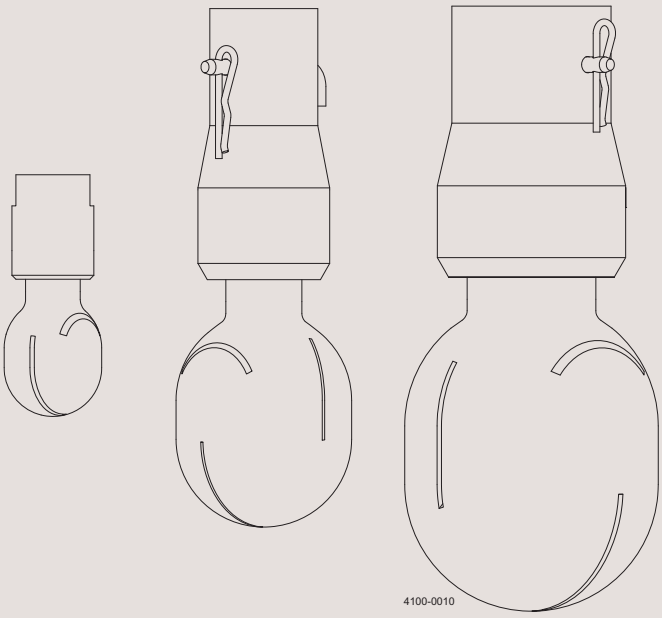
Instruction Manual

Alfa Laval Toftejorg™ Rotary Spray Heads - SaniMicro, SaniMidget, SaniMagnum



Covering: Standard Machines
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: 2009-05

ESE01778-EN12 2020-10

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 EC/EU Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S
Company Name

Albuen 31, DK-6000 Kolding, Denmark
Address

+45 79 32 22 00
Phone No.

hereby declare that

Tank Cleaning Machine Alfa Laval
Designation

Toftejorg SaniMicro, SaniMidget & SaniMagnum
Type
From serial number 2019-0001 to 2030-99999

is in conformity with Machinery Directive 2006/42/EC and the following harmonized standard is used:
DS/EN ISO 12100:2011 Safety of Machinery - Risk Assessment

is in conformity with (Ex / 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. Baseefa04ATEX0357X and IECEx BAS 19.0104X

Marking: II 1G Ex h IIC 85ºC... 175ºC Ga
II 1D Ex h IIIC T85ºC... T140ºC 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 Pumps, Valves, Fittings and Tank Equipment	Lars Kruse Andersen	
Title	Name	Signature

Kolding	2019-09-01
Place	Date (YYYY-MM-DD)

This Declaration of Conformity replaces Declaration of Conformity dated 2019-04-09

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 tank cleaning machine.

NOTE
Indicates important information to simplify or clarify procedures.

2.2 Warning signs

General warning:

ATEX/IECEx warning:

3 Introduction

3.1 Introduction

This manual has been prepared as a guide for installation and for the persons who will be operating and maintaining your tank cleaning machine.

Should you require further assistance, our Technical Sales Support department and worldwide net of sales offices will be 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 body of the tank cleaning machine. For more information on marking see section 3.4 Marking and 3.5 ATEX/IECEx marking.

Warning:

Before installing the machine and setting it into operation carefully read the General safety and installation instructions (page 12) and the specific conditions for safe use in accordance with ATEX/IECEx directive 2014/34/EU (page 13) 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 is intended for use in closed tank, vessel or container. If used in open environment see 4.3 General safety and installation instructions (page 12).

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 13).

For information on recommended installation position see page 12.

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 marked to allow for recognition of type of machine, machine name, serial number and manufacturing address.
The marking is placed on the body of the tank cleaning machine.

Rotary Spray Head
"Sani-xxxx"
s/n.: yyyy-xxxxx
Alfa Laval, DK-6000 Kolding, Albuen 31
CE

"Sani-xxxx" = SaniMicro, SaniMidget or SaniMagnum

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 SaniMicro, SaniMidget and SaniMagnum 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. Baseefa04ATEX0357X.

The IECEx certification is carried out by the Certification Body SGS Baseefa Ltd., who has issued the certificate no. IECEx BAS 19.0104X.

Note
Explosion protection type is constructional safety “c”.

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

Rotary Spray Head
SaniMicro
s/n.: yyyy-xxxxx

Alfa Laval, DK-6000 Kolding
Albuen 31
Ex II 1 GD
Ex h IIC 85°C …175°C Ga
Ex h IIIC T85°C …T140°C Da
CE 0598 Baseefa 04ATEX0357X
IECEx BAS 19.0104X

Rotary Spray Head
SaniMidget
s/n.: yyyy-xxxxx

Alfa Laval, DK-6000 Kolding
Albuen 31
Ex II 1 GD
Ex h IIC 85°C …175°C Ga
Ex h IIIC T85°C …T140°C Da
CE 0598 Baseefa 04ATEX0357X
IECEx BAS 19.0104X

Rotary Spray Head
SaniMagnum
s/n.: yyyy-xxxxx

Alfa Laval, DK-6000 Kolding, Albuen 31
Ex
II 1G Ex h IIC 85°C…175°C Ga
II 1D Ex h IIIC T85°C…T140°C Da
CE 0598 Baseefa 04ATEX0357X IECEx BAS 19.0104X

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

3.6 ATEX/IECEx temperature class and code

The maximum surface temperature depends mainly on operating conditions which are the temperature of the cleaning 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 IIC 85°C…175°C Ga
II 1D Ex h IIIC T85°C…T140°C Da

3.7 Quality system

The Alfa Laval Toftejorg Rotary Spray Head 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 comply with FDA 21CFR§177 and EU 10/2011.

