



Defence
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2020/11 Technical Bulletin

Title: COVID-19 Revised Arrangement for Usage and Maintenance of HVAC Systems (V1.6.1)

Issue date: 9th July 2021

Aim:

1. The aim of this bulletin is to inform and assist Stakeholders with advice to minimise the risks of Coronavirus transmission through usage, and/or maintenance of HVAC Systems.

Applicable to:

2. This Technical Bulletin is applicable to all establishments and installations with mechanical ventilation systems. Mechanical ventilation includes mechanical extract fans, and systems for cooling, heating humidification /dehumidification; supply air, ventilation; and filtration/air cleaning. For facilities where occupation relies on the continuous operation of the HVAC systems e.g. Defence Critical Infrastructure (DCI) and underground facilities, any measures which may affect the operation or performance of the HVAC system must be subject to a site-specific risk and operational assessments to ensure critical defence capabilities are not compromised. This Technical Bulletin does not include normally non-occupied spaces e.g. computer or server rooms, conditioned stores, process facilities, and protected buildings.
3. All previous versions of this document are rescinded.

Situation:

4. Whilst the most common means of transmission of Coronavirus remains through contact with virus contaminated surfaces, hence the need for rigorous personal and workplace hygiene practices, industry good practice guidance has determined that a small but tangible risk of Coronavirus being transmitted in recirculated air distributed by mechanical ventilation systems, principally those HVAC systems typically found in large office complexes and other specialist facilities across the Defence Estate where the percentage of externally supplied air is reduced for thermal comfort and energy efficiency.

Action Required:

The MMO is to:

5. Review water hygiene risk assessments for HVAC systems in line with L8 to ensure Legionella controls are maintained.
6. Ensure that for cleaning and planned or reactive maintenance of ventilation systems, personnel follow industry guidance, socially distance, wear appropriate PPE and dispose of materials safely, and in accordance with Waste Classification*.
7. Prior to any system ventilation changes being made to meet the above guidance, ensure that the existing settings are recorded. Once changes have been made Heads of Establishment/building custodians are to be made aware of the impact of changing ventilation settings.
8. Systems with CO2 set points should be set to 400ppm to increase outside air delivery*.



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9. Ensure that changing ventilation settings has not resulted in unintentional pressure differentials throughout the building potentially impacting upon building safety systems, for example do fire doors open and close as intended.

Heads of Establishments (HoE) Action:

10. HoEs should reinforce the requirements for social distancing, good personal and workplace hygiene with most common form of transmission being through contact with contaminated surfaces; as well as the adoption of the practice of closing toilet seats before flushing in order to minimise the release of droplets and droplet residues from plumes in the air (a recommendation from REHVA highlighting the risks of faecal-oral transmission – see Figure 1).

Building Custodian Actions:

11. The building custodian is to seek advice from DIO/MMO site representatives to determine which mechanical ventilation systems on site provide or could provide 100% fresh air. The systems in question are air conditioning and mechanical ventilation systems, air handling and fan coil units.
12. For systems capable of introducing 100% fresh air, building custodians who have access to the building HVAC system controls should, in consultation with DIO/MMO consider setting the system to operate 24/7 to ensure continuous ventilation of the system and if any other changes, such as reduced ventilation rates during silent hours are appropriate. If reduced silent hours ventilation rates are implemented appropriate ventilation rate increases before reoccupation should be considered. It must be ensured that where possible ventilation is not turned off, even where rooms are not used or occupied to allow continuous dilution of the air supply and a fresh exchange and minimise pockets of stagnant air.
13. During the heating season, the guidance and flowchart detailed in Appendix D should be utilised to determine the actions required on HVAC systems over this period.
14. The building custodian, in consultation with the MMO/DIO is to consider setting all mechanical ventilation serving toilets and washrooms to run constantly, and to affix notices to windows advising building users not to open windows and disturb the pressure differential necessary for effective extraction. Where extract fans are controlled using a Passive Infra-Red (PIR) detector, DIO/MMO site representatives are to be consulted to see if the system can be overridden to ensure that the extraction is set to run continuously. Further guidance on toilet extract fans can be found in Appendix C.
15. Elsewhere in the facility Building Custodians are to consider regular airing by opening windows (ideally to generate a cross flow) even in mechanically ventilated buildings.

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Introduction:

16. This Technical Bulletin is to provide generic guidance to MOD personnel and their industry partners who have responsibilities for Heating, Ventilation and Air Conditioning (HVAC) systems based on recent good practice guidance by CIBSE* REHVA* and BSEA* for the operation of ventilation systems during the Coronavirus (Covid-19) pandemic.
17. This industry good practice is in addition to Public Health guidance provided in the Department for Business, Energy and Industrial Strategy (BEIS) in their Working Safely During Coronavirus, and the hierarchy of occupational control measures, that should always be applied to reduce risk of transmission, avoid use of the facility where possible; where it is unavoidable ensure that sufficient ventilation, fresh air supply and other infrastructure measures are implemented together with, good personal and workplace hygiene, in particular frequent hand washing and strict social distancing to reduce the risk further. Whilst there are positive public health protection benefits to be gained by adopting the practices outlined in this bulletin to support return to work programmes, there are, however, also potential increases in costs.
18. Due to complexity of the subject, the variety of equipment installed and asset usage, decisions to adjust HVAC settings or usage must be made on an Asset by Asset basis, informed by risk assessments involving, User, Maintenance Management Organisation and DIO. The complexity of HVAC systems at a particular establishment will determine the level of assessment required. In all cases suitable and sufficient competence must be consulted and assigned to this process.

