

# SEMI-STAAAL



**Cleaning and logistic systems  
for returnable packaging**

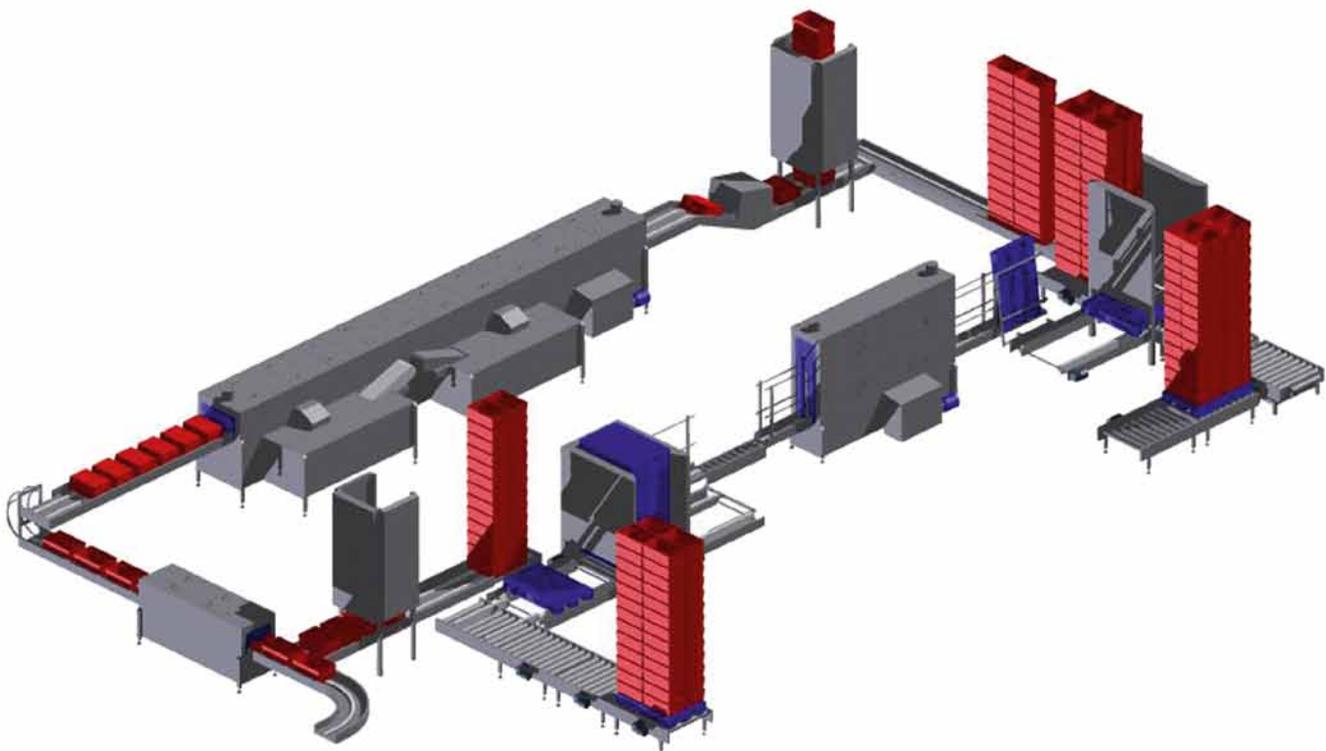
SEMI-STAAAL is one of the European market leaders and pioneers in industrial cleaning and logistic handling systems for returnable packaging.

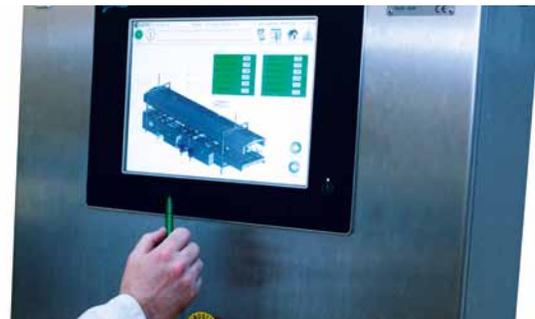
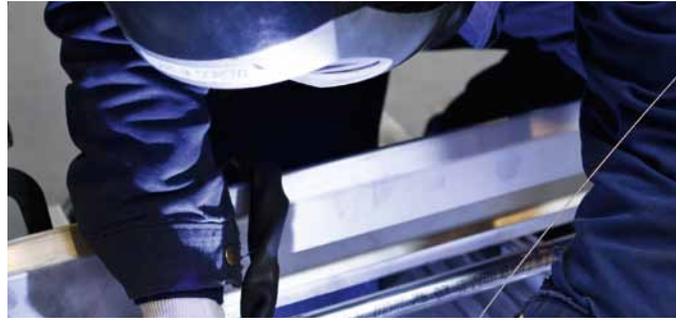
We are a supplier who develops, produces, installs and services tailor made cleaning and logistic solutions for customers around the globe. Our systems are primarily for returnable packaging such as crates, pallets, tubs/ totes, roll containers and racks used within the food, hospital and pharmaceutical industries. The handling systems include:

