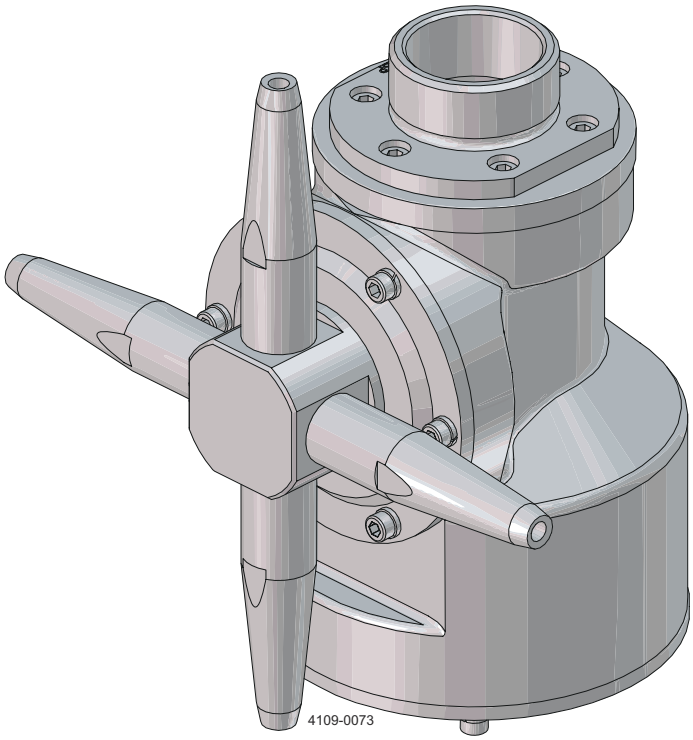
Alfa Laval MultiJet 45



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Instruction Manual

BRITISH ENGLISH

Published by
Alfa Laval Kolding A/S
Albuen 31
DK-6000 Kolding, Denmark
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The original instructions are in English

Contents

1 Declarations of Conformity

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

Rotary Jet Head

Designation

MultiJet 45

Type

From serial number 2022–0001 to 2030–9999

is in conformity with the following directives with amendments:

- Machinery Directive 2006/42/EC. *Following harmonized standard is used: DS/EN ISO 12100:2011 Safety of Machinery - Risk Assessment*

- ATEX Directive 2014/34/EU. *Following harmonized standards are used: EN ISO 80079-36:2016, EN ISO 80079-37:2016, DS/EN ISO/IEC 80079-34:2011, Annex A, paragraph A.5.3 Rotating machines*

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

Marking: II 1G Ex h IIC 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	Lars Kruse Andersen
Title	Name
Kolding, Denmark	2022–07–20
Place	Date (YYYY-MM-DD)
	Signature

UK 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

Rotary Jet Head

Designation

MultiJet 45

Type

From serial number 2022–0001 to 2030–9999

is in conformity with the following directives with amendments:

- The Supply of Machinery (Safety) Regulations 2008
- The Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016

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

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

Marking: II 1G Ex h IIC 85ºC... 175ºC Ga
II 1D Ex h IIIC T85ºC... T140ºC Da

The UK QAN (Quality Assurance Notification) is carried out by Baseefa Ltd., Rockhead Buisness Park, Staden Lane, Buxton, Derbyshire SK17 9RZ, United Kingdom, Notified Body No. 1180. UKType Examination Certification is carried out by Baseefa Ltd., Rockhead Buisness Park, Staden Lane, Buxton, Derbyshire SK17 9RZ, United Kingdom, Notified Body No. 1180. ECEx Certificate of Conformity is carried out by Baseefa Ltd., Rockhead Business Park, Staden Lane, Buxton, Derbyshire SK17 9RZ, United Kingdom. IECExAccepted Certification Body (ExCB).

Signed on behalf of: Alfa Laval Kolding A/S

Global Product Quality Manager	Lars Kruse Andersen
Title	Name
Kolding, Denmark	2022–07–20
Place	Date (YYYY-MM-DD)

Signature

DoC Revison_01_072022

2 Safety

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 installing, operating and maintaining your Alfa Laval Toftejorg tank cleaning machine. Should you require further assistance, our Technical Sales Support department and worldwide net of sales offices 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 gear house of the tank cleaning machine.

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

Warning:

If the Alfa Laval MultiJet 45 stops rotating unintentionally within the warranty period, please return the machine to Alfa Laval.

Please do not try to fix any mechanical problems before shipping.

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

The end-user should verify:

- that the tank cleaning machine is in conformity with respect to tank, vessel or container size in which it is 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.*

3.3 Patents and trademarks

This Instruction Manual is published by Alfa Laval without any warranty. Improvements and changes to this Instruction Manual may at any time be made by Alfa Laval 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 for recognition of type of machine, machine name, serial number and manufacturing address.

The marking is placed on the gear house 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/UKEx/IECEx marking

The Alfa Laval MultiJet 45 is certified as category I component. The ATEX certification is carried out by the Notified Body SGS Fimko Oy, who has issued the certificate no. Baseefa10ATEX0188X.

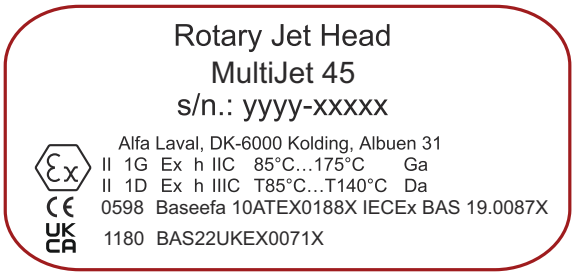
The IECEx certification is carried out by the Certification Body SGS Baseefa Ltd., who has issued the certificate no. IECEx BAS 19.0087X.

The UKEx certification is carried out by the Certification Body SGS Baseefa Ltd., who has issued the certificate no. BAS22UKEX0071X.

Note

Explosion protection type is constructional safety “c”.

The marking on the ATEX/UKEx/IECEx certified Alfa Laval MultiJet 45 is as follows:



Serial number explanation:

Machines supplied with or without standard documentation:

yyyy-xxxxx: serial number

yyyy: year

xxxxx: 5 digit sequential number

3.6 ATEX/UKEx/IECEx temperature class and code

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

Group II EPL Ga

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

Table for determining temperature class (gas atmospheres)		
Temperature Class	**Cleaning fluid Temperature Tp (°C)**	**Ambient temperature Tamb (°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)		
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/UKEx/IECEx marking on the equipment:

II 1G Ex h IIC 85°C…175°C Ga

II 1D Ex h IIIC T85°C…T140°C Da

3.7 Quality system

The Alfa Laval tank cleaning machines are produced according to Alfa Laval Kolding´s ISO 9001 international Standard certified quality system.

4 Installation

4.1 General description

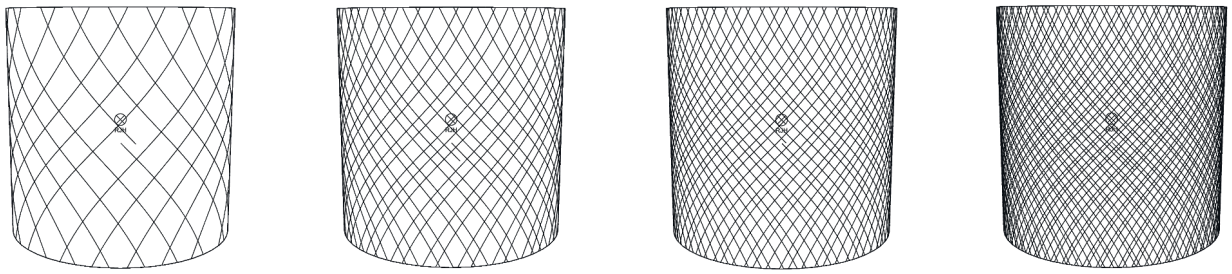
The MultiJet 45 is a media driven and media lubricated tank cleaning machine. As it is self lubricating, there is no lubricating substances such as oil grease etc. in the machine which needs to be regularly changed.

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 fluid passes through a guide and a turbine, which accordingly is set into rotation. The turbine rotation is through a gearbox transformed into a combined horizontal rotation of the machine body and a vertical rotation of the nozzles.

The combined motion of the machine body and the nozzles ensures a fully indexed tank cleaning coverage. After 5 5/8 revolutions of the hub cover with nozzles (5 3/8 revolutions of the machine body), one coarse cleaning pattern is laid out on the tank surface and the first cycle has been made. During the following cycles, this pattern is repeated 7 times, each of which is displaced, and the pattern gradually becomes more dense. Finally, after 8 cycles - a total of 45 revolutions of the hub cover with nozzles (43 revolutions of the machine body), a complete cleaning pattern has been laid out, and the first pattern is repeated (figure 1).



1st cycle 2nd cycle 3rd cycle 4th cycle

The number of cycles needed to perform a proper cleaning depends on type of soilage, position of the tank cleaning machine, cleaning procedure, cleaning temperature and cleaning agent. For substances that are easily mobilised, i.e. are easy to remove, one cycle could be sufficient while in cases of more heavy soilage (high viscous, sticky substances, etc.) a more dense pattern (more cycles) are needed.

The speed of rotation of the turbine depends on the flow rate through the machine. The higher the flow rate the higher the speed of rotation will be. In order to control the RPM of the machine for a wide range of flow rates, the machine has different turbines according to the nozzle size.

Apart from the jet flow through the nozzles, fluid is leaking through the top of the machine, at the hub and through the bottom cover. The leakage between the moving parts at the top and at the hub are cleaning the gabs and thus preventing build-up of material that might cause the friction. The flow through the bottom cover is due to the fact that the machine is media lubricated and that accordingly a flow through the gearbox is needed.

4.3 General safety and installation instructions

Upon arrival check that the machine is in operating condition by inserting a 3/16” Hex Screwdriver (tool No. TE134A) in the screw in top of Turbine shaft and easily turn the Turbine shaft anti-clockwise. If resistance is recognized, disassembled the machine to localize the cause.

Before connecting the machine to the system, all supply lines and valves should be flushed for removal of foreign particles.

The tank cleaning machine should be installed in vertical position (upright or upside down).

The machine should be screwed tightly onto the supply line using a flat jawed spanner on the flats, machined surfaces on the inlet connection.

Subject to the intended use, environment and any inhouse user requirements or policies, a liquid threadlocker such as Loctite No. 243 or equivalent could be used. Other methods could be acceptable and subject to customer preference. For detailed instruction on pre-cleaning and application of the product carefully follow the instruction on the used locking system.

In order to separate the CIP system from the process it is recommended to install a shutoff valve close to the machine inlet. This also prevents back-flow of liquid from the tank through the machine in case the machine is submerged and there is an over-pressure inside the tank.

It is recommended that the fluid valve fitted is of a type that prevents hydraulic shocks. Hydraulic shocks may cause severe damage to the machine and/or the entire installation. Ideally, use a frequency controlled pump with a ramp function for start-up to supply the cleaning liquid.

It is recommended to install a filter with mesh size of max. 3 mm in the supply line in order to avoid large particles to clog inside 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 bemade to prevent starting of the cleaning/mixing operation, while personnel are inside the tank or otherwise can be hit by jets from the nozzles.

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

The machine as delivered has been tested at the factory before shipping. For transportation reasons, the nozzles have been screwed off after the test. In order to secure the nozzles against falling off due to vibrations and other external strains it is important that the nozzles are tightened properly after mounting. If not, the nozzles may be blown off during tank cleaning and cause severe damage on tank, valves and pump. This is especially important if machines are fixed installed in tanks and vessels within the transportation sector in trucks, railcars and onboard ships.

