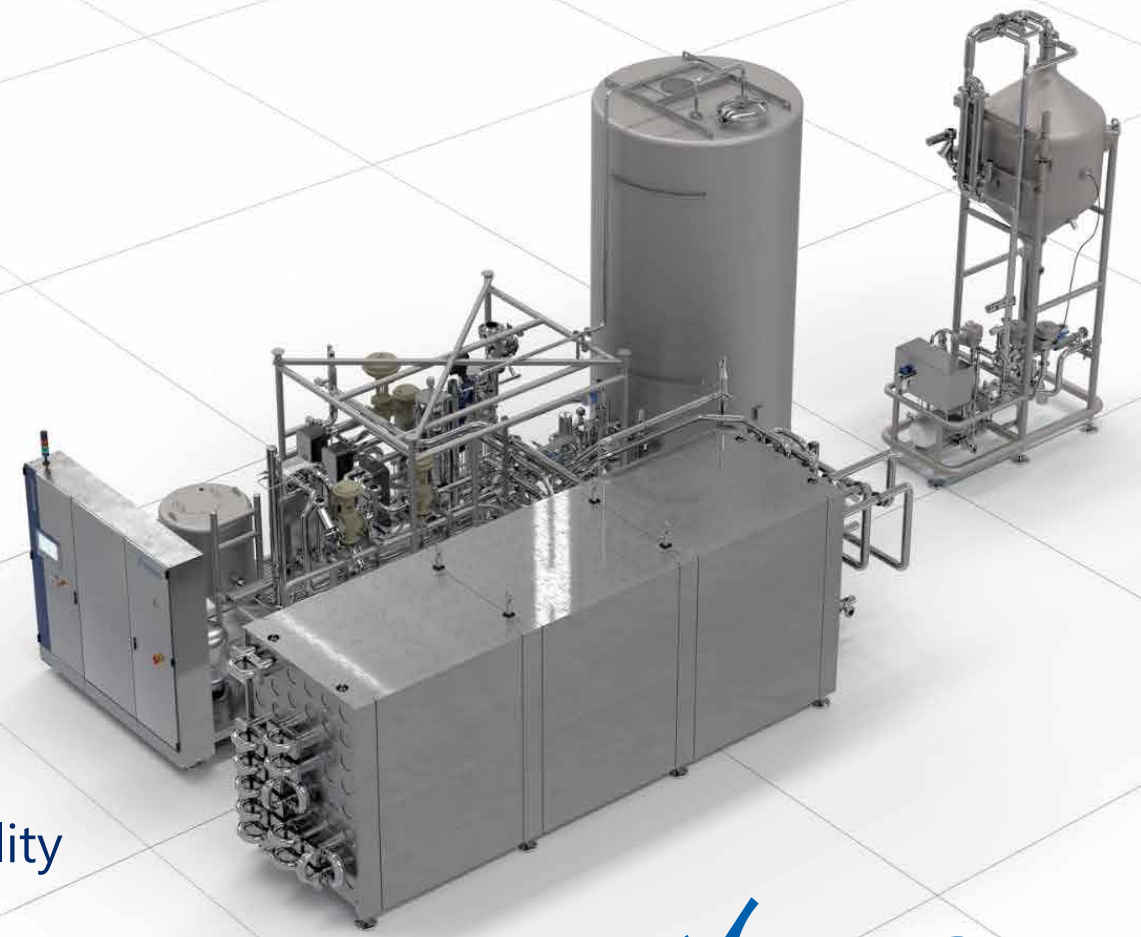




# VarioFlash H

Thermal product treatment for the best juice quality



# The flash pasteuriser for hygienic filling processes



Processes for the product preservation and safe, hygienic sequences are essential factors when it comes to product manufacture – and this obviously also applies to juice. The Krones VarioFlash H flash pasteuriser guarantees the safe microbiological filling of juice. Since every product has its own requirements, Krones adjusts the machines individually to the respective applications.

## At a glance

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- Output range from 7,500 to 60,000 litres per hour
- Application: Juice



# Product treatment system

## Krones VarioFlash H hotfill heating system



**1 Different options for product/rework handling:**  
In the **standard version**, the heating system is designed with a supply tank for disconnecting the upstream process. An **optional rework tank** can be connected to pump the mixing phases.

In the picture:

- Enlarged supply tank that can be used as a rework tank at the same time
- The content of the rework tank can be mixed from 5 to 100 percent with the freshly fed product

