

Series

PB

SMARTER MANIFOLD SYSTEMS

BALL VALVES

CHECK VALVES

3-WAY BALL VALVES

THROTTLE BALL VALVES

POPPET DIVERter VALVES

MANIFOLD COMPONENTS

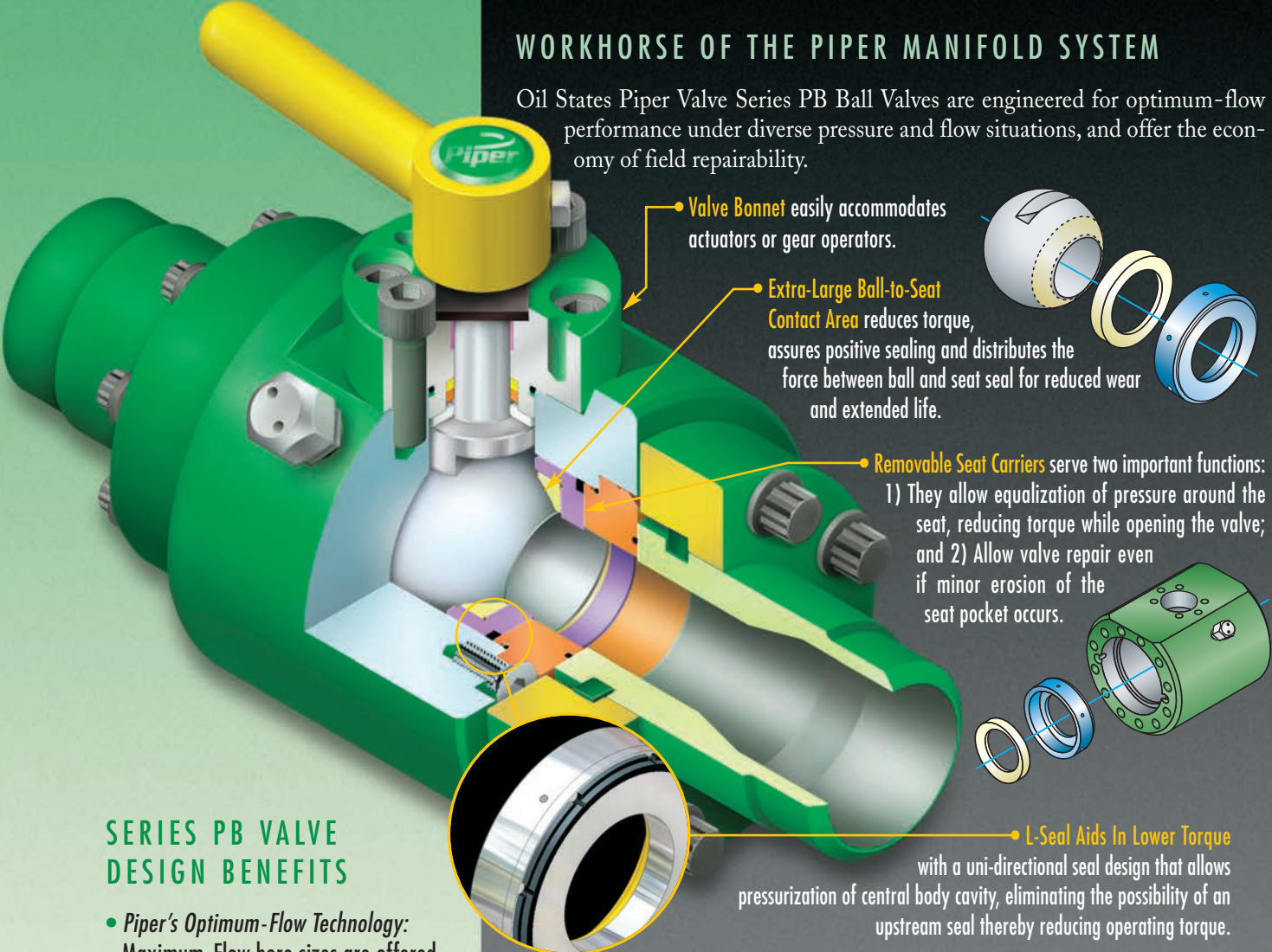


Series PB Ball Valves

DESIGNED, ENGINEERED AND BUILT FOR PERFORMANCE

WORKHORSE OF THE PIPER MANIFOLD SYSTEM

Oil States Piper Valve Series PB Ball Valves are engineered for optimum-flow performance under diverse pressure and flow situations, and offer the economy of field repairability.



