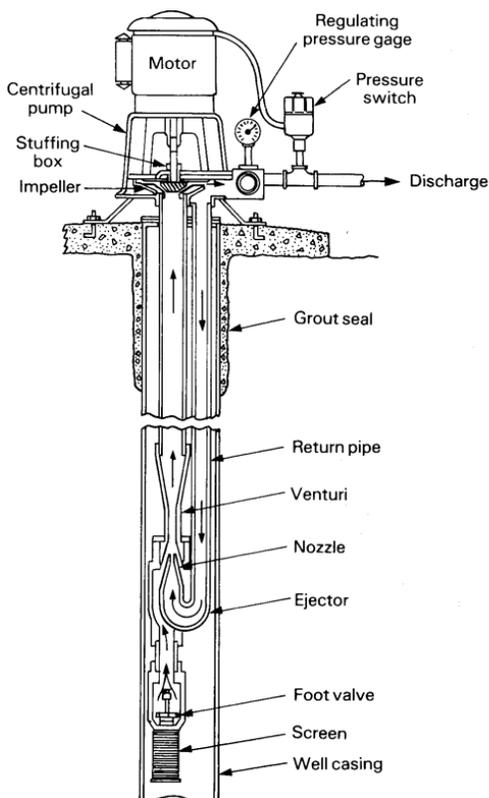


Is a Jet Pump or a Submersible pump more efficient at pumping water from a well?

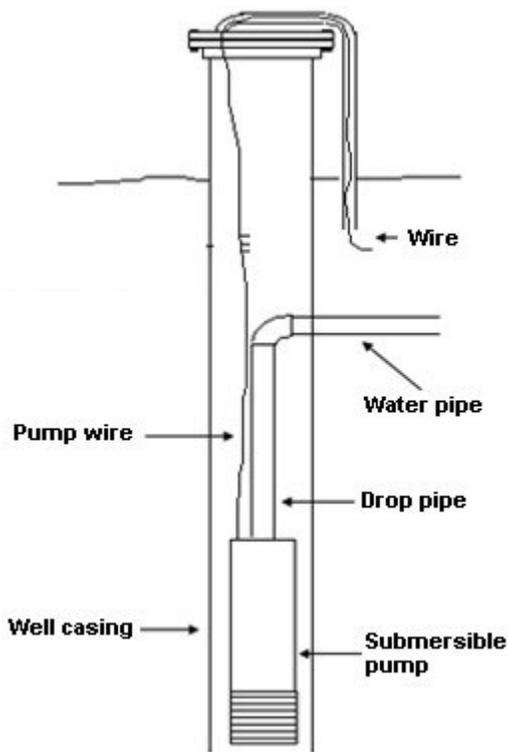
The key to this question lies in the difference between how high water can be sucked with a vacuum and how high water can be pushed under pressure. Imagine that you have a really long straw and you'd like to take a drink from your well. While you may not have the physical ability to take a drink from deep in your well, theoretically you should be able to suck water from about 33'. If you try to suck water from a depth greater than that, the weight of the water starts creating a vacuum of empty bubbles that prohibit water from flowing up your straw. In real life pumps can and do "suck" water out of wells, but this is usually limited to about 15-20 feet in real life because of the loss of efficiency most pumps experience when trying to "suck" water.

On the other hand, if you want to send water to the highest skyscraper/mountain there is no theoretical limit to the pressure you can generate to "push" the water. While your mouth may not be able to produce enough pressure to blow water up a straw that extends from the dead sea to Mt. Everest, the limitations of a vacuum do not apply. The limitations are in the strength of the materials in the pipes and pumps to contain the amount of pressure required to pump water from the dead sea (the lowest place on earth at 1388 feet below sea level) to the peak of Mt. Everest (29,029 ft above sea level)...about 13,000 PSI. There are high pressure pumps that make more pressure than this in special applications for water jet cutting or hydraulic applications.



Jet pumps creatively get around the 33' limitation by putting two pipes down the well and utilizing a venturi. A venturi creates a vacuum when fluid flows through it. So a jet pump pushes water down the well with the "drive" pipe which creates a vacuum as it passes through the venture way down below. This vacuum sucks some water from the well and the pushes it with the recirculated water back up to the top. Some water is stripped off and some is sent back down. This is extremely creative, but very energy intensive as several gallons of water can be recirculated for each gallon of water drawn from the well. Jet pumps have to have water in all these pipes in order for this process to work, hence the term priming the pump. A pipe (stinger) with a one way valve is usually attached to the very bottom of the jet assembly. This valve allows water to go into the jet assembly, but not back into the well. This foot valve helps the Jet pump system remain primed. If one of those multiple pipes or joints leak, well, they all have to come out and the leak found and repaired before the pump will work properly again. Jet pump installation is an engineering effort. The Jet pump must be properly chosen and the jet assembly properly sized with the correct

nozzle and venturi that matches well depth and static water level. The jet assembly with two pipes is sent down the well, which usually requires at least two or three people on deeper wells. Once installed. The jet pump must be primed and the recirculation control valve dialed in. The list of parts for a Jet pump include: pump, control valve, jet assembly, venture, nozzle, foot valve, drive pipe, stinger pipe and suction pipe. Jet pumps are installed less and less frequently and availability for the pumps and parts is getting further and further out because of their inherent disadvantages.



The modern submersible pump uses about half the amount of energy that a jet pump would to pump the same amount of water. It does this by hanging the pump and motor down in the well with one discharge pipe and a power cord. The pump doesn't have to suck or recirculate water, it doesn't require priming, it just gets to push it up out of the well. In most cases (hot water wells excluded) the water in the well keeps the motor nice and cool. Even if there is a small leak in the pipe down the well, it doesn't usually stop the pump from delivering water. Submersible pumps also offer the advantage of relative silence because the pump is many feet underground where you don't have to listen to it run. Submersible pump installations are much simpler and often cheaper than an equivalent Jet Pump installation because they only involve a few main components: Pump, Pipe, Checkvalve & Wire. While it does involve selecting the correct components, the selection process is much simpler than for a jet pump.