



# Alfa Laval Unique Mixproof Large Particle (Unique LP-F)

## Double seat valves

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### Introduction

The Alfa Laval Unique Mixproof Large Particle-Flush (LP-F) 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. The valve enables the simultaneous flow of two different products or fluids with large particles 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—whether higher demands on cleanability, the ability to withstand high pressure. The valve is designed for gentle handling of products containing large particles up to 1¾" (45 mm) or products with high viscosity.

Unlike the Unique Mixproof LP Valve, the Unique Mixproof LP-F Valve is equipped with a lower flush for 100% cleanability of the lip seal in the lower sealing element through seat-lift cleaning alone. It also reduces the need for additional utility installations for external Cleaning-in-Place.

### Application

The Alfa Laval Unique Mixproof LP-F Valve is designed for use hygienic processes that require product safety and continuous flow management of fluids with large particles that require gentle handling and thorough cleaning across the dairy, food, beverage, and many other industries.

### Benefits

- Enhanced product safety
- Spillage-free operation
- Gentle product handling
- Optimized plant efficiency and enhanced cleanability
- Lower lip seal flush

### Standard design

The Alfa Laval Unique Mixproof LP-F Valve is comprised of a series of base components, including valve body, valve plug and actuator that support a wide range of applications. It is supplied with a seat lift cleaning function, which enables handling of two different products at the same time, or safe



handling of one product while seat-lift cleaning operations are being conducted in the other portion of the valve – all without any risk of cross-contamination. When performing seat lift of the lower plug, the valve simultaneously cleans the lower plug seal as well as the lip seal of the lower sealing element.

There are two sizes: 4" and 6". The standard 6" valve comes equipped with balanced lower plug to protect against the effects of pressure peaks and water hammer. To accommodate 1¾" (45 mm) particles, the 4" valve is not equipped with a balanced lower plug but comes with a boost actuator to accommodate a product pressure of up to 10 bar 145 PSI.

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.

## Compliance

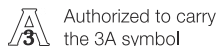
Meets 3A 85-03 requirements for dairy applications

## Working principle

The Alfa Laval Unique Mixproof LP-F 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. 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
Air pressure:	Max. 8 bar

Pressure	
Max. product pressure:	145 PSI (10 bar)
Min. product pressure:	Full vacuum
Air pressure:	Max. 116 PSI

Temperature	
Temperature range:	-5 °C to +125 °C (Depending on elastomer type)

Temperature	
Temperature range:	-23 °F to +257 °F (Depending on elastomer type)

ATEX	
Classification:	II 2 G D <sup>1</sup>



**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

<sup>1</sup> 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)
External surface finish:	Semi-bright (blasted)
Internal surface finish:	Bright (polished), Ra < 0.8 µm
Product wetted parts:	EPDM
<b>Other seals:</b>	
CIP seals:	EPDM
Actuator seals:	NBR
Guide strips:	PTFE

Materials	
Product wetted steel parts:	Acid-resistant steel AISI 316L
Other steel parts:	Stainless steel AISI 304
External surface finish:	Semi-bright (blasted)
Internal surface finish:	External bright/internal polished Ra<32 µin
Product wetted parts:	EPDM (std.) NBR, HNBR or FPM
<b>Other seals:</b>	
CIP seals:	EPDM
Actuator seals:	NBR
Guide strips:	PTFE

## Availability

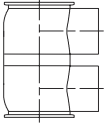
This LP-F edition of the Unique Mixproof valve is a high-end valve with regards to process security as well as from a hygienic point of view. The Unique Mixproof LP-F valve is available in 4" and 6" sizes.