- Storage and buffer systems
- Sorting systems
- Conveying systems
- Box turners and emptying devices
- Pallet magazines
- Stackers
- (de)palletizing systems either by means of a traditional mechanical solution or by a robot

Our solutions span from stand-alone machines to fully integrated automatic high capacity systems. For four decades we have serviced our customers around the world counting more than 600 installations spread across 30 countries. Amongst our customers are ARLA (Dairy/Northern Europe), Danish Crown (Meat/ Northern Europe), National Prawn Company (Shell fish/ Middle East), Svenska Retursystem (Pool/Sweden), United Crate (Pool/Australia), Marine Harvest (Fish/ Canada) and Lundbeck (Pharma/Denmark).

SEMI-STAAAL continuously works on simplifying and improving our design with the objective of making our installations easy to own, operate and service.





As customer you have a partner in SEMI-STAAAL, who has many years of experience with solution projecting, construction, production, electrical/ mechanical installation and after sales service.

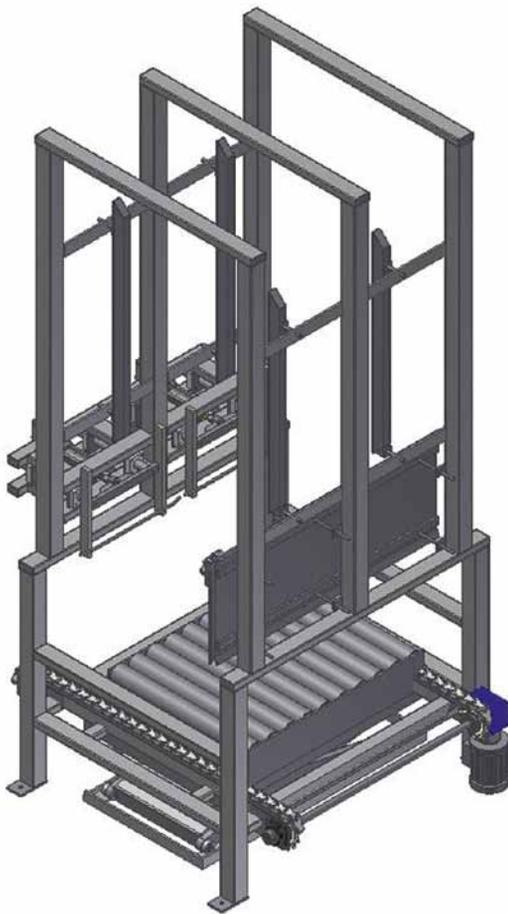
Our electrical control system can be interfaced with our customers ERP/SCADA systems for data transfer and collection. Our more complex systems are equipped with a modem with integrated web cam for remote access with video surveillance. This improves the trouble shooting process and reduces the response time.

Prior to dispatch all our machinery undergoes a Factory Acceptance Test (FAT) at SEMI-STAAAL's premises to ensure that the equipment meets the demands agreed upon. Once the equipment has been installed, SEMI-STAAAL's supervisors carry out a Site Acceptance Test (SAT) and train the operator staff before handing over to the installation.

SEMI-STAAAL offers various service modules with focus on improving uptimes, capacity line efficiency and ensuring that the customer's operation and maintenance staff are up-to-date with the latest knowledge.

Together with our technology partners we contribute to unique solutions within water filtration/water cleaning systems, disinfection and effective heating systems. These solutions have considerable economic and environmental advantages for our customers with regard to energy and water consumption.





SEMI-STAAAL offers solutions for transportation and handling of almost every kind of returnable packaging either as an integrated solution with a washing system, a stand-alone solution or as a sub-supplier with or without electrical control system.

