Alfa Laval PurePulp 450

Disc stack separation system for citrus 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.

PurePulp separators are specially designed for high efficiency three phase separation with continuous removal of highly concentrated pulp. The unique hermetic design assures zero oxidation, maximized product yield and quality, gentle product handling and considerable reduction of power consumption.

Application

The PurePulp range is specially designed for continuous depulping i.e. separation of fruit pulp from juice of citrus and other continental and tropical fruits.

Benefits

- High separation efficiency
- High solids handling capacity
- No loss of aromas
- High yield
- Low power consumption
- Easy to operate
- Easy to maintain

Design

The PurePulp 450 separation 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 design ensures gentle acceleration of the feed and maximizes the separation performance. The mechanical seal on the bowl ensures no oxidation of the product and it also prevents loss of aroma.

The continuous pulp removal via the heavy phase outlet ensures that it is free of any black specs and other impurities, which are removed by intermittent bowl partial discharges.

The hermetic design in combination with the continuous depulping reduces the need for intermittent discharge of pulp significantly, thereby reducing power consumption, wear & tear and product losses.

The bowl casing is jacketed for cooling and sound dampening.

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 remote operation.

All metallic parts in contact with the process liquid are made of high-grade 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 PurePulp 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 three pipe size configurations: DN50, DN65 and DN 80.

Options

- Feed pump
- Solids receiving unit (a collection device and a solids transfer pump)
- Turbidity triggered solids discharge function
- Viscosity measurement
- Automatic feed flow regulation valve
- 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.

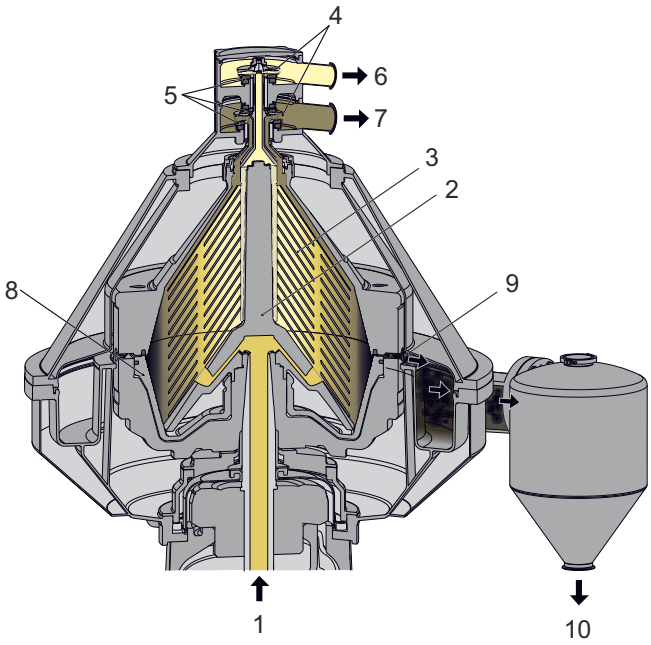
The feed enters the separator bowl from the bottom via the drive spindle. Separation takes place between the bowl discs as a result of the centrifugal force that causes the lighter liquid phase (de-pulped juice) to move towards the centre of the bowl and heavy liquid phase (pulp phase) towards the periphery.

The two liquid phases are continuously pumped out of the hermetically sealed bowl by two integrated impellers through the outlet at the top of the separator.

The heavier solids (black specs and impurities) collected in the periphery of the bowl are discharged intermittently through the discharge ports. The triggering functions by outlet turbidity and/or timer.

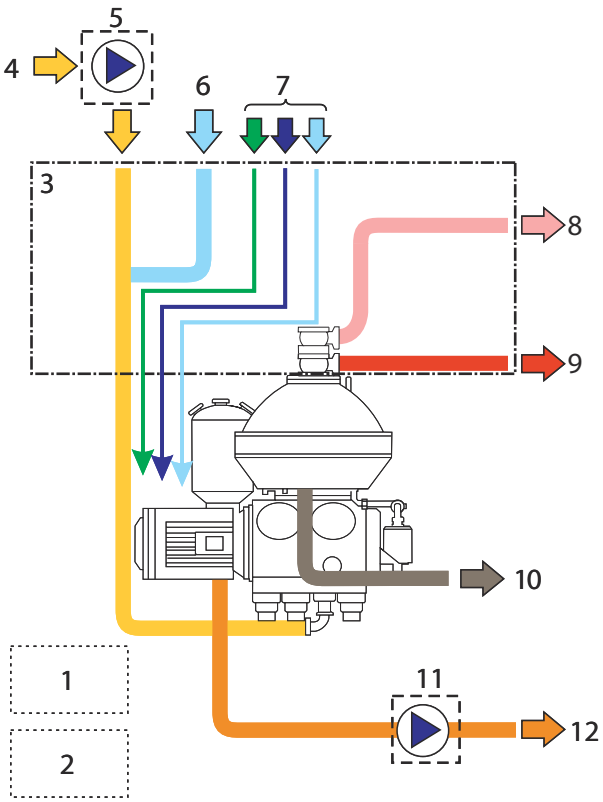
Water is used to control the movement of the sliding bowl bottom part that opens and closes the discharge ports. The discharged solids decelerate in the sludge cyclone and can be pumped out of the system by the optional solids receiving unit.

