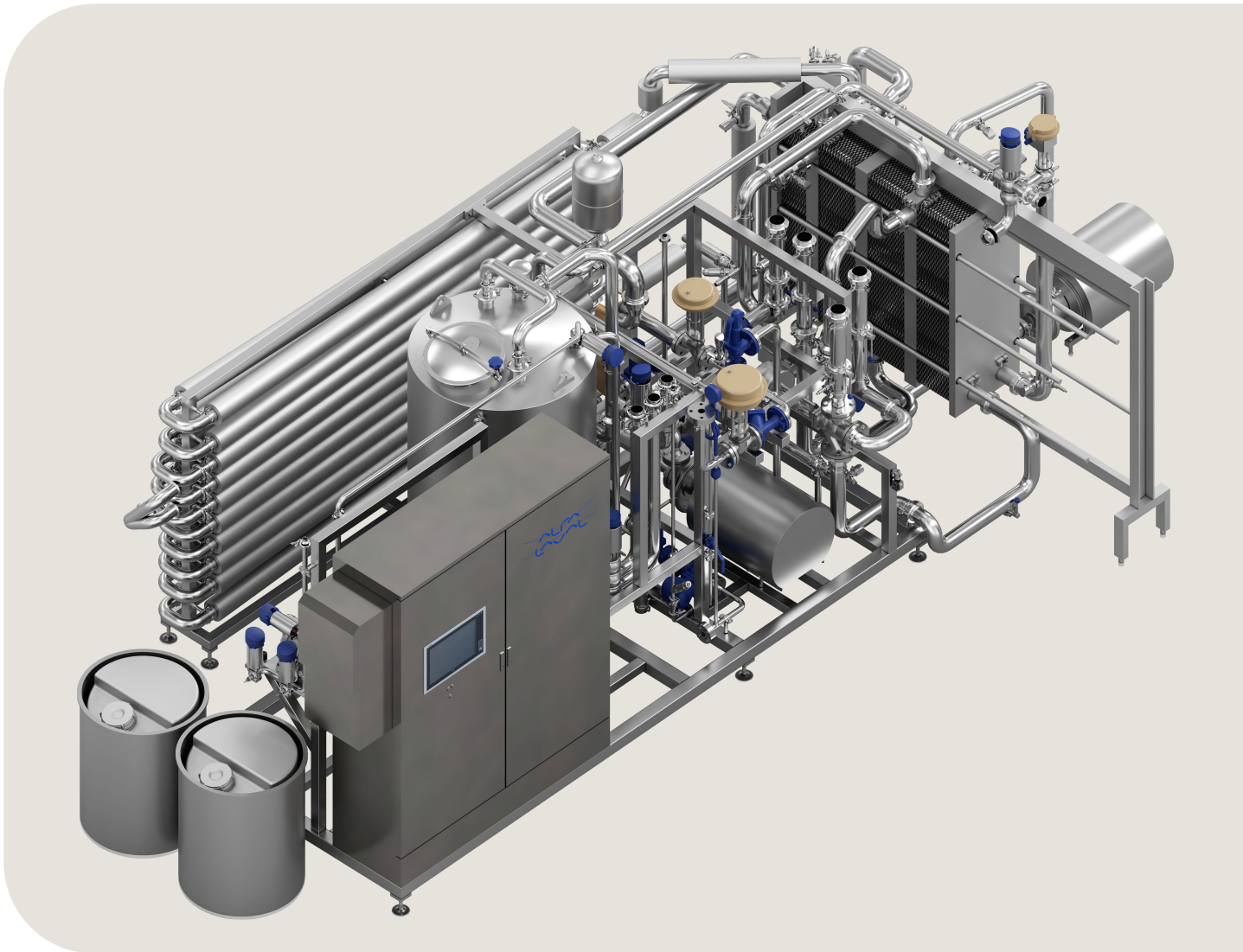


Alfa Laval Steritherm PHE process module

Aseptic heat treatment module for food industries



Introduction

Steritherm PHE process module with plate heat exchanger is designed for aseptic heat treatment of food products.

Application

Steritherm PHE units are in widespread use in heat treatment sterilization of a wide variety of foods of low to medium viscosity such as juices and juice concentrates, syrups, honey and a wide range of products containing small amount of pulp and fibres.

