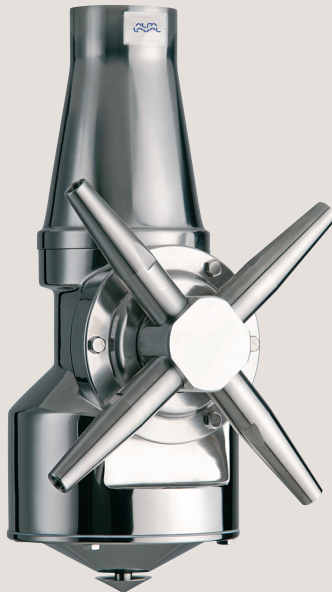




# Instruction Manual

## Alfa Laval IM 15 Rotary Jet Mixer



Covering:  
Standard machines  
Machines delivered with ATEX/IECEX Certification in accordance with Directive 2014/34/EU

ESE02184-EN10      2022-11

Original manual



The information herein is correct at the time of issue but may be subject to change without prior notice

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# 1 Declarations of Conformity

## EU Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00

Company name, address and phone number

Hereby declare that

Rotary Jet Mixer

Designation

IM15

Type

Serial number from 2019-0001 to 2030-99999


is in conformity with the following directives with amendments:

- Machinery Directive 2006/42/EC

- ATEX Directive 2014/34/EU and the following harmonized standards are used:

EN ISO 80079-36:2016, EN ISO 80079-37:2016, DS/EN ISO/IEC 80079-34:2011, Annex A, paragraph A.5.3 Rotating machines

EC Type Examination Certificate no. Baseefa10ATEX0188X and IECEX BAS 19.0087X

Marking:  II 1G Ex h IIC 85°C... 175°C Ga  
II 1D Ex h IIC T85°C... T140°C Da

The QAN (Quality Assurance Notification) is carried out by SGS Fimko Oy, Särkiniementie 3, Helsinki 00211, Finland. Notified Body No. 0598.  
EU Type Examination Certification is carried out by SGS Fimko Oy, Särkiniementie 3, Helsinki 00211, Finland. Notified Body no. 0598.  
IECEX Certificate of Conformity is carried out by Baseefa Ltd., Rockhead Business Park, Staden Lane, Buxton, Derbyshire SK17 9RZ, United Kingdom. IECEX Accepted Certification Body (ExCB).

The person authorised to compile the technical file is the signer of this document.

Global Product Quality Manager

Title

Lars Kruse Andersen

Name

Kolding, Denmark

Place

2022-11-08

Date (YYYY-MM-DD)

Signature

This Declaration of Conformity replaces Declaration of Conformity dated 2019-06-01



# 1 Declarations of Conformity

## UK Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00

Company name, address and phone number

Hereby declare that

Rotary Jet Mixer

Designation

IM15


Type

Serial number from 2019-0001 to 2030-99999

is in conformity with the following directives with amendments:

- The Supply of Machinery (Safety) Regulations 2008
  - The Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016
- EN ISO 80079-36:2016, EN ISO 80079-37:2016, DS/EN ISO/IEC 80079-34:2011, Annex A, paragraph A.5.3 Rotating machines

UKEx Type Examination Certificate no. BAS22UKEX0071X and IECEx BAS 19.0087X

Marking:  II 1G Ex h IIC 85°C... 175°C Ga  
II 1D Ex h IIIC T85°C... T140°C Da

The UK QAN (Quality Assurance Notification) is carried out by Baseefa Ltd., Rockhead Buisness Park, Staden Lane, Buxton, Derbyshire SK17 9RZ, United Kingdom, Notified Body No. 1180.

UKType Examination Certification is carried out by Baseefa Ltd., Rockhead Buisness Park, Staden Lane, Buxton, Derbyshire SK17 9RZ, United Kingdom, Notified Body No. 1180.

IECEX Certificate of Conformity is carried out by Baseefa Ltd., Rockhead Business Park, Staden Lane, Buxton, Derbyshire SK17 9RZ, United Kingdom. IECEx Accepted Certification Body (ExCB).

Signed on behalf of: Alfa Laval Kolding A/S

Global Product Quality Manager

Title

Lars Kruse Andersen

Name

Kolding, Denmark

Place

2022-11-08

Date (YYYY-MM-DD)

Signature

DoC Revison\_01\_112022



*Unsafe practices and other important information are emphasized in this manual.  
Warnings are emphasized by means of special signs.  
**Always read the manual before using the mixer!***

---

### 2.1 Important information

---

#### **WARNING**

Indicates that special procedures must be followed to avoid serious personal injury.

#### **CAUTION**

Indicates that special procedures must be followed to avoid damage to the mixer.

#### **NOTE**

Indicates important information to simplify or clarify procedures.

---

### 2.2 Warning signs

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General warning:



ATEX/IECEx warning:



## 3 Introduction

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Rotary Jet Mixer IM 15

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### 3.1 Introduction

---

This manual has been prepared as a guide for the persons who will be operating and maintaining your Alfa Laval IM 15 Rotary Jet Mixer. 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 job to do will need more frequent attention than one working in ideal conditions.

**Note:** Get the best and most economical performance from your Rotary Jet Mixer. 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.

The English version of the instruction manual is the original manual. We make reservations in regard to possible mistranslations in language versions of the instruction manual. In case of doubt, the English version of the instruction manual applies.

**Important information:**



Before installing the machine and setting it into operation, carefully read the General Safety and Installation Instructions (page 16) and the special conditions for safe use in accordance with ATEX/IECEX directive 2014/34/EU (page 18) and take all necessary precautions according to your application and local regulations.

---

### 3.2 Intended use

---

It is to be verified by the end-user:

- that the rotary jet mixer 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.

The rotary jet mixer is intended for use in closed tank, vessel or container. If used in open environment see 4.3 General safety and installation instructions (page 16).

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### 3.3 Patents and trademarks

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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.

Alfa Laval Kolding A/S. All rights reserved.

Alfa Laval IM 15 Rotary Jet Mixer 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.

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### 3.4 Marking

---

Alfa Laval Rotary Jet Mixers are marked to allow for recognition of type of machine, machine name, serial number and manufacturing address. The marking is placed on the gear house of the mixer.

**Rotary Jet Mixer**  
**IM 15**  
**Patent: EP 1 324 818**  
**s/n.: yyyy-xxxxx**  
Alfa Laval, DK-6000 Kolding, Albuen 31  
CE

#### **Serial number explanation**

Machines supplied with or without standard documentation:

yyyy-xxxxx: serial number

yyyy: year

xxxxx: 5 digit sequential number

---

## 3 Introduction

---

Rotary Jet Mixer IM 15

---

### 3.5 ATEX/IECEX marking

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The Alfa Laval IM 15 Rotary Jet Mixer is certified as category I component. The ATEX certification is carried out by the Notified Body SGS Fimko Oy, who has issued the certificate no. Baseefa10ATEX0188X.

The IECEX certification is carried out by the Certification Body SGS Baseefa Ltd., who has issued the certificate no. IECEX BAS 19.0087X.

#### Note

Explosion protection type is constructional safety "c".

The marking on the ATEX/IECEX certified Alfa Laval IM 15 Rotary Jet Mixer 15 is as follows (for information on marking position see section 3.1 Introduction):

Rotary Jet Mixer  
IM 15

s/n.: yyyy-xxxxx



Alfa Laval, DK-6000 Kolding, Albuen 31  
II 1G Ex h IIC 85°C...175°C Ga  
II 1D Ex h IIIC T85°C...T140°C Da  
CE 0598 Baseefa 10ATEX0188X IECEX BAS 19.0087X

#### Serial number explanation

Machines supplied with or without standard documentation:

yyyy-xxxxx: serial number

yyyy: year

xxxxx: 5 digit sequential number

---

### 3.6 ATEX/IECEx temperature class and code

The maximum surface temperature depends mainly on operating conditions which are the temperature of the cleaning/mixing fluid and the ambient temperature.

#### Group II EPL Ga

The gas temperature class is corrected with a safety margin of 80% due to a requirement for Group II EPL Ga equipment. The gas temperature class depends on the cleaning/mixing fluid temperature or the ambient temperature, whichever of the two is the highest.

Table for determining temperature class (gas atmospheres)		
Gas Temperature class	Cleaning/mixing fluid temperature, $T_p$ (°C)	Ambient temperature, $T_{amb}$ (°C)
85°C (T6)	$\leq +68^\circ\text{C}$	$\leq +68^\circ\text{C}$
100°C (T5)	$\leq +80^\circ\text{C}$	$\leq +80^\circ\text{C}$
135°C (T4)	$\leq +108^\circ\text{C}$	$\leq +108^\circ\text{C}$
175°C	$\leq +140^\circ\text{C}$	$\leq +140^\circ\text{C}$

#### Group III EPL Da

The dust temperature class depends on the cleaning/mixing fluid temperature or the ambient temperature, whichever of the two is the highest. No dust layer is considered.

Table for determining temperature class (dust atmospheres)		
Dust Temperature code	Cleaning/Mixing fluid temperature, $T_p$ (°C)	Ambient temperature, $T_{amb}$ (°C)
T85°C	$\leq +85^\circ\text{C}$	$\leq +85^\circ\text{C}$
T100°C	$\leq +100^\circ\text{C}$	$\leq +100^\circ\text{C}$
T135°C	$\leq +135^\circ\text{C}$	$\leq +135^\circ\text{C}$
T140°C	$\leq +140^\circ\text{C}$	$\leq +140^\circ\text{C}$

#### Example of gas class determination

Cleaning/mixing fluid temperature is 67°C and ambient temperature is 75°C.  
Gas class = T5

ATEX/IECEx marking on the equipment:



II 1G Ex h IIC 85°C...175°C Ga  
II 1D Ex h IIIC T85°C...T140°C Da

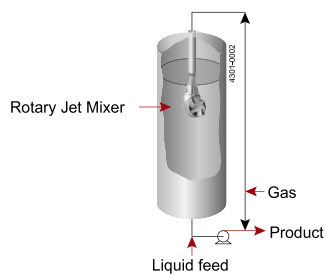


4.1 General description

The Alfa Laval IM 15 Rotary Jet Mixer is a media driven and media lubricated tank/reactor mixer. All materials are selected for contact with food, and the machine is self-cleaning i.e. all internal and external surfaces are cleaned.

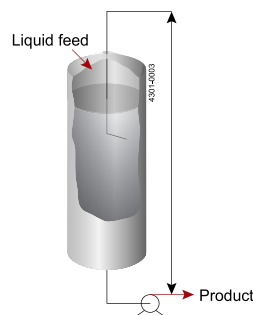
For use in explosive hazard zones the Alfa Laval IM 15 Rotary Jet Mixer ATEX/IECEX version can be used, provided it is installed according to safety instructions in local regulations.

