CLAUDIUS PETERS

Marine Powder Handling

Technik

We know how

www.claudiuspeters.com

MV Helvetica on voyage

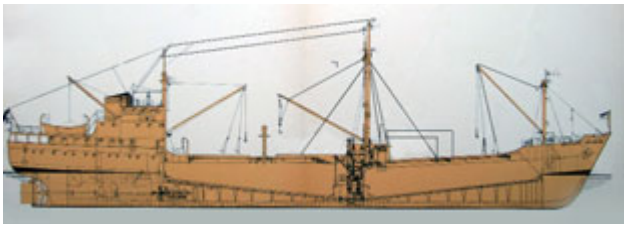
Marine Bulk Powder Technik

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 has over one hundred years experience in handling bulk powder with several decades developing cargo equipment for cement, fly ash, alumina and other materials to match a wide range of sea and shore equipment.

In 1960, the first self-unloading ship, MV Southern Baobab, was built using Claudius Peters pumps and panel aeration for the cargo holds. Since then, this concept has been used successfully on more than 20 self-unloading carriers and around 80 offshore supply vessels from 2500 tdw up to 34,000 tdw.



MV Southern Baobab - built in 1960

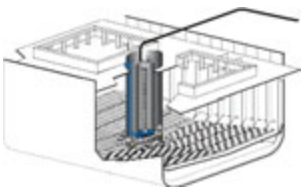
Claudius Peters invented the panel pump system, which is installed in many self-unloading carriers and offshore supply vessels.

Further continuous development has led to even more efficient bulk powder handling systems such as:

- **X-Pump (more than 2000 units are in operation)**
- **FLUIDCON pneumatic transport system**
- **Electronic packing and dispatch systems**
- **Terminal equipment for single or multi-cell silo systems**
- **High capacity pressure vessel systems**

The Claudius Peters Technical Center (Technikum) can provide material analysis of various bulk powders such as cement, alumina, fly ash, oilwell cement, barytes and bentonite.

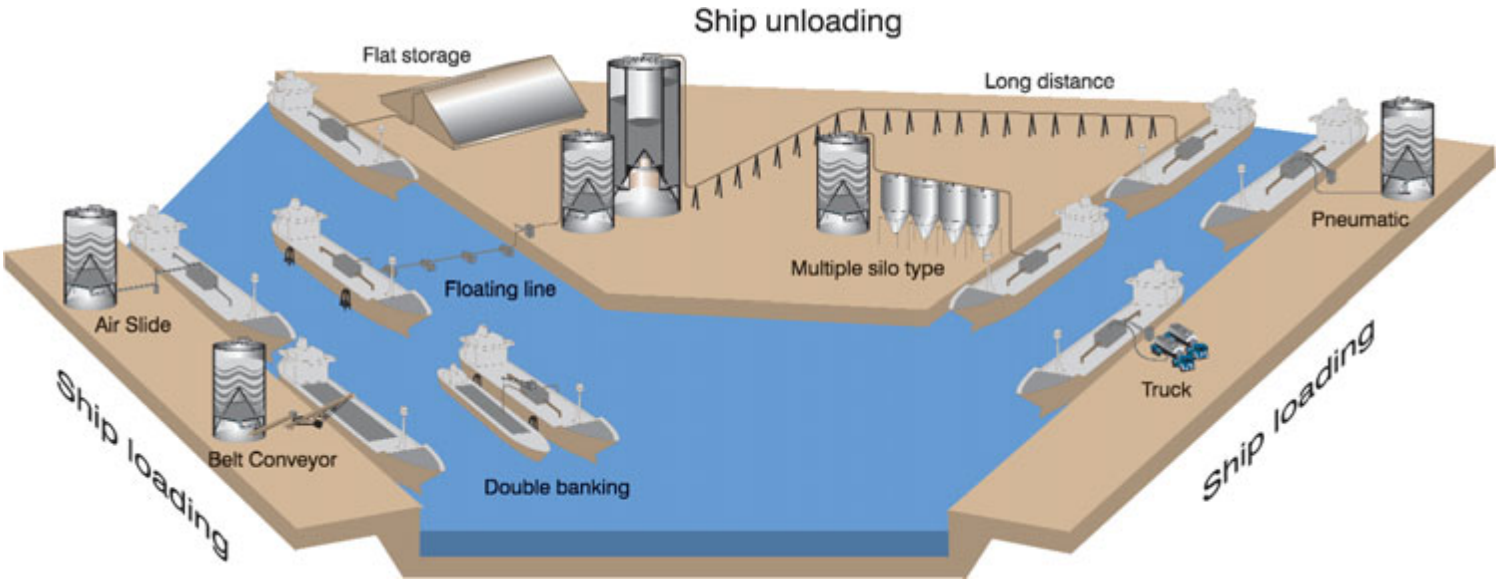
The machinery is custom engineered according to material data and customer logistic requirement.



Mauritius: Port Louis Terminal

Egypt: MV Floria loading at Safaga

Can one ship fit all terminals?



Ship Terminal

As a specialist in both terminal and ship cargo equipment, Claudius Peters recognizes that a successful operation can only be achieved when the ship and terminal systems are designed to work together.

One of our latest developments, the FLUIDCON system, delivers significant advantages for both loading and unloading ships and terminals. Along with our high capacity pressure vessel system, our equipment provides the essential elements to achieve state-of-the-art ship unloading capability.

Ship Loading

Claudius Peters can adapt your ship to match all pneumatic and mechanical terminal loading installations to ensure low pollution and short loading periods.

Ship Unloading

Unloading is generally the most time-critical element of the ship's journey. Short berthing time is ensured with Claudius Peters highly reliable, powerful discharge equipment.

