CSPRV

Clean Steam Pressure Reducing Valve

Description

The Forbes Marshall Clean Steam Pressure Reducing Valve, CSPRV, is an angle pattern self-draining sanitary pressure regulating valve of all 316 type stainless steel construction suitable for use on steam, water and gases. This has been designed in accordance with ASME BPE guidelines. It is available with hygienic sanitary clamp compatible connections and requires no external pressure sensing line. It has clean-in-place (CIP) and sterilize-in-place (SIP) capacity.

Typical Applications Include

Clean steam, gas and liquid supplies to bioreactors, centrifuges, freeze dryers, sterilizers, autoclaves, process tank, humidifiers and culinary equipment.

Valve Tightness

Valve tightness in accordance with VDI / VDE guidelines 2174(leakage rate <0.05 of Kvs Value)

Surface Finish

Internal wetted parts-Ra<0.5 µm electro-polished

Features

- Self-draining and crevice free design
- Non-fluted stem, guided in non-wetted region
- FDA approved PTFE bonded viton diaphragm
- Mechanical stopper to prevent over stroking
- Duel clamp design, easy to dismantle for cleaning
- Oil and grease free wetted components

Certification

This product is available with following certifications.

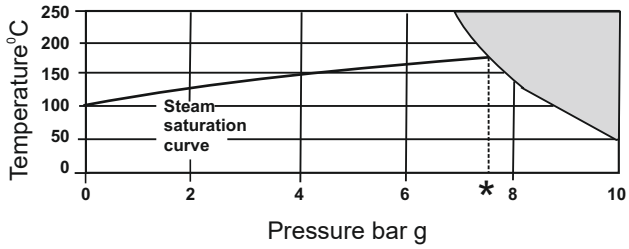
- EN10204 material certifications
- Internal surface finish
- FDA certificate for diaphragm

Sizes and End Connections

DN15, 20, 25, 40 and 50

ISO 2852 & ASME BPE sanitary clamp compatible

Operating Range



The product must not be used in this region

Note: For hygienic / sanitary clamp ends the maximum pressure / temperature may be restricted by the gasket or sanitary clamp used. Please consult Forbes Marshall.

* Max operating pressure 7.6 bar (g)

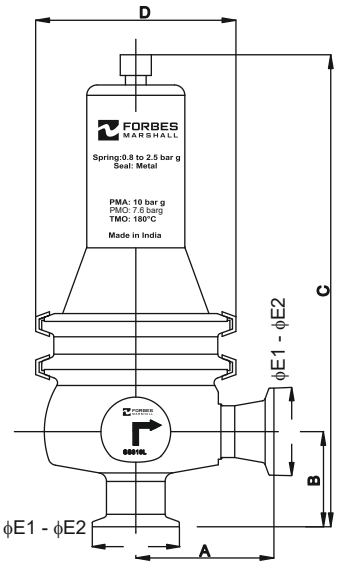


Fig 2

Dimensions (approx) in mm

					ISO	ASME	
Size (DN)	A	B	C	D	øE1	øE2	Weight (kg)
15	83.5	105	324	118	34	25	2.5 Kg
20	70	55	273	118	34	25	3.8 Kg
25	80	55	273	118	50.5	50	4 Kg
40	80	65	289	118	50.5	50	4.3 Kg
50	80	75	305	118	64	63.5	5 Kg

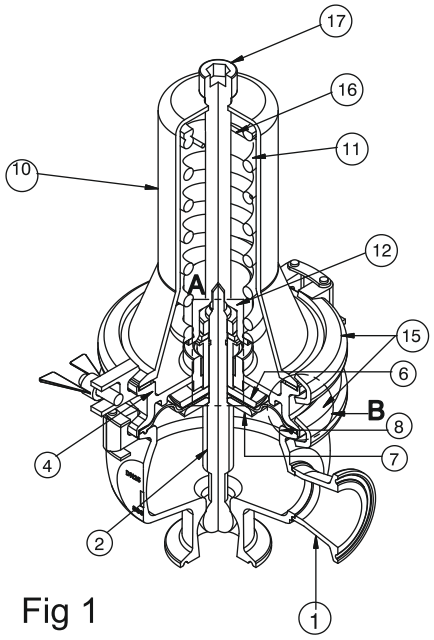
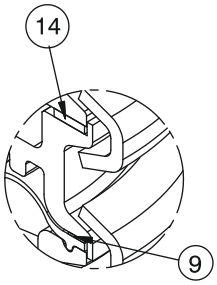
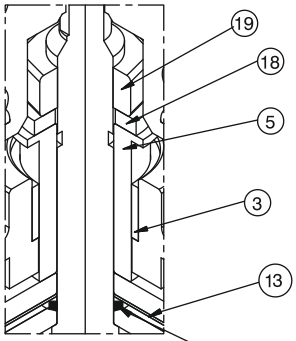