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

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 19).

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.

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

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	>10000pS/m
Medium conductivity	between 25 × εr pS/m and 10 000 pS/m
Low conductivity	<25× εrpS/m

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

High conductivity	>10000pS/m
Medium conductivity	between 50 pS/m and 10 000 pS/m
Low conductivity	<50pS/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.

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 12 bar.

In addition to the above mentioned precautions relating to Directive 2014/34/EU, in *5.2 Safety Precautions* must be observed.

5 Operation

5.1 Normal operation

Use only cleaning media compatible with stainless steel AISI 316/AISI 316L, PFA, A4, ACO212CF, FKM and PEEK. Please note that PEEK is not resistant to concentrated sulfuric acid. Normal detergents, moderate solutions of acids and alkalics will be acceptable. Aggressive chemicals, excessive concentrations of chemicals at elevated temperatures as well as hydrochlorides should be avoided. If you are in doubt, contact your local Alfa Laval sales office.

Product

In cases where the machine is submerged in, or in other ways exposed to, product the compatibility between stainless steel AISI 316/AISI 316L, PFA, A4, ACO212CF and PEEK and the product must be considered carefully.

NOTE

EPDM swells significantly exposed to fatty materials.

Pressure

Avoid hydraulic shocks. Increase pressure gradually. Do not exceed 12 bar inlet pressure. Recommended inlet pressure appears from *Technical Data*. High pressure in combination with high flow rate increase consumption of wear parts. High pressure also reduces the cleaning effect.

Draining using compressed air

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

Draining should always be done inside the tank.

See *Specific conditions for safe use in accordance with ATEX/IECEx certification*.

Steam cleaning

If stream cleaning is done through the machine, the steam pressure must not cause the machine body rotation to exceed 6 rpm (corresponding to approx. 10 sec. per rev of the body) in order to avoid risk of machine breakdown. See *Specific conditions for safe use in accordance with ATEX/IECEx certification*.

Temperature

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

See *Specific conditions for safe use in accordance with ATEX/IECEx certification*.

After use cleaning

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

5.2 Safety precautions

The machine is intended for use inside a tank only. As peak velocity of main jets reaches 40 m/sec., the Alfa Laval MultiJet 45 must not be operated in open air or when tank is open

Warning

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

Make sure that system is depressurised and drained before disassembly.

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

Warning

Tanks may contain poisonous/hazardous products or products which represent an environmental or safety risk.

Never open tank and dismount the machine without checking previous tank contents and necessary precautions.

See also *ATEX/IECEx temperature class and code*.

6 Maintenance

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 Preventive maintenance

Following the Alfa Laval Preventive Maintenance Guidelines and using the Alfa Laval Service Kits ensures the availability of your equipment at all times and enables you to plan your operating budget and your downtime. The risk of unscheduled breakdowns due to component failure is virtually eliminated and in the long term your operating costs are reduced.

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

The recommended preventive maintenance program is based on tank cleaning machines working in average conditions. However, a tank cleaning machine, exposed to heavy soiling and recirculation CIP liquid containing abrasives and/or particulates (see *General safety and installation instructions* for strainer recommendations), needs more frequent attention than one exposed to light/no soiling and recirculation with ordinary CIP liquid. Alfa Laval Kolding A/S recommends that you adjust the maintenance program to suit the cleaning task in hand. Contact your local Alfa Laval sales office for discussion.

For further information regarding Alfa Laval Service Kits and service intervals, see *Maintenance Intervals and service kits* of this manual or the Spare Parts Manual.

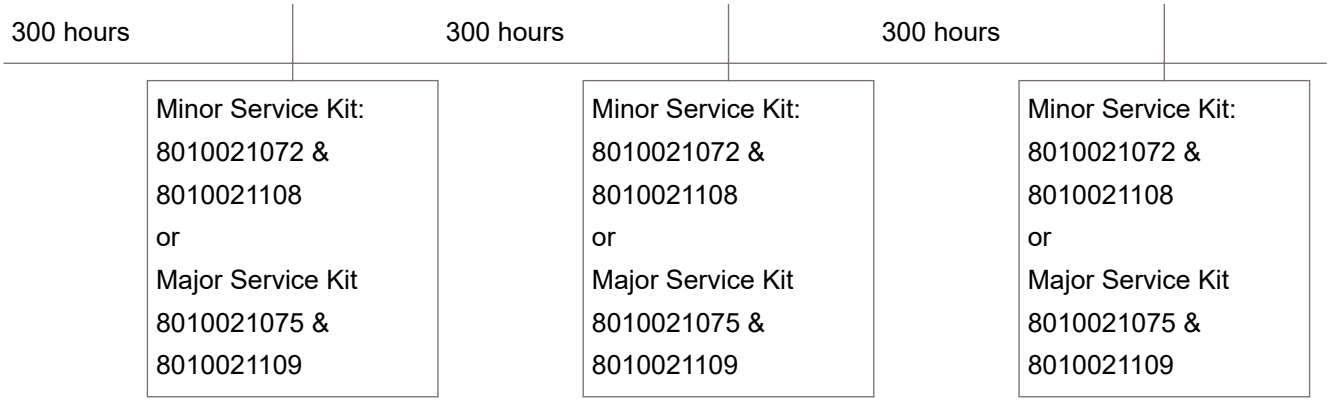
Handle the Alfa Laval MultiJet 45 machine with care. Take proper action to protect surfaces from being damaged. Always use only proper tools. Use MultiJet 45 standard tool kit. Never force, hammer or pry components together or apart. Always perform all assembly/disassembly steps in the order described in this manual. Never assemble components without previous cleaning. This is especially important at all mating surfaces. Work in a clear well lighted work area.

Note: Recommended tightening torque for all screws: 4-5 Nm.

6.3 Maintenance Intervals and service kits

It is recommended that the wear parts are checked every 300 working hours for machine working under normal conditions. There are Minor and Major service kits for the Alfa Laval MultiJet 45 (see *Parts lists and drawing, service kits and tools*.

Service kits



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

Every 300 working hours

1. Disassemble machine as described on the following pages.
2. Clean material build-up and deposits from internal parts with Scotch-brite, S-Ultrafine, eventually chemical cleaner and fine abrasive cloth.
3. Check Slide bearings (position 31 on the cross sectional drawing, see *10 Parts list and drawing, service kits and tools* for wear. If hole is worn oval to max. diameter more than 10.4 mm, Slide bearings should be replaced. If end face of Slide bearing is worn more than x mm into Slide bearing, it should be replaced.
   Note: Under Turbine shaft: x=1.5mm. At Horizontal shaft: x=0.5mm
4. Check Collar bushes (10) in Gear frame. If holes are worn oval to max. diameter more than 13.4 mm, Collar bush should be replaced. How to replace Collar bushes, see *6.12 Replacement of collar bushes*
   Note: Timely replacement of Slide bearings and Collar bushes will prevent costly damage to the gear box.
5. Check Worm wheels (11 and 34). If extremely worn, they should be replaced.
6. Check Main bush (5). If worn it should be replaced.
7. Assemble machines as described in the following pages.
8. Check that the machine is in operating condition by inserting Hex Screw-driver (tool No. TE134A) in screw in top of Turbine shaft and easily turn Turbine shaft clockwise. If any resistance is recognised, the machine should be disassembled to localise the cause.

Apart from the parts specifically mentioned above, all the remaining wear parts should regularly be inspected for wear. Which parts that are wear parts appear from the Spare Part Manual, available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

6.4 General assembly/disassembly recommendations

- Always read the instruction and maintenance manuals carefully before service.
- Always replace all parts included in the Service Kit.
- Prior to assembly/disassembly clean all tools and fixtures to ensure that scratches and marks and trace of soil/corrosion
  from tools are avoided.
- Do not scratch or damage the surfaces of the machine.
- Always place components on soft material

Check surfaces for product residues and clean all parts before assembly. Assembly of the machine is described on the following pages.

Warning:

During disassembly and assembly the threads can gall. If any resistance is felt when screwing/ unscrewing parts, proceed with caution.

6.5 Nozzle mounting

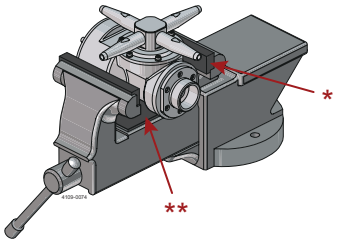
1. Clamp machine firmly in a vice. Protect machine with rubber pad under the machine and use rubber jaws on the vice. Mount jaws upside down to ensure firm grip on the machine. Set torque wrench at the specified tightening torque.

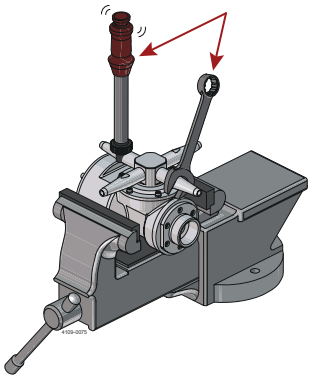
2. Hold one nozzle with flat spanner to counteract while tightening the opposite nozzle with the torque wrench.

Recommended tighening torque: 40 Nm

* Rubber jaw mounted upside down

** Protect with rubber pad





6.6 Top assembly

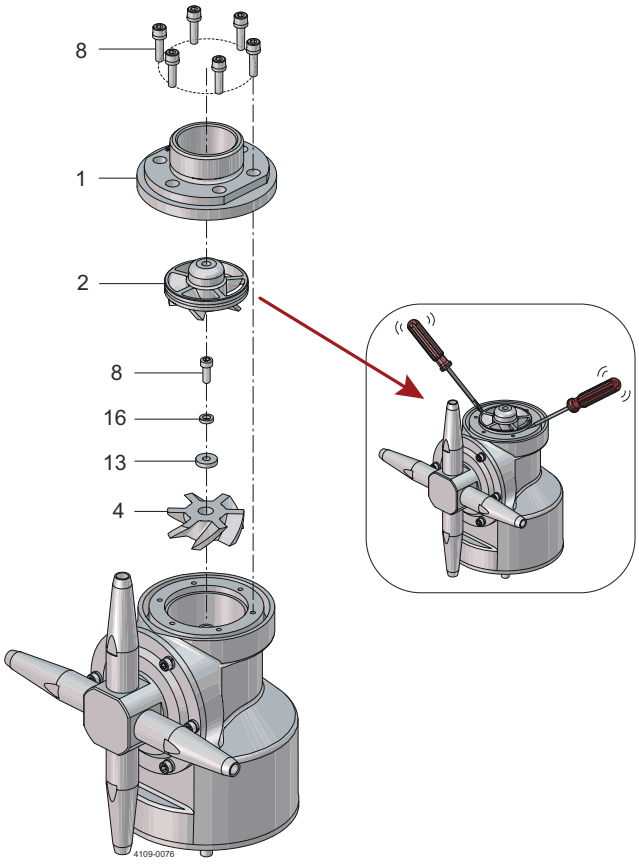
DisassemblyEnter the prerequisites here (optional).

1. Remove Screws (8). Loosen with Key (tool No. TE134) and unscrew with Screwdriver (tool No. TE134A).
2. Lift off Nipple (1).
3. Remove Guide/Guide ring (2). The Guide has a groove in the outer diameter. The Guide is easily lifted out of the Stem by means of two ordinary Screwdrivers inserted into the groove.
4. Remove Screw (15), Spring washer (16) and Washer (13). To secure Impeller against rotation, insert carefully Screwdriver (tool no. TE134A), through Impeller (4) into a hole in the Stem.
5. Pull off Impeller (4).