4.1 General description

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

The Alfa Laval Toftejorg Rotary Spray Head is a sanitary cleaning device of the rotating fan spray type for permanent installation that provides a cleaning pattern from 180° - 360°. The machine is completely self-cleaning and when properly installed also self-draining (see page 12). All product contact surfaces are AISI 316L stainless steel (or better corrosion vice) or FDA compliant and EU 10/2011 compliant polymer materials.

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

The Alfa Laval Toftejorg Rotary Spray Head 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 0.1 – 50 m^3 (22 - 10,998 US gallons) and storage tanks up to 125 m^3 (27496 US gallons). For larger volumes, multiple Alfa Laval Toftejorg Rotary Spray Heads may be applied.

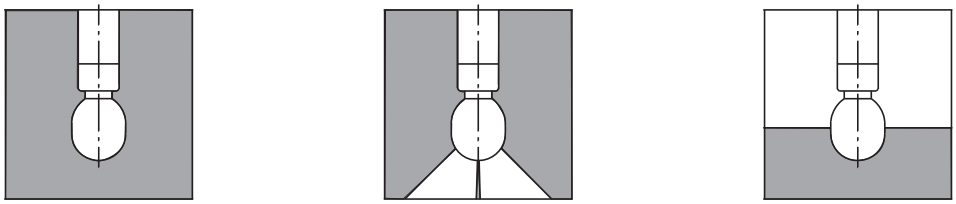
Application assistance and optimal position recommendation is available.

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

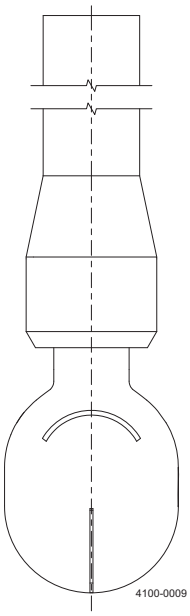
The flow of the cleaning media causes the head of the Alfa Laval Toftejorg Rotary Spray Head to rotate, with fans laying out a swirling pattern throughout the vessel. This generates a vibrating impact and cascading flow that covers all internal surfaces of the tank or reactor. The device's self-cleaning feature is achieved by directing the cleaning media through the rotating bearing and onto the neck of the elongated head.

Spray Pattern



360° 270° 180°

4.3 General safety and installation instructions



Self draining position

Important information:

Recommended installation position:
The Rotary Spray Head tank cleaning machine should be installed in vertical position (upright or upside down), in this position the unit will be self-draining.

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 Rotary Spray Head.

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 treat the machine with care in order not to damage the fine surface of the machine.

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.

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.

For information on use in potential explosive atmospheres see paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification page 13.

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 9.

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 17).

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

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

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

Warning:

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

Warning:

Steaming tanks larger than 100 m³
Tanks with capacities larger than 100 m³ that could contain a flammable atmosphere should not be steam cleaned, as steam cleaning tanks produces an electrostatically charged mist. Tanks smaller than 100 m³ may be steam cleaned.
For further information see IEC/TS 60079-32-1:2013 Explosive atmospheres – Part 32-1: Electrostatic hazards, guidance. With focus on clause 7.10 and 8.5.

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

General guidelines for tanks larger than 100 m³:
Tanks larger than 100 m³ must not be steam cleaned – See guide IEC/TS 60079-32-1:2013 clause 7.10.5 and 8.5
To use the unit in tanks larger than 100m³ is possible under certain conditions.
It is necessary to know the current factors such as tank size, cleaning solvent and product.
Additives can be used in the cleaning solvent, or, for example, the tank can be filled with nitrogen. The basic guidelines are described in the guide IEC/TS 60079-32-1:2013.
It must be ensured that the 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
The maximum permitted cleaning fluid pressure is 3 bar.

In addition to the above mentioned precautions relating to the ATEX/IECEx guidelines Directive 2014/34/EU, the Safety Precautions on page 12 must be observed.

4.5 Recycling information

• Unpacking

- Packing material consists of wood, plastics, cardboard boxes and in some cases metal straps.
- Wood and cardboard boxes can be re-used, recycled or used for energy recovery.
- Plastics should be recycled or burnt at a licensed waste incineration plant.
- Metal straps should be sent for material recycling.

• Maintenance

- During maintenance, oil and wear parts in the machine are replaced.
- All metal parts should be sent for material recycling.
- Worn out or defective electronic parts should be sent to a licensed handler for material recycling.
- Oil and all non-metal wear parts must be disposed of in accordance with local regulations.

• Scrapping

- At the end of use, the equipment must be recycled according to the relevant, local regulations. Besides the equipment itself, any hazardous residues from the process liquid must be considered and dealt with in a proper manner. When in doubt, or in the absence of local regulations, please contact your local Alfa Laval sales company.