• **Valve Bonnet** easily accommodates actuators or gear operators.

• **Extra-Large Ball-to-Seat Contact Area** reduces torque, assures positive sealing and distributes the force between ball and seat seal for reduced wear and extended life.

• **Removable Seat Carriers** serve two important functions:
1) They allow equalization of pressure around the seat, reducing torque while opening the valve; and 2) Allow valve repair even if minor erosion of the seat pocket occurs.

• **L-Seal Aids In Lower Torque** with a uni-directional seal design that allows pressurization of central body cavity, eliminating the possibility of an upstream seal thereby reducing operating torque.

SERIES PB VALVE DESIGN BENEFITS

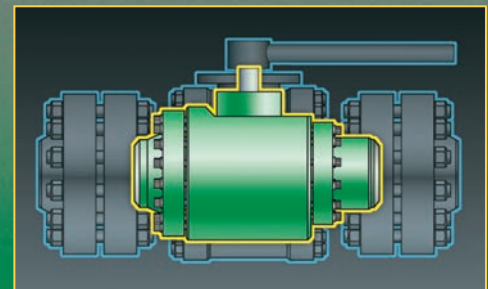
- **Piper's Optimum-Flow Technology:** Maximum-Flow bore sizes are offered that correspond to the inside diameters of ASTM A106 Grade B pipe, reducing or completely eliminating transition areas and thereby minimizing system friction pressure loss.
- Minimal line spread required for easy removal from service.
- Modular 3-Piece design provides multiple end connection options.
- Compact design occupies up to 40% less space than conventional flanged-end ball valves for skids or manifolds. (See right)

BUILD YOUR MANIFOLD LIGHTER, SMALLER, SMARTER.

Start saving the weight, space and money when building manifold systems. See the illustrated comparison below between a conventional 6" ANSI 1500 full port trunion ball valve with flanged end connections including companion flanges, and a Piper Series PB ANSI Class 1500 6" nominal valve.

Dimensional and Weight Comparison

- Total weight is 70 % less.
- Total length is 43% less.
- Relative height to bonnet is 28% less.