Reassembly

1. Reinstall Impeller (4). Make sure that Impeller is correctly rotated to be pushed onto Turbine shaft. Do not try to hammer Impeller in position, as this will damage Slide bearing under Turbine shaft.
2. Mount Washer (13), Spring washer (16) and Screw (15) and tighten. To secure Impeller against rotation insert carefully Screwdriver (tool No. TE134A) through Impeller (4) into a hole in the Stem.
3. Reinstall Guide /Guide ring (2).
4. MountNipple(1). Makesurethatitisin correctpositionoverGuide/Guidering(2). RotateNippletoalignholesinNippleand Stem.
5. Mount Screws (8) with Screwdriver (tool No. TE134A). Tighten with Key (tool No. TE134).

Top Assembly



6.7 Bottom assembly

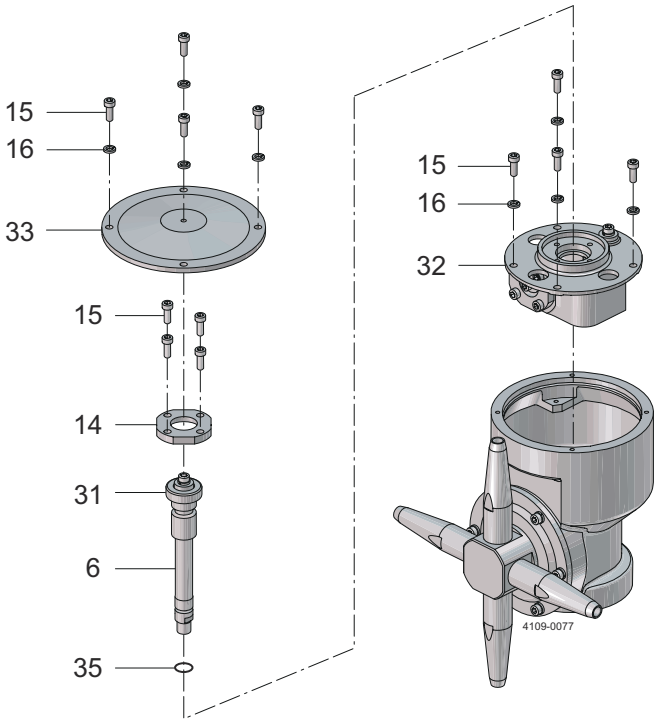
Disassembly

1. Turn machine upside down.
2. Remove Screws (15) and Spring Washer (16) from Bottom cover (33).
3. Remove Bottom cover (33).
4. Remove Screws (15) in Bearing cover (14). Carefully push out bearing (31), O-Ring (35) and Turbine Shaft from the opposite end. Do not try to hammer out Turbine shaft, since this can damage Slide bearing.
5. Remove Screws (15) and Spring Washers (16) along the circumference of Gear frame (32). Turn Gear frame about 1 cm (½"). Draw out Gear Subassembly (holes in Gear frame are excellent for holding Gear Subassembly).

Reassembly

1. Reinsert Gear subassembly in bottom of machine body. Turn Gear Frame (32) to align holes in Gear frame and 3/16" threads n body. Mount Spring washers (16) and Screws (15) along circumference of Gear frame (32). Tighten screw crosswise.
   Note: To secure meshing between Gear wheel (7) and Pinion (9). It might be necessary to rotate slightly either the whole Gear Subassembly or the Gear wheel.
2. Reinsert Turbine shaft (6) with O-ring (35) and Slide bearing (31) carefully through Gear wheel (7). Push carefully Slide bearing (31) into position. Mount Bearing cover (14) with Screws (15). Tighten crosswise.
3. Place Bottom cover (33).
4. Mount Spring washers (16) and Screws (15) and tighten crosswise.

Bottom Assembly



6.8 Hub Assembly

Disassembly

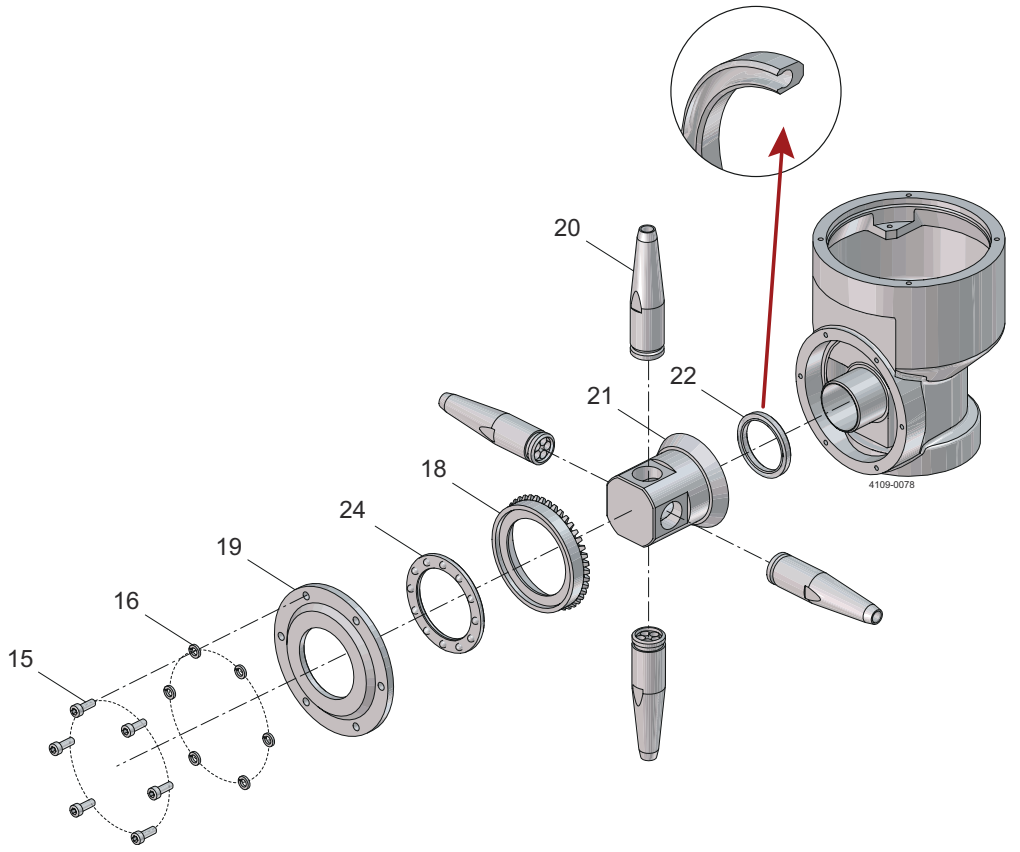
1. Remove Nozzles (20). Nozzles are untightened with a wrench on the faces of the Nozzles.
2. Remove Screws (15), and Spring washers (16) and Hub cover (19).
3. Draw out Hub (21) together with Ball retainer with balls (24) and Bevel gear (18).
4. Remove Lipseal (22) and check for wear. If the Lipseal is worn, it has to be replaced.

Note: If Ball races in Hub cover (19.1) and in Bevel gear (18.1) are extremely worn, they should be replaced as well as the Ball retainer with balls (24). How to replace see *Replacement of Ball races*.

Reassembly

1. Carefully replace Lip seal (pos. 22) in the Hub (pos. 21).
2. Slide on Hub (21). Reinsert Bevel gear with race (18) and Ball retainer with balls (24).
3. Mount Hub cover with race (19), and set with Spring washers (16) and Screw (15).
4. Screw on Nozzles (20) and tighten with wrench. If desired, secure with liquid threadlocker Loctite no. 243 or equivalent.

Hub Assembly



6.9 Stem Assembly

Disassembly

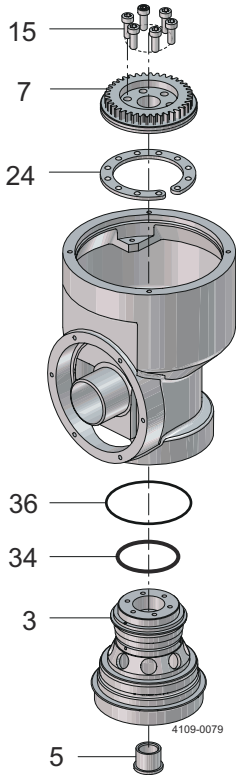
1. Place machine in upside-down position.
2. Remove Screws (15) in Gear wheel (7). To prevent rotation of Stem (3) mount two screws in two holes opposite one another in BIG end of Stem. Place Stem in a vice held by the heads of the two screws.
3. Draw out Gear wheel with ball races (7) and Ball retainer with balls (24).
4. Push out Stem (3).
5. Check O-ring on Stem (pos. 36) and O-ring in Upper collar main (pos. 34), replace if worn.
6. If worn, press out Main bush (5)

If Ball races in Body (29) and on Gearwheel (7.1) are extremely worn they should be replaced together with Ball retainer with balls (24). How to replace see *Replacement of Ball races*.

Reassembly

1. If replaced press Main bush (5) into Stem (3).
2. Push Stem into Body. Turn machine upside-down.
3. Place Ball retainer with balls (24) and Gear wheel (7) into Body on Ball race. Rotate Gearwheel to check free rotation. Mount Gearwheel with Screws (15) and tighten crosswise. To prevent rotation of Stem (3) mount two screws in two holes opposite one another in BIG end of Stem. Place Stem in a vice held by the heads of the two screws.

Stem Subassembly



6.10 Gear Subassembly

Disassembly

1. To make a backstop, remount Turbine shaft (6) with Slide bearing (31) and O-ring (pos. 35) into Gear frame (32). Mount Bearing cover (14) with Screws (15).
2. Hold Turbine shaft (6) against 1st stage Worm wheel (34) with one hand and loosen Screw (15) in Pinion (9) and Horizontal shaft (30) with the other hand.
3. Remove Screws (15) in Bearing cover (14) and take out Turbine shaft (6).
4. Draw out Horizontal shaft (30) and 1st stage Worm wheel (34) after removal of Screw (15), Spring washer (16) and Washer (13).
5. Draw out Pinion (9) and 2nd stage Worm wheel (11), also freeing Journal (12) after removal of Screw (15), Spring washer (16) and Washer (13).
6. Remove Bearing cover (14) and Slide bearing (31) after removal of Screw (15).
7. Remove Screw (15), Spring washer (16), Washer (13) and Slide bearing (31) from Turbine shaft (6). Use faces on Turbine shaft to hold against rotation.

Warning:

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

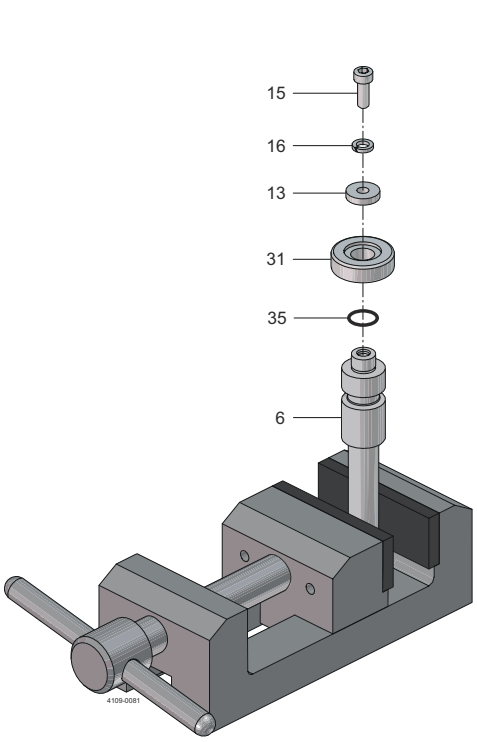
How to replace Collar bushes (10), see *Replacement of Collar bushes*.

