ASHRAE ETF FAQ-002

FAQ Number: 002

Question: Does ASHRAE plan to provide guidance on how to re-occupy a building, especially what measures should be taken to return the HVAC system to normal operation?

Response: The answer to the question is for when the work-remote orders are retracted, and the threat of exposure to Covid-19 is minimal at best (and the orders for social distancing, wearing masks, etc.… are removed). However, if the building is opening during a level of risk, that the Commercial Building Guide (https://www.ashrae.org/technical-resources/resources) that is one of the Occupancy Guides on the web site should be your resource.

# General recommendations:

1. Building operators should create a strategic plan prior to starting the building that includes the following:
	1. Measures to make occupants feel safer
	2. Ensure supply chain for critical items, such as filters, as confirmed for delivery.
	3. Review contractual agreements with tenants with regards to building support.
	4. Establish a communication protocol with tenants and include key contacts
	5. Prepare and provide training for tenants on safety measures.
	6. It is important to note, that if you are opening when PPE requirements are still in place, then the Occupancy Guides should be referenced as they deal with functioning buildings during the epidemic.
	7. Operators should ensure that they have electronic copies of their building plans, past test and balance reports, operation and maintenance (O&M) manuals, Systems Manual, and other pertinent information to operating the building.
2. Notify relevant people - include exact dates and times that the building will be reopened.
3. Follow all local, state and federal executive orders, statutes, regulations, guidelines, restrictions and limitations on use, occupancy and separation until they have been officially relaxed or lifted.
4. Follow CDC advice regarding PPE
5. Follow OSHA Guidelines
6. Ensure that custodial scope includes proper cleaning procedures built from EPA and CDC guidance on approved products and methods:
	1. Disinfect high touch areas of HVAC and other Building Service systems e.g. on/off switch, thermostat
	2. Disinfect interior of refrigerated devices, e.g. refrigerators, where the virus can survive potentially long periods of time.
7. In buildings with operable windows and the outside air temperatures and humidity are moderate open all windows, if possible, for 2 hours minimum, before the reoccupation.
8. Review programming to provide flushing 2 hours before and post occupancies. This includes operating the exhaust fans as well as opening the outside air dampers.
9. Run the system on minimum outside air when unoccupied for the first few months.
10. Garage exhaust, if any, should run 2 hours before occupancy.
11. Install signage to encourage tenants to use a revolving door, if any, rather than opening swing doors in lobby area.
12. Review all procedures to consider the addition of “touchless” interactions where applicable. As an example, auto-flush valves are considered “touchless”.
13. Consider future renovations, to be included in the capital budget, to incorporate some of the strategies to mitigate transmission of viruses as indicated in the ASHRAE Position Document “Infectious Aerosols” as well as the Occupancy Guides on the Covid-19 website.

# Heating, Ventilating and Air-Conditioning:

1. We recommend that all building owners and service professionals follow the requirements of ASHRAE Standard 180-2018 “Standard Practice for the Inspection and Maintenance of Commercial HVAC Systems” which has great tables to show the typical maintenance on equipment that has been in operation
2. Consider PPE when maintaining ventilation materials including filters and condensate until all units have been cleaned. Consult additional guidance before duct cleaning.
3. Check if all the setbacks and setup modes are reversed back to normal.
4. Open outside air intake dampers to their maximum, 100% preferred, 4 hours minimum, before the reoccupation. The maximum position the outside air dampers may be opened will depend on the time of year, local climate, the temperature and humidity of the outside air, the capability of the HVAC equipment to condition the outside air so that the system is able to maintain acceptable indoor temperature and humidity. When operating in this “flush out” mode, monitor the system continuously to make sure that unexpected or unacceptable conditions inside do not develop. Upon completion of the flush, the damper positions should be corrected to provide design levels.
5. Check to see that space temperature and relative humidity levels are being controlled to the acceptable setpoints.
6. Check the status of any heat recovery wheels in the systems for leakage and cross-contamination. These wheels used in units serving multiple spaces may want to be deactivated until a service technician checks the wheel operation and condition.