**The Rotary Jet Mixing technology**

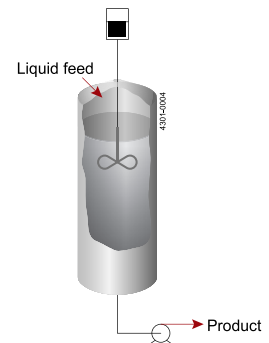


**Traditional Mixing technology**

**Round pumping**



**Propeller mixing**



- A = Rotary Jet Mixer
- B = Gas
- C = Product
- D = Liquid feed

- A = Liquid feed
- B = Product

## 4 Installation

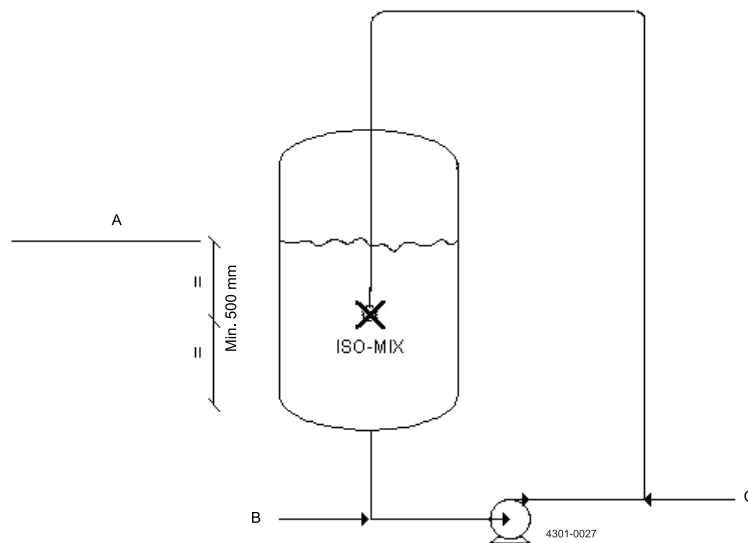
Rotary Jet Mixer IM 15

### 4.2 Functioning

The Alfa Laval IM 15 Rotary Jet Mixer 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 IM 15 Rotary Jet Mixer. 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  $\frac{1}{2}$  m under the liquid surface.



A: normal liquid level

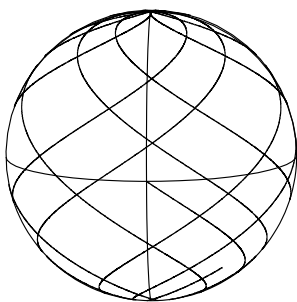
B: Possible liquid or powder supply

C: Possible gas supply

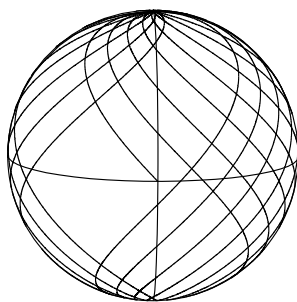
The flow of fluid to be mixed passes from the tank into the mixer through a turbine, which is set into rotation. The turbine rotation is through a gearbox transformed into a combined horizontal rotation of the mixer body and a vertical rotation of the nozzles.

#### Machines with 2 nozzles

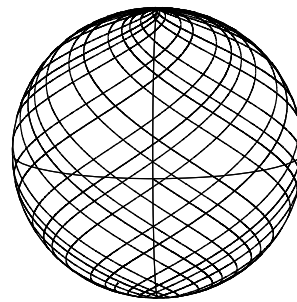
The combined motion of the mixer body and the nozzles ensures a fully indexed tank mixing. After  $11\frac{1}{4}$  revolutions of the Hub with nozzles ( $10\frac{3}{4}$  revolutions of the mixer body), one coarse movement pattern has been established which when projected on the tank surface looks as Figure 1. During the following cycles, 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 IM 15 Rotary Jet Mixer very efficient automatic tank cleaning machine, when the tank is empty.



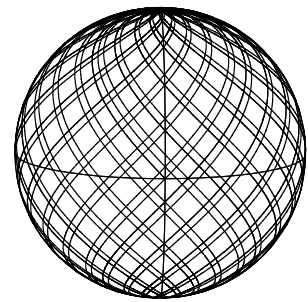
First cycle



Second cycle



Third cycle



Forth cycle

### Machines with 4 nozzles

The combined motion of the mixer body and the nozzles ensures a fully indexed tank mixing. After  $55/8$  revolutions of hub with nozzles ( $55/8$  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 cycles, this pattern is repeated 7 times, each of which is displaced  $1/8$  of the mesh in the pattern. After a total of 45 revolutions of the hub with nozzles (43 revolutions of the mixer body), a complete mixing pattern has been established, and the first pattern is repeated. This feature eliminates "dead volumes" in the tank, and makes the Alfa Laval IM 15 Rotary Jet Mixer a very efficient automatic tank cleaning machine, when the tank is empty.

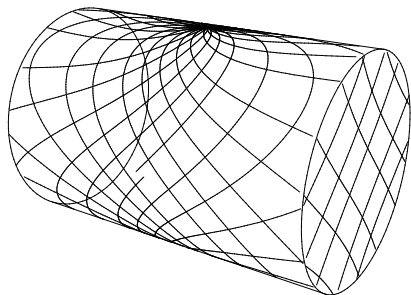


Figure 1: First cycle

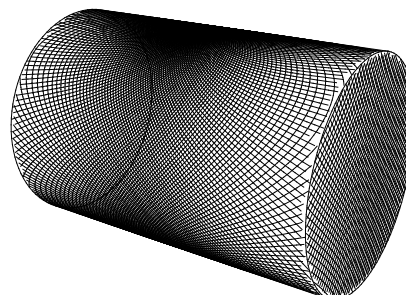


Figure 2: Full pattern

### General for both 2 and 4 nozzle machines

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 100% or 0% turbine/inlet guide.

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 number of rotations required for a satisfactory mixing of a given tank volume depends on the energy input ( $\text{kw}/\text{m}^3$  tank volume), the viscosity of the liquid, required mixing time, 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 IM 15 Rotary Jet Mixer can be used as a tank cleaning machine.

## 4 Installation

Rotary Jet Mixer IM 15

### 4.3 General safety and installation instructions

The Alfa Laval IM 15 Rotary Jet 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 mixer into the system, all supply lines and valves should be flushed to remove foreign matter.

For devices with tapered thread connections to the down pipe, it is recommended that you secure the connection in a manner appropriate for the application. Subject to the intended use environment and any inhouse user requirements or policies, a liquid thread locking adhesive such as Loctite No. 243 or equivalent could be used. Other methods could be acceptable and subject to customer preference.

**Note:** The machine shall be installed in accordance with national regulations for safety and other relevant regulations and standards.  
In EU-countries the complete system must fulfil the EU-Machine Directive and depending of application, the EU-Pressure Equipment Directive, the EU-ATEX/IECEX Directive and other relevant Directives and shall be CE-marked before it is set into operation.

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.

**Warning:**



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

For information on use in potential explosive atmospheres see paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEX certification page 18.

The Alfa Laval IM 15 Rotary Jet Mixer as delivered has been tested at the factory before shipping. For transportation reasons, the nozzles have been screwed off after the test. In order to secure the nozzles against falling off during normal cause of service due to vibrations and other external strains it is important that the nozzles are tightened properly after mounting. If not, the nozzles may be blown off during mixing and cause damage on tank, valves and pump. This is especially important if mixers are installed in tanks and vessels within the transportation sector in trucks, railcars and onboard ships.

Normally, it is sufficient to tighten the nozzles with the specified torque. However, depending on the application and local policies extra securing may be preferred.



### With 2 Nozzles:

1. Clamp machine firmly in a vice: Place machine on top of vice with Hub w. nozzles down wards as illustrated on the figure. Clamp on the Hub. To protect machine use rubber jaws on the vice.
2. Set torque wrench at the specified tightening torque.
3. Tighten nozzle with the torque.



*Recommended tightening torque: 50 Nm.*



### With 4 Nozzles:

1. Clamp machine firmly in a vice: Place machine on top of vice with Hub w. nozzles down wards as illustrated on the figure. Clamp on the Hub. To protect machine use rubber jaws on the vice.
2. Set torque wrench at the specified tightening torque.
3. Hold one nozzle with flat spanner to counteract while tightening the opposite nozzle with the torque wrench.



Rubber jaw mounted upside down  
Protect with rubber pad

*Recommended tightening torque: 50 Nm.*



### Method for tightening the nozzles

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 recognised, the machine should be disassembled to localise the cause.

## 4 Installation

Rotary Jet Mixer IM 15

### 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification

Directive 2014/34/EU

**NOTE**

Explosion protection type is constructional safety “c”.

**Warning: Operated in a hazardous area**



The unit may be operated in a hazardous area only when completely filled with cleaning/mixing fluid/steam. If a medium other than the mixing/cleaning fluid/steam is passed through the equipment the flow must not be high enough to cause the equipment to operate.

**Warning: Operating guidance**



The unit shall be operated in line with guidance provided by IEC/TS 60079-32-1 for tank cleaning.

**Warning: Temperature class and ambient temperature range**



The maximum surface temperature depends mainly on operating conditions which are the temperature of the mixing/cleaning fluid and ambient temperature. The temperature class and ambient temperature range are shown in paragraph 3.6 ATEX/IECEx temperature class and code, page 11.

**Warning: Max. permitted temperature**



When working:  
The maximum permitted mixing/cleaning fluid temperature and ambient temperature is 120°C.  
When not working:  
The maximum permitted ambient temperature is 140°C.

**Warning: Draining using compressed air**



Draining using compressed air must not be done in ex classified zone.  
Draining using compressed air is possible in non ex classified zones (see page 47).

**Warning: Earthing**



All metal and other conductive or dissipative material should be connected to earth with the exception of very small items.  
For further information see IEC/TS 60079-32-1:2013 Explosive atmospheres – Part 32-1: Electrostatic hazards, guidance. With focus on clause 6.2.3, 7.2.1, 7.3, 7.9.2, 13.

**Warning: Earthed when in use**



The unit must be effectively earthed at all times when in use.

## 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification

**Warning: Max. permitted steaming temperature**

The maximum permitted steam temperature through the machine and ambient temperature is 140°C.

**Warning: Steaming tanks larger than 100 m³**

Tanks with capacities larger than 100 m³ that could contain a flammable atmosphere should not be steam cleaned, as steam cleaning tanks produces an electrostatically charged mist. Tanks smaller than 100 m³ may be steam cleaned.

For further information see IEC/TS 60079-32-1:2013 Explosive atmospheres – Part 32-1: Electrostatic hazards, guidance. With focus on clause 7.10 and 8.5.

**Tank size information**

NOTE: The tank cleaning machine has been certified by accredited notified body and can operate in tanks having an enclosed volume up to 100 m³ as long as all ATEX/IECEx warnings in the instruction manual are complied with.

**General guidelines for tanks larger than 100 m³:**

Tanks larger than 100 m³ must not be steam cleaned – See guide IEC/TS 60079-32-1:2013 clause 7.10.5 and 8.5

To use the unit in tanks larger than 100m³ is possible under certain conditions.

It is necessary to know the current factors such as tank size, cleaning solvent and product.

Additives can be used in the cleaning solvent, or, for example, the tank can be filled with nitrogen. The basic guidelines are described in the guide IEC/TS 60079-32-1:2013.

It must be ensured that the equipotentially bonding of all conductive metal objects is in accordance with national regulations for use.

The cleaning fluid conductivity must correspond to the products in the group “High conductivity”, cf. IEC/TS 60079-32-1:2013 clause 7.1 and 7.2.

High conductivity	> 10 000 pS/m
Medium conductivity	between $25 \times \epsilon_r$ pS/m and 10 000 pS/m
Low conductivity	< $25 \times \epsilon_r$ pS/m

For liquids with a dielectric constant of around 2, (e.g. hydrocarbons), these classifications reduce to:

High conductivity	> 10 000 pS/m
Medium conductivity	between 50 pS/m and 10 000 pS/m
Low conductivity	< 50 pS/m

Following a guidance document such as IEC/TS 60079-32-1:2013 to establish safe use of machinery and process is the users own responsibility and is not covered by the ATEX/IECEx certification for this unit except for tanks up to 100 m³. For further information see IEC/TS 60079-32-1:2013 Explosive atmospheres – Part 32-1: Electrostatic hazards, guidance with focus on clause 7.1.3, 7.1.4, 7.2.1, 7.2.4.

## 4 Installation

Rotary Jet Mixer IM 15

### 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification

**Warning: Process generated electrostatic**



The user must address the electrostatic hazards generated from the process of the equipment in accordance with guidance document IEC/TS 60079-32-1:2013.

