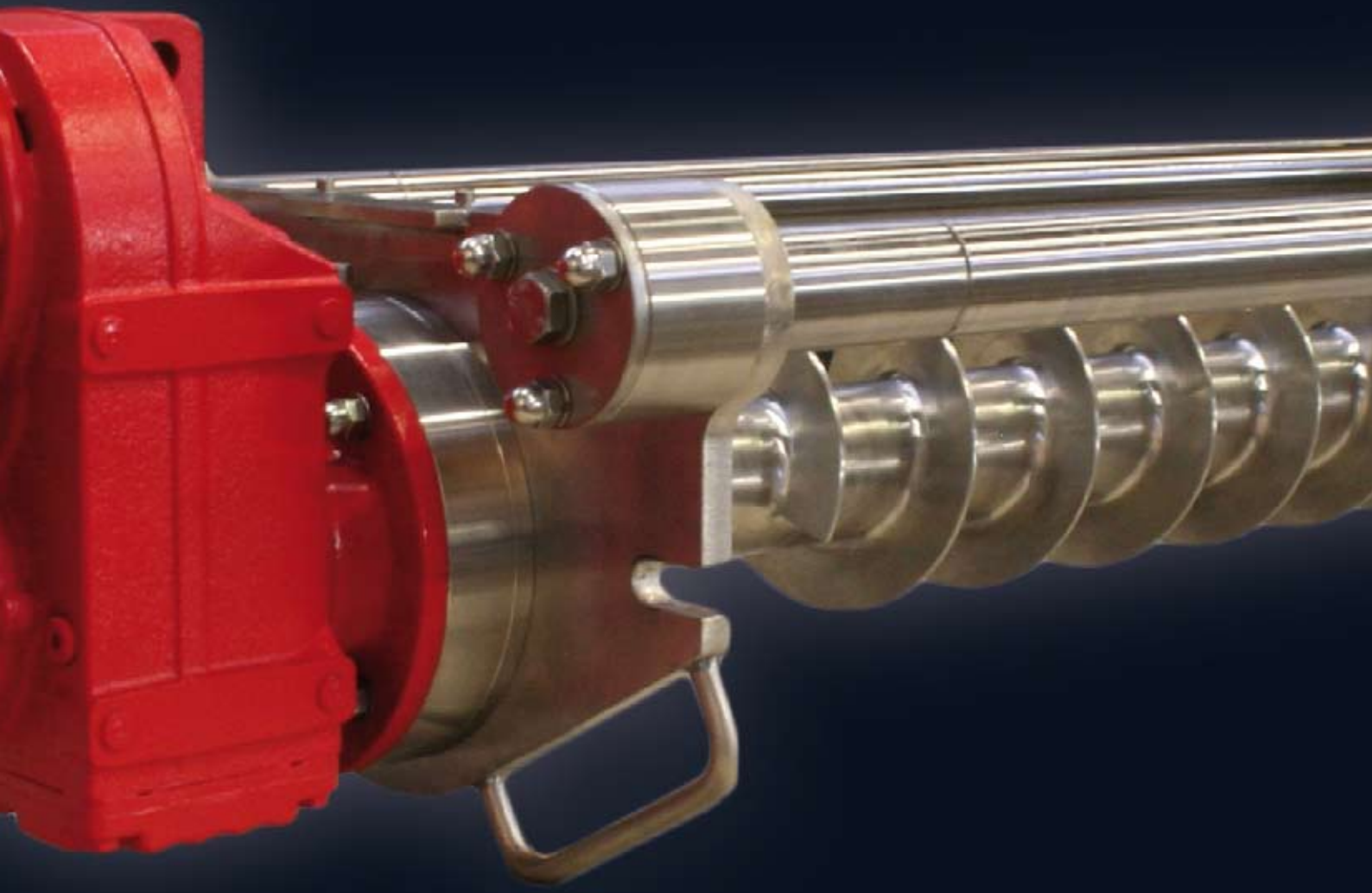
YOUR PROCESS...
...OUR CARE

A→B

DINNISSEN NATURAL INNOVATORS
PROCESS TECHNOLOGY

CONVEYING AND HANDLING



Conveying and handling

The critical step in your production process

Conveying and handling are critical steps in every production process. Dinnissen Process Technology develops and produces a complete range of pneumatic, mechanical and aero-mechanical conveying systems for companies in the feed, food, petfood, pharma and chemical industries. These systems offer our clients flexible and effective solutions for the supply, removal and convey of powders, granules and flakes in every conceivable situation. Our products range from standardized and fairly simple solutions to extremely complex, fully customized systems which comply with all your requirements in terms of speed, capacity, energy consumption, durability and hygiene, and are also suitable for handling ingredients that are fragile and/or susceptible to caking and sticking. Our conveying and handling systems can also be integrated with other process techniques. With over 60 years of experience in handling, weighing, mixing, grinding, screening and packaging bulk goods, Dinnissen is a leader in its chosen field of activity.

