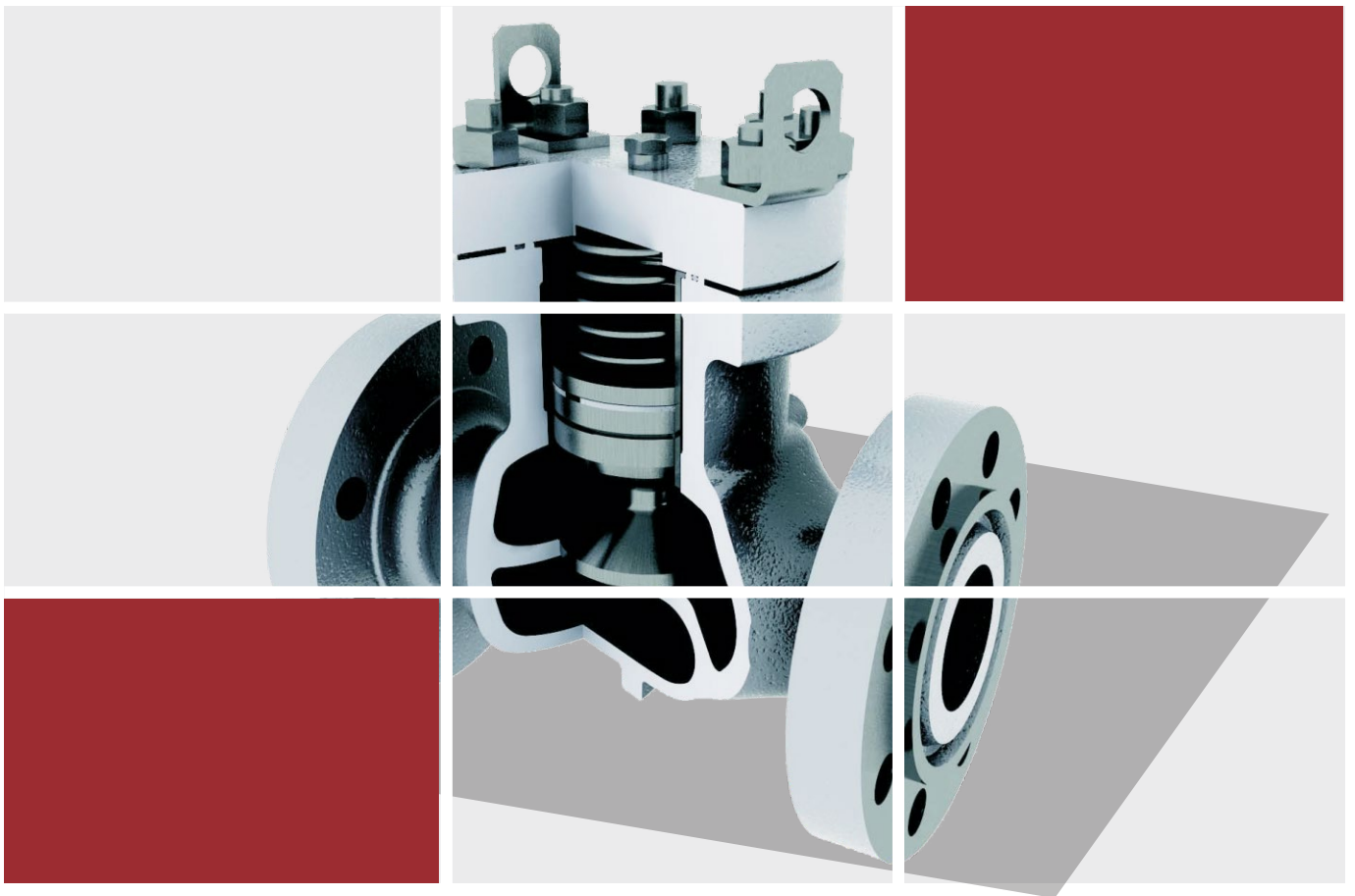




PISTON CHECK VALVES



CALVARY VALVE INC



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PISTON CHECK VALVES

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FEATURES

Easy access to all valve internal parts through cover

Ball check valve inside piston allows quick opening

Integral or removable seat designs available; metal overlays also are available

Spring provides positive closure

Orifice controls closing speed of piston, dampening piston response to changes in flow

Liner

Piston

The greater the backflow pressure, the tighter the seal

Available in RF or RTJ end connections.

