

# COVID-19 Water Management Guidance During Pandemic Response

## Including Return to Work and Sustaining Operations Guidance while the COVID-19 disease is present, and the potential exists for Mold and Legionella formation

COVID-19 is a concern for public health globally. Given the risk to the community at large, this document provides guidance to operational teams in all segments in the United States on how to plan to maintain our client's operations regarding the impact of COVID-19 upon the performance of Technical Services activities, specifically those related to maintenance and repairs of ventilation systems. T

As facilities have undergone complete or partial shutdown periods, it is prudent to evaluate other potential bacteria that may have formed during these low activity periods. These include, but are not limited to, **Mold** and **Legionella**.

**Before beginning any work, we require that our staff utilizes our 3 checks for safety:**

1. Do I know how to do the job?
2. Do I have the right equipment?
3. Is my environment safe?

### Manager Guidance

**What we need to be aware of:**

- Infectious bacteria, like Mold and Legionella, can form as the water systems in use by the HVAC and the potable water distribution systems have been partially or completely shut down for extended periods of time. Likewise, mold can develop on surfaces when humidity control is not maintained.
- It should be noted that transmission by aerosols (the COVID-19) that can be carried by either the HVAC water system or potable distribution system is not proven at this stage. However, good practices for the mitigation of transmission of Mold and Legionella through these systems has been well documented by the CDC in:

<https://www.cdc.gov/coronavirus/2019-ncov/php/building-water-system.html>

- The facility should prepare/develop a Water Quality Management Plan for their site. Specific industry and regulatory resources, for the site to use, are cited later in this document. In the beginning, we suggest the following simplified checklist to get you started with potential water quality issues and to set you up to safely re-start.

### Simplified Water Quality Questionnaire/ Checklist - Typical Domestic Water Systems

|  |     |    |
|--|-----|----|
| a. Have you maintained your hot water heaters/storage tanks at temperatures above 140F?          | Yes | No |
| b. If no to 'a' above, have you drained your hot water heaters/tanks?                            | Yes | No |
| c. Have you periodically opened faucets in buildings that are not in use?                        | Yes | No |
| d. Have you inspected p-traps or taken action to ensure p-traps are full in empty buildings?     | Yes | No |
| e. Have you periodically run/flushed eyewash stations?   | Yes | No |
| f. Have your toured unoccupied buildings to look for visual signs of mold or moldy/mildew odors? | Yes | No |

If the above actions/checklist have not been undertaken in advance of developing the specific plan, please incorporate these actions in your plan.

### Confirmation Activities Before Buildings are Occupied

Regardless of the steps taken during shutdown (like those in the above checklist), water systems should be tested, and unoccupied buildings should be inspected before allowing buildings to be re-occupied. Local water quality inspection/testing companies should be used and written reports of their observations, findings and recommendations should be required.

### Some Final Critical Points When Creating Your Plan:

- Complete a PPE hazard assessment and ensure that you put in the right equipment.
- Clearly specify PPEs listed below and the Steps to Safety as shown in the guidance attached below as required in the SOP for the given task: [Sequence for Putting on PPE.](#)

### Plan Required PPE and Safety Steps for the Staff as Part of Your Plan

The following COVID-19 [Personal Protective Equipment](#) must be used when cleaning the coils and changing filters:

- Goggles or disposable full-face shield

- Respiratory (N-95) masks or higher
- For hand hygiene and safety, every time you change your protective gloves, wash your hands. Ensure there is an adequate supply of hand sanitizer available for employees as well to be used
- Ensure that cleaning supplies, including disinfectant are available.

### **Sustaining Operations (Returning to Occupancy)**

As facilities reopen, we must be mindful that the presence of COVID-19 has not been eradicated. Where directives advised to “stay at home” the new messaging is “safe at home” and “safe in public.” Irrespective of public initiatives, individuals bear the responsibility for practicing safe actions that serve to protect others. For the foreseeable future, masks and gloves will be part of the normal public experience.

