VACUUM CONVEYORS MOVE FOOD AND CONSUMER PRODUCTS WITH EASE

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Stainless steel C-Series conveyors are ideal for conveying starches, powders and other dry ingredients. Powered by pneumatically driven vacuum pumps, these systems safely and quietly transport up to 10-15 tons/hour of material.

Vacuum conveying technology has become an indispensable part of the food and consumer packaged goods (CPG) manufacturing process. It is being used for an increasingly wider array of tasks: moving materials like coffee beans through the food processing line, blending ingredients, even powder handling in the cosmetics industry.

The growing reliance on vacuum conveying is not hard to understand, once you consider its myriad advantages. It is enclosed, hygienic and safe, which is recommended when transferring ingredients and finished products in food processing applications. Powders and granules are ideal for vacuum conveying as well as a number of other materials. Even those materials that are sensitive to humidity and contamination can be safely conveyed.

Most companies and manufacturers in the food industry use vacuum conveyors for loading and unloading mixers or blenders. Specifically, some companies are using vacuum conveyors for the mixing of multiple ingredients such as corn starch and salt in the production of potato chips. Other companies are using conveyors to transport a large quantity of fresh ingredients into packaging machinery without causing damage in the process. Still others are handling plastic pellets in the manufacture of product packaging.

Fresh coffee beans are transported through a vacuum conveyor.

Choosing the best vacuum conveyor for your food or consumer goods manufacturing environment is a challenging task that requires careful consideration. If a system is chosen without the necessary forethought, it may result in serious repercussions, such as loss of productivity, employee hazards, downtime, etc. There are a variety of specific features and benefits to look for when selecting a vacuum conveying system. An ideal system will optimize performance, and increase overall productivity. Look for vacuum conveying systems that offer the following qualities.

Pneumatic vacuum vs. mechanical pumps. The most common types of pumps used in vacuum conveying systems are pneumatic and mechanical. The main difference between these two types of pumps lies in their source of power; pneumatic pumps are powered by compressed air and mechanical pumps are powered by electricity. Pneumatic vacuum pumps are smaller, more compact and lighter in weight, which makes them more energy efficient than mechanical pumps. Additionally, pneumatic pumps have no gears or moving parts, which require lubrication and create friction and sparking. In contrast, mechanical pumps feature several moving parts and require regular lubrication and maintenance.

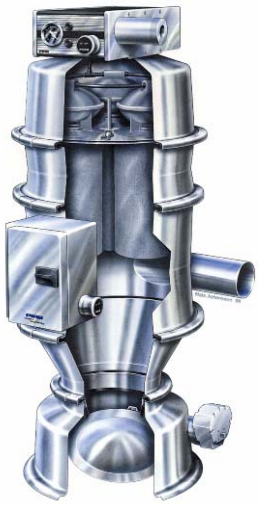
Cappuccino powder ingredients are mixed in a mixing container before the powder is packed in portion bags. A vacuum conveyor is used to move the three separate containers of ingredients to the mixing container. One ingredient at a time is transported within the system.

Another benefit of pneumatic vacuum pumps over mechanical pumps is their ability to operate intermittently. With a pneumatic vacuum pump, an air-operated solenoid valve component can be added to accomplish intermittent use of the vacuum, but a mechanical pump must run continuously. Also important to note is that mechanical pumps only operate properly within an ambient temperature range of 32º F to 100º, while pneumatic vacuum pumps are less affected by ambient temperature conditions, due to their internal multi-chambered design and pneumatic operation.

Lastly, pneumatic vacuum pumps offer minimal product degradation, excellent material containment, and ease of system configuration. Consequently, the heat, noise and contamination issues associated with mechanical pumps are eliminated.

Flexibility and modularity. Rather than opting for a conveyor with unibody construction - which means that it can only be used for one application and offers no flexibility - it is a good idea to opt for a conveyor that can be customized, allowing users to mix and match various attachments to fit their needs. Because food powders and granules feature varying densities and flow characteristics, it is important that the conveyor be modular, and capable of running a variety of different dry materials, such as the sugar, ground coffee and powdered milk that make up cappuccino mixes.

Speed of system. A conveyor should be able to move material at express speeds. Some systems can move product from 0 to 20 meters (65 feet) per second. Also, look for a conveyor that allows you to convey the maximum amount of product. There are systems that can enable you to convey up to 15 tons (33,000 lb) of material per hour.



Cut-away photo of PIAB's C-33 vacuum conveyor.

Hygienic solution with less waste. It is ideal for material being conveyed in the food industry to be completely hygienic and free from contact with any pathogens. When the conveying system is enclosed and safe—from source to destination – there is no risk of contamination or dust generation, thus improving the overall health and safety aspects of the process.

Another advantage of an enclosed vacuum conveying system, as compared to an open belt conveyor system, is that items will not fall off and be destroyed. For example, one company in the food industry was using a belt to convey grated salad to a weighing device before packaging it. They found that a large part of the salad fell of the belt or became stuck on the conveyor belt. The company was able to increase profits by 25,000 Euros per year by switching to a closed system.

