

Alfa Laval Unique Mixproof UltraPure

Double seat valves

Introduction

Alfa Laval Unique Mixproof UltraPure (UP) Valve is a versatile, highly flexible double block-and-bleed valve for the safe and efficient management of fluids at intersection points in matrix piped systems of high-purity process lines. The valve enables the simultaneous flow of two different products or fluids through the same valve without the risk of cross-contamination.

Modular design and a wide variety of options enable the valve to be customized to meet any process requirement needed—whether higher demands on cleanability, the ability to withstand high pressure, or greater resistance against corrosive conditions.

This provides optimized efficiency, a higher degree of plant flexibility, maximum high-purity process uptime, and uncompromised levels of product safety.

Application

The Alfa Laval Unique Mixproof UP Valve is designed for continuous flow management of product in high-purity applications across the biotechnology, pharmaceutical and other high-purity industries where the Alfa Laval Q-doc documentation package and full traceability is a requirement.

Benefits

- Modular, high-purity design
- Cost-effective, spillage-free operation
- Optimized plant efficiency and enhanced cleanability
- Leakage detection and leakage chamber cleaning
- Full component traceability with Q-doc

Standard design

The Alfa Laval Unique Mixproof UP Valve is comprised of a series of base components, including valve body, valve plug, actuator, and cleaning options and accessories that support a wide range of applications. Leakage detection holes enable visual inspection without requiring valve disassembly and provide advance notification of parts wear.

Few straightforward moveable parts contribute to reliable operation and reduced maintenance costs. The valve can also be fitted with the Alfa Laval ThinkTop V50 and V70 for sensing and control of the valve.



Working principle

The Alfa Laval Unique Mixproof UP Valve is a normally closed (NC) valve controlled from a remote location by means of compressed air. The valve has two independent plug seals to separate the liquids; the space between the seals forms a leakage chamber under atmospheric pressure during every working condition. Leakage rarely occurs but, should it occur, product flows into the leakage chamber and exits through the bottom outlet for easy detection.

When the valve is open, the leakage chamber is closed. The product then flows from one line to the other. The radial design of the valve ensures that virtually no product spillage occurs during valve operation. It is possible to adapt valve cleaning and water hammer protection to the requirements of individual process specifications.

Certificates



TECHNICAL DATA

Pressure

Max. product pressure:	1000 kPa (10 bar)
Min. product pressure:	Full vacuum

Temperature

Temperature range:	-5°C to +125°C (depending on elastomer)
Steaming in Place (SIP):	140°C - 40 mins (depending on elastomer)

Note: Steaming In Place; It is recommended to allow the valve to cool down to operational temperature before operating the valve to minimize seal wear

Actuator air pressure:	600 to 800 kPa (6-8 bar)
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ATEX

Classification:	II 2 G D*
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*This equipment is outside the scope of the directive 2014/34/EU and must not carry a separate CE marking according to the directive as the equipment has no own ignition source

Note! In order to use Unique Mixproof valves in ATEX environment, the blue plastic cover at lower plug must be removed for the valve types where the valve is delivered with the cover mounted

PHYSICAL DATA

Materials

Product wetted steel parts:	1.4404 (316L)
Other steel parts:	1.4301 (304)

Surface finish choose from the following:

Internal:	Ra < 0.8µm
Optional:	Ra 0.5 or Ra 0.4 EP
External:	Polished

Note! The Ra values are only for the internal surface.

Product wetted seals:	EPDM Acc. To FDA & USP Class VI
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Other seals:

CIP seals:	EPDM
Actuator seals:	NBR
Guide strips:	PTFE

Pressure drop/capacity diagrams

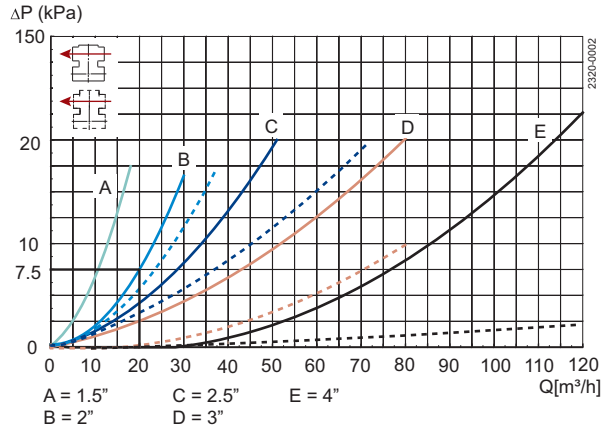


Fig. 3. Pressure drop/capacity diagram, upper body. Full lines: Balanced upper plug. Dotted lines: Unbalanced upper plug.

