



# One Valve for All Solutions

## Alfa Laval Unique Mixproof CP-3

### Concept

The Alfa Laval Unique Mixproof CP-3 is designed with user flexibility in mind. Configurable for applications in all sanitary industries – including compliance with PMO and 3A\* for continuous dairy processing - the modular design offers a wide variety of options.

### Working Principle

Alfa Laval Unique Mixproof CP-3 is remote-controlled by means of compressed air. The valve is a normally closed (NC) valve. The valve has two independent plug seals, forming a leakage chamber between them under atmospheric pressure during every working condition. In case of rare accidental leaking of product, this will flow into the leakage chamber and be discharged harmlessly through the leakage outlet, without any threat of product mixing or cross contamination. When the valve is open, the leakage chamber is closed. The product can then flow from one line to the other.

The valve can be cleaned and water hammer protected to any level according to the needs in the specific process (see next page). There is virtually no spillage of product when operating the valve.

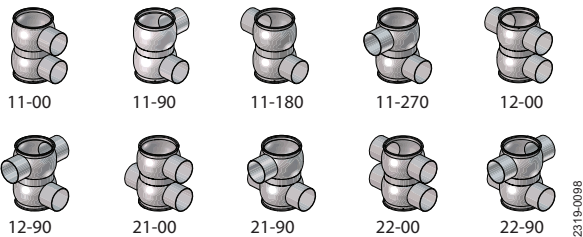
\*Certificate authorization number 1383



### TECHNICAL DATA

Max. product pressure: . . . . . 145 psi (for higher pressure, please ask Alfa Laval)  
 Min. product pressure: . . . . . Full vacuum.  
 Temperature range: . . . . . 23°F to +257°F (Depending on seal material)  
 Air pressure: . . . . . 116 psi

### Valve body combination



### Valve body combinations, example: type 21-00

- 2 Number of ports - lower valve body
- 1 Number of ports - upper valve body
- 00 Angle between ports

### PHYSICAL DATA

Product wetted steel parts: . . . . . Acid-resistant steel AISI 316L  
 Other steel parts: . . . . . Stainless steel AISI 304

Surface finish choose from the following:  
 Internal Bright (polished)/External semi-bright Ra<32µin  
 Internal/external Bright (internal polished) . . . Ra<32µin  
**Note!** The Ra values are only for the internal surface.

Product wetted seals: . . . . . EPDM (Standard), NBR, HNBR or FPM.

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

## Possible configurations

The Alfa Laval Unique Mixproof CP-3 offers a wide range of options, including:

### Lower flush

The Alfa Laval lower flush option ensures CIP of the lower sealing element and the OD of the lower plug during seat push. This option efficiently cleans the lower seal in the housing without the need for external CIP connections, supporting continuous processing.

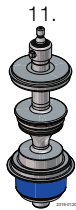
### Balancing flexibility

The Unique Mixproof CP-3 valve has a lower balanced plug to avoid product mix, even in the event of pressure spikes in the system. The upper plug can be configured with or without a balancer depending on the required performance.

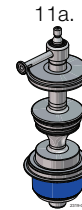
### SpiralClean

The Alfa Laval SpiralClean system makes it possible to clean the upper and lower plugs and leakage chamber by external CIP connections. 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.

Spiral Clean of the leakage chamber is not depending on a special type of plug configuration, but can be added to any of the available plug configurations. Here shown in combination with plug configuration #11



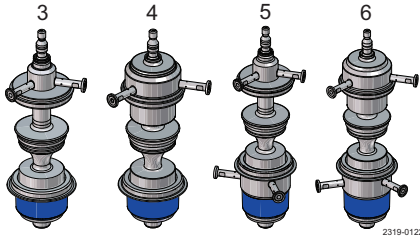
11 Upper: Unbalanced  
Lower: Balanced (Blue bottom)



11a Upper: Unbalanced  
Lower: Balanced (Blue bottom)  
SpiralClean of leakage chamber

## Selection guide (plug configurations)

The drawings below give an overview of the various plug configurations available.

