# CALVING EASE

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# How to Measure

The three rules for measuring anything are:

Know why you are measuring.
Use a tool appropriate for the job.
Use the tool correctly.

**Rule 1. Know why you are measuring.**

In general, the purpose tells us the level of precision needed. If we match the level of precision to the job, we can be reliable and efficient.

Everyone that raises calves has measured water. For example, we add sterile water to reconstitute an antibiotic. The directions say, "Dilute with 104.5 cc sterile water." We pull 60 cc into a syringe, add to antibiotic bottle, pull 44.5 ml more, and add that, too.

When we treat a calf with this reconstituted antibiotic, it is important that we were within one-half a cc when adding water. Consider the consequences. What if we added an extra twenty or thirty cc's of water and then gave the prescribed dose?

In contrast, think about mixing five gallons of milk replacer for ten calves. This does require measuring. But, we are much less exact, certainly not to the nearest one cc of water. When we feed calves with these twenty quarts of reconstituted milk replacer, it is important that we were within a pint of water. Consider the consequences if we added an extra gallon or more of water and then fed just two quarts.

We also measure water as water. For example, we fill water pails for calves. We may fill ten-quart pails 1/4, 1/2, 3/4, or full. For the purpose of tracking water consumption, plus or minus a quart is plenty accurate.

Reliability is defined as having a percentage of the measurements falling within defined limits. For example, when reconstituting an antibiotic with 104.5 cc of sterile water, we might define our goal as 95 percent of the time we want the actual amount added to fall within 104 and 105 cc. We need a high level of precision because of the risk involved in making an error. This is efficient use of our time.

But, the risk due to measurement error is much less for mixing milk replacer. Our goal when reconstituting milk replacer in five-gallon batches might be 90 percent of the time we want the actual amount mixed to come to within plus or minus one pint. We know our feeding errors easily may come to plus or minus one cup for each calf. Therefore, measuring our mix more accurately is not efficient use of our time.

Rule 2. Use a tool appropriate for the job

As in the antibiotic example needing 104.5 cc, when attempting to measure sterile water to the nearest 1/2 cc, none of us would use a quart measuring cup. Naturally, we would use a syringe marked off at least in one cc lines.

*If we need to add three fluid ounces of soap, acid or bleach to a water solution, we could use a pump that delivers one ounce for each full stroke. If we are off by 1/2 ounce, that's close enough. The pump is quick and accurate enough for the job.*

But, how about mixing half a pail of milk replacer in a five-gallon bucket? How are we going to estimate "one-half" in this case? Will we mix five two-quart batches in a two-quart nursing bottle and dump them into the bucket? Will we run a gallon of water in the bottom, dump in the powder, blend, and then just run in enough more water to be about half full?

This is a case of a "missing tool." We need a measuring tool that we can place in the five-gallon pail that will show one-half full. How about using a 30" piece of PVC pipe capped at both ends? It can be calibrated using an accurate two-quart measure and marked.

Rule 3. Use the tool correctly.

Gallon jug pumps, at first glance, seem foolproof. Push down; one ounce of liquid is delivered. But, that assumes the spout is pointed in the right place. That assumes that the plunger is pushed all the way down. It's best to go over the procedure with a person that has this job responsibility.

*All calf raisers have used syringes, right? Wrong! Rather than have a modified live vaccine administered incorrectly, it is best to review syringe use. "This is the 2 cc mark."*

In contrast to liquid measure, we often estimate live body weight of calves using a heart girth weight tape. In the first place, the tape must go around the calf at the proper place. And, the amount of tension needs to be "not too tight, not too loose." Since the tape estimates weight within about ten percent of a scale weight, the correct use is not too critical.

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