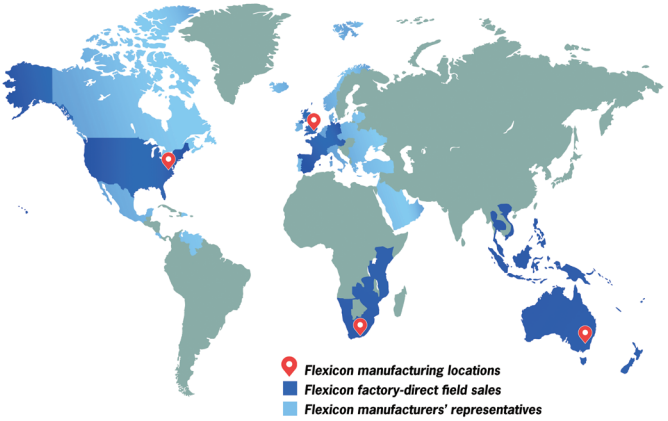
Operator attaches bulk bag to lifting frame with Z-CLIP™ bag strap holders before hoisting the bag into the discharger frame.

Sugar Fed from Bulk Bags Pneumatically at Tereos Artenay

LL-0501



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Sugar Fed from Bulk Bags Pneumatically at Tereos Artenay

ARTENAY, FRANCE — Tereos established a sugar beet processing plant here in 1953 with a capacity of 2000 tonnes (2204 tons) per day, and now processes 11,500 tonnes (12,677 tons) per day with a permanent staff of 190 and seasonal staff of 50. The plant also dries and pelletises sugar beet residue for animal feed, and produces alcohol for the cosmetics, food and chemical industries at an onsite distillery.

Packaging sugar in multiple forms

The plant began serving the consumer market in 1968 when it added a sugar packaging facility to the site, and expanded operations in 2001 with the construction of a warehouse for packaged sugar.

The plant now produces a range of packaged sugars including:

- Granulated brown cane and white sugar sticks in 3-10 g (0.11-0.35 oz) packets
- 5 kg (11 lb) bags of granulated brown cane and white sugar
- 0.25 kg (0.55 lb) cartons of white or brown sugar-stevia mix (sugar cube)
- 0.5 kg (1.1 lb) cartons of white organic sugar and white or brown cane sugar-stevia mix
- 1 kg (2.2 lb) cartons of extra-fine sugar
- 1 kg (2.2 lb) cartons of powdered sugar
- Individually-wrapped white and brown cane sugar cubes

Tereos recently modernised its process to transfer extra-fine sugar to produce 1 kg (2.2 lb) cartons of extra-fine sugar and to produce white and brown cane sugar cubes.

This involved shipping of extra-fine sugar in bulk bags from another Tereos plant in the north of France to the Artenay location, and installing a 18.5 kW (25 hp) pneumatic bulk handling system from Flexicon Europe to move the material to either of two destinations.

Moving extra-fine sugar from bulk bags to process or packaging lines

Extra-fine sugar from the northern plant arrives at the Artenay plant in 1 tonne (1.1 ton) bulk bags which are delivered by forklift to a BULK-OUT® model BFC bulk bag discharger equipped with a cantilevered I-beam, electric hoist and trolley to load bags into the frame. A 56 l (2 cu ft) floor hopper feeds the sugar into a PNEUMATI-CON® pneumatic conveying system through a flow-through pick-up adapter and rotary valve.

Using a pendant, the operator hoists a bulk bag of extra-fine sugar along the cantilevered I-beam into the discharger frame.

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The operator unties the bag spout, allowing sugar to flow into the floor hopper and through a rotary valve into the PNEUMATI-CON® pneumatic conveying line. On the left and right, flexible connections vent dust to filter socks.

A dual pipe plug diverter then directs the sugar to one of two destinations: a wet process for sugar cube production, or a packaging line.

For sugar cube production, extra-fine sugar is transported 20 m (65 ft), including a 7.6 m (25 ft) vertical lift, to a filter receiver that discharges into a 210 l (7.4 cu ft) receiving hopper. A rotary valve at the hopper's outlet discharges through downspouting into a 450 l (16 cu ft) buffer hopper that feeds an existing screw-type conveyor where water is added to form a wet sugar mix used to mold sugar cubes on a continuous basis.

When it's not feeding the cube line, the pneumatic system moves extra-fine sugar 30 m (98 ft) — including an 8.5 m (28 ft) vertical lift — to a filter receiver that discharges into a 210 l (7.4 cu ft) receiving hopper.