5.1 Normal operation

Cleaning Media

Use only media compatible with Stainless Steel AISI 316/316L, SAF 2205 and PTFE. If you have ordered the optional Hastelloy version, please contact your local Alfa Laval sales office for cleaning media guidelines. 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.

Pressure

Please make sure that the connections are correctly mounted before opening of the washing valve. Apply pressure gradually to avoid hydraulic shocks, which might stress mechanical parts in the Alfa Laval Toftejorg Rotary Spray Head cleaner. Max. pressure difference is 3.0 bar.

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 13).

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 13).

Temperature

The maximum recommended cleaning fluid temperature is 95°C. The maximum recommended steam temperature is 140°C. The maximum ambient temperature is 140°C.

See paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification (page 13).

After use cleaning

After use flush the machine with fresh water. Cleaning media should never be allowed to dry or settle in the system.

5.2 Safety precautions

The Alfa Laval Toftejorg Rotary Spray Head 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 9.

6.1 Service and repair of ATEX/IECEx certified machines

Warning:

In case of extensive machine wear, the machine is to be replaced, as it is not possible to repair Rotary Spray Head machines.
Please remember to order an ATEX/IECEx approved Rotary Spray Head machine.

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

In case of machine wear, the machine is to be replaced, as it is not possible to repair Rotary Spray Head machines.

Please remember to order a Q-doc version machine.

6.3 Service and repair of machines ordered with Alfa Laval Q-doc + FAT-SAT

In case of machine wear, the machine is to be replaced, as it is not possible to repair Rotary Spray Head machines.

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 is 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).

6.4 Recommended service intervals

Inspection every 500 working hours. After 2000 working hours: inspection every 200 hours.

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 temperature for safety reasons.

If needed proceed to 1).

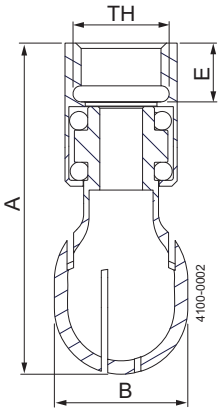
1. Un-install the machine.
2. Visual inspection for foreign objects. Remove any objects and clean before rotation verification.
3. Rotation verification by hand for free rotation.
4. Reinstall machine.
5. Fill in the Service Log.

7 Technical data

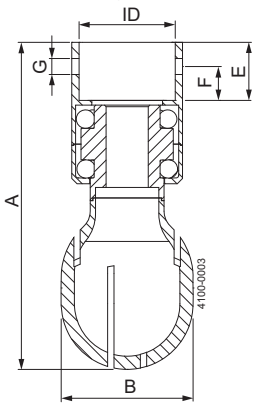
7.1 Alfa Laval Toftejorg SaniMicro

Weight of machine:		Thread and clip-on: 0.30 kg. On pipe: 0.55/090 kg
Working pressure:		1-3 bar
Recommended inlet pressure:		2 bar
Max. working temperature:		95°C (200°F)
Max. ambient temperature:		140°C (284°F)
Wetting radius:		Max. 2.7 m
Impact cleaning radius:		Max. effective 0.6 m
Materials:	Inlet connections:	1.4404 (316L)
	Bearing race parts:	SAF 2205 (UNS31803)
	Balls:	AISI 316/PTFE (FDA compliant 21CFR§177. 1550 and EU 10/2011 compliant)
	Head:	1.4404 (AISI 316L)
Lubricant:	Self-lubricating with the cleaning fluid	Self-lubricating with the cleaning fluid
Connections:		3/8” Rp or NPT thread Clip-on or weld-on for pipe ISO2037/DIN 11.850/BPE US tube

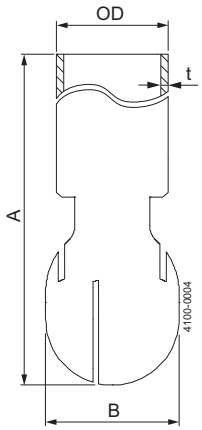
Thread



Clip-on



Weld-on



TH
3/8" Rp (BSP)
3/8" NPT

ID

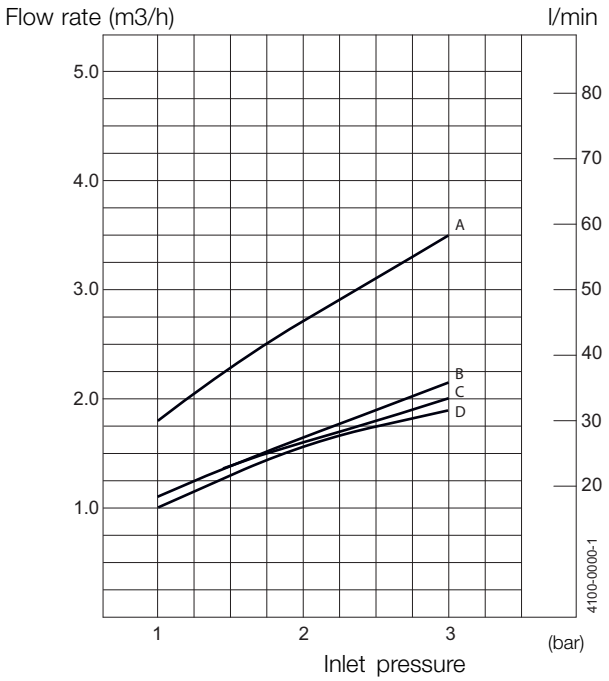
ISO:	ø17.4 mm
DIN Range 1:	ø18.2 mm
BPE US / DIN Range 2 :	ø19.2 mm

