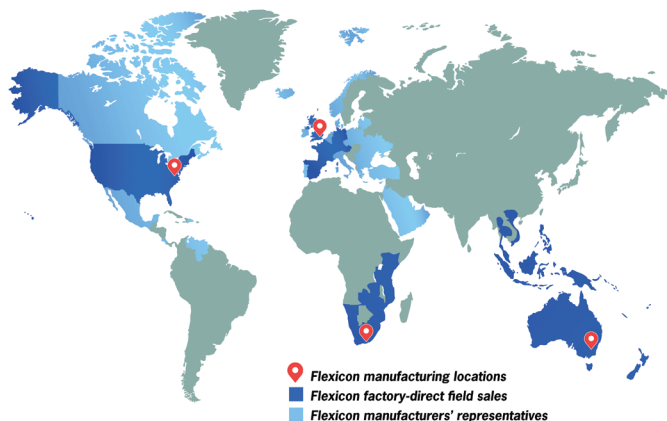




Bulk bag weigh batch dischargers equipped with hoppers and flexible screw conveyors, elevate ingredients 30 ft (9 m), metering precise batch weighs into a ribbon blender under PLC control. The automated, dust-free system replaces manual dumping of 50 lb (23 kg) bags.

Sealed Bulk Bag Discharger/Conveyor System Stops Dust, Cuts Cycle Times, Boosts Quality of Deodorant Chemicals

N-1336



flexicon®

USA

FLEXICON CORPORATION
Tel: +1 610 814 2400
E-mail: sales@flexicon.com
Web: www.flexicon.com

UK

FLEXICON (EUROPE) LTD
Tel: +44 1227 374710
E-mail: sales@flexicon.co.uk
Web: www.flexicon.co.uk

AUSTRALIA

FLEXICON CORPORATION
(AUSTRALIA) PTY LTD
Tel: +61 7 3879 4180
E-mail: sales@flexicon.com.au
Web: www.flexicon.com.au

SOUTH AFRICA

FLEXICON AFRICA (PTY) LTD
Tel: +27 41 453 1871
E-mail: sales@flexicon.co.za
Web: www.flexicon.co.za

SPAIN

FLEXICON EUROPE SPAIN
Tel: +34 930 020 509
E-mail: ventas@flexicon.es
Web: www.flexicon.es

FRANCE

FLEXICON EUROPE SAS
Tel: +33 7 61 36 56 12
E-mail: ventes@flexicon.fr
Web: www.flexicon.fr

GERMANY

FLEXICON EUROPE GmbH
Tel: +49 173 900 78 76
E-mail: vertrieb@flexiconeurope.de
Web: www.flexicondeutschland.de

SINGAPORE

FLEXICON SINGAPORE PTE LTD
Tel: +65 6778 9225
E-mail: sales@flexicon.com.sg
Web: www.flexicon.com.sg

INDONESIA

FLEXICON SINGAPORE PTE LTD
Tel: +62 81 1103 2400
E-mail: sales@flexicon.co.id
Web: www.flexicon.co.id

Sealed Bulk Bag Discharger/Conveyor System Stops Dust, Cuts Cycle Times, Boosts Quality of Deodorant Chemicals

ST. LOUIS, MO — In producing blue in-tank toilet bowl deodorants, Willert Home Products decreased batching time by 20%, improved accuracy of batches to 0.01%, and eliminated dust from the work area by using an automated system of two bulk bag dischargers and five flexible screw conveyors.

Switching from manual dumping of 50-lb bags to automated unloading of 2000-lb bulk bags of two difficult-to-move, hygroscopic powders, paid for the system in less than one year by cycling batches in less time, and cutting raw material costs. Eliminating disposal costs of empty 50-lb bags contributed to savings.

Previously, 50-lb bags of anhydrous borax and sodium sulfate were dumped manually into a 5000-lb capacity blender. Willert Home Products tried unsuccessfully to convey the mix to a smaller blender on the second level with a bucket elevator, then with an aeromechanical conveyor.

