

SUMMARY PRACTICAL MEASURES FOR BUILDING SERVICES OPERATION



The following information is a summary of the COVID-19 guidance developed by **REHVA** - the Federation of European Heating, Ventilation and Air Conditioning Associations, with additional content from **CIBSE** - the Chartered Institution of Building Services Engineers and **BESA** - the Building Engineering Services Association.

Further reading

- [REHVA COVID 19 Guidance](#) - How to operate and use building services in areas with a coronavirus outbreak
- [CIBSE COVID 19 Guidance](#) - Guidance for staff, members and visitors
- [BESA COVID 19 Guidance](#) - Guidance and support for members regarding COVID-19 / Coronavirus

IMPORTANT

- Preventing contamination and protecting public health is more important than thermal comfort.
- All works shall be undertaken with common protective measures including respiratory protection.
- The maintenance personnel should follow standard safety procedures of dusty work, including wearing gloves and respiratory protection.
- Where users can intervene in the control of the ventilation make them aware of the benefit of these for reducing the circulation of infectious material.

Further reading

- [GN 1 - COVID-19 and Engineering Services: guidance](#)
- [GN 2 - COVID-19 and Engineering Services: guidance](#)

PRACTICAL RECOMMENDATIONS FOR BUILDING SERVICES OPERATION

- Switch air handling units with recirculation to 100% outdoor air.

INCREASE AIR SUPPLY AND EXHAUST VENTILATION

- In buildings with mechanical ventilation systems extended operation times are recommended.
- Time ventilation to start at nominal speed at least 2 hours before the building usage time.
- Switch to lower speed 2 hours after the building usage time.
- It is not recommended to switch ventilation systems off in any buildings, even those temporarily vacated, but to operate them continuously at reduced speeds.

DEMAND- CONTROLLED VENTILATION SYSTEMS

- Change CO₂ setpoint to lower, 400 ppm value, in order to assure the operation at nominal speed. Keep the ventilation on 24/7.

- At nights and weekends, do not switch ventilation off, but keep systems running at lower speed

TEMPORARILY VACATED BUILDINGS

(e.g. offices or educational buildings)

- Continue to operate ventilation systems continuously at reduced speed. This will ensure minimal energy usage but will help to remove virus particles out of the building and from surfaces.

OUTSIDE AIR

- Maximise the supply of outside air as much as reasonably possible while maintaining or increasing the social distancing (min physical distance 2-3 m between persons) among employees in order to foster the ventilation cleaning effect.

WINDOW AIRING

- In buildings without mechanical ventilation the use of openable windows is recommended, even if this causes thermal discomfort.
- In buildings with mechanical ventilation, window airing can be used to further boost ventilation, but the balance of air within the building envelope has to be considered to ensure no infiltration of foul air from washrooms enters other parts of the building when doors are opened to gain access.

HUMIDIFICATION

- In buildings equipped with centralized humidification, there is no need to change humidification systems' setpoints (usually 25 or 30%).

HEAT RECOVERY SECTIONS

- Inspect heat recovery equipment to be sure that leakages are under control.

- Under certain conditions virus particles in extract air can re-enter the building. Heat recovery devices may carry over virus attached to particles from the exhaust air side to the supply air side via leaks.
- Properly constructed, installed and maintained, rotary heat exchangers have almost zero transfer of particle-bound pollutants including air-borne bacteria, viruses and fungi.
- There is no evidence that virus-bearing particles would be an object of carry over leakage.
- It is not needed to switch rotors off. Normal operation of rotors makes it easier to keep ventilation rates higher.
- Higher ventilation rates are recommended as carry-over leakage is highest at low airflow.
- If leaks are suspected in the heat recovery sections, pressure adjustment or bypassing can be an option in order to avoid higher pressure on the extract side causing air leakages to the supply side.
- Pressure differences can be corrected by dampers or by other reasonable arrangements.
- Virus particle transmission via heat recovery devices is not an issue when a HVAC system is equipped with a twin coil unit or another heat recovery device that guarantees 100% air separation between return and supply side.

STOP RECIRCULATING AIR

- Any ventilation or air conditioning system (other than DX type fan coils covered elsewhere in this document) that normally runs with a recirculation mode should now be set up to run on full outside air where this is possible.
- Recirculation of air between spaces should be avoided if occupied by different people.
- The potential benefit to public health at this time outweighs the reduction in energy efficiency caused by not recirculating the air.
- Virus particles in return ducts can also re-enter a building when centralized air handling units are equipped with recirculation sectors. Therefore:
- Avoid central recirculation.
- Close the recirculation dampers via the Building Management System or manually.
- Air filters fitted in AHU's and recirculation sections do not normally filter out particles with viruses effectively.

DUCT CLEANING

- Continue with normal duct cleaning and maintenance procedures in line with agreed industry guidance. increase fresh air supply and avoid recirculation of air.
- Extra duct cleaning, over and above the normal duct cleaning and maintenance procedures, is not necessary as ventilation systems are not a contamination source and viruses attached to small particles will not deposit easily in ducts.
- Viral material that settles in ductwork will become unviable over time. In the event that some viral material entered the ventilation and air conditioning systems prior to the buildings being vacated due to the current restrictions, it is extremely unlikely that the

material will pose any risk when those buildings are re-occupied.

