



Cleveland Water

Large Building Water System Flushing Instructions

WHEN TO FLUSH

Before employees return to work after the stay-at-home order is lifted, it is important to perform a full building flush of both the **COLD** water and then the **HOT** water plumbing before water in the building is used or consumed.

Building flushing should be done before a school, business, church, community center, hotel, dormitory, salon, barbershop, daycare, workout facility, dental office, etc. is re-opened.

Flushing also applies to buildings that had limited water use during the time of social distancing. For flushing purposes, large buildings are based on the size and complexity of the plumbing system. In general, larger buildings might include a multi-story structure, with many outlets, extended or complex plumbing systems or a combination of both. The following instructions are NOT meant to replace formal flushing plans that many buildings have in place such as those maintained or implemented by critical care facilities, et. al.

The following steps are meant to serve as an immediate guide for building managers who do not have a formal full building flushing plan. There are no national or industry guidelines for buildings reopening after extended shutdowns. In the long-term, building owners and business operators should have a formal building flushing plan developed by firm experienced/certified to do this type of work.

WHY FLUSH

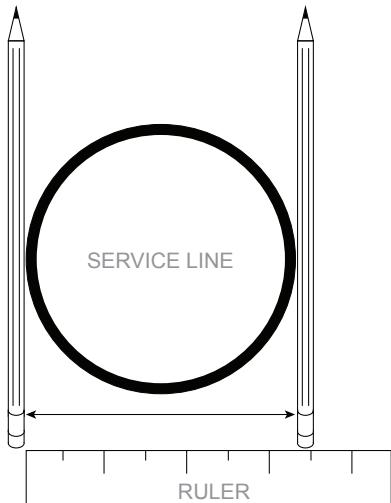
When a building's plumbing system is unused or is underused for an extended period of time, the water in the plumbing system may contain elevated levels of metals and/or elevated levels of chemicals from plastic plumbing components, and will no longer have chlorine residuals that keep the water safe from opportunistic premise plumbing pathogens. The goal of flushing is to ensure aged water is removed from the plumbing system and fresh water with proper chlorine residuals is reintroduced to the cold and hot water pipes.

HOW TO FLUSH

The guidance provides a general outline on how to flush both cold and hot water plumbing in potable water systems in Cleveland Water's service area. Each building is different and will require different actions based on its plumbing systems and water use patterns. Building managers should develop a comprehensive water management program for facilities under their management.

1. Put on proper personal protective gear to prevent aerosolized water from entering your eyes, nose and mouth. This will include a safety mask and eye protection for every person assisting with the building flushing.
2. If possible, remove all aerator screens from every faucet and fixture in the building and leave each aerator screen in a container or bowl by the faucet from which it came.
 - If the building includes tubs, showers or wash sinks with aerator sprayers, use the faucets and not the showerhead or sprayer, to flush the plumbing when possible. If a showerhead is the only option to flush, you may wish to remove the showerhead to prevent the formation of aerosols. If a showerhead is the only way to flush, and the showerhead cannot easily be removed, the showerhead can be used to flush.

3. Flush the building's service line. The volume of water in a large building's service line should be flushed before proceeding with flushing water in the rest of the building. To calculate this volume you need to determine the length of the building's service line, the diameter of the service line and the flow rate of the faucet closest to where the service line enters the building. The service line's length is the distance from the water main beneath the street to where the service line enters the building, plus the distance to the closest faucet. Generally, the water main is on the same side of the street as fire hydrants. The diameter of the service line can be determined by measuring (see the diagram to the right). The average flow rate for many faucets can be found on the manufacturer's website or by timing how long it takes to fill a 1 gallon container. The table on the next page will help you determine how many gallons of water that you will need to flush from the service line.





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3. (Continued) The table below will help you determine how many gallons of water that you will need to flush from the service line. Numbers are rounded to the nearest hundredth of a gallon.

Diameter of Service Line	Volume in every foot of service line	Volume in every 10 feet of service line
1 inch	0.05 gallons	0.5 gallons
1.5 inch	0.10 gallons	1.0 gallons
2 inch	0.2 gallons	2 gallons
3 inch	0.4 gallons	4 gallons
4 inch	0.7 gallons	7 gallons
6 inch	1.5 gallons	15 gallons
8 inch	2.6 gallons	26 gallons
12 inch	5.9 gallons	59 gallons

4. While the service line is being flushed, examine the building's plumbing infrastructure to determine if flushing should proceed one floor of the building at a time, one wing of the building at a time, or a combination thereof. In some cases, only a partial floor or a partial wing on a floor may be able to be flushed at one time. In all cases, the goal is to systematically purge old water out of all pipes and not leave stagnant water in any part of the building.

