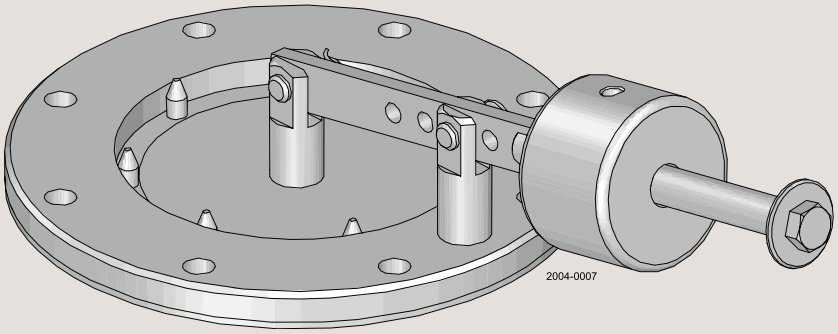
Instruction Manual

Alfa Laval SB Anti Vacuum Valve



ESE02960-EN9 2023-10

Original manual

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

1 Declarations of Conformity

EU Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00
Company name, address and phone number

Hereby declare that

Valve
Designation

SB Anti Vacuum Valve
Type

Serial number from AAB000000001 to AAC999999999
Serial number from 100700000001 to 100799999999

is in conformity with the following directives with amendments:
- Machinery Directive 2006/42/EC
- Pressure Equipment Directive 2014/68/EU, Category IV, Fluids Group II

Conformity Assessment According to Directive 2014/68/EU Annex III Module D
PED Quality Certificate No. QS-005-19 rev2

Notified Body Number: 1336
Inspecta Estonia OÜ
Teaduspargi 8
12618 Tallinn
ESTONIA

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	2023-10-26	
Place	Date (YYYY-MM-DD)	Signature

This Declaration of Conformity replaces Declaration of Conformity dated 2022–11-18

UK Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00
Company name, address and phone number

Hereby declare that

Valve
Designation

SB Anti Vacuum Valve
Type

Serial number from AAB000000001 to AAC999999999
Serial number from 100700000001 to 100799999999

is in conformity with the following directives with amendments:
- The Supply of Machinery (Safety) Regulations 2008
- The Pressure Equipment (Safety) Regulations 2016 Category IV, Fluids Group II

PED Quality Certificate No. QS-005-19 rev2

Notified Body Number: 1336
Inspecta Estonia OÜ
Teaduspargi 8
12618 Tallinn
ESTONIA

Signed on behalf of: Alfa Laval Kolding A/S

Global Product Quality Manager		Lars Kruse Andersen
Title		Name
Kolding, Denmark	2023-10-26	
Place	Date (YYYY-MM-DD)	Signature

DoC Revison_02_102023

2 Safety

Unsafe practices and other important information are emphasised in this manual.
Warnings are emphasised by means of special symbols.

2.1 Important information

Always read the manual before using the valve!

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 valve.

NOTE
Indicates important information to simplify or clarify procedures.

2.2 Warning signs

General warning:

Caustic agents:

All warnings in the manual are summarised on this page.
Pay special attention to the instructions below to avoid serious personal injury and damage to the valve.

2.3 Safety precautions

Installation:
Always read the technical data thoroughly (see chapter 6 Technical data.)
Never touch the moving parts if the actuator for force opening is supplied with compressed air.
Never dismantle the valve or actuator for force opening when under pressure.
Never dismantle the valve when it is hot.

Operation:
Never dismantle the valve or actuator for force opening when under pressure.
Never dismantle the valve when it is hot.
Always read the technical data thoroughly (see chapter 6 Technical data)
Never touch the moving parts or actuator for force opening when supplied with compressed air.

Never cover or in any way restrict the valve, the valve must be able to work unobstructed at all time.

Always handle lye and acid with great care.

Maintenance:
Always read the technical data thoroughly (see chapter 6 Technical data)
Never service the valve when it is hot.
Never service the valve or actuator when under pressure.
Never put your fingers between the valve and actuator for force opening.
Never touch the moving parts if the actuator for force opening is supplied with compressed air.

Transportation:

Always ensure that all bolt connections are disconnected before attempting to remove the valve from the installation.
Always drain liquid out of valves before transportation.
Always ensure sufficient fixing of the valve during transportation.

3 Installation

The instruction manual is part of delivery. Study the instructions carefully.
The items refer to the Parts List and Service Kits section.

3.1 Unpacking/delivery

Step 1
CAUTION
Alfa Laval cannot be held responsible for incorrect unpacking.

Check the delivery for:
1. Valve seat and disc
2. Lever and weight
3. Bearing pins, washers and locking rings
4. Flange gasket
5. Actuator for force opening (option)
6. Splash guard (option)
7. Proximity sensor (option)

Step 2
Remove any packing materials from the valve/valve parts.
Inspect the valve/valve parts for visible transport damage.
Avoid damaging the valve/valve parts.

3.2 General installation

Step 1

Always read the technical data thoroughly.
See chapter 6 Technical data

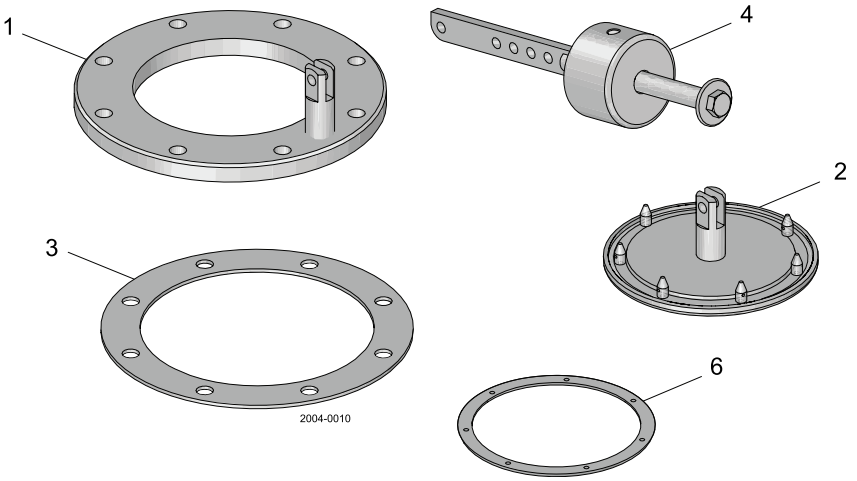
Always release compressed air from the actuator for force opening after use.

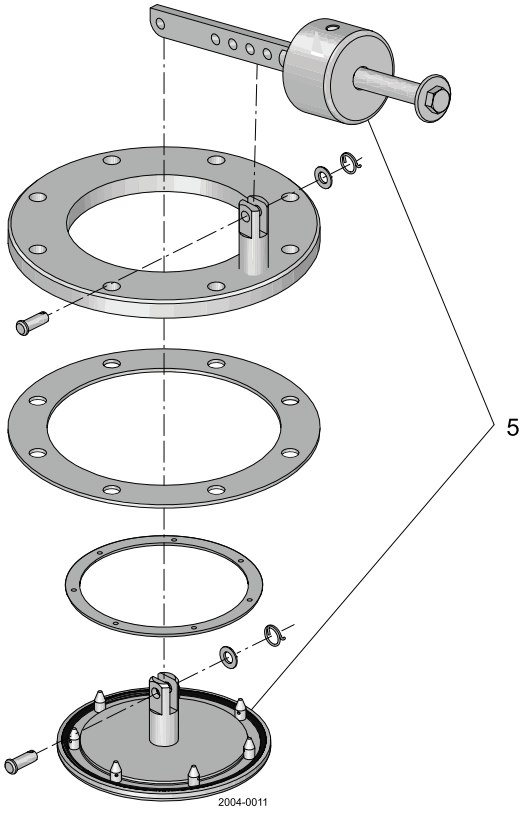
CAUTION
Alfa Laval cannot be held responsible for incorrect installation.

The lever and weight are to be assembled with the valve seat and disc.
Make sure the serial no. engraved on the disc matches the serial no. engraved on the lever.