### Palletizing systems

SEMI-STAAAL has developed a number of (de)palletizing solutions for filled and empty crates based on the following principles:

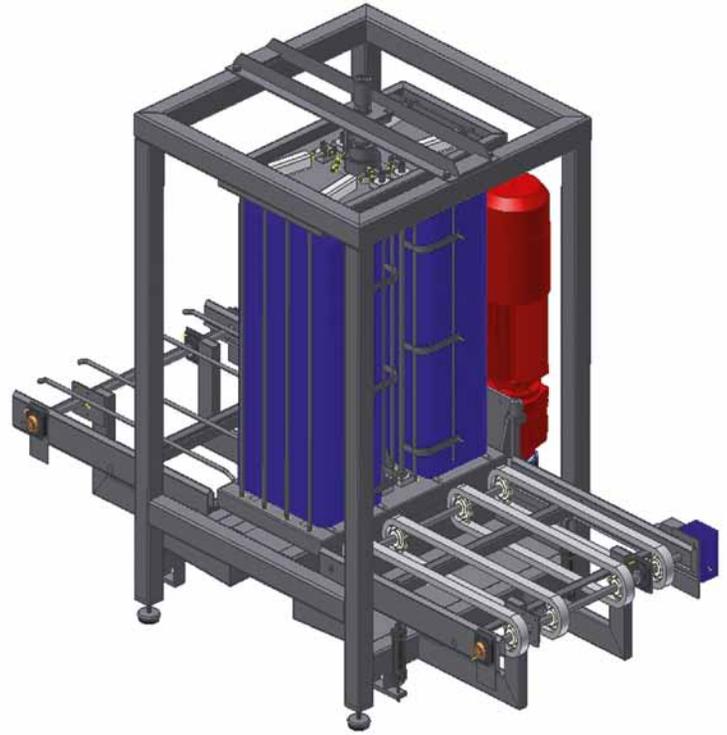
- Crate stack palletizing: All crate stacks on the pallet are (de)palletized in one working cycle
- Layer (de)palletizing. Crates are (de)palletized layer by layer either from top or bottom
- Robots are deployed for more complex (de)palletizing projects where a traditional mechanical solution is not feasible

### Stackers

For washing installations running with high capacities (de) stackers are often used to minimize the manual working functions. SEMI-STAAAL manufactures a wide range of stackers for crates, pallets and tubs and is experienced in both low and high capacity solutions.

With regard to crate stackers, SEMI-STAAAL has manufactured de-stackers with a capacity of 5,000 boxes/hour and a de-stacker capable of handling 10 different crate types.





**Conveyors**

SEMI-STAAAL primarily manufactures conveying systems in stainless steel. We have a complete range of conveying systems covering:

- Chain conveyors
- Vertical conveyors
- Roll conveyors
- Modular belt conveyors

We manufacture conveying systems with modular belts (PP/PE/PVC, polyester), rubber and acetal chains – depending on the transport task for pallets, tubs, boxes, moulds and roll containers, racks etc.

Our roll conveyors are manufactured using stainless steel side guides with PVC, stainless steel or galvanized rolls. The conveyor systems can also be delivered in warm galvanized or lacquered RAL-colour according to the customer's wishes.

The conveyors are tailor made with regard to length, width, height etc. Driving stations can be delivered as drum motors or gear motors.

In our design we emphasize that the conveyors are easy to clean and service.

**Storage and buffer systems**

SEMI-STAAAL has delivered a large range of storage systems for crates, pallets and tubs. I.e. we have delivered a storage system for crates with a capacity of up to 60,000 units for a leading Scandinavian market player in the bakery industry.



# Crate washers



Today most of our foods are transported in returnable plastic crates. SEMI-STAAAL has developed a wide range of products that can handle most of the crate types used both in food and the non-food industry.

SEMI-STAAAL's solutions span from crate washers with a capacity of 50 crates/ hour to full automatic washing and logistic plants with capacities up to 5,000 crates/ hour. Our solutions are often tailor made to our customer's specific requirements for hygiene, space and capacity. Our crate washers are 100% made of stainless steel only – AISI 304 or 316.

### Modularized construction principle

The design of the crate washer depends on whether the crate has been in touch with high protein products, if labels need to be removed or if there is easily removable dirt to be washed off. Typical zones in a crate washer can be: Cold pre-rinse, washing section with/without detergent, high pressure section to remove labels and (disinfecting) after rinse.

