Alfa Laval Unique SSV Aseptic

Single seat valves

Introduction

The Alfa Laval Unique SSV Aseptic is a versatile, reliable pneumatic single seat valve with a single contact surface between the plug and the seat to minimize the risk of contamination.

Its compact, modular and hygienic design meets the highest process requirements in terms of hygiene and safety. Built on the well-proven Alfa Laval Unique SSV platform, it features a one-piece diaphragm that provides hermetic sealing to prevent intrusion of contaminants from the atmosphere, ensuring full protection against the effects of microorganisms during processing. The special diaphragm can also be used with the Unique SSV Standard, Tangential, Two Step, Manual and Tank Outlet.

Few moving parts ensure easy maintenance, high reliability and low total cost of ownership. A wide range of optional features enables customization to specific process requirements.

Application

This Unique SSV Aseptic is designed for uninterrupted production in sterile and aseptic applications across the dairy, food, beverage, brewery, biotechnology, pharmaceutical and many other industries.

Benefits

- Durable, aseptic valve design
- Superior cleanability – smooth inner valve body without crevices
- Extended seal life due to the defined seal compression
- Enhanced product safety due to the static seal leak detection
- Protection against bacterial contamination
- Easy to configure

Standard design

The Unique SSV Aseptic is available in a one- or two-body configuration, with easy-to-configure valve bodies, plugs, actuator and clamp rings. The valve can be configured for aseptic processing as a shutoff valve with two or three working ports or as a changeover valve with three to five ports.

To ensure flexibility, the valve seat that sits between the two bodies in the changeover version is provided for assembly. The valve seals are optimized for durability and long service life through a defined compression design. The actuator is connected to the valve body using a yoke, and all components are assembled with clamp rings.

The valve can also be fitted with the Alfa Laval ThinkTop V50 and V70 for sensing and control of the valve.

Using the Alfa Laval Anytime configurator, it is easy to customize to meet virtually any process requirement.

Working principle

The Alfa Laval Unique SSV Aseptic is operated by means of compressed air from a remote location. The actuator smooths operation and protects process lines against pressure peaks. An integrated valve plug/diaphragm secures aseptic operation. The valve can be controlled using an Alfa Laval ThinkTop®.

Certificates

Authorized to carry the 3A symbol

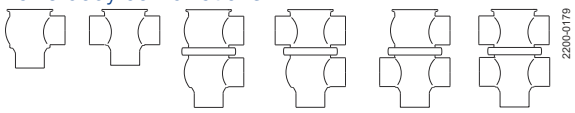
TECHNICAL DATA

Temperature	
Temperature range:	14 °F to 284 °F (EPDM)
Max. sterilization temperature (<1 min):	302 °F/380 kPa (55 PSI)

Pressure	
Pressure range:	0-116 PSI (0-8 bar)
Max. sterilization temperature (steam - short time):	302 °F/55 PSI (3.8 bar)
Air pressure:	72.5-101.5 PSI (500-700 kPa) (5-7 bar)

Note!
Vacuum is not recommended in aseptic applications.

Valve body combinations



Actuator function

- Pneumatic downward movement, spring return (NO)
- Pneumatic upward movement, spring return (NC)
- Pneumatic upward and downward movement (A/A)

PHYSICAL DATA

Materials	
Product wetted steel parts:	AISI 316L
Other steel parts:	AISI 304
Internal surface finish:	Ra 32 µin
Product wetted seal:	EPDM
Optional product wetted seals:	HNBR and FPM
Other seals:	NBR
Diaphragm:	PTFE (Product wetted side)/EPDM

Options

- Male parts or clamp liners in accordance with required standard
- Control and Indication: IndiTop, ThinkTop or ThinkTop Basic
- Product wetted seals in HNBR or FPM
- Low pressure actuator
- High product pressure actuator
- Maintainable actuator
- 2 step/3 position actuator (not for DN/OD 25/DN 25)
- External surface bright
- Tangential valve body

Note!
For further details, see instruction ESE00529.

