

# OUR MOST POPULAR **BULK GOODS HANDLING** **SYSTEMS** AT A GLANCE



Belt conveyors, elevator conveyors,  
pneumatic conveyors, screw conveyors,  
aeromechanical conveyors or  
vibrating conveyors?

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THE STANDARD IN SCREW CONVEYING

## SUMMARY

Are you looking for a solution for the internal conveyance of loose bulk goods and you are unsure which technology would be best suited to your situation? Then we advise you read this white paper, which describes the key decision-making considerations showing both the advantages and disadvantages of each technology.

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## INTRODUCTION

Belts, buckets, air, cable, screw or vibratory feeder? Each type of conveyor has its own underlying technology and associated pros and cons. In any event, don't be influenced solely by the cost of your purchase, because the most appropriate solution will ultimately yield more profit in the long run!

## WHAT CRITERIA DOES A CONVEYING SOLUTION NEED TO MEET?

A good conveyor solution will enable you to transport your bulk product's from A to B as reliably and safely as possible. Your employees will not run any safety risks, the product will meet all your requirements, and both you and your customer will be satisfied.

It must also meet all requirements in terms of cleaning, repair and spare parts. It may appear simple, but in reality it isn't.





## EXPLANATION OF THE DIFFERENT TYPES OF INTERNAL CONVEYING

When it comes to choosing one or more internal conveyors for loose bulk goods, there are several options:

- a conveyor belt
- a bucket elevator
- a pneumatic conveyor
- a screw conveyor
- aeromechanical conveyor
- a vibrating conveyor

## THE CONVEYOR BELT

*A relatively cheap method of conveying*

### How does it work?

Conveyor belt or process belt is probably the best known. With this static mode of conveying, the bulk goods are loose on the belt. It is used, for example, in the food industry when the product must not be damaged. Or where long distances must be covered.

### The benefits

A conveyor belt has many options. The length, width, height, speed and material are available in many variations. You can also perfectly match the materials and design of the belt to the type of product and your conveying requirements. For instance, there are conveyor belts with profiles or so-called carriers which enable products to be conveyed without any restrictions.

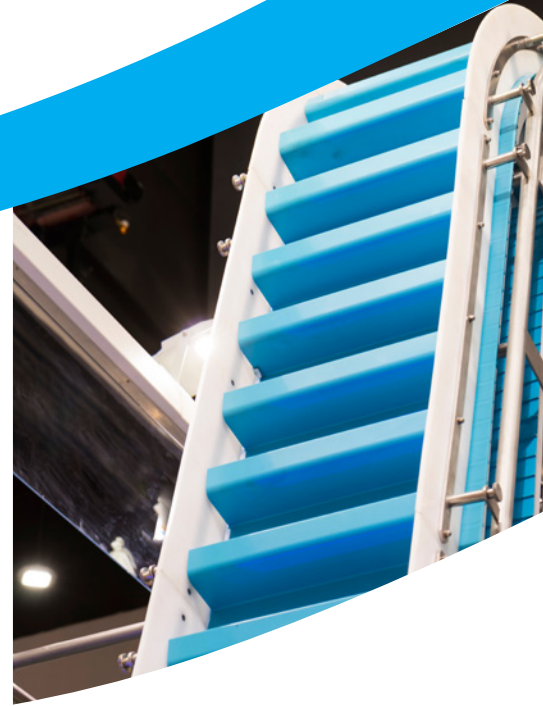
### The disadvantages

This brings us to the limitations of a conveyor belt. Depending on the type of product, the lift angle will always be restricted to 20°. Other issues to consider with smooth belts without carriers/profiles are the amount of floor space required, spillage, returns, risk of belt mistracking, contamination of belt components by the product, and wear on the many rotating parts. Also, the longer the belt, the more idlers and other moving parts there are to maintain and replace.



**TIP:** Involve suppliers of conveying technologies in time regarding the layout of your building, plant or warehouse. They will be able to advise you on how to connect process machines, and will make suggestions regarding a simpler or more pragmatic configuration for your machines.