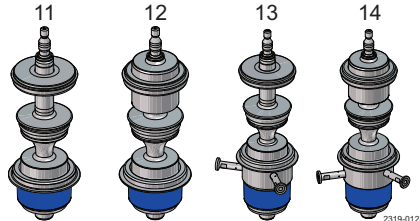


3 Upper: Unbalanced with SpiralClean OD spindle  
Lower: Balanced (blue bottom)

4 Upper: Balanced with SpiralClean OD balancer  
Lower: Balanced (blue bottom)

5 Upper: Unbalanced with SpiralClean OD spindle  
Lower: Balanced with SpiralClean OD balancer (blue bottom)

6 Upper: Balanced with SpiralClean OD balancer  
Lower: Balanced with SpiralClean OD balancer (blue bottom)

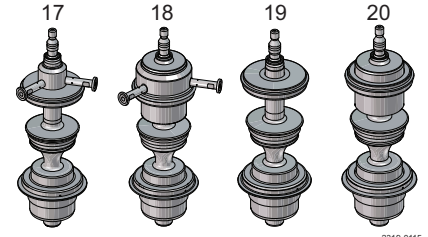


11 Upper: Unbalanced  
Lower: Balanced (blue bottom)

12 Upper: Balanced  
Lower: Balanced (blue bottom)

13 Upper: Unbalanced  
Lower: Balanced with SpiralClean OD balancer (blue bottom)

14 Upper: Balanced  
Lower: Balanced with SpiralClean OD balancer (blue bottom)



17 Upper: Unbalanced with SpiralClean OD spindle  
Lower: Flush OD Balancer (stainless steel bottom)

18 Upper: Balanced with SpiralClean OD balancer  
Lower: Flush OD Balancer (stainless steel bottom)

19 Upper: Unbalanced  
Lower: Flush OD Balancer (stainless steel bottom)

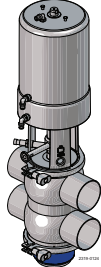
20 Upper: Balanced  
Lower: Flush OD Balancer (stainless steel bottom)

### Size flexibility (mixed housing)

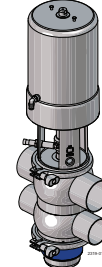
The valve body can be configured with mixed sizes. The body sections can be fully combined, including the full range of 1-1/2" through 6" sizes.

### Seat lift and Seat push

Seat lift and seat push enable cleaning of the plug seals of either the upper or lower plug individually. The Unique Mixproof CP-3 range is available in a variety of configurations, including two separate actuator versions. An actuator with both upper seat lift and lower seat push or an actuator without any seat lift/push operations only one period.



1. 3"/3", 22-00, with lower balanced plug, SpiralClean leakage chamber, actuator with seat lift/push, and external proximity switch for indication of upper plug position
2. 2"/3", 22-00, with lower balanced plug, actuator without seat lift/push and external proximity switch for indication of upper plug position

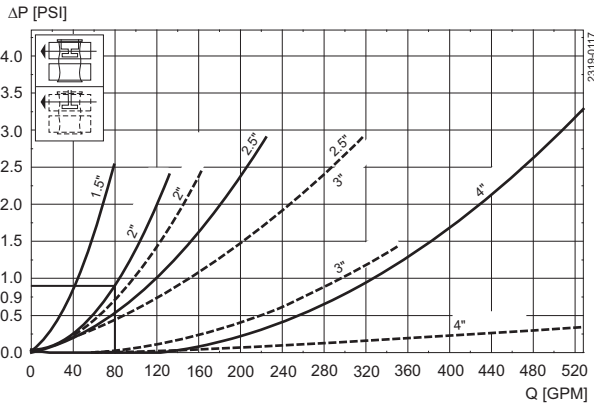


The Unique Mixproof CP-3 modular range offers balanced and unbalanced plugs, seat lift/push, CIP for the plugs and leakage chambers and any combination in between.

