

DISTRIBUTION SYSTEM

Components

The distribution system includes all parts of the water system past treatment. Typical components of the distribution system are storage tanks, pipes, valves, and hydrants.

Tanks

Small water systems have many storage tank choices depending on volume needed, site access, visual impacts, system pressure, and so forth. Storage tanks are shown in figures 30 through 34. Water tanks may provide storage for treated water, chlorine contact time, and/or water pressure for the distribution system.



Figure 30—Welded steel water tank.



Figure 31—Pressure tanks.



Figure 32—Polyethylene tank.



Figure 33—Concrete water tank.



Figure 34—Wooden water storage tank.

Water storage tanks must keep the treated water clean. With the exception of pressure tanks, they should have a lid or cover that keeps birds, rodents, insects, dust, and surface runoff out. They also must have a screened vent to allow air to enter the tank as the water level drops, and leave the tank as water level rises. Outside tank access covers must be lockable and weathertight (figure 35).



Figure 35—Tank lids must be locked. Replace two opposing bolts with padlocks for security.

Water tanks are confined spaces and a confined space warning label should be placed on the tank access (figure 36 and 37). Confined space procedures must be followed by anyone entering the tank.



Figure 36—Access to a buried water tank. The outer hatch doors are hinged with a lock. A confined space warning is clearly posted.



Figure 37—This buried tank access needs a confined space warning and a lock for security.

Pipes

Pipes used in water systems must be approved for potable water use (figure 38).



Figure 38—Polyvinyl chloride pipe approved for potable water use.

NSF International (NSF), American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), and Underwriters Laboratories (UL) test and approve pipe for potable water applications. Polyvinyl chloride, polyethylene, or ductile iron pipe are commonly used in distribution systems.

Distribution system pipes are typically buried below the frostline to keep them from freezing and to protect them from vandalism (figure 39). Valve boxes provide access to distribution system valves (figure 40).



Figure 39—Distribution system pipe placed in a trench.



Figure 40—Valve box.

Valves

Valves are used throughout the distribution system. Valves are used to isolate equipment, buildings, and other areas of the water system for repair as well as to control the direction and rate of flow. They are used to drain the system for seasonal shutdown.

There may be many types of valves in a water system (figure 41). Check valves are used to control the direction of waterflow. Gate valves and ball valves stop waterflow. Include the valve types in the operation and maintenance manual.

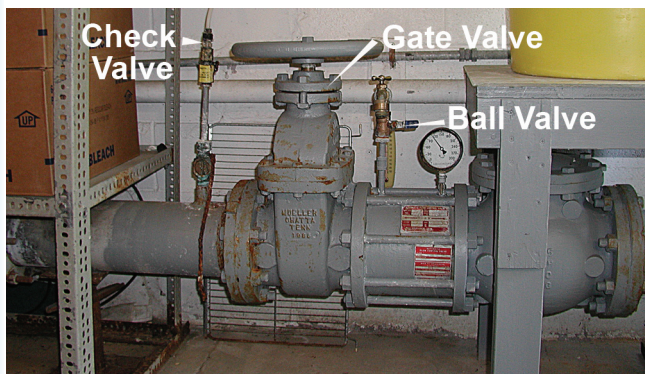


Figure 41—Valves.

Mark valves on the site plan. Inspect and exercise (fully open and close) all valves at least annually to ensure that they are functional, and to flush any trapped sediment from the valve body. Inspect the valves for leaks (figure 42). Do this during startup and shutdown on seasonal systems. Valves suffer more from lack of use than from frequent use.



Figure 42—Leaking valve.

On seasonal water systems, inspect valves and check valve operation during spring startup and fall shutdown.

Replace or repair any valves that leak, fail to perform as intended, or are stuck (will not open or shut).

After a pipe breaks is not a good time to discover that a valve does not work.

Things to check:

- ☐ Ensure that the valve boxes are not full of mud or debris, or have become buried.
- ☐ Inspect the valve for leaks around the valve stem.
- ☐ Ensure that the valve handle is intact.
- ☐ Ensure that the valve can be fully opened and fully closed.
- ☐ Record the inspection date, whether the valve is right or left handed, and whether it is normally open or normally closed.
- ☐ Record any needed repairs or replacements.

Hydrants

Hose bibs, sample taps, faucets, and fire plugs are all hydrants. Note their locations on the site plan. Equip threaded hose bibs with vacuum breakers to prevent potential cross-contamination (figure 43). Use freezeproof hydrants on systems used during the winter (figure 44).



Figure 43—Hose bib with vacuum breaker.



Figure 44—Freezeproof hydrant.

Annually, inspect all hydrants for leaks. While sanitizing the system for seasonal startup, look for leaking hydrants and sticking self-closing faucets.

Provide a splash pad, or apron and paddle-type handle for accessible hydrants (figure 45).



Figure 45—Accessible faucet.

Provide drainage control to prevent site erosion. A concrete pad and drain (figure 46) or armored splash zone (figure 47) can be used.



Figure 46—Faucet with concrete pad and drain.



Figure 47—This armored splash zone allows drainage and prevents site erosion.