When pressure surges and pulsations are prevalent in a flow system, CVI piston check valves are an efficient solution to system protection.

Due to a unique non-slam design, CVI piston check valves have provided years of uninterrupted service downstream from reciprocating pumps and compressors, and in other applications where conventional check valve designs would be subjected to excessive wear. In addition, the CVI piston check valve top entry design allows for easy access and replacement of all valve internal parts with reduced downtime.

Smooth, Reliable Prevention of Backflow

In the absence of pressure differential, a CVI piston check valve rests in the closed position due to gravity and spring force. Pressure on the upstream end of the valve lifts the piston off the seat and allows flow. As flow varies, the piston of the CVI piston check valve floats within a cylinder. Should the flow cease, the piston lowers and seats to create a bubble-tight prevention of backflow.

A ball check mechanism and an adjacent orifice within the piston help to extend valve life by dampening piston movement and eliminating slamming or chattering in the event of sudden pressure surges or erratic flow conditions.

The orifice size affects the degree of piston movement and is optimally selected at the factory to meet the requirements of a specified flow range.

The CVI piston check valve is available with the following features:

- Soft seal
- Metal-to-metal seal
- Renewable seat
- A variety of body and trim materials

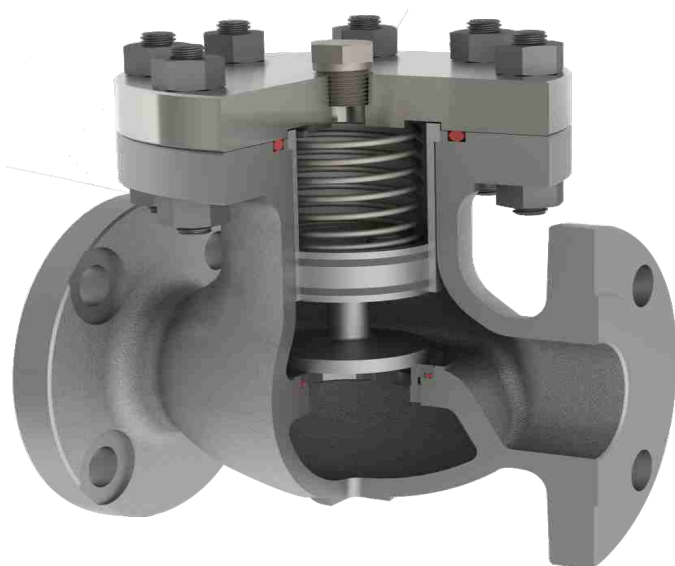
As a result of the piston and seat design, the greater the backpressure acting on the piston, the tighter the seal.

CVI piston check valves comply with API 6D/ ISO 14313, ASTM B 16.34 and NACE MR0175/ISO 15156, and all CVI piston check valves are designed for horizontal service. CVI piston check valves must be ordered specifically for vertical flow when intended for that service.



SERIES PC

Piston Check Valve



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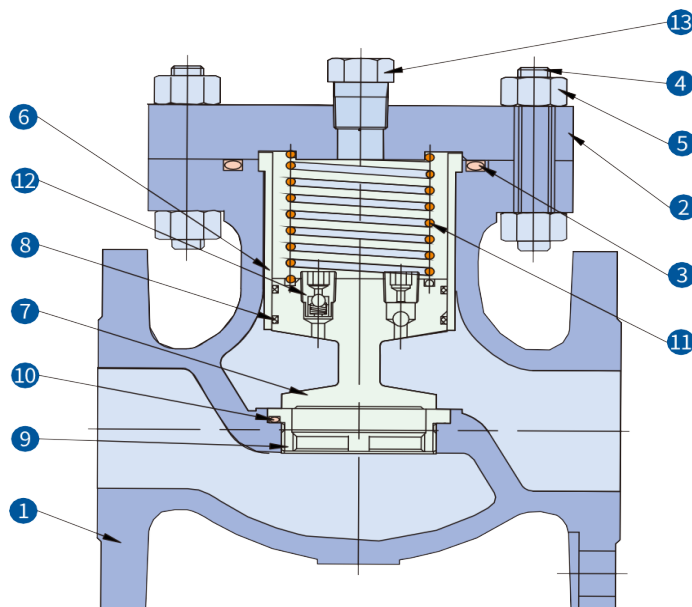
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SERIES PC

