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ALFA
LAVAL

Close at hand

Mixing equipment for Hygienic Fluid Handling Equipment,
May 2024



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Tackle the challenges you face with innovative Alfa Laval solutions for hygienic applications. Regularly updated, this convenient online catalogue gives you fast access to our comprehensive product range.

Sustainability is at the core of Alfa Laval technologies. These hygienic components and equipment can help you reduce emissions, contamination risks, energy and water use, and total cost of ownership. They also increase uptime, safety and product integrity.

Wherever you are, you have fast access to the components, equipment and expertise you need through the Alfa Laval global network of more than 1500 partners, supported by our sales companies worldwide. Using our [eBusiness portal](#), our channel partners can locate the products you need, order equipment, or track shipments in real time.

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Pumps

Centrifugal pumps



LKH



LKH UltraPure



LKH Evap



LKH PF



LKH Multistage

Valves

Double seat valves



Aseptic Mixproof



Unique Mixproof



Unique Mixproof 3-body



Unique Mixproof CP-3



Unique Mixproof UltraPure



Unique Mixproof Large Particle



Unique Mixproof PMO Curd

Diaphragm valves



Unique DV-ST UltraPure



DV-ST Multiport

Ball valves



SBV Sanitary

Shutter valves



Kollek Valves

Regulating valves



Unique RV-ST



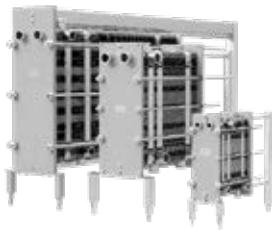
Unique RV-P



CPM-2

Heat transfer

Gasketed plate heat exchangers



Hygienic line



FrontLine



BaseLine



Industrial line

Tank equipment

Tank cleaning machines



SaniJet 25 UltraPure



SaniJet 20 UltraPure



TJ 40G



TJ 20G



TZ 74



TZ 89



GJ PF FT



GJ A6



GJ A2



GJ 9



Multijet 25

Agitators



ALS and ALS-SD



ALB



ALT



ALTB

Mixers



Hybrid Powder Mixer



Rotary Jet Mixer

Tubes and fittings

Hygienic tubes and fittings



Flanges, clamps and unions



Bends, tees and reducers



Tubes and tube support

UltraPure tubes and fittings



UltraPure tubes and fittings

Filters and strainers



Strainers

Rotary lobe pumps



LKH Prime

LKH Prime UltraPure

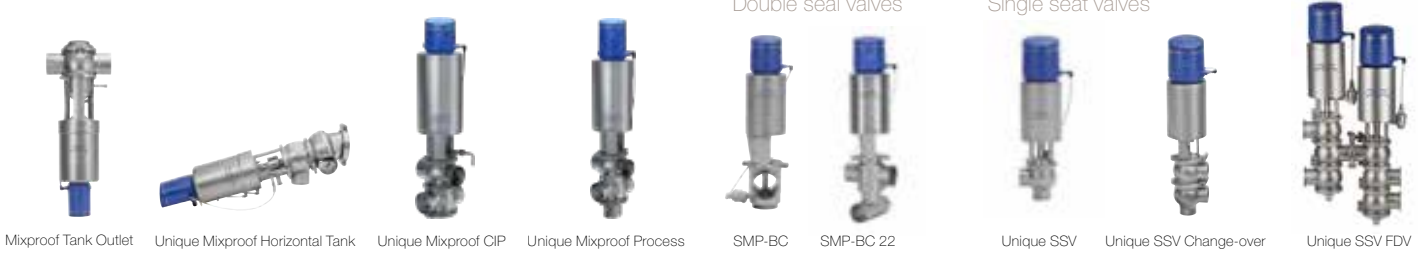
SolidC

OptiLobe

SRU

Double seal valves

Single seat valves



Mixproof Tank Outlet

Unique Mixproof Horizontal Tank

Unique Mixproof CIP

Unique Mixproof Process

SMP-BC

SMP-BC 22

Unique SSV

Unique SSV Change-over

Unique SSV FDV

Control/Check valves

Safety valves



LKC-2 Non-Return

LKC UltraPure

Unique Vacuum Breaker

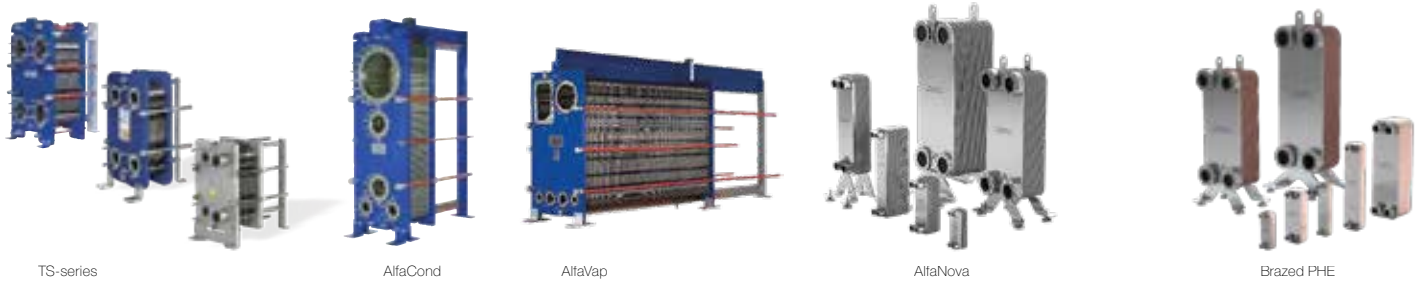
LKUV-2 Air-Relief

Safety Valve

SB Anti Vacuum House

Fusion-bonded plate heat exchangers

Brazed plate heat exchangers



TS-series

AlfaCond

AlfaVap

AlfaNova

Brazed PHE

Static spray balls



GJ 8

GJ BB

MultiJet 45

GJ 4

SaniMicro

SaniMidget

SaniMagnum

SaniMidget SB

SaniMagnum SB

SaniMega SB

LKRK Static Spray Ball

Tank covers



LeviMag

LeviMag UltraPure

LKDC-LP

Type R

LKD

Type CG

Type C

Membranes and filters

Auxiliary membrane equipment



Spiral membranes

Flat sheet membranes

Plate and frame module

LabStak™ modules

Pilot plants

Membrane filtration systems

Housing

Circumferential piston pumps



SX



SX UltraPure



DuraCirc



DuraCirc Aseptic

Twin screw pumps



Twin Screw

Gear pumps



M Gear

Butterfly valves



Unique SSV Aseptic



SSV Tangential



Unique SSV Tank Outlet



Unique SSV Manual



Unique SSSV Small Single Seat



LKB



LKB-F



LKB UltraPure

Sampling valves



SB Anti Vacuum Valve



SB Pressure Relief Valve



Unique Sampling Valve



SB Membrane Sample Valve



SB Micro Sample Port



SB Micro Sample Port Type M

Welded spiral heat exchangers



Spiral Heat Exchangers

Welded plate and block heat exchangers



Combabloc Free Flow

Scraped surface heat exchangers



Contherm

Tubular heat exchangers



Pharma-line S and P



Pharma-line Point of Use

Wall mounted cleaning nozzles



PlusClean/PlusClean UltraPure

Automation Sensing and control



ThinkTop V70



ThinkTop V50



ThinkTop V20



ThinkTop Basic Intrinsically Safe



IndiTop



Unique Control LKB

Tank accessories



Sight glasses



Tank feet

Condition monitoring



CM Connect



CM

Cleaning validation



Rotacheck

Service and spare parts



Service kits

Service tools



Service tools valves



Service tools mixing and blending



Service tools tank cleaning



Service tools pumps

Alfa Laval Stainless Steel and Rubber Materials

Technical Information

Stainless Steel

Our stainless steel material have the following demands to the contents of the most essential alloys:

Descriptions	Standard	Chrome Cr%	Nickel Ni%	Molybdenum Mo%	Carbon C%
AISI 304	ASTM A270	18.0-20.0	8.0-10.5	0.0	≤ 0.08
AISI 304L	ASTM A270	18.0-20.0	8.0-12.0	0.0	≤ 0.03
AISI 316L	ASTM A270	16.0-18.0	10.0-14.0	2.0-3.0	≤ 0.03
1.4301 (304)	EN 10088-1 (X 5CrNi18-10)	17.0-19.5	8.0-10.5	0.0	≤ 0.07
1.4307 (304L)	EN 10088-1 (X 2CrNi18-9)	17.5-19.5	8.0-10.0	0.0	≤ 0.03
1.4401 (316)	EN 10088-1 (X 5CrNiMo17-12-2)	16.5-18.5	10.0-13.0	2.0-2.5	≤ 0.07
1.4404 (316L)	EN 10088-1 (X 2CrNiMo17-12-2)	16.5-18.5	10.0-13.0	2.0-2.5	≤ 0.03
1.4435 (316L)	EN 10088-1 (X 2CrNiMo18-14-3)	17.0-19.0	12.5-15.0	2.5-3.0	≤ 0.03
1.4571 (316Ti)	EN 10088-1 (X6CrNiMoTi17-12-2)	16.5-18.5	10.5-13.5	2.0-2.5	≤ 0.08

Rubber Materials

In order to obtain the longest possible lifetime for rubber seals it is essential to choose the right quality for the actual duty. Consequently when choosing rubber quality, the characteristics of the different rubber types should be considered. All product wetted rubber material are in conformity of FDA.

EPDM Rubber (Ethylene Propylene)

EPDM rubber is widely used within the food industry as it is resistant to most products used in this sector. Another advantage is that it may be used to a recommend max. temperatures of 140°C (244°F). However, there is one essential limitation, EPDM is not resistant to organic and non-organic oils and fats.

Acrylonitrile Butadiene Rubber, NBR

NBR is the rubber type most frequently used for technical purposes. It is quite resistant to most hydrocarbons, e.g oil, grease and fat. It is sufficiently resistant to diluted lye and nitric acid and may be used to a recommended max. 95°C (203°F). As NBR is attacked by ozone it may not be exposed to ultraviolet rays and should thus consequently be stored so that this is avoided.

Silicone rubber, Q

The most significant quality of silicone rubber is that it can be applied from temperatures below -50°C (-58°F) to approx. + 180°C (356°F) and still keep its elasticity. The chemical resistance is satisfactory to most products. However, undiluted lye and acids as well as hot water and steam may destroy silicone rubber. The resistance to ozone is good.

Fluorine rubber, FPM

FPM is often used when other rubber types are unsuited, especially at high temperatures up to approx. 180°C (356°F). The chemical resistance is good to most products, however hot water, steam, lye, acid and alcohol should be avoided. The resistance to ozone is good.

Hydrogenated acrylonitrileButadiene Rubber, HNBR

Mechanically strong and normally resistant to ozone and strong oxidizers, animal and vegetable fats, nonpolar solvents, oils and lubricants, water and aqueous solutions. The recommend max. temperature is 130°C (266°F).

Perfluoroalkoxy polymer, PFA

PFA is very similar to PTFE, but opposite to those PFA is thermo plastic and has minimal porosity. PFA has a very high mechanical strength which makes it a perfect choice when dealing with abrasive products. The PFA seal offers longer service intervals. The recommended max. temperature for the PFA seal is 90°C (194°F).

Product and chemical resistance of flexible rubber materials

The information below is intended as an aid in selecting the best rubber quality for an actual application. It is not possible to state any general lifetime of rubber seals as many factors influence it: chemical attack, temperature, mechanical wear etc. Extreme temperatures, even within the generally accepted limits, may worsen other kinds of attack and thus reduce the lifetime.

Ratings

1 = Unsuitable.

2 = Limited suitability.

3 = Normal suitability.

4 = High suitability.

- = Not recommended for other reasons.

The table contains data which have been compiled from the results of our own tests and the recommendations of our raw material suppliers. The data should be considered as recommendations only and will be brought up-to-date from time to time. They are based on constant contact with the specified product.

In case of doubt or lack of information it would be advisable to consult us directly, which will enable us to investigate specific applications.

Product or process	NBR ¹⁾	HNBR ²⁾	EPDM ³⁾	Q ⁴⁾	FPM ⁵⁾	PTFE ⁶⁾
Dairy products (milk, cream)	3	3-4	3-4	3-4	-	3-4
Dairy products (sour milk products)	3	3-4	3-4	3-4	-	3-4
Brewery products (beer, hops etc.)	3	3-4	3-4	1-2	2-3	3-4
Wine and yeast	3	3-4	4	4	2-3	3-4
Animal and vegetable fats: 100°C	3	4	1-2	3	4	3-4
Water and water solutions < 70°C	3	4	4	3	2-4	3-4
Hot water and steam < 130°C	1	4	4	2	-	3-4
Concentrated fruit juices and etheral oils < 100°C	1	-	1	1	3	3-4
Non-oxydising acids < 80°C	1-2	2	3	1-2	2	3-4
Oxydising acids < 80°C	-	2	3	1	2	3-4
Weak concentrate of lye < 100°C	2	3-4	4	2	2	3-4
Strong concentrate of lye < 100°C	1	2-3	3	1	1	3-4
Mineral oils < 110°C	3	4	-	-	4	3-4
Aliphatic carburetted hydrogen (hexane)	3	3	1	1	4	3-4
Aromatic carburetted hydrogen (benzole)	1	2	1	1	3	3-4
Alcohols	1-3	2-3	2-3	3-4	3-4	3-4
Ester and ketones	1-2	1-2	1-2	1-2	3-4	3-4
Ether	1	2	1	1-3	3-4	3-4
Methylene chloride	1	2	1	2-3	3-4	3-4
Ozone and atmospheric conditions	1-2	3	4	4	3-4	3-4

International designation of flexible rubber materials according to ISO R 1629.

ISO = International standard.

Notes

	Designation of flexible rubber materials	Abbreviation symbol
1)	Nitrile rubber	N
2)	Hydrogenated acrylonitrile rubber	H
3)	Ethylene propylene rubber	E
4)	Silicone rubber	Q
5)	Fluorinated rubber	F
6)	Polytetraflour ethylene	

Compliance and certification

We can provide documented and certified compliance with a broad spectrum of relevant international and local hygiene standards, worldwide. This helps you significantly reduce the engineering costs of setting up and operating standard-compliant processing plants around the world.

Please find below some examples of regulations, standards, and guidelines applicable to our products used in hygienic applications.

More information can be found in Instruction Manuals on alfalaval.com page.

For special requests please contact your local Alfa Laval organization.



Authorized to carry the 3A symbol

The mission of 3-A SSI is to enhance product safety for consumers of food, beverages, and pharmaceutical products through the development and use of 3-A Sanitary Standards and 3-A Accepted Practices. The 3-A symbol is a registered mark used to identify equipment that meets 3-A Sanitary Standards for design and fabrication.



ATEX-directive is the popular name for the European Directive 2014/34/EU setting the rules for equipment and protective systems intended for use in potentially explosive atmospheres.

Compliance to the Regulation (EC) No. 1935/2004.



The framework regulation (EC) No. 1935/2004 regulates food contact materials and articles within EU. It includes several requirements for materials and articles intended to come into contact with food to ensure material safety. The glass and fork symbol may be used to indicate that the relevant requirements stated in (EC) No. 1935/2004 are met.



CE marking is a mandatory conformity mark for products placed on the market in the European Economic Area (EEA). With the CE marking on a product the manufacturer ensures that the product conforms with the essential requirements of the applicable EC directives. The letters "CE" stand for "Conformité Européenne" ("European Conformity").



UKCA marking is a mandatory conformity mark for products placed on the market in Great Britain (England, Scotland, and Wales). With the UKCA marking the manufacturer ensures that the product conforms with the relevant requirements of the applicable legislations.



Within United States, requirements for food contact materials and articles are specified by the Food and Drug Administration (FDA) and are regulated under the Code of Federal Regulations, Title 21 "Food and drugs", Parts 170-199 "Food for human consumption".

**USP Class VI /
ISO 10993**

The United States Pharmacopeia (USP) standards, chapter 87 and 88, and International Organization for Standardization (ISO) standard 10993, sections 5, 6, 10 and 11, specifies requirements to ensure biocompatibility of product contact parts intended to be used in pharma applications.



The American Society of Mechanical Engineers Bioprocessing Equipment (ASME BPE) is the Bioprocess Equipment group of the ASME that provides engineers and quality control professionals a measurable way to specify and purchase equipment for the Biotechnology, Pharmaceutical and Personal Care Products industries.