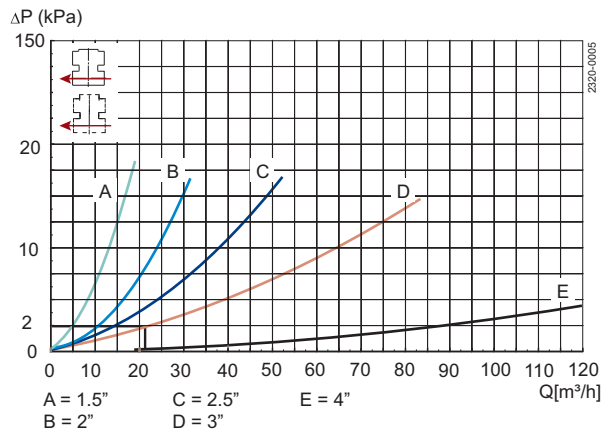


Fig. 4. Pressure drop/capacity diagram, lower body, balanced

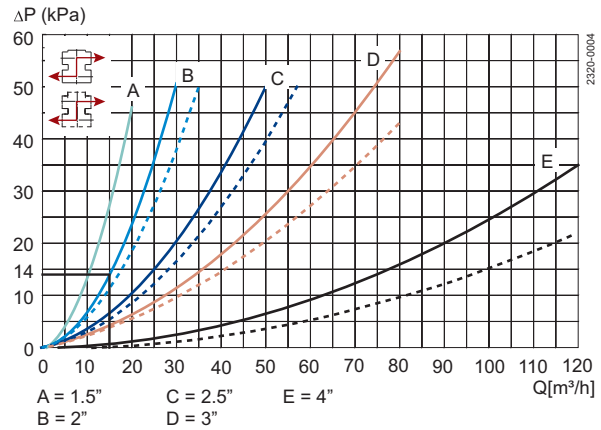
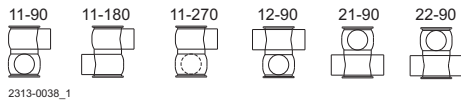


Fig. 5. Pressure drop/capacity diagram, between bodies.
 Full lines: Balanced.
 Dotted lines: Unbalanced.

Notel For the diagrams the following applies: Medium:
 Water (20°C).
 Measurement: In accordance with VDI 2173.

Valve body combinations

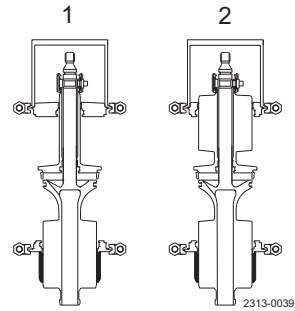


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Valve body combinations, example: type 11-90

- 1 Number of ports - lower valve body
- 1 Number of ports - upper valve body
- 90° Angle between ports

Balancing plugs:



1. Lower balanced plug
2. Upper and lower balanced plugs

Options

- Control and Indication: ThinkTop or ThinkTop Basic.
- Side indication for detection of upper seat lift
- Leakage chamber collection
- Other sizes, options and configurations on request

Documentation

All UltraPure valves are delivered with our comprehensive Q-doc documentation package, which includes:

- 3.1/MTR traceability certificate corresponding to EN 10204
- FDA - Declaration of conformity to FDA (CFR 21; 177.2600 or 177.1550)
- USP - Certificate of conformity to USP Class VI (Chapter 88, biological reactivity test)
- TSE/ADI - Declaration (Transmissible Spongiform Encephalopathy/Animal Derived Ingredients)
- Surface finish conformity declaration

The following documentation is available upon request:

- Surface finish certificate (RA test results)
- ATEX

Air and CIP consumption

ASME BPE	1½"	2"	2½"	3"	4"
Kv-value					
Upper Seat-lift [m³/h]	1.5	1.5	2.5	2.5	3.1
Lower Seat-lift [m³/h]	0.9	0.9	1.9	1.9	2.5
Air consumption					
Upper Seat-lift * [n litre]	0.2	0.2	0.4	0.4	0.62
Lower Seat-lift * [n litre]	1.1	1.1	0.13	0.13	0.21
Main Movement * [n litre]	0.86	0.86	1.63	1.63	2.79

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Note * [n litre] = volume at atmospheric pressure. Formula to estimate CIP flow during seat lift: (for liquids with comparable viscosity and density to water):

$$Q = Kv \cdot \sqrt{\Delta p}$$

$$Q = \text{CIP - flow (m}^3\text{/h)}$$

$$Kv = \text{Kv value from the above table}$$

$$p = \text{CIP pressure (bar)}$$

Actuator

						STD Operating pressure at 6 bar air pressure
Actuator Type	3	4BS1	4SS2	5BS	5SS	
Actuator dimensions	120 x 230	157 x 252	186 x 281	186 x 281	186 x 379	
∅D x L						
Connection Size						
ASME BPE						
1½"	STD	OP				1000 kPa
2"	STD	OP	OP			1000 kPa
2½"	OP	STD	OP	OP	OP	1000 kPa
3"	OP	STD	OP	OP	OP	1000 kPa
4"		OP	OP	STD	OP	1000 kPa

STD: Normal size of actuator

OP: Alternative size of actuator (NB: For choice and performance of optional actuators please contact Alfa Laval or refer to the Anytime Configurator).

