

Alfa Laval Unique Mixproof Tank Outlet

Double seat valves

Introduction

The Alfa Laval Unique Mixproof Tank Outlet (TO) 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. Specially designed for mounting directly on the tank bottom or wall at the inlets and outlets, the valve enables the safe handling of two different products or fluids through the same valve. It provides full drainability and cleanability all the way up to the tank--without any risk of cross-contamination. Modular design and a wide variety of options enable the valve to be customized to meet any process requirement for all mixproof tank outlet operations allowing two different products in pipeline and tank.

Application

The Alfa Laval Unique Mixproof TO Valve is designed for continuous flow management and process safety in hygienic tank inlet and outlets across the dairy, food, beverage, and many other industries.

Benefits

- Enhanced product safety
- Cost-effective, spillage-free operation
- Optimized plant efficiency and enhanced cleanability
- Leakage detection and leakage chamber cleaning
- Configurable to fit your specific needs

Standard design

The Alfa Laval Unique Mixproof TO 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. There are two versions: the Unique Mixproof TO Valve and the Unique Mixproof TO Valve with external cleaning. It is possible to install the Unique Mixproof TO in a horizontal position.

The valve body is connected either to tank flange or a stub flange with a clamp and can be turned in any position upon loosening the clamp slightly. Supplied with TÜV approval AD 2000 and inspection certificate 3.1 according to EN10204, the tank flange is welded directly into the tank. Please note



that it is important to observe the welding guideline in instruction manuals.

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 TO Valve is a normally closed (NC) valve controlled from a remote location by means of compressed air. The valve has two independent plugs and seals to separate the liquids; the space between the seals forms a leakage chamber at 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 the tank to the line. The radial design of the valve ensures that virtually no product spillage occurs during valve operation. It is possible to adapt valve cleaning to the requirements of individual process specifications.

Certificates



Authorized to carry the 3A symbol

TECHNICAL DATA

Pressure

Max. product pressure in pipeline:	145 PSI (1000 kPa)
Min. product pressure:	Full vacuum
Air pressure:	Max. 116 PSI (800 kPa)

Temperature

Temperature range:	23°F to +257°F (Depending on rubber quality)
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ATEX

Classification:	II 2 G D ¹
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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

¹ 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 parts:	1.4404 (316L)
Other steel parts:	1.4301 (304)
Product wetted parts:	EPDM, HNBR, NBR or FPM
Other seals:	CIP seals: EPDM Actuator seals: NBR

Surface finish - choose from the following:

Internal/external Matt (blasted)	Ra<64 µin
Internal Bright (polished)	Ra<32 µin
Internal/external Bright (internal polished)	Ra<32 µin



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

Product wetted seals:	EPDM
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Other seals:

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

Valve Body Combinations

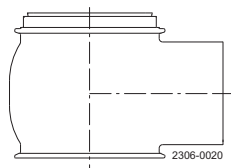


Figure 1. Type 20

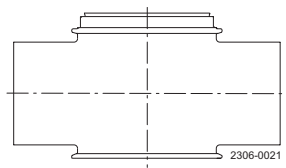


Figure 2. Type 30



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SpiralClean

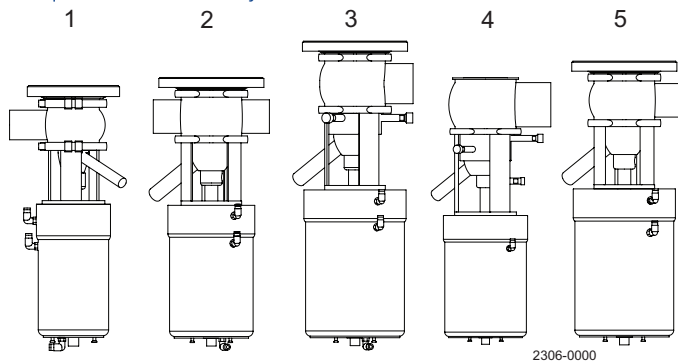
The Alfa Laval SpiralClean system to clean the balanced plug and leakage chamber. The system cleans more efficiently, uses less cleaning fluid by ensuring that a directional flow of CIP fluid reaches all the surfaces in much less time than with conventional systems.

Selection guide

The drawings below gives an overview of all options when choosing the valve to fit your process, thus demonstrating the actual flexibility of the Unique Mixproof tank outlet valve.

