



TMR MIXING INSTRUCTIONS

Total mixed ration (TMR) equipment has allowed beef and dairy producers to increase productivity by creating diets that more closely meet the needs of livestock. In the dairy industry, research has shown an increase in milk production of up to 10 pounds per cow per day when ingredients were provided in a TMR compared to being fed separately. This represents a significant increase in profitability. However, formulating and mixing a TMR takes skill. Type of mixer, ingredient type, mixing procedure, and employee training all influence the end result of a TMR.

Type Of Mixer

Type of mixer influences order in which ingredients should be added. Manufacturers of each type have recommended guidelines that should be followed.

The following is a list of the recommendations of the 3 most common types of mixers.

Vertical auger mixer —

Vertical single auger mixers rely on gravity to return feed to the bottom of the mixer. Silage or hay should be added early to the mix — usually first or second. The poorer the forage quality, the earlier it should be added. If forage is added last, it will tend to float like an ice cube on water. If long-stem hay is added, mix 3 or 4 minutes to cut the core of the bale. Continue to run the mixer while loading other ingredients. Mix and cut for 3 to 4 minutes after the last ingredient is added.

Reel mixer —

Liquid feeds should be added first, followed by small quantity ingredients. The mixer should be operated at slow speed. Mix for 3

or 4 minutes after the last ingredient has been added.

Auger mixer with 4 horizontal augers —

Start mixing with the large quantity ingredients, followed by small quantity ingredients. Add chopped hay.

Run the mixer intermittently while loading. Mix for 2 to 8 minutes after all ingredients are added.

Ingredient Type

Many different feeds can be mixed, but each type has its own mixing characteristics. Long-stem grasses, uncured hays, and baleage tend to be difficult to mix. Certain types of TMR mixers are much better at handling these types of ingredients, while other mixers recommend that these types of ingredients be processed prior to being added to the mix.

Dry ingredients such as grains, proteins, and minerals can act as lubricants to help with the mixing process, whereas wet feeds such as haylage, baleage, liquid molasses, and water can actually cause binding. Careful consideration should be used in determining the proper sequence of ingredients. Sequence will vary depending on type of mixer and type of ingredients. Experimenting with sequence order will help ensure a properly mixed ration.

Mixing Procedure

Variation between mixes is probably the most common error that occurs when making a TMR. Stored forages can change in dry matter content. If adjustments are not made on a frequent basis, ration variation could be great. Forages stored in a bunker or pit silo could

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vary greatly in dry matter content, especially after a rain. A "bucket load" of forage that has been rained on would weigh substantially more than one that has not. Thus, if previous mixes have been taking approximately "X" buckets, adding the same number of buckets of forage might be a more accurate approach to ensure the same amount of dry matter is obtained rather than simply relying on weight. This approach should in no way replace the frequent testing of forages for dry matter content. This can be done in a microwave or using one of several commercial moisture testers available.

Another way to eliminate load-to-load variation is by making a weekly grain mix or premix of the dry ingredients. This eliminates adding small amounts of several ingredients by replacing them with a large amount of one grain mix, thus improving accuracy. This can also reduce chances of overmixing the TMR and further reducing particle size of the forage.

A common error that occurs on many dairies is overmixing the TMR. Overmixing can reduce particle size of the forages and therefore reduce the amount of effective fiber in the ration. Today, mixers are designed to mix ingredients as fast as they can be added. Typical mix time should be a total of 4 to 12 minutes with 2 to 4 minutes mixing after adding the last ingredient. If the mixer is allowed to run while ingredients are being added, steps to reduce travel time from feed to mixer and from mixing area to feed bunk should be implemented. This can be done by keeping the ingredients centrally located and by having a loader big enough for the job.

Using a particle separator box to measure particle size at different stages of the mixing and feed-out process can help ensure mixes are not being overmixed. Sampling TMR at 3

or 4 different locations along the bunk will help to determine if mixing order and time need to be adjusted.

Employee Training

Since feed costs make up the majority of the variable expenses on a dairy, extra emphasis should be taken to ensure that employees responsible for feeding have been properly trained. Standard operating procedures should be established for all employees to follow. Included in these procedures should be:

- Proper mixing instructions that take into account possible seasonal changes in forages and feed ingredients.
- Bunk monitoring for location of feed consumed. This may give possible indications of improper mixing resulting in higher amounts of concentrates to be fed at the beginning or end of a load.
- Daily records that include amount of each ingredient added to mix, total amount of TMR fed, number of animals fed, and amount of TMR refused from previous feeding.
- Sifting refused TMR through a particle separator to determine how much sorting and what portion of the ration is being refused. This allows for a more accurate ration to be formulated.
- Adding water or wet ingredients to a dry TMR mix may help reduce sorting by cows, as well as increase palatability.
- Periodically checking accuracy of scales and regularly scheduled maintenance should be routine for all employees who operate mixer.