Instruction Manual

Alfa Laval Toftejorg™ SaniMidget SB, SaniMagnum SB & SaniMega SB

Covering: Standard machines
3-A standard version (clip-on & weld-on). UltraPure standard version (clip-on & weld-on)
Machines delivered with ATEX/IECEx Certification in accordance with Directive 2014/34/EU
Q-doc - Equipment Doc (3.1 Inspection Certificate - EN 10204)
Q-doc - Qualification Doc (Qualification Documentation, FAT/SAT)
First published: 2009-09

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Original manual

Table of contents

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

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 Spray Head
Designation

SaniMidget SB, SaniMidget SB UP, SaniMagnum SB, SaniMega SB
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. Baseefa10ATEX0187X and IECEx BAS 19.0107X

Marking: II 1G Ex h IIB 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	Lars Kruse Andersen
Title	Name
Kolding, Denmark	2022–11–14
Place	Date (YYYY-MM-DD)
	Signature

This Declaration of Conformity replaces Declaration of Conformity dated 2019-09-01

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 Spray Head
Designation

SaniMidget SB, SaniMidget SB UP, SaniMagnum SB, SaniMega SB
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

EC Type Examination Certificate no. Baseefa10ATEX0187X and IECEx BAS 19.0107X

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Signed on behalf of: Alfa Laval Kolding A/S

Global Product Quality Manager		Lars Kruse Andersen
Title		Name
Kolding, Denmark	2022–11–14	
Place	Date (YYYY-MM-DD)	Signature

DoC Revison_01_112022

2 Safety

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!

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 cover.

NOTE
Indicates important information to simplify or clarify procedures.

2.2 Warning signs

General warning:

ATEX/IECEx warning:

3.1 Introduction

This manual has been prepared as a guide for installing, operating and maintaining your Alfa Laval Toftejorg Rotary Spray Head 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 marking is placed on the body of the tank cleaning machine.

This manual covers the Alfa Laval Alfa Laval Toftejorg SaniMxxxx SB (Slide Bearing) series that consists of four main product series; the Alfa Laval Toftejorg SaniMidget SB, the Alfa Laval Toftejorg SaniMidget SB UltraPure, the Alfa Laval Toftejorg SaniMagnum SB and the Alfa Laval Toftejorg SaniMega SB. All versions are similar in design. Differences are in material selection for the rotor and dimensions.

The Alfa Laval Toftejorg SaniMidget SB UltraPure is equipped with a rotor made from USP Class VI certified material and the Alfa Laval Toftejorg SaniMxxxx SB is equipped with a rotor made from material that meets the 3-A Sanitary Standard 20-25. The USP Class VI polymer used has not been part of the 3-A Third Party Verification (TPV). Consequently the Alfa Laval Toftejorg SaniMidget SB UltraPure has not been verified to meet 3-A Sanitary Standards.

Important information:

Before installing the machine and setting it into operation, carefully read the General safety and installation instructions (page 15) and the specific conditions for safe use in accordance with ATEX/IECEx 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 Introduction

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 is intended for use in closed tank, vessel or container. If used in open environment see 4.3 General safety and installation instructions (page 15).

Steam cleaning

If stream cleaning is done through the machine, the steam pressure must not cause the machine to rotate.
See paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification (page 17).

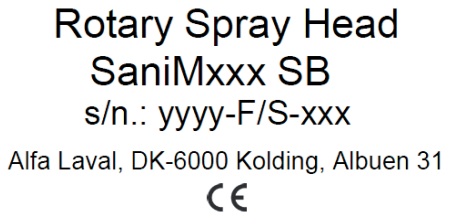
See General Installation Instructions on page 15 of this manual for information on recommended installation position.

3.3 Patents and trademarks

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

3.4 Marking

Alfa Laval tank cleaning machines are all marked to allow recognition of machine type, machine name, Serial number and manufacturing address. The marking is placed on the body of the tank cleaning machine.



Serial number explanation
Machines supplied with or without standard documentation:
yyyy-xxxxx: serial number
yyyy: year
xxxxx: 5 digit sequential number

3.5 ATEX/IECEx marking

The Alfa Laval Toftejorg SaniMidget SB, SaniMagnum SB and SaniMega SB are certified as category I components. The ATEX certification is carried out by the Notified Body SGS Fimko Oy, who has issued the certificate no. Baseefa10ATEX0187X.

The IECEx certification is carried out by the Certification Body SGS Baseefa Ltd., who has issued the certificate no. IECEx BAS 19.0107X.

Note
Explosion protection type is constructional safety “c”.

The marking on the ATEX/IECEx certified Alfa Laval Toftejorg SaniMidget SB, SaniMagnum SB and SaniMega SB is as follows (for information on marking position see section 3.1 Introduction):

Rotary Spray Head
“SaniMxxx SB”
s/n.: yyyy-xxxxx

Alfa Laval, DK-6000 Kolding, Albuen 31
II 1G Ex h IIB 85°C…175°C Ga
II 1D Ex h IIIC T85°C…T140°C Da
0598 Baseefa 10ATEX0187X
IECEx BAS 19.0107X

”SaniMxxx SB” = SaniMidget SB, SaniMidget SB UltraPure, SaniMagnum SB or SaniMega SB

Serial number explanation
Machines supplied with or without standard documentation:
yyyy-xxxxx: serial number
yyyy: year
xxxxx: 5 digit sequential number

Marking for machines supplied with Q-Doc + FAT-SAT documentation

NOTE
Only available for Alfa Laval Toftejorg SaniMidget SB UltraPure.

Rotary Spray Head
SaniMidget SB/UltraPure
s/n.: yyyy-F/S-xxx

Alfa Laval, DK-6000 Kolding, Albuen 31
II 1G Ex h IIB 85°C…175°C Ga
II 1D Ex h IIIC T85°C…T140°C Da
0598 Baseefa 10ATEX0187X
IECEx BAS 19.0107X

Serial number explanation
Machines supplied with Q-Doc + FAT-SAT documentation
yyyy-F/S-xxx: serial number
yyyy: year
xxx: 3 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 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)	≤ +68°C	≤ +68°C
100°C (T5)	≤ +80°C	≤ +80°C
135°C (T4)	≤ +108°C	≤ +108°C
175°C	≤ +140°C	≤ +140°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	≤ +85°C	≤ +85°C
T100°C	≤ +100°C	≤ +100°C
T135°C	≤ +135°C	≤ +135°C
T140°C	≤ +140°C	≤ +140°C

Example of gas class determination

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

ATEX/IECEx marking on the equipment:

II 1G Ex h IIB 85°C…175°C Ga
II 1D Ex h IIIC T85°C…T140°C Da
CE 0598 Baseefa 10ATEX0187X
IECEx BAS 19.0107X

3.7 Quality system, 3-A Sanitary Standards and European Hygienic Design Group (EHEDG)

The Alfa Laval Toftejorg SaniMxxxx SB and Alfa Laval Toftejorg SaniMidget SB UltraPure are designed according to 3-A Sanitary Standards as well as the guidelines of the European Hygienic Design Group (EHEDG) and thus comply with requirements to design, materials, finish and documentation.

Third Party Verification (TPV) shows that the Alfa Laval Toftejorg SaniMxxxx SB meets the requirements of the 3-A Sanitary Standard 78-##. All machines are produced according to Alfa Laval Kolding's ISO 9001 international Standard certified quality system.

Copy of certificates can be downloaded from:
3-A: http://www.3-a.org/3-A-Symbol/Search-Database-of-Current-Certificates

4.1 General description

The Alfa Laval Toftejorg SaniMxxxx SB series are tank cleaning machines intended for industrial use in closed tanks, vessels and containers under typical CIP procedures. They have a broad range of application areas within pharmaceutical, food, dairy and chemical industries.

The Alfa Laval Toftejorg SaniMxxxx SB is a sanitary cleaning device of the rotating fan spray type for permanent installation that provides either a 270° upward cleaning pattern or a 360° cleaning pattern. The machine is designed to be completely self-cleaning as proven by the EHEDG test method. If Installed according to the description on page 15, the Alfa Laval Toftejorg SaniMxxxx SB is completely self-draining in the shown position and completely inspectable. All product contact surfaces are AISI 316L stainless steel or polymer material that conforms to FDA21CFR§177 and EU 10/2011. For the Alfa Laval Toftejorg SaniMxxxx SB plastic material that meets the requirements of 3-A Sanitary Standard 20-## is used. For the Alfa Laval Toftejorg SaniMidget SB/UltraPure a USP Class VI plastic material is used.

