Alfa Laval Culturefuge 200 B

Disc stack separator system for biopharma processing

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.

With the unique Hermetic Design and Bactofuge™ technology Alfa Laval separators are fit to meet the requirements and demands for gentle and efficient processing of high-density biomass or cell culture broths, due to the combination of high separation area and continuous heavy-phase discharge.

Application

The Culturefuge 200 B is specifically designed for high-density industrial fermentation harvesting.

Typical separation applications are the following:

- Cell harvesting
- Microbial cells and cell debris separation
- Probiotics separation
- Suspended protein

Benefits

- Gentle treatment of the product
- Handle a wide range of volume and cell densities
- High yield
- Air free processing minimizing risk of foaming
- Sanitary design
- FDA compliance or USP Class VI regulations for seal rings and wetted polymers
- Low temperature pick up through the machine

Design

The Culturefuge 200 B separation system includes a separator unit and optionally a customized process liquid unit and an electrical and control system unit.

The separator is a premium disc stack centrifuge based on Alfa Laval's unique Hermetic Design concept with bottom fed inlet and mechanical seals. The hermetically sealed bowl prevent oxygen pick-up in the clarified product. The fully hermetically sealed bowl in combination with intermittent discharge enable efficient cleaning with pressurized steam (SIP). or other cleaning agents (CIP).

The frame has a horizontal drive shaft, worm gear,lubricating oil bath and a bowl spindle in the lower part. The bowl is mounted on top of the spindle, inside the space (bowl casing) formed by the upper part of the frame, the solids collecting cover and the frame hood. The bowl casing is jacketed for cooling and noise reduction.

The two separated phases (the light supernatant, and the heavy concentrated biomass) are continuously fed out through the two outlets on top of the separator.

All metal parts in contact with the process liquid are made of stainless steel. The bowl shell is made from highly corrosion resistant super duplex stainless steel EN 1.4501 (UNS 32760, 2398).

The main system connections are sanitary Tri-clamps. The electric motor is suitable for variable frequency drive. The drive system is splash-lubricated without any need for an external lubrication circuit. The machine is equipped with nozzles for flushing of the bowl top, the bowl bottom and the solids collecting chute. The tools for assembly and disassembly of the bowl are made of stainless steel.

Scope of supply

The Alfa Laval Culturefuge 200 B separation system includes the following main components:

- Disc stack centrifuge
- OWM-S (Operating Water Module - Steamable)
- Set of tools
- Commissioning spares
- Documentation (Complied with FDA regulation, Traceable)

Options

Separation system

- The centrifuge can be skid mounted and fully equipped with custom-made process liquid unit and electrical & control system unit on request
- Disc stacks available to suit a variety of process demands
- All parts in contact with the process liquids are available with two alternative surface finishes; Std. 0.8µRa and 0.5µRa (electro polished)
- Passivation of product wetted parts

Service

- Commissioning
- Operators training (basic and advanced level)
- Basic service agreement
- Performance agreement

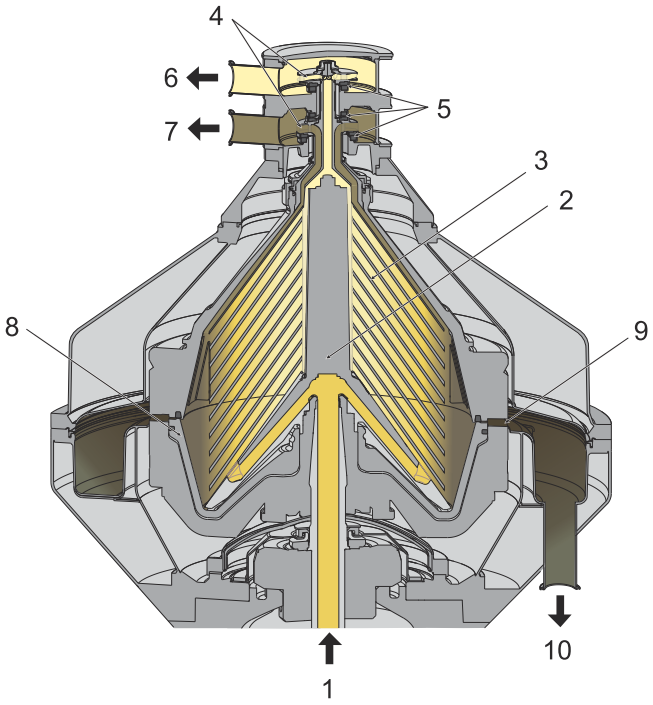
Working principle

Fermentation broth is continuously fed from the bottom (1) into the separator bowl through the hollow spindle which assures gentle acceleration. Separation takes place between the discs (3) in a centrifuge bowl.

In normal production mode there are two continuous outlet flows from the top of the separator. One is clarified liquid (supernatant) and the second is concentrated biomass. Both these flows are discharged under pressure via centrifugal impellers (4). Mechanical seals on the inlet and outlet maintain a full hermetic condition, which prevents air from contacting product liquids.