3.3 Valve assembly

Pos. 1. Valve seat
Pos. 2. Valve disc
Pos. 3. Gasket
Pos. 4. Lever and weight
Pos. 5. Serial number
Pos. 6 Disc ring



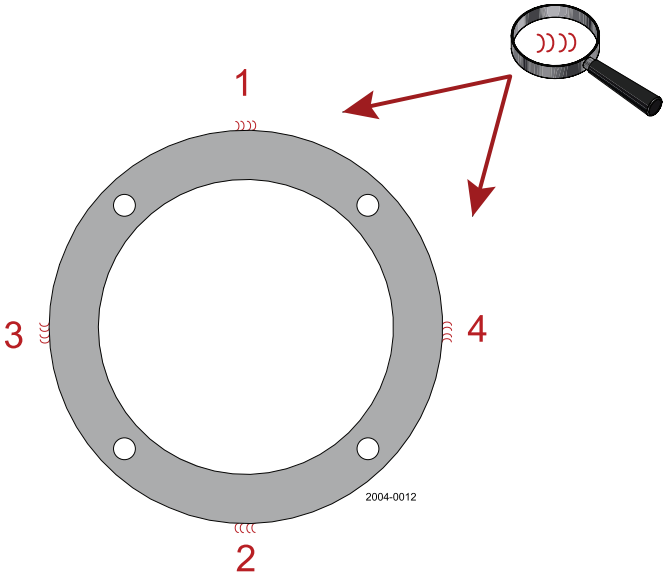


3 Installation

The lever and weight are to be assembled with the valve seat and disc.
Make sure the serial no. engraved on the disc matches the serial no. engraved on the lever.

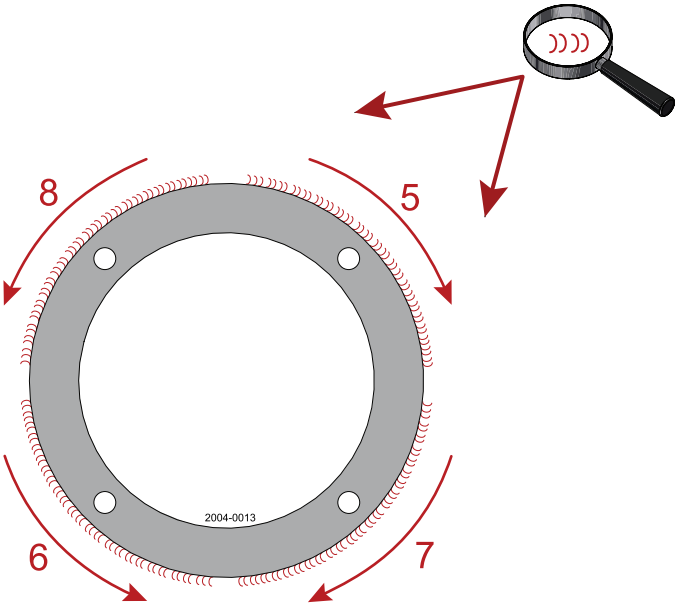
3.4 Welding procedures for welding flange

Step 1
Spot weld from outside



Step 2
Weld the following sections first from the outside then from the inside, and cool with air between each section.

Spot weld from inside

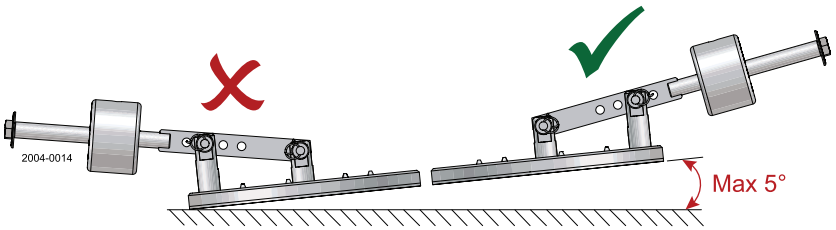


The lever and weight are to be assembled with the valve seat and disc.
Make sure the serial no. engraved on the disc matches the serial no. engraved on the lever.

Step 3

- Ensure that the surface flatness tolerance equals ±0.2.
- Grind and polish the welding flange.

The valve should be seated horizontally. An inclination of max. 5° is acceptable but the lever must then point upwards.



3 Installation

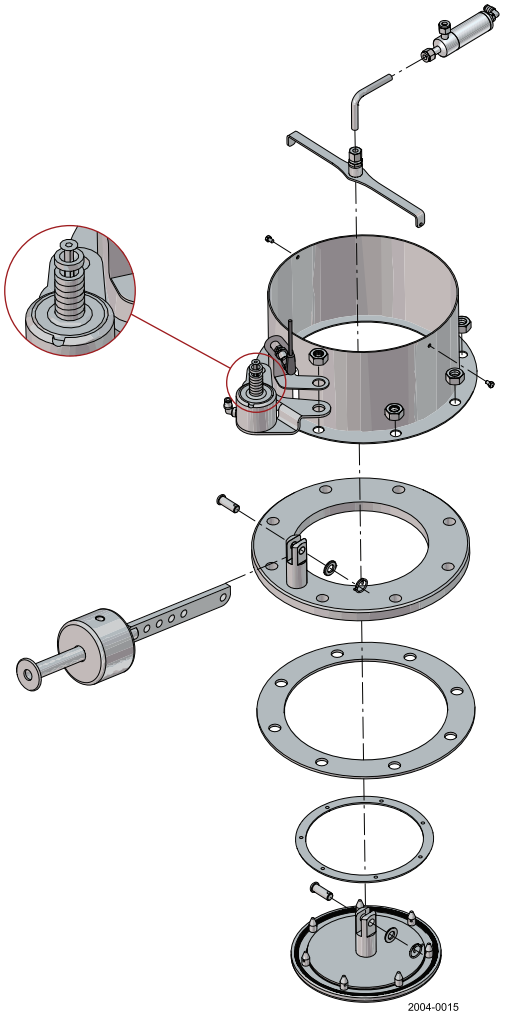
The valve is to be fitted with M16 bolts.
The options Splash guard, Force opener and Proximity sensor are to be fitted with M16 bolts.

3.5 Installation of valve and accessories

Options

1. Force opener: force-opening during valve seat cleaning*
2. Splash guard: containing CIP liquid during valve seat cleaning
3. CIP Nozzle: for cleaning valve seat
4. CIP closing valve: for applying CIP liquid
5. Proximity sensor: for operation detection
6. Welding flange: for installation

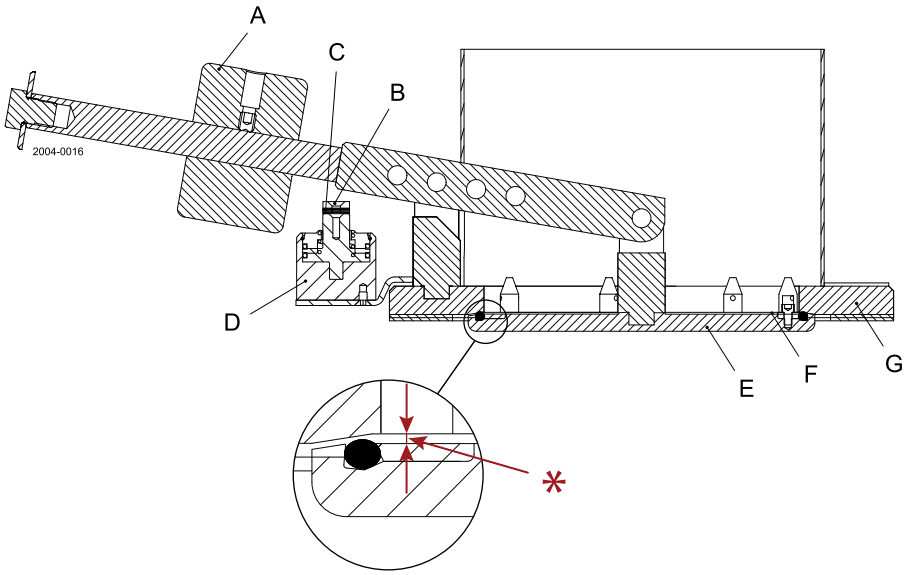
*The force opener is delivered with a spacer kit. Adjust the spacer kit to leave a recommended gap of 2-3 mm (0.08” - 0.12”) to avoid o-rings are washed out by sprayballs etc. See drawing.



