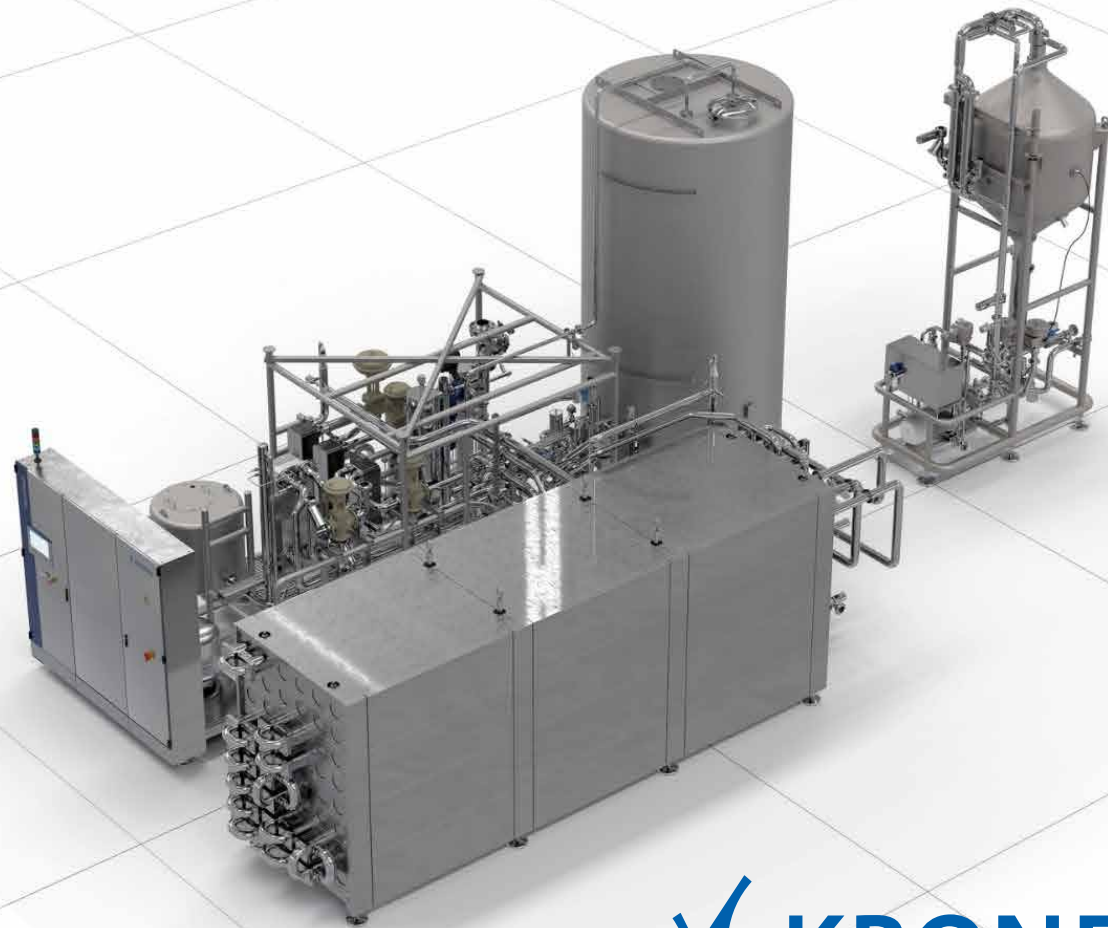




Heat exchanger

Efficient product heating



 **KRONES**

Heat even exacting products



Efficient product heating based on heat exchanger systems with heat exchanger surfaces exactly adjusted to suit the characteristics of the product. Krones systems gently heat your products ensuring microbiological safety and, above all, with substantially reduced energy consumption.

At a glance

- Suitable for a wide variety of products with different flow characteristics (even for products containing particles/fibres)
- Reduction of the thermal load on the product, thanks to reduced dwell times
- Available as complete system or individually designed to suit your line
- Field of application in the Krones product portfolio
 - **Pasteurisation:** VarioFlash J and VarioAsept J
 - **Ultra-high heating:** VarioAsept M
 - **Hotfill:** VarioFlash H