Over 60 years of experience

Over 60 years of experience in bulk handling and solids processing for the food, feed, petfood, pharma and chemical industries.

Dinnissen develops, tests and builds all its solutions at its own facilities

In developing our systems, we leverage our process expertise, years of experience and proprietary advanced calculation programs. In doing so, we focus on your requirements in terms of conveying distance, speed, capacity, durability and final product quality. We also take a range of system parameters into account, including, pressure length and diameter of the pipeline. Our in-house D-innocenter® testing facility enables us to fully test all the systems we develop using products from your own production process. This ensures you beforehand that the solution developed by us will work effectively and efficiently in your facilities. Dinnissen puts systems into operation and provides reliable service all over the world.

Your products tested beforehand

Your products and/or processes tested beforehand on our machines, guaranteeing optimum results.

Pneumatic conveying

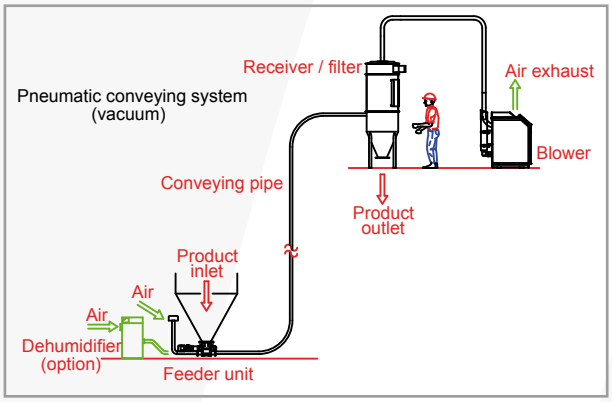
Proven and classic method provides effective solutions in many situations
Air-based conveying is one of the most frequently used methods to convey bulk goods. Dinnissen offers clients the following pneumatic conveying systems:

Vacuum conveying (underpressure)

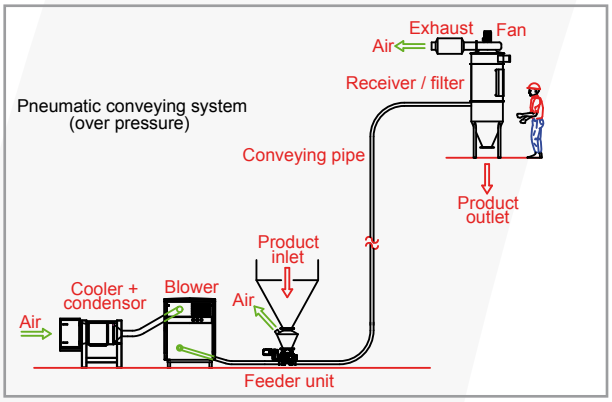
Vacuum conveying can be used to convey powders, granules and flaks with the help of a controlled flow of air or gas. Vacuum conveying makes it possible to convey ingredients from one or more inlet points to a single receiving or handling unit on condition that the ingredients are supplied in a fairly steady flow. An advantage of vacuum conveying is that additional cooling of the air flow used for conveying is generally not needed. In pneumatic vacuum-based conveying systems, the pump is placed after the receiver. As vacuum conveying is based on underpressure, there is practically no release of dust or fine particles even when hatches or linking components are opened. This makes vacuum conveying particularly well-suited for situations in which very strict criteria need to be satisfied in terms of hygiene and a dust-free environment.

Blow conveying (overpressure)

Blow conveying is a form of pneumatic conveying based on a flow of air or gas pushing the materials forward. In such systems, the pump is placed at the start of the system. Blow conveying makes it possible to transport ingredients from a single input location to one or more receiving units. A changeover system can be used to select the receiving unit in use, ensuring effective control of ingredient input. Blow conveying offers an effective solution for situations in which fine particles and dirt must be prevented from entering the production processes.