Powders Bulk up from Humidity

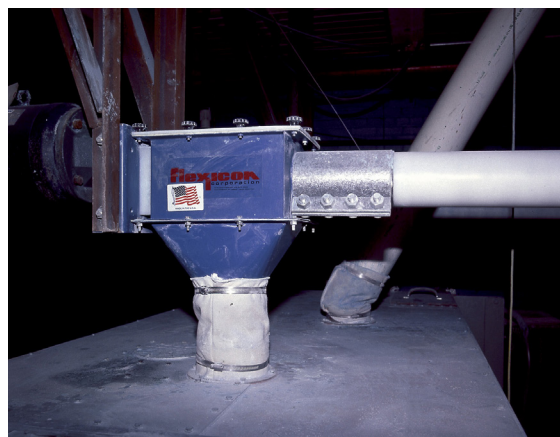
Bryan Willert, vice president of manufacturing, says, “The bucket elevator would lock up and break when the powders bulked up from the humidity here in St. Louis. We replaced it with an aeromechanical conveyor, but that put too much energy into the mix, where the moisture sensitive powders would melt, agglomerate and clog the conveyor’s machinery. The cables would break. When we added a spray-dried surfactant ingredient into the mixer, the conveyor would gum up further.”

Willert considered replacing the aeromechanical conveyor with a pneumatic conveyor, but opted for flexible screw conveyors. “The flexible screw conveyor’s enclosed tube answered our need to isolate the powders from the humid ambient air. With the conveyor’s gentle handling, the powders flow right through,” he says.

The flexible screw conveyors move material through a 4.5” diameter tube enclosing a rugged, flexible stainless steel screw, driven by a low-power electric motor. As the flexible screw rotates, it self-centers. Clearance between the screw and tube wall minimizes or eliminates product damage.

Anhydrous borax is abrasive, yet light and fluffy (bulk density 47.6 lb/cu ft, particle size 200 mesh). The flexible conveyor moving it to the blender requires a heavy-duty, flat-wire screw whose flat conveying surface applies a positive forward force while reducing the radial force against the outer tube’s walls. The heavy-duty wire stands up the material’s abrasiveness.

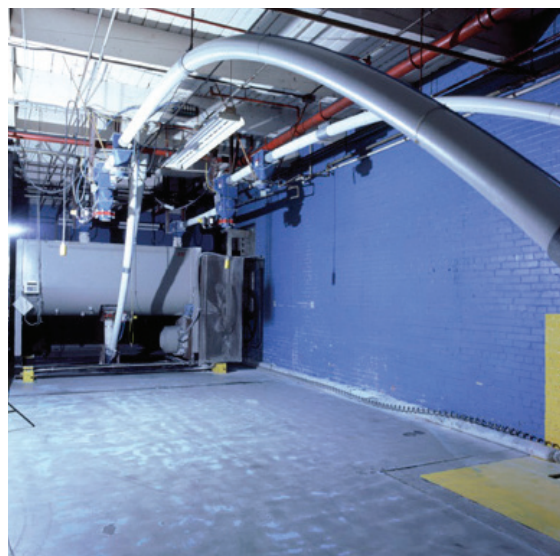
Because sodium sulfate has a higher bulk density (73.2 lb/cu ft and particle size of 200 to 400 mesh) moving it requires a round screw, which imparts the material with higher radial forces.



Two flexible screw conveyors transport ingredients to a ribbon blender which discharges into a third flexible screw conveyor that elevates the blend 30 ft (9 m) through the ceiling to a smaller blender on the second level.



Ingredients are fed into a ribbon blender by a flexible screw conveyor through a discharge transition adapter.



A ribbon blender discharges the blend into a flexible screw conveyor that elevates the mix 30 ft (9 m) through the ceiling to a smaller blender on the second level.

Batching Operation on Two Levels

Two Flexicon bulk bag dischargers, each equipped with a 3.5 cu. ft. capacity pyramidal hopper, feed material into two 30-ft Flexicon flexible screw conveyors that transport the material at a 45° angle, to the 10-ft high bulk mixer.