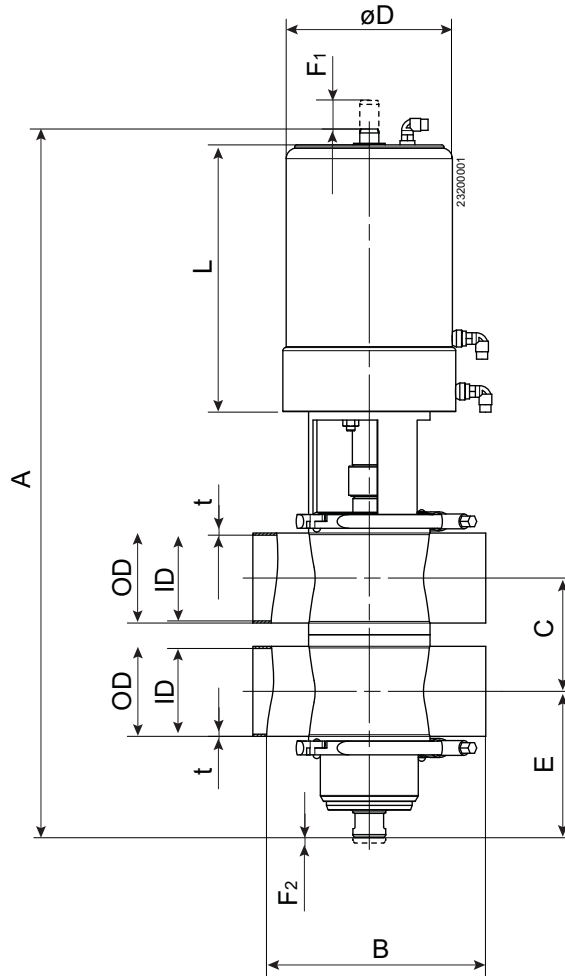
1 BS = Basic spring

2 SS = Strong spring

Radial Seat Diameter

ASME BPE	Seat (mm)	Seat (in)
1½"	∅53.3	∅2.10
2"	∅53.3	∅2.10
2½"	∅81.3	∅3.20
3"	∅81.3	∅3.20
4"	∅100.3	∅3.95

Dimensions (mm)



Size ASME BPE	1½"		2"		DN/OD 2½"		3"		4"	
	mm	in	mm	in	mm	in	mm	in	mm	in
A -	530	20.87	575	22.64	670	26.38	670	26.38	791	31.14
B	170	6.69	220	8.66	220	8.66	220	8.66	300	11.81
*C	60.8	2.39	73.5	2.89	86.2	3.39	98.9	3.89	123.4	4.86
OD	38.1	1.5	50.8	2	63.5	2.5	76.2	3	101.6	4.00
ID	34.8	1.37	47.5	1.87	60.2	2.37	72.9	2.87	97.4	3.83
T	1.65	0.06	1.65	0.06	1.65	0.06	1.65	0.06	2.11	0.08
E	100	3.94	121	4.76	149	5.87	142	5.59	177	6.97
F1	31.5	1.24	31.5	1.24	38	1.5	38	1.5	59	2.32
F2	5	0.2	5	0.2	5	0.2	5	0.2	5	0.20
øD -	120	4.72	120	4.72	157	6.18	157	6.18	186	7.32
L -	230	9.06	230	9.06	252	9.92	252	9.92	281	11.06
Weight (kg)(lb) -	13.5	29.76	15	33.07	24	52.91	24	52.91	34	74.96

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* The measure C can always be calculated by the formula $C = \frac{1}{2}ID_{upper} + \frac{1}{2}ID_{lower} + 26 \text{ mm (1.02 in)}$.

Alfa Laval LKC UltraPure

Control/Check valves

Introduction

The Alfa Laval LKC UltraPure Non-return Valve is a hygienic one-way check valve for use in various processes throughout the high-purity industry to prevent reverse flow. It is easy to install, ensuring safety and high product quality.

Application

The LKC UltraPure Non-return Valve is designed for single directional product flow, meeting the demands of high-purity applications across the biotechnology, pharmaceutical and personal care industries.

Benefits

- Highly reliable, self-acting valve
- Easy to install
- Protects process equipment
- Prevents reverse flow
- Full transparency and traceability of the entire supply chain due to the Alfa Laval Q-doc documentation package

Standard design

The Alfa Laval LKC UltraPure Non-return Valve consists of a valve body in two parts, valve plug and spring, assembled by means of a clamp ring and hygienically sealed with a special seal ring. A guide disc with four legs ensure alignment of the spring-loaded valve plug with an o-ring seal. The valve is available with weld and clamp ends for ISO and DIN tubing connections.

Working principle

The Alfa Laval LKC UltraPure Non-return Valve opens and closes depending on the pressure. The spring acts on the valve plug and keeps the valve closed until the force from the pressure in the inlet exceeds the force of the spring. If a reverse flow should occur, the spring force and the pressure from the outlet will keep the valve closed. Required differential pressure for opening the valve when fitted in a vertical pipe is approximately 6 kPa (0.06 bar).

Certificates



TECHNICAL DATA

Max. product pressure: 1000 kPa (10 bar)

Required differential pressure for opening the valve when fitted in a vertical pipe, as shown in fig. 2, is approx. 6 kPa (0.06 bar).