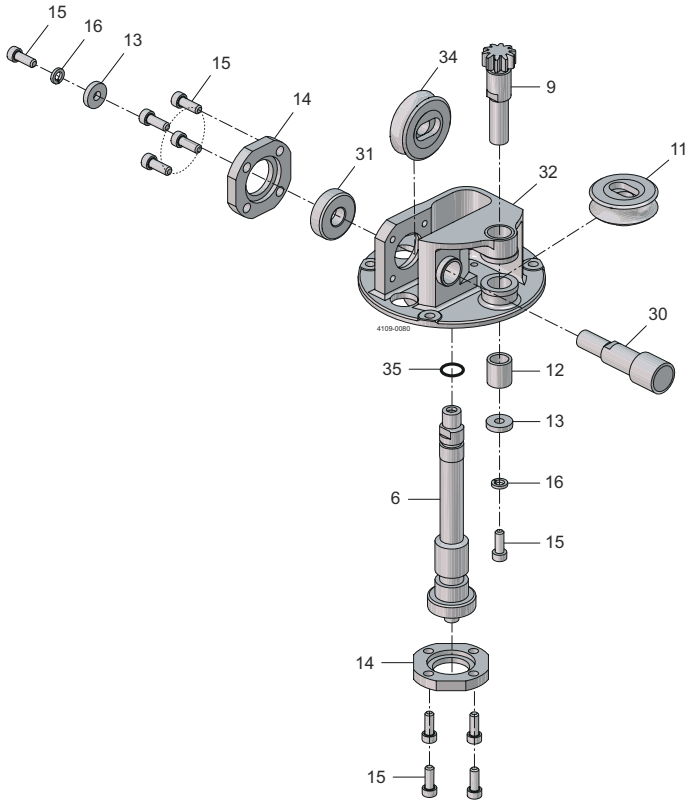
6.11 Reassembly

1. Mount O-ring (35) and Mount Slide bearing (31) carefully on Turbine shaft (6) and secure with Washer (13), Spring washer (16) and Screw (15). Hold Turbine shaft in a vice or with wrench on driver faces and tighten.
2. Push Slide bearing (31) for Horizontal shaft (30) into Gear frame (32) and fix Bearing cover (14) with Screws (15). Tighten crosswise.

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

Gear Subassembly





1. Insert 2nd stage Worm wheel (11), Pinion (pos 9) and Journal (12). Mount Washer (13), Spring washer (16) and fix with Screw (15). Check rotation.
2. Insert 1st stage Worm wheel (34) and Horizontal shaft (30). Mount Washer (13), Spring washer (16) and fix with Screw (15). Check rotation.
3. Reinstall Turbine shaft (6) in Gear frame as mentioned under Disassembly, point 1.
4. Hold Turbine shaft (6) against 1st. stage Worm wheel and tighten Screws (15) in Horisontal shaft (30) and Pinion (9).
5. Remove Turbine shaft (6) with O-ring (pos. 35) and Slide bearing (31) before Gear subassembly is inserted in machine body.

6.12 Replacement of collar bushes

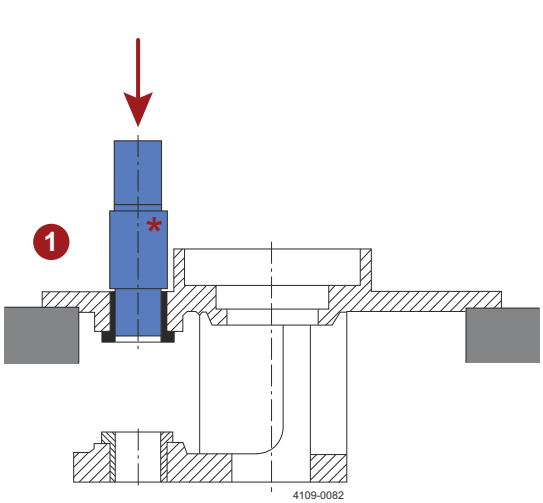
Replacement of Collar Bushes in gear frame

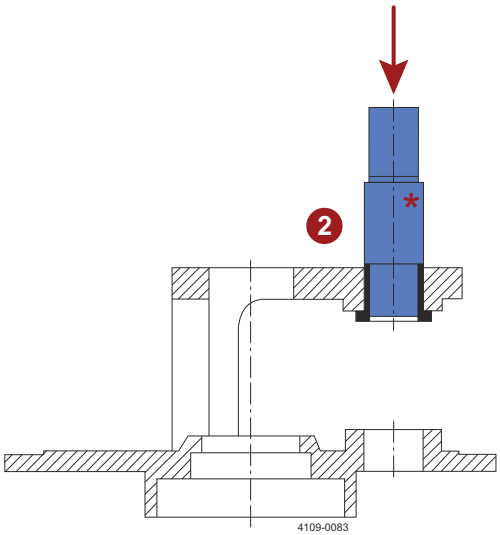
1. Place Gear frame (29) upside down with a firm support under the flange. Use for instance jaws of a vice. Do not clamp on machined surfaces. With Pusher (tool No. TE81B033, see page 46) knock out Collar bush.
2. Turn Gear frame to upright position and hold over support such as flat steel bar clamped in a vice. Knock out Collar bush with Pusher.
3. Turn Gear frame 90° and hold over support. Knock out collar bush with Pusher.
4. Clean holes and push in new Collar bushes into Gear frame.

Warning:

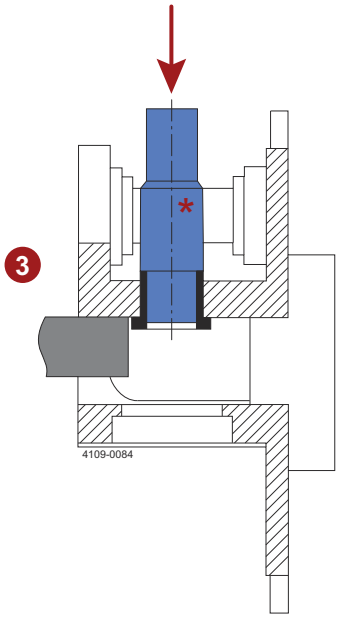
To avoid risk of deforming Gear frame, it is utmost important that it is supported while the Collar bushes are being knocked out.

Removal of Collar bushes.





* Pusher tool TE81B033



6.13 Replacement of ball races

In body

1. With big end downwards knock several times Body with bearings (26) hard against firm wooden support until Ball race (29) drops out.
2. If it is not possible to knock out Ball race in this way, it is necessary first to screw out Main collar lower (28) – see *6.14 Replacement of main collars*. Carefully push off old Ball race without damaging Main collar lower. Use mandrel and firm support. Before mounting of new Ball race, Main collar lower (28) must be remounted into Body – see *6.14 Replacement og main collars*
3. Clean surfaces and place Ball race (29) on Main collar lower (28). Press by hand as long as possible. By means of a tube mandrel or if desired wooden block, carefully hammer Ball races home.

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

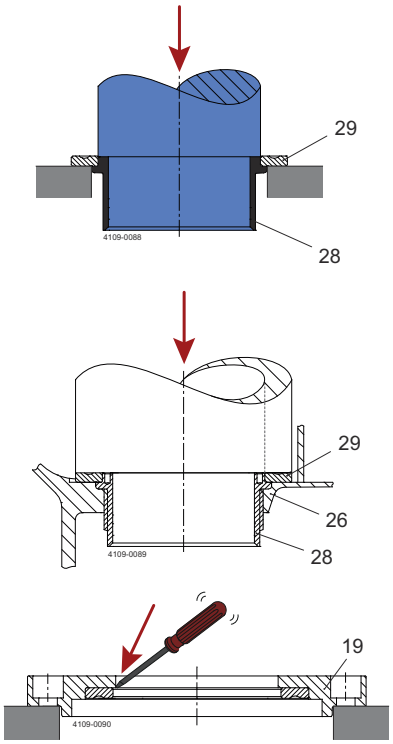
On Gear wheel

1. Place Gear wheel with ball race (7) on support. Support only under Ball race (7.1). With mandrel press off old Ball race.
2. Clean surfaces and press on new Ball race. Ball race must be pressed fully home on Gear. Press parallel. Use press or vice. Do not damage surface of Ball race.

In Hub cover

1. Place Hub cover with ball race (19) on support. Carefully knock out old Ball race by means of small mandrel or if desired screwdriver. Knock several times around the circumference to avoid tilting.
2. Clean surfaces and press in new Ball race. Ball race must be pressed fully home. Press parallel. Do not damage surface of Ball race.

Replacement of Ball races



6.14 Replacement of main collars

Although normally exposed to very limited wear, it is possible to replace Main collars (27 and 28) in Body. The procedure to do this is described below.

Main collar upper

1. Place Body (26) in a vice upright position. Do not clamp on machined faces. Insert tool (see page 43) into Main collar upper (27). Unscrew Main collar.
2. Carefully clean thread and recess in Body. Do not damage special thread in Body. Recess must be absolutely clean.
3. Make sure that new Main collar is clean and free from impurities.
4. Remove O-ring (pos. 34) from old Upper main collar and place it in the new one. (inspect O-ring, if worn it should be replaced also).
5. Screw in new Main collar. Attention should be given to make sure that thread is in correct engagement before screwing in Main collar.
6. Tighten Main collar fully home and tighten up.
7. Check that Main collar is fully home: install Stem, Ball retainer with balls and Gear wheel (see *6.8 Hub Assembly*). Check that there is sufficient axial clearance to allow for free rotation of Stem.

Main collar lower

1. Place Body in a vice in upside down position. Do not clamp on machined faces. Insert tool into Main collar lower (pos. 26.2). Unscrew Main collar.

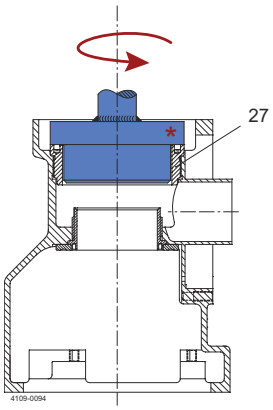
Warning: Thread on Main collar lower is left-handed.

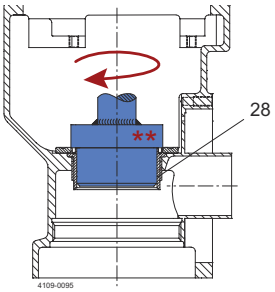
1. Carefully clean thread and recess in Body. Do not damage special thread in Body. Recess must be absolutely clean.
2. Make sure that new Main collar is clean and free from impurities.
3. Inspect O-ring on stem (pos. 36), if worn it should be replaced.
4. Screw in new Main collar. Attention should be given to make sure that thread is in correct engagement before screwing in Main collar.
5. Tighten Main collar fully home and tighten up.
6. Check that Main collar is fully home: install Stem, Ball retainer with balls and Gear wheel (see *6.9 Stem Assembly*). Check that there is sufficient axial clearance to allow for free rotation of Stem.

