



VarioAsept M

Microbiological safety for your products



 **KRONES**

UHT process precisely tailored to milk products



In the Krones Group, particular focus is on milk – the white gold. Particularly the topic of preservation plays a significant role – as the process is not only governed by the highest hygiene requirements, the product itself must also be treated with extreme care. The VarioAsept M UHT system from Krones meets precisely these requirements.

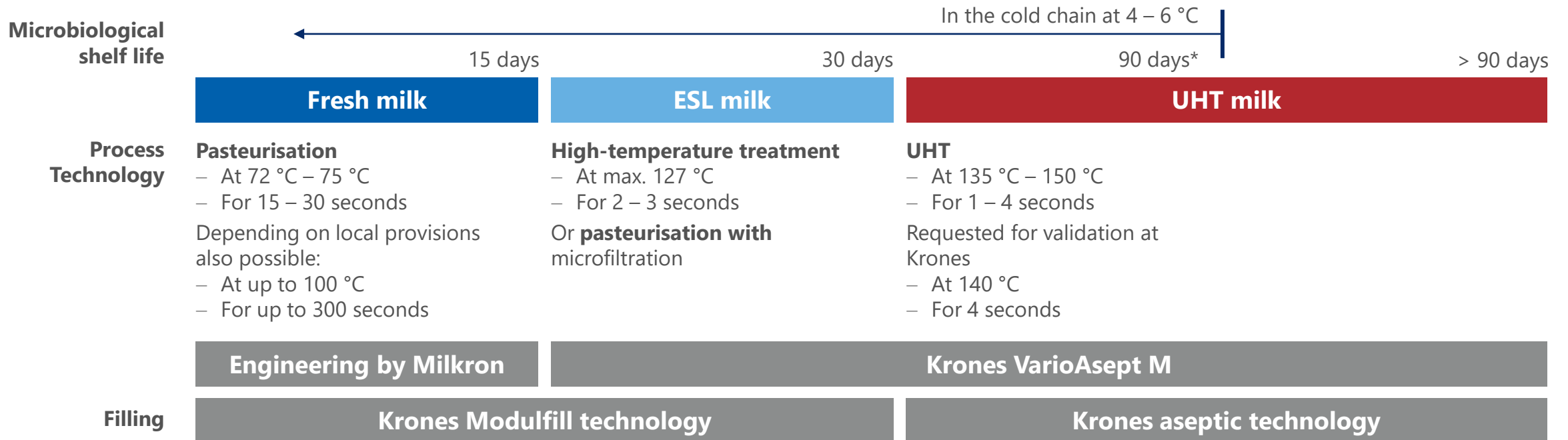
At a glance

- Especially designed for use in the dairy industry
- Output range: between 3,500 and 60,000 litres per hour
- Proven design which ...
 - meets the highest hygiene requirements of dairy-processing companies.
 - treats the product extremely gently.
- With Krones tubular heat exchangers, developed by Krones process equipment experts
- In-house laboratory for product analysis
- Perfectly matched with the Krones aseptic fillers



Filling and preservation of milk

Various treatment processes



* In the cold chain with a shelf life of 30 – 90 days: Usual e.g. in the USA, but not in Europe

Product treatment

Krones VarioAsept M UHT system



Components of the modular component system

Service module

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

Module for media supply

Decoupling of the downstream process for stable production conditions

Krones VarioSpin product deaerator

- Deaeration with patented swirl infeed nozzle:
- Ensures that gas bubbles will quickly escape from the product
 - Reduces oxidative impact such as loss of vitamins or discolouration of juices

