

INFORMATION SHEET

Ventilation

As we are aware, COVID-19 spreads via aerosols which are released by an infected person when they cough, sneeze, talk and breathe, as well as the larger droplets that are released. Larger droplets, will fall by gravity and influences the 2m social distancing measures to reduce spread. However, the fine aerosols can remain airborne for several hours.

There is good evidence to show that people are more at risk of catching an illness in a poorly ventilated room. This is because in a poorly ventilated room, people are exposed to a higher concentration of airborne pathogens and the risk will increase with a greater amount of time spent in the room.

Good ventilation can reduce the risk of spreading coronavirus and it is important to improve general ventilation of spaces through fresh air or mechanical systems. The underlying principle is to dilute and remove airborne pathogens as much as possible, exhausting them to the outside air and reducing the chance that they can become deposited on surfaces or inhaled by room users. This can be done via mechanical (some form of built in air system) or natural ventilation - doors and windows.

Action taken to date

Estates and Facilities Management – Technical Services team have reviewed the ventilation systems in buildings across the estate and changes have been implemented based on the recommendations of guidance documentation from various technical professional bodies. Details of actions taken have been communicated to College operational teams. Where concerns about ventilation and fresh air supply in rooms have been highlighted, in a small number of cases 'do not use' advice has been given.

In general all mechanical ventilation systems have been reviewed and where possible, have been set to run with 100% fresh air, not recirculation and for extended hours, before and post building usage. Ventilation systems have only been taken out of operation where the system crosses and mixes with multiple zones.

Natural ventilation

Not all buildings will have a form of mechanical ventilation and will rely on natural ventilation (windows and doors).

It is recommended to actively use openable windows and vents much more than normal, as long as security is considered and the open windows do not cause a hazard to anyone moving outside.

For small buildings with limited ventilation openings, external doors may be used to increase ventilation as long as care is taken over security and the door is not an alarmed final fire exit door. Propping open internal doors may be appropriate where it delivers a significant increase

in air movement and ventilation rate. It is important to note that internal fire doors are not be propped open.

If possible windows should be open at least 15 minutes prior to room occupation. In warm weather, opening windows is a typical behavioural response, however it is important to ensure that windows are open even if it is cooler outside. If it is windy, cold or raining then it may not be practical to fully open the windows/ vents, however they should be open as far as reasonably possible without causing too much discomfort.

Opening windows can result in draughts that can cause people discomfort. Where possible discomfort should be mitigated by ensuring building users are not located directly in a draught for long periods. During colder weather people are encouraged to wear warm clothes as windows and doors will need to remain open despite the thermal discomfort.

If there are both high level and low level openable windows in a room, then it is recommended to open the high level windows during cooler weather in the first instance, as incoming air will be warmed as it flows down into the room thereby reducing cold draughts. To maximise airflow, both high and low windows should be opened on opposite sides of the space. This does not just increase opening area but creates a more efficient flow, thereby increasing the dilution of pollutants.

Rooms with single sided ventilation or with no mechanical/ natural ventilation

Where a room only has one side that has openable windows/ vents or no mechanical or natural ventilation at all, consideration should be given to areas within the room where air may become stagnant. This is particularly important where a small room has multiple or transient occupancy. When assessing the use of a space of this nature, please follow two simple principles:

- Keep the room main access door open (unless a designated fire door).
- Risk assess occupancy and keep the room capacity to an absolute minimum.

Automated windows/ vents

Some windows and vents are controlled automatically and open in response to indoor air quality and temperature. These windows/ vents are not be interfered with.

Windows in toilet blocks

If windows are the only means of ventilating the toilet block then they should be left open as long as reasonably possible and windows in adjoining rooms should also be open. If the toilet block is fitted with mechanical ventilation, this ventilation should operate 24/7 and the opening of windows is to be avoided to assure the right direction of ventilation.