Replacement of Main Collars

* Tool TE81B129

** Tool TE81B130





7 Trouble shooting guide

7.1 Slow rotation or failure of machine to rotate

Possible Causes	Action
No or insufficient liquid flow	a) Check if supply valve is fully open b) Check if inlet pressure to machine is correct c) Check supply line and filter for restriction/clogging d) Remove Nozzles and check for clogging. If blocked, carefully clean Nozzle without damaging stream straighteners and Nozzle tip. e) Remove Cone/Nipple, Guide and Impeller (see *6.6 Top assembly*) and check for clogging in Impeller area. If large particles repeatedly get jammed in the machine, install filter or reduce mesh size of installed filter in supply line.
Foreign material or material build-up	Insert hex Screwdriver in Screw in top of Turbine shaft and easily turn Turbine shaft clockwise. If any resistance is recognised, disassemble machine in order to localise the cause.
a) Impeller jammed	Remove Guide and Impeller (see *6.6 Top assembly*) and remove foreign material.
b) Turbine shaft sluggish in Main bush	Remove Turbine shaft (see *6.7 Bottom assembly*) and clean Main bush.
c) Bevel gears jammed	Remove Flange/Nipple and Hub Subassembly (see *6.8 Hub Assembly*). Clean teeth on Stem and Bevel gear.
d) Stem jammed/sluggish	Remove Gear Subassembly (see *6.10 Gear Subassembly*). Check free rotation of Stem. Remove Stem (see *6.9 Stem Assembly*). Remove foreign material/material build-up on Stem and inside Main collars. Clean Ball races and Ball retainer with balls. Also clean main bush.
e) Gearbox jammed/sluggish	Remove foreign material from Gearbox. Check rotation of shafts. If restriction is recognized, disassemble gearbox (see *6.10 Gear Subassembly*) and remove material build up, especially on 2. Stage Worm wheel and mating Collar bushes.
f). Hub jammed/sluggish	Disassemble Hub Subassembly (see *6.8 Hub Assembly*). Remove foreign material inside Hub. Clean Ball races and Ball retainer with balls. Also clean nose of Body.
Wear	
a) Slide bearings	See *6.3 Maintenance Intervals and service kits*.
b) Main bush	See *6.3 Maintenance Intervals and service kits*.
c) Worm wheels	See *6.3 Maintenance Intervals and service kits*.
d) Collar bushes	See *6.3 Maintenance Intervals and service kits*.
e) Turbine shaft Horizontal shaft	Check clearance in Main bush and in Slide bearing. Transverse movement should not exceed 0.5 mm. Also inspect Worm wheel for wear. Check clearance in Collar bushes. Transverse movement should not exceed 0.5 mm. Also inspect worm for wear.

Possible Causes	Action
Mechanical defects	
a) Worm wheels. Teeth broken	Replace Worm wheel.
b) Worm wheel can rotate on Horizontal shaft/ Pinion due to damaged driver faces.	Replace Worm wheel.
c) Damaged teeth on gear	Inspect teeth on Stem and Bevel gear for deformation. Mount Bevel gear and Stem in Body (see *6.8 Hub Assembly* and *6.9 Stem Assembly*). Hold Body in upside down position and rotate Hub to check that Bevel gears can work together. If damaged: Replace Stem and/or Bevel gear.

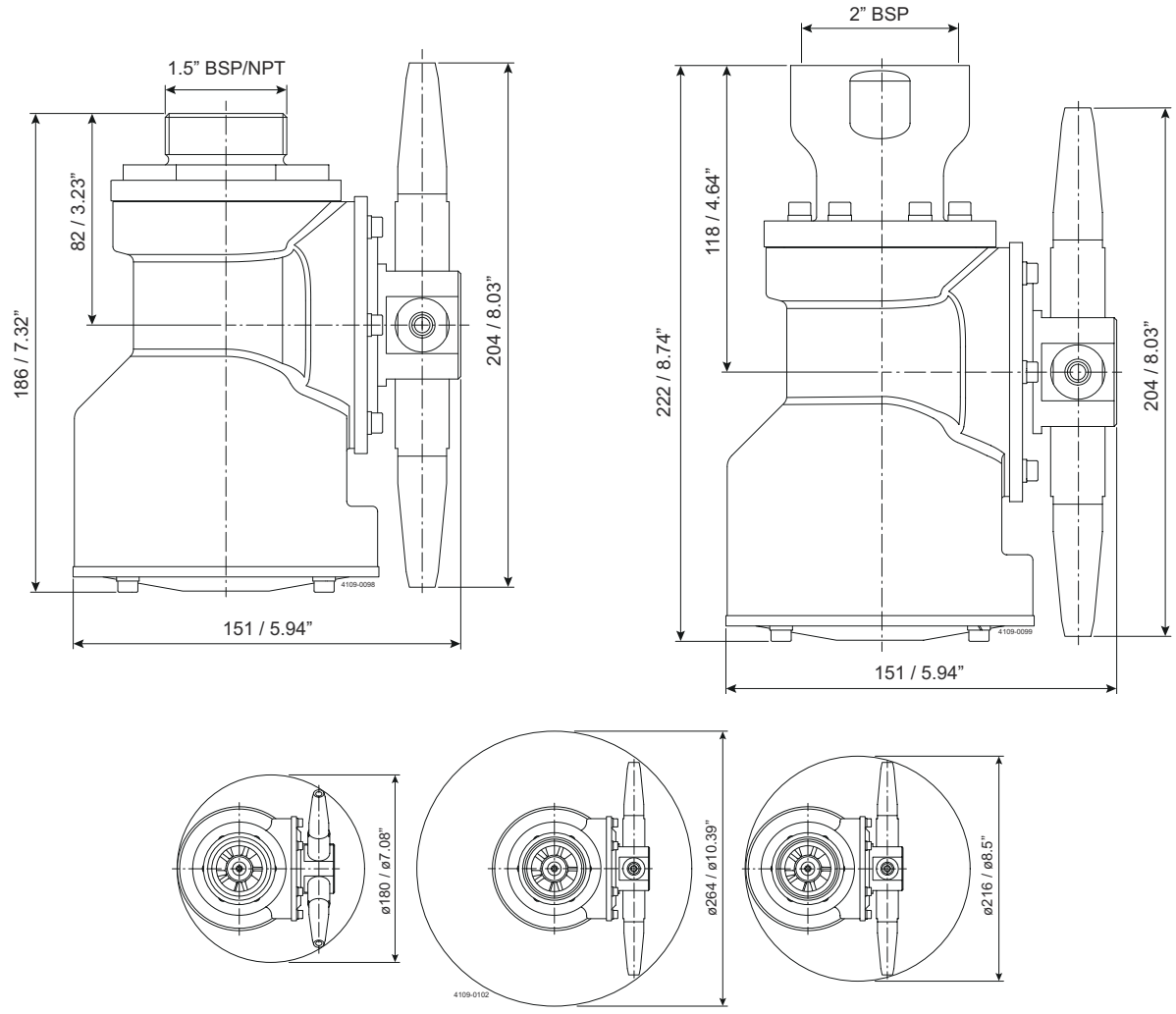
8 Technical data

8.1 Technical data

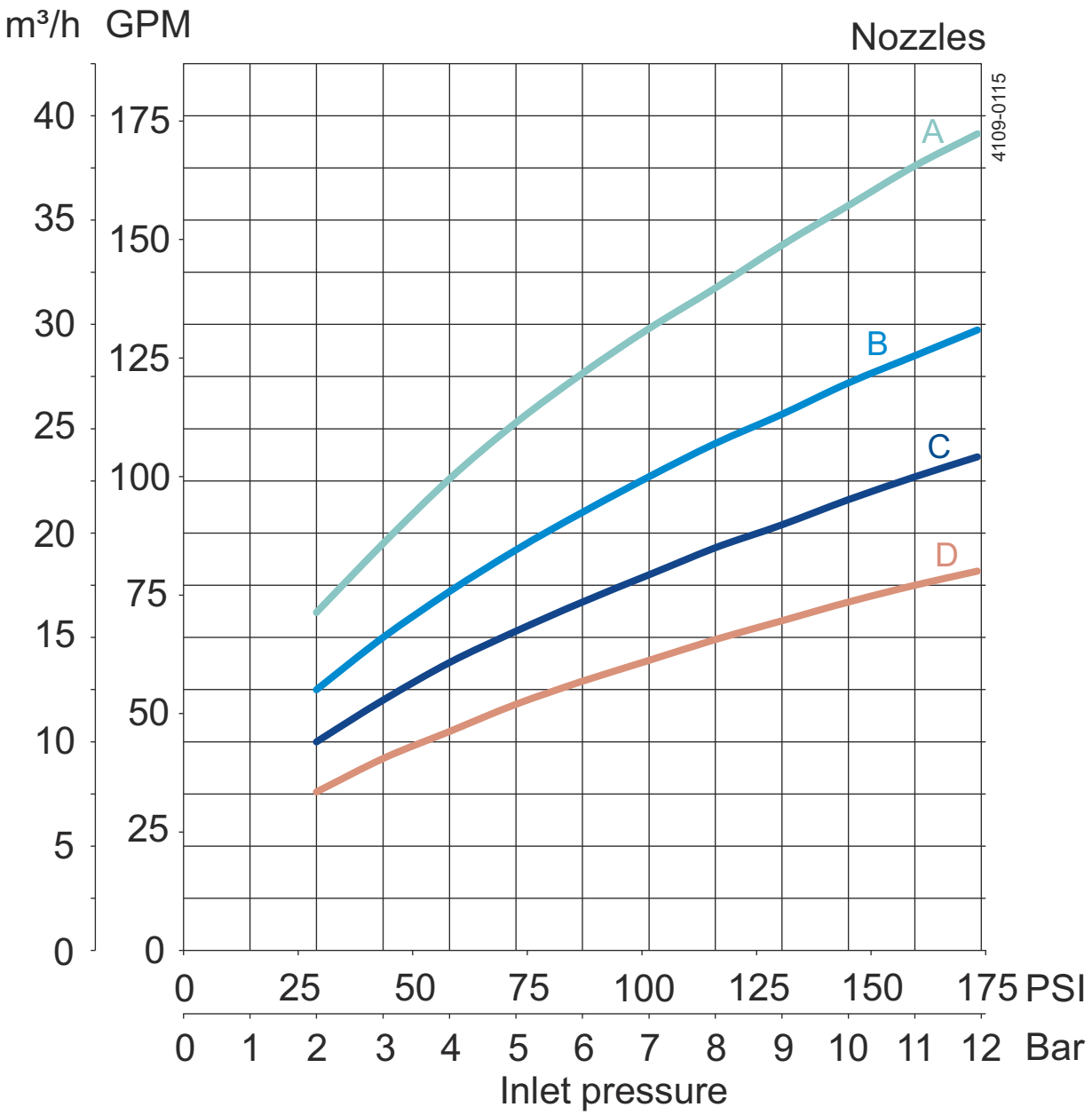
4 Nozzle version

Weight of machine:	6.5 kgs (14,3 lb)
Working pressure:	2–12 bar (30-175 psi)
Recommended inlet pressure:	3–8 bar (45-120 psi)
Working temperature max.:	95°C (200°F)
Ambient temperature:	0 - 140°C (95°C - 140°C when not operated)
Materials:	Stainless steel AISI 316/AISI 316L, PFA, A4, ACO212CF, PEEK, PA6G, FKM