Evoguard valves and pumps

VarioStore tank system for aseptic lines

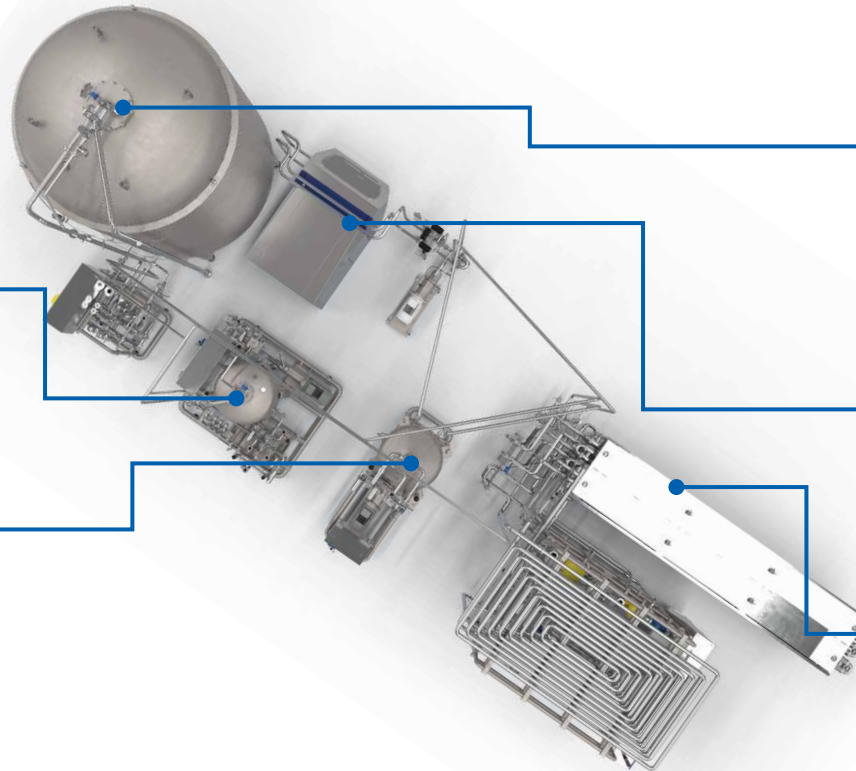
- Vacuum-sealed and pressurised up to 6 bar
- Fully aseptic, automatic valve manifold between UHT system and buffer tank
- With integrated system for sterile gas filtration

Homogeniser by HST

Heat exchanger

- Depending on product requirements:
- Plate heat exchanger
 - Tubular heat exchanger with cross-corrugated tubes for less thermal impact