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Agitators

Product leaflet	
ALS	14

Alfa Laval ALS

Agitators

Introduction

The Alfa Laval ALS is a side-mounted agitator for hygienic mixing and blending in atmospheric and pressurized tanks. Its versatile, modular and hygienic design enables customization to meet the requirements of virtually any duty and ensures cost-effective, energy-efficient operation. Exceptional cleanability through Cleaning-in-Place makes the ALS agitator ideal for use in sterile and aseptic applications. An ATEX-certified version is available for use in potentially explosive environments.

Applications

The ALS side-mounted agitator is designed for a wide range of tank mixing and blending duties across the dairy, food, beverage, brewery, personal care, biotechnology and pharmaceutical industries.

Duties	Typical examples
Keeping media homogeneous	Milk storage tanks, cream tanks, mixed products tanks, UHT, and products storage tanks
Mixing and solutions	Fluid and fluid mixing, drinking yoghurt and fruit mix tanks, flavoured milk mix tanks, and syrup mix tanks
Dispersing	Powder protein and oil mix tanks, micro salt and milk product mix tanks
Suspension	Fluids with particles, juice tanks, crystallizing tanks, etc
Heat transmission	Circulation of media in tank with dimple jacket (cooling or heating)

Benefits

- Versatile, modular, hygienic design
- Can be configured for minimum energy consumption
- Gentle product treatment
- More uptime and higher yields due to low maintenance requirements
- Meets EU and US standards and regulations such as EHEDG, USDA, FDA, 3-A Sanitary Standards

Standard design

The Alfa Laval ALS side-mounted agitator consists of a drive unit with bearing frame, shaft with special shaft seal, and specially designed energy-saving impeller (EnSaFoil) with two or three blades. The complete Alfa Laval agitator range includes top-, bottom- and side-mounting models.



Working principle

The Alfa Laval ALS side-mounted agitator has an electrical drive motor that transmits the energy required for mixing and blending, either directly or via a gearbox, to the agitator shaft. The shaft rotates, turning the EnSaFoil impeller. The impeller movement creates a high flow with low shear due to the highly effective axial pumping effect on the liquid in the tank. This results in effective mixing and blending of the entire contents of the tank.

Options

- Welding flange
- Stainless steel cover for motor/gear motor
- Spare part kit
- ATEX version

Certification

Alfa Laval Q-doc and ATEX certifications available, depending on the individual configuration.



TECHNICAL DATA

Motor

Motor size and speed as required for duty.

As standard with IEC motor IP55, other types on request. As standard painted RAL5010.

Voltage and frequency

As standard for 3x230/460 V, 60 Hz. All motor voltages and frequencies are available.

Gears

Different gear types available according to configuration.

As standard filled with normal synthetic or mineral oil, optional: Food approved oil. As standard painted RAL5010.

Product wetted surface finish

Industrial, shot peened:	Ra < 126 µin
Hygienic, polished:	Ra < 31 µin
Hygienic (UltraPure), polished or electro polished:	Ra < 20 µin

PHYSICAL DATA

Materials

Steel parts:	AISI 316L (standard). Other materials on request
Seal rubber parts (O-rings or bellows):	FPM/FEP (only for stationary O-rings) EPDM or FPM Other materials on request
Mechanical seal parts:	Carbon Carbon (FDA) Silicon carbide

Configurable design

Type ALS agitator design is fully configurable divided in the following elements:

- Drives (drive + shaft support + shaft diameter)
- Seal arrangements (oil trap + shaft seal type)
- Shaft (length)
- Energy Saving Foils (propeller type + surface finish)
- Options

Each element has a broad range of different characteristics which makes it possible to size the agitator for all applications and requirements.

Advantageous and profitable design

Each configuration offers a number of advantages, which are shown in the examples below:

Operation features	Due to
Low energy consumption	the wide range of high efficiency propellers and drive units makes it possible to design for low operational costs
Gentle product treatment	the wide range of high efficiency propellers makes it possible to design for low shear operation

Hygienic features	Due to
Easy external cleaning	stainless steel bearing frame design with O-ring seal (for wash down)
Connections inside the tank (risk zones) can be avoided	bearing frame drives with drive shaft and special internal shaft connection without having a flange coupling inside the tank
Good drip off properties	no plane surfaces or grooves on internal parts
Easy cleaning	no interior shadow sides between the blades and smooth surfaces

Maintenance features

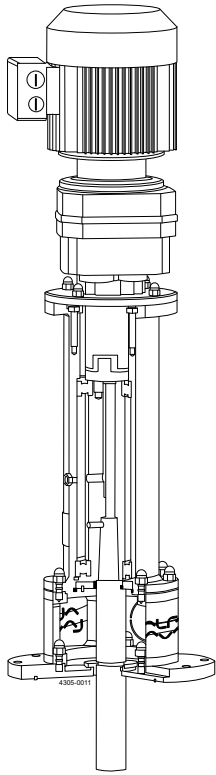
All service (replacement of wear parts such as shaft seals, bearings etc.) can be done from outside of the tank

Easy dismantling

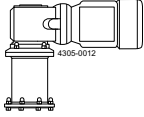

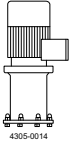
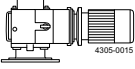
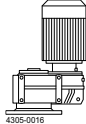
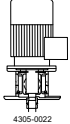
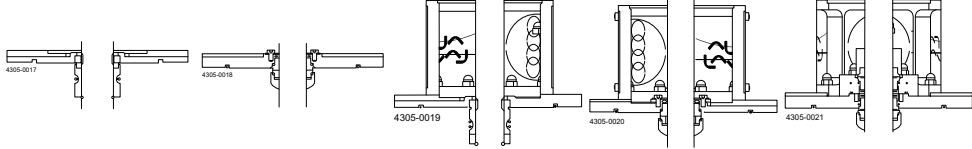

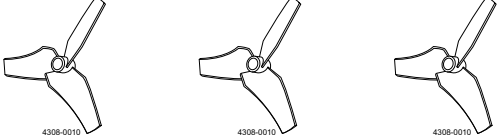
Due to

bearing frame drives with detachable shaft which can be dismantled from outside of the tank

use of spider type coupling and stainless steel parts (no corrosion)



Side mounted agitators

Type ALS	Configuration					
Drives Bearing frame size = xx Shaft diameter = yy (not used if xx = yy)						
Description (power, speed and shaft diameter depending on application)	-ME-GR-Bxx(/yy) Stainless steel bearing frame and right angle gearbox	-ME-GC-Bxx(/yy) Stainless steel bearing frame and coaxial gearbox	-ME-Bxx(/yy) Stainless steel bearing frame and direct motor drive	-ME-GR-yy Right angle gearbox, shaft mounted in hollow shaft of gearbox	-ME-GP-yy Parallel shaft gearbox, shaft mounted in hollow shaft of gearbox	-ME-yyLF-S1- Direct motor drive, shaft connected directly to motor, lantern (spacer), seal flange with O-ring seal against tank flange, drain and shaft seal: single mechanical bellow seal
Seal arrangements						
Description (lower flange and seal material depending on application)	F-S1- Seal flange with O-ring seal against tank flange, drain, oil trap (only geared versions) and shaft seal: single mechanical bellow seal	F-S2- Seal flange with O-ring seal against tank flange, drain, oil trap (only geared versions) and shaft seal: single mechanical non-bellow seal	LF-S1- Lantern (spacer), seal flange with O-ring seal against tank flange, drain, oil trap (only geared versions) and shaft seal: single mechanical bellow seal	LF-S2- Lantern (spacer), seal flange with O-ring seal against tank flange, drain, oil trap (only geared versions) and shaft seal: single mechanical non-bellow seal	LF-D- Lantern (spacer), seal flange with O-ring seal against tank flange, drain, oil trap and shaft seal: double mechanical seal for high pressure applications and aseptic use	
Shaft						
Length = llll Description (material depending on application)	-Sllll- SS shaft, length according to application					
Energy Saving Foils Diameter = vv (125 mm to 1900 mm)						
Description (material depending on application)	-PvvvD3P 3 - bladed propeller, finish: polished Standard: Ra < 0.8 µm	-PvvvD3PE 3 - bladed propeller, finish: polished and electro polished Standard: Ra < 0.8 µm	-PvvvD3G 3 - bladed propeller, finish: shot peened			

Dimensions (inch)

Propeller standard diameter range: Ø11.8 inch to Ø29.5 inch. Specific dimensions on the drive unit and propeller(s) will depend on the actual configuration selected.

Ordering

The following information is required to ensure correct sizing and configuration for ordering:

- Tank geometry
- Product properties
- Task of agitator
- Enquiry forms are available

Tank mixers

Product leaflet

LeviMag	20
LeviMag UltraPure	28
RJ Mixer IM-10	36
RJ Mixer IM-15	40
RJ Mixer IM-20	45
RJ Mixer IM-25	50

Ordering leaflet

RJ Mixer IM-10	54
RJ Mixer IM-15	55
RJ Mixer IM-20	56
RJ Mixer IM-25	57

Alfa Laval LeviMag®

Mixers

Introduction

The Alfa Laval LeviMag® is an aseptic magnetic mixer that uses a patented levitating impeller and advanced design to mix down to the last drop and maximize product yield.

Compact, energy-efficient and easy to maintain, it provides dry-running capabilities and efficient mixing at low speeds, which ensures gentle product treatment, as well as at high speeds for high-intensity mixing. This provides greater process flexibility to handle a wide range of fluid types and mixing duties.

Its open design and low-speed rotation during cleaning contribute to effective residue removal and minimize contamination risks from wear particles. All this contributes to fast return on investment and maximum product yield in tanks ranging in size between 8 US gallons and US 10,567 gallons.

It is supplied with Alfa Laval Q-doc, a comprehensive documentation package that provides full transparency of the entire supply chain.

Applications

Alfa Laval LeviMag magnetic mixer offers effective mixing for multiple processes in the dairy, food, beverage, biotechnology, pharmaceutical and other industries that have demanding requirements for sterile or aseptic storage or processing.

Benefits

- Maximum process efficiency, minimal product loss
- Optimal flow with higher efficiency and less energy consumption
- Mixing down to the last drop for maximum yield due to low agitation and dry-running capability
- Optimized Cleaning-in-Place (CIP) due to full drainability
- Minimized downtime due to ease of maintenance

Standard design

The Alfa Laval LeviMag consists of a detachable drive unit, levitating impeller unit with radial blades, seals, ceramic bearings and magnetic coupling, weld plate and connections. It is available in five sizes, with mixing speeds ranging from 10 rpm up to 800 rpm.



Working principle

An impeller with radial blades installed inside the tank rotates due to the torque from the magnetic coupling. The rotation of the impeller mixes the fluid inside the tank. The unique design of the Alfa Laval magnetic coupling ensures the levitation of the impeller at all times. This enables dry-running and complete drainability of process fluids from the tank possible. This ensures highly efficient mixing down to the last drop and, subsequently, maximum yield. It also enables the free flow of CIP liquid and steam around all parts of the mixer, thereby ensuring thorough cleaning. Impeller levitation also eliminates axial wear.

Available versions

- Impeller with male/female bearing
- Impeller complete, with drive unit
- ATEX version (Cat. II -/2G Ex h IIC T4 -/Gb)

Drive unit versions

- Painted (fan ventilated)
- Clean room finish, Sealed Surface Conversion Treatment (smooth, closed, none fan ventilated)
- Extended console for insulated tanks

Motor efficiency

- IE4 (standard)
- Premium (CUS for US)

Safety class

- No requirements (IE4, Premium)
- Eex-de IIC T4 (on ATEX version)
- Class I div.I, group D T4

Accessories:

- Weld plates
- Inspection & Service tools
- Installation tools

TECHNICAL DATA

Internals

Product Wetted Surface finish:	Ra <32 µin Mech. Polished
Working pressure:	-14.5 to 101.5 PSI
Impeller diameters:	3.94, 5.91, 7.87, 9.84 & 11.81 inch

Weld Plate

Size WP50:	For impeller size 3.94 & 5.91 inch
Size WP81:	For impeller size 7.87, 9.84 & 11.81 inch

Drive Unit:

Motor, IE4 (standard)

Integrated Permanent Magnet Synchron Motor (IPMSM) which has to be operated with a frequency inverter for IE4 motors

The frequency converter (not Alfa Laval supply) must be ordered for the voltage available at the place of operation

Efficiency class:	IE4
Enclosure / Motor protection:	IP66
Configuration:	Blue
Nominal Power:	1.48 hp
Nominal Voltage and frequency (from frequency converter):	Output 217 VAC, connected in delta, 70 Hz, 2100 RPM
Nominal Current:	3.59 A
Configuration:	Clean room, WP50
Nominal Power:	1.01 hp
Nominal Voltage and frequency (from frequency converter):	Output 199 VAC, connected in delta, 70 Hz, 2100 RPM
Nominal Current:	2.53 A
Configuration:	Clean room, WP81
Nominal Power:	1.48 hp
Nominal Voltage and frequency (from frequency converter):	Output 195 VAC, connected in delta, 70 Hz, 2100 RPM
Nominal Current:	3.61 A
Country Code:	All (one type covers all)

Motor, option Premium/CUS

Efficiency class:	Premium
Enclosure / Motor Protection:	IP66
Configuration:	Blue, WP50
Nominal Power:	0.50 hp
Nominal Voltage and frequency (from frequency converter):	Output 265 VAC, connected in delta, 60 Hz
Nominal Current:	1.40 A
Configuration:	Blue, WP81
Nominal Power:	1.01 hp
Nominal Voltage and frequency (from frequency converter):	Output 265 VAC, connected in delta, 60 Hz
Nominal Current:	2.72 A
Country Code:	US/CA

Motor, option ATEX

Efficiency class:	IE3
Enclosure / Motor Protection:	IP66
Safety class:	II2G Ex de IIC T4

Motor, option ATEX

Configuration:	Blue, WP50
Nominal Power:	0.36 hp
Nominal Voltage and frequency (from frequency converter):	Output 230 VAC, connected in delta, 50 Hz
Nominal Current:	1.30 A
Configuration:	Blue, WP81
Nominal Power:	1.01 hp
Nominal Voltage and frequency (from frequency converter):	Output 230 VAC, connected in delta, 50 Hz
Nominal Current:	2.94 A
Country Code:	EU + Not specific

Motor, option LV Explosion Proof Motor

Efficiency class:	Premium
Enclosure / Motor Protection:	IP66
Safety class:	Class1 Div1 Group D
Configuration:	Blue, WP50
Nominal Power:	0.50 hp
Nominal Voltage and frequency (from frequency converter):	Output 208-230 VAC, connected in delta, 60 Hz
Nominal Current:	2.1 – 2.0 A
Configuration:	Blue, WP81
Nominal Power:	1.48 hp
Nominal Voltage and frequency (from frequency converter):	Output 230 VAC, connected in delta, 60 Hz
Nominal Current:	4.4 A
Country Code:	US/CA

Gear

High efficiency helical bevel right angle gearbox.	
Lubricant:	Food compatible oil
Maximum mounting angle acc. to horizontal:	0° - 45° (Different angle intervals based on configuration - Note: Motor may not point downwards)
Surface finish drive unit, standard:	Painted Blue RAL 5010
Surface finish drive unit, Clean Room option:	Sealed Surface Conversion Treatment, Smooth Body (no fan)

Console/flange

Standard height or option for extended height for insulated tanks.	
Attachment, Size WP50:	Clamp connection
Attachment, Size WP81:	Flange-bolt connection

PHYSICAL DATA

Materials

Impeller and Weld plate:	AISI316L (UNS S31603)
Drive Rotor, shaft and console/flange:	AISI304 (UNS S30400)
Gear motor, Painted:	C2 according to DIN 12944 (NSF/ANSI 51-2009e)
Gear motor, Clean room:	Permanent Bond Surface (nsd tupH) - compl. w. FDA Title 21 CFR 175.300
Male Bearing:	
Female bearing:	Silicium Carbide (EN 12756)
Seals:	FEP/FKM
Gearbox oil:	USDA H1

Temperatures

During product Mixing, media:	Max. 194 °F
During CIP (max. 50 RPM):	Max. 203 °F
During SIP (max. 50 RPM):	Max. 257 °F
During SIP (max. 0 RPM):	Max. 302 °F

Max. speed

Impeller size 100:	800 RPM (81 Hz)
Impeller size 150:	480 RPM (48.5 Hz)

Max. speed

Impeller size 200:	480 RPM (83 Hz)
Impeller size 250:	230 RPM (40 Hz)
Impeller size 300:	200 RPM (34.5 Hz)

Documentation:

