



Guidance on the reactivation of buildings after COVID-19 lockdown



The Building Engineering Services Association (BESA) previously released guidance on how buildings can be managed and maintained effectively during the COVID-19 shutdown.



With commercial buildings now tentatively moving from shutdown mode into full operation, it is important to consider what is required both in terms of compliance and best practice for reactivating these buildings. The reactivation process will largely be dependent on how the building was transitioned into shutdown, and what (if any) maintenance activities have been carried out whilst the buildings have been out of use.

BESA recommended that buildings owners, landlords and tenants maintain their buildings for security purposes, to achieve statutory compliance, and to protect the fabric and critical systems as well as satisfying any insurance implications.

The reactivation process for buildings that were shut down in this manner will be much more simplified than for buildings that have undergone a full closure or mothballing. In both instances, BESA's recently updated, SFG30 Mothballing and Reactivation of Buildings standard, could prove useful to determine the actions required.

This blog is intended to give business owners and managers an outline of the main areas to be considered, regarding both, safe working practices and the assessment of building services.

Controlling risk in re-occupied buildings

It is important that building owners and managing agents carefully plan for the reactivation of a building. Consideration of Government, HSE, legislative and sector advice should form the basis of any plan, along with any critical business drivers. In all instances, a risk-based approach should be taken when developing the plan, to ensure that the process is managed and monitored throughout the change/transition period.

It is important to note that under the current circumstances, preventing contamination and protecting public health is more important than thermal comfort. For systems where users can intervene in the control of the ventilation, and where this cannot be disabled, it is important to make users aware of the benefit of these systems for reducing the circulation of infectious material. See below for example of a typical risk-based reactivation approach.

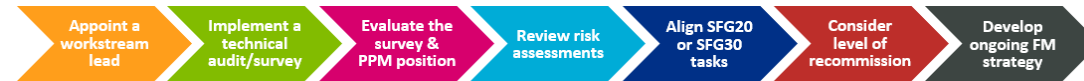


Figure 1: Typical risk-based building reactivation approach

Management considerations

As businesses begin to consider bringing staff back into work premises, several issues need to be considered for the safety of everyone entering the building.

- Management of the organisation(s) that occupy the building requires a planned timeline and scoping out of the necessary works, before a building, that has been vacated for weeks or months, can be safely re-occupied. This should take into account any new working practices required to



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accommodate specific guidance on minimising the risk of viral transmission. As previously stated, any planning process must include all necessary risk assessments and method statements, which should be documented.

- In buildings with multiple occupiers, the managing agent will need to hold detailed discussions with each occupier to discover their individual plans for re-occupying their workspace, for inclusion within the overall plan for the building.
- The timeline and scale/extent of re-occupation of a building needs to be aligned with Government advice.
- Any activity carried out within a commercial building requires someone to work, and therefore needs to be planned and managed in full compliance with the Health and Safety at Work Act. Tasks which were previously considered low risk with straightforward methods of working, may now present new risks and require new ways to complete tasks.
- Ideally, a single body will be responsible for reviewing the activity that the occupiers plan to carry out within the building and, consider the impact this will have on the usability of the building and its building services. This body must also identify which activities may involve additional health risks, given the current circumstances, and establish how to avoid or minimise such risks.
- It is recommended that a pre-occupancy inspection is completed, in order to inform and define the extent, timing, and order of maintenance and

cleaning activities along with new cleaning regimes, which will need implementing. Maintenance and cleaning teams will need to complete updated training on good hygiene practice, to establish activity schedules and to understand the availability and requirements relating to PPE.

- An enhanced cleaning regime is likely to be required, especially where workspaces need to be used by more than one person during the day, in common areas and for regularly touched surfaces, such as door handles, handrails and lift buttons.
- Building managers and occupiers need to consider who will be asked to return to work, activities that will be undertaken, working hours, travel plans and the intended occupancy density. All of these aspects need to be established in order to understand the requirements on building systems, including the supply of domestic hot water, life safety systems and provision of appropriate ventilation rates, as well as access and egress plans. When considering occupancy levels and associated working hours, building managers need to address:
 - ❖ Social distancing requirements in the workplace
 - ❖ Constraints on the travel time of employees, especially in circumstances where staff use public transport (with current guidance being to avoid public transport during peak hours).
 - ❖ Space availability and working routines, including staggered or flexible working hours.