Alternatively: Direct heating



The components in detail

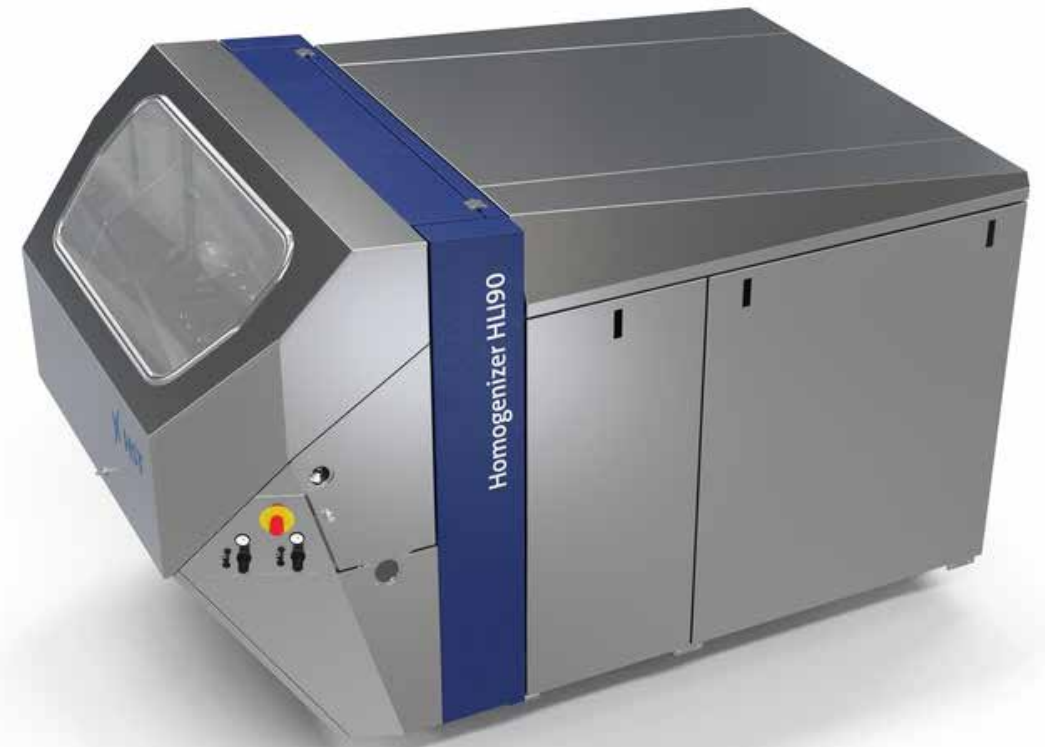
HST homogenizer



The HST homogenizer of the HL/HLI series is a high-pressure reciprocating pump. It comprises 2, 3, 5 or 6 pistons as well as a downstream homogenizing valve.

Benefits to you

- Large range of outputs: 10 to 60,000 litres per hour
- Operates with a pressure up to 800 bar on production machines and up to 1,500 bar on laboratory machines (depending on configuration)
- Cylinder block of high-alloy, forged and corrosion-resistant stainless steel with very little wear parts
- Excellent results during the CIP process thanks to high finish quality and avoidance of dead spaces
- Robust and wear-resistant drive technology
- Integrated PLC controller for monitoring and control of the homogenizer via the product UHT system



The components in detail

VarioSpin product deaerator



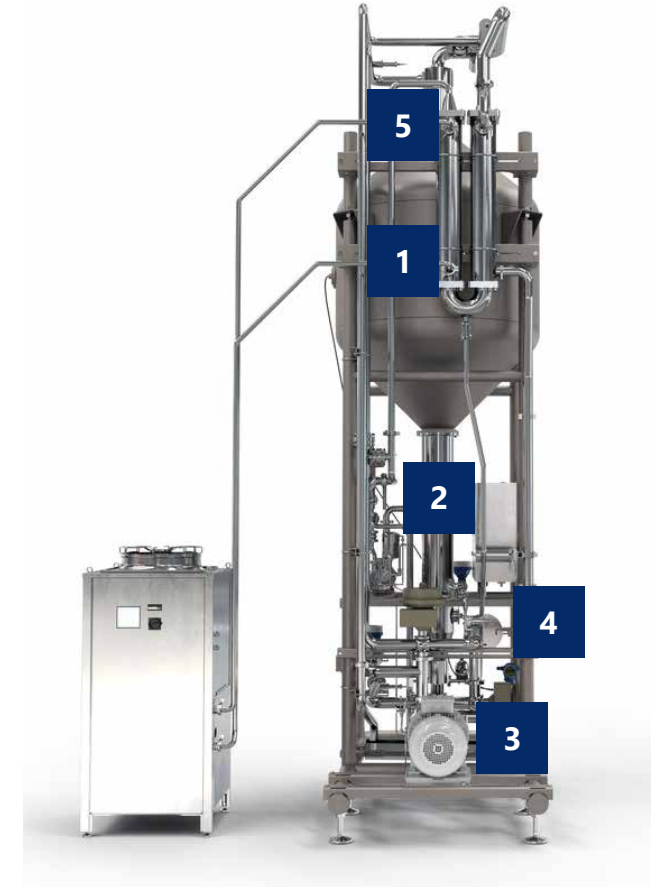
Simplicity, innovation and function – for the most effective product deaerator on the market

Output: 7.5 to 60 m³/h

- 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



Aseptic Intermediate Cleaning (AIC)

For extending the production time



Depending on the product parameters, the AIC process is typically started after eight to twelve hours of production. But production does not need to be stopped for intermediate cleaning to be performed: During the AIC process, the filler is still continually supplied with product. If product is still to be filled during CIP and SIP, various line concepts are available (e.g. a UHT tank with two sterile tanks).

