



# VarioFlash J

Thermal product treatment for the best juice quality



 **KRONES**

# Natural, tasty and durable



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 J 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
- Fields of application: Juice and CSD
- If the line is stopped: "Eco-hygienic sleep mode" stand-by operation for minimal energy and water consumption
- Highest microbiological safety thanks to line sterilisation and variable PU control



# The main components



## Media connection

- Direct connection or via swing bend panel or valve manifold
  - Quality control possible during product change-overs



## Heat exchanger and heat retention section

- Hygienic plate heat exchanger constructed in accordance with Krones specifications
  - For gentle and reliable product heating
  - Heat retention with redundant temperature control



## Integrated buffer tank

- Decouples the heating process from the filler
  - Balances out production fluctuations
  - Ensures an unvarying and consistent supply of the product to the filler

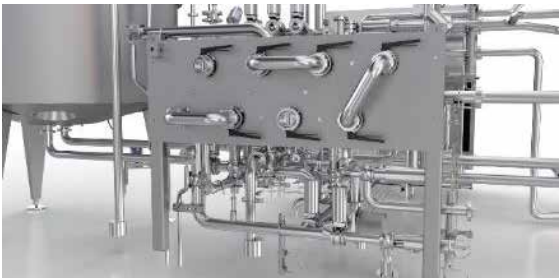


# Design features



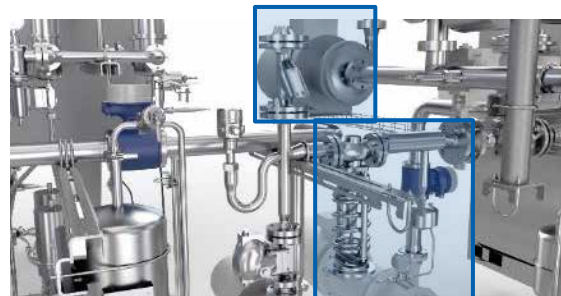
## Integration according to your needs

- Direct connection or via swing bend panel or valve manifold



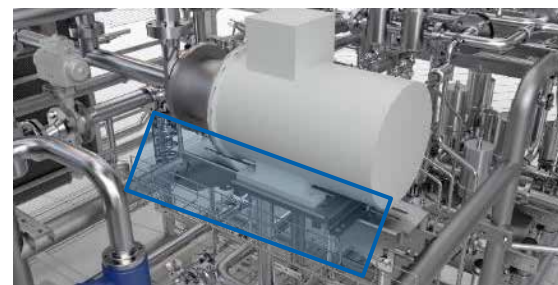
## High product quality also under difficult conditions

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



## Intelligent design for easy maintenance

- e.g. pumps are mounted on a moveable slide for replacement of the slide-ring-seal with a minimum effort



## Stable pasteurisation conditions

- Possible integration of a venting lantern to discharge the released CO<sub>2</sub>