OD x t

ISO:	ø17.2 x 1 mm
DIN Range 1:	ø18 x 1 mm
DIN Range 2:	ø19 x 1.5 mm
BPE US:	ø19.05 x ø1.65 mm

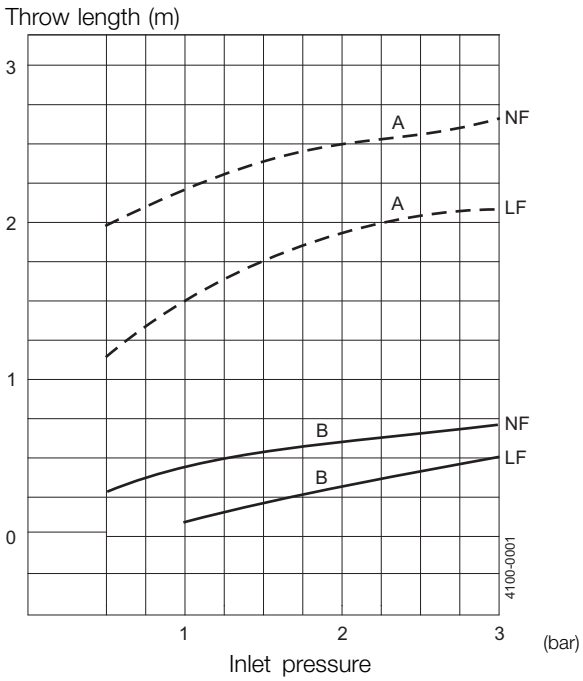
Type	A	B	E	F	G
Tread	62	ø25	11		
Clip-on	62	ø25	11	5.9	ø3.6
Weld-on	77.500	ø25			

Performance Data



A : 360°, 270°UP
B : 360° LowFlow
C : 270°UP LowFlow
D : 180°D

Cleaning radius



A : Wetting
B : Impact cleaning
NF : 360°, 270°UP, 180°D
LF : 360° LowFlow, 270°UP LowFlow

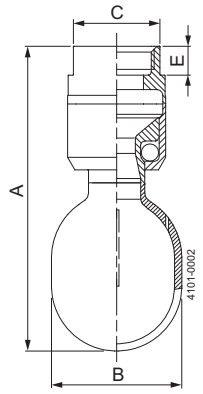
For Clip-on models, the flow rate is increased by approx. 0.2 m^3/h

Note: 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 considered.

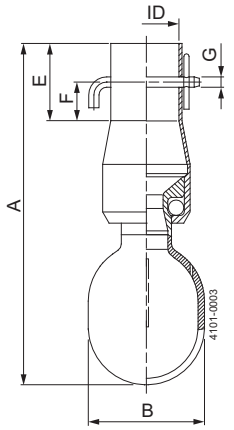
7.2 Alfa Laval Toftejorg SaniMidget

Weight of machine:		Thread and clip-on: 0.30 kg. On pipe: 0.55/090 kg
Working pressure:		1-3 bar
Recommended inlet pressure:		2 bar
max. working temperature.:		95°C (200°F)
Max. ambient temperature:		140°C (284°F)
Wetting radius:		Max. 3 m
Impact cleaning radius:		Max. effective 1.4 m
Materials:	Inlet connections:	1.4404 (316L)
	bearing race parts:	SAF 2205 (UNS31803)
	balls:	AISI 316/PTFE (FDA compliant 21CFR§177. 1550 and EU 10/2011 compliant)
	head:	1.4404 (AISI 316L)
Lubricant:	Self-lubricating with the cleaning fluid	Self-lubricating with the cleaning fluid
Connections:		1/2" or 3/4" BSP or NPT thread Clip-on or weld-on for pipe: ISO2037, ASTM A270. BS4825 part 1 or DIN11850

