

Vacuum Conveying

Simplifying Material Handling



Our Mission

“Our mission is to increase productivity for industrial customers and provide energy saving solutions by promoting our superior technology universally.”



Piab - A powerful business partner

We strive to increase productivity, thus reinforcing your edge in the market. We also aim to reduce energy consumption and improve the working environment. Partnering with Piab means more than having a reliable supplier of vacuum components.

Let us be the expert on conveying technology for you

We take pride in being the innovators in vacuum technology. Technical leadership means finding and developing solutions that have not yet been found by others. You should feel confident in knowing that your relationship with us will keep you on the cutting edge with your vacuum solutions.

At Piab, we commit to serve you with the same level of know-how and service no matter where you are in the world. A strong presence, with representatives all over the world allows Piab to present a global, unified front with one mission – to grow your business.

Productivity

In today's very competitive world, we realize that you need, as much as we do, to always be one step ahead. Among other things, one should always aim to improve productivity. Piab's technology and experience supports your ambition in improving productivity and maintaining your competitive edge.

Energy saving

We believe strongly in taking responsibility for our shared environment. We always strive to have the most energy efficient products. For example, using our smaller compressed air driven pumps directly as a product in your vacuum solution as opposed to using a mechanical vacuum pump with inherent energy losses through long vacuum lines until it reaches the main suction point. This means that our products save energy and give you more flexibility on where to install your machinery.



Industries

Consumer and Food Industries

The most common application within consumer and food industries is conveying ingredients from big or small bags to different process steps in production or conveying the final product to the packaging line. Piab's range of conveyors can handle powders with particle sizes down to 0.5 micron, capacities up to 10 tons/hour and distances up to 50 meters (160 ft) depending on the conditions of the conveyed material. Piab's conveyors are also designed to handle fragile products such as coffee beans or candy. For applications in these industries, we usually consult our global network of experts to ensure the quality of the conveyed product. Piab conveyors meet the very high hygienic demands (FDA) of the consumer and food industries. The equipment is also ATEX Dust compliant.

Typical applications

- Powder and granules transfer
- Form-fill-seal
- Big Bag loading and unloading
- Drum/bag filling and emptying
- Mill/Sieve/Mixer/Blender filling
- Tablet/Fragile products transfer
- Applications in explosive atmosphere
- Hygienic applications
- Compact applications



Success story from the Food Industry

Wrigley Poland sees reduction in energy consumption, maintenance and cleaning time

WRIGLEY is a name well-known in the consumer goods industry for its wide variety of chewing gum and mints. Wrigley Poland recently decided to follow the company move toward process automation by simplifying its conveying process to reduce downtime.

Piab's C33 conveyors were installed for the transfer of flavoring powders from blenders to presses in the confectionary department, and for the handling of rolling compounds at the sheeting machines.

With the Piab system in place, there is less downtime during the manufacturing of pressed mints and pellet form gum, as the vacuum conveyor and filters are very easy to clean. Since installing the conveyors, Wrigley Poland has reduced cleaning time by about 70%, while maintenance has been reduced to periodical replacement of filters only. Wrigley also reports that the previous system cost the company twice as much as the Piab solution at the same capacity, and was much less reliable. The new conveyors are also more efficient, as their design improves the vacuum-assisted flow by 25% without affecting energy consumption.

Pharmaceutical Industry

The pharmaceutical industry has a very high demand for cleanliness as well as for health and safety. Since many of the different powders produced in the pharmaceutical industry are hazardous or considered being a safety risk, Piab designed its range of conveyors to meet these special demands. Piab conveyors work with an enclosed vacuum system, ensuring that no powder leaks out to the surrounding atmosphere. The equipment is also ATEX Dust compliant. Typical applications for the pharmaceutical industry are reactor filling, feeding tablet presses and conveying the final product (tablet or powder) to the packaging line.