Surface specification (Product wetted steel parts)

Internal:	Ra < 0.8 µm
ASME BPE designation:	SF3
External:	Ra < 0.8 µm
Internal:	Ra < 0.5 µm
ASME BPE designation:	SF1
External:	Ra < 0.8 µm

ATEX

Classification II 2 G D*

*This equipment is outside the scope of the directive 2014/34/EU and must not carry a separate CE marking according to the directive as the equipment has no own ignition source

PHYSICAL DATA

Product wetted steel part	1.4404 (316L) Acc. to EN 10088 or equal (AISI 316L)
Other steel parts	1.4301 (304) Acc. to AISI 304
Spring	Electropolished

Elastomers

Product wetted elastomer	EPDM Acc. to FDA and USP Class VI Temperature: -10°C - 140°C
Product wetted elastomer	FPM Acc. to FDA Temperature: -10°C - 180°C

Connections

Weld ends	Matching tubes and fittings: ISO 2037 / Series A/DIN Acc. to ISO or DIN
Clamp ends	Matching tubes and fittings: ISO 2037 / Series A/DIN Acc. to ISO or DIN

Pressure drop/capacity diagrams

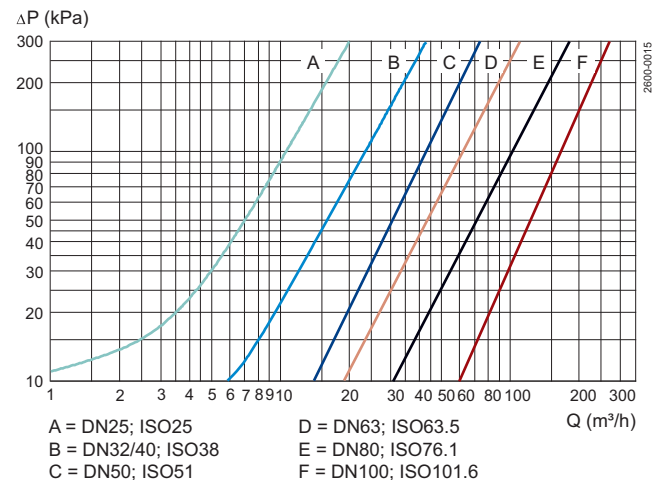


Fig.1. **Note!**

For the diagram the following applies:

Medium: Water (20°C).

Measurement: In accordance with VDI 2173.

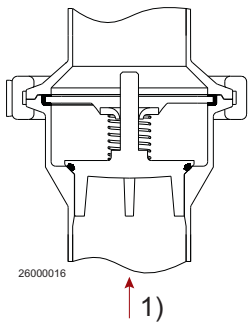


Fig.2.
1 = Flow direction.
Shows the optimal built-in situation to make sure the valve is drainable. The four guide legs of the valve cone ensure good alignment. 90° rotation.

Dimensions (mm)

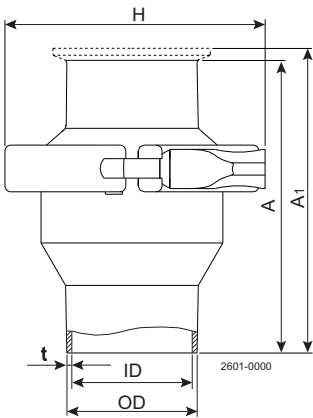


Table 1. Dimensions (mm)

Size	ISO						DIN						
	25	38	51	63.5	76.1	101.6	25	32	40	50	65	80	100
A	62.5	75.0	87.5	95.0	115.0	155.0	62.5	75.0	75.0	87.5	95.0	115.0	155.0
A ₁	105.5	118.0	130.5	138.0	158.0	198.0	105.5	118.0	118.0	130.5	151.0	171.0	211.0
OD	25.4	38.4	51.4	63.9	76.4	102.0	30.0	36.0	42.0	54.0	70.0	85.0	104.0
ID	22.5	35.5	48.5	60.5	72.0	97.6	26.0	32.0	38.0	50.0	66.0	81.0	100.0
t	1.45	1.45	1.45	1.7	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0
H	77.4	90.4	103.6	132.6	144.0	164.0	77.4	90.4	90.4	103.6	132.6	144.0	164.0
Weight (kg):													
Welding ends	0.7	1.0	1.3	2.1	2.9	4.3	0.7	1.0	1.0	1.3	2.1	2.9	4.3
Clamp ends	0.9	1.1	1.4	2.5	3.4	4.7	0.9	1.1	1.1	1.4	2.5	3.4	4.7

TD 900-563

Alfa Laval LKB UltraPure

Butterfly valves

Introduction

The Alfa Laval LKB UltraPure Butterfly Valve is a hygienic in-line valve for routing low and medium-viscosity liquids in stainless steel pipe systems. The LKB UltraPure is available with a standard handle with spring-locking action for straightforward manual operation or with a pneumatic actuator for pneumatic operation.

Application

This in-line butterfly valve is designed for on-off duties in high-purity applications across the personal care, biotechnology and pharmaceutical industries.