# 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



# 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

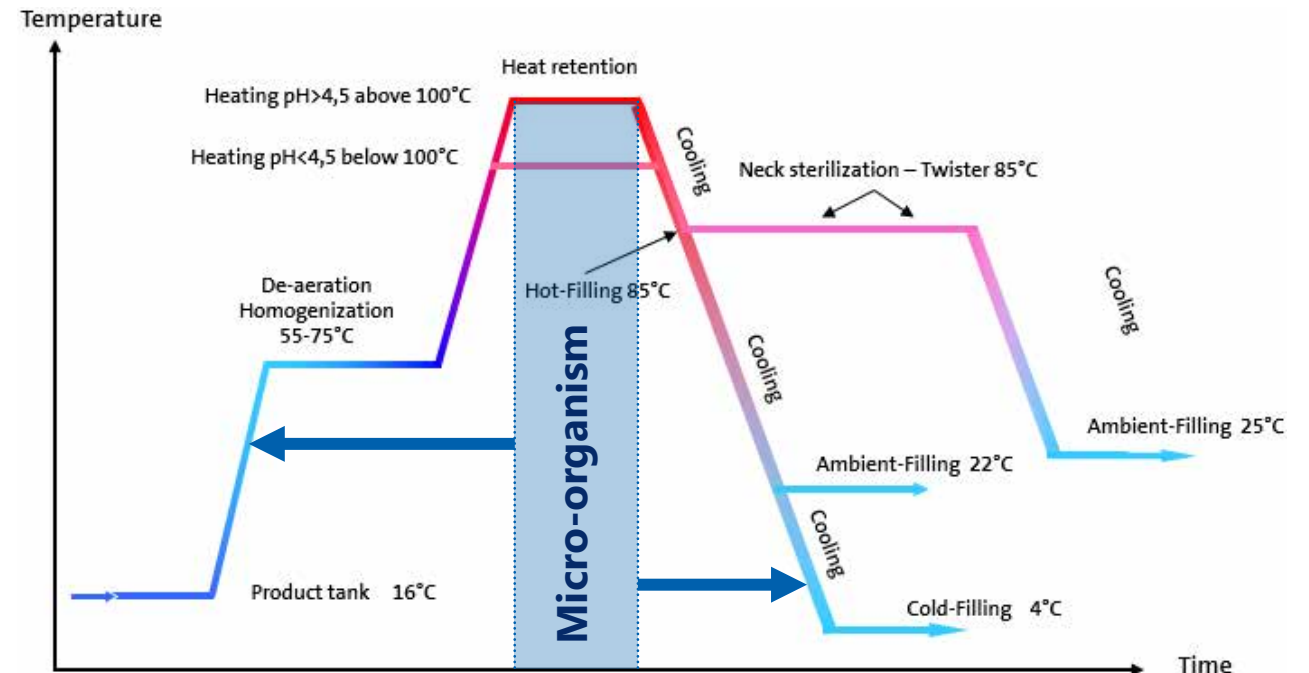
# Thermal product treatment



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 tubular heat exchanger in detail

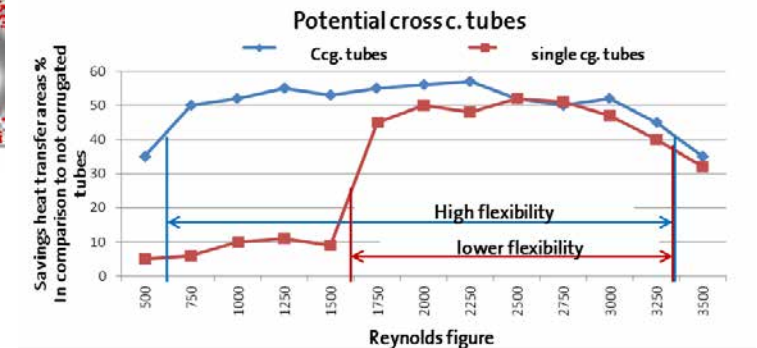
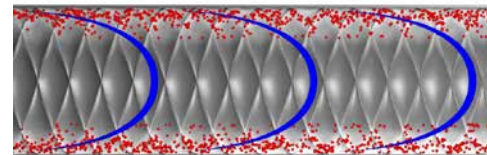
## Thermal product treatment with cross-corrugated tubes



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:

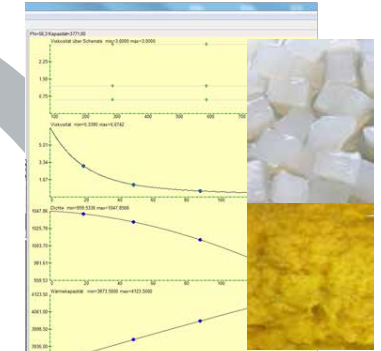
- Viscosity (depending on temperature and shearing rate)
- Heat conductivity
- Flow properties
- Heating requirements
- Oxygen and nitrogen content
- Portion of and size of solids (e.g., fibres, pulp or fruit pieces)
- Foaming tendency

