Pfeiffer
Chemie-Armaturenbau GmbH

PFA-lined Aseptic Control Valve
Series 1c

Application:

This PFA control valve is used in both the pharmaceutical and chemical industry as well as in the ”food and drug” industry. It is also suitable for superheated steam sterilization as well as highly aggressive and efflorescent media:

- Nominal sizes DN 25 to DN 50 and 1“ to 2“
- Nominal pressure PN 10/16
- Temperatures up to 140°C

The control valve consists of a single-seated globe valve with PFA lining and either a pneumatic actuator or hand-operated actuator. The valve is designed according to the modular-assembly principle and can be combined with various options and has the following features:

- Streamlined valve body of spheroidal graphite iron EN-JS 1049 (GGG-40.3), as standard with 3-5 mm thick PFA-lining using transfer moulding process.
- Exchangeable PTFE plug.
- Stem sealed by a peroxide cross-linked EPDM diaphragm with a PTFE support and a backup, spring-loaded PTFE V-ring packing.
- Test connection for monitoring of the primary diaphragm seal.
- Exchangeable actuator.
- Additional equipment can be added in acc. to DIN EN 60534 and Namur recommendations.
- Face-to-face dimensions for DIN version acc. to DIN EN 558-1, basic series 1 (acc. to DIN 3202, F1).
- Face-toface dimensions for ANSI version acc. to DIN EN 558-2, basic series 37 (acc. to IEC 60534-3-1, basic series 37).

Versions:

The Series 1c Globe Valve is available optionally in the following versions:

- Samson pneumatic actuator (Fig. 1).
- Samson hand-operated actuator.
- Actuators of other manufacturers on request.

Special designs:

- Lining made of special compounds, e.g. conductive PFA
- Employment to 200°C possible with special diaphragm.
- Valve plug made of special materials (e.g. HC4, tantalum, titanium, or aluminium oxide) for erosive media.
- Stem made of special material (e.g. Hastelloy).
- Further components made of special material.
- Flange with groove.
- Guided V-port plug.

Fig. 1 - Series 1c Aseptic Globe Valve with Samson actuator

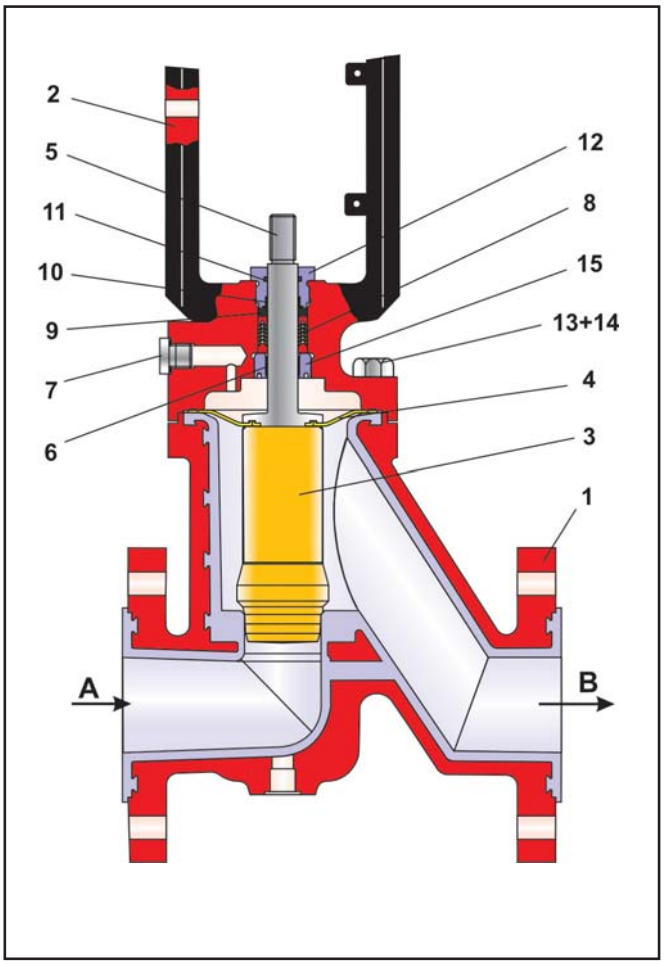


Fig. 2 – Sectional diagram of Series 1c Aseptic Control Valve

Item	Description	Item	Description
1	Valve body	9	Set of Belleville washers
2	Bonnet flange	10	Bearing bushing
3	Plug	11	O-ring
4	Diaphragm	12	Stuffing box
5	Stem connector	13	Hexagon screw
6	Bearing bushing	14	Hexagon nut
7	Locking screw	15	Guide bushing
8	V-ring packing		

Table 1 – List of parts

Additional equipment and mounting parts:

The following accessories are optionally available for the valve separately or in combinations:

- Positioner
- Limit switches
- Solenoid valves
- Supply air pressure regulator/filter
- Pressure gauge mounting blocks

Other accessories possible according to specifications on request.

