



CLAUDIUS PETERS

# Pneumatic Conveying Technik

We know how

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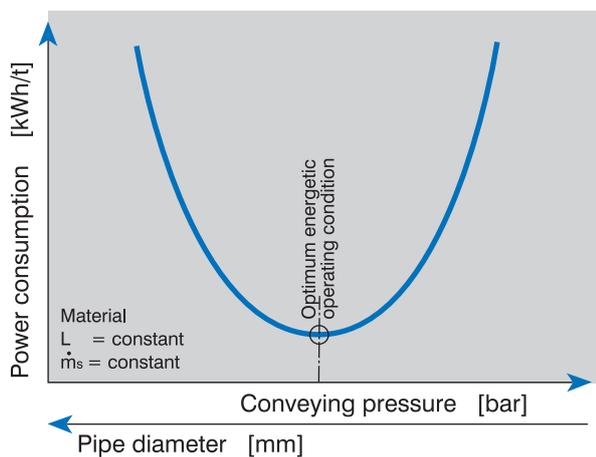
# Claudius Peters

## About us

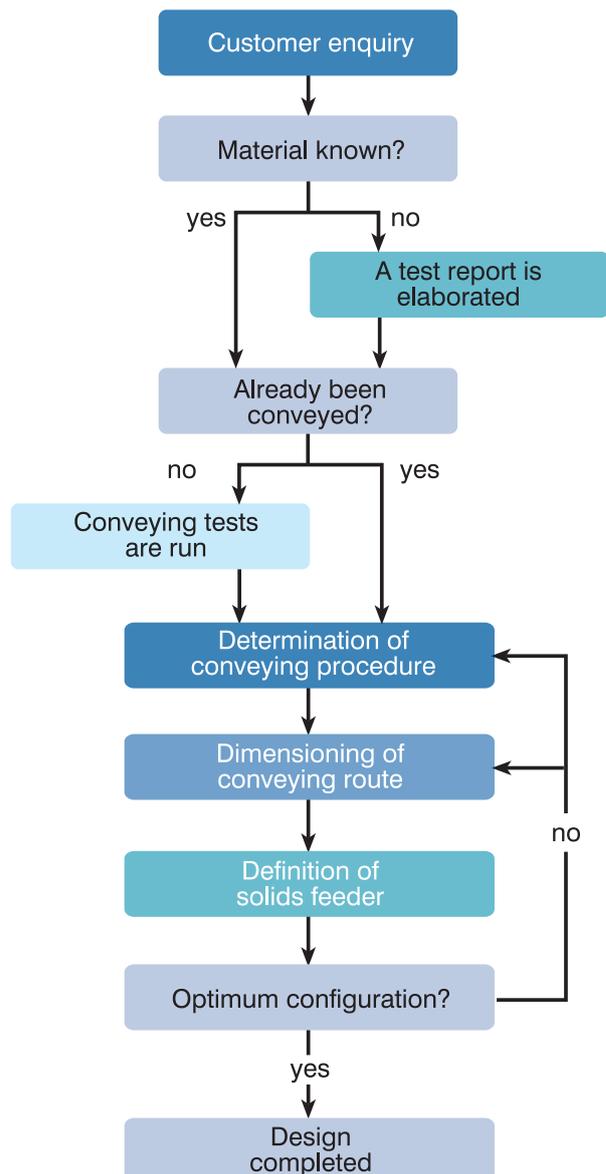
Claudius Peters Projects GmbH, Germany and Claudius Peters Technologies SAS, France are part of the Technologies Division of Claudius Peters Group GmbH, headquartered in Buxtehude, near Hamburg, offering technologies in the field of materials handling and processing and providing turnkey or semi-turnkey systems to a wide range of industries. Claudius Peters Group GmbH is a wholly owned subsidiary of Langley Holdings plc, a privately controlled UK engineering group, with regional offices in the Americas, Europe, China and the Far East.

Claudius Peters is one of the world's leading suppliers of pneumatic conveying systems. Our experience includes the handling of more than 13,000 different bulk solids, which we have analyzed to determine the appropriate conveying procedure. Claudius Peters can deliver the complete plant including examination of the bulk solids, selection of the conveying system and the surrounding auxiliary components. Erection and commissioning of all systems are provided by Claudius Peters.

## It all starts with the material to be conveyed...



Claudius Peters can either analyze a material sample or work to the client's specification to design the necessary pneumatic equipment, including the bulk solid feeder, the air supply equipment, the conveying pipeline and the air/solid classifier. The flow diagram below shows our working procedure which is certified according to DIN EN ISO 9001.





