

Alfa Laval Steritherm VLA process module

Aseptic heat treatment module for food industries



Introduction

Steritherm VLA with Viscoline annular heat exchanger is designed for aseptic heat treatment of food products.

A Steritherm VLA module is normally installed as part of an aseptic processing line. Such a line usually includes an aseptic bag filler and – in some cases – an aseptic tank.

Application

Steritherm VLA units are in widespread use in heat treatment sterilization i.e. pasteurisation of single and double-strength fruit purées of apple, berries, mango, guava, etc., fruit juice concentrates, jams and marmalades, baby food, banana, soups and sauces and a range of different tomato products.

The Steritherm VLA module is able to efficiently treat products with a content of fibres and particles of up to 16 mm (0.63 inches) in length or diameter. In addition, special Steritherm VLA versions are available with gaps of up to 32 mm (1.26 inches) so that they can be used to treat products such as fruit salads, pizza sauce, pineapple titbits.

Benefits

- Versatility in terms of both products and capacity
- Gentle treatment with uniform heating/cooling and long runtimes
- Reliable operation
- Low service and maintenance requirements.

Design

The Steritherm VLA modular unit is pre-assembled on skids for easy, rapid delivery and installation.

To help ensure the required hygiene levels, the sterile product loop is equipped with valves incorporating steam barriers, and the operating mode makes sure the pressure in the sterile product loop is always higher than in the ambient air.

Precise control of operating parameters provides reliable, consistent product treatment. Heat treatment temperatures normally range between 95°C (203°F) and 110°C (230°F) although temperatures up to 140°C (284°F) or more are possible, depending on the particular application. The system can be CIP cleaned using detergents dosed into the inlet feed (optional equipment) or from a central CIP station.

The Steritherm VLA module features the Viscoline VLA -4 annular tube heat exchangers. In this type of heat exchanger, the product flows through the annular space between two concentric pipes, surrounded by heating or cooling media on each side. The media flows counter-currently to the product through similar annular gaps between the outer product pipe and the shell pipe, as well as between the inner product pipe and the pipe in the centre. A wide range of configurations (with gaps of between 4–23 mm (0.158 - 0.906 inches)) is available for the distance between the different pipes – the annular gap.

The media and/or product pipes can also be corrugated, depending on which products they are to be used with and the capacity required. This makes heat transfer even more

efficient as well as reducing the laminar flow effect of viscous products.

Standard configuration

- Feed balance tank
- Product pump of positive type
- Centrifugal pump for CIP/SIP
- Viscoline VLA heater using circulating hot water
- Hot water set including steam and condensate groups
- Holding cell
- Viscoline VLA cooler (tower water)
- Viscoline VLA cooler (chilled water)
- Diversion valves with steam barrier
- Viscoline VLA return SIP cooler
- Control cabinet with PLC and MCC for automatic operation.

All surfaces in contact with product are made of AISI 304 stainless steel or equivalent (AISI 316 in heat exchangers).