## THE BUCKET ELEVATOR

*For vertical conveying of pellets and granules*

### How does it work?

Bucket elevators scoop the product with buckets that are raised vertically using a chain.

### The benefits

What are the advantages of this static-mechanical solution? The large height difference that can be bridged using this solution, and - in relation to a conveyor belt, for example - the small floor area the bucket elevator occupies.

### The disadvantages

A possible drawback is that this system creates a lot of air movement, which can lead to dust being deposited in unwanted areas. Dust may also be released during scooping. You can avoid this by fitting an enclosure with an extraction system and filter, so that no product is released into the surrounding environment. Dust may, however, still be released during unloading. There may also be a risk of explosion. Strain on the chain and wear on moving parts are also characteristics of this type of internal conveyance.

### Designed especially for abrasive or aggressive products: the Z-elevator

A variant is the Z-elevator, which combines vertical and horizontal conveying, and is suitable for abrasive products such as fly ash, coal and sand. Here, too, an enclosure may be needed to prevent dust emission. This system - similar to the bucket elevator - contains a relatively high number of dead zones when scooping.



**TIP:** a conveyor system that is poorly accessible for maintenance or to repair a fault? It's preventable. Suppliers of conveyor solutions can work with you to determine the best configuration so that critical components are always easily accessible.



## THE PNEUMATIC CONVEYOR

*Conveying over longer distances with multiple bends and angles*

### How does it work?

Pneumatic conveyors are conveyors that use air flowing through a tube. There are several technologies: by blowing (overpressure), sucking (vacuum) or in batch (by using a dome valve, where the product is projected away by air pressure).

### The benefits

Pneumatic conveyors excel in the long distances they are able to bridge, up to 150 metres, and the fact that the product flow can be directed past (complex) corners and curves. It is also one of the safest and most maintenance-free ways of internal conveyance, provided the products being conveyed are powders, granules or pellets, and not abrasive products.

### The disadvantages

The air used for conveyance must eventually be separated from the product. This can be done with a cyclone. In addition, the tube through which the air transport takes place must be highly resistant to impact from the product, especially in the bends. Furthermore, it must be taken into account that the product may suffer damage at high air speed: also be aware of any possible dust formation and loss of product. When the airflow drops, residual product may remain in the system. In addition, only smaller quantities of product are able to be transported using this system.



## THE SCREW CONVEYOR

*Reliable, low-maintenance and compact conveyor at all angles*

### How does it work?

A screw conveyor (Archimedes' screw) is one of the oldest methods for conveying bulk product. The mechanical part consists only of external bearings and a drive.

### The benefits

This relatively simple technology composed of few parts makes this form of conveyance very reliable. Transport at all conceivable angles is possible. Because the product is conveyed in one direction only, there are no returns. And, because it is a closed system, there is no contamination from inside to outside or vice versa.

### The disadvantages

In principle, the screw is not accessible for cleaning. Although if fitted with hinged lids, there will be that option. Consider Cleaning In Place (CIP) and the option of driving the screw out of the system. All screw conveyors are equipped with safety devices. This makes it very important to always follow each machine's operating instructions to eliminate the risk of crush injuries caused by rotating parts. Then there is the risk of a slight damage to fragile products. Tests can reveal whether the degree of potential damage is within the acceptable damage limits.



*“Conveyor systems are the main arteries  
of your production process.”*

## THE AEROMECHANICAL CONVEYOR

*Quiet and energy-efficient*

### How does it work?

Take a tube, a steel or stainless steel cable with discs fitted to it, combined with dry bulk goods. Pull the cable through the tube at high speed and an air flow is created. This conveying technology is widely used in the food and chemical industries, among others.

### The benefits

The negative pressure between the discs creates so-called air pockets, enabling the efficient transport of product. Another advantage is that this type of transport is noiseless and can operate at all angles. Aerodynamic transport is also a good option when sensitive bulk goods need to remain undamaged.