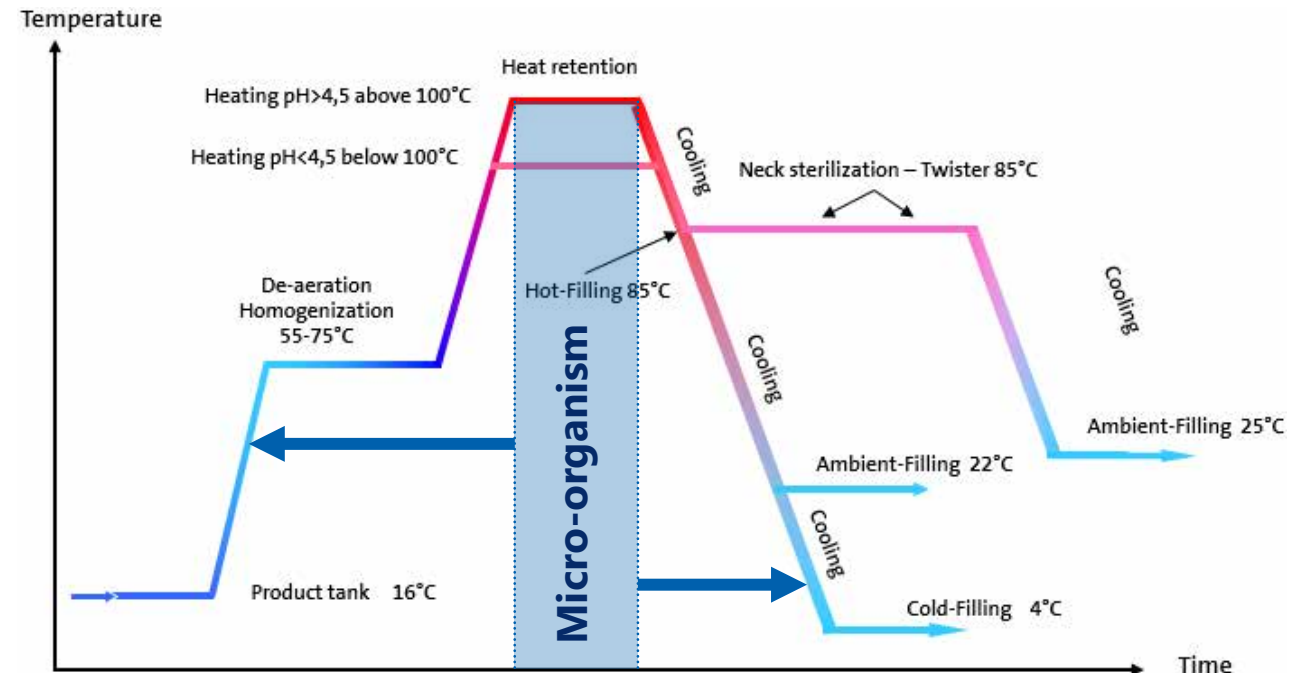


Thermal product treatment



- 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.



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:

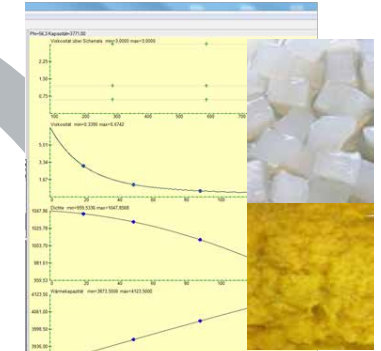
- Viscosity (depending on temperature and shearing rate)
- Heat conductivity
- Flow properties
- Heating requirements
- Oxygen and nitrogen content
- Portion of and size of solids (e.g., fibres, pulp or fruit pieces)
- Foaming tendency

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

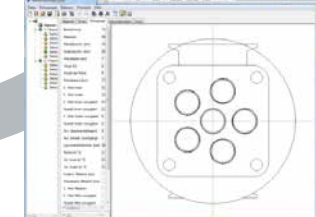
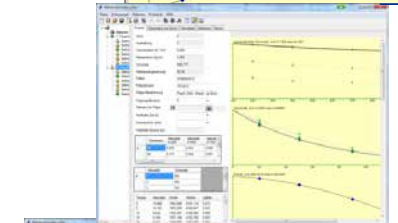


Product data base



Revalidation

Heat exchanger



Calculation

Plate and tubular heat exchangers in 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