The valve is to be fitted with M16 bolts.
The options Splash guard, Force opener and Proximity sensor are to be fitted with M16 bolts.

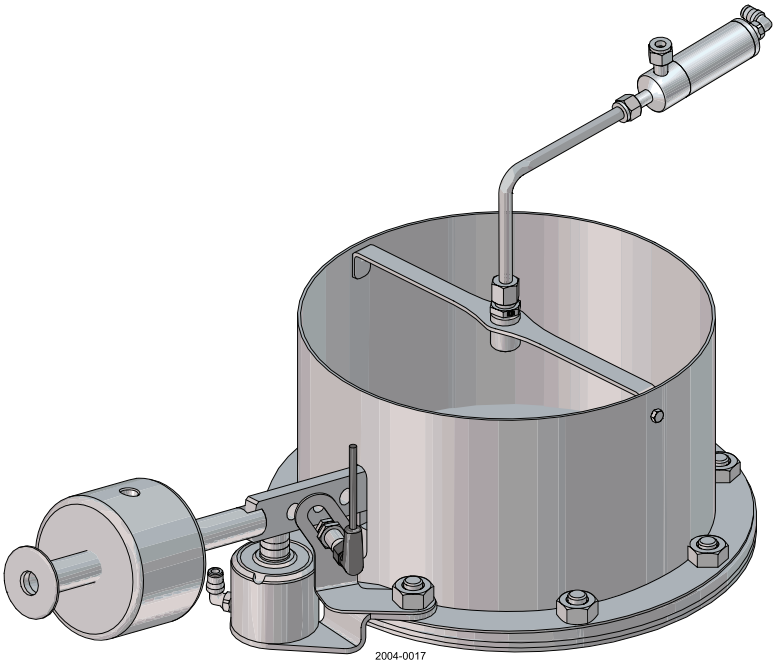
A. = Counter weight
B. = Screw
C. = Spacing rings
D. = Force opener
E. = Valve disc
F. = Valve seat
G. = Top plate

* = Adjust gab to 2-4 mm



Tightening torques for bolts:

M16	218 Nm
M6	11 Nm



3 Installation

The valve is to be fitted with M16 bolts.
The options Splash guard, Force opener and Proximity sensor are to be fitted with M16 bolts.

3.6 Recycling information

Unpacking

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

Maintenance

- 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.

Scrapping

- At the end of use, the equipment should be recycled according to relevant local regulations. As well as 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.

The valve is delivered with counterweight locked by welding to an individual opening pressure to suit the tank design data.

4.1 Operation

⚠
Never cover or in any way restrict the valve, it must be able to work unobstructed at all time.
Alfa Laval cannot be held responsible for incorrect operation.
Never alter the position of the weight or lever, thereby changing the opening pressure of the valve.

Operation range

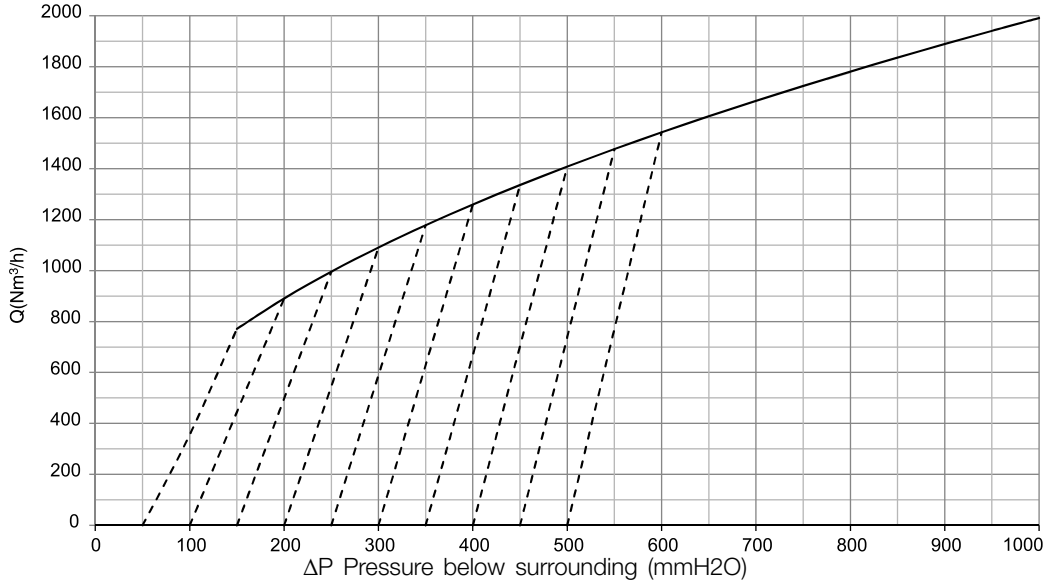
Nominal size	Opening pressure range	Allowable pressure PS
100 mm (4")	50-500 mmH2O (0.07-0.7 psi)	6 bar (87 psi)
150 mm (6")	25-500 mmH2O (0.035-0.7 psi)	6 bar (87 psi)
200 mm (8")	25-500 mmH2O (0.035-0.7 psi)	6 bar (87 psi)
250 mm (10")	25-300 mmH2O (0.035-0.43 psi)	4 bar (58 psi)
300 mm (12")	25-500 mmH2O (0.035-0.7 psi)	4 bar (58 psi)
400 mm (16")	25-100 mmH2O (0.035-0.14 psi)	4 bar (58 psi)

4 Operation

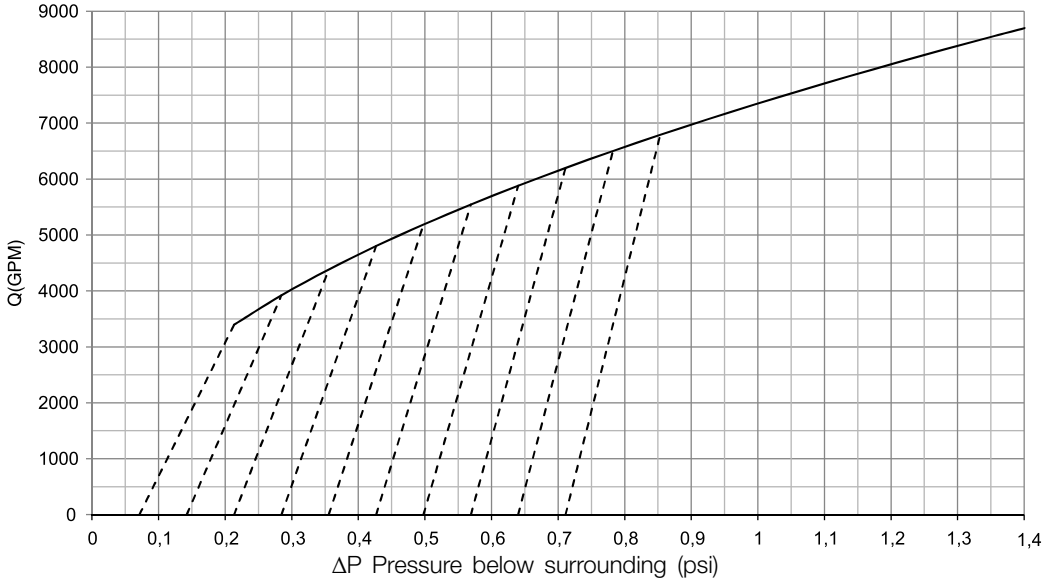
The valve is delivered with counterweight locked by welding to an individual opening pressure to suit the tank design data.