Principal dimensions in mm

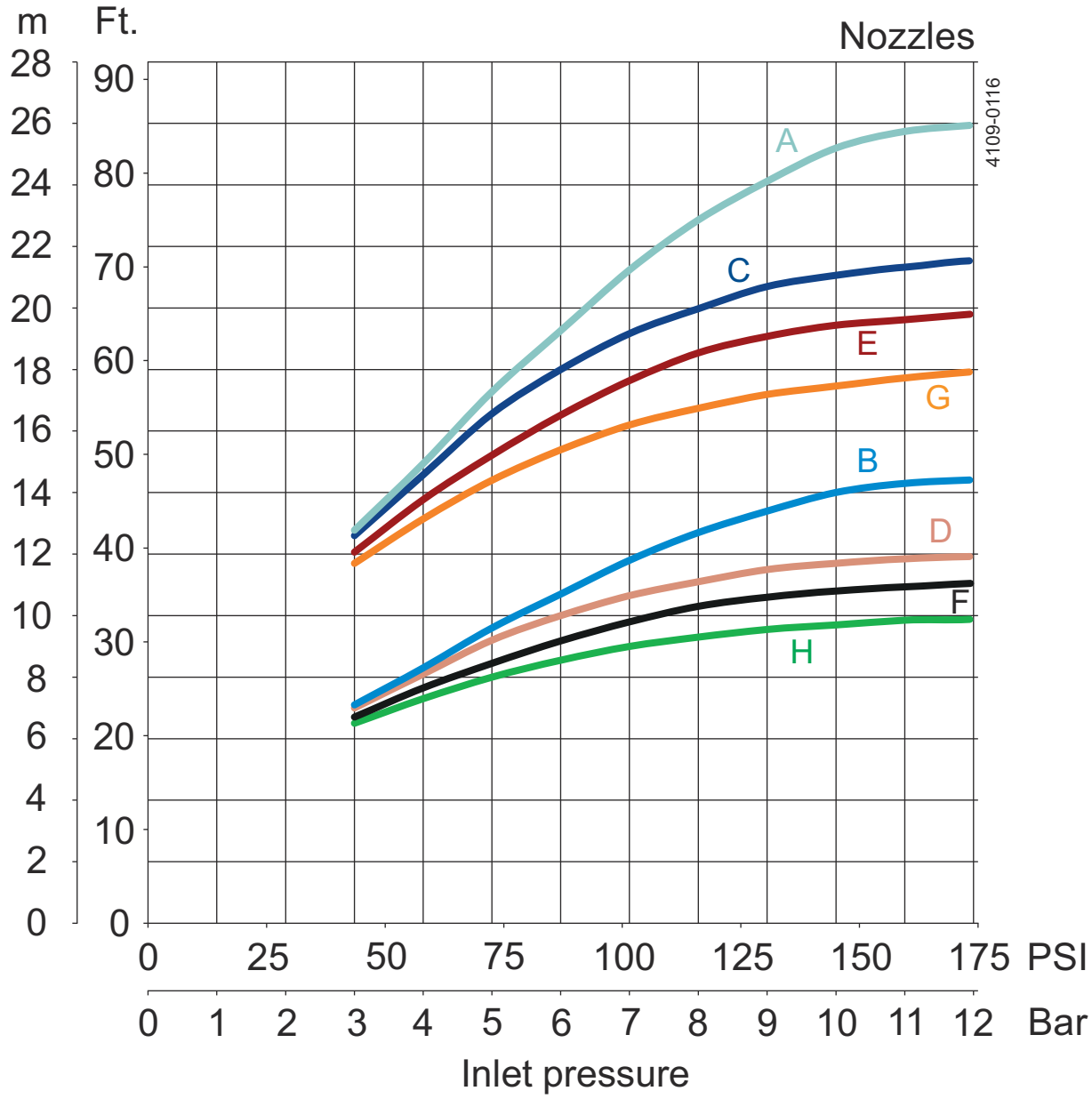


Flow rate



A = 4 x ø10 mm
B = 4 x ø8 mm
C = 4 x ø7 mm
D = 4 x ø6 mm

Throw length

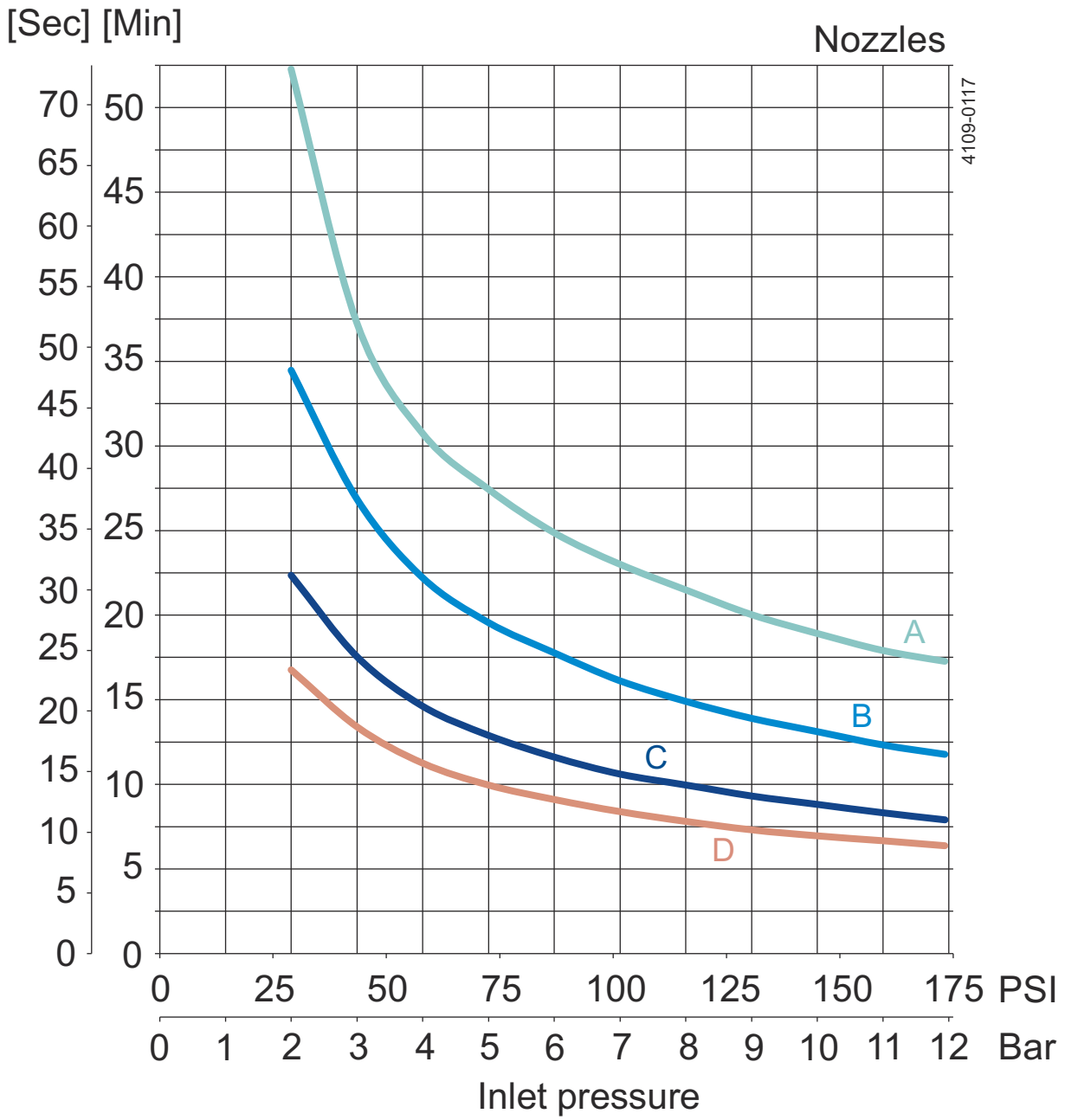


A = 4 x ø10 mm, Max static
B = 4 x ø10 mm, Effective
C = 4 x ø8 mm, Max static
D = 4 x ø8 mm, Effective
E = 4 x ø7 mm, Max static
F = 4 x ø7 mm, Effective
G = 4 x ø6 mm, Max static
H = 4 x ø6 mm, Effective

Note: Throw lengths are measured as horizontal throw length at static condition. Vertical throw length upwards is approx. 1/3 less. Effective throw length is defined as impact centre of jet 250 mm water column (50 lbs/sq.ft). Effective throw length varies depending on jet transverse speed over surface, substance to be removed, cleaning procedure and agent. The inlet pressure has been taken immediately before the machine inlet. In order to achieve the performance indicated in the curves, the pressure drop in the supply lines between pump and machine must be taken into consideration.

Cleaning Time, f. complete Pattern (=8 cycles)

Sec. pr. Rev. PTM(Pattern time Minutes)

