



Independent workplace compliance



WHITE PAPER

COVID-19 contingency planning: Managing air systems and services



COVID-19 contingency planning: Managing air systems and services

Thursday 25th June 2020

As our sector responds to the new normal, we recognise that air quality, from an operations perspective, is a key consideration in helping to reduce the risk of coronavirus transmission, while maintaining conditions as optimum as possible for occupants.

In assessing how you may best manage your buildings and their air systems and services; we have provided the following guidance to help reduce the potential spread of the COVID-19 virus around your buildings.

Introduction

Throughout the last few months of the COVID-19 pandemic the UK has seen unprecedented changes in people's relationship with their working environment. Employers and employees alike have had to adapt to life away from their offices and embrace working from home.

As lockdown restrictions continue to ease, and more and more people are choosing to return to their workplaces; the advice on managing the air systems and services within your buildings remains consistent.

This document establishes first principles of the transmission routes for the virus and goes on to talk about the different factors and influences that we need to consider.

What are the transmission routes for COVID-19?

There are two dominant ways that the SARS-CoV-2 virus – as well as many others - can spread. An infected person coughing, sneezing or talking etc. and producing fine droplets (>5-10 µm in diameter) containing the virus that contaminate the immediate atmosphere (typically not further than 1-2 metres). Illness is then caused as a result of this "close contact" with an already infected person, where:

1. Someone else then respire these contaminated droplets directly: or
2. Someone else contacts a surface contaminated by infected droplets, secretions or other body fluids (fomites) and then touch their mouth, nose or eyes.

It has also been suggested that additional routes of transmission could include very fine droplet nuclei (<5µm in diameter), again generated through an infected person coughing, sneezing or talking, which stay airborne and so can be carried long distances by natural airflows in rooms, or potentially extract systems. While much has been made of this by some, leading to upgrading filters or cleaning/disinfecting systems, there is currently no reported evidence of this being a route of infection for COVID-19.

Updated in June 2020 Public Health England (PHE) report that "the transmission of COVID-19 is thought to occur mainly through respiratory droplets generated by coughing and sneezing, and through contact with contaminated surfaces. The predominant modes of transmission are assumed to be droplet and contact."

Another possible route could be via faecal-oral transmission and SARS-CoV-2 viruses have been detected in stool samples. Flushing toilets with open lids can create a plume of droplets and an associated droplet residue. So potentially this could be a localised means of transmitting contaminated droplets into the local environment and adjacent surfaces.

A number of studies are reporting this as a potential route of transmission although, as of the 29th March 2020 the World Health Organisation (WHO) stated "There have been no reports of faecal-oral transmission of the COVID-19 virus to date." This advice does not appear to have changed in the intervening period.

WHO also report that "there is no evidence to date of viruses that cause respiratory illnesses being transmitted via food or food packaging. Coronaviruses cannot multiply in food; they need an animal or human host to multiply. "It is highly unlikely that people can contract COVID-19 from food or food packaging."

So to conclude "COVID-19 is a respiratory illness and the primary transmission route is through person-to-person contact and direct contact with respiratory droplets generated when an infected person coughs or sneezes."

Coronavirus and forced air ventilation/air conditioning systems

On the 22nd May 2020 the Health and Safety Executive (HSE) published a bulletin stating, "The risk of air conditioning spreading coronavirus is extremely low". The supporting advice, which has since been updated, goes on to say:

"You can continue using most types of air conditioning system as normal. But if you use a centralised ventilations system that removes and circulates air to different rooms it is recommended that you turn off recirculation and use a fresh air supply.

You 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. Also, you do not need to adjust systems in individual rooms or portable units as these operate on 100% recirculation.

If you're unsure, ask the advice of your heating ventilation and air conditioning (HVAC) engineer or adviser.

General ventilation

Employers must, by law, ensure an adequate supply of fresh air in the workplace and this has not changed.

Good ventilation can help reduce the risk of spreading coronavirus, so focus on improving general ventilation, preferably through fresh air or mechanical systems.

Where possible, consider ways to increase the supply of fresh air, for example, by opening windows and doors (unless fire doors).

Also consider if you can improve the circulation of outside air and prevent pockets of stagnant air in occupied spaces. You can do this by using ceiling fans, desk fans or opening windows, for example.

The risk of transmission through the use of ceiling and desk fans is extremely low."

Know what systems you have in place

Air conditioning in general terms can be a catch all phrase often used to cover any type of forced air ventilation. Different systems however have different characteristics and knowing what you have in place and where and what it serves will dictate how your strategy for successfully managing air quality can be prepared.

