CITY AND COUNTY OF CARDIFF

CODE OF GUIDANCE

WORKPLACE VENTILATION

All places where people work, be it an office, workshop, school, leisure centre, laboratory, home for the elderly, etc. need to provide a minimum standard of fresh air to produce a healthy working environment. This is achieved by effective general ventilation. General ventilation is a term used to define the flow of air into and out of a working area and this can be provided by:

Natural Ventilation - which relies on wind pressure and temperature differences to move fresh air through a building and is usually not fully controllable; and

Forced or Mechanical Ventilation - which uses mechanical supply and/or extraction to provide fresh air and is controllable.

Purpose

The purpose of this Code of Guidance is to provide advice on general workplace ventilation, the standards recommended, and ways of achieving effective ventilation.

The Code of Guidance addresses the following:

1.0 Legal requirements in respect of workplace ventilation.

2.0 Principles and use of general workplace ventilation.

3.0 General ventilation standards.

4.0 Measures to achieve effective general ventilation of the workplace.

This guide does not deal specifically with ventilation in respect of:

- Processes requiring local exhaust ventilation (LEV), e.g. welding fume extraction; laboratory fume cabinets; wood machining dust extraction, etc.
- Specialised work situations, e.g. confined spaces.
- Domestic premises.
- Systems for controlling smoke and combustion products arising from accidental fires.

1.0 Legal requirements in respect of workplace ventilation

All workplaces are covered by the Health and Safety at Work etc. Act 1974. This sets out the general duties of employers towards their employees and members of the public, and the duties employees have to themselves and to each other. Although ventilation is not mentioned specifically, employers are required to ensure, so far as is reasonably practicable, the health safety and welfare at work of all their employees. This includes providing a working environment that is both safe and without risks to health.

The Management of Health and Safety at Work Regulations 1999 require suitable and sufficient assessments of risk to employees to be carried out and this should include a consideration of workplace ventilation.

Where people might be exposed to substances hazardous to health, a more specific risk assessment is required by the Control of Substances Hazardous to Health Regulations 1999. (COSHH) The aim is to prevent or control exposure to hazardous substances by using suitable control measures which, in the case of airborne contaminants, might include general or local ventilation. The measures taken to control exposure must also be regularly maintained, examined and tested to keep them in good order.

The Workplace (Health, Safety and Welfare) Regulations 1992 places a requirement on the employer to ensure effective ventilation for any enclosed workplace by providing a sufficient quantity of fresh or purified air (Regulation 6). The official Guidance associated with this Regulation states that the fresh air supply rate to a workplace should not normally fall below 5 to 8 litres per second, per occupant. Several factors would need to be considered when deciding the appropriate rate for a workplace. These include:

- The work activity
- The amount of floor space available per occupant
- The smoking habits of the occupants; and
- Whether there are other sources of airborne contamination arising from work processes, heaters, furnishings etc.

Regulation 5 of the Workplace (Health, Safety and Welfare) Regulations 1992 requires that mechanical ventilation systems used for providing workplace ventilation are maintained (including cleaning) in an efficient state, in efficient working order and in good repair. Regulations 21 and 25 require employers to ensure that toilets are well ventilated so that offensive odours do not linger, and that rest rooms and rest areas include suitable arrangements to protect non-smoker from discomfort caused by smoking.

2.0 Principles and use of general workplace ventilation

Fresh air is required in the workplace to:

- Provide oxygen for breathing in and to remove carbon dioxide from breathing out;
- Remove excess heat and humidity or, if conditioned, provide heat/humidity to keep a comfortable work environment;
- Dilute and remove various types of odours e.g. food, body, etc;
- Dilute and remove any contaminants caused by workplace activities (i.e. the use of general ventilation or local exhaust ventilation following a risk assessment).

The fresh air that is brought into the workplace should be free of contaminants such as engine exhaust emissions, or discharges from oil or gas fired flues and similar outlets. When contamination with particulates (e.g. heavy traffic) is expected then the inlet air should be filtered. Ventilation systems that recirculate air should also be filtered to remove particulates, and should have fresh air added before being reintroduced into the workplace.

When providing fresh air to a workplace it is important to make sure that people are not subjected to uncomfortable draughts from the movement of air.

Health effects of insufficient fresh air

Insufficient fresh air may lead to tiredness, lethargy, headaches, dry or itchy skin and eye irritation. These symptoms can, however also associated with work in poorly designed workplaces and where there are unsatisfactory working arrangements, for example, the inability of workers to control certain aspects or their work. These are common symptoms of what is generally known as ‘sick building syndrome’ and they are generally worse in buildings where there is not enough fresh air.

When to use general ventilation

General ventilation is necessary to remove stale, contaminated, or hot and humid air from the workplace so that employees do not suffer ill health.