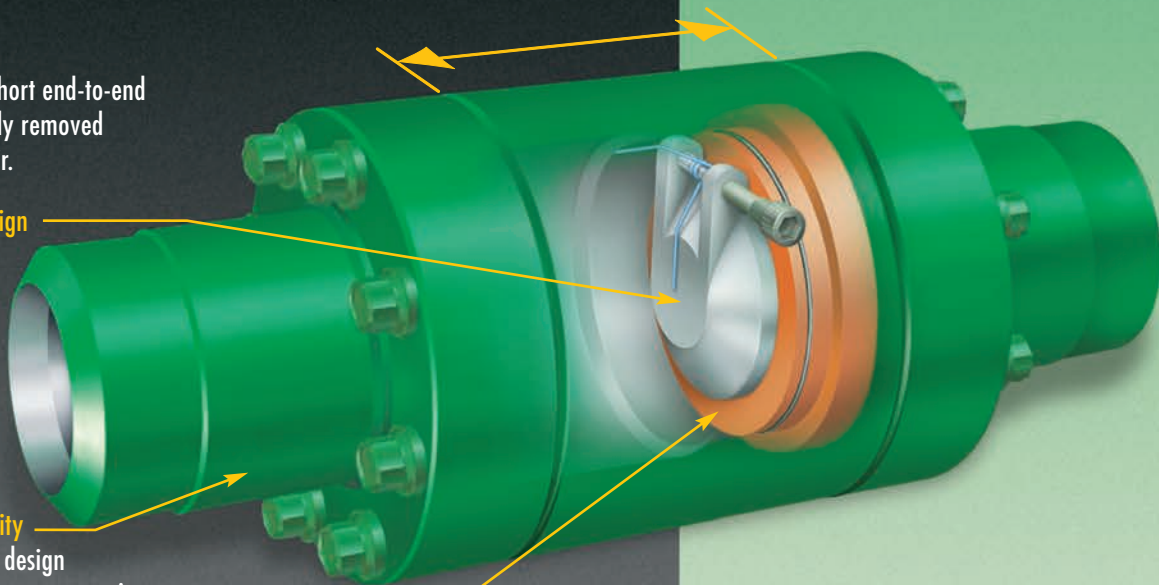


Series PB Check Valves

POSITIVE, SYSTEM BACKFLOW PREVENTION

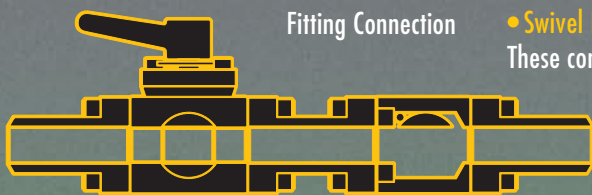
Oil States Piper Valve Series PB Check Valves are engineered and manufactured for compact size and optimum-flow performance capabilities. Economical and field repairable, the Series PB Check Valve is a true performer, offering system-wide positive backflow protection.

- **Body Style** provides short end-to-end dimension and is easily removed from service for repair.
- **Flapper Type Disc Design**
Our Check Valve design utilizes a flapper type disc to provide for a full open flow path and is fully piggable.
- **End Connection Design Offers Versatility**
Piper's built-in flange design offers the benefit of more connection options including Fitting Connections, Direct Bolted or Piper's easy-to-install Swivel Flange Connection.
- **Ball/Check Valve Combination Assemblies**
These assemblies offer the shortest overall length available for maximum space savings as illustrated here.

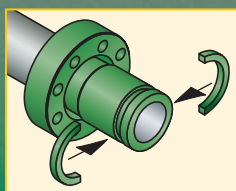


• **Fire-Safe Design** is accomplished utilizing metal-to-metal secondary sealing in critical areas.

• **Swivel Flange Connections**
These connections offer the benefit of fast, easy installation or removal of all Series PB valves. (See page 10 for more details.)



For even greater space and weight savings, smaller size check valves can be bolted directly to ball valve body shown here.



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Series PB Ball Valve Construction

Oil States Piper Valve Series PB Ball Valves are manufactured with materials, coatings and processes to ensure durability.

- Seat seals available in Celcon® and PEEK™ provide a variety of temperature ranges at high operating pressures.
- 17-4PH Stainless Steel stem material for maximum strength and corrosion resistance.
- NACE MRO175 compliance available.
- Fire tested in compliance with API Specification 6FA.
- Piper's large ball/seat interface assures reliability even in unprocessed fluids.
- Available in Subsea design.

Specifying Ball Valve Model Numbers



Manifold assembly prepared for actuator installation.

Body/Bonnet Material	
A • Uncoated Std Matl	3 • 316 SS
1 • Xylan®-Ctd Std Matl	4 • Low Temp Alloy Steel
2 • 17-4PH SS	5 • Duplex SS
Ball Material	
1 • ENP Carbon Steel	3 • Chrome Plated 316 SS
2 • 17-4PH SS	5 • Duplex SS
Stem Material	
1 • 17-4PH SS	5 • Duplex SS
Seat Carrier Material	
1 • Carbon Steel	3 • 316 SS
2 • 17-4PH SS	5 • Duplex SS
Seat Seal Material	
1 • Celcon®	2 • PEEK™
Stem Seal Material/O-Ring Material¹	
1 • PolyMyte-Nitrile/Peroxide-Cured Nitrile	
3 • PolyMyte-Nitrile/Low Temperature Nitrile	
4 • PolyMyte-Viton®/Viton®	
Fasteners	
1 • A193-B7	2 • A320-L7
Actuation	
0 • Bare Stem	2 • Gear Operator
1 • Handle Operated	
Options	
1 • Standard	3 • SS Grease Fitting

¹ For any valve with PEEK™ seats and/or API 10K or 15K rating, PTFE Elgiloy lip seals are used as stem seal.

Consult factory for other trim options.



