

Reopening Building Systems Safely During COVID-19



RISK SERVICES

LINK TO THE FOLLOWING SECTIONS:

[Reopening Building
Systems Safely During
COVID-19](#)

[Water Systems](#)

[HVAC Systems](#)

[Fire and Life Safety Systems](#)

[Gas and Electrical Systems](#)

[Pest Control](#)



REOPENING BUILDING SYSTEMS SAFELY DURING COVID-19

Reopening buildings after prolonged shutdown or reduced operation requires coordinated planning, thoughtful evaluation and focused activity prior to allowing employees to return to work. **Without proper preparation, building occupants can experience symptoms attributable to COVID-19 when the culprits are microbes or mold spores dispersed through the building's water and HVAC systems.** Building owners and facilities managers also need to consider whether fire and life safety systems are functioning properly. Lastly, gas and electrical systems as well as pest infiltration present potential hazards worth consideration prior to opening shuttered buildings.

CDC, EPA, NFPA, NIOSH, ASHRAE and ICC offer resources to guide building owners and facilities managers through the building reopening process. This factsheet highlights important building system considerations and provides direct links to pertinent resources, checklists, standards and whitepapers.

[CDC: Center of Disease Control](#)

[EPA: Environmental Protection Agency](#)

[NFPA: National Fire Protection Association](#)

[NIOSH: National Institute for Occupational Safety and Health](#)

[ASHRAE: American Society of Heating and Air-Conditioning Engineers](#)

[ICC: International Code Council](#)

PRIOR TO TAKING ACTION

There are some important items to consider prior to reopening building systems:

- Confirm the availability of critical maintenance items, such as HVAC filters and disinfectants.
- Follow local, state and federal executive orders, statutes, regulations, guidelines, restrictions and limitations on use, occupancy and distancing until they have been officially relaxed or lifted.
- Follow CDC advice regarding PPE, particularly when handling stagnant water, condensate and filtering media. Assume building systems are contaminated and proceed with safeguards in place.
- Establish a communication plan with tenants clarifying key contacts, safe guarding activities and occupancy updates.



RISK SERVICES

REOPENING BUILDING SYSTEMS SAFELY DURING COVID-19

Water Systems

HVAC Systems

Fire and Life Safety Systems

Gas and Electrical Systems

Pest Control

WATER SYSTEMS

Stagnant water, decreased temperature and low levels of disinfectant (e.g. chlorine) create optimal growth conditions for pathogens, including those that cause Legionnaires' disease – an illness with symptoms similar to COVID-19.

If a **Water Management Program** is not already in place, develop one. The development process itself is a comprehensive method to understand a building's water system, prevent Legionnaires' disease and protect building occupants from water-borne hazards.

ADDITIONAL RESOURCES

CDC:

- [Developing a Water Management Program to Reduce Legionella Growth and Spread in Buildings](#) (36-page tool kit)
- [Identify Buildings at Increased Risk for Legionella Growth and Spread](#) (yes/no worksheet)
- [Preventing Legionnaires' Disease: A Training on Legionella Water Management Programs](#) (free training program)



RISK SERVICES

Reopening Building
Systems Safely During
COVID-19

WATER SYSTEMS

HVAC Systems

Fire and Life Safety Systems

Gas and Electrical Systems

Pest Control

WATER SYSTEMS CONTINUED ON PAGE 3



REOPENING BUILDING WATER SYSTEMS

The following is an abridged list of reopening recommendations from the CDC, EPA and ASHRAE:

1. Review and understand the building water system.

- Know how water moves from the source (e.g. city water main, cistern, well, etc.) to each point of use.
- Consider all potable water sources for drinking, bathing or washing, storage tanks, cooling towers and evaporative condensers, spas, fountains and water features as well as aerosol-generating misters, atomizers, air washers and humidifiers.

2. Contact water utility and local public health department.

- Discuss local water quality and coordinate maintenance, testing or flushing activities.
- Consider coordinating timing with nearby buildings.

3. Inspect water system components and plumbing throughout building.

- Perform maintenance on any water treatment systems, such as replacing point-of-entry or point-of-use filters and water softeners.