4.2 Volumetric flow capacity

Nominal size : 100 mm
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve

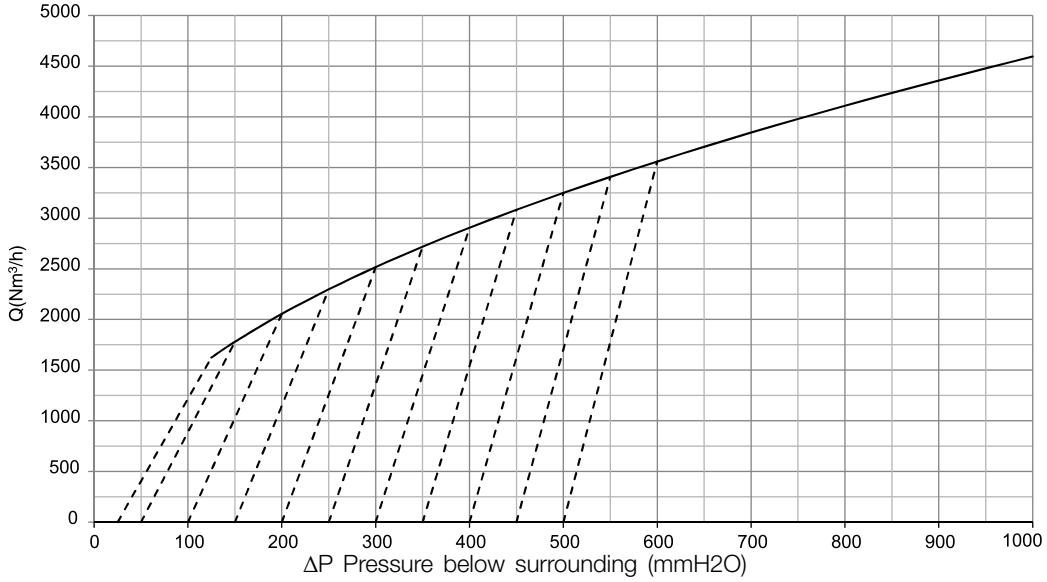


Nominal size : 4"
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve

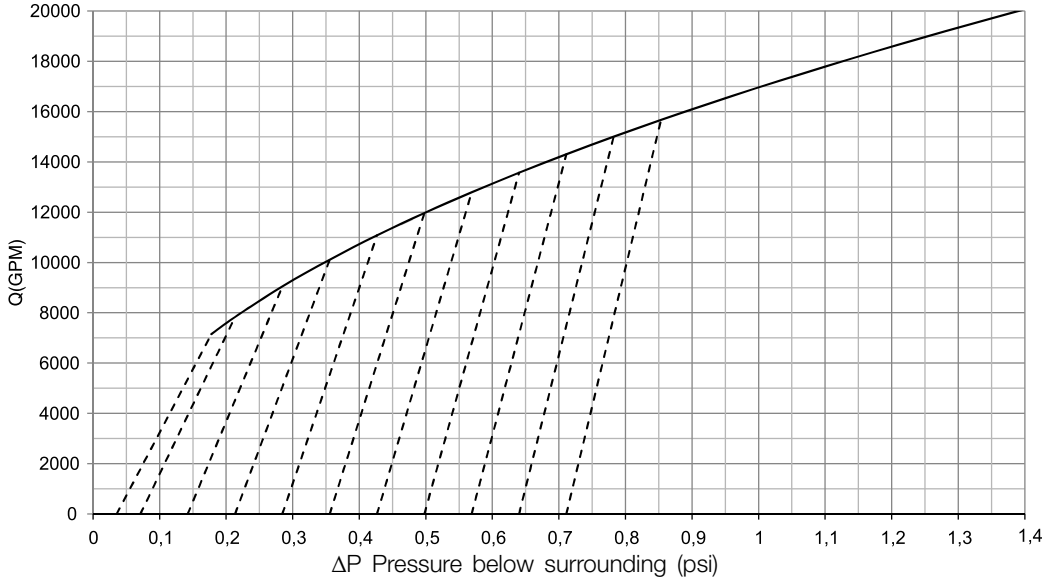


The valve is delivered with counterweight locked by welding to an individual opening pressure to suit the tank design data.

Nominal size : 150 mm
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve



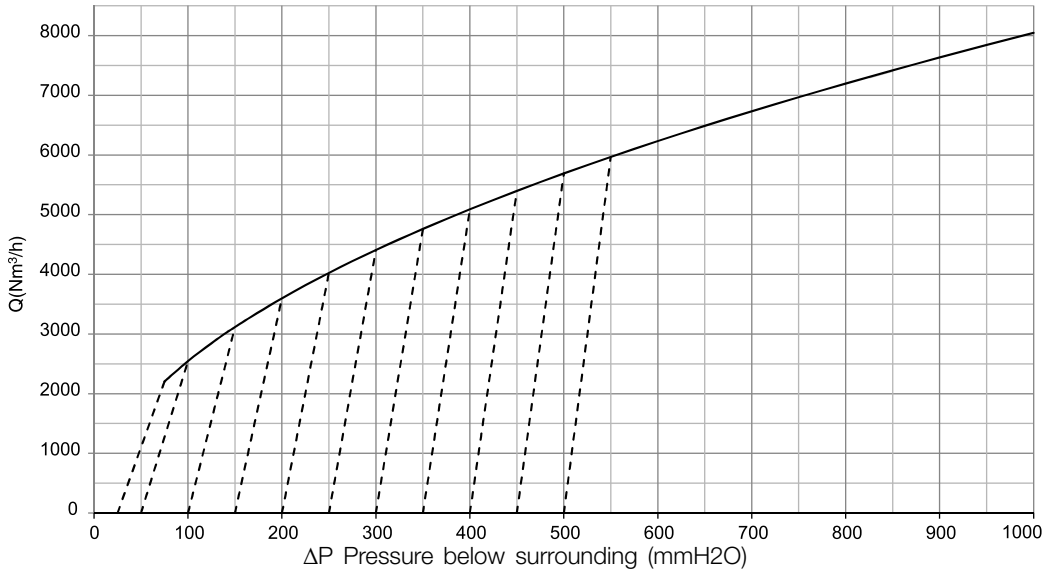
Nominal size : 6"
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve



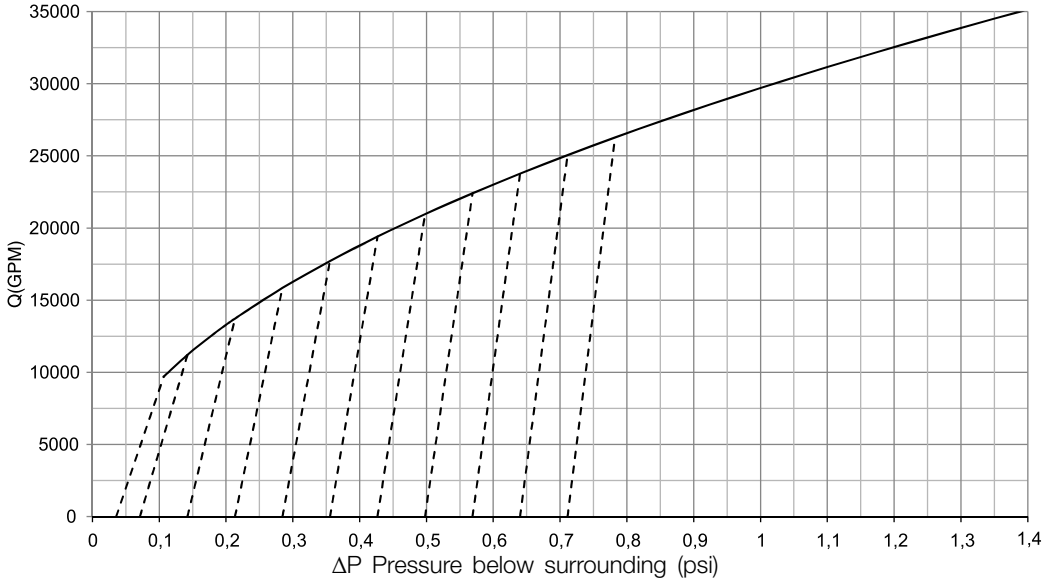
4 Operation

The valve is delivered with counterweight locked by welding to an individual opening pressure to suit the tank design data.