Benefits

- Versatile, highly modular design
- Competitively priced alternative to diaphragm valves in certain applications
- Full transparency and traceability of the entire supply chain due to the Alfa Laval Q-doc documentation package
- Easy to configure in either a manual version or a pneumatic version

Standard design

The LKB UltraPure Butterfly Valve consists of two valve body halves, valve disc, and bushings for the disc stem and seal ring, assembled by means of screws and nuts. The valve can also be fitted with the Alfa Laval ThinkTop® V50 and V70 for sensing and control of the valve.

Working principle

The Alfa Laval LKB UltraPure Butterfly Valve is either controlled remotely by means of a pneumatic actuator or manually by means of a handle.

For pneumatic operation, an actuator converts axial piston motion into a 90° rotation of the shaft. The actuator torque increases as the valve disc comes into contact with the seal ring of the butterfly valve to secure proper closing of the valve seat. The actuator comes in three standard versions: normally closed (NC); normally open (NO); and, air/air activated (A/A). Two actuator sizes, Ø85 mm and Ø133 mm, cover all valve sizes and are available in two versions, LKLA and LKLA-T (T for mounting of indication or control unit on the actuator).

For manual operation, the handle mechanically locks the valve in open or closed position. Handles are available in two positions, four positions, regulating 90° position, and multi-position. The valve can be supplied either with welding connections or clamp connections and can be mounted with indication units for feedback on the valve position (open or closed).



TECHNICAL DATA

Valve	
Max. product pressure:	1000 kPa (10 bar)
Min. product pressure:	Full vacuum
Temperature range:	-10°C to + 140°C (EPDM)
	However max. 95°C when operating the valve (All seals)

Actuator	
Max. air pressure:	600 kPa (6 bar)
Min. air pressure, NC and NO:	400 kPa (4 bar)
Temperature range:	-25°C to +90°C
Air consumption (litres free air):	
- ø85 mm:	0.24 x p (bar)
- ø133 mm:	0.95 x p (bar)
Weight:	
- ø85 mm:	3 kg.
- ø133 mm:	12 kg

ATEX	
Classification	II 2 G D*

*This equipment is outside the scope of the directive 2014/34/EU and must not carry a separate CE marking according to the directive as the equipment has no own ignition source



PHYSICAL DATA

Materials	
Product wetted steel part	1.4404 (316L) acc. to EN 10088
Other steel parts	1.4301 (304) acc. to EN 10088
Bushings for valve disc	PVDF

Elastomers	
Product wetted seals	EPDM acc. to FDA and USP Class VI

Connections	
Weld ends**	Matching tubes and fittings: ISO 2037 / DIN / ASME BPE Acc. to ISO, DIN or ASME BPE
Clamp ends	Matching tubes and fittings: ISO 2037 / DIN / ASME BPE Acc. to ISO, DIN or ASME BPE

** Weld ends on ASME BPE valves are according to ASME BPE 2009 316L Table DT-3 with low sulfur and suitable for orbital welding

Actuator	
Actuator body:	1.4307 (304L)
Piston:	Light alloy
	Air/air version (for ø85 mm: Bronze)
Seals:	NBR
Housing for switches:	PPO

Surface specification (Product wetted steel parts)

ISO 2037 / DIN:	
Internal:	0.5 µm
ASME BPE designation:	SF1
External:	Semi-bright
ASME BPE*:	
Internal:	0.5 µm
ASME BPE designation:	SF1
External:	Semi-bright
ASME BPE*:	
Internal:	0.4 µm electro polish
ASME BPE designation:	SF4
External:	Semi-bright

* According to ASME BPE 2009 table SF-3

Options

- A. Product wetted seals: FPM (acc. to FDA and USP Class VI), Q and PFA
- B. ThinkTop® for control and indication.*
- C. Indication unit with micro switches.*
- D. Indication unit with inductive proximity switches.*
- E. Indication unit with Hall proximity switches.*
- F. Explosion proof indication unit with inductive proximity switches.*
- G. Bracket for actuator.
- H. Handle with two or four positions.
- I. Handle for electrical position indication.
- J. Handle with infinite intermediate positions.
- K. Multipositioning handle**.
- L. Lockable Multiposition Handle. Padlock can be mounted as shown in fig. 3.

Note! Padlock is not delivered.

- M. Special cap for 90° turned handle position.

- N. Service tool for actuator.

- O. Service tool for fitting 25-38 mm (DN25 - DN40) valve discs.

* For further information see Product Catalogue chapter "Control & Indication".

** A padlock can be mounted on the Lockable Multiposition Handle as shown in the opposite figure.

Note! Padlock is not delivered.

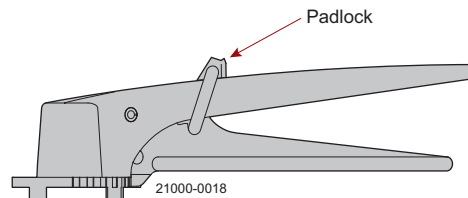


Fig. 1. Lockable Multiposition Handle with padlock.

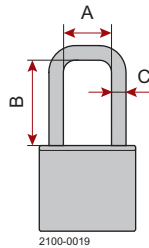


Fig.2. Dimensions - padlock.

