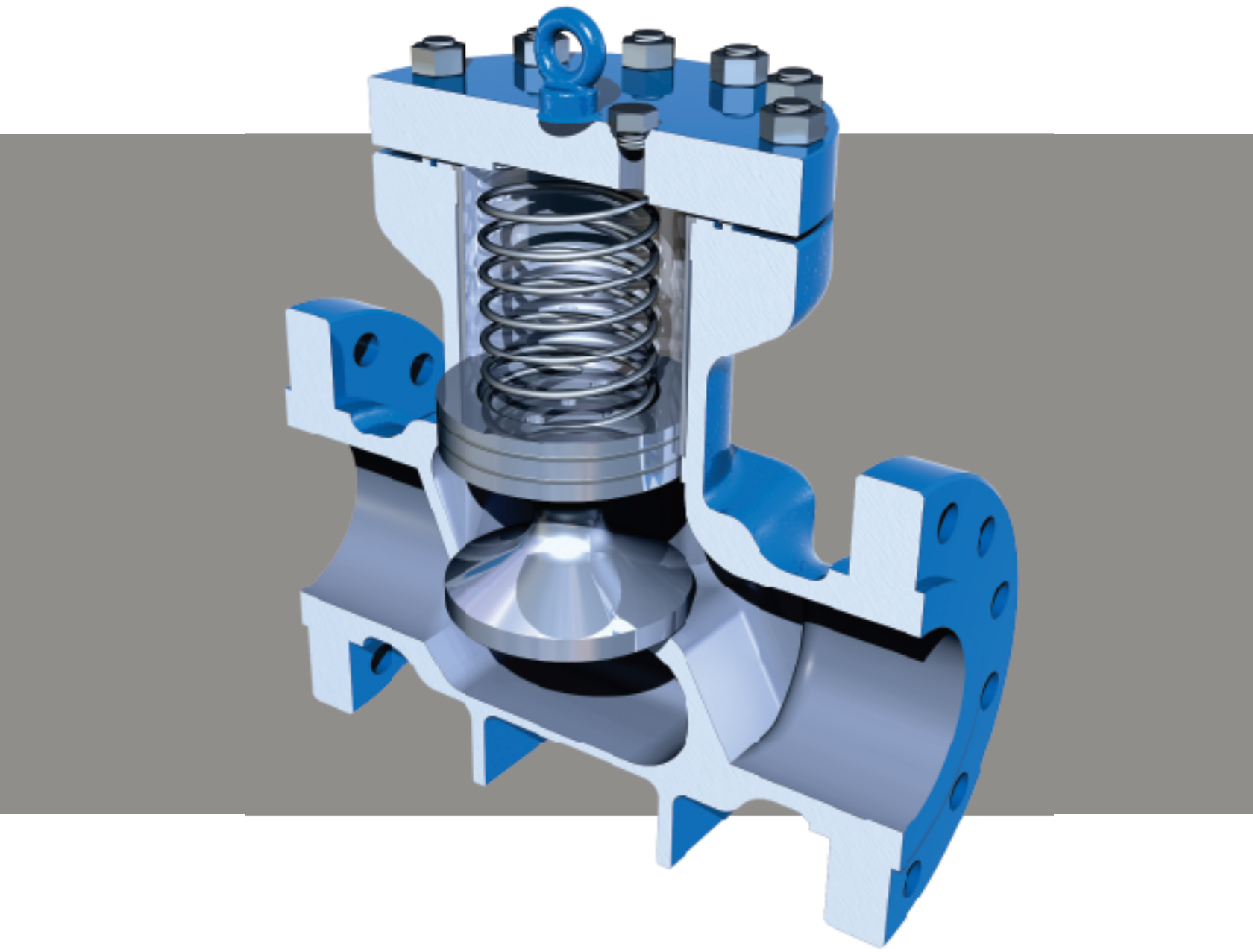
TOM WHEATLEY™ Piston Check Valves



TOM WHEATLEY™

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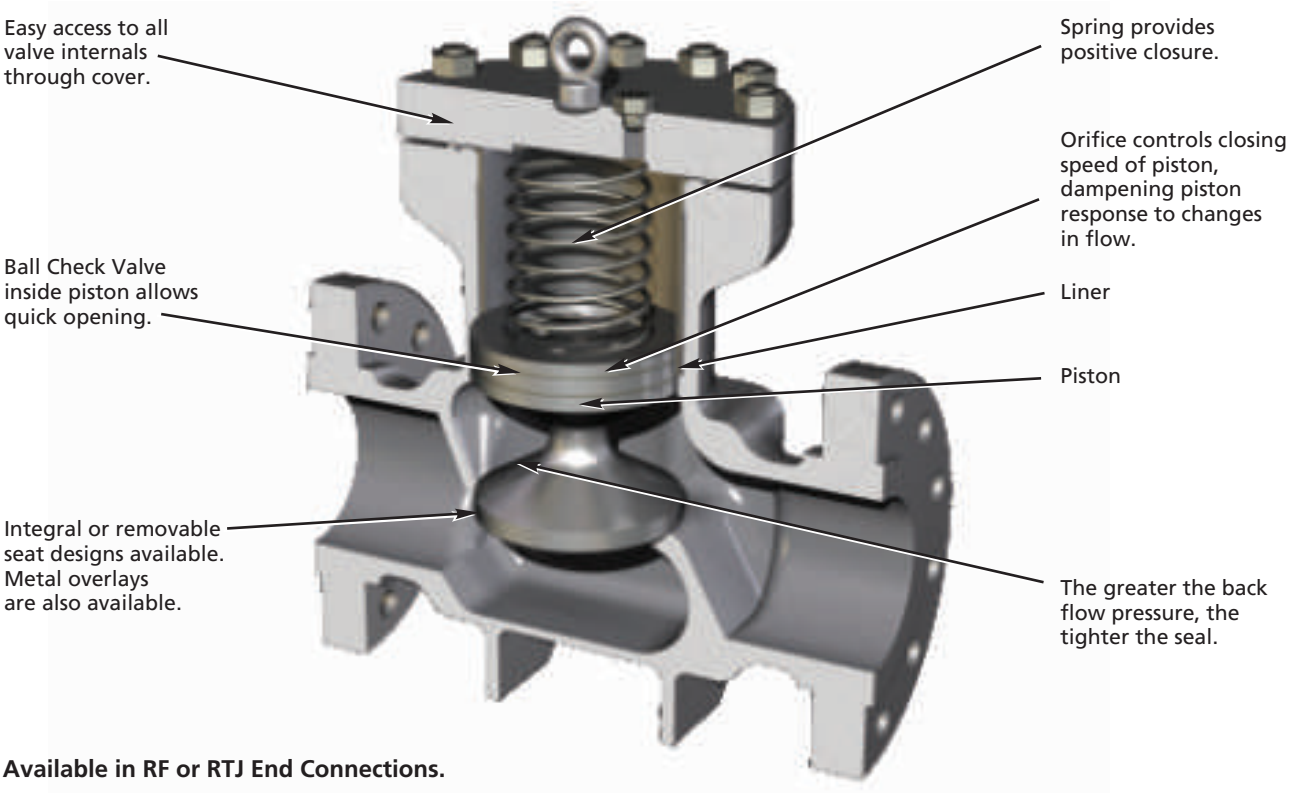
PISTON CHECK VALVES
2 in. (50 mm) THROUGH 12 in. (300 mm) ASME CLASS 150 - 2500



Available in RF or RTJ End Connections.

When pressure surges and pulsations are prevalent in a flow system, TOM WHEATLEY Piston Check Valves are an efficient solution to system protection.

Due to a unique non-slam design, TOM WHEATLEY 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 TOM WHEATLEY Piston Check Valve Top Entry Design allows for easy access and replacement of all valve internals with minimal downtime.

Smooth, Reliable Prevention of Backflow

In the absence of pressure differential, a TOM WHEATLEY 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 TOM WHEATLEY 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 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 TOM WHEATLEY 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 back pressure acting on the piston the tighter the seal.

TOM WHEATLEY Piston Check Valves complies with API 6D (ISO 14313) and is available in the sizes and pressure classes listed above.

All TOM WHEATLEY Piston Check Valves are designed for horizontal service.