- Ensure you follow the guidance related to heat recovery and recirculation.

FILTERS

- Central outdoor air and extract air filters must be replaced according to normal maintenance procedure when pressure or time limits are exceeded, or according to scheduled maintenance.
- To minimise risk when filters, and especially extract air filters, are changed HVAC maintenance personnel should carry out work in line with standard safety procedures.
- Filters should be changed with the system turned off, while wearing gloves, with respiratory protection, and disposed of in a sealed bag.

Further reading

[SFG 001 Air Filter selection to provide clean healthy indoor air quality for city buildings](#)

FAN COIL UNITS

(Including DX fan coils connected as a single split or part of a multi-split or VRF system)

- The spread of COVID19 has been linked to a number of factors in indoor environments, and there is still much research needed to determine the exact mechanisms including the impact of airflows within a space. Terminal units such as fan coils and DX units usually provide both local cooling/heating and fresh air and so are often integral to the distribution of fresh air in a building. As we enter summer cooling demands will rise and with it the pressure to turn up/on units which have been temporarily switched off or speeds reduced.
- The intent of this precautionary interim guidance is to;
 1. maximise the introduction of fresh air from central plant into the space to dilute any Covid19 droplets suspended in the air.
 2. reduce potential cross contamination between rooms.
 3. limit the recirculation air volumes and in room air velocities in shared/open plan spaces to allow any COVID19 droplets to settle out of the airstream and reduce the radius they might be distributed over.
- Whether the unit should be switched off depends on the location, use, and occupation density of the area it serves, and it is paramount that the specific application and installation is looked at in detail to determine the likelihood of any potential spread of contaminated air. Ultimately the logic behind stopping recirculation and maximising fresh air is about reducing risk, so **Fig.1** - Decision flow diagram should be referred to in determining the best way forward:
 - o If the unit serves an area occupied by one person with access of other persons limited or prohibited,

and the air recirculation is all local to that zone, then there is no harm in having the fan coil operational as normal. Any contaminated droplets of moisture in exhaled air will only be recirculating to the person who exhaled it in the first place.

The fan coil should be switched off when that person leaves the zone in case others enter in their absence and the surfaces be cleaned down before it is switched back on again.

- o If the unit serves a multiple occupied area where there is little or no flexibility of movement for the workstations, etc., then it is advisable to switch it off merely as a precaution as the potential for air flow distributing a contaminated air droplet towards other people is higher.
- o If the unit serves a multiple occupied area and it cannot be switched off then care should be taken as to where people are in that area in relation to the air flow emanating from the unit, and the fan speed should be turned down to a low speed setting to minimise air throw.
- o Consideration shall be given to the discharge of condensate created by a cooling coil. The cooling coil will remove moisture as part of the cooling process which will, in turn, remove some droplets containing virus if it is present in the occupied zone. In doing this, the viral particles will run down into the condensate tray and be pumped away. Consideration shall be given to the discharge location of that condensate. Condensate should ideally always be pumped to a drain or gully but if it can not be and there is the possibility of a pooling occurring then

a temporary cover plate or stepover should be installed where the condensate does pool to avoid stepping in the pool of water and potentially spreading it.

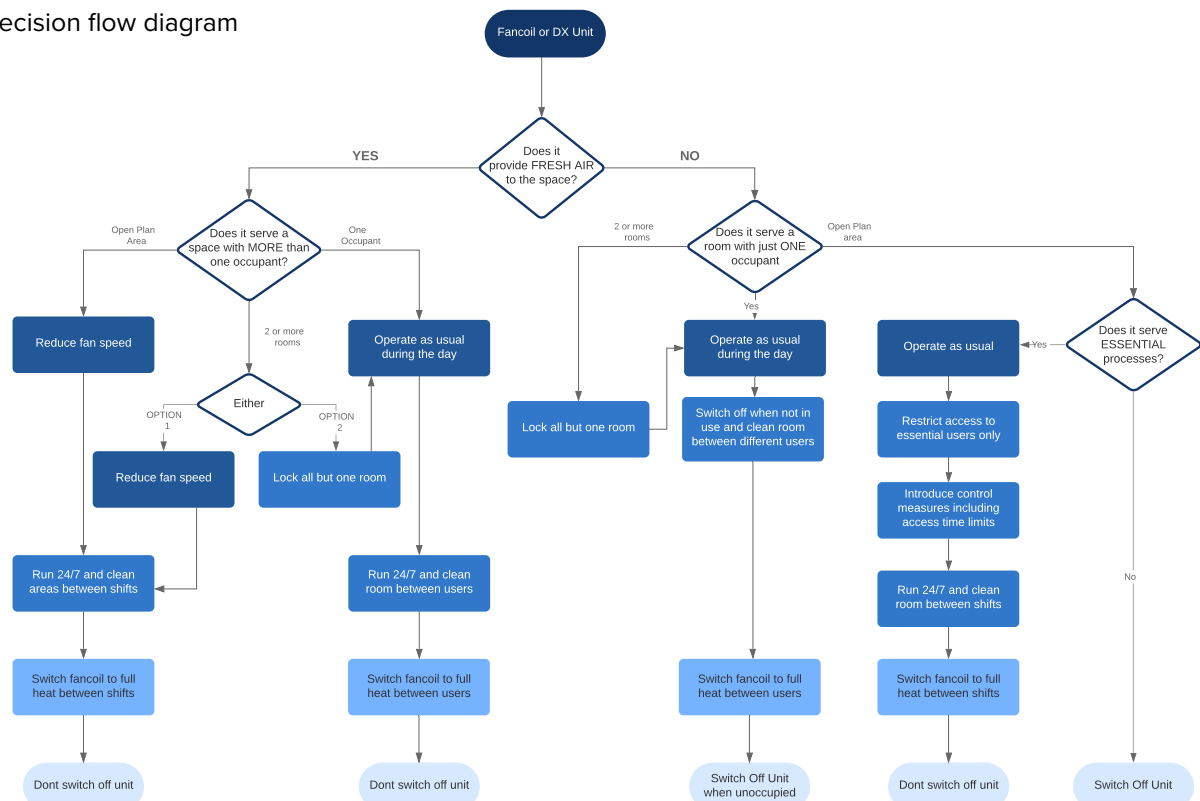
In all cases:

- On the fan coil heat exchanger surface, it is possible to inactivate the virus by heating up fan coils to 60°C for one hour or 40°C each day. If possible the system should switch to full heating mode every evening, or at a time when the building or affected room is unoccupied, to allow the coil temperature to rise to 60°C for at least an hour with the fan on full speed to ensure as much air passes over the hot coil as possible.
- Where fan coils cannot be switched off fans should be continuously operated to avoid re-suspension of virus sediment in filters when the fan is turned on. Continuous operation and exhaust ventilation will remove virus particles.
- Coarse filters within fan coil units do not effectively filter small particles but still might collect particle matter.
- Increasing filter grade may put an undue strain on the fan motor causing burn out, or in the case of DX fan coils, cause liquid refrigerant to slug back to the outdoor unit damaging the compressor. For this reason it should only be done where the air flow can be maintained at a suitable level.

Further reading

[TB/ 048/4: TB/015 COVID19 and air conditioning systems](#)

Fig.1 - Decision flow diagram



VENTILATION GRILLES

- Care should be taken with any ventilation grilles that can be blocked, e.g. floor grilles for displacement ventilation, and occupants educated on the purpose and benefits of these.

ROOM AIR CLEANERS IN SPECIFIC SITUATIONS

- Room air cleaners with HEPA filter efficiency can effectively remove particles from the air in a comparable way to ventilation.
- Devices that use electrostatic filtration principles (not the same as room ionizers!) often work quite well.
- If an air cleaner is used locate the device close to the breathing zone. However, increasing regular ventilation is much more efficient.
- UV cleaning equipment for the supply air or room air treatment can be effective in killing bacteria and viruses in health care facilities.

TOILET FACILITIES

- Exhaust ventilation systems of toilets should be kept on 24/7 and relatively negative pressure must be maintained in the room air to help avoid faecal-oral transmission.
- If toilet seats are equipped with lids it is recommended to flush the toilets with closed lids in order to minimize the release of droplets and droplet residues from plumes in the air. It is important that water seals work all time. Therefore, organise that building occupants are instructed to use the lids.
- Opening toilet windows should be avoided as this may cause a contaminated airflow from the toilet to other rooms. In the absence of adequate exhaust ventilation from toilets and window airing cannot be avoided, it is important to keep windows open in other spaces in order to achieve cross flows throughout the building.

DISPOSAL OF WASTE

- All materials including old filters, should be carefully bagged and disposed of safely.
- Appropriate PPE should be worn.

Further reading

[SFG004 Clean Indoor Air](#)

[SFG 003 LCC Energy Datasheet](#)

DEVELOPMENTS IN FM

- Prepare and focus on the future in what will be an era of significant change for the FM sector.
- Consider and develop ideas, technologies and attitudes that will redefine the industry in the years to come.
- Employers and the FM sector must recognise that the way individuals work is changing and the worker who spends a fixed time working at a fixed workstation day in, day out is a redundant one.

FM RELATIONSHIPS

- Continue to develop relationships and true partnerships with clients/tenants.
- Communication and connection have never been more important in the FM/client/tenant relationship.

SMART TECHNOLOGY

- The future of building and operations management is accelerating through technology
- Utilise the 'internet of things' devices, that provide real-time data from field device measured factors that can predict maintenance needs.
- Become accustomed to using smart technology, especially as artificial intelligence, edge computing and 5G networks boost the IoT's potential.
- Develop the workforce and its skills to implement technology safely and effectively.
- Maximise the capture of data and utilise it to add strategic value to organisational performance.
- Consider ways to demonstrate the value of technology and the ways in which it can be used to add value.

INDOOR AIR QUALITY

- Understand and properly monitor indoor air quality (IAQ) in particular the potential effects on the workforce in enclosed environments.

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