KRONES product treatment systems

The systems for safe thermal product treatment

Natural – tasty – longer lasting

Processes aimed at preservation and safe hygienic processes are the key factors in the manufacture of a product. And that applies for all types of beverage: depending on their ingredients, beverages have a low or high microbiological sensitivity, which makes it essential to have a sophisticated system of equipment for sterile procedures in the stages before filling. All these process stages bring you to your most important objective: quality products and a high market share.

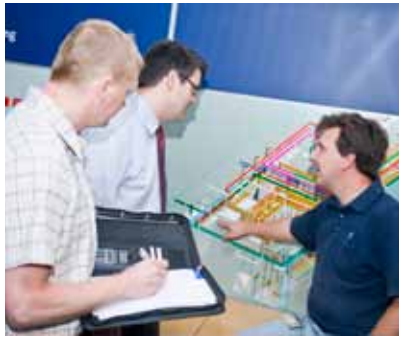
The KRONES AquaAsept systems for sterile water generation, the VarioAsept and Vario-Flash flash pasteurising systems, the VarioStore buffer tanks and the VarioClean CIP system offer the right starting conditions for all product treatment tasks. Largely preassembled modules that are tailored exactly to the application, an efficient operating concept with minimal staffing requirements and variable output level - these are the features indivisibly associated with KRONES technology for product treatment.

VarioFlash B

The KRONES pilot plant – your guarantee of success

Product characterisation as a planning basis for thermal product treatment can be carried out in the KRONES process laboratory. Product samples are analysed for pulp and fibre proportion and size and their dynamic viscosity, thermal conductivity and ingredients are determined. Product data are backed up on a case by case basis by test series in the process pilot plant. The systems are configured to meet the customer's specific requirements. The thermal product treatment systems are fully assembled and extensively tested in the assembly hall. This allows all programs to be run under real-life conditions (temperature, pressure and volumetric flow) so that the customer has minimum on-site installation and commissioning expense.

Determining viscosity with the rheometer



The customer and KRONES engineers in detailed clarification

VarioFlash B in the FAT (Factory Acceptance Test)

Application

The major element of all process steps in beverage production is the preservation concept. One of the processes frequently applied is flash pasteurising, which can be used for products with low and high acidity. Beer and slightly carbonated refreshment drinks are normally heated at 72 to 85 °C for 20 to 60 seconds and subsequently cooled down to the required filling temperature.
Very acidic CO_2-free beverages such as juice drinks and soft drinks are flash-pasteurised for a duration of between 30 and 60 seconds, e.g. at temperatures of 84 to 95 °C, and then cooled down to ambient temperature or hot-fill temperature. These products can then be distributed at ambient temperature.
All low-acid beverage types such as Asian teas, mixed milk and coffee drinks and ESL and non-perishable milk are heated at 125 to 150 °C, depending on the initial concentration of bacteria, the shelf life and the subsequent method of distribution. Fresh milk is heated for 10 to 30 seconds at 72 to 85 °C and always distributed chilled.

Depending on the product intake temperature and the customer's requirements, an up to 100 % recuperative circuit can be set up for cooling after heating, or an additional cooling heat exchanger can be integrated.

VarioFlash J in the syrup station

Modules for thermal product treatment

Product ingredients, customer philosophy and economic considerations are major factors in choosing between plate and tubular heat exchangers.
The tubular heat exchanger concepts comprise modular solutions as well as various multitube tubesheets.
Depending on the efficiency and flexibility requirements, either a product/product tubular heat exchanger or a product/water tubular heat exchanger module can be employed.
In the case of tubular modules, allowance must be made in production and the CIP/SIP processes for the different elongations of the mate-rials used for the column jackets and the inner tubes. The hygienic, 3-layer bellows ensures a hermetic seal between product and environment or heating and cooling medium.
In addition to the heat exchanger, the media feed, deaerator, buffer tank and homogeniser modules are also used. All modules ensure the absolutely leakproof separation of product, CIP media and process water, allowing mixing of the media to be precluded.

VarioAsept M – comprising media connection, tubular heat exchanger, product deaerator and buffer tank

Monotube (left) and multitube (right) with three-layer bellows for material elongation

Figures, data, facts

Output range

The product treatment systems are configured to the customer's specific requirements. The performance spectrum of the modular systems ranges from 5,000 to 60,000 litres per hour.

