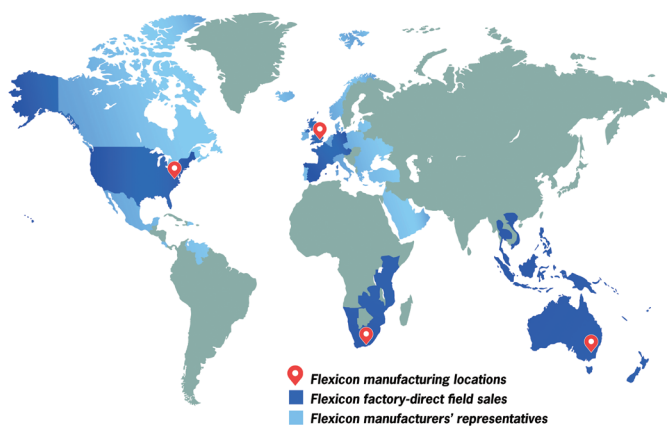




Twin bulk bag weigh batch dischargers with flexible screw conveyor systems feed sugar to a total of six ginger juice cookers selectively by weight, doubling capacity over previous manual methods.

Drink Mix Capacity Up 100%, Labour Down 70% with Bulk Bag Weigh Batch Discharging

II-1096



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SUKOHARJO, CENTRAL JAVA — Singabera produces natural ginger drink mixes and other Indonesian specialties from locally sourced ingredients, and ships them to buyers in Australia, Singapore, Hong Kong, China, Japan and North America.

“We are committed to creating the highest quality products derived from natural plants while managing our environmental footprint,” says Managing Director Michael Na.

“At the old factory, we added coconut and cane sugar from 25 kg (55 lb) bags, and everything was done by hand, including transporting and weighing the sugar and cutting the bags open one by one,” says Mr. Na. “That was a lot of work.”

Foreign objects entering the process was another concern. “The U.S. is our biggest market, and the standards are very strict. Any concern about quality is unacceptable,” Mr. Na says. “We needed to do something differently to have fewer people at the operation and to ensure consistency.”

To meet growing demand and raise quality standards, Singabera built a new factory and installed twin BULK-OUT® bulk bag weigh batch dischargers, each feeding parallel lines of three flexible screw conveyors, from Flexicon (Singapore) Pte.

The automated system weighs and delivers fine sugar to six juice cookers at high rates while containing dust and improving safety.

System handles bulk bags and handheld bags

The twin bulk bag discharging and conveying lines are positioned side-by-side and parallel to one another, each supplying sugar to three cookers on a 2 m (6.5 ft) high mezzanine.

Each model BFC discharger is mounted on load cells and equipped with a cantilevered I-beam, hoist and trolley that lifts and positions a 1 tonne (2,200 lb) bulk bag into the discharger frame without the need for a forklift. A worker pulls the outlet spout through a 380 mm (15 in.) diameter iris valve, which closes around the spout, preventing material flow. The spout is then untied and the valve opened slowly, preventing uncontrolled bursts of material and dust from entering the 400 L (14 cu ft) floor hopper.

To promote evacuation of sugar from bulk bags, FLOW-FLEXER™ bag activators raise and lower opposite bottom edges of the bag with increasingly longer strokes as the bag lightens, eventually raising the bag bottom into a steep ‘V’ shape.

The hoppers include a bag dump hood for manually adding sugar from 25 kg (55 lb) bags, providing Singabera the flexibility to use material from



Operator attaches bulk bag to Z-Clip™ strap holders of the bag lifting frame.



A cantilevered I-beam, hoist and trolley load a bulk bag into each discharger frame without need of a forklift.

bags of multiple sizes. “Most factories in Indonesia still use the smaller bags,” Mr. Na explains, “and sometimes we have to use them because of supply shortages.”

Discharging smaller bags at floor level into the manual bag dumping station means that workers no longer need to carry the bags up ladders or stairs to empty the contents into the cooker. This not only reduces the risk of injury from a repetitive and potentially hazardous manual process, it also reduces the time to achieve the desired batch weights when using smaller bags. A rigid screen keeps foreign objects and packaging material out of the hopper and supports the bag to ease the strain on workers.