Facilities managers play a key role in administering prudent engineering and administrative controls. Facilities have undergone complete or partial shutdowns as a result of the COVID-19 pandemic. Accordingly, water systems that are commonly utilized extensively have been shut down or have seen significant reductions in usage. This greatly increases the potential for the formation of Mold and Legionella in the systems.

Note: this guidance has been provided based on current information available at time of issue . It may conflict with previous guidance issued at earlier stages of the pandemic when less was known about the virus, transmission routes, or differences to other viruses / pandemics. It may be subject to change with future issue.

### **Management Initiatives**

Some guiding principles to include in the formation of the site water management plan :

- Consider (where practical) abandoning public water drinking fountains and replace with water stations to eliminate these high touch, shared facilities.
- Be thorough in the evaluation of water fixtures to ensure all are being considered. An example of potential devices includes:
  - Closed loop systems
    - Heating Hot Water
    - Cooling/Chilled Water
  - Open Loop
    - Cooling Towers
    - Condenser Water
  - Process Water Piping used in Manufacturing, etc.
  - De-ionized Water systems
  - Reverse Osmosis Systems
  - Rainwater Collection Systems
  - Potable Water Systems
    - Hot Water
    - Cold Water
  - Showers
  - Sinks
  - Toilets
  - Eye-Wash Stations

- Spigots
- Be mindful in reviewing “dead legs” and other areas of low/no flow where water remains stagnant.

## Mold

Mold will grow on building materials where there is moisture, produced from leaks or condensation from roofs, windows, or pipes, or from a flood. Mold can grow on a variety of surfaces, such as ceiling tiles, wallpaper, insulation, drywall, carpet, and fabric. People with asthma and other respiratory conditions and those with mold allergy or weakened immune systems should avoid buildings suspected or confirmed to have mold contamination. Ensure that your building does not have mold after a prolonged shutdown to maintain a safe working environment for returning occupants.

### Specific guidance related to mold:

1. Maintain indoor humidity as low as possible, not exceeding 50%, as measured with a humidity meter. Building managers may consider continuous monitoring of indoor humidity using a digital hygrometer, ideally more than once daily, to minimize the need to access the building.
2. After a prolonged shutdown and before occupants return, buildings should be assessed for mold and excess moisture.
  - a. Building inspections by trained industrial hygienists can recognize dampness or mold by sight or odor, without the need for sampling and laboratory analysis. NIOSH offers tools and instructions to assess dampness and mold in schools and general buildings. These tools can be used by building maintenance staff as well as industrial hygienists.
  - b. If dampness or mold is detected, address the source of water entry first. Clean-up and remediation should then be conducted before the building is reoccupied. Plan the remediation before beginning work. Resources for remediation of buildings and homes with mold are provided by NIOSH, the New York City Department of Health and Mental Hygiene, the Environmental Protection Agency (EPA), and CDC.
3. After an assessment has confirmed that mold and moisture are not detected (Step 2a), OR after remediation has been completed (Step 2b), a building HVAC system that has not been active during a prolonged shutdown should be operated for at least 48 to 72 hours (known as a “flush out” period) before occupants return.
  - a. During this period, open outdoor air dampers to the maximum setting that still allows desired indoor air temperatures.
  - b. If an odor is detected that suggests mold growth (such as a musty smell) after the “flush out” period, look for mold that may not have been identified earlier. If mold is found, conduct remediation as described in Step 2b.
  - c. Continue the “flush out” process until no odors are apparent.
  - d. The condition of HVAC filters used during the “flush out” period should be carefully assessed prior to building occupancy and replaced with new or clean filters as necessary.

4. After a building is reopened and occupied, routine (e.g., weekly) checks of the HVAC system are recommended to ensure operating efficiency.
  - a. During HVAC checks, inspect and replace filters as indicated or needed.
  - b. The frequency of HVAC system checks can be gradually reduced (e.g., monthly, quarterly), depending on the operational and maintenance specifications for the HVAC system.
  - c. Maintain indoor temperature and relative humidity within ranges recommended in ASHRAE Standard 55-2017, Thermal Environmental Conditions for Human Occupancy.
  