The unique design is totally free of weldings, threads, screws and press-fits to facilitate self-cleanability. The cleaning device is lubricated by the cleaning media. No oil, grease or other lubricants are used.

The Alfa Laval Toftejorg SaniMxxxx SB is designed for use in pharmaceutical, biotechnological, food and dairy processing applications. It may be used in reactors, mixing/processing tanks, spray dryers and other process equipment with a volume from 7.5-220 m^3 (2-60,000 US gallons)*. For larger volumes, multiple Alfa Laval Toftejorg SaniMxxxx SB's may be applied.

** to comply with EU 10/2011 the minimum batch size should be considered. Declaration of EU 10/2011 conformance can be supplied on request.*

Application assistance and recommendations for optimal position is available.

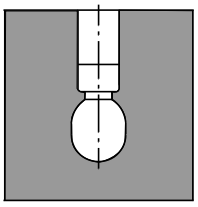
For use in explosive hazard zones the ATEX/IECEx version can be used, provided it is installed according to safety instructions in local regulations.

4.2 Functioning

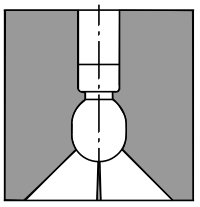
The flow of cleaning media comes through the down-pipe, flushes the connector and exists through the bearing surfaces, slots and leakage passages. This causes the head of the Alfa Laval Toftejorg SaniMxxxx SB to rotate, with fans of water laid out in a swirling pattern on the entire perimeter exposed to the spray pattern. This generates a vibrating impact in the impact pattern and a dynamic cascading flow that covers all internal surfaces of the tank, vessel or reactor.

The Alfa Laval Toftejorg SaniMxxxx SB is (as the rest of the UltraPure and Sani portfolio) designed according to GMP – compliant materials, self-cleaning and drainable. The self-cleaning feature of the device is due to the unique design that includes cleaning of the downpipe. The device is designed with no hindrance to gravity draining. The patented easy assembly and disassembly of the device allows for only one clip to be used and without any press fits. Upon removing the clip this ensures that no parts can fall into the tank (the Alfa Laval Toftejorg SaniMxxxx SB must be held in one hand and the clip in the other hand).

Spray pattern



360°



270° up

4.3 General safety and installation instructions

It is recommended to install a filter with mesh size 250 µm (0.01”) in the supply line to avoid particles, scale etc. from clogging the inside of the cleaner. However, particles up to 0.8 mm can pass the cleaning slots in the rotor.

Before installation, all supply lines and valves must be thoroughly flushed to remove remains from welding, grinding dust, scale and other foreign matter. During handling and installation handle the machine with care in order not to damage the fine surface of the machine.

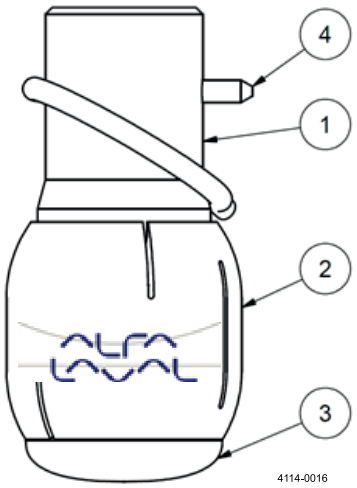
Randomly selected Alfa Laval Toftejorg SaniMxxxx SB machines are tested at the factory before shipping, in accordance with “Test Requirements for SaniMxxxx SB”.

Warning:

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

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.

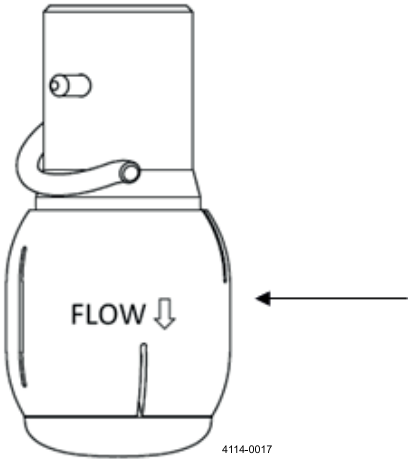


1	Connector
2	Rotor
3	Stator
4	Clip

Note: Only valid for Alfa Laval Toftejorg SaniMidget SB:

Please note that when doing installation or re-assembly, the rotor must be placed correctly according to below drawing in order to ensure normal operation.

The arrow on the rotor shows the flow direction.



Correct orientation of rotor

Note: Flow direction

Important information:

Recommended installation position:
The Rotary Spray Head tank cleaning machine should be installed in vertical position (upright or upside down). If the machine is installed in any angle to vertical, the life time may vary. If installing at an angle to vertical, ensure that the clip cannot fall out by gravity. To maintain drainability, the device should not be tilted more than 25° to vertical.

For information on use in potential explosive atmospheres see paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification page 17.

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 my 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 operating conditions which are the temperature of the 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 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 15).

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 temperatur e
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 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 × ϵr pS/m and 10 000 pS/m
Low conductivity	< 25 × ϵr 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.

4.4 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:

Fluid pressure
SaniMidget SB and SaniMagnum SB
The maximum permitted cleaning fluid pressure is 3 bar.
SaniMega SB and SaniMega SB HF
The maximum permitted cleaning fluid pressure is 4 bar.

In addition to the above mentioned precautions relating to the ATEX/IECEx guidelines Directive 2014/34/EU, the Safety Precautions on page 17 must be observed.

4.5 Installation

The Alfa Laval Toftejorg SaniMxxxx SB clip-on versions are installed on:

1” BPE US down pipe (16B102-xx or 16B132-xx)
1½” BPE US down pipe (16B152-xx or 16B182-xx or 17Bxxx-xx)
2” BPE US down pipe (18Bxxx-xx)

The Alfa Laval Toftejorg SaniMxxxx SB weld-on versions are installed on:

1” BPE US down pipe (16B203-xx or 16B233-xx)
1”ISO down pipe (16B202-xx or 16B232-xx)
DIN Range 1 Ø28 down pipe (16B102-xx or 16B132-xx)
1½” BPE US down pipe (17B203-x0 or 17B233-x0)
2” BPE US down pipe (18B203-x0, or 18B233-x0, or 18B263-x0, or 18B293-x0)

Correct down-pipe dimensions are important to ensure volumetric flow rates as provided in this manual. Clip-on hole centre for 1” must be less than 15 mm (0.59”) from the bottom end (recommended 13-15 mm – 0.51”-0.59”) of the down-pipe and for the 1½” and 2” less than 34 mm (1.33”) from the bottom end (recommended 30-34 mm – 1.18”-1.33”). For weld-on versions **no** clip hole is needed – the connector (containing the clip hole) is welded on the end of the down pipe.

Important information:

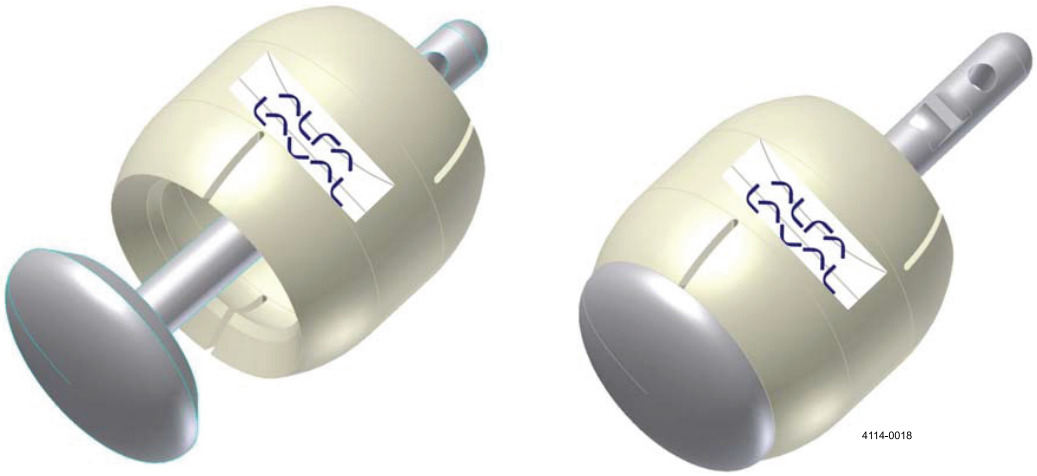
Alfa Laval Toftejorg SaniMxxxx SB weld-on versions:
To continue to meet the requirements of the 3-A Sanitary Standard 78-##, the weld-on version shall be welded onto the end of a **straight down pipe**. This straight down pipe shall be connected to the supply system in a dismountable manner. This shall allow for easy disassembly and reassembly (e.g. a sanitary clamp coupling) to allow visual inspection (through the down pipe) of the inside of the down pipe and the inside of the connector. Welding must be performed in accordance with 3-A accepted Standard 605-##..