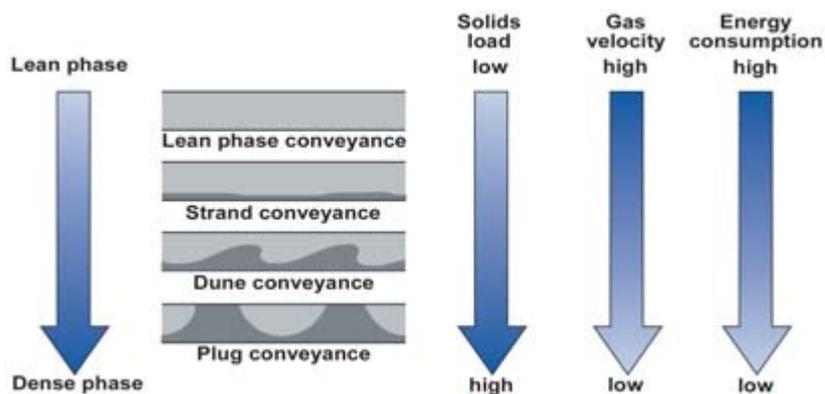
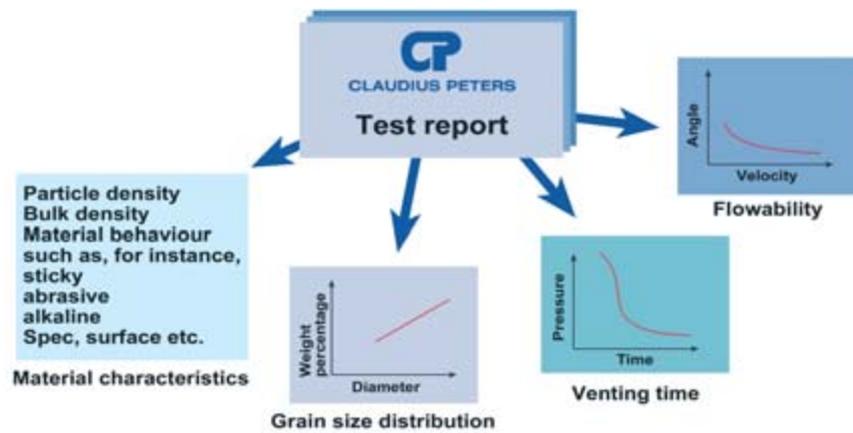
## An experienced partner in conveying technology

The Claudius Peters Technikum (Technical Center) offers clients the advantages of a laboratory for bulk solids and a test facility equipped with all types of conveying systems. Conveying lines up to 800m long with different pipe diameters are available. Our laboratory gives us the capability to design and supply systems which are optimally calculated with regards to process, cost and operating parameters.

In the Claudius Peters Technikum, different conveying procedures can be tested with any operating condition with regards to loads, gas velocities, conveying pressures and conveying distances. The wide range of tests, backed up by years of experience, allow us to design reliable conveying systems with minimal power consumption.

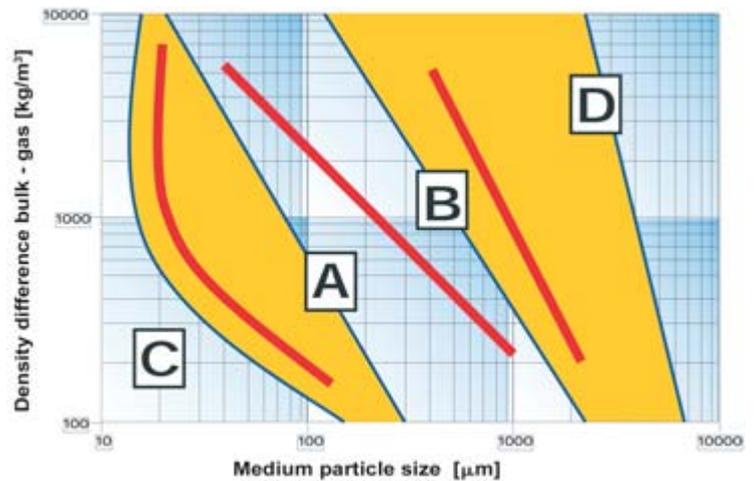


Each material examined in our laboratory is documented in a test report. The materials are measured for deaeration time, density, humidity, wall friction angle, etc. The data is supported by EDP and is used for the optimum design of the plant.



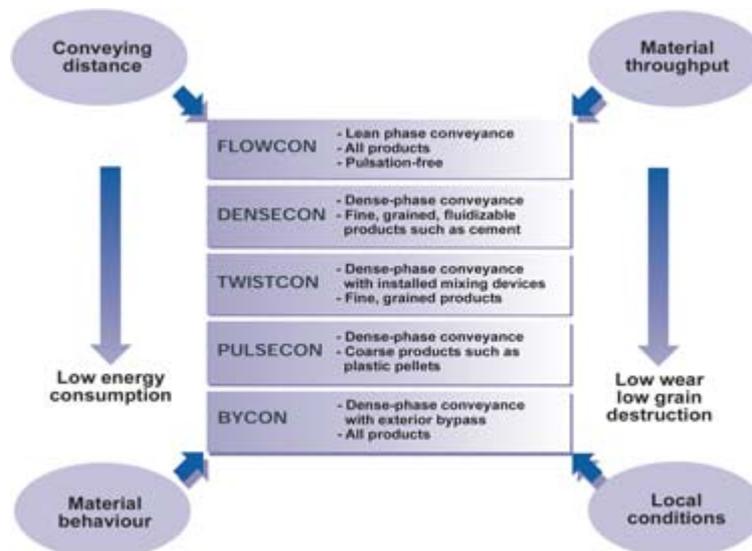
## Determination of the conveying process

The product characteristics analyzed from the bulk material samples are used for the configuration of the plant. The plant typically consists of a bulk solids feeder, pressure generator, conveying pipe and a separator. For example, we classify the bulk solids according to the Geldart diagram. The materials which can easily be conveyed in a dense phase mode are located in the yellow areas. The results of the bulk solids test, the conveying tests and the basic conveyance data from the customer ensure that the appropriate conveying procedure is selected. Once the most suitable procedure has been determined, the plant can be optimally designed at an efficient and acceptable consumption of power. Depending on the required task and the bulk solids behaviour, one of the Claudius Peters conveying modes is selected with our bulk solids feeders.