Principle of operation:

The process medium flows through the Series 1c Globe Valve in the flow-to-open direction.
The valve plug position determines the cross-sectional area of flow between the plug (3) and seat .

The plug is connected over the stem connector (5) to the actuator stem.

The EPDM diaphragm with a PTFE layer (4) seals the area between the valve body (1) and stem connector (5).
The PTFE V-ring packing (8) is used as a backup stem sealing.
A test connection port (7) allows the bellows to be monitored for leakage, e.g. by connecting a suction line or inert gas line.

Note: In the event that cavitation may occur, we recommend the use of a guided plug for differential pressures above 3 bar and differential pressure ratio p2 < Δp.

Note: Before using the valve in hazardous areas, check whether this is possible according to ATEX 94/9/EC. by referring to the Operating Instructions <BA 01a_EN>.

Fail-safe position: Depending on how the pneumatic actuator is mounted to the valve, the valve has two fail-safe positions which become effective when the air pressure in the actuator is relieved or when the supply air fails:

Control valve with actuator "Spring closes":
Upon air failure, the valve is closed.
The valve opens when the signal pressure increases, acting against the force of the springs.

Control valve with actuator "Spring opens":
Upon air failure, the valve is opened.
The valve closes when the signal pressure increases, acting against the force of the springs.

Pressure-temperature diagram:

The range of application is determined by the pressure-temperature diagram. Process data and medium can affect the values in the diagram.

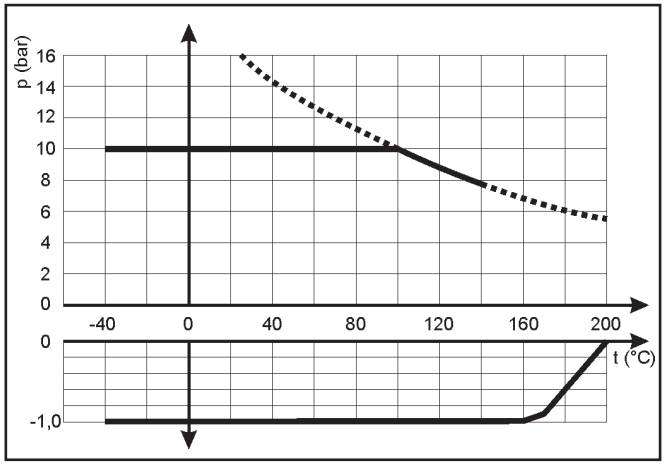


Fig. 3 – Pressure-temperature diagram

Technical Data:

Nominal size	DN 25 to DN 50	1" to 2"
Nominal pressure	PN 10 / 16	PN 10 / 16 flanges and face to face ANSI 150 lbs
Temperature range	See pressure-temperature diagram	
Characteristic	Equal percentage / linear	
Leakage rate	Leakage rate A acc. to DIN EN 12266-1, P12 (Leakage rate 1 BO acc. to DIN 3230 Part 3)	
Plug stem sealing	EPDM/PTFE-diaphragm with backup packing and test connection	
Rangeability	50 : 1	
End connections	as per DIN EN 1092-2, Form B resp. ANSI 150 lbs	

Table 2 – Technical data

Materials:

Body	EN-JS 1049 (ASTM A 395)
Lining	Approx. 4-5 mm thick PFA, (approx. 3mm for DN25)
Bonnet flange	EN-JS 1049 (ASTM A 395)
Valve Plug	PTFE-TFM[1], optionally aluminium oxide or other special materials
Diaphragm	EPDM / PTFE
Plug stem	corrosion-resistant steel 1.4571 optionaly diverse special materials e.g. HC4; Titanium etc.
Packing	PTFE V-ring packing loaded by Belleville washers (1.8159)
Coating	2-Components-Pur-Varnish Colour: Black, RAL 9005

Table 3 - Materials

[1] when seat diameter 2 mm, only tantalum or other metals

z values depending on kvs value and nominal size:

DN		25 1"				40 11/2"	50 2"
Seat-ø in mm		2[2]	6	13	24	30	40
Travel in mm		10	15				
kvs	Cv	Acoustical valve coefficient z					
0.005 0.01 0.05	0.006 0.01 0.06	0.85					
0.1 0.25	0.12 0.29		0.65				
0.63 1.0	0.74 1.17		0.65				
1.6 2.5	1.9 2.9			0.6			
4	4.7			0.55		0.55	
6.3	7.4				0.45	0.5	0.5
10	12				0.4	0.45	0.45
16	19					0.4	0.4
25	29						0.35

Table 4 – Acoustical valve coefficient z in accordance with VDMA 24422

[2] when seat diameter 2 mm, only linear characteristic line available.

Note! Trims with guided plugs partly have reduced Kvs values

Terms for noise level calculation:

according to VDMA 24422.
z = acoustical valve coefficient.

