



Instruction Manual

Rotary Jet Mixer IM 25

- Covering**
- **Standard Machines**
 - **Machines delivered with ATEX Certification in accordance with Directive 94/9/EC**

IM-TE911550-EN5
ESE02186

Date of issue: June 12, 2014
First published: March 2007

Original manual

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Introduction

This manual has been prepared as a guide for the persons who will be operating and maintaining your Alfa Laval Rotary Jet Mixer Iso-Mix 25. The key to long life for your mixer will always be a system of carefully planned maintenance procedures; you will appreciate that a mixer which has a rough and dirty job to do will need more frequent attention than one working in ideal conditions.

Note: Get the best and most economical performance from your Alfa Laval Rotary Jet Mixer Iso-Mix 25 . Insufficient preventive maintenance means poor performance, unscheduled stops, shorter lifetime and extra costs. Good preventive maintenance on the contrary means good performance, no unscheduled stops and superior total economy.

You will find the information contained in this manual simple to follow, but should you require further assistance, our Technical Department will be pleased to help you. Please quote the type and serial number with all your enquiries; this will help us to help you. The type and serial number are placed on the gear house of the mixer.

Note: The illustrations and specifications contained in this manual were effective at the date of printing. However, as continuous improvements are our policy, we reserve the right to alter or modify any unit specification on any product without prior notice or any obligation.

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Intended Use

It is to be verified by the end-user:

- that the machine is in conformity with respect to tank, vessel or container size in which it will be used.
- that the construction materials (both metallic and non-metallic) are compatibility with product, flushing media, cleaning media, temperatures and pressure under the intended use.

If ordered with ATEX certificate:

ATEX Marking

The Rotary Jet Mixer Iso-Mix 25 is certified as category I component. The certification is carried out by the certified body Baseefa, who has issued the certificate no. 10ATEX0188X. The marking on the ATEX certified Rotary Jet Mixer Iso-Mix 25 is as follows:



Changes to the machines are not allowed without approval by the person responsible for the ATEX certification at Alfa Laval Tank Equipment. If changes are made – or spare parts other than Alfa Laval original spare parts are used - the EC Type Examination certification (the ATEX Directive) is no longer valid.

**Important
ATEX
information:**

Also see page 15 regarding special conditions for repair of ATEX certified machines.



Patents and trademarks

This Instruction Manual is published by Alfa Laval Kolding A/S without any warranty. Improvements and changes to this Instruction Manual may at any time be made by Alfa Laval Kolding A/S without prior notice. Such changes will, however, be incorporated in new editions of this Instruction Manual.

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Rotary Jet Mixer Iso-Mix 25 product has patents in the EPO member states and in other countries. The Alfa Laval logotype is a trademark or a registered trademark of Alfa Laval Corporate AB. Other products or company names mentioned herein may be the trademarks of their respective owners. Any rights not expressly granted herein are reserved.

General Description

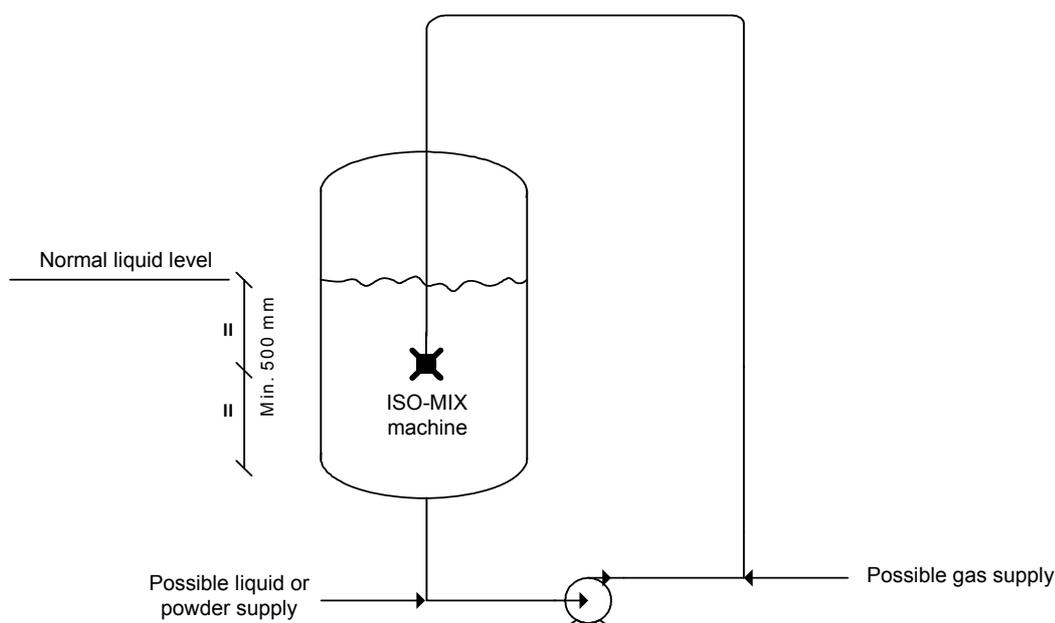
The Alfa Laval Rotary Jet Mixer Iso-Mix 25 is a media driven and media lubricated tank/reactor mixer. As it is self lubricating, there are no lubricating substances such as oil, grease etc. in the machine, which need to be regularly changed.

Functionality

The Alfa Laval Rotary Jet Mixer Iso-Mix 25 is placed inside the tank/reactor under the liquid surface of the liquid volume to be mixed.

The mixer is combined with an external recirculation loop. The fluid of the tank/reactor is recirculated through this loop and reintroduced in the tank/reactor through the Alfa Laval Rotary Jet Mixer Iso-Mix 25. The more fluid being recirculated, the more effective mixing is obtained.

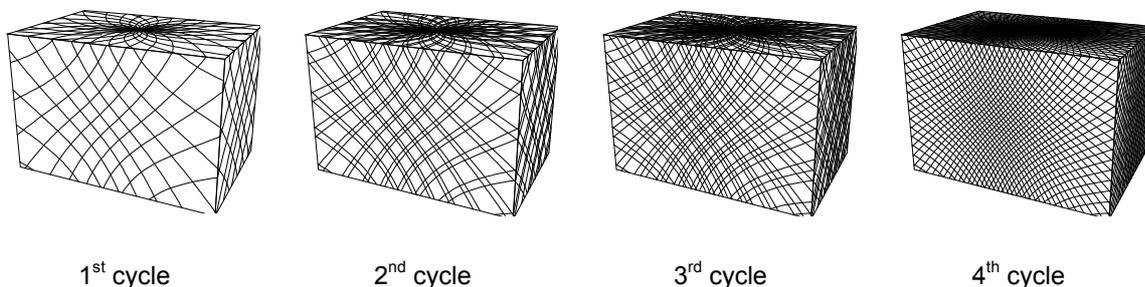
The mixer should be placed in the centre of the fluid to be mixed. Minimum $\frac{1}{2}$ meter under the liquid surface.



The flow of fluid to be mixed passes from the tank into the mixer through a turbine, which is set into rotation. The turbine rotation is through a gearbox transformed into a combined horizontal rotation of the mixer body and a vertical rotation of the nozzles.

Functioning (continued)

The combined motion of the mixer body and the nozzles ensures a fully indexed tank mixing. After $11\frac{1}{4}$ revolutions of the Hub with nozzles ($10\frac{3}{4}$ revolutions of the mixer body), one coarse movement pattern has been established which when projected on the tank surface looks as Figure 1. During the following rounds, this pattern is repeated 3 times, each of which is displaced $\frac{1}{4}$ of the mesh in the pattern. After a total of 45 revolutions of the Hub with nozzles (43 revolutions of the machine body), a complete "mixing pattern" has been laid out, and the first pattern is repeated. This feature eliminates "dead volumes" in the tank, and makes the Alfa Laval Rotary Jet Mixer Iso-Mix 25 a very efficient automatic tank cleaning machine, when the tank is empty.



The speed of rotation of the turbine depends on the flow rate through the mixer. The higher the flow rate is, the higher the speed of rotation will be. In order to control the RPM of the mixer for a wide range of flow rates, the efficiency of the turbine can be changed by using 50%, 100% or 0% turbine/inlet guide. Apart from this the machine can be supplied with a special slow turning gear; the E-gearing gear box

Apart from the jet flow through the nozzles, fluid is leaking through the top of the mixer, at the hub and through the bottom cover. The leakages between the moving parts at the top and at the hub are cleaning the gabs and thus preventing build-up of material that might cause extra friction. The flow through the bottom cover is required to ensure proper lubrication of the gearbox.

The time/number of rotations required for a satisfactory mixing of a given tank volume depends on the energy input (kW/m^3 tank volume), the viscosity of the liquid, tank dimensions and number of mixers per tank.

It is possible to add fluid, gas or solids in the recirculation loop. These ingredients will very effectively be mixed into the entire tank/reactor volume.

When the tank/reactor is empty the Alfa Laval Rotary Jet Mixer Iso-Mix 25 can be used as a tank cleaning machine and the pattern shown above resembles the pattern of jets sweeping the vessel wall.

General description (continued)

Standard Configurations

Machines with E-gear:

Connection	Nozzles (mm) (1" thread conn.)	Article No.
2 1/2" BSP	2 x ø15	TE33B034
	2 x ø17	TE33B036
	2 x ø19	TE33B038
	2 x ø21	TE33B040

The mixer is equipped with a clutch in the hub, which gives the possibility of rotating by hand the nozzles, when the machine is to be lifted out through a tank opening.

Available add-ons

ATEX, category 1 for installation in zone 0/20
 - TE33B0XX-70 ATEX

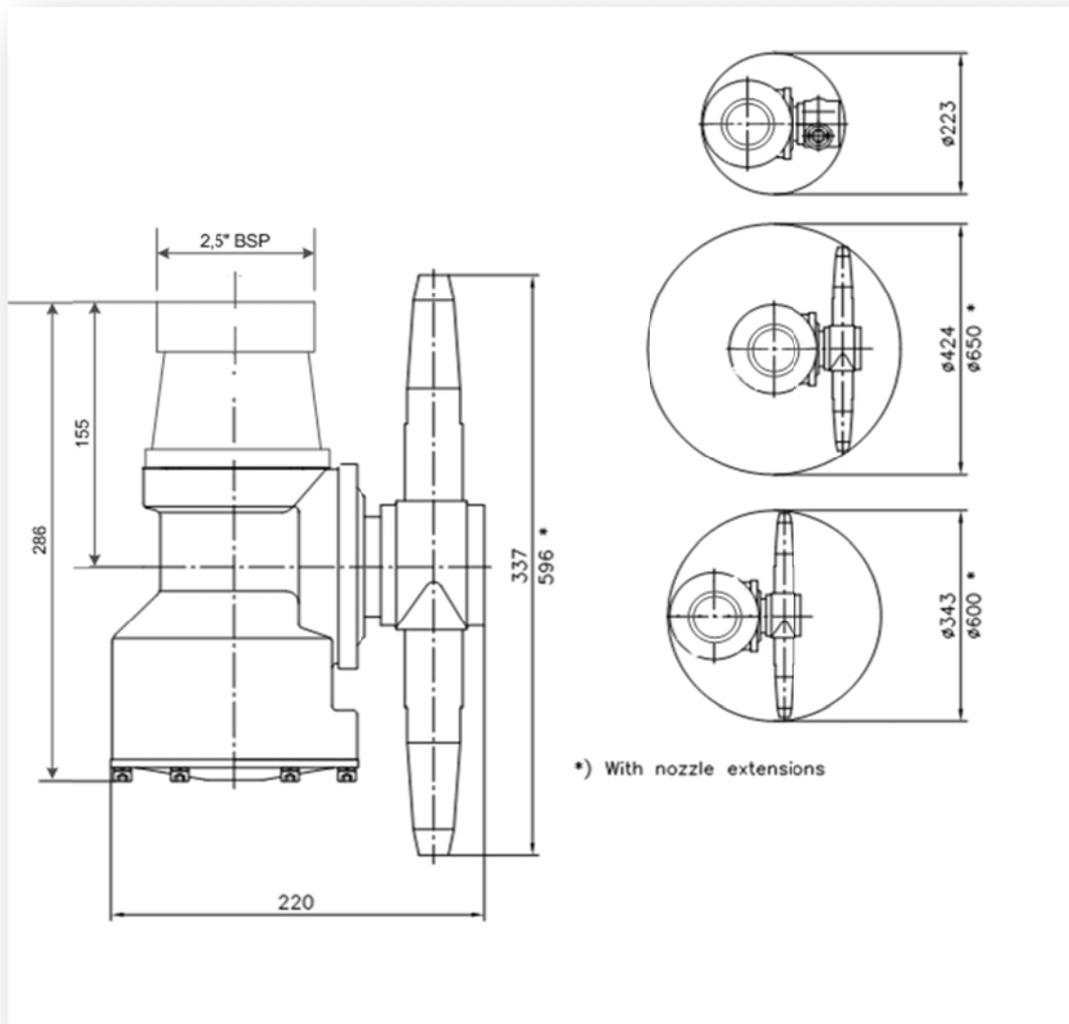
Explanation to Add-ons

ATEX, category 1 for installation in zone 0/20 in accordance with Directive 94/9/EC

