Alfa Laval Hybrid Powder Mixer S15

Powder mixers

Introduction

The Alfa Laval Hybrid Powder Mixer S15 is a stationary dual-stage inline powder dissolution unit that quickly and efficiently disperses powders, mixing them with liquids into a homogeneous blend. Using a single-motor pump, it then transfers the resulting solution at outlet pressures of up to 5 bar. Versatile, cost effective and easy to use, this mixer efficiently produces homogeneous products at high dry matter concentrations and high yields.

Applications

The Hybrid Powder Mixer S15 is an excellent choice for blending thickeners, stabilizers and emulsifiers into concentrations required in most hygienic applications in the dairy, beverage and food industries. It is also capable of producing recombined milk with more than 50% dry matter.

Benefits

- Fast and homogenous powder dissolving
- A combination of a stationary inline powder-liquid mixer and a pump
- High dynamic shear, gentle mixing
- Reduced installation, emissions, energy and maintenance costs
- Reduced total cost of ownership combining the functions of powder mixing and pumping into a single unit
- Reduced investment cost due to the reduction to basic functions

Standard design

The Alfa Laval Hybrid Powder Mixer S15 is comprised mainly of a two-stage pump with a rotor-stator as the first stage and as a second stage. It is also equipped with a funnel and an injector. The funnel is used to introduce powder through an injector system, which can be isolated using a hygienic C-ball valve. The injector pre-blends the powder and the liquid, while at the same time creating underpressure in the funnel outlet.

The S15 unit is reduced to basic functions, without table, frame and frequency converter and therefore has lower investment costs than the fully equipped Alfa Laval Hybrid Powder Mixer M15.

Working principle

The two-stage inline Alfa Laval Hybrid Powder Mixer S15 is typically integrated into a circulation loop connected to a batch tank.

After adding liquid ingredients to the tank, the Hybrid Powder Mixer circulates the liquid over the tank. To provide additional high-efficiency mixing for tanks with volumes larger than 1 - 2 m^3, Installing an Alfa Laval Rotary Jet Mixer is highly recommended.

When adding powder to the liquid, the powder is added through the funnel. The valve under the funnel is opened. The injector positioned under the valve creates an underpressure in the funnel outlet, drawing the powder into the rotor-stator and pre-blending the products. The rotor/stator (single rings) creates the main shear, dynamically and efficiently blending powder and liquid into a homogeneous mixture.

The pump impeller in the second stage creates the final shear and transfers the powder-liquid mixture to the tank under high pressure. A portion of the powder-liquid mixture is sent through the injector back to stage one. This way, the liquid flow in the injector creates the underpressure in the funnel outlet, which enables the dynamic suction of the powder into the liquid.

When the mixing is completed, the Hybrid Powder Mixer may be used as a discharge pump, or as a Cleaning-in-Place (CIP)

recirculation pump to clean the tank when used in combination with an Alfa Laval Rotary Jet Mixer.

TECHNICAL DATA

Version:	230 D / 400-415 Y @ 50 Hz

Materials	
Product wetted steel parts:	W. 1.4404 (316L) and Duplex steel
Other steel parts:	W. 1.4301 (304)
Product wetted seals:	EPDM, PTFE
Other O-rings:	EPDM
Finish:	Semi-Bright
Internal surface roughness:	Pipework acc. to DIN11850 Ra < 0.8 µm (Note: Impellers: Blasted/machined)
Shaft seal:	Single mechanical SiC/SiC, flushed version
Flush tank:	Approx. 1 ltr. incl. sight glass

Note! Flush through possible via easy connection.

Power	
Installed power:	15 kW

Frequency drive
The HPM S15 should always be operated by use of a frequency converter

Connections	
Liquid inlet connection:	DIN 11851 DN 50 male union
Liquid outlet connection:	DIN 11851 DN 40 male union

OPERATIONAL DATA

Recommended operation frequency:	60 Hz (specially for thickeners and stabilizers)

Temperature	
Temperature range:	-10 °C to +95 °C (max. at CIP)
Temperature, Media, Maximum:	70 °C

Pressure	
Recommended inlet pressure:	0.0 - 0.2 bar
Min. back pressure recommended:	1 barg

Dry ingredient capacity:	Dependent on powder properties (for example, 3000 kg/h capacity for skimmed milk powder)
Noise level (at 1 m):	< 90 dB(A)

Dimensions/weight	
HxWxL [mm]:	1115 X 580 X 1300
Weight:	Approx. 230 kg

Motor
Incl. SS motor shroud: Standard foot-flanged motor with a fixed ball bearing on drive side, according to IEC metric standard, 2 poles = 3000/3600 RPM at 50/60 Hz, enclosure IP55 (with drain hole with labyrinth plug), insulation class F

Other
Funnel strainer. Blind cover at powder inlet for use during CIP

Control of powder addition
Manually actuated special C-Ball valve for dry ingredient adding

Operation of the Alfa Laval Hybrid Powder Mixer S15

The two-stage inline Hybrid Powder Mixer is installed in a recirculation loop connected to a batch tank. After adding liquid ingredients to the tank, the Alfa Laval Hybrid Powder Mixer S15 is used to circulate the liquid over the tank. To provide high-efficiency mixing in tanks with volumes larger than 1 - 2 m^3 it is recommended to install an Alfa Laval Rotary Jet Mixer in the tank by connecting it to the end of the circulation pipe.