Vacuum conveying (underpressure)



Blow conveying (overpressure)

In-house development and manufacturing

Our products and custom-made solutions are developed, tested, manufactured and installed by our own people, providing you the best possible assurance in terms of quality and delivery time.

Pneumatic conveying characteristics

- Flexible deployment
- Suitable for conveying over long distances (max. 700 m)
- Conveying capacities from 10 kg to 50 tons per hour
- Compact and easy to integrate into other systems
- Hygienic, fast and easy to clean
- Suitable for fragile materials and materials that can create a dust explosion risk
- Impermeable to gas and dust/fine particles
- Suitable for inert and closed loop systems
- Can be easily integrated into automated production processes
- Can be combined with processing (cooling/drying)
- Very reliable
- Allows the use of cooling systems for fat-containing products
- C.I.P. cleaning
- Low-maintenance
- Anti-wear and tear bends (sustainable systems)
- Minimizes abrasion of product particles (via slow flow)
- Closed system
- Also suitable for heterogeneous particles (in weight and/or shape)
- Suitable for ingredients that are difficult to transport

Easy to clean: separator with retractable filter unit



We take care of your entire process

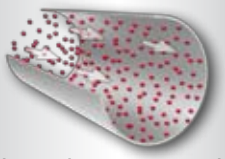
Product intake, transport & handling, feeding, weighing, mixing & processing, milling, sifting and packaging: your entire process chain is in good hands at Dinnissen.

Dilute phase conveying

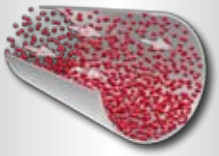
Dilute phase conveying is a form of pneumatic conveying in which the material conveyed is mixed with a large quantity of air/gas. As a result, the material 'glides' through the system as it were. This conveying method is characterized by relatively high conveying speeds. The loading level in dilute conveying systems is low, thereby minimizing damage to the product. The relatively large flow of air used in dilute phase conveying makes it possible to introduce functionalities such as cooling and drying during conveying. A high-pressure ventilator/blower or vacuum pump is often used to generate the conveying medium. Dilute phase conveying systems are reliable and robust, making them suitable even for situations in which the materials handled are supplied in a non steady flow.

Conveying distance: up to ca. 700 m
Maximum capacity: 50 tons per hour
Final gas speed: 20 - 30 m/s

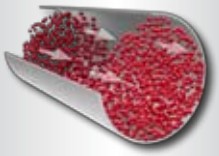
Features



Dilute phase conveying (low loading level)



Slow Flow



Dense phase conveying (high loading level)

Integrated approach to deal with complex challenges

When dealing with complex challenges, we start by putting together a project team of our most experienced specialists. By working together as a team from day one, we can solve even the most difficult challenges.

Dense phase conveying

In dense phase conveying, the materials move through the conveying pipeline in the form of a 'plug' as it were, whereby the flow of air/gas pushes the dense material forwards. This type of conveying is characterized by relatively low conveying speeds and a low consumption of air/gas. A medium-pressure compressor is often used to generate the necessary flow of air/gas. Dinnissen distinguishes between two systems of dense phase conveying:

1 Dense phase with high-pressure slide gates

These conveying systems are based on high-pressure slide gates which make it possible to feed bulk materials into a conveying system even at high pressure differentials. These systems have high loading factors and low rates of gas consumption. They are suitable for continuous production processes and minimize product damage.

2 Dense phase with pressure vessel-based conveying

The use of pressure vessels makes it possible to convey materials through the system in various ways. This type of conveying is characterized by low speeds, high loading factors and low rates of gas consumption. It is suitable for products that are easily abraded and for discontinuous production systems within a dust-free environment. Such systems do not have any rotating parts.

Conveying distance: up to ca. 700 m
Maximum capacity: 50 tons per hour
Final gas speed: 4 -15 m/s

Slow flow / Medium phase conveying

Working in a hygienic, dust-free and compact environment with a minimum consumption of gas/air

Criteria in terms of working hygienically, safely and efficiently are becoming increasingly stringent for a great many environments in the feed, food, petfood, pharma and chemical industries. To satisfy these demands, Dinnissen has developed a special slow flow conveying system. The central focus of the slow flow concept design is to allow for fast and thorough cleaning and to completely prevent the intrusion of even the finest particles into the conveying system. The optimum air-gas to load ratio realized results in relatively low conveying speeds. This makes slow flow technology very suitable for products that are fragile or easily abraded as well as fat-containing products such as milk powders, sugar, instant powders, sand, chalk, milk and cocoa.