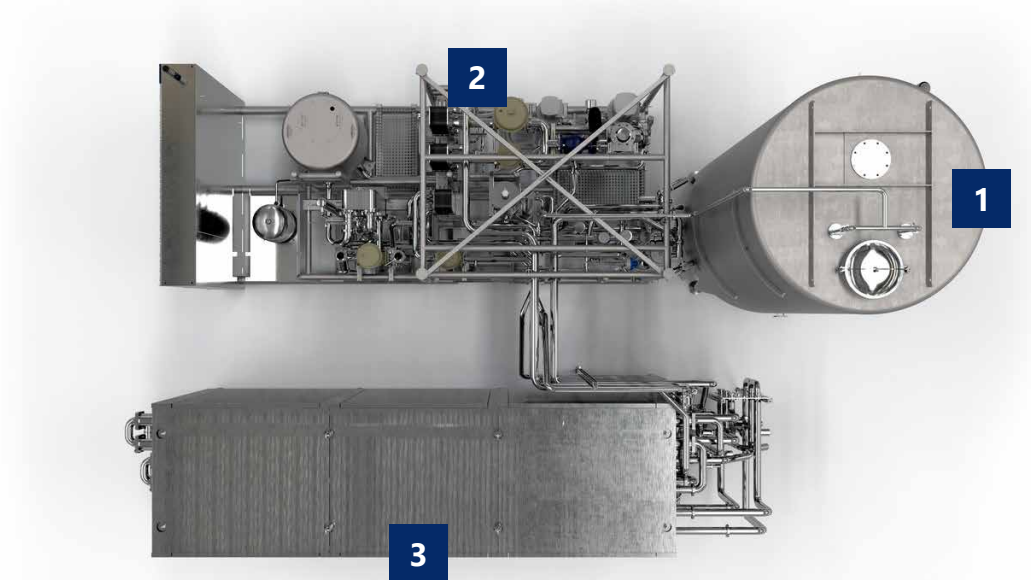
**2 Service module**

- Energy supply for product heat exchanger
- Electrical and pneumatic controller with MCC and Krones HMI

**3 Heat exchanger and heat retention section**

→ Gentle and safe product heating

- Designed for the characteristics of your product
- Design: Either plate heat exchanger from Krones or hygienic tubular heat exchanger built acc. to Krones specifications
- Heat retention with redundant temperature control



### Optional

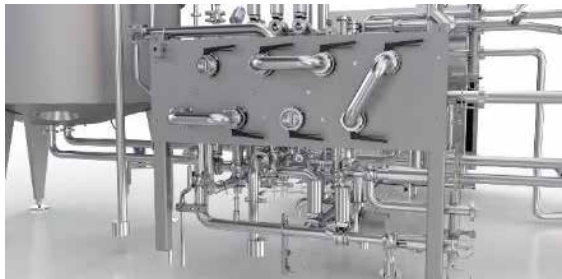
- Connection of
- Deaerator
  - Rework tank
  - Homogenizer

# Design features



## Integration according to your needs

- Direct connection or via swing bend panel or valve manifold



## High product quality also under difficult conditions

- Particle filters in the media supply pipe (during heating and cooling)
- Steam reduction compensates pressure fluctuations



## Intelligent design for easy maintenance

- Easy access to the pumps
- Ways for maintenance



## Stable pasteurisation conditions

- Separate water tank to control the water circuit separately from the infeed tank
- High accuracy for the temperature control



# The components in detail

## The efficient product deaerator



You have invested a great deal in order to develop a fruit juice beverage of top quality? You want to be sure that this quality is preserved in the manufacturing and filling processes? Then integrate the Krones product deaerator VarioSpin in your manufacturing process. With VarioSpin you make use of a compact vacuum-assisted deaerator which permits highly effective filling processes without the formation of foam at the filling valve.

### At a glance

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- Deaeration tanks with patented swirl inlet
- Output: 7.5 to 60 m<sup>3</sup>/h
- Recovery and return of flavouring through a Venturi nozzle
- Internal recirculation for a multi-stage deaeration
- Reduced mixing phases for short change-over times and low product losses



# The components in detail

## VarioSpin product deaerator



**Simplicity, innovation and function – the factors for the most effective product deaerator on the market**

- 1 Efficient flavouring condensation**
  - High product quality without the loss of flavouring sensation
- 2 Compact design**
  - Minimum of mixing phases
  - No moving parts in the vacuum area
  - Short product dwell time in the system
  - Smallest space requirement on the market
- 3 Venturi nozzle**
  - Just-in-time return of flavouring with reliable homogenisation via the product pump
- 4 Water saving**
  - Reduced water consumption thanks to intelligent sealing water utilisation in the vacuum pump circuit
  - Only 10 l/h\* of water instead of 1,000 l/h
- 5 Innovation: patented swirl infeed nozzle**
  - Gentle distribution
  - Reduced foaming
  - Product feed independent from the volume flow rate
  - Entire tank as a material exchange surface
  - High gas reduction

\* Depending on the pump size



# The swirl nozzle in the VarioSpin



- Formation of a uniform product film upon entry of the product into the container
- Efficient use of the tank surface with reduced foam generation
- High material exchange and significant gas reduction
- Variably adjustable volume flow rate of up to 50 percent of the nominal amount without movable, high-maintenance parts
- Generation of a large and turbulent product surface with slight layer thickness
- Improved partial pressure conditions during deaeration due to higher speeds in the nozzle channels
- Hygienic design with low product quantities in the tank and minimum mixing phases



# Five reasons for product deaeration



## Why should you integrate the VarioSpin in your production line

- Reduced solute oxygen to avoid oxidation
- Minimisation of unwanted flavours (e. g. milk)
- Prevention of problems during filling (especially with hot fill processes) thanks to reduced free gasses
- Avoiding pulp and fibres floating up inside the bottle
- Increased shelf time at UHT milk



Deaerated apple juice (left) and non-deaerated apple juice (right)