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Airslide loading of cargo hold

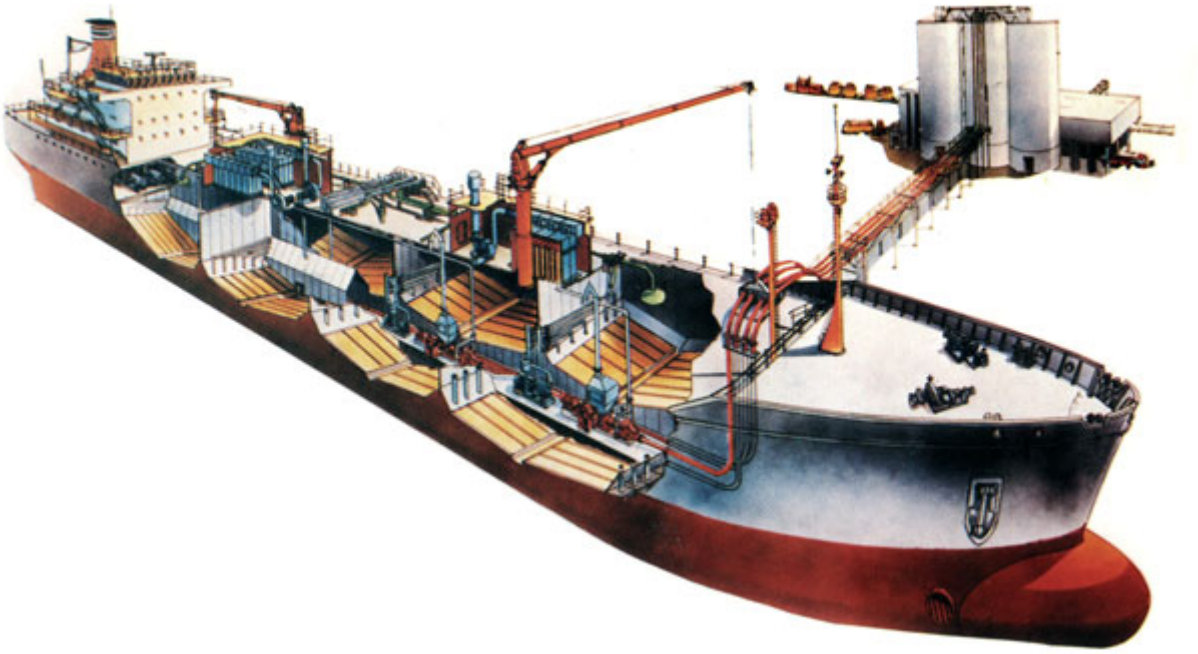
Self-unloading cement carrier

Ship Loading

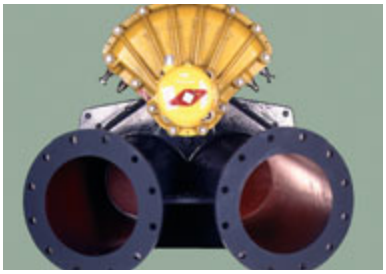
The picture shown below shows a pneumatic piping system. Pipelines and two-way-valves permanently installed on deck take care of the distribution of the material into the different holds. Baffle plates at the pipe-ends ensure a level material surface.

The individual holds can be selected from the central control panel located in the cargo control room and stability control is easily achieved.

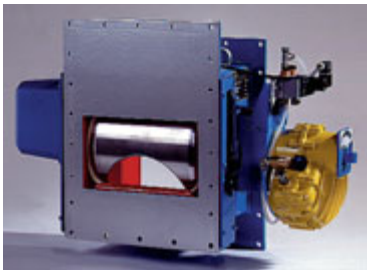
The shore-based conveying pipe is connected via flexible hoses. The holds are equipped with filters to ensure continuous dust-free feeding. Other feeding systems e.g. airslides are also available.



X-Pump feeding



Two way valve



Flow control gate


Pneumatic pipe loading of cargo hold


MV Invicta on voyage

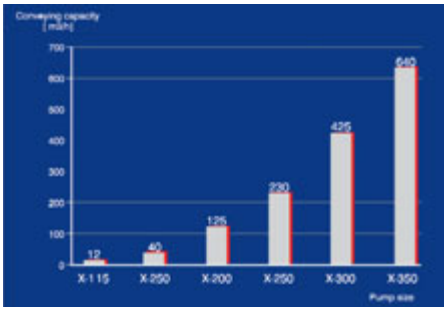
Claudius Peters X-Pump

Ship Unloading: Panel X-Pump

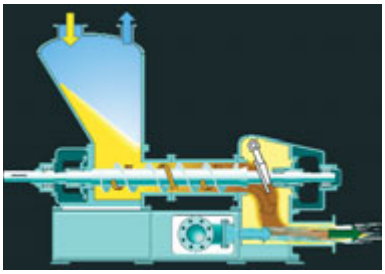
The basic concept of the Panel X-Pump is easy to understand so the system is easy to operate. A ship may consist of four cargo holds, with a midship tunnel dividing the holds to form portside and starboard side sections.

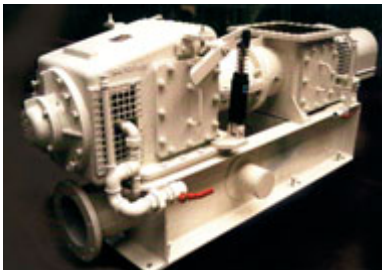
The hold bottom is completely covered by inclined aeration panels (open airslides) for the discharging of materials, the end result being an almost 'cleanly swept' hold. Robust rotary piston blowers are in duty for the holds aeration, with the midship tunnel having enough space to accommodate both the blowers and the pumps.

