



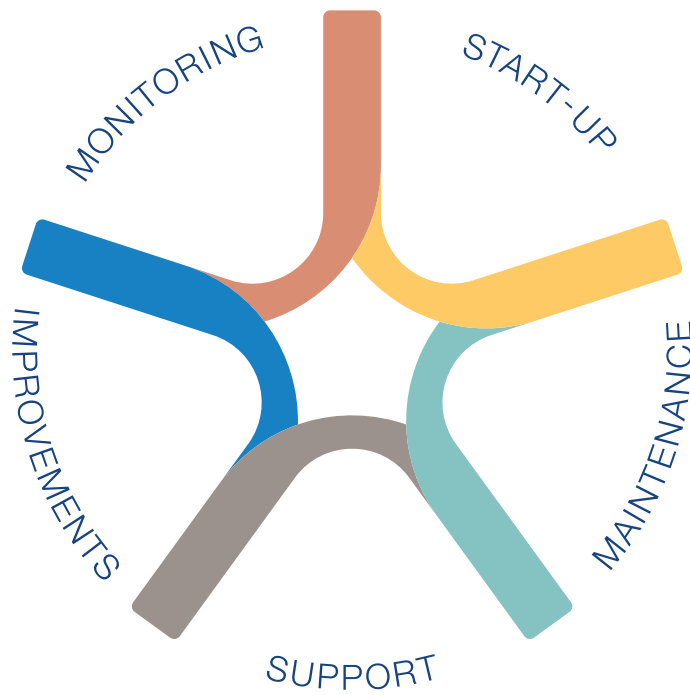
Preventive Maintenance Guidelines

Guidelines for Hygienic Fluid Handling Equipment, May 2020



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1.1 Preventive Maintenance Guidelines



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Valves

Preventive maintenance guidelines

Plan your budget and your downtime

A production stop caused by poor operation or breakdown is costly. Both due to lost product and expensive service.

The most cost-effective way to ensure product safety and production reliability, is to plan and carry out service at scheduled intervals.

Using the Alfa Laval guidelines it is easy to plan the relevant maintenance intervals. You are able to plan your operating budget and the risk of breakdowns is virtually eliminated. Financially, preventive maintenance makes sense.

Instruction manuals and service videos



Detailed manuals are supplied with every product. Service and maintenance videos have been created to enable you to service Alfa Laval products in a correct and efficient way. Scan the QR code to access the service videos.

Genuine spare parts and service kits



Alfa Laval Service Kits and Upgrade Kits are available for scheduled maintenance. They contain all the relevant parts needed for general service. Using genuine Alfa Laval spare parts guarantees the right quality and composition of materials. They of course come with full traceability. Scan the QR code to access the spare parts catalogue.



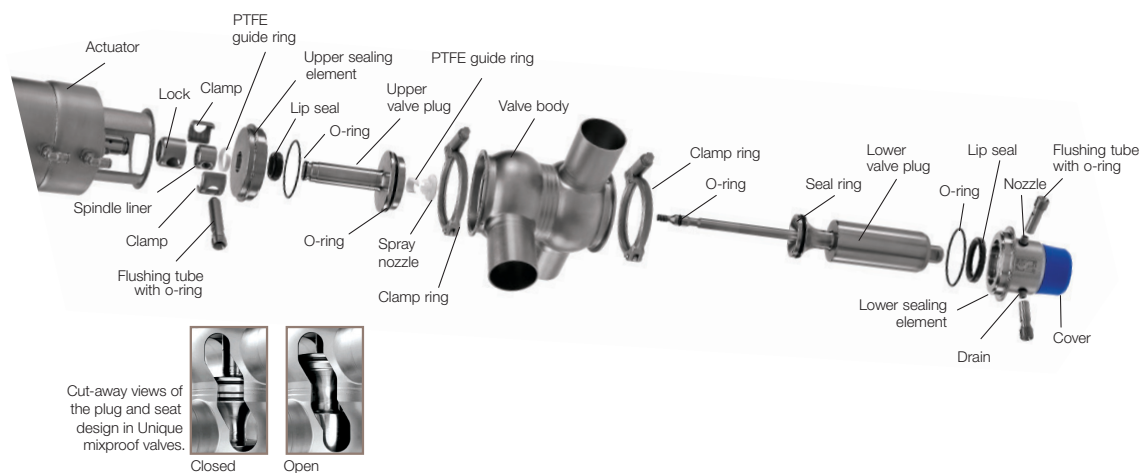
Alfa Laval service tools

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Example of exploded view - Unique Mixproof