Technical Data

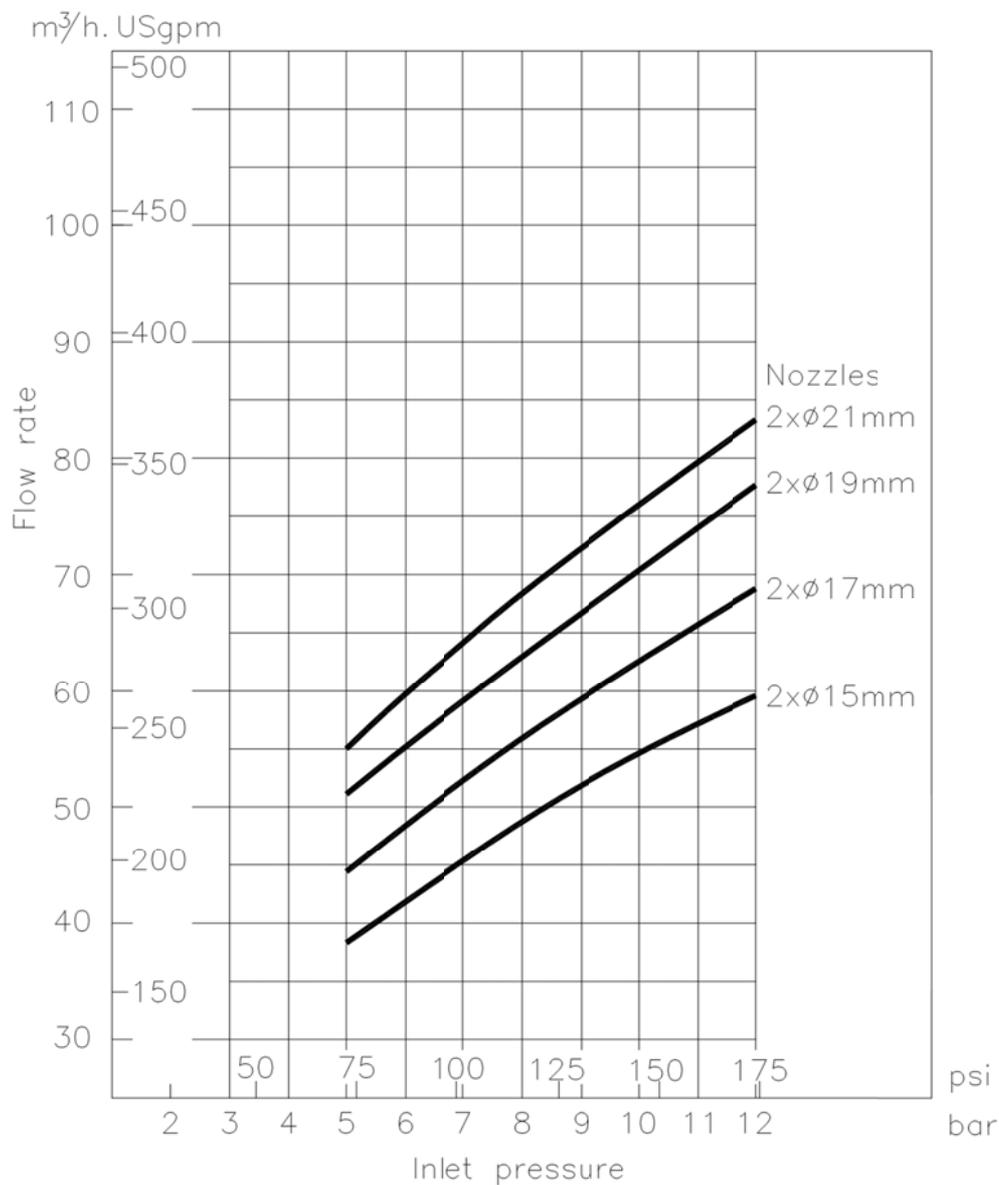
Weight of mixer	:	16 kgs (35.3 lb)
Working pressure	:	2-12 bar (30-175 psi)
Recommended inlet pressure	:	5-10 bar (45-120 psi)
Working temperature max.	:	95° C (200° F)
Max. temperature	:	140°C (284°F)
Ambient temperature	:	0 – 140°C (95°C – 140°C when not operated)
Materials	:	Stainless steel AISI 316/316L, PEEK 450G, SAF 2205, Teflon, TFM, Tefzel, ceramics

Principal dimensions in mm, shown for flange connection



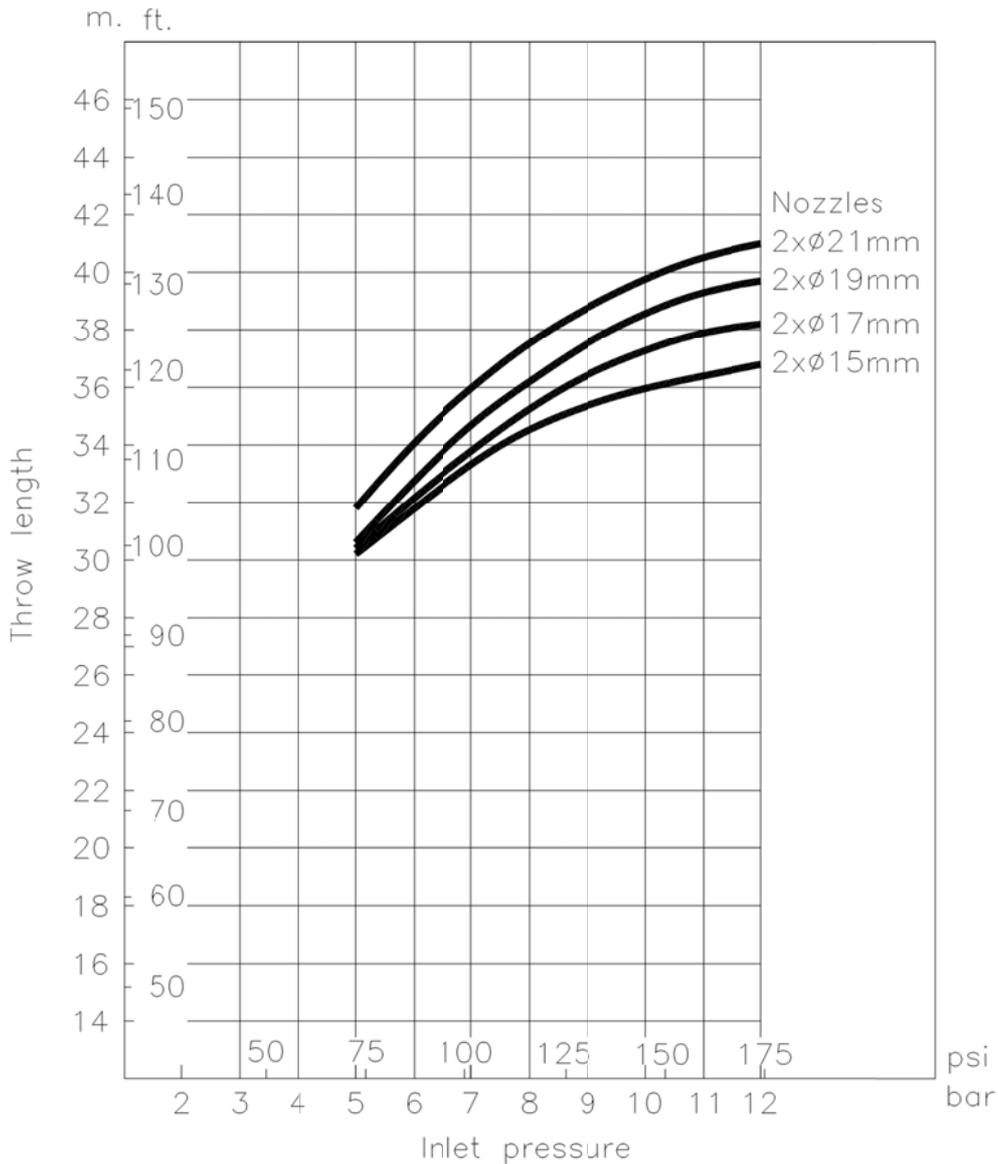
Technical data (continued)

Flow rate



Technical data (continued)