The pumps feed the material from the port or starboard side, whilst the material quantity is adjusted by flow control gates. Heavy duty screw compressors are connected to the X-Pumps and are accommodated either in a deckhouse or in a section of the ship's engine room. This arrangement allows a ship to unload independently from shore-side facilities. The pneumatic conveyance of material is arranged without any transfer points to the onshore receiving station.



Capacity overview

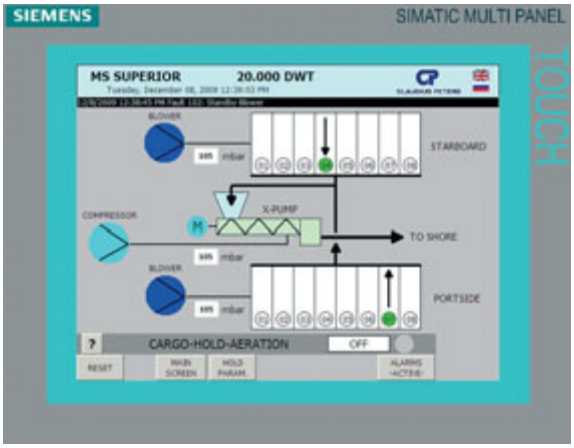

X-Pump (Diagrammatic)


X-Pump

Cargo Handling Control

From the central control panel, located in the cargo control room, the individual holds can be selected for loading and unloading. Stability control is easily achieved by constant monitoring of the individual hold filling level.

With simple operator guidance and easy process diagnostics, the modular family Simatec S7-300 is the first choice for cargo handling control.



X-Pump panel

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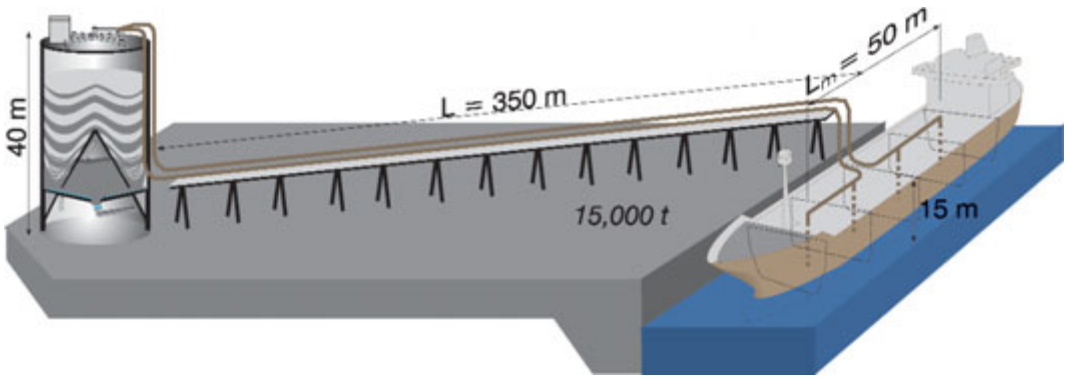
MV Alltrans

Self-unloading cement carrier



System description	Specific consumption* kWh/t	Operating pressure bar	Pressure vessel size m³	Operation cycles cycles/h	Unloading time h	Transport capacity per conveying line t/h
	Screw conveyor and twin pressure vessel					
~~CP~~	3,7	3,5	10	10	38	200
	Pressure vessel vacuum and pressurized operated					
~~CP~~	4,2	0,8 - 4,3	10	10	38	200
	Screw pump					
CP	4,2	2,5	n.a.	continuous	47	200
	HP-CONTANK					
CP	3,1	5	60	2,5	25	300

HP Contank vessel

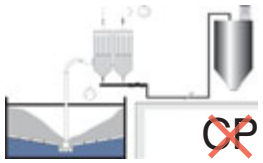
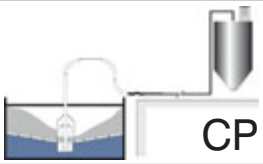
Sri Lanka: MV Floria unloading at Colombo

HP-CONTANK

The Claudius Peters high capacity pressure vessel system is the result of analysing and improving upon unloading systems used in past decades. The high capacity pressure vessel system uses a closed conveying pipe, which runs from the cargo holds to shore-based storage without any transfer points. Whilst the X-Pump based unloading system also shares this feature, the pump based system is limited to 2,5 bar, whilst the high capacity pressure vessel system operates with approximately 6,0 bar, giving lower energy consumption and higher unloading capacity.

The greater the pressure reserve of the ship's cargo equipment the wider the range of conveying pipe lengths and diameters that can be used.

The high capacity pressure vessel system uses a large volume pressure vessel in each cargo hold, which is filled via a screw arranged in the vessel itself and which conveys out of the cargo hold directly to the storage silo located ashore. Several of these senders are connected to each other to deliver quasi-continuous unloading, with one sender being filled while another conveys. There are no longitudinal conveyors between the holds on or under deck. The requirements for damage stability and waterproofness are strictly met by this low-number transfer point concept.

Transfer points cargo hold-ashore	Range to match different storage	Maintenance consumption terminals	Energy	Operation	rating (best / good / basic)
4	medium	• high number of cycles • drives • transfer points	low	complex high number of mechanical and pneumatic components	
2	medium	• high number of cycles • difficult access • vacuum pressure • shortened valve lifetime	high	complex high number of mechanical and pneumatic components	
0	medium	• easy access • simple technology • thousands of X-Pumps in use globally		easy	
0	large	• low number of cycles • drives • transfer points	lowest	medium	

