



VHE Economizer

For deodorization and physical refining of fats and oils



The VHE Economizer

Application

This high-performance heat exchanger is specially designed to recover heat by cooling the deodorized edible fats and oils in deodorization and physical refining plants and – at the same time – heating the incoming oil. This cooling takes place under vacuum and sparging steam conditions.

The VHE Economizer is part of the Alfa Laval SoftColumn™ deodorization concept, but is also available as a retrofit component for installation in other deodorization systems – irrespective of origin.

Operating principles

The hot deodorized oil enters the VHE Economizer at one end of the shell side, which is under vacuum, and flows through a special system of channels and baffles until it reaches the outlet connection at the other end. It is then pumped out for final cooling and storage. A level transmitter installed on the shell controls the oil level on the shell side.

The cold oil enters the VHE Economizer under pressure on the tube side and flows through a multipass tube system until it reaches the outlet connection at the other end. The sparge steam is injected through perforated tubes located on the bottom of the shell, below the heating tubes.

Counter-current flow between the incoming oil and deodorized oil is maintained by a special design of the tubes and baffles on the shell side.

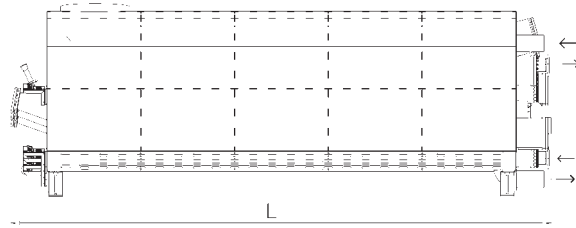
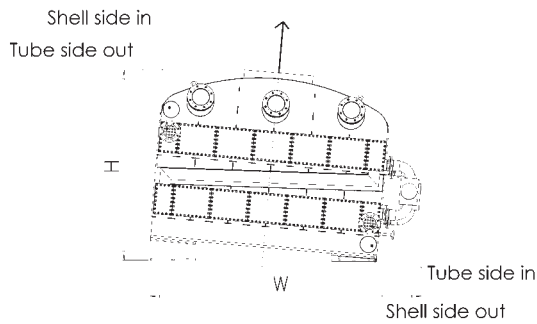
To avoid cross-contamination and provide fast draining during stock changes, the heat exchanger is fitted with a special fast-drain valve arrangement on both sides.

Design features

The VHE Economizer is designed to achieve a high level of heat recovery by cooling the deodorized oil under vacuum and sparge steam conditions, while heating the incoming oil. Under full sparge steam conditions, this gradual cooling means the oil is treated gently and the quality improves. The sparge steam also acts as stripping to remove volatiles that might form during the cooling phase, and to improve the heat transfer rate.

The large heat transfer surface area and the counter-current flow result in a very high oil-to-oil heat transfer rate, which normally means a heat recovery exceeding 75%, depending on the size, application and operating parameters.

The low liquid level and channel system with baffles ensure that the oil follows the desired path. The first oil that enters is



the first out, and thus remains inside the VHE Economizer for the required time. In the last channel, there is a connection for dosing antioxidant, where the oil is under vacuum and at a lower temperature.

The tube side is designed to ensure maximum heat transfer and self-cleaning effect, thus ensuring the best possible operation for each specific duty.

To reduce time and contamination during stock changes, a drain valve arrangement is used on both sides for quick draining.

In order to simplify service and maintenance, the sparge steam tubes are removable from outside for manual cleaning. The inside of the heat exchange tubes is also accessible for cleaning.

The shell side is equipped with illuminated sight glasses that enable observation during processing.

Technical specifications

- Capacity: up to 1700 tons/day (depending on the temperature program)
- Operating temperature: up to 270°C (518°F)
- Pressure on the tube side: up to 8 barg (116 psig)
- Pressure on the shell side: full vacuum
- Design pressure drop on tube side: 2.5 barg (36 psig)
- Typical temperature program, tube side: incoming oil 100–210°C (212–410°F)
- Typical temperature program, shell side: deodorized oil 245–135°C (473–275°F)
- Sparge steam consumption: 0.1% of oil flow
- Standard code: AD Merklblätter
- Material
- Shell: AISI 304
- Tubes: AISI 304L

Options

- Tube drain valve with actuator
- Material: AISI 316/316L
- ASME code for the tube side
- Other temperature programs

Dimensions and weights, approximate:

Model	L, mm (inches)	W, mm (inches)	H, mm (inches)	Net weight, kg (lb)
55	7000 (276)	1500 (60)	2000 (79)	4400 (9800)
80	7000 (276)	1500 (60)	2100 (83)	5100 (11300)
115	7100 (280)	2200 (87)	2200 (87)	7700 (17100)
160	7100 (280)	2700 (107)	2300 (91)	11000 (24400)
213	7100 (280)	2700 (107)	2400 (94)	12000 (26700)
291	7200 (283)	3400 (134)	2500 (98)	15000 (33300)
385	7200 (283)	3400 (134)	2700 (106)	17000 (38000)
550	7300 (287)	4000 (157)	2800 (110)	24000 (53300)

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com