Material Specification

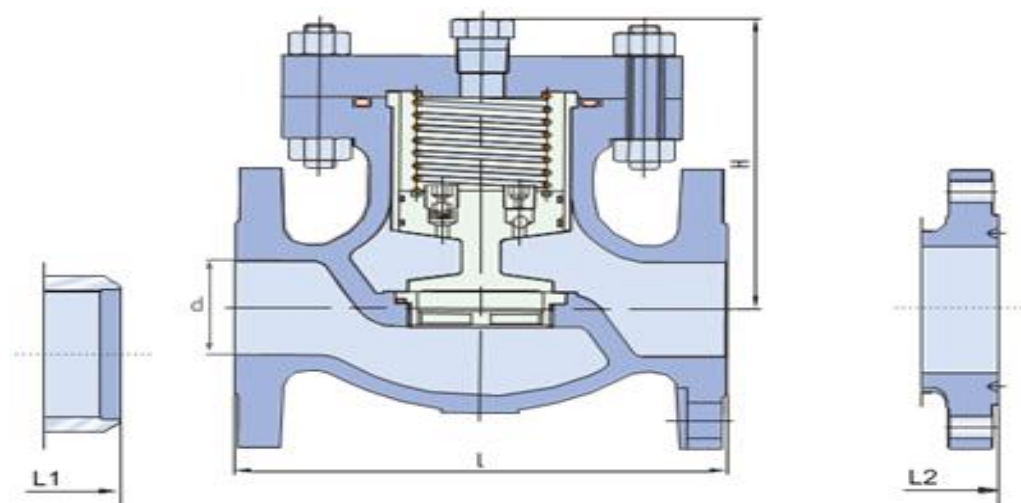


PC CHECK VALVE

Piston Check Valve

NO.	PART	A105/ENP
1	Body	ASTMA216WCC
2	Cover	ASTMA105N
3	*Cover O-Ring	Viton
4	Body Stud	ASTMA193-B7
5	Body Nut	ASTMA194-2H
6	Liner	Carbon Steel ENP
7	Piston	ASTMA105N+316
8	*Piston Rings	Viton
9	Seat Ring	ASTMA105N+316
10	*Seat O-Ring	Viton
11	Piston Spring	Inconel X-750
12	Ball Check Valve	Stainless Steel
13	Plug	Stainless Steel

*Recommended Spare Parts


FULLBORE CLASS 150

SIZE	d	L	L1	L2	H	WEIGHT
in mm	in mm	in mm	in mm	in mm	in mm	lb Kg
2 50	2 51	8 203	8 203	8.5 216	6.7 170	39.7 18
3 80	3 76	9.5 241	9.5 241	10 254	6.9 175	61.7 28
4 100	4 102	11.5 292	11.5 292	12 305	7.9 200	105.8 48
6 150	6 152	14 356	14 356	14.5 368	12.2 310	167.5 76
8 200	8 203	19.5 495	19.5 495	20 508	13.8 350	286.6 130
10 250	10 254	24.5 622	24.5 622	25 635	16.1 410	606.3 275
12 300	12 305	27.5 699	27.5 699	28 711	17.9 455	914.9 415
14 350	13 336	31 787	31 787	31.5 800	20.7 525	1256.6 570
16 400	15 387	34 864	34 864	34.5 876	23.2 590	1715.2 778
24 600	23 591	51 1295	51 1295	51.5 1308	19.5 495	2914.5 1322

