

Pumping Systems

Private Wells and Public Water Systems

In water well construction, it is the drilling process that gets to the water. But the heart of a water well system—the part that gets the water to your house—is the pumping system. What type of pump you use can depend on a variety of factors including the depth of the water, water quantity, system pressure, pump cost and pump efficiency.

What are the different types of household well pumps?

Two types of pumps dominate the household well market today—jet pumps and submersible pumps. Jet pumps are mounted above the ground, often in a small enclosure. Submersible pumps, as the name suggests, are housed under water down in the well.

When should a jet pump be used, and how does it work?

Jet pumps are most often used for shallow wells up to a depth of 25 feet or so, although jet pump technology can be configured to pump water from several hundred feet deep. Jet pumps use suction created by a vacuum to lift water out of the well through a pipe installed in the well. The vacuum is created when an impeller—a rotor that spins at a high speed—drives water through a small nozzle. This creates the vacuum that allows atmospheric pressure to move water up the well.

Because water is used to create the suction, jet pumps generally must be “primed,” that is, filled with water to work.

When should a submersible pump be used, and how does it work?

Submersible pumps can be used at shallow depths or in deeper wells. They push water up through a pipe installed in the well instead of pulling it with suction.

Cylindrical in shape, submersible pumps fit into the well casing, which is the vertical pipe that extends down into the ground. The cylinder houses the pump motor as well as a series of impellers stacked on top of each other. These impellers drive water up through the pump and into a pipe (drop pipe) attached to the top of the pump. This drop pipe is installed within the casing, and the top of the drop pipe is connected to the distribution pipe that exits the well and runs to the house.

The pump is connected to a power source by wires that run up alongside the drop pipe and out the top of the well casing.

Because submersible pumps move more water with the same size motor, they are more efficient than jet pumps. One possible disadvantage is that submersible pumps must be removed from the well to be serviced. But submersible pumps can be very reliable, not requiring service for years or even decades.

What is the relationship of the pump to water pressure?

Part of a household water well pumping system is the pressure tank, usually located in the house. These typically are 20 to 80 gallons in size and deliver water under pressure so that the pump doesn't have to operate every time water is used. The pressure tank prevents a tremendous amount of wear and tear on the pump.

Are there other ways to maintain good water pressure?

Variable frequency drive (VFD) pumping systems vary the speed of the pump motor to deliver the amount of water needed under pressure on demand. The motors of variable speed pumps can vary the run speed from one half up to one and a half times faster than those with constant speeds. And VFD systems require only a small pressure tank of two to four gallons.

Sometimes another way to provide constant water pressure is installation of a control valve between the pump and the pressure tank. This valve automatically adjusts flow from the well pump to maintain a preset pressure. It can be a good, economic solution to certain water pressure problems.

Learn more about water pressure by reading the companion information sheet, “Water Pressure.”

Where can I get more information?

For more information, visit the website of the National Ground Water Association, www.ngwa.org, and its site just for well owners, www.wellowner.org. You also can check with your local water well system contractor.