The slow flow concept makes it possible to work with extremely compact receiver systems, which can be easily and quickly cleaned and easily integrated into new as well as existing environments. The compact design of the system also results in low gas consumption and makes it possible to work with compact air control systems and a smaller air filter as well as lower energy consumption.

Depending upon the specific situation and user requirements and wishes, Dinnissen can expand the slow flow conveying system to include special options. For example, options are available to increase capacity, prevent the entry of even the finest particles, or provide automatic cleaning functionality. Additional options include the integration of extremely accurate measuring and weighing equipment, generating overpressure or underpressure, the use of inflatable seals and automatic cleaning on the basis of air flow. A blower/compressor (medium pressure 0.2-0.5 bar) is often used to generate the conveying medium. The slow flow concept is well-suited for use in continuous systems.

Conveying distance: up to ca. 700 m
Final gas speed: 8-18 m/s

In-house service department

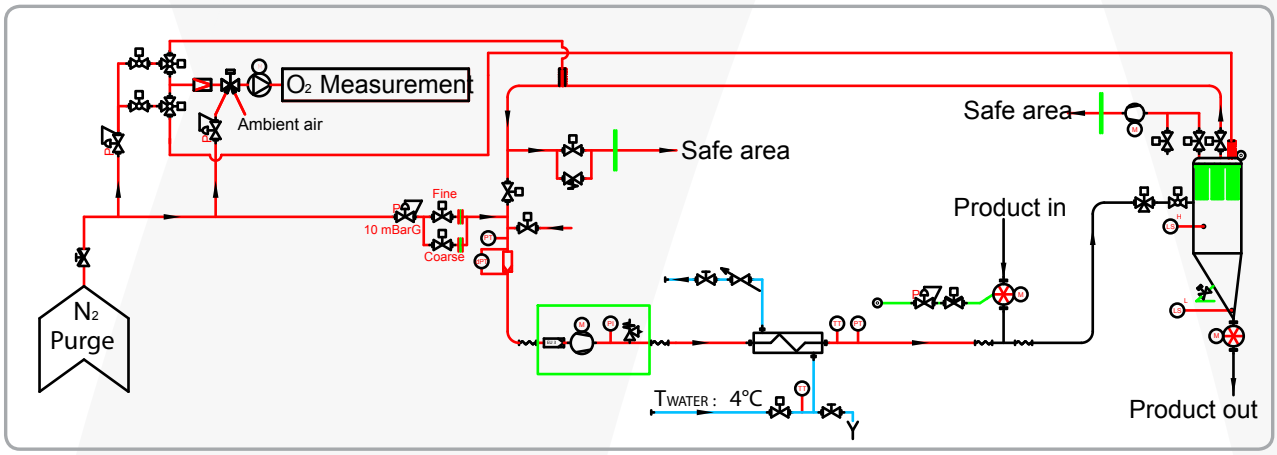
Our in-house service department helps prevent problems and resolves any issues that may arise quickly and efficiently.

Slow Flow conveying characteristics

- Continuous system
- Higher loading factor
- Low gas consumption
- Minimum product damage
- Compact design
- Hygienic
- Ideally suited for debottlenecking of existing systems

Closed loop

Closed loop systems are closed conveying systems in which air is replaced by another gas such as nitrogen as a conveying medium. This makes such systems suitable for inert, explosion-free and oxidation-free conveying systems. Dinnissen also offers options for gas recovery to minimize the consumption of expensive gases.



