



# **Ventilation Systems Operations**

## **In the light of the coronavirus (Covid 19) outbreak**

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## **Revision Table**

<b>Revision</b>	<b>Author</b>	<b>Date</b>	<b>Reason for change</b>
01	DN	08-July-2020	Original Issue
02	DN	14 August 2020	<p>Revision number updated to acknowledge review of the newly published document:</p> <p>REHVA Covid-19 Guidance Document, August 3, 2020</p> <p>Following the review, no changes to the documents were made.</p>
03	SS	11 December 2020	<p>Revision number updated to acknowledge review of the newly published document:</p> <p>Health and Safety Executive (HSE) Ventilation and air conditioning during the coronavirus (COVID-19) pandemic; 3 December 2020</p> <p>Chartered Institution of Building Services Engineers (CIBSE) COVID-19 Ventilation Guidance version 4, 23 October 2020</p> <p>The Federation of European Heating, Ventilation and Air Conditioning Associations (REHVA) COVID-19 guidance document, August 3, 2020</p> <p>Scottish Government Document: Coronavirus (COVID-19): universities, colleges and student accommodation providers to help reduce the spread of COVID-19. 7<sup>th</sup> of December 2020</p>
04	SS	15/03/21	<p>Health and Safety Executive (HSE) Ventilation and air conditioning during the coronavirus (COVID-19) pandemic; 3<sup>rd</sup> March 2021</p> <p>Chartered Institution of Building Services Engineers (CIBSE) COVID-19 Ventilation Guidance version 4, 23 October 2020</p> <p>The Federation of European Heating, Ventilation and Air Conditioning</p>

			<p>Associations (REHVA) COVID-19 guidance document, August 3, 2020</p> <p>Scottish Government Document: Coronavirus (COVID-19): universities, colleges and student accommodation providers to help reduce the spread of COVID-19. February 10<sup>th</sup> 2021</p> <p>Coronavirus (COVID-19): ventilation guidance 18<sup>th</sup> December 2021</p>
04.1	CS	26/03/2021	Small amendment to wording in section 6 to be clearer in surveys
0.5	CS	25/06/2021	Review of national guidance. Addition of CO2 monitoring section. Update of key contacts.

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## 1. Introduction

As part of the building reopening process, The University of Edinburgh Estates Operations Group, has reviewed current industry guidance and advice in relation to the potential risks associated with the operation and maintenance of building ventilation systems. We are committed to taking all reasonable steps to minimise the potential for airborne spread of COVID 19.

The actions we have taken are based on the guidance listed below together with a review by our in-house technical specialists for each of our buildings:

- Health and Safety Executive (HSE) Ventilation and air conditioning during the coronavirus (COVID-19) pandemic; 28<sup>th</sup> May 2021
- Chartered Institution of Building Services Engineers (CIBSE) COVID-19 Ventilation Guidance version 4, 23 October 2020
- The Federation of European Heating, Ventilation and Air Conditioning Associations (REHVA) COVID-19 guidance document, August 3, 2020
- Scottish Government Document: Coronavirus (COVID-19): universities, colleges and student accommodation providers to help reduce the spread of COVID-19. 1<sup>st</sup> June 2021
- Scottish Government Document: Coronavirus (COVID-19): ventilation guidance. 15<sup>th</sup> June 2021
- <https://www.gov.uk/government/publications/emg-and-spi-b-application-of-co2-monitoring-as-an-approach-to-managing-ventilation-to-mitigate-sars-cov-2-transmission-27-may-2021>
- <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2020/08/scottish-covid-19-workbook-2020/documents/advice-card-ventilation-advice-employers/advice-card-ventilation-advice-employers/govscot%3Adocument/advice-card-ventilation-advice-employers.pdf>
- <https://www.hse.gov.uk/coronavirus/equipment-and-machinery/air-conditioning-and-ventilation/index.htm>

## 2. General Principles

HSE say that:

1. Fresh air should be maximised in a space using natural ventilation, mechanical ventilation or a combination of both.
2. Adequate ventilation reduces how much virus is in the air and therefore reduces the risk from aerosol transmission for workers in that area.
3. Ventilation should be considered alongside other control measures needed to reduce the risks of transmission, such as physical distancing, limiting people in the area, assessing activities, keeping your workplace clean and frequent handwashing.