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- Changes to welfare facilities and equipment usage may be required to reduce the risks of transmission of infection. These factors will directly influence decisions regarding levels of occupancy and times of operation.
- In light of the intended occupancy and working hours, other points which building managers will need to consider include.
 - ✦ Lift control programmes may need to be reviewed/implemented in order to support reduced occupancy of lift cars.
 - ✦ Meeting areas may need to adopt restricted numbers in each meeting space, with clear notices on the assessed safe occupancy and changes to furniture layouts where appropriate to support the revised occupancy levels.
 - ✦ Managers and occupying businesses will need to establish how to respond to local outbreaks in any area of the building, in-line with the relevant advice from the Government.

Building Ventilation Systems

In addition to SFG30 requirements, the following measures should be considered/incorporated within the overall reactivation plan. There is growing evidence that SARS-CoV2, the virus which causes COVID-19, can spread by very small particles – called aerosols – which are released by an infected person when they cough, sneeze, talk and breathe. These small droplets may then be breathed in and cause infection.

It is therefore recommended that the overall ventilation strategy for the building is addressed, with a view to increasing the rate of supply of outdoor air to occupants, wherever it is practical to do so, as a precautionary measure.

- Air handling units (AHUs) incorporating recirculation should be switched to operate in 100% outdoor air mode. Virus particles present in return air ducts could potentially re-enter a building when centralised AHUs are equipped with recirculation sections. Air filters present within AHUs and recirculation sections do not typically filter out virus particulate effectively. It is therefore recommended to close all recirculation dampers via the BMS or manually where this is not possible.
- Operate mechanical ventilation and/or air conditioning systems on full fresh air wherever possible.
- Extend the operating times of mechanical ventilation systems, it is not recommended to switch the ventilation systems off in any buildings, even those which are still temporarily vacated, but to operate them continuously at reduced speeds.
- Time ventilation to commence at nominal speed at least two hours prior to building occupation.
- Switch to reduced speed two hours after the end of building occupation.
- Ensure the systems are set to operate over the weekend period at reduced speed.



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- For systems with demand-controlled ventilation, the CO2 setpoint should be lowered to 400 ppm value, in order to assure the operation of the system at nominal speed. Demand-controlled ventilation plant should be in operation 24/7.
- In buildings without mechanical ventilation, the use of openable windows is recommended, even if this causes thermal discomfort. In rooms and zones where there is no direct supply of outside air, consideration should be given to prohibiting access to these spaces by building users, especially where it is likely they would be occupying such a space longer than 30 minutes.
- In buildings with mechanical ventilation, openable windows can be employed to further boost ventilation. However, 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.
- In buildings equipped with centralised humidification, there is no need to change existing setpoints (typically above 40%).
- AHUs incorporating heat recovery equipment should be inspected to ensure that leakages are under control. Under certain conditions, virus particles within extract air streams can re-enter the building. Heat recovery devices may carry over virus attached to particles from the extract air side, to the supply air side via leaks.
- Regenerative air to air heat recovery devices (enthalpy/thermal wheels) have a risk of air leakage and moisture transfer between the supply and

extract air streams at the rotary heat exchanger. The risk is increased if the rotary heat exchanger has not been properly installed, particularly if the pressure in the extract flow is higher than the supply flow. Wherever possible the rotary heat exchanger should be bypassed. In systems where this is not possible, the rotor should be disabled, and the ventilation rates increased as much as reasonably possible. An engineer should check the pressure balance – higher pressure on the extract side of the thermal wheel can cause air leakage to the supply side. In this instance, the difference should be corrected using dampers or other reasonable arrangements.

- Virus particle transmission via heat recovery devices is not considered to be an issue when the system is equipped with a twin coil unit or other heat recovery devices that guarantee 100% air separation between extract and supply sides.
- Constantly review Risk Registers in consideration of emerging COVID-19 risks and updates.

Recirculation of Air within Buildings

There has been much deliberation regarding the recirculation of localised air within occupied areas of buildings. The means of recirculation is generally via fan coil units (FCUs) or active chilled beams designed to condition the space within which they are installed (including DX FCUs connected as a single split or part of a multi-split or VRF/VRV system).

Whether the unit should be switched off largely depends on the location, use, and occupation density of the area it serves.



