

## Weight info adds control

When Macleod Pharmaceuticals expanded to a new range of antibiotic products, it needed to fit a bulk solids mixer, conveyor and filling machine into a confined area and reserve enough space for boxing, taping and labeling operations.

After consultation with bulk solids handling specialists Flexicon Corporation, a flexible screw conveyor system was set up within Flexicon's own Test Laboratory facility, prior to development, to simulate the application and prove the proposed system's viability.

The Company's antibiotics typically comprise seven or eight powdered ingredients that are manually dumped from fibre drums into a 710-litre capacity ribbon blender mounted on load cells. Weight gain information on a display enables operators to dump the required amount of each material.

After a mixing cycle, the powder is gravity discharged into the U-shaped charging adapter of a 80mm diameter flexible screw conveyor.

The conveyor consists of a flexible steel screw enclosed in a tube and driven by an electric motor. As the screw rotates, it propels material through the tube and self-centres, providing sufficient clearance between the screw and the tube wall to prevent product damage. It then transfers the powder through 45° across a distance of about 3.5m to feed a surge hopper above the filling machine that dispenses drugs into a variety of containers. Products are made in campaigns, each of which typically lasts two weeks and involves the manufacture of several batches of a single product.

The screw is the only moving part in contact with the material and can be removed rapidly between product changeovers for sanitising of the screw and the tube's crevice-free interior.

Flexicon engineers also solved design problems specific to this application by orienting the charging adapter horizontally instead of at an angle and fabricating a flange that attached tightly to the blender's valve to discharge powder directly into the charging adapter with no exposure to the atmosphere. Due to a ceiling height restriction, the conveyor's discharge adapter also needed to be oriented as close to horizontal as the



curvature of the conveyor tube would allow. While suspending the discharge adapter, complete with its 87 kg motor, from the ceiling, a Flexicon engineer on the speakerphone fed data into his AutoCAD and calculated the adapter angle that corresponded to the curvature of the conveyor.

The reasons Macleod selected a flexible screw conveyor were two fold:

- to fit within the limited space
- to prevent contamination of the product and plant environment.

Other types of conveying systems that failed to contain the dust, containment is essential in the case of antibiotics, were eliminated while the dust-tight Flexicon system accommodating the curvature of the conveyor tube to fit the restricted space between the blender and filler, fulfilled both points of the brief.

Because this is a new manufacturing site for products that will be packaged in a new container size, US Food and Drug Administration (FDA) approval is required before commercial products can be produced, as is also the case with drugs for humans. In anticipation, Macleod has been running pilot batches and practice runs to validate the system. ●

## Bulk Ingredient Feeding

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