Aim:

19. It is recognised that usage and maintenance requirements of HVAC Systems may need to be adjusted in response to the COVID-19 outbreak in order to minimise the risk of contamination through airborne transmission of particles.
20. **Split air conditioning units and Fan coil units** do not provide 100% fresh air as the indoor units recirculate the air within each area served. It is strongly advised that all Split air conditioning units and fan coil units are turned off. However, facilities that are dependent upon these systems as the sole provider of comfort cooling/ventilation will need to be assessed to determine what actions are required to ensure continued health and safety to personnel working in these areas where these systems are either left working or turned off. The building custodian is to contact DIO/MMO site representatives to seek advice, request that the systems are suitably assessed, and appropriate arrangements are put in place. Those systems that provide cooling to areas not normally occupied, such as servers or other process system cooling may be left running normally. For further guidance on these systems see Appendix A.
21. **Air handling units and mechanical ventilation systems** often have the capability to recirculate or provide a percentage of fresh air depending upon how the system is designed and operated. Building custodians are requested to contact DIO/MMO site representatives to determine which systems installed are able to provide 100% fresh air. For further guidance on these systems see appendix B.
22. **To maintain system efficiency.** Changing existing filters with HEPA filters will affect the system performance so this is not currently recommended. It is important to note that personnel can be at risk when filters are not changed in line with safety standard procedures. It should always be assumed that filters have an active microbiological material on them, including viable viruses. This is



particularly important in any building where there has recently been an infection. Filters should be changed with the system turned off, wearing appropriate PPE which may include gloves and respiratory equipment and disposed of in a sealed bag.

23. **Ensure ventilation grilles are clean with no blockages***. It is advised that personnel are not sat in front of ventilation grilles or floor drains. Where it is impossible due to room size to relocate personnel away from grilles etc, minimise time spent in front of ventilation grille either through staff or task rotation and ensure that any possible fresh air supply is provided into the room (where it doesn't affect ventilation pressures) encourage personnel to sit facing away from grilles, with their back to grilles or other outlets.
24. Where the MMO have control of HVAC systems via BMS or access to plant rooms, in consultation with Building Custodians they are to consider adjusting systems, so far as is practicable, to avoid the recirculation of air between spaces, rooms or zones occupied by different people and consider setting the controls to operate 24/7 at 100% refresh air to ensure continuous ventilation of the system. Other system adjustments, such as reduced ventilation rates during silent hours should be considered. If reduced silent hours ventilation rates are implemented appropriate ventilation rate increases before reoccupation should be considered. It must be ensured that where possible ventilation is not turned off, even where rooms are not used or occupied to allow continuous dilution of the air supply and a fresh exchange and minimise pockets of stagnant air.

Exposure Mechanisms:

25. The below figure depicts various exposure mechanisms for COVID-19 droplets. The adoption of the practice of closing toilet seats before flushing in order to minimise the release of droplets and droplet residues from plumes in the air should be considered (a recommendation from REHVA highlighting the risks of faecal-oral transmission – see Figure 1 below).

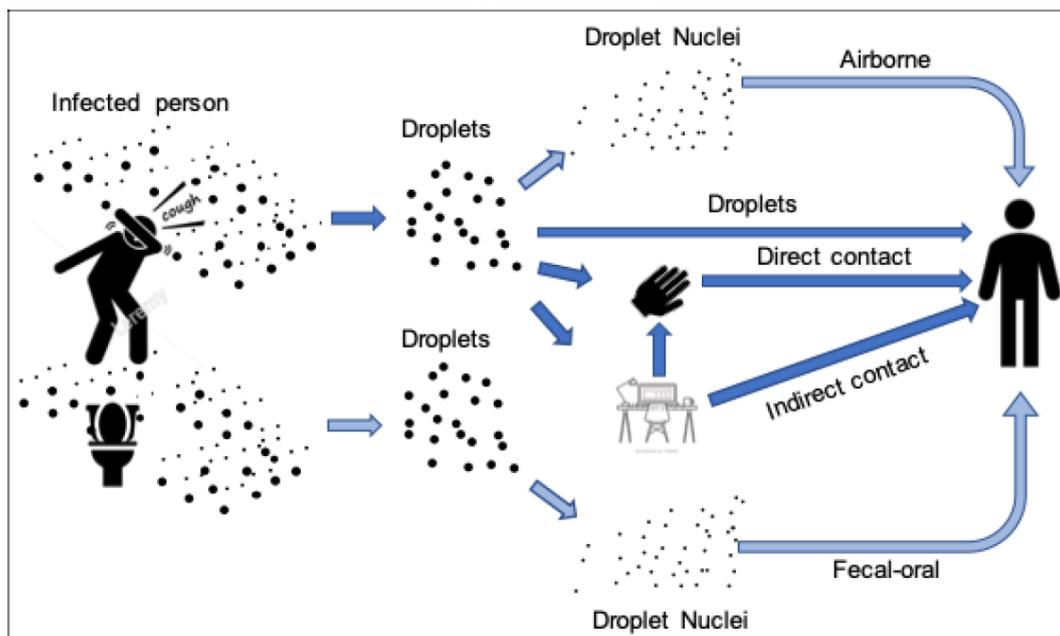


Figure 1. WHO reported exposure mechanisms of COVID-19 SARS-CoV-2 droplets (dark blue colour). Light blue colour: airborne mechanism that is known from SARS-CoV-1 and other flu, currently there is no reported evidence specifically for SARS-CoV-2 (figure: courtesy Francesco Franchimon).



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All to note:

26. Advice on COVID-19 is issued regularly by many sources. The advice contained within this Technical Bulletin will be routinely monitored for continued alignment and will be reissued as necessary.