5. If no routine HVAC operation and maintenance program is in place for the building, one should be developed and implemented. At a minimum, consider including the following:
  - a. Inspection and maintenance of HVAC components
  - b. Calibration of HVAC system controls
  - c. HVAC testing and balancing

*Content adapted from the National Institute for Occupational Safety and Health [NIOSH] Heating, Ventilation, and Air Conditioning [HVAC] Cleaning and Remediation guidance. Additional information and CDC guidance on controlling dampness issues that result in indoor mold growth, as well as on renovation and remediation if indoor mold has become an issue is available from NIOSH.*

## Legionella and Legionnaires' Disease

### Specific guidance when Legionella levels are indicated:

- Conduct site surveys to determine the current microbial growth control measures being used inclusive of frequency and control mechanism.
- Establish a Legionella water monitoring program that includes testing procedures to confirm program compliance, both initially and ongoing.
- Create and implement Legionella training for all applicable personnel.
- Establish and conduct quality system and EHS qualification procedures for all the current sub-contracted water treatment service providers. Also, any Legionella water testing sub-contracted service provider must go through the qualification process as well.

Stagnant or standing water in a plumbing system can increase the risk for growth and spread of Legionella and other biofilm-associated bacteria. When water is stagnant, hot water temperatures can decrease to the Legionella growth range (77–108°F, 25–42°C). Stagnant water can also lead to low or undetectable levels of disinfectant, such as chlorine. Ensure that your water system is safe to use after a prolonged shutdown to minimize the risk of Legionnaires' disease and other diseases associated with water.

People at increased risk of developing Legionnaires' disease, such as those with weakened immune systems, should consult with a medical provider regarding participation in flushing, cooling tower cleaning, or other activities that may generate aerosols. Wearing a half-face air-purifying respirator equipped with an N95 filter, or an N95 filtering facepiece, may be appropriate in enclosed spaces where aerosol generation is likely. Respirators must be used in accordance with a comprehensive respiratory protection program, which includes fit testing, training, and medical clearance ahead of their use (see OSHA standard 29 CFR 1910.134 and OSHA Legionellosis website). For more information about N95 respirators, visit the NIOSH National Personal Protective Technology Laboratory (NPPTL) website.

### **Specific guidance related to Legionella and Legionnaires' disease:**

1. Develop a comprehensive water management program (WMP) for your water system and all devices that use water. Guidance to help with this process is available from CDC and others.
  - a. Water Management Program Toolkit:  
This toolkit is designed to help people understand which buildings and devices need a Legionella water management program to reduce the risk of Legionnaires' disease, what makes a good program, and how to develop it. <https://www.cdc.gov/legionella/wmp/toolkit/index.html>
  - b. Preventing Legionnaires' Disease: A Training on Legionella Water Management Programs (PreventLD Training): Take this training from CDC and partners on creating a water management program to reduce risk of Legionnaires' disease. PreventLD Training aligns with industry standards on managing risk of Legionella bacteria. <https://www.cdc.gov/nceh/ehs/elearn/prevent-LD-training.html>
  - c. Hotel Guidance: Considerations for Hotel Owners and Managers: How to Prevent Legionnaires' Disease <https://www.cdc.gov/legionella/wmp/hotel-owners-managers.html>
  - d. Operating Public Hot Tubs/Spas for pool staff and owners: <https://www.cdc.gov/healthywater/swimming/aquatics-professionals/operating-public-hot-tubs.html>
  - e. Reduce Risk from Water: Plumbing to Patients: Water management programs in healthcare facilities are an important way to help protect vulnerable patient populations as well as staff and visitors. <https://www.cdc.gov/hai/prevent/environment/water.html>
  - f. Preventing Occupational Exposure to Legionella: <https://www.cdc.gov/niosh/docs/wp-solutions/2019-131/default.html>
2. Ensure your water heater is properly maintained and the temperature is correctly set.
  - a. Determine if your manufacturer recommends draining the water heater after a prolonged period of disuse. Ensure that all maintenance activities are carried out according to the manufacturer's instructions or by professionals.