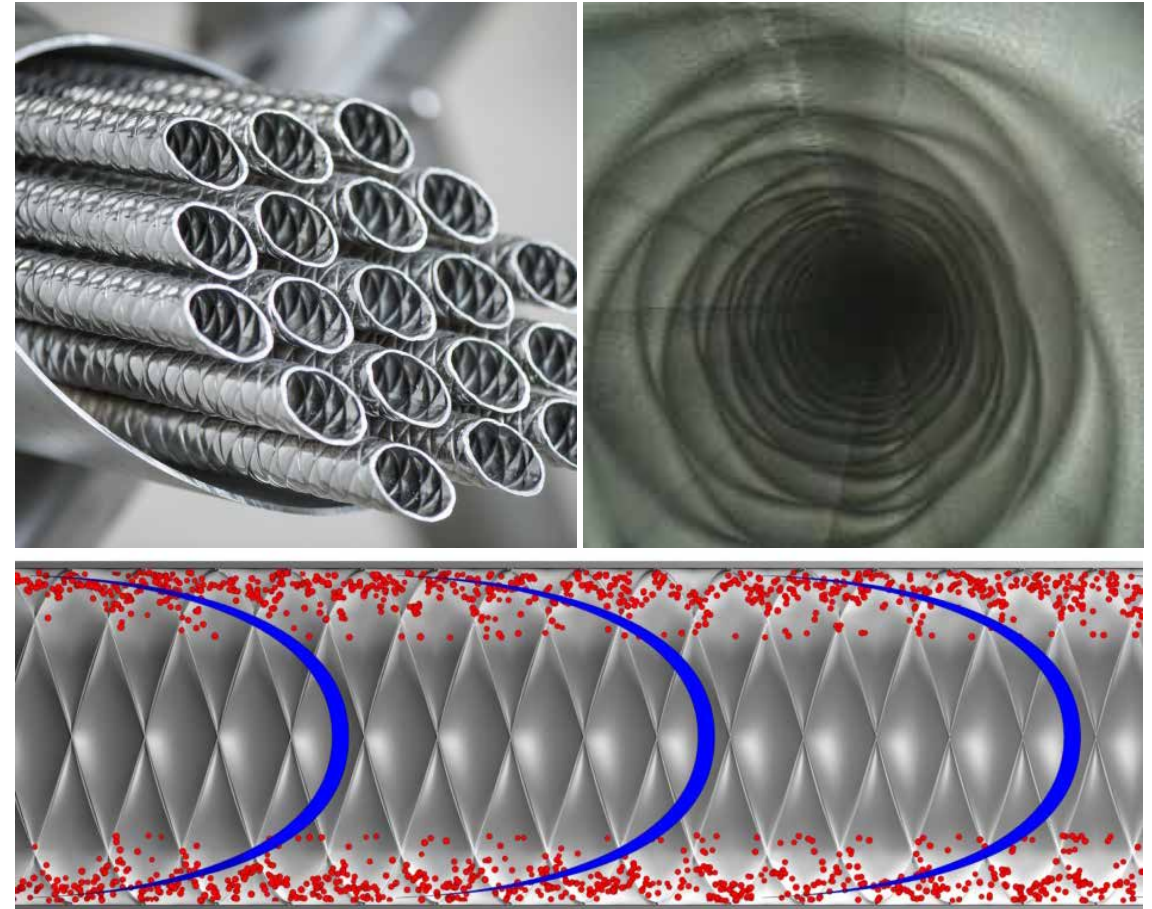
Thermal product treatment with cross-corrugated tubes