As standard with Q-Doc including:

- Compliance with Regulation (EC) No.: 1935/2004
- Compliance with (Ex/ATEX) directive 2014/34/EU (ATEX option, II -/2G Ex h IIC T4 -/Gb)
- Compliance to the EC Regulation for GMP
- 3.1 Material Certificates acc. to EN10204 (MTR) for all wetted parts
- Compliance to FDA CFR 21 (non-metallic parts) for elastomers, ceramics and gear oil
- TSE (Transmissible Spongiform Encephalopathy) / ADI (Animal Derivative Ingredient) Declaration
- Surface finish compliance declaration

Build up:

1. Impeller
2. Seals
3. Female Bearing
4. Male Bearing
5. Weld Plate
6. Clamp ring connection (WP50 only)
7. Flange-Bolt Connection (WP81 only)
8. Drive unit

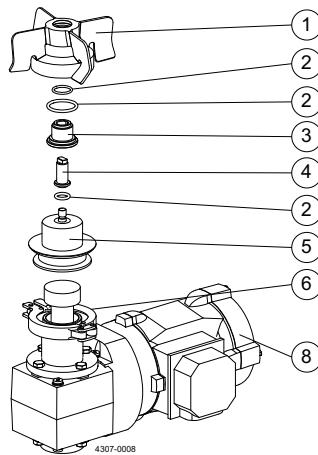


Figure 1. LeviMag WP50

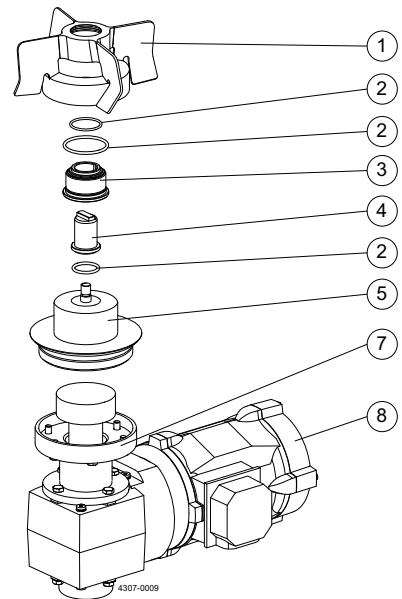
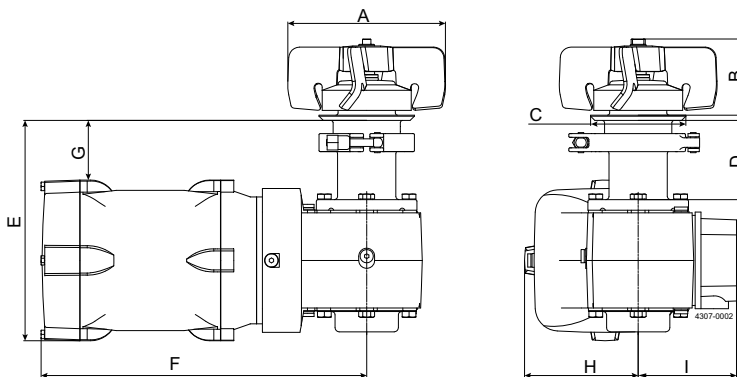
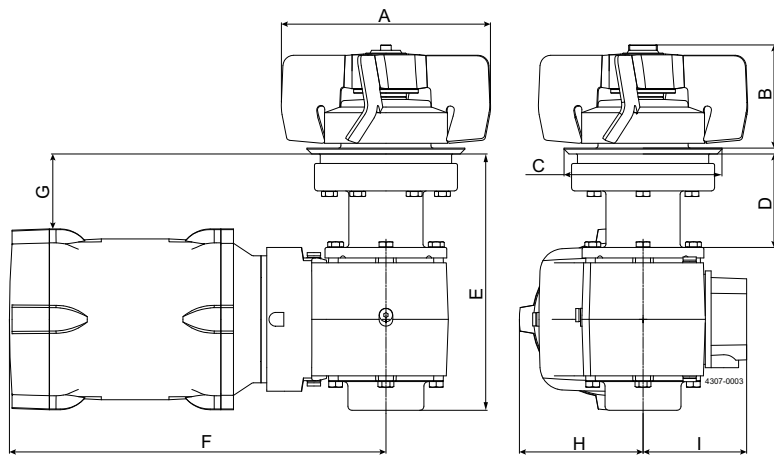


Figure 2. LeviMag WP81

Dimensions (inch)

LeviMag WP50

Model	Size WP50 - Ø100 impeller				Size WP50 - Ø150 impeller			
	Standard console Height + Painted Gear Motor	Extended console Height + Painted Gear Motor	Standard console Height + Clean Room Gear Motor	Extended console Height + Clean Room Gear Motor	Standard console Height + Painted Gear Motor	Extended console Height + Painted Gear Motor	Standard console Height + Clean Room Gear Motor	Extended console Height + Clean Room Gear Motor
A	Ø3.94	Ø3.94	Ø3.94	Ø3.94	Ø5.91	Ø5.91	Ø5.91	Ø5.91
B	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.83
C	Ø3.54	Ø3.54	Ø3.54	Ø3.54	Ø3.54	Ø3.54	Ø3.54	Ø3.54
D	2.95	4.92	2.95	4.92	2.95	4.92	2.95	4.92
E IE4	8.46	10.43	8.23	10.20	8.46	10.43	8.23	10.20
F IE4	13.39	13.39	12.13	12.13	13.39	13.39	12.13	12.13
G IE4	1.97	3.94	2.24	4.21	1.97	3.94	2.24	4.21
H IE4	4.49	4.49	4.25	4.25	4.49	4.49	4.25	4.25
I IE4	4.37	4.37	3.66	3.66	4.37	4.37	3.66	3.66
E Premium/CUS	7.95	9.92	-	-	7.95	20.66	-	-
F Premium/CUS	12.51	12.51	-	-	12.51	12.51	-	-
G Premium/CUS	2.48	4.44	-	-	2.48	4.44	-	-
H Premium/CUS	4.13	4.13	-	-	4.13	4.13	-	-
I Premium/CUS	3.70	3.70	-	-	3.70	3.70	-	-
E ATEX	7.95	9.92	-	-	7.95	9.92	-	-
F ATEX	15.68	14.68	-	-	14.68	14.68	-	-
G ATEX	2.44	4.40	-	-	2.44	4.40	-	-
H ATEX	4.13	4.13	-	-	4.13	4.13	-	-
I ATEX	4.68	4.68	-	-	4.68	4.68	-	-
E LV Explosion Proof	8.77	10.74	-	-	8.77	10.74	-	-
F LV Explosion Proof	20.47	20.47	-	-	20.47	20.47	-	-
G LV Explosion Proof	1.77	3.74	-	-	1.77	3.74	-	-
H LV Explosion Proof	4.84	4.84	-	-	4.84	4.84	-	-
I LV Explosion Proof	5.59	5.59	-	-	5.59	5.59	-	-



LeviMag WP81

Model	Size WP81 - Ø200 impeller				Size WP81 - Ø250 impeller				Size WP81 - Ø300 impeller			
	Standard console Height + Painted Gear Motor	Extended console Height + Painted Gear Motor	Standard console Height + Clean Room Gear Motor	Extended console Height + Clean Room Gear Motor	Standard console Height + Painted Gear Motor	Extended console Height + Painted Gear Motor	Standard console Height + Clean Room Gear Motor	Extended console Height + Clean Room Gear Motor	Standard console Height + Painted Gear Motor	Extended console Height + Painted Gear Motor	Standard console Height + Clean Room Gear Motor	Extended console Height + Clean Room Gear Motor
A	7.87	Ø7.87	Ø7.87	Ø7.87	Ø9.84	Ø9.84	Ø9.84	Ø9.84	Ø11.81	Ø11.81	Ø11.81	Ø11.81
B	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86
C	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87
D	3.50	5.47	3.50	5.47	3.50	5.47	3.50	5.47	3.50	5.47	3.50	5.47
E IE4	9.57	11.53	9.57	11.54	9.57	11.54	9.57	11.54	9.57	11.54	9.57	11.54
F IE4	13.94	13.94	14.06	14.06	13.94	13.94	14.06	14.06	13.94	13.94	14.06	14.06
G IE4	2.91	4.88	2.76	4.72	2.91	4.88	2.76	4.73	2.91	4.88	2.76	4.73
H IE4	4.49	4.49	4.61	4.61	4.49	4.49	4.61	4.61	4.49	4.49	4.61	4.61
I IE4	4.37	4.37	3.86	3.86	4.37	4.37	3.86	3.86	4.37	4.37	3.86	3.86
E Premium/CUS	9.56	11.53	-	-	9.56	11.53	-	-	9.56	11.53	-	-
F Premium/CUS	13.93	13.93	-	-	13.93	13.93	-	-	13.93	13.93	-	-
G Premium/CUS	3.07	5.03	-	-	3.07	5.03	-	-	3.07	5.03	-	-
H Premium/CUS	4.33	4.33	-	-	4.33	4.33	-	-	4.33	4.33	-	-
I Premium/CUS	4.40	4.40	-	-	4.40	4.40	-	-	4.40	4.40	-	-
E ATEX	11.57	13.54	-	-	11.57	13.54	-	-	11.57	13.54	-	-
F ATEX	16.45	16.45	-	-	16.45	16.45	-	-	16.45	16.45	-	-
G ATEX	3.03	5	-	-	3.03	5	-	-	3.03	5	-	-
H ATEX	4.33	4.33	-	-	4.33	4.33	-	-	4.33	4.33	-	-
I ATEX	5.66	5.66	-	-	5.66	5.66	-	-	5.66	5.66	-	-
E LV Explosion Proof	9.76	11.73	-	-	9.76	11.73	-	-	9.76	11.73	-	-
F LV Explosion Proof	21.02	21.02	-	-	21.02	21.02	-	-	21.02	21.02	-	-
G LV Explosion Proof	2.71	4.68	-	-	2.71	4.68	-	-	2.71	4.68	-	-
H LV Explosion Proof	4.84	4.84	-	-	4.84	4.84	-	-	4.84	4.84	-	-
I LV Explosion Proof	5.59	5.59	-	-	5.59	5.59	-	-	5.59	5.59	-	-

Machine Selection

LeviMag can be sized and configured in Alfa Laval configurator. Selection of size can also be done by use of the below selection charts.

Needed information for selection of size:

- Media Viscosity
- Tank Volume
- Tank diameter and tank bottom shape
- Duty (see below Duty Levels)

Duty Level	Duty	Description
1	Keep media homogenous	Keeping fluids homogenous & low gradient heat transfer
2	Mild blending	Simple blending of miscible fluids & high gradient heat transfer, no specific request to mixing time, create suspension if deposit velocity is below 0.59 inch/s
3	Mixing	Mixing of fluids, relative low mixing time, create suspension if deposit velocity is below 1.18 inch/s
4	Powerful mixing	Dissolving solids, very low mixing time, create suspension if deposit velocity is below 2.36 inch/s

Preconditions for using the selection charts

- Liquid height must be equal to or lower than 2½ times the tank diameter
- Specific gravity of the media must be less than or equal to 1.1
- If duty involves suspension of particles (see deposit velocity limits in the duty levels), the tank diameter D must be:



where V is the Net Volume

- If preconditions are not fulfilled please contact Alfa Laval Global Technical Support

How to select

1. Select duty
2. Check preconditions
3. Go to the chart for the chosen duty
4. Read out the point for the requested tank volume (X-axis) and viscosity (Y-axis)
5. Choose the curve to the right from the point
6. If physically possible a larger impeller size can always be chosen - eg. to obtain a gentler product treatment (operating at lower speed)

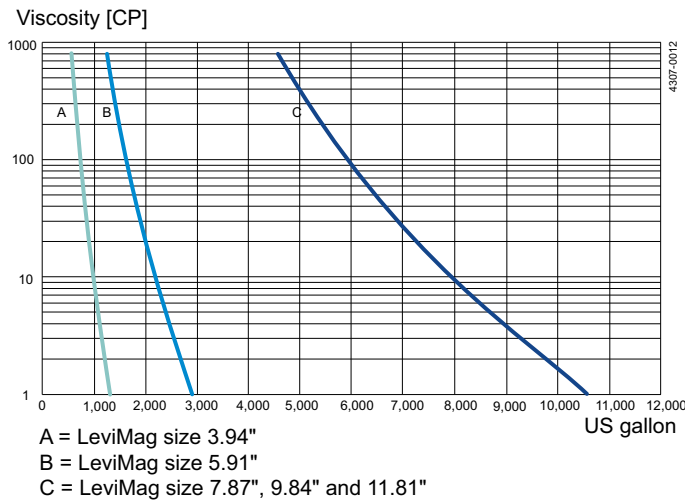


Figure 3. Duty Level 1: Keep media homogenous Volume vs. Viscosity

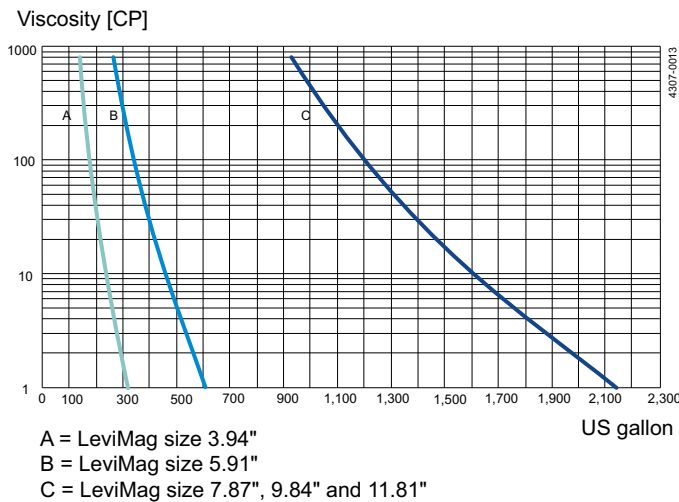
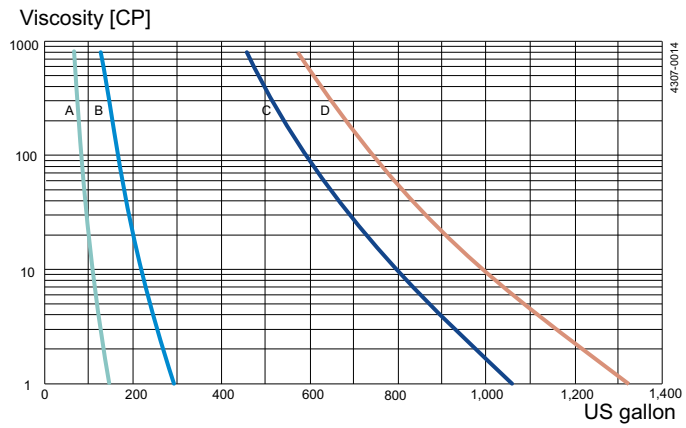
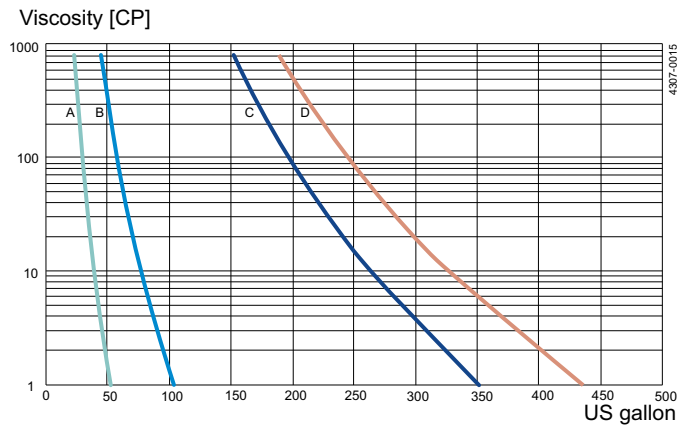


Figure 4. Duty Level 2: Mild blending Volume vs. Viscosity



A = LeviMag size 3.94" C = LeviMag size 7.87" & 9.84"
 B = LeviMag size 5.91" D = LeviMag size 11.81"

Figure 5. Duty Level 3: Mixing Volume vs. Viscosity



A = LeviMag size 3.94" C = LeviMag size 7.87" & 9.84"
 B = LeviMag size 5.91" D = LeviMag size 11.81"

Figure 6. Duty Level 4: Powerful mixing Volume vs. Viscosity

Alfa Laval LeviMag® UltraPure Mixers



Introduction

The Alfa Laval LeviMag® UltraPure is an aseptic magnetic mixer that uses a patented levitating impeller and advanced design to mix down to the last drop and maximize product yield.

