

**WEST VIRGINIA DEPARTMENT OF HEALTH
AND HUMAN RESOURCES
BUREAU FOR PUBLIC HEALTH
OFFICE OF ENVIRONMENTAL HEALTH SERVICES
FACT SHEET**

Private Water Well Owners – Water Well Pumping Systems

Who can install or repair a pump?

Only a certified well driller, certified pump installer, or a property owner (who has passed the required examination) can install a pump. Regardless of who installs the water system, it must comply with WV Legislative Rules, 64CSR19 Water Well Regulations and 64CSR46 Water Well Design Standards. The West Virginia Bureau for Public Health registers certified water well drilling contractors and certified pump installers. Minimum experience qualifications and an examination help ensure that only knowledgeable individuals become registered. Listed below are general examples of pump systems. Your well may need a different system based on local conditions. A certified professional can tell you what system is right for your home.

Types of Water Well Pumps

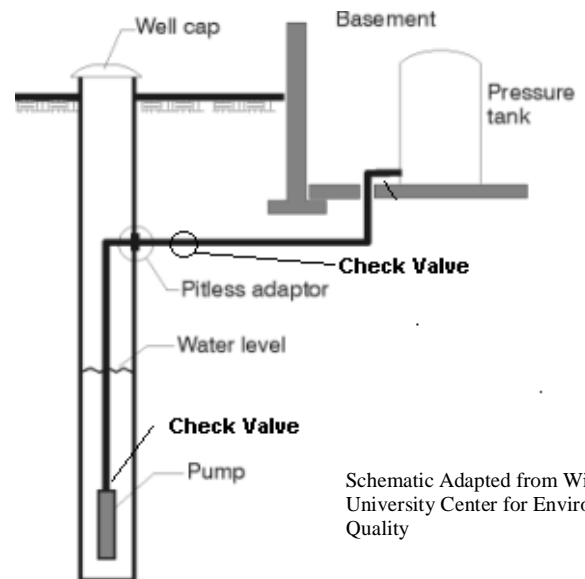
The correct size pump and pump motor depends on the well diameter, the water level in the well, the number of plumbing fixtures, the amount of water use, and the peak water *demand*. Pumps are rated in *gallons per minute* (gpm) or *gallons per hour* (gph), and pump motors are rated in *horsepower* (hp).

Special water needs - such as for irrigation, heat pumps, or livestock - can increase peak demand and require a pump capable of producing more water. If the required rate of flow to meet the peak demand exceeds the maximum rate at which water can be pumped from the well, the difference can often be made up by increasing the storage capacity of the pressure tank. In some locations, a larger diameter well which is capable of handling a larger pump can provide more water.

A **submersible pump**, which is the type most often used in drilled wells, consists of a pump and motor unit. The pump is placed directly into the well, below the water level.

Jet pumps are not installed in the well, but installed above ground. Jet pumps operate by forcing water through a jet or Venturi, a narrow, cone-shaped device that creates a partial vacuum (suction) and draws water from the well into the pumping system. Shallow well jet pumps that are used where the water is less than 25 feet below the surface have the jet located in the pump itself. For deeper wells, the jet is located inside the well below the water level.

Turbine pumps are typically used for municipal, industrial, or irrigation wells, which produce a large volume of water. They have a motor which is placed on top of the well and a turbine shaft extending below the water level. The bottom of the shaft is connected to impellers, which push water to the discharge pipe at the top of the well.



Pitless Adapters and Pitless Units

Years ago, wells were completed in pits, below ground level, so the pump and water pipes would not freeze in cold weather. Well pits, however, represent a serious health hazard, because contaminated flood water and runoff can easily flow into a well pit and get into the well itself. Well pits are also a safety hazard. Children and animals may fall into the pit due to missing or deteriorated pit covers. Toxic gases can also build up inside a well pit, making it a dangerous place to enter and work.

Current well construction regulations prohibit the construction of well heads terminating in pits. If you have an older well located in a well pit, the West Virginia Bureau for Public Health recommends that you upgrade your well installation. Have a certified well contractor extend the casing above the ground level, and install a pitless unit or pitless adapter. For safety reasons, the pit should then be filled in with sanitary (clean dirt) backfill.

The invention of the *pitless adapter* and *pitless unit* have made well pits unnecessary. Pitless adapters and pitless units are special fittings that allow the casing to be extended above ground, which provides safe access for maintenance and repair. The water service pipes are attached to the fittings on the well underground so they will not freeze during cold weather. A water service pipe connects the well to the house or to other water piping. Pitless adapters are small fittings that can be inserted through a hole in the well casing. Pitless units are more complex assemblies, which completely replace the well casing between the frost line and the ground surface. Review West Virginia Legislative Rule, 64CSR46, Water Well Design Standards for proper installation of pitless adapters and units.

What is a well cap?

A well cap is an approved manufactured cover of cast steel, aluminum, or PVC. It is fastened to the well casing with a rubber compression "O" ring or gasket between the sections. Both are incorporated to make a watertight or vector proof seal. Well caps are also vented with a brass or stainless mesh. A female threaded port is used to tie in and insert electrical cable. All well caps installed must meet state regulations.

What is a pressure tank?

Most water systems include a water storage container called a *pressure tank*. The pressure tank is usually located in the basement or a utility room, although some types of tanks may be buried underground. It is a good idea to have a faucet placed near the pressure tank for flushing the tank and collecting water samples for testing.

What is a check valve used for?

Check valves permit water flow only in one direction, and are required on all submersible pump installations. Their purpose is to prevent the water in the column above the pump and in the pressure tank from draining back into the well when the pump shuts off. They also prevent backspin, water hammer and upthrust inside the pump. Any of these three conditions, or a combination of them, can lead to pump or motor failure, plus shortened service life or operating problems in the system.

For additional information contact the:

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