4.6 Assembly

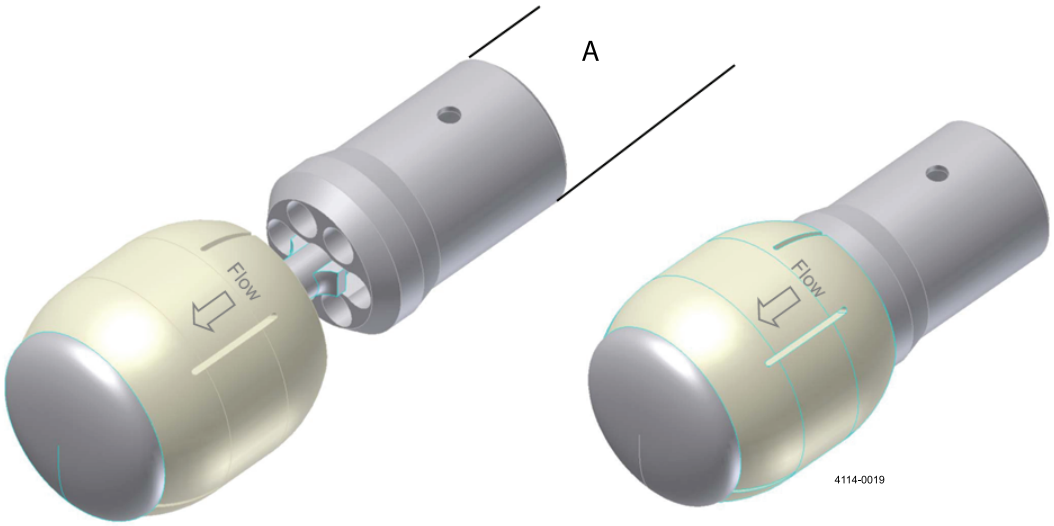
The Alfa Laval Toftejorg SaniMxxxx SB itself is assembled as follows (for the weld-on version, weld the connector onto the down pipe as explained above):

1. Insert the cylindrical end of the stator (3) through the Rotor (2). If the logo is upside down then the rotor is wrongly orientated (see below for correct orientation of logo).

Note: The arrow on the rotor shows the flow direction

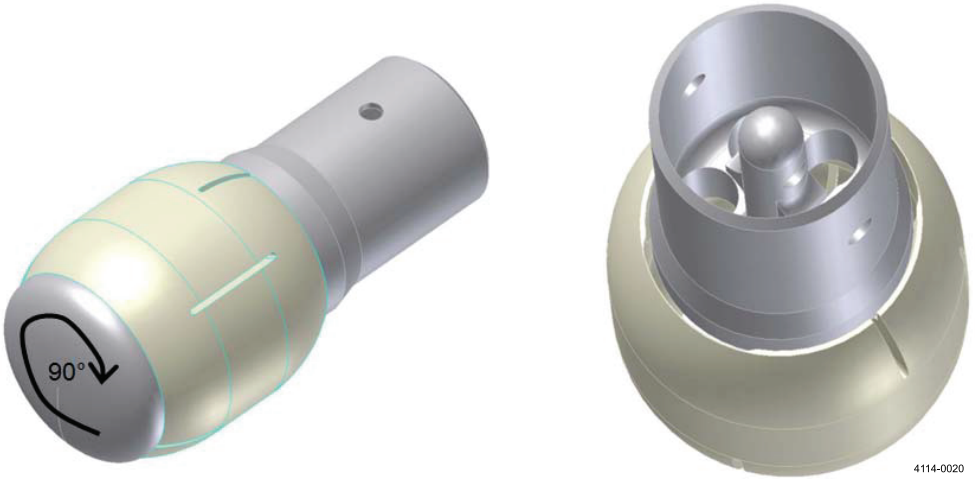


2. The cylindrical end of the stator (3) is then inserted into the centre hole of the Connector (1). The stator can be inserted to its full extent in one position only. When the stator is fully inserted into the connector, the rotor (2) will be fixed between the bearing surface of the stator and connector

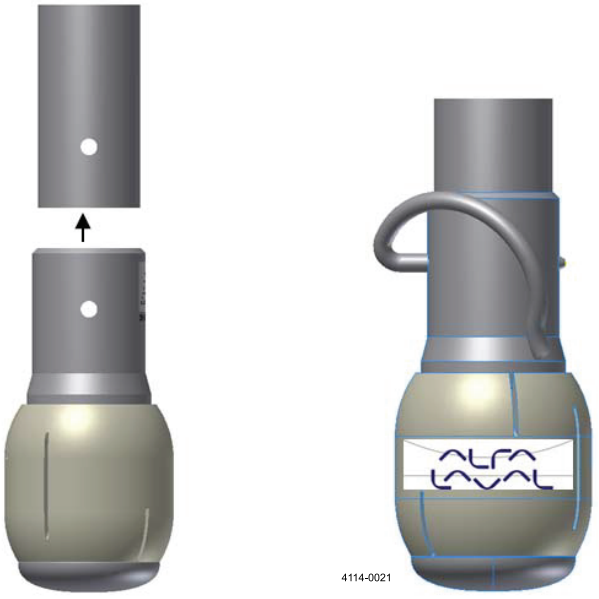


A: Down pipe if weld-on version

3. Having inserted the stator (3) into the connector (1) turn the stator 90° to align the hole in the cylindrical end of the stator with the holes in the connector.

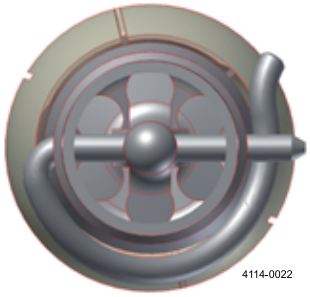


4. **Weld-on version**: Insert the clip (4) through the hole in one side of the connector (1), through the hole in the stator (3) and through the hole on the other side of the connector.
Clip-on version: Holding the machine in one hand (hand below the stator) slide the Alfa Laval Toftejorg SaniMxxx SB onto the downpipe. Align the clip holes in the connector (1) with the clip holes in the down pipe, while mounting the clip through the hole in the connector, the down pipe, the stator (3), the other side of the down pipe and finally out through the other side of the connector.



Hold hand here

5. Twist the clip (4) around the connector (1) to secure it around the connector.



6. Check that the rotor (2) can be rotated freely by turning it with your fingers.

5 Operation

5.1 Normal operation

Cleaning Media

Use only media compatible with Stainless Steel AISI 316L and PEEK. Normal detergents, moderate solutions of acids and alkalics are acceptable. Aggressive chemicals, excessive concentrations of chemicals at elevated temperatures, as well as certain solvents hydrochlorides should be avoided. If in doubt, contact your local Alfa Laval sales office.
Note: PEEK is not resistant to concentrated sulphuric acid.

Pressure

Please make sure that the connections are correctly mounted before opening of the washing valve. Apply pressure gradually in order to avoid hydraulic shocks, which might stress mechanical parts in the Alfa Laval Toftejorg SaniMxxxx SB cleaner. Max. pressure difference is 4.0 bar. Ideally, use a frequency controlled pump with gradually increase of pumping speed.

Draining using compressed air

If the machine is drained using compressed air, then the compressed air pressure must not cause the machine to rotate. Draining should always be done inside the tank.
See paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification (page 17).

Steam cleaning

If stream cleaning is done through the machine, the steam pressure must not cause the machine to rotate.
See paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification (page 17).

Temperature

The machine is designed to operate with cleaning media at temperatures up to 95°C (203°F). However, it withstands temperatures up to 140°C (284°F) inside the tank.

