

Further information on HEVAC and Indoor air quality issues can be found on the FETA/HEVAC Internet: [www.feta.co.uk/](http://www.feta.co.uk/)