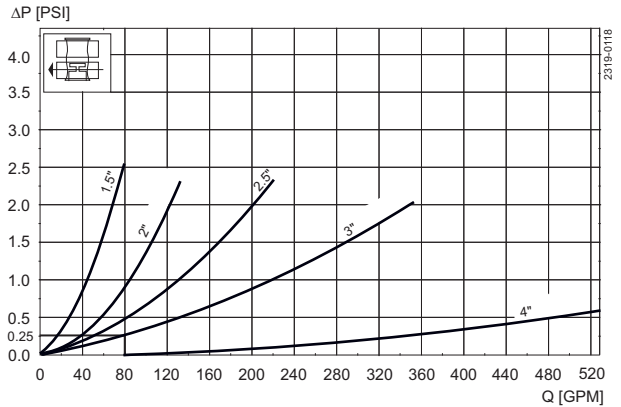
### Options

- Tri clamp connections.
- Control and Indication: IndiTop, ThinkTop or ThinkTop Basic. (ThinkTop is mandatory in a dairy application)
- External proximity switch for indication of upper plug position (This option is mandatory in dairy applications)
- Product wetted seals in HNBR, NBR or FPM
- Various external surface finishes

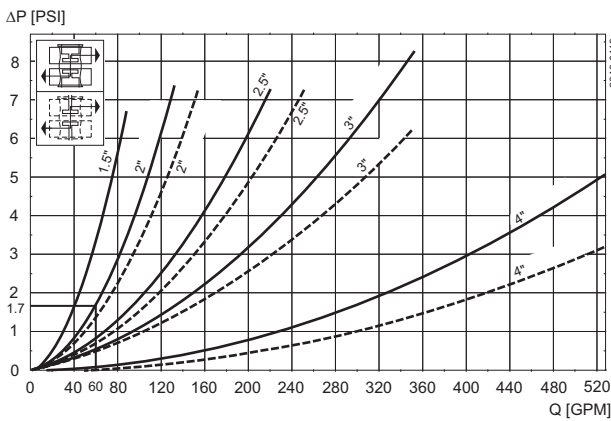
**Pressure drop/capacity diagrams**



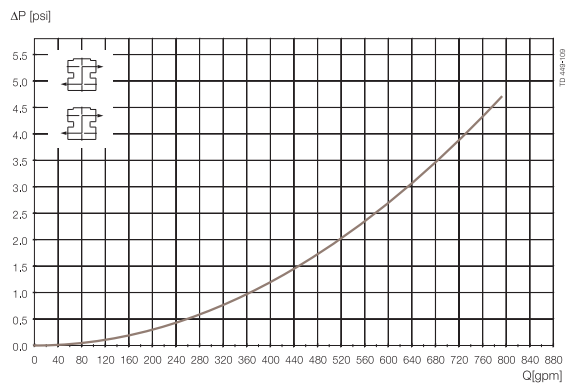
**Fig. 3. Pressure drop/capacity diagram, upper body.**  
**Full lines: Balanced upper plug.**  
**Dotted lines: Unbalanced upper plug.**



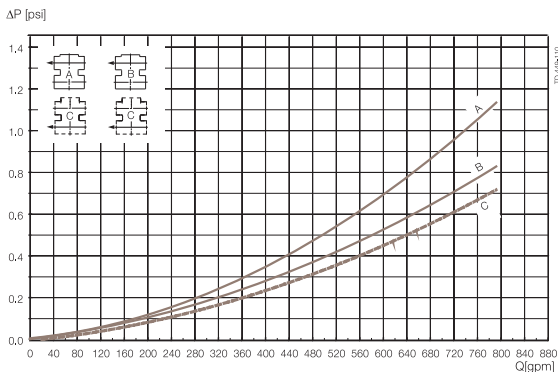
**Fig. 4. Pressure drop/capacity diagram, lower body, balanced plugs.**



**Fig. 5. Pressure drop/capacity diagram, between bodies.**  
**Full lines: Balanced.**  
**Dotted lines: Unbalanced upper plug only one period.**



**Fig. 6 Pressure drop/capacity diagram between bodies Balanced and unbalanced plugs 6"**



**Fig.7 Pressure drop/capacity diagram, through bodies 6"**  
**A. Balanced upper plug**  
**B. Unbalanced upper plug**  
**C. Balanced lower plug**

**Note!** For the diagrams the following applies:

Medium: Water (68°F).