TOM WHEATLEY Piston Check Valves must be specifically ordered for vertical flow up when intended for that service.

Upon request, TOM WHEATLEY Valve is prepared to design other sizes and pressure classes of Piston Check Valves.

TOM WHEATLEY manufactures a full line of Swing Check and Wafer Check Valves.

PISTON CHECK VALVES
2 in. (50 mm) THROUGH 12 in. (300 mm) ASME CLASS 150 - 2500

INSTALLATION/OPERATION

Remove shipping protectors from End Connections. Check interior of the valve through each end for foreign objects and/or shipping braces.

All TOM WHEATLEY Piston Check Valves are designed for horizontal service. TOM WHEATLEY Piston Check Valves must be specifically ordered for vertical flow when intended for that service.

HORIZONTAL SERVICE

TOM WHEATLEY Piston Check Valves should be installed with inlet and outlet at the same level and the bonnet/cover facing upward for proper action. TOM WHEATLEY Piston Check Valves must be installed with the arrow on the body pointing in the direction of intended flow. Horizontal flow is the preferred orientation for the TOM WHEATLEY Piston Check Valves.

VERTICAL FLOW

The TOM WHEATLEY Piston Check Valve is installed with the arrow pointing in the direction of intended flow. User must specify, when ordering if the valve is intended for vertical flow.

Clean the End Connections and Mating Pipe thoroughly prior to assembly. Proper support of the valve and/or pipe should be provided to eliminate strain on End Connections.

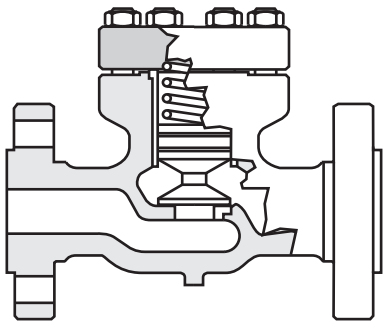
Pressure in excess of the working pressure should not be applied to the closed piston. All valves have been hydrostatically tested to 1 1/2 times the rated working pressure.

Operating temperatures should not exceed 300°F (149°C) continuous or 350°F (177°C) intermittently. Specify when ordering if operating temperatures exceed the above.

MAINTENANCE

TOM WHEATLEY Piston Check Valves require minimum maintenance due to simplicity of design and rugged construction. Recommended spare parts kit consists of Piston Seal, Piston Rings, Springs and Cover Seal.

SECTIONAL VIEW OF ASSEMBLED PISTON CHECK VALVE



HOW TO ORDER

	VALVE SIZE (inches)	ASME PRESSURE CLASS	END CONNECTION/ SEAT	TRIM CODE
ORDERING DATA	02	06	75	10B

VALVE SIZE (inches)	ASME PRESSURE CLASS	END CONNECTION/ SEAT	TRIM CODE
02 = 2” 03 = 3” 04 = 4” 06 = 6” 08 = 8” 10 = 10” 12 = 12”	01 = ASME 150 03 = ASME 300 06 = ASME 600 09 = ASME 900 15 = ASME 1500 25 = ASME 2500	73 = RF - Renewable Seat 74 = RTJ - Renewable Seat 75 = RF - Integral Seat 76 = RTJ - Integral Seat	Materials Code

REPRESENTS	2”	ASME 600	RF WITH INTEGRAL SEAT	10B

Materials Code - See Standard Materials of Constructions
The Alpha Character Represents the Seal Material Code

Body	ASTM A216 Gr. WCC
Cover	ASTM A36
Cover Seal	Fiber Gasket
Bolting	ASTM A193 Gr. B7, ASTM A194 Gr. 2H
Liner	ASTM A29-1018 with ENP
Piston	410 Stainless Steel
Piston Seal	Buna-N
Seat	Integral
Piston Rings	Cast Iron

Note: Other materials of construction and seals available upon request.