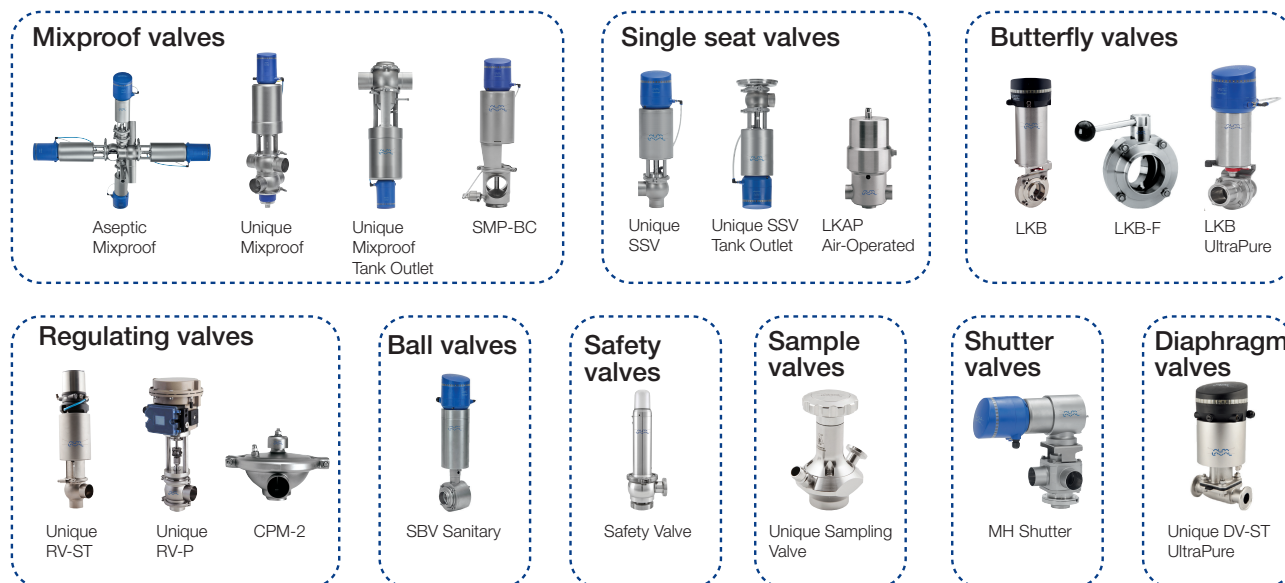


Inspect the valves regularly

The Alfa Laval valves are available in various configurations to fit specific applications. To inspect the valves you need to know the type of valves and which seals are used. This information can be obtained online by using the serial number no which along with year of manufacturing is laser marked on to the actuator.

Preventive maintenance aims to prevent failure of equipment by doing e.g. regular inspection of seals, lubrication and/or adjustments of surrounding equipment without prior knowledge of equipment failure. Based on experience and knowledge about the running conditions, it is also possible to replace wear parts before they fail. Keeping a record of the valve is a good way to build experience for inspection planning.

This Preventive Maintenance Guideline is applicable to most types of valves. Below are show some examples:

**Suggested scheduled maintenance intervals**

Several factors influence the maintenance cycle. The number of activations is important but even with few activations the rubber materials will harden over time and need replacement. The time depends on the product contents, concentration and type of CIP, SIP, differential pressure and processing temperatures.

To ensure that your valves operate efficiently, it is essential to follow a simple preventive maintenance programme. Good maintenance requires careful attention at regular intervals. For lubrication please always refer to the manual for specific information on oil/grease types and required maintenance. **Alfa Laval recommend:**

- Always carefully follow the instruction manual for the specific valve.
- Lubricate relevant rubber parts with the lubricant supplied with the service kit before fitting.
- Service kit for valves actuator parts: Replace after 5 years or depending on working conditions.
- Service kit for valves product wetted parts: Replace every 12 months or depending on working conditions.
- Service kit for Unique sampling valves: Replace after 500-1000 samples depending on working conditions.

The above guidelines may not apply in all working conditions.

Please contact Alfa Laval for information relating to specific applications.

Centrifugal pumps

Preventive maintenance guidelines

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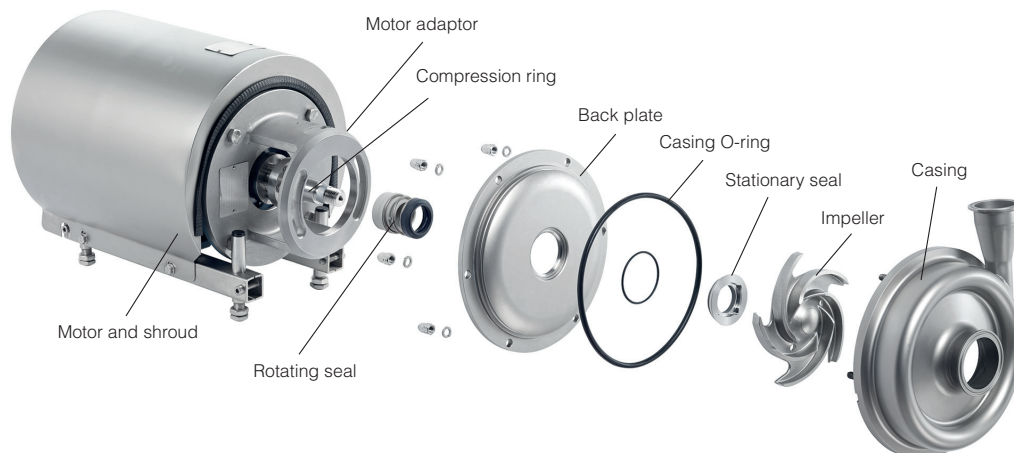
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Example of exploded view - LKH

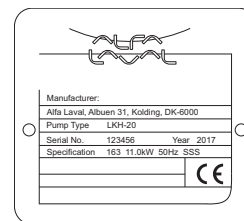


Inspect the pump regularly

The Alfa Laval pumps are available in various configurations to fit specific applications. To inspect the pump you need to know the type of pump and which type of seal is used. This information is available on the name plate of your pump. Further information can be obtained online by using the serial number.

Preventive maintenance aims to prevent failure of equipment by doing e.g. regular inspection and lubrication.

Based on experience and knowledge about the running conditions it is also possible to replace wear parts before they fail. Keeping a maintenance log is a good way to build experience.