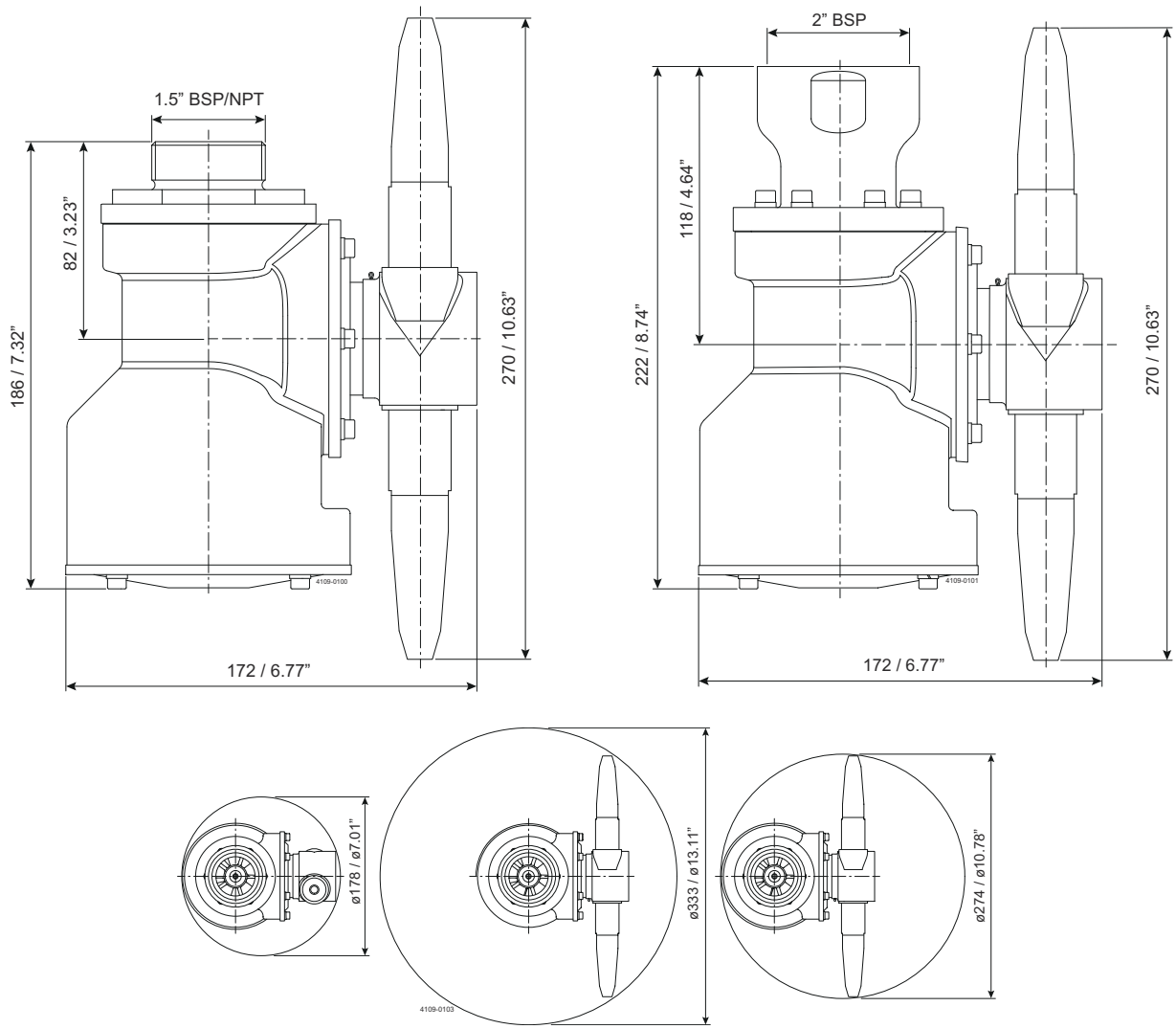


A = 4 x ø10 mm
B = 4 x ø8 mm
C = 4 x ø7 mm
D = 4 x ø6 mm

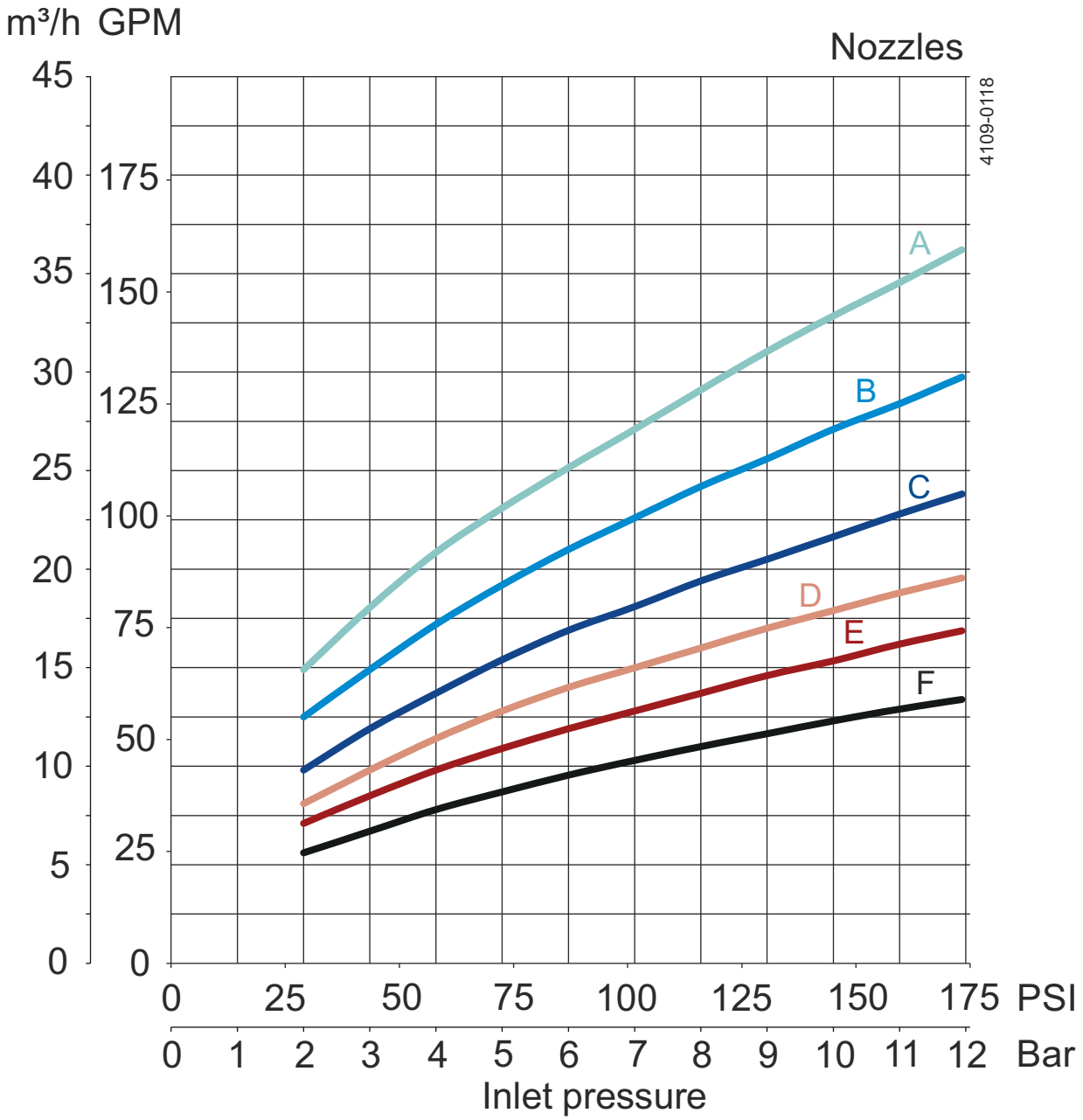
2 Nozzle version

Weight of machine:	6.5 kgs (14,3 lb)
Working pressure:	2–12 bar (30-175 psi)
Recommended inlet pressure:	3–8 bar (45-120 psi)
Working temperature max.:	95°C (200°F)
Ambient temperature:	0 - 140°C (95°C - 140°C when not operated)
Materials:	Stainless steel AISI 316/AISI 316L, PFA, A4, ACO212CF, PEEK, PA6G, FKM

Principal dimensions in mm

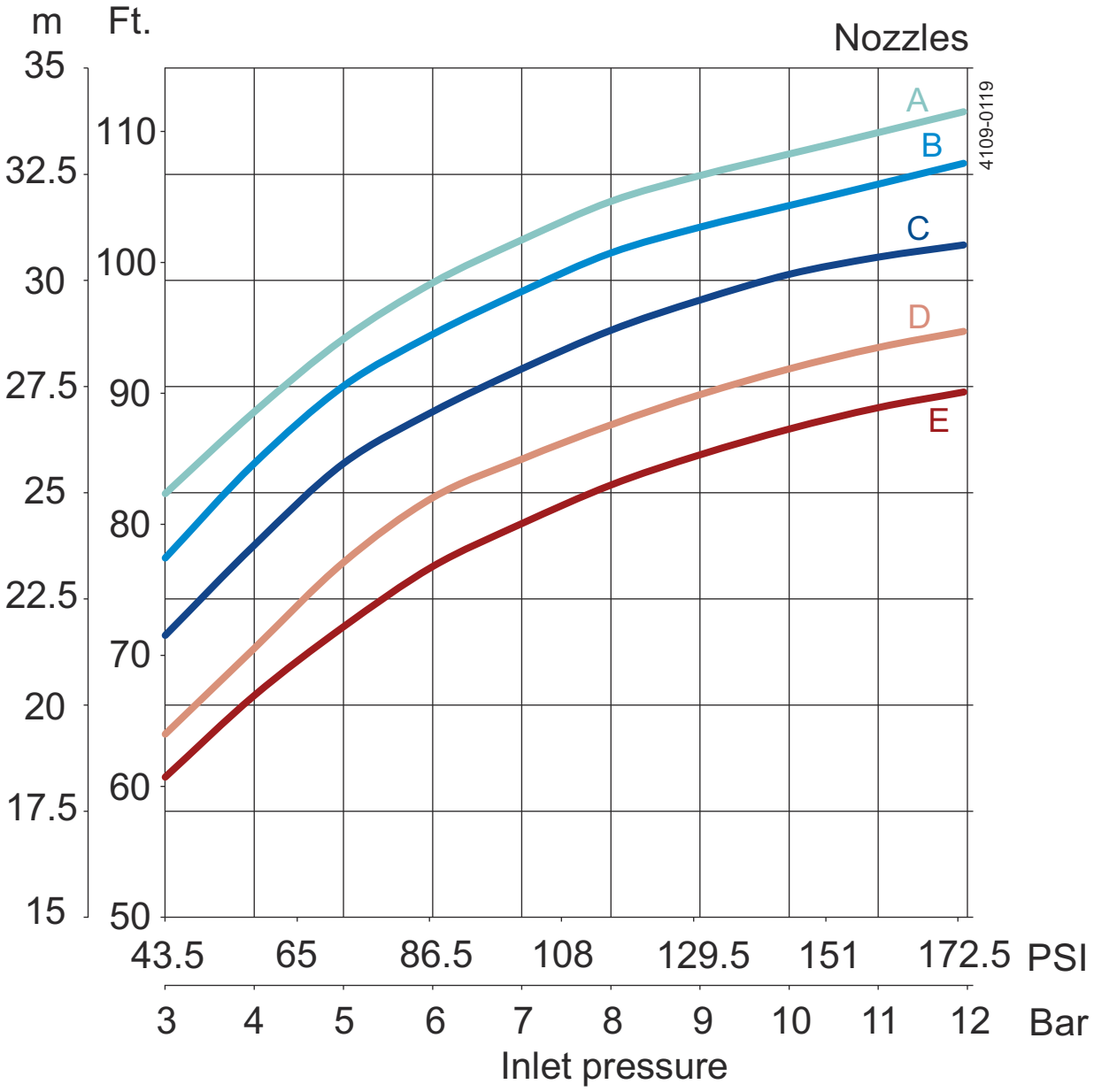


Flow rate



A = 2 x ø14 mm
B = 2 x ø12 mm
C = 2 x ø10 mm
D = 2 x ø9 mm
E = 2 x ø8 mm
F = 2 x ø7 mm

Throw length

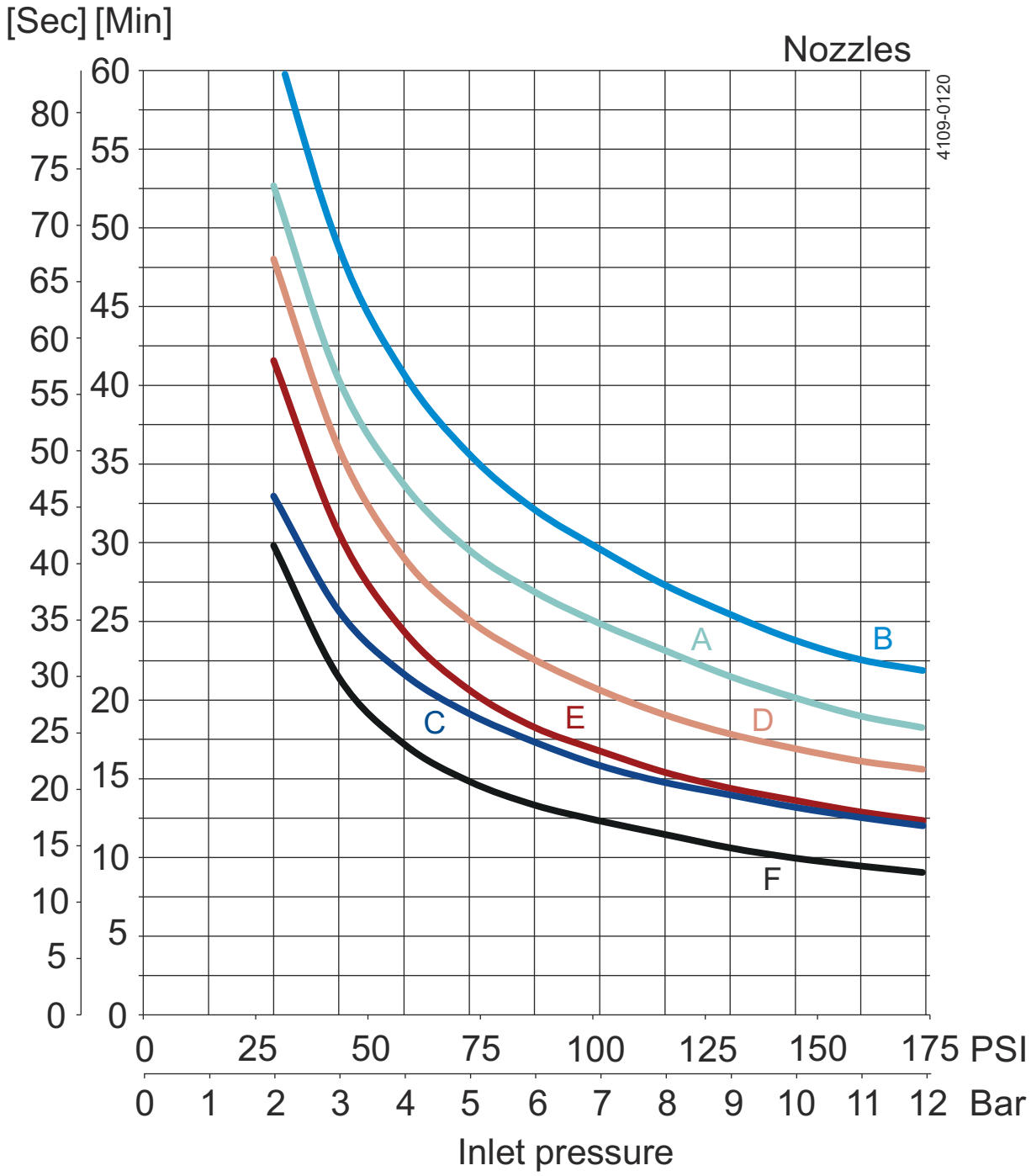


A = 2 x ø14 mm, Max static
B = 2 x ø12 mm, Max static
C = 2 x ø10 mm, Max static
D = 2 x ø8 mm, Max static
E = 2 x ø7 mm, Max static

Note: Throw lengths are measured as horizontal throw length at static condition. Vertical throw length upwards is approx. 1/3 less. Effective throw length is defined as impact centre of jet 250 mm water column (50 lbs/sq.ft). Effective throw length varies depending on jet transverse speed over surface, substance to be removed, cleaning procedure and agent. The inlet pressure has been taken immediately before the machine inlet. In order to achieve the performance indicated in the curves, the pressure drop in the supply lines between pump and machine must be taken into consideration.