While much of the guidance considers system types in isolation (e.g. natural, extract only, localised individual units, mixed mode, mixing boxes, mechanical ventilation/air conditioning) in reality many workplaces have a mixture of ventilation types. So, your controls need to reflect this too as well as how you are proposing to occupy and use the space.

In addition to talking to your HVAC engineers and independent specialists, The Chartered Institution of Building Services Engineers (CIBSE) have produced some good guidance on different type of systems and controls in their "Emerging from Lockdown" publication (link at the end of this guide).

Filter upgrades and duct cleaning?

At approximately 0.1 of a micron SARS-CoV-2, virus particles are much smaller than bacteria and many other particles in our atmosphere. Even F8 filters will only "catch" possibly up to 80% or 90% of particles of 1 micron in size, so they will not provide a direct barrier. Add to this the likelihood that SARS-CoV-2 concentrations in outdoor air will only be very small anyway, the risk is extremely low. Maintaining your systems and their filters and checking performance is the best course of action.

There is the potential for those individuals who are changing filters within air handling units to be exposed to microbiological matter; particularly with regards to changing extract air filters. Although the risk is minimal, you should assume that filters are contaminated with viable viruses. These filters in turn should be changed in line with standard safety procedures: the air handling unit should be switched off; appropriate PPE should be worn; and filters should be disposed of in a sealed bag.

As most of the likely sources of transmission will be the people and surfaces in the office, duct work cleaning will have little effect on this. Equally the majority of virus particles will not colonise and grow in your ductwork distribution systems – very few things do anyway – and if entering, it will either "blow through" or die trying.

Maintain or increase air supply and extract ventilation

By keeping air moving through your building, the supply and extract systems act as a natural diluter for any contaminants within. The supply air adding fresh, uncontaminated air and the extract removing the stale air.

Keeping mechanical ventilation systems operating and, if possible, increasing the run times and 'fresh' air content (reduce the recirculation rates) are good options. Consider operating your ventilation systems to obtain the maximum air change rates you can relative to the space and occupancy levels.

You could run your air system 24/7 for the greatest effect; you could choose to lower these rates (but not switch off) when there are fewer occupants in the building or it is being used intermittently. A secondary option is to extend the current operation times of your ventilation system, so that it starts two hours earlier than normal, and finishes two hours later. At nights and weekends, do not switch ventilation off, but run systems at lower speed. With any of these options you must also weigh up the benefit versus the additional costs, maintenance and environmental impact of your choice.

These options aim to provide the maximum amount of fresh air to your occupants whilst removing any potential virus particles that have been transmitted within your building. Review your system operation to check it is properly balanced, taking into account any changes in occupancy and/or space utilisation, so you are achieving uniform air distribution throughout these areas.

Where you have in room or room to room recirculation (e.g. comfort cooling units), these typically have no fresh air make up so are in essence just recirculating the air within the room (albeit tempered). They therefore will have little or no diluting effect on any airborne pathogens that may be present in the air.

See also "What are you recirculating", "Heat recovery systems" and "Toilet systems" below.

Naturally ventilated buildings

In buildings without a mechanical ventilation system, consider opening windows more frequently, and for longer periods, to achieve a similar diluting effect. Obviously be aware of the possible effect this may have on the thermal balance of the internal environment, or the potential for other pollutants to be drawn into the building.

See also "Toilet systems" below

What are you recirculating?

Locally recirculated air has the potential to reintroduce airborne contaminants into the indoor environment, so be careful how you manage this in your building.

Consider avoiding, where you can, recirculating air through your building from the main air handling system and more importantly the secondary systems (e.g. fan coil units) where in place (note: where recirculation from fan coil units is integral to the correct operation of the air handling systems a compromise of reducing the fan coil fan speed may allow for continued operation of the system whilst also reducing the recirculation rate). Even where filters are installed on either type of system, they will provide little effective protection (see above).

Also check/inspect your heating and/or chilling batteries/coils and extract and return air grilles to make sure they are operating correctly, clean and free of any blockages and or restrictions.

Be aware of the consequential effect reducing the amount of recirculating air may have on, for example, temperature control, and adjust the system accordingly.

Heat recovery systems

Like locally recirculated air, some heat recovery systems can allow extracted contaminants to be reintroduced to the building. For example, particles that become deposited on the extract side of a 'thermal wheel' could be blown back through on to the supply air side. These type of heat exchangers, and others which allow for the possibility of mixing extract and supply air flows, should be investigated for the potential of such 'leaks' occurring, taking into account the pressure differentials between supply and exhaust side air streams.