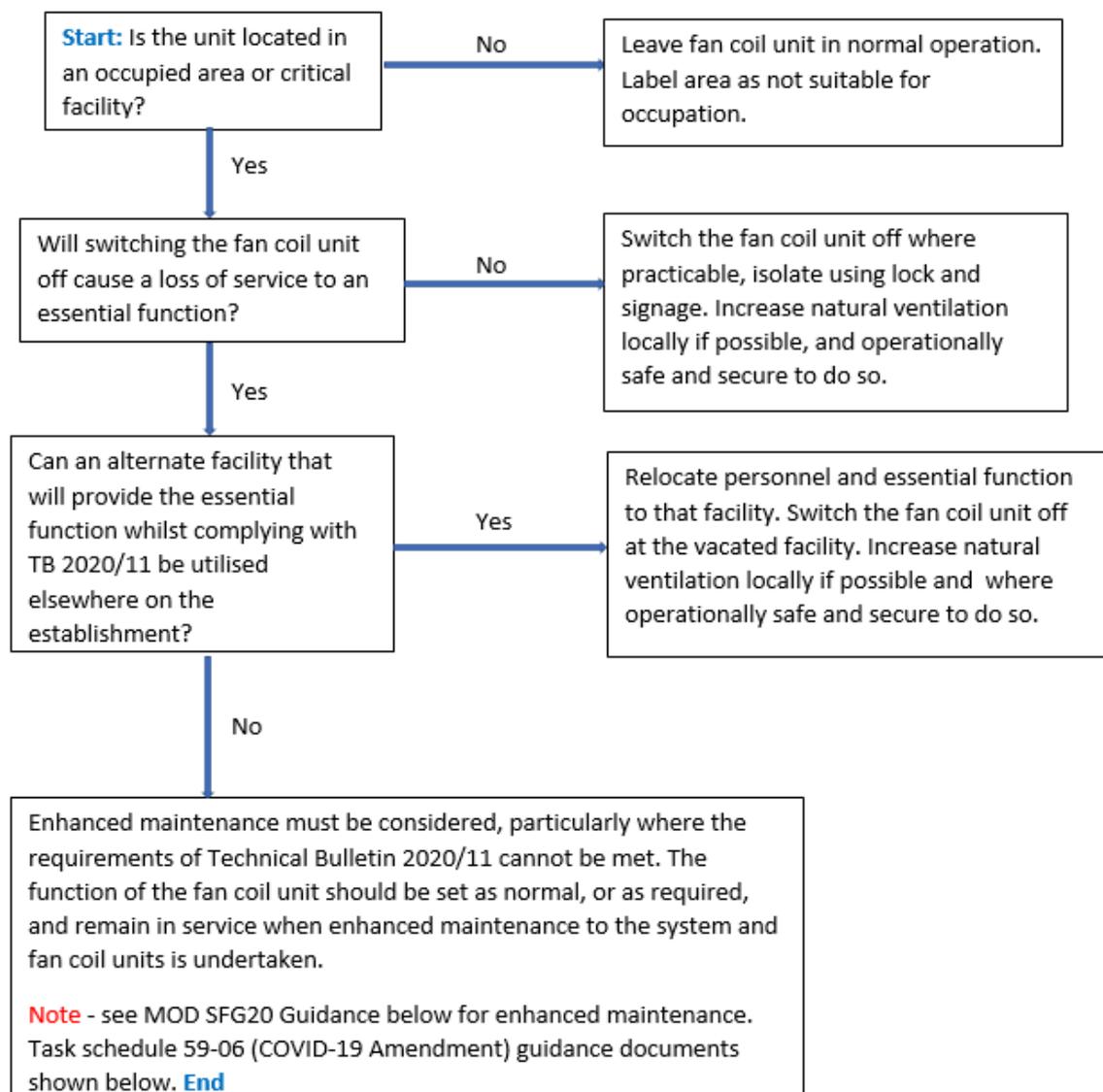


Fan Coil Air Conditioning Units

Decision Tree for MOD COVID-19 Arrangements on Operation and Maintenance of HVAC Systems

This decision tree applies to circulated air fan coils that provide heating or cooling via mechanical air movement to facilities in **an occupied** area, or a critical facility or service that is normally **not occupied**.

These are typically located in the following places in the DIO Estate - Comfort cooling or heating for personnel within offices, workplaces, leisure facilities, essential equipment cooling heating with in computer server facilities, Control Facilities / Towers, Special facilities, Storage areas above or below ground including food storage, cold rooms (above freezing), cellars and dry stores.





MOD SFG20 Maintenance Guidance 59-06 (COVID-19 Amendment) Terminal Units - Fan Coils

Date: 08 Dec 2017 Version: 4 Unit of Measure: Nr

Summary

This schedule reflects the maintenance requirements due to the COVID-19 risk and does not reflect maintenance requirements for system for normal operating environments.

Frequencies Tasks

3M (Months)

15

6M (Months)

30 mins 1 2 3 4 5 6 7

12M (Months)

15 mins 8 9 10 11 12 13 14

Annual Timing 75 mins

Introduction

The term Terminal Units covers those items of equipment relating to the ingress of ventilating or conditioned air into the working environment. Operationally their effectiveness may be impaired by the build-up of dust and related deposits, whilst visually, dirt will arise from the atmosphere.

In a dirty environment it may be necessary to increase the frequency of maintenance above that recommended in this specification. Detailed maintenance of the associated controls is covered in Controls (SFG 14).

Please refer to the overarching introduction (SFG 00-01) to make sure you are of the correct skill level as indicated within the task schedule to carry out the described works. Ensure you have read and understood the manufacturer's recommendations, carried out risk assessment(s) on each item of plant to identify the correct frequency of maintenance, identified all safety procedures that need to be applied and recorded in order to carry out the work in a safe and reliable manner.

Display Order Tasks

1

Status

Frequency: 6M **Skill Set:** Mechanical

Action: Switch off and isolate.

Visually inspect unit for damage, corrosion and firmness of fixings.

Notes: Electrical isolation should be carried out in accordance with HSE Guidance.

Where units are ceiling mounted, cover any office machinery/equipment situated below unit being serviced.

2

Condensate drain connection and pump

Frequency: 6M **Skill Set:** Mechanical

Action: Check connection is clear.

Ensure condensate lift pump is operational and able to discharge condensate to the drainage pipework.

Notes: The check should also ensure that the condensate drainage pipework has the correct fall to allow water to flow to the drainage stack

3

Permanent filters

Frequency: 6M **Skill Set:** Mechanical

Action: Clean and refit, ensuring proper location.

The period between cleaning is dependent on operating conditions, in a very dirty atmosphere, the filter will require more frequent cleaning.

Notes: See Filters (SFG 21-02) about safety instructions.

4

Disposable type filters

Frequency: 6M **Skill Set:** Mechanical

Action: Check filters, withdraw and clean (or replace if necessary) filter media from dirty side with vacuum cleaner.

(The period between cleaning is dependent on operating conditions, in a very dirty atmosphere, the filter will require more frequent cleaning).

Notes: See Filters (SFG 21-02) regarding safety and disposal procedures.