See paragraph 4.4 Specific conditions for safe use in accordance with ATEX/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 Alfa Laval Toftejorg SaniMxxxx SB is intended for use inside a tank only, and must not be operated in open air or when the 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.

6 Maintenance

In order to keep the tank cleaning machine servicing as an efficient tool in the tank cleaning operations, it is essential to maintain its high performance by following a simple preventive maintenance programme, which will help keep the tank cleaning machine in good condition

Good maintenance is careful and regular attention!

6.1 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.

6.2 Service and repair of machines ordered with Alfa Laval Q-doc

In order to ensure full traceability and to obtain full test documentation (FAT: Factory Acceptance Test), it is necessary to order a new Rotary Spray Head machine with Alfa Laval Q-doc. The new Rotary Spray Head machine will be manufactured and tested (FAT) and shipped to the customer with new Alfa Laval Q-doc for further qualification (SAT: Site Acceptance Test) and validation (PV: Process Validation).

6.3 Recommended service intervals

The design of the Alfa Laval Toftejorg SaniMxxxx SB asks for little maintenance, as there are no rotating parts in direct contact with stationary parts. It is recommended that inspection is performed after each 500 running hours.

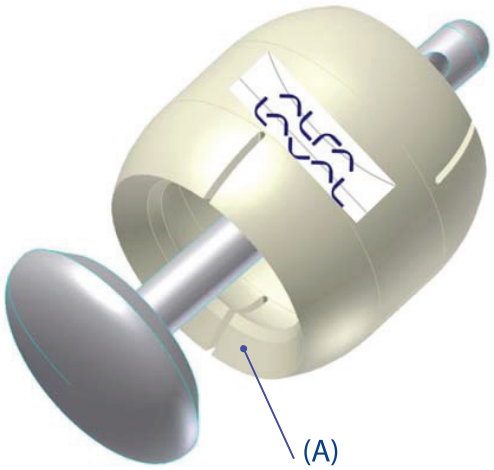
For continuous surveillance of the Alfa Laval Toftejorg SaniMxxxx SB, monitor and log the volumetric flow rate. If the volumetric flow rate increases or decreases by more than 15% over time this could be a sign of wear or blockage of the flow path in certain parts of the machine and the machine should be inspected.

A service consists of:

0. At a pressure of 0.3 bar open a hatch in the tank to verify rotation and liquid fans are emerging from all slots. **ATTENTION: Use only pure water at normal temperatur e for safety reasons.**

If needed proceed to 1).

1. Un-install the machine (as described on the following pages).
2. Visual inspection for foreign objects. Remove any objects and clean before rotation verification.
3. Visual inspect the bearing surfaces, the holes for the clip-on connection and the width of the slots in the rotor.
4. Look for wear of the bearings (A). Recommendation: Replace rotor if heavy wear on the bearing surfaces is observed.
5. Look for wear of the slots in the spray head. Recommendation: Replace rotor if slot width (slot at equator on rotor) exceeds SaniMidget SB: 1.2 mm, SaniMagnum SB: 3.2 mm, SaniMega SB 4.2 mm and SaniMega SB high flow version 5.2 mm, as throw length decreases and flow rate increases.
6. In case of machine wear, the parts worn down are to be replaced.
7. Reinstall machine.
8. Fill in the Service Log.



Lists of parts included in the machines are provided on page 40.

6.4 Dissassembly

Disassemble machine as described on the following pages.

1. Hold one hand under the stator (3) of the Alfa Laval Toftejorg SaniMxxxx SB.

Hold hand here

2. With the other hand unlock the clip (4) and withdraw it from the holes to loosen the Alfa Laval Toftejorg SaniMxxxx SB from the down-pipe (for weld-on version: from the connector).
3. Still holding the hand under the stator (3), lower the Alfa Laval Toftejorg SaniMxxxx SB free from the down pipe and remove it from the tank together with the clip (4).
4. When out of the tank, turn the Stator (3) 90° to allow it to be withdrawn from the connector (1).

This completes the disassembly and the four parts (stator, rotor, connector and clip) of the Alfa Laval Toftejorg SaniMxxxx SB can be inspected. For the weld-on versions, the connector (3) is still on the down pipe and shall be inspected on the inside by looking down through the straight down-pipe.

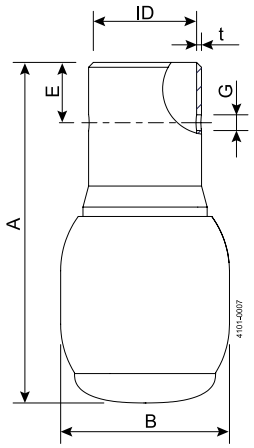
6.5 Reassembly

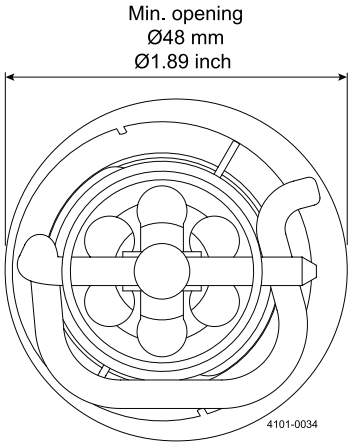
Reassembly is carried out according to the installation instruction given on page 15.

7.1 Alfa Laval Toftejorg SaniMidget SB and SaniMidget SB UltraPure

Surface finish	:	Ra < 0.8 µm (32 µin)
Weight of machine	:	SaniMidget SB 1": 0.20 kg (0.44 lbs) SaniMidget SB 1½": 0.44 kg (0.97 lbs)
Working pressure	:	1 – 3 bar (14.5 – 44 psi)
Recommended pressure	:	2 bar (29 psi)
Max. working temperature	:	95°C (203°F)
Max. sterilisation temperature	:	121°C (250°F)
Max. ambient temperature	:	140°C (284°F)
Wetting radius	:	3 m (9.8 ft)
Impact cleaning radius	:	1.4 m (4.6 ft)
Materials	: :	AISI 316L, PEEK 450G (for 3-A version) PEEK w. USP Class VI cert (for UltraPure version)
Lubricant	:	Self-lubricating with the cleaning fluid
Steam or gas (air)	:	Not supported (contact AL for recommendations)
Connections	:	Clip-on 1" BPE US, Clip-on 1½" BPE US Clip-on 1½" ISO 2037, Weld-on 1" BPE US Weld-on 1" ISO 2037, Weld-on DN25 DIN Range 1

Dimensions





Dimensions (mm)

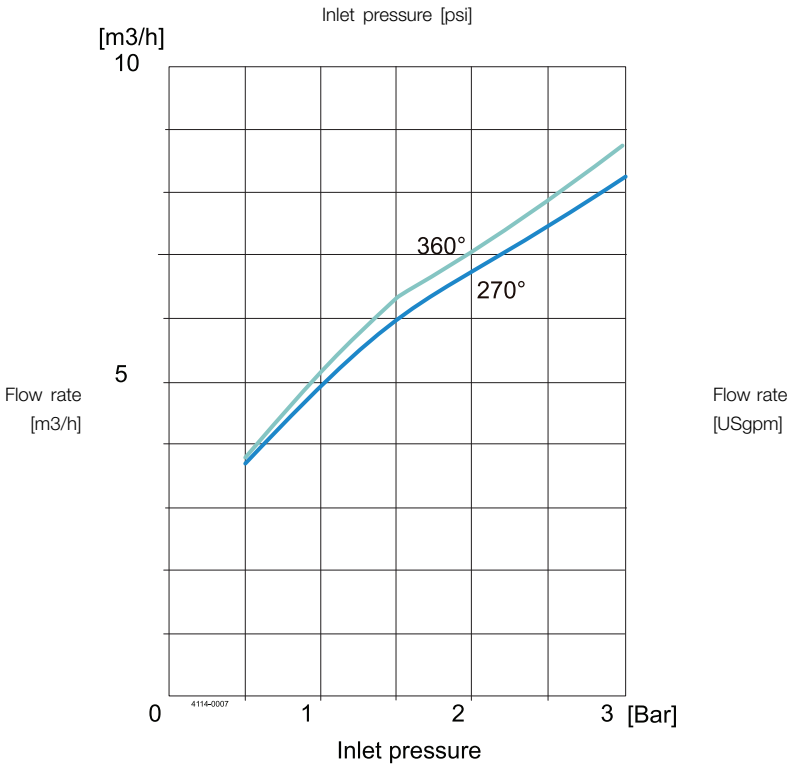
	Clip-on 1" BPE US		Clip-on 1½" BPE US		Weld-on 1" ISO 2037		Weld-on 1" BPE US		Weld-on DIN Range 1 (Ø28)	
	mm	inch	mm	Inch	mm	inch	mm	inch	mm	inch
ID	25.7	1.012	38.4	1.512						
OD					25.0	0.984	25.4	1.000	28.1	1.106
t	1.2	0.047	1.2	0.047	1.2	0.047	1.65	0.065	1.2	0.047
B	42.0	1.653	54.7	2.154	42.0	1.653	42.0	1.653	42.0	1.653
A	84.8	3.338	118.3	4.659	104.8	4.126	104.8	4.126	84.8	3.338
Ø-clip	4.0	0.157	4.0	0.157	4.0	0.157	4.0	0.157	4.0	0.157
G	4.1	0.161	4.1	0.161	4.1	0.161	4.1	0.161	4.1	0.161
E	15.0	0.590	25.4	1.000						