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



Typical bowl drawing for a solids-ejecting separator. The details illustrated do not necessarily correspond to the separator described.

1. Inlet
2. Distributor
3. Disc stack
4. Impeller
5. Hermetic seal
6. Light liquid phase outlet
7. Heavy liquid phase outlet
8. Sliding bowl bottom
9. Solids discharge ports
10. 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 panel and VFD
3. Process & service liquid unit
4. Feed inlet
5. Feed pump (optional)
6. Standby / safety water supply
7. Utilities
8. Heavy liquid phase outlet
9. Light liquid phase outlet
10. Separator drain
11. Solids receiving unit (optional)
12. Discharged solids outlet

Technical data

Performance data[1]	
Hydraulic capacity	60 000 litre/h
Maximum motor power	37 kW (49.6 HP)

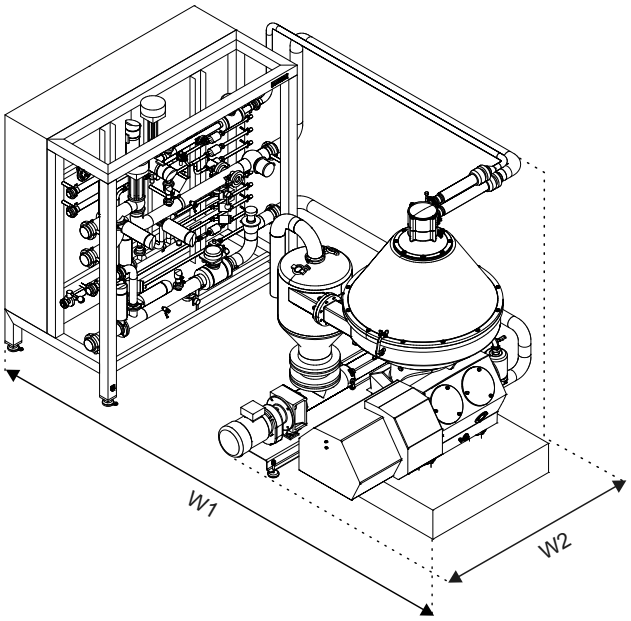
[1] Actual capacity and power consumption depend on application, solids content and operating conditions

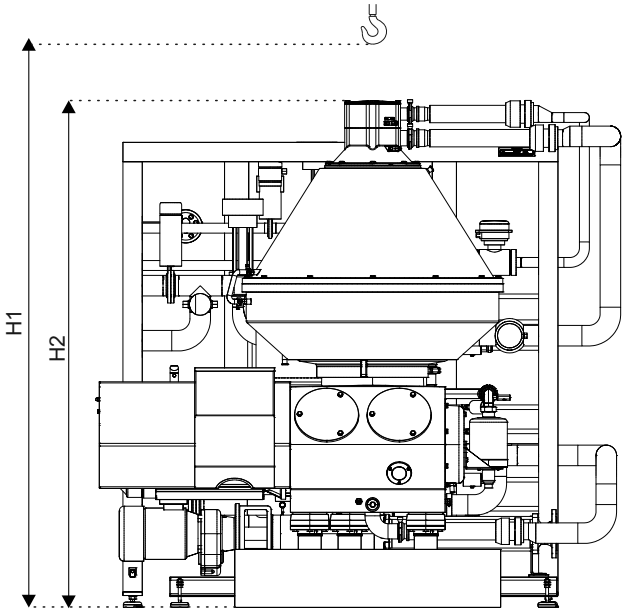
Connections	
Feed inlet	DIN 11851 DN50/65/80
Light phase liquid outlet	DIN 11851 DN50/65/80
Heavy phase liquid outlet	DIN 11851 DN40
Solids outlet	DIN Flange DN80

Material data	
Bowl body	Super Duplex Stainless Steel, EN 1.4501, ASTM/UNS S32760
Frame top part	Stainless steel 316, EN 1.4401, ASTM S31600
Gaskets (product wetted)	FKM, FDA approved materials
Piping	Stainless steel, AISI 304L
Frame and cabinets	Stainless steel, AISI 304

Weights	
System incl, separator, bowl and motor	3000 kg (6614 lbs)
Bowl	788 kg (1737 lbs)

Dimensional data





Dimensions	
H1 (minimum lifting height)	3000 mm (9 ft 10 1/8 inches)
H2	2100 mm (6 ft 10 11/16 inches)
W1	3600 mm (11 ft 9 3/4 inches)
W2	2100 mm (6 ft 10 11/16 inches)

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How to contact Alfa Laval

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