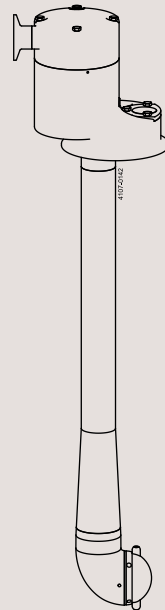




# Instruction Manual

Alfa Laval Toftejorg™ SaniJet 20 Media Driven



Covering: Standard, Hastelloy

Q-doc: Equipment Documentation (3.1 Inspection Certificate - EN 10204)

Q-doc + FAT-SAT: Qualification Documentation

Improved surface finish (0.5  $\mu\text{m}$  Ra internal/external media contact parts)

Machines delivered with ATEX/UKEx/IECEX Certification in accordance with Directive 2014/34/EU

First published: 07-2000

ESE01819-EN15

2023-11

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 Head

Designation

SaniJet 20 Media, SaniJet 20 Media UP

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. Baseefa05ATEX0117X and IECEX BAS 19.0063X

Marking:  II 1G Ex h IIC 85°C... 175°C Ga  
II 1D Ex h IIIC 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 2019-05-01



# 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 Head

Designation

SaniJet 20 Media, SaniJet 20 Media UP


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
- 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

UKEx Type Examination Certificate no. SGS23UKEX0148X and IECEx BAS 19.0063X

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

Signed on behalf of: Alfa Laval Kolding A/S

Global Product Quality Manager

Title

Lars Kruse Andersen

Name

Kolding, Denmark

Place

2023-09-25

Date (YYYY-MM-DD)



Signature

DoC Revison\_02\_092023



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SaniJet 20

*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 tank cleaning machine!***

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### 2.1 Important information

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#### **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 tank cleaning machine

#### **NOTE**

Indicates important information to simplify or clarify procedures.

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### 2.2 Warning signs

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General warning:



ATEX/UKEx/IECEx warning:

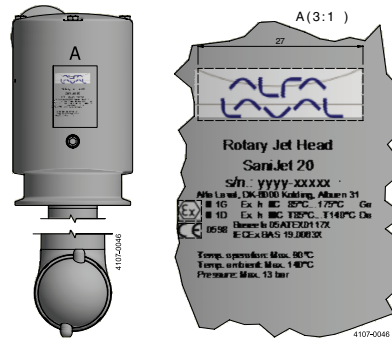


## 3 Introduction

SaniJet 20

### 3.1 Introduction

This manual has been prepared as a guide for installing, operating and maintaining your Alfa Laval Toftejorg tank cleaning machine. Should you require further assistance, our Technical Sales Support department and worldwide net of sales offices are pleased to help you. Please quote the type, article and serial numbers with all of your enquiries; this helps us to help you. The type and serial number are placed on the Base house of the tank cleaning machine.



Get the best and most economical performance from your tank cleaning machine. Insufficient preventive maintenance means poor performance, unscheduled stops, shorter lifetime and extra costs. On the contrary, good preventive maintenance means good performance, no unscheduled stops and superior total economy

**Warning:**



Before installing the machine and setting it into operation carefully read the General Installation and Safety Instructions (page 16) and the special conditions for safe use in accordance with ATEX/UKEx/IECEX Certification Directive 2014/34/EU (page 17) and take all necessary precautions according to your application and local regulations.

**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.

### 3.2 Intended use

It is to be verified by the end-user:

- that the tank cleaning 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.

The tank cleaning machine/rotary jet mixer is intended for use in closed tank, vessel or container. If used in open environment see 4.4 General safety and installation instructions (page 16).



### 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.

The Alfa Laval logotype is a trademark or a registered trademark of Alfa Laval Corporate AB. "Toftejorg" and "SaniJet" are trademarks or registered trademarks of Alfa Laval Kolding A/S. The Toftejorg™ SaniJet 20 product has patents in the EPO member states, in the US and in other countries. Other products or company names mentioned herein may be the trademarks of their respective owners. Any rights not expressly granted herein are reserved.

### 3.4 Reserved rights for design changes

---

Alfa Laval is continuously working on improving our equipment and services. In this improvement work Alfa Laval may for example change the design and material in our equipment. A change in the design will not necessarily entail a change of the specification and item no. for the equipment.

Alfa Laval reserves the right to change the design of Alfa Laval equipment without any notifications for improvements of our design.

If Equipment from Alfa Laval is used in connection with, for example, a validated plant, and an order for replacements is made, the design of the replacement may have been changed even if the specifications /item no. is the same as the existing installed and validated ones.

When ordering a replacement please contact Alfa Laval sales support in this matter before placing the order.

### 3.5 Marking

---

Alfa Laval tank cleaning machines are marked to allow for recognition of type of machine, machine name, serial number and manufacturing address.

The marking is placed on the base house of the tank cleaning machine.

**Rotary Jet Head**  
**SaniJet 20**  
**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

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SaniJet 20

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### 3.6 ATEX/UKEx/IECEX marking

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The Alfa Laval Toftejorg SaniJet 20 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. Baseefa05ATEX0117X.

The IECEX certification is carried out by the Certification Body SGS Baseefa Ltd., who has issued the certificate no. IECEX BAS 19.0063X.

The UKEx certification is carried out by the Certification Body SGS Baseefa Ltd., who has issued the certificate no. SGS23UKEX0148X.

#### Note

Explosion protection type is constructional safety “c”.

The marking on the ATEX/UKEx/IECEX certified Alfa Laval Toftejorg SaniJet 20 is as follows (for information on marking position see section 3.1 Introduction):

Rotary Jet Head  
“Machine name”  
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 05ATEX0117X  
IECEX BAS 19.0063X  
UK 1180 SGS23UKEX0148X

“Machine name” = SaniJet 20 Media or SaniJet 20 Media UP

#### Serial number explanation

Machines supplied with or without standard documentation:

yyyy-xxxxx: serial number

yyyy: year

xxxxx: 5 digit sequential number

#### Serial number explanation Q-doc, FAT-SAT

Machines supplied with Q-doc + FAT-SAT documentation:

yyyy-FAT-SAT-xxx: serial number

yyyy: year

xxx: 3 digit sequential number

### 3.7 ATEX/UKEx/IECEx temperature class and code

The maximum surface temperature depends mainly on operating conditions which are the temperature of the cleaning 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 fluid temperature or the ambient temperature, whichever of the two is the highest.

Table for determining temperature class (gas atmospheres)		
Gas Temperature class	Cleaning 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 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 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 fluid temperature is 67°C and ambient temperature is 75°C.

Gas class = T5

ATEX/UKEx/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 Toftejorg SaniJet 20 is a tank cleaning machine intended for industrial use in closed tanks for processing storage and transportation. There is a broad range of application areas within pharmaceutical, food and chemical industries.

The Alfa Laval Toftejorg SaniJet 20 is a sanitary cleaning device of the rotary jet head type for permanent installation that provides a 360° indexed cleaning pattern. Provided it is installed in an upright position, the Alfa Laval Toftejorg SaniJet 20 is completely self-cleaning and self-draining, and it has an integrated self-cleaning down pipe (patent pending). The drive mechanism is located outside the tank or process equipment, leaving a minimum of parts to be submerged into the product. All product contact surfaces are AISI 316/316L, duplex SAF 2205, Ti, Hastelloy C22/C276 stainless steel and USP Class VI and/or FDA approved polymer materials such as PEEK, EPDM, Viton and FFKM.

No threads or screws have been used in the product contact areas.

The cleaning device is lubricated by the cleaning media. No oil, grease or other lubricants are used.

The Alfa Laval Toftejorg SaniJet 20 is available in media driven or motor driven (air) version. The motor driven version is equipped with a magnetic clutch providing a leakage-proof transmission and provide an effective drive for low flow machines in rough environments. The air motor has variable speed in order to adjust cleaning intensity. The air version is covered by Instruction Manual IM-TE91A793.

The Alfa Laval Toftejorg SaniJet 20 is designed for use in pharmaceutical, biotechnological, food and dairy processing applications. Tanks and vessels between 0.5-30 m<sup>3</sup> (130-8,000 US gallons). The design makes the Alfa Laval Toftejorg SaniJet 20 especially well suited when processing high viscous, foaming or thixotropic products and in chemical processing applications, where product cross contamination is unacceptable and must be avoided.

For use in explosive hazard zones the SaniJet 20 media driven ATEX/UKEx/IECEx version can be used, provided it is installed according to safety instructions in local regulations.

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### 4.2 Quality system

---

The Alfa Laval Toftejorg SaniJet 20 is produced according to Alfa Laval Kolding's ISO 9001 International Standard certified quality system. All parts are made from certified material and all non-metal parts are made from FDA and USP Class VI approved materials. (Viton is, however, not USP Class VI approved).

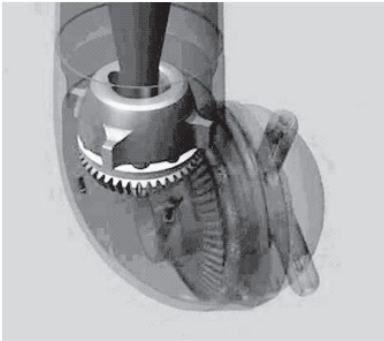
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## 4 Installation

SaniJet 20

### 4.3 Functionality

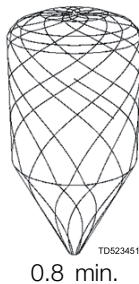
Alfa Laval Toftejorg SaniJet 20 consists of 3 main parts: The **Drive unit** with flow inlet and the Base housing placed outside the tank, and inside the tank: the **Down pipe** with the rotating Outer tube and the **Cleaner unit**.