Important information:

The SaniMidget SB Weld-on versions only continue to meet the requirements of the 3-A Sanitary Standard 78-##, if the installation makes visual inspection of all liquid contacts surfaces possible. See Installation instructions on page 15.

Performance Data for Alfa Laval Toftejorg SaniMidget SB

Flow rate



A = 360° - B = 270°

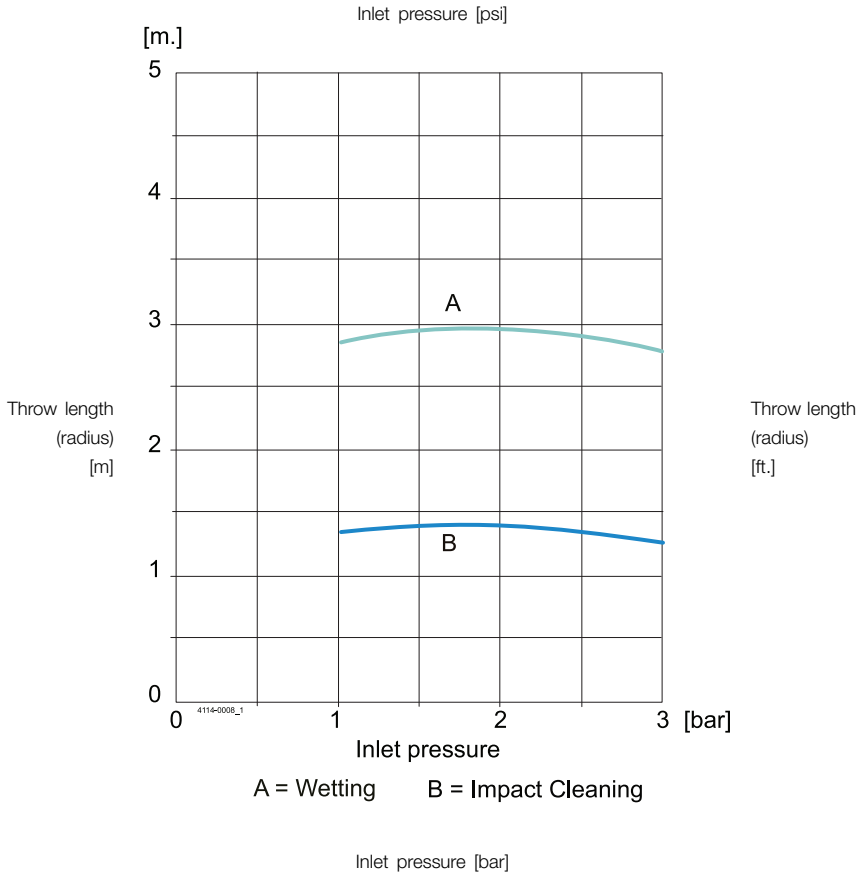
For Clip-on models, the flow rate is increased by approx. 1.5 m^3/h.

Note: The curves show the average value of flow rate and throw length. The Flow rate can vary up to +/- 10%.

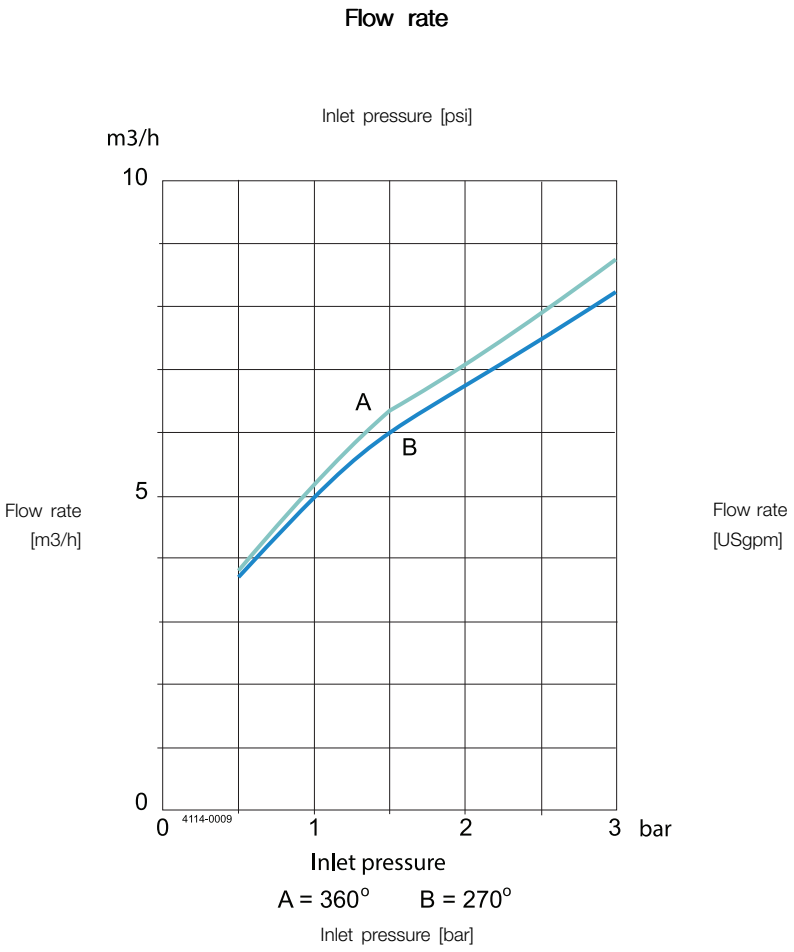
Note: The inlet pressure has been taken immediately before the inlet to the machine. In order to achieve the performance indicated on the curves, the pressure drop in the supply lines between pump and machine must be taken in consideration and the water temperature during testing was approx. 20°C.

Performance Data for Alfa Laval Toftejorg SaniMidget SB

Cleaning radius/Thr ow length



Performance Data for Alfa Laval Toftejorg SaniMidget SB UltraPure



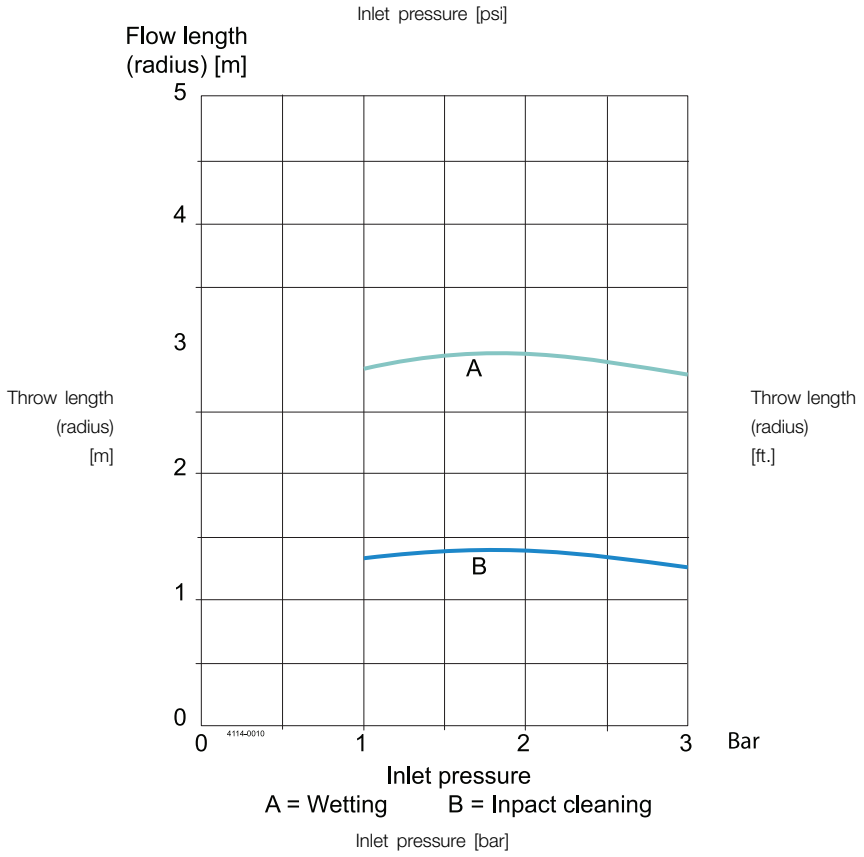
For Clip-on models, the flow rate is increased by approx. 1.5 m^3/h.