Keep a record of the pump, use the statistics for inspection planning LKH, LKH Evap, LKHI, LKHPPF, LKHM, LKHex, SolidC, i-CP, FM-OS, GM, LKH Prime, MR	Supplier Instruction	Inspect / Clean / Lubricate		
		Weekly	Monthly	Yearly
Over all pump				
- Keep pump clean and protected from environment		x		
- Listen for unusual noise		x		
- Keep a record of the pump		x		
- Use the statistics for inspection planning				
Shaft seal				
- Inspection for leakage (* SSS; FSS; DMSS/DSS)		x		
- Flow rate of flushing (* FSS, DMSS/DSS)		x		
Motor	x			
Motor surface temperature			x	
Bearing temperatures			x	
Bearing vibration			x	
Inspection Motor bearings				x
Pump head				
Check pump head and flow rate			x	
** Check for internal wear and pitting				x

* SSS=Single shaft seal, FSS= Flushed single shaft seal, DMSS/DSS= Double mechanical shaft seal

** During replacing shaft seals, service kit contains all necessary parts.

Scheduled maintenance intervals

To ensure that your pumps operate efficiently, it is essential to follow a simple preventive maintenance programme, which will keep your machine in good working condition. Good maintenance requires careful attention at regular intervals. For pump lubrication please always refer to the manual for specific information on oil/grease types and required maintenance. **Alfa Laval recommend:**

- Service kit should be replaced after 12 months. Always replace shaft seal and o-rings at the same time.
- Inspect motor bearings yearly, replace complete bearing if worn, ensure that the bearing is axially locked (See motor instructions)

To replace the shaft seal it is necessary to remove the pump casing. This is a good opportunity to inspect the casing, impeller and backplate for signs of wear and cavitation. This should be done at least once a year and recorded in the pumps maintenance log.

After commissioning, when it is ensured, that the pump is installed stress free and running without cavitation, the vibrations should be measured and recorded. Excessive vibrations will reduce the life span of the bearings. An increase in vibrations may indicate that the bearings should be replaced. Bearing temperatures depend on several factors incl. the temperature of the surroundings. Consequently it is not possible to state an absolute temperature. If however an increase in temperature above that of normal recorded takes place, it may be an indication that the bearings should be replaced. Temperatures above 100°C will significantly reduce the life span of the grease. Please notice that some motor bearings are permanently greased whilst others need regular relubrication. Please always refer to the manual for specific information on bearing types and required maintenance.

The above guidelines may not apply in all working conditions.

Please contact Alfa Laval for information relating to specific applications.

Positive displacement pumps

Preventive maintenance guidelines

Plan your budget and your downtime

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Instruction manuals and service videos



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Genuine spare parts and service kits



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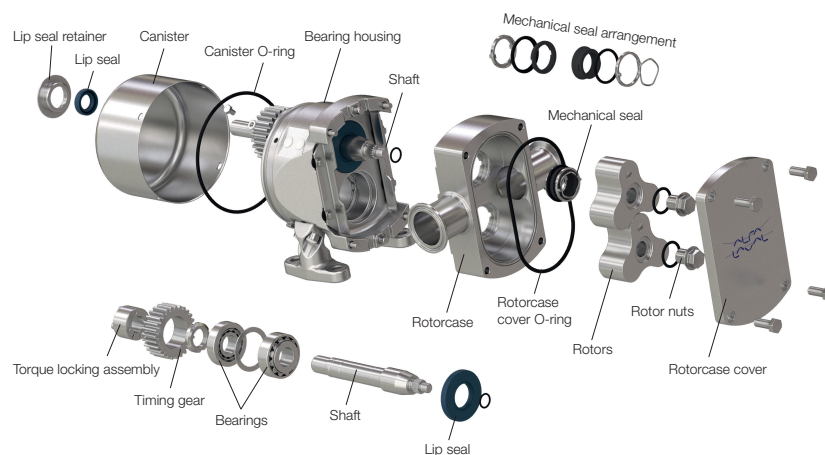
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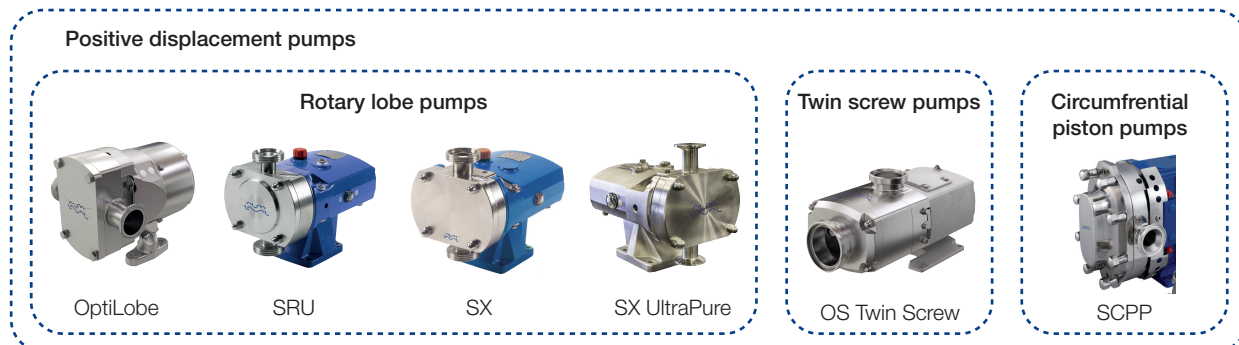
Example of exploded view - OptiLobe



Inspect the pump regularly

The Alfa Laval pumps are available in various configurations to fit specific applications. To inspect the pump you need to know the type of pump. This information is available on the name plate of your pump. Further information can be obtained online by using the serial number.