**Warning: Electrostatically charged liquid**



Liquids can become electrostatically charged when they move relative to contacting solids or the spraying of liquids can also create a highly charged mist or spray. The liquid must be made electrically conductive by additives or otherwise.

For further information see IEC/TS 60079-32-1:2013 Explosive atmospheres – Part 32-1: Electrostatic hazards, guidance. With focus on clause 7.1.3, 7.1.4, 7.2.1, 7.2.4.

**Warning: Appropriate cleaning fluid**



The cleaning fluid should be appropriate for the application (e.g. so no chemical reaction can take place between the cleaning fluid and the residue of process fluid/powder/compound which can generate heat or a hybrid mixture).

Chemical reactions in Zone 20 - Hybrid mixtures:

End-user must ensure that the cleaning fluid used does not create a hybrid mixture according to IEC 60079-10-1:2015 Annex I.1 in connection with powder / dust residues in the tank in zone 20.

This should ensure that the atmosphere does not change to a classification that lies outside the machine's certified scope. When the machine is used for cleaning tanks containing potentially flammable dust atmospheres, and a potentially flammable fluid is used as the cleaning fluid then an assessment of the hybrid mixture shall be undertaken by the user, prior to operation.

For further information see IEC 60079-10-1:2015 Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres. With focus on clause 3.6.6 and Annex I – Hybrid mixtures.

**Warning: Appropriate mixing fluid**



The mixing fluid should be appropriate for the application (e.g. so no chemical reaction can take place between the mixing fluid and the residue of process fluid/compound which can generate heat).

**Warning: Mixing conditions**



When the IM machine is used for mixing, it shall be fully submerged in the tank liquid and it shall only be used for submerged mixing/blending of liquids.

### 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification

**Warning: Fluid pressure**

The maximum permitted cleaning/mixing fluid pressure is 12 bar.



**Warning: Risk due to tank liquid surface potential**

When jet mixing there is a risk for the jet to break the liquid surface in the tank with a vapour space where a high field strength could occur.

If the jet breaks the liquid surface there is a risk due to the surface potential of the liquid in the tank.

The tank liquid and mixing fluid must be made electrically conductive by additives or otherwise.

For further information see IEC/TS 60079-32-1:2013 Explosive atmospheres – Part 32-1: Electrostatic hazards, guidance.

With focus on clause 7.9.5 – Jet mixing.



In addition to the above mentioned precautions relating to Directive 2014/34/EU, the Safety Precautions on page 16 must be observed.

## 5 Operation

Rotary Jet Mixer IM 15

### 5.1 Normal operation

#### **Media to be mixed**

The Alfa Laval IM 15 Rotary Jet Mixer should be used only in fluids compatible with Stainless Steel AISI 316/316L, SAF2205, Titanium, Hastelloy C22/C276, PEEK, EPDM, Viton and FFKM. 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 your local Alfa Laval sales office.

#### **Pressure**

Avoid hydraulic shocks. Increase pressure gradually. Do not exceed 12 bar inlet pressure. Recommended inlet pressure: 5-8 bar (73 - 116 psi). High pressure in combination with high flow rate increase consumption of wear parts. It is recommended to install a hydrofor in the system, if a positive pump is used for recirculation.

#### **Draining using compressed air**

If the machine is drained using compressed air, then the compressed air pressure must not cause the machine body rotation to exceed 1.5 rpm (corresponding to approx. 40 sec. per rev of the body) in order to avoid risk of machine breakdown.

Draining should always be done inside the tank.

See paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification (page 18).

#### **Steam cleaning**

If steam cleaning is done through the machine, the steam pressure must not cause the machine body rotation to exceed 15 rpm (corresponding to approx. 4 sec. per rev of the body) in order to avoid risk of machine breakdown. See paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification (page 18).

#### **Temperature**

The maximum recommended cleaning fluid temperature is 120°C. The maximum recommended steam temperature is 140°C. The maximum ambient temperature is 140°C.

See paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification (page 18).

#### **After use cleaning**

After use flush the mixer with fresh water. Fluids should never be allowed to dry or set-up in the Alfa Laval IM 15 Rotary Jet Mixer system due to possible "salting out" or "scaling" of the ingredient.

### 5.2 Safety precautions

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The machine is intended for use inside a tank only. As peak velocity of main jets reaches 40 m/s, Alfa Laval IM 15 Rotary Jet Mixer must not be operated in open air or when tank is open.

**Warning:**



Hot chemicals and steam under pressure may be used for cleaning and sterilising. Protect against scalding and burning. Never tamper with or try to open clamps or other connections while system is in operation. Make sure that system is depressurised and drained before disassembly.

The cleaning jets impinging the tank surface are a source of noise. Depending on pressure and distance to the tank walls, noise level may reach up to 85 dB.

**Warning:**



Tanks may contain poisonous/hazardous products or products which represent an environmental or safety risk. Never open tank and dismount the machine without checking previous tank contents and necessary precautions.

See also 3.6 ATEX/IECEx temperature class and code, page 11.

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## 6 Maintenance

Rotary Jet Mixer IM 15

### 6.1 Preventive maintenance

In order to keep your Alfa Laval IM 15 Rotary Jet Mixer servicing you as an efficient tool in your mixing operations, it is essential to maintain its high performance by following a simple preventive maintenance programme, which will always keep your mixer in good condition.

Good maintenance is careful and regular attention!

The following recommended preventive maintenance is based on a Alfa Laval IM 15 Rotary Jet Mixer working in average conditions. However, 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. We trust that you will adjust your maintenance programme to suit.

Alfa Laval Tank Cleaning Equipment Service Kits contain all you need. They comprise genuine Alfa Laval spare parts, manufactured to the original specifications.

Always use only proper tools. Use standard tool kit for Alfa Laval IM 15 Rotary Jet Mixer (page 52). If not stated otherwise never use unnecessary force (i.e. 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 (depending on working conditions)

- 1 Disassemble mixer as described on the following pages.
- 2 Clean material build-up and deposits from internal parts with chemical cleaner and/or desired fine abrasive cloth.
- 3 Check slide bearings (28) for wear. If hole is worn oval to max diameter of 10.4 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 (10) in gear frame. If holes are worn oval to max diameter of more than 13.4 mm, collar bush should be replaced. How to replace collar bushes, see page 36.

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

5. Check worm wheels (11 and 33). If extremely worn, they should be replaced.
6. Check main bush (5). If worn it should be replaced.
7. Assemble machines as described in the following pages.
8. Check that the machine is in operating condition by inserting 3/16" Hex screwdriver (tool no. 134A) in screw in top of turbine shaft, and easily turn turbine shaft clockwise. If any resistance is recognised, the mixer should be disassembled in order to localise the cause.

Apart from the parts specifically mentioned above, all the remaining wear parts should regularly be inspected for wear. Wear parts are specified in the Reference Lists of Parts, page 48 and 50.



### 6.2 Service and repair of ATEX/IECEX certified machines

**Warning:**



All service and repair of ATEX/IECEX certified machines can be performed by Alfa Laval Kolding A/S, Denmark, or by an Alfa Laval service center approved by Alfa Laval Kolding A/S.

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

In order to ensure compliance with the ATEX/IECEX regulations and keep the machine ATEX/IECEX certification valid, the service or repair must be performed by an authorized person with knowledge of the ATEX/IECEX requirements and regulations. All spare parts must be original Alfa Laval spare parts and the repair or service must be done according to the instructions in this manual.

If a customer wishes to carry out service or repair himself, it is the responsibility of the repair shop to ensure that the ATEX/IECEX requirements are met in any way possible. After performing service or repair, the repair shop thus carries the full responsibility for traceability of all relevant documents in order to ensuring the retention of the ATEX/IECEX certification of the machine.

## 6 Maintenance

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Rotary Jet Mixer IM 15

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### 6.3 Top assembly

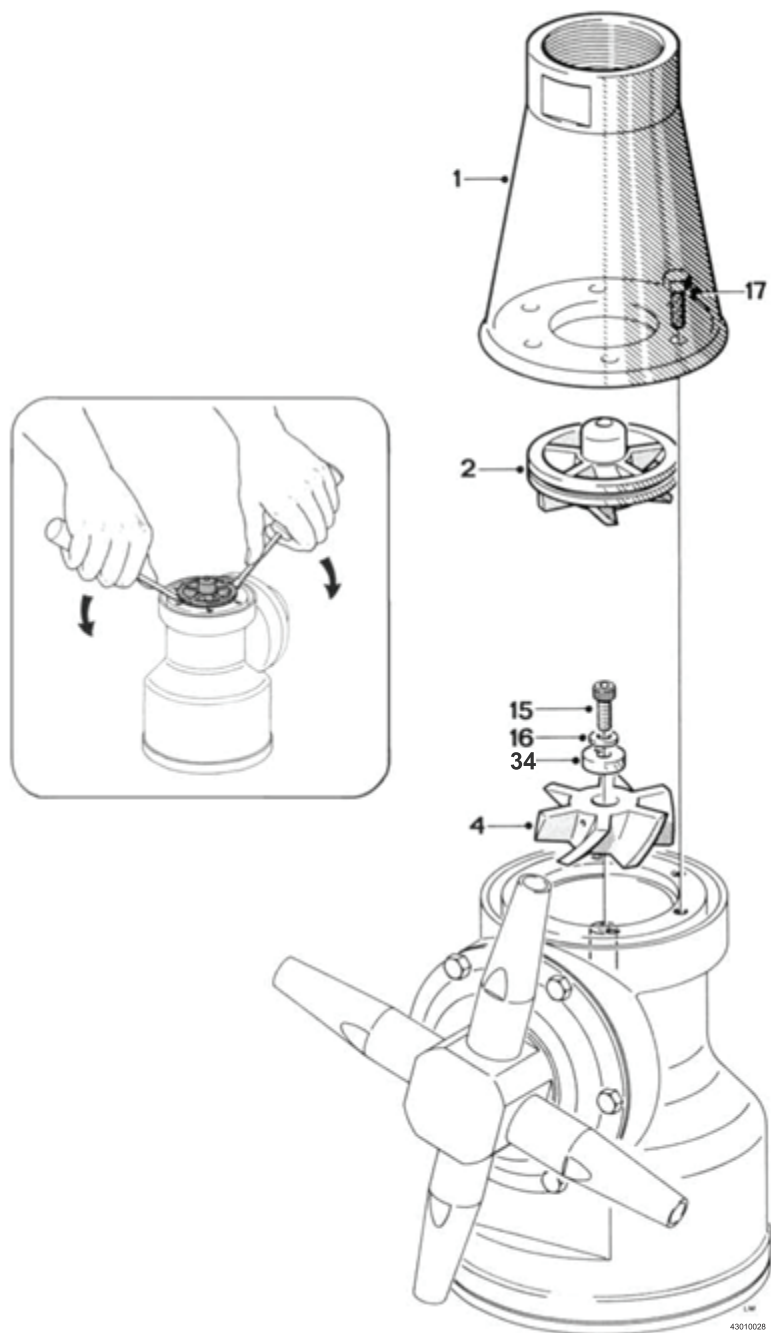
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#### Disassembly

1. Remove 3/16" screws (17). Loosen and unscrew with a socket wrench (tool no. 462A).
2. Lift off top cone (1).
3. Remove guide/guide ring (2). The guide has a groove in the outer diameter. The guide is easily lifted out of the stem by means of two ordinary screwdrivers inserted into the groove.
4. Remove 3/16" screw (15), spring washer (16) and washer (34). To secure impeller against rotation, insert carefully screwdriver (tool no. 134A), through impeller (4) into a hole in the stem.
5. Pull off impeller (4).