5

Test unit



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Frequency: 6M **Skill Set:** Mechanical

Action: Restore power supply and run unit.

Check airflow is normal at correct speed setting.

Check unit operates without undue noise or vibration.

Check operation of controller.

Notes:

6

Casing

Frequency: 6M **Skill Set:** Mechanical

Action: Clean

Notes: Where units are above false ceilings ensure that tiles are not left in a stained condition.

7

Chilled water/LPHW control valves

Frequency: Amber **Frequency:** 6M **Skill Set:** Mechanical

Action: Check functioning.

Check all flexible hoses if fitted are in good condition.

Notes: For detailed maintenance see Valves (SFG 62).

8

Ductwork flexible couplings (if fitted)

Frequency: 12M **Skill Set:** Mechanical

Action: Check condition.

Repair/refit any ductwork to the spigots as necessary.

Notes:

9

Grilles and diffusers

Frequency: 12M **Skill Set:** Mechanical

Action: Clean using vacuum or alternatively, remove and clean.

Notes: Care should be taken to avoid damage to diffuser ceiling lights or ceiling.

10

Cooling/Heating battery

Frequency: 12M **Skill Set:** Mechanical

Action: Clean cooling/heating battery/element by applying an air jet to the air leaving face.

Inspect all pipework, valves, stopcocks, air vents, drain valves, check valves, safety valves and pressure reducing valves for leaks, defects or malfunctions. Rectify if possible or note for early attention.

Notes:

11

Frequency: 12M **Skill Set:** Mechanical

Action: Check the fan runners for security on shafts and clean with a soft brush and vacuum cleaner.

Check operation of fan motor and motor shaft for 'lift' etc.

Clean interior of unit.

Notes:

12

Electrical

Frequency: 12M **Skill Set:** Electrical

Action: Check all terminals are tight and cable insulation is in good condition.

Check operation of thermostats.

Check operation of damper motors, ensure free operation.

Carry out earth continuity test in accordance with the current edition of the IET wiring regulations.

Carry out insulation resistance test in accordance with the current edition of the IET wiring regulations.

Notes:

13

Strainers

Frequency: 12M **Skill Set:** Mechanical



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Action: Inspect and clean strainers as necessary.
Replace damaged strainer elements and worn seals.
Notes: Report any build-up of sludge/filing to the client.

14

Thermostats

Frequency: 12M **Skill Set:** Mechanical

Action: Check operation by moving set point.
Restore to original setting.

Notes: For detailed maintenance see Switches (SFG 58-01).

15

Fan Coils and Drainage Trays

Frequency: 3M **Skill set:** Mechanical

Action: Inspect and Clean

Sanitise the Fan Coil units with an appropriate sanitiser suitable for heat exchanger coils **only**.

Wash down the drainage tray and drain and place a prolonged release Chlorine Biocide dosage tablet in the drain tray.

Notes: Frequency and amount of Chlorine Biocide dosage required should be determine by the size of the system and manufacturers recommendations.

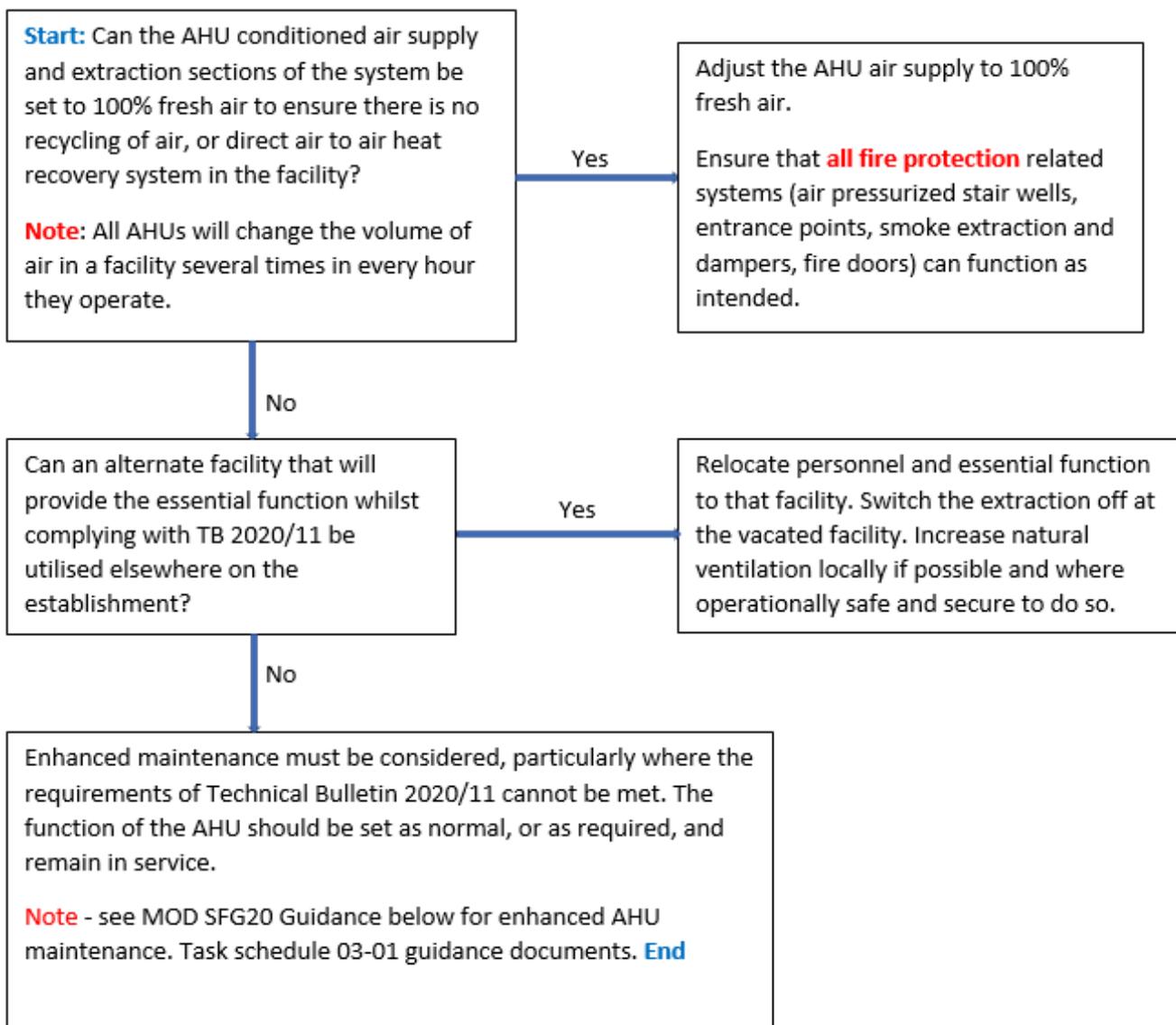


Air Handling Units (AHU)