PISTON CHECK VALVES
2 in. (50 mm) THROUGH 12 in. (300 mm) ASME CLASS 150 - 2500

ASSEMBLY/DISASSEMBLY

A. Remove the cover.

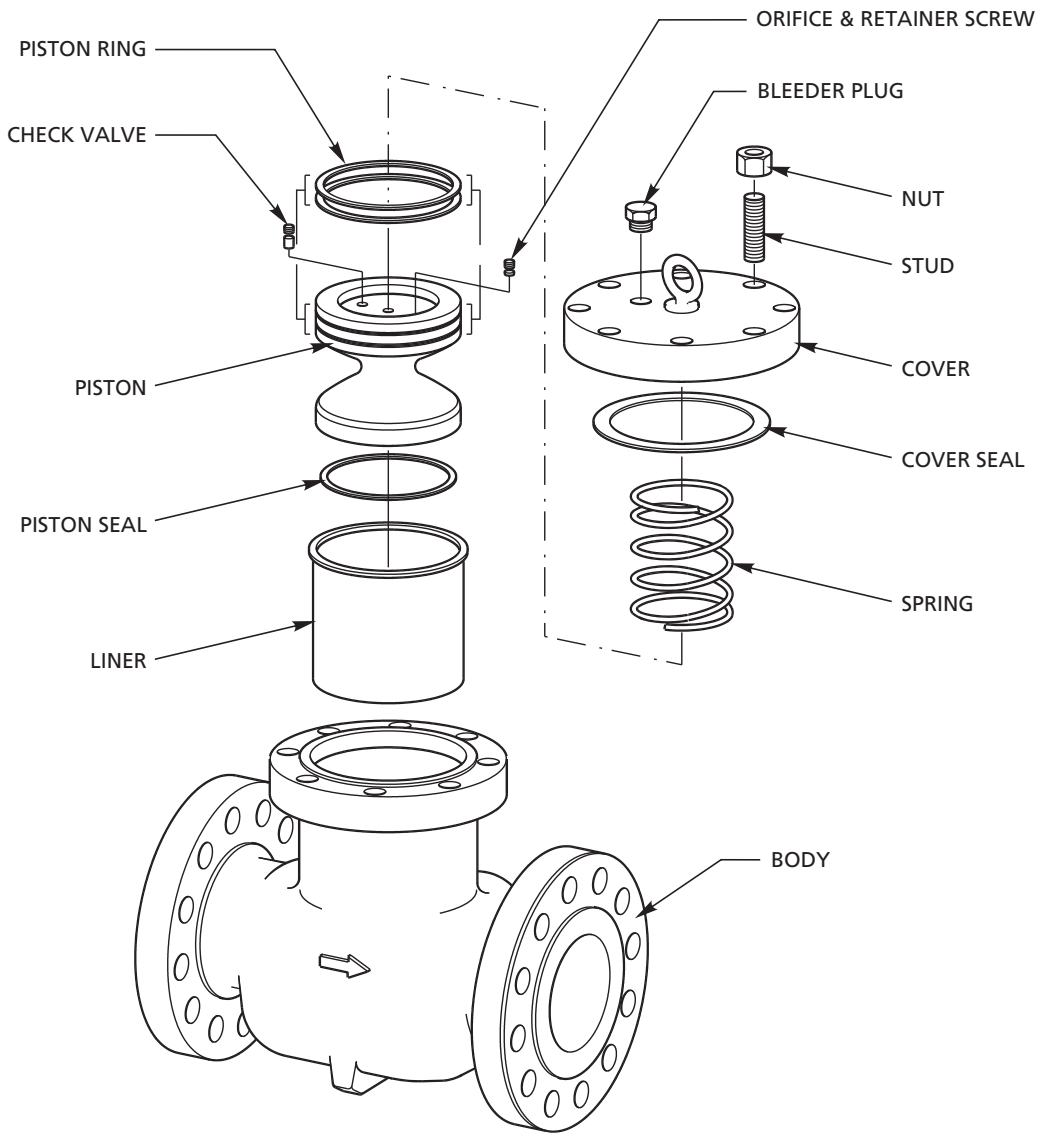
B. Lift piston and liner assembly out of body (use eye hole in center of piston if necessary). Remove piston from liner and remove check valve and orifice(s) from piston.