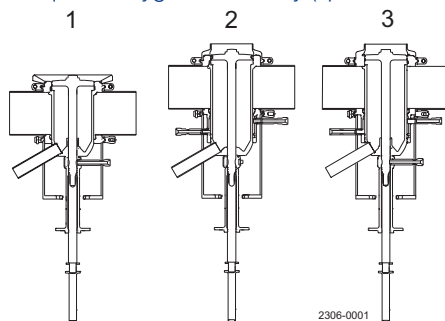
The Unique-TO concept offers balanced plug in pipe line, seat lift, CIP for the plugs and leakage chambers and any combination in between.

Unique-TO size flexibility



1. DN50 with tank flange, group 3 actuator including seat lift and seat push
2. ISO63.5 (2½") with tank flange, group 4 basic actuator including seat lift and seat push
3. ISO76.1 (3") with spiral on upper balanced plug and tank flange, group 5 basic actuator including seat lift and seat push
4. DN150 with spiralclean on leakage chamber upper balanced plug and group 4 basic actuator
5. ISO 63.5 (2½") with tank flange, group 4 basic actuator including seat lift

Unique-TO hygienic flexibility (spiral clean options)



1. External CIP of leakage chamber
2. External CIP of upper balanced plug
3. External CIP cleaning of leakage chamber and upper balanced plug

Standard configurations

To assist you in the selection we have included some standard configurations:

- Unique-TO
- Unique-TO with external cleaning.

You can either choose these directly or add additional features ensuring that the valve suits your specific needs.



Unique-TO meets the typical demands of a process valve in the food and drink industry.

- Actuator with seat lift integrated.
- Standard balanced plug in pipeline.

Unique-TO with external cleaning meets the highest demands for hygienic processing.

- Actuator with seat lift integrated.
- Standard balanced plug in pipeline.
- SpiralClean of leakage chamber and balanced plug

Options

- Male parts or clamp liners in accordance with required standard
- Control and Indication: ThinkTop
- Side indication for detection of upper seat lift
- Product wetted seals in HNBR, NBR or FPM
- Various internal/external surface finish
- 3A (hygienic standard) on request
- Blind flange
- Conversion flange that enables replacement of an SMP-TO valve though reusing the existing SMP-TO tank flange - see fig. 1.
- Tank connection supplied separately

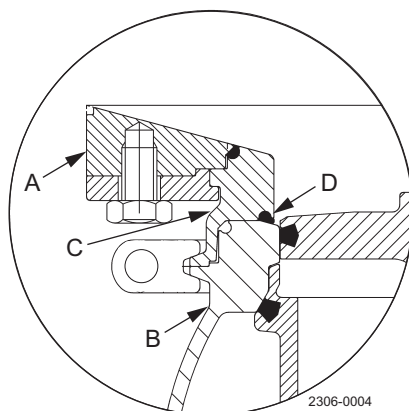


Figure 3. Converting from SMP-TO valve to Unique-TO valve in tank flange

- A. SMP-TO tank flange
 B. Unique Mixproof TO valve
 C. Conversion flange
 D. O-ring for conversion flange

When Unique-TO is mounted on a SMP-TO flange via the Alfa Laval conversion flange add 28 mm to valve height dimensions (A1-A4)

Size		Max. size of particle (in)	Max. tank pressure (psi)	Actuator size 3-Basic (ø4.7"x9")	Actuator size 4-Basic (ø6.2"x10")	Actuator size 5-Basic (ø7.3"x11")	Opening pressure in pipe line at 87 PSI air pressure (psi)
inch	DIN						
51 - 2"	DN50	ø0.35	58	Standard			145
63.5 - 2½"	DN65	ø0.60	65		Standard		145
63.5 - 2½"	DN65	ø1.22	87			Long stroke	145
76.1 - 3"	DN80	ø0.60	65		Standard		145
76.1 - 3"	DN80	ø1.22	87			Long stroke	145
101.6 - 4"	DN100	ø1.22	65			Standard	145
101.6 - 4"	DN100	ø0.60	50		Option		145
	DN125	ø1.29	50			Standard	145
	DN125	ø0.60	36		Option		145

