Alfa Laval Merco 32

Disc stack separator with nozzles, for starch applications

Introduction

Alfa Laval is the leading supplier of process equipment and process lines to starch industry worldwide. Our strong position on the market and more than 80 years of experience allow us to bring our unique know-how to all aspects of starch operations. Merco® separators provide an ideal combination of high flow capacity and low energy consumption. Merco®'s well-known sturdy design ensures long service life, reliable uptime and low maintenance costs.

Application

Merco® separators are dedicated starch centrifuges designed for applications in the corn wet milling process. They are used for classification of solids according to size, dewatering and washing of solids. Merco® separators are intended for clarification of liquids, containing relatively high concentrations of solids.

Typical separation applications are:

- Primary separation (PS)
- Gluten thickening (GT)
- Millstream thickening (MST)
- Middling clarifier (CL)

Benefits

- High separation efficiency
- Robust and reliable design
- Integrated solids recirculation
- Low power consumption

Design

The Merco® is a nozzle centrifuge designed for continuous discharge of solids. The centrifuge is equipped with a motor, a self-cleaning strainer for the feed, speed and vibration sensors, oil temperature sensors for the spindle bearings and the motor windings, a hydraulic power unit for the lifting hoist, a set of special tools and a standard set of spares.

The unique recirculation system provides highly efficient separation, as solids can be recirculated to the nozzles at the same time as wash water is being recirculated. Working with the underflow draw-off valve, the return flow system provides a unique means of controlling the separation process. It allows the operator to control and optimize the separation process. The nozzle design with a large diameter, provides a buffer to even out variations in feed concentration and to prevent blockages. The machine thus becomes more versatile, and can be easily adapted to process changes. The machine also features a built-in hydraulic hoist that eliminates the need for an external lifting device thus reducing the time required to service the centrifuge.

The centrifuge is equipped with sensors for monitoring bowl speed, vibration, temperature and oil pressure. Twenty peripheral nozzles are directed at a small tangential angle in order to recover energy from the material being discharged.

Scope of supply

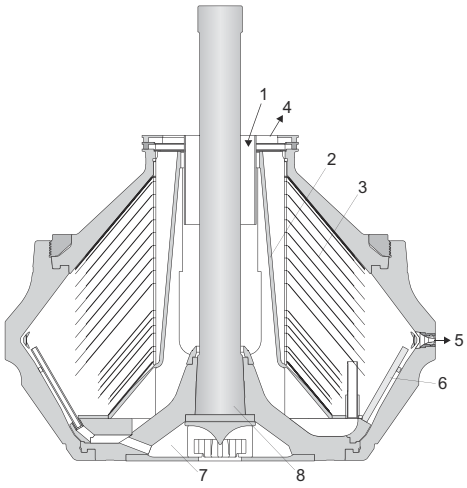
- Disc stack centrifuge, including motor. Bowl variants:
  - GT/MST/CL
  - PS
- Motor
  - CT (Control torque)
  - VFD (Variable frequency drive)
- Stand and hoist
- Sensors:
  - Speed
  - Vibration
  - Bearing temperatures
  - Motor winding temperature
- Start up service kit
- Set of tools
- Documentation

Options

- Extra nozzles
- Extra service kits
- US standard tool kit
- System ancillaries:
  - Starter
  - Control cabinet
- Additional system components
- Performance agreement

Working principle

The feed, consisting of both liquid and solids, is led into the rotating centrifuge bowl from the top via a stationary inlet (1). It is then accelerated in a distributor (2), before entering the disc stack (3). The actual separation process takes place between the discs, with the liquid phase moving through the disc stack towards the centre of the bowl. When it has reached the centre, it is then discharged over a power ring (4). The solids, which are heavier, collect at the periphery of the bowl, and are then continuously discharged through the nozzles (5). Part of the concentrated solids discharged through these nozzles can be recirculated into the bowl periphery through the recirculation tubes (6), via the recirculation chamber (7). The wash water, used to free solubles and other impurities from the solids, can also be recirculated to the periphery of the bowl the same way. The bowl is mounted on a vertical spindle (8) that is driven via belts by a vertically mounted motor.



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. Power recovery ring
5. Solids outlet
6. Recirculation tubes
7. Recirculation chamber
8. Vertical spindle

Technical data

Performance data	
Hydraulic capacity[1]	210 m^3/h (924 US gpm)
Maximum feed/sediment density	1100/1250 kg/m^3
Sound pressure[2]	85 dB(A)
Maximum nozzle flow[3]	82 m^3/h
Feed temperature	0-65°C

[1] Actual throughput capacity depends on particle sizes, densities, viscosity and required degree of separation

[2] According to ISO 3744 or 3746.

[3] Wet solids. Actual flow depends on the power consumption in conjunction with the actual feed flow.

Utility consumption	
Power consumption at idling (2450 / 3300 rpm)	14/20 kW (19/27 HP)
Power consumption at 130 m3/h, 160 kW, 3300 rpm	114 kW (155 HP)
Motor power	132/160 kW (179/217 HP)
Maximum washing/flushing liquid	45 m^3/h

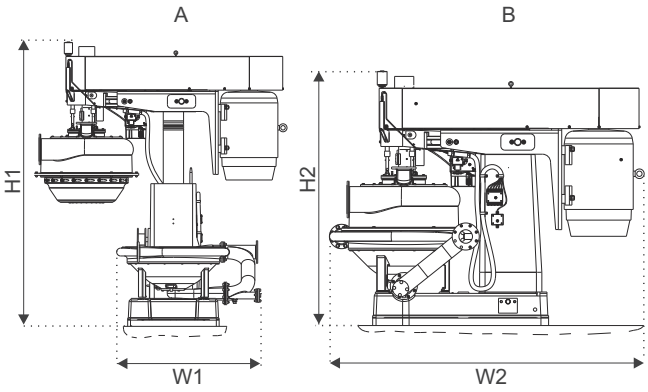
Connections	
Inlet process liquid, incl safety liquid and flushing	4" ANSI Flange Class 150
Inlet washing liquid (PS)	2" ANSI Flange Class 150
Outlet light phase	8" ANSI Flange Class 150
Outlet solids phase recirculation (A)	5" ANSI Flange Class 150
Outlet solids phase (B)	4" ANSI Flange Class 150

Material data	
Bowl body	Stainless steel 1,4462 UNS S31803
Housing assembly	Cast stainless steel ASTM A-743
Machine base, column and radial arm	Cast iron
Gaskets & O-rings	Nitrile rubber

Weight (approximate)	
Separator bowl, GT/CL/MST	1042 kg (2297 lbs)
Separator bowl, PS	980 kg (2160 lbs)
Motor weight (160 kW)	Max. 1200 kg (2645 lbs)
Gross lifting weight[1]	3500 kg (7716 lbs)

[1] Without separator bowl, motor.

Dimensional drawing



Dimensions	
H1	Min. 3129 mm (10 ft 3 3/16 inch)
H2	2320 mm (7 ft 7 5/16 inch)
W1	1586 mm (5 ft 2 7/16 inch)
W2	2955 mm (9 ft 8 5/16 inch)

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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