#### Reassembly

1. Reinstall impeller (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 (34), spring washer (16) and 3/16" screw (15) and tighten. To secure impeller against rotation insert carefully screwdriver (tool no. 134A) through impeller (4) into a hole in the stem..
3. Reinstall guide/guide ring (2).
4. Mount top cone (1). Make sure that it is in correct position over guide/guide ring (2). Rotate top cone to align holes in top cone and stem.
5. Mount and tighten 3/16" screws (17) with a socket wrench (tool no. 462A).



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## 6 Maintenance

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Rotary Jet Mixer IM 15

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### 6.4 Bottom assembly

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#### Disassembly

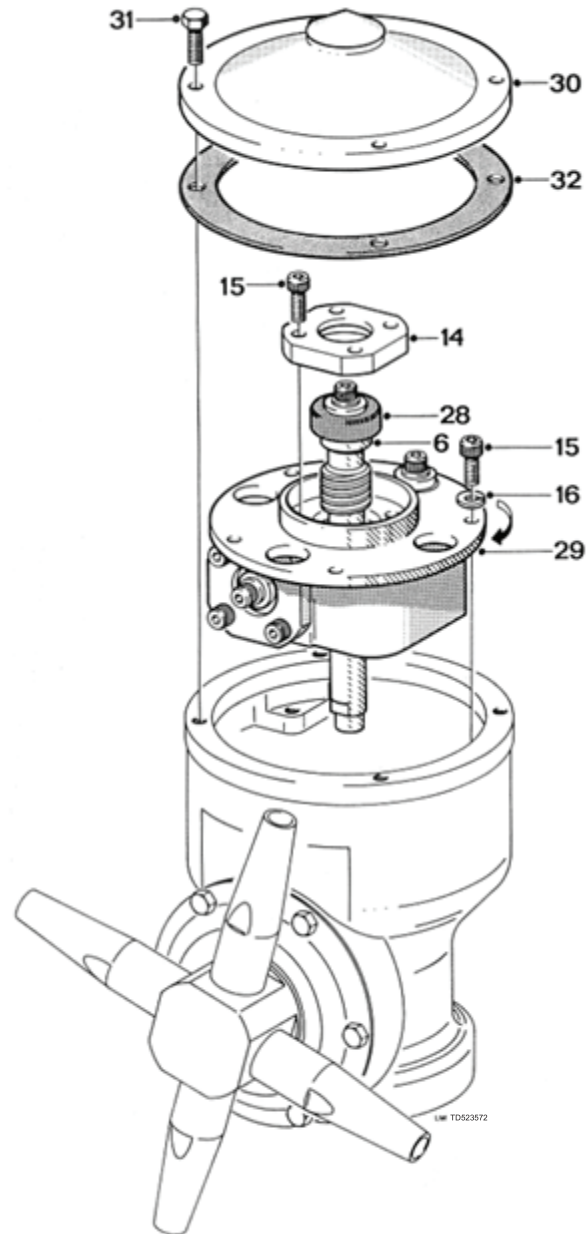
1. Turn machine upside down.
2. Remove 3/16" screws (31) from bottom cover (30).
3. Remove bottom cover (30) and gasket (32).
4. Remove 3/16" screws (15) in bearing cover (14). Carefully push out turbine shaft (6) from opposite end. Do not try to hammer out turbine shaft, since this can damage slide bearing.
5. Remove 3/16" screws (15) and spring washers (16) along the circumference of gear frame (29). Turn gear frame about 1 cm (1/2"). Draw out gear subassembly (holes in gear frame are excellent for holding gear subassembly).

#### Reassembly

1. Reinsert gear subassembly in bottom of machine body. Turn gear frame (29) to align holes in gear frame and 3/16" threads in body. Mount spring washers (16) and 3/16" screws (15) along circumference of gear frame (29). Tighten screw crosswise.
2. Reinsert turbine shaft (6) with slide bearing carefully through gear wheel (7). Push carefully slide bearing (28) into position. Mount bearing cover (14) with 3/16" screws (15). Tighten crosswise.
3. Place bottom gasket (32) and bottom cover (30).
4. Mount 3/16" screws (31) and tighten crosswise.

<p><b>Note:</b> To secure meshing between gear wheel (7) and pinion (9), it might be necessary to rotate slightly either the whole gear subassembly or the gear wheel.</p>
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Bottom Assembly



## 6 Maintenance

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*Rotary Jet Mixer IM 15*

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### 6.5 Hub subassembly

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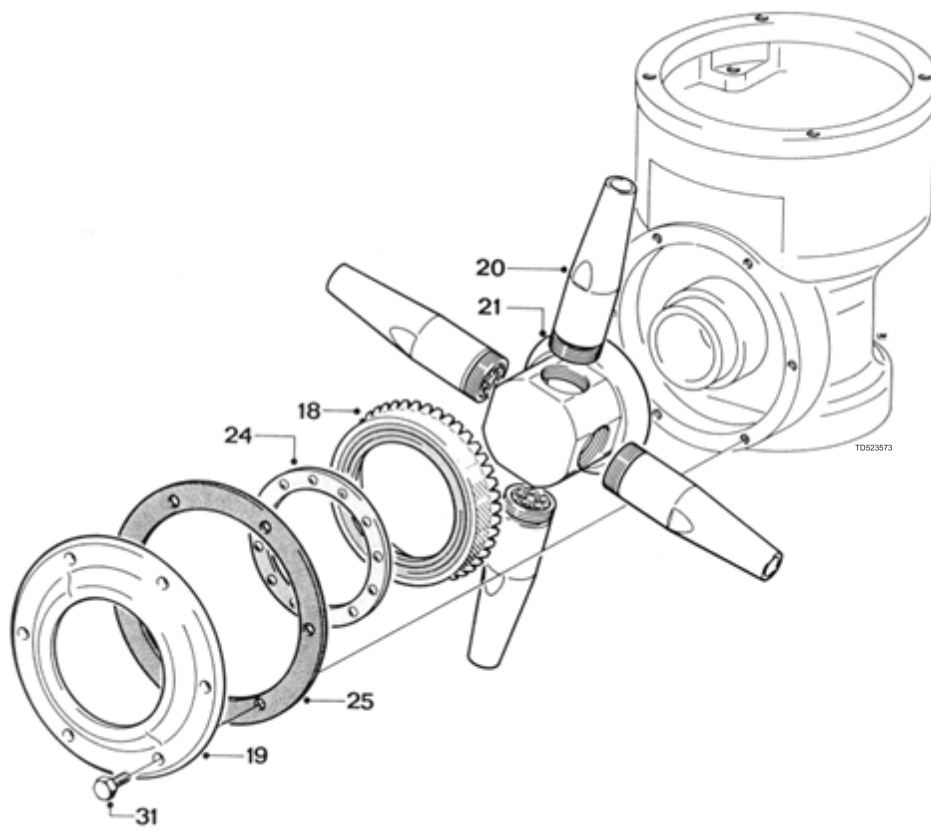
#### **Disassembly**

1. Remove nozzles (20). Nozzles are untightened with a wrench on the faces of the nozzles.
2. Remove 3/16" screws (31), hub cover (19), and gasket (25).
3. Draw out hub (21) together with ball retainer with balls (24) and bevel gear (18).
4. If ball races (18.1 and 19.1) in hub cover and in bevel gear are extremely worn, they should be replaced as well as the ball retainer with balls (24). How to replace ball races see page 38.

#### **Reassembly**

1. Slide on hub (21). Reinsert bevel gear with race (18) and ball retainer with balls (24).
2. Mount gasket (25) and hub cover with race (19), and set with 3/16" screws (31). Tighten clockwise.
3. Screw on nozzles (20) and tighten with wrench.

Hub Subassembly



## 6 Maintenance

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Rotary Jet Mixer IM 15

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### 6.6 Stem subassembly

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#### Disassembly

1. Place machine in upside-down position.
2. Remove 3/16" screws (15) in gear wheel (7). To prevent rotation of stem (3) mount two 3/16" 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.
3. Draw out gear wheel with ball races (7) and ball retainer with balls (24).
4. Push out stem (3).
5. If worn, press out main bush (5).

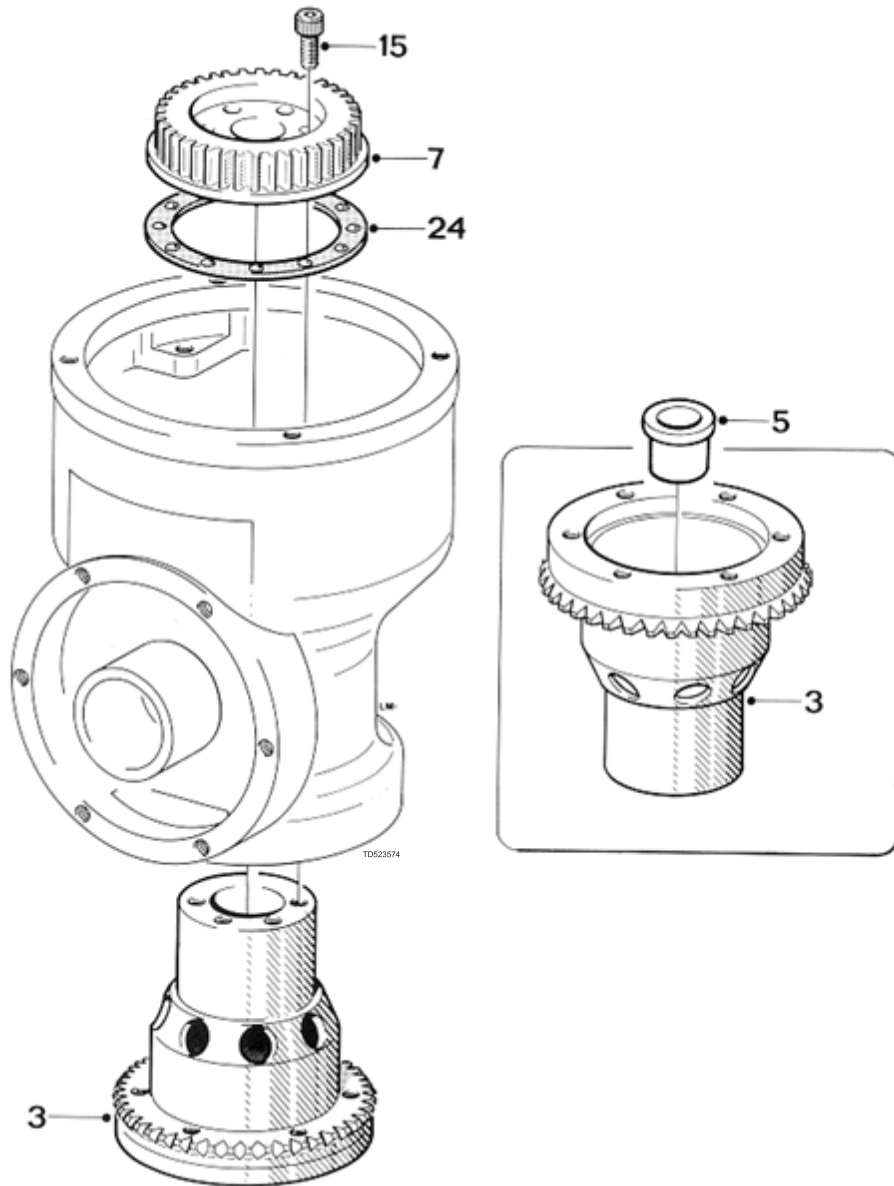
If ball races in body (26.3) and on gear wheel (7.1) are extremely worn they should be replaced together with ball retainer with balls (24). How to replace ball races see page 38.

#### Reassembly

1. If replaced press main bush (5) into stem (3).
2. Push stem into body. Turn mixer upside-down.
3. Place ball retainer with balls (24) and gear wheel (7) into body on ball race. Rotate gear wheel to check free rotation. Mount gear wheel with 3/16" screws (15) and tighten crosswise. To prevent rotation of stem (3) mount two 3/16" 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.