### Water filtration

Depending on type and amount of dirt which is washed down from the crates and the required degree of automation SEMI-STAAAL recommends a suitable filtration system. We have a number of alternative filtration systems such as:

- Manual filter baskets
- Pipe filters
- Automatic self-cleaning rotating drum filters
- Automatic self cleaning filter belts
- Automatic self cleaning filter pumps which we can filter particles down to 50 µm

The filtration system can be a considerable water saving precaution.



### HACCP design and CIP

SEMI-STAAAL washing machines are made according to the HACCP principles. All the in- and outside surfaces are self draining to avoid accumulation of bacteria. For automatic cleaning of the inside of washing machine it can be equipped with a CIP system (Cleaning In Place). Another hygienic advantage of the SEMI-STAAAL crate washers is that the machine is divided in a bottom and a top part. The top part of the machine can be lifted by means of pneumatic cylinders giving free access for cleaning and servicing of the inside of the machine.

### Nozzles

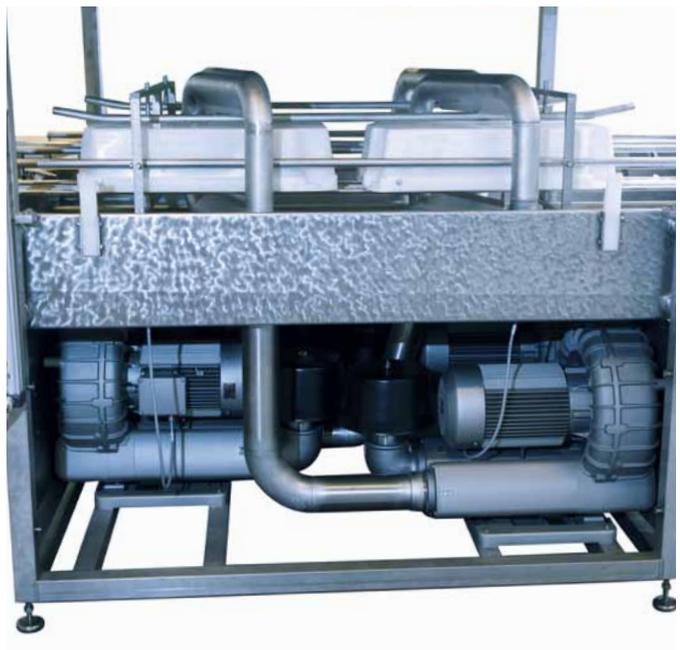
The nozzles can in most cases be dismantled and cleaned within a few minutes without the use of tools. The entire nozzle system is tailored around the crate to ensure each cm<sup>2</sup> is cleaned properly. All our nozzles are CNC precision machined and made of stainless steel AISI 316.

For heating of the re-circulating water we have a wide range of solutions (hot water or steam through a heat exchanger, gas or electric), which is adapted our customers' energy conditions. SEMI-STAAAL has implemented some of the most heat efficient systems on the market.

### Drying system

In most of our crate drying systems we use compressors (side chamber blowers). By applying this methodology we can remove 90% of the water from the crates. This water is collected and led back to the crate washer. In industries demanding 100% dry crates a drying chamber used in addition. For customers with high demands on capacity, ergonomics and energy our centrifugal dryer is applied. This drying system works on the principle of the centrifugal force whereby we can guarantee down to approx. 2 gram water residue on the crates. The centrifugal dryer can work with a capacity up to 6,000 crates/hour.

*Kohberg, Denmark: has a fully automatic washing plant from SEMI-STAAAL which de-palletize, wash, dry and stack 2,000 crates/ hour and a storage system for 60,000 crates which delivers clean crates directly to the packing lines.*



# Tub washers



SEMI-STAAAL is one of the European leaders for tub washing systems with up to 100 references worldwide. Our solutions span from minor stand-alone tub washers with a capacity of 10 tubs/hour to fully automatic washing systems with a capacity of up to 100 tubs/hour.

### Modularized construction principle

SEMI-STAAAL's tub washers are available in two different versions. The space efficient cabinet solution, where infeed and discharge of the tub are made on the same side. The tunnel solution where infeed and discharge of the tub are on two opposite sides of the tub washer in order to separate clean tubs from dirty tubs. Extra modules such as pre-rinse, extra washing section, high pressure section, tub stackers, turners etc. can be integrated into the system depending on flow-, hygiene- and capacity requirements.