Conveying in multiple directions, selectively by weight

The floor hopper for each station charges an inclined 7.5 m (24.6 ft) long flexible screw conveyor that either feeds the first juice cooker or the charging adapter of a horizontally-oriented 4.5 m (15 ft) flexible screw conveyor. The horizontal conveyor can, in turn, feed the second juice cooker or the charging adapter of another horizontally-oriented 4.5 m (15 ft) long flexible screw conveyor that feeds the third juice cooker.

The sugar exiting the inclined conveyor passes through a short length of downspouting into a pneumatically-actuated slide gate valve which either opens to deposit the sugar into the cooker, or closes to move the sugar through the horizontal conveyor to the next discharge point. The closed slide gate also reduces the effects of the cooker’s heat and steam on the sugar which could otherwise agglomerate and cause the convey line to shut down.

Each conveyor’s stainless steel outer tube encloses a flexible steel spiral that is driven beyond the point of discharge, preventing material contact with the bearings or seals.

Once an operator selects which juice cooker should receive a batch of sugar, a PLC actuates the corresponding slide gate valve(s) and 4 kW (5.4 hp) gear drive(s) of one, two or three of the horizontal conveyors.

When feeding the first juice cooker, the PLC runs the inclined conveyor at full rate, and then at trickle feed rate prior to stopping the conveyor when the bulk bag discharger has lost the accurate batch weight. When feeding the second or third juice cooker, the PLC additionally starts and stops the horizontally-oriented conveyor(s) in the same manner.

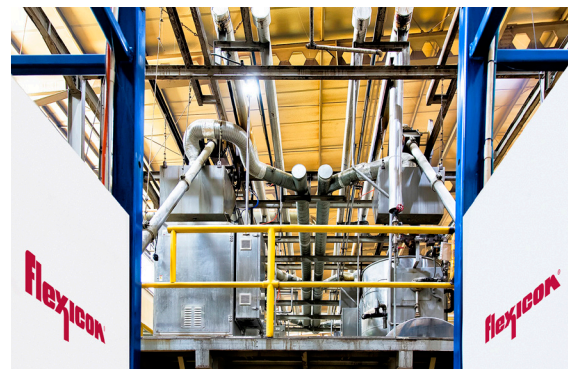
Once a batch of sugar — typically 150 kg (332 lb) — is added to a corresponding volume of juice, the solution cooks for 45 to 60 minutes.

More capacity, accuracy and consistency

A level switch in each bulk bag discharger’s floor hopper signals when workers need to load another bulk bag. The PLC maintains in-process batch information to ensure that weight accuracy is maintained during changeovers.



Operator pulls the bag through the iris valve, which closes around the spout, allowing gradual opening and dust-free material flow.



Twin flexible screw conveyors from the bulk bag dischargers connect to horizontally-oriented flexible screw conveyors on the mezzanine feeding sugar to the six juice cookers.

Depending on the season, Singabera runs its drink-making process over two or three 8-hour shifts, employing three workers per shift instead of 10 workers required previously. Sugar throughput is 7 to 15 tonnes (15.4 to 33 tons) a day, twice what the old factory could handle.

"The system eliminates heavy manual labour, helping worker well-being tremendously," Mr. Na says. "Other benefits are accuracy, consistency, and hygiene." The bulk bags also improve storage. "We can stack them using forklifts or put them on racks, making warehousing more efficient than with smaller bags. Flexicon gave us a turnkey solution, and it's been working to its full capabilities."

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Another filter receiver intakes sugar and discharges it into a receiving hopper which supplies the packaging line. Tereos Sucre chose pneumatic conveying to eliminate the risk of contamination.



Sugar gravity feeds from the flexible screw conveyor through downsputting into a juice cooker. The motor is positioned beyond the conveyor discharge, preventing material from contacting bearings or seals.



Under PLC control, the system weighs and delivers sugar to the six juice cookers at high rates.



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