

Powdered antibiotics conveyed through a curve, dust free

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 sanitizing 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 87kg 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, U.S. 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.

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Centralised vacuum cleaning system saves time & money

Dust Extraction International has installed a centralised vacuum cleaning system for a major international metallurgical processing company in the UK. The requirement was for a multi-operator housekeeping or single operator bulk removal system to be designed and installed by a competent and reputable company experienced in this type of cleaning system.

The metallurgical company instructed an in-house Project Manager to undertake a feasibility study into centralised vacuum cleaning systems for certain areas of their plant. Several companies were contacted for quotations and Dust Extraction International were selected. "What impressed us about Dust Extraction International was their speed of response to visit our site, their detailed engineering and commercial tender, and the fact they had a proven track record with another of our other plants", commented the Clients' Project Manager.

When interviewed the client said that the



system was installed safely, with no disruption to normal manufacturing / processing. They added, "The system proved its worth very quickly with our housekeeping being dramatically improved. We recently had a breakdown that resulted in some spillages that in the past would have required us to bring in a contractor to undertake the clean up. Instead this work was carried out in-house with the vacuum system giving us both a saving in time and cost."

Dust Extraction International designed, supplied and installed a graduated pipe work system to interconnect a total of 20 hose connection points: 15 x 50 mm hose connection points for general housekeeping / vacuum cleaning duties, and 5 x 80 mm hose connections for bulk product removal throughout the multi-floor processing building, these are connected back to a filter separator and exhauster located externally at ground floor level.

The system has been designed for two operators using a 50 mm flexible hose and tool carrying out general housekeeping / vacuum cleaning duties, or for one operator using an 80 mm flexible hose and tool carrying out bulk spillage removal duties from specific areas.

The extracted products, which are generally powders are separated from the conveying air within a filter separator, which has filtration media cleaned by the reverse jet technique. The materials are dispensed from the vessel into a FIBC connected to the separator via a spigot and strap via twin pneumatically operated discharge valves.

Motive conveying air for the system is generated by an exhauster package, provided with a vacuum breaker, silencers, and powered by a 22.0 kW motor all located within a force draft ventilated acoustic enclosure which ensures emitted noise levels are below 70 dB(A) at 1 metre measured under free field conditions.

The plant was supplied complete with a sequenced electrical control panel manufactured in accordance with the client's specification, including the required motor starters and capable of generating the required control voltage.

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