Orange cells floated up in the juice which has not been completely deaerated



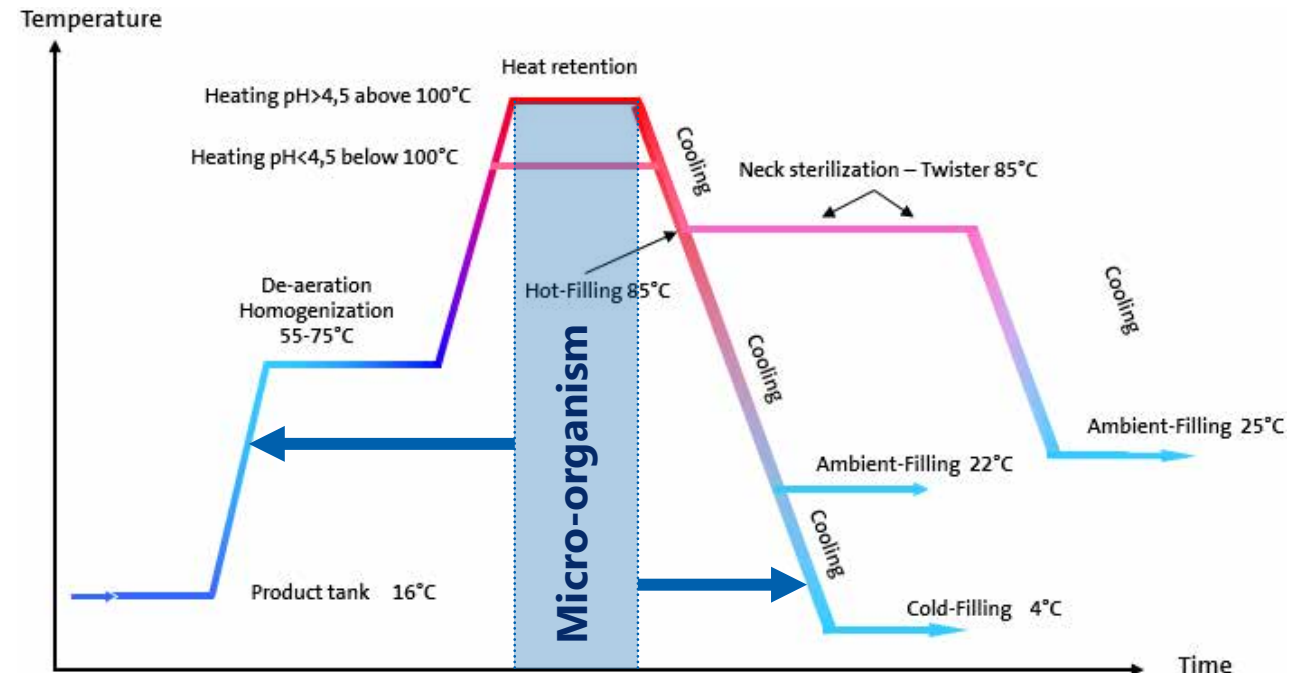
# Thermal product treatment



Optimal planning of the thermal product treatment will result in a reduced ...

- thermal impact acting on the product due to the short dwell times.
- requirement for thermal and pump energy.
- portion of product loss due to reduced line volumes.
- oxidation rate if a VarioSpin product deaerator is used.

The heating temperatures and periods are defined by the killing kinetics of the various micro-organisms. An optimum design of the heat exchanger surfaces can reduce the dwell time in the heating and cooling zones. It is essential to find the correct balance between the least possible number of tubular modules (optimisation of the heat exchanger surface) and gentle product heating.



# The components in detail

## Plate or tubular heat exchanger – a comparison



### Plate heat exchanger



- Low investment costs
- Low line volume
- High energy recovery rates
- Low space requirements
- Wide variety of plate sections



- Higher maintenance costs (e.g. for seals)
- Reduced service life of the plates (susceptible to damage due to pressure peaks)
- Limited application for products with particles and/or fibres



Design according to Krones specifications

### Tubular heat exchanger



- Less susceptible to damage due to pressure peaks
- Wide range of tube sheets available
- Suitable for a wide variety of products with different flow characteristics (even for products containing particles/fibres)
- No seals in the product area
- Almost unlimited service life of the modules
- Low maintenance costs



- Lower energy recovery rates
- Higher investment costs
- More space required



Design and manufacture by Krones

# The tubular heat exchanger in detail

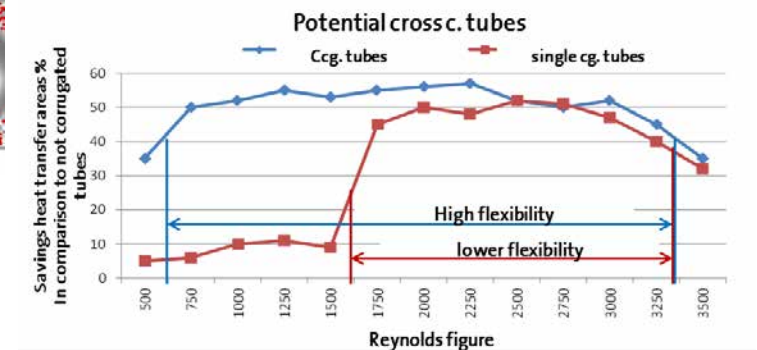
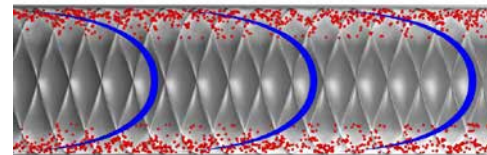
## Thermal product treatment with cross-corrugated tubes



The use of cross-corrugated tubes increases the flexibility of product treatment with regard to output range and product variety. Due to their surface structure, cross-corrugated tubes can break up the laminar boundary layer which results in a high turbulence and positively affects the further output and/or viscosity. This can reduce the required surface of the heat exchanger by up to 30 %.