## Airside systems:

1. Check to see that the fans have turned on, and air is moving in and out of the building.
2. Check to make sure that the dampers (outside and return) are working properly as this helps control the fresh air to the building. If the building increased its OA during the epidemic, rebalancing of the dampers may be required to achieve design air flows.
3. Check overall building pressure to make sure it is positive. Do the same for any critical interior spaces.
4. Check that the filters are still in acceptable condition. Facility staff to wear PPE levels assuming that the system may have been contaminated prior to shut down or upon re-starting.
5. Operator should consider increasing the level of filtration in the AHUs for one or two replacement cycles upon opening the building. Make sure the air handling systems and fans can overcome the additional pressure drop of the new filters and still maintain air flow at acceptable levels. Refer to the Filtration Guidance on the Covid-19 website (link if available).
	1. If higher filtration is not available, portable units in the high-traffic areas could considered to be used for a few months.

## Cooling systems:

1. Check the refrigerant pressures to make sure it is adequately charged.
2. Check the water quality in the systems and add chemicals as needed.
3. Check coil leaving air temperatures to make sure the systems are providing dehumidification.
4. Check the water levels and make-up water source for cooling towers to ensure they are available.
5. Check pump operation and that water is flowing.

## Heating System

1. Check the fuel source to make sure it is on and available. Old fuel oil may need to be replaced.
2. Confirm that the flues and make-up air paths are open prior to engaging boilers.
3. Check that the coils actuators are controlling to temperature or that heating elements are turned on at the disconnect.
4. If the boiler system(s) were shut down, follow state boiler codes and the manufacturer's written instructions for starting up and bring hot water and steam heating systems and plants back online.

## Building Automation System:

1. Check that the devices and sensors are within an acceptable calibration for controlling space comfort and ventilation.
2. Check that the alarms are set-up and their communication path is correct (it is notifying the right person).
3. Consider including remote access to the Building Management System (BMS) and the Building Automation System (BAS) so that operators can check that the building is operating properly and secure. The BMS would include items like security and access control while the BAS is typically controlling the HVAC.
4. Consider an update to the programming that would incorporate HVAC strategies to reduce virus transmission prior to future events. Automate the control sequences applied as “Epidemic Mode” operation that can be turn on by manual selection of the operator with one stroke.
	1. Refer to Occupancy Guides for suggested HVAC strategies to employ when operating the building in an epidemic.

# Plumbing Systems:

1. Many facilities have a water risk management plan such as an ASHRAE 188, to provide guidance and protocols to minimize the risk of water borne pathogens, such as legionella pneumophila in their utility water systems.
2. Turn on the water and run the drinking fountains, lavatories, urinals, water closets, and pantries to ensure water quality before usage.
3. Make sure all P and U-traps on plumbing drains are wet.
4. Distributed domestic hot water systems - if possible, keep these systems circulating. Keep water above 140F to avoid microbial incursion. Do not let it drop below 120F. If circulation was stopped, try to circulate once every two weeks for two hours at temperature. If the hot water recirculating system goes down for extended duration, do a high temperature flush and pull the strainers before going back online.
5. Maintenance should wear epidemic level PPE when maintaining any of the sewage ejectors and lift stations until those systems are sterilized.

# Electrical Systems:

1. Plug in all appliances that were unplugged to avoid phantom electrical loads, including but not limited to:
	1. Computers
	2. Routers
	3. Modems
	4. Televisions
	5. Printers
	6. Chargers
	7. Microwaves
	8. Things that turn on with a remote control

# Special Systems:

1. Check on Fire Alarms and other Equipment with battery backup power supplies. Consider having an electrical technician come and check that everything is working properly.
2. Have fire protection sprinkler systems, fire alarm systems, emergency lighting systems and other life-safety systems inspected by local authorities having jurisdiction (AHJs), if required by state and local statutes and ordinances, and by contract service professionals who routinely maintain these systems.
3. Check on the battery backup power supplies for IT and IOT devices, especially the ones that are mission critical. That would include servers, BAS, communication systems, lighting control systems and security systems.
4. If the building is equipped with an emergency or backup generator arrange to have it tested as required by codes, local jurisdictions and the manufacturer’s recommendations.