Throw length

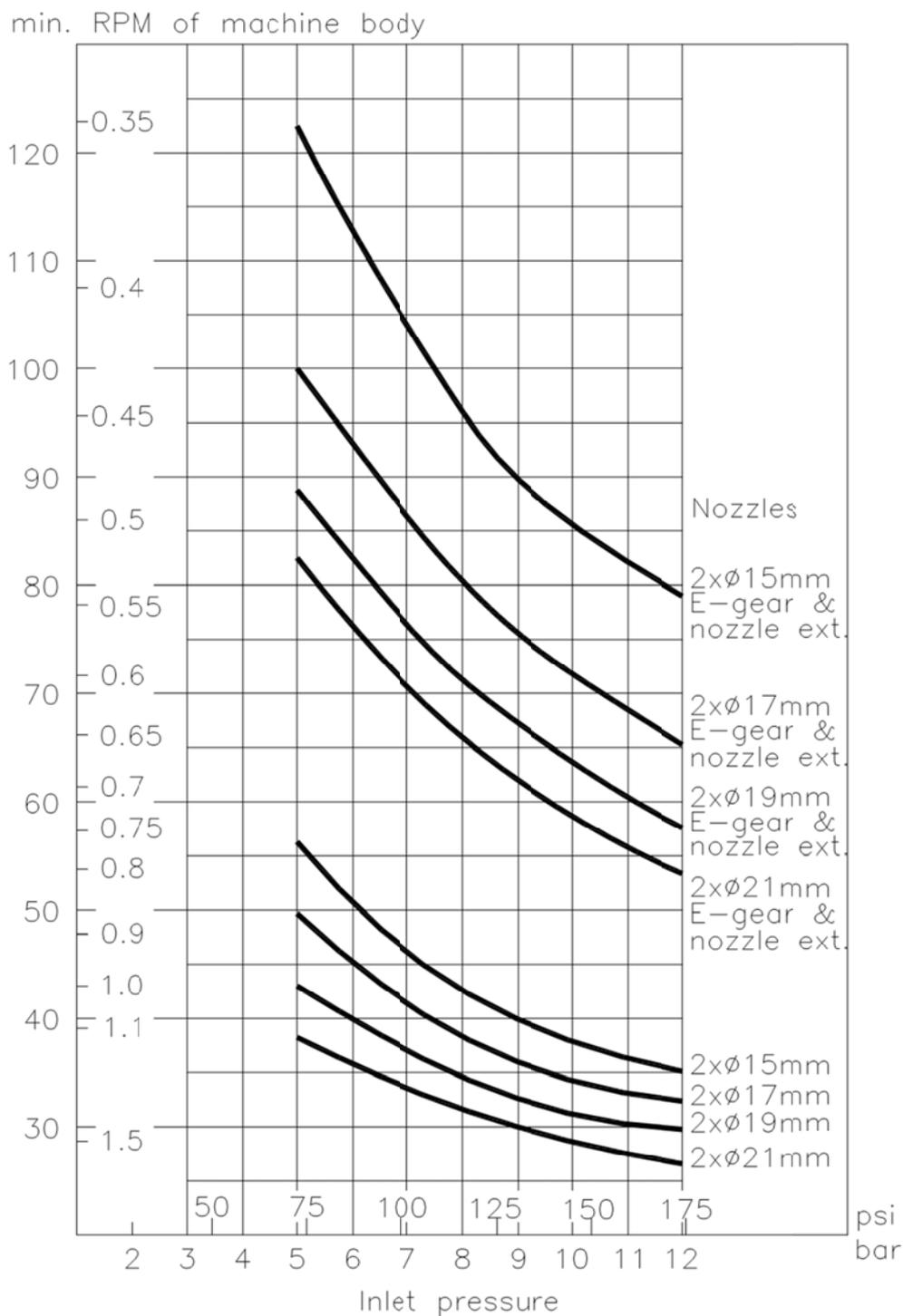


Note: The distance (reach) of the jet from the rotary nozzles at which the jets still have a reasonable mixing effect depends i.a. of pressure, the diameter of the nozzles, the viscosity of the fluid, the desired mixing time and various other parameters. The effective reach of the jets as indicated above is in a fluid with a viscosity of 1 cP.

The pressure is measured at the mixer. This means that due consideration shall be taken to pressure drops in the recirculation line from the pump to the mixer as well as to static pressure differences, when the jet mixing system is being dimensioned.

Technical data (continued)

Cleaning time, complete pattern (= 4 cycles)



Installation and Normal Operation

General Safety and Installation Instructions

The mixer should be installed in vertical position (upright or upside down). It is recommended to install a filter in the supply line in order to avoid large particles to clog inside the machine. Before connecting the machine into the system, all supply lines and valves should be flushed to remove foreign matter.

It is recommended to secure the bolted connection between machine and down pipe against loosening to vibrations. Use Locking wire, nabs or equivalent for the actual application.

ATEX

Warning:



If the machine is used in potential explosive atmospheres, tapes or joint sealing compounds which are electrical insulators must not be used on threads or joints, unless an electrical connection is otherwise established to ensure an effective earthing. In addition, connecting pipe work, must be electrically conductive and earthed to the tank structure. The resistance between the nozzles and the tank structure should not exceed 20,000 Ohm. This is essential to avoid the build-up of static electricity on the machine.

For further information see DS/CLC/TR 50404:2003 Safety of Machinery, guidance and recommendations for the avoidance of hazards due to static electricity.

Electrical equipment such as magnetic valves and electric actuators must not be installed in Ex-zones without type approval and marking, corresponding to the EX-class in question.

Note: The machine shall be installed in accordance with national regulations for safety and other relevant regulations and standards.

Precautions shall be made to prevent starting of the cleaning operation, while personnel are inside the tank or otherwise can be hit by jets from the nozzles.

In EU-countries the complete system must fulfil the EU-Machine Directive and depending of application, the EU-Pressure Equipment Directive, the EU-ATEX Directive and other relevant Directives and shall be CE-marked before it is set into operation.

The machine as delivered has been tested at the factory before shipping. For transportation reasons, the nozzles have been screwed off after the test. All you will have to do to make the machine ready for use is to refit the nozzles and tighten with wrench. Secure with Loctite No. 242 or equivalent.

Check that the machine is in operating condition by inserting 3/16" hex Screwdriver (tool No. TE134A) in screw in top of Turbine shaft and easily turn Turbine shaft clockwise. If any resistance is recognized, the machine should be disassembled to localize the cause.

Installation and Normal Operation (continued)

Normal Operation

The Alfa Laval Rotary Jet Mixer Iso-Mix 25 should be used only in fluids compatible with Stainless steel AISI 316/316L, PTFE, PEEK 450G, SAF 2205, A4, ETFE, PTFE and Ceramics (Al_2O_3). Please note that PEEK is not resistant to concentrated sulfuric acid. Furthermore, the fluids to be mixed should not contain abrasive materials and fibrous material and the viscosity should not be above 450 cP. Aggressive chemicals, excessive concentrations of chemicals at elevated temperatures, as well as certain hydrochlorides should be avoided. If you are in doubt, contact Alfa Laval Tank Equipment.

After Use Cleaning

After use flush the machine with fresh water. Other fluids than water should never be allowed to dry or set-up in the system due to possible "salting out" or "scaling" of the ingredient.

Pressure

Avoid Hydraulic shocks. Put on pressure gradually. Do not exceed 12 bar inlet pressure. Recommended inlet pressure appears from Technical Data (page 8-9). High pressure in combination with high flow rate will increase consumption of wear parts.

If a positive pump is used for recirculation, it is recommended to install a pressure equalizer/hydrofor in the system.

ATEX Steam cleaning pressure

Warning:



If steam cleaning is done through the machine, the steam pressure must not cause the machine to rotate.

ATEX Draining:

Warning:



If the machine is drained using compressed air, then the compressed air pressure must not cause the machine to rotate.

Installation and Normal Operation (continued)

Temperature

In accordance with the ATEX specifications regarding special conditions for safe use, see page 15.

ATEX

Warning:



Steam Cleaning:

Tanks with capacities greater than 100 m³ that could contain a flammable atmosphere should not be steam cleaned, as steam issuing from a nozzle could contain charged droplets.

Tanks smaller than this may be steam cleaned providing that: the steam nozzles and other metal parts of the system are reliably earthed and grounded to the tank structure.

ATEX

Warning:



Atmosphere/surface temperature:

In potentially explosive atmospheres, the temperature must not exceed the maximum surface temperature according to the temperature class for the combustible gas or liquid.

Installation and Normal Operation (continued)

Special Conditions for Safe Use in accordance with the ATEX Certification, Directive 94/9/EC

<p>ATEX Warning:</p> 	<p>The unit may be operated, in a hazardous area, only when filled with the process fluid.</p>
<p>ATEX Warning:</p> 	<p>The maximum permitted process fluid temperature and ambient temperature, when the machine is operating is 95°C.</p> <p>When the machine is not operating, the maximum permitted ambient temperature is 140°C.</p>
<p>ATEX Warning:</p> 	<p><u>Working pressure:</u></p> <p>The maximum permitted process fluid pressure is 12 bar.</p>
<p>ATEX Warning:</p> 	<p>The unit must not be operated in a vessel having an enclosed volume of greater than 100m³.</p> <p><u>Tanks larger than 100 m³</u></p> <p>To use Rotary Jet Mixers in tanks larger than 100m³ is possible under certain conditions.</p> <p>It is necessary to know the current factors such as tank size, cleaning solvent and product.</p> <p>Additives can be used in the cleaning solvent, or, for example, the tank can be filled with nitrogen. The basic rules are described in the guide "CLC / TR 50404:2003".</p> <p>Following a guidance document such as "CLC / TR 50404:2003" to establish safe use of machinery and process is the users own responsibility and is not covered by the ATEX certification for this product.</p>
<p>ATEX Warning:</p> 	<p>The user must address the electrostatic hazards generated from the process of the equipment in accordance with guidance document CLC/TR 50404:2003.</p>

In addition to the above mentioned precautions relating to the ATEX guidelines Directive 94/9/EC of March 23 1994, the Safety Precautions on page 15 must be observed.

Service and Repair of ATEX Approved Machines

In order to ensure compliance with the ATEX regulations for service and repair in accordance with EN 60079-19, all service and repair of ATEX approved machines should be performed by Alfa Laval Tank Equipment, Kolding, Denmark.

Warning: ATEX requirements regarding repair of ATEX approved machines according to EN 60079-19.



A tag with the following labelling information must be attached to the machine:

- Repair symbol 
- Alfa Laval logo and address
- Repair number
- Date of repair
- Machine serial number

The tag must be laminated and attached to the machine-downpipe outside the tank using a cable tie.

If a customer wishes to carry out service or repair himself, it is the responsibility of the repair shop to ensure that the ATEX requirements are met in any way possible. After performing service or repair, the repair shop thus carries the full responsibility for the ATEX approval of the machine.

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Maintenance and repair

Preventive Maintenance

In order to keep your Alfa Laval Rotary Jet Mixer Iso-Mix 25 servicing you as an efficient tool in your tank mixing operations, it is essential to maintain its high performance by following a simple preventive maintenance programme, which will always keep your tank cleaning machine in good condition.

Good maintenance is careful and regular attention!

The following recommended preventive maintenance programme is based on machines working in average conditions. However, you will appreciate that a machine, which has a rough and dirty job to do, will need more frequent attention than one working in ideal conditions. We trust that you will adjust your maintenance programme to suit.

Always use only proper tools. Use standard tool kit. Never force, hammer or pry components together or apart. Always perform all assembly/disassembly steps in the order described in this manual.

Never assemble components without previous cleaning. This is especially important at all mating surfaces. Work in a clear well lighted work area.

Every 4000 working hours

1. Disassemble machine as described on the following pages.
2. Clean material build-up and deposits from internal parts with chemical cleaner and fine abrasive cloth.
3. Check Slide bearings (pos. 30) for wear. If hole is worn oval to max. diameter more than 12.4 mm, Slide bearing should be replaced. If end face of Slide bearing is worn more than x mm into Slide bearing, it should be replaced.

Under Turbine Shaft: $x = 1.5$ mm

At Horizontal Shaft: $x = 0.5$ mm

4. Check Collar bushes (pos. 12) in Gear frame. If holes are worn oval to max. diameter more than 15.4 mm, Collar bush should be replaced. How to replace Collar bushes, see page 30.

Note: Timely replacement of slide bearings and collar bushes will prevent costly damage to the gearbox.

Maintenance and Repair (continued)

Preventive Maintenance

5. Check Worm wheels (pos. 13 and pos. 14). If extremely worn, they should be replaced.
6. Check Main bush (pos. 6). If worn oval to max. diameter more than 15.4 mm, it should be replaced.
7. Assemble machines as described in the following pages.
8. Check that the machine is in operating condition by inserting a 3/16" hex Screwdriver in screw in top of Turbine shaft and easily turn Turbine shaft clockwise. If any resistance is recognized, the machine should be disassembled to localize the cause.

Apart from the parts specifically mentioned above, all the remaining wear parts should regularly be inspected for wear.