### At a glance

- Low thermal load
- Short heating and cooling phases
- Low loss of flavour and vitamins
- Minimum colour change (e.g., for tea)
- Preservation of the natural product quality



# Verification of your product data as basis for calculating the heat exchanger



Krones would like to make sure that you get the heat exchanger ideally suited for your product. In the Krones technical centre, we first check your products for typical characteristics:

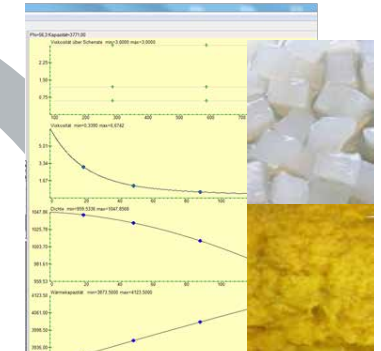
- Viscosity (depending on temperature and shearing rate)
- Heat conductivity
- Flow properties
- Heating requirements
- Oxygen and nitrogen content
- Portion of and size of solids (e.g., fibres, pulp or fruit pieces)
- Foaming tendency

If no product samples are available, a reference product from our considerable product database (more than 2000 product data from all over the world) can be selected.

Product features

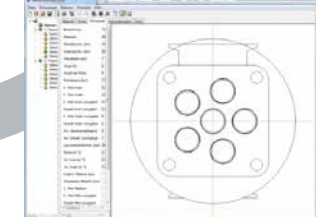
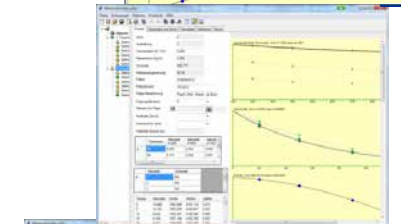


Product data base



Revalidation

Heat exchanger



Calculation

# Standard

## Heat recovery within VarioFlash H



### Recovery I

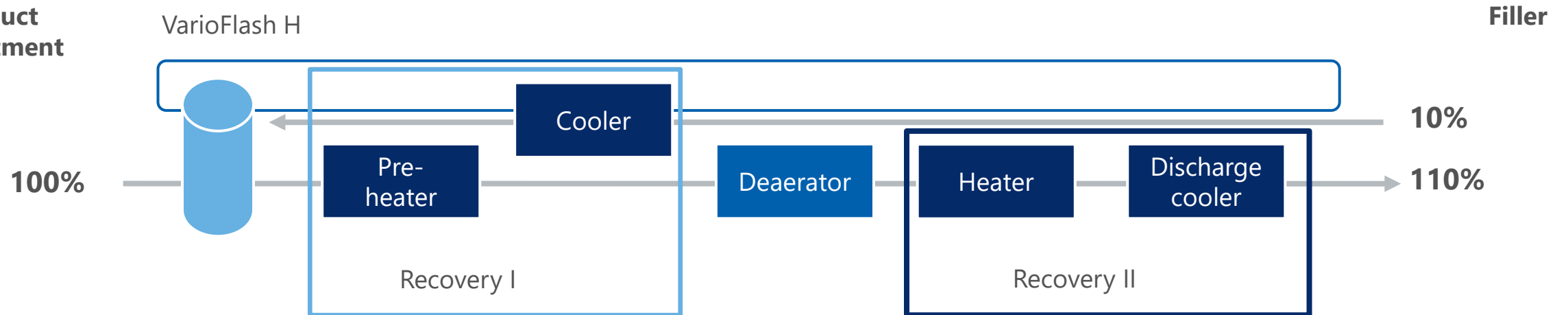
In the hotfill process, the VarioFlash H is designed with an excess output of approximately five to ten percent compared to the filler. This excess output leads to permanent circulation throughout the entire system in order to compensate for heat losses at the filler or in the piping system.

Before the product is returned to the supply tank, it is cooled down accordingly. Via an internal water circuit, this energy can then be used to regeneratively heat cold product.

### Recovery II

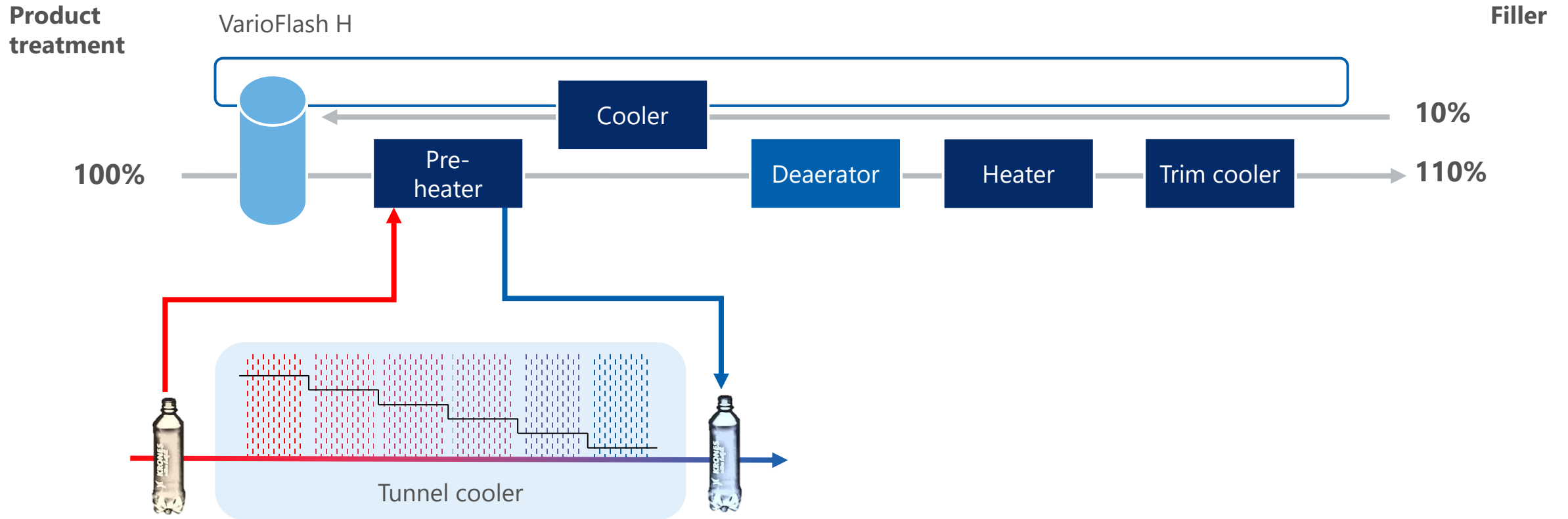
If the temperature required for heating is higher than the filling temperature, an internal energy circuit is used to recover the excess energy. Through this heat exchange, the filling temperature is precisely set.

