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 be fitted with Alfa Laval ThinkTop V-series for sensing and control of the valve. See ThinkTop datasheets for further details.

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.

TECHNICAL DATA

Pressure	
Max. product pressure in pipeline:	1000 kPa (10 bar)
Min. product pressure:	Full vacuum
Air pressure:	Max. 800 kPa (8 bar)

Temperature	
Temperature range:	-5°C to +125°C (Depending on rubber quality)

ATEX	
Classification:	II 2 G D[1]

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)

Surface finish - choose from the following:	
Internal/external Matt (blasted)	Ra<1.6 µm
Internal Bright (polished)	Ra<0.8 µm
Internal/external Bright (internal polished)	Ra<0.8 µm

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

Product wetted seals:	EPDM

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

Valve Body Combinations

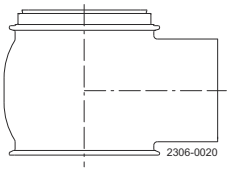


Figure 1. Type 20

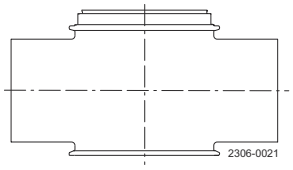


Figure 2. Type 30

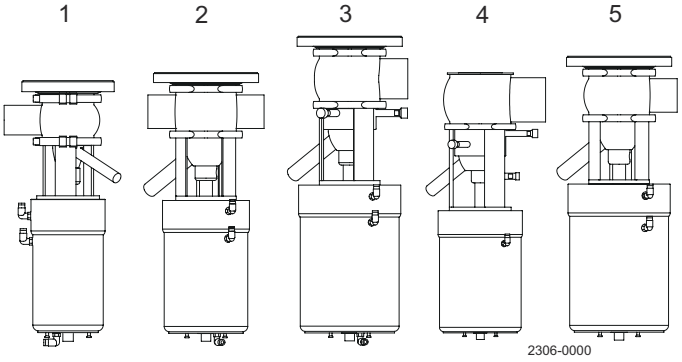
SpiralClean

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

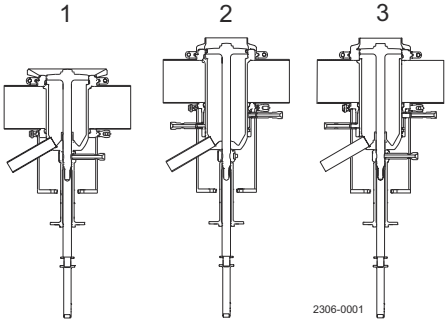
The drawings below gives an overview of all options when choosing the valve to fit your process, thus demonstrating the actual flexibility of the Unique Mixproof tank outlet valve.
The Unique-TO concept offers balanced plug in pipe line, seat lift, CIP for the plugs and leakage chambers and any combination 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 V-Series
- 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

