



Building Reopening Checklist – Potable Water Systems

<DISCLAIMER – The following checklist is a GUIDELINE to assist in developing a plant for flushing and reopening potable water systems in buildings – no guarantees or warranties are made based on these recommendations>

Buildings or floors that have been lightly occupied (<10% of normal occupancy for example) or unoccupied for more than 21 days should prepare the potable water systems for reopening 1 to 5 days prior to re-occupancy.

The CDC website for guidance for various building types is given here:

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


A checklist for reopening should include:

- Identifying team responsible for deciding when the building will be reopened
- Identifying the personnel responsible for reopening the building(s)
 - Note that for large campus system with multiple buildings it is unreasonable to open all buildings simultaneously so **a priority list for opening buildings should be developed by the team**
- Each building should be inventoried for
 - Water filters
 - Drinking fountains
 - Flushing drinking fountain procedure should be in place (once filter is removed the fountain needs to be flushed - where is that water going – drain, bucket, hose?). New filters in stock
 - Ice Machines
 - Lines should be flushed before putting new filter in place.
 - Other filters that may be present in kitchens
 - Water softeners
 - Overall Number of Fixtures
 - Bathrooms
 - Sensor based faucets (eye, pressure, etc) can be more difficult to flush – refer to faucet manual to identify how to override the sensor for flushing (for example)

- Kohler (<https://support.kohler.com/hc/en-us/articles/360008995074-Overriding-the-Sensor-on-Touchless-Faucets>)
 - Moen (<https://www.moen.com/customer-support/faq/faq-025>)
- Sinks (non -bathroom) (classrooms, hallways, offices, etc)
 - Kitchens
 - Showers (locker rooms, dorms, etc)
- Hot water heater(s)
 - Tank systems
 - Can system be cleaned – if so schedule
 - Tankless systems
 - Can system be cleaned – if so schedule
 - What is hot water delivery temperature to fixtures (degrees F)
 - (_____ F)
- Once an inventory has been completed put together a list for ordering equipment
 - Replacement filters for all systems
 - Drinking fountains
 - Ice Machines
 - Other
 - Thermometers or other devices for measuring hot water temperature
 - Buckets (for flushing drinking water fountains if no drain close by)
 - Order a chlorine testing kit such as

Free & Total Chlorine Test Strips, 0-10 mg/L

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Product #: 2745050

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The most widely used disinfectant for drinking water, chlorine is also important for sanitizing swimming pools, cooling towers, other industrial equipment, and in the treatment of municipal wastewater. Its measurement and control are vital for both safety and economic reasons. Chlorine exists in water as "free" chlorine (hypochlorite) or "combined" chlorine (chloramines). With Hach Water Quality Test Strips, technicians in the field can test many samples in only a few minutes and make immediate evaluations on-site. No measuring, set-up, clean-up, or chemical handling are necessary. Hach test strips are also used in laboratories all over the world for pre-test screening-to detect the presence of materials that might interfere with lab testing. Contains 50 tests.

- <https://www.hach.com/free-total-chlorine-test-strips-0-10-mg-l/product?id=7640211603&callback=pf>

Note there are 50 tests per bottle.

- Work backwards to determine how long it will take to flush buildings and to staff properly
 - All fixtures that may be used for consumption (drinking, eating, food prep) and bathing (showers, tubs, etc) need to be flushed until either
 - A free chlorine residual of 0.5 ppm has been achieved for potable cold water
 - OR
 - The water temperature at the location is consistent with delivery temperature of hot water (e.g. if hot water is made at 140 F and delivered at 120 F the water at the tap should be 120 F +/- 2 degrees F.
 - The flushing process needs to be documented with:
 - Date/Time of flushing
 - Final water quality (either free chlorine or temperature)
 - It is unreasonable to flush a large building in a few hours. In order to have enough time it is a helpful exercise to do an estimate of time per floor/building.