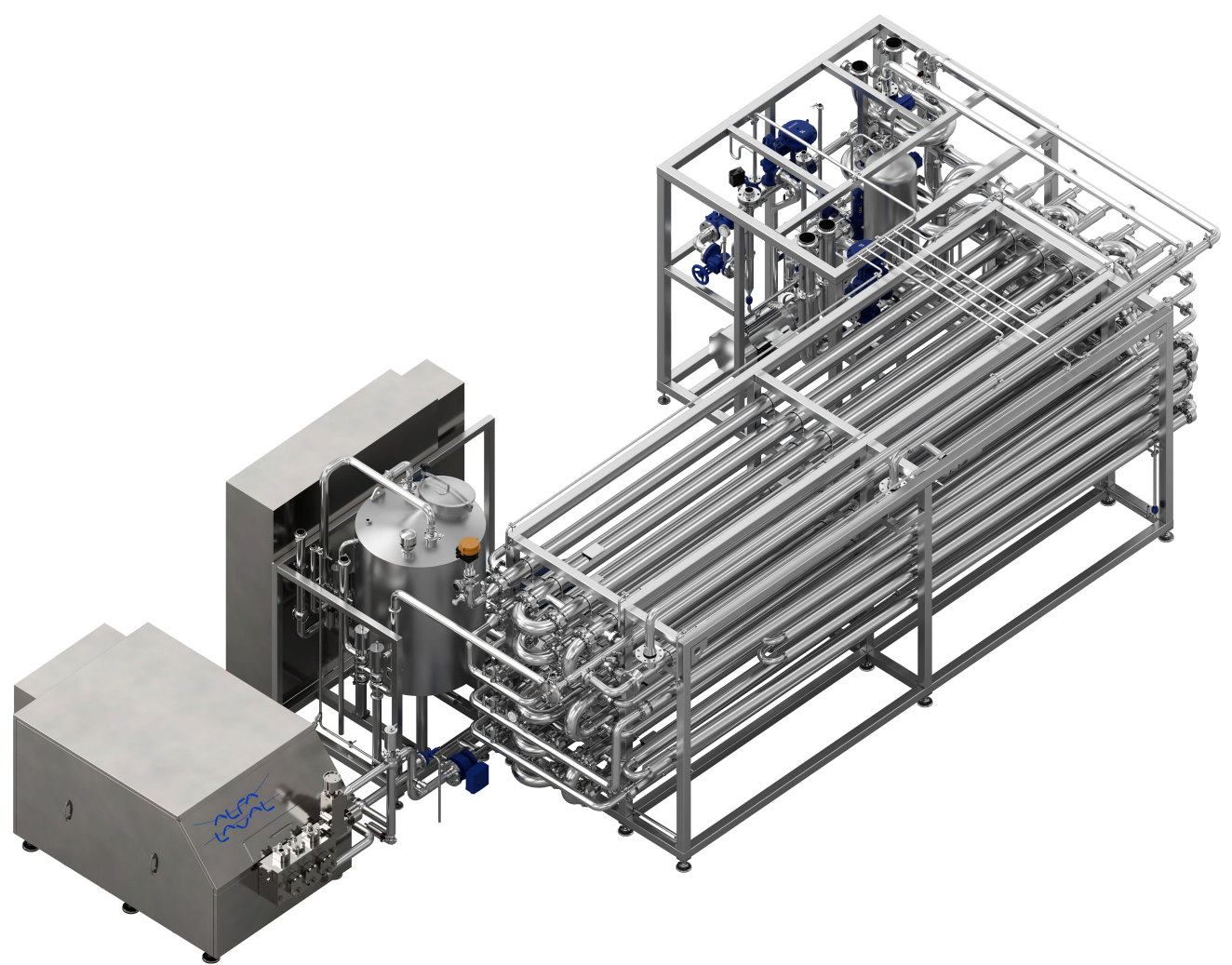
Options

- Detergent (caustic/acid) dosing modules
- Conductivity measurement
- Feed flow control
- PED approval
- FDA-compliant design
- Product-wetted surfaces made of materials other than AISI 316 / 304, stainless steel, such as SMO.

Technical data basic model		Size 1	Size 2	Size 3	Size 4	Size 5
Capacity ¹	kg/h (lbs/h)	2,500 (5,512)	3,500 (7,716)	6,000 (13,228)	8,000 (17,637)	10,000 (22,046)
Steam	kg/h (lbs/h)	270 (595)	370 (816)	650 (1,433)	850 (1,874)	1,100 (2,425)
Tower water	m3/h (GPM)	3.3 (14.5)	16 (70.4)	30 (132)	24 (106)	55 (242)
Chilled water	m3/h (GPM)	3.3 (14.5)	8 (35)	15 (66)	8 (35)	18 (79)
Installed power	kW (HP)	6.6 (8.8)	8.5 (11.4)	14 (18.8)	17.2 (23.0)	19 (25.5)
Dimension ² L	mm (inch)	7,500 (295.3)	7,500 (295.3)	7,500 (295.3)	7,500 (295.3)	7,500 (295.3)
Dimension W	mm (inch)	4,000 (157.5)	4,000 (157.5)	4,000 (157.5)	4,500 (177.2)	4,800 (189.0)
Dimension H	mm (inch)	3,000 (118.1)	3,000 (118.1)	3,500 (137.8)	3,500 (137.8)	3,500 (137.8)

¹ Capacity based on single strength fruit puree of approx 1000 cP viscosity and a feed temperature of 50°C

² All dimensions are indicative



Working principle

Steritherm VLA basic design: Superheated water at 125°C (257°F) is used to pre-sterilize (SIP) the Steritherm VLA unit for 30 minutes before any product is admitted.