A butterfly valve at the hopper outlet supplies an existing 6000 l (212 cu ft) hopper, allowing continuous packaging of extra-fine sugar in 1 kg (2.2 lb) cartons.

As each hopper reaches capacity, a level sensor signals a PLC when to stop each pneumatic convey line.

Since the handling of extra-fine sugar is sensitive when suspended in air at certain concentrations, this section of the system is ATEX-compliant to meet relevant European safety regulations.

Pneumatic conveying provides simplicity, flexibility

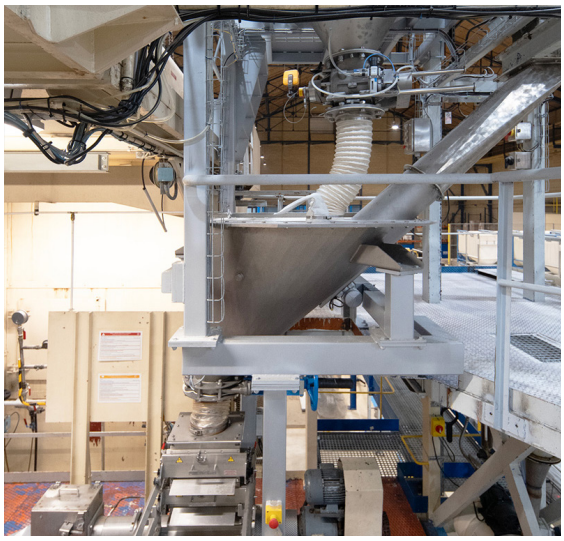
Because sugar must be lifted to 8.5 metres (28 ft) to the receiving hoppers, "A belt conveyor was impractical and a pneumatic system was therefore our only option," explained Jean-Paul Amyot, Tereos packaging workshop manager at Artenay. "Pneumatic systems also have the benefit of being simple, flexible, and compact, and are closed, eliminating the risk of contamination, which is particularly important when handling food products."

Flexicon was selected to supply the system because it was the only company "able to provide the flow rate we were asking for," continued Amyot. It is the first pneumatic system installed at the Artenay plant; sugar is handled manually or by belt conveyor in other parts of the plant.

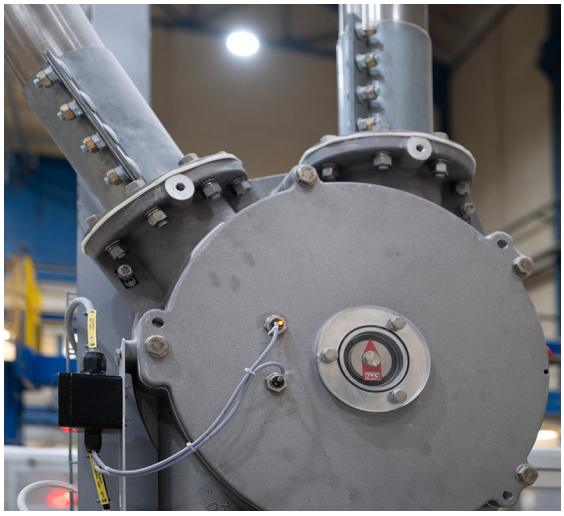
Application problem solving

Pneumatic conveying is not without its challenges, however. At Artenay, these became apparent when handling extra-fine sugar, which is mixed with starch to avoid agglomeration.

"When handling mixed materials in a pneumatic system, there is always a risk of separation," said Amyot. "This occurred when handling the extra-fine sugar. After some investigation, we discovered the root cause was inadequate homogenisation of the material by the sugar supplier, which



A dual pipe plug diverter directs sugar either 20 m (65 ft) to the wet process for sugar cube production, or 8.5 m (28 ft) to the packaging line.



The hopper beneath the filter receiver dischargers to a buffer hopper from which extra-fine sugar enters the sugar cube process.

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was exacerbated in the pneumatic conveyor. We worked with our supplier to improve homogeneity, and with Flexicon to ensure any separation of material fell within our product specifications."

"During this process, we found it beneficial to work with an experienced manufacturer who had the capability to test our materials in a pneumatic system," concluded Amyot. "Flexicon stayed with us every step of the way to deliver a system that works for us."

Tereos Sucre France
Artenay, France
www.tereos.com

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

The filter receiver separates sugar from the air stream through filter media. Reverse-pulse jet cleaning dislodges accumulated dust for continuous separation of material.

Packages of Tereos extra fine sugar.

Brown cane sugar cube rests on background of extra-fine white sugar.

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