Building A		Tasks - start faucets/fixtures, test, record	Total Estimated Time
Number of floors	6	Time (min per system)	Time (min per system)
Number of bathrooms per floor	3	10	30
Number of sinks per floor other than bathrooms	4	5	20
Number of drinking water fountains per floor	4		
Number of drinking fountains with filters (30 minutes per filter change and flush)	4	30	120
Number of kitchens (total) (2 filters)	1	30	30
Number of showers per floor	10	5	50
Time per floor			250 minutes (4.16 hours)
Total time (hrs) to flush building	Floors x hours		25 hours
		hrs per person	
Number of floors to flush at one time	3	8.3	
Number of personnel to complete building in 1 day (8 hours)	3		

- In this example the drinking fountains with fountains are the limiting factor – taking about 30 minutes per system to change (including flushing).
- It may be useful to flush from higher floors first (for taller structures) or from areas far from the incoming water point for buildings that are more spread out.
- Note that these are just estimates for time.

Validate water system by testing for Legionella

- Perform a Legionella test on 2 to 3 cold water systems from different floors as well as the hot water system (tank) and distribution (showers).
 - This can be done by submitting samples to a local laboratory (like EMSL, or EMLab P&K) note that there is a 10 day turn around for this testing or it can be completed using an on-site test that returns results in 45 minutes. (<https://www.spartanbio.com/products/environmental/legionella/>)
 - Cost for analysis of Legionella should be between \$100 to \$200 per sample

EXAMPLE FLUSHING PROCEDURE

- Flushing process should be performed as follows:
 - Start at one end of the floor of the building as far away as possible from where water enters building
 - Working in one direction on the floor
 - Open faucets in sinks to allow continuous flow of cold water or tempered water taking care not to overflow sink or drain
 - Record date/time starting and location
 - Systems with dual (hot/cold) handles can both be opened
 - Run Showers to allow continuous flow of hottest temperature available
 - Record date/time starting and location
 - **ONCE ALL SYSTEMS ARE FLOWING GO BACK TO INITIAL SYSTEM THAT WAS STARTED**
 - For cold water test free or total chlorine
 - Minimum level should be 0.5 ppm as FAC
 - If level is 0.5 ppm FAC or greater the faucets in that room (e.g. bathroom with three sinks) can be shut off
 - Only one fixture per “room” needs to be tested for chlorine - all fixtures must be flowing
 - Record date, time, location and free chlorine level
 - If level is not at 0.5 ppm FAC or greater then fixtures should continue to run to drain. Retest every 5 minutes until the free chlorine is above 0.5 ppm as FAC.
 - Record date, time, location and free chlorine level
 - For hot water test (hot water faucets, showers)
 - Temperature should be measured as +/- 2 degrees of delivery temperatures set point.
 - If delivery temperature is 120 F then faucet or shower should measure 118 to 122 F.
 - If level is at +/- 2 degrees F of delivery temperature the sink or shower can be shut off.
 - Only one fixture per “room” needs to be tested for temperature – all fixtures must be flowing
 - Record date, time, location and temperature.
 - If temperature is lower than delivery temperature by more than 2 degrees, the fixtures should continue to run to drain. Retest every 5 minutes until the temperature is within 2 degrees of delivery temperature set point.
 - Record date, time location and temperature.
 - NOTE: It is important not to exceed the capacity of the hot water system or temperatures will not meet required delivery temperature.

- When all fixtures have been flushed, change filters on drinking fountains and flush fountains as well as any other filters that may be present (ice machines, etc).
 - These should be done last to minimize flushing of these systems – water that is in the piping will be freshly chlorinated and will minimize flushing times.
- Regenerate any water softeners if present.

Example Data Collection Form

System	Date/Time Started	Date/Time Finished	Free or Total Chlorine (if cold) – as ppm Chlorine (must be greater than 0.5 ppm)	Temperature (if hot) > 118 F	Filter change out (yes/no)
Sink in Bathroom 1205	6/1/20 - 8:30 am	6/1/20 – 9:00 am	1.0 ppm		
Shower in Bathroom 1205	6/1/20 8:35 am	6/1/20 – 9:10 am		118F	
Drinking Fountain – Asset number 65234	6/1/20 9:20 am	6/1/20 10:10 am	1.0 ppm		Yes