

Use of the US EPA Hydrant Sampler

Background and Objective: The hydrant sampler was developed to enable system operators to sample water quality from a desired area of the distribution system, without accessing a residential or commercial tap. Additionally, this approach also allows system operators to quickly assess water quality in the distribution system in the proximity of a routine compliance sample location.

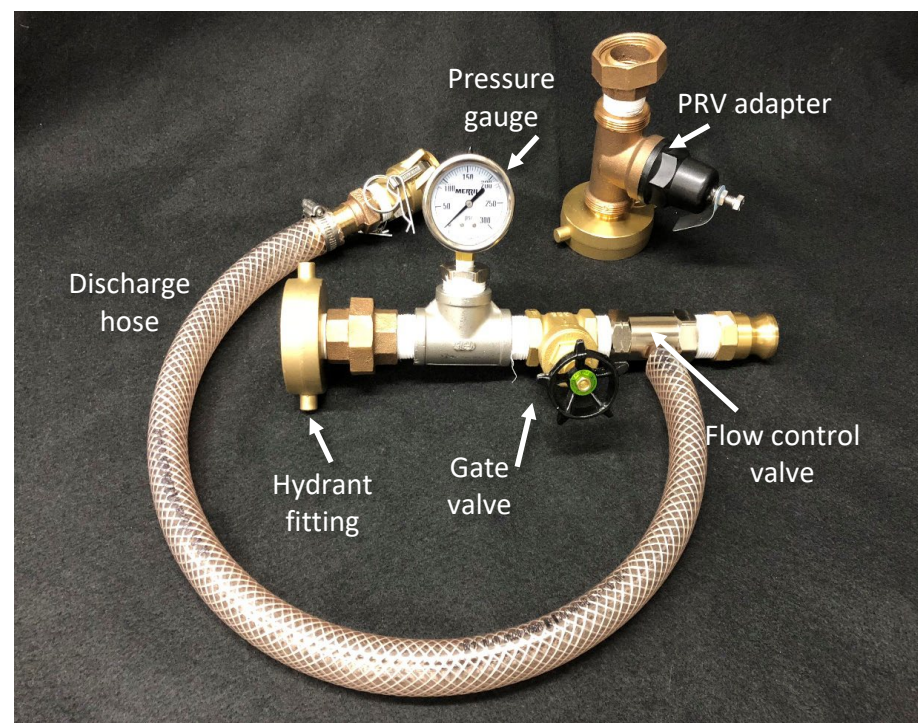
Dry barrel hydrants are the most common type of hydrant. They are designed to be operated with their valves fully open. The hydrant sampler was designed to allow the hydrant valve to be fully open while collecting samples in a controlled, safe manner.

When using the hydrant sampler, the user should identify the **calculated flush time (CFT)** needed at that sample location. Note that:

- Under-flushing may result in obtaining a water sample from the hydrant service line (i.e., not capturing water quality from the desired location).
- Excessive over-flushing may result in obtaining a water sample further away from the intended sample location, especially in smaller diameter distribution mains.

Hydrant Sampling Procedure

1. Determine the time needed to flush the hydrant lead and riser (CFT) using the procedure on the next page.
2. Ask the water system operator for the approximate pressure at the sample location. If the pressure is > 125 psi, install a pressure-reducing valve (PRV) adapter. *The water system operator should generally operate all aspects of the hydrant, including:*
 - Remove the hydrant outlet cap and connect the sampler to the hydrant, confirming the gate valve is closed.
 - Slowly open the hydrant until it is fully open.
3. If the PRV adapter is not being used, record the static pressure on the pressure gauge.
4. Open the sampler gate valve and start the timer. Note that the flow control valve restricts the hydrant flow to a constant rate of 20 gallons per minute (gpm).
5. Allow the sampler to flush for the CFT.
6. Collect the sample:
 - Close the sampler gate valve and remove the discharge hose,
 - Open the gate valve to achieve a flow rate suitable for sample collection,
 - Close the gate valve between samples and when sampling is complete.
7. When sampling is complete, close the sampler gate valve and *have the operator:*
 - Slowly close the hydrant valve,
 - Open the sampler gate valve slightly to release any remaining pressure and confirm the hydrant is fully closed,
 - Remove the sampler from the hydrant.



For more information, please refer to the *Hydrant Sampler Parts List* (EPA 815-B-18-008) at <https://www.epa.gov/sdwa/hydrant-sampler-procedure-and-parts-lists>

Determining the Calculated Flush Time (CFT) for Representative Distribution System Sampling from Hydrants using the Hydrant Sampler

When utilizing the hydrant sampler, the **Calculated Flush Time [CFT]** approach should generally be used (particularly if this will be a routine sample location for the water system), though field experience has shown that flushing the hydrant sampler for 3 minutes will generally be sufficient (e.g., for pipe diameters of 6 inches and a pipe length of 30 feet or less).

The CFT is determined using the following steps:

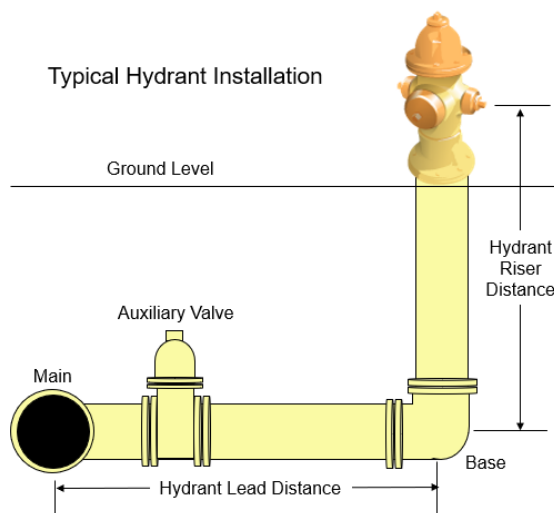
1. Estimate the total length and diameter of the piping (lead line) between the main and the hydrant (see hydrant installation figure). Utilize an operator's knowledge of system, a system/site map, and design standards as needed.

Vertical length/diameter:

- The diameter of the hydrant riser diameter is typically 6 inches and assume that the hydrant riser is 6 feet long based on design standards, unless indicated differently.

Horizontal length/diameter:

- The diameter of the hydrant lead is typically 6 inches, unless indicated differently.
- Measure or estimate the length of pipe between main and hydrant base. If the location of the main is unknown, measure the horizontal distance between the auxiliary valve to the hydrant and add one foot to account for distance from the main to the auxiliary valve.



Minimum Calculated Flush Times (minutes) at 20 gpm for various line sizes (inner diameter, ID, provided in inches).

Line Length (feet)	4" ID	6" ID	8" ID
5	0.5	0.5	1.0
10	0.5	1.0	1.5
15	0.5	1.5	3.0
20	1.0	1.5	3.0
25	1.0	2.0	3.5
30	1.0	2.5	4.0
35	1.5	3.0	5.0
40	1.5	3.0	5.5
45	1.5	3.5	5.5
50	2.0	4.0	6.5
60	2.0	4.5	8.0
70	2.5	5.5	9.5
80	3.0	6.0	10.5
90	3.0	7.0	12.0
100	3.5	7.5	13.5