



Culturefuge 400

Production scale separation system

As more and more biopharmaceuticals, derived from mammalian cell cultures, are being commercialized, so is the capacity of bioreactors increasing. To process a 20,000 litres plus bioreactor, in a reliable and consistent manner, without compromising the product quality needs the knowhow and experience of Alfa Laval.

The Culturefuge series of centrifuges has been developed specifically for cell cultures. The unique hollow spindle concept allows for gentle acceleration of the feed liquid thus minimizing the lysis of shear sensitive cell wall membranes.

Unique hollow spindle design

Alfa Laval has worked for many years with centrifuges that are bottom fed through a hollow spindle. Liquids entering the centrifuge are gradually accelerated as they move up-wards through the spindle. The feed zone of the centrifuge is completely filled with rotating liquid and there is no air/liquid interface. This smooth acceleration minimizes shear forces acting on the liquid and thus prevents cell lysis.

Hermetic outlet

The Culturefuge 400 has a completely hermetic outlet. Clarified concentrates are discharged via a pump that precludes any contact with air. This is particularly desirable when the liquids are prone to foam or where the products are susceptible to oxidation. It also prevents the ingress of air, which can disturb the operation of downstream depth filters.

Hygienic design

The Alfa Laval hermetic centrifuges have been used for decades in the dairy and beverage industries. Hygienic considerations were of the utmost importance in the design of these earlier machines. The Culturefuge 400 has been upgraded even further. It is fully steam sterilizable and has a full cleaning-in-place capability. Pressure vessel designs according to ASME or PED are available. Cooling jackets surrounding the centrifuge bowl provide efficient temperature control and also contribute to a low noise level.



Complete system

The centrifuge can be mounted on a fixed base frame, which includes process piping for service liquids and process liquids entering and leaving the centrifuge. Many module configurations are possible depending on a client's specific needs. Everything from GLSP to completely contained, aseptic operation with full sterilization-in-place (SIP) can be provided. Typically, a steam sterilizable pump removes the solids phase. The electrical system includes starter, PLC control system and pneumatic unit. A starter panel with variable frequency drive (VFD) is usually delivered loose for installation in a MCC.

Materials

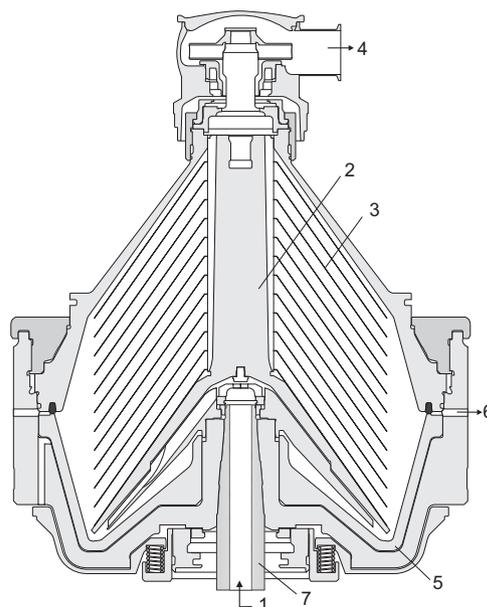
All product contact parts are made of high-grade stainless steel with a surface finish of 0.5 µm Ra with electropolish. Gaskets are made of FDA approved EPDM elastomer and are compliant with USP Class VI requirements.

Available configurations

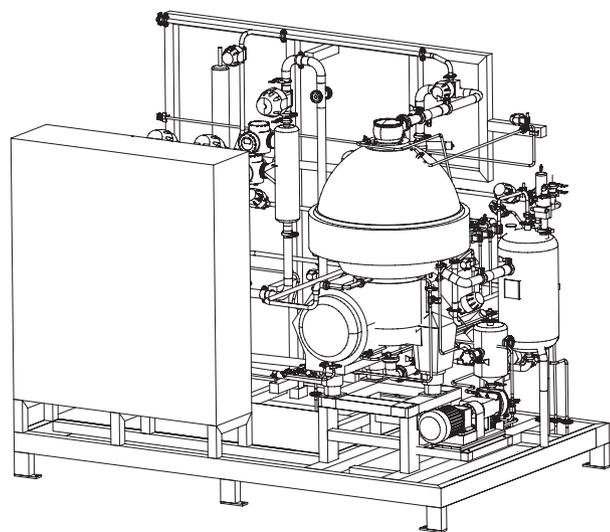
The skid-mounted modular design can be delivered for open operation, contained running, steam sterilizable aseptic operation or steam decontamination-only operation.

Working principles

The feed is introduced to the rotating centrifuge bowl from the bottom through a hollow spindle (1). It is accelerated in a distributor (2) before entering the disc stack (3), where the separation takes place. The separated liquid phase leaves through the liquid outlet (4) at the top of the bowl. The collected solids in the solid space are intermittently discharged from the periphery of the bowl. During normal production the operating water keeps the sliding bowl bottom (5) closed against the bowl hood. During discharge the sliding bowl bottom drops for a short time (less than a second) and the solids are ejected through the discharge ports (6). The high velocity of the ejected solids is reduced in the sludge ring. The bowl is mounted on a vertical spindle (7).



Typical bowl drawing for a hermetic, solids-ejecting centrifuge. Details illustrated do not necessarily correspond to the centrifuge described.



Typical layout drawing of a Culturefuge 400 module with SIP system.

Technical data

Throughput capacity	max. 20 m ³ /h ¹⁾
Max. G-force	max. 7,425
Max. bowl speed	max. 5,119 rpm
Installed motor power	22 kW (30 HP)
Sound pressure	73 dB(A) ²⁾

¹⁾ Actual capacity depends on feed material and separation demands.

Main dimensions**

Height	2,300 mm
Width	2,950 mm
Depth	1,550 mm

** Can vary according to specific demands.

Shipping data (approximate)***

Net weight	3,200 kg
Gross weight	3,500 kg
Volume	18 m ³

*** Complete system with bowl and motor.

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.