- A. Min. 20 mm
- B. Min. 35 mm
- C. $\varnothing 6$ mm

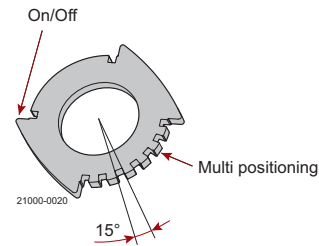


Fig. 3 Positioning cap.

Note! For Ultra Pure ASME BPE clamp valve (size 1" - 2½")

Installation and removal of some clamp rings is easiest by removal of the lockable multi position handle first.

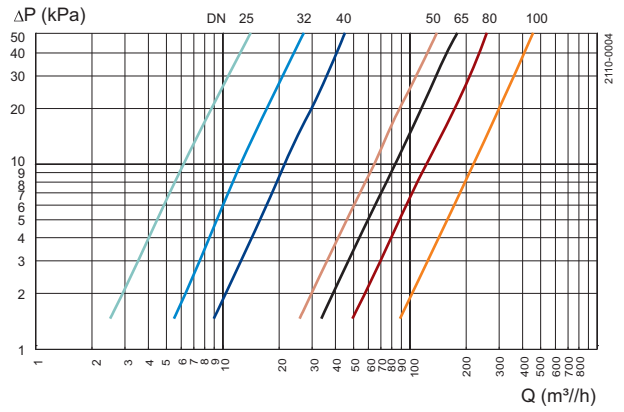
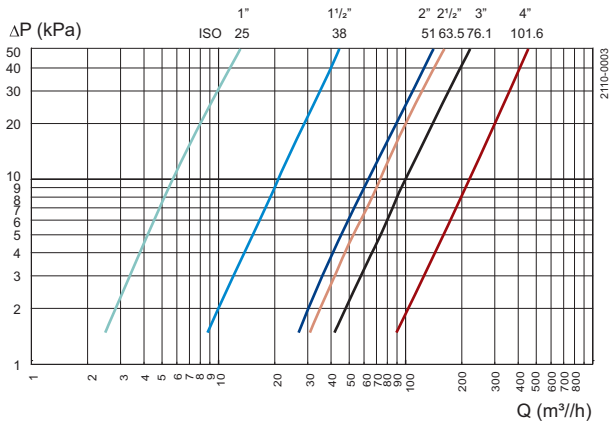
Documentation

All valves are delivered with Alfa Laval Q-doc.

Note!

For further details, see also ESE01699.

Capacity/Pressure drop diagrams



NOTE!

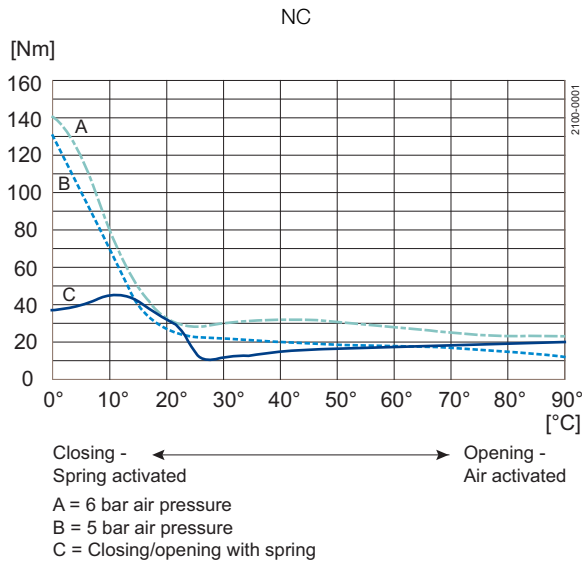
For the diagrams the following applies:

Medium: Water (20°C).

