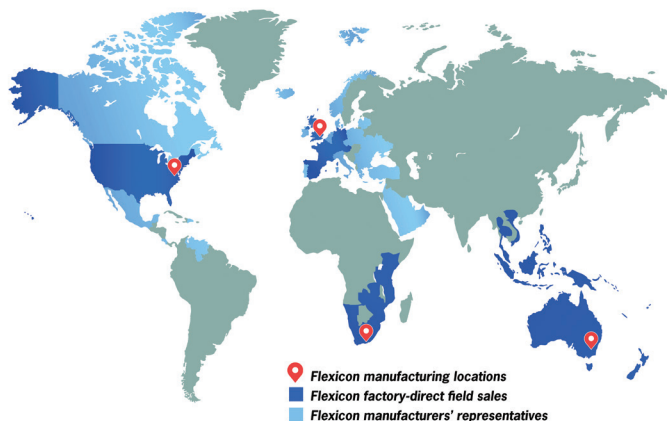




Flexible screw conveyor at right transports dextrose granules from bulk bag discharger at 500 lb (225 kg) capacity blender. Second flexible screw conveyor transports blended powders to the bulk bag filler. Blended powders discharged from the 2500 lb (1125 kg) capacity ribbon blender are transported through a flexible screw conveyor to the bulk bag filler at left. From the bulk bag discharger (shown empty), another flexible screw conveyor will convey powdered flavors to the packaging line.

## Bulk Bag Unloading/Filling/Conveying System Supplies Packaging Line with Powdered Flavors

R-0110



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## Bulk Bag Unloading/Filling/ Conveying System Supplies Pack- aging Line with Powdered Flavors

Surging sales of powdered flavors produced by Mother Murphy's Laboratories exceeded the capacity of the plant's manual dumping and packaging equipment. Operators worked overtime on two shifts, emptying 50-lb (22.5 kg) bags of dextrose into a 500-lb (225-kg) capacity blender, adding spray-dried flavor bases, then bagging and boxing the blended products manually.

The company boosted production with two bulk transfer systems comprised of three bulk bag dischargers, two bulk bag fillers and five flexible screw conveyors; all manufactured by Flexicon, one 2500-lb (1125 kg) and one 500-lb (225 kg) capacity blender, and two fill-by-weight packaging machines.

The systems allow simultaneous blending of one product and packaging of another, enabling the plant to fill orders from 2000 to 20,000 lb (900 to 9000 kg) while minimizing overtime, eliminating manual bag dumping and packaging, and reducing the need for a second shift.

### Dextrose Powders Mixed with Spray-Dried Flavors

In the first transfer system, a bulk bag discharger introduces dextrose granules from 2000-lb (900 kg) bulk bags into an 8 cu ft (0.23 cu m) capacity hopper, which doubles as a dumping station into which the operator manually adds spray-dried flavor bases from totes. A 15-ft (5.4 m) long, 8-in (20 cm) diameter flexible screw conveyor moves the dextrose and flavor base powders at a 45° incline to the 10-ft (3 m) high blender which mixes 2500 pounds of the material in 15 minutes. Another 15-ft long, 8-in diameter flexible screw conveyor transports the blended powders to the bulk bag filler that fills 2500-lb bags. This enables the plant to warehouse bulk bags containing various flavors for future packaging, or to send bags directly to the packaging station.

The second, smaller transfer system employs two flexible screw conveyors to move powders from a second bulk bag discharger into the 500-lb (225 kg) capacity blender, then to second bulk bag filler.

The packaging side of the operation consists of a third bulk bag discharger unloading bags of powdered flavors into an 8 cu ft (0.23 cu m) capacity hopper. A 15-ft long, 6-in (15 cm) diameter flexible screw conveyor elevates the product and discharges it onto a vibratory conveyor positioned on a 10-ft (3 m) high stand. The vibratory conveyor, containing a 30-mesh screen, acts as a sifter to scalp pieces of oversize foreign material as the powder gravity-feeds through a magnet and diverter into two packaging machines. Here, polyethylene bags within cardboard boxes are filled by weight—50-lb (22.5 kg) in this case—and sealed for shipment to large baking companies and customers in the food, cereal and snack food industries.

Mother Murphy's blends and fills hundreds of dry powdered flavors, requiring frequent wash down of system components between production runs. To



*Flexible screw conveyor at right transports dextrose granules from bulk bag discharger at 500 lb (225 kg) capacity blender. Second flexible screw conveyor transports blended powders to the bulk bag filler. Blended powders discharged from the 2500 lb (1125 kg) capacity ribbon blender are transported through a flexible screw conveyor to the bulk bag filler at left. From the bulk bag discharger (shown empty), another flexible screw conveyor will convey powdered flavors to the packaging line.*

clean the flexible screw conveyors, the operator removes the outer tube screw cap and reverses the drive, evacuating any residual material before flushing with cleaning solution and water. The hoppers, blenders, vibratory conveyor, and diverter are also washed with cleaning solution and flushed with water.

## **Sealed System Contains Dust**

From the point of material entry to exit, dust is contained by a variety of means specific to individual equipment, and by air-tight connections between equipment.

The bulk bag dischargers employ iris flow control valves that enable the operator to cinch the spout prior to releasing the drawstring, then to open the valve gradually, controlling the rate of discharge of material from the bag, minimizing the amount of air and dust displaced from the hopper into the plant.

The dumping station portion of the bulk bag discharger is equipped with a hood and dust collector that vacuums airborne dust from the operator's atmosphere onto cartridge filters that are blasted on a timed cycle by reverse pulse/jet nozzles, causing dust build-up to fall into the hopper.

Transition adapters at hopper outlets provide dust-tight connections to the flexible screw conveyors, which are fully enclosed, providing dust-free operation.

Finally, the bulk bag filler employs an inflatable rubber cuff that forms a dust-tight seal between the filler outlet and the bag spout interior. The vibratory conveyor and packaging machines are also enclosed, and will be equipped with a dust collector and cartridge filter.

## **Promoting Flow of Powders**

To promote flow of powders from the bulk bag dischargers, pneumatically activated FLOW-FLEXER® bag activators raise and lower opposite bottom edges of the bag at pre-set intervals. As the bag empties, the stroke of the plates increases, raising the bottom of the bag into a steep 'V' shape, promoting complete product discharge.

Both hoppers include a pneumatic turbine vibrator and mechanical agitator to promote the flow of material into the charging adapter of the flexible screw conveyor whose only moving part contacting material is a rugged, centerless screw. The conveyor is capable of moving both free- and non-free-flowing materials handled by the company, including those that tend to pack, cake, seize, smear or plug, with no separation of blended products being conveyed to the filling line.

Mother Murphy's offers extensive custom blended flavor and extract selections for the food, beverage, bakery, cereal and other industries.

The company purchased the system through Material Dynamics, Inc., Marietta, GA, and its representative Warren Griffin.

In addition to bulk bag dischargers and flexible screw conveyors, Flexicon manufactures pneumatic conveyors, bulk bag fillers, manual dumping stations, drum dumpers, weigh batching and blending systems and plant-wide bulk handling systems with automated controls.



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