C. Inspect seals and sealing surface for foreign material, nicks and/or gouges.

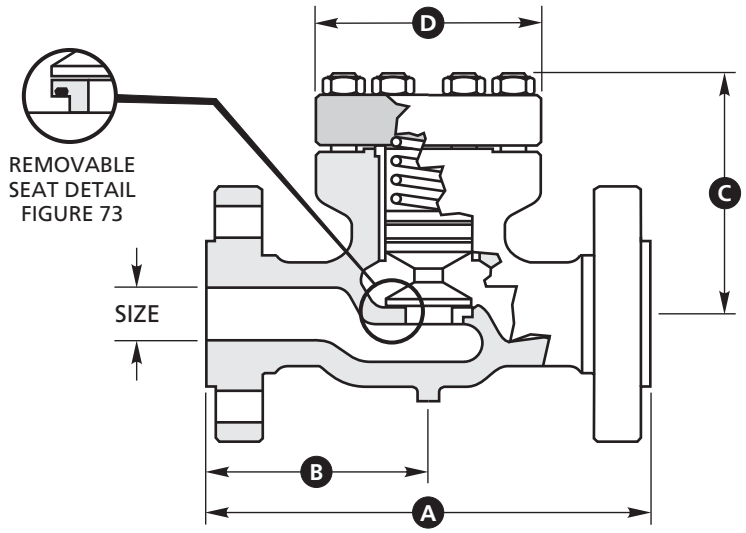
D. Check body seat face for wear or damage.

E. Replace any parts showing signs of damage, excess wear or deterioration.

F. Reassemble in reverse order.



PISTON CHECK VALVES
2 in. (50 mm) THROUGH 12 in. (300 mm) ASME CLASS 150 - 2500
RAISED FACE FLANGED END, FIGURE NUMBERS 73 AND 75