### Product treatment



# Option

## Heat recovery with tunnel cooler LinaCool (EquiTherm H)



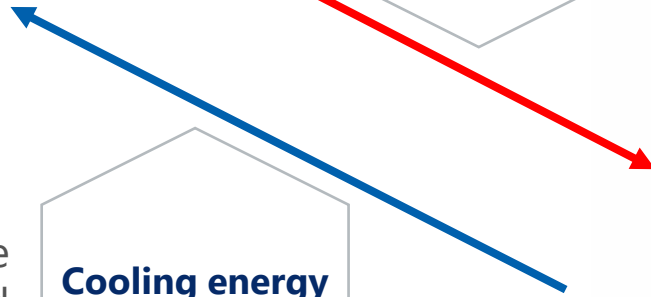
# Heat recovery with tunnel cooler LinaCool (EquiTherm H)

## The method of operation at a glance



**Saving thermal energy**

The thermal energy won in the LinaCool is supplied to the flash pasteuriser for product reheating.



**Cooling energy saving:**

The cooled medium is supplied to the cooling tower, cooled down and then used in the LinaCool.

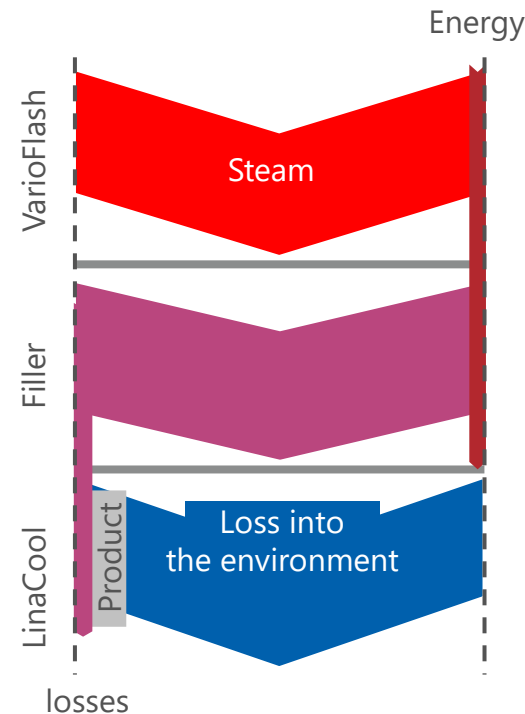


# Heat recovery with tunnel cooler LinaCool (EquiTherm H)

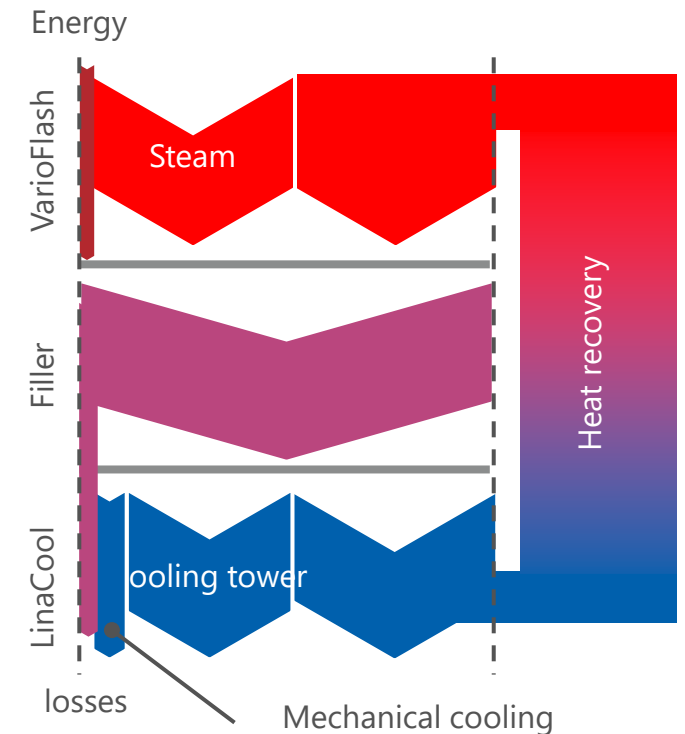
## The method of operation in detail

- Return of the removed thermal energy from the LinaCool to the VarioFlash flash pasteuriser
- Pre-heating of the product through one of the heat exchangers upstream from the flash pasteuriser with heat loss from the tunnel cooler
- Less steam required in the flash pasteuriser as the product is already preheated
- Return of the chilled coolant from the flash pasteuriser to the tunnel cooler

### Energy flow without recovery



### Energy flow with recovery





# Separate treatment of juice and fruit pieces



The quality of juice is not only defined by its taste but also by the feeling in the mouth. The Krones dosing systems are the solution for all bottling plants that strive for top product quality and wish to lean on a high-standard fruit juice production as compared to the conventional hot filling process.

