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MIXING AND BLENDING

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Case history

Perfecting the art of tea

A tea importer uses a rotary batch mixer to increase product consistency.

Tea is perhaps the most popular and versatile drink worldwide. Hot, cold, black, green, or Oolong, tea can have a wide range of flavors unlike any other drink. To obtain this variety, tea manufacturers must blend different leaves to reach a balance between sweet and bitter flavors.

To ensure those flavors don't vary from batch to batch of the same product, however, companies must ensure a high-quality blend. Henry P. Thomson (HPT), Peapack, N.J., one of the largest tea importers in the US, has struggled with this issue since the company's founding in 1912. "If we receive 400 sacks of an African tea," says John Smith, HPT's vice president and managing director, "the tea may be lighter or darker in color or vary in quality due to seasonal variations from sack to sack. Yet, the customer expects blends that have no variation in quality or flavor from batch to batch."

Looking for a consistent brew

Most tea blends consist of four to six different kinds of tea. In the past, HPT outsourced its blending and packaging to a logistics company in New Orleans. However, after the devastation of Hurricane Katrina in 2005, HPT moved its blending, packaging, and distribution services to a warehouse in Augusta, Ga. At the new location, HPT first installed a ribbon blender but soon found that the blender's heavy action and high shear damaged the tea. Next, the company purchased a custom-built mixer, but due to design and construction shortcomings, the mixer failed to reduce costs or protect the tea from damage.

HPT then turned to Munson Machinery, Utica, N.Y., a supplier of mixers and blenders. The supplier recommended a rotary batch mixer to gently and accurately create HPT's tea blends. "Everyone we've talked to in the tea industry says this is the mixer of choice for its gentle mixing and other features," says HPT president Eugene Amici.

The stainless steel rotary batch mixer uses a gravity-driven mixing process in which internal mixing flights and lifters create gentle four-way mixing action — tumble, turn, cut, and fold — to produce a 100 percent uniform

After passing through a vibratory screener, the tea is conveyed to the rotary batch mixer.

batch in 1 to 3 minutes. The unit has a 140-cubic-foot capacity and mixes continuously as tea is loaded through the stationary inlet. The mixing paddles create a fluid bed, and the continuous rotation throughout the entire blending cycle assures that all material remains in motion, preventing segregation in batches of varying ingredient bulk densities. Internal flights then lift and direct the blended product to the discharge gate, evacuating the rotating mixing drum, which is free of dead spots.

"The forward section of the previous mixer had to be tilted upward to promote evacuation from the discharge gate," Smith says. "The new mixer remains level and discharges fully, which eliminates product waste and provides rapid cleanout."

The previous machine also had a topside shaft that bore a large amount of weight. The new mixer is supported by two external trunnion rings riding on heavy-duty roller assemblies, eliminating the need for an internal shaft with bearings and seals that could potentially contaminate the product and prevent thorough cleaning. "The new mixer occupies half the amount of space required by the previous mixer," Amici says. "It's also much more energy efficient."

The tea arrives at HPT's warehouse preprocessed in 90- to 140-pound sacks and is then screened using a vibratory screener to remove any oversized objects. The tea is fed onto a conveyor outfitted with magnets to remove any metallic particles and conveyed into the mixer. After mixing, the blended tea is conveyed to a packaging station where a storage vessel holds one batch. While that batch is being filled into either 900- to 2,300-pound bulk bags or 105-pound sacks, the next batch is being mixed.

Efficient, consistent quality

HPT's previous mixer processed a maximum of 1,800 pounds in each batch, but the new rotary batch mixer can blend between 1,600 and 2,600 pounds per batch. "The mixer can comfortably mix our daily output of 40,000 pounds per day and can push to 50,000 pounds per day, if needed,"

The rotary batch mixer blends between 1,600 and 2,600 pounds per batch and runs 24 hours per day, 7 days per week.

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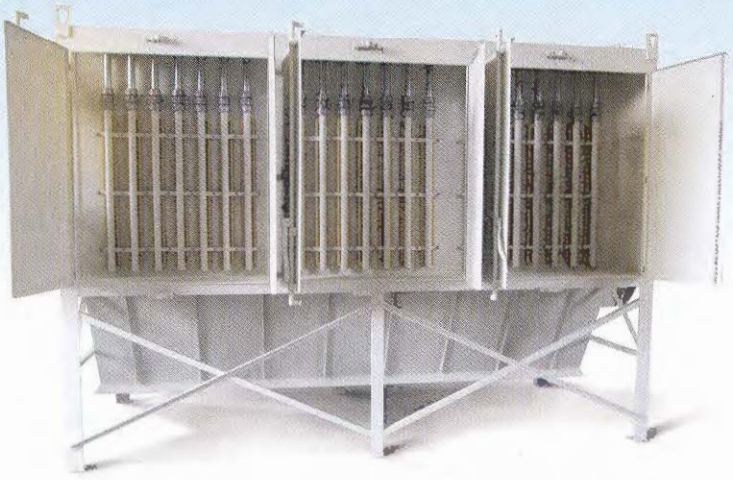

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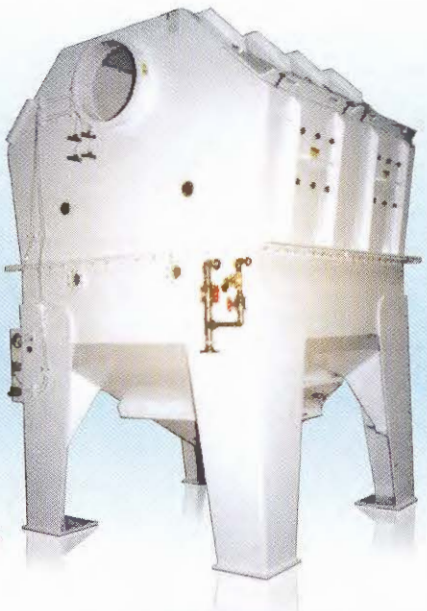

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Internal flights lift and direct the blended tea to the mixer's discharge gate.

Smith says. "We have it running all day, every day."

The rotary batch mixer's thorough blending helps HPT ensure a consistent product despite inconsistences in the tea from bag to bag. "To customers both large and small, our blending quality stands as one of HPT's core values," Amici says. **PBE**

Note: Find more information on this topic in articles listed under "Mixing and blending" in *Powder and Bulk Engineering*'s article index in the December 2015 issue or the Article Archive on *PBE*'s website, www.powderbulk.com. (All articles listed in the archive are available for free download to registered users.)

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