Other valves in the same basic design

- Shut-off valve
- Change-over valve
- Reverse acting valve
- Long stroke version

- Manual operated valve
- Small Single Seat Valve (SSSV)

Semi-Maintainable actuator comes with 5 year warranty.

Dimensions (inch)

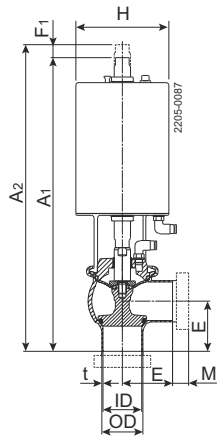


Figure 1. Shut-off valve

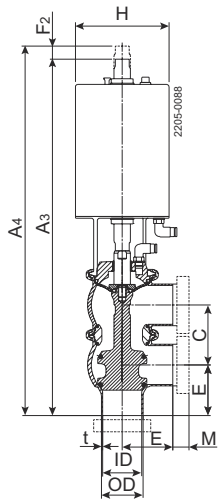


Figure 2. Change-over valve

Nominal size	DN/OD					
	1"	1.5"	2"	2.5"	3"	4"
A_1	12.14	12.38	14.46	15.50	17.01	18.99
A_2	12.57	12.81	15.06	16.09	17.8	19.74
A_3	14.02	14.8	17.37	18.90	20.91	23.86
A_4	14.34	15.13	17.88	19.41	21.54	24.49
C	1.88	2.39	2.91	3.4	3.89	4.87
OD	0.98	1.5	2.01	2.5	3.0	4
ID	0.86	1.37	1.88	2.37	2.87	3.84
t	0.06	0.06	0.06	0.06	0.06	0.08
E	1.97	1.95	2.40	3.19	3.39	4.69
F_1	0.43	0.43	0.59	0.59	0.75	0.75
F_2	0.31	0.35	0.51	0.51	0.63	0.63
H	3.35	3.35	4.52	4.52	6.07	6.07
M/ Clamp	0.50	0.50	0.50	0.50	0.50	0.63
Weight (lb)						
Shut-off valve	6.8	7.2	12.3	14.6	25.3	30.8
Change-over valve	8.6	9.3	15.8	19.1	31.2	40.5

Note!

Opening/closing time will be affected by the following:

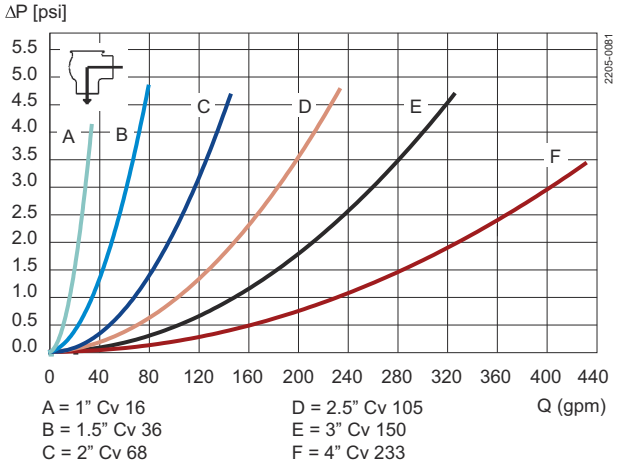
- The air supply (air pressure)
- The length and dimensions of the air hoses
- Number of valves connected to the same air hose
- Use of single solenoid valve for serial connected air actuator functions
- Product pressure

Air Connections Compressed air:

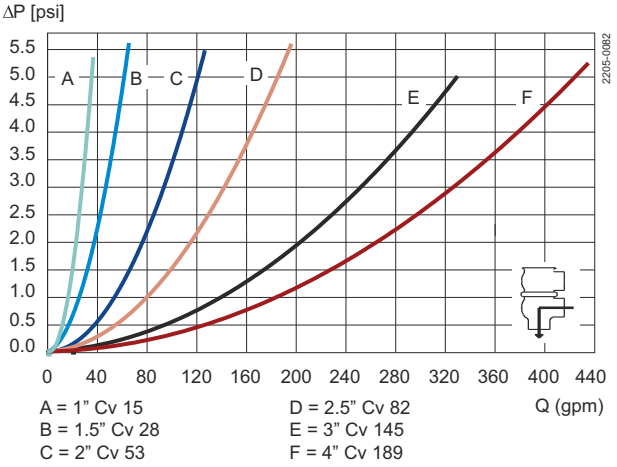
R 1/8" (BSP), internal thread.