Stem Subassembly



## 6 Maintenance

Rotary Jet Mixer IM 15

### 6.7 Gear subassembly

#### Disassembly

1. To make a backstop, remount turbine shaft (6) with slide bearing (28) into gear frame (29). Mount bearing cover (14) with 3/16" screws (15).
2. Hold turbine shaft (6) against 1<sup>st</sup> stage worm wheel (33) with one hand and loosen 3/16" screws (15) in pinion (9) and horizontal shaft (27) with the other hand.
3. Remove 3/16" screws (15) in bearing cover (14) and take out turbine shaft (6).
4. Draw out horizontal shaft (27) and 1<sup>st</sup> stage worm wheel (33) after removal of 3/16" screw (15), spring washer (16) and washer (34).
5. Draw out pinion (9) and 2<sup>nd</sup> stage worm wheel (11), also freeing journal (12) after removal of 3/16" screw (15), spring washer (16) and washer (34).
6. Remove bearing cover (14) and slide bearing (28) after removal of 3/16" screw (15).
7. Remove 3/16" screw (15), spring washer (16), washer (34) and slide bearing (28) from turbine shaft (6). 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.



How to replace collar bushes (10), see page 36.

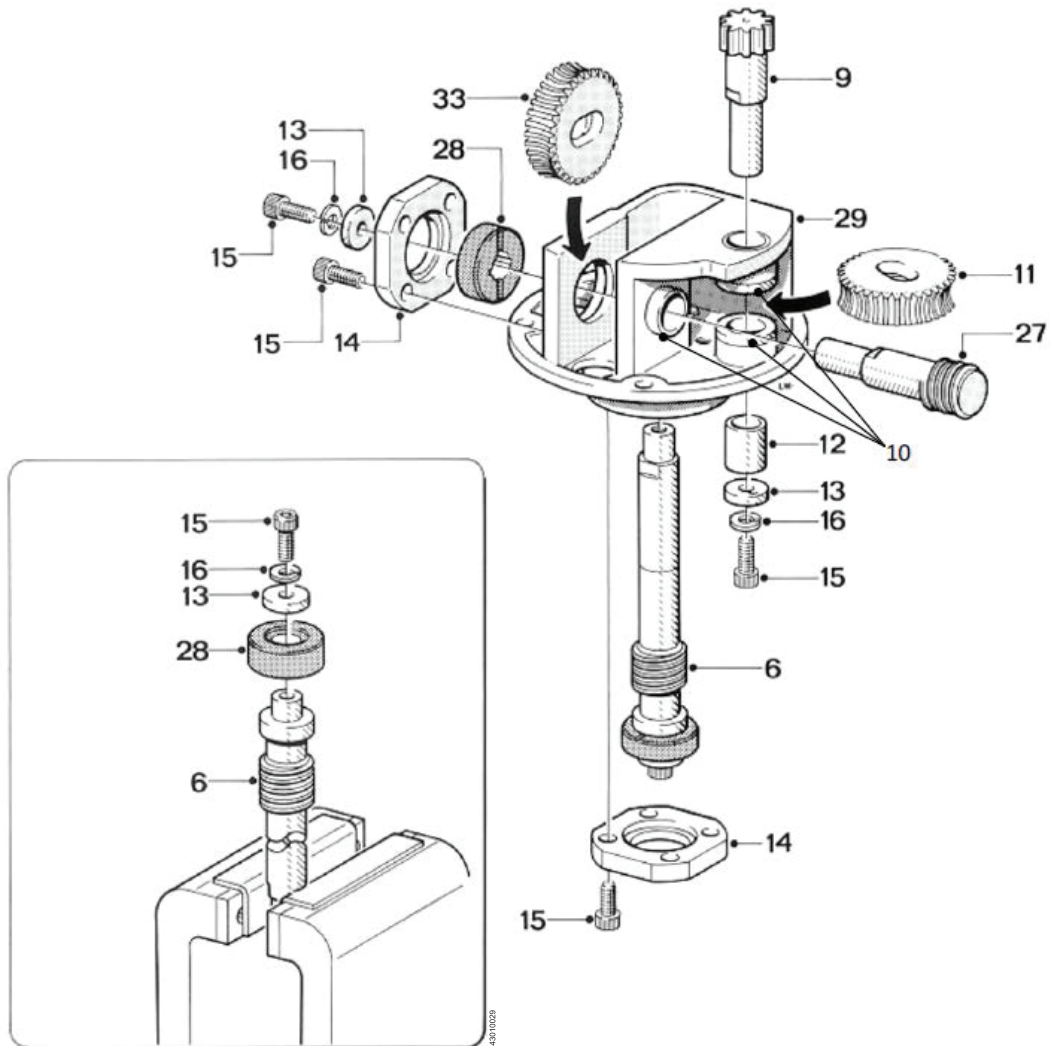
#### Reassembly

1. Mount slide bearing (28) on turbine shaft (6) and secure with washer (34), spring washer (16) and 3/16" screw (15). Hold turbine shaft in a vice or with wrench on driver faces and tighten.
2. Push slide bearing (28) for horizontal shaft (27) into gear frame (29) and fix bearing cover (14) with 3/16" screws (15). Tighten crosswise.
3. Insert 2<sup>nd</sup> stage worm wheel (11), pinion (9) and journal (12). Mount washer (34), spring washer (16) and fix with 3/16" screw (15). Check rotation.

**Note:** It is important that the screw holding the pinion is fastened to a torque moment of 5 Nm, to secure it from loosening.

4. Insert 1<sup>st</sup> stage worm wheel (33) and horizontal shaft (27). Mount washer (34), spring washer (16) and fix with 3/16" screw (15). Check rotation.
5. Reinstall turbine shaft (6) in gear frame as mentioned under disassembly, point 1.
6. Hold turbine shaft (6) against 1<sup>st</sup> stage worm wheel and tighten 3/16" screws (15) in horizontal shaft (27) and pinion (9).
7. Remove turbine shaft (6) with slide bearing (28) before gear subassembly is inserted in mixer body.

Gear Subassembly



## 6 Maintenance

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Rotary Jet Mixer IM 15

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### 6.8 Replacement of collar bushes

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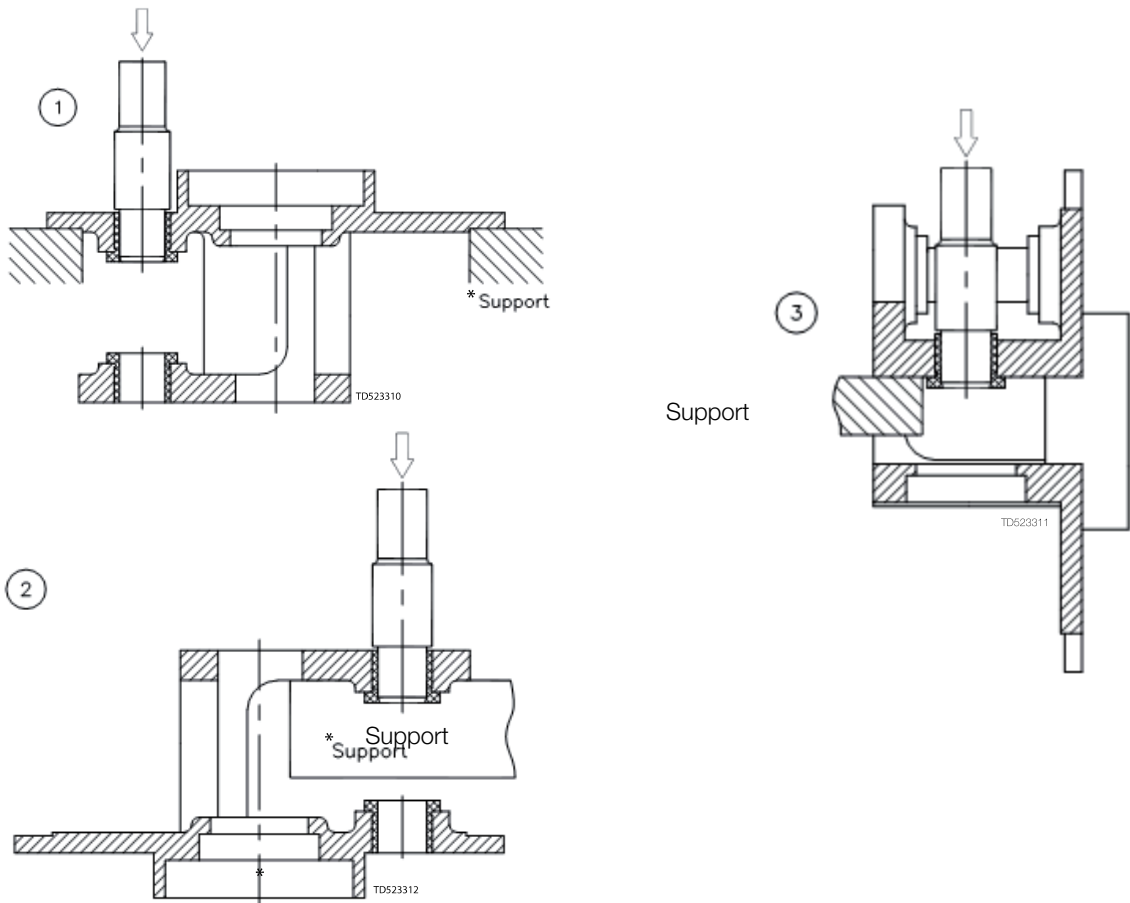
1. Place gear frame (29) upside down with a firm support under the flange. Use for instance jaws of a vice. Do not clamp on machined surfaces. With pusher (tool no. TE81B033, see page 52) knock out collar bush.
2. Turn gear frame to upright position and hold over support such as flat steel bar clamped in a vice. Knock out collar bush with pusher.
3. Turn gear frame 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. Clean holes and push in new collar bushes into gear frame.

Replacement of Collar Bushes



Removal of old Collar bushes

## 6 Maintenance

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Rotary Jet Mixer IM 15

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### 6.9 Replacement of ball races

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#### In body

1. A. With big end downwards knock several times body with bearings (26) hard against firm wooden support until ball race (26.3) 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 (26.2). Carefully push off old ball race without damaging main collar lower. Use mandrel and firm support.  
Before mounting of new ball race, main collar lower (26.2) must be remounted into body – see page 40.
3. Clean surfaces and place ball race (26.3) on main collar lower (26.2). Press by hand as long as possible. By means of a tube mandrel or if desired wooden block, carefully hammer ball races home.

Ball races 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.

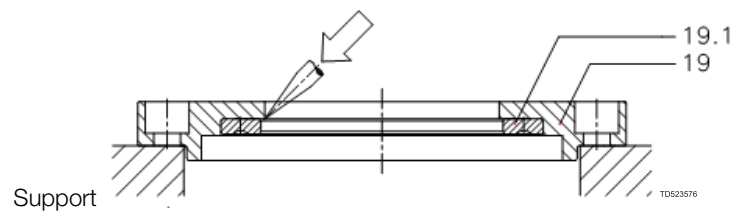
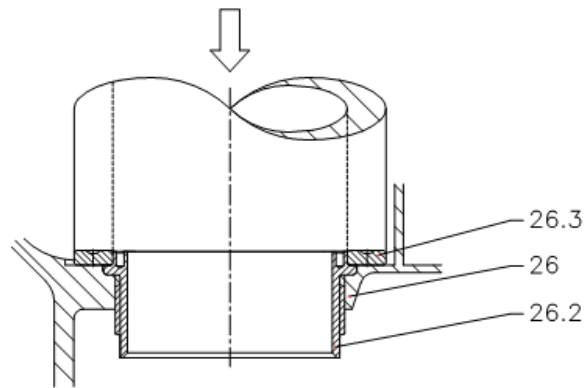
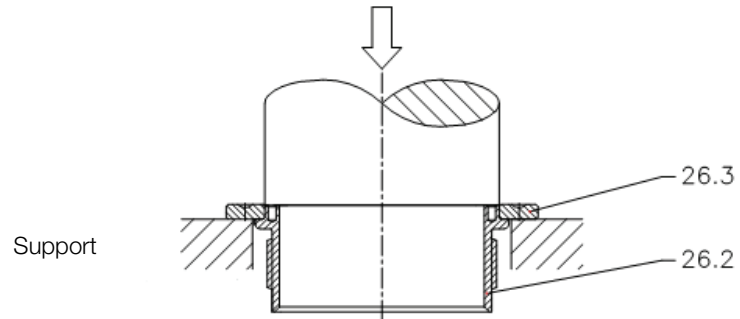
#### On Gear wheel

1. Place gear wheel with ball race (7) on support. Support only under ball race (7.1). 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 (19) 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.

