



# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH  
ENVIRONMENTAL HEALTH SECTION  
PRIVATE WELL PROGRAM

## Private Well Guidance for Determining Well Safe Yield

One of the least understood aspects of private well water drilling is that of determining a well's "yield". Yield is defined in Section 19-13-B51b (18) of the Connecticut Public Health Code (PHC) as "the quantity of water delivered per unit of time which may flow or be pumped continuously from the well". The definition is rather general as the yield of the well is determined by several factors. The Connecticut Well Drilling Code, Section 25-128-51, has no definition and only refers back to Section 19-13-B51 K (b) of the PHC, which outlines the testing procedure and total pump test time according to the well's withdrawal rate. This section states: "In the case of non-public water supply wells, i.e. private wells, with a required withdrawal rate of less than ten gallons per minute (gpm), the pumping period during the drilling and clearing may be included in the time of the yield test. The minimum length of such yield test shall be four hours for the well..." Some state codes, Massachusetts for example, require a 24-hour pump test for all private wells. This office would recommend a minimum of 18 hours especially for low yielding wells (less than 1.0 gpm).

The above referenced definition applies to all wells, but the yield testing requirements apply to new wells only. Homeowners should be aware that some health departments may have adopted more stringent testing requirements. Many wells, depending on the water quality of the aquifer(s), may experience a lessening yield over time. When a well's yield becomes reduced so that it cannot fulfill its function, the well may be rehabilitated by chemical treatment (superchlorination, acid rinsing, etc.) surging or jetting or a combination thereof. In extreme cases hydrofracturing of the well/borehole may be needed. Hydrofracturing refers to the application of high-pressure water at various depths in the well. This opens up water bearing fractures/fissures thereby increasing the well's yield.

Because most private wells usually have low withdrawal rates, (e.g. <10 gpm) they are generally not treated with the aforementioned methods, mostly because of the prohibited costs involved. Common practice when a private well is going dry is to drill deeper. This is usually a good idea because the storage capacity of the borehole increases, but the downside is that the well will require a larger pump with more horsepower as the head above the pump has been increased. Increasing the diameter of the well (6">8">10") will not necessarily increase its yield and is not the most effective way to increase well storage capacity. Remember there is only 1.5 gallons of water for each foot of pipe with a six-inch well casing.

Do not hire a water hauling company to fill your well with trucked in water. Doing this is like pouring water over a dry sponge. The trucked in water will flow out of the well/borehole into the empty fissures & cracks of the aquifer, leaving little water in the well itself.

Requirements for new private well development vary considerably from state to state and even



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from town to town. The testing period ranges from 1 to 24 hours. Low yielding aquifers normally require an extended 24-hour “stress” pump test of the aquifer. The writer knows of one town in Connecticut that required a long term pumping of a well to establish a stabilized yield before a building permit was issued. Some state and local agencies include the flushing of the well, to remove fines, cuttings, etc. in the pump test. This truncated test would barely rid the well of “fines” much less determine the actual yield of the well. The writer’s family business had a well drilled for condenser cooling and, initially, the well-pumped sand for the first 6 months of operation before it finally cleared. This can happen to many private wells.

As an individual purchasing an older home with an existing well there is one thing one can do, without the cost of removing the well pump, to check on the well’s present yield. Have your licensed plumber or well driller install a low capacity, 1-10 gallons per minute (gpm) water meter on the well’s discharge line and run the well to the ground’s surface (daylight) until the well’s discharge stabilizes (i.e. the well consistently produces the same amount of water over a given time). If the well discharge exceeds 10 gpm, one could go to the next larger capacity meter. But if you’re getting 10 plus gpm from the stabilized discharge, going to a larger meter is usually not necessary. The exception would be if you were looking for a higher well yield to meet the demands for pool filling or lawn irrigation. If you find that the well’s pumping capacity does not meet your domestic needs and you do not wish to go deepen the well or drill a new one, you can install more storage tank capacity in your basement (see the article regarding storage tanks in this series).

Standardized design criteria for potable private well design specify 75 gallons per day per capita. A typical 2-bedroom house with 4 persons averages 300 gallons per day for domestic water demand. Homes with larger families and more bedrooms use 2 persons per bedroom and the 75-gallon per day per person requirement.

Water storage tanks can either be atmospheric tanks, with a booster pump, or pressure tanks. Usually the pressure tanks available now have a diaphragm, disk or neoprene bladder that physically separates the pre-charged air from the water in the tank eliminating water logging of the tank, as was the case with older non-bladder tanks. Keep in mind that these pressure tanks have very little stored or useable water volume as compared to the entire tank volume and this little useable volume of stored water will cause “short-cycling” of your well pump’s motor that will reduce the pump’s life. The *minimum* well/booster pump run time should be at least two minutes. This alternate solution is quoted in Section 25-128-39 of the Connecticut Well Drilling Code, “Storage may be provided by using of combinations of hydro pneumatic (pressure) tanks and/or non-pressurized (atmospheric) tanks with booster pumps”.

Do not hesitate to use more above ground storage, if room allows, making sure each tank has a drain valve, because this water will be available to you during power outages while the borehole storage will not be available.

Should you have further questions please contact your local health department or Ray Jarema, PE or Cliff McClellan, RS at the state Private Well Program at the Connecticut Department of Public Health at 860-509-7296.

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