



FEQX 520S - Large capacity nozzle centrifuge

For yeast and distillery applications with solids recirculation system

Alfa Laval separator centrifuges for the yeast and distillery industries are available in many different sizes and configurations, each one designed and adapted for dealing with the widely varying separation tasks required. The FEQX 520S-31CG is the largest centrifuge with peripheral nozzles for these industries.

Applications

The FEQX 520S is specifically designed for separation of distiller's, and fodder yeast as well as other fermentation broths. Separation of particles with sizes down to 0.5 μm is possible.

Typical processing capacities

Conventional fermentation of molasses/sugar w. recycle	180 m ³ /h.
High conc. fermentation of molasses/sugar w. recycle	120 m ³ /h
Spent sulphite liquor fermentation	130 m ³ /h
Fodder yeast at 5% DM in the feed	90 m ³ /h

Standard design

Separation takes place in the bowl, which is placed on a vertical spindle. An electric motor mounted vertically drives the spindle near the bottom via a flat belt. Two motors are available: a standard motor for variable frequency drive or a control-torque motor. All metallic parts that come in contact with the process liquid are made of high-grade stainless steel. The 18 nozzles can be reached from the outside via a hatch in the frame hood, which enables technicians to replace them easily and rapidly without dismantling the frame. The nozzles are made of tungsten carbide, suitable for abrasive solids. The inlet and outlet device is equipped with flanges. The bowl casing has connections for flushing above and below the bowl.

Special features

The FEQX 520S is equipped with a solids recirculation system, which constitutes a unique means of controlling the separation process. Recirculation makes it possible to use a larger nozzle size and to meet fluctuations in the solids flow. Circulating oil ensures that the bearings are lubricated. An external pump maintains the necessary pressure.

Basic equipment

Centrifuge with motor, set of tools, speed and vibration sensors, oil pressure switch, temperature sensors for the main spindle bearing and the motor winding, vibration dampening feet, foundation plate and standard set of spares.



Fig. 1 FEQX 520S complete with motor

Options

Control-torque motors of four different power ratings are available. Frequency drive is also possible. The bowl is available in two versions, with or without erosion protection. Liquid-wetted gaskets are made of nitrile rubber or food grade EPDM rubber. The centrifuge bowl is available with four different disc spacings. The connections are designed with either DIN or ANSI flanges.

Optional extras

The FEQX 520S can be fitted with a nozzle monitor. This consists of a microphone, which is hit by the jet from each individual nozzle. The signal is then transmitted to a box, which displays the result. The monitor shows whether the nozzles are clogged or worn out, thus enabling safe operation and high availability. A cover interlocking kit makes it impossible to start the centrifuge unless it is properly assembled. The FEQX 520S can be delivered as a complete system, including valve modules for process liquid and wash water, starter and control system. A conversion kit for rebuilding into FESX 520S is available.

Operating principles

The feed containing the liquid and the solids is introduced to the rotating centrifuge bowl (fig. 2) from the top via a stationary inlet pipe (1), and is accelerated in a distributor (2) before entering the disc stack (3). Separation takes place between the discs. The light phase moves through the disc stack towards the centre of the bowl, and is pumped out under pressure by means of a built-in paring disc (4). The yeast is collected at the bowl periphery and continuously discharged through the nozzles (5). Filler pieces (6) prevent build-up of the solids between the nozzles. The nozzle flow is collected in a cover around the bowl and further discharged into a pump. Part of the effluent from the pump can then be recirculated back to the nozzles through a pipe (7), a separate recirculation chamber (8), and recirculation tubes (9).