1

VarioSpin product deaerator

Has a positive impact on the production time as undissolved gas facilitates fouling in the heat exchanger.

2

VarioStore sterile tank

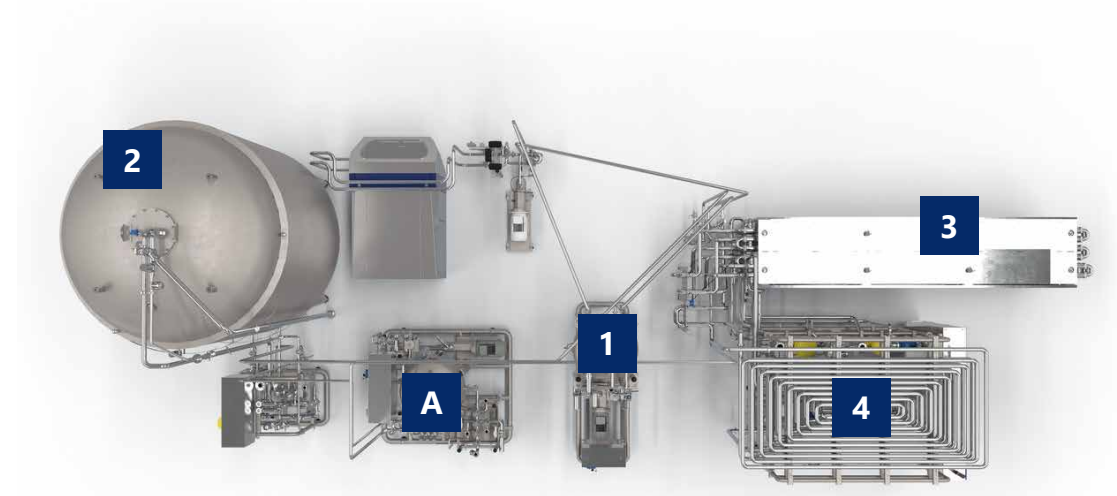
Continuous* supply to the filler

3

Heat exchanger design for long production times:

- Adapted flow speeds
- Low temperature differences for gentle heating
- Seamless heat exchanger tubes (optional)
- Electropolished heat exchanger tubes (optional)

*Depending on the acceleration output of the VarioAsept compared to the filler



4

Additional pre-heating section for protein denaturation

- Optimised heat retention times for long production times
- Approx. 90 °C for 120 sec.

A

AIC process sequence

- 1 Dosing of caustic concentrate
 - 2 Flushing of removed residues
 - 3 Caustic circulation
 - 4 Water circuit with brief acid dosing for neutralisation
- duration:** approximately 1.5 hours