Preventive maintenance aims to prevent failure of equipment by doing e.g. regular inspection and lubrication. Based on experience and knowledge about the running conditions it is also possible to replace wear parts before they fail. Keeping a maintenance log is a good way to build experience. It is advisable to install pressure gauges on both sides of the pump so that any problems within the pump/pipework can be monitored.



This Preventive maintenance guidelines mainly cover positive displacement pumps as below:

	Inspect / Clean / Lubricate			
	Supplier Instruction	Weekly	Monthly	Half-yearly
OptiLobe, SRU, SX & SX UltraPure, Twin Screw, SCPP				
Checking the seals for leakage		x		
Checking the lip seals for leakage		x		
Check pumping pressures		x		
SRU, SX, & SX UltraPure				
Check the oil seals for leakage		x		
Checking the oil level in the gearcase with pump stationary		x		
Drive unit / all type of pump	x			

Scheduled maintenance intervals

To ensure that your pumps operate efficiently, it is essential to follow a simple preventive maintenance programme, which will keep your machine in good working condition. Good maintenance requires careful attention at regular intervals. For pump lubrication please always refer to the manual for specific information on oil/grease types and required maintenance. Please check if the positive displacement pump is supplied pre-filled with oil.

Alfa Laval recommend:

- Service kit for all positive displacement pumps replaced every 12 months.
- SRU / SX: Change of oil every 3000 hours of pump operation.
- OptiLobe: Change of grease every 20000 hours of pump operation.
- OS Twin Screw: Change of oil every 4000 hours of pump operation.
- SCPP: Change of oil every 750 hours.

The above guidelines may not apply in all working condition.

Please contact Alfa Laval for information relating to specific applications.

Agitators

Preventive maintenance guidelines

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Example of exploded view - ALS with D-seal



Inspect the agitator regularly

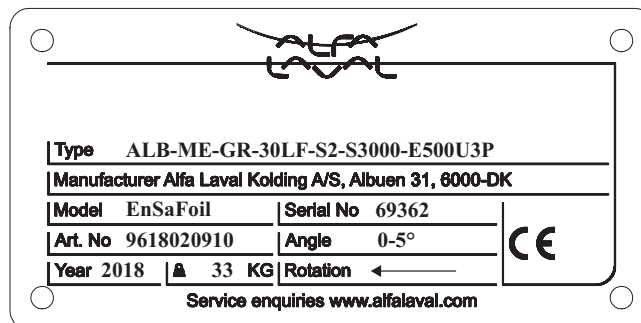
The Alfa Laval agitator is available in various configurations fit to solve a specific application. To inspect the agitator you need to know the type of agitator and which seals are used. This information is available on the name plate of your agitator. Further information can be obtained online by using the serial number.

Agitator type definition

Top mounted agitators	Type: ALT
Top mounted agitators with Bottom support	Type: ALTB
Bottom mounted agitators	Type: ALB
Side mounted agitators	Type: ALS

Type of agitator and example of agitator name plate.

For more information please contact Alfa Laval.



Preventive maintenance aims to prevent failure of equipment by doing e.g. regular lubrication and adjustments. Based on experience and knowledge about the running conditions, it is also possible to replace wear parts before they fail. Keeping a maintenance log is a good way to build experience.

	Inspect/clean/lubricate			
	Supplier instruction	Weekly	Monthly	Half-yearly
Drive unit/all types of agitator				
Motor	x			
- Clean surfaces - to avoid overheating		x		
Gear	x			
- Clean vent screw (if any)		x		
- Check for oil leakage		x		
Flange/all types of agitator				
Clean drain			x	
Shaft sealing for ALS/ALB				
-Not flushed mechanical seal: S1, S2, S3, S3SD			x	
-Flushed mechanical seal: DC,D			x	
Shaft sealing for ALT/ALTB				
- Radial seal: R		x		
- V-ring seal: V			x	
-Not flushed mechanical seal: S, S3			x	
-Flushed mechanical seal: DC, D			x	
Bearing frame if any/all types of agitator				
Clean PreVent screw		x		
Check spider clearance				x
Check gaskets				x
Lubricate radial seals				x
Impeller device/all types of agitator				
Sticky media				
- Clean impeller device			x	
Abrasive media				
- Check blade thickness*			x	
Check fastening of pointed set screws			x	
Guidance/support for ALT/ALTB				
Shaft rotation- radial movement < 5mm				
Bushing: BS1, BS3				x
Bushing: BS1 with Abrasive media			x	
Bushing: BS2, MS2			x	

* If any suspicion of reduction in blade thickness, contact Alfa Laval and inform serial no. stated on the name plate

Scheduled maintenance intervals

To ensure that your agitator operates efficiently, it is essential to follow a simple preventive maintenance programme, which will keep your machine in good working conditions. Good maintenance requires careful attention at regular intervals.