Claudius Peters conveying systems range from FLOWCON, the conventional flow conveyance for feeding coal burners, to BYCON, a bypass conveyance with exterior additional air injection for reduced wear and minimal energy consumption.

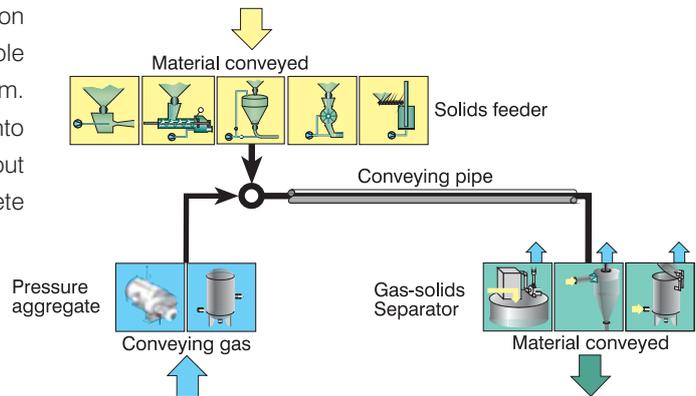
### Five proven conveying modes for bulk solids





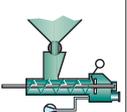
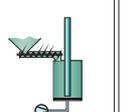
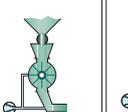
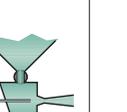
## Or the question of “how”

Claudius Peters delivers positive pressure and suction conveying systems. The illustration shows the principle structure of a positive pressure vessel conveying system. This system introduces defined quantities of bulk solids into the conveyor pipe against the conveying pressure without air leakage losses. Claudius Peters offers the complete range of suitable feeder types.



### Types of Feeder for plant configuration

The variety of possible feeders with their standardized range of applications is indicated in the chart below. Other solutions for the ranges not included in the chart, can also be supplied.

	Pressure vessel	X-Pump	Airlift	Blow-through feeder	Jet feeder
	All non-adhesive materials 	Wide particle size distribution with fine shares 	Fluidisable materials 	Coarse and fine materials low abrasion 	All materials 
Max. throughput [t/h]	150 (single) 300 (twin)	400	900	60	6
Max. conveying distance [ m ]	3500	1500	120 vertical	250	75
Max. pressure difference in conveyor pipe [ bar ]	6	2,5	0,6	1	0,2

## Type 1 - Claudius Peters Pressure Vessel Conveyor

### For a better understanding of the concept:

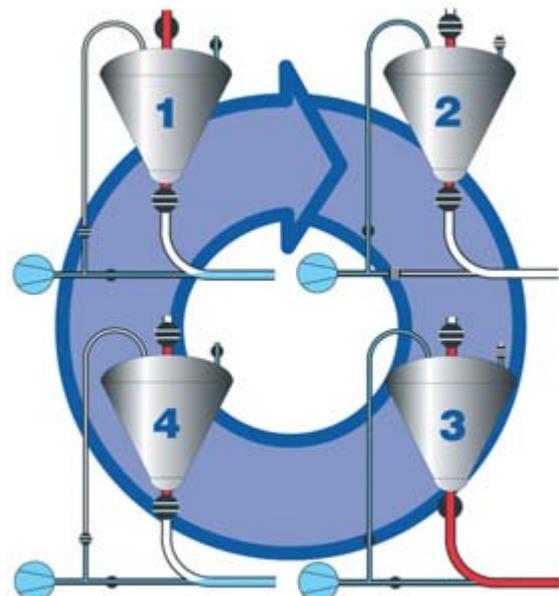
What are the main features characterizing pressure vessel conveying? What transport applications should require this type of conveying system?

- High availability
- Low maintenance requirements
- Partial load operation
- Suitable for dense phase conveyance
- Appropriate for all types of bulk solids
- Available sizes up to 50m<sup>3</sup>.
- Conveying distances up to 3500m
- Conveying pressures up to 30bar
- Systems with top or bottom discharge



### The principle of the pressure vessel conveyance at a glance:

1. Filling
2. Pressurizing
3. Conveying
4. Venting





## For long distances and high throughputs

Solids can be conveyed by single, twin or double-storey vessels to suit the requirements

Single pressure vessel conveyance

- Batch conveyance
- Maximum Capacity 150t/h
- Fully automatic
- Simple, low costs

Twin pressure vessel conveyance

- Quasi-continuous conveyance
- Maximum Capacity 300t/h
- Fully automatic
- 50% reserve in case of vessel failure

Double-storey vessel conveyance

- Continuous conveyance
- Maximum Capacity 150t/h
- Fully automatic

Special applications

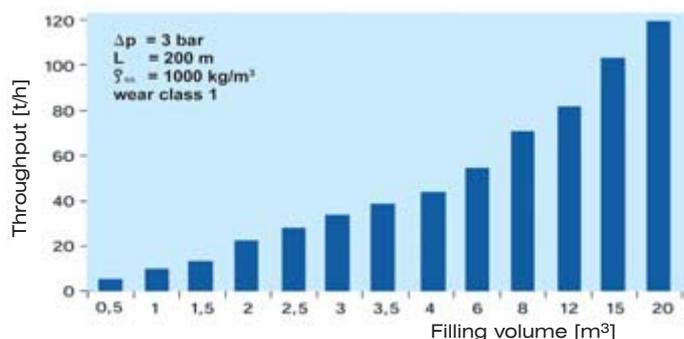
In addition to conveying vessels, Claudius Peters also offers injection vessels. These vessels are designed for injecting substances against high counter pressures. The injection vessels can be provided with distribution devices within the conveying pipe to divide the material flow accordingly such as feeding coal into a blast furnace at various points.