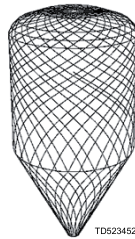
The flow of the cleaning fluid passes from the inlet through the Base housing, through the Down pipe, into the Cleaner head and out through the Nozzles. The Outer tube of the Down pipe is rotably suspended on a Stationary shaft with a Ball bearing inside the Outer tube. The Drive mechanism rotates the Outer tube with the Cleaner unit around the vertical axis. Via a set of Bevel gears on the Stationary shaft and the Cleaner head, the Cleaner head with the Nozzles is simultaneously rotated around the horizontal axis in a fixed relation thus moving the nozzles and the jets 360° around in the tank making a pre-set indexed cleaning pattern.

The Alfa Laval Toftejorg SaniJet 20 utilises the patented “Golden Section” cleaning pattern. The distance between the tracks of the jets ensures an efficient removal of remaining product from the tank surface right from the beginning of the cleaning sequence, allowing for short cleaning time.

**Example - 2 nozzle machine:**



0.8 min.



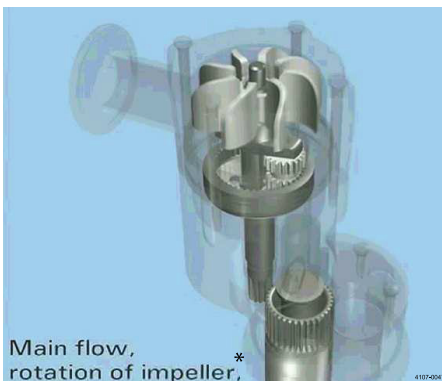
2.3 min.



6 min.

The time needed to perform a proper cleaning depends on type of soilage, distance, cleaning procedure and agent. For substances that are easily mobilised, i.e. are easy to remove, less than 1 min. could be sufficient while in cases of more heavy soilage (high viscous, sticky substances, etc.) a more dense pattern/longer time will be needed.

The machine is driven by the cleaning media, which is supplied under pressure via the inlet connection. The flow enters the Inlet cap tangentially and rotates the Impeller. The velocity of the liquid determines the rotation speed of the Impeller. This depends on the actual flow rate and the size of the inlet opening. The Inlet cap is made with two different size openings.



Main flow,  
rotation of impeller, \*

The Impeller shaft is in mesh with a Planet gear, of which the Output shaft rotates the Down pipe with the Cleaner unit.

The Planet gear is placed in the middle of the flow and thus flushed through axially while in operation, securing that all the Gear parts are thoroughly lubricated and cleaned. Bearings are designed to allow flow through the bearings for lubrication and cleaning.

*\*Main flow, rotation of impeller*

### Self-cleaning

Apart from the main flow flushing the inside of the Base housing and the Down pipe, and thereafter forming the jets through the Nozzles, fluid is flushed through all internal cavities, through Bevel gear, Ball bearings and gabs between moving parts and is finally also used for cleaning of the outside surfaces of the machine. From the gab between the Base housing and the rotating Down pipe, a cleaning jet is directed against the Down pipe, thus loosening and removing product remains on the outside. A liquid film flushing all around the tube further assists by continuously transporting away loosened product remains. The front of the Cleaner head is flushed by a liquid flow from the gab between the Cleaner head and the Retaining ring.

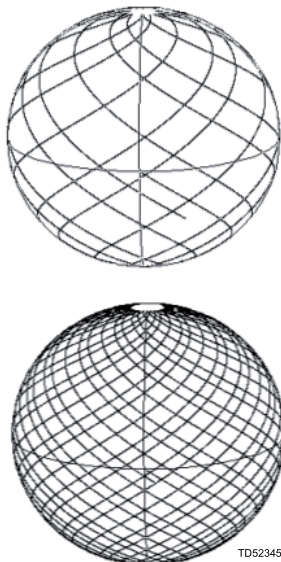
In order to ensure a proper self-cleaning, the machine must be installed in an approx. **upright position** and the inlet pressure must be **min. 3 bar**. In the bottom of the Cleaner head, in the Retaining ring, the machine is equipped with a hole to ensure self-draining. This self-draining is only ensured, if the machine is installed in an **upright position**.

### Cleaning Pattern, The Golden Section

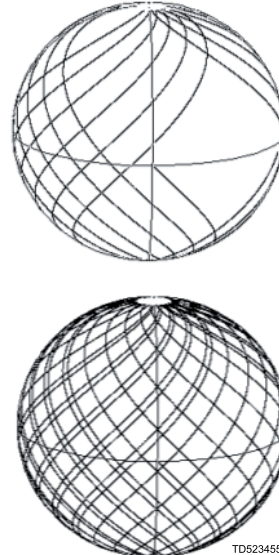
The patented Golden Section cleaning pattern (EP-Patent No.: 0495883. US-Patent No.: 5,279.675) is unique in building up the pattern in an ultimate uniform way. The pattern starts very coarse and refines itself in a step-less way by laying out the tracks approximately in the middle between the two most distant tracks already made. This means that the jets always clean the areas containing most remaining product, and thereby remove as much deposit as possible in the shortest possible way.

In case a complete cleaning pattern is not required, it will be possible to reach the same cleaning level within half the time and by using half the amount of cleaning fluid compared to a traditional step-wise cleaning pattern. Furthermore, due to the uniform cleaning pattern, the cleaning can be stopped at any time, whereas with traditional non-uniform cleaning pattern this would not be advantageous. However, after the complete cleaning pattern has been established, the difference between the Golden Section and the traditional stepwise cleaning pattern is negligible.

Golden Section - Cleaning pattern



Traditional - Cleaning pattern



## 4 Installation

SaniJet 20

### 4.4 General safety and installation instructions

The Alfa Laval Toftejorg SaniJet 20 is designed to be installed in a vertical upright position.

It is recommended to install a filter with mesh size 250 µm (0,0001") in the supply line in order to avoid particles, scale etc. from clogging inside the machine. It is essential to **avoid fine solid particles**, such as fine sand, in the cleaning fluid as they will increase wear considerably. This is particular important in case of recirculation.

In order to prevent accidental leakage of cleaning fluid into the tank it is recommended to install a shut-off valve close to the machine inlet. This will also prevent back-flow of liquid from the tank through the machine in case the cleaner head is submerged and there is an over-pressure inside the tank. The installation and operation shall be made in such a way that the draining of the machine is ensured.

It is recommended that the fluid valve fitted is of a type that **prevents hydraulic shocks**, which may cause severe damage to the entire installation.

**Before installation, all supply lines and valves must be thoroughly flushed** to remove remains of welding electrodes, grinding dust, scale and other foreign matter.

During handling and installation handle the machine with care in order not to damage the fine surface finish of the machine.

The Alfa Laval Toftejorg SaniJet 20 machine has been tested in a test tank, according to Alfa Laval test procedures at the factory before shipping. For the media driven version it is advised to check if the shipping has made any damaged to the machine which may cause performance disturbance. This is done by blowing compressed air into the inlet and verify that the machine rotates evenly. If resistance is recognised, the machine should be disassembled in order to localise the cause.

**Note:** Do not try to turn Nozzle head by hand, since this may damage the Gear. Nozzle head can be turned by blowing air from an air pistol through the inlet connection of the media driven machine or the intake port of the air motor.

#### 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/UKEx/IECEX Directive and other relevant Directives and shall be CE-marked before it is set into operation.

**Warning:**



Precautions shall be made to prevent starting of the cleaning/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 4.5 Specific conditions for safe use in accordance with ATEX/UKEx/IECEX Certification page 17.



#### 4.5 Specific conditions for safe use in accordance with ATEX/UKEx/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 fluid/steam. If a medium other than the 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 operations conditions which is the temperature of the cleaning fluid and ambient temperature.

The temperature class and ambient temperature range are shown in paragraph 3.7 ATEX/UKEx/IECEX temperature class and code, page 11.

**Warning: Max. permitted temperature**



When working:

The maximum permitted cleaning fluid temperature and ambient temperature is 95°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 38).

**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 Installation

SaniJet 20

### 4.5 Specific conditions for safe use in accordance with ATEX/UKEx/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/UKEx/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 equipollently 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/UKEx/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.

**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: Fluid pressure**

The maximum permitted cleaning fluid pressure is 13 bar.

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

## 5 Operation

SaniJet 20

### 5.1 Normal operation

#### **Cleaning Media**

Use only cleaning fluids, which are 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. Normal detergents, moderate solutions of acids and alkalis are acceptable as well as a number of solvents at ambient temperature during cleaning. Aggressive chemicals, excessive concentrations of chemicals at elevated temperatures as well as certain solvents and hydrochlorides should be avoided. If you are in doubt, contact your local Alfa Laval sales office.

#### **Product**

In cases where the machine is submerged in, or in other ways exposed to, product the compatibility between stainless steel AISI 316, SAF 2205, PEEK, FFKM, FPM (Viton), EPDM, Titanium and Hastelloy C22/C276 and the product must be considered carefully.

#### **NOTE**

EPDM swells significantly exposed to fatty materials.

#### **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. High pressure also reduces the cleaning effect.

The machine is designed to stand up to 13 bar working pressure. This is normally not recommended but may be used for special purposes, where high pressure at close distance is preferred.

#### **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 4.5 rpm (corresponding to approx. 13 sec. per rev of the body) in order to avoid risk of machine breakdown.

Draining should always be done inside the tank.

See paragraph 4.5 Specific conditions for safe use in accordance with ATEX/UKEx/IECEX Certification (page 17).

#### **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 4.5 Specific conditions for safe use in accordance with ATEX/UKEx/IECEX Certification (page 17).

#### **Temperature**

The maximum recommended cleaning fluid temperature is 90°C. The maximum recommended steam temperature is 140°C. The maximum ambient temperature is 140°C.