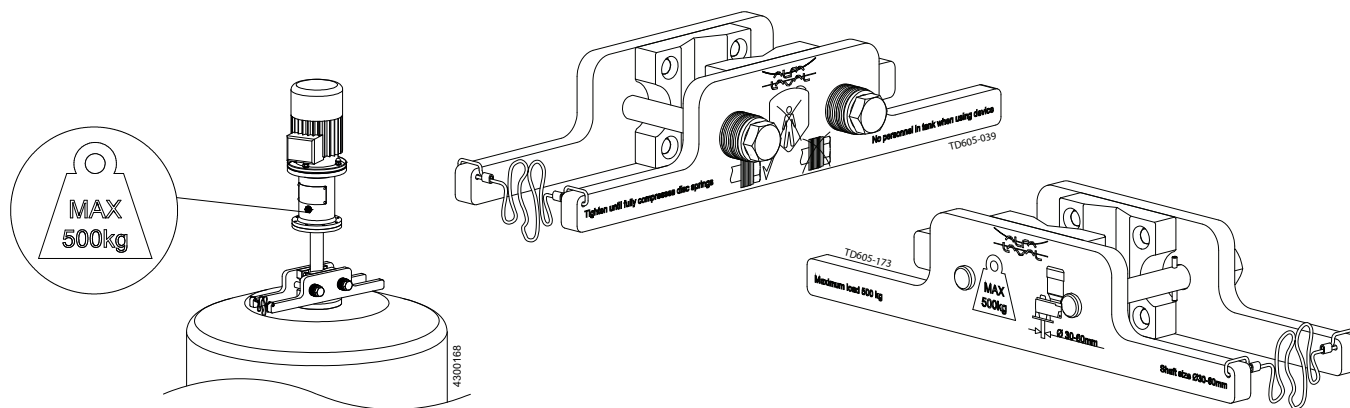
The following recommended preventive maintenance procedures are based on the average operating conditions of most Alfa Laval agitators. However, you will appreciate that a machine, which is subject to rough and dirty conditions, will need more frequent attention than one working in ideal conditions. We trust that you will adjust your maintenance programme to meet the demands of your normal operating conditions.

	Replace every:			
	3000 hours or yearly	3000 hours or every 3rd year	6000 hours or every 3rd year	10000 hours or every 3rd year
Shaft sealing for ALS/ALB				
-Not flushed mechanical seal: S1, S2, S3			x	
-Mechanical seal/shut down seal: S3SD		x		
-Flushed mechanical seal: DC, D				x
Shaft sealing for ALT/ALTB				
- Radial seal: R	x			
- Gab seal: G				x
- V-ring seal: V	x			
- Not flushed mechanical seal: S, S3		x		
- Flushed mechanical seal: DC, D				x
Bearing frame for ALS/ALB/ALT/ALTB				
Spider type coupling (if any)				x
Static seals				x
Radial seals	x			
Bearings, rmp < 700				x
Bearings, rmp > 700			x	
Guidance/support for ALT/ALTB				
Bushing: BS1, BS3			x	
Bushing: BS2, MS2	x			
Bushing: BS1, BS2, MS2	Replace if temperature > 100°C			

Agitator service tool example

Shaft retainer tool - a very useful tool during maintenance of top mounted agitators (ALT / ALTB). Designed to support agitators at a weight up to 500 kilogram. For more information please refer to the manual.

Description	Item no.
Shaft diameter between Ø30 and Ø60	TE2608084880



The above guidelines may not apply in all working conditions.

Please contact Alfa Laval for information relating to specific applications.

Magnetic mixers

Preventive maintenance guidelines

Plan your budget and your downtime

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Genuine spare parts and service kits



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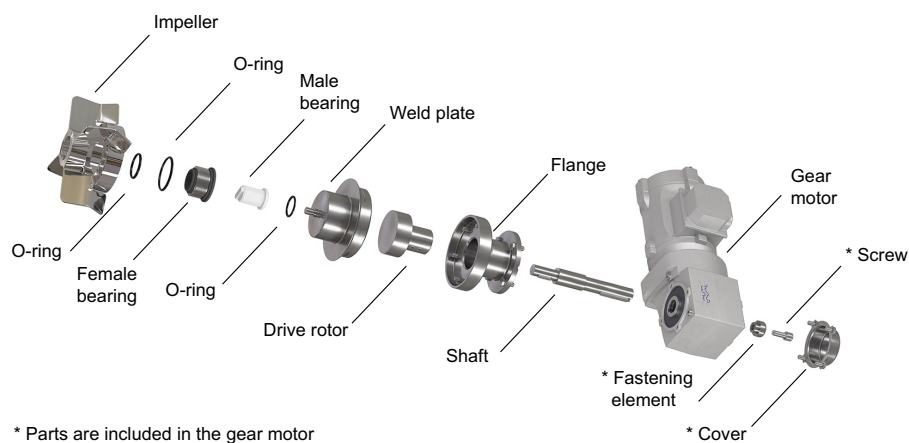
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Example of exploded view - LeviMag® UltraPure



Inspect the magnetic mixer regularly

Preventive maintenance aims to prevent failure of equipment by doing e.g. regular lubrication and adjustments. Based on experience and knowledge about the running conditions, it is also possible to replace wear parts before they fail. Keeping a maintenance log is a good way to build experience.

After the first 25 hours of operation, listen for abnormal sounds. If any, dismantle the mixer and check all parts for scratches and dents. Alfa Laval recommend that the bearings and O-rings should be checked for cleanability and wear after one month of operation. If there is abnormal wear on either component, contact Alfa Laval for further instructions.

Regular inspections should be performed at least every 6th months or as according to local preventive maintenance plans. If any component is found damaged during inspection, please contact Alfa Laval for repair and/or replacement parts. All wear parts or damaged parts should be replaced only with Alfa Laval genuine spare parts.

