

Powder and Bulk Engineering



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**TIPS FOR CONTINUOUS
FLUID-BED DRYER DESIGN**

**POWDER PUMPS AND WET
AGGLOMERATION**

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Case history | Mixer going strong nearly 40 years later

A glass container manufacturer installed a mixer in 1980 that's still in operation today.

Anchor Glass Container Corp. is headquartered in Tampa, FL, and is one of the largest manufacturers of glass bottles and jars for the food and beverage industry in the US. The company operates production facilities in New York, Florida, Georgia, Indiana, Minnesota, and Oklahoma.

"Glass containers have been manufactured at the Elmira, NY, location since 1912 when Thatcher Glass Manufacturing operated the factory," says Michael Gesek, engineering services manager. "The location has two furnaces, one for amber glass and one for flint glass — the industry term for clear glass."

In 1980, the company installed a 50-cubic-foot-capacity GB-50 rotary glass batch mixer. The batch mixer supports the flint glass line that produces bottles and jars made of clear sodium silicate glass. Today, that mixer still blends the ingredients that produce more than a million glass containers per day. During the mixer's 38 years of operation, that adds up to about 14 trillion containers produced and 4 million tons of material mixed.

Designed for an abrasive application

Manufactured by Munson Machinery Co., a mixing and blending equipment supplier based in Utica, NY, the rotary glass batch mixer was installed on a flint glass production line. The mixer was rebuilt in 2011 when the line was updated.

The mixer has a horizontal vessel that rotates on external trunnion rings at both ends, eliminating the need for internal shafts or bearings that would be unable to withstand constant contact with highly abrasive materials. Internal vanes, or 'flights,' create a four-way tumble-turn-cut-fold mixing action as the drum rotates. "The action of the internal mixing flights is critical for mixing efficiency and blending

of ingredients rapidly and thoroughly," Gesek says.

Ingredients are loaded through a stationary inlet at one end of the machine and discharged through a stationary outlet at the opposite end. When the discharge plug gate valve is opened, the flights also serve as a mechanism to lift the material toward and through the discharge port. The drum rotates until discharge is complete, preventing separation or stratification of ingredients that have disparate sizes, shapes, and bulk densities. "One hundred percent discharge means no carryover from one batch to the next," Gesek says, "and we've been very happy with that." The mixer keeps rotating while the ingredients are loaded and discharged, which Gesek cites as an advantage. "We like that it doesn't stop between batches. We run five or six batches — 45 minutes to an hour each — then shut off for half an hour, depending on production requirements," Gesek says. "If we had to stop the mixer between batches, much more power would be required."



The batch mixer has helped Anchor Glass produce roughly 14 trillion containers since the mixer was installed in 1980.

Creating the right blend for glass production

The glass batch mixer is fortified with abrasion-resistant steel on all material contact surfaces, specifically for the glass industry. "Glass is made out of sand, among other ingredients," Gesek says. "All

the raw materials are brought by truck or rail and stored in silos. Scales on the bottom of the silos measure the specific ingredient weights to make the formula for the batch. The components are sent one at a time into the mixer.”

The mixer processes the same combination of materials — several different components, plus recycled glass. The flint glass line usually runs batches with 15 to 20 percent recycled glass.

All the components are dry and gravity-fed from the silos, assisted by vibratory feeders. A scale measuring each component signals the PLC to discharge the material onto a belt conveyor, which empties into a chute feeding the mixer inlet. After the ingredients are loaded, mixing takes only 90 seconds. The discharge gate opens and the batch empties into a bucket elevator, which transfers the batch onto a belt conveyor which, in



To prolong the batch mixer’s service life, Anchor Glass performs scheduled maintenance to replace the equipment’s limited wear parts.

turn, loads the material into holding bins ready for the furnace. The bins can hold a total of more than 40 tons of blended batches and each batch weighs about 2 tons. The glass batch mixer’s daily throughput ranges from 270 to 370 tons, depending on demand.

“One hundred percent discharge means no carryover from one batch to the next,” Gesek says, “and we’ve been very happy with that.”

Prolonging service life with maintenance

Since the mixer always runs the same mixture and each component is dry, cleaning is unnecessary. Anchor Glass has developed a preventive maintenance program to minimize unexpected downtime, which has helped keep the

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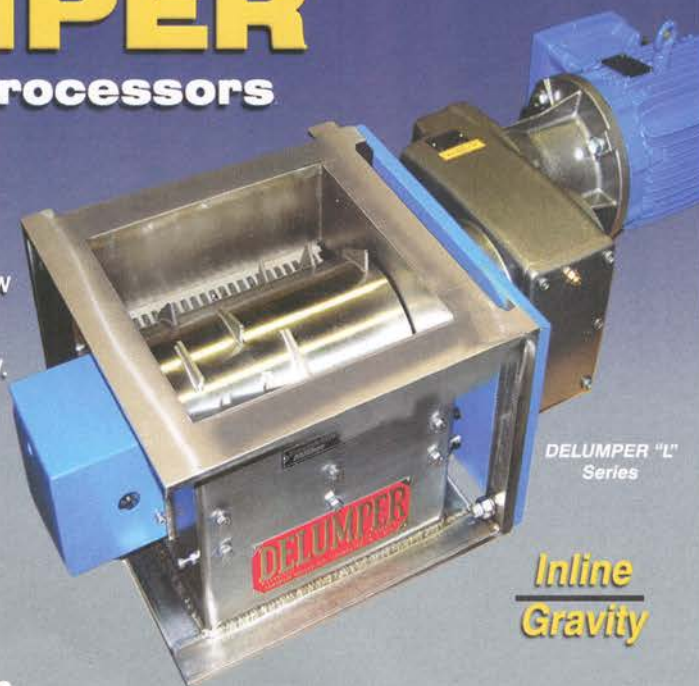
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mixer on the job all these years. "We change the inlet and outlet seals annually, and we change the trunnion rings and rollers every couple of years," Gesek says. Anchor also replaces the drive chain (which stretches over time) and the small sprocket semiannually. Some components last longer. The large sprocket is replaced every 10 years, the discharge gate assembly is replaced every 3 to 5 years, and the mixing flights lasted for 20 years despite the abrasiveness of the glass batches.

The glass batch mixer performed its job for 30 years before it was time for a replacement drum, which was accomplished quickly onsite in 2011. The Anchor Glass maintenance team worked with the supplier on the rebuild. "It took two days, and we ran the mixer at the end of the second day," Gesek says.

Anchor Glass made one modification to the system by installing an inverter drive so the drum rotation could start up slowly, reducing stress on the mixer drive system. If the need arises, the company could customize the system with inlet or discharge modifications to connect the mixer to new equipment, load cells for precise control of batch sizes, or a variable-speed controller.

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