Design parameters for defining this type of application

- Standard sizes: 0.2 to 20m<sup>3</sup>
- Customized sizes to 35m<sup>3</sup> are in operation
- Throughputs to 300t/h are presently operating
- Distances to 3500m
- Customized solutions
- Modern control techniques with valves suiting the specific bulks



Throughput for single pressure vessel (for example cement)



## Type 2 - Claudius Peters X-Pump

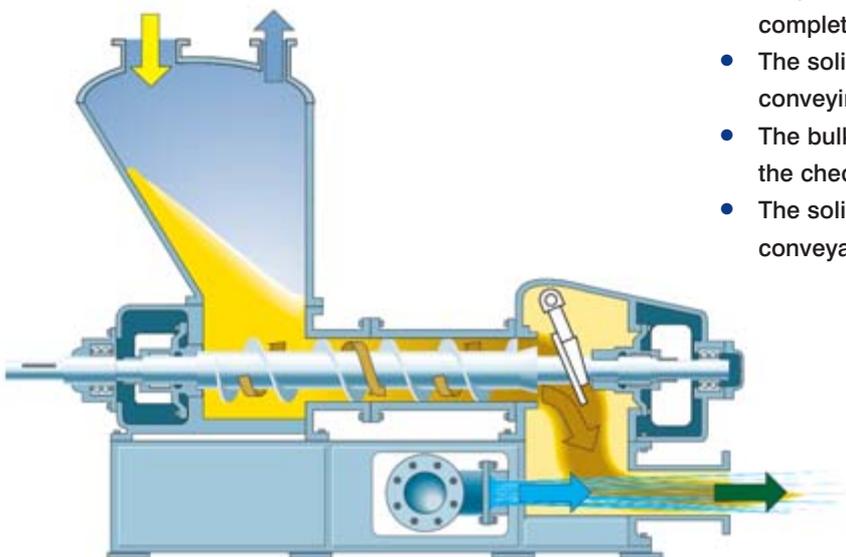
Conveyance with the Claudius Peters X-Pump is one of the most successful systems developed by Claudius Peters. As one of the core components of our product range, the Claudius Peters X-Pump has been operating reliably for clients all over the world for many years

- Continuous conveyance
- Suitable for dense phase conveyance
- High availability
- Low maintenance
- Partial load operation possible
- Fine particle bulk solids possible
- Conveying volumes to 640m<sup>3</sup>
- Conveying distances to 1500m
- Low construction height
- Pressure and shock resistant design
- Pulsation free conveyance



### Conveyance with the Claudius Peters X-Pump

- The bulk solids are fed into the pump surge bin to be deaerated
- The pump surge bin is not an intermediate bin
- The rotating screw compresses the bulk solids to a plug at the end of the screw. The screw is completely filled with the solids
- The solids in the plug and the screw seal off the conveying pressure
- The bulk solids pressure builds up and forces open the check flap
- The solids are fed into the conveying air stream and conveyance begins

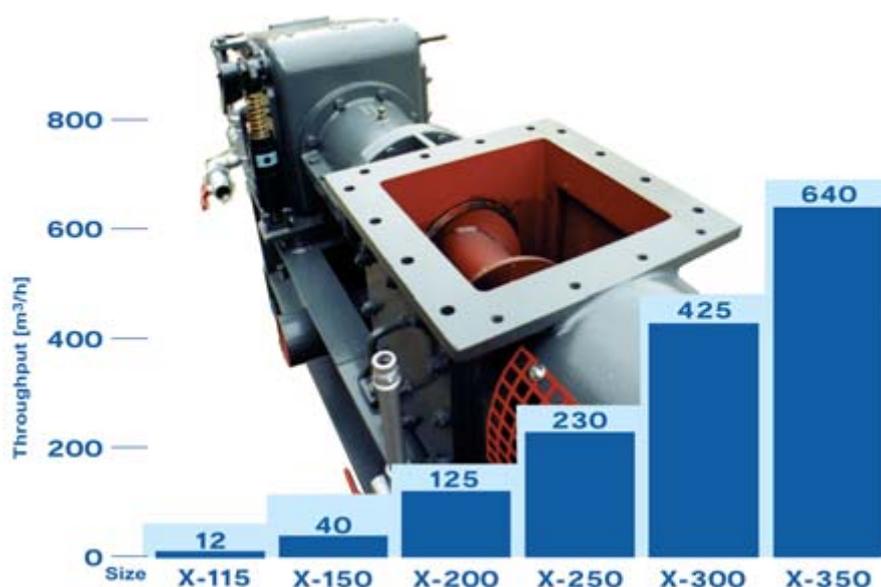




## Versatile and flexible

The Claudius Peters X-Pump is the optimum solids feeder for a wide range of applications, including silos, preheaters and pre-calciners, ship loaders and many more. The Claudius Peters X-Pump capability is outstanding.