Typical applications

- Powder and granules transfer
- Form-fill-seal
- Big Bag loading and unloading
- Reactor filling
- Drum/bag filling and emptying
- Mill/Sieve/Mixer/Blender filling
- Tablet/Fragile products transfer
- Hazardous powder transfer
- Applications in explosive atmosphere
- Hygienic applications
- Compact applications



Success story from the Pharmaceutical Industry

Reduced cleaning time by 600 hours with C21 conveyor

A contract manufacturer for solid dosage forms develops and produces multi-layered tablets, film-coated tablets, sugar-coated tablets, pellets and hard gelatin capsules. In a highly competitive market, productivity improvements and reduced cleaning times create a strong competitive edge – something the company searched for when looking for new production solutions.



An example of Piab installation for powder transfer.

The C21 vacuum conveyor replaced Piab's own old VC conveyor for the conveying process of powder to tablet presses.

The cleaning process was reduced from three to two hours, giving one hour more production time. The new conveyors also gave improvements in the working environment thanks to lighter equipment and fewer parts of the machine, reducing the possibility of mix-up of parts. The labor cost of cleaning was reduced by €9,000/year and the increased productivity equals to approximately €15,000/year. The return of investment in Piab products was reached in 20 months.

Chemical Industry

The chemical industry often handles aggressive and hazardous powders that require specially designed equipment. Piab conveyors work with an enclosed vacuum system which ensures the highest level of working environment for the operator. Piab conveyors are ATEX Dust compliant.

Typical applications

- Painting/paint coating
- Toner transfer
- Powder and granules transfer
- Form-fill-seal
- Big Bag loading and unloading
- Reactor filling
- Drum/bag filling and emptying
- Mill/Sieve/Mixer/Blender filling
- Hazardous powder transfer
- Applications in explosive atmosphere
- Compact applications



C conveyor

piFLOW™i

Success story from the Chemical Industry

OKI reduces maintenance and downtime with a safe, speedy conveying system

OKI *OKI was founded in 1881 as Japan's first telecommunications equipment manufacturer. At their plant in Glasgow, Scotland, more automated processes and equipment were introduced in order to remain competitive and to meet increased operation requirements. One process they decided to improve upon was the transfer of toner powders from the plant's ground level into filler heads. OKI was also interested in improving the working environment and finding a solution that complied with ATEX legislation and met or exceeded Health & Safety regulations.*

OKI started working with Piab to replace the existing vacuum transfer systems with 28 of Piab's C21 vacuum conveyors. The enclosed vacuum conveyors, safely and quietly transport the toner powder in distances ranging from 4-25m (15-80 ft) and with a total daily throughput of 2,000kg (4,400 lb) of powder.

Mr. Peter Barnes, senior operations engineer at OKI, cited reduced downtime as a major benefit of the Piab conveyors, and stated that the level of technical support required is incredibly low. "Our new Piab systems are extremely reliable, and much more cost effective to operate than the old systems." The conveyors have also proved easy to clean and simple to maintain. OKI also found that the lifecycle of Piab's filters was much greater than that of the previous system's filters, which resulted in significant reductions in the running costs.

General Industry

The General industry often handles abrasive powders that require specially designed equipment. Our conveyors are designed with Stainless Steel body (ASTM 304) to resist wear of parts. Piab conveyors are ATEX Dust compliant.

Typical applications

- Powder and granules transfer
- Form-fill-seal
- Big Bag loading and unloading
- Drum/bag filling and emptying
- Applications in explosive atmosphere

piFLOW™_i



Success story from the General Industry

Reliable conveyors decrease downtime for tile manufacturers



One of Europe's most innovative producers of automatic systems for weighing and dosing applications, Euroelettra, was challenged to provide its customers in the ceramic tile industry a cost-effective and reliable dosing system that was able to safely transport the thin colored metal oxide powders commonly used in production.

Euroelettra included Piab's industrial vacuum conveyors in the design of its dosing system. The industrial conveyor series was able to run successfully with minimal stoppages due to its simple design and ability to safely handle ceramic powders that are traditionally difficult to transport. Hence, utilizing vacuum conveyors that require minimal maintenance and are completely enclosed, Euroelettra's customers can now safely convey up to 2,000 kg (4,400 lb) of ceramic powder per hour. Product quality has also improved as the industrial conveyors supply an even amount of powder to the dosing machines, ensuring that the color of the completed tiles is more consistent.

Piab Quality Standards



Piab offers conveyors for ATEX applications. These conveyors are type examined according to ATEX by a third party. Piab has a quality management system which fulfils the high standards that is required for delivering ATEX equipment on a regular basis.