See paragraph 4.5 Specific conditions for safe use in accordance with ATEX/UKEx/IECEX Certification (page 17).

#### **After use cleaning**

After use flush the machine with fresh water. Cleaning media should never allow to dry or settle in the system due to possible "salting out" or "scaling" of the cleaning media. If cleaning media contains volatile chloride solvents, it is recommended **not to flush with water** after use, as this might create hydrochloric acid.

### 5.2 Safety precautions

The machine is intended for use inside a tank only. As peak velocity of main jets reaches 40 m/s, Alfa Laval Toftejorg SaniJet 20 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:**



Retaining screw on side of Base housing (17) must never be loosened, when machine is mounted in tank unless down pipe is supported and Pressure line is disconnected, as otherwise the complete Down pipe assembly will fall down.

**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 3.7 ATEX/UKEx/IECEX temperature class and code, page 11.

## 6 Maintenance

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SaniJet 20

### 6.1 Preventive maintenance

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In order to keep your tank cleaning machine servicing you as an efficient tool in your tank cleaning operations, it is essential to maintain its high performance by following a simple preventive maintenance programme.

Good maintenance is careful and regular attention!

The following recommended preventive maintenance is based on tank cleaning machines working in average conditions. However, you will appreciate that a tank cleaning 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.

Handle machine with care. Take proper action to protect fine surfaces from being damaged.

Always use only proper tools. Use Toftejorg™ SaniJet 20 standard tool kit (page 47). 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.

### 6.2 Reserved rights for design changes of Alfa Laval equipment used in validated processes

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Alfa Laval is continuously working on improving our equipment and services. In this improvement work Alfa Laval may for example change the design and material in our equipment. A change in the design will not necessarily entail a change of the specification and item no. for the equipment.

Alfa Laval reserves the right to change the design of Alfa Laval equipment without any notifications for improvements of our design.

If Equipment from Alfa Laval is used in connection with, for example, a validated plant, and an order for replacements is made, the design of the replacement may have been changed even if the specifications /item no. is the same as the existing installed and validated ones.

When ordering a replacement please contact Alfa Laval sales support in this matter before placing the order.

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### 6.3 Service and repair of ATEX/UKEx/IECEX certified machines

**Warning:**



All service and repair of ATEX/UKEx/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/UKEx/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/UKEx/IECEX Directive) is no longer valid.

In order to ensure compliance with the ATEX/UKEx/IECEX regulations and keep the machine ATEX/UKEx/IECEX certification valid, the service or repair must be performed by an authorized person with knowledge of the ATEX/UKEx/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/UKEx/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/UKEx/IECEX certification of the machine.

## 6 Maintenance

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SaniJet 20

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### 6.4 Service and repair of machines ordered with Q-doc and with Q-doc + FAT-SAT

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In order to ensure full traceability and to obtain full qualification and validation documentation, all service and repair of machines ordered with Q-doc (Equipment Documentation) and Q-doc + FAT-SAT (Qualification Documentation) should be handled and ordered in one of the 3 different ways described below:

**1. Q-doc + FAT-SAT Service/Repair Order** (Item no. TEREP-Q-doc):

*(This maintenance order should be selected if the customer wishes to have Alfa Laval Kolding A/S to obtain full file log of all FAT (Factory Acceptance Test) documents for the Tank Cleaning Machine).*

- Maintenance/Repair is carried out at Alfa Laval Kolding A/S and Q-doc + FAT-SAT Maintenance Log, FAT-SURFACE (if necessary), FAT-WELD (if necessary) and FAT-PERFORMANCE is performed. The FAT documents are stored in the Q-doc + FAT-SAT Maintenance Log as PDF-files.
- Q-doc (Equipment Documentation) for all steel spare parts are stored in the Q-doc + FAT-SAT Maintenance Log as PDF-files.
- The machine is returned to the customer incl. the Q-doc + FAT-SAT Log CD and hardcopy of all FAT documents, for further qualification (SAT: Site Acceptance Test) and validation (PV: Process Validation).
- Word and PDF documents are stored in the Alfa Laval Q-doc + FAT-SAT Maintenance Log folder.

**2. Q-doc Spare Part Order** (Item no.: TE24XXXX-90, TE24XXXX-91 or TE24XXXX-94)

*(This maintenance order should be selected if the customer wishes to carry out service or repair. The customer or the repair shop thus carries the full responsibility for the full traceability of the material and FAT documentation for the Tank Cleaning Machine).*

- The spare part is sent to the customer incl. Q-doc (Equipment Documentation) as hardcopy.

**3. Q-doc + FAT-SAT Spare Part Order** (Item no.: TE24XXXX-5X for Inner shaft (14), Outer pipe (12) and Inlet cap (39))

*(This maintenance order should be selected if the customer wishes to carry out service or repair. The customer or the repair shop thus carries the full responsibility for the full traceability of the material and FAT documentation for the Tank Cleaning Machine).*

- The spare part is sent to the customer incl. Q-doc (Equipment Documentation) incl. Weld-Log documentation (Inner shaft, Outer pipe) as hardcopy.
- This service information will not be recorded in the Alfa Laval Q-doc + FAT-SAT folder. The customer has to perform all Qualification tests and documentation (FAT, SAT, IQ & OQ) himself.

Contact local Alfa Laval service and support (see. [www.alfalaval.com](http://www.alfalaval.com)). Important information to give to Alfa Laval:

- Serial No.
  - Q-doc maintenance order type:
    - Item no.: TEREP-Q-doc
    - or
    - Item no.: TE24XXXX-90, -91 or -94
  - Item no.: TE24XXXX-5X (see page 39 for more information)
-



### 6.5 Every 150/300 working hours

If the used cleaning media is tap water or commonly used CIP solvents, the recommended maintenance interval is 300 hours. However, if special cleaning media is used such as e.g. WFI, the recommended maintenance interval is 150 hours (see page 46).

1. Disassemble machine as described on the following pages.
2. Clean material build-up and deposits from internal parts with water or suitable chemical cleaner, possibly Scotch-brite, S-Ultrafine.
3. Check Slide bearing (31) for wear. If endface of Bearing is worn more than 0.5 mm into Slide bearing, it should be replaced. If hole is worn to more than  $\varnothing 6.2$  mm, it must be replaced.
4. Check Bearing bush for Turbine shaft (38) in Inlet cap. If hole is worn oval to a max. diameter of more than 8.35 mm, Bearing should be replaced. At the same time replace Bearing bushes in Base housing (20 + 19).
5. Check Carrier bearing (36). If worn to a max. diameter of more than  $\varnothing 12.2$  mm, it should be replaced.
6. Check Bearing bushes (20 + 19) in Base housing by fitting Output shaft (30) and check sideways movement. Replace if necessary. If bushes are worn they will allow Output shaft to tilt and eventually the planet gear will be blocked. Always replace together with Bearing bush (38) in Inlet cap.

**Note:** Timely replacement of bearings for Turbine shaft and Output shaft will prevent costly damage to the gear. However, all Bearing bushes, made from high performance plastic PEEK-material, are mounted with press-fit and should not be removed unless they need to be replaced.

7. Check Planet wheel (35) while still mounted in Planet wheel carrier (33). It must rotate easily on Shaft. If restriction or much clearance on Shaft is felt, Planet wheel should be dismounted for inspection of Bearing (hole in Planet wheel) and Shaft for Planet wheel (34). Max diameter of holes:  $\varnothing 6.2$  mm.

Check wear of the teeth.

8. Check unrestricted rotation of Ball bearings. Inspect for build-up of foreign material in Ball rings (10 + 4) and Ball races. Balls must rotate freely in Ball rings.
9. Assemble machines as described in the following pages.
10. Check that the machine is in operating condition by blowing compressed air from an air pistol into the inlet. If any resistance is recognised, the machine should be disassembled in order to localise the cause.

In order to ensure current good hygiene it is recommended to replace all rubber seals at each service inspection.

Apart from the parts specifically mentioned above, all the remaining wear parts should regularly be inspected for wear. Wear parts are specified in the parts lists, pages 40 ff.

## 6 Maintenance

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SaniJet 20

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### 6.6 Turbine Unit - dismantling and reassembling

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#### Dismantling

1. Remove M5 Screws (40). Loosen and unscrew with a Socket wrench (tool no. TE462A).
2. Lift off Inlet cap (39). If it is necessary to replace Bearing bush (38), remove Bearing bush from Inlet cap. Do not remove Bearing bush unless it must be replaced, as the bush is easily damaged when removed.
3. Withdraw Impeller with Impeller shaft (37). Pull off Impeller shaft from Impeller (37), (Only TE24HXXX and 24CXXX Hastelloy version).
4. Withdraw the Planet gear (33-36).
5. Remove Gasket (18) and withdraw the Gear ring (32).
6. Withdraw Output shaft (30). If it is necessary to replace Bearing bush (31), remove Bearing bush from Output shaft. Do not remove Bearing bush unless it must be replaced, as the bush is easily damaged when removed.
7. Remove Gasket (18) from Base unit (16).
8. Check free rotation of Planet wheel (35). Inspect teeth for wear. Also check if any noticeable clearance on shaft is felt. If necessary remove Planet wheel: Carefully knock out Shaft for Planet wheel (34). Use suitable mandrel and plastic hammer. If necessary replace Planet wheel and Bearing bush (36).

#### Reassembling

Before reassembly make sure that all parts are clean without deposits or build-up of foreign matter.