FULLBORE CLASS 300

SIZE	d	L	L1	L2	H	WEIGHT
in mm	in mm	in mm	in mm	in mm	in mm	lb Kg
2 50	2 51	10.5 267	10.5 267	11.1 283	6.7 170	57.3 26
3 80	3 76	12.5 318	12.5 318	13.1 333	7.9 200	101.4 46
4 100	4 102	14 356	14 356	14.6 371	9.3 236	154.3 70
6 150	6 152	17.5 445	17.5 445	18.1 460	12.2 310	308.6 140
8 200	8 203	21 533	21 533	21.6 549	13.8 350	414.5 188
10 250	10 254	24.5 622	24.5 622	25.1 638	16.1 410	639.3 290
12 300	12 305	28 711	28 711	28.6 727	17.9 455	941.4 427
14 350	13 336	33 838	33 838	33.6 854	20.7 525	1291.9 586
16 400	15 387	34 864	34 864	34.6 879	23.2 590	1730.6 785
24 600	23 591	53 1346	53 1346	53.9 1368	19.5 495	4724.4 2143

FULLBORE CLASS 600

SIZE	d	L	L1	L2	H	WEIGHT
in mm	in mm	in mm	in mm	in mm	in mm	lb Kg
2 50	2 51	11.5 292	11.5 292	11.6 295	7 178	77.2 35
3 80	3 76	14 356	14 356	14.1 359	8.3 212	101.4 46
4 100	4 102	17 632	17 632	17.1 435	11.8 300	231.5 105
6 150	6 152	22 559	22 559	22.1 562	14.4 365	463 210
8 200	8 203	26 660	26 660	26.1 664	16.1 410	738.5 335
10 250	10 254	31 787	31 787	31.1 791	17.9 455	1212.5 550
12 300	12 305	33 838	33 838	33.1 841	20.7 525	1433 650

FULLBORE CLASS 900

SIZE	d	L	L1	L2	H	WEIGHT
in mm	in mm	in mm	in mm	in mm	in mm	lb Kg
2 50	2 51	14.5 368	14.5 368	14.6 371	8 204	112.4 51
3 80	3 76	15 381	15 381	15.1 384	11.1 283	198.4 90
4 100	4 102	18 457	18 457	18.1 460	12.5 318	343.9 156
6 150	6 152	24 610	24 610	24.1 613	13.6 345	615.1 279
8 200	8 203	29 737	29 737	29.1 740	17.1 435	1040.6 472
10 250	10 254	33 838	33 838	33.1 841	20 509	1660.1 753
12 300	12 305	38 965	38 965	38.1 968	23.4 594	2072.3 940

FULLBORE CLASS 1500

SIZE	d	L	L1	L2	H	WEIGHT
in mm	in mm	in mm	in mm	in mm	in mm	lb Kg
2 50	2 51	14.5 368	14.5 368	14.6 371	8 204	112.4 51
3 80	3 76	18.5 470	18.5 470	18.6 473	13 329	315.3 143
4 100	4 102	21.5 546	21.5 546	21.6 549	14.4 365	471.8 214
6 150	5.5 146	27.8 705	27.8 705	28 711	16.5 420	868.6 394



HOW TO ORDER AND SPECIFY API6D PISTON CHECK VALVES

A	TYPE
PCK	PISTON CHECK VALVE

B	DN
01	1" 10 10"
02	2" 12 12"
03	3" 16 16"
06	6" 24 24" etc.