Since there are special safety requirements for equipment and health protection for workers in potentially explosive atmospheres, the EU has created legislation called the ATEX directives. Equipment that is certified according to the ATEX directive 94/9/EC has to be designed in a way that it cannot cause an explosion during its intended use.

The conveyors fulfil the requirements for the following ATEX zone classification for dust: zone 21 and 22 on the outside and zone 20 on the inside.

Piab's conveyors that are classified for use in potentially explosive atmospheres have specific features.

- All seals/rubber parts between the machine's sheet metal parts are made of dissipative (antistatic) materials.
- All larger plastic parts are made of dissipative (antistatic) materials.
- As a consequence of this, only antistatic variants of filters and fluidization cones are used.

An ATEX-certified conveyor is delivered with CE Declaration of conformity and CE marking that clearly states the ATEX classification and contains the EX symbol.

EX II 1/2 D c +80°C 0°C ≤ Ta ≤ 60°C



The U.S. Food and Drug Administration (FDA) issues a Code of Federal Regulations that regulates what materials can be used in contact with foodstuffs and pharmaceuticals. Piab's C serie of vacuum conveyors consist solely of materials that are in accordance with FDA requirements.

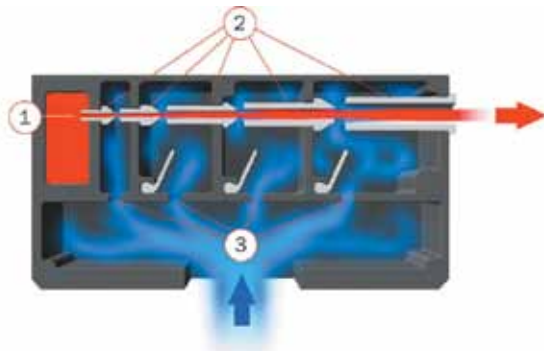


One of the objectives of the United States Department of Agriculture (USDA) is to ensure the quality of food products and the safety of the consumer. USDA reviews and accepts process equipment for dairy products. Piab follows the guidelines from USDA.

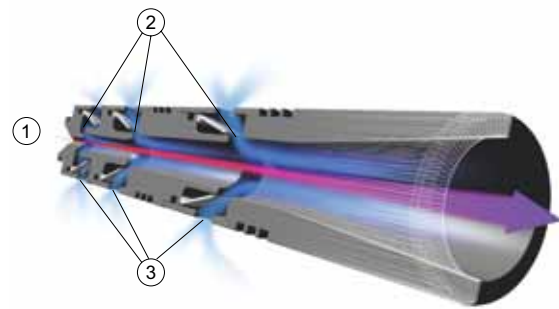
Principle of Piab vacuum pumps

COAX® cartridges are based on advanced technology for creating vacuum with compressed air. The COAX® cartridges are smaller, more efficient and more reliable than conventional ejectors, which allows for the design of a flexible, modular and efficient vacuum system. A vacuum system based on COAX® technology can provide you with three times more vacuum flow than conventional systems, while reducing energy consumption.

When compressed air (1) passes through the nozzles (2), air is pulled through with the stream of compressed air. Suction will be generated at the opening of each stage (3), resulting in vacuum.