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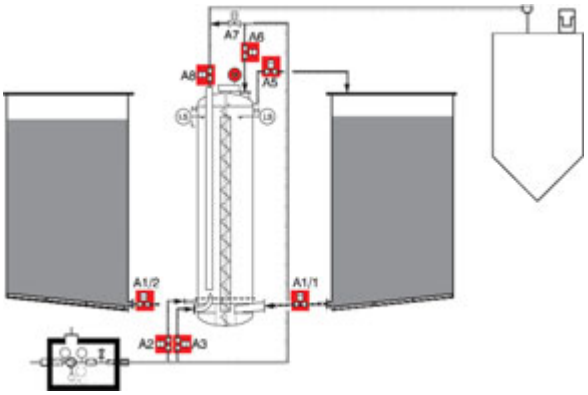
MV Elbia on voyage

Self-unloading carrier



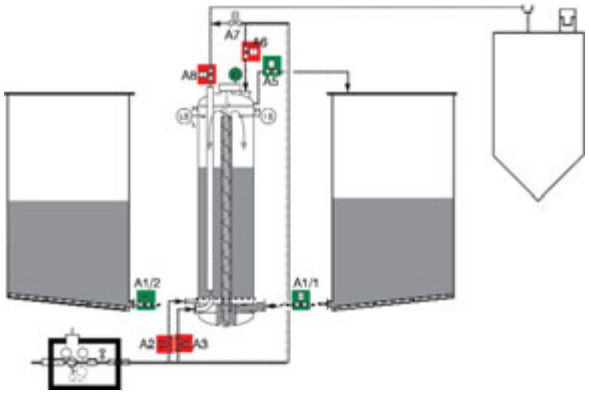
Structure HP-CONTANK

An accessible round vertical duct is positioned in the center of each cargo hold. The HP-CONTANK is installed excentrically within this cargo hold duct.

The HP-CONTANK has an aeration bottom, underneath is the prechamber, above the discharge chamber .

A vertical screw connects these two chambers.

Flow Control Gates (A1/1) connect and isolate the cargo holds with the HP-CONTANK prechamber.

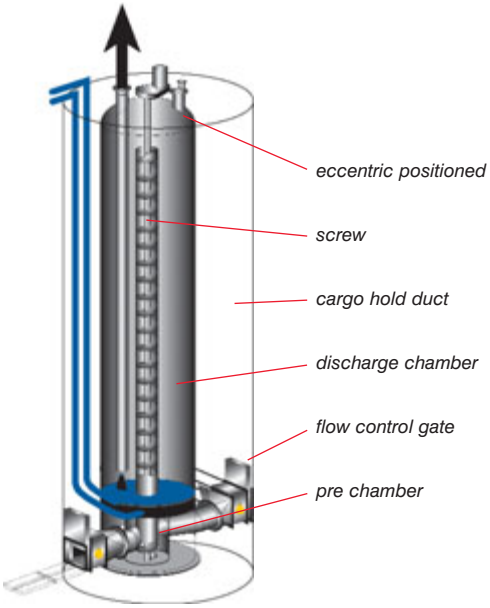


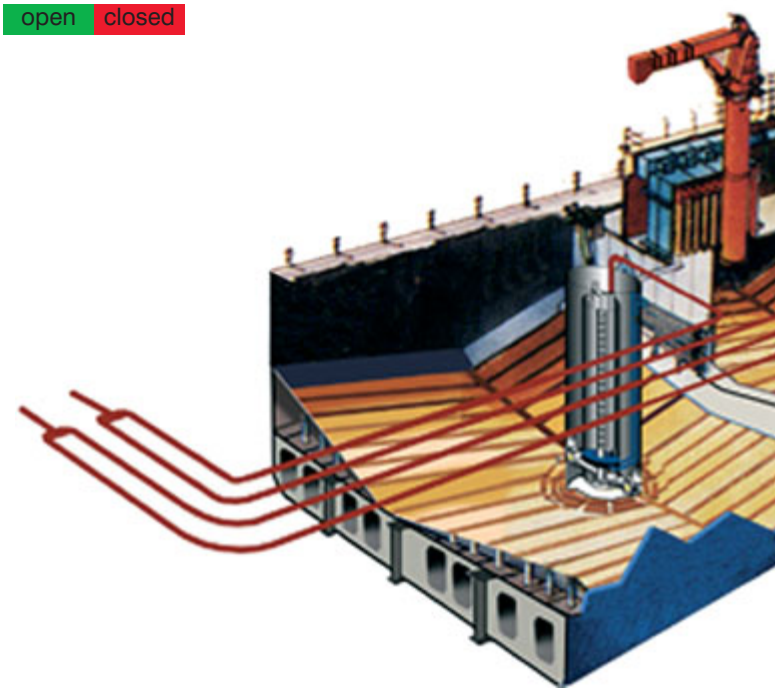
Feeding HP-CONTANK

The bulk solid is fed to the prechamber from the cargo holds controlled by Flow Control Gates (A1/1). The vertical screw lifts the bulk solid into the discharge chamber which keeps the prechamber none pressurized.