For example, 400t/h cement can be conveyed distances of up to 1500m. Additionally, the geometry of the screw is adjusted to accommodate the specific bulk solids requirements.



### Examples for applications:

- Feeding of silo
- Injection of pulverized coal
- Transport of filter dust
- Feeding of preheater
- Ship loading and unloading

### Capacity ranges:

- Conveying capacities to 400t/h cement equivalent to 640m³/h
- Conveying pressures to 3.0bar gauge
- Conveying distances to 1500m
- Loads to 100kg solids per kg conveying gas

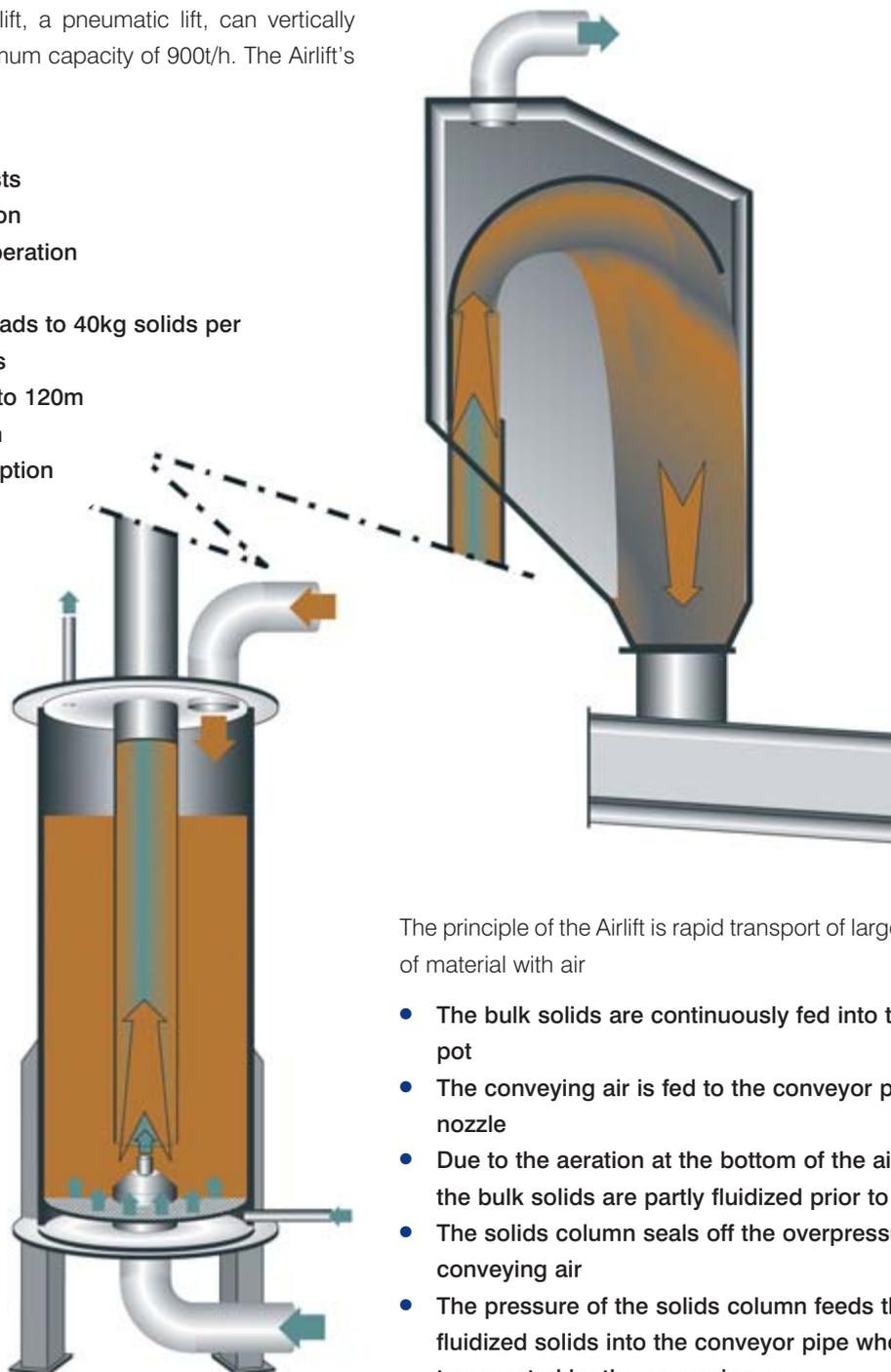
### Special features:

- Variable arrangement of the pump outlet
- Different screw geometries and end flights
- End flights can be replaced separately
- Easy assembly, wear parts can be replaced with minimal dismantling
- Screw supported at both ends of the shaft
- Individual screw geometry for each bulk solid
- Check flap with integrated damper
- Pulsation free conveyance

## Type 3 - Claudius Peters Airlift

The Claudius Peters Airlift, a pneumatic lift, can vertically convey solids to a maximum capacity of 900t/h. The Airlift's other features include:

- High availability
- Low investment costs
- Continuous operation
- Easy partial load operation
- All fluid bulk solids
- Conveyance with loads to 40kg solids per kg of conveying gas
- Conveying heights to 120m
- Capacities to 900t/h
- Low power consumption



The principle of the Airlift is rapid transport of large quantities of material with air

- The bulk solids are continuously fed into the Airlift pot
- The conveying air is fed to the conveyor pipe via a nozzle
- Due to the aeration at the bottom of the airlift pot, the bulk solids are partly fluidized prior to transport
- The solids column seals off the overpressure of the conveying air
- The pressure of the solids column feeds the fluidized solids into the conveyor pipe where it is transported by the conveying gas



## Pneumatic lift with high capacity

The Claudius Peters Airlift transports material vertically to cyclone preheaters or storage silos. With throughputs to 900t/h, the Airlift is an efficient high capacity conveying method. The Claudius Peters Airlift has a specialized design called "dosification" (DOSCON) that has a variety of applications.