Your products tested beforehand

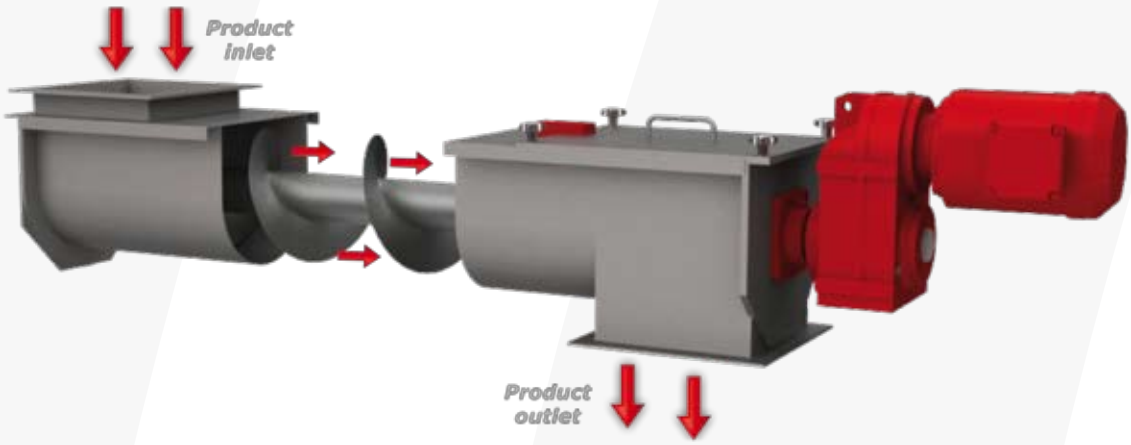
Your products and / or processes tested beforehand on our machines, guaranteeing optimum results.

Mechanical conveying

An effective option for materials that are difficult to convey and pose a risk of explosion
Mechanical conveying can be an effective option in particular for situations in which heavy, doughy, or fragile products need to be conveyed as well as for products that pose a risk of explosion. Dinnissen offers clients various mechanical systems with horizontal, vertical or diagonal conveying.

Screw conveying

Screw conveying is based on a screw that turns around to convey products through a system of pipes. Dinnissen supplies systems with single or double screws and even concave screws (i.e. 2 to 4 screws that overlap) that allow you to convey products that are viscous or sticky or cake easily, such as cheese spread, filter cakes and wood chips. We supply screw conveying systems suitable for conveying tiny quantities to very large quantities per hour. For environments subject to rigorous hygienic requirements, Dinnissen supplies special systems fitted with screws that can be easily removed or with shaft-free screws, which can be cleaned quickly and easily. A screw conveying system with a low loading factor is extremely well-suited for conveying fragile products.



In-house development and manufacturing

Our products and custom-made solutions are developed, tested, manufactured and installed by our own people, providing you the best possible assurance in terms of quality and delivery time.

Conveyor belt systems

Conveyor belt systems offer the advantage that they convey products without shaking them. This makes them suitable for conveying ingredients that are fragile or sticky or pose an explosion risk. The conveyor belt systems supplied by Dinnissen are very well aligned, which means that the conveyor belts will continue to run smoothly for a long period of time. We also make sure that the loading factor and tension applied to the belts are correct. In combination with our range of handling accessories customized to specific products (granules, flakes etc.), these systems ensure that the ingredients conveyed remain in place on the conveyor belt even in case of vertical or diagonal (up to 60°) transport.

Chain conveying and disc conveying systems

Chain and disc conveying systems are based on plastic discs attached to a chain or cable. As the chain or cable is pulled through a system of pipes, the free-hanging discs push the ingredients through the system. Chain based and disc based conveying systems are especially useful for conveying products that are easily abraded, fragile or fluidizable and can achieve very high capacities (up to 300 tons per hour).

Vibrating conveyors

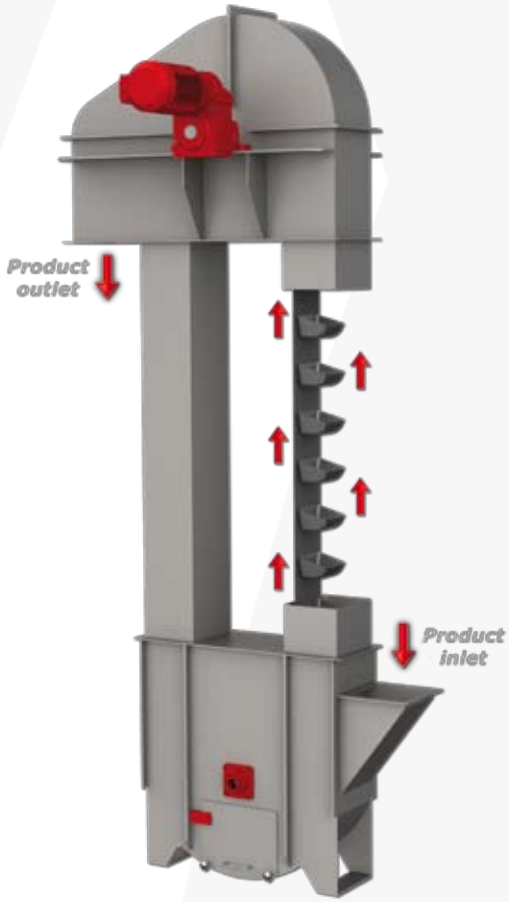
Vibrating conveyors use a pipe or gutter shaped component through which ingredients are conveyed with the help of vibrations. Such systems contain no moving parts, making them relatively easy to clean. This type of conveying is particularly suited for fragile powders and granules.