So the bulk solid can easily flow from the cargo hold into the prechamber

open closed

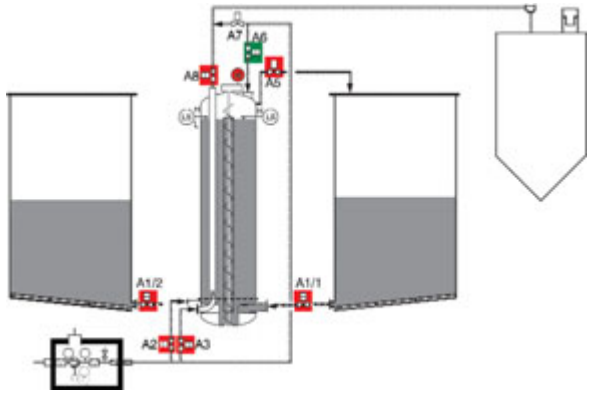





Cargo hold with aeration panels


MV Alltrans on voyage

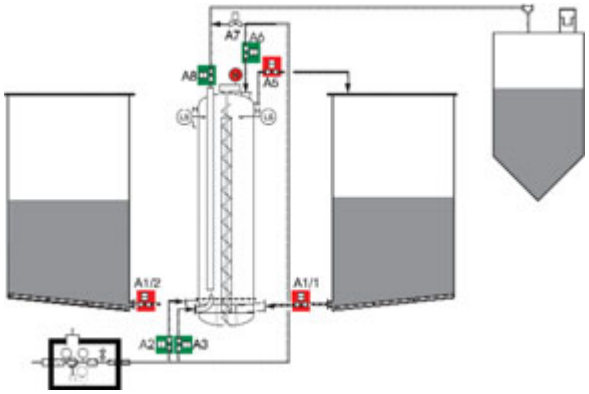
HP-CONTANK



Pressurize HP-CONTANK

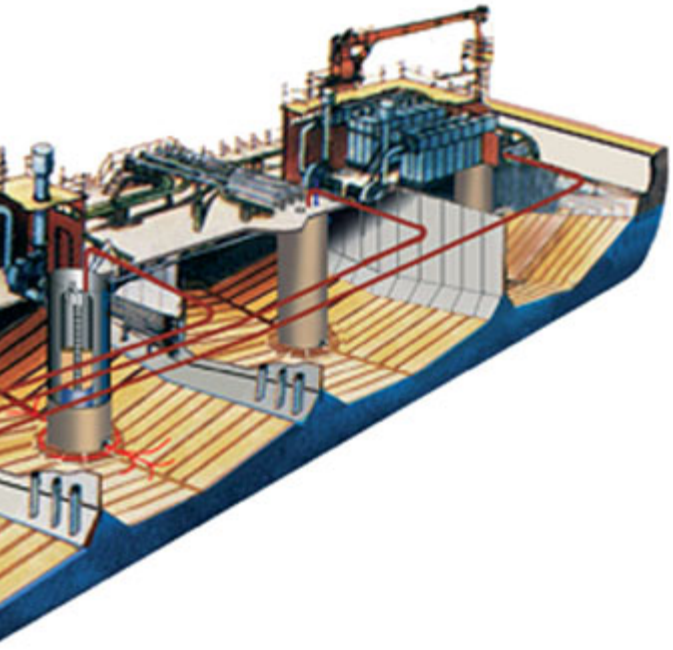
After full level indication the screw is stopped. A sealing is inflated around the screw shaft.

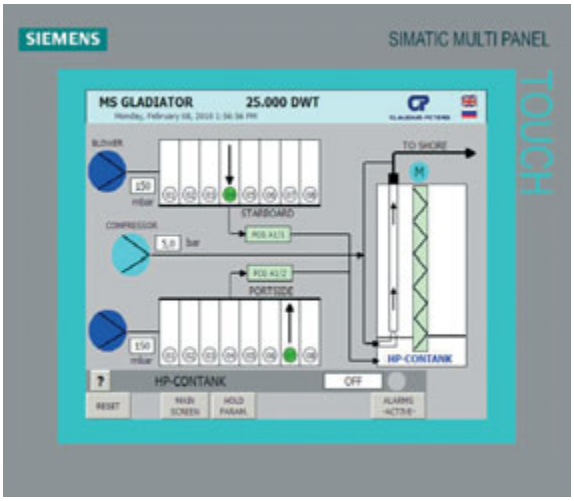
Both the prechamber and the discharge chamber are pressurized to a pre-selected conveying pressure



Empty HP-CONTANK

By opening the bulk solid outlet valve A8 and the air supply to the conveyor pipe the pneumatic transport is initiated. During the transport the aeration bottom is continuously aerated. Complete emptying of the vessel is detected by a pressure sensor which initiates a residual pressure release. Afterwhich the next filling process starts.





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Modern PSV

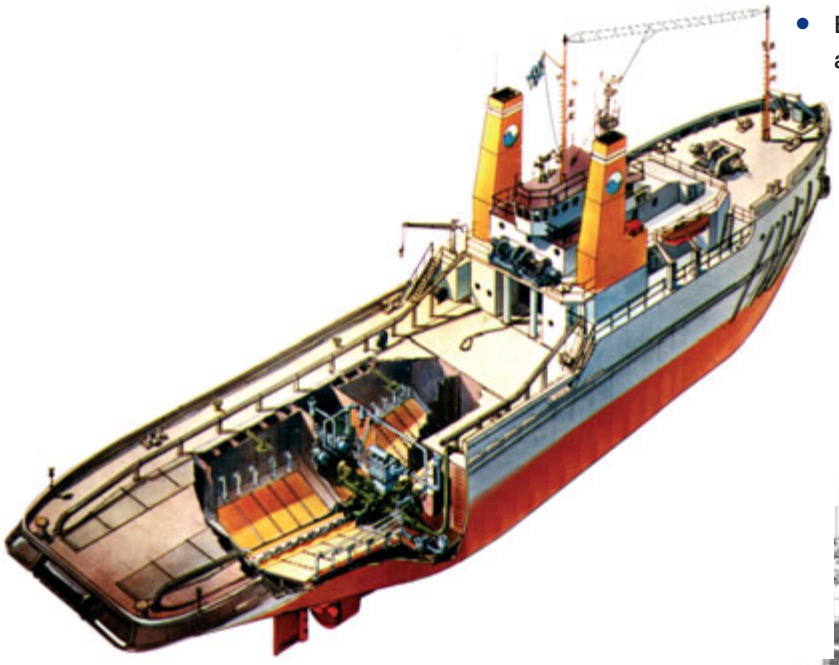
Platform supply vessels

Offshore supply vessels for platforms and oil rigs operate in the most adverse and harsh environments, placing extreme demands on their equipment both in terms of performance and reliability. One of their roles is supplying cement, barytes and bentonite used for drilling operations. This is achieved using either panel pump systems or high capacity pressure vessel systems.

