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WHITE PAPER

COVID-19 contingency planning: Managing air systems and services



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As our sector responds to the challenges of managing COVID-19 we recognise that air quality, from an operations perspective, needs to be considered in helping to reduce risk while maintaining conditions as optimum as possible for occupants.

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

Introduction

One of the consequential benefits of the 'lockdown' strategy and social distancing resulting from the COVID-19 pandemic is a reduction in traffic, as well as other (industry, transport, etc.), emissions leading to improved outdoor air quality in many urban areas.

Particularly with upper respiratory tract illnesses, like COVID-19 or indeed the more typical seasonal colds and flu, forced air ventilation systems can become a target as the spreader of disease. The truth is though that in well maintained, well managed buildings air quality within is often significantly better than the outside.

Changes in occupancy levels and run times, when combined with advice advocating upgrading filters or shutting systems down can cause potential issues in maintaining suitable air quality in our operational buildings. So, what are the influences 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 (formites) and then touch their mouth, nose or eyes.

It has also been suggested that additional routes of transmission could include very fine droplet nuclei (<5 μm 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.

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."*

So what options are available to you to consider doing with this information in mind?

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.

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. If your building is highly populated – some still are – an additional measure may be to 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 a few hours earlier than normal, and finishes a few hours later.

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. 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.

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).

Be aware of the consequential effect reducing the amount of recirculating air may have on, for example, temperature control, and adjust the system accordingly. Hopefully the current clement weather will persist and help with a few extra degree days.

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 temporarily switched off.

Toilet systems

Although not yet firmly 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; and
- Actively promote good hygiene practises, especially hand washing.

Social distancing of occupants

The number of occupants in your building is likely to have changed and, in many instances, greatly reduced. You could look to increasing social distancing by utilising the increased space and spreading people out throughout the building, as opposed to all being concentrated in one area. While this will maximise the effect of the ventilation system in removing any airborne virus particles, it could have a negative effect on for example fire safety management.

Keep people apart and consider managing times (communal breaks etc.) where there may be increased demand for the use of toilets or kitchen facilities.

For many offices enforced social distancing as a result of most people working away from the office may be a natural consequence anyway. Try and manage numbers of occupants and their locations accordingly to maintain distance but not adversely affect fire and other health and safety, cleaning and security issues by having one or two people working on each of multiple floors.

Cleaning and hygiene

Effective cleaning and hygiene, with social distancing are key to helping reduce the spread of COVID-19:

- 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; and
- 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 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>

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



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