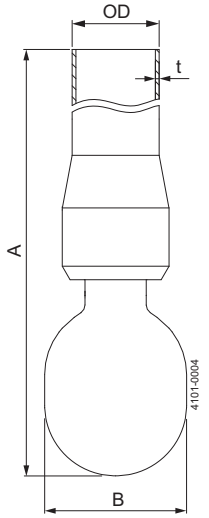
Thread



Clip-on



Weld-on



TH
3/4"Rp (BSP)
3/4" NPT

ID

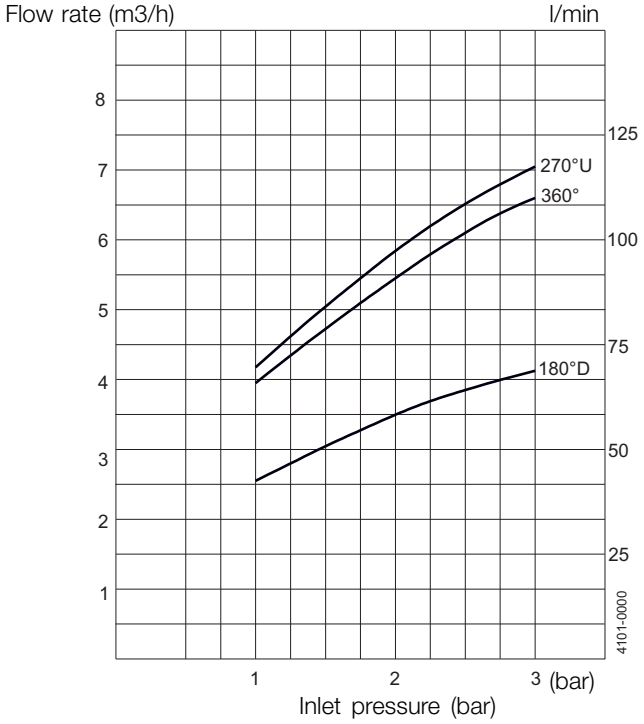
ISO:	ø25.3 mm
BPE US:	ø25.7 mm
DIN Range 1:	ø28.3 mm
DIN Range 2:	ø29.3 mm

OD x t

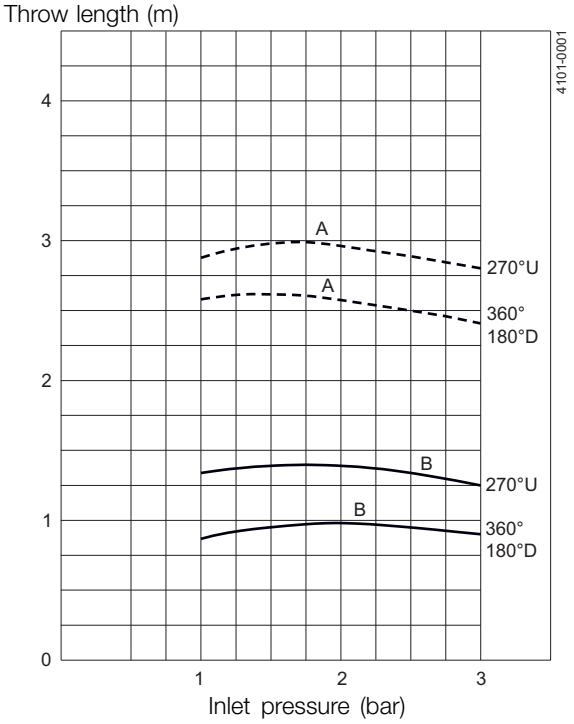
ISO:	ø25 x 1.2 mm
BPE US:	ø25.4 x 1.65 mm
DIN Range 1:	ø28 x 1 mm
DIN Range 2:	ø29 x 1.5 mm

Type	A	B	C	E	F	G
Thread	102	ø45	30	10		
Clip-on	133.5	ø45		30	15	ø4
Weld-on	120.5, 500, 1000	ø45				

Performance Data



Cleaning radius



A: Wetting - B: Impact cleaning

For Clip-on models, the flow rate is increased by approx. 0.5 m^3/h

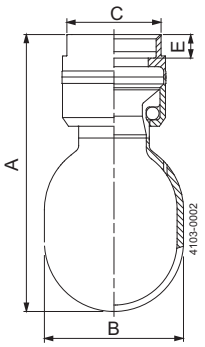
Note: The inlet pressure has been taken immediately before the machine inlet. In order to achieve the performance indicated in the curves, the pressure drop in the supply lines between pump and machine must be considered.

7 Technical data

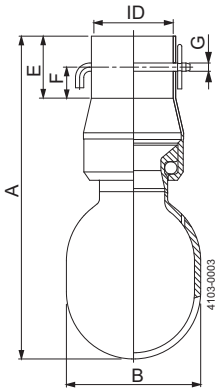
7.3 Alfa Laval Toftejorg SaniMagnum

Weight of machine:		Thread and clip-on: 0.76 kg. On pipe: 0.97/1.52 kg
Working pressure:		1-3 bar
Recommended inlet pressure:		2 bar
Max. working temperature:		95°C (200°F)
Max. ambient temperature:		140°C (284°F)
Wetting radius:		Max. 3m
Impact cleaning radius.		Max. effective 2m
Materials:	Inlet connections:	1.4404 (316L)
	bearing race parts:	SAF 2205 (UNS31803)
	balls:	AISI 316/PTFE (FDA compliant 21CFR§177. 1550 and EU 10/2011 compliant)
	head:	1.4404 (AISI 316L)
Lubricant:	Self-lubricating with the cleaning fluid	Self-lubricating with the cleaning fluid
Connections:		1 1/4” BSP or NPT thread Clip-on or weld-on for pipe: ISO2037, ASTM A270. BS4825 part 1 or DIN11850

