Goldsmiths
UNIVERSITY OF LONDON

Ventilation Strategy

Contents

Ownership	Estates and Facilities Management
Policy Contact	Director of Estates and Facilities Management
Approval	H&S Committee
Protective Marking	Public
Last review date	September 2021
Next review date	September 2023

1 Introduction

The law says employers must make sure there's an adequate supply of fresh air (ventilation) in enclosed areas of the workplace. This has not changed during the pandemic.

You can do this by using:

- natural ventilation - fresh air comes in through open windows, doors or air vents. This is also known as 'passive airflow'; or

- mechanical ventilation - fans and ducts bring in fresh air from outside Ventilation isn't the only way of making sure you're working safely. You should also make sure workers are keeping the workplace clean and washing their hands frequently.

  This strategy identifies the existing general ventilation used throughout Goldsmiths, University of London and measures to ensure workplace safety.

2 Covid Context

The World Health Organisation (WHO) learned of the new coronavirus called SARS-CoV-2 (COVID-19) on 31 December 2019, following a report of a cluster of cases of 'viral pneumonia' in Wuhan, People's Republic of China.

There are three main means of transmission of the virus. The first and second of these (from surfaces and via directly inhaled particles from infected people) are mitigated via measures such as social distancing, wearing of Personal Protective Equipment (PPE), enhanced cleaning and hygiene regimes.

The third main factor in the spread of the virus is "aerosol transmission". Adequate ventilation mitigates the risk of a concentration of virus particles causing infection as fresh air moves into a space to disperse and dilute that concentration.

The Health and Safety Executive (HSE), Chartered Institution of Building Services Engineers (CIBSE) and University Health and Safety Association (USHA) have all issued or reviewed guidance on ventilation during the summer of 2021. Their latest documents can be found at:

HSE: Ventilation and air conditioning during the coronavirus (COVID-19) pandemic
CIBSE: Covid-19 Ventilation (version 5)
USHA: Ventilation as a control measure in managing the spread of Covid-19

3 Duties

3.1 Director of Estates

The Director of Estates is the named “responsible person” and the individual responsible within the organisation for making sure that H&S systems meet the legal minimum standard, including ventilation systems.

3.2 Deputy Director of Estates

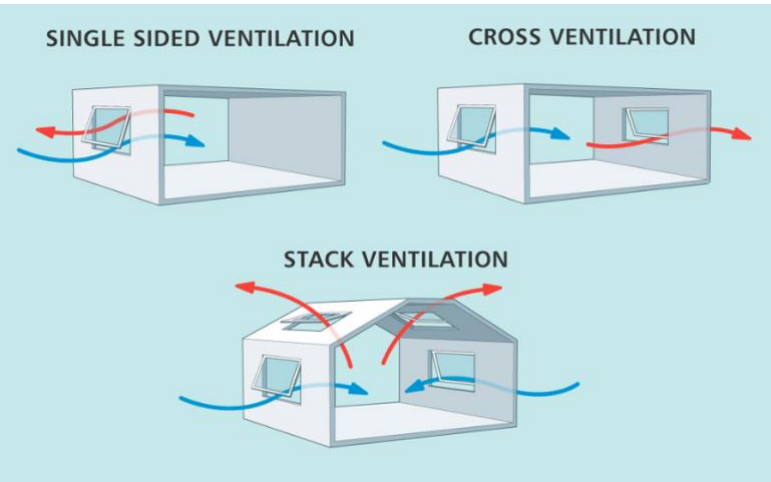
The Deputy Director of Estates is the named “competent person” who has the knowledge, skills, training and experience and ability to carry out or delegate specialist tasks such as maintenance safely and accurately. The Deputy Director of Estates is supported in this role by the Technical Services Manager.

In tandem these roles ensure that a legally compliant plan for ventilation is established and acted upon. The key task to ensure that an adequate supply of fresh air in enclosed areas of the workplace via either natural or mechanical ventilation.

4 Ventilation Systems

4.1 Natural Ventilation

Natural ventilation is the use of environmentally friendly systems that do not require any automated or mechanical solutions. In addition to being more ecological, natural ventilation is also more cost-efficient, and relies on natural external factors such as the wind and the temperature of the interior space and its surroundings.



4.1.1 Single-sided ventilation

Single-sided ventilation is the use of openings on one side of a building. This is used to naturally ventilate the space of projects with limited area.