4. Perform hot water system inspection and maintenance.

- Water temperature should be at or above 140°F to prevent Legionella or other microbial growth.

5. Do not let temperature drop below 120°F.

- FLUSH water systems in the order specified by this EPA Checklist.

ADDITIONAL RESOURCES

EPA:

- [Maintaining or Restoring Water Quality in Buildings with Low or No Use](#)
- [Restoring Water Quality in Buildings for Reopening](#) (checklist for building owners)

CDC:

- [Guidance for Reopening Buildings After Prolonged Shutdown or Reduced Operation](#) (additional guidance for cooling towers, hot tub/spas, decorative water features and safety equipment)

ASHRAE:

- [How to Return the HVAC system to Normal Operation FAQ](#) (see Plumbing Systems)



RISK SERVICES

Reopening Building
Systems Safely During
COVID-19

WATER SYSTEMS

HVAC Systems

Fire and Life Safety Systems

Gas and Electrical Systems

Pest Control

HVAC SYSTEMS

Mold will grow on building materials where there are sources of moisture like water leaks or condensation from roofs, windows, pipes or flooding. Mold can disproportionately affect employees with respiratory conditions, asthma, allergies to mold or a weakened immune system.

CDC and ASHRAE offer in-depth guidance regarding HVAC system reopening. Below is a summary of key considerations.

1. Inspect and maintain the HVAC system.

- Is the dehumidification method (e.g. sub-cooling air with chilled water, glycol or refrigerant or using desiccants) working properly? Is there standing water or condensation requiring flushing or removal?

2. Maintain indoor humidity as low as possible.

- Relative humidity between 40-60% is recommended by CDC and ASHRAE. (See link to ASHRAE's article on dehumidification strategies provided below.)
- Setting humidity too low may result in occupant discomfort due to dry skin and eyes, irritation of mucus membranes and static electricity.

3. Assess building for mold and excess moisture.

- NIOSH also has tools that maintenance staff can use to assess dampness and mold in [schools](#) and [general buildings](#).
- If mold and moisture is detected, clean up and remediate as appropriate.

4. "Flush out" building HVAC system.

- Inspect and maintain HVAC system. Change out filters and clean ducts if needed.
- Initiate flushing only if mold and moisture has either not been detected or was successfully remediated.
- Open outside air intake dampers to maximum. ASHRAE recommends [100% fresh air flushing for four hours minimum](#) before reoccupation.

5. Conduct routine HVAC checks after occupancy.

- Maintain indoor temperature set points based on the existing licensing requirements for the space use and occupancy.
- Maintain relative humidity between 40-60%.
- Inspection frequency can be adjusted as appropriate depending on HVAC system operational and maintenance specifications.

ADDITIONAL RESOURCES

CDC:

- [Guidance for Reopening Buildings After Prolonged Shutdown or Reduced Operation](#)

ASHRAE:

- [Dehumidification Strategies and their Applicability Based on Climate and Building Typology](#)
- [Research Project Report CO-RP3, Academic Research to Support Facility Guidelines Institute & ANSI/ASHRAE/ASHE Standard 170](#)
- [How to Return the HVAC System to Normal Operation FAQ](#)

NIOSH

- [Dampness and Mold Assessment Tool for Schools and General Buildings](#)



RISK SERVICES

Reopening Building Systems Safely During COVID-19

Water Systems

HVAC SYSTEMS

Fire and Life Safety Systems

Gas and Electrical Systems

Pest Control

FIRE AND LIFE SAFETY SYSTEMS

Building safety, security, and property management should perform exterior walkarounds, interior walkthroughs and visual inspections of the building premises to ensure buildings can be reopened safely.

Exterior inspection considerations

- Fire lanes are posted and clear.
- Clear access to building standpipe systems, sprinkler systems, utilities and utility rooms, and backup generators.
- Building service areas such as docks, shipping and receiving areas in addition to dedicated employee entrances and exits are clear and free from obstructions.
- Remove trash from dumpsters. Ensure regular waste pickup schedule resumes.
- Ensure all exterior roadway entrances and exits are open and free from obstructions.