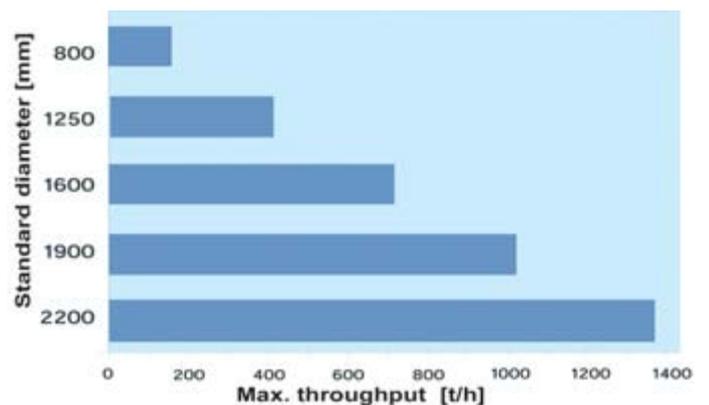
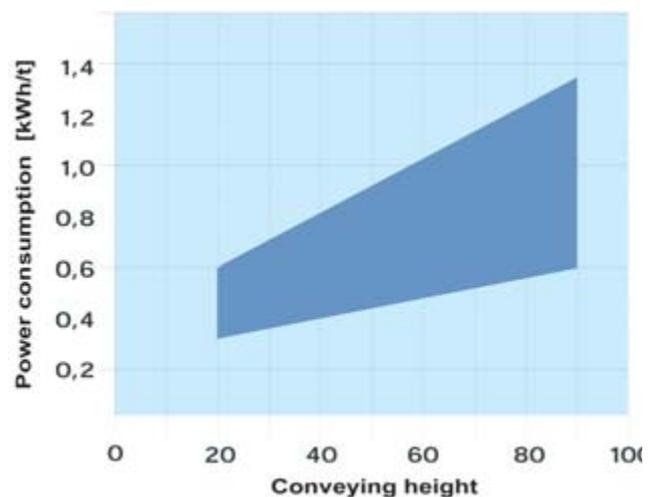
### Examples for applications

- Feeding of heat exchangers
- Standby system for mechanical preheater feeding such as bucket elevators
- Silo feeding
- Pulsation free, precise dosing (system: DOSCON)
- All types of vertical transports

### Performance range

- Throughputs of 10 to 900t/h
- Conveying heights up to 120m
- Bottom aeration
- Bottom cone for coarse bulk solids
- Several feed points using two-way gates in the conveyor pipe
- Bulk solids and conveying gas can be separated by the Claudius Peters expansion vessel

### Power consumption and throughputs of Claudius Peters Airlift

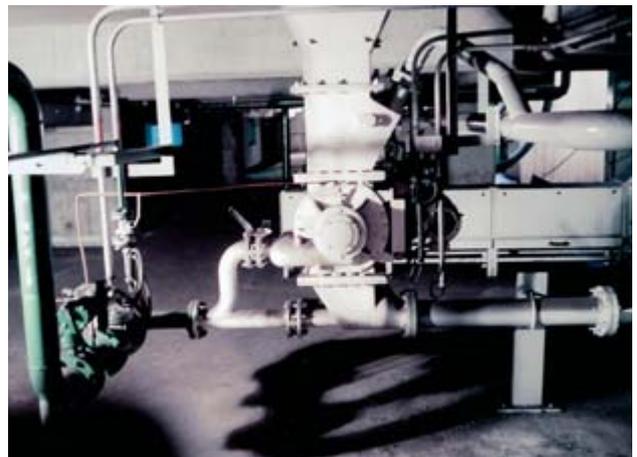
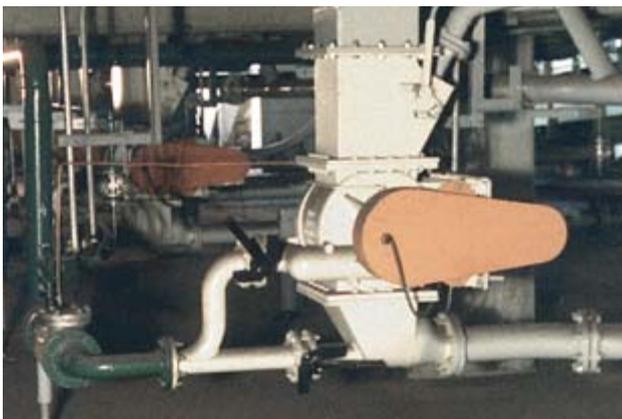