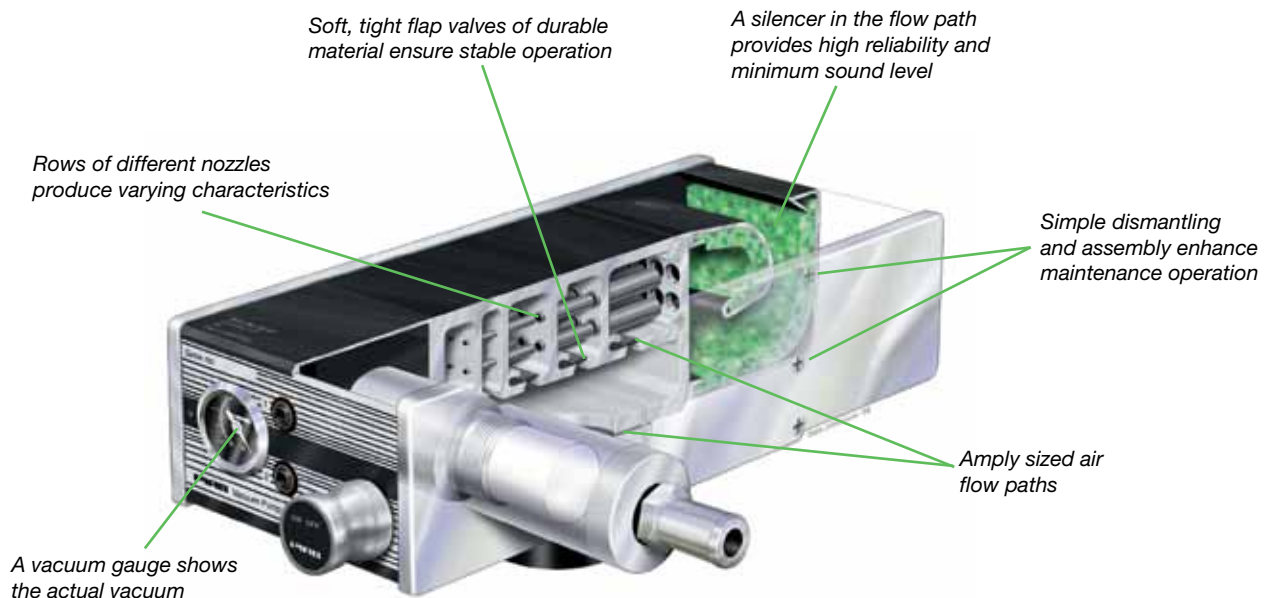
Multi-ejector Piab vacuum pump



Piab vacuum pump driven by COAX® technology

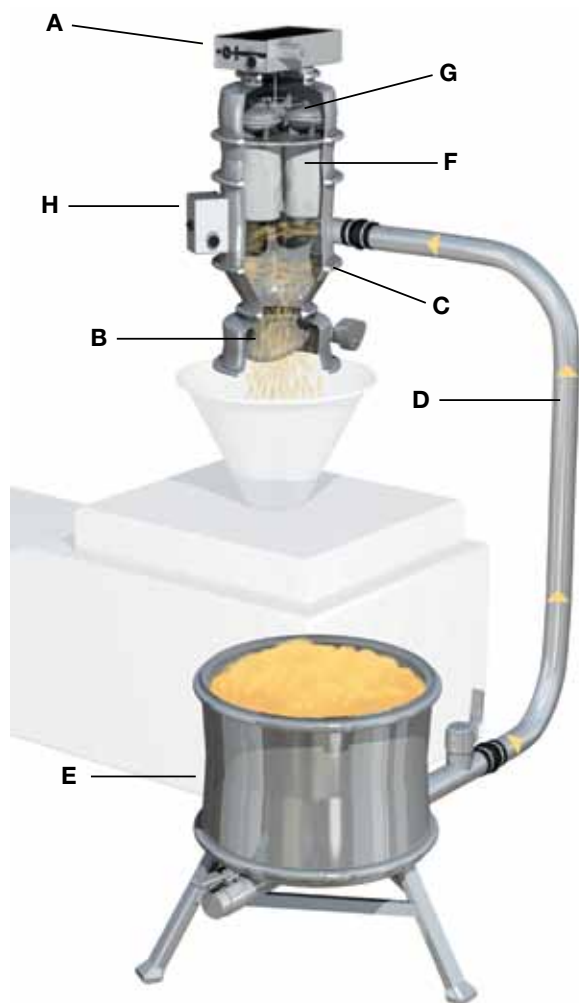
Simple compact design

This picture shows a multi-ejector Piab vacuum pump in cross section.



The principle of vacuum conveying

Conveying various materials such as powder and bulk products are hygienically and efficiently handled by using vacuum in a closed system. Piab's vacuum conveying solutions are designed to improve production efficiency by reducing the need for manual labor that can result in injuries and increased costs.



