

Case history

Flour additive supplier fortifies service with a rotary drum mixer

A supplier expands services to include rice encapsulation.

Research Products Company (RPC), Salina, Kan., supplies enrichments and maturing and bleaching agents to millers for wheat and pasta flour production. The enrichments include vitamins and minerals that are blended to government standards. The supplier provides products and services globally.

RPC receives additives in 50-pound bags and 20- to 50-kilogram fiber drums. They mix the additives to form 10 standard blends, and they custom blend to order. The additive blends are packaged in 50-pound boxes or other sizes to meet customers' needs.

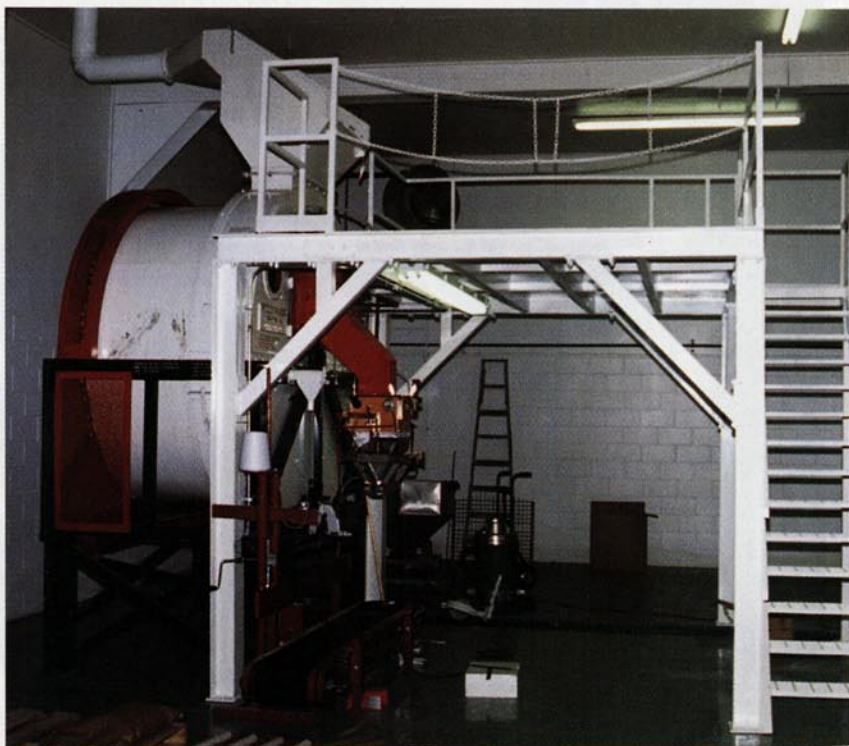
Besides selling additives, the supplier consigns chlorinating and material-feeding equipment to additive buyers.

RPC also maintains the equipment as a service to their customers.

Supplier expands services, needs mixer

Like most companies, RPC is always on the lookout for new opportunities and had considered expanding their business into a related market — the rice industry. Coating rice with enrichments seemed like a natural fit with existing services, so RPC recently decided to take the step and diversify.

The supplier had several types of existing blenders for mixing flour additives, but these didn't appear appropriate for coating rice, according to technical director Steve Schorn. "Our other blenders are really made



At RPC, this horizontal rotary drum mixer coats rice with enrichments.

for powdered ingredients,” he says. “For this particular application, we needed a mixer that would provide a gentler, yet thorough blending and coating action.”

RPC considered a continuous rotary drum mixer to coat rice with enrichments, but a continuous process would require a larger footprint than a batch process. As well, RPC was more comfortable with batch-style processing than continuous processing. “There was some concern about getting a uniform coating with a continuous process,” Schorn says. “We saw advantages in quality control with a batch process.”

RPC locates mixer, runs tests

In May 1993, while attending the Powder & Bulk Solids Exhibition in Chicago, an RPC production techni-

