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Neutraceuticals: Automate the transfer of tablets and capsules and reduce waste with vacuum conveying technology

Taby, Sweden

Vacuum conveying technology has been used to a great advantage within the pharmaceutical and food industries. Since neutraceuticals are positioned inbetween pharmaceutical and food industries, it can benefit from the key technological developments aimed at both. Some of the products in neutraceutical markets are made as tablets and capsules. The technologies currently used in the industry to transfer tablets and capsules as well as manual labor are not yet as optimal for the task as vacuum conveying technology. Tablets need to be moved around the manufacturing plant, transferring them from one processing unit to another, for instance from a coating drum to a packaging line. During such transfer and handling plentiful tablets/capsules either chip or have to be handled manually – both resulting in waste.

With the development of technology, vacuum conveyors have advanced to be able to replace manual labor in handling delicate objects. Elaborated below are key aspects to consider when choosing vacuum conveyor for the transfer of tablets or capsules.

Functionality of conveyor. Just as you need to handle delicate objects carefully by hand, an automated conveying system needs to be designed with careful handling in mind. The key to this is speed. The operating speed of any conveyor has to be appropriate for its application, and in order to make sure that delicate tablets stay intact. It is important to look for conveyors and pumps which can achieve slower speed - transporting the material in a gentle way.

Solutions for different product types. Tablets doesn't only vary in size and shape, but can also be coated, uncoated, hard or soft pressed. For capsules, size and shape consideration is important. All these characteristics need to be addressed with specially adapted equipment in order for the products to be transported safely and gently through the plant. For example, coated tablets may seem easy to handle due to their hard coating. However, the coating is susceptible to cracking if the tablets hit hard surfaces or sharp edges along the conveyor system. Therefore, it may be more appropriate to use a flexible hose rather than steel tubing, and to smooth out edges with a protective silicone lining. A star-shaped or otherwise angled tablet may suffer grinding not only from hitting the conveyor walls, but also from colliding with each other. To avoid such collisions, the flow rate may need to be regulated and adjusted to suit various tablets with different material properties and shapes. Manufacturers should look for a vendor that can provide a selection of accessories optimized for transfer of tablets or capsules.

Filtration. Uncoated tablets often create a lot of dust, which needs to be separated from the tablets before packaging. This is easily achieved by the addition of a cyclone-like pre-separator in which the dust is sucked towards the vacuum pump, whilst the heavier tablets drop down into a container. The dust is then filtered out before it reaches the pump, avoiding pump break-downs. The amount of dust will determine the required filter surface, and the dust particle size will determine how fine the filter mesh needs to be. Filters are an important and integral component of a vacuum conveyor system. They offer protection for machinery such as the vacuum pumps, but also help to protect the operator from inhalation of the dust from tablets, potentially containing medically active substances. Some manufacturers offer conveyors that can be equipped with high efficiency particle assay (HEPA) filters, which filter 99,9% of all dust particles. Additional types of filters are available for powders with a

particle size of greater than 0,5 microns. The key to successful filtration is to choose a supplier that offers a substantial range of filters for a wide variety of tablets.

Size/Shape. Regardless of whether it is manual or automated, the handling of delicate tablets can pose quite a challenge. Sometimes specially adapted equipment is needed, such as tubing of extra-long bend radius. The dimensions of the inlet and outlet units, as well as the feed nozzles, can also be adjusted to better suit fragile tablets. In fact, the dimensions of the entire system may impact on the potential damage to such tablets.

Hygienic and easy to clean solution. Hygiene is of premium importance to the nutraceutical industry, and regardless of the type of tablets they transport; conveyors have to be kept clean. However, cleaning means downtime, an undesirable production pause. Conveyor systems with a minimum number of moving parts that can be assembled and disassembled without tools, offer minimal production stops for cleaning or other maintenance work. Modular systems are also easier and quicker to clean or otherwise maintain. Faulty or damaged parts can be extracted and replaced with very little disruption to the overall production process.

Lab testing: As it offers the opportunities of a fully automated and sealed system, a vacuum conveyor is a superior solution for tablet handling. However, many different options and configurations need to be considered before you can arrive at a system that is fit for purpose and results in minimal tablet damage. Hence, lab testing is a vital step in the conveyor selection process. Some manufacturers offer testing facilities in which you can test-run the equipment for your particular application. A variety of conveying characteristics can be tested for different types of tablets and over various vertical and horizontal distances. Test-runs will also provide a basis for analysis of the volumes conveyed per minute over given distances, as well as the vacuum cycle time and the energy consumption. In addition, testing can help to allay fears or correct misconceptions associated with unknown technology. For instance, the idea that vacuum systems are noisy can readily be put to rest. However, and most importantly, testing will help you crack the problem of transportation of tablets within the plant – without cracking the tablets.

Other important aspects to consider when choosing vacuum conveyor are: **Certification** (ATEX, FDA, EN1935/2004 and EN 10/2004) and **Warranty**.

Choosing a vacuum conveying system for transfer of tablets is not a simple tasks, but taking above points in consideration can simplify the process of reaching a decision.

If you have any questions, please contact:

Piab AB, Täby, Sweden
+46 (0)8 630 25 00, info-sweden@piab.com, www.piab.com

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