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

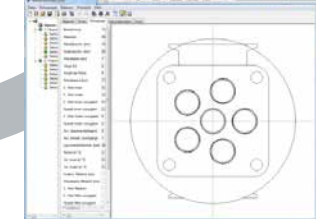
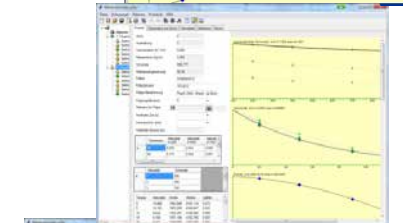


Product data base



Revalidation

Heat exchanger



Calculation

# Optional additional module

## Integrated carbonation

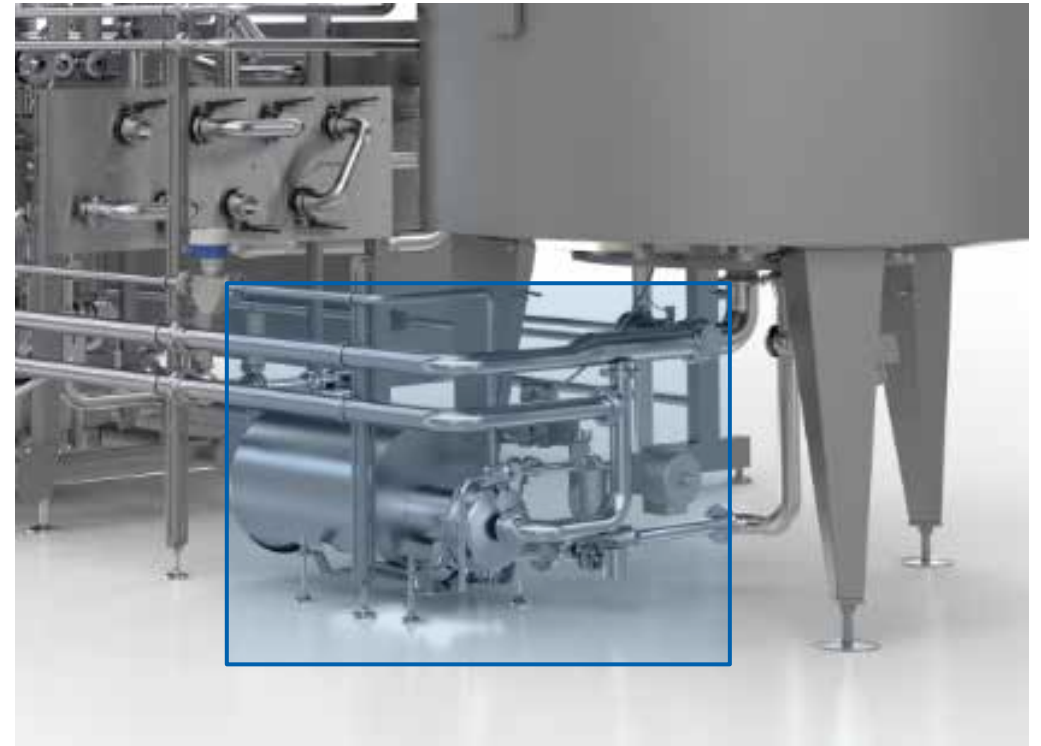


Krones is the **only manufacturer on the market** to integrate a module for **carbonation directly in the heating system**.

### Benefits to you

- **Considerably smaller footprint** (than if it were to be installed as an individual machine): no additional buffer tank needed as the existing product tank acts as a buffer
- **Everything in a single system:** Sanitation directly through the hot-water circuit in the VarioFlash possible
- **Optimal microbiological conditions:** omission of unnecessary components after product heating
- **Highest CO<sub>2</sub> dosing accuracy:**  $\leq 0.08$  g/l (temperature-dependent, if production conditions remain consistent, described as sigma 1)
- **More flexible line concepts possible:** e. g. use of a less expensive free-flow plate heat exchanger (compared to the tubular heat exchanger)
- **Many years of experience:** more than 1,500\* delivered Contiflow systems, allowing us to become familiar with the exact challenges presented by carbonation

\* As of: June 2022



### Applications:

- Sorghum beer
- High-gravity brewing
- Etc.