Compact, energy-efficient and easy to maintain, it provides dry-running capabilities and efficient mixing at low speeds, which ensures gentle product treatment, as well as at high speeds for high-intensity mixing. This provides greater process flexibility to handle a wide range of fluid types and mixing duties.

Its open design and low-speed rotation during cleaning contribute to no dead zones, effective residue removal and minimize contamination risks from wear particles. All this contributes to fast return on investment and maximum product yield in tanks ranging in size between 8 gallon and 10567 gallon.

It is supplied with Alfa Laval Q-doc, a comprehensive documentation package that provides full transparency of the entire supply chain and helps make the validation process easy.

Applications

Alfa Laval LeviMag UltraPure offers effective mixing for multiple processes, such as those involving serums, vaccines, plasma fractions, bacteria and cell cultures, and APIs, in the biotechnology, pharmaceutical and other industries with demanding sterile or high-purity applications.

Benefits

Maximum process efficiency, minimal product loss

Optimal flow with higher efficiency and less energy consumption

Mixing down to the last drop for maximum yield due to low agitation and dry-running capability

Optimized Cleaning-in-Place (CIP) due to full drainability

Minimized downtime due to ease of maintenance

Standard design

The Alfa Laval LeviMag UltraPure consists of a detachable drive unit, levitating impeller unit with radial blades, seals, ceramic bearings and magnetic coupling, weld plate and connections. It is available in five sizes, with mixing speeds ranging from 10 rpm up to 800 rpm.

Working principle

An impeller with radial blades installed inside the tank rotates due to the torque from the magnetic coupling. The rotation of the impeller mixes the fluid inside the tank. The unique design of the Alfa Laval magnetic coupling ensures the levitation of the impeller at all times. This enables dry-running and complete drainability of process fluids from the tank possible. This ensures highly efficient mixing down to the last drop and, subsequently, maximum yield. It also enables the free flow of CIP liquid and steam around all parts of the mixer, thereby ensuring thorough cleaning. Impeller levitation also eliminates axial wear.

Available versions

Impeller with male/female bearing

Impeller complete, with drive unit

Impeller prepared for Speed Sensor

ATEX version (Cat. II -/2G Ex h IIC T4 -/Gb)
SS EN 1.4435 (316L) as standard, Special Alloys EN 1.4529 or EN 2.4602 available on request

Drive unit versions

Painted (fan ventilated)

Clean room finish, Sealed Surface Conversion Treatment (smooth, closed, none fan ventilated)

Extended console for insulated tanks

Motor efficiency

IE4 (standard)

Premium (CUS for US)

Safety class

No requirements (IE4, Premium)

Eex-de IIC T4 (on ATEX version)

Class I div.I, group D T4

Accessories

Weld plates

Speed Sensor

Inspection & Service tools

Installation tools

TECHNICAL DATA

Internals

Product Wetted Surface finish: Ra <14.96 µin Mech. polished and Electropolished (Acc. to ASME BPE SF4)

Working pressure: -14.5 to 101.5 PSI

Impeller diameters: 3.94, 5.91, 7.87, 9.84 & 11.81 in Standard or prepared for speed sensor

Versions: Standard or prepared for speed sensor

Weld Plate

Size WP50: For impeller size 3.93 & 5.91 in

Size WP81: For impeller size 7.87, 9.84 & 11.8 in

Drive Unit

Motor, IE4 (standard)

Integrated Permanent Magnet Synchron Motor (IPMSM) which has to be operated with a frequency inverter for IE4 motors

The frequency converter (not Alfa Laval supply) must be ordered for the voltage available at the place of operation

Efficiency class: IE4

Enclosure / Motor protection: IP66

Configuration: Blue

Nominal Power: 1.48 hp

Nominal Voltage and frequency (from frequency converter): Output 217 VAC, connected in delta, 70 Hz, 2100 RPM

Nominal Current: 3.59 A

Configuration: Clean room, WP50

Nominal Power: 1.01 hp

Nominal Voltage and frequency (from frequency converter): Output 199 VAC, connected in delta, 70 Hz, 2100 RPM

Nominal Current: 2.53 A

Configuration: Clean room, WP81

Nominal Power: 1.48 hp

Nominal Voltage and frequency (from frequency converter): Output 195 VAC, connected in delta, 70 Hz, 2100 RPM

Nominal Current: 3.61 A

Country Code: All (one type covers all)

Motor, option Premium/CUS

Efficiency class: Premium

Enclosure / Motor Protection: IP66

Configuration: Blue, WP50

Nominal Power: 0.50 hp

Nominal Voltage and frequency (from frequency converter): Output 265 VAC, connected in delta, 60 Hz

Nominal Current: 1.40 A

Configuration: Blue, WP81

Nominal Power: 1.01 hp

Nominal Voltage and frequency (from frequency converter): Output 265 VAC, connected in delta, 60 Hz

Nominal Current: 2.72 A

Configuration: Blue, WP81

Nominal Power: 1.01 hp

Nominal Voltage and frequency (from frequency converter): Output 265 VAC, connected in delta, 60 Hz

Nominal Current: 2.72 A

Configuration: Blue, WP81

Nominal Power: 1.01 hp

Nominal Voltage and frequency (from frequency converter): Output 265 VAC, connected in delta, 60 Hz

Nominal Current: 2.72 A

Configuration: Blue, WP81

Nominal Power: 1.01 hp

Nominal Voltage and frequency (from frequency converter): Output 265 VAC, connected in delta, 60 Hz

Nominal Current: 2.72 A

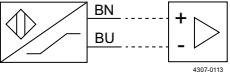
Motor, option ATEX	
Nominal Voltage and frequency (from frequency converter):	Output 230 VAC, connected in delta, 50 Hz
Nominal Current:	1.30 A
Configuration:	Blue, WP81
Nominal Power:	1.01 hp
Nominal Voltage and frequency (from frequency converter):	Output 230 VAC, connected in delta, 50 Hz
Nominal Current:	2.94 A
Country Code:	EU + Not specific
Motor, option LV Explosion Proof Motor	
Efficiency class:	Premium
Enclosure / Motor Protection:	IP66
Safety class:	Class1 Div1 Group D
Configuration:	Blue, WP50
Nominal Power:	0.50 hp
Nominal Voltage and frequency (from frequency converter):	Output 208-230 VAC, connected in delta, 60 Hz
Nominal Current:	2.1 – 2.0 A
Configuration:	Blue, WP81
Nominal Power:	1.48 hp
Nominal Voltage and frequency (from frequency converter):	Output 230 VAC, connected in delta, 60 Hz
Nominal Current:	4.4 A
Country Code:	US/CA
Gear	
High efficiency helical bevel right angle gearbox	
Lubricant:	Food compatible oil
Maximum mounting angle acc. to horizontal:	0° - 45° (Different angle intervals based on configuration - Note: Motor may not point downwards)
Surface finish drive unit, standard:	Painted Blue RAL 5010
Surface finish drive unit, Clean Room option:	Sealed Surface Conversion Treatment, Smooth Body (no fan)
Console/flange	
Standard height or option for extended height for insulated tanks	
Attachment, Size WP50:	Clamp connection
Attachment, Size WP81:	Flange-bolt connection
PHYSICAL DATA	
Materials	
Impeller and Weld plate:	EN 1.4435 (316L/UNS31603), Optionally: EN 1.4529 or EN 2.4602
Drive Rotor, shaft and console/flange:	AISI304 (UNS S30400)
Gear motor, Painted:	C2 according to DIN 12944 (NSF/ANSI 51-2009e)
Gear motor, Clean room:	Permanent Bond Surface (nsd tupH) - compl. w. FDA Title 21 CFR 175.300
Male Bearing:	
Female bearing:	Silicium Carbide (EN 12756)
Seals:	FEP/FKM
Gearbox oil:	USDA H1
Temperatures	
During product Mixing, media:	Max. 194 °F
During CIP (max. 50 RPM):	Max. 203 °F
During SIP (max. 50 RPM):	Max. 257 °F
During SIP (max. 0 RPM):	Max. 302 °F
Max. speed	
Impeller size 100:	800 RPM (81 Hz)
Impeller size 150:	480 RPM (48.5 Hz)
Impeller size 200:	480 RPM (83 Hz)
Impeller size 250:	230 RPM (40 Hz)
Impeller size 300:	200 RPM (34.5 Hz)
Speed sensor	
(Accessory, can only be used for impeller configuration “prepared for speed sensor”)	
Alfa Laval Magnetic-Inductive Speed Sensor for LeviMag - the Magnetic inductive proximity sensor is actuated by magnetic fields and capable of detecting permanent magnets in the impeller through the non-magnetic tank material.	
Technical Data	
Electrical design:	NAMUR
Approval:	ATEX category II 1G KEMA 02 ATEX 1090X SIL2 (Low Demand Mode) acc. to IEC 61508 PL c acc. to ISO 13849-1 at HFT0

Connection:
 Output:
 Switching frequency:
 Current consumption non-actuated:
 Current consumption actuated:
 Physical data
 Materials:

SIL3 (All Demand Mode) acc. to IEC 61508
 PL e acc. to ISO 13849-1 with redundant configuration HFT1
 DC 2-wire, nom. 8.2 VDC
 Acc. to DIN EN 60947-5-6 (NAMUR)
 1 kHz
 < 1.2 mA
 < 2.1 mA

Cable 4 mm, 2 x 0.25 mm², Blue, Lif9YYW, PVC, 2 m

Wiring Diagram



Enclosure:

IP67

Documentation:

- As standard with UltraPure Q-Doc including:
- Compliance with Regulation (EC) No.: 1935/2004
- Compliance with (Ex/ATEX) directive 2014/34/EU (ATEX option, II -/2G Ex h IIC T4 -/Gb)
- Compliance to the EC Regulation for GMP
- 3.1 Material Certificates acc. to EN10204 (MTR) for all wetted parts
- Compliance to USP Class VI <88> and FEP/FKM seals
- Compliance to FDA CFR 21 (non-metallic parts) for elastomers, ceramics and gear oil
- TSE (Transmissible Spongiform Encephalopathy) / ADI (Animal Derivative Ingredient) Declaration
- Surface finish compliance declaration

Options:

Surface roughness measurements included

Weld Log included

Build up:

Impeller

Seals

Female Bearing

Male Bearing

Weld Plate

Clamp ring connection (WP50 only)

Flange-Bolt Connection (WP81 only)

Drive unit

Speed Sensor (Accessory)

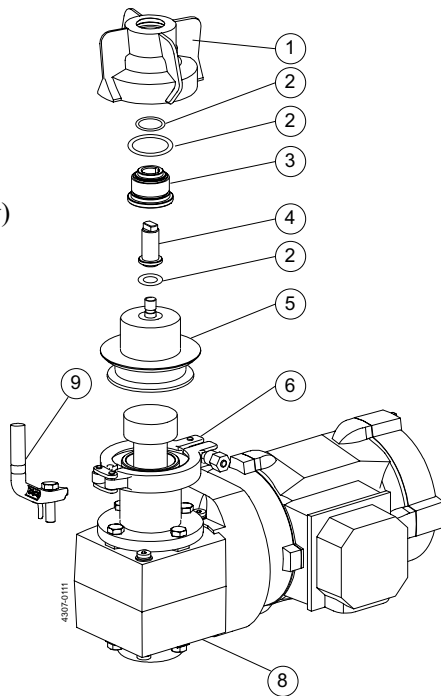


Figure 1. LeviMag WP50

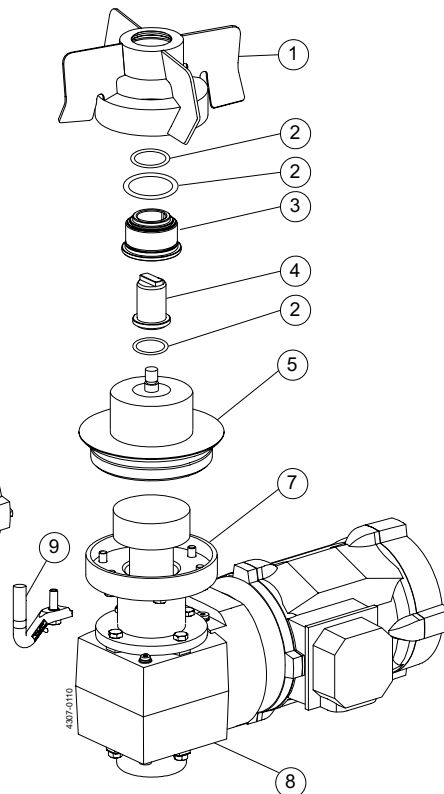


Figure 2. LeviMag WP81

Dimensions: (inch)

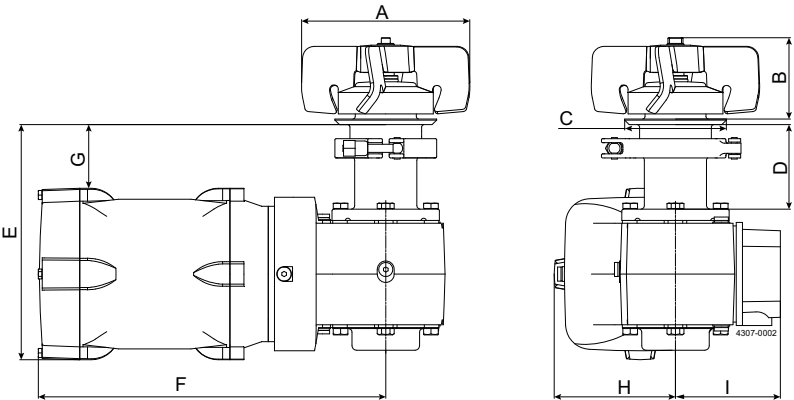
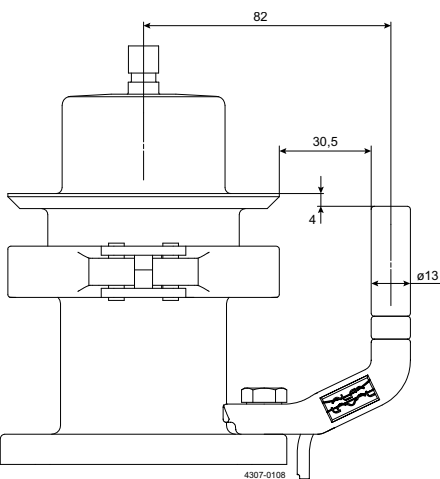


Figure 3. LeviMag WP50

Model Configuration	Size WP50 - Ø100 impeller				Size WP50 - Ø150 impeller			
	Standard console	Extended console	Standard console	Extended console	Standard console	Extended console	Standard console	Extended console
	Height + Painted Gear Motor	Height + Painted Gear Motor	Height + Clean Room Gear Motor	Height + Clean Room Gear Motor	Height + Painted Gear Motor	Height + Painted Gear Motor	Height + Clean Room Gear Motor	Height + Clean Room Gear Motor
A	Ø3.94	Ø3.94	Ø3.94	Ø3.94	Ø5.91	Ø5.91	Ø5.91	Ø5.91
B	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.83
C	Ø3.50	Ø3.50	Ø3.50	Ø3.50	Ø3.50	Ø3.50	Ø3.50	Ø3.50
D	2.95	4.92	2.95	4.92	2.95	4.92	2.95	4.92
E IE4	8.46	10.43	8.23	10.20	8.46	10.43	8.23	10.20
F IE4	13.39	13.39	12.13	12.13	13.39	13.39	12.13	12.13
G IE4	1.97	3.94	2.24	4.21	1.97	3.94	2.24	4.21
H IE4	4.49	4.49	4.25	4.25	4.49	4.49	4.25	4.25
I IE4	4.37	4.37	3.66	3.66	4.37	4.37	3.66	3.66
E Premium/CUS	7.95	9.92	-	-	7.95	9.92	-	-
F Premium/CUS	12.51	12.51	-	-	12.51	12.51	-	-
G Premium/CUS	2.48	4.44	-	-	2.48	4.44	-	-
H Premium/CUS	4.13	4.13	-	-	4.13	4.13	-	-
I Premium/CUS	3.70	3.70	-	-	3.70	3.70	-	-
E ATEX	7.95	9.92	-	-	7.95	9.92	-	-
F ATEX	14.68	14.68	-	-	14.68	14.68	-	-
G ATEX	2.44	4.40	-	-	2.44	4.40	-	-
H ATEX	4.13	4.13	-	-	4.13	4.133	-	-
I ATEX	4.68	4.68	-	-	4,68	4.68	-	-
E LV Explosion Proof	8.77	10.74	-	-	8.77	10.74	-	-
F LV Explosion Proof	20.47	20.47	-	-	20.47	20.47	-	-
G LV Explosion Proof	1.77	3.74	-	-	1,77	3.74	-	-
H LV Explosion Proof	4.84	4.84	-	-	4.84	44.21	-	-
I LV Explosion Proof	5.59	5.59	-	-	5.59	5.59	-	-