Note: The curves show the average value of flow rate and throw length. The Flow rate can vary up to +/- 10%.

Note: The inlet pressure has been taken immediately before the inlet to the machine. In order to achieve the performance indicated on the curves, the pressure drop in the supply lines between pump and machine must be taken in consideration and the water temperature during testing was approx. 20°C.

Performance Data for Alfa Laval Toftejorg SaniMidget SB UltraPure

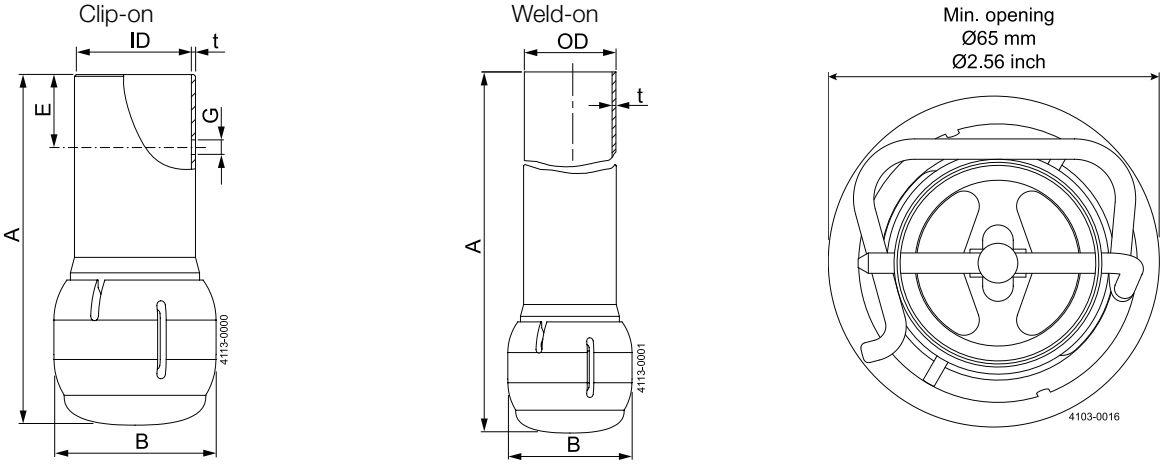
Cleaning radius/Throw length



7.2 Alfa Laval Toftejorg SaniMagnum SB

Surface finish	:	Ra < 0.8 µm (32 µin)
Weight of machine	:	0.40 kg (0.88 lbs)
Working pressure	:	1 – 3 bar (14.5 – 44 psi)
Recommended pressure	:	2 bar (29 psi)
Max. working temperature	:	95°C (203°F)
Max. sterilisation temperature	:	121°C (250°F)
Max. ambient temperature	:	140°C (284°F)
Wetting radius	:	4.5 m (14.7 ft)
Impact cleaning radius	:	2.4 m (7.5 ft)
Materials	:	AISI 316L, PEEK 450G (for 3-A version)
Lubricant	:	Self-lubricating with the cleaning fluid
Steam or gas (air)	:	Not supported (contact AL for recommendations)
Connections	:	Clip-on 1½" BPE US Weld-on 1½" BPE US

Dimensions



Dimensions (mm)

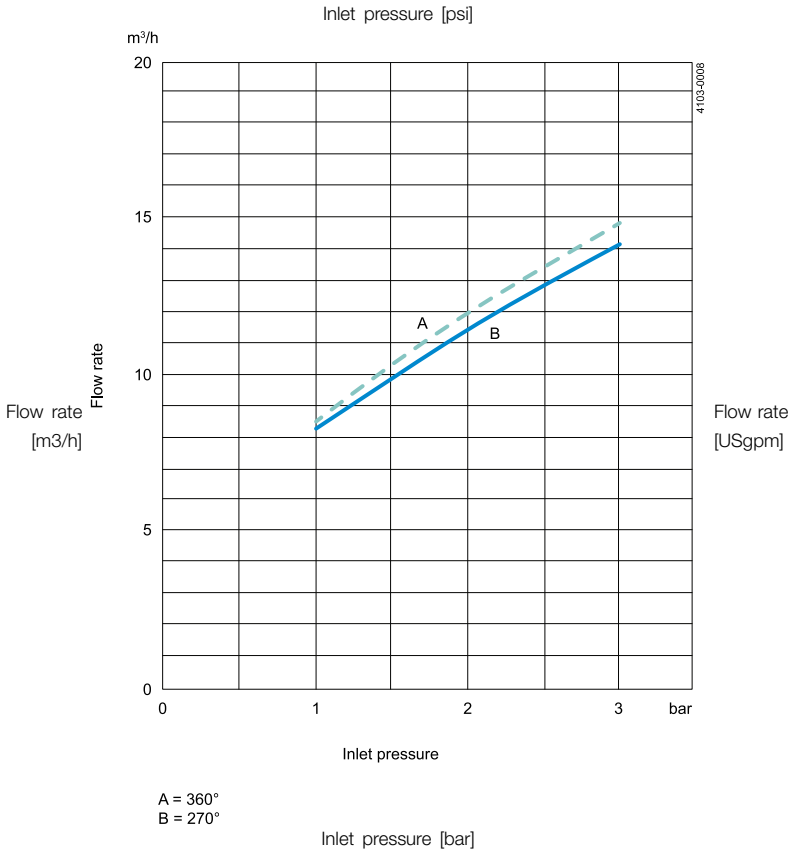
Type	A	B	E	G	ID	OD	t	Clip
Clip-on	118.3	54.7	25.4	ø4.1	ø 38.4			ø4.0
Weld-on**	138.9	54.7				ø38.1	1.2	

Important information:

The SaniMagnum SB Weld-on versions only continue to meet the requirements of the 3-A Sanitary Standard 78-##, if the installation makes visual inspection of all liquid contacts surfaces possible. See Installation instructions on page 15.

Performance Data for Alfa Laval Toftejorg SaniMagnum SB

Flow rate



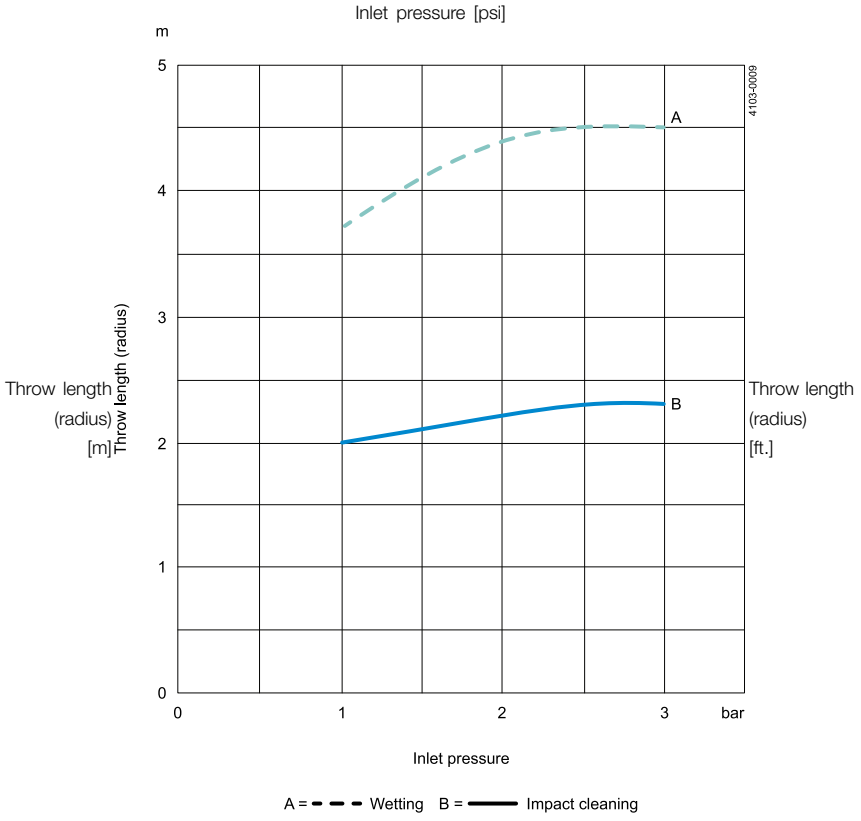
For Clip-on models, the flow rate is increased by approx. 1.5 m^3/h.