## Type 4 - Claudius Peters Blow Feeder

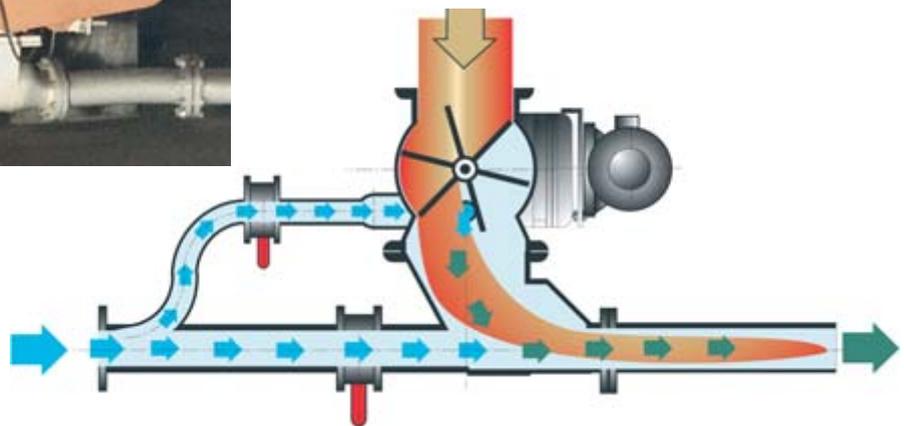
Bulk solids with difficult flow behaviours can be handled with our feeding and conveyance unit. The Claudius Peters Blow Feeder offers interesting features for all conveying procedures requiring more than only throughput and conveying distance specification.

- High availability
- Compact design
- Partial load operation if required
- Closed, dust free system
- Pulsation free
- Throughputs to 100m<sup>3</sup>/h
- Continuous conveyance
- Conveying distances to 250m
- Fine grained and coarse grained bulk solids, low abrasivity

The feeding roller, blow pan, and conveyor pipe are the necessary equipment for the conveying process of the blow feeder:



- The bulk solid drops into a rotating feeding chamber
- Through lateral air connections, the solid is blown out of the lower chamber
- The bulk solid drops into the blow pan
- The conveying air picks up the bulk solid and transports it within the conveyor pipe

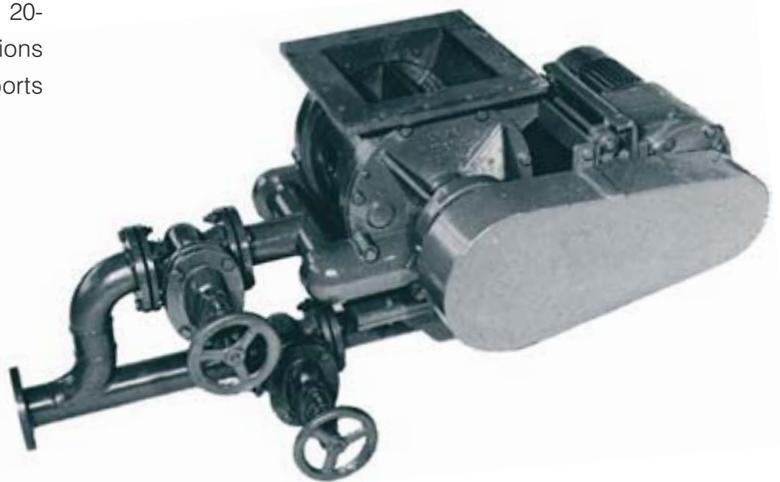




Not all types of applications demand high throughputs. When average performance values are required at optimum cost efficiency rates, Claudius Peters recommends a blow feeder. This feeder has typical volume throughputs of 20-30m<sup>3</sup>/h with a maximum of 100m<sup>3</sup>/h. Specifications requiring this design are intermediate transports applications and filter dust return.

#### Examples for applications

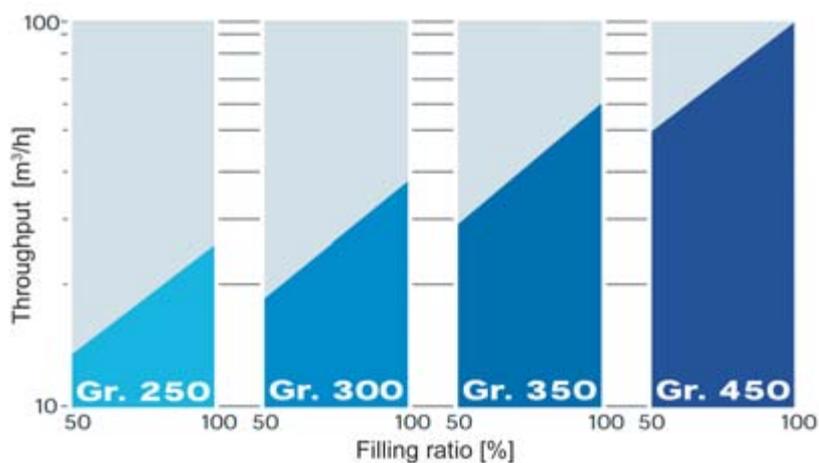
- Silo feeding
- Intermediate transports
- Material return, i.e., bag discharge to the packer prebin
- Filter dust return
- Average throughputs at optimum cost efficiency rates



#### Capacity ranges

- Throughputs to 100m<sup>3</sup>/h
- Conveying distances to 250m
- Conveying pressures to 0.4bar gauge or up to 1.0 bar gauge for only slightly abrasive bulk solids