The product enters via the balance tank and is then pumped through the first heater, where circulating hot water heats it to the appropriate sterilization temperature. The subsequent tubular holding cell provides the product residence time necessary for effective treatment.

The product is then cooled in two stages – by tower water and then subsequently by chilled water – before being led to the filler/aseptic tank. A diversion function is included to ensure that no untreated product reaches the filler, should the heat treatment temperature drop below a pre-set value. For high acid products (pH<4.5) this is arranged in such a way that the production can restart as soon as the right temperature has been regained, without the need of a re-sterilization with water.

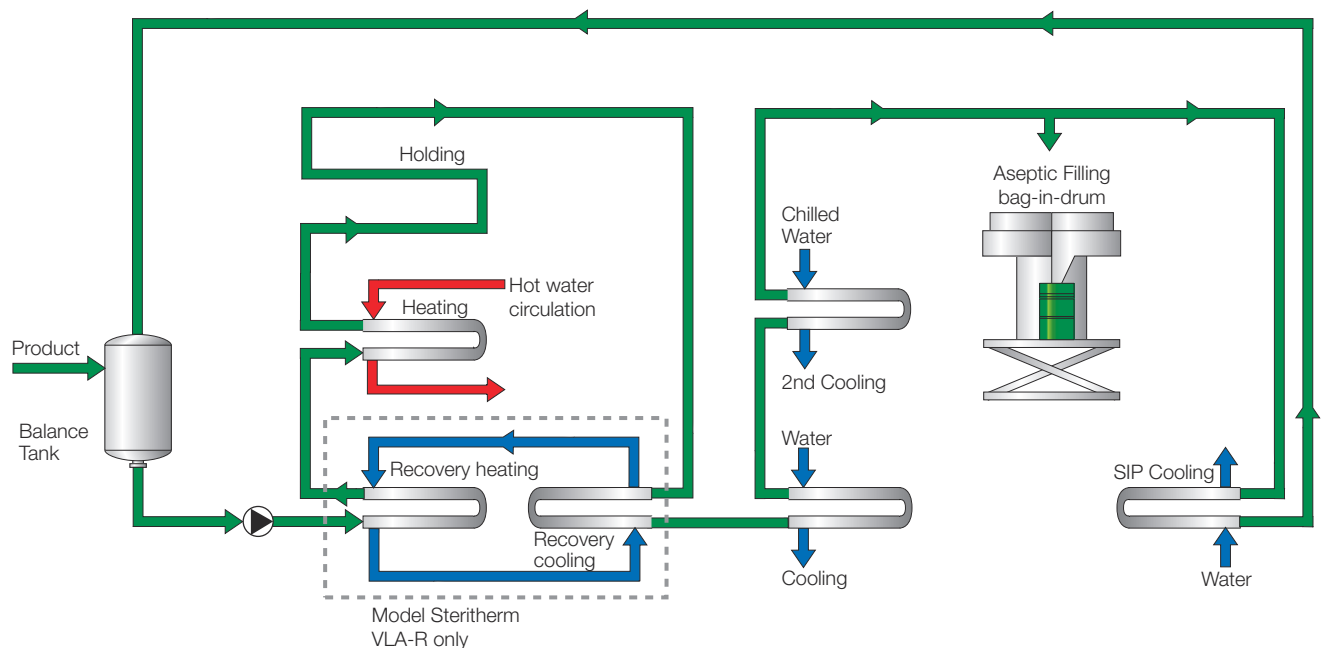
Steritherm VLA with integrated Alrox deaerator: The Steritherm VLA unit can be integrated with a special Alrox deaerator module to remove air from the product prior to heat

treatment. The Steritherm and Alrox units, along with their control systems, are completely integrated.

Steritherm VLA-R (heat recovery): A special version of the Steritherm VLA unit is available with indirect heat recovery, for improved energy efficiency. In this configuration, circulating water is transferring heat – extracted from the hot product that has passed through the holding cell – to the flow of cold product entering the system at the beginning of the process.

