



# Milling and Grain est. 1891

November - December 2014

## Outloading from Silos



**Volume 125 - Number 6**

Site Monitoring and Maintenance  
Ingredients for a great milling technology school  
Changing Perspectives: HGCA conference

**YOUR GLOBAL PARTNER FOR ALL THINGS MILLING, STORAGE AND HANDLING**

[millingandgrain.com](http://millingandgrain.com)

[perendale.com](http://perendale.com)

Perendale  
Publishers Ltd 







# Rotary batch mixers

by Steve Knauth, Marketing Manager, Munson Machinery Co Inc

**A**DM Alliance Nutrition, Inc. is a leading manufacturer and distributor of vitamin and trace mineral pre-mixes, ingredients and food additives used in manufacturing pet food products. In addition, about 10 percent of the company's output is mixes for bovine and swine feed.

"We run about 1100 pre-mixes from 400 different powdered ingredients largely for pet food producers," notes Alliance Nutrition Location Manager Kyle Taylor. The ingredient list is vast—zinc sulphate, zinc oxide, manganese, L-phenonine, riboflavin, lysine, assorted vitamins and minerals, and a host of other nutritional compounds to name a few.

"The mixers we use to produce our blends are critical to the success of our business," adds Mr. Taylor.

Three of the company's mixers are Munson Rotary Batch machines that are over 30 years old and run 24/7.

## Versatile Mixers Prevent Separation

"The rotary batch mixers have lasted a long time, process high volumes, and are very reliable," says Mr. Taylor. "Their motors are a lot smaller than the ones in our paddle mixers, so they are very energy-efficient. They also clean up quicker because they discharge completely with little or no product heel. This is important because of the many fast changeovers for different customers we need to make each day," says Mr. Taylor. Once a unit discharges, workers stop the machine, lock the drum and physically get inside to sweep out residues. "It's pretty much a dry process. Sometimes we use limestone, but no cleansers," he adds.

Mr Taylor says he prepares each batch to keep the particle size and bulk density of his raw materials as uniform as possible to get the best mix for each product run. But sometimes this is not possible. Notwithstanding, even if particle sizes are significantly different and densities are as disparate as nine to 38.8 kg/cubic feet, the rotary batch mixers produce uniform blends.

"The units are versatile. In the past we used them to do batches of peas and carrots with virtually no separation, and when we switched them over to pet food powders

we got the same even results without having to make any engineering changes."

The 700 THS-110 model is the smallest of the plant's three rotary batch mixers with 3.1 cu m capacity. The other two are rated at 5.1 cu m. The 700 THS-110 and 700 TS-180 machines can mix 2727 kg per batch, while the 700 THC-180 can mix 5454 kg because of its more powerful motor and gearbox.

Considering their longevity, maintenance has been light. The machines are extremely robust, and do not have a lot of moving parts. Because of their solid steel frames, alignment is precise. When parts do wear out, they are still readily available.

"We've replaced the main sprockets, chains, rollers and drive motors twice in the last 25 years," notes Mr Taylor, "and we replace the seals about once a year on average."

Unlike the company's agitated mixers, the rotary batch mixers do not heat the material, preventing delicate and expensive additives, such as vitamins with time-release coatings, from breaking down.

Individual product campaigns or runs on the rotary batch mixers average between 0.9 and 2.7 tonnes, but can go as high as 27 tonnes for bulk loads, which are packed into pneumatic trucks, or hopper bottoms as they're also called, that customers provide. Smaller batches are packed either in 454 kg to 1000 kg bulk bags or standard bags in the 9-27 kg range. The company has three bagging lines and four bulk bag lines. At an average six minutes per batch, ADM completes about 60 batches per day for an average weekly output of 843 tonnes.

## Quality Approaches Food Grade

Powder flow at the ADM facility is largely gravity fed over four floors, and assisted by "drags," the name for paddles hooked to U-shaped conveyor chains. At the top level, workers feed the special ingredient hand-adds into the mixers. One floor below are the mixers, along with 17 bulk bins for 12 different bulk ingredients that automatically batch into the three units. Surge tanks, which are rectangular steel holding tanks sized to accommodate one entire load from the mixers, are located on the second floor. These in turn feed the bulk loaders, bulk bags, and bag lines on the ground floor.

Metal detectors, which use either ceramic or rare earth magnets, are in place at strategic locations. "If material coming in has gone through a grinding process for instance, calcium carbonate which starts as large rocks—we want to be sure we can catch a loose bolt, broken blade, or other item from equipment failure, which is rare, but nothing we want to take chances with," explains Mr Taylor.

Mixer studies are commonplace at ADM. Their purpose is to evaluate homogeneity of batches to ensure that each customer gets the same quality of product time after time.

Small samples of the batch are taken from various areas of the mixer (around 15 typically), and the number of particles of each ingredient is counted. The number of counted particles in each sample is compared to the average (mean) of the batch recipe. A lower coefficient of variation (CV) number is preferred indicating the samples are close to the desired theoretical perfectly homogenous blend, and variation is small throughout the batch. That is, homogeneity is consistent throughout the batch. Typically, any CV below 5 is considered a high quality blend.

For example, in two typical studies of the rotary batch mixers at ADM, the CV numbers came out below 5 – 4.01, 4.18, 4.30, 1.49 – indicating high batch quality and homogeneity.

"Assays are an important part of the quality control program we've developed together with our customers over the years," explains Mr. Taylor.

While the ADM plant is considered "feed-grade," high-tech quality and other controls are moving it toward food-grade. "Companies involved in companion animal feed are going toward that way of doing things," he says.

The rotary batch machines at ADM have been mixing heavy volumes for decades, and will likely continue for decades to come. "Sooner or later, like everything else, they will be up for replacement," admits Mr. Taylor, "but considering how robust and well designed they are, an overhaul if and when needed could make them last another 20 years."