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



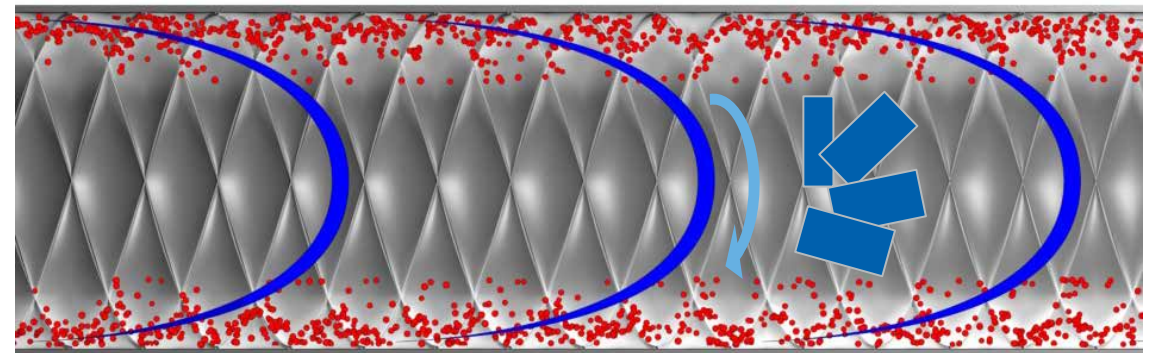
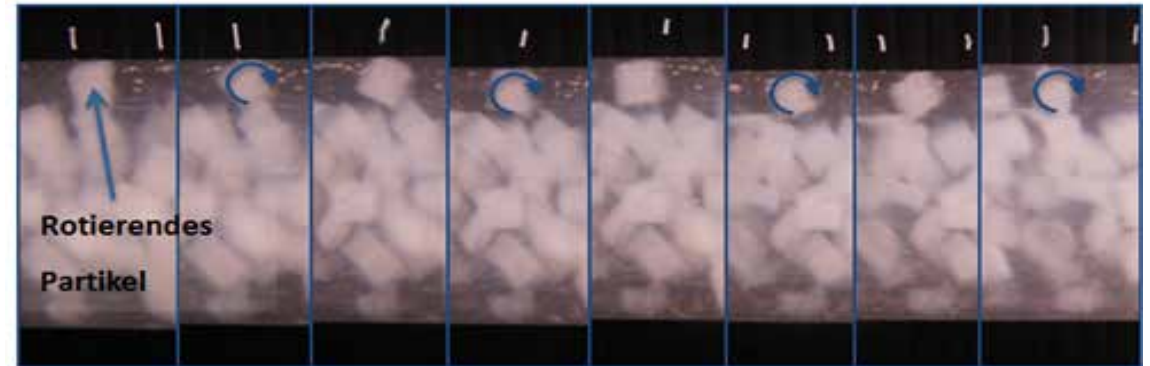
Cross-corrugated tubes

Treatment of products containing particles

- Highly concentrated suspensions of fruit pieces and juice (for instance fruit mixtures which are treated in twin-flow mode) tend to laminar flow behaviour. Main features are the comparatively fast core flow and the overheated outer zones.
- The cross-type swirl gently rotates the particles. The structure of the cross-corrugated tubes
 - breaks open the laminar boundary layer.
 - ensures even distribution of the fruit pieces in the tube.
 - prevents partial underpasteurisation in the core flow.

Your benefits from a more efficient and, at the same time, reliable heating

- Reduced flow speed
- Reduced pressure level
- Reduced damage rate of the fruit pieces



Heat recovery



Krones heat exchangers follow the principle of "product against water"

- They are ideally suited for a large variety of products and a wide output range
- They process also highly viscous products or products with fruit pieces
- Flexible configuration thanks to the variable mass flow on the secondary side

Juice

20 mPas, output: 30 m³/hours



Length compensation with bellows



Stainless steel bellows on secondary side for the compensation of the heat expansion

- No dynamic seal required – therefore almost maintenance-free
- Fully welded design
- Secondary side connection via clamps
- No leakage during the cold operating condition



Benefits to you



Specific configuration of the product treatment system

Thanks to special Krones measuring and configuration programs, you will be provided with customised heating systems which are based on precise data and exactly adjusted to suit the characteristics of your products.

Modular design

Thanks to its flexible structure, the Krones heat exchanger is supplied in two sizes: A compact variant for low outputs and a high-end variant for medium to high outputs.

Gentle product treatment

Our special tube modules with cross-corrugated section enable a quick heat transfer and, at the same time, high recovery efficiency. As the mixture phase quantities are reduced to a minimum, the required heat exchanger surface and thereby the thermal stress, as well as the pressure and product loss are reduced as well.

Safe cleaning

Thanks to a design with reduced dead space, all product contacting surfaces can easily be cleaned.

Comprehensive concepts for process technology

In addition to heat exchangers, Krones also offers compact and space-saving units for product deaeration, heating and product mixing, as well as process water sterilisation and CIP/SIP systems.

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

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.

Evoguard – pumps for absolute process safety

In addition to separation and shutting off, one thing is particularly important for a plant: the reliable feeding of your product. This is why Evoguard also offers innovative centrifugal pumps in addition to high-quality valves.

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.

Evoguard – excellent valve technology all along the line

The Evoguard valve series comprises a modular system with hygienic and aseptic components which contributes to an increased performance at every point of the production line and has the perfect solution for every process step.

**SOLUTIONS
BEYOND
TOMORROW**