Note: The curves show the average value of flow rate and throw length. The Flow rate can vary up to +/- 10%.

Note: The inlet pressure has been taken immediately before the inlet to the machine. In order to achieve the performance indicated on the curves, the pressure drop in the supply lines between pump and machine must be taken in consideration and the water temperature during testing was approx. 20°C.

Performance Data for Alfa Laval Toftejorg SaniMagnum SB

Cleaning radius/Thr ow length

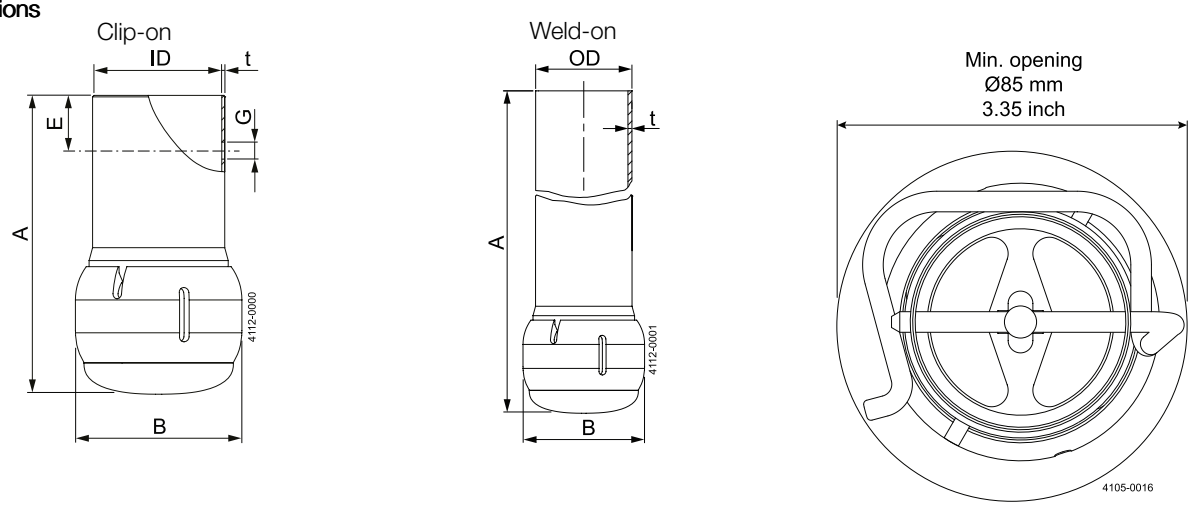


Inlet pressure [bar]

7.3 Alfa Laval Toftejorg SaniMega SB and SaniMega SB HF

Surface finish	:	Ra < 0.8 µm (32 µin)
Weight of machine	:	0.61 kg (1.34 lbs)
Working pressure	:	1 – 4 bar (14.5 – 58 psi)
Recommended pressure	:	3 bar (44 psi)
Max. working temperature	:	95°C (203°F)
Max. sterilisation temperature	:	121°C (250°F)
Max. ambient temperature	:	140°C (284°F)
Wetting radius	:	5.7 m (18.7 ft)
Impact cleaning radius	:	2.7 m (8.85 ft)
Materials	:	AISI 316L, PEEK 450G (for 3-A version)
Lubricant	:	Self-lubricating with the cleaning fluid
Steam or gas (air)	:	Not supported (contact AL for recommendations)
Connections	:	Clip-on 2" BPE US Weld-on 2" BPE US

Dimensions



Dimensions (mm)

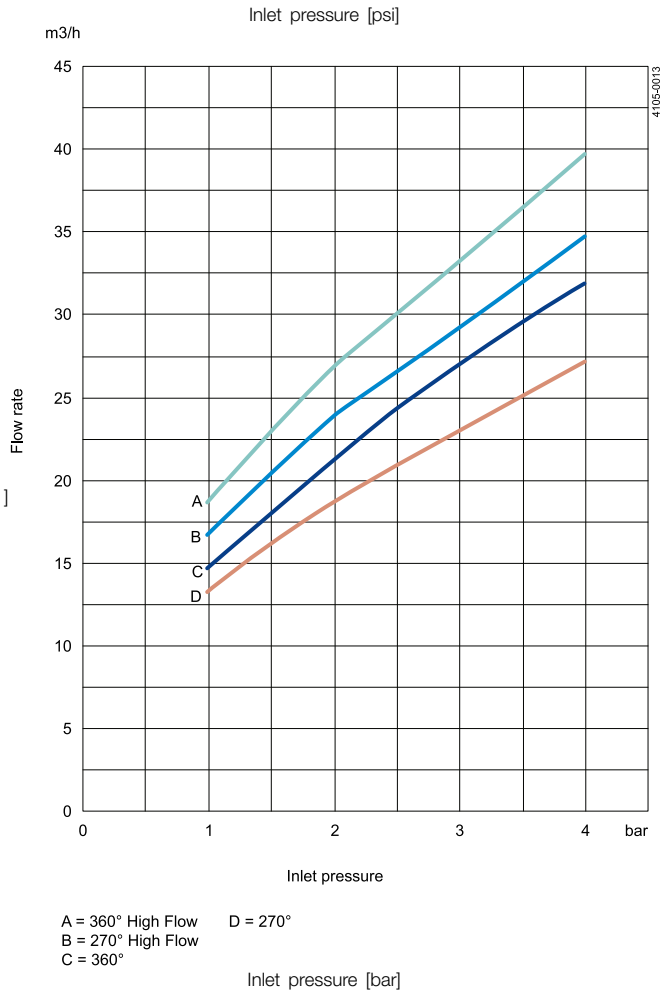
Type	A	B	G	E	ID	OD	t	Clip
Clip-on 2" BPE US	121	ø67.4	ø5.1	25.4	ø51.1			ø5.0
Weld-on** 2" BPE US	141.6	ø67.4				ø50.8	1.2	

Important information:

The SaniMega SB Weld-on versions only continue to meet the requirements of the 3-A Sanitary Standard 78-##, if the installation makes visual inspection of all liquid contacts surfaces possible. See Installation instructions on page 15.