Nominal size : 200 mm
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve

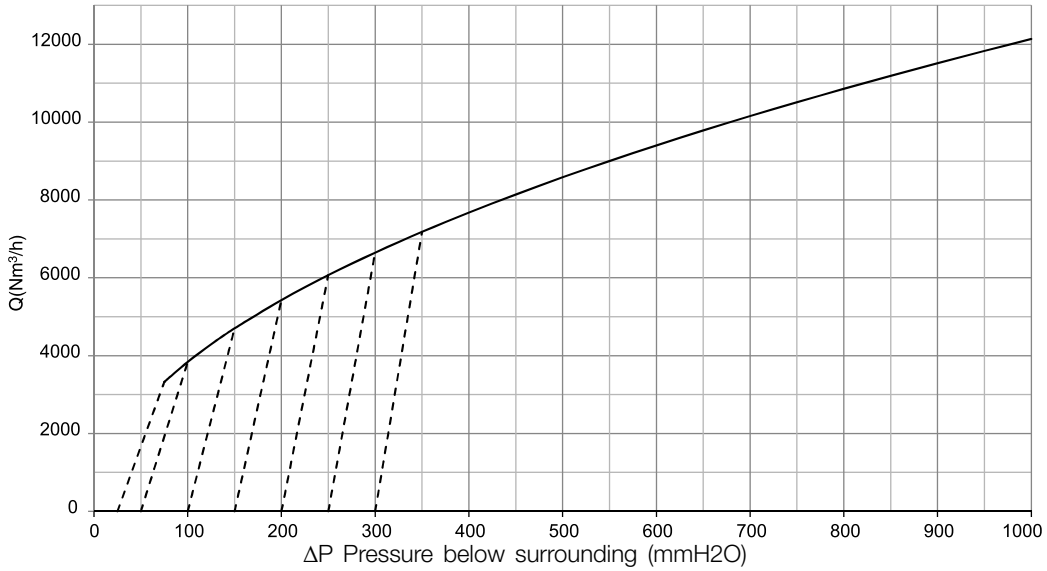


Nominal size : 8"
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve

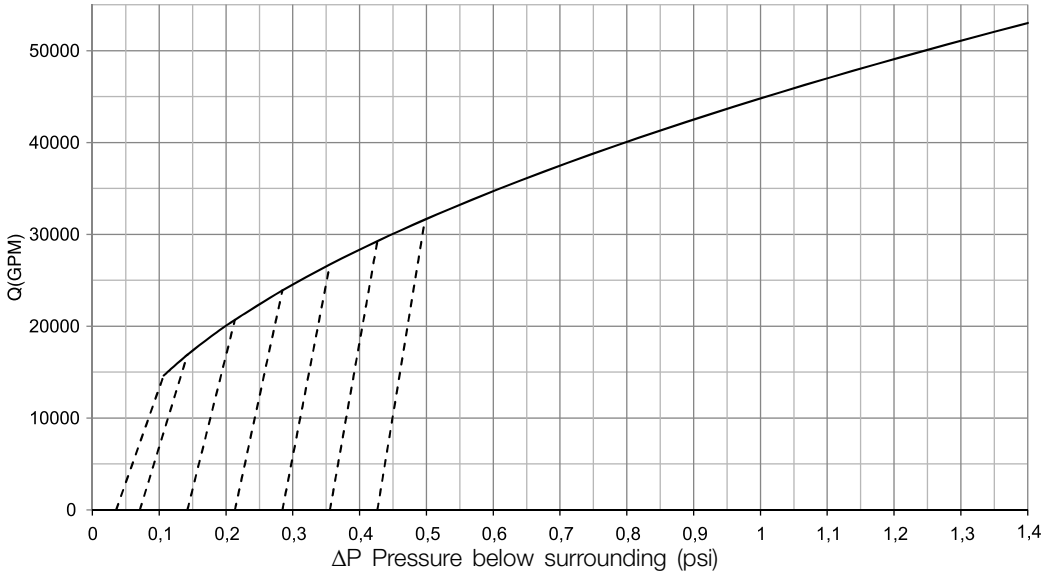


The valve is delivered with counterweight locked by welding to an individual opening pressure to suit the tank design data.

Nominal size : 250 mm
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve



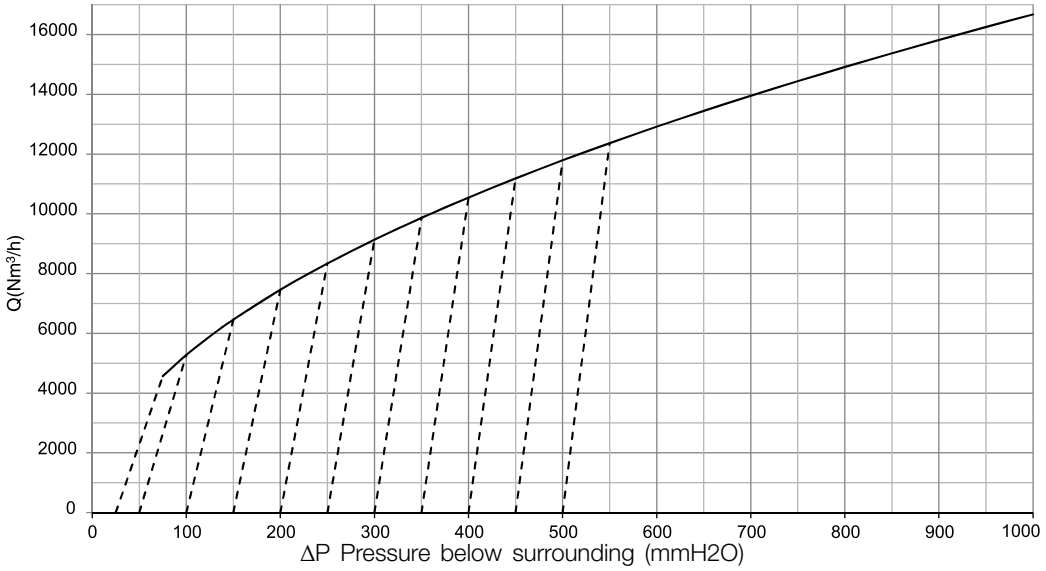
Nominal size : 10"
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve



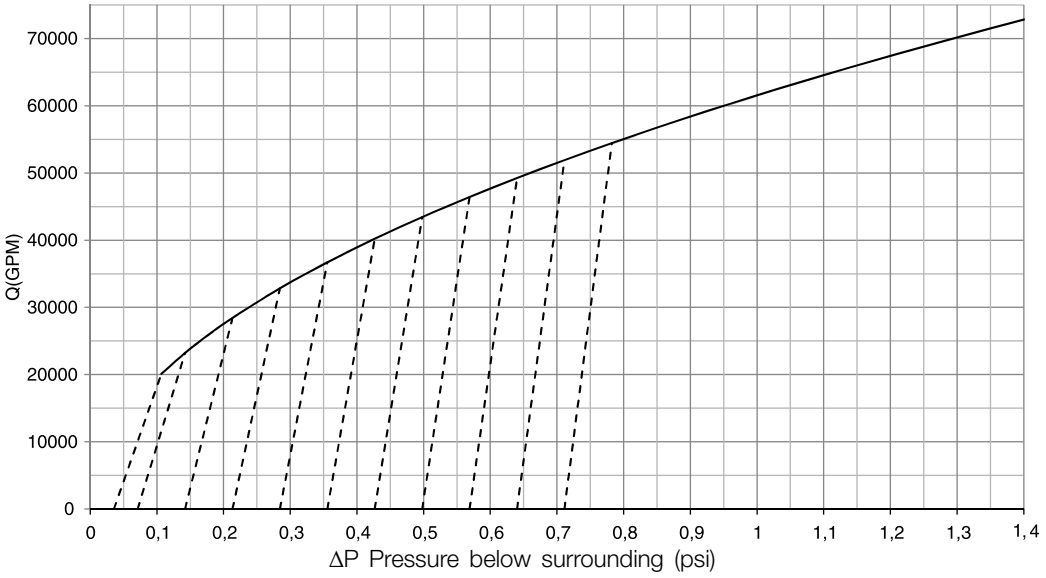
4 Operation

The valve is delivered with counterweight locked by welding to an individual opening pressure to suit the tank design data.