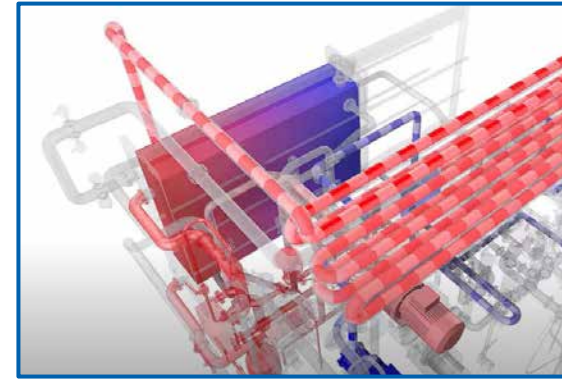
# Additional feature

## Hygiene concept for the filler



The use of a VarioClean CIP system in conjunction with the VarioFlash makes it possible to create a total hygiene concept for cleaning the process section and filler. The rinsing water for the filler is always fed from the VarioFlash under pasteurised conditions.

In addition to the SIP process during filler cooling, this VarioFlash function can also be used during production preparations and product change-over.



## Benefits to you

- Low risk of the filler becoming re-infected during the cool-down phase of CIP cleaning
- Maximum microbiological safety, even during critical process steps



# Additional feature: advantage for sustainability

## System for energy recovery with the bottle washer

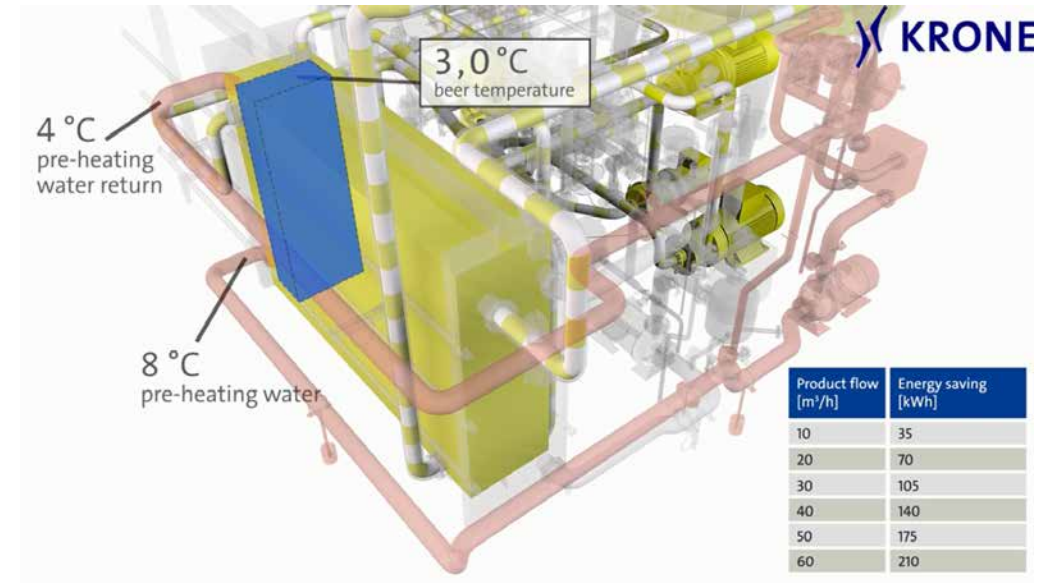


Warm rinsing water is produced in the last cleaning step of the bottle washer. It can be provided via a separate water circuit in the VarioFlash flash pasteuriser. All that is needed is an additional section in the heat exchanger, the heat can then be subsequently transferred to the product.

