Water Conservation Information

Regarding water well pump selection

A critical function of the GCGCD groundwater management is conservation of groundwater and prevention of waste. The GCGCD water level monitoring program has recorded a steady groundwater level decline for the last 14 years. To minimize this decline and to provide a sustainable water supply for future generations, GCGCD is providing the following information on pump selection and water saving practices as a guide to the public.

Selecting the right submersible pump is important to provide the necessary water supply at the most efficient energy cost. The pump selection is based on the pump pressure required and the gallons per minute needed. The pressure in feet is the amount of lift from pumping water level (not where the pump is set) plus the pressure required to distribute the water to the point of use. After determining the system pressure and the use required, selection of the right manufacturers model is next. Models are designed for individual applications. The attached Gould's water technology curves are provided as a guide and do not represent a promotion of product by GCGCD. Note that the model type selection is important. Increasing horsepower does not automatically provide additional flow and may only increase energy cost and equipment wear. As an illustration compare a model 5GS15 (1 ½ HP) pump with a model 10GS10 (1 HP) pump. At 350 feet head the 5GS15 will pump approximately 8 GPM and 10GS10 will pump approximately 12 GPM. Using a larger size pressure tank can be an important consideration in increasing surge capacity to handle peak demand.

The following information taken from: Wellcare, information for you about sizing a well pump.

Determine Gallons Per Minute Required

A key to selecting the right size pump is to figure the gallons per minute of water required at peak periods. A pump should be selected to meet normal peak demand for the household, rather than average use. There are two common methods for sizing a residential pump system that give similar results:

- Residential Capacity Based on Fixture Count

The capacity of the pump system in gallons per minute should equal the number of fixtures in the home. This must take into account all use for the kitchen, bath, appliances, outside irrigation, a pool and special fixtures, such as a hot tub.

In this model, a modern home with two bathrooms (three outlets each), kitchen sink, dishwasher, washing machine, laundry tub and two outside hose outlets would require a capacity of 12 gallons per minute, based on the 12 fixtures or outlets.

- Residential Capacity Based on Peak Demand

A second model, using the same fixtures and plumbing as the previous example, calculates capacity based on a seven-minute peak demand. The peak time for household water use is normally in the morning, when the family rises, or in the evening, when all are home. Seven minutes is the average high water use timeframe for a shower or automatic washer.

To determine peak demand, read down the column in Table 1 under the number of bathrooms to the normal seven-minute peak demand total. Note this figure, which in a two-bathroom house is 98 gallons. Then read down the same column to the minimum-sized pump required to meet peak demand, which in a two-bathroom house is 14 gallons per minute.}

TABLE I, SEVEN-MINUTE PEAK DEMAND USAGE

OUTLETS	FLOWRATE GPM	TOTAL USAGE GALLONS	BATHROOMS IN HOME			
			1	1 1/2	2 - 2 1/2	3-4
Shower or Bath Tub	5	35	35	35	53	70
Lavatory	4	2	2	4	6	8
Toilet	4	5	5	10	15	20
Kitchen Sink	5	3	3	3	3	3
Automatic Washer	5	35		18	18	18
Dishwasher	2	14			3	3
Normal seven-minute *peak demand (gallons)			45	70	98	122
Minimum sized pump required to meet peak demand without supplemental supply			7 GPM (420 GPH)	10 GPM (600 GPH)	14 GPM (840 GPH)	17 GPM (1020 GPH)

Note: Values given are average and do not include higher or lower extremes

*Peak demand can occur several times during morning and evening hours.

Address Low Well Capacity

In the best and most economical water system, the needs of the household are less than the rate at which water can be drawn from the well. If the peak demand exceeds the maximum rate of water available, the pump must be sized within the well capacity and the peak demand reached through added storage capacity.

Usually a large-size pressure tank can perform this function. In fact, a larger water storage tank can prolong the life of your pump, as it reduces the need for the pump to cycle as often. Most wear and tear on the well pump occurs when it stops and starts.

Ensure Adequate Water Pressure

Water pressure is the final consideration in sizing the well pump. Pressure must be sufficient to force the water through the piping system to the highest outlet and to properly operate modern appliances, continuously and when other outlets are also in use. Most appliances, such as dishwashers and washing machines, require a pressure of at least 10 pounds per square inch (psi) at their inlet for proper operation. Lawn sprinklers usually require a minimum of 20 psi and sometimes up to 40 psi. The installation of water conditioning equipment, such as water softeners, results in a pressure drop in the system for different flow rates and must be considered in determining required pressure. If the piping system is old and the inside diameters of the pipes are reduced due to deposits of rust or lime, the friction loss through the system will be great.

"May we be responsible stewards of our natural resources."

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Additional Suggestions

- Utilization of water saving fixtures and practices. Recommendations can be found on the Texas Water Devolvement Board website www.twdb.texas.gov
- Utilization of soil moisture measurement devices for management of irrigation water use.
- Utilization of low profile irrigation systems to reduce atmospheric loss.
- Utilizations of storage tanks and water troughs instead of earthen stock tanks when using groundwater for livestock and wildlife.

GCGCD is providing this information to well owners and pump installers as a guide to provide for a conservation and energy efficient installation.