Filtration. Filters are an integral component to the vacuum conveyor, because they prevent dust and fine particles from being drawn into the vacuum pump and escaping into the surroundings. Additionally, filters protect the product from foreign bodies. There are several filtration options to consider—the key is to pick a vendor that offers a variety of choices. Herding filters are ideal for all powder applications and are recommended for powders with a particle size of .5 micron and greater. 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.

Lab testing. This vital step in the conveyor selection process is often overlooked. If you can find a manufacturer with this capability, the advantages are evident. Make sure the lab is able to test-run a variety of powders, granules or fluids, to assess conveying characteristics over various vertical and horizontal distances. You will also want the opportunity to view an analysis of volume conveyed per hour or minute over a given distance, as well as vacuum cycle time and energy consumption.

Fluidization. Fluidization allows for compressed air to pass through a porous material, creating a cushion that reduces the coefficient of friction allowing non free flowing material to discharge freely from the vacuum receiver. Fluidization is ideal for the conveying of non-free-flowing powders, a common characteristic of so many sugars and starches.

PIAB's testing facility allows customers to test powder, granule or fluid samples. Testing ensures the vacuum cycle time and energy consumption are effective.

Size/Shape. Ideally, conveyors offer a relatively small footprint, allowing manufacturers to maximize floor space for product production. The shape of various conveyor parts is also an important consideration, not just in terms of efficiency but also as it relates to safety issues. For instance, the conical shape of some conveyor modules makes them stiff and rigid, eliminating the risk of implosion.

Durable material. Conveyors for the food and CPG industries should be constructed with a durable material in order to cope with the most demanding circumstances. Easy cleaning ability, combined with the innate strength, makes stainless steel the material of choice for strict hygiene conditions.

Flow modulation. Users should be able to modulate flow characteristics through the conveyor line by increasing and decreasing the amount of air at the feed point. This can also be achieved by increasing or decreasing the product velocity by adjusting the feed pressure at the vacuum pump. Flow modulation changes the way material is conveyed and provides the operator with greater control.

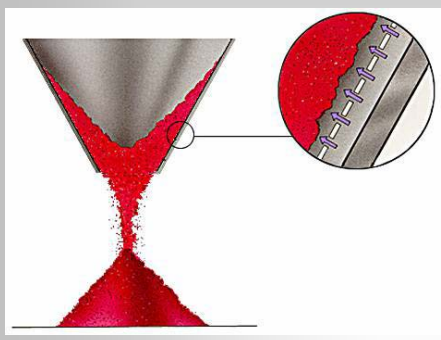
Access to accessories. Customers should look for a vendor that can provide a selection of accessories for the conveying system, such as feed wands, feed adapters and portable stands. Devices such as these can greatly optimize the conveyor's performance.

Warranties. Like any industrial product, conveyors come with warranties that protect the user against costly repair during the warranty period. Some conveyor manufacturers offer warranty periods of up to five years.

Employee safety and production efficiency. Having your employees manually "scoop" food or cosmetic ingredients can put them at risk of breathing dust or chemicals into their lungs. Additionally, lifting and handling of heavy sacks can result in serious back or shoulder strain. With the proper conveying system, a greater number of materials can be safely conveyed, reducing the risks of employee inhalation or physical injury.

Manual transport of ingredients can also lead to inefficiencies in production. A large pizza manufacturer was able to improve efficiency by automating its

The fluidization feature creates a consistent, reliable flow of product both in the feed source and the discharge from the vacuum receiver. Fluidization is ideal for the conveying of non-free flowing powders.



existing material handling processes. The company's current system required the manual feeding of cheese into a sprinkling mechanism that drops cheese onto mini-pizzas as they pass by on a conveyor belt, dispersing the cheese evenly while saving the excess cheese. The existing process was physically intensive and potentially dangerous, not to mention costly and challenging for the company to ensure a consistent product. With a vacuum conveyor now in place, manual labor has been drastically reduced, allowing the company to reassign one of its full-time workers to a more productive task. Additionally, the automated system is much easier to control and ensure the highest quality product for its customers.

Environmentally- friendly. With the increasing need for energy efficiency and low contamination, the government has been tightening regulations on emission control. Make sure your conveying equipment complies with the latest industry standards; mechanical systems often pose a threat of oil or lubricant contamination.

Clearly, a conveying system is not an "impulse" buy. It requires careful consideration of numerous criteria regarding performance, safety, ergonomics, and flexibility. But the time spent in this process will be an invaluable investment in the overall health of your manufacturing operation.

PIAB is a global leader in industrial vacuum technology, designing innovative solutions that improve the productivity and working environment of vacuum users around the world. PIAB manufacturers a complete line of vacuum pumps, vacuum accessories, vacuum conveyors and suction cups for a variety of automated material handling and factory automation processes.

For more information on choosing a vacuum conveyor system for your food or CPG manufacturing process, please visit www.piab.com.