Air Consumption (In^3 free air) for one stroke			
Size	**1"-1½"**	**2"-2½"**	**3"-4"**
NO and NC	0.96 x air pressure [PSI]	2.17 x air pressure [PSI]	5.51 x air pressure
A/A	1.94 x air pressure [PSI]	4.82 x air pressure [PSI]	11.15 x air pressure [PSI]

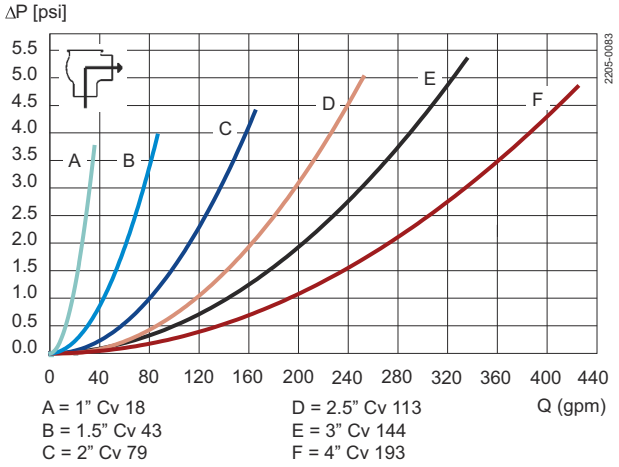
Pressure drop/capacity diagrams



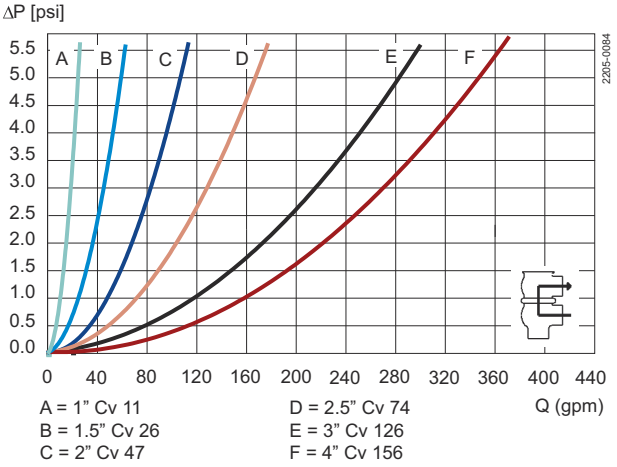
A = 1” Cv 16
B = 1.5” Cv 36
C = 2” Cv 68
D = 2.5” Cv 105
E = 3” Cv 150
F = 4” Cv 233



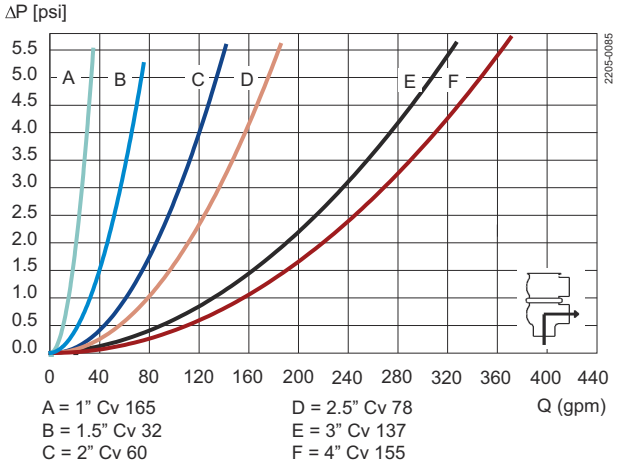
A = 1” Cv 15
B = 1.5” Cv 28
C = 2” Cv 53
D = 2.5” Cv 82
E = 3” Cv 145
F = 4” Cv 189