### Benefits to you

Considerable **heating energy savings** during flash pasteurisation

Sample calculation: up to 105 kWh of heating energy can be saved per hour at a production output of 30 m<sup>3</sup>/h.



# Additional feature: advantage for sustainability

## "Eco-hygienic sleep mode" stand-by operation



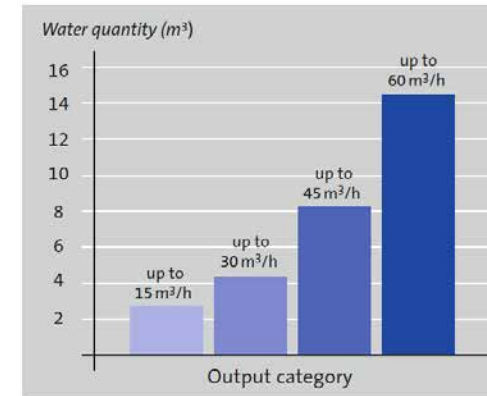
### Application

If a filler is stopped, the VarioFlash circulates the water in a circuit under production conditions:

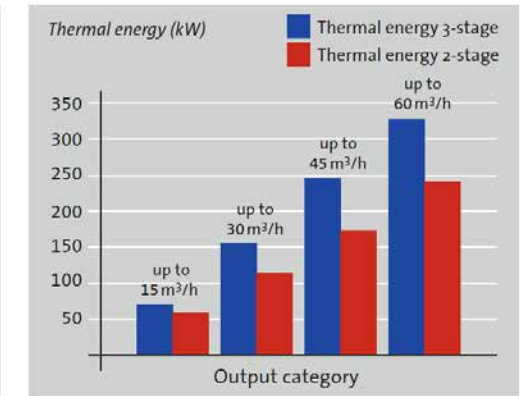
- In a 2-stage system, water must be supplied permanently to maintain the system production conditions (in this case, for cooling). The heated water is drained.
- In a 3-stage system, no additional water is required as the coolant can be used to keep the VarioFlash in its production condition.

However, thermal energy is required in both cases.