1. Remount Planet wheel and Shaft (35/34) by carefully knocking Shaft home with plastic hammer. If replaced, observe correct version. Note: Planet wheel carrier has two holes with different center line distance (see sketch page 40).
  2. Insert Gasket (18) in top of Base unit (16).
  3. If replaced, insert Bearing bush (31) into the Output shaft (30) and push home with thumb. Insert the Output shaft (30). Check free rotation.
  4. Place Gear ring (32) on Gasket (18) in Base unit (16). If replaced, observe correct version.
  5. Insert Planet gear into Gear ring (32) on top of Bearing bush (31). Rotate Planet gear to check correct mesh.
  6. Press Impeller onto Impeller shaft (37), (Only TE24HXXX and 24CXXX Hastelloy version). Mount Impeller shaft through Planet gear (33-36). Rotate to verify correct mesh.
  7. Mount Gaskets (18) into Inlet cap (39).
  8. If it is necessary to mount new Bearing bush (38) press Bearing bush fully home into the Inlet cap (39) with thumb. Mount Inlet cap over Impeller.
  9. Mount and tighten Screws (40) with Socket wrench (tool no. TE462A). Tighten crosswise. Torque: 3-4 Nm.
-

### 6.7 Cleaner Head Unit - dismantling and reassembling

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#### Dismantling

1. Loosen Cleaner unit (14) with Hook spanner (tool no. TE20B701). Insert carefully into holes in Retaining ring (3). Turn counter-clockwise and draw out Cleaner unit. Never use Pipe wrench or any other tool than the Alfa Laval Toftejorg SaniJet 20 special Hook spanner, which is developed especially to protect the surface from being damaged.
2. Remove Seal ring (8).
3. Pull off Clip ring (6). Push out Pin (7).
4. Draw off Bevel gear (5) together with Ball ring (4) and Retaining ring (3).
5. If replacement is necessary, pull off Bearing bush (2) from Cleaner head (1). The Bearing bush should not be removed unless worn or damaged. Wear on this part will increase leakage flow around the front of the Cleaner head, and accordingly increase the total flow rate.

#### Reassembling

1. If necessary press new Bearing bush (2) fully home onto Cleaner head (1).
2. Mount Retaining ring (3), Ball ring (4) and Bevel gear (5) on Cleaner head (1).
3. Hold Cleaner head and turn Bevel gear to align the groove over the holes in the Cleaner head. Mount Pin (7).
4. Secure with Clip ring (6) over Pin (7). Check that Pin with Clip ring can move axially.
5. Hold Retaining ring (3) and check free rotation of Cleaner head unit.
6. Insert Seal ring (8) into Cleaner house on Outer tube. Make sure that it is fitted correctly into recess.
7. Insert Cleaner head unit (14) in Outer tube. Correct mounting is made foolproof: Drain hole in Retaining ring must be at the lowest point. Tighten with Hook spanner (tool no. TE20B701).

#### Caution:



It is important that Seal ring is fitted correctly and that Retaining ring is tightened fully home against "stop". Check that assembly is firmly held in position. If assembly feels loose, replace Seal ring.

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## 6 Maintenance

SaniJet 20

### 6.8 Base Unit - dismantling and reassembling

#### Dismantling of Outer tube

In order to dismantle the parts in the Outer tube, it is necessary first to release the Inner shaft (14).

**Warning:**



Retaining screw on side of Base housing (16) must never be loosened, when machine is mounted in tank unless down pipe is supported and Pressure line is disconnected, as otherwise the complete Down pipe assembly will fall down.

1. Remove Retaining screw (17). Loosen and unscrew with a M10 Hex key (Allen key). Pull out Outer tube (12) together with Inner shaft (14) from Base housing (16).
2. Turn Outer tube upside down. Hold Bevel gear (9) and push Inner shaft (14) approx. 5 mm into Outer tube. Then rotate Inner shaft  $\frac{1}{4}$  revolution, in order for pin in the shaft to pass through grooves in Bevel gear. Remove Bevel gear (9) and Ball ring (10).
3. Rotate Inner shaft to pass grooves in Ball race (11) and pull it out. Tip out Ball race from Outer tube (12).
4. If it is necessary to replace Bearing ring (13) on Outer tube, pull it off. The Bearing ring should not be removed unless worn or damaged. Wear on this part will increase leakage around Down pipe and accordingly increase total flow rate. It is recommended to replace if diameter is below  $\varnothing 38.7$  mm. Diameter must never be below  $\varnothing 38.5$  mm.
5. Remove Plain seal (15) from Inner shaft (14).
6. If necessary, replace Bearing bush (20 and 19) in Base housing (16).

#### Reassembling of Outer tube

1. Mount Plain seal (15) on Inner shaft (14).
2. Turn Outer tube (12) upside down. Fit Ball race (11) into Outer tube. Make sure that it is correctly placed in recess.
3. Mount Inner shaft (14) from below into the Outer tube. Hold against Ball race (11) and fit Inner shaft pin through axial grooves. Place Ball ring (10) and Bevel gear (9) over Inner shaft on top of the Ball race (11). Hold Bevel gear, rotate Inner shaft and draw back to fit pin into groove in the end face of the Bevel gear.
4. Place Base housing (16) upside down. Fit upper end of Inner shaft into Base housing. By pressing at the lower end of Inner shaft push the entire assembly into Base housing. Tighten with Retaining screw (17).

*SaniJet 20*

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Alfa Laval Toftejorg SaniJet 20 is as a standard prepared for monitoring by a Rotacheck Sensor (see Rotacheck System page 30). A Plug (22) is fitted in the Base housing in the opening designed for the Rotacheck sensor.

### **Dismantling of Plug or Rotacheck Sensor**

1. Remove Screws (24). Loosen and unscrew with a Socket wrench (tool no. TE462A).
2. Remove Bracket (23).
3. Press up Plug/Rotacheck (22). Remove O-ring (21).

### **Reassembling of Plug or Rotacheck Sensor**

1. Insert O-ring (21) in hole for Rotacheck on Base housing (16). Make sure that it is fitted correctly into O-ring groove inside hole. Insert Plug/Rotacheck (22).
  2. Place Bracket (23) over Plug/Rotacheck.
  3. Mount and tighten Screws (24) with Socket wrench (tool no. TE462A).
-

## 6 Maintenance

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*SaniJet 20*

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### 6.9 Rotacheck system

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The Rotacheck System is an ex-proof system, designed for monitoring the operation of the tank cleaning machine. The Sensor is supplied from a special Relay. The Sensor will send a signal to the Relay each time it is hit by a jet from the rotating tank cleaning machine, thus providing verification that the machine is rotating, of the rotation speed, and that the nozzles are not blocked. To install Rotacheck Sensor simply replace Plug (22) with Rotacheck Sensor TE52E067. For further information see Data sheet and operators manual for Rotacheck system.

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## Slow rotation or failure of machine to rotate

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 machine is correct.</p> <p>c). Check supply line/filter for restrictions/clogging.</p> <p>d). Remove Inlet cap (see page 40) and check for clogging in Impeller area.</p> <p>e). Remove Gear ring and Output shaft (see page 40) and check for clogging in Base housing.</p> <p>f). Remove Cleaner head (see page 27) and check Nozzles and Cleaner head for clogging. If blocked, carefully clean without damaging Nozzles vanes and Nozzle tip. Use air pistol.</p> <p>g) Inspect Bevel gear, Ball ring and Bevel gear inside Outer tube (see page 28). If necessary, remove parts and clean.</p> <p>If large particles repeatedly get jammed in the machine, install filter or reduce mesh size of installed filter in supply line.</p>
<b>Foreign material or material build-up</b>	<p>With air pistol blow air through inlet and check that machine rotates evenly. If any resistance is recognised, disassemble machine in order to localise the cause. Remove Turbine shaft with Impeller and Planet gear assembly (see page 40) and remove foreign material.</p>
a). Impeller jammed	Remove Turbine shaft with Impeller (see page 40) and clean Bearings.
b). Turbine shaft sluggish in Bearing	Remove foreign material from Planet wheel and Internal gears. Check rotation of Planet wheel. If restriction is recognised, disassemble Planet gear assembly (see page 40) and remove material build up, especially on Shaft and hole in Planet wheel.
c). Planet gear jammed/sluggish	Remove Planet gear assembly (see page 40). Turn Down pipe and check unrestricted rotation. Remove Gear ring and Output shaft. Remove foreign material/material build-up on Output shaft, in holes and Bushes in Base housing. Rotate again Down pipe. It must rotate freely without any restriction. If not, remove Cleaner unit (see page 27). Clean out any foreign material and material build-up inside Cleaner head in the bottom of the Outer tube. Hold Retaining ring and rotate Cleaner head. If any restriction is recognised, disassemble Cleaner unit and clean all parts. Balls in ball ring must rotate freely.
d). Output shaft jammed/sluggish	If Down pipe still does not rotate freely without any restriction, it must be disassembled. Clean opening in bottom of Base housing and Bearing ring on Outer tube. Remove Bevel gear, Ball ring and Ball race inside Outer tube and clean parts. Balls in Ball ring must rotate freely without any restriction.
e). Cleaner unit or Bevel gears jammed/sluggish	
f). Down pipe jammed/sluggish	

## 7 Trouble shooting guide

SaniJet 20

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### Possible Causes

### Fault finding

#### Wear

- a) Slide bearings
- b) Bearings for Turbine shaft
- c) Planet wheels
- d) Shafts for Planet wheels

See page 22 to 25.

See page 22 to 25.

See page 22 to 25.

Check clearance of Planet wheels on Shafts. Transverse movement should not exceed 0.3 mm.

- e) Turbine shaft

Check clearance in Planet gear, Bearing bush and Bearings for Turbine shaft.

Transverse movement should not exceed 0.3 mm. Also inspect teeth for wear.

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#### Mechanical defects

- a) Planet wheels. Teeth broken
- b) Planet wheel can not rotate on Shafts/  
Shafts bent
- c) Damaged teeth on Bevel gear

Replace Planet wheel.

Replace Shafts for Planet wheels.

