

High capacity ship unloaders



Bulk Handling - Unloaders



Siwertell unloaders have satisfied customers worldwide for decades

Cargotec's Siwertell ship unloaders are selected by operators who strive for high efficiency with minimal impact on the environment through advanced technology. We focus on each customer's need and create a tailor-made solution accordingly.

The ship unloader programme offered by Cargotec exploits technologies and philosophies developed by a world leading company over decades. In defining and developing the most operationally efficient and safest dry bulk handling terminal, Cargotec emphasises environmental performance and versatility features in both its products and services.

In developing materials handling equipment our goal is to ensure that operators using systems supplied by Cargotec contribute to preserving the environment.

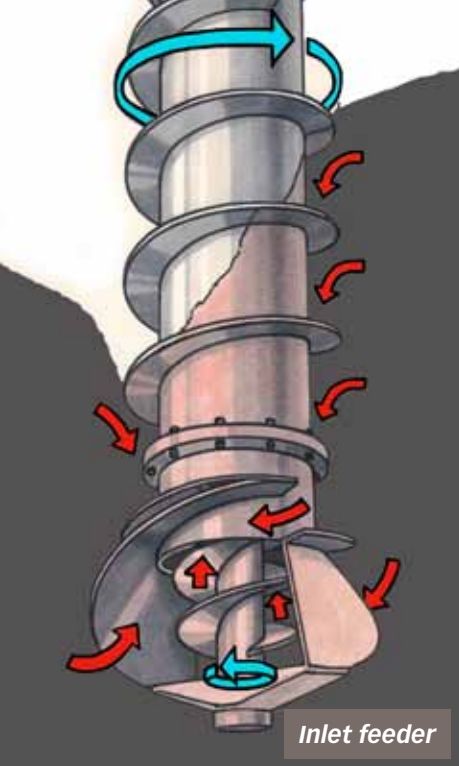
That is why the Siwertell ship unloader is designed with totally-enclosed conveying lines, transfer points and discharge arrangements to jetty conveyors.

A Siwertell ship unloader is totally enclosed from the pick-up point in the hold, which is below the cargo surface, to the transfer point at the jetty con-

veyor. A cleaner and safer environment is thus achieved through minimal spillage and dust. Outstanding performance is not only a question of developing high capacity unloading facilities. It is equally, if not more, important in the context of efficiency. A properly designed unloader should be able to maintain its rated capacity throughout the main part of the unloading process of the ship, with efficient assistance from cleaning equipment in the final stages of the cleaning process of each hold.

Outstanding performance should be linked not only to unloading rates and efficiency in the unloading process but also to the ability to unload sensitive cargoes without degeneration of the cargo and with limited power consumption.

Depending on the design parameters, terminal conditions and operational requirements, a truly versatile unloader can in one case be designed to be equally environment-friendly and efficient in unloading, for example, cement and clinker - two commodities used by the same industry but with totally different characteristics - or in another case designed to perform in anything from barges to oceangoing ships. With decades of experience in bulk material handling equipment, Cargotec has earned its competence and understanding of current and future industry needs by delivering dry bulk handling systems worldwide for all kinds of materials in many different shoreside and offshore applications.



Inlet feeder

Unloader movements (blue) / Cargo flow (red)

Products and technology

The Siwertell unloader programme offers a variety of sizes and installations, depending on the size of ship to be handled, the rated unloading capacity and the commodity to be handled. To meet market demands, the unloader range is adjustable for handling anything from smaller ships and barges up to Cape size, at rated unloading capacities up to 2,500 tph - however, even higher capacities can be achieved as we design according to each customer's needs.

Cost savings

Energy

The light weight and continuous operation of the Siwertell unloader both contribute to economical use of power. Average energy consumption varies with the type of cargo, capacity and size of ship to be unloaded but is, for example, less than half that of a pneumatic unloading system.

Labour

It takes only one man to operate a Siwertell unloader as the operator is his own hatch man. The operator uses either the radio remote controller and positions himself at the hatch with an excellent view of the inlet feeder or he controls from an operator's cabin (optional equipment). The cabin is positioned on a separate arm on the slewing turret and follows the move-

ments of the unloader. The operator has an excellent view of the hatch area.