Benefits

- Versatility in terms of both products and capacity
- Small — compact footprint
- Small product hold up volume
- Gentle treatment with uniform heating/cooling and long runtimes
- Reliable operation.

Design

The Steritherm PHE plate heat exchanger consists of a pack of stainless steel plates clamped in a frame. The frame contains several separate sections in which different stages of treatment, such as pre-heating, final heating and cooling take place. The heating medium is hot water, and the cooling medium cold water, ice water or propyl glycol, depending on the requirement.

The plates are corrugated in a pattern designed for optimum heat transfer. The plate pack is compressed in the frame. Supporting points on the corrugations hold the plates apart, so that thin channels are formed between them. The liquids enter and leave the channels through holes in the corners of the plates. Varying patterns of open and blind holes route the liquids from one channel to the next. Gaskets round the edges of the plates and round the holes form the boundaries of the channels and prevent external leakage and internal mixing.

The Steritherm PHE module is fully automated to safeguard the aseptic status. Accurate temperature control throughout the entire operating range saves energy and assures product quality. The temperature difference between product and media is very low, usually 1-2 °C depending on the application. An auto diagnostics supervision system can enable simple trouble shooting and consequent data recording for full traceability.

Standard scope of supply basic model

- Product balance tank with level control
- Centrifugal pump with frequency inverter
- Frontline PHE pre-heater (energy recovery)
- Centrifugal booster pump
- Frontline PHE, final heating section using circulating hot water
- Hot water set including steam and condensate groups
- Insulated holding tube
- Frontline PHE pre-cooler (energy recovery) and final cooler
- Set of hygienic and aseptic valves
- Set of product instruments (temperature, pressure and flow)
- Set of media flow control valves and instruments
- Set of pipes, fittings, cable and cable trays for preassembly of the system
- Stainless steel control panel, IP 55, with Siemens PLC S7 and HMI mounted on main module.

All surfaces in contact with product are made of AISI 316 stainless steel or equivalent. Other materials can be considered based on the application.

The unit is pre-assembled on a skid, wired and FAT tested before delivery.

Options

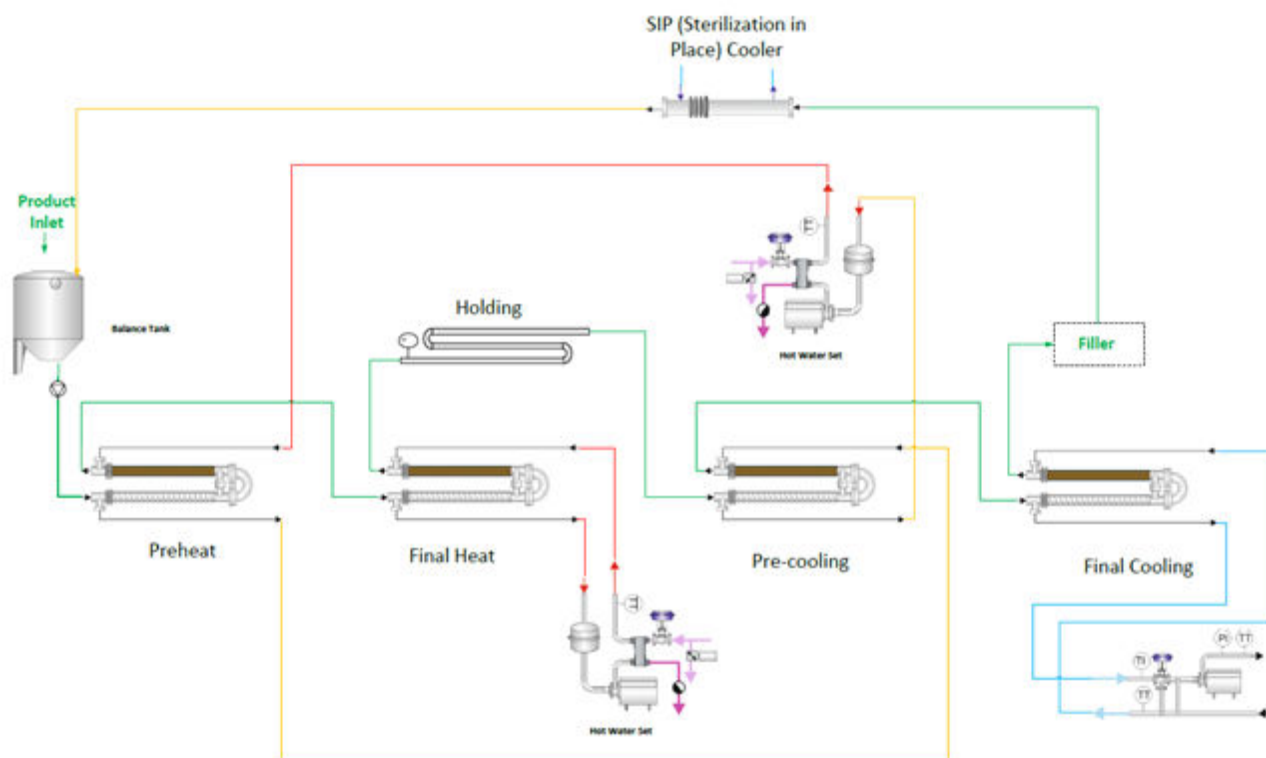
- Positive displacement product pump for medium-high viscosity products (including aseptic product pump)
- Deaeration unit
- Aseptic or sanitary homogenizer for improved product stability
- "Once through" CIP unit
- Counterflow CIP automatic manifold
- PLC based on Allen Bradley
- Variable holding time
- Output for hot filling applications
- 3A flow components
- Documentation for FDA validation.