Inspect teeth on Bevel gear for deformation. Mount Cleaner Unit in Outer tube (See page 27). Remove Planet gear. Hold Base housing and rotate Down pipe to check that Bevel gears can work together. If damaged: Replace Bevel gears.



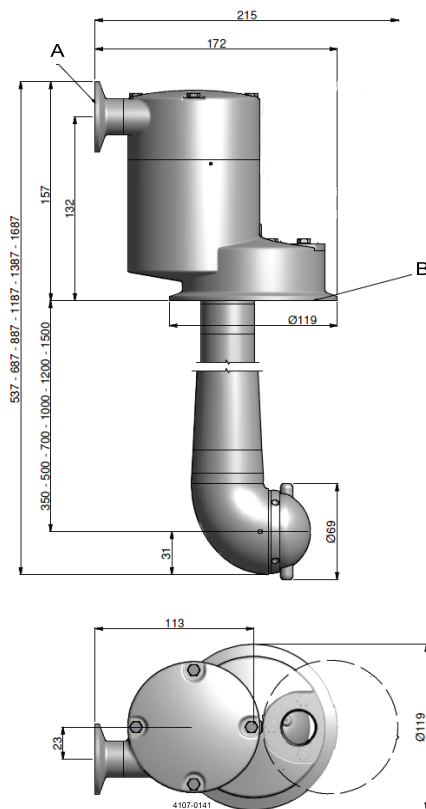
**Performance Data for Alfa Laval Toftejorg SaniJet 20 Media Driven**

Weight of machine:	9.5 kg (21 lbs)
Working pressure:	3-13 bar (45-185 psi)
Recommended media pressure:	5-8 bar (73-116 psi)
Max. working temperature:	+90°C (194°F)
Max. ambient temperature:	+140°C (284°F)
Effective throw length:	1.5-4 m (5-13 ft)
Materials:	Stainless Steel: AISI 304/316/316L, SAF 2205, Titanium, Hastelloy C22/C276, MS-nickled Sealing: EPDM. FDA-approved 21 CFR §177 and USP Class VI Sealing: Viton, FFKM. FDA-approved 21 CFR §177 Polymers: PEEK, FDA-approved 21 CFR §177 and USP Class VI
Surface finish:	Product contact surfaces: Ra = 0.8 µm – except weldings
Improved surface finish:	0.5 µm Ra internal/external media contact parts - 0.8 µm Ra non media contact parts. Note: Certain Exception applies
Lubricant:	Self-lubricant with the cleaning media

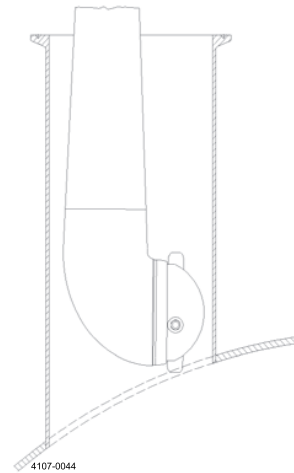
**Principal dimensions in mm**

Inlet connection: 1" Clamp ISO2852

Tank connection: 4" Clamp ISO2852



For portable installation or installation through long "nozzles", 4" (100 mm) version is recommended



A: 1" Clamp ISO2852	B: OPTION: Rotachek Sensor	C: 4" Clamp ISO2852
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# 8 Technical data

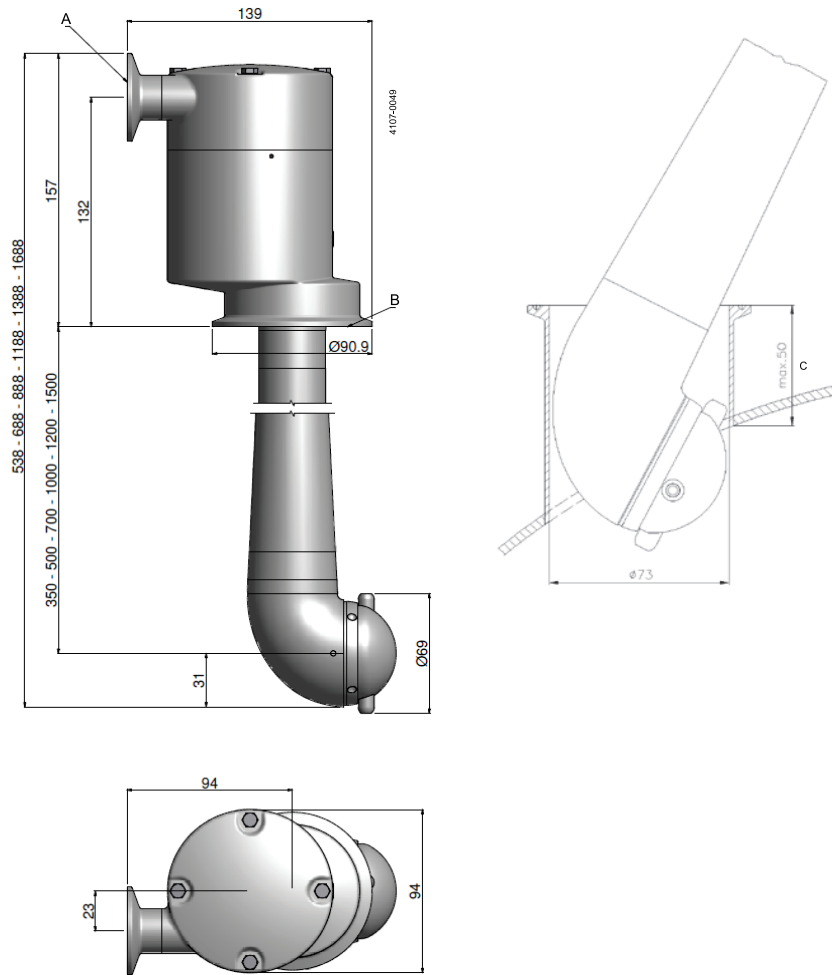
SaniJet 20

## Principal dimensions in mm

Inlet connection: 1" Clamp ISO2852

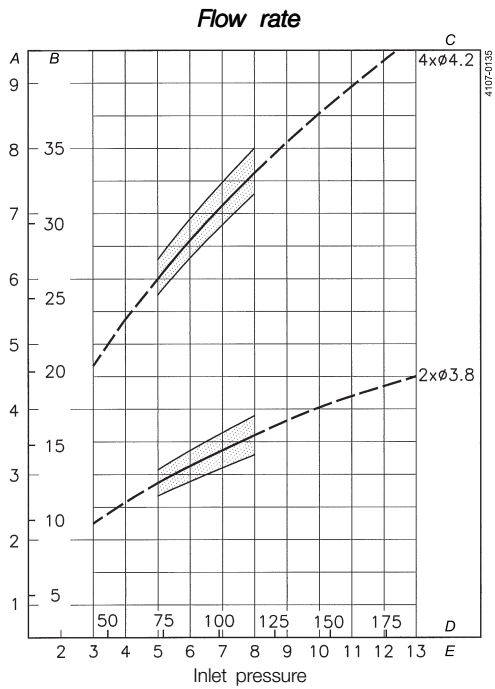
Tank connection: 3" Clamp ISO2852

For permanent installation machine can pass through 3" clamp of max. length 50 mm:

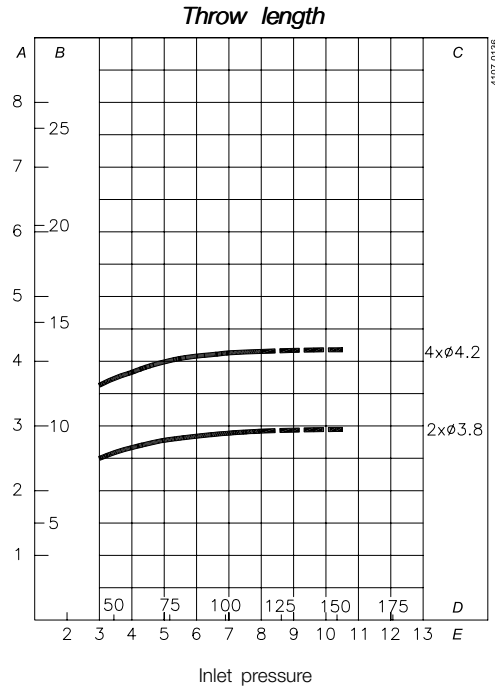


A: 1" Clamp ISO2852	B: 3" Clamp ISO2852	C: Max. 50 mm
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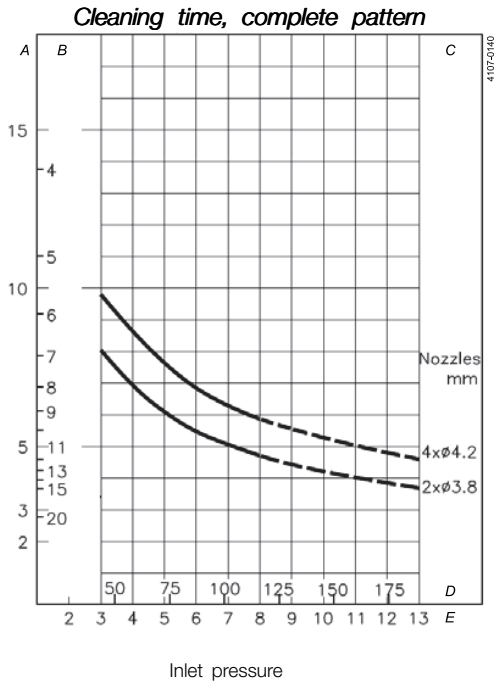
Performance data for Alfa Laval Toftejorg SaniJet 20 Media Driven



A: m<sup>3</sup>/h. B: USgpm. C: Nozzles mm. D: psi. E: bar



A: m. B: ft. C: Nozzles mm. D: psi. E: bar



A: min. B: RPM of down pipe. C: Nozzles mm. D: psi. E: bar

**Note:** Effective throw length varies depending on jet transverse speed over surface, substance to be removed, cleaning procedure and agent.