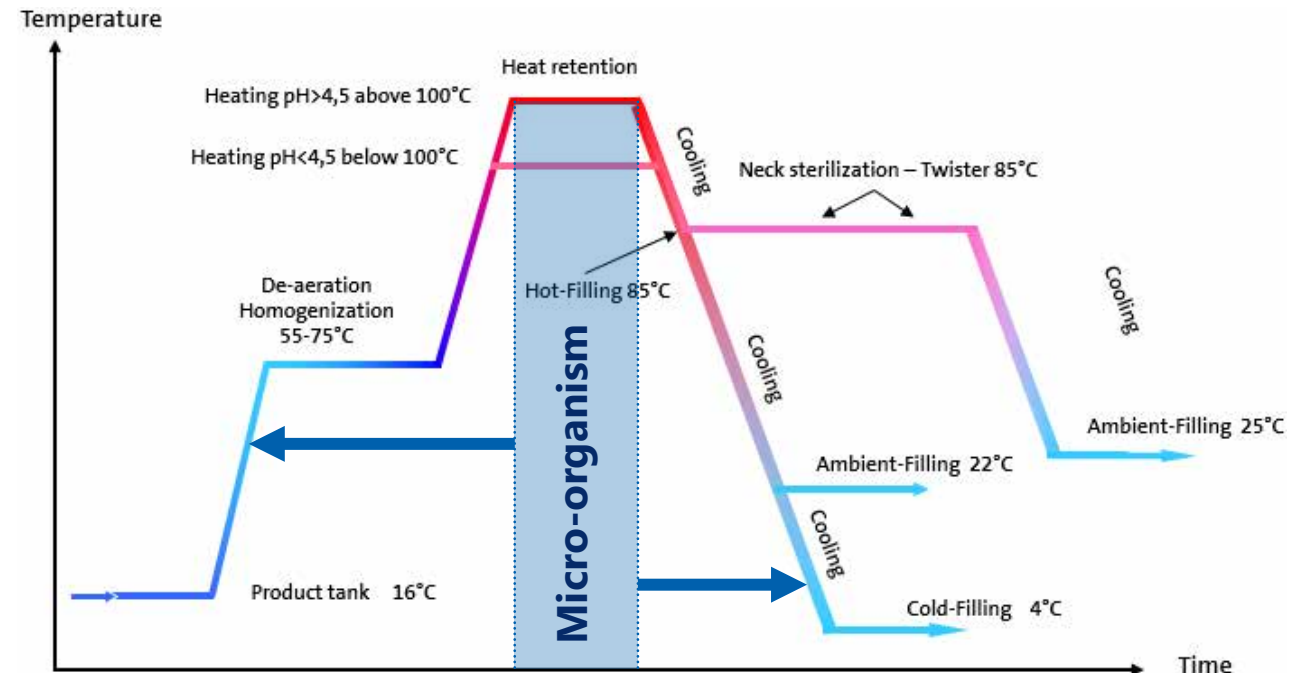
Thermal product treatment



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

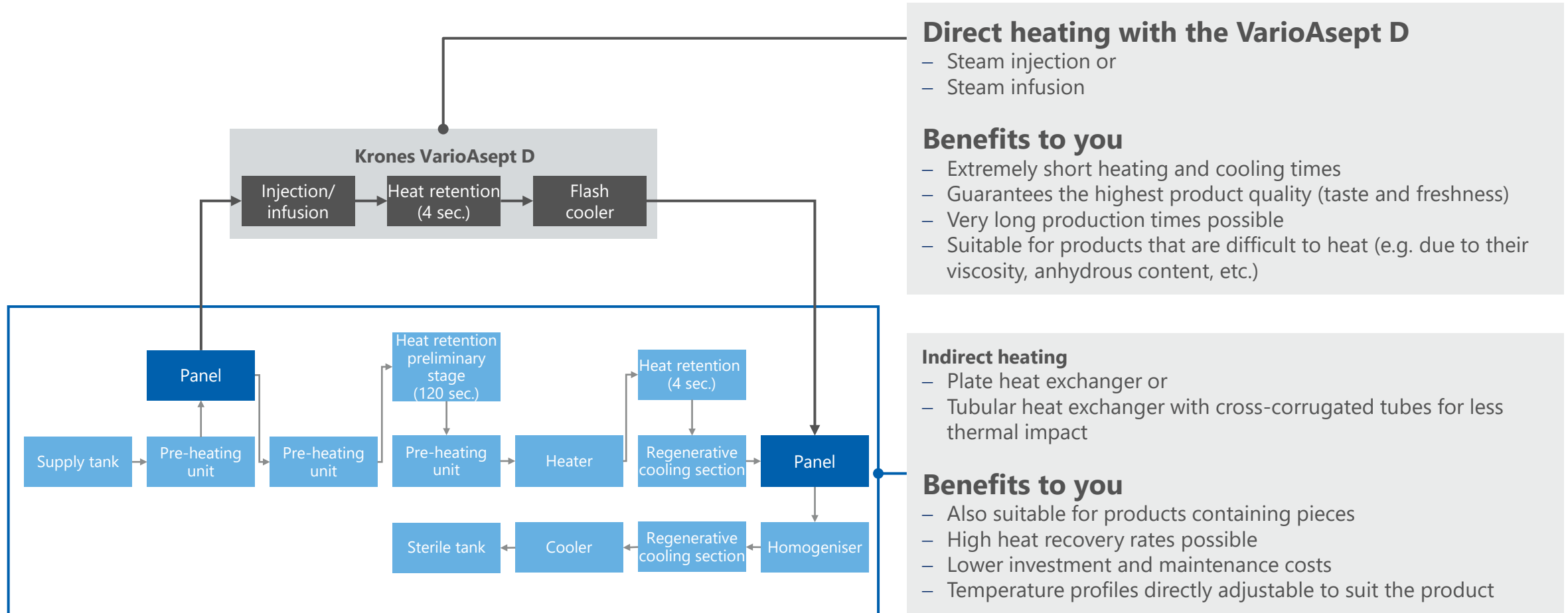
- thermal impact acting on the product due to the short dwell times.
- requirement for thermal and pump energy.
- portion of product loss due to reduced line volumes.
- oxidation rate if a VarioSpin product deaerator is used.