#### Blow Feeder capacities



## Type 5 - Claudius Peters Jet Feeder

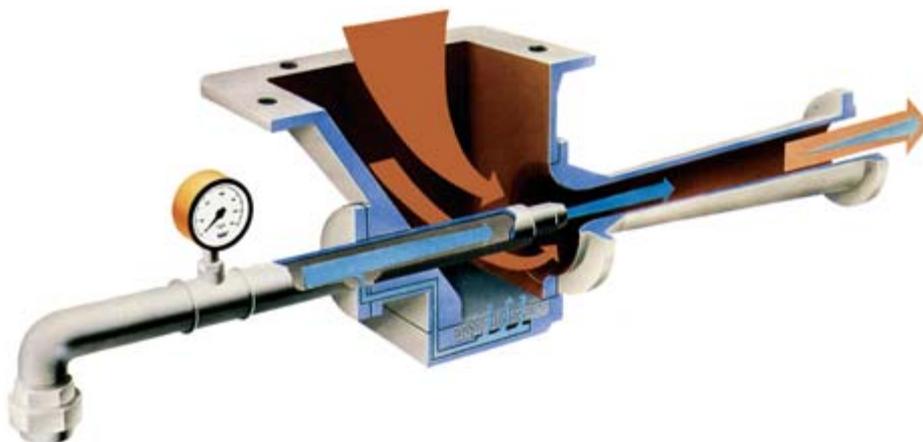
The Claudius Peters Jet Feeder is the most compact of the five feeder types available. This feeder offers important advantages for the specific applications.

- Continuous operation
- High operational safety
- Long life times
- Low investment costs
- High solids temperature capability
- Partial load operation without modification of the conveying air flow
- Lean phase conveyance
- All bulk solids
- Closed dust free system
- Simple and space saving construction
- No movable parts in the solids flow
- Throughputs up to 6t/h
- Conveying pressures to 0.2bar gauge
- Loads to maximum of 6kg/kg



**Jet feeding is the conversion of static pressure into kinetic energy**

- Bulk solids feeding directly from the prebin or through a rotary feeder
- Within the nozzle, the static pressure of the conveying gas is converted into kinetic energy
- The conveying gas draws the bulk solids into the mixing chamber
- Within the connected diffuser, the kinetic energy of the blended air and solids is reconverted into static pressure





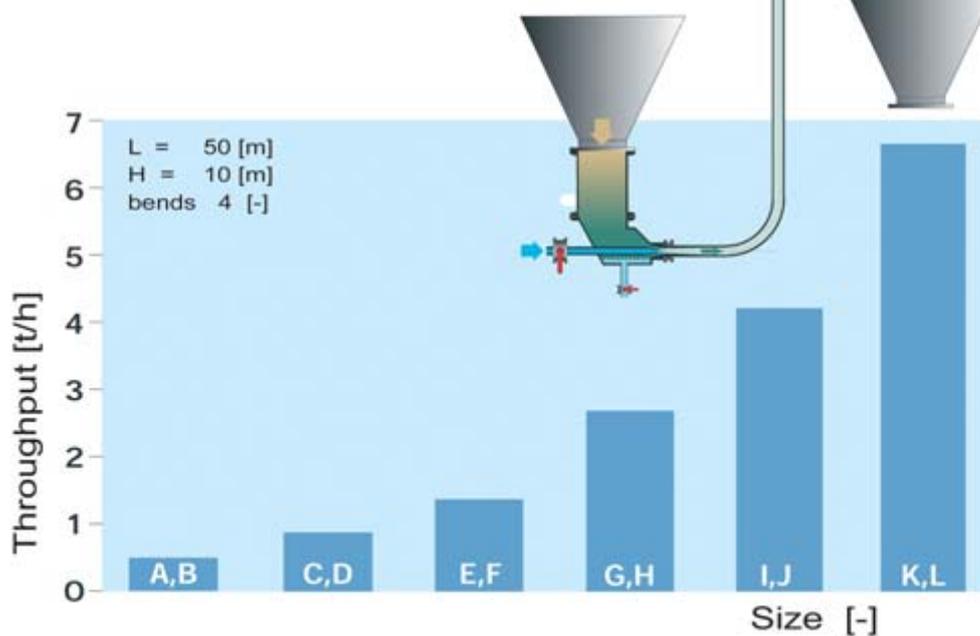
## The ideal feeder for low conveying capacities

The Claudius Peters Jet Feeder is the best design for low solid mass flows, adapting to different operating conditions. The operating conditions determine the size and the type of the nozzle. The variants with and without an aerated bottom and the corresponding diameter of the transport pipeline, provide a reliable conveying method.

### Examples for applications

- Silo feeding with minimized bulks solids flows
- Material return to a packing machine
- Filter dust return
- Economic operation with minimized bulk solids flows
- Conveyance of hot fly ash

### Throughputs of Claudius Peters Jet Feeders



### Claudius Peters Jet Feeder Range

- Jet Feeders with and without an aerated bottom
- Jet Feeders with connected pipe diameters of DN 65 to DN 150
- Optimum adjustment to the operating conditions with different sizes and designs

CALCINING | COOLING | DISPATCH  
DOSING | DRY BLENDING | DRYING  
GRINDING | PACKING  
PNEUMATIC CONVEYING  
PULVERIZED FUEL SUPPLY  
SILO SYSTEMS  
STOCKYARD SYSTEMS  
ALUMINA HANDLING SYSTEMS  
MARINE POWDER HANDLING  
TURNKEY PROJECTS



**We know how**

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