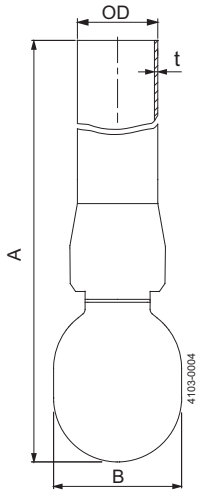
Thread



Clip-on



Weld-on

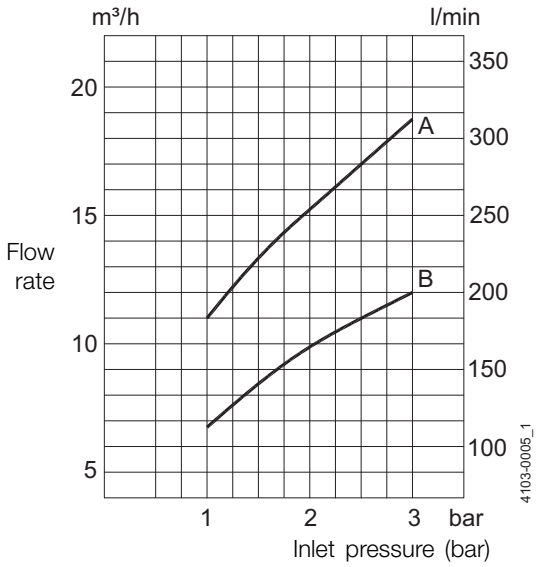


TH	ID		OD x t	
1 1/4” (BSP)	ID 1: 1½”	ø38.4 mm	ISO	ø38 x 1.2 mm
1 1/4” NPT	ID 2: 2”	ø51.3 mm	BPE US	ø38.1 x 1.65 mm
1½" (BSP)	DIN Range 1	ø40.4 mm	BPE US	ø50.8 x 1.65 mm
1½" NPT	DIN Range 2	ø41.4 mm	DIN Range 1	ø40 x 1 mm
			DIN Range 2	ø41 x 1.5 mm

Type	A	B	C	E	F	G
Tread	130	ø65	44	10		
Clip-on	157	ø65		30	15	ø4.2
Weld-on	157, 500, 1000	ø65				

Performance Data

Flow rate (m3/h)



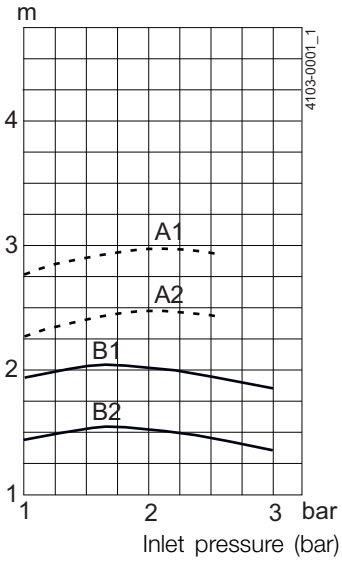
A : 360°, 270°UP

B : 360° LowFlow

C : 270°UP LowFlow

D : 180°D

Throw length (m)



A : Wetting

B : Impact cleaning

A1: 360°, 270°UP, 180°D

A2: 360° LowFlow, 270°UP LowFlow

B1 : 360°/270°UP, 180°D
B2 : 270°UP LowFlow, 360° LowFlow

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

Note: 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 considered.

8 Product programme

This manual covers the product programme for Alfa Laval Toftejorg SaniMicro, SaniMidget and SaniMagnum.
For the different types of Alfa Laval Toftejorg SaniMicros, SaniMidgets and SaniMagnums, please see the following pages.

8.1 Alfa Laval Toftejorg SaniMicro

Alfa Laval Toftejorg SaniMicro, Clip-on

Surface finish: Semi bright

	Clip-on OD 17.2, ISO2037		Clip-on DN15, DIN11850-R1		Clip-on 3/4" US tube/DN15 DIN11850-R2	
Spray Pattern	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22
360°	TE14B100-01	TE14D100-01	TE14B110-01	TE14D110-01	TE14B120-01	TE14D120-01
360° low flow	TE14B101-01	TE14D101-01	TE14B111-01	TE14D111-01	TE14B121-01	TE14D121-01
270°	TE14B103-01	TE14D103-01	TE14B113-01	TE14D113-01	TE14B123-01	TE14D123-01
270° up low flow	TE14B104-01	TE14D104-01	TE14B114-01	TE14D114-01	TE14B124-01	TE14D124-01

Surface finish: 0.5 µm Ra internal/external. With 3.1 certificate and electro-polished

	Clip-on OD 17.2, ISO2037	Clip-on DN15, DIN11850-R1	Clip-on 3/4" US tube/DN15 DIN11850-R2
Spray Pattern	Stainless steel	Stainless steel	Stainless steel
360°	TE14F100-91	TE14F110-91	TE14F120-91
360° low flow	TE14F101-91	TE14F111-91	TE14F121-91
270°	TE14F103-91	TE14F113-91	TE14F123-91
270° up low flow	TE14F104-91	TE14F114-91	TE14F124-91