Claudius Peters Panel Pump System

This system gives the following advantages:

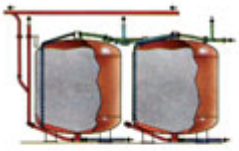
- Lower capital costs
- Easy access for inspection
- Simple operation
- Discharge rate can be variable-controlled from any hold
- Greater hold utilization in excess of 45 % compared to a pressure vessel

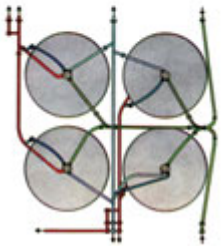


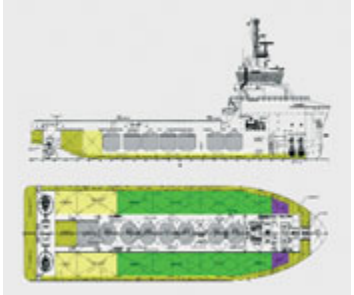
Claudius Peters High Capacity Pressure Vessel System

This system gives the following advantages:

- Both horizontal and vertical arrangements are available to optimize space utilization
- Claudius Peters pressure vessels have flat bottoms providing greater storage capacity than conical vessels
- Aeration panels in the bottom ensure optimum emptying at maximum discharge rates
- Exchangeable tank bottoms permit the system to be adapted to handle mud cargos








MS Finn Barent


MV Invicta

Converted bulk carrier
ship modification – de-bottlenecking

Are you thinking of hiring a bulk carrier for your cement trade?

Conversions are more profitable than you might think as the cargo operation is under your control.

Conversions of second-hand bulk carriers are also an excellent alternative to new build ships, offering significant savings on time and money.

Due to a high degree of prefabrication, you can expect the ship to be out of action for just a few months - a major driving factor in favor of conversion.

New build ships can be customized to fit to all planned harbors and will have lower operation and maintenance costs.

A long term trade with fixed called harbors is also a clear argument for a new build ship. Claudius Peters specialists will provide the optimum solution.

Ship modification to adapt

Ship owners or shipping companies have to bear in mind both new terminal requirements and new ship safety regulations. Claudius Peters specializes in analyzing your existing equipment and considering how best to adapt it e.g. adding a new feeding airslide system on your ship decks.

We have the expertise to de-bottleneck your cargo handling equipment, whether it is an original Claudius Peters system or another make or brand.

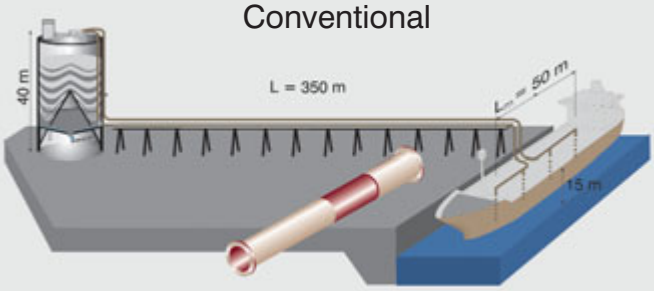
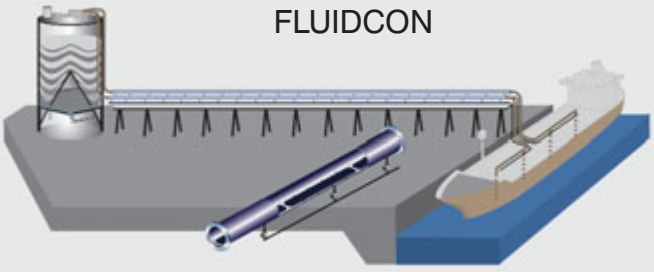
	SHIP						SHORE		
	Duration in appr. months	Invest-ment costs	Required pay	Trade scenario	Operation & maintenance costs	Hold cleaning	Dependancy on port conditions/ regulations	Terminal investment	Range of terminals
Bulk carrier	n.a.	n.a.	n.a.	spot	**high** • loose hatches may cause wet cement • clogging of unloading machine • high demurrages • loss customers reorder	**difficult** • bobcat, crane stevedores necessary • high dependency of shore side	**high** • stevedore duty • no open hatch operation allowed • no rain operation	**bulk high** • power bulk high supply • ship-unloader • conveying	**very limited** • due to availability of shore based unloader
Converted bulk carrier into self-unloader	3	50	short	short term	**medium**	**easy** • total discharge assured by complete hold panel operation	**low** • ship crew operation • water tight hold • ship integrated anti-dust systems • meet wide range of different port regulations	**low** • conveying pipe • filter	**may be limited** • due to the ship length and draft
New build self-unloader bulk-carrier	12	100	long term	long term	**low**	**easy** • total discharge assured by complete hold panel operation	**low** • ship crew operation • water tight hold • ship integrated anti-dust systems • meet wide range of different port regulations	**low** • conveying pipe • filter	**wide** • due to the ship length and draft