Minor ingredients, such as liquids and dyes, are introduced at a bag dump station and transported to the mixer by a 10-ft flexible screw conveyor.

From the bulk mixer, another 25-ft flexible screw conveyor elevates the mix to a small 600-lb mixer on the second level, gravity feeding a surge hopper that, in turn, charges a feeder that meters the mix into a co-rotating twin screw extruder producing the toilet tank pucks.

Dischargers Move Stubborn Powders

Each bulk bag discharger is equipped with pneumatically activated FLOW-FLEXER® bag activators that promote the flow of stubborn powders by massaging the lower side walls of the bag at pre-set intervals. As the bag empties, the stroke of the plates increases, raising the side walls in a steep 'V' shape, promoting complete product discharge. "The powders wouldn't move out of the bags without the massagers," Willert says.

The hopper beneath each bulk bag discharger contains a mechanical agitator and pneumatic vibrator that promote flow into each flexible screw conveyor's intake adapter.

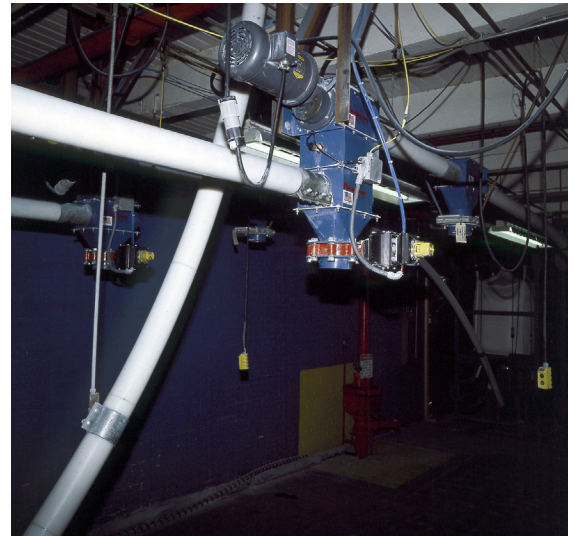
System Seals off Dust

The batching system eliminates the dust previously generated when dumping 50-lb bags into the bulk mixer. The powders remain enclosed from the time the bulk bags are connected, through conveying process and final extrusion. "The whole system is sealed tight," says Willert.

From each bulk bag discharger, dust is controlled by a 12-in diameter iris valve with a flexible, impermeable diaphragm that allows the operator to pull the tied bag spout into the intake chute and close the valve around the spout. The spout is then untied, the chute's access door closed, and the notched valve released slowly, preventing uncontrolled bursts of material from the bag and the escape of dust.

Quality Control Improves

Quality control and accuracy of the final batch are monitored and controlled by a PLC/PC batching program that Willert Home Products designed and installed. The program meters precise amounts of the two powders from the bulk bags through the flexible conveyors at speeds governed by a variable speed motor control. Willert says, "The conveyors can hold tight tolerances to our setpoint. The control can tell the conveyors to go into a dribble mode and stop on a dime to within less than 1/2 pound."



Charging adapters join 30 ft long (9 m) flexible screw conveyors from bulk bag unloaders to 10-ft long (3 m) conveyors, which will feed a second ribbon blender to increase capacity with a second batching line.

Previously, an operator tried to empty precise amounts from the 50-lb bags by sprinkling the ingredients into the mixer. "It was pretty inaccurate," he says.

To increase capacity, the company is installing a second batching line similar to the first. It includes a second 5000-lb capacity blender, a 1000-lb capacity blender, a surge hopper and a second extruder. Flexible screw conveyors, extended horizontally from the original flexible conveyors by transition adapters will move the material.

Willert Home Products contract-manufactures toilet deodorant pucks for a Japanese company for its local distribution. The more accurate and productive batching system responds to growing demand for the product and to the customer's rigorous quality standards.



USA

FLEXICON CORPORATION
Tel: +1 610 814 2400
E-mail: sales@flexicon.com
Web: www.flexicon.com