



## Alfa Laval Culturefuge 200

### Medium capacity solids-ejecting centrifuge for the biotechnological industries

Many new biological products are derived from fragile organisms. Although relatively easy to separate the trick is accomplishing the separation in a gentle manner without destroying the shear sensitive cell wall membranes that isolate the complex intracellular proteins from the extracellular target proteins. If this can be avoided, downstream purification of the target proteins becomes much easier.

The Alfa Laval Culturefuge 200 is a steam-sterilizable hermetic centrifuge designed for separation of mammalian and microbial cells as well as cell debris and suspended proteins at capacities up to 10 m<sup>3</sup>/h. The unique hermetic design with bottom feed not only gives gentle acceleration of shear-sensitive particles; it also simplifies the peripheral equipment and minimizes turbulence in the feed by having control valves on the outlet. The hermetic inlet together with the special geometry of the separator leads to maximum separation efficiency. Special attention has been paid to a hygienic, CIP-able design which is a pre-requisite for successful sterilization.

#### Application

The machine is designed for clarification duty, separating particles from one liquid, especially shear sensitive particles. Applications that require low oxygen pick-up can also take advantage of the hermetic features offered by this machine. The sterilizability makes the machine suitable for most biotechnological separation duties.

#### Standard design

The machine consists of a frame that has a horizontal drive shaft, worm gear, lubricating oil bath and a hollow vertical 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 double-walled for cooling and noise reduction.

The bowl is sealed off from this space by mechanical seals. There is also a mechanical seal at the bottom of the spindle, and a mechanical seal at the top of the spindle to make sterilization with pressurised steam possible.

All metal parts in contact with the process liquid are made of stainless steel with surface finish Ra <0.8 or Ra <0.5, the latter el-polished.



Alfa Laval Culturefuge 200 complete with motor.

The bowl is of the solids-ejecting disc type with an automated hydraulic operating system for discharging. It is a so-called timer triggered discharge system, meaning that the bowl content is emptied at pre-set discharge intervals. In production normally only part of the bowl content is emptied, whereas during CIP total discharges are possible. The partial discharge takes place at full speed without any interruption of the feed. The hydraulic/pneumatic system for the discharge is mounted on the lower part of the frame.

The centrifuge is available with main connections as sanitary clamps and all other utility connections of clamp type. The electric motor (IEC or NEMA type) is suitable for variable frequency drive, which makes it possible to have bowl speeds down to 80 % of the maximum bowl speed.

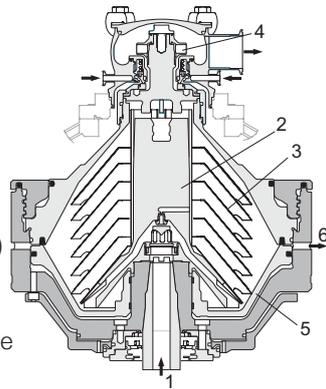
The design conforms to a number of EC directives, and the machine is made in accordance with the general directives for machinery. The machine is equipped with nozzles for flushing of the bowl top, the bowl bottom and the solids collecting chute.

**Design features**

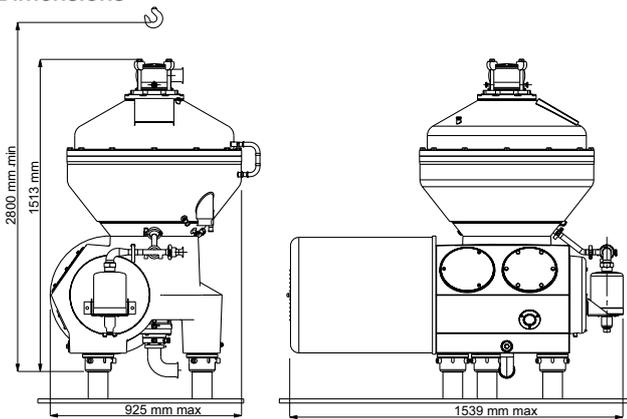
- Fully hermetic design for minimal shear stress and absence of oxygen.
- Different disc stacks for different sediment loading
- Two different outlet impeller diameters available
- Designed for easy cleaning-in-place (CIP).
- The centrifuge system can be made fully contained
- Design pressure of the bowl casing 300 kPa.
- Design pressure for the cooling jacket 300 kPa for connection to centralized cooling circuit.
- Bowl casing and cooling jacket designed according to ASME or PED.
- Sterilizable (SIP) with 270 kPa steam in a 20-30 min cycle, including discharge system.
- Most parts in contact with the process liquids available with two alternative surface finishes.
- Product wetted parts passivated (optional).
- All product wetted polymers and seal rings compliant with FDA regulation.

**Working principle**

Separation takes place inside a rotating bowl. The untreated feed is introduced to the bowl from the bottom through a hollow spindle (1), and is accelerated in the distributor (2) before entering the disc stack (3). The separation of the sediment takes place in between the discs. The light phase moves towards the center and is discharged by an impeller (4). The heavy sediment phase is collected at the periphery and is ejected from the bowl intermittently at full operating speed. The variable volume partial discharge is achieved by a hydraulic system below the separation space. At preset intervals, this system forces the sliding bowl bottom (5) to drop down, thus opening the sediment ports (6) at the periphery.



**Dimensions**



Alfa Laval reserves the right to change specifications without prior notification.

**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](http://www.alfalaval.com)

**Utilities consumption**

Electric power	17.5 kW <sup>1)</sup>
Flushing liquid per discharge	10-30 l per discharge
Operating liquid	1 l per discharge
Steam @ 270 kPa pressure	20 kg per sterilization
Cooling liquid for frame parts	max. 500 l/h

<sup>1)</sup> At 3 m<sup>3</sup>/h. Power consumption increases with the flow rate.

**Material data**

Bowl body, bowl hood and lock ring	s.s.1.4501 UNS 32760
Frame top part and hood (ASME)	s.s 1.4404 ASME SA-240
Frame top part and hood (PED)	s.s. 1.4404
Frame bottom part	Cast iron, clad with s.s 1.4301 UNS S 30200
In-and outlet parts	s.s. 1.4401 UNS S 31600
Gaskets and O-rings product-wetted	EPDM rubber food grade and PTFE food grade
Bowl seal ring	PEEK food grade
Seal rings in- and outlet	Resin impregn. Carbon Graphite food grade
Wear ring in- and outlet	Reaction bonded Silicon Carbide food grade

**Technical specification**

Hydraulic capacity	10 m <sup>3</sup> /h <sup>1)</sup>
Bowl volume	15 l
Bowl speed	max. 7 200 rpm
G-force	max. 11 900
Motor speed synchronous	57,6 Hz (VFD) 1728 rpm
Installed motor power/protection	22/25 kW/IP 55; IE3
Feed inlet pressure required at inlet flange	max. 50-100 kPa <sup>2)</sup>
Overhead hoist lifting capacity	min. 300 kg
Sound pressure	79 dB(A) <sup>3)</sup>

<sup>1)</sup> Actual throughput depends on amount and type of solids in the feed, viscosity and required degree of clarification.

<sup>2)</sup> At 5 m<sup>3</sup>/h

<sup>3)</sup> According to ISO 3744

**Shipping data (approximate)**

Centrifuge excl. motor	max 1288 kg
Motor	177/211 kg
Bowl	max 292 kg
Gross weight	2200 kg
Volume	6 m <sup>3</sup>