Design features

- High level of automation for reliable operating processes with automatic product change-over by signal exchange with the PLC
- Large recipe memory for reliable and reproducible production using predefined parameters
- Open, easily accessible and hygienic design on a frame made of stainless steel
- Quick-change device for changing the mechanical seals of the pumps
- Standard, hygienically optimised or aseptic fittings used according to the heating processes (flash pasteurising, UHT), filling processes and customer specifications
- Menu-led operation via iPanel Compact with 15-inch touchscreen, with processes represented in the active flow diagram and operator interventions documented by the transponder system
- Prepared for integration in a higher-level process control system
- Short start-up phases through upstream Factory Acceptance Tests and pre-parameterisation
- Support available with the KRONES Lifecycle Service contract

All pumps are positioned for easy access on one side

Quick-change device for the pump's mechanical seal

VarioFlash – thermal product treatment for hygienic filling processes

VarioFlash B

- Application: Beer and mixed beer drinks (including light and CO_2-free drinks) with cold or ambient temperature discharge
- Flexible PU adjustment and output-controlled hot water circuit for particularly gentle and reliable product heating of beer and mixed beer drinks
- Buffer tank for automatic output adjustment in the event of fluctuations in production, reducing (avoiding) start-up and shut-down processes and minimising product loss and media consumption

VarioFlash J

- Processing of spritzer products and CO_2-free drinks with cold or ambient temperature discharge
- Flexible PU adjustment and output-controlled hot water circuit for particularly gentle and reliable product heating
- Hygienically optimised fittings, instrumentation and control after the heat retention unit
- Steam-locked valves and pumps prevent recontamination

VarioFlash H

- Treatment of CO_2-free fruit juices and soft drinks with high-temperature discharge
- Product discharge in hot-filling without buffer tank
- Intelligent hardware and software structure for product heat retention in the filler

Type designation

B = Beer
H = Hotfill
J = Juice

VarioFlash J

VarioFlash
Your benefits

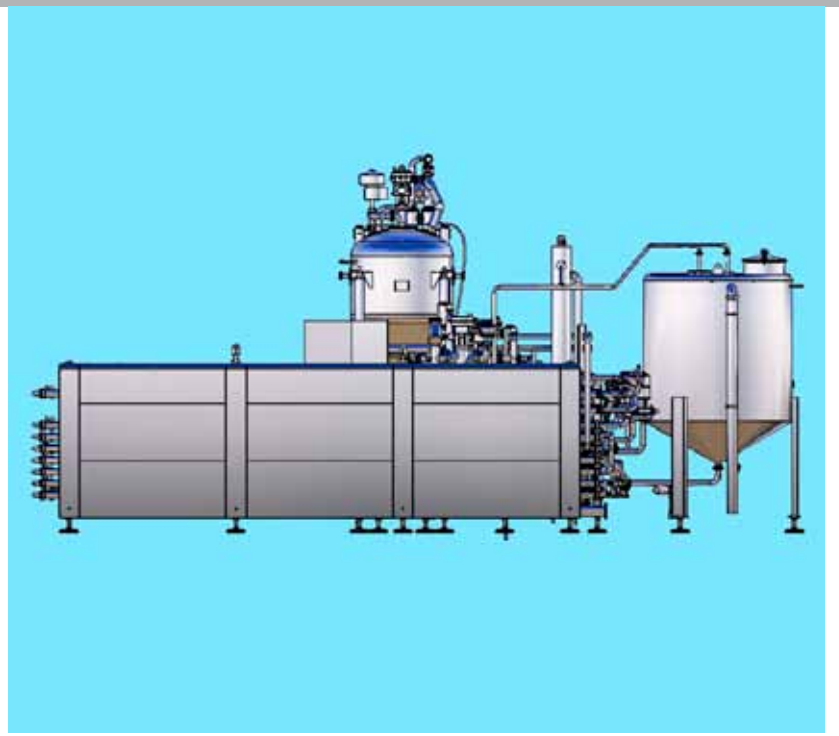
- **Flexibility in the production process**
  Short product change-over times (last/first bottle) of no more than 30 minutes with intermediate water rinsing can be achieved using the KRONES filler with additional hardware and software.

- **Minimised recontamination risk**
  Maximum product safety is delivered by reliable separation of the media by means of double seat valves and a positive pressure difference from product to heating/cooling medium combined with the vacuum-tight product tank and hence hot and cold cleaning of the mandrel fittings without drawing in atmospheric air.

- **High accuracy**
  The buffer tank is fitted with a capillary level monitoring facility that ensures precise, temperature-compensated content measurement.

- **Precise traceability of all processes**
  All process-relevant parameters are saved and archived by an electronic data writer.

- **System-friendly media guide**
  The CIP run-off for sampling valves prevents damage to the electrics and pneumatics caused by cleaning agents. The CIP collecting pans in the complete module facilitate run-off of the cleaning media.