You will need to ensure that higher air pressure is present on the supply air side, to stop exhaust air from leaking into the supply air side. Higher ventilation rates are also recommended in order to minimise the potential for leaks. If there is no evidence of any leakage, then there is no need to switch such heat recovery systems off. If there is evidence of any bypass, then such systems should be temporarily switched off.

Toilet systems

Although still not yet established, there are a number of simple measures you could take to control possible faecal-oral transmission of SARS-CoV-2 – these will also prove more effective for other viruses (e.g. noroviruses) too. These could include:

- Flushing toilets with the lid closed, thereby reducing droplet plumes being created. Therefore, minimising any faecal-oral transmission of SARS-CoV-2 virus particles.
- Keeping your toilet extract systems maintained and operational. Consider bypassing any controls on your extract system (if you can without affecting other systems) and operating them continuously during occupation of the building.
- Try to maintain negative air pressure in the toilets, this keeps smells as well as any generated contaminants out of adjacent areas.
- Keep the plumbing systems well maintained and preserve water seals. For example, by stopping drains drying out.
- Actively promote good hygiene practises, especially hand washing.

Social distancing of occupants

On the 11th May 2020 "Working safely during coronavirus (COVID-19)" with 8 sector based guidance documents was released through GOV.UK. This included advice on (COVID-19 Secure and the social distancing requirements for the various sectors, which covered:

- Construction and other outdoor work
- Factories, plants and warehouses
- Labs and research facilities
- Offices and contact centres
- Other people's homes - people working in, visiting or delivering to other people's homes
- Restaurants offering takeaway or delivery
- Shops and branches – effectively retail premises
- Vehicles - People who work in or from vehicles, including couriers, mobile workers, lorry drivers, etc.

As the number of occupants in buildings is still likely to be reduced compared to that prior to lockdown, increased space and the ability to spread people throughout the building is more of a possibility. Be aware though that while this not only promotes social distancing as well as maximising the effect of the ventilation system in removing any airborne virus particles, it could have a negative effect on for example fire safety management.

Try and manage numbers of occupants and their locations accordingly to maintain social distancing requirements and indoor air quality, but not adversely affect fire and other health and safety, cleaning and security issues.

Cleaning and hygiene

Effective cleaning and hygiene (along with social distancing) is another key theme to COVID-19 Secure. This is also covered in "Working safely during coronavirus (COVID-19)". Reducing the potential for airborne transmission of the virus through good hygiene practices will again help maintain air quality, this could include:

- Encourage staff to adopt good hygiene practises at all times and back this up with poster and other campaigns;
- Amend cleaning regimes to target the most effective interventions. More regularly sanitising frequently used/touched surfaces such as handles, lift buttons, security pads, kitchen cupboards and utensils, vending machines, etc. will be time better spent than vacuuming.
- Clean/sanitise desks regularly used and communal phones and equipment in "touchdown areas" or hot desks.
- Keep consumables, soap, hand sanitisers, toilet rolls, etc. readily available and accessible.
- Regularly remove waste and check areas such as washrooms and kitchens regularly.

Assurity Consulting will continue to take guidance from authoritative sources including Public Health England, WHO and the Government regarding COVID-19. As further information becomes available so we will update this guidance as required. Sources of information include:

1. COVID-19: General advice (GOV.UK)

<https://www.gov.uk/guidance/wuhan-novel-coronavirus-information-for-the-public>

2. COVID-19: Advice for employers and businesses (GOV.UK)

<https://www.gov.uk/government/publications/guidance-to-employers-and-businesses-about-covid-19/guidance-for-employers-and-businesses-on-covid-19#what-to-do-if-a-member-of-staff-or-the-public-with-confirmed-covid-19-has-recently-been-in-your-workplace>

3. Coronavirus (COVID-19): latest information and advice (HSE)

<https://www.hse.gov.uk/news/coronavirus.htm>

4. Working safely during coronavirus (Covid-19) (GOV.UK)

<https://www.gov.uk/guidance/working-safely-during-coronavirus-covid-19>

5. Coronavirus disease (COVID-19) pandemic (World Health Organisation)

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

6. COVID-19 guidance - The Federation of European Heating, Ventilation and Air Conditioning associations (REHVA)

<https://www.rehva.eu/activities/covid-19-guidance>

7. Emerging from Lockdown (CIBSE)

<https://www.cibse.org/coronavirus-covid-19/emerging-from-lockdown>

This guide was first produced on the 3rd April 2020 (and last updated on 22nd June 2020)

For information on the services Assurity Consulting provide, please get in touch.



Call us on
+44 (0)1403 269375



Email us at
info@assurityconsulting.co.uk



Visit our website
assurityconsulting.co.uk