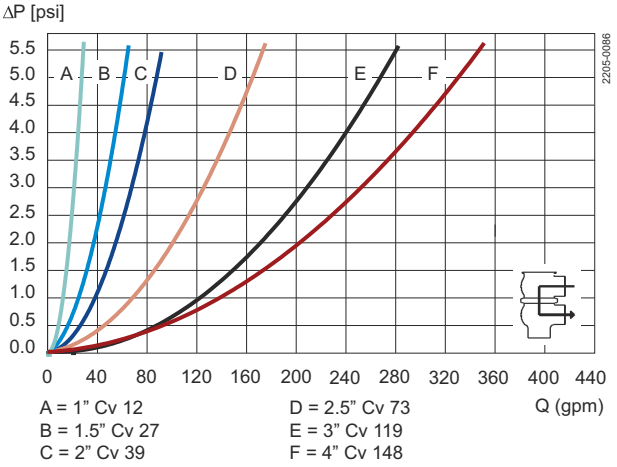
A = 1” Cv 18
B = 1.5” Cv 43
C = 2” Cv 79
D = 2.5” Cv 113
E = 3” Cv 144
F = 4” Cv 193



A = 1” Cv 11
B = 1.5” Cv 26
C = 2” Cv 47
D = 2.5” Cv 74
E = 3” Cv 126
F = 4” Cv 156



A = 1” Cv 165
B = 1.5” Cv 32
C = 2” Cv 60
D = 2.5” Cv 78
E = 3” Cv 137
F = 4” Cv 155



A = 1” Cv 12
B = 1.5” Cv 27
C = 2” Cv 39
D = 2.5” Cv 73
E = 3” Cv 119
F = 4” Cv 148

Note!
For the diagrams the following applies:
Medium: Water (68 ° F/20 °C)
Measurement: In accordance with VDI 2173
Pressure drop can also be calculated in Anytime configurator.

Pressure drop can also be calculated with the following formula:

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

Where

Q = Flow (gallon/minute).

Cv = gallon/minute at a pressure drop of 1 PSI (see table above).

Δ p = Pressure drop in psi over the valve.

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Q = Flow (gallon/minute).

Cv = gallon/minute at a pressure drop of 1 PSI (see table above).

Δ p = Pressure drop in psi over the valve.

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

2.5" shut-off valve, where Cv = 128 (See table above).

$160 = 128 \times \sqrt{\Delta p}$

$$\Delta p = \left(\frac{160}{128}\right)^2 = 1{,}6 \text{ psi}$$

(This is approx. the same pressure drop by reading the y-axis above)