Working principle

Before production starts, the module is sterilized in place (SIP) by overheated water. After sterilization is complete, the unit remains sterile under aseptic conditions. Production may start when the aseptic tank and/or filling machine are ready to receive the processed product.

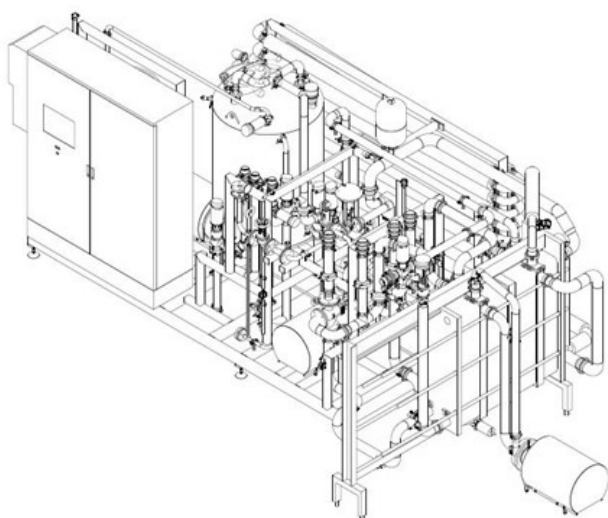
Production starts with the product entering the balance tank of the unit, which is the starting point of the Steritherm PHE module. The untreated product is pre-heated from the inlet temperature by direct energy recovery that minimizes the heating (and cooling) media demand. The hot sterilized product is heating up the cold incoming product in the regenerative PHE section. The treated product is in overpressure compared to the untreated product. The final heating to the sterilization temperature is achieved by means of hot water recirculation. The hot water is produced in a dedicated hot water set.

The product is cooled down to the final temperature in two stages. In the first stage the product is cooled in the regeneration section and in the second and last stage the product is cooled down to the outlet temperature by chilled water.



Principal flow diagram basic model

Dimensional drawing



Example of layout

Technical data

Basic model		Size 1	Size 2	Size 3	Size 4
Capacity	kg/h (lbs/h)	3,000 (6,614)	7,000 (15,432)	15,000 (33,069)	20,000 (44,092)
Steam	kh/h (lbs/h)	130 (287)	350 (772)	480 (1,058)	1,200 (2,646)
Cold water	m ³ /h (GPM)	5,000 (22,014)	12,000 (52,834)	25,000 (110,072)	20,000 (88,057)
Installed power	kW (HP)	13 (17)	25 (34)	30 (40)	32 (43)
Dimension L	mm (inch)	3,500 (138)	3,500 (138)	5,500 (217)	4,500 (177)
Dimension W	mm (inch)	2,200 (87)	2,300 (91)	2,300 (91)	2,300 (91)
Dimension H	mm (inch)	3,000 (118)	3,600 (142)	4,000 (157)	2,700 (106)

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