Please refer to table in section 3 below for the University's application of industry recommendations.

Ventilation guidance produced by the Scottish Government, the Health and Safety Executive and Industry bodies is very clear that ventilation must continue to comply with the Workplace (Health, Safety and Welfare) Regulations 1992 and the Scottish Building Technical Handbook (non-domestic) in Scotland.

### 3. UoE Application of Industry Recommendations

All buildings, as part of the reopening process, have undergone a review by the applicable Building Reopening Group with regards to their ventilation systems and requirements, as appropriate, as well as some more specific checks as follows:

This table outlines the various checks and changes that Estates have undertaken in line with Covid-19 recommendations, depending upon the specific ventilation systems in each building. Please note items 13 and 14 are local school responsibilities (opening windows during occupation as per section 4.1.2.1 of this document).

HVAC Components			Roles / Responsibilities		
No	System / Component	Description	BMS	Trades	Building Users
1	Supply Fan / Extract fan	<p>Change the clock times of the system timers to run ventilation at nominal speed at least 2 hours before the building usage time and switch to lower speed 2 hours after the building usage time.</p> <p>In demand-controlled ventilation systems change CO2 set point to lower, 400 ppm value, in order to maintain the operation at nominal speed.</p> <p>Keep the ventilation on 24/7 with lower ventilation rates when people are absent.</p>	Phase 1 -Set to 24/7 where controlled via BMS. (Phase 2 - review if night time set back can be applied)	Apply setting to all non-BMS systems	Confirm building operation time, if different from 7am - 7pm
2	Mixing boxes (Recirculating Boxes)	Close the recirculation dampers (via the Building Management System or manually).	Phase 1: Change setting to 100% fresh air via BMS system.	Confirm BMS settings applied. Apply setting to all non-BMS systems	NA

3	Thermal Wheel	<p>The wheel to remain turned off during warmer time of the year.</p> <p>The system should be checked and re-instated if necessary, prior to winter months.</p>	Thermal Wheels switched off or bypass mode. Phase 2 -prior to winter check if the unit can withstand full 100% fresh air	Confirm BMS settings applied. Apply setting to all non-BMS systems	NA
4	Localised toilets - mechanical ventilation	In toilet blocks with mechanical extract ventilation the extract ventilation should remain constantly on where possible and windows in the toilet block remain closed	Set to 24/7 where controlled by BMS	Apply setting to all communal systems, where practicable and not operated by BMS setting	<p>Building occupants should keep these fans on where possible.</p> <p>Building users inform the helpdesk in the event of local fan failure</p>
5	Fan Coil Units	<p>Current HSE advice suggests that we do not need to adjust air conditioning systems that mix some of the extracted air with fresh air and return it to the room as this increases the fresh air ventilation rate.</p> <p>Also, we do not need to adjust systems in individual rooms or portable units as these operate on 100% recirculation.</p> <p>Where practicable these units have been set to 24/7 operation.</p>	Set to 24/7 where controlled by BMS	Apply setting to all non-BMS systems	Identify local recirculation units (DX) not required for the room function and switch off.
6	Door Curtain Heaters	These would be locally isolated to take advantage of the warmer summer weather. The system will be reinstated prior to winter.	NA	Apply setting to all non-BMS systems	NA

7	Plate heat exchangers	On this basis the heat recovery device can remain online, but the unit should be inspected to ensure there are no leaks	NA	Visual inspection only	NA
8	Run around coils	No action.	NA	Normal PPM	NA
9	Duct Cleaning	Duct cleaning is not effective against room-to-room infection	NA	Normal PPM	NA
10	Outdoor Air Filters / Air Intakes	It is not necessary to change existing outdoor air filters and replace them with other filter types.  Filters should be changed in line with the standard maintenance regime requirement. Dirty filters or air intakes louvre can reduce air flow into the building	NA	Normal PPM, ensure external louvre is clean	NA
11	Filters	From the filter replacement perspective, normal maintenance procedures can be used.	NA	Normal PPM (Ensure adequate safety measures are in place)	NA
12	Fume Cupboard / Safety Cabinet Extract and Make Up Air	Leave systems as normal operation to maintain pressure regimes etc.	NA	Normal PPM	Normal PPM