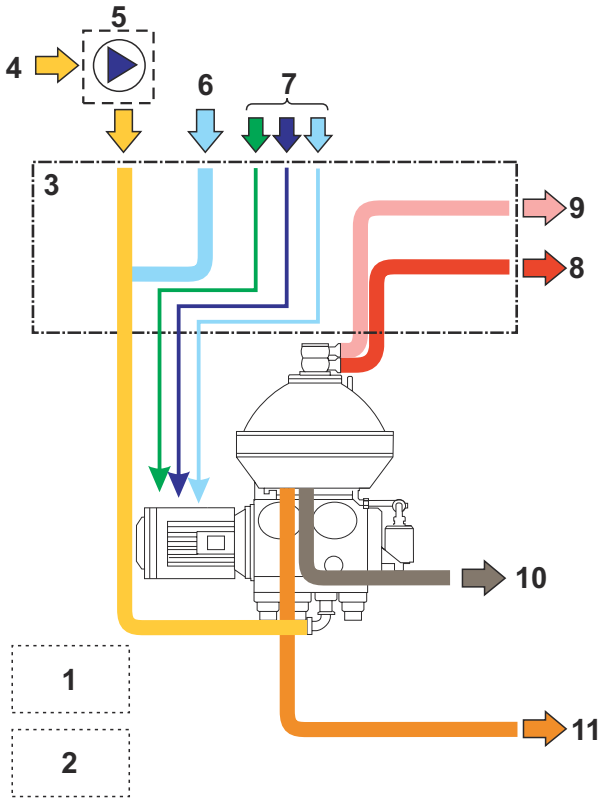
During production mode the bowl bottom is hydraulically pressed into a closed position, ensuring a tight seal against the bowl hood. Solids, which move towards the bowl periphery under centrifugal force, pass out of the separator over the top disc.

During cleaning (CIP), the separator is fed with cleaning solutions continuously. The intermittent discharge function can be employed to improve the cleaning the bowl internals. Periodically, at predetermined intervals, the sliding bowl bottom (8) is lowered hydraulically and waste residue is evacuated through the discharge ports (9). The bowl is then closed again by hydraulic action. The intermittent discharge is done at full speed without shutting off the feed of cleaning liquid.



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



Typical flow chart of a separator system. The details may differ based on the actual order.

1. Control cabinet (optional)
2. Motor starter cabinet and VFD (optional)
3. Process & service liquid unit (optional)
4. Product inlet
5. Feed pump (optional)
6. Standby/Safety water
7. Utilities
8. Heavy phase outlet
9. Light phase outlet
10. Separator drain
11. Discharged solids outlet

Technical data

Performance data[1]	
Hydraulic capacity	10m3/h@3 bar inlet pressure
Maximum discharge capacity	10 liters
Motor power	30 kW (40.2 HP)
Sound pressure level	78 dB

[1] Actual capacity and power consumption depend on operating conditions

Connections	
Feed inlet	iso 77,5, ISO Clamp coupling
Heavy phase outlet (solids)	iso 60,3, ISO Clamp coupling
Product outlet	iso 48,3 ISO Clamp coupling
Discharge solids outlet	iso 77,5, ISO Clamp coupling

Material data	
Bowl body	Stainless steel EN 1.4501
Frame top part (ped / asme)	Stainless steel EN 1.4404/SA-240 Cast grey iron, clad with stainless steel
Frame bottom part	EN 1.4301
Inlet and outlet parts	Stainless steel EN 1.4404/SA-240
Gaskets (product wetted)	EPDM FDA, EPDM USP VI
Separator, bowl and motor	1794-1867 kg (3955–4116lbs)
Bowl	298 kg (657 lbs)

Weights	
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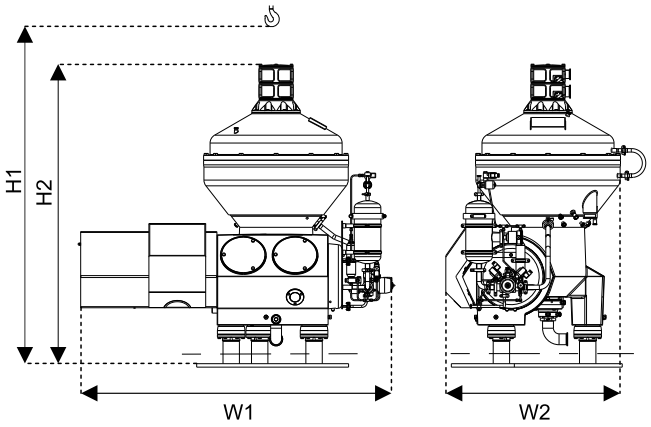
Dimensional drawing



Dimensions	
H1	2800 mm (9 ft 2 1/4 inches)
H2	1760 mm (5 ft 9 1/4 inches)
W1	1730 mm (5 ft 8 1/8 inches)
W2	1022 mm (3 ft 4 1/4 inches

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