

AGRI-FACTS

Practical Information for Alberta's Agriculture Industry

Revised April 2009

Agdex 716(C01)

Farm Water Supply Requirements

All farms in Alberta require a safe and dependable supply of good water. To accomplish this goal requires some planning. Start by estimating the average daily water requirements and annual water requirements.

Water supply system

Table 1 and the attached worksheets can be used for estimating the amount of water used on a farm. The average daily water requirements are based on typical average outside or in-barn temperatures that occur throughout the year.

Although these average numbers are useful for estimating water use throughout the year, they cannot be used for designing the water supply or pumping system. For example, consider a beef feedlot on a hot summer day. Feeder cattle will drink approximately twice the amount shown in Table 1. For this reason, the water supply and pumping system need to be designed to meet these peak demand days.

Livestock and poultry water consumption

Livestock and poultry water consumption depend on a number of physiological and environmental conditions such as:

- type and size of animal or bird
- physiological state (lactating, pregnant or growing)
- activity level
- type of diet – dry hay, silage or lush pasture
- temperature – hot summer days above 25°C can sometimes double the water consumption of animals raised outside
- water quality – palatability and salt content

Water requirements

The attached worksheets can be used to calculate the farm water requirements. In addition to the daily water requirements, consider other water uses throughout the year such as:

- garden and yard watering
- greenhouse
- fire
- other uses

The above water requirements can then be added to the daily water requirements to estimate the total annual water requirements.

Water sources

The next step in the planning process is to ensure the water sources are sufficient to meet the average farm water requirements throughout the year as well as the peak demand days. Begin with an inventory of all the water sources including wells, dugouts, etc.

For well sources, list the number of wells, the well purpose, construction date(s), depth, casing size and well yield in gallons per minute plus any supply or quality problems.

For slow producing wells that produce sufficient water but not fast enough to meet peak water demands, consider adding a cistern. The addition of a cistern, with about one half to one day's water storage, will often eliminate the need for another well or wells. The water can then be re-pumped at a much faster rate to meet the peak demands. For more information on wells, refer to the manual *Water Wells That Last for Generations*. Copies of this manual can be obtained from the Alberta Agriculture and Rural

Development Publications Office in

*All farms in
Alberta require
a safe and
dependable
supply of good
water*

Edmonton by calling toll-free 1-800-292-5697. The manual can also be viewed online on the Alberta Agriculture and Rural Development website (www.agriculture.alberta.ca).

For dugouts, list the purpose, age, size and approximate water volume plus any problems with seepage, quality or inadequate runoff. To determine the dugout size required, add up the daily water requirements (on the attached worksheets) and multiply by the number of days used per year to obtain your annual water requirements.

For runoff filled dugouts in Alberta, the dugout size should contain a two or three year requirement. This level will prevent shortages during extended drought periods. In southern areas where dugouts can be filled from an irrigation canal, the dugout can be sized for a 250 to 365 day capacity.

Allowances should also be made for summer evaporation, seepage and ice losses in winter. Dugout evaporation ranges from 15 per cent in northern Alberta to 30 to 50 per cent in southern Alberta. Seepage losses are extremely variable. Dugouts used for winter water supplies will lose approximately 25 per cent to ice. Generally, deeper dugouts with steep slopes provide the best water quality and help minimize losses. For more information on farm dugouts, refer to Agdex 716 (B01) *Quality Farm Dugouts*.

For farms using both wells and dugouts as a farmstead water supply, consider using the well water for household use because it is typically of better quality. Dugouts can provide a good quality water source for livestock and irrigation purposes. Dugouts can also provide a good habitat for some types of fish; however, it is best to place them in a pond not used for other purposes.

Other planning considerations

No matter what water source is used, the following things must be done to protect your water supply:

- regularly test the water
- treatment, if necessary
- monitor supply
- protect the water source from contamination

For more information on farm water sources, systems, analysis and treatment, refer to Agdex series 716 A, B, C, and D or contact an Agricultural Water Specialist at 310-FARM (3276).

Prepared by:

Farm Water Supply Branch
Alberta Agriculture and Rural Development

Type of animal	Animal size	gpd	Type of animal	Animal size	gpd
Beef			Dairy		
Feeders*	550 lb.	4.0	Milking cow**	Holstein	30.0
	900 lb.	7.0	Dry cows/replacement heifers	Holstein	10.0
	1,250 lb.	10.0	Calves	to 550 lb.	3.0
Cows with calves**	1,300 lb.	12.0	Poultry		
Dry cows**	1,300 lb.	10.0	Broilers		0.035
Calves**	250 lb.	2.0	Roasters/pullets		0.040
Swine***			Layers		0.055
Farrow – finish		20/sow	Breeders		0.070
Farrow – late wean	50 lb.	6.5/sow	Turkey growers		0.130
Farrow – early wean	15 lb.	5.5/sow	Turkey heavies		0.160
Feeder	50 - 250 lb.	1.5/pig	Sheep/Goats		
Weaner	15 - 50 lb.	0.5/pig	Ewes/does		2.0
Horses, Bison, Mules			Milking ewes/does		3.0
Household use: people			Feeder lamb/kids		1.5
Elk, Donkeys			Deer, Llamas, Alpacas		
Ostriches					2.0