Performance Data for Alfa Laval Toftejorg SaniMega SB and SaniMega SB HF

Flow rate



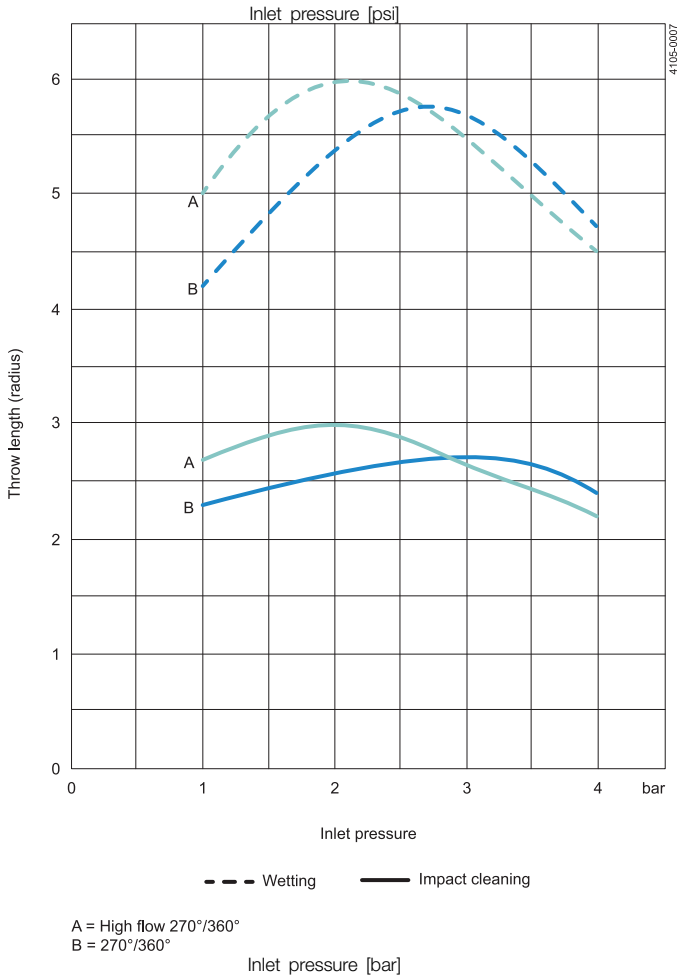
For Clip-on models, the flow rate is increased by approx. 1.5 m^3/h.

Note: The curves show the average value of flow rate and throw length. The Flow rate can vary up to +/- 10%.

Note: The inlet pressure has been taken immediately before the inlet to the machine. In order to achieve the performance indicated on the curves, the pressure drop in the supply lines between pump and machine must be taken in consideration and the water temperature during testing was approx. 20°C.

Performance Data for Alfa Laval Toftejorg SaniMega SB and SaniMega SB HF

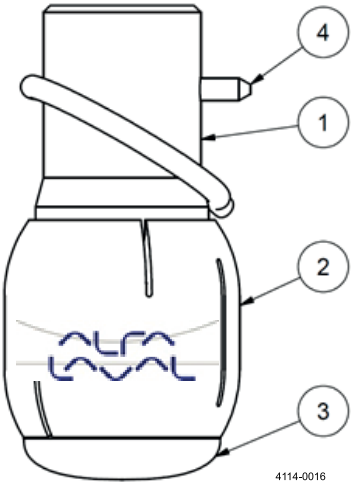
Cleaning radius/Thr ow length



A = High flow 270°/360°
B = 270°/360°

Inlet pressure [bar]

8.1 Part lists for Alfa Laval Toftejorg SaniMxxxx SB



*Wear part

	Postion 1	Postion 2	Postion 3	Postion 4
Item number	AISI 316L	PEEK 450G	AISI 316L	AISI 316L
16B102-x0	16B510	16B543*	16B521	16B562
16B132-x0	16B510	16B540*	16B520	16B562
16B152-x0	16B515	16B552*	16B531	16B563
16B182-x0	16B515	16B550*	16B530	16B563
16B202-x0	16B511	16B543*	16B521	16B562
16B203-x0	16B512	16B543*	16B521	16B562
16B232-x0	16B511	16B540*	16B520	16B562
16B233-x0	16B512	16B540*	16B520	16B562
17B102-x0	17B500	17B543*	16B531	16B563
17B132-x0	17B500	17B540*	16B530	16B563
17B203-x0	17B502	17B543*	16B531	16B563
17B233-x0	17B502	17B540*	16B530	16B563
18B102-x0	18B500	18B543*	18B521	18B562
18B132-x0	18B500	18B540*	18B520	18B562
18B142-x0	18B500	18B544*	18B521	18B562
18B152-x0	18B500	18B545*	18B520	18B562
18B203-x0	18B502	18B543*	18B521	18B562
18B233-x0	18B502	18B540*	18B520	18B562
18B263-x0	18B502	18B544*	18B521	18B562
18B293-x0	18B502	18B545*	18B520	18B562

8.2 Part lists for Alfa Laval Toftejorg SaniMidget SB UltraPure

*Wear part

	Postion 1	Postion 2	Postion 3	Postion 4
Item number	AISI 316L	PEEK MG	AISI 316L	AISI 316L
16B132-x5	16B510	16B542*	16B520	16B562
16B232-x5	16B511	16B542*	16B520	16B562
16B233-x5	16B512	16B542*	16B520	16B562

9 Product programme

This manual covers the product programme for Alfa Laval Toftejorg™ SaniMxxxx SB tank cleaning machine.

9.1 Standard configurations

Table 1. Standard configurations for Alfa Laval Toftejorg SaniMidget SB

Connection	Rotor	Item number	
		270°U	360°
1" Clip-on BPE US Weld-on DIN Range 1 (ODø28)	PEEK 450G	16B132-00	16B102-00
1½" Clip-on BPE US	PEEK 450G	16B182-00	16B152-00
1" Weld-on ISO	PEEK 450G	16B232-00	16B202-00
1" Weld-on BPE US	PEEK 450G	16B233-00	16B203-00

Table 2. Standard configurations for Alfa Laval Toftejorg SaniMidget SB UltraPure

Connection	Rotor	Item number	
		270°U	360°
1" Clip-on BPE US Weld-on DIN Range 1 (ODø28)	PEEK MG*	16B132-05	16B102-05
1" Weld-on ISO	PEEK MG*	16B232-05	16B202-05
1" Weld-on BPE US	PEEK MG*	16B233-05	16B203-05

*PEEK MG (USP Class VI conforming) was not part of the TPV. As a consequence SaniMidget SB UltaPure has not been verified to meet the requirements of 3-A Sanitary Standards.

Table 3. Standard configurations for Alfa Laval Toftejorg SaniMagnum SB

Connection	Rotor	Item number	
		270°U	360°
1½" Clip-on BPE US	PEEK 450G	17B132-00	17B102-00
1½" Weld-on ISO	PEEK 450G	17B232-00	17B202-00
1½" Weld-on BPE US	PEEK 450G	17B233-00	17B203-00

Table 4. Standard configurations for Alfa Laval Toftejorg SaniMega SB

Connection	Rotor	Item number	
		270°U	360°
2" Clip-on BPE US	PEEK 450G	18B132-00	18B102-00
2" Weld-on ISO	PEEK 450G	18B232-00	18B202-00
2" Weld-on BPE US	PEEK 450G	18B233-00	18B203-00

Table 5. Standard configurations for Alfa Laval Toftejorg SaniMega SB HF

Connection	Rotor	Item number	
		270°U	360°
2" Clip-on BPE US	PEEK 450G	18B152-00	18B142-00
2" Weld-on BPE US	PEEK 450G	18B293-00	18B263-00

See page 43 for available documentation add-ons.

This manual covers the product programme for Alfa Laval Toftejorg™ SaniMxxxx SB tank cleaning machine.

9.2 Available add-ons

For: TE1XBXXX-X0 SaniMidget SB, SaniMagnum SB, SaniMega SB/SB HF 3-A - Number: 78-##. Spray Cleaning Devices	For: TE16BXXX-X5 SaniMidget SB UltraPure
-00 Standard + 2.2 Material Certification can be supplied on request	**-95** Q-doc
-90 Q-doc	**-85** Q-doc + ATEX/IECEx
-70 ATEX/IECEx + 2.2 Material Certification can be supplied on request	**-55** Q-doc + FAT-SAT
-80 Q-doc + ATEX/IECEx	**-65** Q-doc + FAT-SAT + ATEX/IECEx

Explanation to Add-ons		
Q-doc (Equipment Documentation)	-doc	Equipment Documentation includes: - EN 1935/2004 DoC - EN 10204 type 3.1 inspection Certificate and DoC - FDA DoC - GMP EC 2023/2006 DoC - EU 10/2011 DoC - ADI DoC - QC DoC
Q-doc + FAT-SAT (Qualification Documentation)	-doc	Qualification Documentation includes: - RS, Requirement Specification - DS, Design Specification incl. Traceability Matrix - FAT, Factory Acceptance Test incl. IQ & OQ - SAT, Site Acceptance Test Protocol incl. IQ & OQ for End-User Execution - Q-doc
ATEX/IECEx	Ex	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 IIB 85°C...175°C Ga II 1D Ex h IIIC T85°C...T140°C Da
3-A	3 78-##	3-A number: 78-##. Spray Cleaning Devices

10 General information

10.1 Service and repair

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.

10.2 How to contact Alfa Laval Kolding A/S

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

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