## At a glance

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- Application: Beverages with fruit components, such as premium fruit juices or mixed milk beverages
- Processes food pieces or fruit components of all kinds and consistencies
- Doses fruit pieces with a size of 10 x 10 x 10 millimetres independent from the aseptic filling or hot filling process
- Processes fruit and juice separately and therefore reduces damage on the fruit pieces to a minimum



# The twin-flow method

## The fruit juice flow

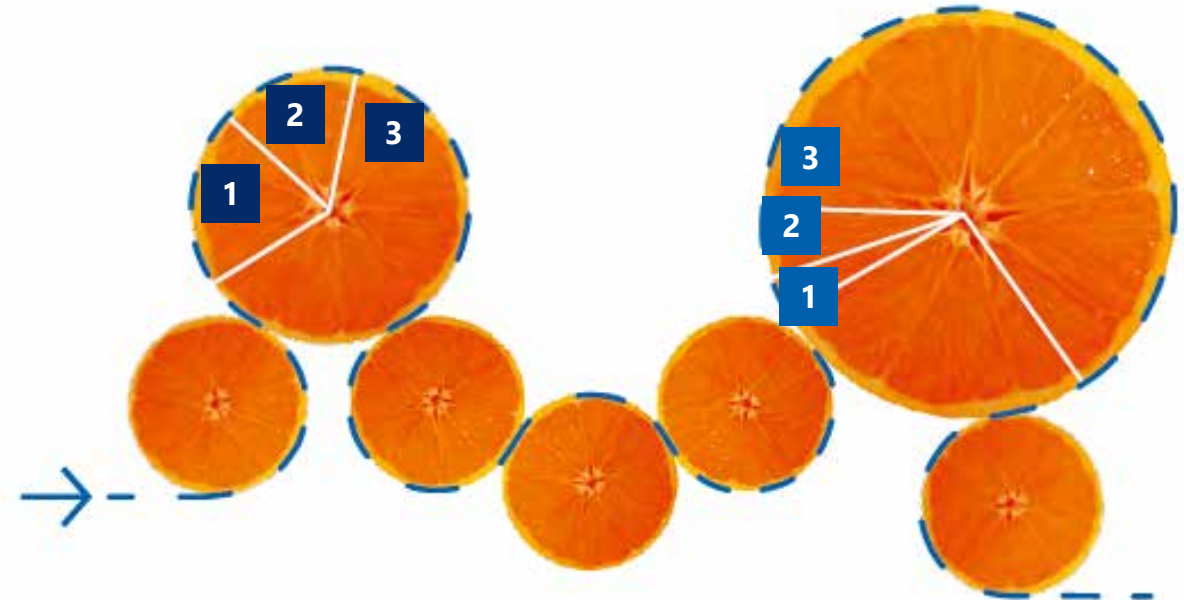


### Hot filling

#### FlexiFruit pre-dosing system

- Hot dosing of the fruit flow into the bottle
- Processes fruit pieces of up to 10 x 10 x 10 millimetres
- Also suitable for products with a higher viscosity
- Works with diaphragm valves which are gentle on the product
- Keeps the fruit pieces in their original shape and structure - even with highly sensitive sacs
- Non-contact filling in accordance with hygienic standards
- Only opens the filling valve if there is a bottle positioned underneath it

**Krones FlexiFruit is an intelligent and self-adjusting pre-dosing system which controls the dosing quantity on its own via the Modulfill filler.**