## Options

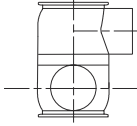
- Male parts or clamp liners in accordance with required standard
- Control and Indication: ThinkTop
- Side indication for detection of upper seat lift
- Product wetted seals in HNBR, NBR or FPM

## Valve body combinations

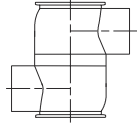
TYPE 11-00



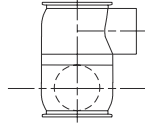
TYPE 11-90



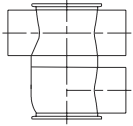
TYPE 11-180



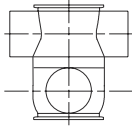
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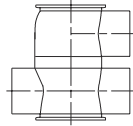
TYPE 12-00



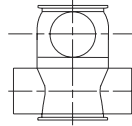
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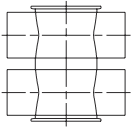
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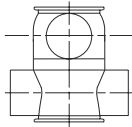
TYPE 21-90



TYPE 22-00



TYPE 22-90



### Pressure drop/capacity diagrams

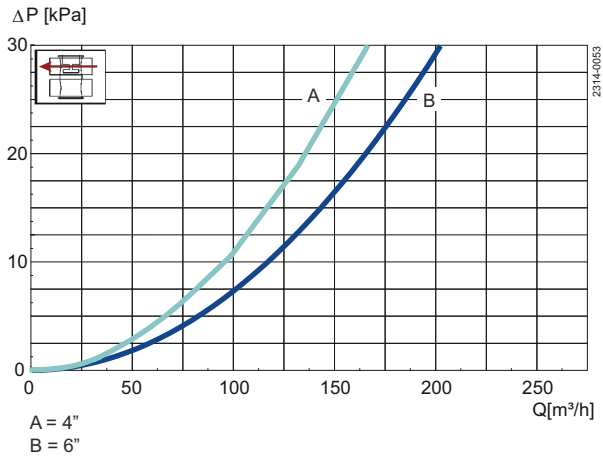


Figure 1. Pressure drop/capacity diagram, upper bodies

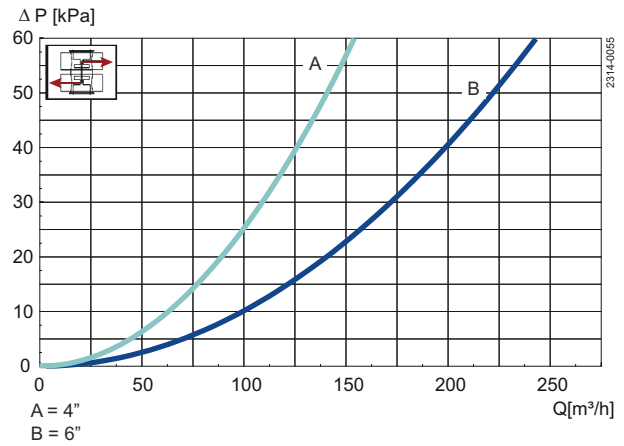