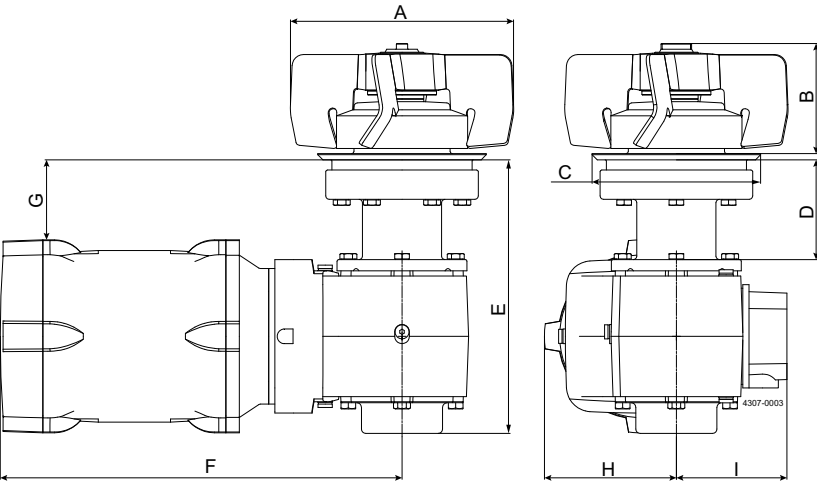
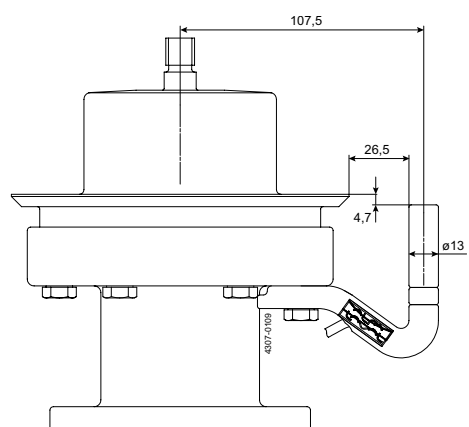


Figure 4. LeviMag WP81

Model Configuration	Size WP81 - Ø200 impeller				Size WP81 - Ø250 impeller				Size WP81 - Ø300 impeller			
	Standard console Painted Gear Motor	Extended console Painted Gear Motor	Standard Clean Room Gear Motor	Extended Clean Room Gear Motor	Standard console Painted Gear Motor	Extended console Painted Gear Motor	Standard Clean Room Gear Motor	Extended Clean Room Gear Motor	Standard console Painted Gear Motor	Extended console Painted Gear Motor	Standard Clean Room Gear Motor	Extended Clean Room Gear Motor
A	Ø7.87	Ø7.87	Ø7.87	Ø7.87	Ø9.84	Ø9.84	Ø9.84	Ø9.84	Ø11.81	Ø11.81	Ø11.81	Ø11.81
B	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86
C	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87	Ø5.87
D	3.50	5.47	3.50	5.47	3.50	5.47	3.50	5.47	3.50	5.47	3.50	5.47
E IE4	9.57	11.53	9.57	11.54	9.57	11.54	9.57	11.54	9.57	11.54	9.57	11.54
F IE4	13.94	13.94	14.06	14.06	13.94	13.94	14.06	14.06	13.94	13.94	14.06	14.06
G IE4	2.91	4.88	2.76	4.72	2.91	4.88	2.76	4.73	2.91	4.88	2.76	4.73
H IE4	4.49	4.49	4.61	4.61	4.49	4.49	4.61	4.61	4.49	4.49	4.61	4.61
I IE4	4.37	4.37	3.86	3.86	4.37	4.37	3.86	3.86	4.37	4.37	3.86	3.86
E Premium/CUS	9.56	11.53	-	-	9.56	11.53	-	-	9.56	11.53	-	-
F Premium/CUS	13.93	13.93	-	-	13.93	13.93	-	-	13.93	13.93	-	-
G Premium/CUS	3.07	5.03	-	-	3.07	5.03	-	-	3.07	5.03	-	-
H Premium/CUS	4.33	4.33	-	-	4.33	4.33	-	-	4.33	4.33	-	-
I Premium/CUS	4.40	4.40	-	-	4.40	4.40	-	-	4.40	4.40	-	-
E ATEX	11.57	13.54	-	-	11.57	13.54	-	-	11.57	13.54	-	-
F ATEX	16.45	16.45	-	-	16.45	16.45	-	-	16.45	16.45	-	-
G ATEX	3.03	5	-	-	3.03	5	-	-	3.03	5	-	-
H ATEX	4.33	4.33	-	-	4.33	4.33	-	-	4.33	4.33	-	-
I ATEX	5.66	5.66	-	-	5.66	5.66	-	-	5.66	5.66	-	-
E LV Explosion Proof	9.76	11.73	-	-	9.76	11.73	-	-	9.76	11.73	-	-
F LV Explosion Proof	21.02	21.02	-	-	21.02	21.02	-	-	21.02	21.02	-	-
G LV Explosion Proof	2.71	4,68	-	-	2.71	4.68	-	-	2.71	4.68	-	-
H LV Explosion Proof	4.84	4.84	-	-	4.84	4.84	-	-	4.84	4.84	-	-
I LV Explosion Proof	5.59	5.59	-	-	5.59	5.59	-	-	5.59	5.59	-	-



Machine Selection:

LeviMag UltraPure can be sized and configured in Alfa Laval configurator. Selection of size can also be done by use of the below selection charts. Needed information for selection of size:

Media Viscosity

Tank Volume

Tank diameter and tank bottom shape

Duty (see below Duty Levels)

Duty Level	Duty	Description
1	Keep media homogenous	Keeping fluids homogenous & low gradient heat transfer
2	Mild blending	Simple blending of miscible fluids & high gradient heat transfer, no specific request to mixing time, create suspension if deposit velocity is below 0.59 inch/s
3	Mixing	Mixing of fluids, relative low mixing time, create suspension if deposit velocity is below 1.18 inch/s
4	Powerful mixing	Dissolving solids, very low mixing time, create suspension if deposit velocity is below 2.36 inch/s

Preconditions for using the selection charts:

Specific gravity of the media must be less than or equal to 1.1

Liquid height must be equal to or lower than 2½ times the tank diameter

If duty involves suspension of particles (see deposit velocity limits in the duty levels), the tank diameter D must be:



where V is the Net Volume

If preconditions are not fulfilled please contact Alfa Laval Global Technical Support

How to select:

Select duty

Check preconditions

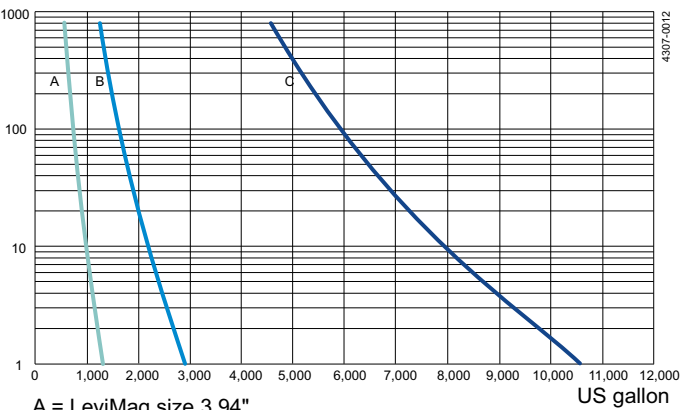
Go to the chart for the chosen duty

Read out the point for the requested tank volume (X-axis) and viscosity (Y-axis)

Choose the curve to the right from the point

If physically possible a larger impeller size can always be chosen - eg. to obtain a gentler product treatment (operating at lower speed)

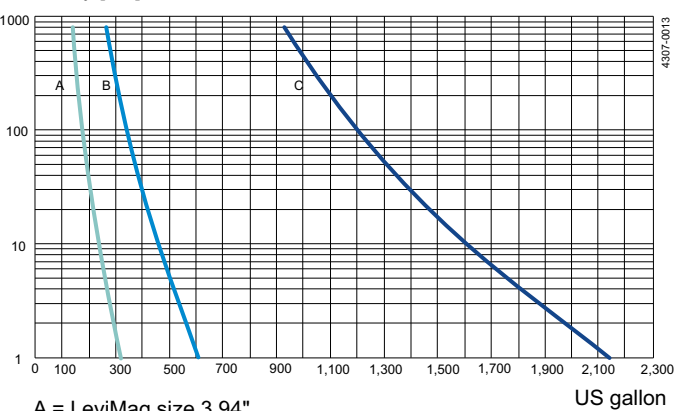
Viscosity [CP]



A = LeviMag size 3.94"
 B = LeviMag size 5.91"
 C = LeviMag size 7.87", 9.84" and 11.81"

Figure 5. Duty Level 1: Keep media homogenous Volume vs. Viscosity

Viscosity [CP]



A = LeviMag size 3.94"
 B = LeviMag size 5.91"
 C = LeviMag size 7.87", 9.84" and 11.81"

Figure 6. Duty Level 2: Mild blending Volume vs. Viscosity

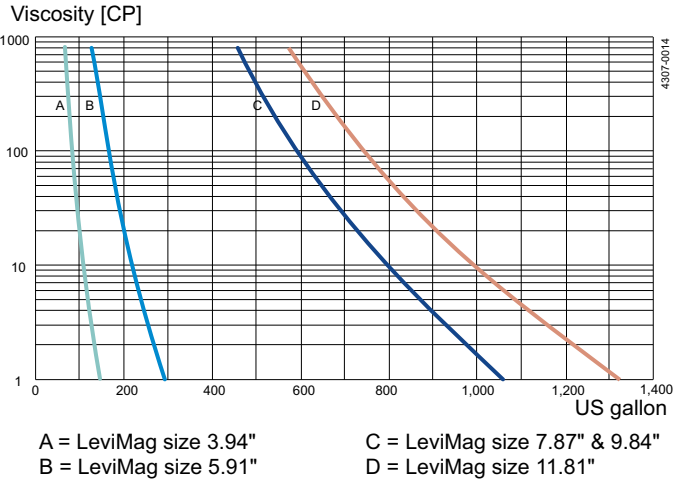


Figure 7. Duty Level 3: Mixing Volume vs. Viscosity

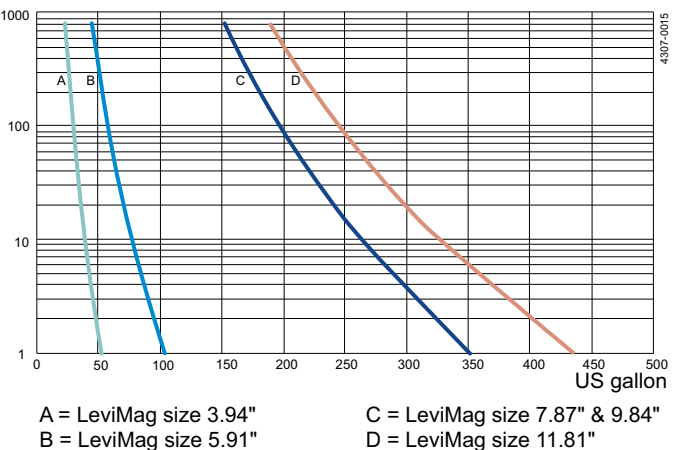


Figure 8. Duty Level 4: Powerful mixing Volume vs. Viscosity

Alfa Laval RJ Mixer IM-10

Tank mixers

Introduction

The Alfa Laval IM 10 Rotary Jet Mixer effectively handles liquid mixing, gas dispersion, powder mixing, and tank cleaning while reducing mixing time, energy consumption and costs.

Patented technology based on proven Rotary Jet Head technology, it provides quick, efficient and uniform mixing without any batch rotation or the use of baffles. It also ensures greater process flexibility, making it easy to switch to new product formulations with diverse viscosities, densities and volumes.

Applications

The IM 10 Rotary Jet Mixer is designed for liquid mixing, gas dispersion (aeration, deaeration, carbonation), and powder mixing in process and storage vessels from 35.3 to 353.1 ft³ in size across the dairy, food, beverage, brewery, healthcare, home and personal care, and biotechnology industries.

When the tank is empty, the IM10 also acts as a superb Cleaning-in-Place (CIP) system, saving water, cleaning media and energy compared to using a spray ball CIP system.

Benefits

- Fast, effective liquid mixing performance in tanks
- Efficient gas and powder dispersion
- Can be used as tank cleaning machine
- Handles multiple applications
- Unmatched, cost-effective mixing performance
- Simplified, hygienic design, modest investment
- Optional pre-engineered skid-mounted pump unit available

Standard design

The Alfa Laval IM 10 Rotary Jet Mixer consists of a mixer body, turbine and nozzles. Compared to traditional systems using propeller mixers, there is no need for a shaft, seal or gearbox. Excellent mixing is achieved without the use of baffles or any batch rotation. Available in four different models (IM 10, IM 15, IM 20, IM 25), these mixers are designed for tank volumes from 26.4 gallons in size and beyond, and they are capable of handling re-circulation flow rates up to 3178 foot³/h.



Working principle

Before round pumping or adding any products from upstream pipe works, ensure that the IM 10 Rotary Jet Mixer is positioned at the correct level and submerged into the liquid. Four nozzles feed the liquid, gas or powder into the liquid in the tank. The nozzles rotate around both the horizontal and vertical axes in a 360° movement. This three-dimensional jet rotation enables the jets to reach the entire tank volume, providing fast, efficient mixing of the injected liquid, gas or powder without requiring batch rotation.

The complete system is built with a circulation loop, enabling liquid to be pumped from the bottom of the tank and back into the Rotary Jet Mixer. For faster mixing requirements, several rotary jet mixers can be installed in series.

TECHNICAL DATA

Lubricant:	Self-lubricating with the mixing/cleaning fluid
Standard thread:	1" BSP or NPT, female, Top cone 1" BSP with hygienic seal
Min. tank opening:	See dimension drawings

Pressure

Working pressure:	28-114 PSI
Recommended pressure during mixing:	28-85 PSI
Recommended pressure during CIP:	57-114 PSI

PHYSICAL DATA

Materials

Materials:	AISI 316L, AISI 316, SAF 2205 (UNS 31803), EPDM, PEEK, PVDF, PFA, Ceramics
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Weight

Weight:	11.2 lbs
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Temperature

Max. working temperature:	203 °F
Max. ambient temperature:	284 °F

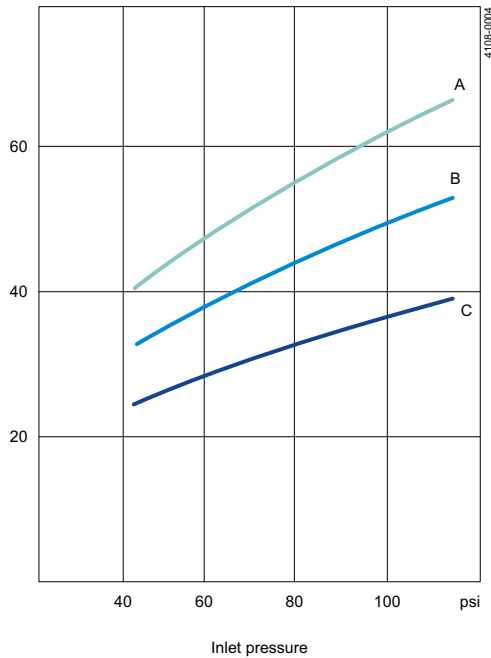
Certificates

2.1 material certificate.

Flow rate

Relationship between inlet pressure and flow rate for liquids with waterlike properties for the IM 10 Rotary Jet Mixer.