Replacement of Ball races



## 6 Maintenance

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Rotary Jet Mixer IM 15

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### 6.10 Replacement of main collars

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Although normally exposed to very limited wear, it is possible to replace main collars (26.1 and 26.2) and hub liner (26.4) in body. The procedure to do this is described below.

#### Main collar upper

1. Place body (26) in a vice upright position. Do not clamp on machined faces. Insert tool into main collar upper (26.1). Unscrew main collar.
2. Carefully clean thread and recess in body. Do not damage special thread in body. Recess must be absolutely clean.
3. Make sure that new main collar is clean and free from impurities.
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 and tighten up.
6. Check that main collar is fully home: install stem, ball retainer with balls and gear wheel (see page 34). Check that there is sufficient axial clearance to allow for free rotation of stem.

#### Main Collar lower

1. Place body in a vice in upside down position, and repeat procedure described above.

**Warning:** Thread on main collar lower is left-handed.

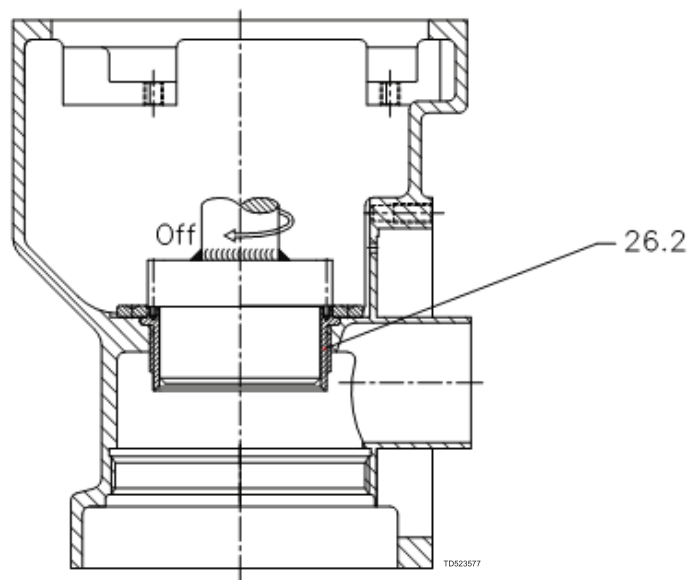
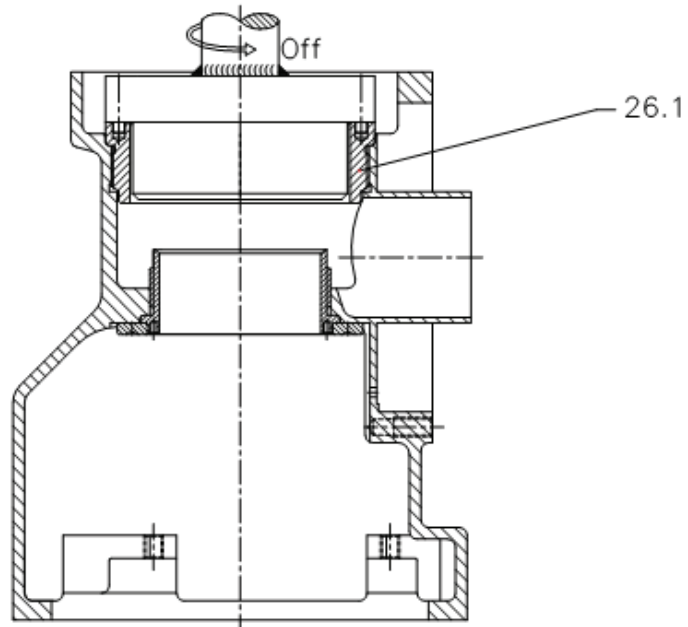


#### Hub liner

1. Place body in a vice. Insert two ordinary screwdrivers behind hub liner and press it out.
2. Push on new hub liner.



Replacement of Main Collars



## 7 Trouble shooting guide

Rotary Jet Mixer IM 15

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### Symptom: Slow or no rotation of machine

Possible Causes	Fault finding
<b>No or insufficient liquid flow</b>	<p>a). Check if supply valve is fully open.</p> <p>b). Check if inlet pressure to mixer is correct.</p> <p>c). Check supply line/filter for restrictions/clogging.</p> <p>d). Remove nozzles and check for clogging. If blocked, carefully clean nozzle without damaging nozzle vanes and nozzle tip.</p> <p>e). Remove Top cone guide and impeller (see page 26) and check for clogging in impeller area.</p> <p>f). If large particles repeatedly get jammed in the mixer, install filter or reduce mesh size of installed filter in supply line.</p>
<b>Foreign material or material build-up</b>	<p>Insert Hex screwdriver in screw in top of turbine shaft and easily turn turbine shaft clockwise. If any resistance is recognised, disassemble machine in order to localise the cause.</p>
a) Impeller jammed	Remove guide and impeller (see page 26) and remove foreign material.
b) Turbine shaft - sluggish in main bush	Remove turbine shaft (see page 28) and clean main bush.
c) Bevel gear jammed	Remove top cone and hub subassembly (page 30). Clean teeth on stem and bevel gear.
d) Stem jammed/sluggish	Remove gear subassembly (see page 28). Check free rotation of stem. Remove stem (see page 32). Remove foreign material/material build-up on stem and inside main collars. Clean ball races and ball retainer with balls. Also clean main bush.
e) Gearbox jammed/sluggish	Remove foreign material from gearbox. Check rotation of shafts. If restriction is recognized, disassemble gearbox (see page 34) and remove material build up, especially on 2 <sup>nd</sup> stage worm wheel and mating collar bushes.
f) Hub jammed/sluggish	Disassemble hub subassembly (see page 30). Remove foreign material inside hub. Clean ball races and ball retainer with balls. Also clean nose of body.

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**Symptom: Slow or no rotation of machine**

**Possible Causes**  
**Wear**

**Fault finding**

a) Slide bearings	See page 24
b) Main bush	See page 24
c) Worm wheels	See page 24
d) Collar bushes	See page 24
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.

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**Mechanical defects**

a) Worm wheels. Teeth broken	Replace worm wheel.
b) Worm wheel cannot 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 30 and 32). 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.

## 8 Technical data

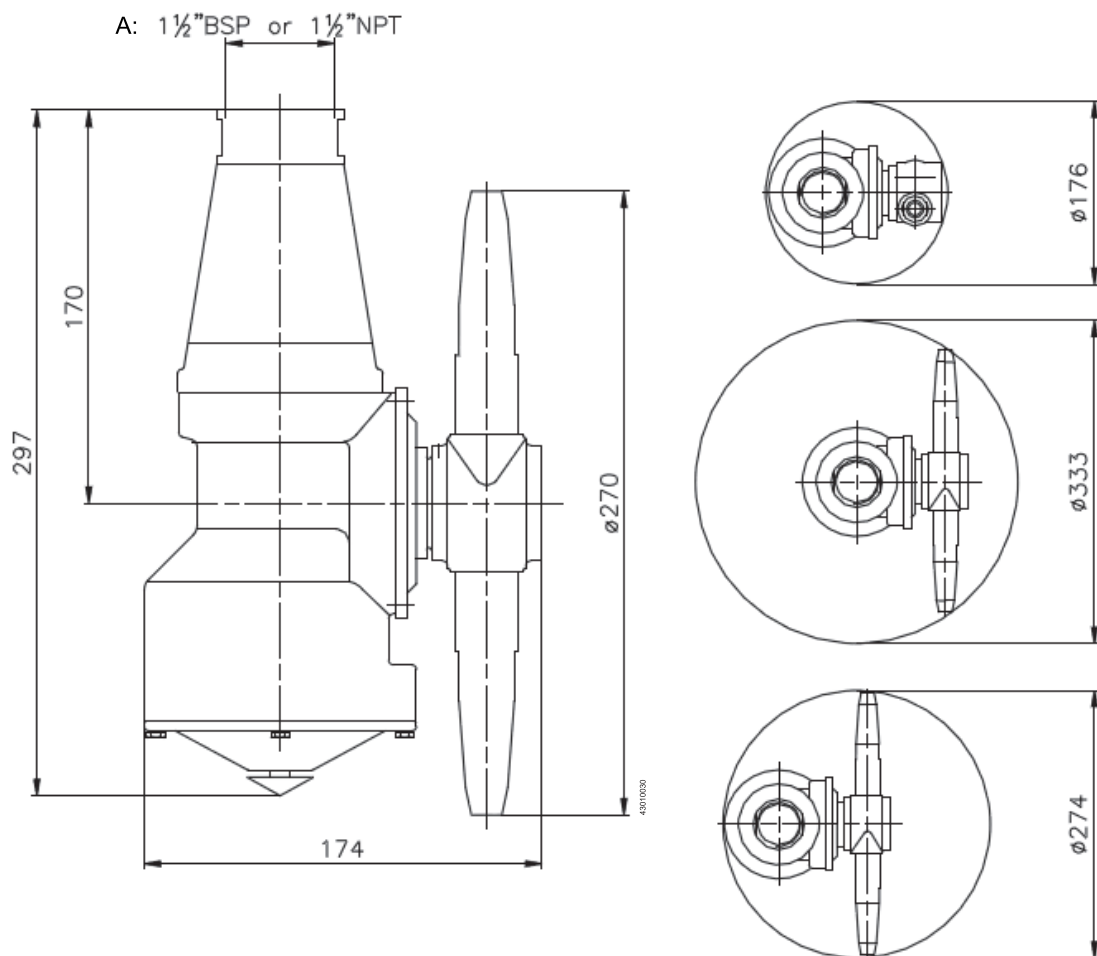
Rotary Jet Mixer IM 15

### Performance data

#### 8.1 IM 15 Rotary Jet Mixer with 2 nozzles

Weight of machine:	6.1 kg (13.4 lbs)
Working pressure:	2-12 bar (30-175 psi)
Recommended pressure during mixing:	2-6 bar (30-87 psi)
Recommended pressure during CIP:	5-6.5 bar (73-94)
Working temperature max.:	120°C (248°F)
Max. temperature:	140°C (284°F)
Ambient temperature:	0-140°C (120°C -140°C when NOT operated)
Materials:	Stainless Steel AISI 316/316L, PEEK 450G, Teflon TFM, Tefzel 200, Ceramics, SAF 2205