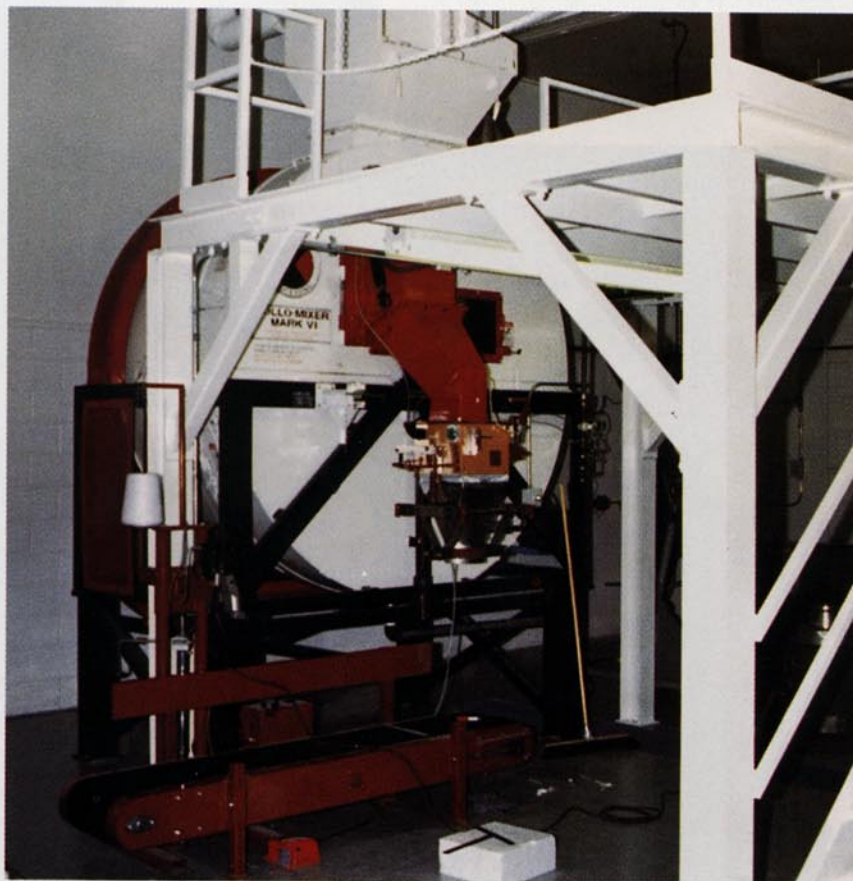
cian found a manufacturer that made a rotary drum batch mixer with potential for rice coating. That summer, four RPC representatives visited the mixer manufacturer’s plant to run rice coating tests.

Besides testing the mixer’s performance, the team was sent to develop a proprietary rice-encapsulation method that would meet rice industry standards. RPC’s top goals were to blend the fragile rice without degrading it and to develop a coating that wouldn’t rinse away. After running several tests and asking the mixer manufacturer for some custom modifications, RPC developed the encapsulation method they wanted.

Mixer is successful

The tests proved the mixer worked as hoped. The rice and enrichments

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The mixer has an integral packager for filling 50-pound bags.

were uniformly blended without clumping and the rice was thoroughly coated. Upon discharge, no enrichments were left in the mixer, and no rice was left uncoated.

In December that year, RPC installed the Rollo-Mixer Mark VI horizontal rotary drum mixer. The mixer consists of a stainless steel rotating drum supported by two pillow block bearings. The bearings are supported by a steel frame that sits on a steel support base. The mixer has a bag dump station on a platform that can support pallets of product.

The mixer drum in this application has an 88-inch diameter. Overall mixer and platform dimensions are 14 feet 11 inches high, 8 feet wide, and 6 feet deep.

During each drum revolution, the mixer's arrangement of flights divides the batch 25 times into continuous streams of particles that randomly flow into and through each other. The mixer rotates at about 3 rpm and achieves uniform mixing typically in six to nine revolutions (2 to 3 minutes).

"The mixer rotates slowly, and it has a folding action that makes a falling 'curtain' of blended product," Schorn says. The curtain exposes the particles' surface area so a liquid binder can be sprayed onto it, creating a uniform coating.

The Mark VI series mixer has no acute angles or pockets to create

hangup points or hamper complete discharge. For spray applications, the unit can be manufactured with up to 12 nozzles. The mixer has a variable-frequency drive motor so the operator can change drum speeds to suit varying requirements for blending, coating, or packaging. The mixer has a viewing window and several access doors.

"It blends in a short time period despite the slow drum rotation. The folding action gives us a good blend."

The 4,000-pound-capacity unit at RPC was equipped with a packager that automatically fills the coated rice into 50-pound bags. The packager has an oval-shaped filler outlet around which the operator places a bag. The operator steps on a foot pedal to trigger an air-activated clamp that seals the bag around the outlet. The operator then trips a hand lever to open a clamshell gate, allowing a preset amount of product to fill the bag. When the weight is reached, a counterweight system trips the gate to close. The mixer continues blending while product is discharged to bags so uniformity is maintained throughout the batch. An operator can draw a random product sample, via a manual sampler, while the unit is blending.

The mixer installation was fairly uneventful per Schorn's recollection. "I don't remember any hitches with the installation, except that we decided to change where the mixer was placed," he says. "It was delivered, we got it powered, and it ran fine."

Mixer allows supplier to diversify

Schorn says the mixer's chief benefit is that the gentle, rolling action doesn't break up the rice. "And it blends in a short time period despite the slow drum rotation," he says. "The folding action inside the mixer gives us a good blend. It works quite well for this coating application. We couldn't have done it with our existing blenders, and we save the space we would have needed for a continuous blender." The integral packager also saves space by eliminating the need for auxiliary packaging equipment.

The rotary batch mixer enabled RPC to expand their business into the rice industry as planned. The new rice coating process complements RPC's enrichment supply services and diversifies their operations. "We regularly receive requests to create new, specialized ingredient premixes from customers around the world," Schorn says. "Beyond coating rice, the mixer helps meet these diverse requests."

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