

PRIVATE WATER SUPPLY SYSTEMS

Private water supply system may be either a well, spring, cistern or the most common type



- a well. The most common source of water for wells is groundwater created by the precipitation of rain and snow. This precipitation seeps into the ground and percolates down to a saturated layer of sand, gravel or rock, or the aquifer. The natural filtering of the water through the ground purifies it. This natural filtration makes the water potable so that it can be used for drinking and other household uses. The water can also pick up minerals and pollutants as part of this percolation process and these elements may need to be filtered or treated before the water can be safely used.

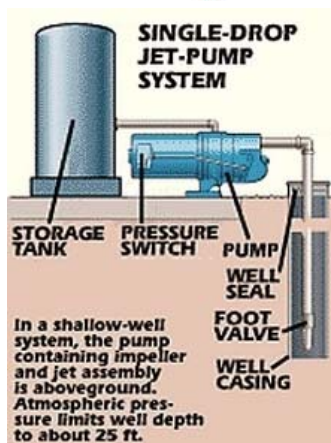
Deeper wells normally provide better quality water due to this filtering, but the quality of the water should never be taken for granted. An analysis of the water should therefore be taken at the time of the well installation and periodically thereafter. An analysis is also recommended and possibly required (time of sale), when purchasing a house with a private water system.

The most common water test is a potability test. This test will simply determine if the water contains bacteria, which may indicate contamination from nearby private waste disposal systems or other sources of contamination. This is the minimum type testing required in most instances. Certain types of loans (e.g. VA, USDA, FHA) may require specific water testing parameters. Since there is always a chance of other conditions that can affect water quality such as excessive mineral content hardness e.g. Arsenic, Lead, Iron), acidity (ph) or chemical contamination (VOC), a complete water analysis is desirable.

There are two basic types of wells: "shallow wells" which draw water from less than 25 feet below ground level and "deep wells," which draw water from greater depths - often several hundred feet deep. While deep wells provide better filtration and a reduced chance of contamination, the increased depth makes it more difficult to draw the water up.

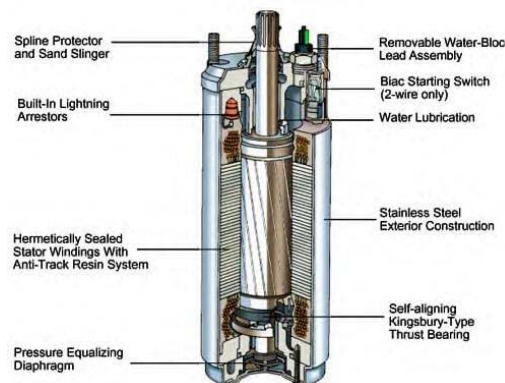
There are three basic types of pumps used to draw water from a well: submersible, jet and piston. All three can be used for shallow wells but the submersible pump is used most frequently for deep wells.

The piston pump is a direct descendant of the old hand pump and is, therefore, not in general use today. It derives its name from the fact that its operation consists of a piston that draws water into a cylinder and then discharges it on every alternative stroke.



A jet pump consists of two components: a jet assembly and a centrifugal pump. The pump is similar to a small water wheel driven by a motor. This wheel increases the velocity and the pressure of the water and diverts a portion of it to the jet assembly. The jet assembly has no moving parts but uses this recirculated water to create a suction, which draws well water into the assembly and pushes the water back to the pump. The water passes through the pump and part of it is circulated again while the balance is sent on to a well water storage tank.

A submersible pump assembly is located in the well. The electric motor and centrifugal pump are both designed to operate under water. Since the pump is located in the well, water is drawn in through screened openings and pumped up to the storage tank through a single discharge pipe. Although this type pump is difficult to service, benefits are its quiet operation (due to its location in the well) and its ability to function in very deep wells.



If a system consisted solely of the piping and pump, the pump would have to operate every time someone filled a glass with water or flushed a toilet.

Since this would result in excessive wear and short-term failure of the pump, a storage or "pressure" tank is installed in the system.



This pressure tank is partially filled with air, the pump forces water into the tank which compresses the air. This compressed air forces water through the household pipes when a faucet or valve is opened. As the water leaves the storage tank, the air inside expands and the pressure decreases. When the pressure in the tank drops, the pump is automatically activated and forces water into the tank until the pressure increases to a preset shut-off point. A gauge in the system will indicate the system pressure.



A pressure switch in the system senses the pressure and activates the pump when needed.



This switch is normally adjustable, with typical start/stop pressure settings of approximately 30 to 50 pounds per square inch.

Most modern systems do not require much maintenance; however, you should be aware of the following issues:

- A water logged tank develops when the air in the tank is slowly absorbed into the water. This condition causes the pressure to change rapidly in the system as the water enters or leaves the tank. This in turn causes the pump to cycle (starts and stops frequently). Introduction of more air into the tank corrects this condition.
- Since the water from the well is usually around 50"-55°F (10" -12"C), condensation can occur on the storage tank and cold-water piping. In order to minimize this sweating and consequential dripping and rusting, insulation can be installed on the tank and water piping.