Alfa Laval Toftejorg SaniMicro, Weld-on

Surface finish: Semi bright

		Weld-on OD 25, ISO2037		Weld-on DN15, DIN11850-R1		Weld-on DN15, DIN11850-R2		Weld-on 3/4" ASME BPE tube	
Spray Pattern	Height (mm)	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22
360°	62	TE14B200-01	TE14D200-01	TE14B210-01	TE14D210-01	TE14B220-01	TE14D220-01	TE14B230-01	TE14D230-01
360° low flow	62	TE14B201-01	TE14D201-01	TE14B211-01	TE14D211-01	TE14B221-01	TE14D221-01	TE14B231-01	TE14D231-01
270° up	62	TE14B203-01	TE14D203-01	TE14B213-01	TE14D213-01	TE14B223-01	TE14D223-01	TE14B233-01	TE14D233-01
270° up low flow	62	TE14B204-01	TE14D204-01	TE14B214-01	TE14D214-01	TE14B224-01	TE14D224-01	TE14B234-01	TE14D234-01
180° down	62	TE14B202-01	TE14D202-01	TE14B212-01	TE14D212-01	TE14B222-01	TE14D222-01	TE14B232-01	TE14D232-01
360°	500	TE14B250-01		TE14B260-01		TE14B270-01		TE14B280-01	
360° low flow	500	TE14B251-01		TE14B261-01		TE14B271-01		TE14B281-01	
270° up	500	TE14B253-01		TE14B263-01		TE14B273-01		TE14B283-01	
270° up low flow	500	TE14B254-01		TE14B264-01		TE14B274-01		TE14B284-01	
180° down	500	TE14B252-01		TE14B262-01		TE14B272-01		TE14B282-01	

Alfa Laval Toftejorg SaniMicro, Thread

Surface finish: Semi bright

	Thread 3/8" Rp (BSP)		Thread 3/8" NPT	
Spray Pattern	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22
360°	TE14B000-01	TE14D000-01	TE14B010-01	TE14D010-01
360° low flow	TE14B001-01	TE14D001-01	TE14B011-01	TE14D011-01
270° up	TE14B003-01	TE14D003-01	TE14B013-01	TE14D013-01
270° up low flow	TE14B004-01	TE14D004-01	TE14B014-01	TE14D014-01
180° down	TE14B002-01	TE14D002-01	TE14B012-01	TE14D012-01

This manual covers the product programme for Alfa Laval Toftejorg SaniMicro, SaniMidget and SaniMagnum.
For the different types of Alfa Laval Toftejorg SaniMicros, SaniMidgets and SaniMagnums, please see the following pages.

8.2 Alfa Laval Toftejorg SaniMidget

Alfa Laval Toftejorg SaniMidget, Clip-on

Surface finish: Bright

	Clip-on OD 25, ISO2037		Clip-on DN25, DIN11850-R1		Clip-on DN25 DIN11850-R2		Clip-on 1" US tube	
Spray Pattern	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22
360°	TE10B100-01	TE10D100-01	TE10B105-01	TE10D105-01	TE10B106-01	TE10D106-01	TE10B102-01	TE10D102-01
270° up	TE10B130-01	TE10D130-01	TE10B135-01	TE10D135-01	TE10B136-01	TE10D136-01	TE10B132-01	TE10D132-01

Surface finish: 0.5 µm Ra internal/external. With 3.1 certificate and electro-polished

	Clip-on OD 25, ISO2037	Clip-on DN25, DIN11850-R1	Clip-on 1" US tube/DN25 DIN 11850-R2	Clip-on 1" US tube
Spray Pattern	Stainless steel	Stainless steel	Stainless steel	Stainless steel
360°	TE10F100-91	TE10F105-91	TE10F106-91	TE10F102-91
270° up	TE10F130-91	TE10F135-91	TE10F136-91	TE10F132-91

Alfa Laval Toftejorg SaniMidget, Weld-on

Surface finish: Bright

		Weld-on OD 25, ISO2037		Weld-on DN15, DIN11850-R1		Weld-on DN15, DIN11850-R2	
Spray Pattern	Height (mm)	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22
360°	120.5	TE10B202-01	TE10D202-01	TE10B204-01	TE10B204-01	TE10B203-01	TE10D203-01
270° up	120.5	TE10B232-01	TE10D232-01	TE10B234-01	TE10B234-01	TE10B233-01	TE10D233-01
180° down	120.5	TE10B222-01	TE10D222-01	TE10B224-01	TE10B224-01	TE10B223-01	TE10D223-01
360°	500	TE10B200-01		TE10B205-01		TE10B207-01	
270° up	500	TE10B230-01		TE10B235-01		TE10B237-01	
180° down	500	TE10B220-01		TE10B225-01		TE10B227-01	
360°	1000	TE10B201-01		TE10B206-01		TE10B208-01	
270° up	1000	TE10B231-01		TE10B236-01		TE10B238-01	
180° down	1000	TE10B221-01		TE10B226-01		TE10B228-01	

Alfa Laval Toftejorg SaniMidget, Thread

Surface finish: Bright

		Thread 3/4" Rp (BSP)		Thread 3/4" NPT		Thread 3/4" NPT
Spray Pattern	Height (mm)	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22	Stainless steel
360°	102	TE10B001-01	TE10D001-01	TE10B003-01	TE10D003-01	TE10B002-01
270° up	102	TE10B031-01	TE10D031-01	TE10B033-01	TE10D033-01	TE10B032-01
180° down	102	TE10B021-01	TE10D021-01	TE10B023-01	TE10D023-01	TE10B022-01

8 Product programme

This manual covers the product programme for Alfa Laval Toftejorg SaniMicro, SaniMidget and SaniMagnum.
For the different types of Alfa Laval Toftejorg SaniMicros, SaniMidgets and SaniMagnums, please see the following pages.