VarioFlash H with deaerator and tubular heat exchanger

CIP run-off for sampling valves protects fittings and pumps (left)

Double seat valves with steamlock (right)

VarioAsept – thermal product treatment for aseptic filling processes

VarioAsept J

- Used for the treatment of juice products, soft drinks, teas and mixed coffee and tea drinks
- Comprises tubular or plate heat exchanger, optional deaeration module and homogeniser, buffer tank and media feed

VarioAsept M

- Applications in milk products
- Equipped with an additional heat retention section in the pre-heating area
- Controlled denaturation of the milk proteins at approx. 90 °C to prevent greater fouling in the heater and to ensure long service life (production times without CIP/SIP)

VarioAsept J – media connection

VarioAsept
Your benefits

- **Temperature control by choice**
  The heating process can be optionally controlled with a precise F-value or temperature control or through flexible PU adjustment.

- **Long production times**
  Aseptic intermediate cleaning with base at the product treatment temperature of the heat exchanger can be carried out without any pause in production by the aseptic filler as the filler is supplied by the aseptic buffer tank.

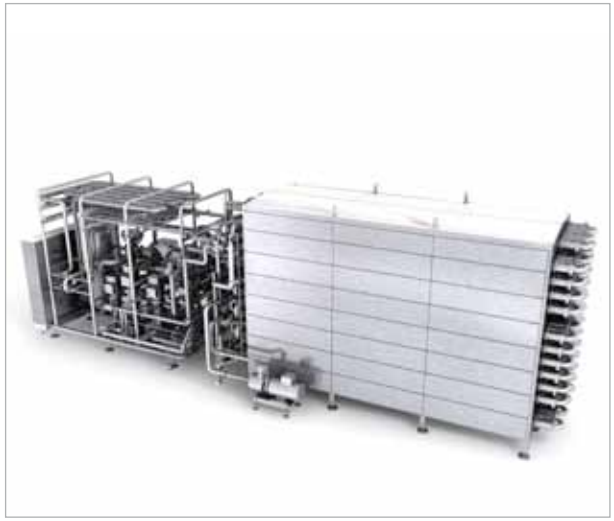
- **Reliable media separation**
  Leakproof aseptic valves and a positive pressure difference are major contributors to high product safety.

- **Aseptic product change-over**
  The water rinsing between last/first bottle of no more than 35 minutes (for KRONES standard layout) ensures high production flexibility.

- **Low product losses**
  The collecting system for mixing phases, the integrated buffer tank and automatic output adjustment in the event of production fluctuations in upstream and downstream systems contribute to high cost effectiveness.

- **System-friendly media guide in CIP steps**
  The CIP run-off for sampling valves prevents damage to the electrics and pneumatics caused by cleaning agents, while the CIP collecting pans in the complete module facilitate run-off of the cleaning media.

Plate heat exchanger



Tubular heat exchanger

System expansions

Product deaeration in the UHT system

Quality defects in the product caused by gases, in particular oxygen, can be prevented by using a deaerator, allowing the residual oxygen content in the product to be maintained at up to 0.3 ppm, depending on the product characteristics and initial gas level.
Deaeration is achieved by ensuring homogeneous distribution of the product over the greatest possible area on the inside surface of the container. A swirl nozzle system ensures gentle, efficient and foam-free distribution of the product in the vacuum phase.

Your benefits

- Nozzle system operates independently of product viscosity and system output
- Swirl nozzle also used for the CIP processes
- No interior parts in the tank
- A smaller deaeration tank can be configured in place of traditional deaeration systems
- Flavour vapours produced are recovered in a one or two-stage condenser

The compact design of the system allows only a low product quantity to be processed in the system at any time. The plus points of this concept include excellent deaeration figures and the avoidance of temperature damage and microorganism development before the heater stage.

The compact deaerator unit

The homogeniser ensures a uniform product composition, guaranteeing uniform heat transfer in the heating phase.

System expansions

VarioStore tank system for aseptic systems

The intermediate storage and buffering of products in the product treatment process is crucial for an effective and finely tuned production process. The KRONES VarioStore range of sterile tanks includes versions with or without agitator and a tank volume of between 20 and 50 m³.
The vacuum-tight tank is complemented by a valve manifold with aseptic product valves, sterile steam-locks and the necessary process gas feed.

Your benefits

- Available as an independently operating aseptic buffer tank with its own PLC or integrated into a thermal product treatment system, depending on the application
- Up to three process gases can be connected for superimposing pressure on the products
- Tank cooling can be configured with water return system
- Product homogenisation in VarioStore, in a version with magnetic agitator and hermetic separation of sterile and ambient areas or with condensate-rinsed bar agitator
- Sterile gas filtration with redundant 0.2 µm filter plus inline steam sterilisation
- Content display in aseptic version by means of capillary differential pressure measurement