

Water System Startup Guide for Schools

All or portions of school buildings are generally closed and vacated during breaks, including for an extended period during summer recess. During these times school water systems are not in use. It is crucial to take precautions when starting up the building water system in preparation for return to normal operations.

As water sits stagnant within water lines and fixtures, the water quality may be adversely impacted by chemical or microbiological contaminants which can cause significant health risks. Stagnant water allows for metals such as lead and copper to leach into the water within the plumbing due to the corrosive characteristics of water. Stagnant water also allows for biological growth and an increase in the presence of bacteria such as Legionella and other bio-film associated bacteria. Use the following steps to guide you through your water system startup.

Preparation

1



Inspect and ensure the integrity of the plumbing system is intact. Repair any supply piping or drain leaks found during the visual inspection and replace any damaged or open plumbing traps.



Remove aerators, point of use filters, and shower hoses, and ensure motion sensors have been disabled on automatic faucets.



Check the integrity of the water system by closing all faucets within the system and shutting down or bypassing any additional systems that may be feeding the overall water system such as a water softener.



Ensure the water heater is properly maintained. Confirm the temperature is correctly set, generally at a minimum of 120°F. Also determine if the manufacturer recommends draining the water heater after a prolonged period of disuse.



Turn on the main supply to the building's water system.

Flushing: Flushing is a process that clears out bacteria and contaminants that may have accumulated during a period of unuse or stagnation. Proper personal protection equipment (PPE) should be worn during flushing activities. Prior to reopening, use the following steps to flush your water system:

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A

Follow the flow of water from the main water supply (use the building's as-built diagrams if available) and begin flushing at the first location within the system to eliminate all sediment and debris sitting within the main supply line. This may require flushing for up to one hour to properly remove all sediment and debris from the main line.

B

Begin moving along the water system to each faucet, spigot, and/or outlet throughout the system. Flush cold water first, and then move on to hot water. Times of flushing may vary depending on the amount of sedimentation detected, but most likely, flushing the cold water for 1 minute and the hot for 30 seconds will suffice.

C

During flushing activities, observe plumbing fixtures to ensure no leakage. Repair any piping, fixture, or drain leaks found during flushing. If it is a multi-story facility and an as-built is unavailable it is best practice to begin at the lowest level and work your way up.

Testing/Results

Testing

- Sample at various points in the system, starting at the point of entry for the main water supply, and then at near, middle, and far locations from the water supply, which may be faucets or spigots.
- Assess water parameters such as pH, temperature, and residual disinfectant depending on the water source. See Maintaining/Monitoring Section for specific control limits to reference.
- For most protective measures collect samples for bacteriological components such as total coliform, e.coli, and legionella; as well as chemical components such as lead, and copper.



Results

- If bacteria is present in the building water system, then disinfection will be needed. Follow guidance for disinfection which is summarized in the points below for both well water and public water supply sources:



- **Well water source** - If the physical structure is served by a groundwater source direct from a water well, then follow guidance from the Indiana Department of Health for well disinfection. Please see following link: <https://www.in.gov/health/eph/files/Directions-for-Disinfecting-Wells1.pdf>

- **Municipal water source** - If the physical structure is served by a municipal water source, then follow the CDC guidance related to specific comprehensive water management programs associated with the use of the building. Please see

following link for further guidance: <https://www.cdc.gov/coronavirus/2019-ncov/php/building-water-system.html>

- If metals (lead or copper) are present in the building water system, then additional flushing may be needed. If levels are not acceptable, then seek guidance from a water treatment specialist to implement interventions to reduce the health risk exposure.

Follow-up

• When testing is completed and/or interventions implemented replace all aerators, point of use filters, shower hoses, and you may initiate motion sensors for automatic faucets.

• If bacteria sourced contamination is found to be associated with a hot water heater, water softener, or ice maker refer to the manufacturer's guidance to clean, disinfect, and recommission those systems, and conduct confirmation sampling once recommissioned.



Building a Water Management Program (WMP)

Water management programs are used to identify hazardous conditions and take steps to minimize the growth and spread of waterborne pathogens in building water systems. A link to the CDC Toolkit is listed below. The toolkit will offer explanation of the ASHRAE Standard 188, and provide assistance in conducting a risk assessment of your building water system to determine if you need a water management program. If a program is needed, the toolkit will guide you through the development of a WMP, but if not needed it still offers some valuable insight to safely managing your system.

cdc.gov/legionella/wmp/toolkit/



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Maintaining/Monitoring

Whether a WMP is in place or not, the Indiana Department of Health recommends schools establish control measures along with associated limits in creating environmental conditions that prevent bacterial intrusion, growth, and transmission. The CDC established the following guidelines related to water control measures (mainly water parameters) that should be collected on a regular basis with measurement frequency dependent on variability within the results. A good starting point is to collect water parameters on a weekly basis at various points throughout the building water system by targeting potential points of concern (i.e. dead legs, low use, greatest exposure, etc..).

Water parameters should include **temperature**, **pH**, and **residual disinfectant**. While developing control limits use the following guidance from CDC to drive decisions:

- Stored hot water should be greater than 140 degrees F
- Circulated hot water should be at 120 degrees F or above
- Stored and circulated cold water should be below 77 degrees F



It is important to maintain water heaters at appropriate temperatures while following local and state anti-scald regulations. Sometimes maximum temperatures allowed may be too low to limit Legionella growth. Engineering controls and devices that mix hot and cold water at or near the point of use can reduce the risk of scalding while allowing water in pipes to remain hot enough to limit Legionella growth.

Determine the disinfectant used by the water source (public water supply or private system), and measure for residual disinfectant to ensure it is detectable throughout.

Maintain records and document water parameter measurements to establish consistency in understanding the building water system. Per ASHRAE Standard 188, facilities should consider legionella testing if the control limits for the building water system are not maintained, whether a WMP is established or not.

Additional Resources:

Building Water System COVID-19 Evaluation Tool: <https://engineering.purdue.edu/PlumbingSafety/covid19/Guidance-Evaluation-Tool.pdf>

Building Water Quality and Coronavirus: Flushing Guidance for Periods of Low or No Use Environmental Science, Policy & Research Institute https://esprininstitute.org/wp-content/uploads/2020/04/FINAL_Coronavirus-Building-Flushing-Guidance-20200403-rev-1.pdf