We take care of your entire process

Product intake, transport & handling, feeding, weighing, mixing & processing, milling, sifting and packaging: your entire process chain is in good hands at Dinnissen.

Elevators

Vertical conveying can be realized most effectively using an elevator. Such systems are based on wear-resistant containers mounted on a non-stretch belt or durable chain. Depending upon the specific situation, elevator based conveying can be carried out vertically or in a Z- or U-shaped pattern. Shuttle cups can also be used for granulates or very fragile products. Elevator based systems are reliable, energy-efficient, less susceptible to contamination and maintenance friendly. They are suitable for conveying ingredients that are sensitive to wear and tear, abrasion and breakage, such as sugar, compound feeds, chemicals, chalk, sand and cement. Dinnissen supplies elevator systems and can also ensure that an appropriate pre-dosing system is installed. The containers are available in polished or unpolished stainless steel, plastis and in wear-resistant steel.



Over 60 years of experience

Over 60 years of experience in bulk handling and solids processing for the food, feed, pharma and chemical industries.

Aero-mechanical conveying

A sophisticated combination of mechanical and pneumatic conveying
Aero-mechanical conveying offers a solution for moving ingredients within a (pneumatic) conveying system upwards at an angle of 45° to 90°. A screw with a high turning rate (200 to 600 RPM) provides a combination of mechanical and pneumatic conveying. Powders, granules and flakes are quickly sucked up in the whirling flow of air and then powerfully pushed and sucked upwards in a suspended state. Capacities of up to 70 tons per hour and vertical conveying heights of up to 15 m can be realized at relatively low rates of energy consumption. At the outlet, bulk goods are unloaded via the centrifugal force. Aero-mechanical conveying is a pressure-free concept implemented without the use of filters, blowers or other equipment. Aero-mechanical conveying systems can be fitted with several inlet and outlet points. They offer a closed particle-free system with low investment and maintenance costs.

Conveying distance: 2 - 15 m
Maximum capacity: 70 tons per hour



Your products tested beforehand

Your products and/or processes tested beforehand on our machines, guaranteeing optimum results.

Table comparing different conveying devices

	pneumatic conveying	screw-conveying	belt-conveyor	disc-conveyor	chain-conveyor	elevator/container conveying
contamination	++	--	+	-/+	--	--
hygiene	++	--	-	--	--	--
product breakage	-/+	-/+	++	+	-/+	-/+
dust-free	++	++	--	+	+	+
robustness/reliability	++	++	-/+	-/+	-/+	++
energyconsumption	--	++	++	-/+	-/+	++

++ VERY SUITABLE + SUITABLE -/+ SATISFACTORY - MEDIOCRE -- UNSATISFACTORY

Service and warranty all over the world

A global network of reliable dealers and agents guarantees you fast and accessible service wherever you are.

Material handling

Dinnissen Process Technology develops and supplies systems for docking and conveying bags, containers, big bags and drums. Therefore we use belts, (big-bag) roller conveyors or chain conveyors. We also supply revolving tables, empty pallet stations, conveying points, traverses and unloading points. We integrate conveying and handling systems into unified solutions, whereby the separate systems are seamlessly integrated with each other. The end result is that you are ensured of an effective and efficient system which fits seamlessly into your overall production process.