Maintenance and Repair (continued)

Top Assembly

Disassembly

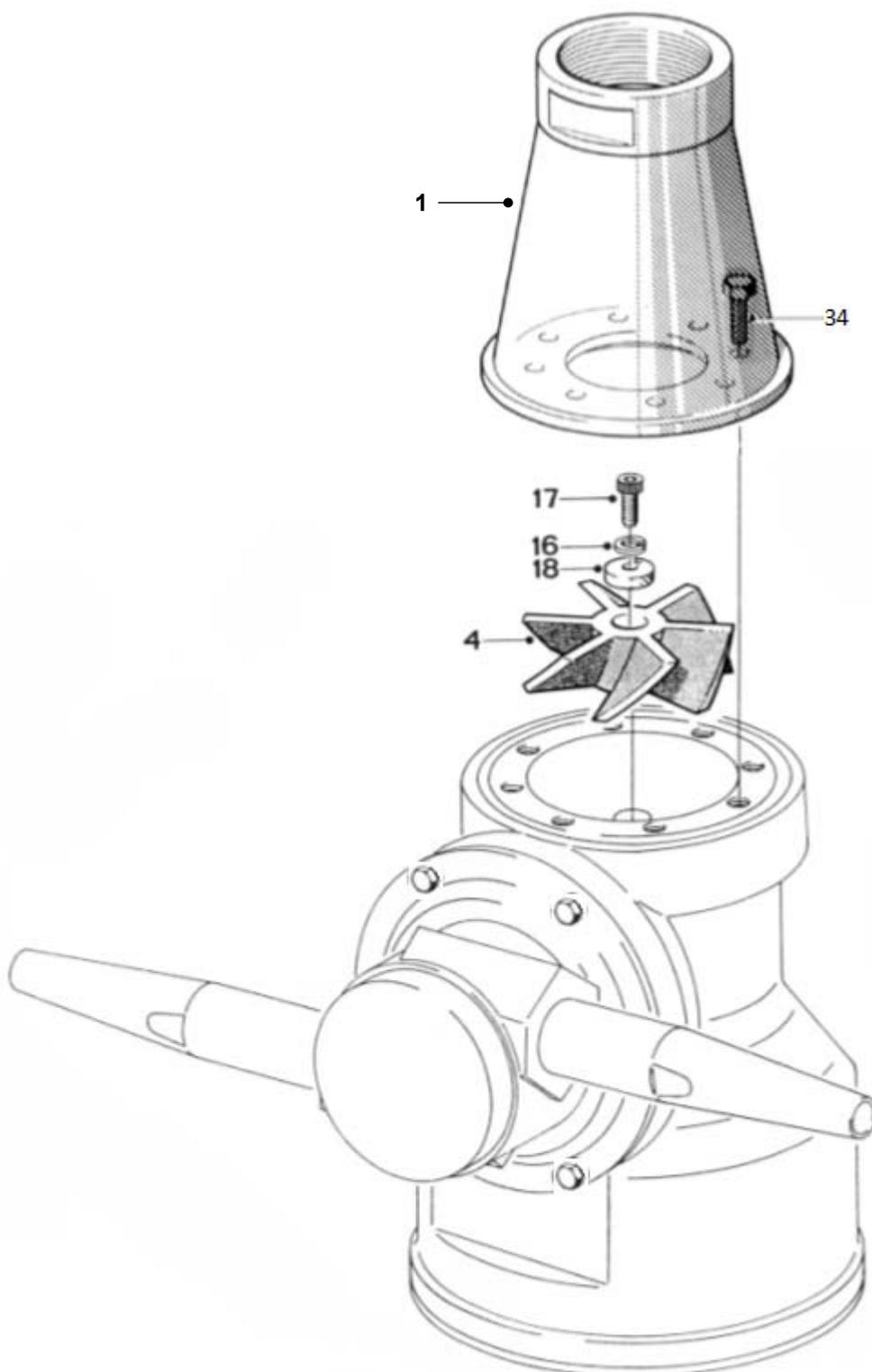
1. Remove Screws (pos. 34). Loosen with Key (tool No. TE135) and unscrew with Screwdriver (tool No. TE135A) through holes in the Top cone.
2. Lift off Top cone (pos. 1).
3. Remove Screw (pos. 36), Spring washer (pos. 16) and Washer (pos. 18). To secure Impeller against rotation, insert carefully Screwdriver (tool No. TE135A), through Impeller (pos. 4) into a hole in the Stem.
4. Pull off Impeller (pos. 4).

Reassembly

1. Reinstall Impeller (pos. 4). Make sure that Impeller is correctly rotated to be pushed onto Turbine shaft. Do not try to hammer Impeller in position, as this will damage Slide bearing under Turbine shaft.
2. Mount Washer (pos. 18), Spring washer (pos. 16) and Screw (pos. 36) and tighten. To secure Impeller against rotation insert carefully screwdriver through Impeller (pos. 4) into a hole in the Stem.
3. Mount Top cone (pos. 1). Rotate Top cone to align holes in Top cone and Stem.
4. Mount Screws (pos. 34) with screwdriver through holes in the Top cone. Tighten with Key.

Maintenance and Repair (continued)

Top Assembly



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Maintenance and Repair (continued)

Bottom Assembly

Disassembly

1. Turn machine upside down.
2. Remove Screws (pos. 36) and Spring washer (pos. 16) from Bottom cover (pos. 33).
3. Remove Bottom cover (pos. 33)
4. Remove Screws (pos. 36) and Spring washers (pos. 16) along the circumference of Gear frame (pos. 31). Draw out Gear Subassembly (holes in Gear frame are excellent for holding Gear Subassembly).

Reassembly

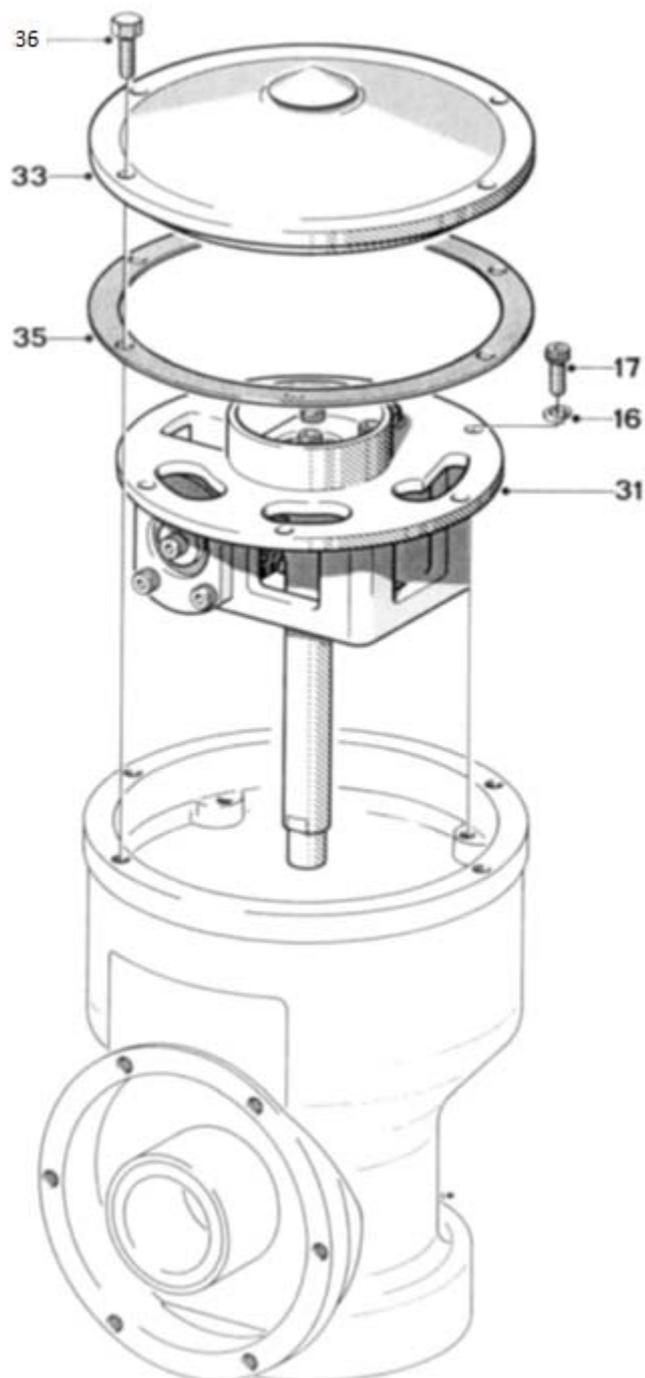
1. Reinsert Gear subassembly in bottom of machine body. Mount Spring washers (pos. 16) and Screws (pos. 36) along circumference of Gear frame (pos. 31). Tighten screws crosswise.

Note: Turbine shaft is inserted carefully through Gear wheel and Stem. Note also that in order to secure meshing between Gear wheel (pos. 8) and Pinion (pos. 11) - it might be necessary to rotate slightly either the whole Gear Subassembly or the Gear wheel.

2. Place Bottom cover (pos. 33).
3. Mount Spring washers (pos. 16) and Screws (pos. 36) and tighten crosswise.

Maintenance and Repair (continued)

Bottom Assembly



Maintenance and Repair (continued)

Hub Subassembly

Disassembly

1. Remove Nozzles (pos. 22). Nozzles are untightened with a wrench on the faces of the nozzles.
2. Remove Screws (pos. 36) from Hub cover (pos. 21).
3. Draw out Hub Subassembly. If Hub cover (pos. 21) clings into Body, knock carefully with plastic hammer on outer diameter to loosen.
4. Remove Cotter pin (pos. 24). Unscrew contra clockwise Hub conical part (pos. 23) freeing Hub cover (pos. 21), Ball retainer w. balls (pos. 27) and Bevel gear (pos. 20). To unscrew Hub conical part (pos. 23), Hub nozzle part (pos. 25) is held in a vice. Caliper (tool No. TE369) is used for the unscrewing using the two holes in end face of Hub conical part.

Note: Left-hand thread

If Ball races (pos. 26) in Hub cover and in Bevel gear are extremely worn, they should be replaced as well as the Ball retainer with balls (pos. 27). How to replace Ball races see page 32.

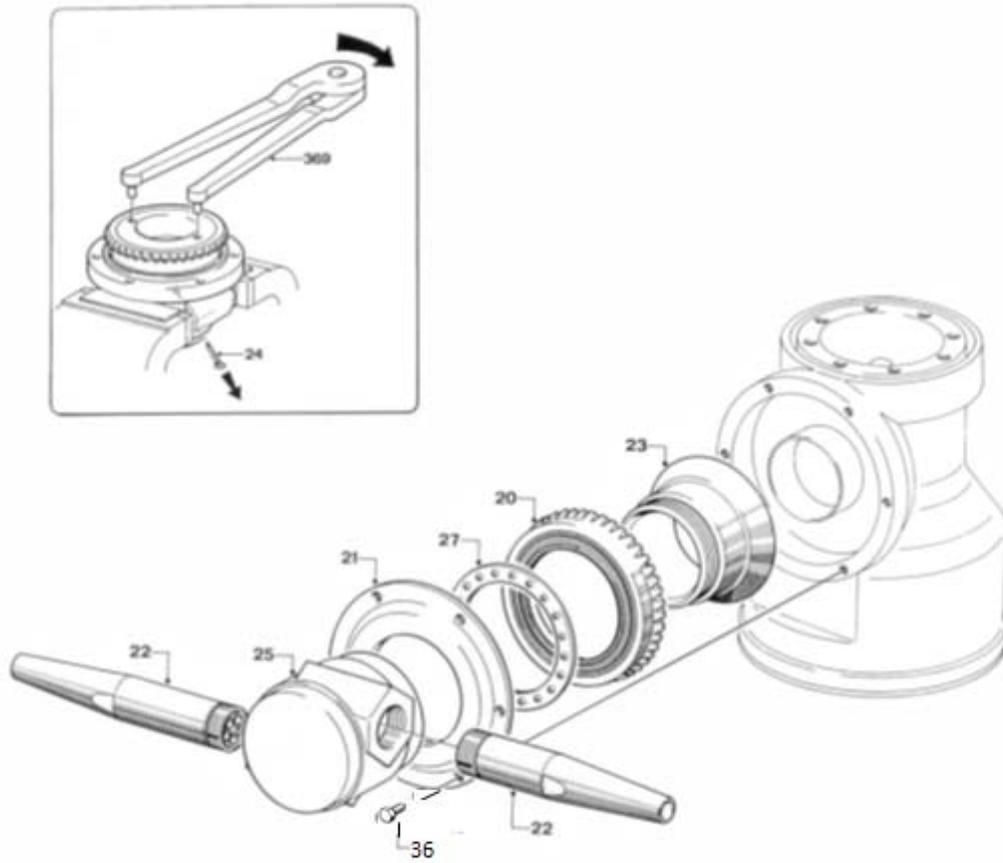
If blue Teflon liner inside Hub is extremely worn, it can be replaced. This part requires that a precise procedure be followed to accomplish installation. It is suggested that an authorized Alfa Laval Tank Equipment Service Centre perform the replacement when necessary. However, should the customer insist that they perform the installation, please contact your nearest Service Centre for a copy of the procedure.