Nominal size : 300 mm
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve

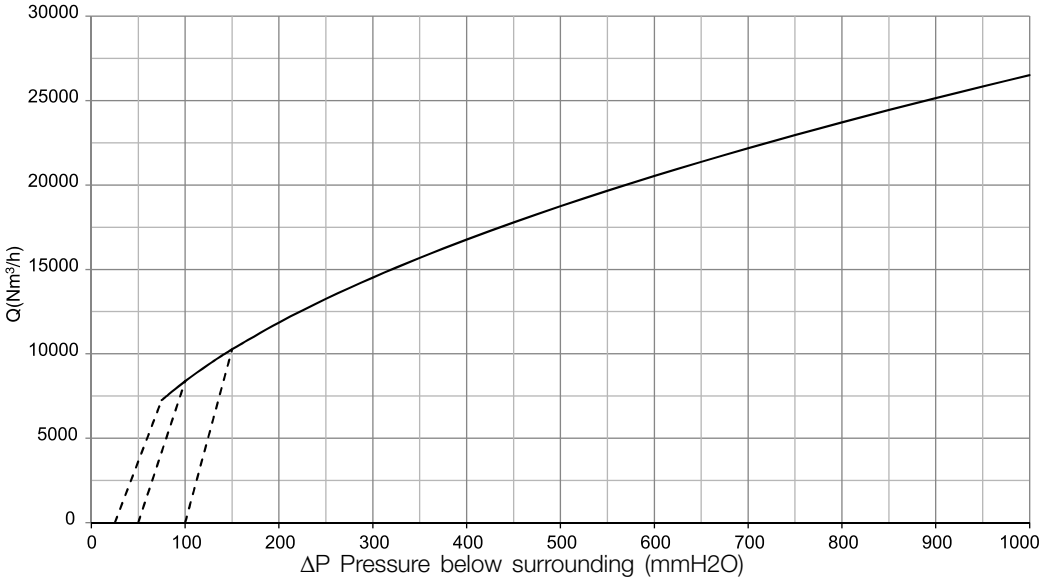


Nominal size : 12"
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve

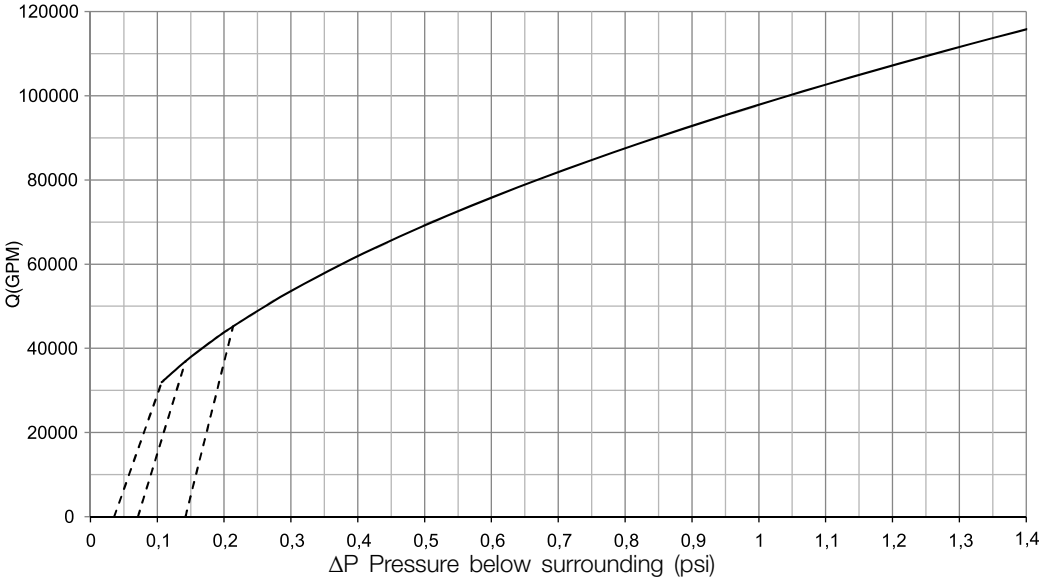


The valve is delivered with counterweight locked by welding to an individual opening pressure to suit the tank design data.

Nominal size : 400 mm
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve



Nominal size : 16”
Volumetric flow capacity
Medium: Air
- - - - Preset opening pressure to fully open valve



4 Operation

The valve is delivered with counterweight locked by welding to an individual opening pressure to suit the tank design data.

4.3 Recommended cleaning

Always handle lye and acid with great care.

Caustic hazard!

Always use rubber gloves!

Always use protective goggles!

Cleaning In Place (CIP) The Anti Vacuum Valve is cleaned, when closed, by the tank cleaning head, but this will not include the valve seating. To include the valve seating in the cleaning cycle, there are two options:

CIP Kit 1 - Force opener; splash guard.
The valve is force-opened during tank CIP. The cleaning of the valve seat is dependent on cleaning jets from the tank cleaning head. Any CIP liquid escaping the tank is contained by the splash guard and drains back into the tank.

CIP Kit 2 - Force opener; splash guard; CIP nozzle; CIP closing valve.
The valve is force-opened during tank CIP. The cleaning of the valve seat is performed by the CIP nozzle. All CIP liquid from the CIP nozzle is contained by the splash guard and drains back into the tank.
NOTE: Applying any of the above CIP options requires that the tank is pressureless at the moment of force opening the Anti Vacuum Valve.

CIP Recommendation :
Do not open anti-vacuum valve from very beginning of tank CIP.
Allow for some caustic cleaning to run on the closed valve before flushing the valve seat.

The valve is delivered with counterweight locked by welding to an individual opening pressure to suit the tank design data.

5.1 General maintenance

Step 1

Always read the technical data thoroughly.
See chapter 6 Technical data

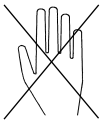
Step 2

Never service the valve when it is hot.

Never service the valve with the valve or actuator under pressure.

Atmospheric pressure required!

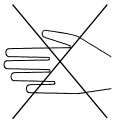
Burning hazard!



Step 3

Never put your fingers between the valve and actuator for force opening.

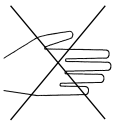
Cutting hazard!



Step 4

Never touch the moving parts if the actuator for force opening is supplied with compressed air.

Moving parts!



5 Maintenance

The valve is delivered with counterweight locked by welding to an individual opening pressure to suit the tank design data.

Below are some guidelines for maintenance and lubrication intervals.

Valve

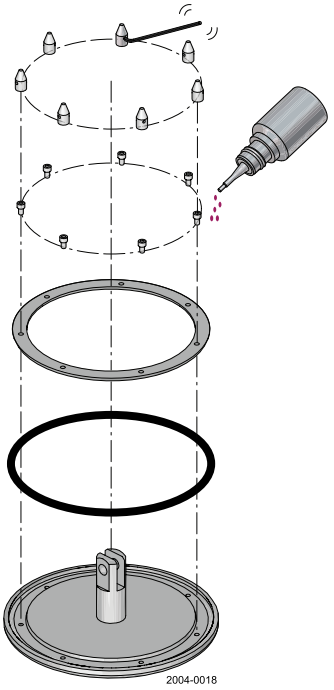
To ensure the valve operates correctly, test of function at regular intervals is required.

Intervals are dependent on operation conditions and should be specified by the user or local regulations. Alfa Laval recommend intervals of once every 6-12 months.

O-ring and flange gasket replacement every 2-5 years.

Replacement of o-ring

1. Dismount position pins, whit the help of an allen key eg.
2. Dismount screw and remove ring, and old o-ring.
3. Place new o-ring in slot, and place disc ring again.
4. Fasten screw by cross tighten screws. Max. tightning torque 2 Nm. Remember to lubricate thread on screws, with a little amount of food grade grease, to make sure they can be dismounted again.
5. Finally screw postions pins back onto screw heads again. max. torque 0.5 Nm.



Actuator for force opening

Disassemble, clean and lubricate the actuator every 2-5 years.

O-ring replacement every 2-5 years.

It is important to observe the technical data during installation, operation and maintenance.
All personnel should be informed about the technical data.