Before powder is added in to the funnel, we have to make sure that no air is in the circulation pipe and a minimum pressure of 1 bar is build up after the HPM. After powder is introduced in the funnel, the C-Ball valve under the funnel is opened. The valve is the only component that the operator must control during introduction of the powder. The injector positioned under the valve creates an under pressure in the funnel outlet, drawing the powder into the rotor-stator stage of the pump and blending the powder and liquid into a homogeneous mixture. The impeller in the second stage of the pump transfers the powder-liquid mixture back to the tank while part of the powder-liquid mixture is sent through the injector creating the under pressure in the funnel outlet, which enables the suction of the powder into the liquid.

When mixing is complete, the Hybrid Powder Mixer may be used as a discharge pump or, when used with the Alfa Laval Rotary Jet Mixer, as a CIP forward pump – depending on the size of the tank and Rotary Jet Mixer - to clean the tank interior.

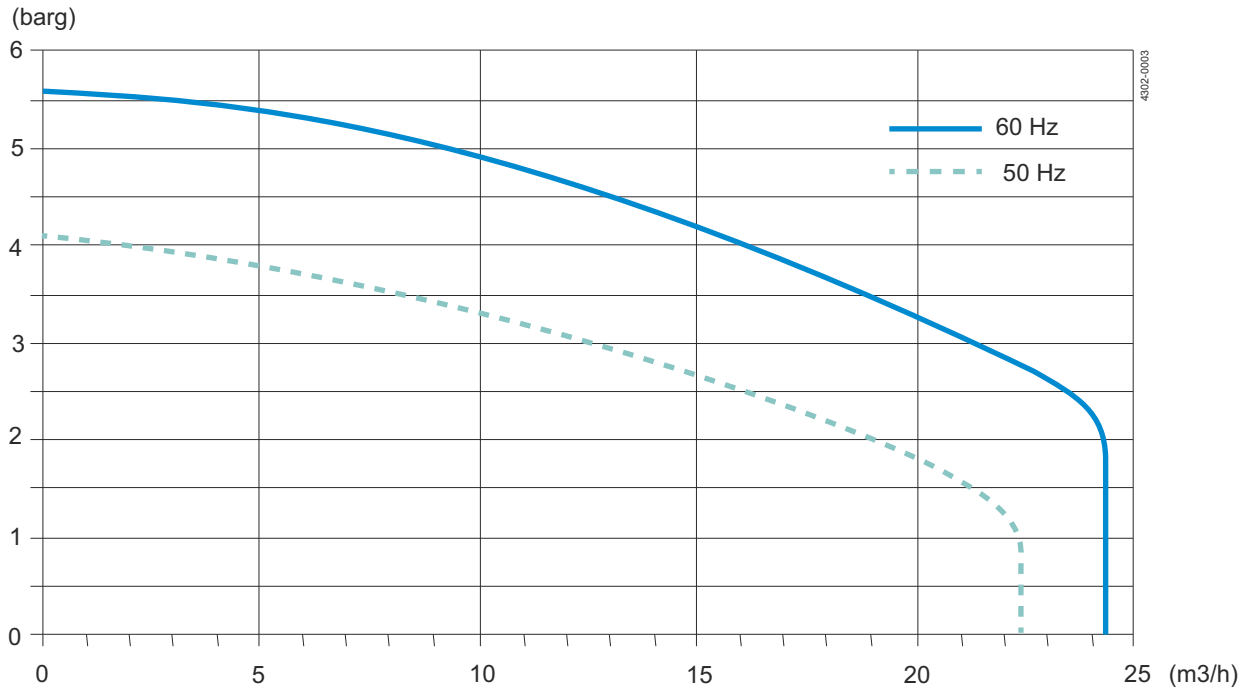
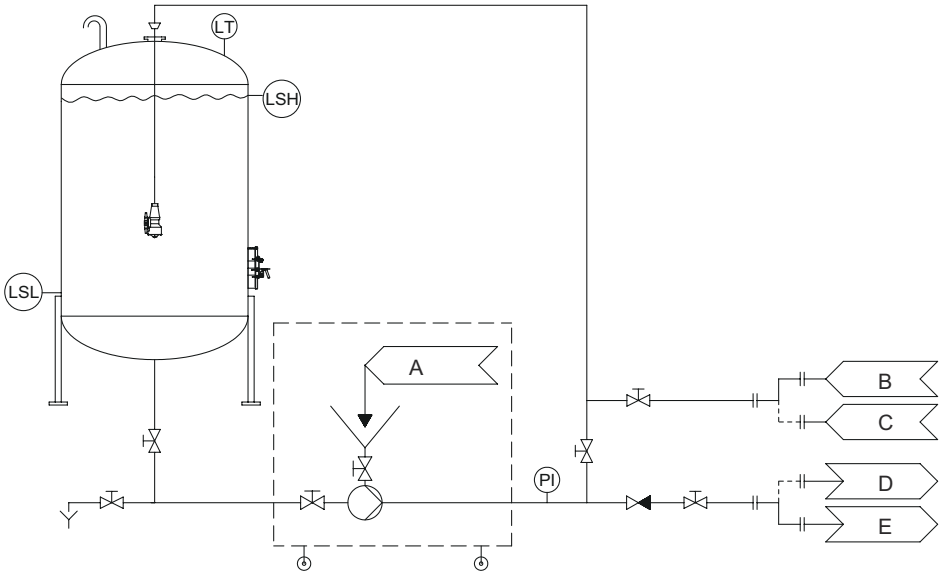


Figure 1. Pump Curve for the Alfa Laval Hybrid Powder Mixer S15

Pump curve with water



NOTE: This diagram is for illustration and guidance only

A = Powder/Crystals
B = Main media
C = CIP-F
D = CIP-R
E = Product

Figure 2. Example of setup with the Alfa Laval Hybrid Powder Mixer S15 and an Alfa Laval Rotary Jet Mixer

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