Reassembly

1. Mount Bevel gear (pos. 20), Ball retainer with balls (pos. 27) and Hub cover (pos. 21) on Hub conical part (pos. 23). Screw on Hub nozzle part (pos. 25). Note: Left-handed thread. To tighten, place Hub nozzle part in a vice and use Caliper (tool No. TE369). Tighten until holes are aligned to pass Cotter pin (pos. 24). Insert Cotter pin and split (preferably new cotter pin).
2. Slide on Hub Subassembly, fit Hub cover (pos. 21) into Body and and Screws (pos. 36).
3. Screw on Nozzles (pos. 22) and tighten with wrench. If desired secure with Loctite No. 242 or equivalent.

Maintenance and Repair (continued)

Hub Assembly



Maintenance and Repair (continued)

Stem Subassembly

Disassembly

1. Place machine in upside-down position.
2. Unscrew Gland (pos. 5). Note: Left hand thread. Push out Main bush (pos. 6).
3. Turn machine upside down.
4. Remove Screws (pos. 10) in Gear wheel (pos. 8). To prevent rotation of Stem (pos. 3) mount two 1/4" screws in two holes opposite one another in BIG end of Stem. Place Stem in a vice held by the heads of the two screws.
5. Draw out Gear wheel with Ball race (pos. 8) and Ball retainer with balls (pos. 27).
6. Push out Stem (pos. 3).

If Ball races in Body (pos. 28.3) and on Gear wheel (pos. 8.1) are extremely worn they should be replaced together with Ball retainer with balls (pos. 27). How to replace Ball races, see page 32.

If blue liners on Stem are extremely worn, they can be replaced. This part requires that a precise procedure be followed to accomplish installation. It is suggested that an authorized Alfa Laval Tank Equipment Service Centre perform the replacement when necessary. However, should the customer insist that they perform the installation, please contact your nearest Service Centre for a copy of the procedure.

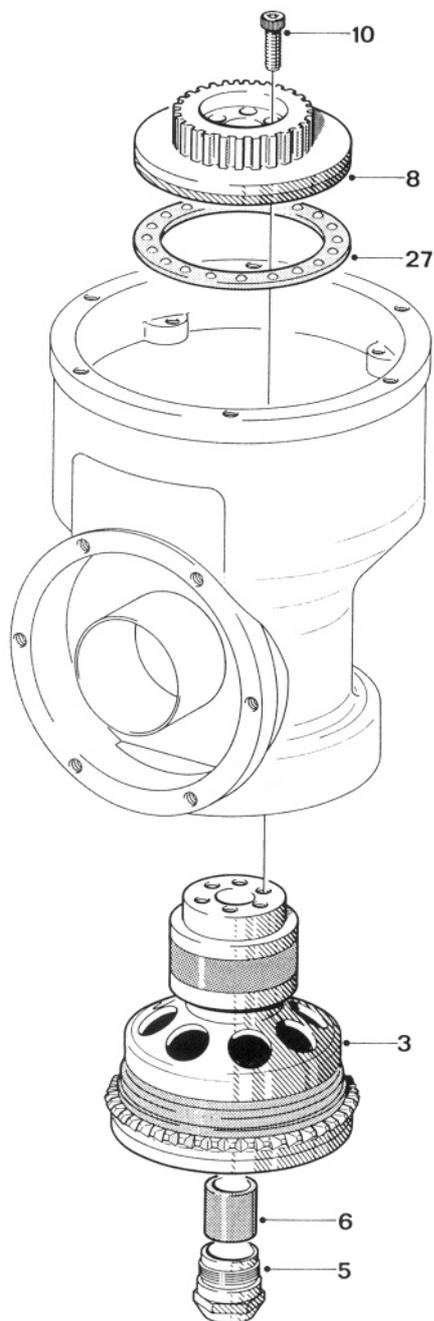
Reassembly

1. Push Stem (pos. 3) into Body. Turn machine upside-down.
2. Place Ball retainer with balls (pos. 27) and Gear wheel (pos. 8) into Body on Ball race. Rotate Gear wheel to check free rotation.
3. Mount Gear wheel (pos. 8) with 1/4" Screws and tighten crosswise.
4. Turn machine to upright position. Remount Main bush (pos. 6) in Gland (pos. 5) and screw into Stem (pos. 3).

<p>Note: Left-hand thread</p>

Maintenance and Repair (continued)

Stem Subassembly



Maintenance and Repair (continued)

Gear Subassembly

Disassembly

1. Hold Turbine shaft (pos. 7) against 1st stage Worm wheel (pos. 13) with one hand and loosen Screws (pos. 17) in Pinion (pos. 11) and Horizontal shaft (pos. 29) with the other hand.
2. Draw out Turbine shaft (pos. 7) after Screw (pos. 17), Spring washer (pos. 16) and Washer (pos. 18) has been removed. Use faces on Turbine shaft to hold against rotation.

Warning

Do not damage driver faces on Turbine shaft. Use only proper tools providing a firm grip such as a wrench or a vice.



3. Draw out Horizontal shaft (pos. 29) and 1st stage Worm wheel (pos. 13) after removal of Screw (pos. 17), Spring washer (pos. 16) and Washer (pos. 18).
4. Draw out Pinion (pos. 11) and 2nd stage Worm wheel (pos. 14), also freeing Journal (pos. 15) after removal of Screw (pos. 17), Spring washer (pos. 16) and Washer (pos. 18).
5. Remove Bearing cover (pos. 32) and Slide bearing (pos. 30), after removal of Screws (pos. 17).

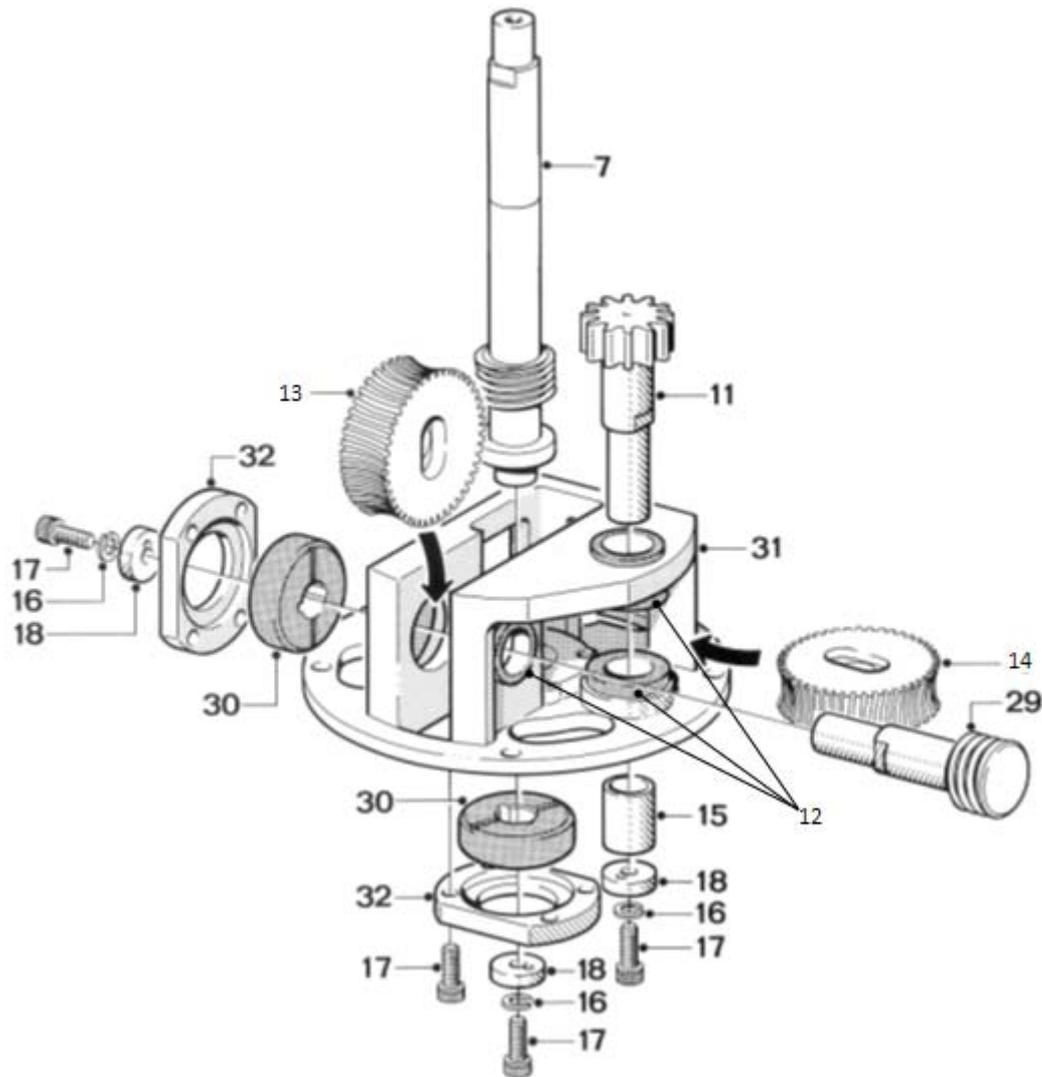
How to replace Collar bushes (pos. 12), see page 30.

Reassembly

1. Push Slide bearings (pos. 30) into Gear frame (pos. 31) and fix Bearing covers (pos. 32) with Screws (pos. 17). Tighten crosswise.
2. Insert 2nd stage Worm wheel (pos. 14), Pinion (pos. 11) and Journal (pos. 15). Mount Washer (pos. 18), Spring washer (pos. 16) and fix with Screw (pos. 17). Check rotation.
3. Insert 1st stage Worm Wheel (pos. 13) and Horizontal shaft (pos. 29). Mount Washer (pos. 18), Spring washer (pos. 16) and fix with Screw (pos. 17). Check rotation.
4. Insert turbine shaft (pos. 7). Mount Washer (pos. 18), Spring washers (pos. 16) and fix with Screw (pos. 17). Use faces on Turbine shaft to hold against rotation when tightening screw.
5. Hold Turbine shaft (pos. 7) against 1st stage Worm wheel and tighten Screws (pos. 17) in Horizontal shaft (pos. 29) and Pinion (pos. 11). Check rotation on Turbine shaft.

Maintenance and Repair (continued)

Gear Subassembly



I

Maintenance and Repair (continued)

Replacement of Collar Bushes

1. Place Gear frame (pos. 31) upside down with a firm support under the Top cone. Use for instance jaws of a vice. Do not clamp on machined surfaces. With Pusher (tool no. TE81B031, see page 36) knock out Collar bush.
2. Turn Gear frame to upright position and hold over support such as flat steel bar clamped in a vice. Knock out Collar bush with Pusher.
3. Turn Gearframe 90° and hold over support. Knock out Collar bush with Pusher.