Principal dimensions in mm



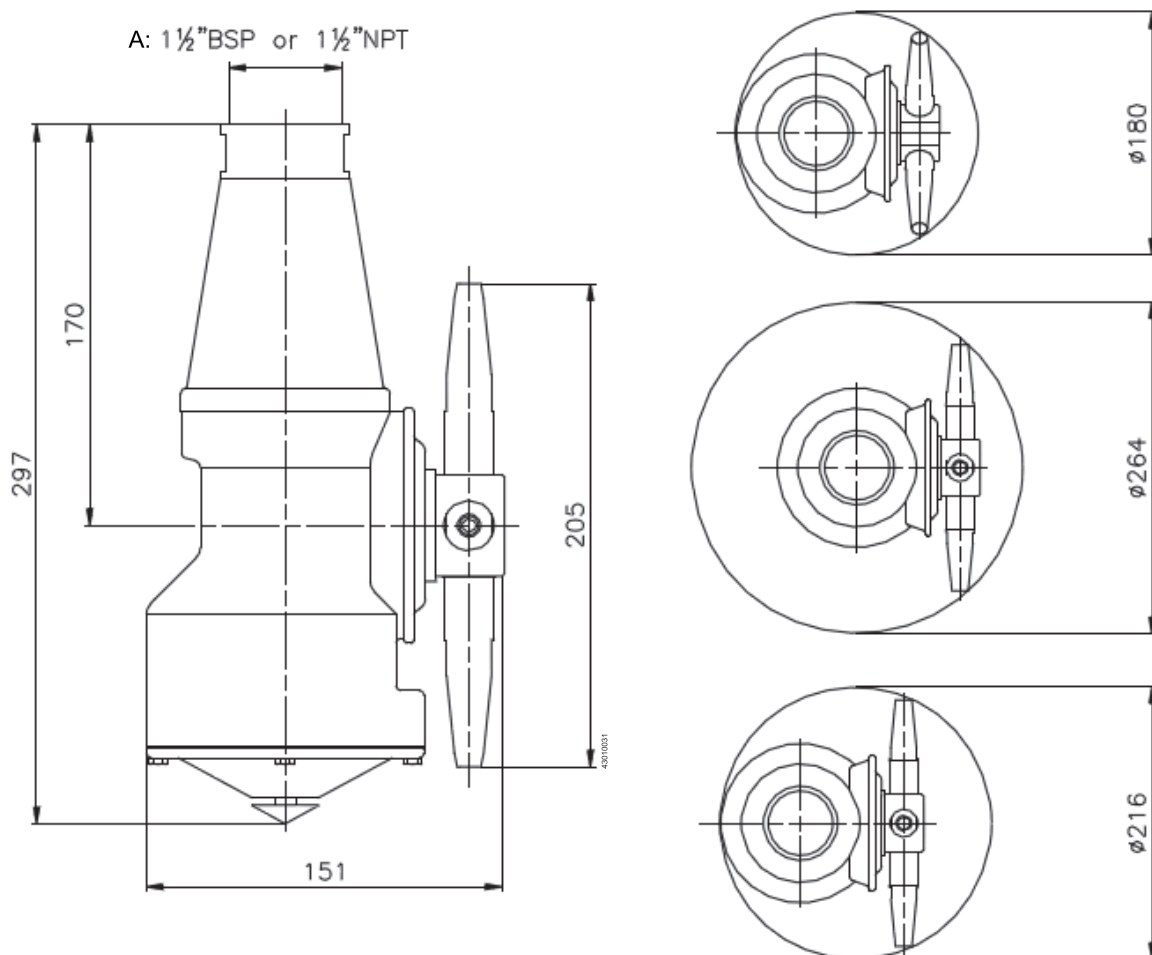
A: 1½" BSP or 1½" NPT

Rotary Jet Mixer IM 15

**Performance data****8.2 IM 15 Rotary Jet Mixer with 4 nozzles**

Weight of machine:	6.1 kg (13.4 lbs)
Working pressure:	2-12 bar (30-175 psi)
Recommended pressure during mixing:	2-6 bar (30-87 psi)
Recommended pressure during CIP:	5-6.5 bar (73-94)
Working temperature max.:	120°C (248°F)
Max. temperature:	140°C (284°F)
Ambient temperature:	0-140°C (120°C -140°C when NOT operated)
Materials:	Stainless Steel AISI 316/316L, PEEK 450G, Teflon TFM, Tefzel 200, Ceramics, SAF 2205

Principal dimensions in mm



A: 1 1/2" BSP or 1 1/2" NPT

## 8 Technical data

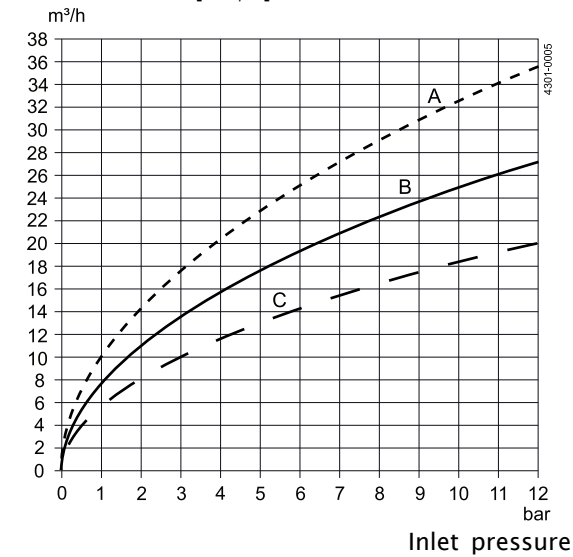
Rotary Jet Mixer IM 15  
Performance data

### 8.3 Performance data

#### Flow rate

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

#### Volumetric flow rate [m<sup>3</sup>/h]

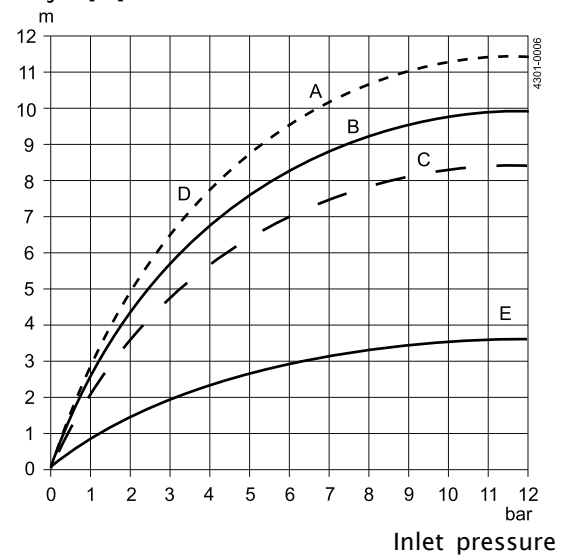


Nozzles A) d = 8 mm  
B) d = 7 mm  
C) d = 6 mm

#### 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.

#### Reach of jet [m]



Nozzles A) d = 8 mm  
B) d = 7 mm  
C) d = 6 mm  
D) Cleaning  
E) Mixing

#### 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.


## 9.1 Standard configuration for Alfa Laval IM 15 Rotary Jet Mixer

Connection	Turbine/Inlet Guide	Nozzles (mm), 1 ½ thread conn.	Standard Item no.	With e-gear Item no.
Top Cone: 1½" BSP, Female	100%	4 x ø6 4 x ø7 2 x ø8 2 x ø8	TE31B061 TE31B071 TE31B081 TE31B181	TE31E061 TE31E071 TE31E081 TE31E181
	0%	4 x ø7 4 x ø8 4 x ø9 2 x ø10 2 x ø11	TE31B070 TE31B080 TE31B184 TE31B182 TE31B183	TE31E070 TE31E080 TE31E184 TE31E182 TE31E183
Top Cone: 1½" NPT Female	100%	4 x ø6 4 x ø7 2 x ø8 2 x ø8	TE31B166 TE31B167 TE31B168 TE31B281	TE31E166 TE31E167 TE31E168 TE31E281
	0%	4 x ø7 4 x ø8 4 x ø9 2 x ø10 2 x ø11	TE31B177 TE31B178 TE31B284 TE31B282 TE31B283	TE31E177 TE31E178 TE31E284 TE31E282 TE31E283

The mixer is equipped with a clutch in the hub, which gives the possibility of rotating the nozzles by hand, when the mixer is not under pressure and first has to be lifted out or in through a tank opening.

## 9.2 Available add-ons

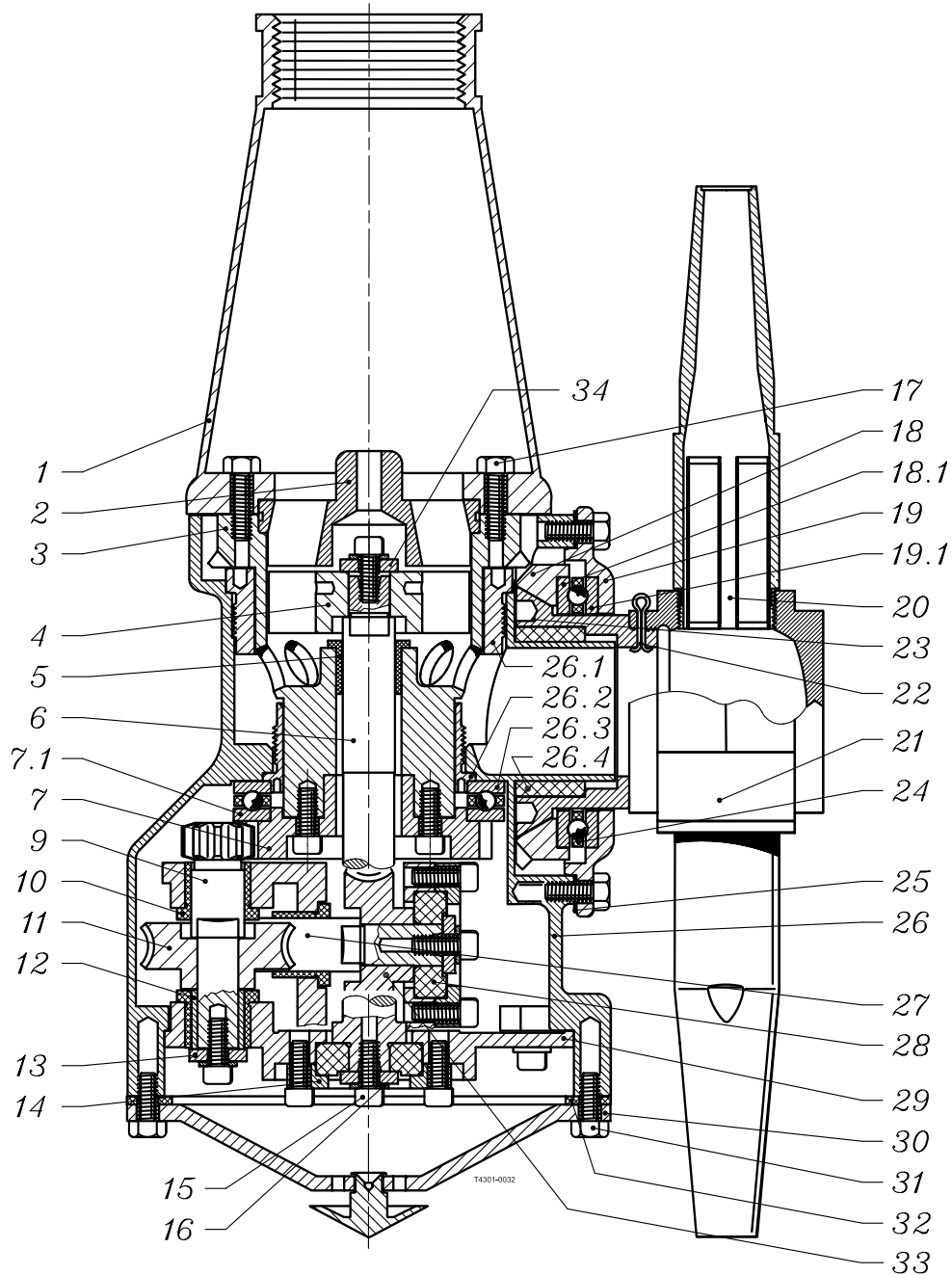
TE31XXX70	ATEX/IECEx
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Explanation to Add-ons		
ATEX/IECEx		ATEX/IECEx includes: ATEX/IECEx approved machine for use in explosive atmospheres. Category 1 for installation in zone 0/20 (inside tank) in accordance with Directive 2014/34/EU.  II 1G Ex h IIC 85°C...175°C Ga II 1D Ex h IIC T85°C...T140°C Da