Series PB Ball Valve Selection Table

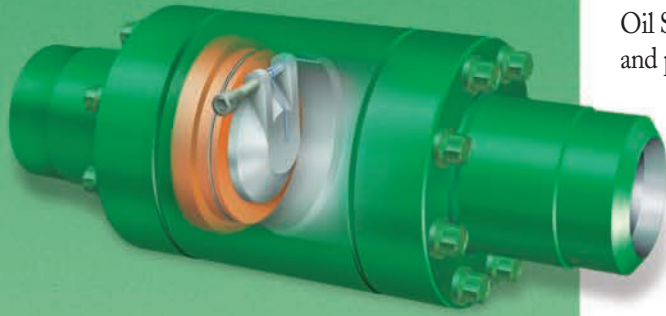
Working Pressure — Test Pressure PSI (Bar)	Comparable Pressure Class	Nominal Size		Ball Valve Model	Body Group Shape	Port Diameter		Assembly Ball Valve Body Group Weight		Weight w/Weld End Connections		Companion Check Valve
		in	mm			in	mm	lb	kg	lb	kg	
3,705 CWP (255) — 6,000 Test (414)	API 3000 ANSI 1500	1	25	BCR13	●	0.81	21	16	7	26	12	CCR13
		2	50	BC108	■	1.50	38	25	11	43	20	CC108
		2	50	BCR24	●	1.50	38	35	16	56	25	CCR24
		2 1/2	65	BAR29	●	1.81	46	32	15	58	26	CC113
		3	80	BAR33	●	2.06	52	42	19	75	34	CAR32
		3	80	BB209	●	2.56	65	92	42	134	61	CC206
		4	100	BA305	●	3.31	84	120	54	186	84	CC302
		4	100	BA312	●	3.75	95	195	88	269	122	CA310
		6	150	BA503	●	5.19	132	380	172	516	234	CA500
		8	200	BA700	●	7.06	179	693	314	1013	460	CA700
		10	250	BA901	●	8.50	216	1049	476	1470	667	CA808
5,000 CWP (345) — 7,500 Test (517)	API 5000	1	25	BCR13	●	0.81	21	16	7	26	12	CCR13
		2	50	BC108	■	1.50	38	25	11	43	20	CC108
		2	50	BCR24	●	1.50	38	35	16	56	25	CCR24
		2 1/2	65	BC113	●	1.81	46	32	15	75	34	CC113
		3	80	BB200	●	2.06	52	44	20	98	44	CC206
		3	80	BB209	●	2.56	65	92	42	134	61	CC206
		4	100	BC304	●	3.25	83	191	87	266	121	CC302
		6	150	BC402	●	4.13	105	306	139	495	225	CC401
		6	150	BB503	●	5.19	132	393	178	571	259	CB500
		8	200	BB700	●	7.06	179	691	313	1001	454	CB700
		10	250	BC808	●	8.50	216	1251	567	1755	796	CC808
6,170 CWP (425) — 10,000 Test (690)	ANSI 2500	1	25	BCR13	●	0.81	21	16	7	26	12	CCR13
		2	50	BC108	■	1.50	38	25	11	43	20	CC108
		2	50	BCR24	●	1.50	38	35	16	56	25	CCR24
		2 1/2	65	BC113	●	1.81	46	32	15	58	26	CC113
		3	80	BC204	●	2.25	57	84	38	142	64	CC206
		4	100	BC304	●	3.25	83	191	87	266	121	CC302
		6	150	BC402	●	4.13	105	306	139	495	225	CC401
		6	150	BC412	●	4.75	121	426	193	658	298	CC410
		8	200	BC701	●	7.06	179	733	333	1119	508	CC701
				10	250	BC808	●	8.50	216	1251	567	1755
10,000 CWP (690) — 15,000 Test (1,034)	API 10000	1	25	BDR13	●	0.81	21	17	8	28	13	CDR13
		2	50	BD108	●	1.50	38	46	21	76	34	CD108
		2 1/2	65	BD113	●	1.81	46	51	23	88	40	CD113
		3	80	BD202	●	2.13	54	94	42	153	69	CD201
		3	80	BD210	●	2.63	67	133	60	215	98	CD212
		4	100	BD302	●	3.13	80	174	79	283	128	CD301
		6	150	BD402	●	4.13	105	371	168	596	270	CD401
		6	150	BD502	●	5.13	130	701	318	980	445	CD500
		8	200	BD701	●	7.06	179	1653	750	2586	1173	CD701

Series PB Check Valve Construction

Oil States Piper Valve Series PB Check Valves are manufactured with material, coatings and processes to ensure durability.

- Flappers available in a variety of materials for maximum corrosion and erosion resistance.
- Spring material is Nickel Alloy X-750 for additional corrosion resistance.
- PTFE flapper seal promotes positive sealing and extended service life.
- Fire tested in compliance with API specification 6FD.
- Available in Subsea design.