Possible damages on the parts are listed below:

No.	Component	Check zone	Description	Control method	Action
1	Impeller	Surfaces and edges	- scratches, foreign particles - tolerance on bearing surface	- visual - measuring	- cleaning - change bearing
2	Female bearing	Surfaces and edges	- scratches - tolerance on surface	- visual - measuring	- change bearing
3	Male bearing	Thread	- damage on thread	- visual	
3	Male bearing	Surfaces and edges	- scratches - tolerance on surface	- visual - measuring	- change bearing
3	Male bearing	Thread	- damage on thread	- visual	
4	O-rings	Surface	- deformed - cracks	- visual	- change O-rings
5	Weld Plate	Surfaces and edges	- damage on thread	- visual	- re-thread, if possible
5	Weld Plate	Thread	- damage on outer OD	- measuring	- re-polish, if possible
6	Drive Unit	Drive rotor	- foreign particles on parts	- visual	- cleaning
6	Drive Unit	Gear motor	- leaks or noises		- change gear motor
6	Drive Unit	Motor	- cable failure	- audible	- repair gear motor

The clearance between female and male bearing should not exceed 0.15 mm.

If the value exceeds – Alfa Laval recommend changing both bearings.

Scheduled maintenance intervals

To ensure that your Alfa Laval LeviMag® operates efficiently, it is essential to follow a simple preventive maintenance program, which will keep your machine in good working conditions. Good maintenance requires careful attention at regular intervals. The following recommended preventive maintenance procedures are based on the average operating conditions of most Alfa Laval magnetic mixers. A mixer which is subject to abrasive fluids, will need more frequent attention than one working in ideal conditions. The maintenance program should be adjusted to meet the demands of your normal operating condition.

Alfa Laval recommend that bearings and O-rings are inspected at least every 6 months.

Alfa Laval recommend that bearings and O-rings are replaced at least every 6000 operating hours or every 3rd year.

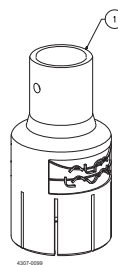
LeviMag® service tool example (for more information please refer to the manual)

Use the male bearing tool with a lifting rod to remove the male bearing and replace O-ring.



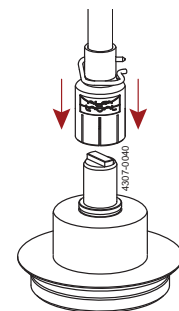
A lifting rod with handle & tool

A lifting rod with different length can be purchased from Alfa Laval.



Male bearing tool

It is included when ordering male bearing Service kits.



The above guidelines may not apply in all working conditions.

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Tank cleaning equipment

Preventive maintenance guidelines

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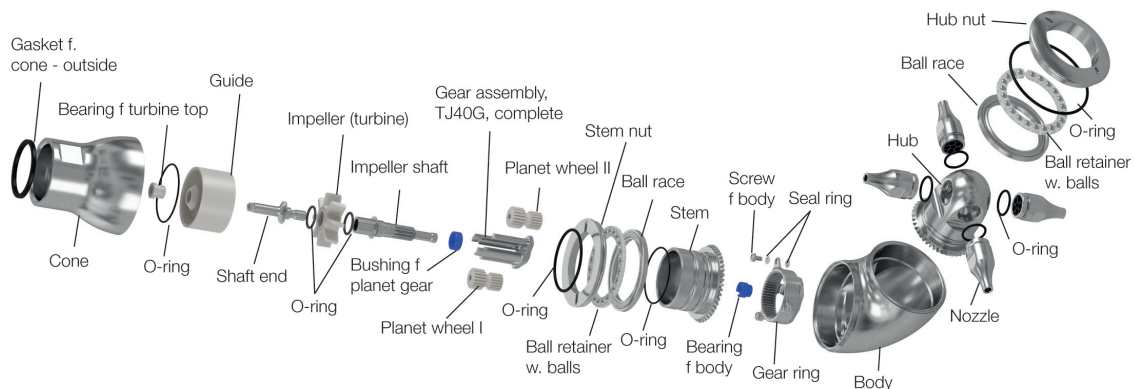
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Example of exploded view - TJ40G



Inspect the tank cleaning equipment regularly

The recommended preventive maintenance program is based on tank cleaning machines working in average conditions. However, a tank cleaning machine, exposed to heavy soiling and recirculation CIP liquid containing abrasives and/or particulates (manual instructions for strainer recommendations), needs more frequent attention than one exposed to light/no soiling and recirculation with ordinary CIP liquid.

This preventive maintenance guidelines cover Toftejorg rotary jet heads as below:

**Scheduled maintenance intervals for Toftejorg tank cleaning:**

Application	Hours	Replace service kit every x working hours or y years:					
	Type	150 hours	200 hours or yearly	300 hours or yearly	400 hours or 2rd year	600 hours or 3rd year	800 hours or 4th year
Pharma Biotech personal care etc.	SaniJet 25						
	Inspection kit		x			x	
	Minor service kit				x		
	Major service kit						x
	SaniJet 20 Air						
	Service kit			x			
	SaniJet 20 Media						
	Service kit	x*		x			

* If the used cleaning media is tap water or commonly used CIP solvents, the recommended maintenance interval is 300 hours. However, if special cleaning media is used such as e.g. WFI, the recommended maintenance interval is 150 hours.