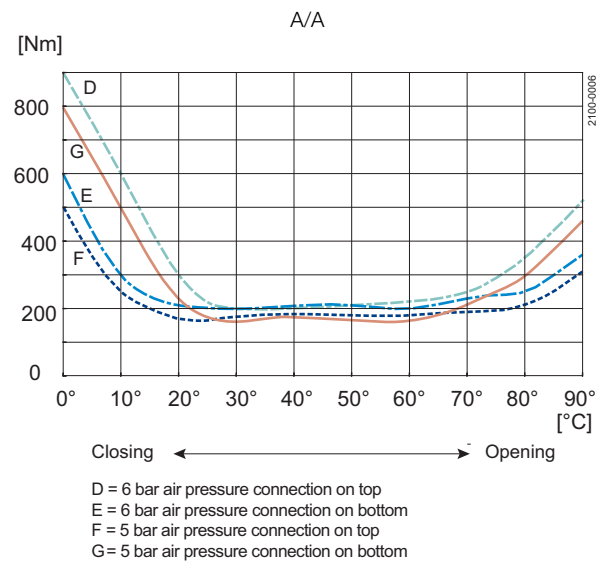
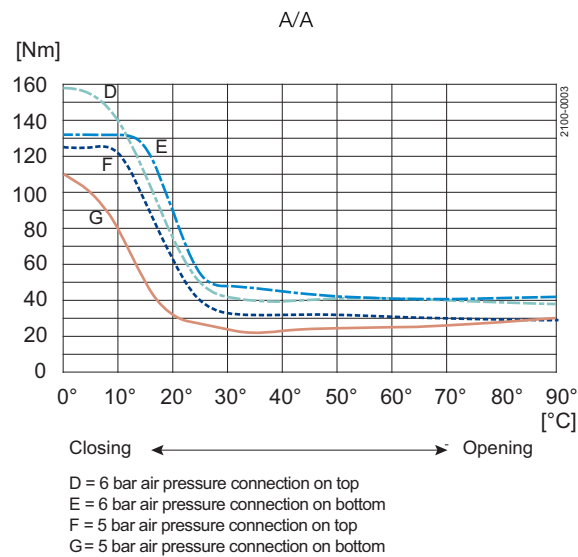
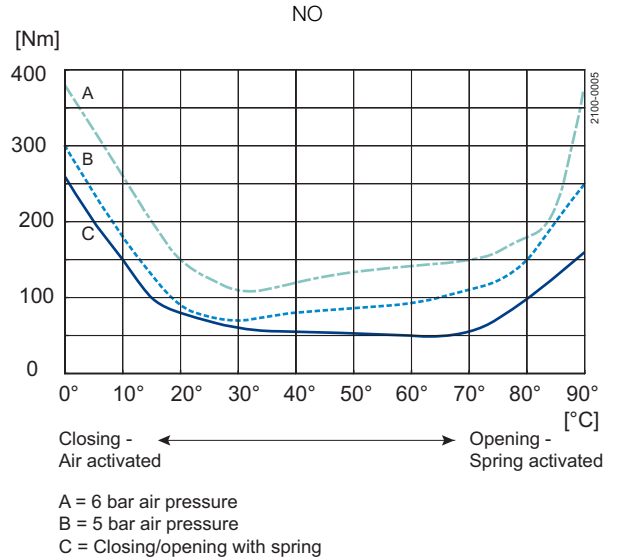
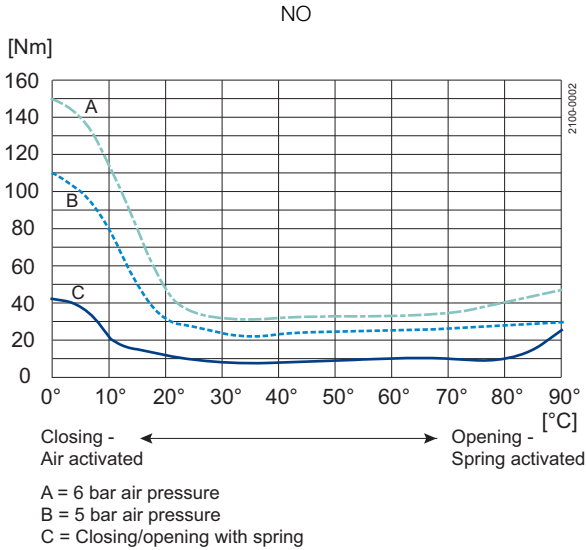
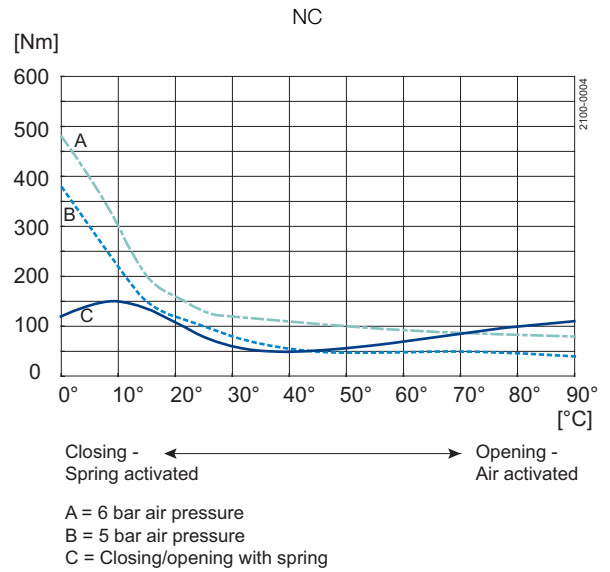
Measurement: In accordance with VDI 2173.

Torque diagrams - Actuator

LKLA ø85 mm:



LKLA ø133 mm:



Torque values (for rotating the valve disc in a dry seal ring)

Size	Max. Nm	
25 mm	DN25	15
	DN32	15
38 mm	DN40	15
51 mm	DN50	20
63.5 mm	DN65	25
76 mm	DN80	30
101.6 mm	DN100	35

Dimensions (mm)

Fig. 1. Dimensions - valve.

