



Alfa Laval Clara 450

Disc stack separation system for food and beverage applications

Introduction

For more than 100 years, Alfa Laval has been supplying separators for various industries. Today, Alfa Laval has the most complete and diverse offering of separators – each fully optimized for its specific duty and supplied with all auxiliary systems and key components.

The use of disc stack separators in different food and beverage applications goes back several decades. Based on the long-term cooperation with the food and beverage industry, Alfa Laval separators are specifically designed for the requirements and demands of this industry.

The Clara range of high-speed separators is specially developed for food, beverage and industrial fermentation applications. The Clara range offers gentle product treatment, high separation efficiency and low power consumption.

Application

The Alfa Laval Clara 450 is optimally designed to ensure high performance and maximized yield for clarification duties in the food and beverage industries and for other hygienic applications. It is also suitable for the polishing of beverages with high content of dissolved gas, like sparkling wine and of products that are sensitive to oxidation or loss of aromas.

Typical separation applications are clarification of the following products:

- Sparkling wine
- Wine
- Fruit juices
- Coffee and tea

Benefits

- High separation efficiency
- No oxygen pick-up
- No loss of dissolved CO₂ and aromas
- Gentle treatment of the product
- Low power consumption
- Robust and reliable design
- Easy to operate

Design

The Clara 450 system consists of a separator, a process & service liquid unit, and an electrical & control system.



The disc stack separator is based on the Alfa Laval fully hermetic concept with bottom fed design. The bowl is sealed mechanically to prevent loss of dissolved CO₂ & aromas and oxidation of the clarified product. The separator has variable discharge volume, which leads to minimum product loss.

The system is modularized and can be configured from a selection of basic and other optional standardized units and control functions.

The control system includes a PLC and a user-friendly HMI to monitor and control the separation process parameters. The system can be configured for a remote operation.

All metallic parts in contact with the process liquid are made of stainless steel. Gaskets and seals in contact with the product are made of FDA approved material and are approved according to food regulations (EC1935/2004).

The separation system is designed for automated Cleaning in Place (CIP).

Scope of supply

The standard Clara 450 separation system includes the following main components:

- Disc stack separator
- Process & service liquid unit:
 - Valves, instruments and other components
 - Flow and back pressure regulation valves
 - Flow meter
 - Sight glasses
 - Sample valves
 - Timer triggered solids discharge function
- Electrical & control system:
 - Control cabinet with PLC and HMI
 - Motor starter cabinet with VFD
- Commissioning spares
- Set of special tools
- Documentation
- The system is available in two pipe size configurations: DN50 and DN65.

Options

- Feed pump
- Solids receiving unit (a collection device and a transfer pump for discharged solids)
- Turbidity triggered solids discharge function
- Capacity control by inlet turbidity
- Service options:
 - Commissioning
 - Operators training (basic and advanced level)
 - Basic service agreement
 - Performance agreement

Working principle

The process & service liquid unit monitors and regulates the flow and pressure of the feed and utility liquids in and out of the separator.

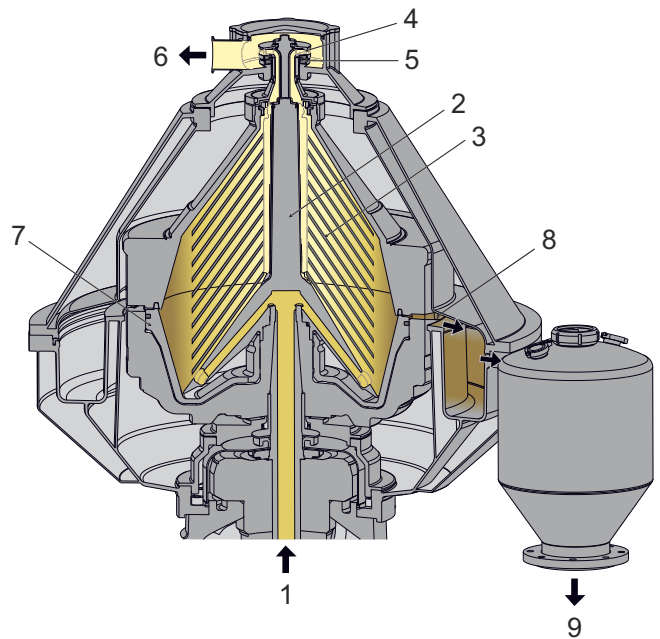
The feed enters the separator bowl from the bottom via the drive spindle. Separation takes place between the bowl discs as a result of the centrifugal force that causes the solids to move towards the periphery.

The clarified/separated liquid is continuously pumped out of the hermetically sealed bowl by an integrated impeller through the outlet at the top of the separator.

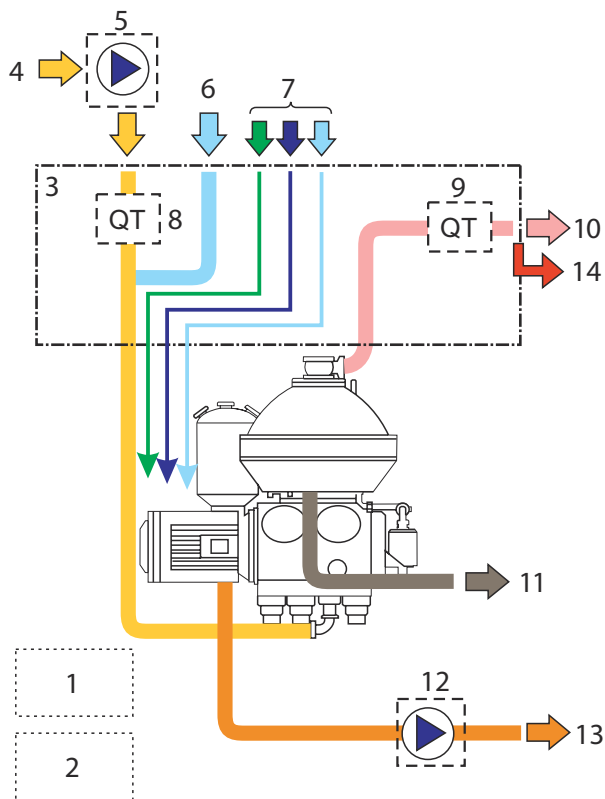
The solids collected in the periphery of the bowl are discharged intermittently through the discharge ports. The discharge is triggered by a timer or by an optional turbidity meter mounted on the clarified product outlet pipe.