Specifying Check Valve Model Numbers



Body Material

- A • Uncoated Std Matl
- 1 • Xylan®-Ctd Std Matl
- 2 • 17-4PH SS
- 3 • 316 SS
- 4 • Low Temp Alloy Steel
- 5 • Duplex SS

Flapper Material

- 1 • 17-4PH SS
- 2 • Nitronic 60
- 3 • 316 SS

Retainer / Seat Carrier Material

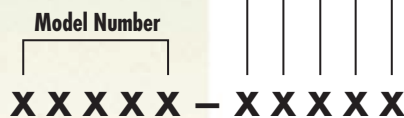
- 1 • 17-4PH SS
- 2 • 316 SS
- 3 • Carbon Steel
- 4 • Alloy Steel
- 5 • Duplex SS

O-Ring Material

- 1 • Peroxide-Cured Nitrile
- 3 • Low Temperature Nitrile
- 4 • Viton®

Check Valve Orientation

- 1 • Other Than Vertical Downflow
- 2 • Vertical Downflow



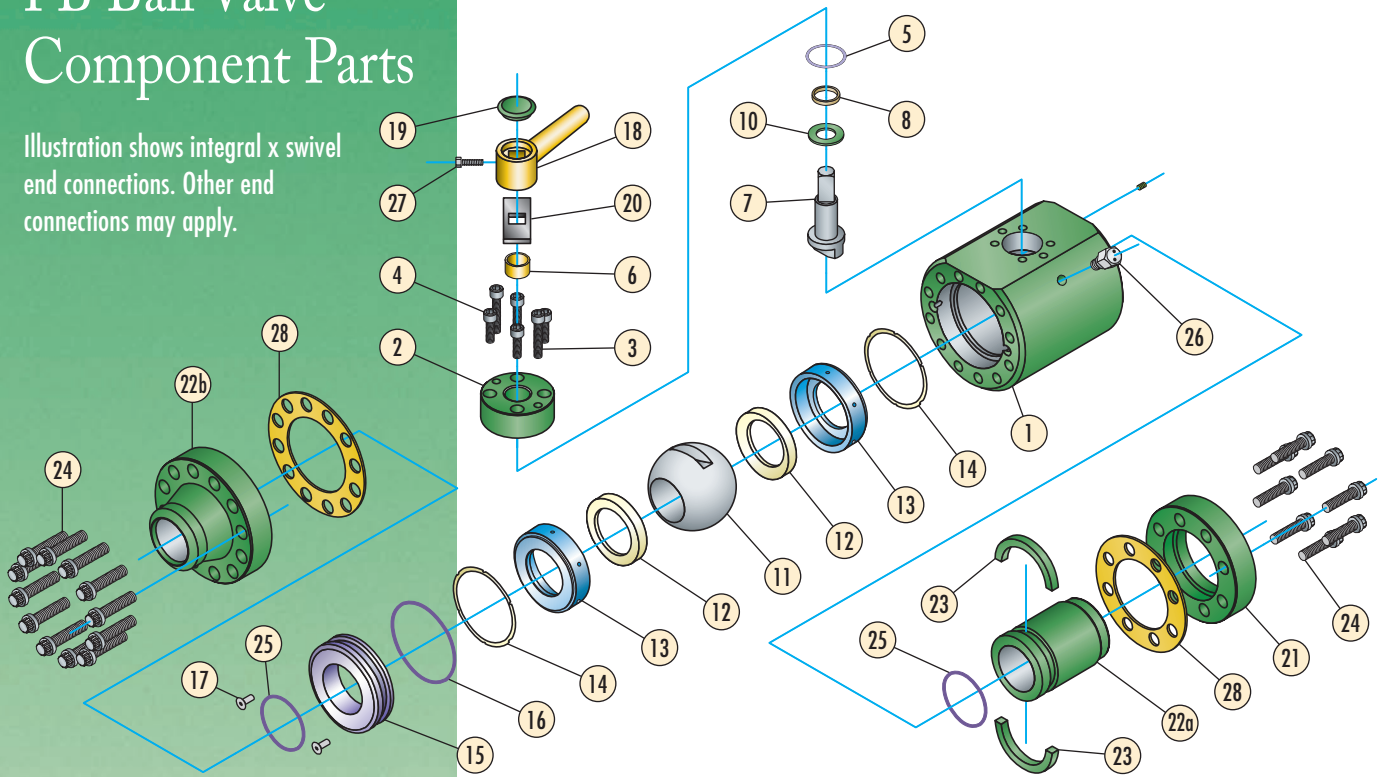
Consult factory for other trim options.

