

# Mixing Tips for Milk Replacer

- **Follow the manufacturer's instructions for mixing temperature, amount of powder and volume of water.**
- **Have a written recipe [X number of calves = Y weight of powder and Z litres of water].**
- **Use scales to measure milk replacer powder.**
- **Calibrate containers rather than estimating water volume.**
- **Make a calibrated measuring stick for mixing.**
- **Use a thermometer to get the right temperature mix.**

Let's start out our conversation about this topic by reminding ourselves that calves thrive on consistency. One element of this consistent care is their milk replacer. How do we arrange our work to produce high quality **consistent** milk replacer every feed, every day?

## **Follow the manufacturer's instructions**

Each manufacturer has options for both ingredients and processes when making milk replacer. Depending on the choices made, an individual milk replacer will have relatively unique mixing requirements to achieve the best quality reconstituted product.

**The most important of these recommendations is the mixing temperature for the powder.** Recommendations may be as low as 43°C and as high as 65°C. Using excessively cold water may result in incomplete mixing and uneven dispersion of nutrients. Using excessively hot water most often results in uneven mixing of the fat. At extremely high temperatures the denaturing of whey protein could affect digestibility of the product. Always follow the manufacturer's recommendations.

**Mixing instructions.** Unfortunately, some manufacturers have confusing mixing instructions about how much water and powder to use. For example, let's say your feeding program is set up for the dry matter in milk replacer at 12.5%. That delivers 500grams in 2 litres.

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On one hand, some instructions correctly tell you to mix the powder with some water and after blending add more water to arrive at the desired volume. This works well – you add 125g powder to 1 litre of water, mix and add more water to make 2 litres. You end up with 2 litres with about 12.5% solids.

On the other hand, incorrect directions tell you to add the powder to the final volume of water.

For example, add 125g of powder to 2 litres of water. Instead of ending up with two litres of 12.5 percent solids you get more than two litres of an 11.6% mix [116g powder per liter rather than 125g].

If you are mixing milk replacer for one calf at a time using either mixing method delivers 125g of powder since the calf drinks the entire batch anyway.

However, if you are mixing in bulk using incorrect instructions, then feeding by volume (e.g., two-litre feeding) the calves get 116g rather than the 125g of powder that was the intended amount (about 7% less). And, if more than one person mixes milk replacer there is a good chance that they may not use the same mixing methods which results in inconsistent feeding.

## **Make Mixing Easy**

- **Have a written recipe.**

This is simple and easy. For so many calves, use so much powder and add water to “x” level. Many people have a whiteboard where mixing amounts for the next feed are noted at the end of each feeding, along with the ear tag numbers of calves that didn’t eat right and need special attention.

- **Use weigh scales to measure milk replacer powder.**

I am guilty of not using weigh scales back in the 1990’s. However, the past 17 years of farm visits has convinced me that when you are mixing milk

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replacer for more than one calf at a time there is no easier way to measure milk replacer powder than with a scale.

1. Put the bucket on the scale.
2. Scoop in powder.
3. Stop when the needle hits the right place.
4. Add the powder to the bucket of water for mixing. Using a scale has the added benefit of being much more accurate than estimating powder by volume (using a cup or scoop).

- **Calibrate containers rather than guessing at water volume.**

If you use a tank, take time one day to fill it with water in graduated known quantities – mark the tank at each step. Choose steps that experience shows make sense on your operation.

- **Make a calibrated measuring stick for mixing.**

If you use large containers (e.g., 50, 100 litres) find a piece of 4cm PVC pipe [1.5 -2”] that is about 30cm longer than the container is tall. Glue a cap on each end. Put it into the container. Now, add water in graduated known quantities – put a temporary mark the pipe at each step (for example, in 4 or 8L steps).

In order to get permanent marks on the pipe at each level use a file to roughen the PVC pipe surface slightly at each temporary mark so that an ear-tag pen will make a permanent black line. Now, if you have a 50 L container but only need 35L of mix you can mix your powder-water slurry and fill to the 35L line on your homemade calibration stick. Remember to wash the stick after each use.

I often had to make up small batches of milk replacer for sick calves and such. I made a calibrated PVC stick for a 20L pail calibrated by 4-litre stages. Even if I wasn't doing the job I knew that anyone could run water into a bucket up to the desired level on the stick without too much guessing.

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- **Use a thermometer to get the right temperature mix.**

If you have a temperature gauge on your mixer tap, that's great. If you don't, and you use a hose or milker tubing from the parlor to transfer water from your mixer tap, try inserting a rapid read thermometer into this line at a 30° angle. That way at least you start with the right temperature water.



- **Use a thermometer to check the final mixed product**

Especially in cold weather avoid using your hands to estimate temperature – they are notoriously inaccurate due to the environmental chill factor. Remember during cold weather to start with your mix 2 or 3 degrees warmer than in the summer.