#### FlexiFruit pre-dosing system

- 1 Dosing of fruit pieces
- 2 Pipe draining
- 3 Drip-off time

#### Modulfill filler

- 1 Settling
- 2 Pre-dosing inspection
- 3 Filling

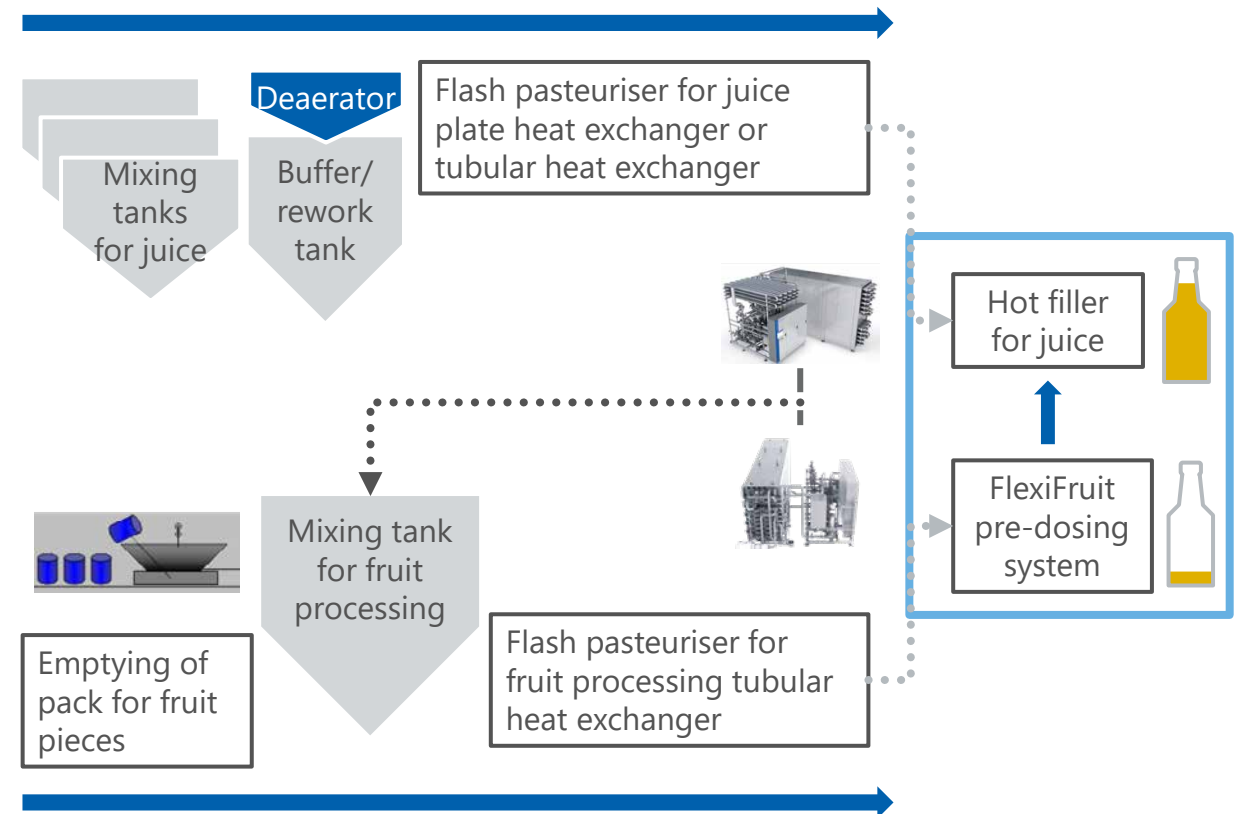
# The Krones twin-flow method



Double protection: The double-flow method systematically prevents valuable fruit pieces from being overdosed in order to guarantee a specific volume in the bottle. At the same time, the fruit pieces are protected from being damaged through strong impacts.

## Separate treatment of fruit and juice for:

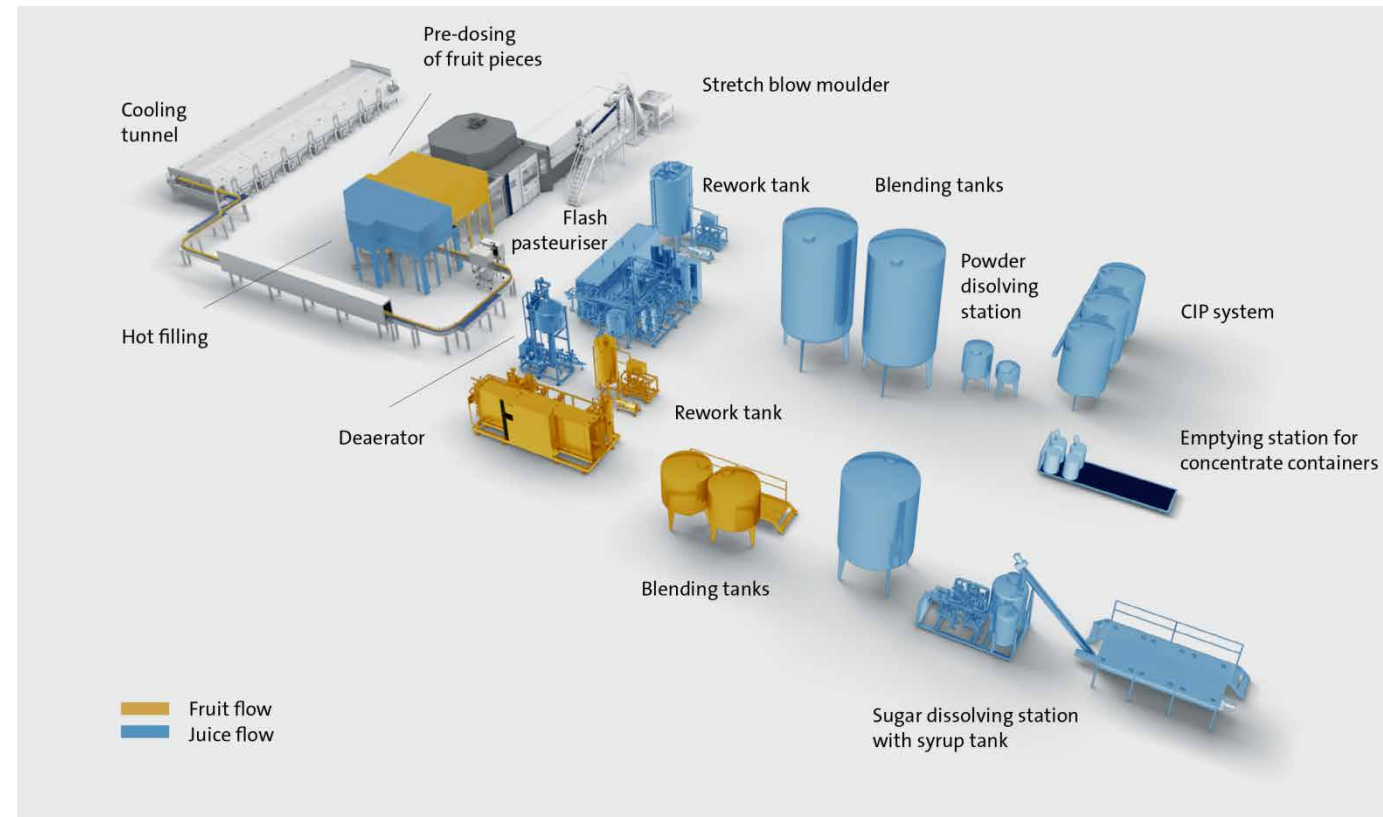
- Least-possible strain on the fruit components
- Gentle deaeration of the juice flow without harming the product
- Top quality of the final product
- Low overall thermal load on the product by rapid heating and cooling of the main flow
- Maximum product and media efficiency
- Constant product homogeneity thanks to high-precision dosing of the fruit pieces