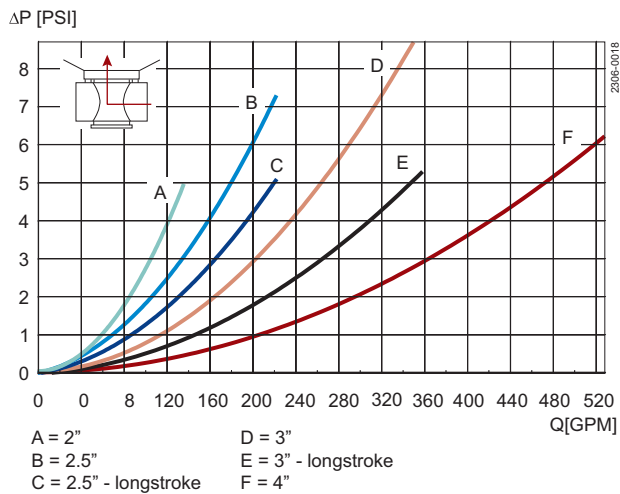
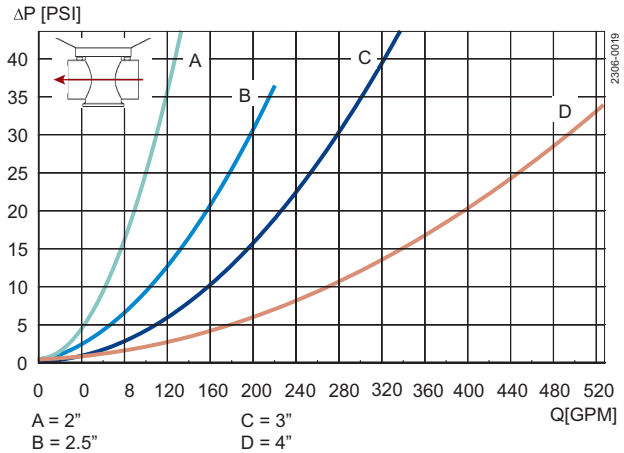
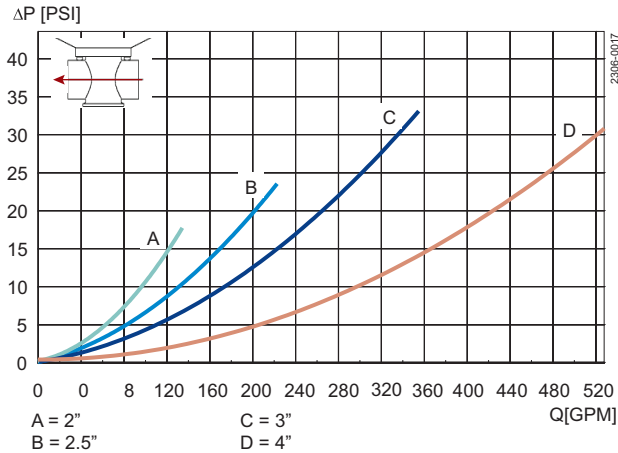


Size		Max. size of particle (in)	Max. tank pressure (psi)	Actuator size 3-Basic (ø4.7"x9")	Actuator size 4-Basic (ø6.2"x10")	Actuator size 5-Basic (ø7.3"x11")	Opening pressure in pipe line at 87 PSI air pressure (psi)
inch	DIN						
	DN150	ø1.29	50			Standard	145
	DN150	ø0.60	36		Option		145



Note! Max. pressure in tank means that a higher pressure in tank will open the valve. It is possible to open with 145 PSI (10 bar) (1000 kPa) in pipe line. When closing the valve the pressure can not be higher than "Max. Tank pressure".

Pressure drop/capacity diagrams



Note!

For the diagrams the following applies:
Medium: Water 68° F (20°C)
Measurement: In accordance with VDI 2173



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Air and CIP consumption

Size	Inch				DN		Longstroke	
ISO-DIN	2"	2½"	3"	4"	125	150	2½"	3"
Air consumption for Balanced Seat-lift	0.20	0.40	0.40	0.62	0.62	0.62	0.40	0.40
Air consumption for Tank Seat-lift	1.10	0.13	0.13	0.21	0.21	0.21	0.13	0.13
Air consumption for Main Movement	0.86	1.62	1.63	2.79	2.79	2.79	1.63	1.63
Cv-value for Balanced CIP Seat-lift [gpm]	1.744	2.907	2.907	2.209	4.302	4.302	2.907	2.907
Cv-value for Tank Seat-lift [gpm]	1.047	2.209	2.209	1.628	3.605	3.605	2.209	2.209
Cv-value for SpiralClean Spindle CIP [gpm]	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140
Cv-value for SpiralClean External CIP in leakage chamber [gpm]	0.291	0.337	0.337	0.337	0.337	0.337	0.337	0.337



Note! Recommended min. pressure for SpiralClean: 29 PSI.