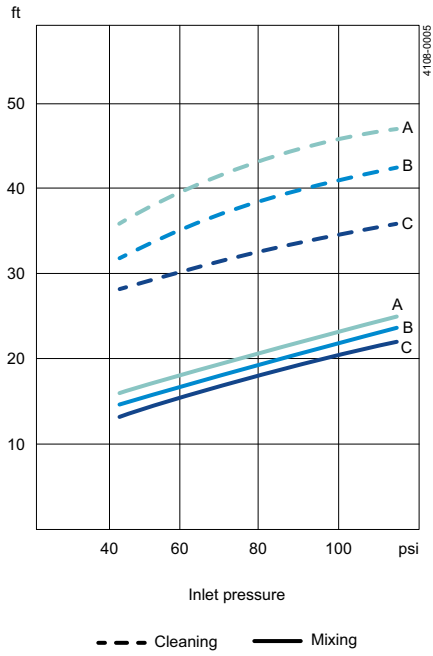
Volumetric flow rate
USgpm



A = 0.22"
B = 0.18"
C = 0.15"

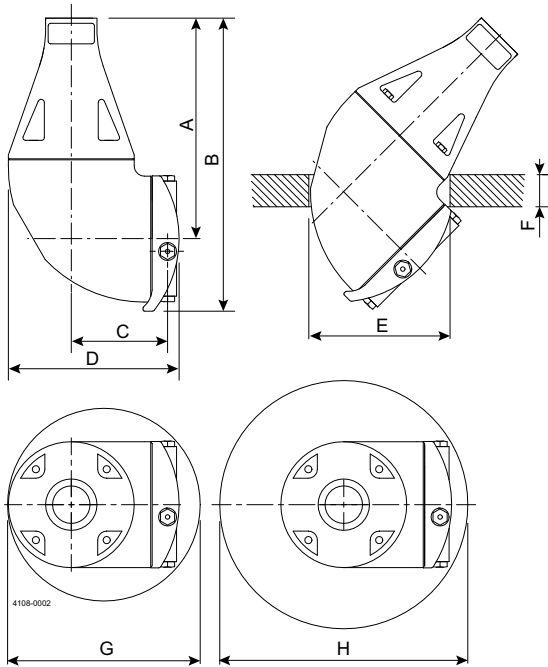
Reach of jet

Reach of jet for the IM 10 during cleaning, and indicative reach of jet for mixing of liquids with water-like properties.



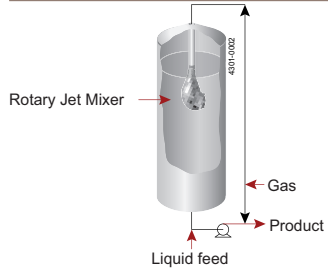
A = 4 x ø0.22"
 B = 4 x ø0.18"
 C = 4 x ø0.15"

Dimensions (inch)



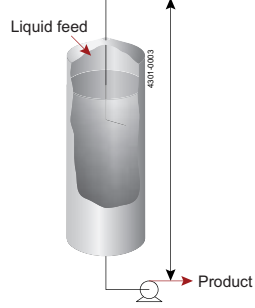
A	B	C	D	E	F	G	H
6.81	9.06	2.95	5.24	Ø4.33	Max. 0.99	Ø5.91	Ø7.87

The Rotary Jet Mixing technology

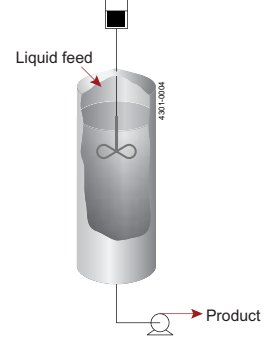


Traditional Mixing technology

Round pumping



Propeller mixing



Alfa Laval RJ Mixer IM-15

Tank mixers

Introduction

The Alfa Laval IM 15 Rotary Jet Mixer effectively handles liquid mixing, gas dispersion, powder mixing, and tank cleaning while reducing mixing time, energy consumption and costs.

Patented technology based on proven Rotary Jet Head technology, it provides quick, efficient and uniform mixing without any batch rotation or the use of baffles. It also ensures greater process flexibility, making it easy to switch to new product formulations with diverse viscosities, densities and volumes.

Applications

The IM 15 Rotary Jet Mixer is designed for liquid mixing, gas dispersion (aeration, deaeration, carbonation), and powder mixing in process and storage vessels from 70.6 to 3531.5 ft³ in size across the dairy, food, beverage, brewery, healthcare, home and personal care, and biotechnology industries.

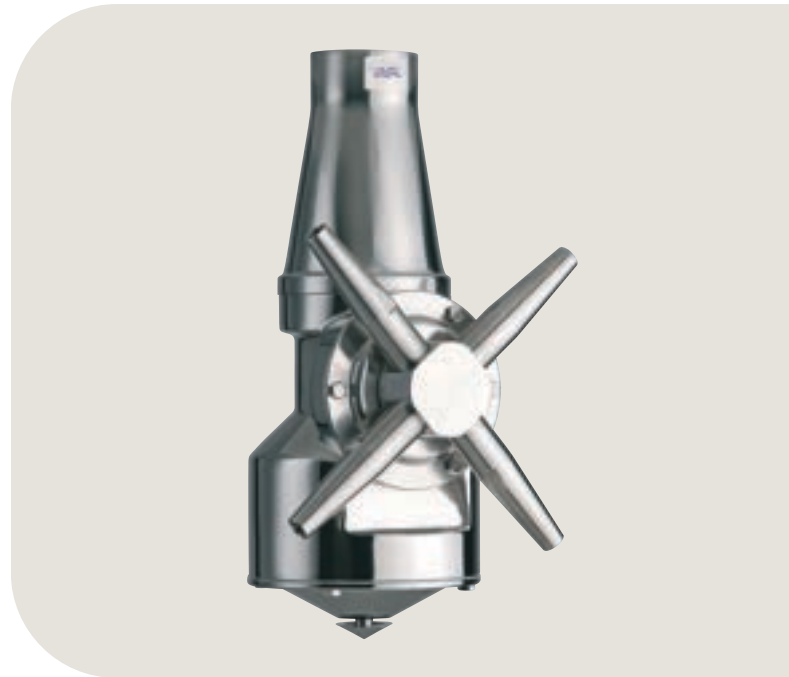
When the tank is empty, the IM 15 also acts as a superb Cleaning-in-Place (CIP) system, saving water, cleaning media and energy compared to using a spray ball CIP system.

Benefits

- Fast, effective liquid mixing performance in tanks
- Efficient gas and powder dispersion
- Can be used as tank cleaning machine
- Handles multiple applications
- Unmatched, cost-effective mixing performance
- Simplified, hygienic design, modest investment
- Optional pre-engineered skid-mounted pump unit available

Standard design

The Alfa Laval IM 15 Rotary Jet Mixer consists of a mixer body, turbine and nozzles. Compared to traditional systems using propeller mixers, there is no need for a shaft, seal or gearbox. Excellent mixing is achieved without the use of baffles or any batch rotation. Available in four different models (IM 10, IM 15, IM 20, IM 25), these mixers are designed for tank volumes from 26.4 gallons in size and beyond, and they are capable of handling re-circulation flow rates up to 3178 ft³/h.



Working principle

Before round pumping or adding any products from upstream pipe works, ensure that the IM 15 Rotary Jet Mixer is positioned at the correct level and submerged into the liquid. Two or four nozzles feed the liquid, gas or powder into the liquid in the tank. The nozzles rotate around both the horizontal and vertical axes in a 360° movement. This three-dimensional jet rotation enables the jets to reach the entire tank volume, providing fast, efficient mixing of the injected liquid, gas or powder without requiring batch rotation.

The complete system is built with a circulation loop, enabling liquid to be pumped from the bottom of the tank and back into the Rotary Jet Mixer. For faster mixing requirements, several rotary jet mixers can be installed in series.

Certificates

2.1 material certificate, ATEX.



TECHNICAL DATA

Lubricant:	Self-lubricating with the mixing/cleaning fluid
Connection:	Standard thread 1.5" BSP or NPT, female
Min. tank opening:	See dimension drawings

Pressure

Working pressure:	28-171 PSI
Recommended pressure during mixing:	28-85 PSI
Recommended pressure during CIP:	72-94 PSI

PHYSICAL DATA

Materials

Materials:	AISI 316L, AISI 316, SAF 2205, PTFE, PEEK, Tefzel, Ceramics
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Weight

Weight:	13.6 lbs
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Temperature

Max. working temperature:	203 °F
Max. ambient temperature:	284 °F

Qualification Documentation

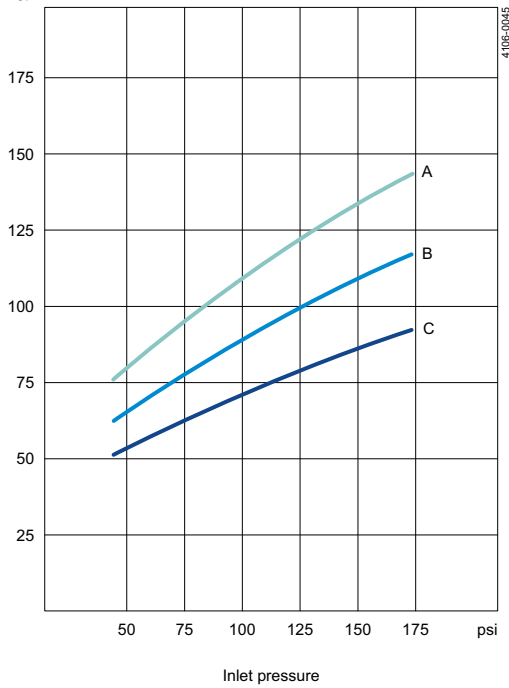
Documentation specification

	ATEX approved machine for use in explosive atmospheres.
ATEX	Catagory 1 for installation in zone 0/20 in accordance with Directive 2014/34/EU II 1G Ex h IIC 185 °F ...347 °F Ga II 1D Ex h IIIC T185 °F ...T284 °F Da

Flow rate

Relationship between inlet pressure and flow rate for liquids with waterlike properties for the IM 15 Rotary Jet Mixer.

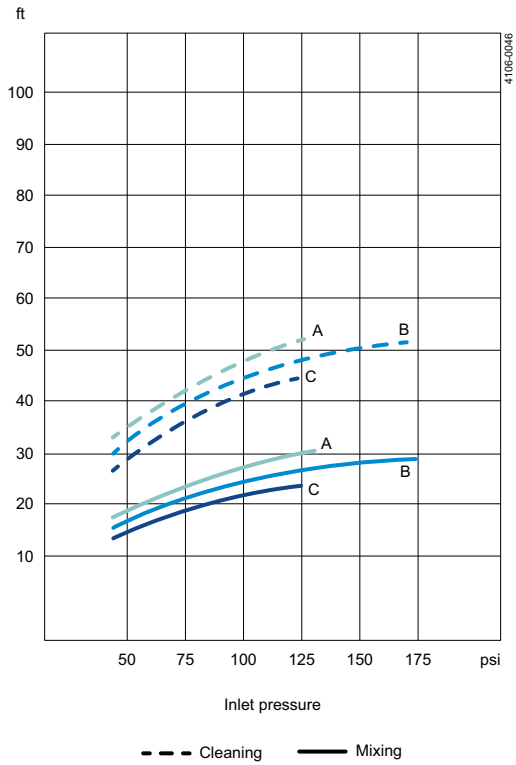
Volumetric flow rate
USgpm



A = 4 x ø0.31"
B = 4 x ø0.28"
C = 4 x ø0.24"

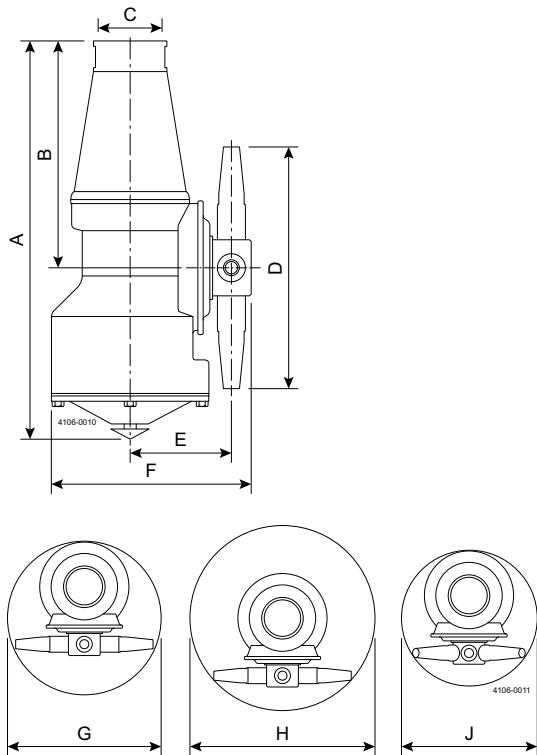
Reach of jet

Reach of jet for the IM 15 during cleaning, and indicative reach of jet for mixing of liquids with water-like properties.



A = 4 x \varnothing 0.31"
 B = 4 x \varnothing 0.28"
 C = 4 x \varnothing 0.24"

Dimensions (inch)

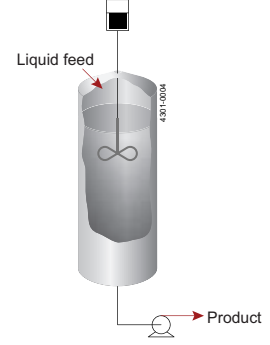
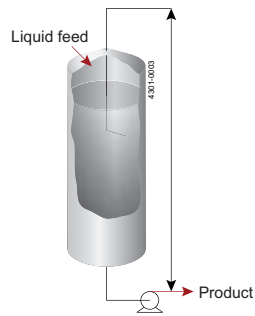
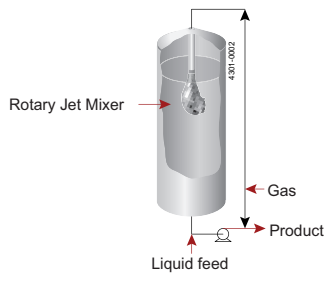


A	B	C	D	E	F	G	H	J
11.70	6.69	1½" BSP or 1½" / 2" NPT	8.03	3.07	5.98	Ø8.50	Ø10.39	Ø7.09

The Rotary Jet Mixing technology

Traditional Mixing technology

Propeller mixing



Alfa Laval RJ Mixer IM-20

Tank mixers

Introduction

The Alfa Laval IM 20 Rotary Jet Mixer effectively handles liquid mixing, gas dispersion, powder mixing, and tank cleaning while reducing mixing time, energy consumption and costs.

Patented technology based on proven Rotary Jet Head technology, it provides quick, efficient and uniform mixing without any batch rotation or the use of baffles. It also ensures greater process flexibility, making it easy to switch to new product formulations with diverse viscosities, densities and volumes.

Applications

The IM 20 Rotary Jet Mixer is designed for liquid mixing, gas dispersion (aeration, deaeration, carbonation), and powder mixing in process and storage vessels from 176.6 to 7062.9 ft³ in size across the dairy, food, beverage, brewery, healthcare, home and personal care, and biotechnology industries.

When the tank is empty, the IM 20 also acts as a superb Cleaning-in-Place (CIP) system, saving water, cleaning media and energy compared to using a spray ball CIP system.

Benefits

- Fast, effective liquid mixing performance in tanks
- Efficient gas and powder dispersion
- Can be used as tank cleaning machine
- Handles multiple applications
- Unmatched, cost-effective mixing performance
- Simplified, hygienic design, modest investment
- Optional pre-engineered skid-mounted pump unit available

Standard design

The Alfa Laval IM 20 Rotary Jet Mixer consists of a mixer body, turbine and nozzles. Compared to traditional systems using propeller mixers, there is no need for a shaft, seal or gearbox. Excellent mixing is achieved without the use of baffles or any batch rotation. Available in four different models (IM 10, IM 15, IM 20, IM 25), these mixers are designed for tank volumes from 26.4 gallons in size and beyond, and they are capable of handling re-circulation flow rates up to 3178 ft³/h.



Working principle

Before round pumping or adding any products from upstream pipe works, ensure that the IM 20 Rotary Jet Mixer is positioned at the correct level and submerged into the liquid. Two or four nozzles feed the liquid, gas or powder into the liquid in the tank. The nozzles rotate around both the horizontal and vertical axes in a 360° movement. This three-dimensional jet rotation enables the jets to reach the entire tank volume, providing fast, efficient mixing of the injected liquid, gas or powder without requiring batch rotation.

The complete system is built with a circulation loop, enabling liquid to be pumped from the bottom of the tank and back into the Rotary Jet Mixer. For faster mixing requirements, several rotary jet mixers can be installed in series.

Certificates

2.1 material certificate, ATEX.