rating		
best	good	basic

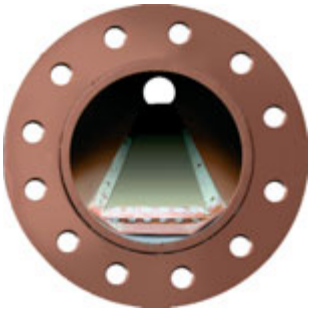
CLAUDIUS PETERS

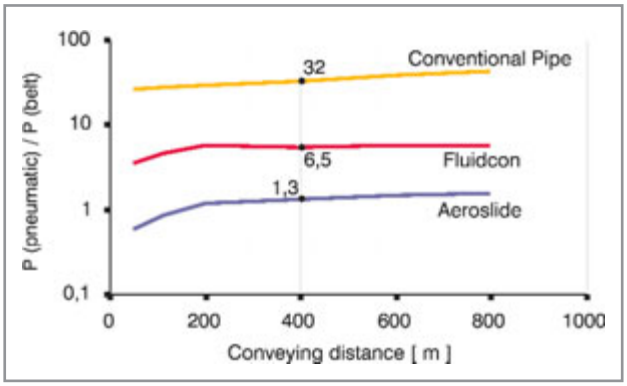

MV Alltrans on voyage

Power saving with FLUIDCON

System	Spec. consumption kWh/t	Operating pressure bar	Convey air volume m³/h	Start-end convey air speed m/s
Conventional 	3,1	5,0	9,700	8 ↓ 29
FLUIDCON 	2,1	3,5	6,800	5 ↓ 15

Above example discusses the effect of applying conventional pipe or FLUIDCON in combination with the HP-CONTANK


FLUIDCON pipe system




Russia: 440 m FLUIDCON

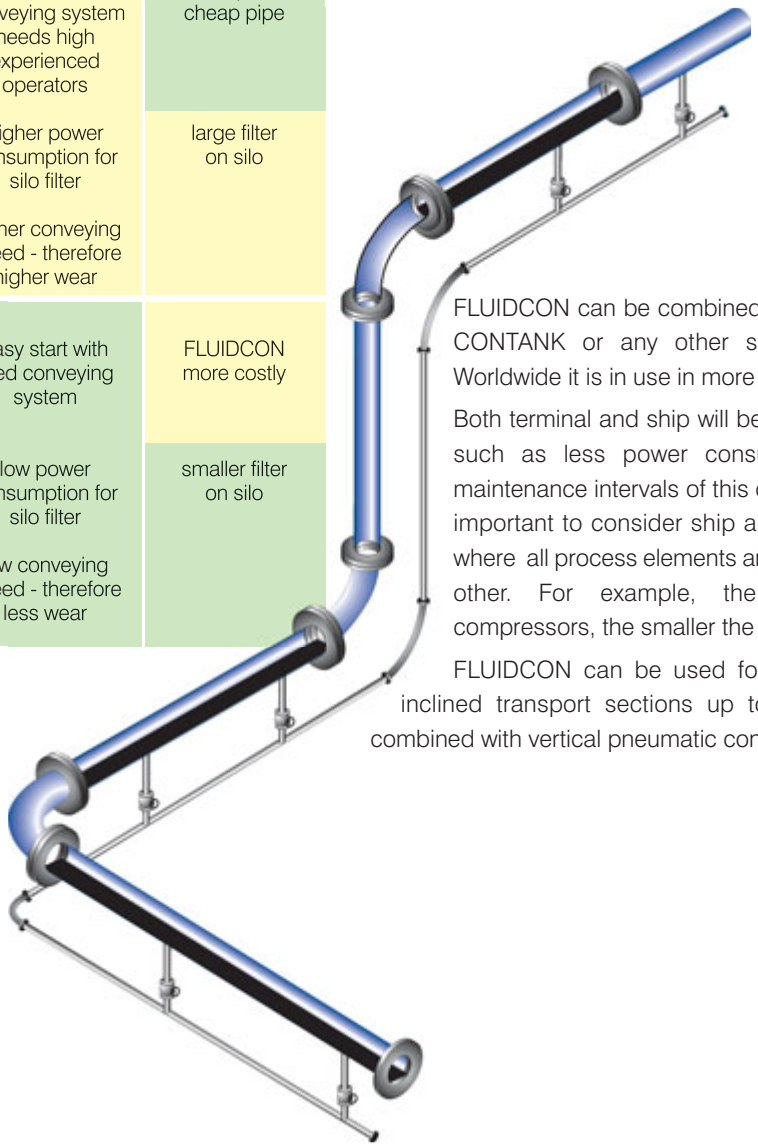

Australia: Brisbane 26,000t silo

Long distance pneumatic transport

SHIP		SHORE	
Operation	Investment	Operation	Investment
restart with filled conveying system needs high experienced operators	larger compressor	restart with filled conveying system needs high experienced operators	simple cheap pipe
higher power and fuel consumption	large electrical generator	higher power consumption for silo filter higher conveying speed - therefore higher wear	large filter on silo
easy start with filled conveying system	smaller compressor	easy start with filled conveying system	FLUIDCON more costly
lower power and fuel consumption	smaller electrical generator	low power consumption for silo filter low conveying speed - therefore less wear	smaller filter on silo

rating	
best	good

FLUIDCON is the result of transferring the advantages of airslides into a pipe transport. It is benchmarking all other pneumatic systems in terms of easy operation and low energy consumption.



FLUIDCON can be combined with the X-Pump, HP-CONTANK or any other solid feeding system. Worldwide it is in use in more than 80 applications.

Both terminal and ship will benefit from advantages such as less power consumption, and longer maintenance intervals of this conveying system. It is important to consider ship and shore as a system where all process elements are interacting with each other. For example, the smaller the ship compressors, the smaller the silo filters.

FLUIDCON can be used for long horizontal and inclined transport sections up to 25° inclination and combined with vertical pneumatic conveying.

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Thailand: X-Pumps for double banking

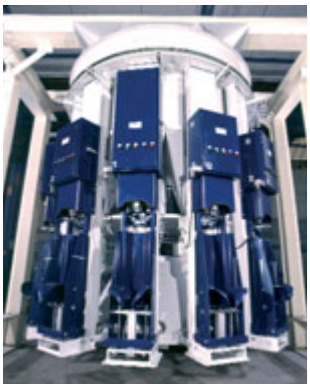
Floating terminals

Claudius Peters Technik for Floating Terminals

A floating terminal combines in one floating unit all the facilities of a shore-based terminal, such as storage silos, conveying equipment, packing station and loading facilities.