### The disadvantages

This system, which is a mix of pneumatic and mechanical transport, cannot run at full load so the product must be metered. Furthermore, the potential of the cable bending on the cam wheels can cause a wire to break (unobserved). If any material is loosened in consequence, it will mix with the product. As these are usually very small particles, the metal detector will not always discover them. The result is suspicious product which, in the worst case, is detected too late.



## THE VIBRATING CONVEYOR

*For optimal distribution of bulk goods such as powders, pellets and wood chips*

### How does it work?

This mode of conveyance consists of a chute fitted with a spring package and rubbers. By using a vibrating motor, vibrating magnet or unbalance shafts / an electric motor, the chute is made to vibrate. The bulk goods are moved in a linear direction and continuous shaking of the chute distributes the product automatically and evenly.

### The benefits

Detection and monitoring of product is very easy as it is conveyed in a so-called 2D layer. This system is easy to clean. However, the main advantage of this form of conveying is that the transported product does not come into contact with moving or rotating parts, therefore any crushing is prevented.

### The disadvantages

If there is a mix in (grain) size and/or a difference in specific weight of the individual raw materials, segregation of the product may occur. Furthermore, the materials must be dry to prevent them from caking or sticking to the channel. There may also be dust emission, which can be prevented by using devices such as covers and/or chute at the inlet and outlet.



## OVERVIEW OF TYPES OF CONVEYANCE

	Conveyor belt	Bucket elevator	Pneumatic conveyor	Screw conveyor	Aeromechanical conveyor	Vibrating conveyor
Low-noise	+++	+++	-	+++	+++	-
For long distances	+++	+	++	-	+	+++
At all angles	Up to 20°	Yes	Yes	Yes	Yes	Yes
Energy efficient	Yes	Yes	No	+	No	Yes
Easy to clean	No	No	Yes	+(+)	No	Yes
Hygienic	No	No	Yes	Yes	No	No
Low-maintenance	No	No	Yes	Yes	Yes	Yes
Residual product	No	Yes	No	Yes	Yes	No

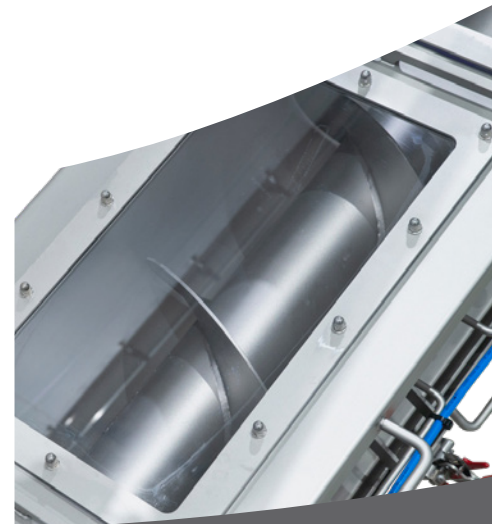
*+* = 'somewhat suitable' / 'somewhat'    *++* = 'suitable'    *+++* = 'very suitable' / 'excellent for'    *-* = 'not suitable' or 'not'

## CONCLUSION

Which conveying technology suits your situation best, depends on several factors. Also, remember that different conveying technologies are not mutually exclusive. Reputable suppliers often work together to find the best solution for a conveying task. We can refer you to our partners if required.

**Would you like advice on which transport technology is best suited to your process?**

Then why not **get in touch** with us! We will be happy to tell you all about screw conveyors and other means of conveying as a link between different steps in a production process.







If screw conveyors are not your area of expertise and the demands are high, you need to be able to rely on a company which not only has this expertise in-house, but also a proven track record. Van Beek screw conveyors have it all. We sell, design, manufacture and supply customer-specific screw conveyors, bulk truck loaders and screw heat exchangers. We accomplish all this with our team of over 50 enthusiastic and highly skilled employees based at our offices in Drunen, the Netherlands.

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