5. Once the building's service line is flushed, turn that cold water faucet off. Then begin opening the cold water faucets that are closest to the faucet that was used for service line flushing. This will mean starting in the basement or lowest floor of the building and opening the cold water on contiguous faucets as high as each faucet goes. Continue opening **COLD WATER** faucets, including tubs, utility sinks, drinking fountains and outdoor spigots, until all **COLD WATER** faucets are open on that floor/wing or until you notice the water flowrate at any faucet is significantly lower than normal.

- For buildings with motion activated water faucets, consult the manufacturer's instructions on how to bypass the motion detection system.

- Drinking fountains should not be flushed through a filtering device. If a drinking fountain can only be flushed through its filter, the filter should be changed after flushing is complete. Some drinking fountains can be kept in the "on" position by inserting a paperclip along the edge of the "on" button, or the button may be taped in the open position.

- 6.** After the first set of faucets are open, let the **COLD WATER** run for at least 30 minutes. During this time, also flush each toilet in the contiguous plumbing area 2 or 3 times. Running the **COLD WATER** should remove any old (stagnant) water which may contain higher concentrations of metals, chemicals from plastic, or opportunistic premise plumbing pathogens. By removing the aerator screen, you also allow any particulate metals or plastics to escape and not become lodged on the screen.





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7. After 30 minutes, turn off the first set of **COLD WATER** faucets in the same order that they were opened. Then begin opening the next set of contiguous **COLD WATER** plumbing. Repeat the process of opening **COLD WATER** faucets as high as they go until all **COLD WATER** faucets in the building have been flushed for 30 minutes.

8. Now it is time to flush the **HOT WATER** plumbing. Start this flushing with the series of faucets that are closest to the hot water heater. These may be different than the faucets that were closest to where the service line enters the building. Turn on the **HOT WATER** at each faucet, including tubs and showers, and let the **HOT WATER** run for at least 15 minutes. Hot water plumbing should be flushed in sets of contiguous faucets, once again with the goal of purging stagnant water from the system. When only cold or lukewarm water is coming out of the hot water faucets, shut them all off.

9. If possible, test both the **COLD WATER** and **HOT WATER** for chlorine residuals. Cleveland Water is delivered to all customers with at least 0.2 parts per million (ppm) of chlorine residuals in the water. Typically, residuals range from 0.2 ppm to 1.5 ppm with high residuals in water in buildings that are closer to one of our water treatment plants. In some cases, a person may be able to smell the chlorine residuals in the water. If you can test for chlorine residuals you should flush cold water until you get at least 0.2 ppm with a goal of at least 0.5 ppm.

10. Once the **HOT WATER** flushing is complete, go back to each faucet individually and turn the **COLD WATER** on as high as it goes for 1 minute to remove hot water from the fixture.

- At this time, also flush the water from shower faucets where the tub faucet was used to flush, spray aerators, refrigerated water dispensers, ice makers, coffee pots, dishwashers, washing machines and other appliances.
- Appliances can be set to run a short cycle while empty.
- Dispose of any water that runs through coffee makers for at least two cycles, longer if the water is discolored.
- Ice cubes, for the first few cycles of new ice making, should not be used for consumption.

11. After both **COLD WATER** and **HOT WATER** flushing has been completed, clean and reattach aerators to each faucet. If an aerator cannot be cleaned, we recommend that you do not reattach it. Use the faucet without an aerator until a replacement can be bought at a hardware store or online.

Additional building systems that use water should also be inspected, cleaned and disinfected following best practices and industry protocols. These features include decorative water features and fountains, hot tubs/spas, pools, eye wash stations, fire sprinkler systems, and cooling towers. Hot water heaters should also be properly maintained and the temperature set correctly (at least 120°F) to reduce the potential for Legionella bacteria growth. Higher temperatures can further reduce the risk of Legionella growth, but measures must be taken to prevent scalding which can occur if a water heater is set to a temperature greater than 130°F.

ONLINE RESOURCES

Centers for Disease Control – Guidance for Building Water Systems
[cdc.gov/coronavirus/2019-ncov/php/building-water-system.html](https://www.cdc.gov/coronavirus/2019-ncov/php/building-water-system.html)

NSF International
nsf.org/newsroom/in-the-time-of-covid-19-building-water-systems-with-low-demand-require-care

Ohio Environmental Protection Agency
epa.ohio.gov/Portals/28/documents/pws/guidance-for-premise-plumbing-water-service-restoration.pdf

Mechanical and Plumbing Industry Council of Cleveland (MAPIC)
MAPIC can be reached at 216-459-0770 or mapic.org/members

Ohio Association of Plumbing Inspectors
oapi.org/web/contacts

Purdue University Center for Plumbing Safety
engineering.purdue.edu/PlumbingSafety/resources/flushing-plans