



**COLORADO STATE UNIVERSITY
EXTENSION**

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Calculating Water for Cattle

During the summer and especially on days of extreme heat, water becomes even more important for the health and nutrition of the cattle herd. Ensuring an appropriate amount of clean fresh water is imperative. Understanding the water requirements of cattle, the water availability and flow rate of sources to replenish water consumed will help a producer determine what is required to meet the needs of their herd.

Water intake is variable depending on multiple factors. Animal size, stage of production, ambient air temperature and feed type can affect the daily water needs. Growing cattle such as stocker cattle under 600 pounds could need a little as 10 gallons per day if the temperature stays in the low 80°s but can increase to over 15 gallons per day if temperatures increase into the upper 90°s¹. For bred or lactating cows, water intake is even greater. A minimum for these cattle is 20 gallons per day when high temperatures are above 90°.

A good rule of thumb for days with highs over 90° is to provide 2 gallons of water per 100 pounds of body weight². Using this rule, producers need to calculate their herds daily needs. For example, a pasture with 100 head of lactating cows weighing an average of 1200 pounds would need to provide 2,400 gallons of water per day.

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Table I. Approximate total daily water intake of beef cattle¹.

<i>Temperature in °F²</i>						
Weight	40°	50°	60°	70°	80°	90°
Lb.	Gallons	Gallons	Gallons	Gallons	Gallons	Gallons
<i>Growing Heifers, Steers, Bulls</i>						
400	4.0	4.3	5.0	5.8	6.7	9.5
600	5.3	5.8	6.6	7.8	8.9	12.7
600	6.3	6.8	7.9	9.2	10.6	15.0
<i>Finishing Cattle</i>						
600	6.0	6.5	7.4	8.7	10.0	14.3
800	7.3	7.9	9.1	10.7	12.3	17.4
1,000	8.7	9.4	10.8	12.6	14.5	20.6
<i>Wintering Beef Cows³</i>						
900	6.7	7.2	8.3	9.7		
1,100	6.0	6.5	7.4	8.7		
<i>Lactating Cows⁴</i>						
900	11.4	12.6	14.5	16.9	17.9	18.2
<i>Mature Bulls</i>						
1,400	8.0	8.6	9.9	11.7	13.4	19.0
1,600+	8.7	9.4	10.8	12.6	14.5	20.6

¹1996 National Research Council Nutrient requirements of Beef Cattle, Seventh Revised Edition, 1996. Table derived from an article by C. F. Winchester and M. J. Morris, Vol 15, No 3, Journal of Animal Science, August 1956.

²Water intake is a function of dry matter intake and ambient temperature. Water intake is constant up to 40°F.

³Dry matter intake influences water intake. Heavier cows are assumed to be in greater body condition and require less dry matter and, therefore, less water.

⁴Cows larger than 900 pounds are included in this recommendation.

Credit: ¹Water Requirements for Beef Cattle. University of Nebraska – Lincoln Extension. NebGuide G2060.

To determine if a pasture has enough water available, finding the capacity of the stock tanks in the pasture can be done with some quick math. Start by finding the volume of the tank. The formula for a round tank is: $\pi (3.14) \times \text{tank diameter squared} \div 4 \times \text{water depth} = \text{volume (in cubic feet)}$. Using a 12 foot diameter round tank that is 2 feet deep as an example, we can plug in the appropriate numbers: $3.14 \times 12^2 \div 4 \times 2 = 226.08 \text{ cubic feet}$. Each cubic foot of volume can hold 7.48 gallons of water. To finish up the calculations, multiply the volume by 7.48 gallons. Continuing with the example round tank, it could hold 1,691.08 gallons of water ($226.08 \text{ cubic feet} \times 7.48 \text{ gallons per cubic foot} = 1691.08 \text{ gallons}$).

Round Livestock Tank Size and Water Capacity (Approximations for 24 inch depth)			
Tank Size (Diameter)	Capacity (Gallons)	Tank Size (Diameter)	Capacity (Gallons)
6 ft.	395	12 ft.	1690
8 ft.	718	15 ft.	2640
9 ft.	920	18 ft.	3810
10 ft.	1000	21 ft.	5175
11 ft.	1400	24 ft.	6750

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Typical cattle behavior has cattle coming to drink from water sources several times per day. They will not drink their full daily intake in one trip to water but could intake 2 gallons to as much as 5 gallons in a single trip to water. It is important to remember that nursing calves need access to water too. Cows normally drink first and lower the tank water level, thus it is necessary to provide enough water in a tank to ensure that calves can reach water, especially on warm summer days.

Considering these behaviors, the refill rate of a tank can be just as important as size. If all 100 cows came to the tank and drank 5 gallons each, 500 gallons would be removed and need to be replaced. Flow rate of water sources is measured in gallons per minute. A typical well for a home site can produce a flow rate of 3 to 6 gallons per minute. In remote areas, a windmill, or solar livestock well pump may provide 2 to 4 gallons per minute. Knowing the flow rate of the water source allows a producer to calculate how quickly water can be replaced in a tank.

Resources

- ¹Rasby, R. & Walz, T. (2011). Water requirements for beef cattle. University of Nebraska – Lincoln Extension. NebGuide G2060. Lincoln, Nebraska. <https://extensionpublications.unl.edu/assets/pdf/g2060.pdf>
- ²Dyer, T.G. (2017) Water requirements and quality issues for cattle. University of Georgia Extension. Special Bulletin 56. Athens, Georgia. https://secure.caes.uga.edu/extension/publications/files/pdf/SB%2056_5.PDF

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