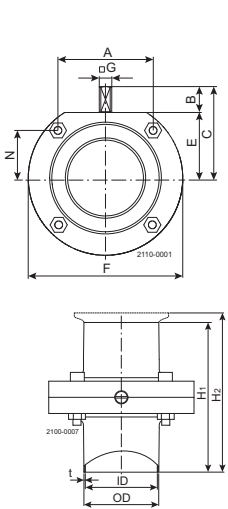
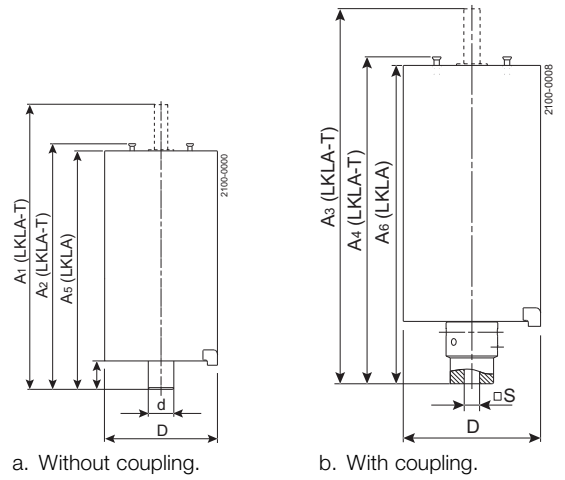


Fig. 2. Dimensions - actuator.



a. Without coupling.

b. With coupling.

Dimensions (mm)

LKB UltraPure

Size	ISO 2037						DIN						
	25	38	51	63.5	76.1	101.6	DN	DN	DN	DN	DN	DN	DN
	mm	mm	mm	mm	mm	mm	25	32	40	50	65	80	100
A	42.00	42.00	61.00	61.00	79.50	106.00	42.00	42.00	42.00	61.00	61.00	79.00	106.00
B	15.50	16.70	16.60	17.50	16.60	16.00	14.70	15.90	16.70	16.60	17.50	16.00	160.00
C	49.00	49.00	58.50	69.50	73.50	93.00	48.00	49.00	54.00	63.00	75.00	79.00	93.00
OD	25.00	38.00	51.00	63.50	76.10	101.60	29.00	35.00	41.00	53.00	70.00	85.00	104.00
ID	22.60	35.60	48.60	60.30	72.90	97.60	26.00	32.00	38.00	50.00	66.00	81.00	100.00
t	1.20	1.20	1.20	1.60	1.60	2.00	1.50	1.50	1.50	1.50	2.00	2.00	2.00
E	32.50	32.50	42.00	52.00	57.00	77.00	33.30	33.30	37.70	46.60	57.30	63.00	77.00
F	78.00	78.00	99.00	117.00	132.00	169.00	79.00	79.00	86.50	105.70	125.00	143.00	169.00
□ S	8	8	8	8	10	12	8	8	8	8	10	10	12
H1	127.00	127.00	132.00	134.00	162.00	180.00	127.00	127.00	127.00	132.00	142.00	164.00	180.00
H2	104.20	104.20	109.20	111.20	176.40	194.40	90.00	90.00	90.00	95.00	118.00	120.00	136.00
J	82.00	82.00	92.00	102.00	107.00	127.00	74.00	74.00	78.00	88.00	98.00	104.00	118.00
K	120.00	120.00	120.00	120.00	162.00	162.00	120.00	120.00	120.00	120.00	162.00	162.00	162.00
N	26.50	26.50	30.50	40.50	43.50	53.00	27.30	27.30	31.70	35.10	45.80	49.50	53.00
Weight (kg)	1.2	1.0	1.5	2.1	3.0	4.7	1.2	1.1	1.3	1.8	3.1	3.5	5.1

Size	ASME					
	mm	mm	mm	mm	mm	mm
A	42.00	42.00	61.00	61.0	79.50	105.90
B	15.50	16.70	16.60	17.50	16.61	16.00
C	49.00	49.00	58.50	69.50	73.66	93.00
OD	25.40	38.10	50.80	63.50	76.2	101.60
ID	22.10	34.80	47.50	60.20	72.90	97.00
t	1.65	1.65	1.65	1.65	1.65	2.10
E	32.50	32.50	42.00	52.00	56.99	77.00
F	78.00	78.00	98.80	117.00	132.00	169.00
□ S	8.00	8.00	8.00	8.00	10.00	12.00
H ₁	127.00	127.00	132.00	134.00	162.00	180.00
H ₂	72.40	72.40	77.40	79.40	87.37	111.80
J	82.00	82.00	92.00	102.00	107.01	127
K	120.00	120.00	120.00	120.00	162.00	162.00
N	26.50	26.50	30.50	10.50	43.50	53.00
Weight (kg)	1.20	1.00	1.50	2.10	3.00	4.70

NOTE! Weights are for valves with welding ends and handles.

Dimensions (mm) - Actuator

LKLA and LKLA-T:

Valve size	25-63.5 mm DN25-50	76.1 mm DN65-80	101.6 mm DN100	101.6 mm DN100
A ₁	244	242	242	363
A ₂	193	191	191	316
A ₃	244	244	244	337
A ₄	173	173	173	290
A ₅	185	183	183	308
A ₆	165	165	165	282
D	85	85	85	133
d	17	17	17	30
l	16.5	16.5	16.5	34
□ s	8	10	12	12
Function	NC, NO, A/A	NC, NO, A/A	NC, NO, A/A	NC, NO, A/A

900593

Connections

Compressed air

R1/8" (BSP), internal thread.