Pressure data for Unique Single Seat Valve Aseptic

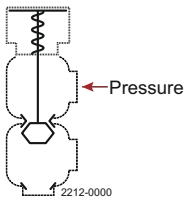

Figure 3. 1

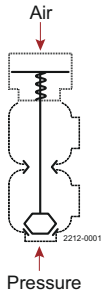

Figure 4. 2

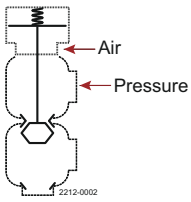

Figure 5. 3

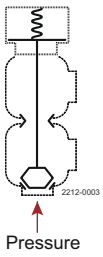

Figure 6. 4

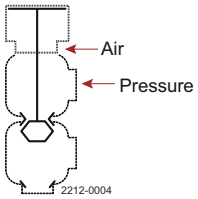

Figure 7. 5

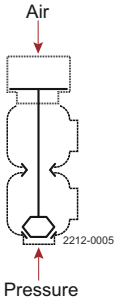

Figure 8. 6

Shut fully closed. Max. static pressure without leakage

Actuator / Valve body combination and direction of pressure	Air pressure (PSI)	Plug position	Valve size DN 25 DN/OD 1"	DN 40 DN/OD 1½"	DN 50 DN/OD 2"	DN 65 DN/OD 2½"	DN 80 DN/OD 3"	DN 100 DN/OD 4"
Figure 3. 1		NO	116	87	116	64	109	78
Figure 4. 2	87	NO	116	110	116	81	104	70
Figure 5. 3	87	NC	116	116	116	6.8	109	73
Figure 6. 4		NC	116	91	104	61	93	61
Figure 7. 5	87	A/A	116	116	116	116	116	116
Figure 8. 6	87	A/A	116	116	116	116	116	116

Shut fully closed. Options with high pressure actuator - Max. static pressure without leakage

Actuator / Valve body combination and direction of pressure	Air pressure (PSI)	Plug position	Valve size DN 25 DN/OD 1"	DN 40 DN/OD 1½"	DN 50 DN/OD 2"	DN 65 DN/OD 2½"	DN 80 DN/OD 3"	DN 100 DN/OD 4"
Figure 3. 1		NO	116	116	116	116	-	-
Figure 4. 2	87	NO	116	116	116	116	-	-
Figure 5. 3	87	NC	116	116	116	116	116	59
Figure 6. 4		NC	116	116	116	116	116	102

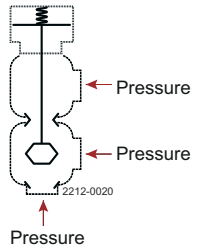

Figure 9. 1

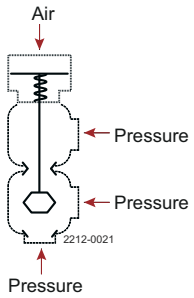

Figure 10. 2

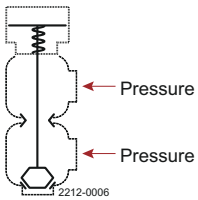

Figure 11. 3

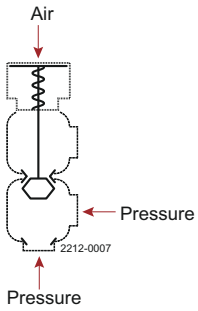

Figure 12. 4

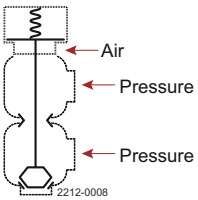

Figure 13. 5

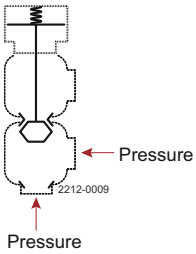

Figure 14. 6

Valve is closing. Approximately max. pressure in bar at which the valve can close by means of the spring or air pressure

Actuator / Valve body combination and direction of pressure	Air pressure (PSI)	Plug position	Valve size					
			DN 25 DN/OD 1"	DN 40 DN/OD 1½"	DN 50 DN/OD 2"	DN 65 DN/OD 2½"	DN 80 DN/OD 3"	DN 100 DN/OD 4"
Figure 9. 1		NC	94	94	116	116	106	110
Figure 10. 2	87	NO	116	116	116	116	115	116

Seat fully closed - Standard valve. Approximately pressure in bar, at which the valve plug can change positions by the spring or air pressure

Actuator / Valve body combination and direction of pressure	Air pressure (PSI)	Plug position	Valve size					
			DN 25 DN/OD 1"	DN 40 DN/OD 1½"	DN 50 DN/OD 2"	DN 65 DN/OD 2½"	DN 80 DN/OD 3"	DN 100 DN/OD 4"
Figure 11. 3		NO	116	116	116	116	116	116
Figure 12. 4	87	NO	116	116	116	116	116	116
Figure 13. 5	87	NC	116	116	116	116	116	116
Figure 14. 6		NC	116	116	116	83	116	78