

Fresh Water Needs for Dairy Farms

By Dean E. Falk, Extension Dairy Specialist University of Idaho

Dairy cows and milking facilities require a reliable high quality water supply. Dairy production is changing with larger production units being planned and constructed. These dairy facilities require a water supply that can deliver high quality water to the cows at all times in sufficient amounts to meet both physiological and sanitation needs of the facility.

The data reported in the literature for water consumption for dairy facilities varies considerably. For example, in three different studies the water needs for lactating cow consumption, and milking center cleaning range between 40 to 50 gallons fresh water per cow per day. In these studies the free stall units were flushed with recycled lagoon water in all areas except the milk parlor and milk room. This concept reduces the amount of water that is introduced into the waste management system.

Texas data illustrates that water use on eleven dairy farms varied widely, depending on the type of manure removal system and other factors. The greatest variable was the use of sprinkler cow wash systems and/or flush systems versus manual manure removal. The total amount of fresh water used for sanitation and manure removal averaged 39.6 gallons per cow per day. The mean value for each farm ranged from 12.3 to 69.2 gallons per cow per day. The water used for cattle drinking water troughs on seven of the dairies studied averaged 28.7 ± 12.0 gallons per cow per day. Thus the Texas data average fresh water use per cow per day for sanitation and drinking was 68.3 gallons. Their data showed wide differences in water use for facilities that flushed or had cow sprinklers versus those that used manual cleanup. The average water use for milking parlors and milking pens without flush or cow sprinklers averaged 19.9 ± 14.0 gallons per cow per day. In contrast, milking parlors and holding pens with sprinkler cow washers used an average of 7.1 ± 17.7 gallons per cow per day.

Calculating Herd Requirements for Fresh Water

It is possible to estimate fresh water use on individual dairies, even with the wide variation reported in the literature. Estimates for total requirements can be developed for drinking water, wash pen sprinklers (if used), and milk house and parlor. Water needs can be estimated by completing Worksheet 1 (requires [f\do_be Acrobat](#)) with information found in Tables 1-4.

Drinking Water Needs

Drinking water needs can be determined by using the information found in Table 1 and Table 2. Table 1 shows a typical herd makeup assuming a uniform year around calving, 13 month calving interval, a 33% replacement rate (1/2 supplying a calf), 50% female calves and males sold at birth for a 100 lactating cow herd.

Water intakes for dairy cattle are influenced by several factors including dry matter intake, milk production, ambient temperature, and sodium intake. However, Table 2 provides a good estimate of water intake based upon size, milk production and temperature. The data from the water intake table when matched with the herd makeup table will estimate herd drinking water.

Wash Pen Needs

The wash pen can be a large user of fresh water on typical dairies. The amount used is dependent on line pressure, sprinkler orifice, number of sprinklers and minutes per day used. Table 3 shows the gallons per minute per sprinkler with different line pressure in pounds per square inch. The number of sprinklers in the wash pen, the minutes used per day and the nozzle discharge will determine water used in the wash pen.

Milk House and Parlor Needs

Milk house and parlor waste can be estimated from data found in Table 4.

Summary

Dairies under construction or expanding must evaluate their water needs to ensure that a water source is capable of supplying the production needs of the facility. The information provided in this article can aid in that estimation.

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Table 1: Typical Dairy Herd Composition

CATEGORY	NUMBER	% OF HERD	AVG. WEIGHT (LBS.)
Milking cows	83	83.1	400
Dry cows	17	17	1550
Total mature cows	100		
Heifers			
16 - 24 months	42	38	1050
13 - 15 months	13	12	800
9 - 12 months	19	17	600
5 - 8 months	19	17	400
3 - 4 months	9	8	250
0 - 2 months	9	8.1	50
Total replacements	111		

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Table 2: Dairy Cattle Water Intake

WEIGHT (LB)	MILK (LB)	40° & BELOW	60°	80°F
Lactating cows				
1400	20 ²	12.0	14.5	17.9 gal/day
	60 ²	22.0	26.1	24.7
	80 ²	27.0	31.9	38.7
	100 ²	32.0	37.7	45.7
Dry cows				
1400 ¹		9.7	12.0	16.2
1600 ¹		10.4	12.8	17.3
Heifers				
1200 ¹		8.7	10.8	14.5
800		6.3	7.9	10.6
400		3.7	4.6	6.1
200		2.0	2.5	3.3

¹Maintenance and pregnancy² Maintenance and milk production

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Table 3: Nozzle Discharge (gpm)

	1/8" dia.	9/64" dia.	5/32" dia.	11/64" dia.	3/16" dia.
40 psi	2.96	3.74	4.61	5.54	6.64
45 psi	3.13	3.99	4.91	5.91	7.03
50 psi	3.3	4.18	5.15	6.19	7.41
55 psi	3.46	4.37	5.39	6.48	7.77

Milk House and Parlor Needs

Milk house and parlor waste can be estimated from data found in Table 4.

Table 4: Volume of Milkhouse and Parlor Wastes

WASHING OPERATION	WATER VOLUME
Bulk Tank	
Automatic Wash	50 to 60 gal. per wash
Manual Wash	30 to 40 gal. per wash
Pipeline, in parlor	
Volume is higher for long stanchion barns)	75 to 125 gal. per wash
Pail Milkers	30 to 40 gal. per wash
Miscellaneous Equipment	30 gal. per day
Cow Prep Wash	
Automatic	1 to 4.5 gal. per wash per cow
Manual	0.25 to 0.5 gal. per wash per cow
Parlor Floor	40 to 75 gal. per day
Milkhouse floor	10 to 20 gal. per day
Holding Pen (sprinklers)	5 gpm per head (depending on nozzle size and pressure)

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