

Alfa Laval Hybrid Powder Mixer M15

Powder mixers

Introduction

The Alfa Laval Hybrid Powder Mixer M15 is a mobile 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 M15 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 mobile 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

Standard design

The Alfa Laval Hybrid Powder Mixer M15 is comprised mainly of a two-stage pump with a rotor-stator as the first stage and as the 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 unit is mounted on a stainless-steel frame. The table easily slides into position on the frame, making it easy to place bags of powder there during mixing. It also functions as a lid to cover the funnel when not in use. The liquid inlet is equipped with a sight glass and a butterfly valve.

Working principle

The two-stage inline Alfa Laval Hybrid Powder Mixer M15 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, tank with volumes larger than 1 - 2 m³, 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 into 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

Versions

ROW version: (380-480 VAC)

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 (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.

Motor

ROW version (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

Power:

Motor power: 15 kW

Frequency drive

Type:	Danfoss VLT® AutomationDrive FC 300 series
Power rating:	18.5 kW (Normal overload 110 % / 60 s)
Input voltage:	380-480 VAC
Mains option:	Local mains disconnect
Insulation class:	IP66
RFI filter:	Class A1/B
Display:	Graphical local control panel

Connection

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

Control of powder addition

Manually actuated special C-Ball valve for dry ingredient adding

Other

Funnel strainer.

Blind cover at powder inlet for use during CIP

OPERATIONAL DATA

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 (e.g. 3000 kg/h capacity for skimmed milk powder)
Noise level (at 1 m):	< 90 dB(A)

Dimensions/weight

HxWxL [mm]:	1130 X 826 X 1340
Weight:	Approx. 280 kg.
Max. table load:	300 kg.

Operation of the Alfa Laval Hybrid Powder Mixer

The two-stage in-line Hybrid Powder Mixer is installed in a recirculation loop connected to a batch tank. This user-friendly mobile unit has a built-in table to facilitate handling of heavy bags of powder. The table easily slides into position for convenient placement of the bags during mixing.

After adding liquid ingredients to the tank, the Alfa Laval Hybrid Powder Mixer is used to circulate the liquid over the tank. To provide high-efficiency mixing in tanks with volumes larger than 1 - 2 m³ it is recommended to install an Alfa Laval Rotary Jet Mixer in the tank by connecting it to the end of the circulation pipe.

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.

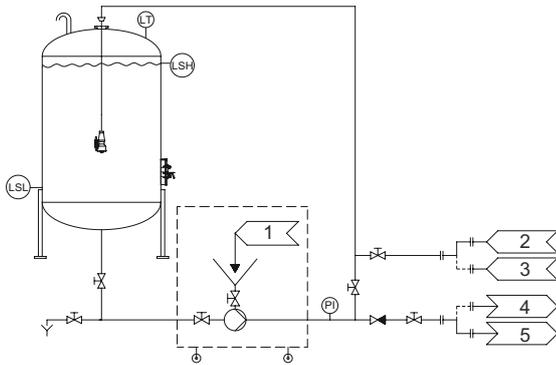


Figure 1. Example of setup with the Alfa Laval Hybrid Powder Mixer and an Alfa Laval Rotary Jet Mixer

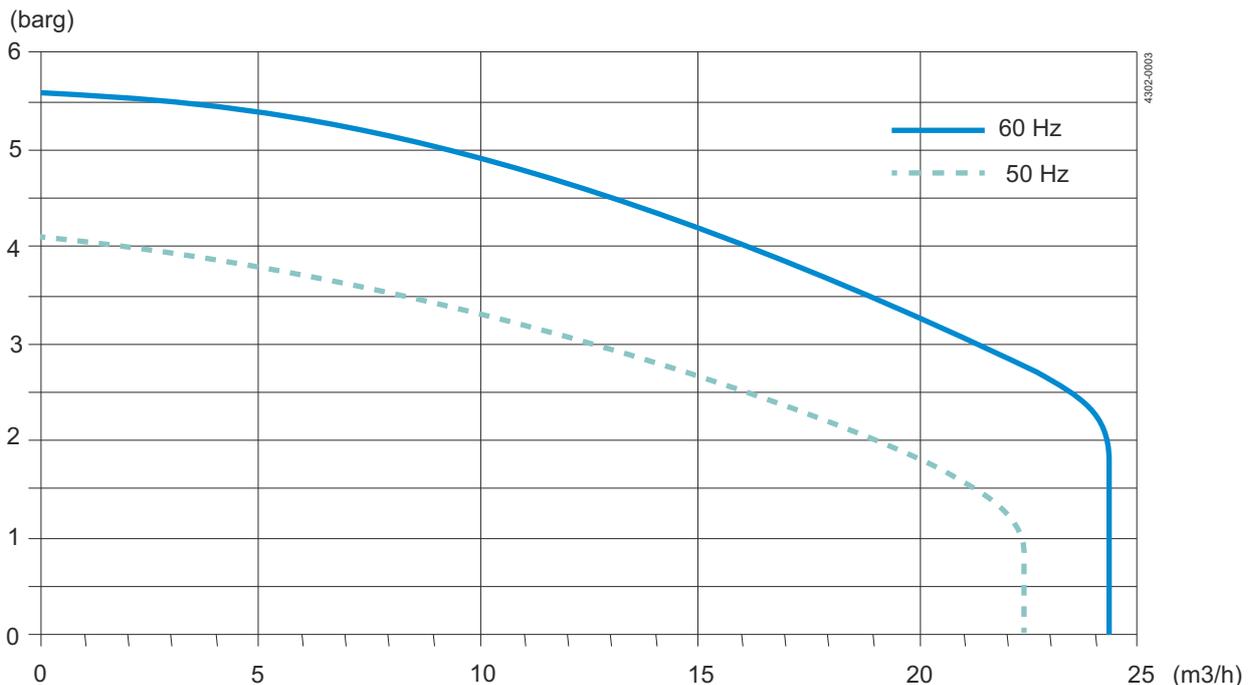


Figure 2. Pump Curve for the Alfa Laval Hybrid Powder Mixer

Pump curve with water

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