Series PB Check Valve Selection Table

Working Pressure — Test Pressure PSI (Bar)	Comparable Pressure Class	Nominal Size		Check Valve Model	Body Group Shape	Port Diameter		Check Valve Body Group Weight		Assembly Weight w/Weld End Connections		Companion Ball Valve
		in	mm			in	mm	lb	kg	lb	kg	
3,705 CWP (255) — 6,000 Test (414)	API 3000 ANSI 1500	1	25	CCR13	●	0.81	21	12	5	26	12	BCR13
		2	50	CC108	■	1.50	38	15	7	29	13	BC108
		2	50	CCR24	●	1.50	38	22	10	42	19	BCR24
		2 1/2	65	CC113	●	1.81	46	35	16	65	29	BAR29
		3	80	CAR32	●	2.00	51	31	14	62	28	BAR33
		3	80	CC206	●	2.38	60	29	13	65	30	BB209
		4	100	CC302	●	3.13	80	66	30	130	59	BA305
		4	100	CA310	●	3.63	92	62	28	127	58	BA312
		6	150	CA500	●	5.00	127	120	54	209	95	BA503
5,000 CWP (345) — 7,500 Test (517)	API 5000	1	25	CCR13	●	0.81	21	12	5	26	12	BCR13
		2	50	CC108	■	1.50	38	15	7	29	13	BC108
		2	50	CCR24	●	1.50	38	22	10	42	19	BCR24
		2 1/2	65	CC113	●	1.81	46	35	16	65	29	BAR29
		3	80	CC206	●	2.38	60	29	13	65	30	BB200/209
		4	100	CC302	●	3.13	80	65	30	130	59	BC304
		6	150	CC401	●	4.06	103	300	136	379	280	BC402
		6	150	CB500	●	5.00	127	306	139	400	182	BB503
		8	200	CB700	●	7.06	179	467	212	451	333	BB700
6,170 CWP (425) — 10,000 Test (690)	ANSI 2500	1	25	CCR13	●	0.81	21	12	5	26	12	BCR13
		2	50	CC108	■	1.50	38	15	7	29	13	BC108
		2	50	CCR24	●	1.50	38	22	10	42	19	BCR24
		2 1/2	65	CC113	●	1.81	46	35	16	65	29	BAR29
		3	80	CC206	●	2.38	60	29	13	65	30	BC204
		4	100	CC302	●	3.13	80	66	30	130	59	BC304
		6	150	CC401	●	4.06	103	200	91	379	280	BC402
		6	150	CC410	●	4.63	118	287	130	375	170	BC412
		8	200	CC701	●	7.06	179	467	212	610	277	BC701
10,000 CWP (690) — 15,000 Test (1,034)	API 10000	1	25	CDR13	●	0.81	21	8	4	25	18	BDR13
		2	50	CD108	●	1.50	38	57	26	42	31	BD108
		2 1/2	65	CD113	●	1.81	46	50	23	72	33	BD113
		3	80	CD201	●	2.06	52	46	21	83	61	BD202
		3	80	CD212	●	2.75	70	150	68	181	133	BD210
		4	100	CD301	●	3.06	78	200	91	190	86	BD302
		6	150	CD401	●	4.06	103	280	127	373	275	BD402
		6	150	CD502	●	5.00	127	634	288	576	425	BD502
		8	200	CD701	●	7.06	179	744	338	1350	613	BD701

PB Ball Valve Component Parts

Illustration shows integral x swivel end connections. Other end connections may apply.