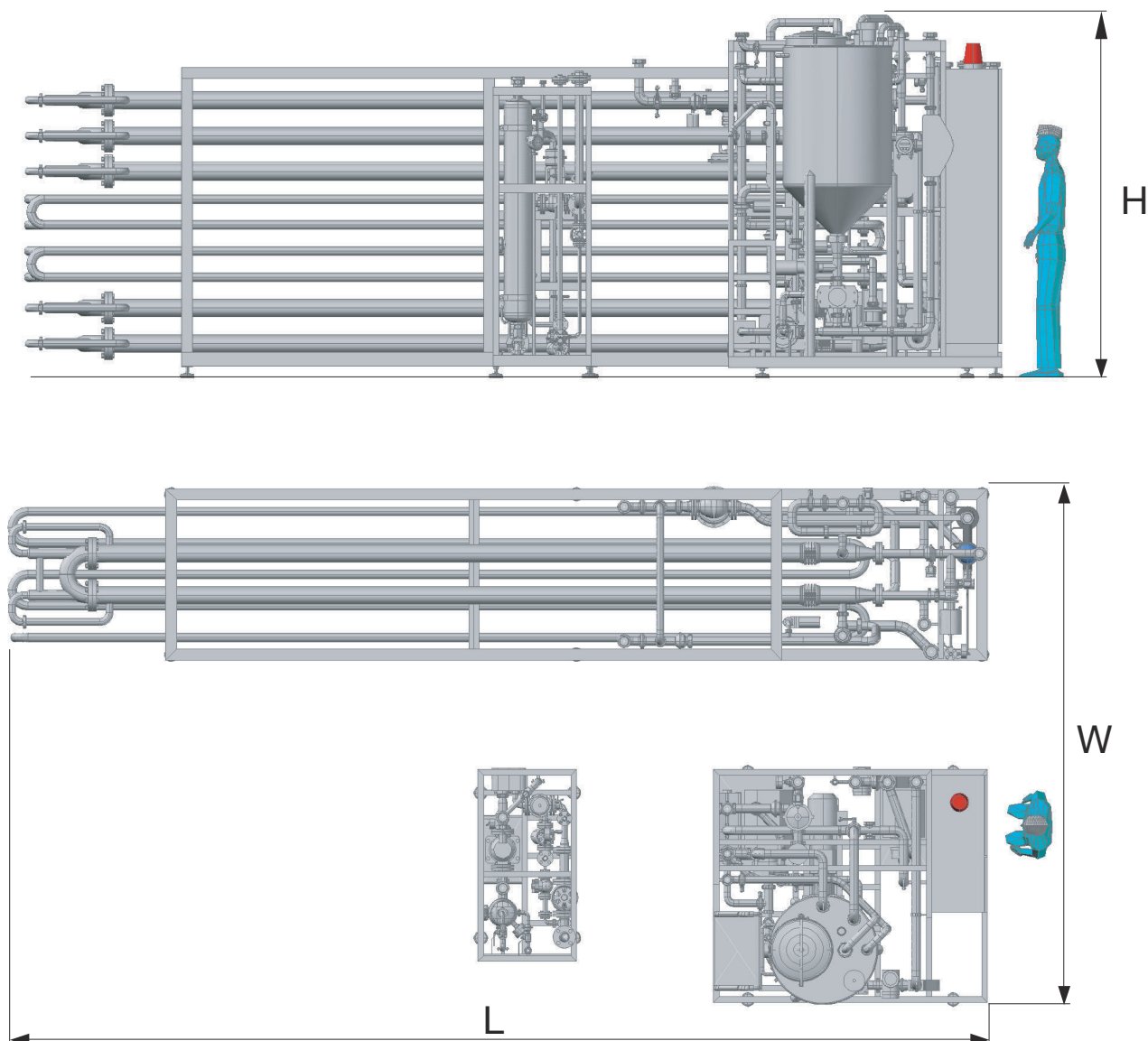
Such heat recovery is particularly advantageous at feed temperatures below 40°C (104°F), making it possible to reduce consumption of steam and cooling water by as much as 40–50%.

Steritherm VLA-H (high pressure): Some products with very high viscosities, such as fruit purée concentrates, can require a special version of the Steritherm VLA unit capable of operating with high pressures. This unit is fitted with a high-pressure piston pump and heat exchangers and valves with higher pressure ratings. This version can also be adapted to tackle the particular requirements associated with banana puree processing.



Principal flow diagram basic model

Dimensional drawing



Example of general layout basic model

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