Warning

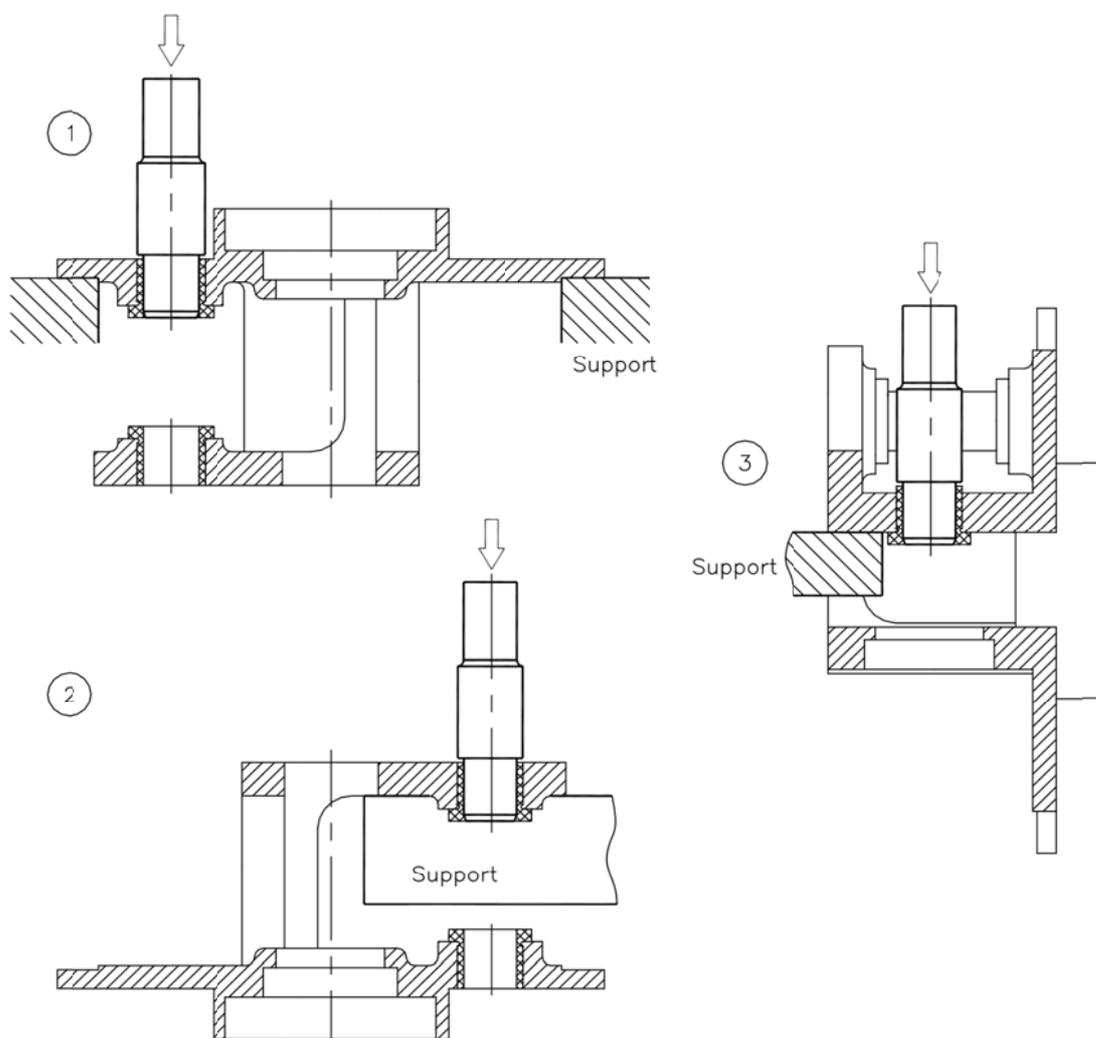


To avoid risk of deforming Gear frame, it is utmost important that it is supported while the Collar bushes are being knocked out.

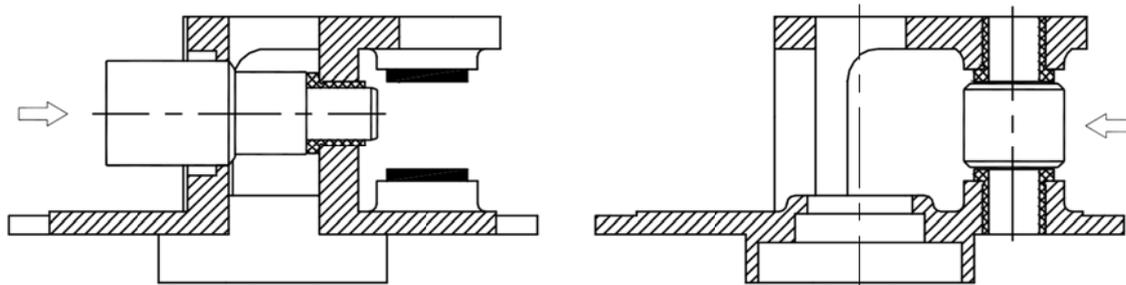
4. Remove all remains of old Araldite etc. Holes must be perfectly clean before mounting new Collar bushes. Rinse with chemical cleaner.
5. Coat new Collar bushes with CIBA-GEIGY two component Standard blue Araldite and push into Gear frame.
6. To hold Collar bushes in correct position, insert fixtures (tool No. TE81B032, see page 36) and let harden according to instructions.

Maintenance and Repair (continued)

Replacement of Collar Bushes



Removal of old Collar bushes



Mounting of new Collar bushes

Maintenance and Repair (continued)

Replacement of Ball races

In Body

1. A. With big end downwards knock several times Body with bearings (pos. 28) hard against firm wooden support until Ball race (pos. 28.3) drops out.
2. B. If it is not possible to knock out Ball race in this way, it is necessary first to screw out Main collar lower (pos. 28.2) - see page 34. Carefully push off old Ball race without damaging Main collar lower. Use mandrel and firm support.
3. Before mounting of new Ball race, main collar lower (pos. 28.2) must be remounted into Body - see page 34.
4. Clean surfaces and place Ball race (pos. 28.3) on Main collar lower (pos. 28.2). Press by hand as long as possible. By means of a tube mandrel or if desired wooden block, carefully hammer Ball race home.

Ball race must not project over end face of Main collar lower. To avoid tilting mandrel must push along the whole circumference of Ball race. Do not damage surface of Ball race.

On Gear wheel

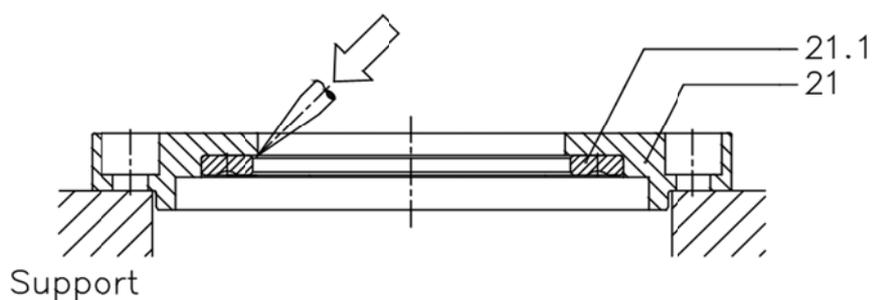
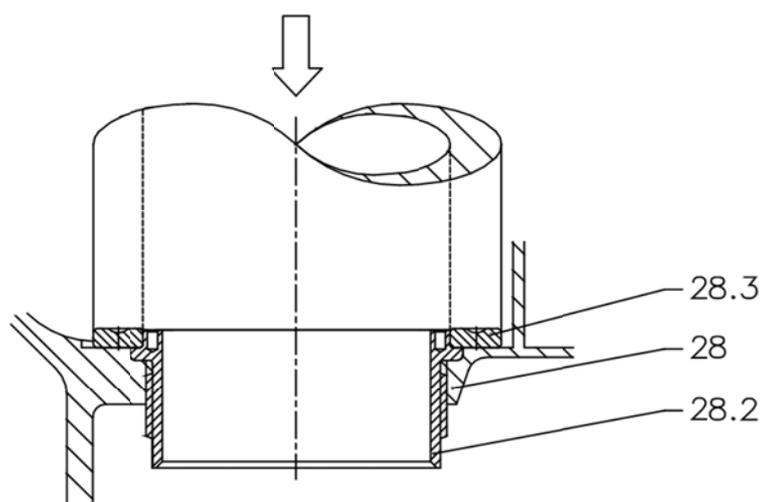
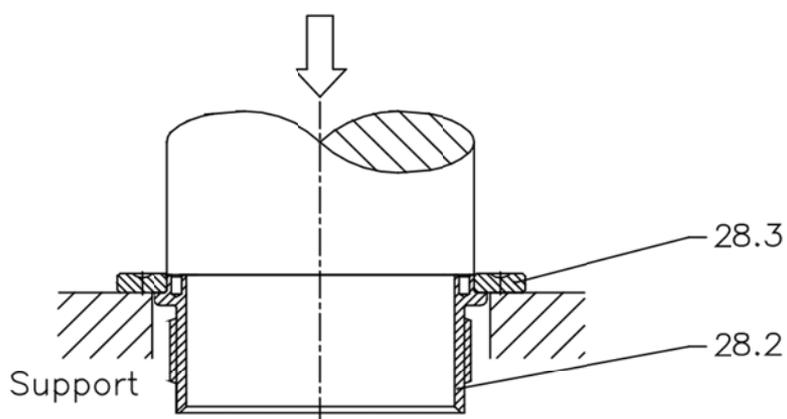
1. Place Gear wheel with ball race (pos. 8) on support. Support only under Ball race (pos. 8.1). With mandrel press off old Ball race.
2. Clean surfaces and press on new Ball race. Ball race must be pressed fully home on Gear. Press parallel. Use press or vice. Do not damage surface of Ball race.

In Hub cover

1. Place Hub cover with Ball race (pos. 21) on support. Carefully knock out old Ball race by means of small mandrel or if desired screwdriver. Knock several times around the circumference to avoid tilting.
2. Clean surfaces and press in new Ball race. Ball race must be pressed fully home. Press parallel. Do not damage surface of Ball race.

Maintenance and Repair (continued)

Replacement of Ball races



Maintenance and Repair (continued)

Replacement of Main Collar

Although normally exposed to very limited wear, it is possible to replace Main collar (pos. 28.2) in Body. The procedure to do this is described below.

Warning



Replacement of Main Collars involves risk of damaging the special threads and accordingly the body. It is recommended to let an authorized Alfa Laval Tank Equipment distributor do the replacement.

Main collar lower

1. Place Body (pos. 28) in a vice in upside down position. Do not clamp on machined faces. Insert Tool (see page 37) into Main collar (pos. 28.1). To loosen Loctite, knock hard on tool with hammer. Unscrew Main collar.