1. Vacuum is created with a compressed air driven Piab vacuum pump (A). The pump can be automatically controlled.

2. The bottom valve (B) closes and the vacuum increases in the container (C) and the conveying line (D).

3. The powder is carried away from the feed station (E) into the conveying line and then to the container.

4. The filter (F) protects the pump and the surrounding area from dust and small particles.

5. During the conveying time, the air shock tank (G) is filled with compressed air.

6. At a preset time, the pump and the conveying are stopped and the bottom valve (B) is opened. The powder is discharged at the same time as the airshock is activated and the compressed air cleans the filter from dust and small particles.

7. When the pump starts again, this process is repeated and a new cycle starts. The suction time and emptying times are normally controlled by a pneumatic or an electric control system (H).



Product range

Piab has a wide product range that includes different types of vacuum conveyors. One thing they have in common is that they are designed for modularity and flexibility across many industrial segments. The C Series is more suitable when you have higher hygienic demands e.g. FDA. The **piFLOW™** is a more robust conveyor line that is more ample for general industry.

C Modular Conveyor – Flexible

This is a widely used conveyor for a number of applications, primarily in the pharmaceutical, food and chemical industries. Its main advantage is a modular design. You may build from a modular concept to reach capacities up to 10 tons/h, or remove volume modules in a snap when you change material or change your capacity needs. In this range, we have C21, C33 and C56 where the number indicates the diameter in centimeters of the conveying unit.

- All material used that is in contact with the conveyed product is made of stainless steel ASTM 316 L.
- Internal volume is extremely flexible, simply add or remove a module in a quick move.
- FDA certificate for all plastic and rubber parts.
- ATEX Dust certified.
- Test Report 2.2.
- Produced according to the USDA directive.
- The **C2100-64** is a unique conveyor that is compact in design. Ideal for when you only need a limited capacity and have strict restrictions on headroom above your machine. This conveyor is equipped with the most energy efficient ejector available on the market – COAX® cartridges.
- The **C2101-120** is a simplified model with limited options and capacity, equipped with COAX® cartridges.
- The **Unibody** option of C conveyors offers a reduced amount of dirt traps in the powder zone, to meet a higher hygienic demand.



C33, C56, C21



C2100-64



C2101-120



Unibody

piFLOW™i - Basic

This is a basic conveyor widely used in the general industry and sometimes in the chemical industry. It has a high throughput performance as well as a small foot print. This conveyor is often used as an alternative to mechanical conveyors when there is a requirement for dust free conveying or low maintenance. Another advantage is that the pump is based on COAX® technology which is the most energy efficient way to produce vacuum. Capacity up to 4 tons/h.

- COAX® patented technology.
- ASTM 304
- Easy to install.
- Easy to use
- ATEX Dust certified.
- Antistatic filter and seals.
- Cost-effective solution when no hygienic standards are needed, e.g. FDA.



Optimize your vacuum conveyor

Filter

Filter type	Material	Grade of filtration	Applications	Quality standards
Pleated Filter	Polyester	0.5µm	Extreme fine and free flowing powder	ATEX, FDA
Pleated Rod Filter	Polyethylene	0.5µm	Fine powder	ATEX (only the black filter), FDA
Textile Filter bags	Polyester	5µm	Granules	ATEX, FDA, Food quality



Pleated Filter



Pleated Rod Filter



Textile Filter bags

Control units

Piab control units are fully pneumatic operated with an extremely reliable function. The full pneumatic design also removes any source of ignition from the system and at the same time simplifies the validation process.



Control unit CU is integrated in a stainless steel box for hygienic requirements. The unit is design to control all functions of the conveyor with simple installation and settings of the timers. The CU is compliant with ATEX.

Control unit PPT is designed to control the basic functions of the conveyor. The unit can be ordered with or without manual start/stop. The PPT is compliant with ATEX.



The Valve unit VU-EP is designed to convert an electrical signal to a pneumatic signal, when there is a need to control the conveyor with a PLC or similar electrical control systems. The unit is prepared for connection to Piab conveyors main functions and is therefore easy to install.

Feed point

The surrounding air is the carrier of the product and should be added at the feeding point. Is the product to be conveyed directly from a container? Is it to be picked up from up high or down low? Piab offers many different options from Feed Nozzles and Feed Adapters to Feed Stations.



Feed nozzles and suction pipes

To manually feed the conveyor direct from bags, barrels, buckets, etc. The air flow intake into the nozzle can be adjusted to optimize the transport of the product into the conveying line.