Water is used to control the movement of the sliding bowl bottom part that opens and closes the discharge ports. The discharged solids decelerate in the sludge cyclone and can be pumped out of the system by the optional solids receiving unit.

The process & service liquid unit also controls the separator's discharge system, flushing, and CIP.



1. Inlet
2. Distributor
3. Disc stack
4. Impeller
5. Hermetic seal
6. Liquid phase outlet
7. Sliding bowl bottom
8. Solids discharge ports
9. Solids outlet from cyclone



Typical flow chart of a separator system. The details may differ slightly between different systems.

1. Control cabinet
2. Motor starter cabinet and VFD
3. Process & service liquid unit
4. Product inlet
5. Feed pump (optional)
6. Standby/Safety water
7. Utilities
8. Turbidity meter for capacity control (optional)
9. Turbidity meter for discharge triggering (optional)
10. Outlet for clarified product
11. Separator drain
12. Solids receiving unit (optional)
13. Discharged solids outlet
14. Process & service liquid unit drain

Technical data

Performance data¹

Maximum capacity	DN50:	20,000 litre/h (88 US gpm)
	DN65:	35,000 litre/h (154 US gpm)
Maximum motor power		55 kW (73.8 HP)

¹ Actual capacity and power consumption depend on operating conditions

Connections

Feed inlet	DIN 11851 DN50/65
Product outlet	DIN 11851 DN50/65
Solids outlet	DIN Flange DN200

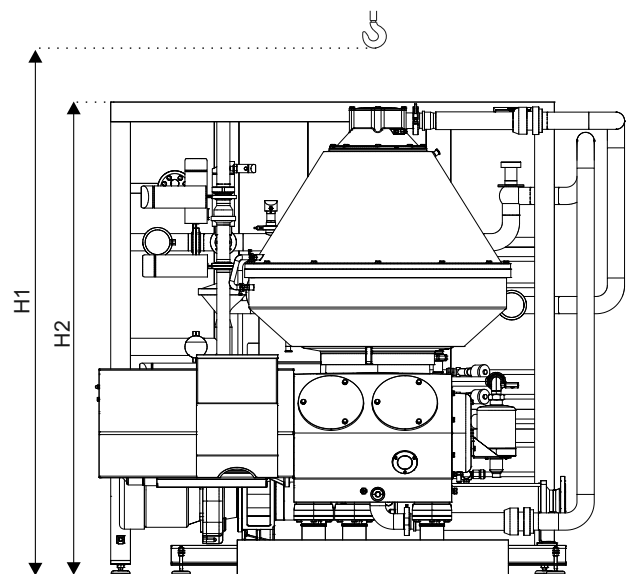
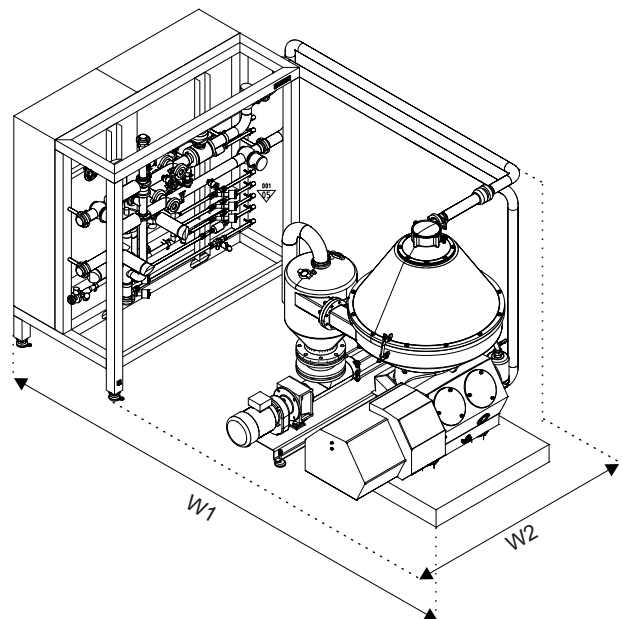
Material data

Bowl body	Stainless steel, EN 1.4418
Frame top part	Stainless steel 316, EN 1.4401, ASTM S31600
Gaskets (product wetted)	NBR and EPDM, FDA approved materials
Piping	Stainless steel, AISI 304
Frame and cabinets	Stainless steel, AISI 304

Weights

System incl. separator, bowl and motor	3400 kg (7495 lbs)
Bowl	800 kg (1764 lbs)

Dimensional drawing



Dimensions

H1 (minimum lifting height)	3000 mm (9 ft 10 1/8 inches)
H2	1925 mm (6 ft 3 13/16 inches)
W1	3600 mm (9 ft 9 3/4 inches)
W2	2050 mm (6 ft 8 11/16 inches)

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