- b. Make sure that your water heater is set to at least 140°F.
  - c. Higher temperatures can further reduce the risk of Legionella growth but ensure that you take measures to prevent scalding.
3. Flush your water system
- a. Flush hot and cold water through all points of use (e.g., showers, sink faucets)
  - b. Flushing may need to occur in segments (e.g., floors, individual rooms) due to facility size and water pressure. The purpose of building flushing is to replace all water inside building piping with fresh water.
  - c. Flush until the hot water reaches its maximum temperature.
  - d. Care should be taken to minimize splashing and aerosol generation during flushing.
  - e. Other water-using devices, such as ice machines, may require additional cleaning steps in addition to flushing, such as discarding old ice. Follow water-using device manufacturers' instructions.
4. Clean all decorative water features, such as fountains
- a. Be sure to follow any recommended manufacturer guidelines for cleaning.
  - b. Ensure that decorative water features are free of visible slime or biofilm.
  - c. After the water feature has been re-filled, measure disinfectant levels to ensure that the water is safe for use.
5. Ensure hot tubs/spas are safe for use
- a. Check for existing guidelines from your local or state regulatory agency before use.
  - b. Ensure that hot tubs/spas are free of visible slime or biofilm before filling with water.
  - c. Perform a hot tub/spa disinfection procedure before use.  
CDC Hot Tub Disinfection Guidance (follow Steps 4–9 and 12–13).  
<https://www.cdc.gov/legionella/downloads/hot-tub-disinfection.pdf>
- Facilities may decide to test the hot tub/spa for Legionella before returning to service if previous device maintenance logs, bacterial testing results, or associated cases of Legionnaires' disease indicate an elevated level of risk to occupants. All Legionella testing decisions should be made in consultation with facility water management program staff along with relevant public health authorities.
6. Ensure cooling towers are clean and well-maintained
- a. Ensure that cooling towers are maintained (including start-up and shut-down procedures) per manufacturer's guidelines and industry best practices.
  - b. Guidance on start-up and shut-down procedures from the Cooling Technology Institute (CT 159): <https://cti.org/pub/cticode.php>
  - c. Ensure that the tower and basin are free of visible slime, debris, and biofilm before use.
  - d. If the tower appears well-maintained, perform an online disinfection procedure.
    - Guidance on disinfection procedures from the Cooling Technology Institute:  
<http://www.cti.org/downloads/WTP-148.pdf>

7. Ensure safety equipment including fire sprinkler systems, eye wash stations, and safety showers are clean and well maintained. Regularly flush, clean, and disinfect these systems according to manufacturers' specifications.
8. Maintain your water system
  - a. Consider contacting your local water utility to learn about any recent disruptions in the water supply. This could include working with the local water utility to ensure that standard checkpoints near the building or at the meter to the building have recently been checked or request that disinfectant residual entering the building meets expected standards.
  - b. After your water system has returned to normal, ensure that the risk of Legionella growth is minimized by regularly checking water quality parameters such as temperature, pH, and disinfectant levels.
  - c. Follow your water management program, document activities, and promptly intervene when unplanned program deviations arise.

This guidance is not designed to be exhaustive or applicable in every situation but should be used as a guide for potential actions to be taken to minimize the risk of mold and Legionella.

## References

Center for Disease Control Website: <https://www.cdc.gov/coronavirus/2019-ncov/php/building-water-system.html>

ASHRAE Guidance on Returning to Work: <https://www.ashrae.org/about/news/2020/ashrae-offers-covid-19-building-readiness-reopening-guidance>

Facility Executive Article linking COVID to Legionnaires: <https://facilityexecutive.com/2020/05/buildings-closed-due-to-covid-19-at-risk-for-legionnaires-disease/>

Washington State Department of Health:

<https://www.doh.wa.gov/Portals/1/Documents/1600/coronavirus/LegionellaandBuildingWaterSystemClosuresCOVID-19.pdf>

The CDC recommends the following guidance as a recommendation to maintain a healthy work environment <https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-business-response.html>