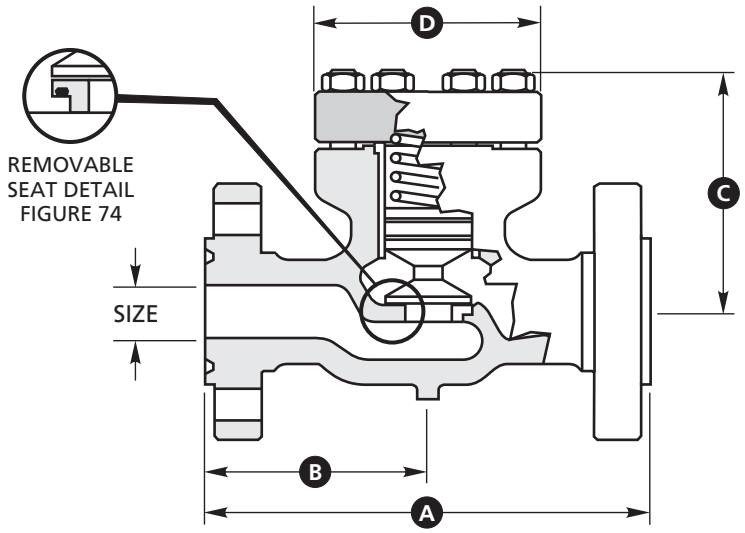


DIMENSIONS

NOMINAL SIZE in. (mm)	ASME CLASS	A	B	C	D
2 (50)	150	10.50 (267)*	5.25 (134)	6.50 (165)	7.00 (178)
	300	10.50 (267)	5.25 (134)	6.50 (165)	7.00 (178)
	600	11.50 (292)	5.75 (146)	6.75 (171)	7.00 (178)
	900	14.50 (368)	7.25 (184)	7.00 (178)	7.00 (178)
	1500	14.50 (368)	7.25 (184)	7.25 (184)	7.00 (178)
	2500	17.75 (451)	8.88 (226)	7.75 (191)	8.00 (203)
3 (80)	150	12.50 (318)*	6.25 (159)	8.00 (203)	8.25 (210)
	300	12.50 (318)	6.25 (159)	8.00 (203)	8.25 (210)
	600	14.00 (356)	7.00 (178)	8.25 (210)	8.25 (210)
	900	15.00 (381)	7.50 (191)	8.50 (216)	8.25 (210)
	1500	18.50 (470)	9.25 (235)	11.50 (292)	11.63 (295)
	2500	22.75 (578)	11.38 (289)	12.50 (318)	11.63 (295)
4 (100)	150	14.00 (356)*	7.00 (178)	11.25 (286)	9.75 (248)
	300	14.00 (356)	7.00 (178)	11.25 (286)	9.75 (248)
	600	17.00 (432)	8.50 (216)	11.50 (292)	9.75 (248)
	900	18.00 (457)	9.00 (229)	11.88 (302)	9.75 (248)
	1500	21.50 (546)	10.75 (273)	13.25 (337)	10.75 (273)
	2500	26.50 (673)	13.25 (337)	15.00 (381)	10.75 (273)
6 (150)	150	17.50 (445)*	8.75 (223)	16.13 (410)	11.75 (298)
	300	17.50 (445)	8.75 (223)	16.13 (410)	11.75 (298)
	600	22.00 (559)	11.00 (280)	16.38 (416)	11.75 (298)
	900	24.00 (610)	12.00 (305)	16.75 (425)	11.75 (298)
	1500	27.75 (705)	13.88 (353)	19.00 (483)	13.13 (334)
	2500	36.00 (914)	18.00 (457)	19.00 (483)	13.13 (334)
8 (200)	150	19.50 (495)	9.75 (248)	16.75 (425)	14.50 (368)
	300	21.00 (533)	10.50 (267)	16.75 (425)	14.50 (368)
	600	26.00 (660)	13.00 (330)	16.75 (425)	14.50 (368)
	900	29.00 (737)	14.50 (368)	16.75 (425)	14.50 (368)
10 (250)	150	24.50 (622)	12.25 (311)	18.50 (470)	17.00 (432)
	300	24.50 (622)	12.25 (311)	18.50 (470)	17.00 (432)
	600	31.00 (787)	15.50 (394)	18.50 (470)	17.00 (432)
	900	33.00 (838)	16.50 (419)	18.50 (470)	17.00 (432)
12 (300)	150	27.50 (699)	13.75 (349)	22.50 (572)	24.00 (610)
	300	28.00 (711)	14.00 (356)	22.50 (572)	24.00 (610)
	600	33.00 (838)	16.50 (419)	22.50 (572)	24.00 (610)
	900	38.00 (965)	19.00 (483)	22.50 (572)	24.00 (610)

* Length exceeds dimensions given in API 6D/ISO 14313.

PISTON CHECK VALVES
2 in. (50 mm) THROUGH 12 in. (300 mm) ASME CLASS 150 - 2500
RING JOINT FLANGED END, FIGURE NUMBERS 74 AND 76