Cleaning Time, f. complete Pattern (=8 cycles)

Sec. pr. Rev. PTM(Pattern time Minutes)



A = 2 x ø14 mm
B = 2 x ø12 mm
C = 2 x ø12 mm, fast
D = 2 x ø10 mm
E = 2 x ø8 mm
F = 2 x ø7 mm

9 Product programme

9.1 Standard configurations

Standard Configurations for MultiJet 45

Connection	Nozzles (mm)
Male thread; 1½" BSP or 1½" NPT or Cone for adaptors	4xø6 4xø7 4xø8 4xø10
Male thread: 1½" BSP or 1½" NPT or Cone for adaptors	2xø7 2xø8 2xø10 2xø12 2xø12, fast 2xø14

Please go to Anytime configurator for possible configurations and item numbers.

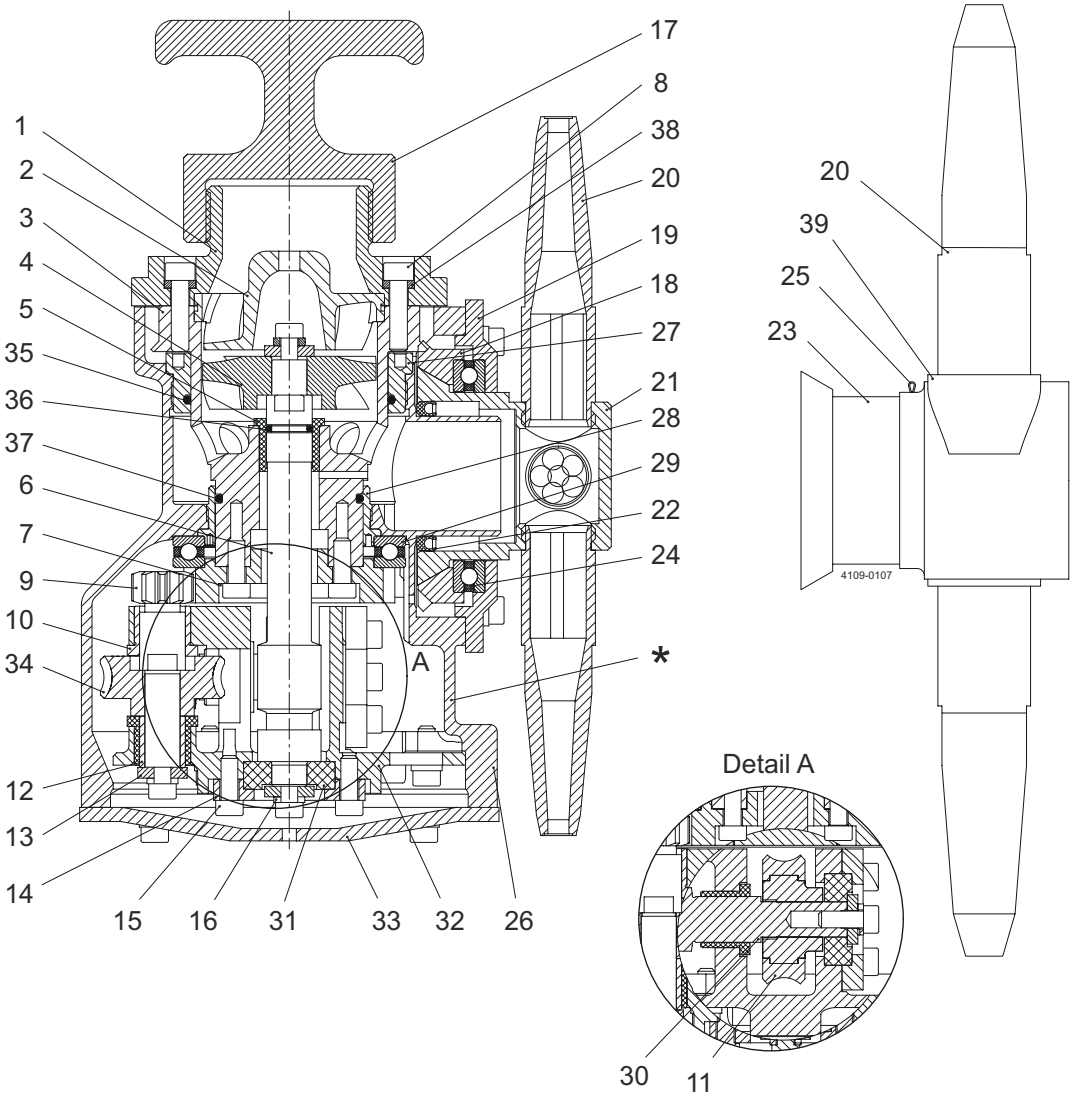
9.2 Available add-ons

Available add-ons	
	ATEX/UKEx/IECEx

Explanation to Add-ons		
ATEX/IECEx		**ATEX/IECEx includes:** **ATEX/IECEx** certified machine for use in explosive atmospheres. Category 1 for installation in zone 0/20 in accordance with directive 2014/34/EU. II 1G Ex h IIC 85°C…175°C Ga II 1D Ex h IIIC T85°C…T140°C Da

10 Parts list and drawing, service kits and tools

10.1 Alfa Laval MultiJet 45



Parts list

Pos.		Qty	Denomination
1	□	1	Process connection
2	□	1	Guide
3		1	Stem
4	□	1	Impeller
5	Δ*	1	Main bush
6	Δ	1	Turbine shaft
7		1	Gear wheel w. ball race
7.1	Δ	1	Ball race
8		6	Screw
9		1	Pinion
10	Δ*	3	Collar bush
11	Δ*	1	Worm wheel
12		1	Journal
13		4	Washer
14		2	Bearing cover
15		32	Screw
16		17	Spring washer
17	□	1	Handle
18		1	Bevel gear w. ball race
18.1	Δ	1	Ball race
19		1	Hub cover w. ball race
19.1	Δ	1	Ball race
20	□	4/2	Nozzle
21	□	1	Hub
22	Δ*	1	Lip seal
23	□	1	Hub conical part
24	Δ	2	Ball retainer w. balls
25	□Δ	1	Split Pin
26		1	Body
27	Δ	1	Main collar upper
28	Δ	1	Main collar lower

Pos.		Qty	Denomination
29	Δ	1	Ball race
30	□Δ	1	Horizontal shaft
31	Δ*	2	Slide bearing
32		1	Gear frame
33		1	Bottom Cover
34	Δ*	1	Worm wheel
35	Δ*	1	O-ring
36	Δ*	1	O-ring
37	Δ*	1	O-ring
38		7	Washer
39	□	1	Hub nozzle part

□ Configuration according to delivery note/order.

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

Service kits

	Denomination	item no.
Service kits for 4xø6, 4xø7, 4xø8, 2xø7 & 2xø8		
*	MINOR service kit	8010021072
Δ	MAJOR service kit	8010021075

	Denomination	item no.
Service kits for 4xø10, 2xø10, 2xø12 & 2xø14		
*	MINOR service kit	8010021108
Δ	MAJOR service kit	8010021109

Parts marked with * are included in the Minor service kit: 8010021072 & 8010021108

Parts marked with Δ are included in the Major service kit: 8010021075 & 8010021109

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

Check reference for more information on available add-ons.

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

10.2 Tools

Standard Tool kit for MultiJet 45, Article No. TE81B050

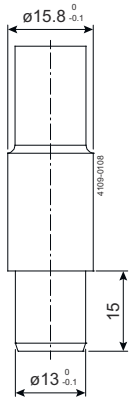
Tool No.	Description	No.
TE134	Hex Key for Screw	1 pcs.
TE134A	Hex Screwdriver for Screw	2 pcs.

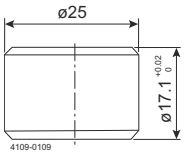
Available on request:

Tool No.	Description
TE81B033	Pusher for 1½" collar bush
TE81B034	Fixture set for collar bush

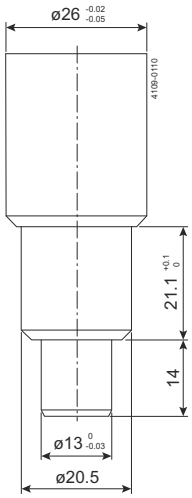
Sketch of tools for replacement of Collars bush:

TE81B033: Pusher for 1½" collar bush



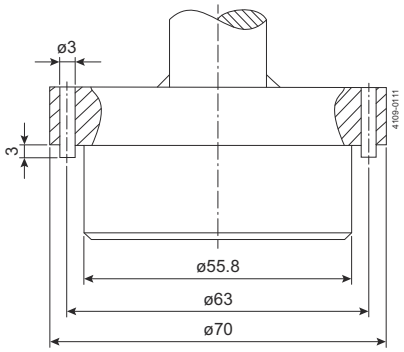


TE81B130: Tool for lower collar

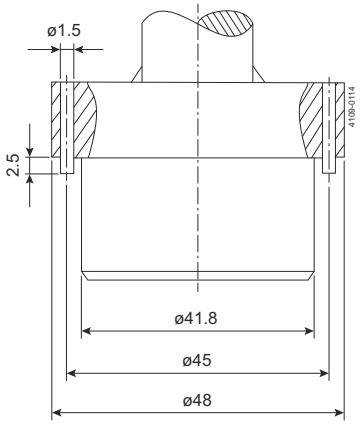


Sketch of tools for replacement of Main collars

TE81B129: Tool for upper collar



TE81B130: Tool for lower collar



11 General information

11.1 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.

11.2 How to order spare parts

On the parts drawings as well as on all instruction drawings, the individual parts have a position number, which is the same on all drawings. From the position number, the part is easily identified in the parts list, see*Parts list and drawing, service kits and tools*.

Individual parts should always be ordered from the parts list, see *Parts list and drawing, service kits and tools*. Item number and denomination should be clearly stated.

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

Please also quote the type of machine and serial number. This will help us to help you. The type and serial numbers are stamped on the body of the tank cleaning machine.

11.3 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.alfalaval.com- info.dk@alfalaval.com

Contact details for all countries are continually updated on our websites