C	PRESSURE CLASS
15	Class 150 90 Class 900
30	Class 300 150 Class 1500
60	Class 600 250 Class 2500
80	800 20 2 M

D	END
RJ	Ring joint
BW	Butt weld
RF	Raised face
SE	Screwed In

E	BODY
A1	WCB A5 CF8M B1 F316
A2	WCC A6 CF8 B2 F304
A3	LCB A7 WC6
A4	LCC A8 WC9

F	TRIM
G1	A105+ENP G5 316
G2	A105 +F316 G6 304
G3	A105+HCr G7 A182 F316
G4	LF2+ENP G8 TUNGSTEN COATED

G	SOFT GOODS
E1	VITON
E2	VITON GLT
E3	HNBR
E4	BUNA
E5	GRAPHITE + SS

H	SEALS
1	Standard Flow Controlled 2 PRESSUE SEAL

A	B	C	D	E	F	G	H
TYPE	DN	CLASS	END	BODY	TRIM	SOFT GOODS	OPERATION

EXAMPLE	DESCRIPTION
C-06-30-RF-A1-G5-E4-1	CAST STEEL API 600 CHECK VALVE, 6" 300 CLASS, RAISED FACE, BODY WCB, TRIM #5 FULL STELLITE, SOFT GOODS GRAPHITE SS, OPERATION OUTSIDE LEVER WITH LOCKING DEVICE



MATERIALS OF CONSTRUCTION

Components	US Standard Trim 10 "X" "X"	Canada Standard Trim 12 "X" "X"	Stainless Steel Trim 20 "X" "X"	Full Stainless Trim 30 "X" "X"	Metal-to-Metal Trim 40 "X" "X"	Stellite™ Facing Seat/Piston Trim 50 "X" "X"
Body	A216-WCC	A352-LCC	A216-WCC	A351-CF8M	A216-WCC	A216-WCC
Cover	ASTM A515 Gr. 70	ASTM A516 Gr. 70	ASTM A515 Gr. 70	A240-316	ASTM A515 Gr. 70	ASTM A515 Gr. 70
Cover Seal	See Note 1	See Note 1	See Note 1	See Note 1	See Note 1	See Note 1
Bolting	A193 Gr. B7 A194 Gr. 2H	A320 Gr. L7M A194 Gr. 7M	A193 Gr. B7 A194 Gr. 2H	A193 Gr. B7M A194 Gr. 8M	A193 Gr. B7 A194 Gr. 2H	A193 Gr. B7 A194 Gr. 2H
Liner	A29-1018 ENP	A29-1018 ENP	A29-1018 ENP	A29-1018 ENP	A29-1018 ENP	A29-1018 ENP
Piston	410 SS	410 SS	410 SS	410 SS	410 SS	410 SS w/Stellite #6 Hard Face
Piston Seal	See Note 1	See Note 1	See Note 1	See Note 1	n/a	See Note 1
Seat Integral	A216-WCC	A352-LCC	n/a	A351-CF8M	n/a	n/a
Seat Renewable	Carbon Steel	Carbon Steel	316 SS	316 SS	Carbon Steel	410 SS w/Stellite #6 Hard Face
Piston Rings	Cast Iron	Cast Iron	Cast Iron	Cast Iron ENP	Cast Iron	Cast Iron
Piston Spring	Alloy X-750	Alloy X-750	Alloy X-750	Alloy X-750	Alloy X-750	Alloy X-750

Notes:

1. In the trim number description, "X" "X" relates to the cover and piston seal material options. When ordering, replace the first "X" with the cover seal from the list below. Use the second "X" only when the piston seal is different from the cover seal (i.e., VM for FKM (Viton®) cover seal and metal-to-metal piston seal).

B = Buna-N

V = FKM (Viton)

T = Teflon®

M = Metal-to-metal*

H = HSN

F = Fiber gasket

A = AFLAS

* Not available in fg. 75 or 76

Other seal material options are available upon request.