Terms for control valve sizing:

according to DIN EN 60534-2-1:
FL = 0.95 **xT = 0.75**

Correction terms:

For gases and vapours: ΔLG = 0,
For liquids: ΔLF = 0

Permissible differential pressures Δ p:

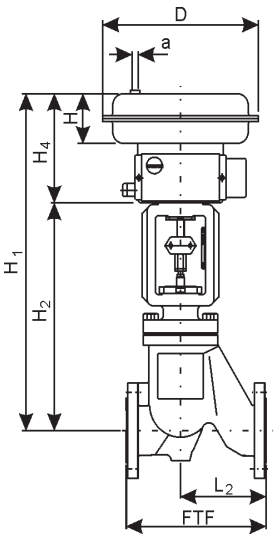
Signal pressure range			0.2-1.0	0.3-1.1	0.4-1.2	0.4-2.0	0.6-3.0	0.2-1.0		
Required supply pressure			1.3	1.4	1.4	2.3	3.3	1.2	1.4	1.6
DN	Seat ø mm	Actuator cm²	Δ p with p2 = 0							
25 1"	2	240	> 16	-	-	-	-	> 16	-	-
	6	240	> 16	-	-	-	-	> 16	-	-
	13	240	12.6	> 16	-	-	-	12.6	-	12.6
	24	240	2.3	6.4	10.5	10.5	> 16	2.3	10.5	> 16
		350	6	12	> 16	> 16	> 16	6	> 16	> 16
40 11/2"	30	240	-	3.5	6.2	6.2	11.6	-	6.2	11.6
		350	3.3	7.2	11.2	11.2	> 16	3.3	11.2	> 16
50 2"	38	240	-	1.6	3.4	3.4	6.9	-	3.4	6.9
		350	1.5	4	6.6	6.6	11.6	1.5	6.6	11.6

Table 5a - Valves with spring closing actuator.
Valve with signal pressure 0 bar closed.

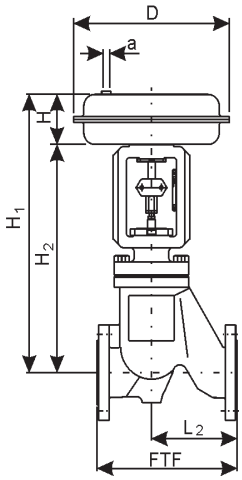
Table 5b - Valves with spring opening actuator.
Valve with required signal pressure closed

The shaded columns of the table show the standard values. The differential pressures in the white columns of table 5a apply to pre-loaded springs. The permissible differential pressures quoted are only valid for soft-dealing valves.

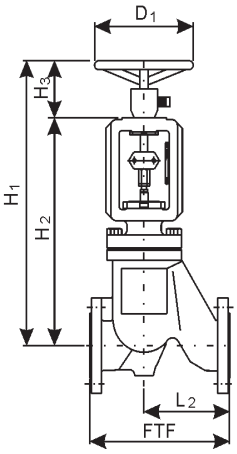
Dimensions and weights:



Series 1c Aseptic Valve with
Samson Type 3277 Actuator



Series 1c Aseptic Valve with
Samson Type 3271 Actuator



Series 1c Aseptic Valve with
Samson Type 3273 Hand-operated Actuator

Fig. 5 – Dimensional drawing

DN		25 / 1"	40 / 11/2"	50 / 2"
FTF	Basic series 1 (DIN)	160	200	230
	Basic series 37 (ANSI)	184	222	254
L2		96	121	146
H1	Samson Type 3271	H2 + H		
	Samson Type 3277	H2 + H4		
	Samson Type 3273	H2 + H3		
H2		358	377	383,5
H4	240 ccm	161	161	161
	350 ccm		186	186
Weight of the valve in kg		11,5	18	21,5
Samson Actuator in ccm		240		350
D		240		280
H		65		85
a		G 1/4"		G 3/8"
Weight of the Type 3271		5		8
Weight of the Type 3277		9		12
D1		180	180	180
H3		92	92	92
Weight of the Type 3273		2	2	2

Table 6 – Dimensions in mm and weights in kg

Selection and sizing of the control valve:

1. Calculate the appropriate Kvs acc. to DIN EN 60534-2-1
2. Select valve size and Kvs over Table 4.
3. Determine the differential pressure and select the suitable actuator over Tables 5a and 5b.
4. Check the application against the pressure-temperature diagram.
5. Select additional equipment.

Ordering text:

Series 1c Valve,
DN....., PN....., Kvs.....,
Body: ENJS 1049 / PFA, Flange type .....
Characteristic: Equal percentage/linear
Special design
Actuator: Samson Type ....., ...cm^2, Signal pressure .....bar,
Mounting of positioner, limit switch, and/or a solenoid valve.

Note: All relevant details regarding the version ordered, which deviate from the specified version in this technical description data, can be taken if required, from the corresponding order confirm.

Please contact our technical sales team for your special requirements

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Specifications subject to change without notice.

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