Application	Hours	Replace minor or major service kit every x working hours:			
	Type	250 hours	300 hours	500 hours	1000 hours
Food Dairy & beverage	TJ40G				
	Minor service kit			x	x
	Major service kit				x
	TZ-89		x		
	TJ20G			x	
	TZ-74** (SC,BKV)			x	
	TZ-79**		x		
Fine chemical & industry	MultiJet 25			x	
	MultiJet 40		x		
	MultiJet 50		x		
	MultiJet 65	x			
	TZ-66**		x		
	TZ-67**		x		
	TZ-750	x			

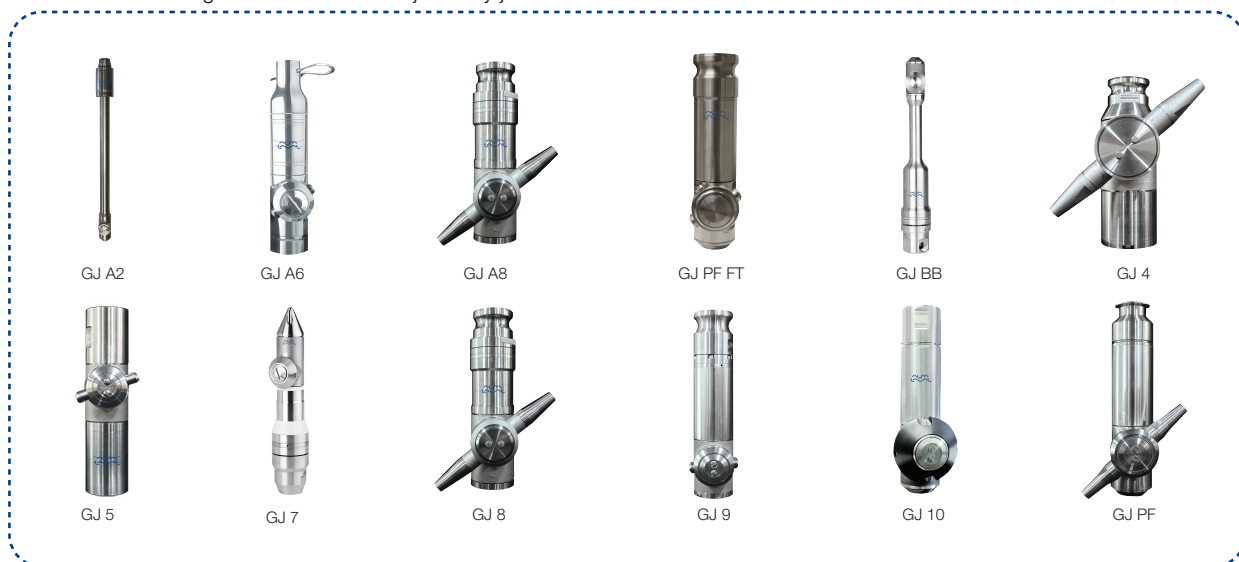
** Need conversion overview or replace suggestion from TZ67/66 and TZ-74/79 to TJ40G please contact Alfa Laval.

All recommended service kits are found in the manual for the specific machine.

Scheduled maintenance intervals for Gamajet tank cleaning

The Alfa Laval Gamajet should be washed out with clean water after each use to remove any foreign material or soft substances left in the machine that may harden during storage and cause the Alfa Laval Gamajet to seize or lock up. A clean water rinse through the Alfa Laval Gamajet will also wash out any residues of chemical cleaners or recirculated wash water that could adversely affect the O-rings during prolonged contact in storage. The best position to store the machine is to stand it up with the inlet connection facing down.

This preventive maintenance guidelines cover Gamajet rotary jet heads:



An interval of 100 hours is recommended initially. If all of the components are found to be in acceptable condition after the first 100 hours, the Alfa Laval Gamajet may then be inspected and routine preventive maintenance should be performed recommended hours of operation, depending on the severity of use.

All the bearings, bushings, seals and O-rings are wear parts. Ideally, they should all be replaced, as a group, If just one bearing or seal is worn or damaged, replace both it and its mate, not just the worn or damaged part.

Gamajet recommended maintenance hours shown as below:

Application	An interval of 100 hours is recommended initially.						
	Type	100 hours	100-200 h	300-500 h	400-600 h	500-700 h	600-800 h
Food Dairy & beverage	GJ A2	x			x		
	GJ A6	x		x			
	GJ A8	x		x		x	
	GJ PF FT	x					x
Fine chemical & industry	GJ BB	x			x		
	GJ 4	x				x	
	GJ 5	x		x			
	GJ 7	x	x				
	GJ 8	x		x			
	GJ 9	x		x			
	GJ 10	x				x	
GJ PF	x				x		

All recommended service kits are found in the manual for the specific machine.

The above guidelines may not apply in all working conditions.

Please contact Alfa Laval for information relating to specific applications.

Hygienic gasketed plate heat exchangers

Preventive maintenance guidelines

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Using the Alfa Laval guidelines it is easy to plan the relevant maintenance intervals. You are able to plan your operating budget and the risk of breakdowns is virtually eliminated. Financially, preventive maintenance makes sense.

Instruction manuals and service videos



Detailed manuals are supplied with every product. Service and maintenance videos have been created to enable you to service Alfa Laval products in a correct and efficient way. Scan the QR code to access the service videos.

Genuine spare parts and service kits



Alfa Laval Service Kits and Upgrade Kits are available for scheduled maintenance. They contain all the relevant parts needed for general service. Using genuine Alfa Laval spare parts guarantees the right quality and composition of materials. They of course come with full traceability. Scan the QR code to access the spare parts catalogue.