DIMENSIONS

NOMINAL SIZE in. (mm)	ASME CLASS	A	B	C	D
2 (50)	150	11.13 (283)*	5.56 (142)	6.50 (165)	7.00 (178)
	300	11.13 (283)	5.56 (142)	6.50 (165)	7.00 (178)
	600	11.63 (295)	5.56 (142)	6.75 (171)	7.00 (178)
	900	14.63 (372)	7.31 (148)	7.00 (178)	7.00 (178)
	1500	14.63 (372)	7.31 (148)	7.25 (184)	7.00 (178)
	2500	17.88 (454)	8.88 (226)	7.75 (191)	8.00 (203)
3 (80)	150	13.13 (334)*	6.56 (167)	8.00 (203)	8.25 (210)
	300	13.13 (334)	6.56 (167)	8.00 (203)	8.25 (210)
	600	14.13 (359)	7.06 (180)	8.25 (210)	8.25 (210)
	900	15.13 (384)	7.56 (192)	8.50 (216)	8.25 (210)
	1500	18.63 (473)	9.19 (233)	11.50 (292)	11.63 (295)
	2500	23.00 (584)	11.50 (292)	12.50 (318)	11.63 (295)
4 (100)	150	14.63 (372)*	7.31 (186)	11.25 (286)	9.75 (248)
	300	14.63 (372)	7.31 (186)	11.25 (286)	9.75 (248)
	600	17.13 (435)	8.56 (218)	11.50 (292)	9.75 (248)
	900	18.13 (461)	9.06 (230)	11.88 (302)	9.75 (248)
	1500	21.63 (549)	10.81 (275)	13.25 (337)	12.75 (324)
	2500	26.88 (683)	13.44 (341)	15.00 (381)	12.75 (324)
6 (150)	150	18.13 (461)*	9.06 (230)	16.13 (410)	11.75 (298)
	300	18.13 (461)	9.06 (230)	16.13 (410)	11.75 (298)
	600	22.13 (562)	11.06 (281)	16.38 (416)	11.75 (298)
	900	24.13 (613)	12.06 (306)	16.75 (425)	11.75 (298)
	1500	28.00 (711)	14.00 (356)	19.00 (483)	13.13 (334)
	2500	36.50 (927)	18.25 (464)	19.00 (483)	13.13 (334)
8 (200)	150	20.00 (508)	10.00 (254)	16.75 (425)	14.50 (368)
	300	21.63 (549)	10.81 (275)	16.75 (425)	14.50 (368)
	600	26.13 (664)	13.06 (332)	16.75 (425)	14.50 (368)
	900	29.13 (740)	14.56 (370)	16.75 (425)	14.50 (368)
10 (250)	150	25.00 (635)	12.50 (318)	18.50 (470)	17.00 (432)
	300	25.13 (638)	12.56 (319)	18.50 (470)	17.00 (432)
	600	31.13 (791)	15.56 (395)	18.50 (470)	17.00 (432)
	900	33.13 (842)	16.56 (421)	18.50 (470)	17.00 (432)
12 (300)	150	28.00 (711)	14.00 (356)	22.50 (572)	24.00 (610)
	300	28.63 (727)	14.31 (363)	22.50 (572)	24.00 (610)
	600	33.13 (842)	16.56 (421)	22.50 (572)	24.00 (610)
	900	38.13 (969)	19.06 (484)	22.50 (572)	24.00 (610)

* Face-to-Face dimensions is greater than that shown in API 6D/ISO 14313.

PISTON CHECK VALVES
2 in. (50 mm) THROUGH 12 in. (300 mm) ASME CLASS 150 - 2500
STANDARD MATERIALS OF CONSTRUCTION

PART	STANDARD TRIM 10X	STAINLESS SEATS TRIM 20X	FULL STAINLESS TRIM 30X	METAL-TO-METAL TRIM 40X	STELLITE SEATS TRIM 50X
Body	A216-WCC	A216-WCC	A351-CF8M	A216-WCC	A216-WCC
Cover	A36	A36	A240-316	A36	A36
Cover Seal ASME 150-600 - Fiber Gasket ASME 900 - 2500 - O-Ring	 ASB* Buna	 ASB* Buna	 ASB* Buna	 ASB* RTJ	 ASB* Buna
Bolting	A193-B7, A194-2H	A193-B7 A194-2H	A193-B7M A194-8M	A193-B7 A194-2H	A193-B7 A194-2H
Liner	A29-1018 ENP	A29-1018 ENP	A276-316 EHC	A29-1018 ENP	A29-1018 ENP
Piston	410 SS	410 SS	316 SS	410 SS	410 SS with Stellite #6 hard face
Piston Seal	See Note 1	See Note 1	See Note 1	See Note 1	See Note 1
Seat Integral	A216-WCC	N/A	A351-CF8M	A216 WCC	N/A
Seat Renewable	Carbon Steel	316 SS	316 SS	Carbon Steel	410 SS with Stellite #6 hard face
Piston Rings	Cast Iron	Cast Iron	Cast Iron ENP	Cast Iron	Cast Iron
Piston Spring	Alloy X750	Alloy X750	Alloy X750	Alloy X750	Alloy X750

* Buna-N Cover Seal furnished on ASME Class 900 and higher as Standard.

Notes.