Water saved (2-stage) per hour of standstill time



Thermal energy per hour of standstill time





# "Eco-hygienic sleep mode" stand-by operation

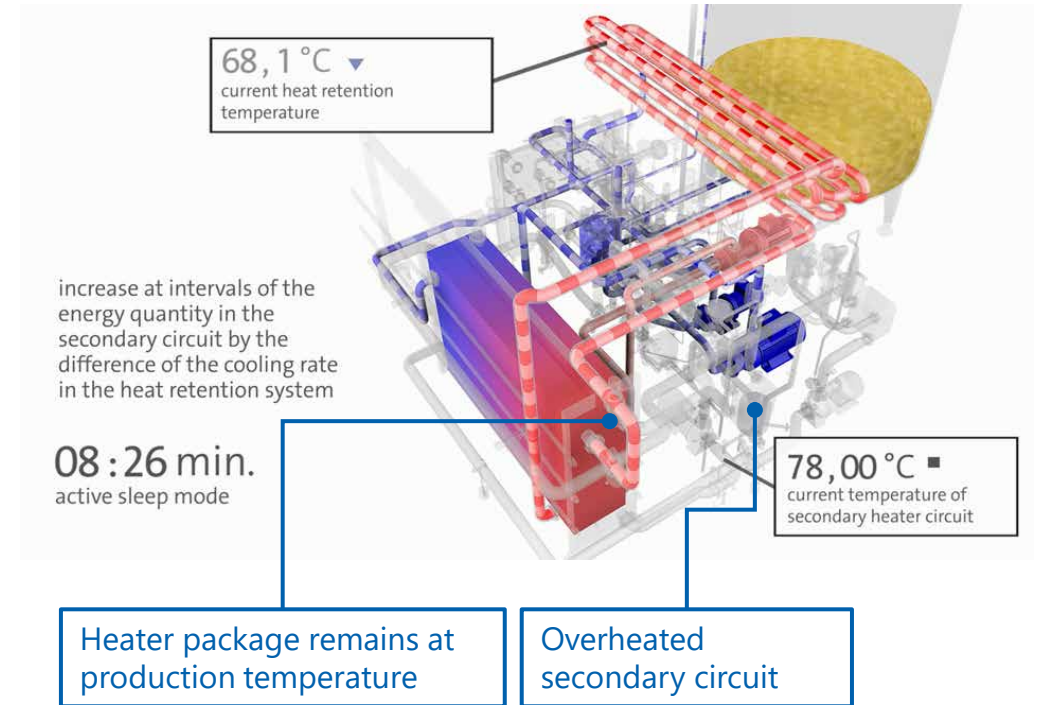


## Method of operation

- The water circuit stops.
- The system for energy recovery remains in stand-by mode and under beverage-sterile conditions.
- The temperature in the secondary circuit is permanently kept at a defined level. The heat exchanger package therefore serves as a temperature-controlled barrier between pasteurised and unpasteurised product.
- During restarting, the water circuit also starts up again slowly. At the heat exchanger discharge, the PU value does not drop too low as the secondary circuit still has enough residual energy.
- After a few minutes, the plant is ready for production again.

## Benefits to you

**Low energy and water consumption** without water circulation



# Additional feature

## Dynamic buffer tank control



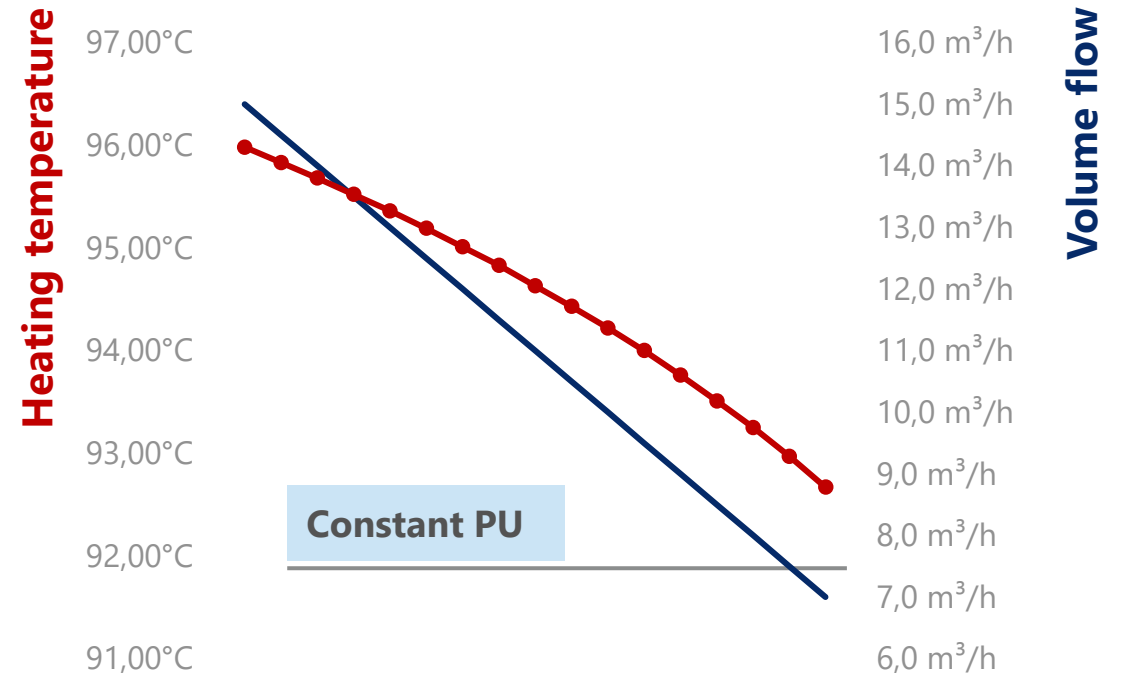
A variable PU control in conjunction with an output-controlled hot-water circuit makes it possible to heat beer and flavoured beers in a particularly gentle and reliable manner.