TECHNICAL DATA

Lubricant:	Self-lubricating with the mixing/cleaning fluid
Connection:	Standard thread 2" BSP or NPT, female
Min. tank opening:	See dimension drawings

Pressure

Working pressure:	28-171 PSI
Recommended pressure during mixing:	28-85 PSI
Recommended pressure during CIP:	72-94 PSI

PHYSICAL DATA

Materials

Materials:	AISI 316L, AISI 316, SAF 2205, PEEK, PVDF, Tefzel, Ceramics
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Weight

Weight:	26.9 lbs
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Temperature

Max. working temperature:	203 °F
Max. ambient temperature:	284 °F

Operation

Secure that the mixer is positioned in the correct level and submerged into the liquid before round pumping or when adding any additional products from any up-stream pipe works.

Qualification Documentation

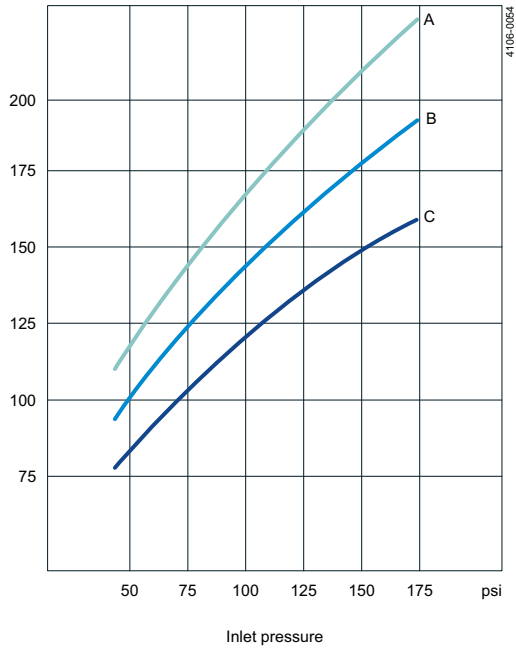
Documentation specification

	ATEX approved machine for use in explosive atmospheres.
	Catagory 1 for installation in zone 0/20 in accordance with Directive 2014/34/EU
ATEX	II 1G Ex h IIC 185 °F ...347 °F Ga
	II 1D Ex h IIC T185 °F ...T284 °F Da

Flow rate

Relationship between inlet pressure and flow rate for liquids with waterlike properties for the IM 20 Rotary Jet Mixer.

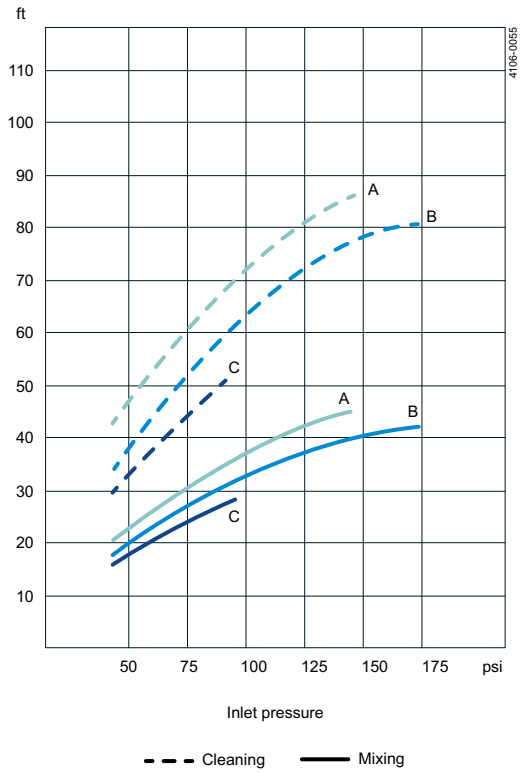
Volumetric flow rate
USgpm



A = 4 x \emptyset 0.39"
B = 4 x \emptyset 0.35"
C = 4 x \emptyset 0.31"

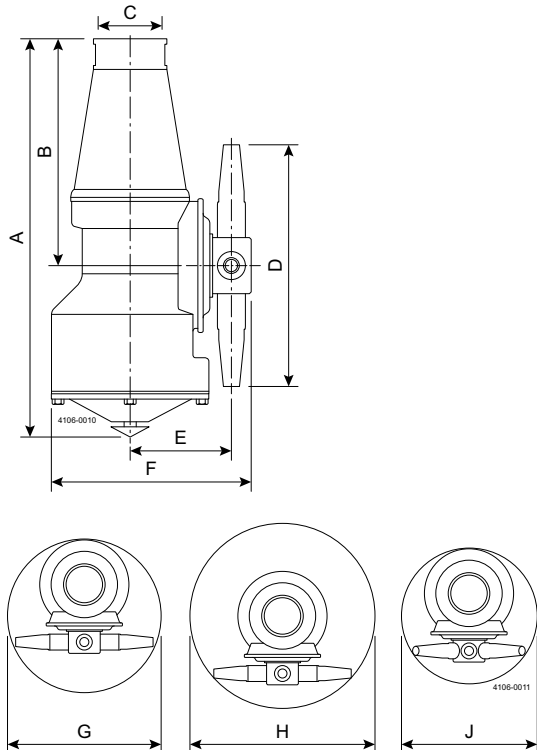
Reach of jet

Reach of jet for the IM 20 during cleaning, and indicative reach of jet for mixing of liquids with water-like properties.



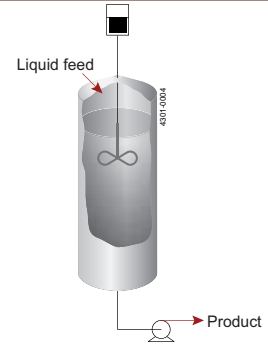
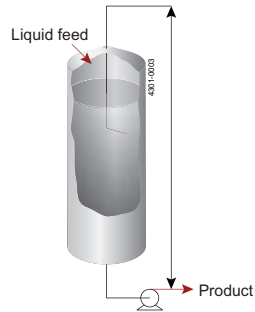
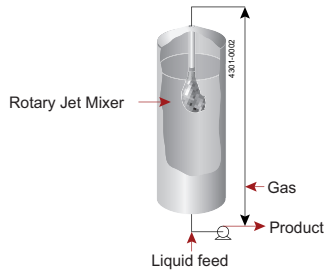
A = 4 x ø0.39"
B = 4 x ø0.35"
C = 4 x ø0.31"

Dimensions (inch)



A	B	C	D	E	F	G	H	J
14.02	8.66	2" BSP / 2" NPT	10.55	3.86	7.68	Ø11.02	Ø13.50	Ø9.13

The Rotary JetMixing technology	Traditional Mixing technology	
	Round pumping	Propeller mixing



Alfa Laval RJ mixer IM-25

Tank mixers

Introduction

The Alfa Laval IM 25 Rotary Jet Mixer effectively handles liquid mixing, gas dispersion, powder mixing, and tank cleaning while reducing mixing time, energy consumption and costs.

Patented technology based on proven Rotary Jet Head technology, it provides quick, efficient and uniform mixing without any batch rotation and the use of baffles. It also ensures greater process flexibility, making it easy to switch to new product formulations with diverse viscosities, densities and volumes.

Applications

The IM 25 Rotary Jet Mixer is designed for liquid mixing, gas dispersion (aeration, deaeration, carbonation), and powder mixing in process and storage vessels from 13.08 to 1307.95 yard³ in size across the dairy, food, beverage, brewery, healthcare, home and personal care, and biotechnology industries.

When the tank is empty, the IM 25 also acts as a superb Cleaning-in-Place (CIP) system, saving water, cleaning fluids and energy compared to using a spray ball CIP system.

Benefits

- Fast, effective liquid mixing performance in tanks
- Efficient gas and powder dispersion
- Can be used as tank cleaning machine
- Handles multiple applications
- Unmatched, cost-effective mixing performance
- Simplified, hygienic design, modest investment
- Optional pre-engineered skid-mounted pump unit available

Standard design

The Alfa Laval IM 25 Rotary Jet Mixer consists of a mixer body, turbine and nozzles. Compared to traditional systems using propeller mixers, there is no need for a shaft, seal or gearbox. Excellent mixing is achieved without the use of baffles or any batch rotation. Available in four different models (IM 10, IM 15, IM 20, IM 25), these mixers are designed for tank volumes from 26.4 gallons in size and beyond, and they are capable of handling re-circulation flow rates up to 3178 ft³/h.



Working principle

Before round pumping or adding any products from upstream pipe works, ensure that the IM 25 Rotary Jet Mixer is positioned at the correct level and submerged into the liquid. Two or four nozzles feed the liquid, gas or powder into the liquid in the tank. The nozzles rotate around both the horizontal and vertical axes in a 360° movement. This three-dimensional jet rotation enables the jets to reach the entire tank volume, providing fast, efficient mixing of the injected liquid, gas or powder without requiring any batch rotation.

The complete system is built with a circulation loop, enabling liquid to be pumped from the bottom of the tank and back into the Rotary Jet Mixer. For faster mixing requirements, several rotary jet mixers can be installed in series.

Certificates

2.1 material certificate, ATEX.



TECHNICAL DATA

Lubricant:	Self-lubricating with the mixing/cleaning fluid
Connection:	Standard thread 2.5" BSP, female
Min. tank opening:	See dimension drawings

Pressure

Working pressure:	28 - 171 PSI
Recommended pressure during mixing:	57 - 114 PSI
Recommended pressure during CIP:	72 - 145 PSI

PHYSICAL DATA

Materials

Materials:	AISI 316L, AISI 316, SAF 2205, PEEK, PVDF, Carbon, Tefzel, Ceramics
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Weight

Weight:	26.9 lbs
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Temperature

Working pressure:	205 °F
Recommended pressure during mixing:	284 °F

Qualification Documentation

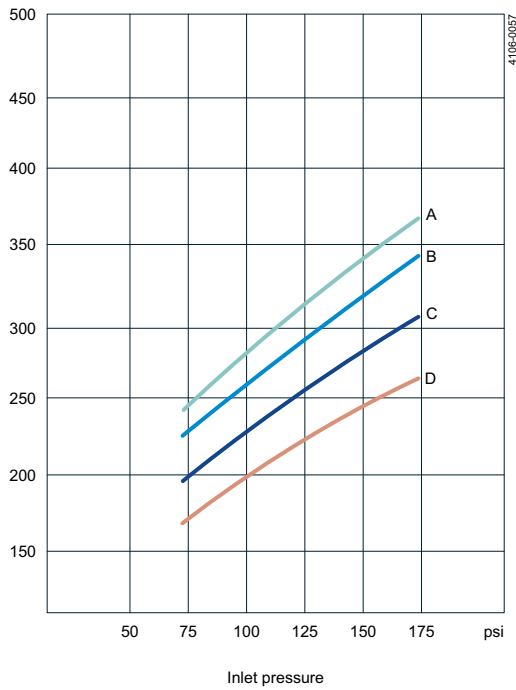
Documentation specification

	ATEX approved machine for use in explosive atmospheres.
	Catagory 1 for installation in zone 0/20 in accordance with Directive 2014/34/EU
ATEX	II 1G Ex h IIC 185 °F ...347 °F Ga
	II 1D Ex h IIC T185 °F ...T284 °F Da

Flow rate

Relationship between inlet pressure and flow rate for liquids with waterlike properties for the IM 25 Rotary Jet Mixer.

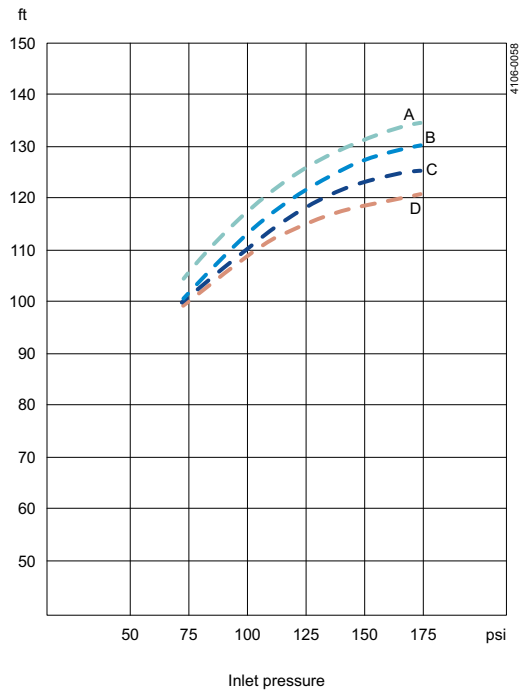
Volumetric flow rate
USgpm



A = 2 x \varnothing 0.83" D = 2 x \varnothing 0.59"
 B = 2 x \varnothing 0.75"
 C = 2 x \varnothing 0.67"

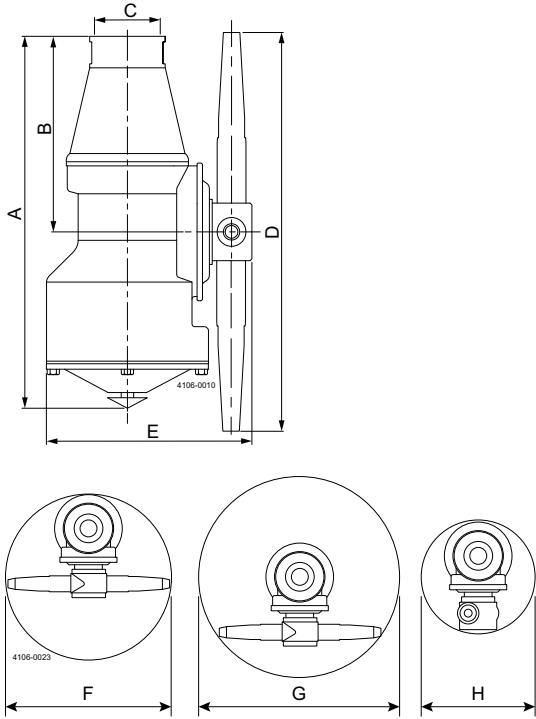
Reach of jet

Reach of jet for the IM 25 during cleaning, and indicative reach of jet for mixing of liquids with water-like properties.



A = 2 x \varnothing 0.83" D = 2 x \varnothing 0.59"
 B = 2 x \varnothing 0.75"
 C = 2 x \varnothing 0.67"

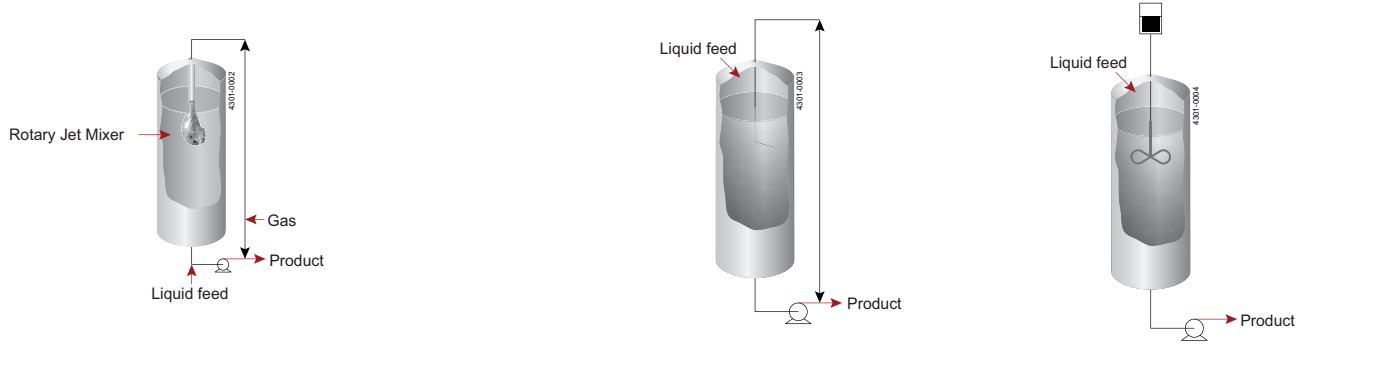
Dimensions (inch)



A = 2.5" BSP

A	B	C	D	E	F	G	H
11.26	6.10	3.15	13.27	8.66	Ø13.50	Ø16.69	Ø8.78

The Rotary Jet Mixing technology	Traditional Mixing technology	
	Round pumping	Propeller mixing



Item no.	Flow at 72.5 PSI	No. of nozzles	Dimension (inch)				
	yard ³ /h		Dimension (inch)	A	C	E	
							Thread (1" NPT-female)
TE30N030	15.7	4 x \varnothing 0.15	9.06	1.42	0.63	3.94	
TE30B030	9.2	4 x \varnothing 0.15	9.06	1.42	0.63	3.94	
TE30B040	12.4	4 x \varnothing 0.18	9.06	1.42	0.63	3.94	
TE30B050	15.7	4 x \varnothing 0.22	9.06	1.42	0.63	3.94	