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- Recirculation of air between spaces within buildings should be avoided where possible, if occupied by different people.
- If the unit serves an area occupied by one person with access of other persons limited or prohibited, and the air recirculation is entirely local to that zone, then there is no harm in allowing the FCU to operate as normal. Any potentially contaminated droplets of moisture present within exhaled air will only be recirculating to the person who exhaled it in the first place. The FCU should be disabled when that person leaves the zone in case others enter during their absence. Additionally, it is advised that surfaces are cleaned down before the unit is enabled again.
- If the unit serves a multiple occupied area and the FCU is also the means for distributing fresh air, then it is advisable to keep the FCU operational, due to the benefit of maximising the air exchange rate with outside air within the space. Building managers may need to assess the location of the occupants in relation to the air flow pattern emanating from the FCUs, and re-arrange furniture as required. In situations where the FCU does not provide fresh air into the space and is essentially recirculating air within the area served, the potential for air flow distributing a contaminated air droplet towards other people is higher – therefore in this instance it is recommended to disable the unit.
- In situations where FCUs cannot be disabled, it is recommended that fans are continuously operated to avoid re-suspension of virus sediment in filters when the fan is turned on. Continuous operation coupled with exhaust ventilation will remove virus particles.
- On the FCU heat exchanger surface, it is possible to inactivate COVID-19 virus particulate by heating the coil to a temperature of 60°C for a period of one hour, or 40°C throughout the day. It is recommended that the system is set to enable full heating mode every evening, or at a time when the building or affected space is unoccupied, to allow the coil temperature to rise to 60°C for at least an hour with the fan enabled at full speed to ensure as much air as possible passes over the hot coil.
- Increasing filter grade material within FCUs may put an undue strain on the fan motor causing burn out, or in the case of DX FCUs 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.

Toilet Facilities

The World Health Organisation (WHO) has recently recognised the risk of a faecal-oral transmission route for COVID-19. In a technical briefing held on 2nd March, WHO recommended closing toilet lids when flushing, and avoiding dried-out floor drains and traps within other sanitary devices by regularly adding water (at least every three weeks, dependent upon climate).

- Exhaust ventilation systems serving toilets should be kept operational 24/7, and relatively negative pressure must be maintained within 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 minimise the release of droplets and droplet



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residues from plumes in the air. It is important that water seals work at all times.

- The opening of windows within toilet areas should be avoided as this may cause a contaminated air flow from the toilet to other occupied spaces. In the absence of adequate exhaust ventilation from toilet and window airing cannot be avoided, it is important to keep windows open within other spaces in order to achieve cross flows throughout the building.

Air Sterilisation

In poorly ventilated spaces with a high occupancy and where it is difficult to increase ventilation rates to an acceptable level, CIBSE recommend that it may be appropriate to consider using air cleaning and disinfection devices. The most appropriate devices are likely to be local HEPA filtration units or those that use germicidal UV (GUV).

GUV devices use light in the UV-C spectrum and have been shown to inactivate coronaviruses. Such devices can be applied as an upper-room system or a standalone consumer unit, but it is important that these are sized correctly for the room they are serving, as many do not have the flowrate required to be effective in larger spaces.

In-duct UV-C is not recommended to control infection transmission unless it is to decontaminate air that is recirculated. Devices that emit ozone or other potentially hazardous by-products should not be used within occupied spaces.

When developing a building reactivation plan, it is important to consider the following:

- Ensure assets are brought back to full operation together.
- Plan resources and any materials/parts that may be required.
- Engage supporting 3rd party specialists early to avoid long lead times.
- Review the plan regularly in light of circumstantial changes and the release of new information.
- Communicate proposed plans to the building management team.
- Ensure all building aspects are compliant prior to reoccupation.

A typical building reactivation process includes:

- Update risk assessments
- Assign property usage level - retained occupancy / partial occupancy / mothballed
- Review SFG20 requirements
- Consider SFG30 services reactivation
- Water sampling
- Change air filters
- Thermal image electrical check distribution boards
- Produce information sheet
- Review PPM maintenance control procedures
- Examine drainage systems



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- Operation checks on fire and access control systems
- Lift test
- Record and log evidence
- Refer to BESA/ESA guidance (note GN1)

Throughout the process of readying buildings for reoccupation, it is important to prepare and focus on the future in what will be an era of significant change for the FM sector. The future of building operations management is accelerating through smart technology, with real-time data provided by field device measured factors that can predict maintenance needs becoming more prevalent.

The need to be able to monitor and control building systems remotely has become more apparent over the last few weeks, with many organisations now considering how the capturing of building data can add strategic value to organisational performance.

I hope you find this information useful - should you wish to discuss the guidance in greater detail or have any specific operational concerns relevant to your own buildings, please do not hesitate to contact me.



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