Numerous types of valves are required in every water system. Valves are used to operate the distribution system, as well as to control treatment processes, pumps, and other equipment. As detailed here, the correct type of valve must be selected for each use. The primary uses are to start and stop flow, isolate piping, regulate pressure and throttle flow, prevent backflow, and relieve pressure.

1. Gate valves are the most common type of valve found in water distribution systems. The gate, or disk, of the valve is raised and lowered by a screw, which is operated by a handwheel or valve key. When fully open, gate valves provide almost unrestricted flow because the gates are pulled fully up into the bonnet.

2. Globe valves are commonly used for water faucets and other household plumbing. The valves have a circular disk that moves downward into the valve port to shut off flow.

3. Needle valves are similar to globe valves except that a tapered metal shaft fits into a metal seat when the valve is closed. Needle valves are used most often to precisely throttle flow.

4. Pinch valves are closed by pinching shut a flexible interior liner. This type of valve is particularly useful for throttling the flow of liquids that are corrosive or might clog other types of valves.

5. Butterfly valves consist of a body in which a disk rotates on a shaft to open or close the valve. Because the disk of a butterfly valve stays in the water path in the open position, the valve creates a higher resistance to flow than a gate valve does.

6. Check valves allow flow in only one direction. They are commonly used at the discharge of a pump to prevent backflow when the power is turned off.

7. Plug valves have cylindrical or conically tapered “plugs” that can be rotated inside the valve body to control flow.

8. Ball valves consist of a ball resting in a cylindrical seat. A hole is bored through the ball to allow water to flow when the valve is open. The valve is closed when the ball is rotated 90°.

9. Control valves respond to signals generated by independent devices, such as flowmeters or temperature gauges, and are normally fitted with actuators and positioners. Pneumatically actuated globe valves are widely used for control purposes, although quarter-turn types such as (modified) ball and butterfly valves are also used for control.

Some illustration elements exaggerated for emphasis.