Interior inspection considerations

Ensure proper operation of:

- Building entrances and exits including doors, revolving doors, and garage doors.
- Emergency exit doors and stairwells. Ensure they are free from obstructions.
- Exit signage and lighting throughout the interior of the building.
- Security systems, including mechanical locks, electronic locks, and access control devices.
- Elevator and escalator operations including maintenance, emergency stop, and emergency recall.

SYSTEMS AND EQUIPMENT

- Fire and life safety systems and equipment require inspection, testing and maintenance (ITM) to ensure occupants are safe until a qualified professional can complete the regularly scheduled ITM activities of those systems.
- National Fire Protection Association (NFPA) developed a [Fire and Life Safety Checklist for Reopening a Building](#) to guide the process. The checklist includes:
 - Fire sprinkler systems and signaling equipment.
 - Fire detection and alarm systems and equipment.
 - Fire suppression systems and equipment, including hood systems, ventilation systems and dampers.
 - Portable fire extinguishers.
 - Building-maintained medical equipment such as Automatic External Defibrillators (AEDs).

ADDITIONAL RESOURCES

ICC:

- [Considerations for Reopening Following the COVID-19 Pandemic, Buildings in the Community and the Role of the Code Department \(whitepaper\)](#)

NFPA:

- [Fire and Life Safety Checklist for Reopening a Building](#)
- [Guidance for Maintaining Fire Protection and Life Safety Systems Regardless of Status](#)



RISK SERVICES

Reopening Building Systems Safely During COVID-19

Water Systems

HVAC Systems

FIRE AND LIFE SAFETY SYSTEMS

Gas and Electrical Systems

Pest Control

GAS SYSTEMS

Inspect, test and maintain the building gas delivery system, including the gas main connection, at each meter, along piping and within equipment (e.g. boilers, heaters, etc.). Ensure carbon monoxide sensors are tested and operating properly. If the gas distribution system or related gas powered equipment is complex, ensure a qualified professional conduct inspection, testing and maintenance.

Keep in mind, boilers pose a myriad of potential hazards beyond gas use and require specialized expertise.

ELECTRICAL SYSTEMS

Have a qualified professional perform an electrical inspection of the system following the recommendations made by NFPA 78 [Guide on Electrical Inspections](#).

- Ensure parts of the electrical system are working correctly, including but not limited to, grounding, conduit, panels, boxes, service equipment, feeders, transformers, solar systems, wiring methods, receptacles, ground fault protection, fixtures, etc.
- Dangerous conditions include improper grounding, wet areas, rust, corrosion, evidence of overheating, damaged equipment and improper bonding or wiring.
- Implement arc flash hazard protection measures as required by NFPA 70E® [Electrical Safety in the Workplace](#).
- 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.
- Check battery backup power supplies for:
 - Fire alarms
 - Information technology (IT) and Internet of Things (IOT) devices – especially the ones that are mission critical. These could include servers, building automation systems (BAS), communication systems, lighting control systems and security systems.



RISK SERVICES

Reopening Building Systems Safely During COVID-19

Water Systems

HVAC Systems

Fire and Life Safety Systems

GAS AND ELECTRICAL SYSTEMS

Pest Control

ELECTRICAL SYSTEMS



PEST CONTROL

Rodents can cause structural damage to virtually any type of building through defecation, nest building and gnawing. They leave trails of urine and fecal droppings potentially exposing occupants to diseases, like Hantavirus or hemorrhagic fevers to name a few. Early symptoms may include fatigue, fever, chills, muscle aches and abdominal pain – all of which could be misconstrued as a COVID-19 exposure.

Rodents also build their nests in large electrical appliances, again chewing on or through insulation and wiring, which can cause the appliance to short circuit, malfunction, or lead to the risk of fire.

Cockroaches may also pose a health hazard if allowed to breed in shuttered buildings. The cockroach is considered an allergen source and an asthma trigger for building occupants.

ADDITIONAL RESOURCES

CDC:

- [Diseases Directly Transmitted by Rodents](#)
- [Healthy Housing Reference Manual – Chapter 4: Disease Vectors and Pests](#)



RISK SERVICES

Reopening Building
Systems Safely During
COVID-19

Water Systems

HVAC Systems

Fire and Life Safety Systems

Gas and Electrical Systems

PEST CONTROL

PEST CONTROL

