

How to Size a Farm and Home Water System

A farmstead 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 the Private Water Systems Handbook by Midwest Plan Service, available online from Iowa State University at <https://www-mwps.sws.iastate.edu/catalog/water-septic-systems/private-water-systems-handbook> or at:

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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.

Table 1. Home and outdoor living water requirements.

Use	Flow rate (gallons/minute)	Total use (gallons)
Adult or child		50–100/day
Baby		100/day
Automatic washer	5.0	30–50/load
Non-automatic washer	5.0	15–45/load
Dishwasher	2.0	7–15/load
Garbage disposer	3.0	4–6/day
Kitchen sink ¹	3.0	2–4/use
Shower or tub ¹	5.0	25–60/use
Toilet flush ²	3.0	4–7/use
Bathroom lavatory	2.0	1–2/use
Water softener regeneration ³	5.0	50–100/time
Backwash filters ³	10.0	100–200/backwashing
Outside hose faucet	5.0	
Fire protection ⁴	10.0	1,200/2 hour period

¹Water flow restricting valves and shower heads can reduce flow and water use by up to 50 percent.

²Ordinary toilet; low-flow toilets will reduce water usage by 40 to 90 percent.

³Water hardness, softener size, etc., affect water use.

⁴For limited fire fighting; at least 10 gallons per minute with a 1/4-inch nozzle at 30 psi for 2 hours/day (1,200 gallons). Preferred: 20 gallons per minute at 60 psi for 2 hours/day (2,400 gallons).

Table 2. Recommended flow rates for home water systems.

Number of bedrooms	Number of bathrooms			
	1	1½	2	3
	Flow rate (gallons/minute)			
2	6	8	10	
3	8	10	12	
4	10	12	14	16
5		13	15	17
6			16	18

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Table 3. Approximate farm water requirements.

Water use per animal	Gallons/day
Milk cow	35 to 45
Dry cow	20 to 30
Calves (1 to 1½ gallon/100 pounds body weight)	6 to 10
Swine	
Finishing	3 to 5
Nursery	1
Sow and litter	8
Gestating sow	6
Beef animal	8 to 12
Sheep	2
Horse	12
100 chicken layers	9
100 turkeys	15

Water use for milk houses and parlors

Washing operation	Water volume
Bulk tank	
Automatic	50 to 60 gallons/wash
Manual	30 to 40 gallons/wash
Pipeline in parlor (volume increases for long lines in large stanchion barn)	75 to 125 gallons/wash
Pail milkers	30 to 40 gallons/wash
Miscellaneous equipment	30 gallons/day
Cow preparation	(Gallons/wash/cow)
Automatic	1 to 4½
Estimated average	2
Manual	¼ to ½
Parlor floor	40 to 75 gallons/day
Milk house floor	10 to 20 gallons/day

Water use flow rates*

	Average summer use (gallons per minute)	
	Minimum	Preferred
Automatic waterers		
Cattle, hogs or sheep (20 to 40 head per bowl)	½	2
Poultry (100 to 150 layers)	¼	1
Cleaning hose for milk house and dairy utensils	3	5
Cleaning and manure removal hose for milking barn or hog house	5	10
Outdoor hydrant for uses other than fire-fighting	3	5

*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 percent for cool weather. Also use 60 percent of the tabulated livestock consumption for pond storage if the average year-round temperature is about 50 degrees Fahrenheit.

Table 3 gives farm water requirements. Use this information to determine peak use in gallons per day, then refer to Table 4 to determine peak use and flow rates for livestock production provided in gallons per minute.

Table 4. Flow rates for livestock production.

Peak use (gallons/day)	Flow rate (gallons/minute)
Up to 1,000	8 (minimum)
1,500	12
2,000	16
2,500	20
3,000	24
4,000	28
5,000	32
6,000	36
7,000	39
8,000	42
9,000	45
10,000	48
12,000	50

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ALSO FROM MU EXTENSION PUBLICATIONS

- EQ378 *Selecting a Site for Livestock and Poultry Operations*
G1800 *Sources for Farm and Home Water Supply*
G6720 *Home Lawn Watering Guide*
WQ660 *An Action Program for Safe Drinking Water*

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