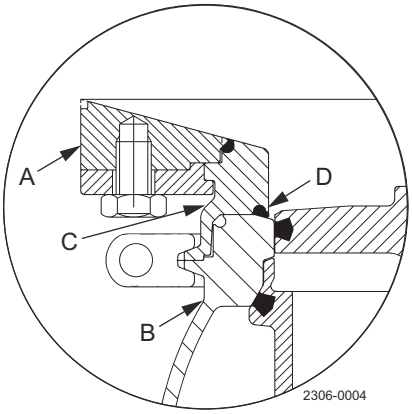


Figure 3. Converting from SMP-TO valve to Unique-TO valve in tank flange

A. SMP-TO tank flange

B. Unique Mixproof TO valve

C. Conversion flange

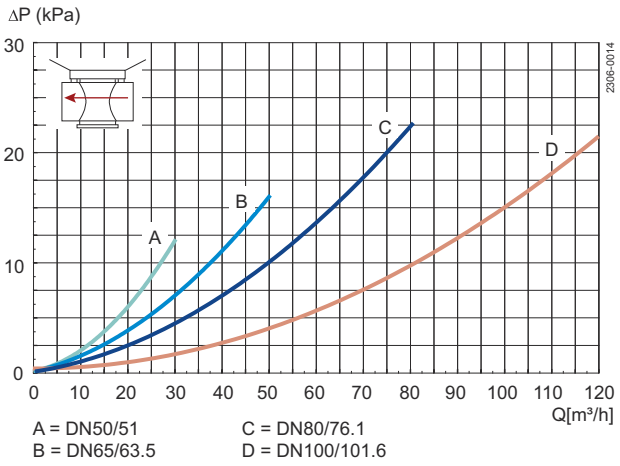
D. O-ring for conversion flange

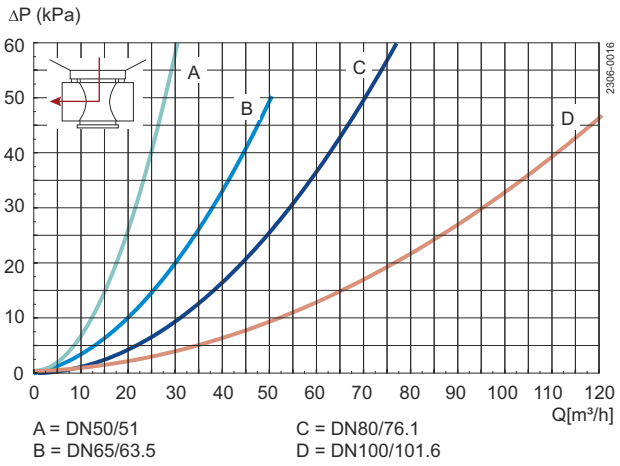
When Unique-TO is mounted on a SMP-TO flange via the Alfa Laval conversion flange add 28 mm to valve height dimensions (A1-A4)

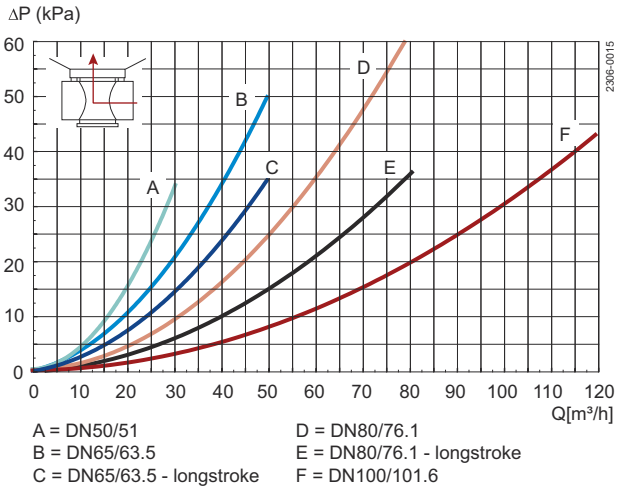
Size		Max. size of particle (mm)	Max. tank pressure (kPa)	Actuator size 3-Basic (ø120x230)	Actuator size 4-Basic (ø157x252)	Actuator size 5-Basic (ø186x281)	Opening pressure in pipe line at 6 bar air pressure (kPa)
mm	DIN						
51	DN50	ø9	400	Standard			1000
63.5	DN65	ø15	450		Standard		1000
63.5	DN65	ø31	600			Long stroke	1000
76.1	DN80	ø15	450		Standard		1000
76.1	DN80	ø31	600			Long stroke	1000
101.6	DN100	ø31	450			Standard	1000
101.6	DN100	ø15	350		Option		1000
	DN125	ø33	350			Standard	1000
	DN125	ø15	250		Option		1000
	DN150	ø33	350			Standard	1000
	DN150	ø15	250		Option		1000

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

Pressure drop/capacity diagrams







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

Air and CIP consumption

Size	DN/OD				DN						Longstroke DN/OD		Longstroke DN	
ISO-DIN	51	63.5	76.1	101.6	50	65	80	100	125	150	63.5	76.1	65	80
Air consumption for Balanced Seat-lift Litre = volume at atmosphere pressure	0.20	0.40	0.40	0.62	0.20	0.40	0.40	0.62	0.62	0.62	0.40	0.40	0.40	0.40
Air consumption for Tank Seat-lift Litre = volume at atmosphere pressure	1.10	0.13	0.13	0.21	1.10	0.13	0.13	0.21	0.21	0.21	0.13	0.13	0.13	0.13
Air consumption for Main Movement Litre = volume at atmosphere pressure	0.86	1.63	1.63	2.79	0.86	1.62	1.62	2.79	2.79	2.79	1.63	1.63	1.62	1.62
Kv-value for Balanced CIP Seat-lift [m^3/h]	1.50	2.50	2.50	1.90	1.50	2.50	2.50	1.90	3.70	3.70	2.50	2.50	2.50	2.50
Kv-value for Tank Seat-lift [m^3/h]	0.90	1.90	1.90	1.40	0.90	1.90	1.90	1.40	3.10	3.10	1.90	1.90	1.90	1.90
Kv-value for SpiralClean Spindle CIP [m^3/h]	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Kv-value for SpiralClean External CIP in leakage chamber [m^3/h]	0.25	0.29	0.29	0.29	0.25	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29

Note! Recommended min. pressure for SpiralClean: 2 bar.