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

Flexible heating options



Direct heating with the VarioAsept D

- Steam injection or
- Steam infusion

Benefits to you

- Extremely short heating and cooling times
- Guarantees the highest product quality (taste and freshness)
- Very long production times possible
- Suitable for products that are difficult to heat (e.g. due to their viscosity, anhydrous content, etc.)

Indirect heating

- Plate heat exchanger or
- Tubular heat exchanger with cross-corrugated tubes for less thermal impact

Benefits to you

- Also suitable for products containing pieces
- High heat recovery rates possible
- Lower investment and maintenance costs
- Temperature profiles directly adjustable to suit the product

Direct heating with the VarioAsept D

Product range



Krones VarioAsept D

Module for steam injection or infusion

- 1 Dairy products
- 2 Plant-based drinks
- 3 Sensitive products



Direct heating with the VarioAsept D

Procedure 1: infusion



- The product is fed into the infusion chamber from above.
- It then drops through the steam-filled chamber where it heats up to the required heating temperature.
- The product does not come into contact with the hot stainless steel surface of the vessel. The conical end of the chamber itself is cooled.
- Deaeration is performed during the heating process.

Scope

- Products of medium or high viscosity and plant-based drinks
- Milk and dairy drinks

Benefits to you

- Long production times possible
- Highly flexible technology for sophisticated products with high demands on quality



80 °C

150 °C

Direct heating with the VarioAsept D

Procedure 2: injection



Steam is injected directly into the product through an adjustable nozzle.

Scope

Low-viscosity products

Benefits to you

Compared to steam infusion:

- Compact design, significantly reduced footprint
- Lower operating costs
- Significantly reduced investment costs
- Suitable for the majority of products to be treated



80 °C

150 °C



Direct heating with the VarioAsept D

The flash chiller



- In both direct heating procedures, the product is diluted with steam.
- It then runs through a vacuum flash cooler, which ensures that precisely the amount of water previously absorbed through the steam also evaporates again.
- The temperature is immediately lowered again to 70 degrees Celsius. This is the temperature that the product had before the injection or infusion.

The technology involved in flash cooling is based on the phenomenon that the boiling point of a liquid is lowered when the steam pressure drops.