Formula to estimate CIP flow during seat lift:

(for liquids with comparable viscosity and density to water):

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

Q = CIP - flow gpm)

Cv = Cv value from the above table

Δ p = CIP pressure (psi)

Cv = US gallons/min

Dimensions (inch)

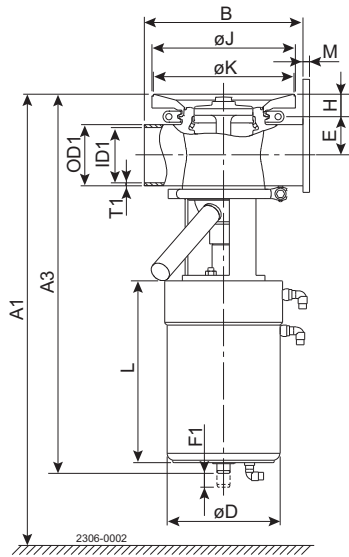


Figure 4. Unique-TO connected to tank flange

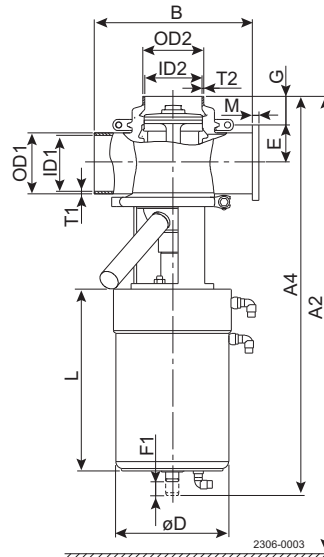


Figure 5. Unique-TO connected to stub flange

A1 + A2 = Min. clearance to allow that actuator and internal valve parts can be lifted out of the valve body. If ThinkTop is mounted, add 7.09 inch.



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Group	3	4	4	5	6	6	4	4
Size	DN/OD						DN - longstroke	
ISO-DIN	2"	2½"	3"	4"	125	150	2½"	3"
A1 min. dimension. Unique-TO	22.80	25.43	25.95	29.65	31.69	35.04	27.56	28.07
A1 min. dimension. Unique-TO with external cleaning	24.25	27.01	27.52	32.01	34.06	xxx	29.13	29.65
A2 min. dimension Unique-TO	23.15	25.79	26.30	30.00	32.05	35.39	27.91	28.43
A2 min. dimension Unique-TO with external cleaning	24.61	27.36	27.87	32.36	34.41	xxx	29.49	30.00
A3 Unique-TO	18.43	20.71	20.71	23.39	24.41	26.77	22.64	22.64
A3 Unique-TO with external cleaning	19.88	22.28	22.28	25.75	26.77	xxx	24.21	24.21
A4 Unique-TO	18.78	21.06	21.06	23.74	24.76	27.13	22.99	22.99
A4 Unique-TO with external cleaning	20.24	22.64	22.64	26.10	27.13	xxx	24.57	24.57
B	8.66	8.66	8.66	11.81	11.81	11.81	8.66	8.66
OD1	2.01	2.50	3.00	4.00	5.08	6.06	2.50	3.00
ID1	1.88	2.37	2.87	3.84	4.92	5.91	2.37	2.87
t1	0.06	0.06	0.06	0.08	0.08	0.08	0.06	0.06
E	1.45	1.70	1.95	2.43	2.97	3.47	1.70	2.00
F1	1.24	1.50	1.50	2.32	2.32	2.32	2.32	2.32
F2 (Tank plug)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
G	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
H	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
øD	4.72	6.18	6.18	7.32	7.32	7.32	7.32	7.32
L	9.06	9.92	9.92	11.06	11.06	11.06	11.06	11.06
OD2	2.01	2.50	3.00	4.00	5.08	5.08	2.50	3.00
ID2	1.88	2.37	2.87	3.84	4.92	4.92	2.37	2.87
t2	0.06	0.06	0.06	0.08	0.08	0.08	0.06	0.06
øJ	6.26	7.84	7.84	7.84	7.84	7.84	7.84	7.84
øK	6.10	7.68	7.68	7.68	7.68	7.68	7.68	7.68
M/ISO clamp	0.83	0.83	0.83	0.83			0.83	0.83
M/DIN clamp					1.10	1.10		
M/ISO male	0.83	0.83	0.83	0.83			0.83	0.83
M/DIN male					1.81	1.97		
M/SMS male	0.79	0.95	0.95	1.38			0.95	0.95
M/BS male	0.87	0.87	0.87	1.06			0.87	0.87
Weight (kg) ¹ Unique TO	27.50	49.50	49.50	72.60	79.20	83.60	61.60	61.60
Weight (kg) ¹ Unique TO with external cleaning	28.60	51.70	51.70	74.80	81.40	xxx	63.80	63.80

¹ = without tank flange

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