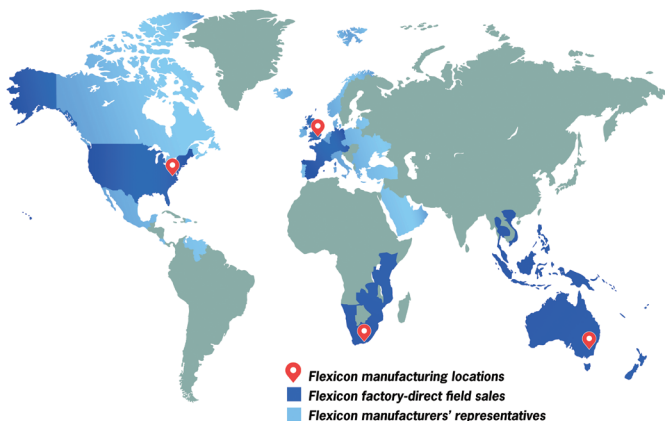




*The conveyor exits the hopper at a 45 degree incline and curves to vertical, elevating the material 5.5 m (18 ft) to the dosing system inlet dust-free.*

## Flexible Screw Feeding of Problematic Chemical Ingredients to Dosing Line

JJ-0773



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## Flexible Screw Feeding of Problematic Chemical Ingredients to Dosing Line

NORTH RHINE-WESTPHALIA, GERMANY — A manufacturer of specialty chemicals here handles two problematic powdered ingredients, benzofuroxan and triazonol, to produce their energetic products for mining and demolition.

In addition to being known irritants, these compounds are abrasive, dusty, hygroscopic, compressible, and tend to pack and cake. When exposed to air and allowed to rest, they agglomerate into fist-sized clumps which harden, making them difficult to convey without interruption.

The materials must be transferred from 25 L (6.6 gal) drums into elevated processing equipment — but a previous vacuum conveying system proved incapable due to dust clogging of filters, and agglomerates reducing the feed rate.

Manual dumping of the materials became unsustainable because of the physical effort required, the potential dusting and irritation hazard, and the difficulty in achieving a consistent feed rate of material without clumps.

To improve throughput and handling of these ingredients, the company installed a flexible screw conveyor and receiving hopper from Flexicon (Europe) GmbH.

### Conveying in a restricted space

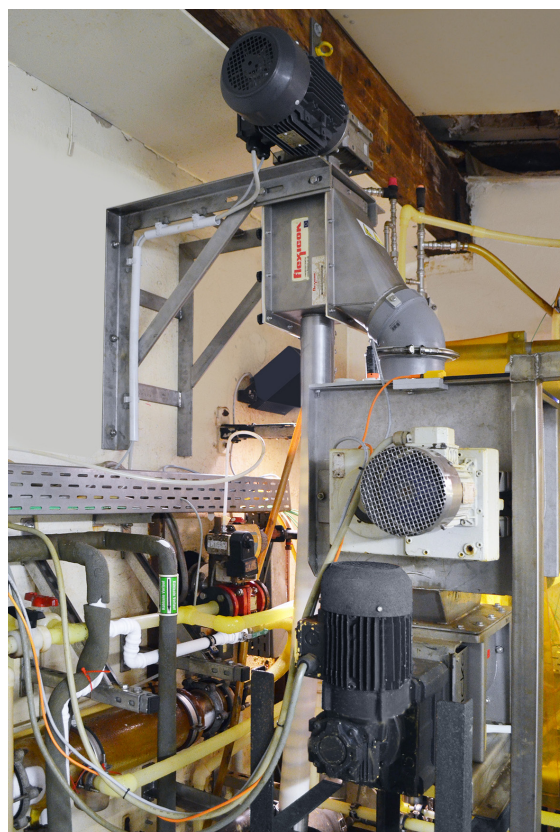
The hopper has a footprint of 700 x 1100 mm (28 x 43 in.), fitting into the plant's restricted product loading area, leaving ample space for emptying of drums containing the materials. A support tray combined with a hinged hopper cover allow for quick and ergonomic loading of the materials.

Steep back and side walls of the stainless steel 110 L (3.9 cu ft) capacity floor hopper reduce the ability of the hygroscopic ingredients to bridge or “rat-hole.” Combined with the hopper geometry, a mechanical agitator assembly maintains good flow of material while eliminating material agglomerations.

The conveyor, a Flexicon model 1312, is comprised of a stainless steel flat, centreless screw that rotates within an abrasion-resistant ultra-high molecular weight polyethylene outer tube.

Flexibility of the screw and tube allow the conveyor to exit the hopper at a 45 degree incline and curve to vertical, propelling materials 5.5 m (18 ft) to the dosing system inlet, dust-free.

The screw is the only moving part contacting material, and is driven by an electric motor positioned beyond the discharge point, preventing



A right-angle gear reducer allows horizontal orientation of electric motor to fit below a ceiling beam.



The flexible screw is driven by a 2.2 kW (2.95 hp), 1425 rpm IP65 electric motor beyond the material discharge point, precluding material contact with seals.



The 110 L (3.9 cu ft) capacity hopper, with fold-down support tray and hinged lid, is equipped with a mechanical agitator to reduce agglomerates, promoting flow into the conveyor's charging adapter.

material contact with seals or bearings. As the screw rotates, it self-centres within the tube, providing ample clearance between the screw and tube wall, eliminating the need for bearings along the length of the conveyor.

## **Dosing without interruption**

High and low level sensors on the dosing hopper sidewall signal a programmable controller when to start and stop the conveyor, automatically maintaining a sufficient volume of material for dosing without interruption.

Since the company uses the conveying system only for benzofuroxan and triazolon, cleaning between batches is unnecessary. However, the conveyor is emptied on a daily basis by reversing the screw rotation, which removes residual material from the conveyor, preventing material from solidifying in the conveyor tube.

According to the production manager, the new system was built to ATEX standards for handling dusty, abrasive materials, with IP65 motor and electrical enclosures, and material contact surfaces of 304 stainless steel.

“The Flexicon system provides a steady and reliable conveying process that leads to consistently high product quality, while allowing better planning and adherence to delivery times,” he says. “The system works very well and is a benefit especially for the employees. The physical labour has been greatly reduced, and the process flow is very reliable and stable.”



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