1. In the Trim Number Description "X" relates to standard Piston Seal Material Options.
   When ordering a valve substitute one of the following for "X"

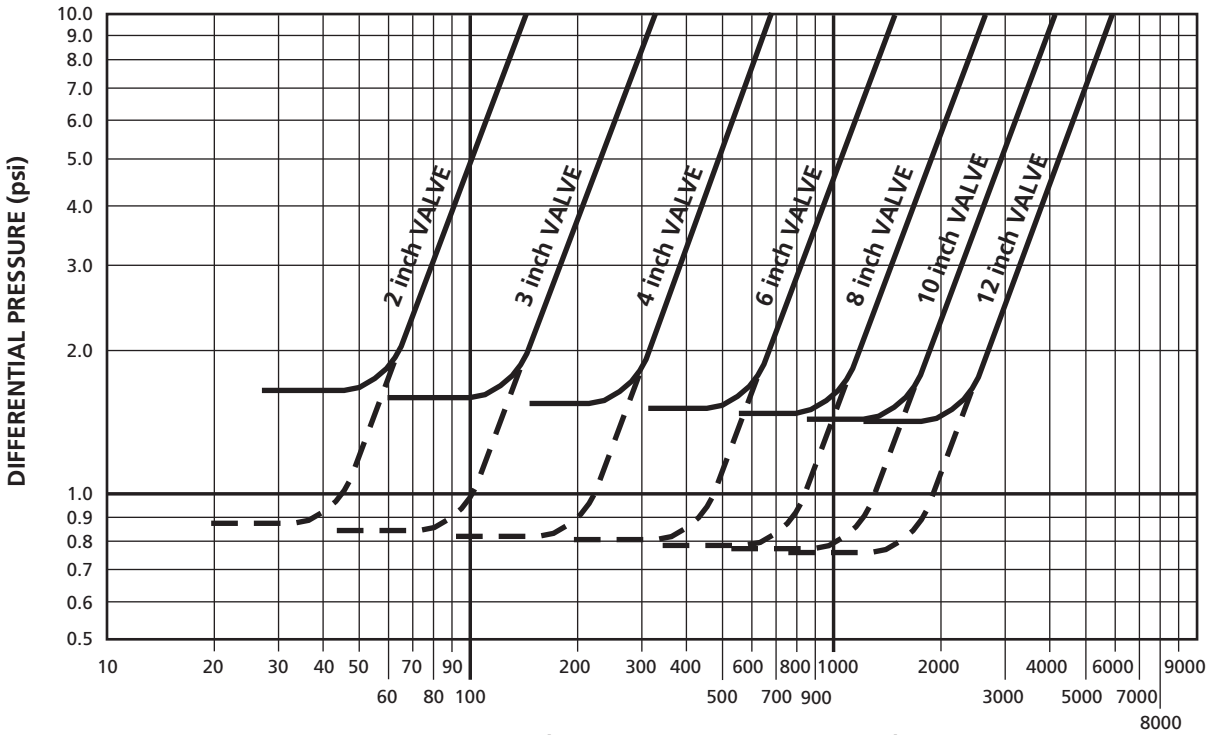
   B = Buna-N
   V = Viton
   T = Teflon
   M = Metal-to-Metal.

   Other seal material options are available upon request.

2. N/A = Not available.
3. For valves with O-Ring Cover Seals the seal material will be the same as the Piston Seal Material.
4. ENP = Electroless Nickel Plated.
5. EHC = Engineered Hard Chrome Plating.
6. Materials comply with NACE MR0175 / ISO 15156.
7. Other materials are available upon request.

PISTON CHECK VALVES
2 in. (50 mm) THROUGH 12 in. (300 mm) ASME CLASS 150 - 2500
PRESSURE LOSS CURVES/FLOW COEFFICIENTS

PRESSURE LOSS CURVES FOR PISTON CHECK VALVES



DOTTED LINES REPRESENT PRESSURE LOSS FOR VALVES WITHOUT SPRINGS

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

GAS (COMPRESSIBLE FLOW)

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

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

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.

LIQUID (INCOMPRESSIBLE FLOW)

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

WHERE:

- Q = FLOW LIQUIDS-GPM, GASES-SCFH
- C_v = FLOW COEFFICIENT
- P_1 = INLET PRESSURE (psia)
- P_2 = OUTLET PRESSURE (psia)
- ΔP = PRESSURE DROP ($P_1 - P_2$)
- T = ABSOLUTE TEMPERATURE (°F + 460)
- G = SPECIFIC GRAVITY (WATER = 1)

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