Decision Tree for MOD COVID-19 Arrangement on Operation and Maintenance of Air Handling Units

AHUs (Building Supply Air and Exhaust Air Extraction Air Systems) supply conditioned air that can be tempered, humidified, pressurised and filtered. The systems are usually balanced to set parameters for welfare purposes or to provide conditioned air to a bespoke environment. These may be facilities in an **occupied area**, or a critical facility or service that is normally **not occupied**.

These are typically located in the following places in the DIO Estate - Comfort cooling / heating for personnel, within offices, workplaces, leisure facilities, essential equipment cooling / heating within computer server facilities, Control Facilities / Towers, Special facilities Storage areas above or below ground including dry food.





MOD SFG20 Maintenance Guidance 03-01 (COVID-19 Amendment) Air Handling Units - General

Date: 25 Jun 2019

Version: 4

Unit of Measure: System

Summary

This schedule reflects the maintenance requirements due to the COVID-19 risk and does not reflect maintenance requirements for system for normal operating environments.

Summary

Frequencies Tasks

1M (Month)

20 mins 1 2 3 4 5 6

3M (Months)

30 mins 7 8 9 20

6M (Months)

30 mins 10 11

12M (Months)

120 mins 12 13 14 15 16 17 18 19

Annual Timing 540 mins

Introduction

Please refer to the overarching introduction (SFG 00-01) to make sure you are of the correct skill level as indicated within the task schedule to carry out the described works. Ensure you have read and understood the manufacturer's recommendations, carried out risk assessment(s) on each item of plant to identify the correct frequency of maintenance, identified all safety procedures that need to be applied and recorded in order to carry out the work in a safe and reliable manner.

Notes:

Serious health risks arise from disease organisms that can grow in the nutrient-rich accumulations of bird droppings, feathers and debris. Not only are bird droppings an unsightly mess that can be difficult to remove and cause slip-and-fall accidents, they also harbour numerous human pathogens.

How dangerous are bird droppings to human health?

The question seems simple but quantifying a human's risk of acquiring disease from a bird or its droppings is difficult since exposure to the pathogens do not always result in disease and most bird-related diseases are not reportable to health authorities. Bird faecal matter and feathers can have devastating effects on the heating and cooling components and indoor air quality of a commercial facility. Excrement problems can affect employees, maintenance personnel and potentially customers. For additional information, see (SFG 87-33) - Bird Excrement and Associated Material Removal.

Display Order Tasks

1

Filter

Frequency: 1M **Skill Set:** M&E

Action: Check manometer reading and renew filter media as indicated.

Examine manometers and check for correct operation and setting, topping up fluid as required.

Notes: Check the pressure differential across the filters.

It should be noted that checking the filter should be carried out weekly by the client.

2

Guide vane actuators and modulating dampers

Frequency: 1M **Skill Set:** M&E

Action: Check operation.

Notes:

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3

Condensate drains

Frequency: 1M **Skill Set:** M&E

Action: Check for condensate carry-over and that drains are clear.

Check condition of condensate tray and repaint as necessary, close condensate trap and fill tray to maximum with clean fresh water.

Examine and ensure that all drain points and pipework are clear and free from obstruction, clean/disinfect and report drip tray condition, record in water risk assessment logbook.

Remove any loose debris using wet and dry vacuum cleaner.

Ensure that adequate air-break exists between condensate trap and drain to prevent siphoning.

Notes:



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4

Humidifier pumps, sprays and water supply to tank

Frequency: 1M **Skill Set:** M&E

Action: Check operation.

Notes: The user should note that SFG20 schedules for Humidifiers (SFG 33-05 and 33-08) should also be used for cleaning and disinfections tasks required by L8.

5

Vent air

Frequency: 1M **Skill Set:** M&E

Action: Air should be vented from heating and cooling coils where fitted.

Notes:

6

Drive belts

Frequency: 1M **Skill Set:** M&E

Action: Check tension, alignment and condition.

Notes: Re-tension or replace as necessary.

For more detailed maintenance procedures see Belt Drives (SFG 04-01).

7

General

Frequency: 3M **Skill Set:** M&E

Action: Visually examine entire unit and check for correct operation. Ensure all brackets, supports, mountings and fixings are in position and secure. Examine for any undue noise, vibration or overheating and report accordingly.

Ensure all access panels are correctly positioned and secure.

Examine for water or air leaks.

Check and ensure security and integrity of safety guards.

Examine AHU flexible connections and ensure security of retaining bands.

Where accessible, examine all manually operated valves. Ensure full and free travel and correct setting, checking for leakage.

Adjust or repack valve glands as required.

Clean, remove all deposits and lubricate valve stems.

Notes:

8

Damper and guide vane pivots and linkages

Frequency: 3M **Skill Set:** M&E

Action: Lubricate lightly.

Check operation and adjust as required, ensure correct operation of all safety devices, valves and control linkages.

Notes:

9

Motorised damper

Frequency: 3M **Skill Set:** M&E

Action: Check to see that louvres are clear and not obstructed, couplings are secure, and that motor runs without excessive noise or vibration.

Operate remote controls to check that actuator operates correctly and in sequence with other interconnected dampers.

Examine actuators, dampers and linkages for security and freedom of movement and lubricate as required. Ensure full and free travel and check the integrity of all mechanical linkages.

Check condition of all wiring and wiring facilities, ensuring security of terminations.

Clean unit.