Figure 2. Pressure drop/capacity diagram, between bodies

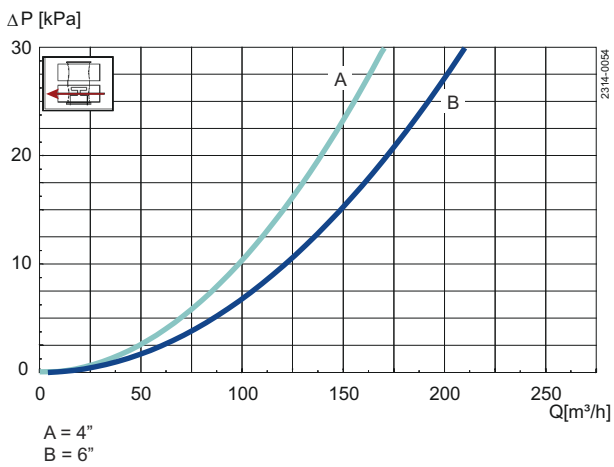


Figure 3. Pressure drop/capacity diagram, lower body



#### Note!

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

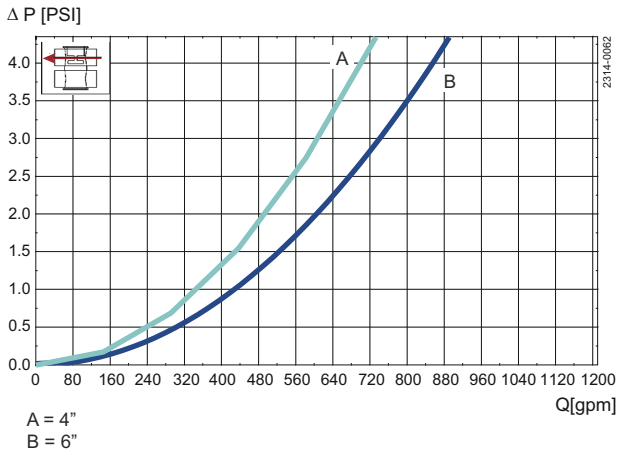


Figure 4. Pressure drop/capacity diagram, upper bodies

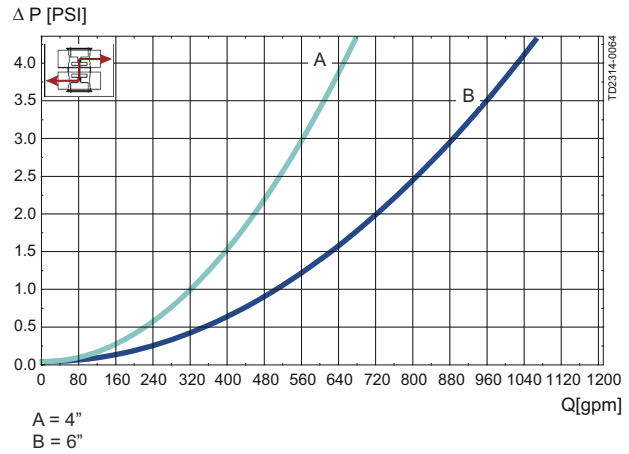


Figure 5. Pressure drop/capacity diagram, between bodies

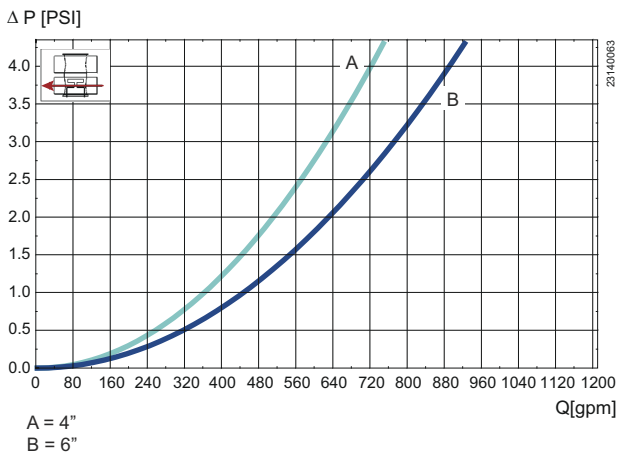


Figure 6. Pressure drop/capacity diagram, lower body



**Note!**

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

**Air and CIP consumption**

		OD 4"	OD 6"
<b>Kv-value</b>			
Upper Seat-lift	[m <sup>3</sup> /h]	3.2	7.1
Lower Seat-lift	[m <sup>3</sup> /h]	3.9	8.9
<b>Air consumption</b>			
Upper Seat-lift	[n litre] <sup>1</sup>	0.62	0.62
Lower Seat-lift	[n litre] <sup>1</sup>	0.21	0.21
Main Movement	[n litre] <sup>1</sup>	3.54	3.54

<sup>1</sup> [n litre] = volume at atmospheric pressure

<b>Size</b>			
		4"	6"
Cv-value Upper Seat-lift	[gpm/psi]	5.3	12.1
Cv-value Lower Seat-lift	[gpm/psi]	6.7	10.2