4.1.2 Cross Ventilation

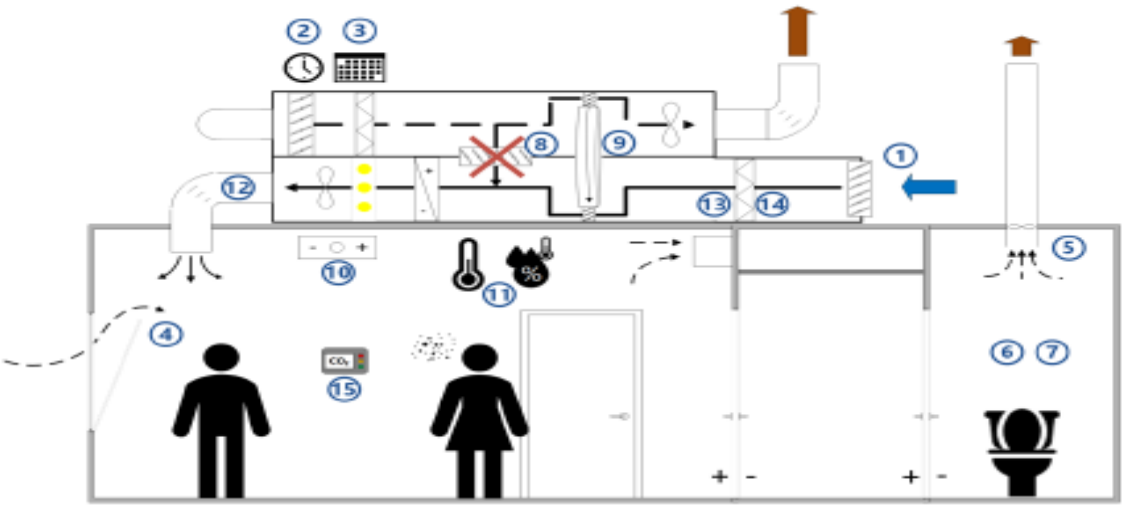
Cross ventilation is when the openings in a structure are arranged on opposite or adjacent walls, allowing air to enter from both sides, cross the space, and exit from the opposite direction.

4.1.3 Stack Ventilation

Stack ventilation introduces cooler air from the outside into the building at a low level, which gradually becomes warmer as it gets exposed to heat sources within the space. This causes the now-warm air to rise and leave the space through openings situated at a higher level. In order for this ventilation system to work properly, the indoor temperature has to be higher than the outside, which means that this is not always an efficient enough system to use on its own.

4.2 **Controlled Ventilation (Mechanical)**

Mechanical ventilation systems circulate fresh air using ducts and fans, rather than relying on airflow through small holes or cracks in a building's walls, roof or windows.



4.2.1 Roof Ventilators

The simplest forms of mechanical ventilation systems simply circulate the air at the ceiling level. They create air movement at the ceiling level to cool the space.

4.2.2 Displacement Ventilation

Ducts can be used to supply air to different levels of a multi-storey building, using underfloor or displacement ventilation that provide fresh air from floor-mounted or low-level wall mounted ventilators within the occupied rooms or zones.

4.2.3 Supply and Extract Systems

Fan-assisted extracts work by enhancing the air movement to exhaust latent heat when the internal temperature is high.

Mechanical ventilation systems can have both supplier and extract vents. These systems may also include filters to ensure a higher standard of indoor air quality, coupled with heating and/or cooling coils.

The current guidance recommends that;

- planned maintenance is undertaken once every six months
- Fan speeds are maintained at a standard of 30Hz

4.2.4 Extract Only Systems

Mechanical extract only systems are used where the air is likely to become contaminated such as in kitchens, bathrooms etc and where there is a need for constant and predictable extraction of air. Supply only systems are suitable for occupied offices that need to be supplied by fresh air when the air movement needs to be controlled.

5 Ventilation at Goldsmiths, UoL

The University has a range of bookable teaching and learning rooms across the campus as well as designated departmental space and shared office/hot desk accommodation.

The Estates department have surveyed all bookable spaces across the campus.

5.1 **Natural Ventilation**

The majority of all Goldsmiths buildings are naturally ventilated.

In window ventilated spaces suitable ventilation can be provided by using a “pause” technique of having windows open until the temperature drops and then closing them again and repeating once temperatures reach the desired limit.

5.2 Mechanical Ventilation

Twenty-one of the bookable rooms have a form of mechanical ventilation installed, nine of which, have non-opening windows.

Where feasible mechanical air source systems across campus have been configured to operate on 100% fresh air removing the risk of recirculated air flow. Wherever a space has fresh air supplied by mechanical means, the supply fan and extract time programs have been adjusted with an enabled signal run time of 24 hours per day rather than college opening hours, this will increase the rate air of air changes. These adjusted times means that we are in line with the recommendation for educational buildings, as it is not recommended to switch ventilation off, but to operate continuously.

Fan speeds have also been adjusted to ensure an increased velocity can be maintained from the standard 30Hz to maximum of 50Hz. Thus ensuring the standard flow rate from 5-10 l/s/ per person can be maximised where applicable.

In regard to extract and supply air filters, where applicable all extract and supply air filters have been changed with a revised frequency of planned maintenance from the standard guidance of 6 months to a 3-month regime. External intakes have been cleaned and internal diffusers will be monitored and cleaned accordingly.