Notes: For detailed maintenance see Actuators (SFG 01).

10

Frost protection, boost thermostat and controls

Frequency: 6M **Skill Set:** M&E

Action: Check operation.

For more detailed maintenance information refer to Sensors and Switching Devices (SFG 50).

Notes: This check should be carried out in September and February in Great Britain.



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Fans

Frequency: 6M **Skill Set:** M&E

Action: Check operation of fan in accordance with the relevant section of Fans (SFG 20).

Notes:

12

Drive pulleys

Frequency: 12M **Skill Set:** M&E

Action: Check alignment and security.

Notes:

13

Drive couplings

Criticality: Amber **Frequency:** 12M **Skill Set:** M&E

Action: Check alignment and for excessive clearance.

Notes: Wear is indicated by excessive clearance and couplings should be replaced.

14

Heating and cooling coils

Frequency: 12M **Skill Set:** M&E

Action: Check condition and clean.

Check air and water pressure drops across coils.

Check operation of the heating and cooling coil in accordance with Heat Exchangers - Coils (SFG 29-01).

Notes: Even when filters are fitted, dirt can build-up causing loss of machine output.

15

Controls and electrical connections

Frequency: 12M **Skill Set:** M&E

Action: Check operation and condition.

Notes: Calibration/Interrogation/Control Adjustment.

See relevant sections Control Panels and Controllers (SFG 14) and Sensors and Switching Devices (SFG 50).

16

Valves

Frequency: 12M **Skill Set:** M&E

Action: Fully open and close and then reset at the original setting.

Notes:

17

Air handling unit

Frequency: 12M **Skill Set:** M&E

Action: Thoroughly clean interior and check for corrosion. On reassembly check for air tightness.

Test and ensure correct operation of auto air vents replacing any faulty components. Vent any air from system and ensure all drains are free from obstruction.

Check and ensure security, freedom of movement and correct settings of all control linkages, vanes, damper blade assemblies and auto roll mechanisms. Lubricate as required.

Examine and report condition of all associated insulation.

Examine fan internally, clean as required, reporting any deterioration and ensuring security of fan impellers and balance weights.

Examine all LTHW and chilled water battery/coil fins for obstruction or blockage, free as appropriate.

Clean batteries/coils and comb fins.

Examine and ensure all motor ventilation airways are clear, remove all dirt and dust by vacuum cleaner.

Check paintwork for corrosion, if present determine and report on cause.

Clean the AHU externally and internally removing all dust and dirt from the unit(s).

Inspect insulation and barriers within unit for evidence of damage or overheating and report on condition.

Notes: Include heating and cooling coils, fan impeller, eliminator plates and other fittings.



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Motors

Frequency: 12M **Skill Set:** M&E

Action: Check all motors in accordance with Motors - Drive Elements (SFG 39-01).

Notes: This should not exceed data plate value. Measure shaft float and end play.

19

Anti-vibration mountings and ductwork flexible connections

Frequency: 12M **Skill Set:** M&E

Action: Check condition.

Mountings:

Check for slackness in nuts, screws and bolts.

Re-tighten as necessary.

Inspect anti-vibration mountings for permanent set (in metal springs).

Inspect rubber blocks and mat for shearing or cracking under load.

If any mountings are suspect, check plant alignment and the alignment of duct and/or pipe connections.

Notes:

20

Cooling / Heating Coils and Drainage Trays

Frequency: 3M **Skill Set:** Mechanical

Action:

Sanitise the AHU cooling / heating coils with an appropriate sanitiser suitable for heat exchanger coils **only**.

Wash down the drainage tray and drain and place a prolonged release Chlorine Biocide dosage tablet in the drain tray.

Notes: Frequency and amount of Chlorine Biocide dosage required should be determined by the size of the system and manufacturers recommendations.



Appendix C

Guidance for Applying Technical Bulletin 2020/11 to Toilets with Extraction Only Fans on MOD Estate

There are a significant number of extraction only fans serving toilets across the MOD estate. Many do not appear to be identified on the establishment's asset register or on the MMO's CAFM. There are concerns that due to various reasons some are not able to run continuously or leaving these fans on continuously will cause premature failure or potentially fires due to their poor condition.

Good Practice Guidance

Technical Bulletin 2020/11 follows industry good practice guidance. It is recommended that MOD remains within the remit of this guidance as far as is reasonably practicable to do so. Continuous running of these extraction fans should be considered and as a minimum for periods of building occupation.

CIBSE COVID-19 Ventilation Guidance Version 2 Issued on 12 May 2020 states:

4.1.2.5 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. In internal toilets blocks with passive stack or mechanical exhaust systems, the principle of this ventilation system is that air will flow into the toilet block as the door to the block is opened, thus ensuring that contaminants and odours are kept within the toilet block and do not enter adjacent rooms. Opening windows in toilet blocks with mechanical extract ventilation may reverse the air flow when doors open allowing contaminated air to flow from the toilet block into the adjacent room – which is to be avoided. Therefore, in toilet blocks with mechanical extract ventilation the extract ventilation should remain constantly on and windows in the toilet block remain closed. A notice may be required on the toilet doors/walls to explain this and discourage opening. For external toilet blocks with no adjoining rooms, open windows can supplement the ventilation and can be left open. It is important to keep toilet doors closed to ensure the ventilation dilutes and removes any pollutants rather than recirculating them to the rest of the building.'

Non COVID-19 Requirements to Consider:

Irrespective of COVID-19 as an employer, DIO/MOD has a duty under the Building Regulations / Workplace Regulations / PUWER to provide suitable light, ventilation and cleanness of its toilet facilities. Extract fans supporting these facilities should be checked to ensure they are operating effectively, where this is not the case action should be taken to clean, repair or replace them as necessary.

Recommendations:

Through support of the HoE / Building Custodians, toilet extract fans should be identified and a functional check carried out. It is recommended that where possible the Unit HVAC Asset and Equipment List be populated with the identified fans.

Priority for those requiring maintenance should be based on risk and an establishments overall COVID-19 HVAC programme. Suggested initial action would be to identify extract fans located in toilet facilities at operational buildings and confirm they are operating efficiently. If not, these should be reported through the normal process.