Warning

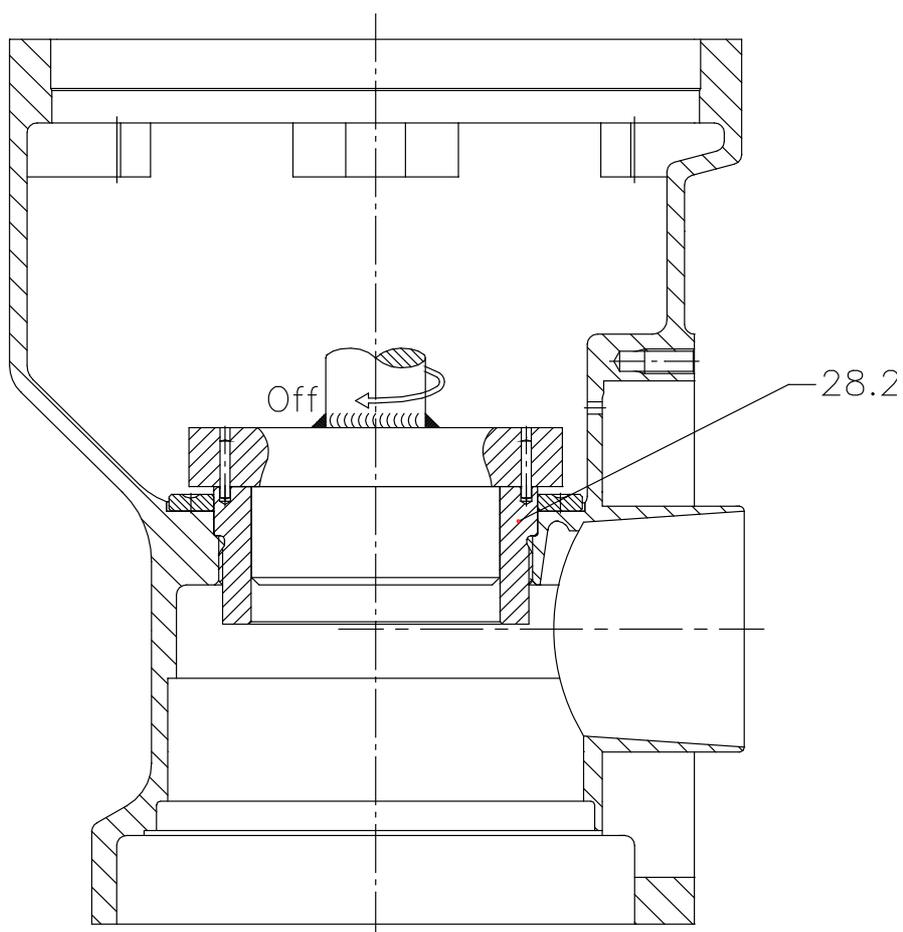


Thread on Main collar lower is left-handed

2. Carefully clean thread and recess in Body. Do not damage special thread in Body. Recess must be absolutely clean and free from remains of old Loctite. If desired, use solution of ethylene glycol.
3. Make sure that new Main collar is clean and free from impurities. Apply Loctite No. 242 on thread.
4. Screw in new Main collar. Attention should be given to make sure that thread is in correct engagement before screwing in Main collar.
5. Tighten Main collar fully home. Several times knock hard on tool and tighten up.

Maintenance and Repair (continued)

Replacement of Main Collar



Tools

Standard Tool Kit for IM 25 Rotary Jet Mixer, Article No. TE81B065

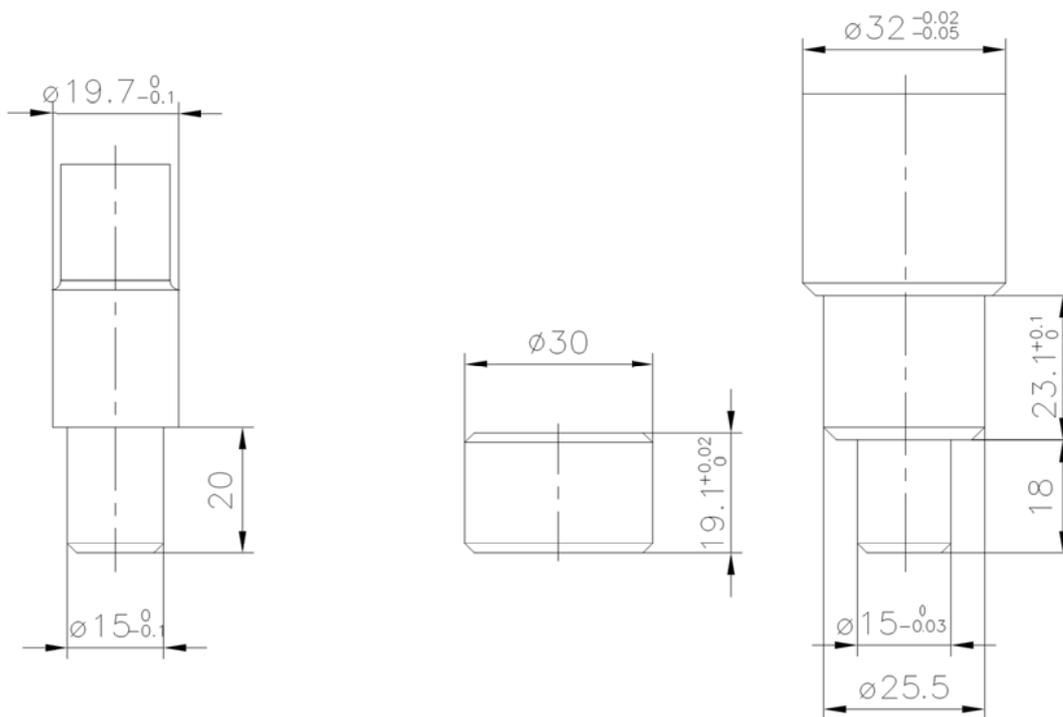
Tool No.	Description
TE134	Hex key for 3/16" screw (1 piece)
TE134A	Screw driver for 3/16"screw (1 piece)
TE135	Hex key for 1/4"screw (1 piece)
TE135A	Hex screwdriver 3/16" (1 piece)
TE369	5mm Calipers (1 piece)

Sketch of Tools for replacement of Collar bush

Available on request

TE81B031: Pusher for 2" gear frame

TE81B032: Fixture set for gear frame

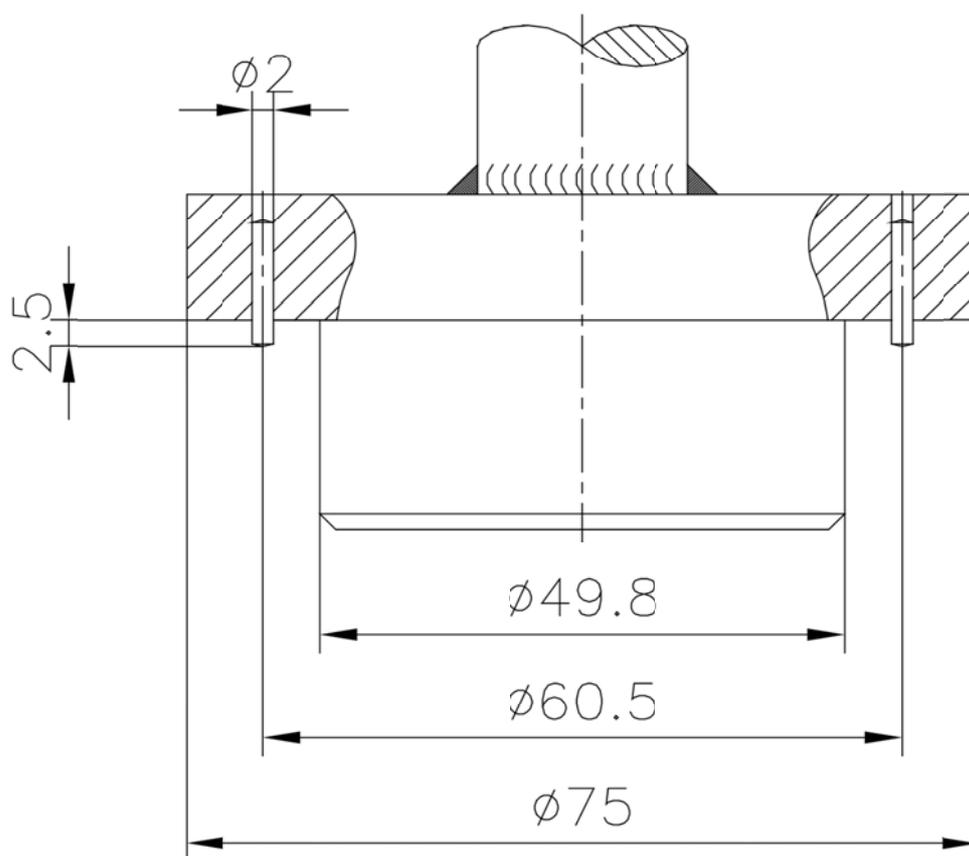


Tools (continued)

Sketch of tool for replacement of Main collar

Available on request

TE81B132 Tool f. lower Collar (2"+3"TCM) Compl.



Trouble Shooting Guide

Symptom: Slow rotation or failure of the machine to rotate

Possible causes	Action
No or insufficient liquid flow	<p>a). Check if supply valve is fully open.</p> <p>b). Check if inlet pressure to machine is correct.</p> <p>c). Check supply line/filler for restrictions/clogging.</p> <p>d). Remove nozzles and check for clogging. If blocked, carefully clean nozzle without damaging stream straighteners and nozzle tip.</p> <p>e). Remove Top cone/Nipple, Guide and Impeller (see page 20) and check for clogging in Impeller area.</p> <p>If large particles repeatedly get jammed in the machine, install filter/strainer or reduce mesh size of installed filter in supply line.</p>
Foreign Material or Material Build-up	<p>Insert hex Screwdriver in screw in top of Turbine shaft and easily turn Turbine shaft clockwise. If any resistance is recognized, disassemble machine to localize the cause.</p>
a) Impeller jammed	Remove Guide and Impeller (see page 20) and remove foreign material.
b) Turbine shaft sluggish in Main Bush	Remove Gear Subassembly with Turbine shaft (see page 22) and Gland (pos. 5) and clean Main bush.
c) Bevel gears jammed	Remove Top cone/Nipple and Hub Subassembly (see page 24). Clean teeth on Stem and Bevel gear.
d) Stem jammed/sluggish	Remove Gear subassembly (see page 22). Check free rotation of Stem. Remove Stem (see page 26). Remove foreign material/material build-up on Stem and inside Main Collars. Clean Ball Races and Ball retainer with balls. Also clean Main bush.

Trouble Shooting Guide (continued)

Possible causes	Action
e) Gearbox jammed/sluggish	Remove foreign material from Gearbox. Check sluggish rotation of shafts. If restriction is recognized, disassemble gear subassembly (see page 28) and remove material build up, especially on 2nd stage Worm wheel and mating Collar bushes.
f) Hub jammed/sluggish	Disassemble Hub Subassembly (see page 24). Remove foreign material inside Hub. Clean Ball races and Ball retainer with balls. Also clean nose of Body.

Wear

a). Slide bearings	See page 18 -19 .
b). Main bush	See page 18 -19 .
c). Worm wheels	See page 18 -19 .
d). Collar bushes	See page 18 -19 .
e). Turbine shaft	Check clearance in Main bush and in Slide bearing. Transverse movement should not exceed 0.5 mm. Also inspect worm wheel for wear.
f). Horizontal shaft	Check clearance in Collar bushes. Transverse movement should not exceed 0.5 mm. Also inspect worm for wear.

Mechanical defects

a). Worm wheel/Teeth broken	Replace Worm wheel.
b). Worm wheel can rotate on Horizontal shaft/Pinion due to damaged driver faces.	Replace Worm wheel.
c). Damaged teeth on Bevel gear	Inspect teeth on Stem and Bevel gear for deformation. Mount Hub and Stem in Body (see page 24 and 26). Hold Body in upside down position and rotate Hub to check that Bevel gears can work together. If damaged: Replace Stem and/or Bevel gear.