Close to no spillage

As the Siwertell unloader uses a totally enclosed conveying system there is very minimal spillage. Minimising product losses when handling expensive cargoes in itself justifies investment in a Siwertell unloader, let alone the enhanced environmental footprint. It also helps keep the jetty cleaner and thereby less clean-up work after operation is required.

Shipping cost

With the high sustained unloading rate through the ship of the Siwertell, the significantly reduced time for discharge results in massive savings.

Jetty savings

Considering the ship sizes handled, a Siwertell unloader is comparatively light weight and slim in design. Even for large unloaders, the required rail span can be quite narrow. Taking these two factors into account it is possible to make major savings in jetty construction when building new terminals. The Siwertell is also easily adapted to fit existing jetties of weaker design.

Inlet feeder

The unique Siwertell inlet feeder ensures a high filling degree of the vertical screw conveyor, enabling Siwertell unloaders to provide high and well balanced unloading capacity. The inlet feeder is able to dig into the cargo while the unloader is being positioned either through travelling, slewing, luffing or pendulum modes; hence a high unloading efficiency is achieved through an uninterrupted discharging process. The inlet feeder is designed to pick up the cargo below the surface and secure efficient unloading of compacted materials and cargoes with hard surface crusts. The active cargo pick-up, facilitated by the inlet feeder and supported by the unparalleled reach and movement of the Siwertell arm system, ensures almost a dust-free unloading process as cargo avalanches can be minimised.

Cargo flow

All Siwertell unloaders are fitted with the unique Siwertell inlet feeder and a vertical screw conveyor. The vertical conveyor is available in different sizes, each offering a variety of unloading capacities depending on the material and configured to handle the intended cargo(s) as efficiently and cost effectively as possible. In some configurations the vertical screw is designed as a continuous screw flight over the complete conveyor length with integrated interme-



Cargotec, scope of supply for dry bulk handling systems includes:

- plant and terminal systems
- ship unloaders / loaders
- road-mobile ship unloaders
- conveying systems
- transfer terminal solutions
- storage systems

Siwertell products are designed, marketed and supplied from Cargotec's offices in Bjuv, Sweden, with support from local representatives worldwide.

mediate supports, while for other configurations specially adapted intermediate bearings are used.

Optionally, a collector unit can be attached to the vertical conveyor to facilitate a final cleaning procedure that is less labour intensive and improves the dust formation while cleaning. The collector unit is designed for use when unloading the final pile of free flowing cargoes such as cement and alumina; being telescopic, it will follow the tanktop of the hold, slowly rotating at a speed of 0-20 rpm.

As the cargo leaves the vertical conveyor it is transferred through a completely sealed transfer box to a horizontal screw conveyor. In most cases this horizontal screw conveyor runs the complete length of the horizontal arm to the vertical gravity chute in the slewing tower. In other cases the horizontal screw conveyor serves as a shorter feeding conveyor to ensure a dust and spillage free transfer to a horizontal belt conveyor taking the cargo to the slewing centre.

At the exit of the horizontal conveyor the cargo is gravity conveyed through vertical chutes, either directly to a truck/ rail car loading station or a receiving jetty conveyor placed immediately under the slewing centre of the unloader; or into a gantry conveyor running on the main beam of the gantry to one or multiple discharge positions for loading to truck/

rail cars and/or jetty conveyors. The gantry conveyor is either a screw conveyor or a belt conveyor.

Discharge arrangements

Siwertell unloaders can be fitted with one or multiple outlets facilitating direct loading of trucks or rail cars or loading onto one or more jetty conveyors of any technology. To maximise the efficiency of the Siwertell there is the possibility to continuously discharge the cargo on the jetty conveyor over the entire travelling length. To be able at the same time to have enclosed and environment-friendly transfer and onward conveying, the jetty conveyor needs to be covered.

To facilitate these three criteria – efficiency, enclosed transfer and enclosed conveyor – Cargotec has developed the movable transfer trolley with belt lifting arrangement. The jetty conveyor, which may be of the belt conveyor or screw conveyor type, is fitted with a rubber cover belt which is lifted by the transfer trolley to allow the gantry conveyor access for discharging the cargo on the receiving conveyor in a covered, dust- and spillage-free manner.

