Q1: 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?

A: The intent of this question is for when the work-remote orders are retracted, and the threat of exposure is greatly reduced. Those are listed below for many systems in the building. If you are restarting a building still at a high-level threat of exposure, please review the Occupancy Guides at www.ashrae.org/Covid19.

General recommendations:

1. Prior to starting the building, operators may want to create a strategic plan that includes the following:
    a. Create measures to make occupants feel safer
    b. Ensure supply chain for critical items, such as filters, as confirmed for delivery
    c. Review contractual agreements with tenants with regards to building support
    d. Establish a communication protocol with tenants and include key contacts
    e. Prepare and provide training for tenants on safety measures

It is important to note, that if you are opening when PPE requirements are still in place, the Occupancy Guides should be referenced as they deal with functioning buildings during the epidemic.

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:
    a. Disinfect high-touch areas of HVAC and other building service systems (e.g. on/off switches, thermostats)
    b. Disinfect interior of refrigerated devices, e.g. refrigerators, where the virus can potentially survive for long periods of time.

7. In buildings with operable windows, if the outside air temperature and humidity are moderate, open all windows for two hours minimum before the reoccupation.
8. Review programming to provide flushing two 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.
10. Garage exhaust, if any, should run two 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.

Heating, Ventilating and Air-Conditioning:

1. ASHRAE recommends that all building owners and service professionals follow the requirements of ASHRAE Standard 180-2018 which has tables to show the typical maintenance on equipment that has been in operation.
2. Consider PPE when maintaining ventilation materials, including filters and condensate. 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, four 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, and 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. Consider deactivating these wheels until a service technician checks the operation and condition.

Airside systems:

1. Check to see that the fans have turned on, and that air is moving in and out of the building.
2. Check to make sure the dampers (outside and return) are working properly as this helps control the fresh air to the building. If the building increased its outside air (OA) during the epidemic, rebalancing 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 should wear PPE, assuming the system may have been contaminated prior to shut down or upon restarting.
5. Operator should consider increasing the level of filtration in the Air Handling Units (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 www.ashrae.org/covid19.

If higher filtration is not available, portable units in the high-traffic areas may be used for a few months.

Cooling systems:

1. Check the refrigerant pressures to make sure the system 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 coil 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 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 manually selected by the operator with one stroke.
    a. 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 Standard 188-2018, Legionellosis: Risk Management for Building Water Systems, to provide guidance and protocols to minimize the risk of waterborne 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 140°F to avoid microbial incursion. Do not let it drop below 120°F. 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. 1. Plug in all appliances that were unplugged to avoid phantom electrical loads, including but not limited to:
    a. Computers
    b. Routers
    c. Modems
    d. Televisions
    e. Printers
    f. Chargers
    g. Microwaves
    h. 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 Information Technology (IT) and Internet of Things (IOT) devices, especially the ones that are mission critical. That would include servers, building automation systems (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.