# The principle of the twin-flow method



- The juice flow (main flow) is briefly and conventionally heated with the plate heat exchanger and deaerated to reduce oxidation products.
- At the same time, the flow of particles is heated separately in special tubular heat exchangers and fed by means of pumps that are gentle on the product.
- Mixing of the two components:
  - The FlexiFruit pre-dosing system doses fruit pieces with a size of up to 10 x 10 x 10 millimetres into the empty containers.
  - The Modulfill filler fills the juice portion hot into the containers which already contain the fruit pieces.



# Filling systems for hotfill applications



- Highest product reliability thanks to automatic heating circulation in all production conditions
- Highest hygiene level thanks to the Monotec design

## For PET: Modulfill VFJ

- Lowest product losses thanks to the product being fed from above
- Short cleaning duration thanks to automatically positioned CIP cups and automated exterior cleaning



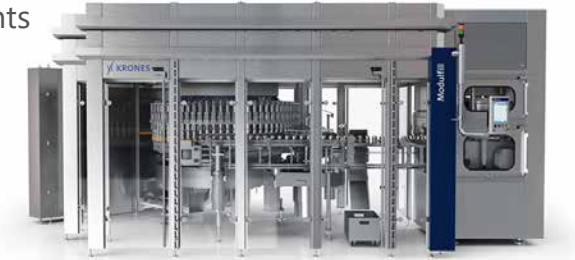
## For glass: Modulfill HES

- Minimum change-over times thanks to automatic probe adjustment and handling parts that can be changed without tools
- Short cleaning duration thanks to an automated exterior cleaning system



## For cans: Modulfill VFS-C

- Minimal change-over times achieved through guidance handling parts that can be changed without tools
- Multiple can formats without change parts thanks to combined centring bells with flexible formats
- Short cleaning duration thanks to an automated exterior cleaning system
- Servo drive technology for a lower energy consumption and higher flexibility
- Available in a block arrangement with the Krones Modulseam
- Option: Compact clean room for increased hygiene requirements



# Benefits to you



## High accuracy and product safety

The highly accurate temperature control ensures guaranteed microbiological quality. The exact adherence of the selected heating temperature is redundantly monitored.

## Flexibility in the production process

Product changes can be realised within just 30 minutes (between the last and the first bottle) with intermediate water rinsing and appropriate hardware and software.

## References

The VarioFlash is a model for success. With more than 250 reference customers\*, this machine is one of our most-built units guaranteeing best product quality worldwide.

## Precise tracking of all operation steps

All process-relevant parameters are saved and archived by an electronic data writer.

\* Version 2022

## Hygienic design

The compact and hygienic design ensures high process safety, eases maintenance and reduces the loss of product through reduced mixing phases during the start and stop phases.

## Across-the-line energy concept

By coupling the VarioFlash and the LinaCool tunnel cooler, energy synergies can be utilised across the entire line. You thus benefit from optimally utilised energy resources and ensure more sustainability in the production process.

### Requesting a new machine

You can easily send a request for a non-binding quotation in our Krones.shop.



# Everything from a single source



## Training sessions at the Krones Academy – trained personnel for an increased efficiency of your line

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The multifaceted offer by the Krones Academy ranges from operation, servicing and maintenance courses through to management training. We will gladly also create your individual training programme.

## KIC Krones cleaning agents make your machine shine

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An immaculate production environment is essential if your product is to shine. KIC Krones provides you with the optimum cleaning agents and disinfectants for each individual production step.

## Krones Lifecycle Service – Partner for Performance

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It goes without saying that also after the purchase of new machines, Krones takes care of your lines: The Krones LCS experts are always there to help you reaching your goals and turn your wishes into optimal LCS solutions.

## High-quality components from Evoguard and Ampco

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Are you looking for shut-off, separation or control valves? For hygienic or aseptic applications? Would you like to have pump technology that perfectly fits into your machines? You will find exactly what you are looking for at Evoguard and Ampco Pumps. The two Krones subsidiaries cover the entire spectrum of process technology components that you need for high-quality production.

**SOLUTIONS  
BEYOND  
TOMORROW**