Indirect heating

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

Indirect heating

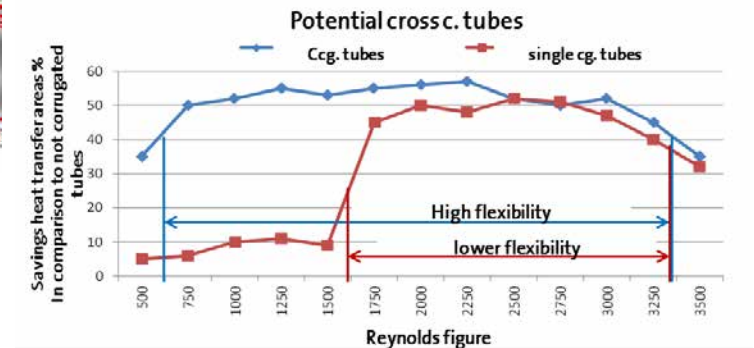
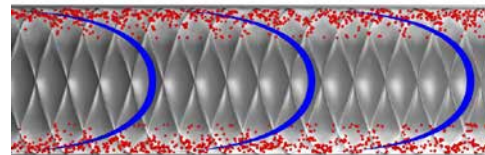
Tubular heat exchanger: thermal product treatment with cross-corrugated tubes



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



Indirect heating

Verification of your product data as the basis for heat exchanger calculation



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:

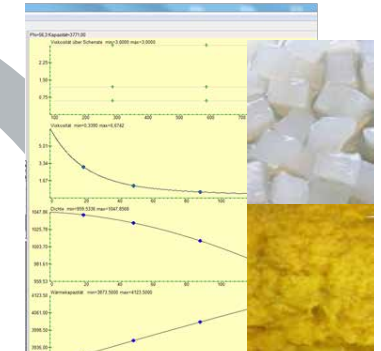
- Viscosity (depending on temperature and shearing rate)
- Heat conductivity
- Flow properties
- Heating requirements
- Oxygen and nitrogen content
- Portion of and size of solids (e.g., fibres, pulp or fruit pieces)
- Foaming tendency

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

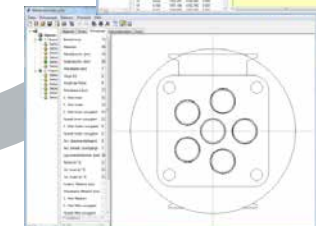
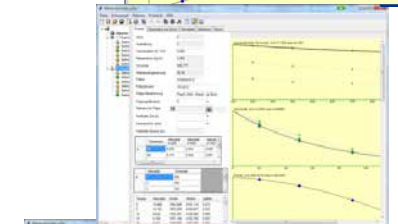


Product data base



Heat exchanger

Revalidation



Calculation

Benefits to you



Temperature control by choice

The heating process can be optionally controlled with a precise F-value or temperature control system, or through flexible PU regulation.

Low product losses

A rework tank for mixing phases, the integrated buffer tank and automatic output regulation in the event of production fluctuations in upstream and downstream systems contribute to high cost effectiveness.

Long production times

Aseptic intermediate cleaning with caustic at the product treatment temperature of the heat exchanger can be carried out without interrupting the aseptic filler production as the filler is supplied by the aseptic buffer tank.

Aseptic product change-over

Water flushing within 35 minutes between the last and the first bottle (for Krones standard layout) provides high flexibility for production.

Gentle product treatment

The thermal and oxidative stress on your product will be reduced because specially designed inner tubes in the selective heater and chiller sections can be heated and chilled again very quickly.

Requesting a new machine

You can easily send a request for a non-binding quotation in our [Krones.shop](https://www.krones.com/shop).



From line planning to the finished product

Everything from a single source



No matter on which door you knock at the Krones Group: There will be competent support for your requirements and wishes everywhere. Our portfolio ranges from single lines and components all the way to the processing of complete line projects for the dairy industry:

- 1** CIP station for trucks
- 2** Administration and laboratory
- 3** Processing, filling and packaging
- 4** Raw milk receiving
- 5** Warehouse and logistics
- 6** Utilities and waste water recycling



Holistic expertise at Kronos

Aseptic filling systems



- 10 year sterility guarantee available
- Automatic adjustment of the handling parts at speeds of up to 36,000 containers per hour
- Output: up to 72,000 containers per hour