Easy reach

The slim design of the Siwertell arm system together with its unique manoeuvrability allows the vertical arm to kick in and out $\pm 30^\circ$ and the horizontal arm to luff up and down

$\pm 20^\circ$ ($+35^\circ$ - 45° to get in and out of the ship). Furthermore, the complete arm system slews $\pm 110^\circ$ and, together with travelling on the rails, all parts of the cargo hold can be reached and unloading efficiency achieved in all ship sizes that the Siwertell is designed to handle. To further improve the reach - especially required on stationary positioned unloaders and where the travelling length is not really long enough to accommodate the ship size - a tilting function of the slewing structure $\pm 10^\circ$ is optionally available on the larger range of Siwertell unloaders.

Multi-cargo

The Siwertell unloader is designed to move bulk cargo from ship to shore in the shortest possible time. It can handle most dry bulk cargoes ranging from powders via granules to lumps. The capacity range suits most bulk operators and makes the Siwertell an excellent choice, whether the operator needs to handle one cargo or multiple cargoes through the same unloader. The Siwertell is tailored to the demands of each operator and the same machine can be used for handling feedstuff one day and fertilisers another without requiring changes to the equipment. If your unloading operation is sensitive and demanding and calls for extraordinary equipment, a Siwertell unloader is the answer.



Examples of cost alternatives

OPERATION DATA		Alt A	Alt B	Alt C	Alt D
Rated capacity	(tph)	600	1 200	1 500	2 400
Yearly throughput	(tonnes)	1 000 000	1 000 000	4 000 000	4 000 000
Ship size	(dwt)	65 000	65 000	150 000	150 000
Ship cost/day	(USD)	45 000	45 000	140 000	140 000
Working hours/day	(h)	22	22	22	22
Efficiency	%	75	75	70	70
No of unloading days	(days)	101	51	173	108
Total ship cost	(USD)	4 545 000	2 295 000	24 220 000	15 120 000

Project elaboration and design

In conjunction with the client, Cargotec defines and establishes the frames and guidelines of the proposed project to meet the targeted technical and economical goals. Our highly qualified and experienced engineers are your guarantee of adequate project elaboration and systems design. The latest generation of 3-D design tools are widely employed in the design process.

Installation, commissioning and training

We undertake on a worldwide basis installation and commissioning services or provide erection supervision at the customer's option. Our start-up and commissioning team of engineers ensures a smooth transition into service, whether you are taking delivery of a single system or a complete turn-key plant. Complex installations and plants may call for specialist staff training

programmes, which we can plan and effect in co-operation with the customer.

Electrical and process control systems

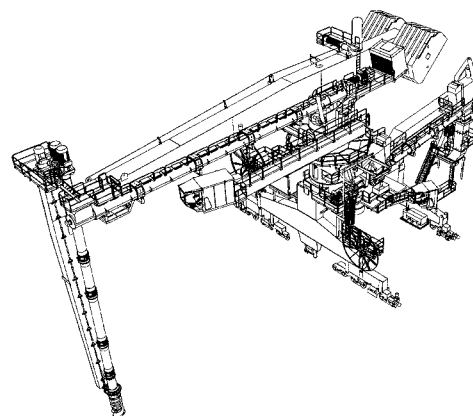
A modern bulk terminal is a complex installation of mechanical and electrical systems. We provide comprehensive technical solutions which include not only the mechanical systems but also the electrical and process control systems. Our electrical and process control department is organised to cover the full range of services and all design aspects in these fields.

Service

Through a worldwide network of Cargotec service stations we can offer services ranging from traditional sales of on-demand spare parts via inspection and training contracts to fully-fledged operation and maintenance contracts.

Examples of cost alternatives

The above table illustrates four different alternatives of shipping cost solutions depending on the rated unloading capacity - all based on the high efficiency of the Siwertell unloader.



Cargotec is present throughout the world.



Cargotec improves the efficiency of cargo flows by offering solutions for loading and unloading goods on land and at sea – wherever cargo is on the move. For handling dry bulk materials, Cargotec provides engineering solutions through its Siwertell brand. Designed to ensure environmentally-friendly and efficient cargo operations, Siwertell ship unloaders and loaders are based on unique screw conveyor technology, in combination with belt conveyors and aeroslides and can handle virtually any dry bulk cargo.



SIWERTELL IS A CARGOTEC BRAND

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