### Filtration

SEMI-STAAAL recommends a filtration system depending on type of dirt which is washed down from the tubs and the customer's requirements with regards to automation. Our filtration systems consist of manual filter baskets, pipe filters, automatic self-cleaning rotating drum filters, automatic self cleaning filter belts and self cleaning filter pumps which can filter particles down to 50 µm.



### HACCP design and CIP

SEMI-STAAAL's tub washers are made according to the HACCP principles. All in- and outside surfaces are self draining to avoid accumulation of bacteria. The washing machine can be equipped with a CIP system (Cleaning In Place) to achieve automatic cleaning of the inside of the washing machine.

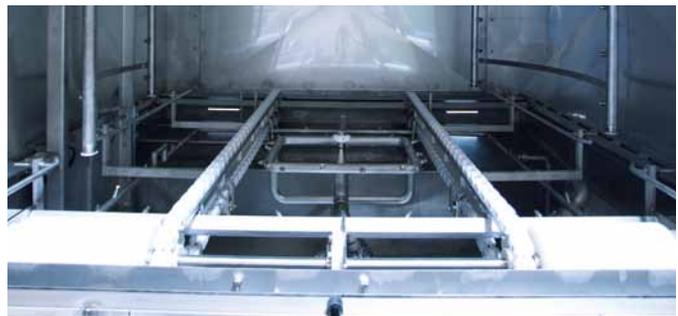
### Nozzles and energy

The nozzles are specially manufactured and orientated to the size and shape of the tub and can be dismantled and cleaned in few minutes. For heating of the recirculated water we have solutions adapted to the local energy conditions. Some of the most heat efficient systems on the market has been implemented by SEMI-STAAAL.

### Drying system

For drying of tubs we have two different solutions available. In the traditional drying system where compressors (side chamber blowers) are used we can remove up to 90% of the water residues on the tubs. This water can be collected and reused. In industries demanding 100% dryness a drying chamber is used in addition.

*National Prawn Company/ The Kingdom of Saudi Arabia: Has a fully automatic "in-line system" for washing of lids and tubs with a capacity of approx. 60 tubs + 60 lids/ hour. The system also features an automatic storage for approx. 400 tubs and lids. The installation is remotely video supervised by SEMI-STAAAL.*



# Pallet washer



Concurrently with the increasing requirement for the use of plastic pallets SEMI-STAAAL has developed a complete range for transport, stacking and washing of pallets.

## Two versions

SEMI-STAAAL's pallet washers are based on two different versions. A vertical space saving solution where the pallets are washed upright and a horizontal solution where the pallets are washed in a bottom down position. If needed brushes can be integrated into the solution to clean challenging surfaces/dirt. Both solutions can be supplemented with:

- Pre-rinse section
- Additional washing zone with/without chemicals
- High pressure zone for label removal
- Automatic handling of pallets before and after wash (conveyors, (de)stackers, drying systems, foiling etc).

## HACCP – Filtration – nozzle system

SEMI-STAAAL washing machines are made according to the HACCP principles. All the in- and outside surfaces are self draining to avoid accumulation of bacteria. For automatic cleaning of the inside of washing machine it can be equipped with a CIP system (Cleaning In Place). Another hygienic advantage of the SEMI-STAAAL pallet washers is that the machine is divided in a bottom and a top part. The top part of the machine can be lifted by means of pneumatic cylinders giving free access for cleaning and servicing of the inside of the machine. The entire nozzle system can be dismantled without the use of tools.

SEMI-STAAAL's drying system removes approx. 90% of the water from the objects.

*Svenska Retursystem Sweden: Has a fully automatic system for pallets with de-stacker, washer, sorting of four pallet types, stackers, strapping and double stacking of plastic pallets with a capacity of approx. 130 pallets/hour.*



## Bin washer

SEMI-STAAAL's bin washers (VEMAG bins) can vary according to individual requirements and can be delivered as a stand-alone machine or as a fully automatic high capacity system.

### Two versions

The cabinet solution where the infeed and discharge is on the same side of the machine and the tunnel solution where the bin is fed in from one side and led out on the opposite side. A washing tunnel with fixed nozzles and rotating turbines ensures that the bin is intensively cleaned on all in- and outside surfaces including the wheel system.

### HACCP design and CIP

SEMI-STAAAL washing machines are made according to the HACCP principles where all inside and outside surfaces are self-draining to avoid bacterial accumulation.

*Familien Dafgaard, Sweden has a full automatic tunnel bin washing system with three washing zones which handles up to 100 bins/ hour.*



# SEMI-STAAAL

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