Especially for slightly acidic and pH-neutral products: Contipure AseptBloc

- FDA and 3A certificate available for the entire aseptic block arrangement
- All of the components in the clean room housing block can be completely sterilised: The sterile preform or sterile container never leaves the sterile zone until it reaches the capper
- Up to 168 hours of continuous production in one go



For sensitive carbonated and cold chain products: Contipure Bloc P

- Fastest CIP/SIP process on the market
- Only requires 1.5 hours for cleaning and sterilisation (from the first to the last bottle)
- Sterilisation time of only 30 minutes after user intervention



Because every minute counts ...

Efficient product change-over with CIP/SIP

Improvements in the machine design and process sequence have considerably accelerated the CIP and SIP cleaning processes in the UHT system and sterile tank, meaning that product change-overs now take just as long here as in Krones filling systems.

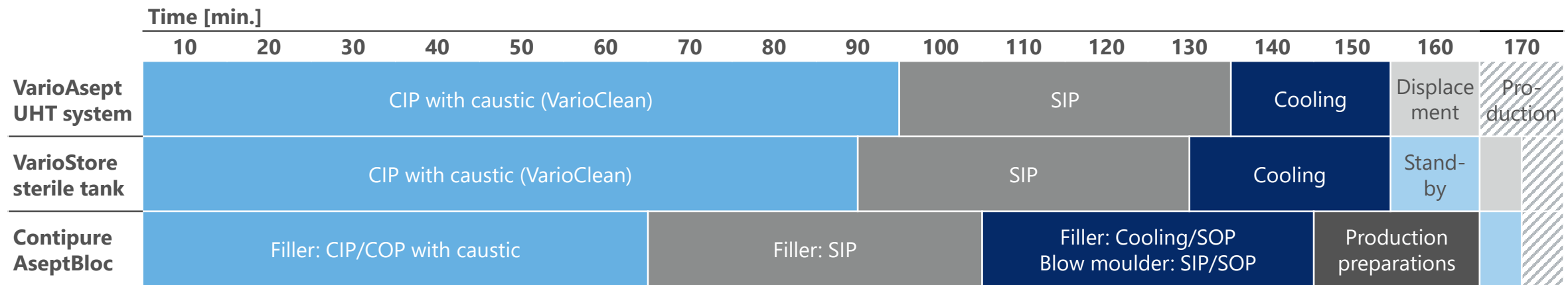


Benefits to you

- **Change-over time reduced:** Now only 165 minutes (instead of 210 minutes previously)
- **Connected loads for steam reduced during SIP:** Only 2,700 kg/h* (instead of 5,900 kg/h previously)

Example** “Product provided” signal to the filler = 0

“Product provided” signal to the filler = 1



* Based on: Model type TPB30 | ** Based on a VarioAsept type TPB30 with indirect heating (incl. deaerator and aseptic homogenizer); Product: Non-carbonated, without fruit pieces; pH value = High Acid; values dependent on product data, line layout and machine equipment

Holistic expertise at Krones

Process components from Evoguard



Valves and valve manifolds

From the simple shut-off function up to the most advanced aseptic processes and complex valve manifolds: The Evoguard valve range combines hygienic and aseptic designs with all the requirements to meet demands on process stability, reliability, and maintainability.

Hygienic pumps

Gentle feed combined with the highest efficiencies, robust design and high maintainability underline the advantages of the Evoguard centrifugal pump series as well as the pumps of Ampco.

Vessel dome fittings

Thanks to the modular approach, individual solutions for tank cleaning and safety can be configured based on the customer's specific requirements.

Evotube tubular heat exchanger

Maintenance-free modules with cross-corrugated tubes ensure an efficient heat transfer combined with gentle product handling. They are developed and manufactured by Krones.



Everything from a single source



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

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

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

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.

**SOLUTIONS
BEYOND
TOMORROW**