General ventilation may also provide adequate control of airborne contaminants where these are of such low toxicity and produced in such low concentrations that it would be impractical and costly to use local exhaust ventilation. In these circumstances it is essential that a COSHH risk assessment be carried out to determine the control measures that are necessary to safeguard people’s health. When using general ventilation to control exposure to contaminants generated from a work process it is important that:

- The rate of contaminant produced is low enough for it to be effectively diluted by the airflow rate;

- The contaminant has a low toxicity;

- The contaminant is produced at a uniform rate;

- The contaminated air is not drawn or blown towards the faces of workers;

- The contaminant is generated in low concentrations and can be controlled to the assigned 'Occupational Exposure Level' standard; and

- The airflow does not affect the performance of other extraction systems e.g. fume cupboards.

Clearly these issues require some expertise and so it is advisable to consult a ventilation engineer or other competent person to decide on the correct ventilation rate and design.

3.0 Standards of General Ventilation

As mentioned above, the Guidance associated with the Workplace (Health, Safety and Welfare) Regulations 1992 states that the fresh air supply rate to every enclosed workspace should not normally fall below 5 to 8 litres per second, per occupant.

The Chartered Institution of Building Services Engineers (CIBSE) has also published authoritative guidance in respect of workplace ventilation. This recommends a fresh air supply rate of 8 litres per second per person to provide a clean and hygienic workplace in open plan offices, shops and factories. Higher fresh air supply rates of up to 36 litres per second per person are recommended for heavily contaminated buildings.

Standards for gas, coal or oil fired equipment

The fresh air requirements in respect of gas, coal or oil fired equipment are set out in British Standards and will depend on the flue arrangement. Ventilation rates can vary considerably for different types of appliance and people are at risk of poisoning from carbon monoxide gas if there is not enough fresh air in the room to remove combustion products. It is essential that all appliances are properly installed and regularly maintained by a CORGI registered engineer.

Air movement

Air movement caused by general ventilation can be discomforting and it is important that draughts are kept to a minimum. People are generally happier if they can control their environment, for example by opening or shutting a window when required. The CIBSE recommend an air flow velocity of

between 0.1 to 0.15 metres per second during normal temperatures, and up to 0.25 metres per second during the summer months.

4.0 Measures to achieve effective ventilation of the workplace

The basic design of the workplace has a major influence on the effectiveness of natural ventilation. Apart from the fresh air supplied directly through vents, windows, grilles and open doors, a certain amount will also be supplied indirectly through gaps around doors, panels and window frames. The following are some measures that can be taken to improve the level of workplace ventilation where this is necessary:

- Having additional windows that open to provide controllable, draught free ventilation.

- Making sure available windows, doors and vents are opened to provide a good supply of fresh air

- The installation of trickle ventilators in window frames as well as air vents in walls and roofs

- Fit electrically powered fans to walls, windows or roofs to extract contaminated air;

- Fans can also be fitted to introduce fresh air into the workplace i.e. certain fans extracting contaminated air while others supply fresh air, thus keeping fresh air flowing through the building;

  N.B. It is important to make sure that:

  - Extract fans are located as near the contamination source as possible

  - People work between the air supply and contaminant source, so that contaminated air does not flow past them.

  - There are no openings for supply air near the exhaust discharge point, this is to avoid contaminated air re-entering the building

- Extraction fans can also be used in combination with open windows/vents with the latter supplying the make up air;

- Portable fans can be used to achieve an adequate air flow at specific locations within a building, to keep employees cool or to dilute contaminants;

- A properly designed and installed mechanical ventilation system will be necessary to keep internal workplace conditions constant with regard to a wide range of external weather conditions.

- Local exhaust ventilation systems will be required where, following a COSHH risk assessment, it is considered necessary to remove hazardous airborne contaminants at source from a specific process.

Further Information:

The Health and Safety at Work etc. Act 1974.

The Management of Health and Safety at Work Regulations 1999. – plus Approved Code of Practice and Guidance (L21)

The Control of Substances Hazardous to Health Regulations 1999. – plus Approved Code of Practice and Guidance (L5)

The Workplace (Health, Safety and Welfare) Regulations 1992. – plus Approved Code of Practice and Guidance (L24)

The Gas Safety (Installation and Use) Regulations 1994. – plus Approved Code of Practice and Guidance (L56)

Health and Safety Executive Guidance 'HS(G) 202' – General Ventilation in the Workplace.

Health and Safety Executive Guidance 'HS(G) 37' – An Introduction to local Exhaust Ventilation.

Health and Safety Executive: Catering Information Sheet No. 10 – Ventilation of kitchens in catering establishments.

Chartered Institution of Building Services Engineers (CIBSE) Guidance Note 'GN 2' – Guidance to complying with the 1992 health and safety regulations.