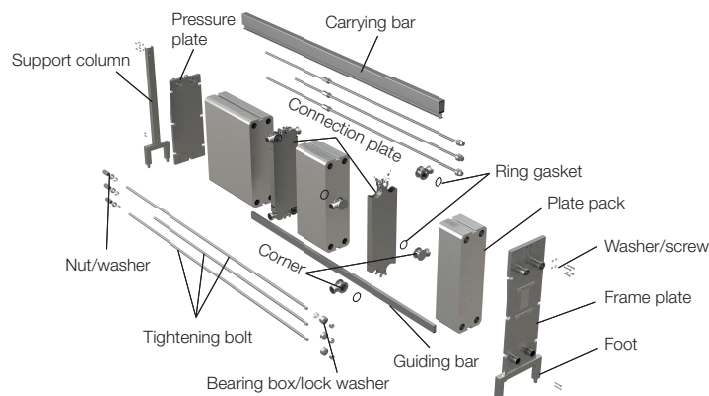
Alfa Laval service tools

Alfa Laval has the specific tools required to service Alfa Laval hygienic equipment. These include tools for installing, operating and maintaining our hygienic equipment.

Using genuine spare parts ensures your certificates are still valid.

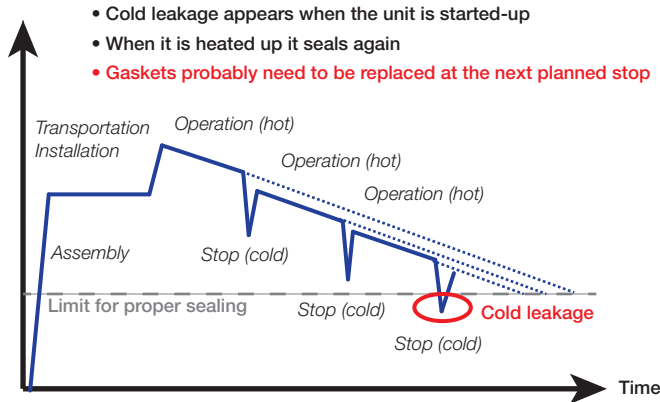


Example of exploded view - Front8



Gasket - aging

Gasket force



- Cold leakage appears when the unit is started-up
- When it is heated up it seals again
- Gaskets probably need to be replaced at the next planned stop

Temperature, pressure and environment are important factors that affect gasket wear and tear. Schedule maintenance at a convenient time before reaching the proper sealing limit.

Factors effecting efficiency and lifetime

Maintaining heat transfer and sealing efficiencies is vital to productivity. Frequent cleaning on regular basis ensures heat transfer efficiency as well as prevents the build up of residual material on the plates. Barring the presence of corrosive media, clean plates effectively limit other factors that may contribute to gasket wear

A gasket, its material properties and its construction are specifically selected to provide optimal sealing performance for its intended application. Knowing exactly when to replace gaskets is difficult since the timing varies, depending on the application.

But over time, all gaskets wear due to natural aging as well as the temperature, pressure and stress of normal operating conditions. In extreme cases, gaskets are also subject to blowout due to pressure shock in the system that may damage the plates. Even despite best practices, leakage can occur.

- **Temperature**

Higher operating temperatures cause more wear and tear on the gaskets. So do the temperature swings from hot to cold that are characteristic of dairy and other sanitary processes. Under these conditions, leakage may occur. Careful monitoring is key to early detection. Whenever cold leakage occurs, especially at startup, it is time to replace the gaskets.

- **Pressure**

Higher pressure also causes more wear and tear on the gaskets. Therefore, processes operating at higher pressures generally require more frequent gasket replacement. That's why plate heat exchangers used to pasteurise beer, for example require gasket replacement more often than those used for dairy pasteurisation.

- **Compression**

Gaskets are subjected to local stress from the moment you first clip them on to and tighten the plates. Subsequent opening and closing of any heat exchanger also puts undue stress on the gaskets, causing loss of elasticity and sealing ability. To prevent unnecessary wear, automatic cleaning procedures, such as cleaning in place (CIP), are recommended

- **Cleaning in place**

Carefully monitor your cleaning process since the composition of the cleaning solution can, over time, affect the rubber. Always use the cleaning solutions recommended by your gasket supplier since using substitutes can harm the gaskets. Some cleaning solution suppliers, for instance, add ozone to the water, which degrades the rubber in gaskets used in sterilisation processes

Maintenance guidelines

- Perform integrity tests at regular intervals.
- Keep all heat exchanger documentation in a safe, easy-to-access location.
- Have the unit's serial number handy to assist your supplier when locating parts.
- Store spare gaskets in a sealed bag, in a dry, cold and dark place, and away from ozone-producing equipment as machines or light armatures.
- If applicable, inspect Gemini doublewall plates each year since these plates are vital to the safety and integrity of your products.

Maintenance recommendations

- Keep detailed operation and maintenance records. Charting performance helps create a useful road map for maintenance and determine the right intervals for cleaning, thorough plate inspection and gasket replacement.
- Act, don't react. Reactionary maintenance is always more expensive than proactive maintenance. Develop a maintenance schedule based on your records and stick to it.
- Monitor, monitor, monitor. Keep a watchful eye on your processes, especially at startup when cold leakage can occur, and use good judgment to determine when suspicious activity requires action.

The above guidelines may not apply in all working conditions. Please contact Alfa Laval for information relating to specific applications.

Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineered solutions. Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

How to contact Alfa Laval

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