Fig 1



DETAIL B



DETAIL A

Materials

No.	Part	Material	Standard
1	Body	Stainless Steel	ASTM A 276 SS 316L
2	Stem	Stainless Steel	ASTM A 276 SS 316L
3	Guide Bush	Stainless Steel	PTFE Coating
4	Adaptor	Stainless Steel	ASTM A 276 SS 316L
5	Step Bush	Stainless Steel	ASTM A 276 SS 316L
6	Upper Disc	Stainless Steel	ASTM A 276 SS 316L
7	Lower Disc	Stainless Steel	ASTM A 276 SS 316L
8	Diaphragm	Viton + PTFE	
9	Diaphragm Gasket	PTFE	
10	Spring Housing	Stainless Steel	ASTM A 351 CF8M
11	Spring		AISI 304
12	Spring Nut	Stainless Steel	ASTM A 276 SS 304
13	Disc washer	PTFE	
14	Gasket	PTFE	
15	Sanitary Clamp	Stainless Steel	SS316
16	Spring Clip		AISI 304
17	Allen Screw	Stainless Steel	BS6105 A4 70
18	Washer	Stainless Steel 304	
19	Nut	Stainless Steel 304	
20	Stem seal	PTFE	

Limiting Conditions

Inlet:PN10	
Outlet: see ”pressure setting range” below	
Maximum design pressure	10 bar g @ 50 °C
Maximum design temperature	250 °C
Minimum design temperature	-10 °C
Maximum operating temperature	180 °C
Maximum operating pressure	DN 15-25) 7.6 bar g (DN 40-50) 6 bar g
Minimum operating temperature	-10 °C
Max. cold hydraulic test pressure	15 bar g

Pressure Setting Range

Size	DN 15-50	
Inlet / Outlet rating	PN10	PN 10
Spring range	0.8-2.5 bar g	1-5 bar g

To protect your system you should install a safety valve downstream of the CSPRV to prevent the maximum permitted operating pressure (normally 1.5 x maximum set pressure) being exceeded.

How to Order

Example : 1 No. DN25 CSPRV direct acting clean steam pressure reducing valve having a pressure range of 0.8-2.5 bar g PN10 rating, FPM diaphragm and ISO 2852 sanitary clamp compatible connections.

Installation Note

The CSPRV should always be fitted with the inlet vertical and the spring housing directly above the valve.

Safety Information, Installation and Maintenance
For full details see the user manual supplied with the product.

Available Spares (refer fig 1)

Stem	2
Diaphragm	8
Sanitary Clamp	15

How to Order Spares

Always order spares by using the description given in the column headed 'Available Spares' and state the size, model and pressure range.

Example: 1 No. Diaphragm for a DN25 CSPRV direct acting clean steam pressure reducing valve having a pressure range of 0.8-2.5 bar g, PN10 rating and an FPM diaphragm.

Kv Values

Valve Size (mm)	DN15	DN20	DN25	DN40	DN50
Maximum Kv	2.4	3.9	4.9	6.4	7.8

For conversion,

Cv (UK) = Kv x 0.93

Cv (US) = Kv x 1.156

Recommended Fluid Velocities

Steam	Saturated	10 to 40 m/s
	Superheated	15 to 60 m/s
Gas	Up to 2 bar g	2 to 10 m/s
	above 2 bar g	5 to 40 m/s
Liquids		1 to 5 m/s

The required Kv can be calculated from the following formulae, where,

ms = Steam mass flow(kg/h)
V = Liquid Volume flow (m^3 / h)
V_g= Gas flow at standard conditions : 0°C @ 1.013 bar a (m^3/h)
$X = \frac{P_1 - P_2}{P_1}$ (pressure drop factor)
P_1 = Upstream pressure (bar absolute)
P_2 = Downstream pressure (bar absolute)
S = Specific gravity
T = Absolute average gas temperature (Kelvin = °C + 273)

Steam critical pressure drop P_2 <= 0.58 P1

$$Kv = \frac{\dot{m}s}{12\,P_1}$$

Non-critical pressure drop P_2 >= 0.58 P1

$$Kv = \frac{\dot{m}s}{12P_1\sqrt{1 - 5.67\,(0.42 - x)^2}}$$

Gas

$$Kv = \frac{\dot{V}_g}{287}\sqrt{\frac{ST}{(P_1-P_2)\,(P_1+P_2)}}$$

Liquid

$$Kv = \dot{V}\sqrt{\frac{S}{P_1 - P_2}}$$

Calculating the Kv and selecting a suitable valve

Using your maximum flowrate and smallest differential pressure (P_1-P_2), calculate the required Kv from one of the above formulae. **Max Kv = 1.3 x calculated Kv** (now refer the above table of max Kv for size selection)

FORBES MARSHALL

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