8.3 Alfa Laval Toftejorg SaniMagnum

Alfa Laval Toftejorg SaniMagnum, Clip-on

Surface finish: Semi bright

	Clip-on OD 38, ISO2037/US tube		Clip-on OD 51, ISO2037/US tube		Clip-on DN40 DIN11850-R1		Clip-on DN40 DIN11850-R2	
Spray Pattern	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22
360°	TE11B100	TE11D100	TE11B104	TE11D104	TE11B105	TE11D105	TE11B106	TE11D106
360° low flow	TE11B140	TE11D140	TE11B144	TE11D144	TE11B145	TE11D145	TE11B146	TE11D146
270° up	TE11B130	TE11D130	TE11B134	TE11D134	TE11B135	TE11D135	TE11B136	TE11D136
270° up low flow	TE11B150	TE11D150	TE11B154	TE11D154	TE11B155	TE11D155	TE11B156	TE11D156

Surface finish: 0.5 µm Ra internal/external. With 3.1 certificate and electro-polished

	Clip-on OD 38, ISO2037/US tube	Clip-on OD 51, ISO2037/US tube	Clip-on DN40 DIN11850-R1	Clip-on DN40 DIN11850-R2
Spray Pattern	Stainless steel	Stainless steel	Stainless steel	Stainless steel
360°	TE11F100-91	TE11F104-91	TE11F105-91	TE11F106-91
360° low flow	TE11F140-91	TE11F144-91	TE11F145-91	TE11F146-91
270° up	TE11F130-91	TE11F134-91	TE11F135-91	TE11F136-91
270° up low flow	TE11F150-91	TE11F154-91	TE11F155-91	TE11F156-91

Alfa Laval Toftejorg SaniMagnum, Weld-on

Surface finish: Semi bright

		Weld-on OD 38, ISO2037		Weld-on OD 38, ISO2037/ASME BPE tube		Weld-on OD 51, ISO2037/ASME BPE tube		Weld-on DN40, DIN11850-R2	
Spray Pattern	Height (mm)	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22
360°	157	TE11B202	TE11D202	TE11B252	TE11D252	TE11B253	TE11D253	TE11B204	TE11D204
360° low flow	157	TE11B242	TE11D242	TE11B262	TE11D262	TE11B263	TE11D263	TE11B244	TE11D244
270° up	157	TE11B232	TE11D232	TE11B282	TE11D282	TE11B283	TE11D283	TE11B234	TE11D234
270° up low flow	157	TE11B248	TE11D248	TE11B292	TE11D292	TE11B293	TE11D293	TE11B249	TE11D249
180° down	157	TE11B222	TE11D222	TE11B272	TE11D272	TE11B273	TE11D273	TE11B224	TE11D224
360° up	1000	TE11B201		TE11B250		TE11B251		TE11B205	
360° low flow	1000	TE11B241		TE11B260		TE11B261		TE11B245	
270° up	1000	TE11B231		TE11B280		TE11B281		TE11B225	
270° up low flow	1000	TE11B247		TE11B290		TE11B291		TE11B235	
180° down	1000	TE11B221		TE11B270		TE11B271		TE11B215	

This manual covers the product programme for Alfa Laval Toftejorg SaniMicro, SaniMidget and SaniMagnum.
For the different types of Alfa Laval Toftejorg SaniMicros, SaniMidgets and SaniMagnums, please see the following pages.

Alfa Laval Toftejorg SaniMagnum, Thread

Surface finish: Semi bright

	Thread 1 1/4" Rp (BSP)	Thread 1 1/4" (NPT)	Thread 1 1/2" Rp (BSP)		Thread 1 1/2" NPT	
Spray Pattern	Stainless steel	Stainless steel	Stainless steel	Hastelloy C22	Stainless steel	Hastelloy C22
360°	TE11B000	TE11B002	TE11B004	TE11D004	TE11B003	TE11D003
360° low flow	TE11B041	TE11B043	TE11B014	TE11D014	TE11B013	TE11D013
270° up	TE11B030	TE11B032	TE11B034	TE11D034	TE11B033	TE11D033
270° up low flow	TE11B045	TE11B046	TE11B054	TE11D054	TE11B053	TE11D053
180° down	TE11B020	TE11B022	TE11B024	TE11D024	TE11B023	TE11D023

8.4 Available add-ons

TE10XXXX-91	Q-doc.
TE10XXXX-71	ATEX/IECEx
TE10XXXX-81	ATEX/IECEx + Q-doc.
TE10XXXX-51	Q-doc + FAT - SAT
TE10XXXX-61	Q-doc + FAT - SAT incl. ATEX/IECEx

Explanation to Add-ons		
Q-doc (Equipment Documentation)		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)		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		ATEX/IECEx includes: ATEX/IECEx approved machine for use in explosive atmospheres. Category 1 for installation in zone 0/20 (inside tank) in accordance with Directive 2014/34/EU. II 1G Ex h IIC 85ºC...175ºC Ga II 1D Ex h IIIC T85ºC...T140ºC Da

9.1 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.

9.2 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.