6.1 Technical data

The Anti Vacuum Valve is used to minimise the risk of implosion of tanks exposed to vacuum e.g. during emptying, cool-rinsing after hot-cleaning or caustic cleaning in a CO2 atmosphere. The Anti Vacuum Valve can be fitted on any closed tank.
The Anti Vacuum Valve is delivered with counterweight set and locked for an individual opening vacuum to suit the tank design data. When the vacuum in the tank is lower than the preset opening value, the valve opens and lets in atmospheric air. The valve can be equipped with a Force opener and a CIP device for extra cleaning.

Valve data

Nominal size	Opening pressure range	Allowable pressure PS
100 mm (4")	50-500 mmH2O (0.07-0.7 psi)	6 bar (87 psi)
150 mm (6")	25-500 mmH2O (0.035-0.7 psi)	6 bar (87 psi)
200 mm (8")	25-500 mmH2O (0.035-0.7 psi)	6 bar (87 psi)
250 mm (10")	25-300 mmH2O (0.035-0.43 psi)	4 bar (58 psi)
300 mm (12")	25-500 mmH2O (0.035-0.7 psi)	4 bar (58 psi)
400 mm (16")	25-100 mmH2O (0.035-0.14 psi)	4 bar (58 psi)

Materials	
Product wetted steel parts	EN 1.4404 (AISI 316L) with 3.1 cert.
Product wetted steel surfaces	Surface roughness Ra<0.8 µm (<32 µ")
Product wetted seals	EPDM/NBR
Temperatur e	
Max. operating temperature	80°C
Max. sterilization temperature	140°C (max. 30 min.)

Actuator data

Actuator for force opening	
Max. air supply	10 bar
Min. air supply	5 bar
Noise	
Noise of actuator	75 dB(A)

6 Technical data

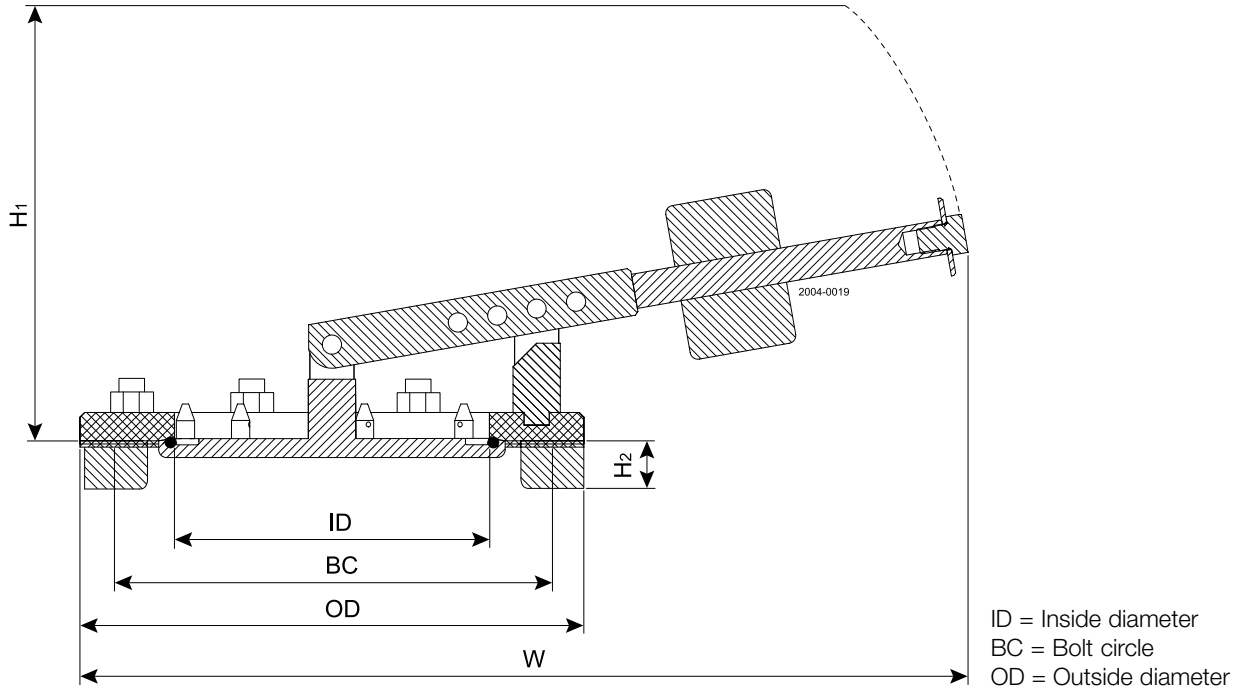
It is important to observe the technical data during installation, operation and maintenance.
All personnel should be informed about the technical data.

Weight

Nominal size	Opening pressure	Weight
100 mm (4")	50 mmH2O (0.07 psi)	5 kg
	100 mmH2O (0.15 psi)	5.2 kg
	150 mmH2O (0.22 psi)	5.5 kg
	200 mmH2O (0.29 psi)	5.3 kg
	250 mmH2O (0.36 psi)	5.8 kg
	300 mmH2O (0.435 psi)	6.8 kg
	350 mmH2O (0.51 psi)	6.8 kg
	400 mmH2O (0.58 psi)	6.8 kg
	450 mmH2O (0.65 psi)	6.8 kg
	500 mmH2O (0.72 psi)	6.8 kg
150 mm (6")	25 mmH2O (0.04 psi)	9.7 kg
	50 mmH2O (0.07 psi)	9.7 kg
	100 mmH2O (0.15 psi)	10.7 kg
	150 mmH2O (0.22 psi)	10.7 kg
	200 mmH2O (0.29 psi)	12.7 kg
	250 mmH2O (0.36 psi)	12.7 kg
	300 mmH2O (0.44 psi)	12.7 kg
	350 mmH2O (0.51 psi)	12.7 kg
	400 mmH2O (0.58 psi)	14.6 kg
	450 mmH2O (0.65 psi)	14.6 kg
	500 mmH2O (0.72 psi)	14.6 kg
200 mm (8")	25 mmH2O (0.04 psi)	16.1 kg
	50 mmH2O (0.07 psi)	16.1 kg
	100 mmH2O (0.15 psi)	18.1 kg
	150 mmH2O (0.22 psi)	16.1 kg
	200 mmH2O (0.29 psi)	20.3 kg
	250 mmH2O (0.36 psi)	20.3 kg
	300 mmH2O (0.44 psi)	24 kg
	350 mmH2O (0.51 psi)	24 kg
	400 mmH2O (0.58 psi)	28 kg
	450 mmH2O (0.65 psi)	28 kg
	500 mmH2O (0.72 psi)	28 kg
250 mm (10")	25 mmH2O (0.04 psi)	23.3 kg
	50 mmH2O (0.07 psi)	23.3 kg
	100 mmH2O (0.15 psi)	25.3 kg
	150 mmH2O (0.22 psi)	31.2 kg
	200 mmH2O (0.29 psi)	31.2 kg
	250 mmH2O (0.36 psi)	36 kg
	300 mmH2O (0.44 psi)	36 kg
300 mm (12")	25 mmH2O (0.04 psi)	24 kg
	50 mmH2O (0.07 psi)	28 kg
	100 mmH2O (0.15 psi)	33.9 kg
	150 mmH2O (0.22 psi)	33.9 kg
	200 mmH2O (0.29 psi)	38.7 kg
	250 mmH2O (0.36 psi)	38.7 kg
	300 mmH2O (0.44 psi)	39.3 kg
	350 mmH2O (0.51 psi)	39.3 kg
	400 mmH2O (0.58 psi)	39.3 kg
	450 mmH2O (0.65 psi)	39.3 kg
	500 mmH2O (0.72 psi)	39.3 kg
400 mm (16")	25 mmH2O (0.04 psi)	55.2 kg
	50 mmH2O (0.07 psi)	55.2 kg
	100 mmH2O (0.15 psi)	60.2 kg

It is important to observe the technical data during installation, operation and maintenance.
All personnel should be informed about the technical data.