Formula to estimate CIP flow during seat lift:

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

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

Q = CIP - flow (m^3/h)
Kv = Kv value from the above table
Δ p = CIP pressure (bar)

Dimensions (mm)

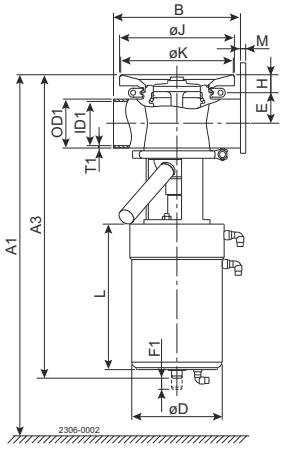


Figure 4. Unique-TO connected to tank flange

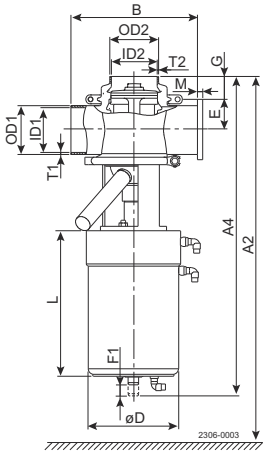


Figure 5. Unique-TO connected to stub flange

A1 or A2 min. clearance to allow that actuator and internal valve parts can be lifted out of the valve body. Add 180 mm to A1 or A2 if ThinkTop is mounted.

											Longstroke			
Size	**DN/OD**				**DN**						**DN/OD**		**DN**	
ISO-DIN	**51**	**63.5**	**76.1**	**101.6**	**50**	**65**	**80**	**100**	**125**	**150**	**63.5**	**76.1**	**65**	**80**
A1 min. dimension. Unique-TO	579	646	659	753	577	652	667	755	805	890	700	713	706	721
A1 min. dimension. Unique-TO with external cleaning	616	686	699	813	614	692	707	815	865	---	740	753	746	761
A2 min. dimension Unique-TO	588	655	668	762	586	661	676	764	814	899	709	722	715	730
A2 min. dimension Unique-TO with external cleaning	625	695	708	822	623	701	716	824	874	---	749	762	755	770
A3 Unique-TO	468	526	526	594	468	526	526	594	620	680	575	575	575	575
A3 Unique-TO with external cleaning	505	566	566	654	505	566	566	654	680	---	615	615	615	615
A4 Unique-TO	477	535	535	603	477	535	535	603	629	689	584	584	584	584
A4 Unique-TO with external cleaning	514	575	575	663	514	575	575	663	689	---	624	624	624	624
B	220	220	220	300	220	220	220	300	300	300	220	220	220	220
OD1	51	63.5	76.1	101.6	53	70	85	104	129	154	63.5	76.1	70	85
ID1	47.8	60.3	72.9	97.6	50	66	81	100	125	150	60.3	72.9	66	81
t1	1.6	1.6	1.6	2.0	1.5	2.0	2.0	2.0	2.0	2.0	1.6	1.6	2.0	2.0
E	36.9	43.2	49.5	61.8	38	46	53.5	63	75.5	88	43.2	49.5	46	53.5
F1	31.5	38	38	59	31.5	38	38	59	59	59	59	59	59	59
F2 (Tank plug)	5	5	5	5	5	5	5	5	5	5	5	5	5	5
G	40	40	40	40	40	40	40	40	40	40	40	40	40	40
H	31	31	31	31	31	31	31	31	31	31	31	31	31	31
øD	120	157	157	186	120	157	157	186	186	186	186	186	186	186
L	230	252	252	281	230	252	252	281	281	281	281	281	281	281
OD2	51	63.5	76.1	101.6	53	70	85	104	129	129	63.5	76.1	70	85
ID2	47.8	60.3	72.9	97.6	50	66	81	100	125	125	60.3	72.9	66	81
t2	1.6	1.6	1.6	2.0	1.5	2.0	2.0	2.0	2.0	2.0	1.6	1.6	2.0	2.0
øJ	159	199	199	199	159	199	199	199	199	199	199	199	199	199
øK	155	195	195	195	155	195	195	195	195	195	195	195	195	195
M/ISO clamp	21	21	21	21	---	---	---	---	---	---	21	21	---	---
M/DIN clamp	---	---	---	---	21	21	21	21	28	28	---	---	21	21
M/ISO male	21	21	21	21	---	---	---	---	---	---	21	21	---	---
M/DIN male	---	---	---	---	23	25	25	30	46	50	---	---	25	25
M/SMS male	20	24	24	35	---	---	---	---	---	---	24	24	---	---
M/BS male	22	22	22	27	---	---	---	---	---	---	22	22	---	---
Weight [kg][1] Unique TO	12.5	22.5	22.5	33	12.5	22.5	22.5	33	36	38	28	28	28	28
Weight [kg][1] Unique TO with external cleaning	13	23.5	23.5	34	13	23.5	23.5	34	37	---	29	29	29	29

[1] = without tank flange

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