- Adjustment of the flow rate to the actual filling speed
- Adjustment of the heating temperature to the changing dwell time in the heat retention section
- Precision of the controller: +/- 0.3 to 0.5 °C

### Benefits to you

**Adjustment of the VarioFlash J output to the actual filler output:** lowering the production speed extends the buffer time in the buffer tank, thus avoiding product displacements – and thus product losses.

### PU control



— Volume flow rate —●— Heating temperature

# Benefits to you



## High accuracy and product safety

The high-precision PU control provides guaranteed microbiological quality by using the maximum buffer capacity. 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.

## Hundreds of satisfied customers

The VarioFlash is a model for success: With more than 250\* reference customers, this system 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.

\* As of: June 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.

## Economic efficiency and best product quality

Our systems for energy recovery and the patented standby mode reduce the consumption of energy. Innovative procedures like the express pasteurisation provide improved juice quality on top.

### Requesting a new machine

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



# Certified ecological efficiency

## Machines with enviro seal



At Krones, the enviro label stands for excellent ecological efficiency. Products that bear the enviro label have proven in an objective test procedure that they efficiently use energy and media, and that they produce in an environmentally-friendly way. The requirements are defined by the EME standard that has been developed by TÜV SÜD (technical inspection authority) for assessing production plants. The enviro test procedure, too, has been certified by TÜV SÜD as an independent expert. Therefore, you can be sure that: an enviro label stands for ecological efficiency.

### This is why the VarioFlash J is enviro-classified:

#### Energy efficiency

- Patented "Eco-hygienic Sleep Mode" stand-by operation for minimal energy and water consumption
- Heat exchanger designed for the product of each customer
- Internal heat recovery of up to 95 percent

#### Media efficiency

- Intelligent buffer tank control reduces the consumption of CO<sub>2</sub>



# Suitable filling systems for beer and carbonated soft drinks



## For PET: Modulfill VFS with PFR valves

- More flexible and faster thanks to PFR (Proportional Flow Regulator) technology
- Highest hygiene level thanks to the Monotec design
- Beer filling with a minimum oxygen absorption and the lowest CO<sub>2</sub> consumption
- **Modulfill VFS-M:** Block synchronisation with mixer for minimum product losses



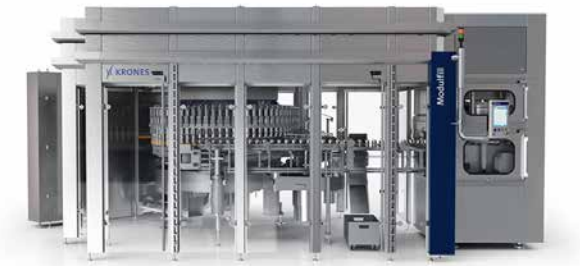
## For glass: Modulfill HES

- Beer filling with a minimum oxygen absorption and the lowest CO<sub>2</sub> consumption
- 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
- Highest hygiene level thanks to the Monotec design



## For cans: Modulfill FS-C

- Available both for craft beers and for outputs of up to 135,000 containers per hour
- Multiple can formats without change parts thanks to combined centring bells with flexible formats
- Servo drive technology for a lower energy consumption and higher flexibility
- Low-maintenance, grease-free main bearing with automatic oil-circulating lubrication system
- Available in a block arrangement with the Krones Modulseam
- Option: Compact clean room for increased hygiene requirements



# 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.

## Evoguard – pumps for absolute process safety

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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

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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.

## Evoguard – excellent valve technology all along the line

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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**