Interface requirements



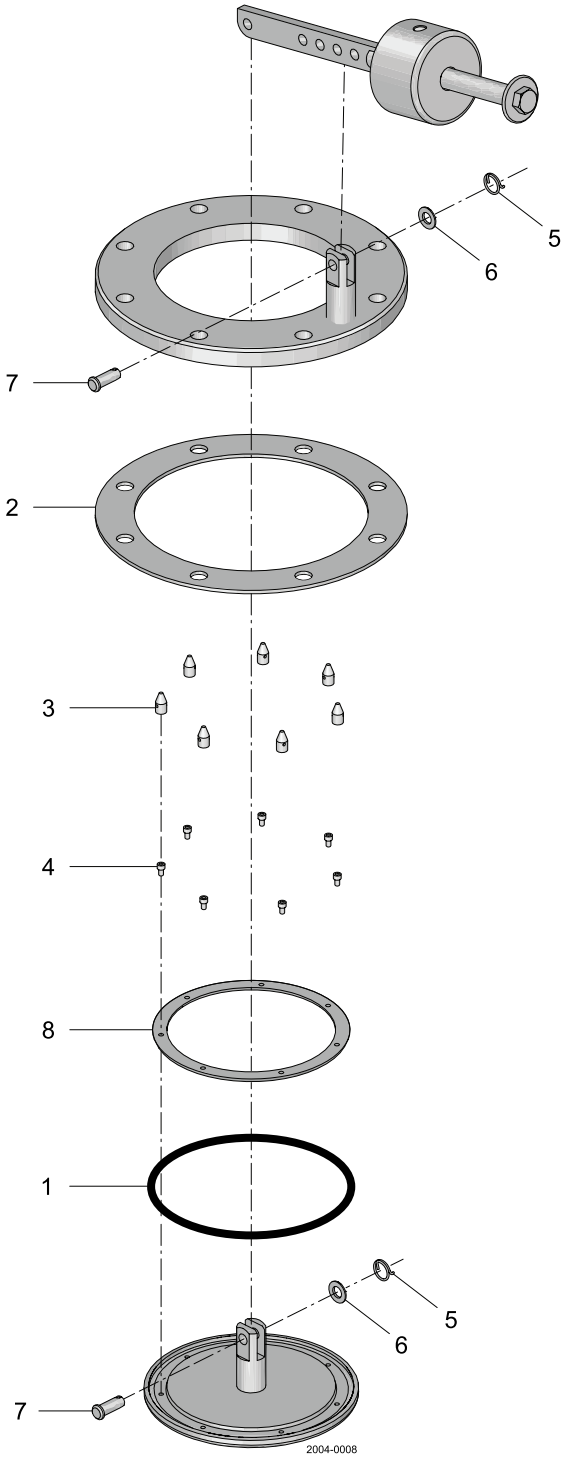
Interface requirements (mm)

Nominal size	ID	BC	OD	Bolts	H1	H2	W
100 (4”)	100 (3.93”)	165 (6.50”)	200 (7.87”)	4xM16	310 (12.20”)	30 (1.18”)	510 (20.07”)
150 (6”)	150 (5.91”)	230 (9.06”)	270 (10.63”)	8xM16	325 (12.80”)	30 (1.18”)	550 (21.65”)
200 (8”)	200 (7.87”)	280 (11.02”)	320 (12.60”)	8xM16	310 (12.20”)	30 (1.18”)	570 (22.44”)
250 (10”)	250 (9.84”)	330 (12.99”)	370 (14.57”)	8xM16	325 (12.80”)	30 (1.18”)	600 (23.62”)
300 (12”)	300 (11.81”)	380 (14.96”)	420 (16.54”)	12xM16	500 (19.66”)	30 (1.18”)	940 (37.00”)
400 (16”)	400 (15.75”)	515 (20.26”)	560 (22.05”)	12xM16	490 (19.29”)	30 (1.18”)	1010 (39.76”)

7 Parts list and service kits

It is important to observe the technical data during installation, operation and maintenance.
All personnel should be informed about the technical data.

7.1 Anti Vacuum Valve Ø100 to Ø400



It is important to observe the technical data during installation, operation and maintenance.
All personnel should be informed about the technical data.

Parts list

Pos.		Qty	Denomination
1		1	O-ring
2		1	Gasket
3	□	8	Control pin
4	□	8	Screw
5	♦	2	Locking ring
6	♦	2	Washer
7	♦	2	Bearing tap

Service kits

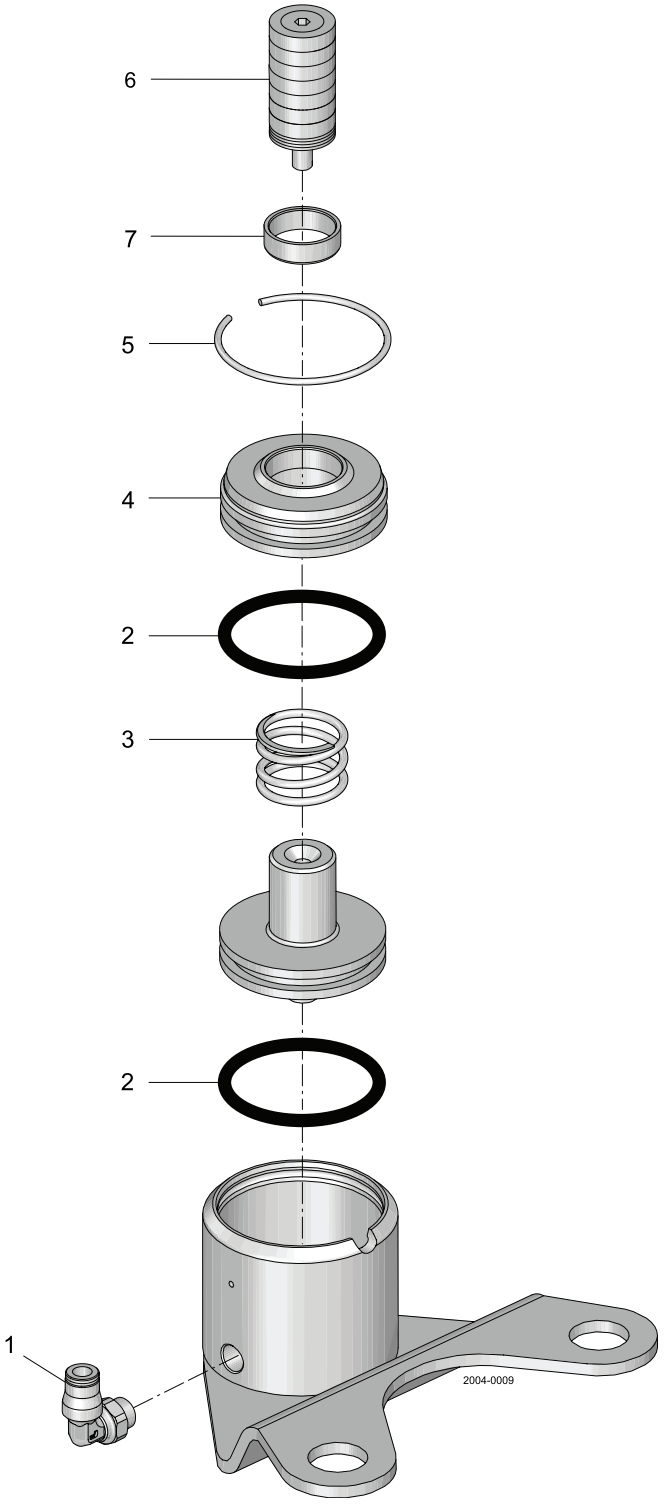
	Denomination	
Assembly kits for Ø100 to Ø400		
□	**Assembly kit, AVV**	**9615145807**
♦	**Assembly kit, AVV**	**9615145808**

Parts marked with □♦ are included in the assembly kits.

7 Parts list and service kits

It is important to observe the technical data during installation, operation and maintenance.
All personnel should be informed about the technical data.

7.2 Force Opener



It is important to observe the technical data during installation, operation and maintenance.
All personnel should be informed about the technical data.

Parts list

Pos.		Qty	Denomination
1		1	Air fitting
2		2	O-ring
3	o	1	Spring
4	o	1	Force opener cover
5	o	1	Locking ring
6	o	1	Spacer kit
7			Bushing

Service kits

	Denomination	
Assembly kits for Ø75 to Ø150		
o	**Assembly kit, force opener**	**9615146201**

Parts marked with □♦o are included in the assembly kits.

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.