<sup>1</sup> [cubic inches]= volume at atmospheric pressure

Size	4"		6"	
Air consumption Upper Seat-lift	[cubic inches] <sup>1</sup>	38	38	
Air consumption Lower Seat-lift	[cubic inches] <sup>1</sup>	13	13	
Air consumption Main Movement	[cubic inches] <sup>1</sup>	216	216	

<sup>1</sup> [cubic inches]= volume at atmospheric pressure

### Formula to estimate CIP flow during seat lift:

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

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

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

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

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

$K_v$  =  $K_v$  value from the above table

$C_v$  =  $C_v$  value from the above table

$\Delta p$  = CIP pressure (bar)

$\Delta p$  = CIP pressure (psi)

### Dimensions (mm) Dimensions (inch)

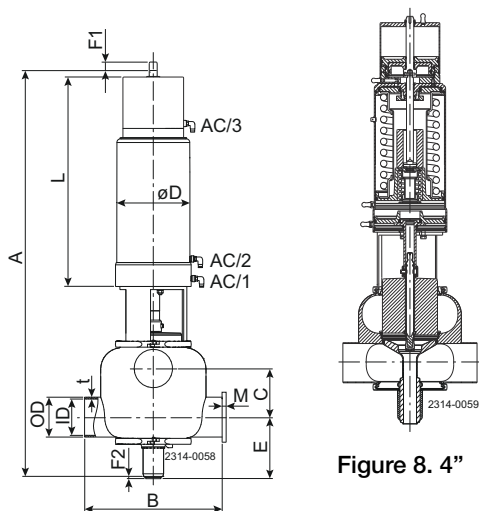


Figure 8. 4''

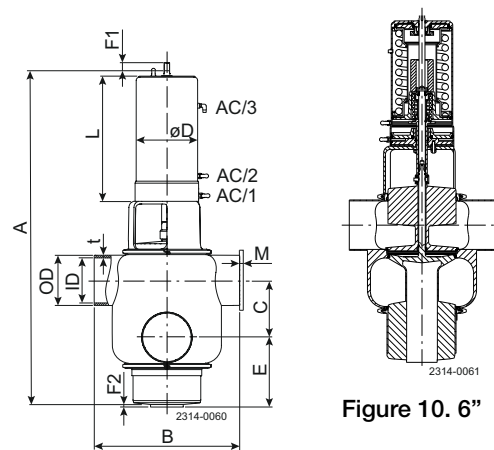


Figure 9. 6''

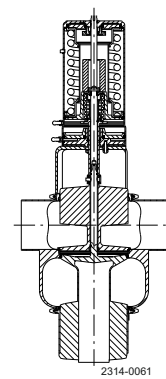


Figure 10. 6''

Figure 7. 4''

Size	4"	6"
A	1038.00	1002.00
B	350.00	440.00
C <sup>1</sup>	123.60	172.67
OD	101.60	152.40
ID	97.61	146.86
t	2.00	2.77
E	166.00	210.80
F1	75.00	75.00
F2	5.00	5.00
øD	186.00	186.00
L	534.00	379.00
M/Tri-clamp	21.00	38.60
Weight (kg)	64.90	86.20

<sup>1</sup> Note! The measure C can always be calculated by the formula  $C = \frac{1}{2}ID\text{-upper} + \frac{1}{2}ID\text{-lower} + 26\text{mm}$ .

Size	4"	6"
A	40.87	39.45
B	13.78	17.32
C <sup>1</sup>	4.87	6.80
OD	4.00	6.00
ID	3.84	5.78
t	0.08	0.11
E	6.54	8.30
F1	2.95	2.95
F2	0.20	0.20
øD	7.32	7.32
L	21.02	14.92
M/Tri-clamp	0.83	1.52
Weight (lb)	143.08	190.04

<sup>1</sup> Note! The measure C can always be calculated by the formula  $C = \frac{1}{2}ID\text{-upper} + \frac{1}{2}ID\text{-lower} + 1.02$  in

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