The inlet pressure has been taken immediately before the machine inlet. In order to achieve the performance indicated in the curves, the pressure drop in the supply lines between pump and machine must be taken into consideration.

## 9 Product programme

This manual covers the product programme for Alfa Laval Toftejorg SaniJet 20 Media Driven. For information on Alfa Laval Toftejorg SaniJet 20 Air Driven, please refer to Instruction Manual ESE01829

### 9.1 Standard configurations

Media Driven: Alfa Laval Toftejorg SaniJet 20 (3" connection)

Standard (EPDM as standard)		
Length	2 x ø3.8 mm	4 x ø4.2 mm
500 mm	TE24B040	TE24B060
350 mm	TE24B041	TE24B061
700 mm	TE24B042	TE24B062
1000 mm	TE24B044	TE24B064
1200 mm	TE24B046	TE24B066
1500 mm	TE24B048	TE24B068

Hastelloy (FFKM as standard)		
Length	2 x ø3.8 mm	4 x ø4.2 mm
500 mm	TE24C040	TE24C060
350 mm	TE24C041	TE24C061
700 mm	TE24C042	TE24C062
1000 mm	TE24C044	TE24C064
1200 mm	TE24C046	TE24C066
1500 mm	TE24C048	TE24C068

Improved surface finish* (EPDM as standard)		
Length	2 x ø3.8 mm	4 x ø4.2 mm
500 mm	TE24E040	TE24E060
350 mm	TE24E041	TE24E061
700 mm	TE24E042	TE24E062
1000 mm	TE24E044	TE24E064
1200 mm	TE24E046	TE24E066
1500 mm	TE24E048	TE24E068

Improved surface finish* and Hastelloy C22 (FFKM as standard)		
Length	2 x ø3.8 mm	4 x ø4.2 mm
500 mm	TE24J040	TE24J060
350 mm	TE24J041	TE24J061
700 mm	TE24J042	TE24J062
1000 mm	TE24J044	TE24J064
1200 mm	TE24J046	TE24J066
1500 mm	TE24J048	TE24J068

\* Surface finish: 0.5 µm Ra internal/external media contact parts. 0.8 µm non media contact parts. Passivated. Note: Nominal Surface Finish

## 9 Product programme

This manual covers the product programme for Alfa Laval Toftejorg SaniJet 20 Media Driven. For information on Alfa Laval Toftejorg SaniJet 20 Air Driven, please refer to Instruction Manual ESE01829

### Media Driven: Alfa Laval Toftejorg SaniJet 20 (4" connection)

Standard (EPDM as standard)		
Length	2 x ø3.8 mm	4 x ø4.2 mm
500 mm	TE24G040	TE24G060
350 mm	TE24G041	TE24G061
700 mm	TE24G042	TE24G062
1000 mm	TE24G044	TE24G064
1200 mm	TE24G046	TE24G066
1500 mm	TE24G048	TE24G068

Hastelloy (FFKM as standard)		
Length	2 x ø3.8 mm	4 x ø4.2 mm
500 mm	TE24H040	TE24H060
350 mm	TE24H041	TE24H061
700 mm	TE24H042	TE24H062
1000 mm	TE24H044	TE24H064
1200 mm	TE24H046	TE24H066
1500 mm	TE24H048	TE24H068

Improved surface finish* (EPDM as standard)		
Length	2 x ø3.8 mm	4 x ø4.2 mm
500 mm	TE24F040	TE24F060
350 mm	TE24F041	TE24F061
700 mm	TE24F042	TE24F062
1000 mm	TE24F044	TE24F064
1200 mm	TE24F046	TE24F066
1500 mm	TE24F048	TE24F068

Improved surface finish* and Hastelloy C22 (FFKM as standard)		
Length	2 x ø3.8 mm	4 x ø4.2 mm
500 mm	TE24D040	TE24D060
350 mm	TE24D041	TE24D061
700 mm	TE24D042	TE24D062
1000 mm	TE24D044	TE24D064
1200 mm	TE24D046	TE24D066
1500 mm	TE24D048	TE24D068

\* Surface finish: 0.5 µm Ra internal/external media contact parts. 0.8 µm non media contact parts. Passivated. Note: Nominal Surface Finish




The item numbers TE24GXXX, TE24HXXX, TE24FXXX, TE24DXXX, TE24BXXX, TE24CXXX, TE24EXXX and TE24JXXX must always be included with an add-on extension of -XX.

## 9 Product programme

This manual covers the product programme for Alfa Laval Toftejorg SaniJet 20 Media Driven. For information on Alfa Laval Toftejorg SaniJet 20 Air Driven, please refer to Instruction Manual ESE01829

### 9.2 Available add-ons

For: TE24GXXX, TE24FXXX, TE24BXXX, TE24EXXX	For: TE24HXXX, TE24CXXX, TE24DXXX, TE24JXXX
-0X Standard	-0X Standard
-5X Q-doc + FAT-SAT	-5X Q-doc + FAT-SAT
-6X Q-doc + FAT-SAT + ATEX/UKEx/IECEX	-6X Q-doc + FAT-SAT + ATEX/UKEx/IECEX
-7X ATEX/UKEx/IECEX	-7X ATEX/UKEx/IECEX
-8X Q-doc + ATEX/UKEx/IECEX	-8X Q-doc + ATEX/UKEx/IECEX
-9X Q-doc	-9X Q-doc
-X0 EPDM (Standard)	-X4 FFKM (Standard)
-X1 FPM (Viton)	
-X4 FFKM	

Explanation to Add-ons		
<p><b>Q-doc</b> (Equipment Documentation)</p>		<p>Equipment Documentation includes:</p> <ul style="list-style-type: none"> <li>- EN 1935/2004 DoC</li> <li>- EN 10204 type 3.1 inspection Certificate and DoC</li> <li>- FDA DoC</li> <li>- GMP EC 2023/2006 DoC</li> <li>- EU 10/2011 DoC</li> <li>- ADI DoC</li> <li>- QC DoC</li> </ul>
<p><b>Q-doc + FAT-SAT</b> (Qualification Documentation)</p>		<p>Qualification Documentation includes:</p> <ul style="list-style-type: none"> <li>- RS, Requirement Specification</li> <li>- DS, Design Specification incl. Traceability Matrix</li> <li>- FAT, Factory Acceptance Test incl. IQ &amp; OQ</li> <li>- SAT, Site Acceptance Test Protocol incl. IQ &amp; OQ for End-User Execution</li> <li>- Q-doc</li> </ul>
<p><b>ATEX/UKEx/IECEX</b></p>		<p>ATEX/UKEx/IECEX includes: ATEX/UKEx/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.</p> <p>II 1G Ex h IIC 85°C...175°C Ga II 1D Ex h IIC T85°C...T140°C Da</p>

This manual covers the product programme for Alfa Laval Toftejorg SaniJet 20 Media Driven. For information on Alfa Laval Toftejorg SaniJet 20 Air Driven, please refer to Instruction Manual ESE01829

### 9.3 Available add-ons for spare parts

Item no.	Description
TE2XXXXX-90 or TE2XXXXX-91 or TE2XXXXX-94	Q-doc including - EN 1935/2004 DoC - EN 10204 type 3.1 inspection Certificate and DoC - FDA DoC - GMP EC 2023/2006 DoC - EU 10/2011 DoC - USP Class VI DoC - ADI DoC - QC DoC
TE2XXXXX-50 or TE2XXXXX-51 or TE2XXXXX-54 Inner shaft (14) or Outer tube (12) or Inlet cap (39) only	Q-doc + FAT-SAT including - Q-doc  •Weld-Log documentation (if necessary) as hardcopy

### 9.4 Accessories

#### Clamp Coupling Parts

Reference no.	Description
9611-31-019-0	Clamp welding liner 1"
9611-99-1358	Gasket EPDM f. 1" Clamp coupling
211053	Clamp ring 1"
9611-31-023-0	Clamp welding liner 3"
9611-99-1362	Gasket EPDM f. 3" Clamp coupling
211056	Clamp ring 3"
9611-31-024-0	Clamp welding liner 4"
9611-99-1363	Gasket EPDM f. 4" Clamp coupling
211057	Clamp ring 4"

#### Monitoring

An electronic system with rotation sensor to validate 360° coverage can be included:

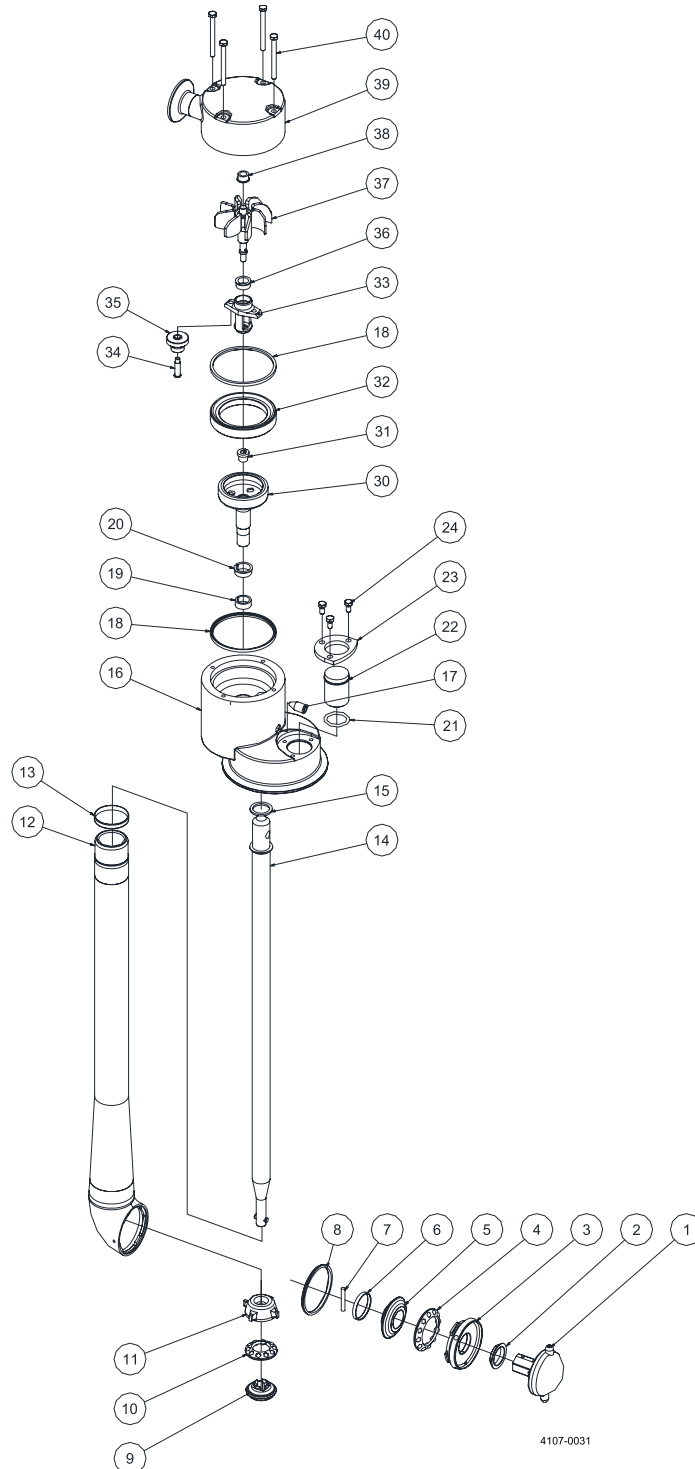
TE52E067 Rotacheck Sensor  $\varnothing$ 27 mm  
 TE52E058 Rotacheck Relay

For further information see page 30.

# 10 Parts drawings and lists, service kits and tools

Toftejorg SaniJet 20 Media Driven

## 10.1 Toftejorg SaniJet 20 Media Driven



4107-0031

Alfa Laval Toftejorg SaniJet 20, Media Driven - New Version - item numbers TE24Xxxx



## 10 Parts drawings and lists, service kits and tools

Toftejorg SaniJet 20 Media Driven

### Parts list

Pos.	Qty	Denomination
1	□	Cleaner head
2	◆○●	Bearing bush
3		Retaining ring
4		Ball ring N
5		Bevel gear
6		Clip ring
7		Pin
8	□●	Seal ring H
9		Bevel gear
10		Ball ring
11		Ball race
12	□	Outer tube
13	◆○●	Bearing ring, top
14	□	Inner shaft
15	□●	Plain seal S
16		Base housing
17		Retaining screw
18	□●	Gasket D
19	◆○●	Bearing bush, D2
20	◆○●	Bearing bush, D1
22		Plug
23		Bracket
24		Screw
30		Output shaft
31	◆○◇●	Bearing bush
32		Gear ring T2
33		Planet wheel carrier
34		Shaft f. planet wheel
35		Planet wheel T2
36	◆○◇●	Bearing bushing D1
37		Impeller w. shaft
38	◆○◇●	Bearing bushing M
39	□	Inlet cap
40		Screw

### Service kits

Denomination	Item no.
--------------	----------

#### Service kits

- ◇ Minor service kit Toftejorg SaniJet 20, all versions ..... TE20B290
- Service kit in EPDM for Toftejorg SaniJet 20 ..... TE20B297
- Service kit in FPM (Viton) for Toftejorg SaniJet 20 ..... TE20B298
- ◆ Service kit in FFKM (Perlast) for Toftejorg SaniJet 20 ..... TE20C297

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

Configuration according to delivery note/order

<sup>1)</sup> Pos. 16 is not sold as single Spare part component but only as part of a machine maintenance/repair order. For further information please contact Alfa Laval Customer Support.

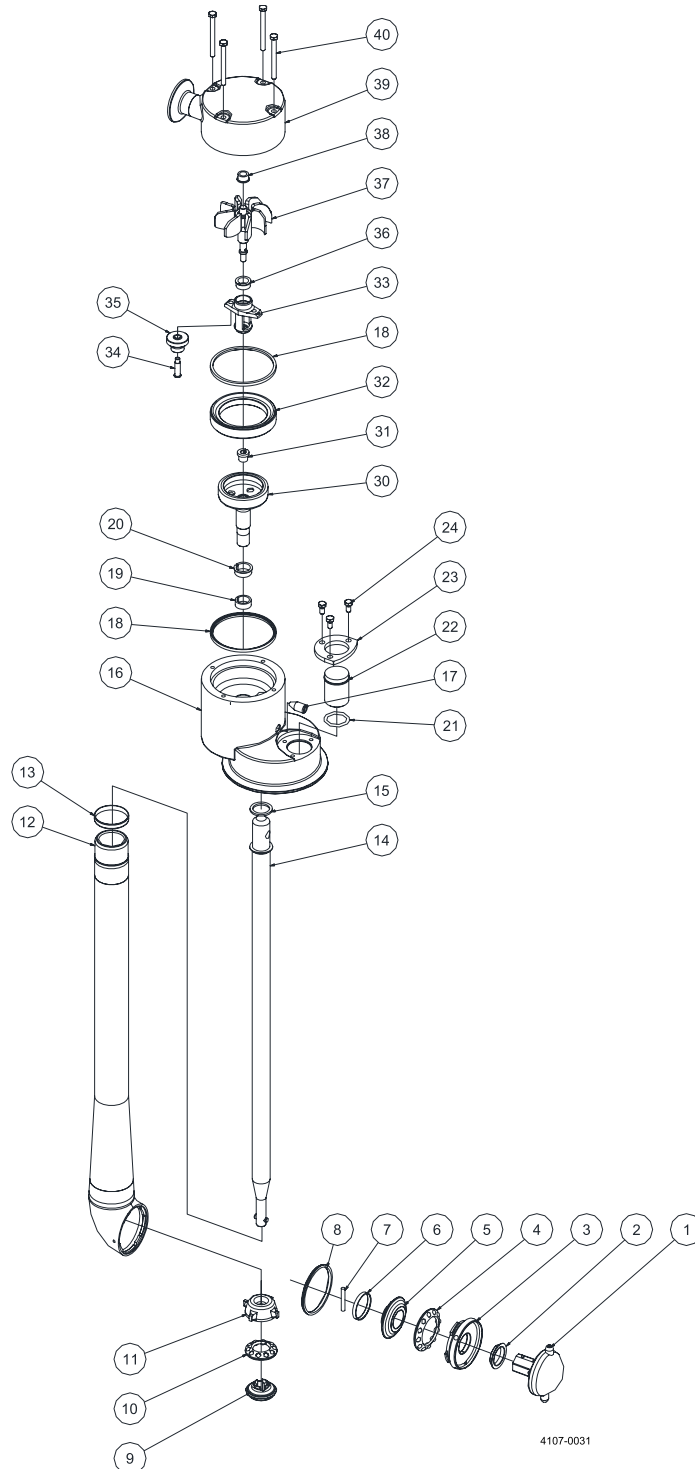
The machine can be delivered with ATEX/UKEx/IECEX certification.

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 drawings and lists, service kits and tools

Toftejorg SaniJet 20 Media Driven with improved surface finish

## 10.2 Toftejorg SaniJet 20 Media Driven with improved surface finish



Alfa Laval Toftejorg SaniJet 20, Media Driven - New Version - item numbers TE24Xxxx

## 10 Parts drawings and lists, service kits and tools

Toftejorg SaniJet 20 Media Driven with improved surface finish

### Parts list

Pos.	Qty	Denomination
1	□	Cleaner head
2	◆○●	Bearing bush
3		Retaining ring
4		Ball ring N
5		Bevel gear
6		Clip ring
7		Pin
8	□●	Seal ring H
9		Bevel gear
10		Ball ring
11		Ball race
12	□	Outer tube
13	◆○●	Bearing ring
14	□	Inner shaft
15	□●	Plain seal S
16		Base housing
17		Retaining screw
18	□●	Gasket D
19	◆○●	Bearing bush, D2
20	◆○●	Bearing bush, D1
21	□●	O-ring
22		Plug
23		Bracket
24		Screw
30		Output shaft
31	◆○◆●	Bearing bush
32		Gear ring T2
33		Planet wheel carrier
34		Shaft f. planet wheel
35		Planet wheel T2
36	◆○◆●	Bearing bush D1
37		Impeller w. shaft
38	◆○◆●	Bearing bush M
39	□	Inlet cap
40		Screw

### Service kits

Denomination	Item no.
--------------	----------

#### Service kits

- ◇ **Minor service kit Toftejorg SaniJet 20, all versions** ..... TE20B290
- **Service kit in EPDM for Toftejorg SaniJet 20** ..... TE20B297
- **Service kit in FPM (Viton) for Toftejorg SaniJet 20** ..... TE20B298
- ◆ **Service kit in FFKM (Perlast) for Toftejorg SaniJet 20** ..... TE20C297

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

Configuration according to delivery note/order

<sup>1)</sup> Pos. 16 is not sold as single Spare part component but only as part of a machine maintenance/repair order. For further information please contact Alfa Laval Customer Support.