There are also split systems, these however do not have a fresh air input to them, and just cool the available air in the room, In cases where these systems are used, Additional ventilation via windows should be used where possible to provide a good supply of fresh air.

6 CO2 Measurements

CO2 measurements are used as a broad guide to ventilation within a space.

The Estates department hold Digital CO2 monitors and have an agreed Planned Preventative Maintenance schedule to test and record ten randomly selected rooms per day, Monday to Friday to ensure that areas are suitable for use and that here is no build-up of CO2.

CO2 will be recorded against a traffic light recording system;

Rating	CO2 (ppm)	Short-term actions recommended
Green	< 800	Continue to ventilate the room regularly
Amber	800 - 1499	Ventilate the room
Red	> 1500	Air the room; leave and come back later

There are some spaces where CO2 monitors will be less effective. CO2 monitors are not suitable for use in areas that rely on air cleaning units because these remove contaminants (such as coronavirus) from the air but do not remove CO2.

In large, open spaces and spaces with higher ceilings, such as food production halls or Theatres, you can't be sure the air is fully mixed and CO2 monitors may be less representative.

Monitors are also of limited use in less populated areas. These include fitting rooms or large offices with one or two occupants.

It is important, given every space is different, that consideration is given as to whether a CO2 monitor will be appropriate means to measure.

The Estates maintenance team will be able to provide further guidance.

7 Key Risks

It is a priority of the Estates department to identify spaces that are usually or often occupied but are poorly ventilated. A poorly ventilated space can be identified in several ways; they may be stuffy, smelly or experience unexplained high humidity. If there is no natural or mechanical ventilation, or if high aerobic activities such as singing or exercise take place there, they are risk areas.

Adhering to the occupancy limit for a space as specified on the room booking system or on the entrance door to the space combined with the correct ventilation and minimum rate for adequate airflow to comply with Building Regulations will minimise any risk.

Steps that can be taken to improve areas of concern

A. Raising the airflow above usual levels as long as thermal comfort can be maintained
    - open high-level vents before low-level ones
    - open many windows by a small amount instead of having just a few windows wide open
    - open windows 15 minutes prior to occupation and for 15 minutes after occupation
    - regular purging of high volume but poorly ventilated spaces (such as corridors)
    - relaxing dress codes
    - manual over-ride on automated windows and vents to adjust the CO_2 set point to a lower value
    - operate systems using 100% fresh air where possible (that is, disable options for recirculating air)
    - be alert to fire safety when deciding whether doors can be left open

- window restrictors could be removed (after risk assessment on the likelihood of falls)
- windows and doors could be left open overnight (after considering security risk)
- do not use desk or ceiling fans in poorly ventilated spaces

B. Mitigations specific to common mechanical ventilation systems
   - extend the operating hours of mechanical ventilation systems (for instance for one hour before and after a space is used)
   - for heat recovery systems refer to the manufacturers documentation, or for buildings built after 2002, the building log book
   - for twin coil units or plate heat exchange systems inspect for leaks between the air exhaust and supply ducts
   - for thermal wheels there is a risk of leakage between the air exhaust and supply streams depending on the relative pressures in the ducts – check the configuration with the help of a qualified engineer
   - adopt the usual safety procedures for when carrying out dusty work
   - the recirculation of air by centralised air handling units serving several rooms does increase risk but at a low level. Operate with dampers closed when reasonable
   - high efficiency particulate air filters (HEPA filters) should be used but only in systems designed for them and changed regularly in accordance with current best practice/PPM schedules
   - when changing filters replace and maintain as usual. While clogged filters reduce airflow, they are not a source of contamination in their own right. Filters may have viable virus particles in them – they should be changed with the system turned off and disposed of in a sealed bag. PPE should be worn.
   - duct cleaning – as virus particles lose viability over time anyway additional cleaning beyond the usual (for instance in kitchens) is unnecessary. In such situations the prime purpose is about fire safety rather than as an anti-virus measure.
   - outside air filters can be maintained as usual as they are not a high-risk source of viral aerosols
   - for split air conditioning systems where there is no source of outside air, the duration of use of these spaces should be minimised
   - for fan coil units where there is a good source of outside air, the unit helps to reduce the chances of stagnant pockets of air with high concentrations of the virus; but if there is no such supply of outside air the unit simply spreads the particles around and should be switched off
   - active chilled beams which chill outside air as it arrives into the building can be used as normal
   - passive chilled beams can be used if there is a good source of outside air – otherwise they simply spread the particles around and should be switched off

- air cleaning devices (with fitted HEPA filters) have limited through airflow and should therefore be used in rooms of less than 10sq^{m} – they should be used where occupants are and not in isolated corners.

C. What else?
   - reduce occupation density
   - limit times in which the space is open for use
   - re-purpose the use of the space.