# 10 Parts lists and drawings, service kits and tools

Rotary Jet Mixer IM 15 with 2 nozzles

## 10.1 Parts drawing and list of parts - IM 15 with 2 nozzles





# 10 Parts lists and drawings, service kits and tools

Rotary Jet Mixer IM 15 with 2 nozzles

## Parts list

Pos.	Qty	Denomination
1	□	1 Top Cone
2	□	1 Guide
3		1 Stem
4		1 Impeller
5	◆○	1 Main bush
6	◆○	1 Turbine shaft
7		1 Gear wheel w. ball race
7.1	◆○	(1) Ball race
9		1 Pinion
10	◆○	3 Collar bush
11	◆○	1 Worm wheel
12		1 Journal
13		3 Washer
14		2 Bearing cover
15		22 Screw
16		8 Spring washer
17		6 Screw
18		1 Bevel gear w. ball race
18.1	◆○	(1) Ball race
19		1 Hub cover w. ball race
19.1	◆○	(1) Ball race
20	□	2 Nozzle
21		1 Hub
22		1 Split pin for 2 nozzle
23		1 Hub conical part
24	□◆	2 Ball retainer with balls
25		1 Hub gasket
26		1 Body
26.1		1 Main collar upper
26.2		1 Main collar lower
26.3	◆○	(1) Ball race
26.4		1 Hub collar
27	◆○	1 Horizontal shaft
28	◆○	2 Slide bearing
29		1 Gear frame
30		1 Bottom cover compl.
31		10 Hex Screw
32		1 Bottom gasket
33	◆○	1 Worm wheel w. reinforcement
34		1 Washer

## Service kits

Denomination	Item no.
◆ <b>Standard service kit</b> .....	<b>TE31B299</b>
○ <b>Standard service kit for ATEX/IECEX machines</b> .....	<b>TE31B29970</b>

1) Pos. 26 is not sold as single spare part component. Only sold as part of a machine maintenance/repair order. For further information please contact Alfa Laval Customer Support.

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

Configuration according to delivery note/order.

Parts marked with ◆ are included in the Standard Service Kit TE31B299

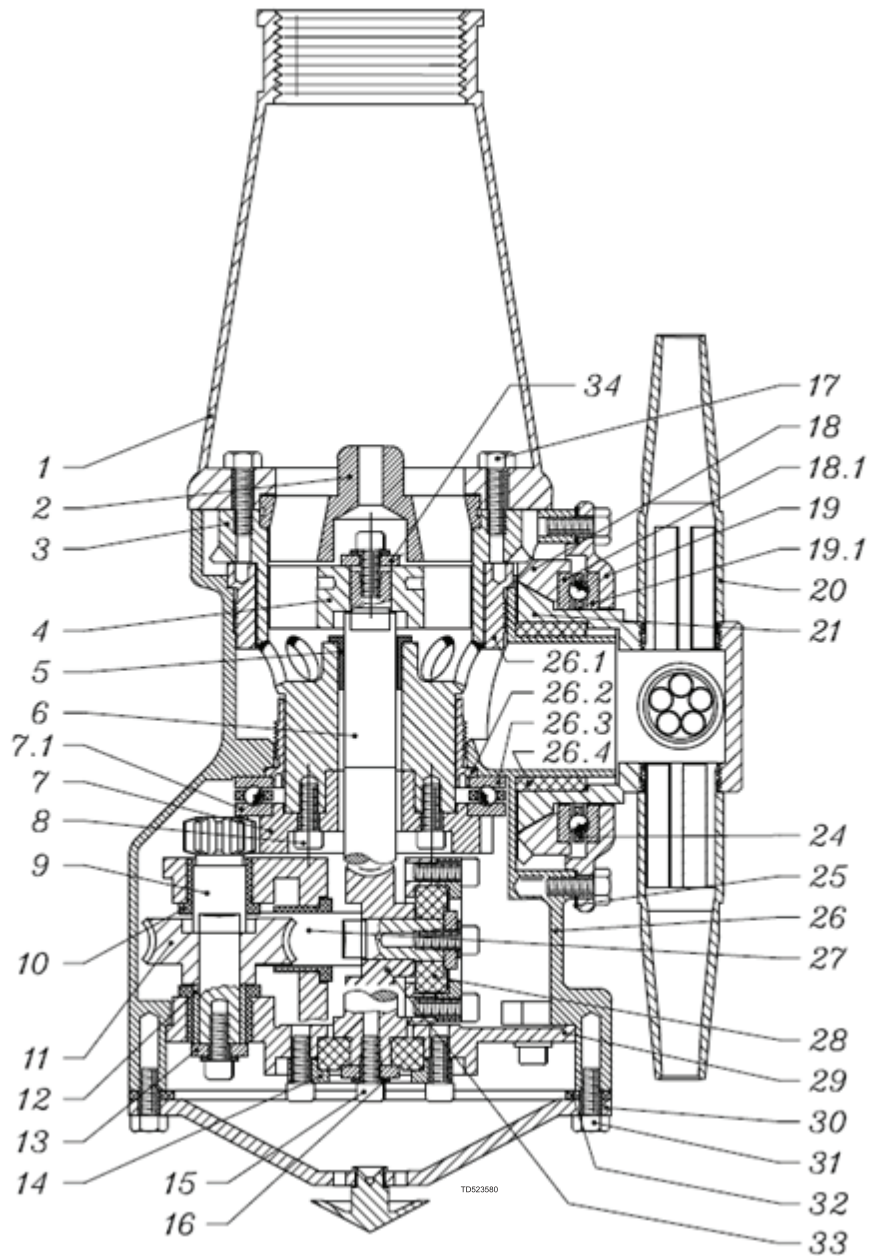
Parts marked with ○ are included in the Standard Service Kit TE31B29970 (ATEX/IECEX)

Please refer to the Spare Part Manual for information on item numbers and materials. The Spare Part manual is available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

# 10 Parts lists and drawings, service kits and tools

Rotary Jet Mixer IM 15 with 4 nozzles

## 10.2 Parts drawing and list of parts – IM 15 with 4 nozzles



# 10 Parts lists and drawings, service kits and tools

Rotary Jet Mixer IM 15 with 4 nozzles

## Parts list

Pos.	Qty	Denomination
1	1	Top Cone
2	1	Guide
3	1	Stem
4	1	Impeller
5	1	Main bush
6	1	Turbine shaft
7	1	Gear wheel w. ball race
7.1	1	Ball race
9	1	Pinion
10	3	Collar bush
11	1	Worm wheel
12	1	Journal
13	3	Washer
14	2	Bearing cover
15	22	Screw
16	8	Spring washer
17	6	Screw
18	1	Bevel gear w. ball race
18.1	1	Ball race
19	1	Hub cover w. ball race
19.1	1	Ball race
20	4	Nozzle
21	1	Hub for 4 nozzle
24	2	Ball retainer with balls
25	1	Hub gasket
26	1	Body
26.1	1	Main collar upper
26.2	1	Main collar lower
26.3	1	Ball race
26.4	1	Hub collar
27	1	Horizontal shaft
28	2	Slide bearing
29	1	Gear frame
30	1	Bottom cover compl.
31	10	Hex Screw
32	1	Bottom gasket
33	1	Worm wheel w. reinforcement
34	1	Washer

## Service kits

Denomination	Item no.
<b>Service kits</b>	
Standard Service Kit .....	TE31B299
Standard service kit for ATEX/IECEX machines.....	TE31B29970

1) Pos. 26 is not sold as single spare part component. Only sold as part of a machine maintenance/repair order. For further information please contact Alfa Laval Customer Support.

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

Configuration according to delivery note/order.

Parts marked with **◆** are included in the Standard Service Kit TE31B299

Parts marked with **○** are included in the Standard Service Kit TE31B29970 (ATEX/IECEX)

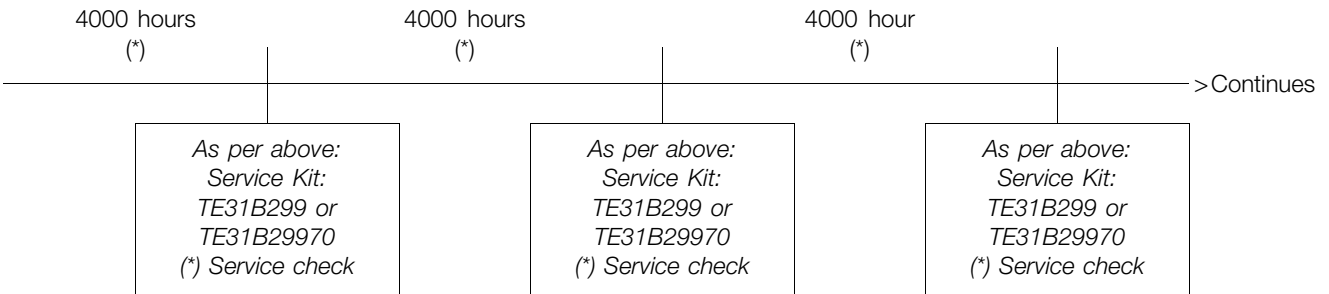
Please refer to the Spare Part Manual for information on item numbers and materials. The Spare Part manual is available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

# 10 Parts lists and drawings, service kits and tools

Rotary Jet Mixer IM 15

## 10.3 Service intervals

### 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.

Please refer to the Spare Part Manual for information on item numbers and materials. The Spare Part Manual is available from the online Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

## 10.4 Tools

### Standard Tool Kit for IM 15 Rotary Jet Mixer, Article no. TE81B055

#### Parts list

Pos.	Qty	Denomination
-	1	Hex key for 3/16" screw
	2	Screw driver for 3/16" screw
	1	8 mm Socket wrench w. pin

#### Special Tools for IM 15 Rotary Jet Mixer

(Available on request)

1 x Pusher f. 1½" machines .....	TE81B033
1 x Tool f. upper Collar (1½"TCM) Compl. ....	TE81B129
1 x Tool f. lower Collar (1½"TCM) Compl. ....	TE81B130

### 11.1 Service & repair

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Upon every return of a product, no matter if for modifications or repair, it is necessary to contact your local Alfa Laval office to guarantee a quick execution of your request.

You will receive instructions regarding the return procedure from your local Alfa Laval office. Be sure to follow the instructions closely.

### 11.2 How to order spare parts

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On the parts drawings as well as on all instruction drawings, the individual parts have a position number, which is the same on all drawings. From the position number the part is easily identified in the parts lists, page 48 and 50.

Individual parts should always be ordered from the parts lists, page 48 and 50. Item number and denomination should be clearly stated.

Please refer to the Spare Part Manual for information on item numbers. The Spare Part Manual is available from the online Alfa Laval Product catalogue Anytime or the Close at hand spare part catalogue.

Please also quote the type of machine and serial number. This will help us to help you. The type and serial numbers are stamped on the Connection Nipple on the top of the Rotary Jet Mixer.

### 11.3 How to contact Alfa Laval Kolding A/S

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For further information please feel free to contact:

**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](http://www.toftejorg.com), [www.alfalaval.dk](http://www.alfalaval.dk) - [info.dk@alfalaval.com](mailto:info.dk@alfalaval.com)

Contact details for all countries are continually updated on our websites

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**How to contact Alfa Laval**

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

Please visit [www.alfalaval.com](http://www.alfalaval.com) to access the information directly.

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