Item no.	Flow at 72.5 PSI	No. of nozzles	Guide	Dimension (inch)				
	yard ³ /h			Dimension (inch)	A	C	E	
								Thread (1½" NPT-female)
TE31B166	20.9	4 x ø0.24	100 %	11.69	1.97	0.63	8.03	
TE31B167	24.9	4 x ø0.28	100 %	11.69	1.97	0.63	8.03	
TE31B177	24.9	4 x ø0.28	0 %	11.69	1.97	0.63	8.03	
TE31B178	29.4	4 x ø0.31	0 %	11.69	1.97	0.63	8.03	
								Thread (1½" Rp-female (BSP))
TE31B181	18.3	2 x ø0.31	100 %	11.69	1.97	0.63	10.63	
TE31B070	24.9	4 x ø0.28	0 %	11.69	1.97	0.63	8.03	
TE31B182	24.9	2 x ø0.39	0 %	11.69	1.97	0.63	10.63	
TE31B183	27.5	2 x ø0.43	0 %	11.69	1.97	0.63	10.63	
TE31B080	29.4	4 x ø0.31	0 %	11.69	1.97	0.63	8.03	

Item no.	Flow at 72.5 PSI	No. of nozzles	Guide	Dimension (inch)				
	yard ³ /h			Dimension (inch)	A	C	E	
Thread (2" NPT-female (BSP))								
TE32B181	30.1	4 x \varnothing 0.31	100 %	14.02	2.56	0.63	10.55	
TE32B191	36.0	4 x \varnothing 0.35	100 %	14.02	2.56	0.63	10.55	
TE32B213	36.6	2 x \varnothing 0.51	0 %	14.02	2.56	0.63	13.27	
TE32B200	42.5	4 x \varnothing 0.39	0 %	14.02	2.56	0.63	10.55	
Thread (2" Rp-female (BSP))								
TE32B081	30.1	4 x \varnothing 0.31	100 %	14.02	2.56	0.63	10.55	
TE32B090	36.0	4 x \varnothing 0.35	0 %	14.02	2.56	0.63	10.55	
TE32B091	36.0	4 x \varnothing 0.35	100 %	14.02	2.56	0.63	10.55	
TE32B113	36.6	2 x \varnothing 0.51	0 %	14.02	2.56	0.63	13.27	
TE32B100	42.5	4 x \varnothing 0.39	0 %	14.02	2.56	0.63	10.55	
TE32B115	48.4	2 x \varnothing 0.59	0 %	14.02	2.56	0.63	13.27	

Item no.	Flow at 116 PSI	No. of nozzles	Guide	Dimension (inch)			
	yard ³ /h			Dimension (inch)	A	C	
Thread (2½" Rp-female (BSP))							
TE33E015	62.8	2 x ø0.59	0 %	11.26	3.15	13.27	
TE33E017	73.2	2 x ø0.67	0 %	11.26	3.15	13.27	
TE33E019	82.4	2 x ø0.75	0 %	11.26	3.15	13.27	
TE33E021	88.9	2 x ø0.83	0 %	11.26	3.15	13.27	

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Powder mixers

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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 72.5 psi. 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

US version:	(380-480 VAC)
CANADA version:	(525-600 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 < 32 µ inch
Shaft seal:	Single mechanical SiC/SiC, flushed version
Flush tank:	Approx. 1 ltr. incl. sight glass



Note! Flush through possible via easy connection.

Motor

US/CANADA version: Standard-C Face/Foot mounted NEMA motor with a fixed ball bearing on drive side, according to NEMA standard, 2 poles = 3600 RPM at 60 Hz, enclosure TEFC Wash Down.

Power:

Motor power:	20 hp
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Frequency drive

Type:	Danfoss VLT® AutomationDrive FC 300 series
Power rating:	25 hp (Normal overload 110 % / 60 s)
Input voltage (US version):	380-480 VAC
Input voltage (CANADA version):	525-600 VAC
Mains option:	Local mains disconnect
Insulation class:	IP66/NEMA 4X
RFI filter (US version):	Class A1/B
RFI filter (CANADA version):	No filter
Display:	Graphical local control panel

Connection

Liquid inlet connection:	TriClamp 2"
Liquid outlet connection:	TriClamp 1½"

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:	14 °F to 203 °F (Max. at CIP)
Temperature, Media, Maximum:	158 °F

Pressure

Recommended inlet pressure:	0.0 - 2.9 PSI
Min. back pressure recommended:	14.5 PSI

Dry ingredient capacity:	Dependent on powder (e.g. 6614 lb/h capacity for skimmed milk powder)
Noise level (39.3 in):	< 90 dB(A)

Dimensions/weight

HxWxL [inch]:	44.45 X 32.52 X 52.76
Weight:	Approx. 617 lb
Max. table load:	661 lb

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 500 gallons 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.

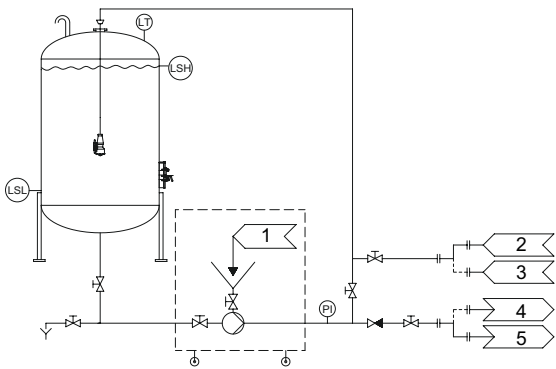


Figure 1. Example of setup with the Alfa Laval Hybrid Powder Mixer and an Alfa Laval Rotary Jet Mixer

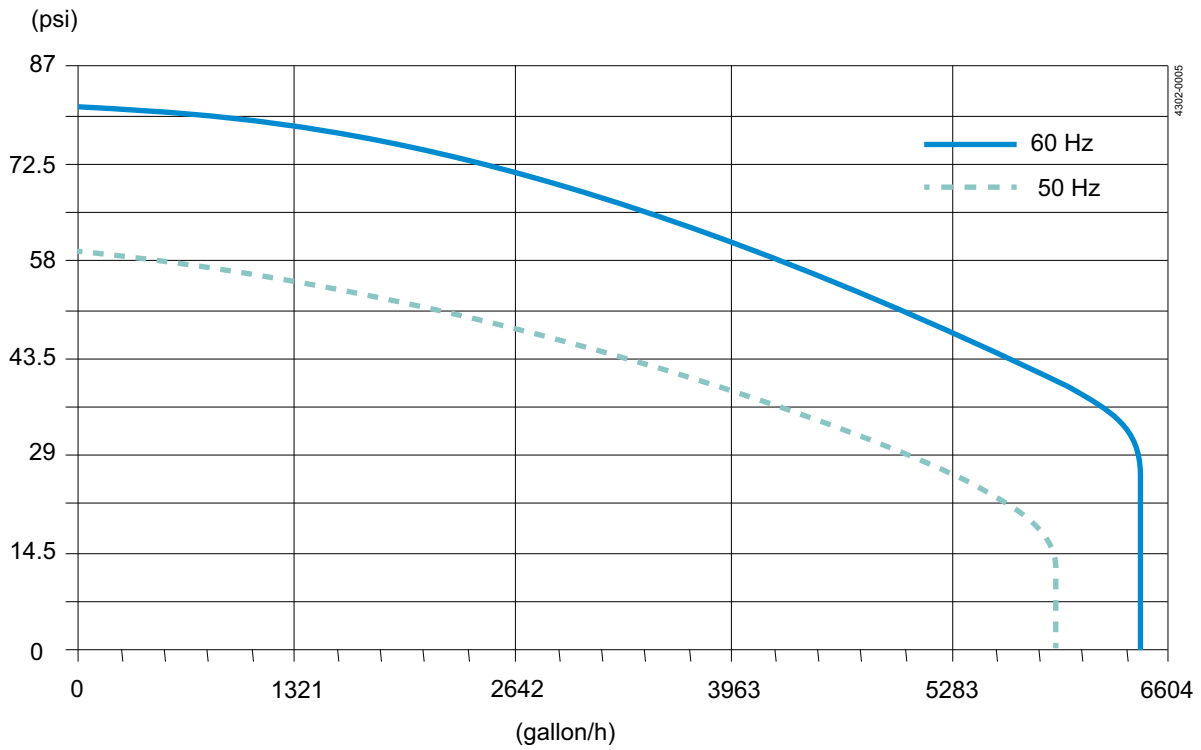


Figure 2. Pump Curve for the Alfa Laval Hybrid Powder Mixer

Pump curve with water

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 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 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:	230/460 VAC @ 60 Hz
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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 < 32 µ inch
Shaft seal:	Single mechanical SiC/SiC, flushed version
Flush tank:	Approx. 0.26 gallon incl. sight glass



Note! Flush through possible via easy connection.

Power

Motor power:	20 hp
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Frequency drive

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

Connections

Liquid inlet connection:	TriClamp 2"
Liquid outlet connection:	TriClamp 1½"

OPERATIONAL DATA

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

Temperature range:	14 °F to 203 °F (max. at CIP)
Temperature, Media, Maximum:	158 °F

Pressure

Recommended inlet pressure:	0.0 - 2.9 PSI
Min. back pressure recommended:	14.5 PSI

Dry ingredient capacity:	Dependent on powder (for example, 6614 lb/h capacity for skimmed milk powder)
Noise level (39.3 in):	< 90 dB(A)

Dimensions/weight

HxWxD [inch]:	43.90 x 22.83 x 51.18
Weight:	507 lb

Motor

Standard-C Face/Foot mounted NEMA motor with a fixed ball bearing on drive side, according to NEMA standard, 2 poles = 3600 RPM at 60 Hz, enclosure TEFC Wash Down

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 500 gallons 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 14.5 psi 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.

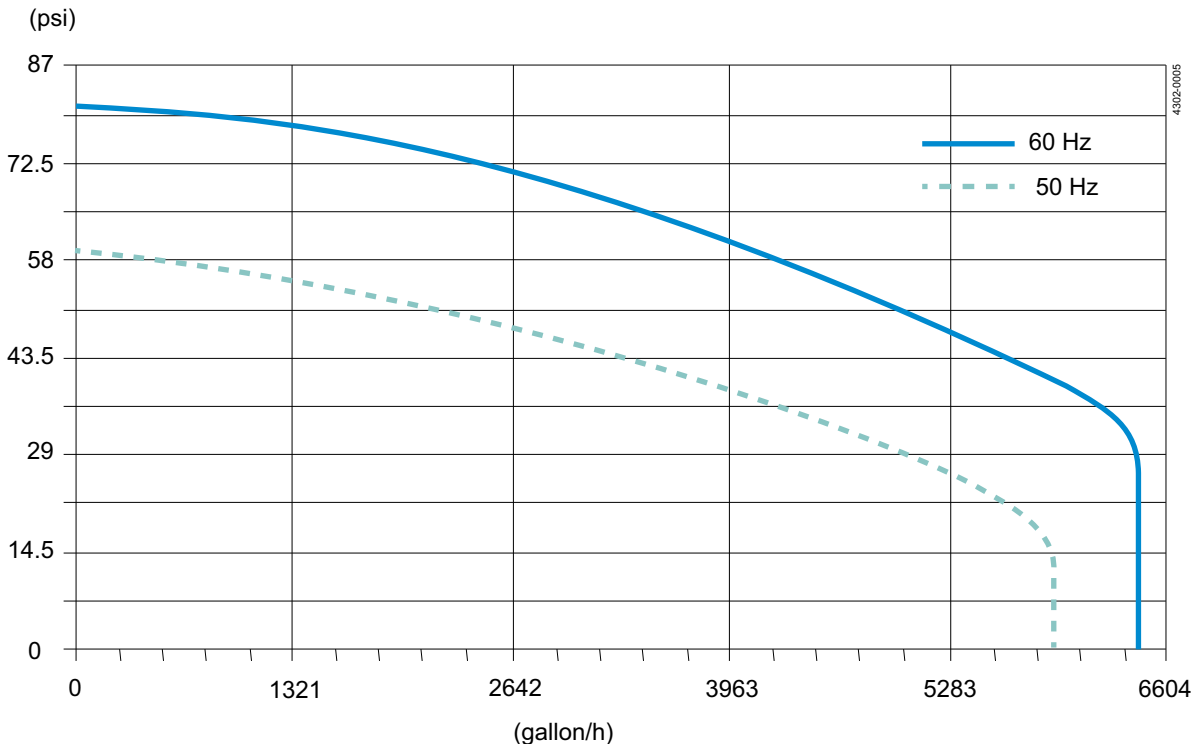
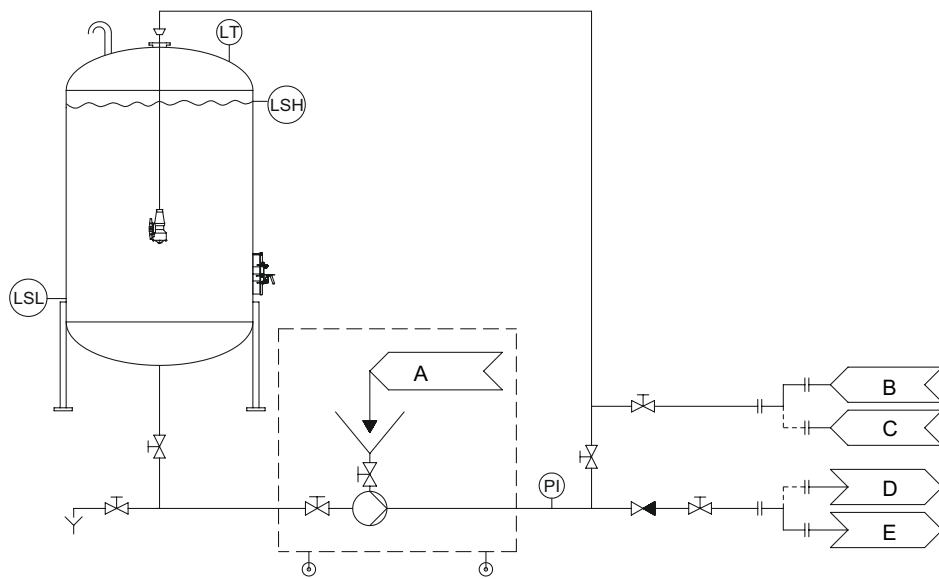


Figure 1. Pump Curve for the Alfa Laval Hybrid Powder Mixer S15

Pump curve with water



NOTE: This diagram is for illustration and guidance only

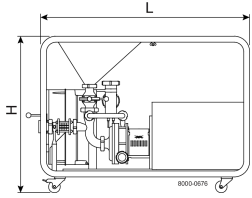
- | | |
|---------------------|-------------|
| A = Powder/Crystals | D = CIP-R |
| B = Main media | E = Product |
| C = CIP-F | |

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

ALSIS Code: 5521

Item no.	Description	Dimension (inch)			
		L	W	H	
Hybrid Powder Mixer, HPM S15, US version					
8010014182	Alfa Laval Hybrid Powder Mixer HPM S15 Motor power: 20 hp Voltage: 230/460 VAC @ 60 Hz Inlet TriClamp 2" Outlet: TriClamp 1 1/2"	51.18	22.83	43.90	

ALSIS Code: 5521

Item no.	Description	Dimension (inch)			
		L	W	H	
Hybrid Powder Mixer, HPM M15, US version					
8010014183	Alfa Laval Hybrid Powder Mixer HPM M15 Motor power: 25 hp Voltage: 380-480 VAC Inlet: TriClamp 2" Outlet: TriClamp 1½"	52.76	32.52	44.49	



This is Alfa Laval

Alfa Laval is active in the areas of Energy, Marine, and Food & Water, offering its expertise, products, and service to a wide range of industries in some 100 countries. The company is committed to optimizing processes, creating responsible growth, and driving progress – always going the extra mile to support customers in achieving their business goals and sustainability targets.

Alfa Laval's innovative technologies are dedicated to purifying, refining, and reusing materials, promoting more responsible use of natural resources. They contribute to improved energy efficiency and heat recovery, better water treatment, and reduced emissions. Thereby, Alfa Laval is not only accelerating success for its customers, but also for people and the planet. Making the world better, every day. It's all about Advancing better™.

How to contact Alfa Laval

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

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