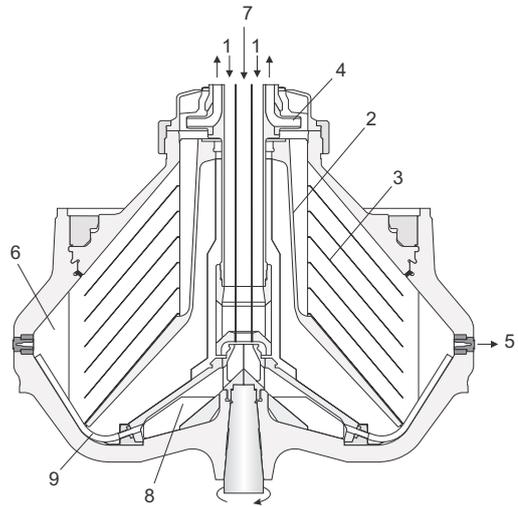


Fig. 2 Typical bowl drawing for a nozzle centrifuge with recirculation of solids. Details illustrated do not necessarily correspond to the centrifuge described.

Utilities consumption

Electric power	max. 170 kW ¹⁾
Safety water	23-55 m ³ /h ²⁾
Flushing water	60/460 l/h ³⁾

¹⁾ At max process flow rate 120 m³/h, nozzle flow rate 40 m³/h, and recirculation rate 20 m³/h. Power consumption increases with the flow rate

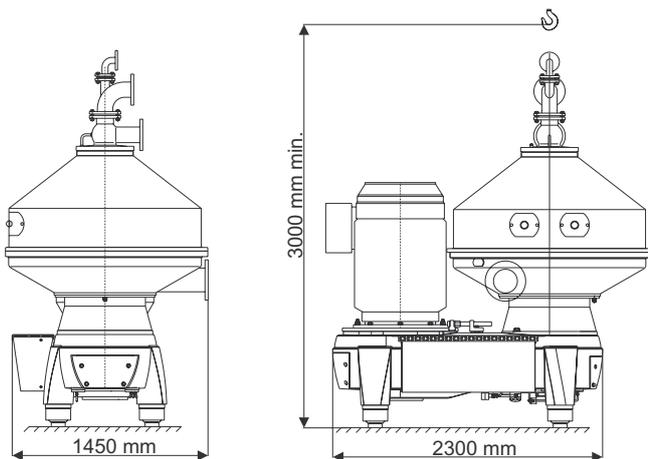
²⁾ The bowl should be filled at start, stop and normal operation. In case process liquid is not available, safety water should be used. The above figures refer to nozzle sizes from 1.6 to 2.5 mm and max. bowl speed. The safety water feed to separator should always exceed the nozzle flow by 10%.

³⁾ Above/below bowl. Intermittent flow.

Shipping data (approximate)

Centrifuge incl. bowl and motor	4570 kg
Bowl weight	1050 kg
Gross weight	4900 kg
Volume	8 m ³

Dimensions



Technical specification

Throughput capacity	max. 250 m ³ /h ¹⁾
Light liquid flow	max. 200 m ³ /h
Nozzle flow	max. 100 m ³ /h
Bowl volume	120 l
Bowl speed	3750 rpm
Motor speed, synchr. 50/60	1500/1800 rpm
Motor power installed	135/160/200 kW
Centrifugal force inside bowl	max. 6480 g
Starting time	5-8 mins
Stopping time without brake	80 mins
Feed temperature range	0 - 100 °C
Feed inlet pressure at inlet flange	100 kPa ²⁾
Outlet pressure at outlet flange	max. 500 kPa ³⁾
Sound pressure	89 dB(A) ⁴⁾

¹⁾ Actual capacity depends on particle sizes, densities, viscosity and require degree of separation.

²⁾ At max. process flow rate 180 m³/h. Inlet pressure increases with the flow rate.

³⁾ At outlet flow rate 80 m³/h. Max. pressure decreases with flow rate.

⁴⁾ According to ISO 3744.

Material data

Bowl body	s.s. 1.4501 UNS S32760
Bowl hood, lock ring and distributor	s.s. 1.4462 UNS S31803
Solids cover and frame hood	s.s. 1.4401 UNS 316 00
In and outlet parts	s.s. 1.4401 UNS 316 00
Frame bottom part	Cast grey iron
Gaskets and O-rings	Nitrile rubber or food grade EPDM ¹⁾

¹⁾ In accordance with FDA 21 CFR 177.260

How to contact Alfa Laval

Contact details for all countries are continually updated on our website. Please visit www.alfalaval.com to access the information direct.