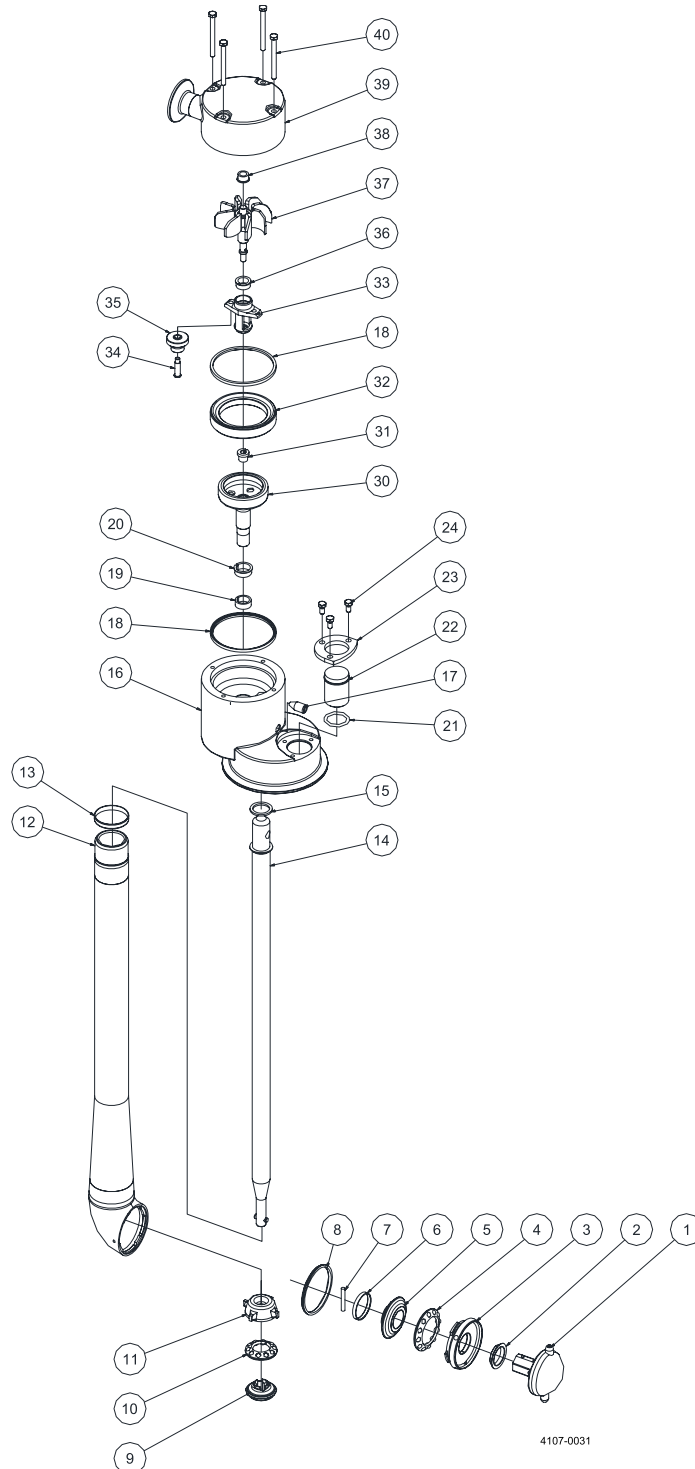
The machine can be delivered with ATEX/UKEx/IECEX certification.

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 drawings and lists, service kits and tools

Toftejorg SaniJet 20 Media Driven, Hastelloy version

## 10.3 Toftejorg SaniJet 20 Media Driven, Hastelloy version



Alfa Laval Toftejorg SaniJet 20, Media Driven - New Version - item numbers TE24Xxxx

## 10 Parts drawings and lists, service kits and tools

Toftejorg SaniJet 20 Media Driven, Hastelloy version

### Parts list

Pos.		Qty	Denomination
1	□	1	Cleaner head
2	◆	1	Bearing bush
3		1	Retaining ring
4		1	Ball ring N
5		1	Bevel gear
6		1	Clip ring
7		1	Pin
8	◆	1	Seal ring H
9		1	Bevel gear
10		1	Ball ring
11		1	Ball race
12	□	1	Outer tube, L = 350 mm
13	◆	1	Bearing ring
14	□	1	Inner shaft, L = 350 mm
15	◆	1	Plain seal
16		1	Base housing
17		1	Retaining screw
18	◆	2	Gasket
19	◆	1	Bearing bush
20	◆	1	Bearing bush
21	◆	1	O-ring
22		1	Plug
23		1	Bracket
24		3	Screw
30		1	Output shaft
31	◆◆	1	Bearing bush
32		1	Gear ring T2
33		1	Planet wheel carrier
34		1	Shaft f. planet wheel
35		1	Planet wheel T2
36	◆◆	1	Bearing bush
37	□	1	Impeller
38	◆◆	1	Bearing bush
39	□	1	Inlet cap
40		4	Screw

### Service kits

Denomination	Item no.
--------------	----------

#### Service kits

◆ Minor service kit Toftejorg SaniJet 20, all versions ..... TE20B290

◆ Service kit in FFKM (Perlast) for Toftejorg SaniJet 20 ..... TE20C297

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

Configuration according to delivery note/order

<sup>1)</sup> Pos. 16 is not sold as single Spare part component but only as part of a machine maintenance/repair order. For further information please contact Alfa Laval Customer Support.

The machine can be delivered with ATEX/UKEx/IECEX certification.

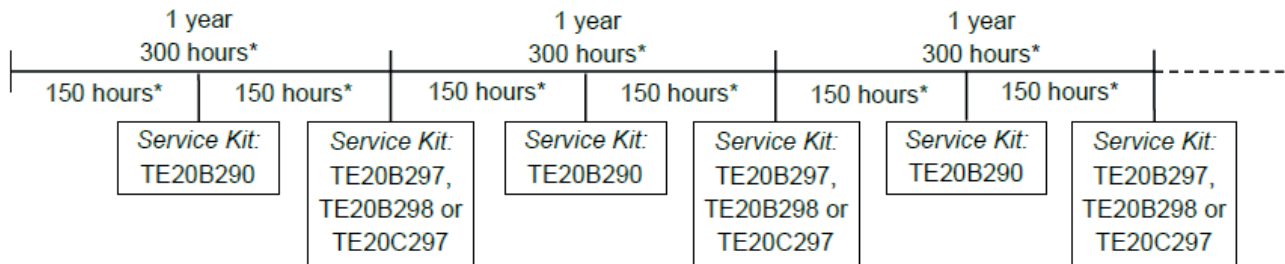
Please refer to the Spare part manual for information on item numbers and materials. The Spare part manual is available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

## 10 Parts drawings and lists, service kits and tools

### Service kits

#### 10.4 Service kits

##### Service intervals



\*See page 25 regarding recommended service intervals

##### Minor Service Kit for Alfa Laval Toftejorg SaniJet 20 media driven version

Article no. TE20B290

##### Parts list

Pos.	Qty	Denomination
31	1	Bearing bushing
36	1	Bearing bushing D1
38	1	Bearing bushing M

##### Service Kit in EPDM for Alfa Laval Toftejorg SaniJet 20 media driven version

Article no. TE20B297

##### Parts list

Pos.	Qty	Denomination
2	1	Bearing bush
8	1	Seal ring H
13	1	Bearing ring, top
15	1	Plain seal S
18	2	Gasket D
19	1	Bearing bush D2
20	1	Bearing bush D1
21	1	O-ring
31	1	Bearing bushing
36	1	Bearing bushing D1
38	1	Bearing bushing M

## 10 Parts drawings and lists, service kits and tools

### Service kits

#### Service Kit in FPM (Viton) for Alfa Laval Toftejorg SaniJet 20 media driven version

Article no. TE20B298

##### Parts list

Pos.	Qty	Denomination
2	1	Bearing bush
8	1	Seal ring H
13	1	Bearing ring, top
15	1	Plain seal S
18	2	Gasket D
19	1	Bearing bush D2
20	1	Bearing bush D1
21	1	O-ring
31	1	Bearing bushing
36	1	Bearing bushing D1
38	1	Bearing bushing M

#### Service Kit in FFKM (Perlast) for Alfa Laval Toftejorg SaniJet 20 media driven version

Article no. TE20C297

##### Parts list

Pos.	Qty	Denomination
2	1	Bearing bush
8	1	Seal ring H
13	1	Bearing ring, top
15	1	Plain seal S
18	2	Gasket D
19	1	Bearing bush D2
20	1	Bearing bush D1
21	1	O-ring
31	1	Bearing bushing
36	1	Bearing bushing D1
38	1	Bearing bushing M

Available add-on's regarding material certificates, Declaration of Compliance and Q-doc documents, see page 39 for more information.

## 10.5 Tools

##### Parts list

Pos.	Qty	Denomination
		Socket Wrench w. pin
		Hook spanner

## 11 General information

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*Service kits*

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### 11.1 Service and 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 (page 40) as well as on all instruction drawings, the individual parts have a position number, which is the same on all drawings. From the position numbers, the part is easily identified in the parts lists, page 40 ff.

Individual parts should always be ordered from the parts lists, page 40 ff. 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 on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

Please also quote the type of machine and serial No. This will help us to help you. The type and serial numbers are laser engraved on the Base house of the tank cleaning machine.

**Note:** In cases where spare parts are ordered for machines originally delivered with Q-doc (Equipment Documentation), please state this information on your ordering form together with the machine type and serial number. This is to ensure full traceability henceforward.

**Note:** In connection with ordering of spare parts for machines originally delivered with Q-doc + FAT-SAT (Qualification Documentation) please note that all service and repair should be performed by Alfa Laval Kolding A/S, Denmark, see page 24 "6.4 Service and repair of machines ordered with Q-doc and with Q-doc + FAT-SAT".

### 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, www.alfalaval.dk - 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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