Guiding principles adopted by Swansea University Technical Services

- Secure ventilation of spaces with outdoor air.
- Switch ventilation to nominal speed at least 2 hours before the building usage time and switch to lower speed 2 hours after the building usage time.
- At nights and weekends, do not switch ventilation off but keep running at lower speed.
- Switch air handling units with recirculation to 100% outdoor air.
- Inspect heat recovery equipment to be sure that leakages are under control.
- Switch fan coils either off or increase the duration of operation where they are remotely controlled by our Building Management System.
- Fan coil units and air conditioning units sprayed with a biocide cleaner including the filters.
- Fan coil units and air conditioning units have had biocide tablets inserted in the condensate trays.
- Ensure regular airing with windows where possible (even in mechanically vented buildings).
- Keep toilet ventilation 24/7 in operation.
- Avoid open windows in toilets to assure the right direction of ventilation.
- Instruct building occupants to flush toilets with closed lid where possible.
- Do not change heating, cooling and possible humidification set points.
- Do not plan duct cleaning for this period.
- Replace central outdoor air and extract filters as usual, according to maintenance schedules (we have also upgraded the specification of our replacement filters).
- Regular filter replacement and maintenance works shall be performed with common protective measures including respiratory protection.

CO2 Monitoring

People exhale carbon dioxide (CO₂) when they breathe out. If there is a build-up of CO₂ in an area, it can indicate ventilation needs improving. CO₂ levels are not a direct measure of possible exposure to COVID-19, but the use of CO₂ monitors can help identify poorly ventilated areas.

E&FM have reviewed all centrally bookable teaching and meeting spaces, to assess the suitability of the current methods of ventilation available. Rooms identified as having poor ventilation may be fitted with CO₂ monitors, to monitor the levels within that space.

This data will help guide how the spaces can be managed to enable safe levels of occupancy and timetabling.

The installation and calibration of CO₂ monitors must only be carried out by E&FM. This is to ensure a consistent approach, where they are placed in identified, risk assessed locations and the readings are interpreted accurately.

The two main types of monitoring devices will be as follows:

- Fixed wall or ceiling mounted monitors, linked to the Universities Building Management System. These provide real time remoting monitoring by the Technical Services team
- Portable, non-dispersive infrared (NDIR) CO2 monitors which will be placed in designated locations. These readings can only be taken at point of use.

See below CO2 monitor guidance note that will be printed out and displayed with monitors in identified spaces.

Further information:

- [CIBSE Coronavirus](#)
- [HSE Air Conditioning and Ventilation during the COVID pandemic](#)

CO2 Monitor Guidance Note

Good Ventilation is a key control in reducing the risk of COVID transmission. A range of methods are in place to measure and improve ventilation at the University and this includes the provision of CO2 monitors in some spaces.

CO2 monitors can provide a guide to the adequacy of ventilation within a space and help identify poorly ventilated areas.

- Measurements must be considered over a defined period, to give a holistic representation of ventilation levels in the space. Results taken at a snapshot in time, can be misleading.
- Do not interfere with the monitors in any way, by moving them, altering settings, or breathing closely on the devices as this can lead to misleading results.

Raised CO2 levels are not a direct measure of possible exposure to COVID-19.

Below is a list of CO2 measurements and guidance on how the spaces can be managed in line with those readings.

CO2 reading in parts per million (ppm)	Action required
400ppm or below (Green indicator on NDIR monitor)	Report to estatesadmin@swansea.ac.uk using the template provided below. This is more representative of outdoor areas. The monitor may be faulty or in the wrong location. Monitor to be relocated by E&FM to review readings.
400-800ppm (Green indicator on NDIR monitor)	Space is likely well ventilated. No further action required. Continue to monitor readings for any significant changes.
800ppm-1500ppm (Amber indicator on NDIR monitor)	Elevated levels of CO2 in the space. This is not a cause to vacate or stop activity. <ul style="list-style-type: none"> • Open doors (not fire doors) and / or windows where possible • Continue to monitor levels as the session progresses, to check for significant changes.
1500ppm and above (Red indicator on NDIR monitor)	If these readings are noted at the beginning of a session or remain consistent over a 15 minute period, take the following action: <ul style="list-style-type: none"> • Open doors (not fire doors) and windows that are not already open • Reduce the room capacity / vacate the room for 15 minutes or so the CO2 levels drop back to below 1500ppm • Consider the activity – is it contributing to the increased CO2 i.e. exercise, shouting, singing and aerosol generating activities

Please report any consistently high amber or red readings to estatesadmin@swansea.ac.uk using the template below:

CO2 Monitor Asset number	CO2 Monitor reading (PPM)	Building	Room Number	Time of day	Number of people in the space