13	Natural Ventilation	Opening Windows	NA	NA	Local Users should open windows and vents regularly to increase the natural air flow as much as possible. Review / manage windows in the building according to recommendation and weather conditions
14	Natural ventilation - toilets	If windows are the only means of ventilating the toilet block then they should be left open if reasonably possible, and windows in adjoining rooms should also be open	NA	NA	Review / manage windows in the building according to recommendation and weather conditions

#### 4. **Building Reopening process – Roles & responsibilities**

4.1 Buildings which have been through the reopening process and have their ECCG Building Reopening Checklist:

4.1.1 HoS/Majority Occupier must ensure ventilation requirements are regularly reviewed to ensure that any change in occupancy is considered against the current ventilation strategy for the building. This can be via the Building Reopening Group or College Co-ordination Group as applicable.

4.1.1.1 If modifications are required, they must liaise with Estates Department via the Campus Comms Team (CCT) Estates Rep/submit this request via the Helpdesk.

4.1.1.2 Assistance can be provided by Estates Department if required.

4.1.2 HoS/Majority Occupier must ensure that users of the buildings are informed of any building specific ventilation requirements. This could include, but is not limited to:

4.1.2.1 Identifying areas which are natural ventilation only and require users to open windows to ensure sufficient ventilation in those areas including in between uses to ensure a change of air. This could also include placing areas out of use if no openable windows are available.

4.1.2.2 **Ensuring local controls are not changed without the appropriate input from Estates Department.**

## 5. CO2 monitoring text

“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”-HSE

As part of our comprehensive arrangements to fulfil our obligation in this area the University has and will continue to consider utilising CO2 monitors in appropriate spaces. It is perhaps worth noting that there are a number of limitations to CO2 monitoring. There is no direct correlation between CO2 levels and infection risk of covid-19 – values can give a measure of air changes in a space or room to indicate the efficiency of the air handling/ventilation but is not an indicator of number of covid-19 particles in the air.

- CO2 values are dependent on a number of factors and require careful interpretation and cannot be used to define ‘safe’ areas.
- CO2 monitors are an aid to understanding and increasing ventilation, but are not a mitigation measure in themselves.
- CO2 monitoring **does not provide a direct measure of infection risk, or a direct measurement of ventilation rates**

Estates and Health and Safety Department work closely together with Building Managers to understand any areas of concern and to decide if CO2 monitors would be useful in the circumstances.

## 6. Review of this document

The industry guidance is subject to continuous review and change in the light of evolving knowledge about the potential spread of Covid-19. This document will be updated in line with any significant changes of HSE advice and industry guidelines. It will be formally reviewed on the first of every month by the Head of Building Services, Head of Estates Health and Safety and the University’s Occupational Hygiene & Projects Manager. This review will include considering any potential risk to Estates staff when carrying out routine maintenance.

## 7. Continuing Developments

Estates are continuing to carry out surveys of areas across the campuses, recording the type of ventilation within the spaces and implementing carbon dioxide (CO2) monitoring where concerns of poor ventilation have been identified. This survey data will allow Estates to assess the most suitable action to be taken to implement improvements where required.

We are also undertaking a desktop review of air change rates (ACH) including validating against a sample of on-site testing of air flow rates.

A comprehensive survey has been carried out of arrangements for both natural and mechanical ventilation and a major work programme is under way to carry out any necessary improvements in the light of the evidence and advice emerging, with guidance provided to Building managers initially in March 2021 to review their indoor space and report any areas with limited or problematic ventilation, either natural or mechanical. This process can be found at

[https://uoe.sharepoint.com/:b:/r/sites/Covid19/Shared%20Documents/Ventilation\\_guidance\\_f](https://uoe.sharepoint.com/:b:/r/sites/Covid19/Shared%20Documents/Ventilation_guidance_f)



[or Building Review Groups as we move out of lockdown and into the levels.pdf?csf=1&web=1&e=QAqxld.](#)

## 8. **Raising Concerns**

If you have a reason to believe there may be a significant problem in your area please speak to your Building Manager in the first instance. If there are still concerns or further assistance required, please contact Estates at [ventilation.estates@ed.ac.uk](mailto:ventilation.estates@ed.ac.uk).

### **Key contact details:**

First point of contact: [ventilation.estates@ed.ac.uk](mailto:ventilation.estates@ed.ac.uk)

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