2. N/A = Not available

3. ENP = Electroless nickel plated

4. EHC = Engineered hard chrome plating

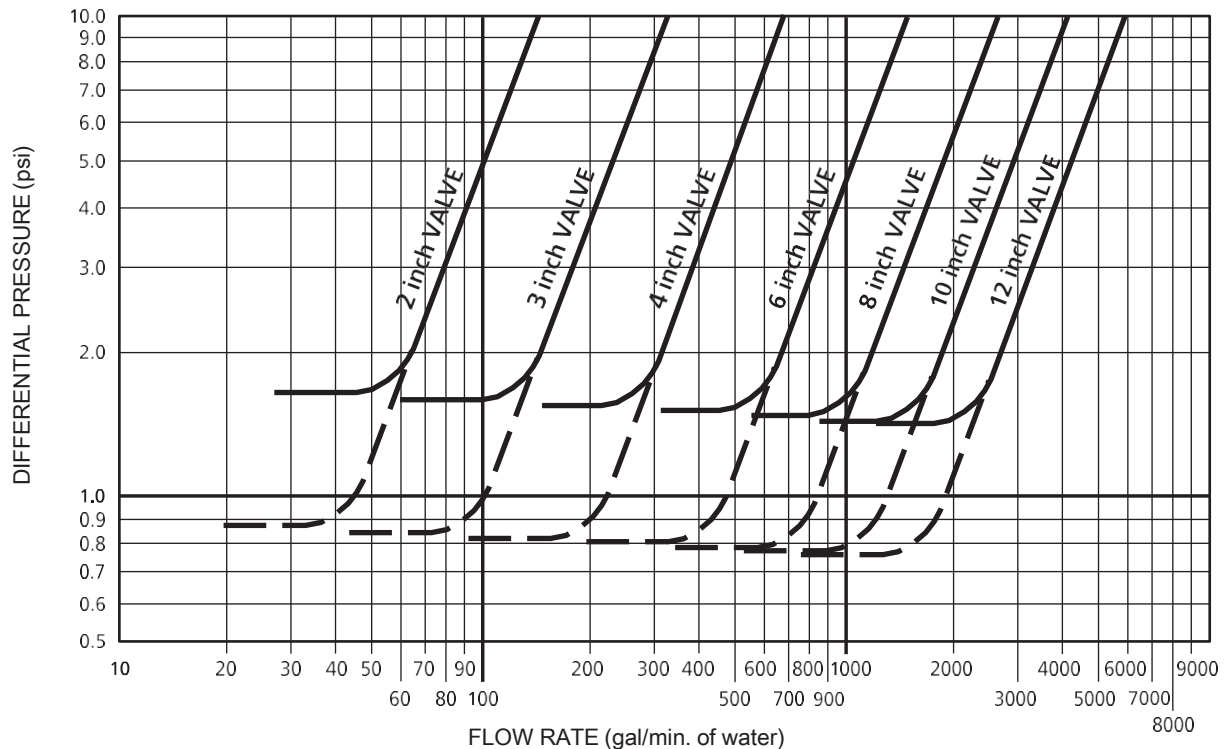
5. Materials comply with NACE MR0175/ISO 15156

6. Other materials are available upon request



PRESSURE-LOSS CURVES/FLOW COEFFICIENTS

Pressure-loss Curves



Dotted lines represent pressure loss for valves without springs.

Flow Coefficients

Flow Coefficients (C_v) Full Open Valves

Valve Size	C_v
2	46
3	104
4	212
6	477
8	848
10	1325
12	1908

Liquid (incompressible flow)

The equations listed below are the basis for the above nomogram. The nomogram is a method for solving the equations below quickly and simply when service fluid is water.

$$C_v = Q \sqrt{\frac{G}{\Delta P}} \quad Q = C_v \sqrt{\frac{\Delta P}{G}} \quad \Delta P = \left[\frac{Q}{C_v} \right]^2 G$$

Where:

Q = FLOW: LIQUIDS – gal/min
GASES – cf/hour

C_v = FLOW COEFFICIENT P_1
= INLET PRESSURE (psia)

P_2 = OUTLET PRESSURE (psia)

ΔP = PRESSURE DROP ($P_1 - P_2$)

T = ABSOLUTE TEMPERATURE ($^{\circ}F + 460$)

G = SPECIFIC GRAVITY (WATER = 1)

Gas (compressible flow)

$$C_v = \frac{Q}{963} \sqrt{\frac{GT}{P_1^2 - P_2^2}}$$

$$Q = C_v 963 \sqrt{\frac{P_1^2 - P_2^2}{GT}}$$



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