

# How to Size a Farm and Home Water System

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A farmstead water system should be able to supply the peak flow rate continuously for two hours. A home water system should be able to supply peak demand continuously for one hour. If the peak use rate exceeds the maximum well yield, provide intermediate storage.

If you want water for fire control, the system should be able to supply 20 gallons per minute at 60 pounds per square inch pressure.

For more details on computing system capacity, see *Private Water Systems* by Midwest Plan Service, available from the Agricultural Plan Service, Room 200, Agricultural Engineering Building, University of Missouri, Columbia, MO 65211.

## Home Flow Rates

Table 1 gives water use rates of several commonly used items. For an easy way to determine flow rates for a home, refer to Table 2. Add the home flow rate to the farmstead rate to determine total system capacity.

## Farm Flow Rates

Table 3 gives farm water requirements. Use this information to determine peak use in gallons per day, and then refer to Table 4 to read directly flow rate in gallons per minute.

Table 1. Home and outdoor living water requirements.

use	flow rate gal/min	total use gal
adult or child		50-100/day
baby		100/day
automatic washer	5	30- 50/load
non-automatic washer, hand tub	5	15- 45/load
dishwasher	2	7- 15/load
garbage disposer	3	4- 6/day
kitchen sink <sup>a</sup>	3	2- 4/use
shower or tub <sup>a</sup>	5	25- 60/use
toilet flush <sup>b</sup>	3	4- 7/use
bathroom lavatory	2	1- 2/use
water softener regeneration <sup>c</sup>	5	50-100/time
backwash filters <sup>c</sup>	10	100-200/backwashing
outside hose faucet	5	—
fire protection <sup>d</sup>	10	1200/2-hr period

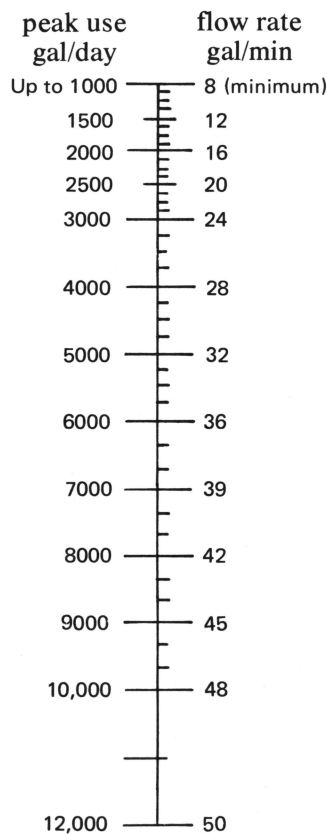
<sup>a</sup> Water flow restricting valves and shower heads can reduce flow and water use by up to 50%.  
<sup>b</sup> Ordinary toilet; low flow toilets will reduce water usage by 40%-90%.  
<sup>c</sup> Water hardness, softener size, etc. affect water use.  
<sup>d</sup> For limited fire fighting; at least 10 gal/min with a ¼ inch nozzle at 30 psi for 2 hr/day (1,200 gal). Preferred: 20 gal/min at 60 psi for 2 hr/day (2,400 gal).



**Table 2. Recommended flow rates for home water systems.**

no. of bedrooms	number of bathrooms in home			
	1	1½	2	3
	flow rate, gal/min			
2	6	8	10	—
3	8	10	12	—
4	10	12	14	16
5	—	13	15	17
6	—	—	16	18

**Table 4. Flow rates for livestock production.**



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**Table 3. Approximate farm water requirements.**

water use per animal		gal/day
milk cow		20-25
dry cow		10-15
calves (1-1½ gal/100 lb body weight)		6-10
swine, finishing		3- 5
nursery		1
sow and litter		8
gestating sow		6
beef animal		8-12
sheep		2
horse		12
100 chicken layers		9
100 turkeys		15

water use for milkhouses and parlors.		water volume
washing operation		
bulk tank		
automatic		50-60 gal/wash
manual		30-40 gal/wash
pipeline		
in parlor (volume increases for long lines in a large stanchion barn.)		75-125 gal/wash
pail milkers		30-40 gal/wash
miscellaneous equipment		30 gal/day
cow preparation		gal/wash/cow
automatic		1-4½
estimated average		2
manual		¼-½
parlor floor		40-75 gal/day
milkhouse floor		10-20 gal/day

water use flow rates		
Air temperature, size of animal, species, age, milk or egg production, type of ration, dry matter consumed, and other variables affect livestock water consumption.		
Average summer values are listed—use 60% for cool weather. Also use 60% of the tabulated livestock consumption for pond storage if the average year-around temperature is about 50° F.		
	minimum	preferred
automatic waterers		
cattle, hogs, or sheep (20-40 head per bowl)	½ gal/min	2 gal/min
poultry (100-150 layers)	¼	1
cleaning hose for milkhouse and dairy utensils	3	5
cleaning and manure removal hose for milking barn or hog house	5	10
outdoor hydrant for uses other than firefighting	3	5