Special features:

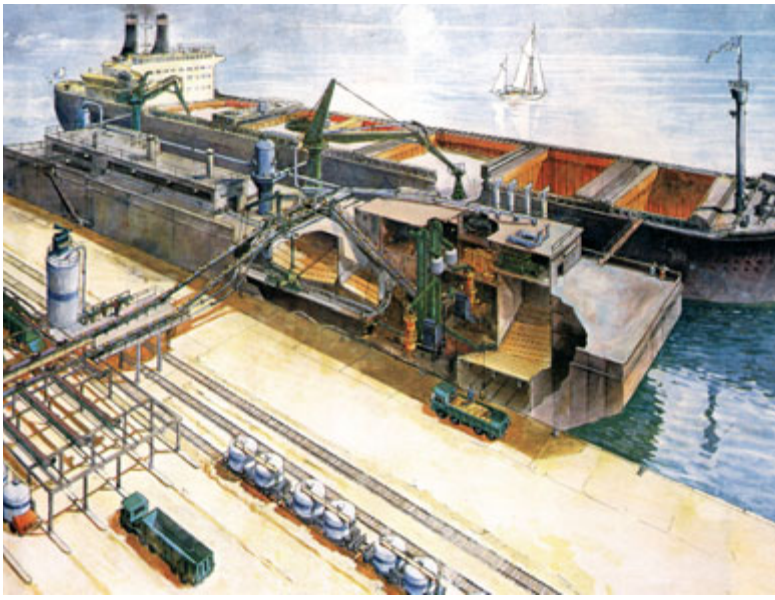
- **Independent, stand-alone, due to onboard supply facilities and operation accommodation**
- **Relocation at any time**
- **Adaption to any quay or port facility**
- **Weather does not affect both bulk and bag production**
- **Immediate operation start upon arrival at destination**


8-spout Rotary Packer

Packing and Palletizing

Globally hundreds of packing plants are equipped with Claudius Peters equipment including:

- **Rotary packers**
- **Automatic bag applicators**
- **Automatic bag trapping**
- **Bag loading devices for trucks**
- **Palletizers**


Saudi Arabia: Floating Terminal with CP Packer


Indonesia: Borsowa Barge with CP Packer

Vietnam: Hong Chon Terminal

Singapore: Jurong Port: silo, packer and palletizer

Shore based terminals

Example Jurong Port

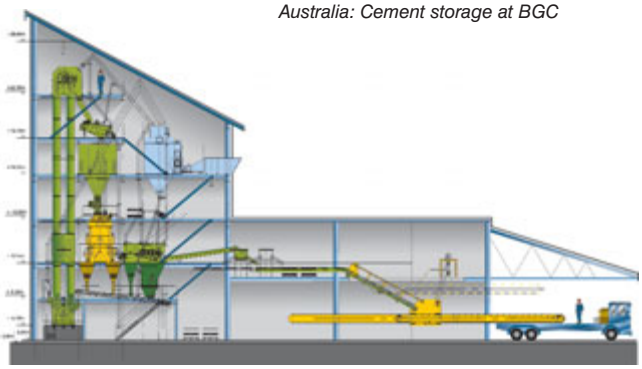
This terminal has a throughput of more than 3,5 million tonnes/year. More than a hundred ships have to be unloaded.

Onshore typical tasks:

- **Distribution to the individual silos**
- **Storing**
- **Blending**
- **Bagging and palletizing**
- **Bulk loading**

Typical truck traffic equates into 140,000 trucks/year

Australia: Cement storage at BGC



Packer with truck loader

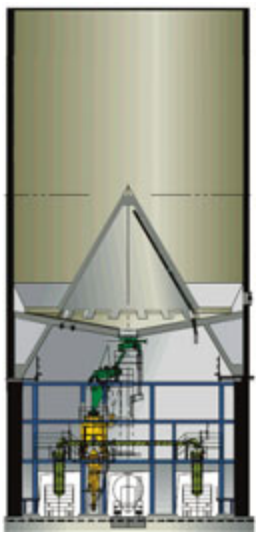
Pneumatic Transport - FLUIDCON

Considering that a low energy demand is one of the dominant decision factors of a pneumatic system, Claudius Peters developed the FLUIDCON system. Now benchmarking all other pneumatic systems, this system can be used on board and onshore.

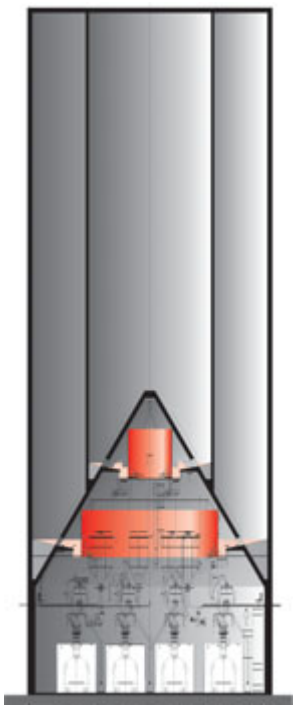
Multi-Cell Silos

Claudius Peters silos are designed with a unique expansion or inspection chamber. Typical storage capacities vary from 1,000 tonnes up to 30,000 tonnes.

Cells with different material types can feed the mixing plant, allowing you to produce your own material recipe.



Silo 10,000t with integrated packer



Multi-cell silo for 30,000t

CLAUDIUS PETERS

CALCINING | COOLING | DISPATCH
DOSING | DRY BLENDING | DRYING
GRINDING | PACKING
PNEUMATIC CONVEYING
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STOCKYARD SYSTEMS
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TURNKEY PROJECTS

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