Any deviation from TB 2020/11 should be risk assessed and agreed by the HoE / Building Custodian.



Appendix D

MOD COVID-19 Arrangements for the Operation and Maintenance of HVAC Systems During the 2020 – 2021 Heating Season

It should be noted, current Industry guidance¹ has advised that HVAC systems operating at increased surface temperatures typically 40°C – 60°C can inactivate the COVID-19 virus.

Where during the heating season if the requirements of this Technical Bulletin cannot be met, due to the inability of the HVAC system to maintain an acceptable internal building temperature whilst the incoming air supply and building extraction sections are set to 100% air movement. The following actions should be taken (also see decision tree):

For buildings at or Near to Full Occupancy:

Fan Coil Units

Fan coil units are to be set to normal operation with an adjustment for units to achieve a maximum set point temperature for 1 hour per day outside normal occupancy times.

This adjustment should be done manually or via the Building Management System (BMS).

Air Handling Units (AHUs)

AHUs are to be set to reduce the air recirculation to the minimum level required to maintain an acceptable temperature inside the building. AHUs are to be adjusted to operate at maximum set point temperature for 1 hour per day outside normal occupancy times.

This adjustment should be done manually or where applicable through the Building Management System (BMS).

It is recommended that records are maintained of the changes and actions taken.

Enhanced Maintenance

In addition to the above requirement, enhanced maintenance as detailed in Appendices A and B must be considered, particularly where the requirements of Technical Bulletin 11/2020 cannot be met and the HVAC system has been reduced from providing 100% air movement. Enhanced maintenance is essential where maximum set points of the system cannot be achieved for the minimum 1 hour period. Cooling / heating coils should as a minimum be sanitised with an appropriate sanitiser suitable for heat exchanger coils **only**. The drainage tray and drain should be washed down ensuring a prolonged release Chlorine Biocide dosage tablet meeting good industry practice to a 3 Monthly frequency.

For buildings at Reduced Occupancy.

Building HVAC systems are designed to provide a given number of air changes per hour at normal occupancy levels, based upon the capacity of the building and the activities undertaken therein. Where buildings are being used at a reduced occupancy level, the air changes will be maintained as required for full occupancy, this in effect creates an increase in fresh air per occupant, diluting the concentration of any virus contained within the building.



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Buildings reduced occupancy levels of 50% or below can be returned to normal operation during the heating season so long as the requirements in 1 and 2 below can be assured. Buildings above 50% occupancy the arrangements detailed above for near to full occupancy should be followed.

1. Sufficient maintenance is being carried out to the HVAC system for operation at optimal capacity:
 - a. there are no 'dead spots' of air distribution typically caused by blocked ventilation grilles or filters
 - b. condensate drainage systems are clear and surfaces are clean.
2. Implementation of an effective hygienic working environment. Resuspension of the virus in the workplace will be minimised through regular cleaning of surfaces to remove any virus that has dropped out of suspension.

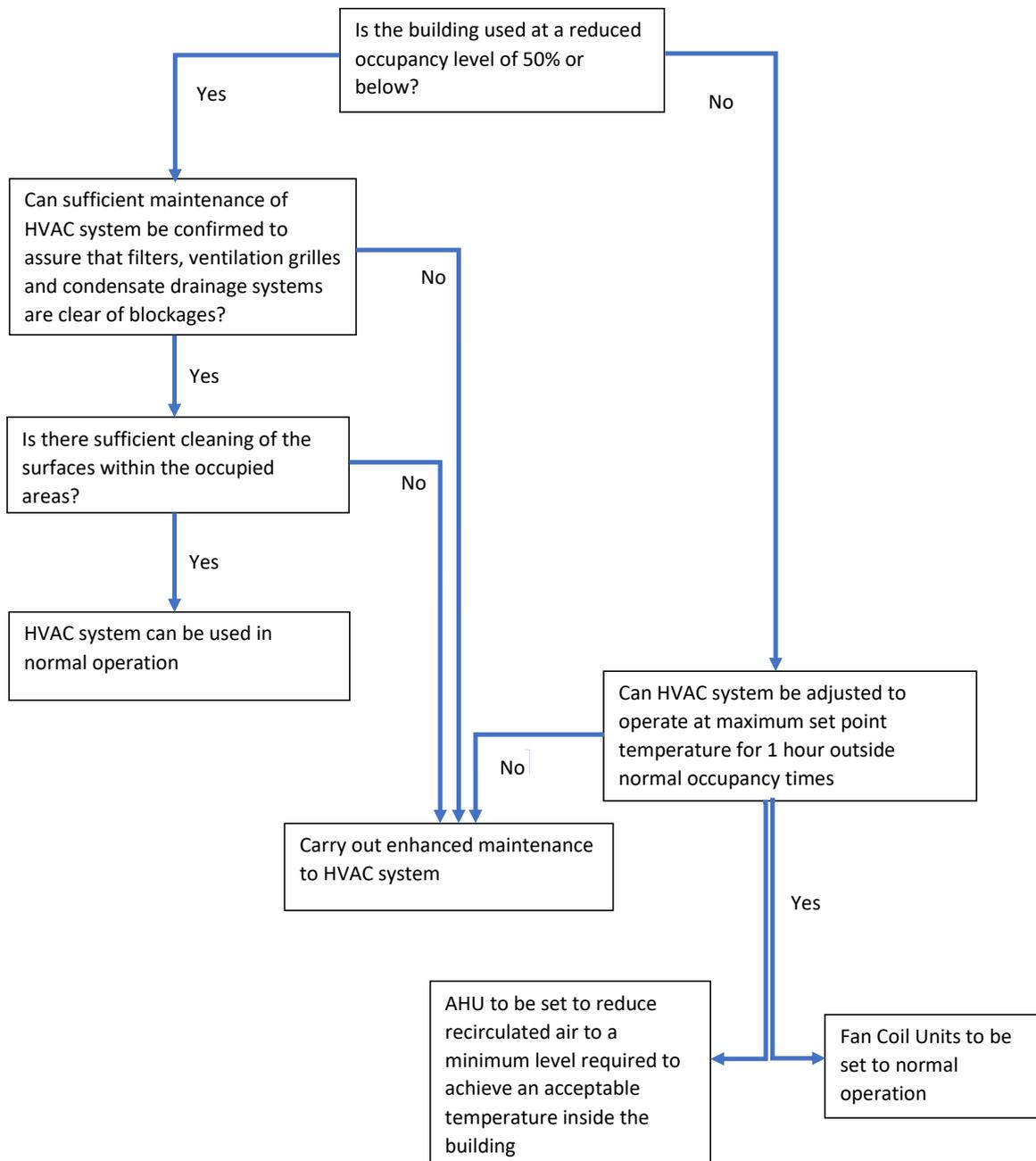
¹ BESA VG002 Version 4 dated 1st July 2020 – developed by REHVA with additional content