* For peak demand on hot summer days above 25°C – multiply gpd x 2

** For peak demand on hot summer days above 25°C – multiply gpd x 1.5

*** The numbers for all types of swine and milking dairy cows include wash water.

Work Sheet

Average daily and annual water requirement

The average daily and annual water requirement numbers can be used for estimating the amount of water used on a farm. The average daily water requirements are based on typical average outside or in-barn temperatures that occur through the year. These numbers, however, cannot be used for designing the water supplies and pumping capacity of a

farm water system. For example, consider a beef feedlot on a hot summer day. Feeder cattle will drink approximately twice the amounts shown in the table below. For this reason, the water supply and pumping systems need to be designed to meet these peak demands.

Household use									
People		x	60.0		gpd	=			gpd

Beef	Animal size	No. of animals							
Feeders*	550 lb.		x	4.0	gpd	=		gpd	feeders on silage
	900 lb.		x	7.0	gpd	=		gpd	feeders on silage
	1,250 lb.		x	10.0	gpd	=		gpd	feeders on silage
Cows with calves**	1,300 lb.		x	12.0	gpd	=		gpd	on pasture or hay
Dry cows**	1,300 lb.		x	10.0	gpd	=		gpd	on pasture or hay
Calves**	250 lb.		x	2.0	gpd	=		gpd	on pasture or hay

- * For peak demand on hot summer days above 25°C, multiply gpd x 2
- ** For peak demand on hot summer days above 25°C, multiply gpd x 1.5

Swine***	Animal size	No. of animals							
Farrow – finish			x	20.0	gpd	=			gpd
Farrow – late wean	50 lb.		x	6.5	gpd	=			gpd
Farrow – early wean	15 lb.		x	5.5	gpd	=			gpd
Feeder	50 - 250 lb.		x	1.5	gpd	=			gpd
Weaner	15 - 50 lb.		x	0.5	gpd	=			gpd

*** Includes wash water for all types of swine operations.

Dairy	Animal size	No. of animals							
Milking cow***	Holstein		x	30.0	gpd	=			gpd
Dry cows/replacement heifers	Holstein		x	10.0	gpd	=			gpd
Calves	to 550 lb.		x	3.0	gpd	=			gpd

*** Includes 3 gpd/cow for wash water.

Sub total _____ **gpd**

Poultry		No. of birds					
Broilers		x	0.035	gpd	=		gpd
Roasters/pullets		x	0.040	gpd	=		gpd
Layers		x	0.055	gpd	=		gpd
Breeders		x	0.070	gpd	=		gpd
Turkey growers		x	0.130	gpd	=		gpd
Turkey heavies		x	0.160	gpd	=		gpd

Sheep/Goats		No. of animals					
Ewes/does		x	2.0	gpd	=		gpd
Milking ewes/does		x	3.0	gpd	=		gpd

Horses, Bison, Mules		x	10.0	gpd	=		gpd
Elk, Donkeys		x	5.0	gpd	=		gpd
Deer, Llamas, Alpacas		x	2.0	gpd	=		gpd
Ostriches		x	1.0	gpd	=		gpd

Sub total _____ **gpd**
Total daily water requirements _____ **gpd**

Annual water requirements							
Irrigation of garden and yard in the summer (assume 6 in. application)							
Area in square feet		x	3 gal/sq. ft.	=			gal.
Chemical spraying (acres)			gal/acre	=			gal.
Greenhouse				=			gal.
Fire (1,200 gal./2 hour period)				=			gal.
Other uses				=			gal.
Total daily water requirements (from above)	_____ gpd	x	365 days	=			gal.
Total annual water requirements							gal.

* For information on water requirements for field crops, contact an irrigation specialist.

Note: These livestock and poultry water requirement numbers have been compiled with input from Alberta Agriculture and Rural Development staff. Please visit the *Quality Farm Dugouts* publication on the Alberta Agriculture and Rural Development website for more information on calculating the size of dugout required. The website is at: www.agriculture.alberta.ca

Calculator

Average daily and annual water requirements calculator

An online calculator is provided that uses the same default values shown in this factsheet. If you currently meter your water use and have water use rates that consistently differ from these default values, you may wish to use these values instead. In the case of livestock, the herd age distribution, feed systems (i.e. wet feed) or other specialized production management can increase or decrease your water use (see the online calculator at: www.agriculture.alberta.ca/water-requirements).

04/09/200