Measurement: In accordance with VDI 2173.

**Example to determine pressure drop:**

**Upper body size: 2". Balanced upper plug.**

Capacity: 80 gpm.

**Lower body size: 3". Balanced lower plug.**

Capacity: 80 gpm.

**Between bodies:**

Capacity: 60 gpm.

**Result:**

From fig. 3,  $\Delta p = 0.9$  psi through upper body.

From fig. 4,  $\Delta p = 0.25$  psi through lower body.

From fig. 5,  $\Delta p = 1.7$  psi seeing that:

1. The smallest body determines the curve for  $\Delta p$  between bodies.
2. Always choose the curve for balanced plugs if upper plug is balanced. If only lower plug is balanced, always choose the curve for unbalanced.

Size ISO	OD 1½"	OD 2"	OD 2½"	OD 3"	OD 4"	OD 6"
<b>Cv-value</b>						
Upper Seat-lift [gpm/psi]	2.9	2.9	4.3	4.3	5.3	6.3
Lower Seat-lift [gpm/psi]	2.2	2.2	3.6	3.6	4.9	5.3
<b>Air consumption</b>						
Upper Seat-lift * [cubic inches]	12	12	24	24	38	38
Lower Seat-lift * [cubic inches]	6.7	6.7	8	8	13	13
Main Movement * [cubic inches]	52	52	99	99	170	170
<b>Cv-value SpiralClean</b>						
External CIP of upper and lower plug [gpm/psi]	0.14	0.14	0.14	0.14	0.14	0.14
External CIP of leakage chamber [gpm/psi]	0.29	0.29	0.34	0.34	0.34	0.34

**Note**

\* [cubic inches] = volume at atmospheric pressure

Recommended min. pressure for SpiralClean: 29 psi.

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

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

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

Q = CIP - flow (gpm).

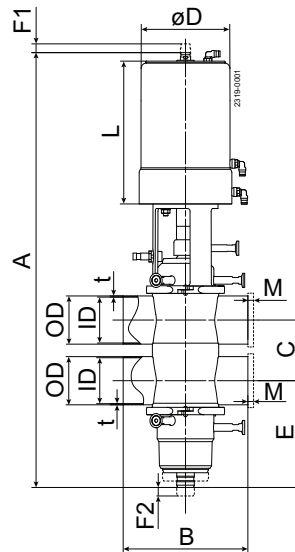
Cv = Cv value from the above table.

$\Delta p$  = CIP pressure (psi).

**Actuator**

Tube OD	STD
	Operating pressure (psi)
1½"	145
2"	145
2½"	145
3"	145
4"	145
6"	Fully balanced 145 / Upper unbalanced 138

Dimensions (in)



**Note for mixed bodies:**

1. The seat always applies to the smallest valve body.
2. Dimension B is equal with the largest valve body size.

Size	1½"	2"	2½"	3"	4"	6"
*A	24.055	25.827	29.921	29.921	36.299	40.394
B	6.693	8.661	8.661	8.661	11.811	11.811
**C	2.394	2.906	3.398	3.894	4.866	6.806
OD	1.5	2	2.5	3.0	4.0	6.0
ID	1.370	1.882	2.374	2.870	3.843	5.782
t	0.063	0.063	0.063	0.063	0.079	0.109
E	5.669	6.496	7.874	7.598	9.764	10.768
F1	1.240	1.240	1.496	1.496	2.323	2.323
F2	0.197	0.197	0.197	0.197	0.197	0.197
øD	4.724	4.724	6.181	6.181	7.323	7.323
L	9.055	9.055	9.921	9.921	11.063	11.063
M/Tri-clamp	0.827	0.827	0.827	0.827	0.827	1.518
Weight (lb)	32	35	60	60	84	115

**NOTE!**

\*For the A-measure if different upper/lower body sizes, please refer to Configurator in Alfa Laval Anytime or contact Alfa Laval.

\*\*The dimension C can always be calculated by the formula  $C = \frac{1}{2}ID\text{-upper} + \frac{1}{2}ID\text{-lower} + 1,02"$



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