



HVAC

BEST PRACTICES RECOMMENDATIONS FOR RE-OCCUPYING BUILDINGS

In this changing world, we must now address issues that we would not normally think about.

HVAC equipment and Building Automation Systems (BAS) play crucial roles in an organization's ability to reoccupy a building. When effectively deployed, they can significantly improve indoor air quality and create healthy and safe environments for building occupants. To effectively condition and control the indoor environment, it is important to look at a building holistically and consider its occupancy, usage, and the methods currently used for controlling and conditioning the environment.

In order to expedite building re-occupancy, CM3 has developed best practice recommendations for HVAC equipment and BAS programming which may help address existing air quality and purification issues. In conjunction with recommendations from ASHRAE, BOMA, and other leading organizations, here is our list of recommended actions:

IMPROVED FILTRATION

Air filtration is one of the most important aspects of effective risk management in a facility. Just like the masks we wear each day to keep ourselves safe, effective filtration has a significant impact on reducing the number of harmful particulates in the air.

We are encouraging our customers to increase the efficiency (higher MERV rating) of their installed filters and we can help identify the highest available filtration level for their equipment. Although the assumption may be that higher filtration levels are better, there is a point at which higher levels of filtration in particular systems can damage equipment. It is important to understand the equipment before proceeding with higher MERV rated filters.

As the efficiency of a filter increases so does the amount of fan energy needed to move the air across the filter. There are a number of different methods of managing and monitoring an air system to ensure its performance is constant through the lifespan of a filter. Some of these methods utilize variable frequency drives for fan motors, installation of airflow monitoring devices, and more robust filter pressure monitoring. Assessing these measures can contribute to a robust air filtration solution for our customers.

Other items to consider: sheave changes on motors, change to ECM motor, the addition of VFD, filter pressure monitoring (instead of a switch), variable-speed fan with head pressure control (on DX units), airflow stations.

It is also beneficial to increase the frequency of filter changes, especially as the volume of outside air introduced into the system is increased. The efficiency of filters must remain high in to ensure the quality of the air introduced into a building.

VENTILATION RATES & METHODS

OUTSIDE AIR

Where possible, building owners are encouraged to prioritize outside air exchanges on a regular basis. “Flushing” the air with outside air should ideally be done 2 hours prior to occupancy, and post-occupancy (This is the opposite of a normal morning warmup that currently occurs in most occupied buildings). The ability to meet these recommendations is dependent on the equipment’s ability to control the volume of outside air, and effectively condition the additional load. If the equipment is not able to handle the load, such as on unusually hot or cold days, the volume of outside air introduced into a system should be scaled to ensure that proper conditioning of the space is possible.

Where outside air dampers are present, servicing of these dampers should be performed to ensure proper operation. Because of their exposure, dampers may be prone to damage or deterioration and should be inspected regularly.

Good quality air monitoring devices are very important. They are necessary to effectively manage the quantity of Outside Air as well as its quality (through the use of outdoor air CO2 and VOC monitors).

AIR PENETRATIONS

Since conditioning a space is of paramount importance in controlling the presence of airborne contaminants in a building, effective control of the air within a building is vital. It is recommended to perform a thorough inspection of the mechanical equipment as well as ductwork throughout a building to ensure that air is neither infiltrating the conditioned system nor escaping from the system prior to filtration.

A Building leakage test is the best way to determine how “Leaky” a building really is.

REGULAR HVAC PREVENTIVE MAINTENANCE

Achieve ongoing proper function and optimal building operation moving forward with more regular preventive maintenance and equipment inspections. The road back toward building occupancy is getting paved with regulatory compliance. The ability to ensure a controlled and healthy indoor environment is likely to be an expectation well beyond the end of this pandemic.

Regular scheduled Preventive Maintenance is the best solution for ensuring that the equipment controlling the indoor environment continues to run at optimal levels.

Our recommendation is to increase the frequency of system inspections, and take proactive action with issues identified as potential risks to the environmental control equipment.

HUMIDITY MANAGEMENT

Controlling humidity levels in buildings is an important factor in controlling the spread and lifecycle of contagions. Maintaining relative humidity between 40-60% provides an optimal environment to both reduce the prevalence and lifecycle of contaminants, and provide an environment which allows immune systems to most effectively combat illnesses.

- » Humidity levels lower than 40% lengthens the lifecycle of airborne threats.
- » Humidity levels greater than 60% create environments where bacteria, mold, and other threats can thrive and spread.

Humidity is one of those conditions that will be affected by other solutions that we implement to modify the ventilation systems of buildings. We will have to review each application carefully to make sure we are maintaining control of humidity as well as meeting the new goals of airflow.

It is recommended that our customers incorporate humidity control into their system, if it does not already exist.

AIR PURIFICATION BEYOND FILTRATION AND VENTILATION

Air filtration and increased ventilation are responses which demand minimal additional equipment to implement, and can provide healthier indoor air by reducing the presence of contaminants in the space. There are additional measures which will help significantly eliminate the presence of airborne threats.

Ionization solutions have been proven to eliminate airborne viral threats in 2 ways. The first is by creating an environment which forces clumping of particulates which increases their mass and allows gravity to pull them from the air. Secondly, the process of ionization removes molecules from the virus necessary for them to sustain life, thereby killing viruses and eliminating the threat.

3rd party independent tests have proven the effectiveness of these solutions at removing most known threats in an environment. There is documentation available to help explain the technology, and it is encouraged to request assistance in the process of deploying these systems.

Once again, is it important to look at the building as a whole and determine which strategies may be a fit. As we look at implementing these solutions we have to consider the fact that each independent solution is interrelated to others in terms of its effect on air flow, air quality, and energy usage.

There is no magic pill that will fit every facility.

HELPFUL RESOURCES

Here are links directly to resources provided by independent organizations which may help guide, and lend credibility to our discussions:

ASHRAE RESOURCES

- » <https://www.ashrae.org/about/news/2020/ashrae-offers-covid-19-building-readiness-reopening-guidance>
- » <https://www.ashrae.org/technical-resources/commercial#general>

BOMA RESOURCES

- » https://www.boma.org/BOMA/Research-Resources/3-BOMA-Spaces/Newsroom/Press_Room/2020/Getting_Back_to_Work.aspx
- » https://mcusercontent.com/5730f266584395757d3d41050/files/714a2dd4-54e8-4a3f-8579-c632b7d4538a/Pathway_Back_to_Work.pdf