# TABLETS & CAPSULES

FORMULATION PRODUCTION PACKAGING

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INDUSTRY application

# Rotary batch mixer boosts throughput at Arizona Nutritional

*The 300-cubic-foot capacity rotary batch mixer achieves blend uniformity in 3 to 5 minutes, cleans quickly, and saves energy.*

Arizona Nutritional Supplements (ANS), a contract manufacturer based in Chandler, AZ, operates two facilities—one dedicated to powders (Chilton) and the other to tablets, hard capsules, and softgels (Beck). Packaging includes bottles, blisters, packets, and stick packs.

"Due to high growth in nutritional supplements, our powder business has increased by over 500 percent in the past few years," said Jeff Neal, ANS plant manager and director of operations. "That's indicative of what's happening worldwide, and why we needed more mixing and blending capacity."

At first, ANS blended powders using five V-type blenders and a 125-cubic-foot ribbon blender. But that equipment couldn't meet increases in demand, so the company relocated the bulk-products portion of its operation to the Chilton facility. There it, installed a larger ribbon blender and a rotary batch mixer, both supplied by Munson Machinery, Utica, NY.

ANS serves more than 200 customers worldwide, requiring numerous daily product changeovers. It was critical that the new mixing and blending equipment achieve uniform blends of materials having diverse particle sizes and flow characteristics across a wide range of batch sizes. Equally important was preventing cross-contamination and minimizing downtime between runs, while complying with FDA and GMP standards.

## Ribbon and rotary synergy

The new ribbon blender has a 500-cubic-foot capacity, and the rotary batch mixer's capacity is 300 cubic feet. In both machines, the product contact surfaces are stainless steel with large weld radii that are ground and polished to a mirror finish. "They're designed for easy, fast wash-downs," Neal said.

Two types of mixer-blenders were specified because each has its own advantages. The ribbon blender, with a stationary U-shaped trough and ribbon-shaped blades, is "ideally suited to products requiring high shear, such as whey, soy, protein, and greens," Neal said. "But high shear also creates friction that causes sugar- and fructose-based powders, such as drink mixes, to heat and form clumps. The rotary mixer, on the other hand, can handle these."

Even though the ribbon blender's capacity exceeds that of the rotary batch mixer, its overall output (approximately 49.5 tons per day) is nearly the same, because the ribbon blender has longer blending and cleaning cycles. The ribbon blender, for instance, has a shaft penetrating both sidewalls of the mixing chamber through seals that contact material and require cleaning. Plus, at the end of each production run, a "heel" of material at the bottom of the trough must be removed prior to cleaning. Nonetheless, "thanks to tight tolerances between ribbon blades and the blender trough, product heel is minimal," Neal said.

"The ribbon blender is less expensive than the rotary mixer and gives us good return on the batch sizes we run," Neal said. However, the rotary batch mixer operates and cleans faster and uses much less energy: 40 horsepower to rotate the drum versus 150 horsepower to drive the ribbon blender.

"Where a ribbon blender may take 20 minutes to achieve batch uniformity, the rotary unit takes only 3 to 5 minutes," Neal said. The shorter cycles are the result of four machine characteristics: 1) rapid gravity feed-

*The sliding intake chute of the rotary batch mixer gives workers quick access to the drum's interior for cleaning and inspection.*

ing of ingredients through the hopper; 2) gentle but rapid four-way mixing action (tumble, turn, cut, and fold); 3) the ability to mix continuously during loading and discharge; and, 4) complete discharge after mixing in as little as 20 seconds per 4,400-pound batch.

Each batch discharges completely so that no product heel remains, allowing the unit to be immediately washed and sanitized using two internal nozzles that spray-clean the drum.

"In my view, rotary is the way of the future, and why we're transitioning more of our customers in that direction," Neal said. "But some still insist on ribbon blenders for their products, so we offer both."

### Aiming for pharma standards

Following discharge from the Munson units, finished powder is auger-fed into 1,330-pound-capacity bulk bags and transported to the filling area. There, the bags are lifted, and finished product is gravity-fed into hoppers that supply the various packaging lines, which include one stick line, three pouch lines, and three jar lines, one of which is dedicated to small runs.

To help prevent cross-contamination and allergens from spreading between products, the mixing-blending and packaging departments are kept separate, and each suite maintains negative air pressure. "We have adopted the same mindset as the pharmaceutical industry," Neal said. Finished sizes range up to 0.7 ounce for stick packs, 2.1 to 3.5 ounces for stand-up pouches, and from 3.5 ounces to 5 pounds for jars.

Neal said he's pleased with the performance of the rotary batch mixer and the ribbon blender. He's also pleased that more people are opting for things like healthy protein, whey, soy, vegetable, and other shakes for breakfast instead of pancakes or bacon and eggs. "It's good for them, and for us." *T&C*

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