IM 25 Rotary Jet Mixer

Reference list of parts

Pos.	Ref. no.	No./ unit	Description	Material	Remarks
1	TE33B510	1	Top cone 2½" BSP	Stainless steel	Spare part
3	TEB604Z	1	Stem	Stainless steel/Polymer	Spare part
3.1	TEB604-2*)		Bottom liner	Polymer	Wear part
3.2	TEB604-1*)		Top liner	Polymer	Wear part
4	TE32B508	1	Impeller 100%	Stainless steel	Spare part
5	TE608Z	1	Gland	Stainless steel	Spare part
6	TE22B576	1	Main bush	Polymer	Wear part
7	TE32B511	1	Turbine shaft	Stainless steel	Wear part
8	TE32B303	1	Gear wheel w. ball race	Stainless steel	Spare part
8.1	TE32B510		Ball race	Stainless steel	Wear part
10	TE120	6	Screw	Stainless steel	Spare part
11	TE114	1	Pinion	Stainless steel	Spare part
12	TE22A586	3	Collar bush	Carbon	Wear part
13	TE22A365	1	Worm wheel	Polymer/Stainless steel	Wear part
14	TE22A364	1	Worm wheel E-gear	Polymer/Stainless steel	Wear part
15	TE117	1	Journal	Stainless steel	Spare part
16	TE156	9	Spring washer	Stainless steel	Spare part
17	TE118	17	Screw	Stainless steel	Spare part
18	TE619A	3	Washer	Stainless steel	Spare part
19	TE32B515	1	Washer	Stainless steel	Spare part
20	TE32B307	1	Bevel gear w. ball race	Stainless steel	Spare part
20.1	TE32B510		Ball race	Stainless steel	Wear part
21	TE22D540	1	Hub cover w. ball race	Stainless steel	Spare part
21.1	TE32B510		Ball race	Stainless steel	Wear part
22	<input type="checkbox"/> TE50C015	2	Nozzle, ø15 mm	Stainless steel	Spare part
	<input type="checkbox"/> TE50C017	2	Nozzle, ø17 mm	Stainless steel	Spare part
	<input type="checkbox"/> TE50C019	2	Nozzle, ø19 mm	Stainless steel	Spare part
	<input type="checkbox"/> TE50C021	2	Nozzle, ø21 mm	Stainless steel	Spare part
23	TE624-OKZ	1	Hub conical part	Stainless steel/Polymer	Spare part
23.1	TE624-11*)		Hub liner	Polymer	Wear part
24	TE448	1	Cotter pin	Stainless steel	Spare part
25	TE624-2-15	1	Hub nozzle part	Stainless steel	Spare part
26	TE22D553	1	Hub gasket	Polymer	Spare part
27	TE32B302	2	Ball retainer w. balls	Polymer/Ceramics	Wear part
28		1	Body	Stainless steel	Not available
28.2	TE22E516	1	Main collar lower	Stainless steel	Wear part
28.3	TE32B510	1	Ball race	Stainless steel	Wear part
29	TE128E	1	Horizontal shaft	Stainless steel	Wear part
30	TE22A571	2	Slide bearing	Polymer	Wear part
31	TE630	1	Gear frame	Stainless steel	Spare part
32	TE531	2	Bearing cover	Stainless steel	Spare part
33	TE32B350	1	Bottom cover	Stainless steel	Spare part
34	TE120	8	Screw	Stainless steel	Spare part
35	TE22D554	1	Gasket f. bottom cover	Polymer	Spare part
36	TE421H	12	Screw	Stainless steel	Spare part

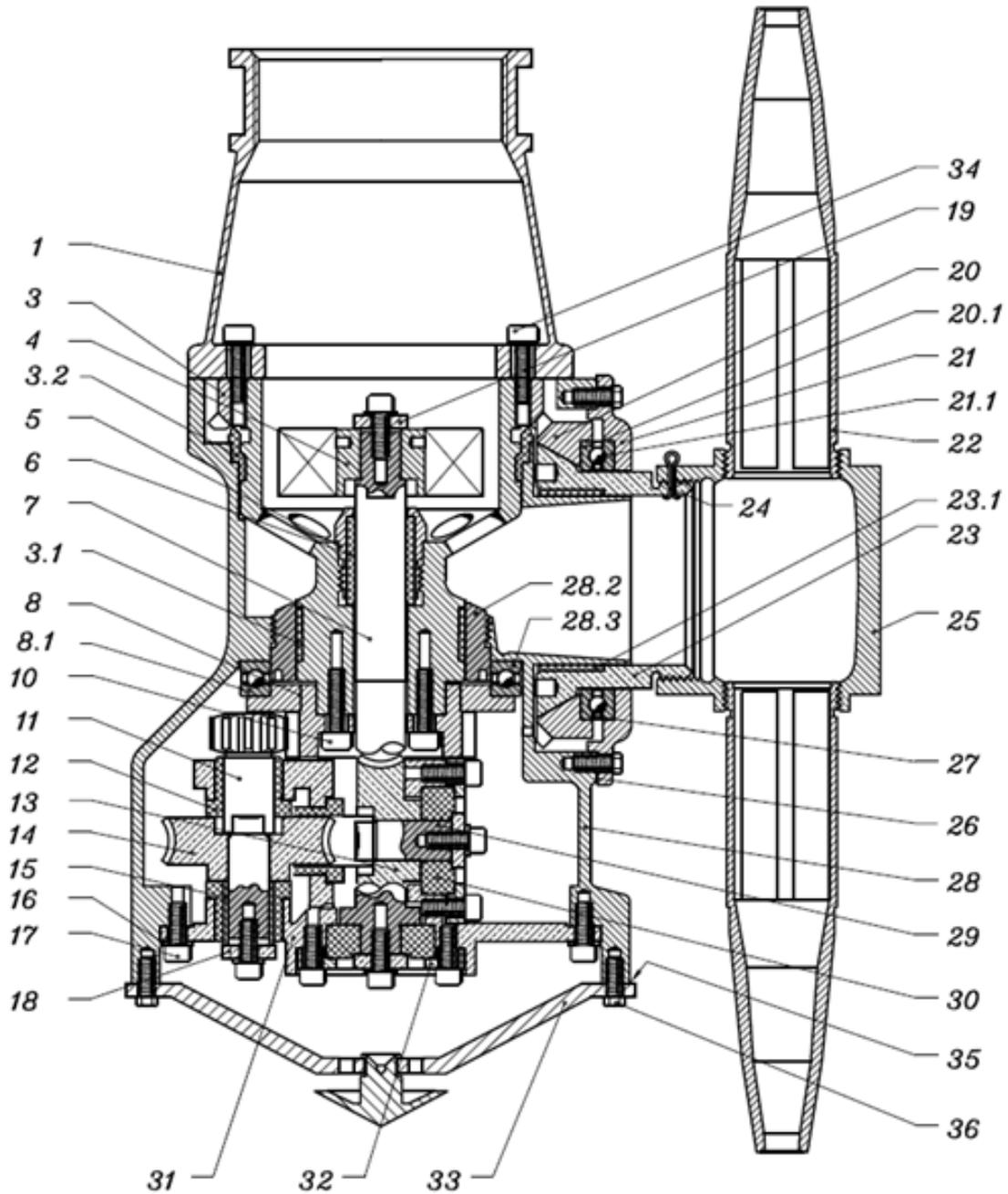
Configuration as delivered marked

*) See remarks page 24 and 26.

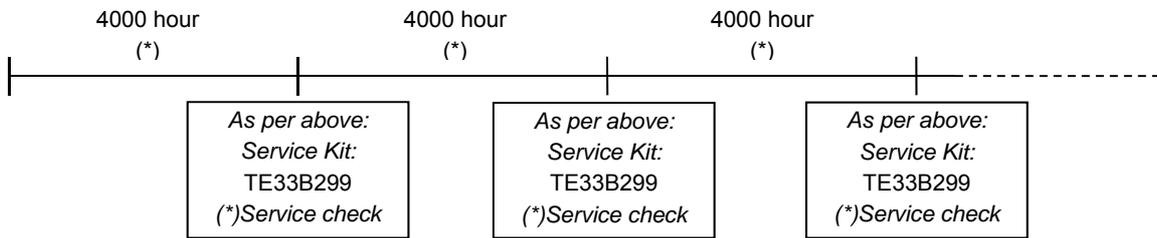
Please note that some of the polymer parts are in PEEK. PEEK is not resistant to concentrated sulfuric acid.

IM 25 Rotary Jet Mixer

Cross Sectional Drawing



Service intervals



* **Note:** The service intervals are recommended on the basis of pure liquids. When liquids contain particles and other kind of abrasives, we recommend shorter service intervals depending on the actual running conditions.

Standard Spare Part Service Kits and Tool Kits

Standard Spare Part Service Kit for IM 25 Rotary Jet Mixer, Article No. TE33B299

Part No.	Description	No.
TE22A364	Worm wheel E-gear	1 pc.
TE22A365	Worm wheel w. reinforcement	1 pc.
TE22A571	Slide bearing	2 pcs.
TE22A586	Collar bush	3 pcs.
TE22B576	Main bush	1 pc.
TE32B302	Ball Retainer with Balls	2 pcs.
TE33B510	Ball Race	4 pcs.

Standard Tool Kit for IM 25 Rotary Jet Mixer, Article No. TE81B065

Part No.	Description	No.
TE134	Hex key for 3/16" screw	1 pc.
TE134A	Screw driver for 3/16"screw	1 pc.
TE135	Hex key for 1/4"screw	1 pc.
TE135A	Hex screwdriver 3/16"	1 pc.
TE369	5mm Calipers	1 pc.

Special Tools for IM 25 Rotary Jet Mixer

Available on request:

Part No.	Description	No.
TE81B031	Pusher for Collar bush	1 pc.
TE81B032	Fixture set for Collar bush	1 pc.
TE81B132	Tool f. lower Collar (2"+3"TCM) Compl.	1 pc.

How to Order Spare Parts and Claim Procedure

How to Order Spare Parts

On the Cross Sectional Drawing as well as on all instruction drawings, the individual parts have a pos. no., which is the same on all drawings. From the pos. no. the part is easily identified in the Reference List of Parts, page 40.

Individual parts should always be ordered from the Reference List of Parts, page 40. Ref. no. and description should be clearly stated.

Please also quote the type of machine and serial No. This will help us to help you. The type and serial nos. are stamped on the Body of the mixer.

Claim Procedure

In case of failure that needs assistance from Alfa Laval Tank Equipment, it is essential for our evaluation that the problem as well as the working conditions of the machine are described as detailed as possible.

How to contact Alfa Laval Tank Equipment

For further information please feel free to contact:

Alfa Laval Tank Equipment

Alfa Laval Kolding A/S

31, Albuen - DK 6000 Kolding - Denmark

Registration number: 30938011

Tel switchboard: +45 79 32 22 00 - Fax switchboard: +45 79 32 25 80

www.toftejorg.com , www.alfalaval.dk - info.dk@alfalaval.com

Contact details for all countries are continually updated on our websites.

Declaration of Conformity



EC Declaration of Conformity

The designated company

Alfa Laval Kolding A/S

Company name

Albuen 31, 6000 Kolding, Denmark

Address

+45 79 32 22 00

Phone no.

hereby declare that

Tank Cleaning Machine

Denomination

Alfa Laval Rotary Jet Mixer Iso-Mix 25

Type

Valid from SN: 2014 00001 to 2015 10000

is in conformity with the following regulations and directives with amendments:

- **FDA 21CFR§177**

- **The Machinery Directive 2006/42/EC**

DS/EN ISO 12100:2010

- **The Pressure Directive 97/23/EC**

According to its own volume and the rated pressure range the product is regarded an Article 3, paragraph 3 Equipment

- **The Equipment Explosive Atmospheres (ATEX) Directive 94/9/EC**

(Applicable for machine certified as category 1 and 2 component, see machine engraving)

DS/EN 13463-1:2009, DS/EN 13463-5:2011,

DS/EN ISO/IEC 80079-34:2011, Annex A, paragraph A.5.3 Rotating machines

EC Type Examination Certificate no. Baseefa10ATEX0188X

Marking:  II 1 GD c T175°C Tamb 0°C to +140°C

*Baseefa Ltd., Certification body number 1180, Rockhead Business Park
Staden Lane, Buxton, Derbyshire SK17 9RZ, United Kingdom*

The technical construction file is retained at the above address.

R&D Manager

Title

Henrik Falster Hansen

Name

Signature

ATEX Responsible Engineer

Title

Denniz Høxbroe

Name

Signature

June 12, 2014

Date

Alfa Laval Kolding A/S

Company



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 directly.

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