Feed adapters

The feed adapters are suitable for Piab feed station, customized hoppers, big bag unloaders or silos. The feed adapters can adjust the carrying air to optimize the transport of the product into the conveying line.



Feed station

The feed station should be placed under a big bag or for dumping small bags. It has fluidization as an option for sticky, bridging, non-free flowing products to make the transport problem-free.

Piping

Pipes have lower friction (faster and gentler conveying) than hoses and should be used in all stationary installations. Total conveying distance, vertical distance, number of pipe bends, diameter, whether you are using steel pipes, vacuum hoses or a combination of pipes and hoses, the type of connections between the pipes, these are all factors to consider when you choose piping system.



Stainless steel pipe bends



PVC hose

Testing facilities

Piab's state-of-the-art testing facilities ensure quality control by allowing you to test our conveyors in combination with your product. Piab's vacuum conveyor testing facilities are specially designed for engineers



Picture from Piab's testing facility in Europe.

in the food, chemical and pharmaceutical industries. Testing ensures you that your material can be conveyed safely, hygienically, quietly and efficiently. Piab engineers secure conveying characteristics over various vertical and horizontal distances. You will receive a report containing all necessary data for the conveying application, such as achieved capacity, filter type, feeding point, tube diameter and accessories. This detailed report allows you to be certain that conveying time and energy consumption are effective. You will find testing facilities in Europe, Americas and Asia.

Warranties

Piab offers a warranty to distributors, integrators and users of Piab products worldwide as per the following definitions:

- A five-year warranty is valid for complete vacuum conveyors excluding controls.
- A five-year warranty is valid for vacuum pumps excluding accessories and controls.
- A one-year warranty is valid for other products.

General warranty principles:

- Piab guarantees against defects in the manufacture and materials by normal use in proper environment, when following the instructions for care, maintenance and control described in the appropriate Piab manual.
- Piab replaces or repairs, free of charge, faulty products provided that these are returned to Piab, and found to be covered by the warranty.
- It is at Piab's discretion whether a faulty product should be sent back to Piab for replacement or if the repair shall be made locally at Piab's expense.
- This warranty does not include wear parts such as filter elements, seals, hoses, etc.
- This warranty does not include subsequent damages caused by defective products.



An example of Piab installation.

Application form for vacuum conveyors

Contact

Distributor:		
Customer:	Contact:	
Address:	Postal code:	
Country:	Phone:	Fax:
E-mail:	Web address:	

Product conveyed

Product conveyed:	Chemical formula:
Bulk density: kg/dm ³ [lb/ft ³]	Particle size: max μm, min μm, majority between and μm
Is the product abrasive? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Flowability: <input type="checkbox"/> Free flowing <input type="checkbox"/> Bridging <input type="checkbox"/> Adhesive <input type="checkbox"/> Hygroscopic	
The product is: <input type="checkbox"/> Static <input type="checkbox"/> Explosive <input type="checkbox"/> Inflammable <input type="checkbox"/> Toxic <input type="checkbox"/> Aggressive in other ways:	
Angle of repose: °	Other properties:

Installation

Capacity: ton/h	Other intervals:		
Total conveying distance: m[ft]	Horizontal: m[ft]	Vertical: m[ft]	Number of bends:
Type of pipe system: <input type="checkbox"/> Hose <input type="checkbox"/> Metal pipe <input type="checkbox"/> Combination	Diameter: mm[in]		
Humidity of the product: %	Hygroscopic moisture: %		
Product picked up from: <input type="checkbox"/> Silo <input type="checkbox"/> Big bag <input type="checkbox"/> Sack <input type="checkbox"/> Drum/Barrel <input type="checkbox"/> Other:			
The installation is: <input type="checkbox"/> Indoors <input type="checkbox"/> Outdoors <input type="checkbox"/> Combination			
The operation is: <input type="checkbox"/> Manual <input type="checkbox"/> Automatic <input type="checkbox"/> Semi-automatic			
Other information:			

ATEX information

Internal zone:	External zone:
Ambient temperature: °C[F]	Temperature of the product: °C[F]

Place and date

Signature / Name in block letters

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No need to compromise

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