HVAC Systems - Heating Season

Decision Tree for MOD COVID-19 Arrangements on Operation and Maintenance of HVAC Systems during the heating season

This Decision Tree should be followed if the requirements of the TB 11/2020 and either Appendix A or B decision tree cannot be met during the heating season.





Defence
Infrastructure
Organisation

Appendix E

MOD COVID-19 Arrangements for managing risks associated with lack of natural ventilation

Both Scientific independent bodies and Central Government guidance note the high risk of COVID-19 virus transmission through airborne particles, particularly in poorly ventilated indoor spaces. The risk of airborne transmission is particularly high when there is inadequate Natural Ventilation within a workplace / environment not supported by Mechanical Ventilation systems.

This appendix provides guidance to the Defence Estate and adopts a precautionary approach with the objective of ventilating spaces as much as reasonably possible in order to reduce transmission risk associated with COVID-19.

Maintaining good levels of ventilation remains the key focus even in colder weather conditions, whilst minimising occupant discomfort due to draughts and lower indoor temperatures.

This guidance will inform consideration of safe working practices and the provision of ventilation in non-residential buildings. It is intended primarily for offices, communication control centres, educational buildings, storage facilities, retail areas and industrial buildings where occupants are mainly sedentary.

Further consideration and specialist advice may be needed for healthcare, food production, other specialist buildings and indoor spaces, fire exit routes, connecting corridors and where activities in these areas (personnel use) are known to increase respiratory aerosols in taking place, e.g. singing, loud talking, aerobic exercise¹.

Assessment of Natural Ventilation

It is preferable to prevent recirculation of air from one space to another. Opening windows or vents (auto and manual) in areas not covered by mechanical ventilation may make the supply air unacceptably cold. Equally, closing of windows or vents may cause a reduction in the rate of supply of outside air to the occupied spaces below the suitable fresh air rates for a typical working environment.

In these instances, there is a balance between two risks: the greater risk arising from recirculating some air of cross-contamination between rooms or zones, which is relatively low risk, against the risk of increasing contaminant build-up as a result of not maintaining adequate provision of outside air, which poses a higher risk. Recirculation should be considered if this is the only way of maintaining adequate provision of outside air to occupied spaces without causing undue occupant thermal discomfort².

Where possible, windows and vents are often the mechanism for providing fresh air. In the colder months, the natural forces that drive air through these openings are greater, and therefore they do not need to be opened as wide as possible. Opening of high-level vents can enable mixing of the outside air with air in the space and warms the incoming air before it reaches the occupied zone. If natural ventilation openings are the only mechanism for delivering outside air into a space it is important not to completely close them when the spaces are occupied as this can result in very low ventilation rates and increased risks of airborne viral transmission.

¹ Further specific information supporting this paragraph, advice can be found in its entirety in CIBSE COVID-19 ventilation guidance.

² Detailed Guidance on recirculation is given in section 4.2.2 of the CIBSE COVID-19 ventilation guidance.



Poorly Ventilated Areas and Additional Precautions

The risk of airborne transmission is greatest in poorly ventilated areas. These are often smaller rooms with limited outside air supplies. Spaces that are often stuffy or smelly are also likely to be poorly ventilated. It is particularly important to increase the supply of outside air to these spaces and cleaning regime if justified and risk assessed.

It is recommended that occupancy density is reduced where possible in these type of workplace environments. In rooms and neutral zones where there is no direct supply of outside air, consideration should be given to limiting access to these spaces by building users, especially where it is likely that they would be occupying such a space for considerable lengths of time (longer than 30 minutes). This may include basement rooms, fire exit corridors and service corridors or storage areas which rely on infiltration of air from other spaces.

It may be appropriate in some circumstances to use Nondispersive infrared (NDIR) CO₂ sensors for assessing air quality in the workplace, the decision to install and use would require specialist advice. These may be used as part of a risk assessment to determine whether adequate ventilation is being provided to an occupied workplace or zone.

Indoor ventilation dilutes exhaled CO₂ from occupants and so the CO₂ concentration in a space is often used to help indicate ventilation rates. CO₂ concentrations regularly greater than 1500ppm are indicative of poorly ventilated spaces and attention should be given to improving the outside air provision to such spaces³.

Technology in the form of Germicidal ultraviolet (GUV) devices can for some circumstances be considered for air cleaning. They use light in the UV-C spectrum and have been shown to inactivate coronaviruses. There is significant emerging evidence of the efficacy of UV-C sources at a wavelength of 254nm to deactivate SARS-CoV-2.

There are currently still uncertainties about a variety of factors affecting UV performance including dosage and exposure time, and how these might depend upon the ventilation rate of outside air to working space so the use of these devices must be is a risk assessed by suitably qualified and experience personnel when considering use of this technology, to ensure correct sizing, positioning and operating protocols.

In addition, specific room and system configuration, air flow, distribution and humidity as well as the safe deployment of UV for occupants, building personnel Maximum Exposure Levels (MEL) and operational times should be considered first before use⁴.

Room air filter cleaners are not recommended for use on the Defence Estate unless a specific risk assessment has been completed giving reason for their potential use.

³ For more information see Section 5.2. 2 of the CIBSE COVID-19 ventilation guidance.

⁴ For further information on the potential use of UV and important safety considerations, see section 6 of the CIBSE COVID-19 ventilation guidance.



Decision Tree for Management of Natural Ventilation

