

Getting a Water Meter to Work for You

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It is not uncommon to read articles in popular farm magazines that suggest that dairy cows should be consuming 20-30 gallons of water per day. Some farmers and farm advisors have expressed concern when they measure average water consumption in the range of 12-20 gallons.

The Wisconsin's Stray Voltage Analysis Team (SVAT) monitored 22 herds during investigations in 1994. The recorded water intake varied from 11 to 31 gallons per cow per day with an average of 21 gallons. Is it possible for water consumption measurements of 11 gallons per cow per day to be normal when 20-30 gallons is commonly seen in print? How can you know if your cows are drinking enough? What is enough?

How much a cow or a herd drinks depends on;

- 1) What animals are being monitored by the meter (milk cows, dry cows, heifers, steers),
- 2) Availability of non-metered water (such as feed moisture, ponds, extra outside water tanks),
- 3) Dry matter intake (DMI roughly depends on the animal weight of those being monitored),
DMI is measured as pounds per day as percent age of body weight.
- 4) Low temperature of the day, and
- 5) Sodium intake.

Conclusions about water intake based simply on gallons per animal in comparison to "printed normals" can be misleading. It is also misleading to directly compare total gallons consumed during one period against total gallons consumed during a different period. To decide if the cows are drinking enough, conclusions based on measured water intakes need to be compared to the calculated needs. The example data sheet (at the end of this article) contains the details that should be recorded at the same time that daily, weekly, or monthly water meter readings are taken. It is important that these details are recorded in order to make sense of the meter readings that are being recorded.

Without such information, using a water meter is

likely to result in inconclusive information, and unnecessary concerns about the level of water consumption.

Example:

In one particular dairy barn a water meter had been installed for many years. The average water consumption of 13-15 gallons per cow per day was considered a problem. In response to the perceived problem numerous things were tried. Four separate wells had been dug. Several water treatment devices and procedures were used. Thousands of dollars were invested in an effort to eliminate a perceived connection between low water intake and stray voltage. Ultimately water intake was found not to be the problem. The misinterpretation of the average consumption among had wrongly focused attention on water for many years.

The most powerful influence on water intake is dry matter intake, while changes in sodium intake have a relatively less significant influence. Water consumption is highly driven by dry matter intake, environmental temperature, and milk production. However, increasing water consumption by decreasing the distance to water sources, improving water pressure, decreasing competition, and improving quality has been shown to be beneficial, and should not be ignored.

Comparing water intake from a water cup verse a bucket, tub or trough can be misleading. Water consumption from a tub or water trough will be more than the amount consumed from a water cup. Monitoring or comparing water intake by various methods is likely to produce misleading information. This confusion will result in unwarranted concerns that water consumption is lower than normal.

Calculating Water Intake Needs

A currently accepted formula for calculating water intake is as follows:

$$\text{Water intake} = [0.9 \times \text{Milk yield} + 1.58 \times \text{DMI} + 0.11 \times \text{Na} + 2.64 \times (\text{Temp}/1.8 - 17.778) + 35.25] / 8$$

Where,

Water intake = Gallons of water per animal per day

Milk yield = Pounds of milk per animal per day
 DMI = Average dry matter intake as percentage of body weight
 Na = Sodium intake (grams) per animal per day
 Temp. = Low temperature of the day in Fahrenheit

Consider the following real example of a herd investigated this year:

- * Water for 61 animals was metered, consisting of;
 - 40 milking cows (avg. Wt. = 1,350 lb.),
 - 6 dry cows (avg. Wt. = 1,450 lb.), and
 - 15 springing heifers (avg. Wt. = 800 lb.).
- * Milk production (Milk Yield) averaged 40 pounds per cow per day.
- * Average dry matter intake (DMI) as a percentage of body weight was calculated to be;
 - Milking cows = 2.7%,
 - Dry cows = 1.6%, and
 - Springing heifers = 1.4%.
- * Sodium intake (Na) was measured to be around 17 grams.
- * The low temperature (Temp) of the day was 44 degrees F.
- * Water from feed was calculated to be 1.3 gallons per animal per day.

Water Intake Calculations

	Ave. Wt. (lb.)	Milk Yield (lb./cow/day)	DMI (% wt.)	Water Intake (gal./animal/day)
6/61 Dry cows	1450	0	23.2	11.4 **
40/61 Milking cows	1350	40	36.5	18.5
15/61 Springing heifers	800	0	11.2	9.1
Weighted Average			28.9	15.5
	Measured Average			13.6
	Water from Feed			1.3
	Measured Total			14.9
	Calculated Average			15.5
	Difference			-0.6

** Sample Calculation: $Water\ intake = [0.9 \times 0 + 1.58 \times 23.2 + 0.11 \times 17 + 2.64 \times (44/1.8 - 17.778) + 35.25] / 8$
 " " = 11.4 gal./animal/day

In the above example, water intake was metered at a straight average of 13.6 gallons per animal per day. After making an adjustment for water from the feed, the measured intake was not significantly different from the calculated water needs. On this farm, dry matter intake was depressed due to forage and ration management. Thus milk production was depressed as a result of poor nutrition. Also sodium intake was quite low. While poor performance in the herd was reflected in a water intake that was lower than desired, intake was not significantly lower than the calculated water needs of the herd.

This example demonstrates;

- 1) The importance of calculating water needs de-

pending on the type of animals being measured (dry, milking, mature cows, heifers), and

- 2) The relative importance of the factors that influence water intake.

Factors Influencing Water Intake

As can be seen by the formula, the intake of water changes as follows:

- 1.58 pounds of water per 1 pound of dry matter intake (DMI)
- 1.47 pounds of water per 1° F (Temp.)
- 0.90 pounds of water per 1 pound of milk (Milk yield)
- 0.11 pounds of water per 1 gram of sodium (Na)

Using a Water Meter

Water meters are usually available from a local municipal water utility for under \$100. Advice on the size of meter, and specific installation instructions (requirements for leveling, sand filter needs, calibration, etc.) can be obtained from the meter provider. The meters should also be occasionally calibrated after the initial installation.

It is important to realize that meter readings alone are of little to no value. The meter readings need to be compared to an estimated water intake need. An installation in a location that measures only the water used by the cows being milked is the most valuable. Daily records of water consumption should also contain the number and type of animals, estimate of additional sources of water, feed intake, environmental temperature, and milk production records.

A very crude estimate of calculated water needs can be done as follows:

Note: Estimate assumes ration at around 50% dry matter and cows are Holsteins:

- 0.55 For Salt (Avg. of 40 grams per animal per day)
- + _____ 0.113 X (Average milk yield of cows being metered)
- + _____ 6.42 X (The number of milking cows divided by total animals)
- + _____ 4.63 X (The number of dry cows divided by total animal)
- + _____ 1.07 X (The number of heifers (Avg. of 450 lb.) divided by total animals)
- + _____ Temperature :
- If average of 40 degrees = 5.9
- If average of 50 degrees = 7.7
- If average of 60 degrees = 9.5
- If average of 70 degrees = 11.4
- _____ Sum of the above

Sum will give a crude estimate of water needs in gallons/animal/day.