We manage and control the entire process

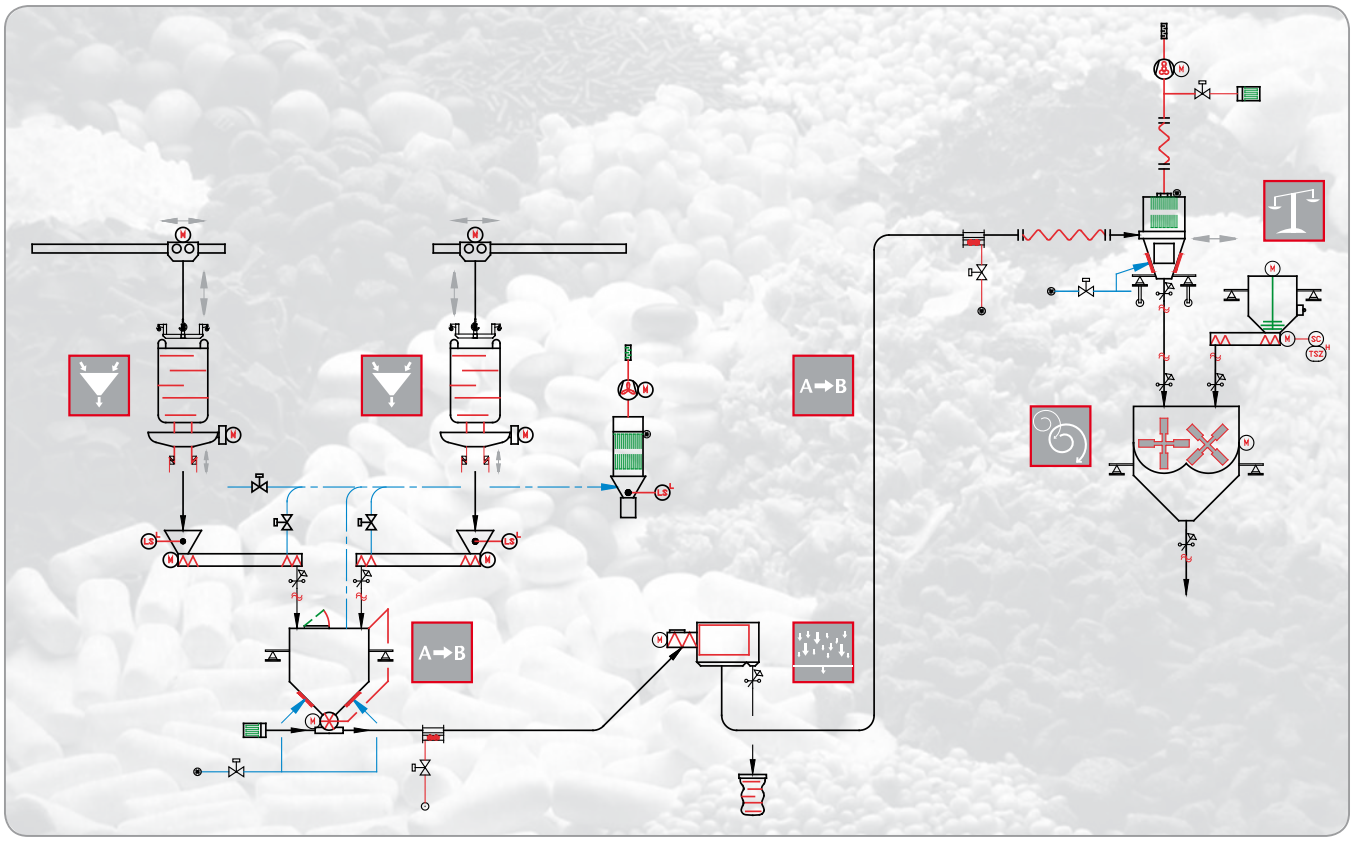
With over 60 years of experience in process technology, our knowledge is not limited to handling the flow and supply of ingredients and products. We can provide you with effective and efficient solutions for transporting even the most difficult powders and for precisely weighing, dosing, screening, grinding, mixing and packaging a wide range of materials. We design and develop our products and solutions at our own in-house facilities and have extensive manufacturing and service departments.

Prior testing is your best guarantee for good results

Our D-innocenter® testing facility enables us to develop new techniques and carry out trial runs with your products on our equipment. By working together with you, we can provide optimum solutions that are tested beforehand to guarantee the best results.

We take care of your entire process

Product intake, transport & handling, feeding, weighing, mixing & processing, milling, sifting and packaging: your entire process chain is in good hands at Dinnissen.



Total process with: feeding, pneumatic conveying, inline sifting, mixing etc.

Seven forces of Dinnissen

- More than 60 years of experience
- Your products and/or processes tested beforehand on our machines
- In-house development and manufacturing
- We take care of your entire process
- Integrated approach for dealing with complex challenges
- Service and warranty all over the world
- In-house service department helps prevent problems and resolves them quickly and efficiently

YOUR PROCESS...
...OUR CARE

PET FOOD | FOOD | RECYCLING
AQUA FEED | LIFE SCIENCE | MINERALS
FEED | PHARMACEUTICAL | DETERGENTS
CHEMICAL | PLASTICS

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