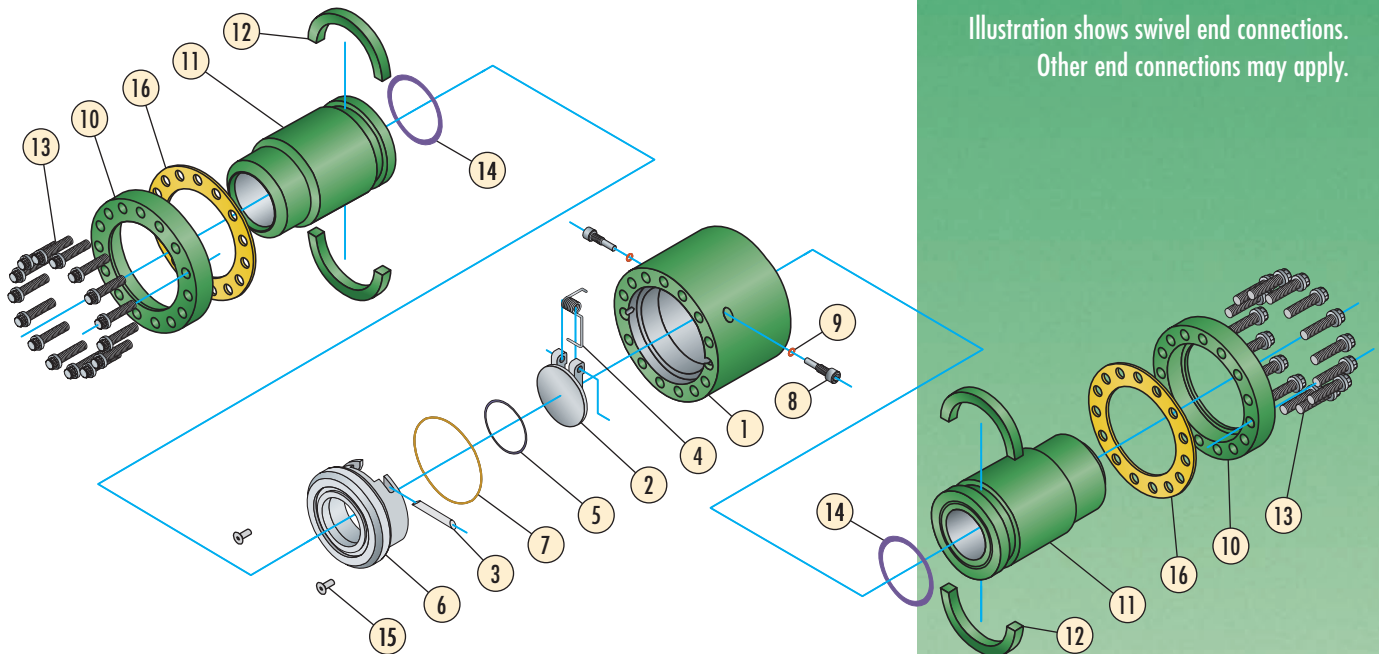


Index	Qty	Description	Standard Materials	Optional Materials ¹
1	1	Body	Carbon Steel ² , Alloy Steel ³	316 SS, 17-4PH SS, Duplex SS
2	1	Bonnet	Carbon Steel	316 SS, 17-4PH SS, Duplex SS
3	2	Stop Cap Screw	A193-B7 (Xylan [®])	A320-L7 (Xylan [®])
4	4	Bonnet Cap Screw	A193-B7 (Xylan [®])	A320-L7 (Xylan [®])
5	1	Bonnet Seal	Peroxide-Cured Nitrile	Viton [®] A, Low Temp Nitrile
6	1	Stem Bearing	Garlock DU	
7	1	Stem	17-4PH SS	Duplex SS
8	1	Stem Seal	PolyMyte/Peroxide-Cured Nitrile	Polymyte/Viton [®] , PTFE Elgiloy
10	1	Thrust Bearing	Alloy Steel (Xylan [®])	Xylan [®] -Coated Nitronic 60
11	1	Ball	ENP Carbon Steel	316 SS, 17-4PH SS, Duplex SS
12	2	Seat	Celcon [®]	PEEK [™]
13	2	Seat Carrier	Carbon Steel, (SBN-QPQ)	316 SS, 17-4PH SS, Duplex SS
14	2	L-Seal	Peroxide-Cured Nitrile	Viton [®] A, Low Temp Nitrile
15	1	Retainer	Carbon Steel	316 SS, 17-4PH SS, Duplex SS
16	1	Retainer Seal	Peroxide-Cured Nitrile	Viton [®] A, Low Temp Nitrile
17	2	Retainer Screw	Carbon Steel, Plated	
18	1	Handle	Carbon Steel	
19	1	Handle Cap	Plastic	
20	1	Stop Plate	Carbon Steel	
21	2	Swivel Flange	Carbon Steel	
22a	2	Bevel for Weld Nipple	Carbon Steel, Alloy Steel	316L SS, Duplex SS
22b	2	Integral Flange	Carbon Steel, Alloy Steel	316L SS, Duplex SS
23	2	Half Ring	Alloy Steel	
24	Varies	End Connection Cap Screw	A193-B7 (Xylan [®])	A320-L7 (Xylan [®])
25	2	End Connection Seal	Peroxide-Cured Nitrile	Viton [®] A, Low Temp Nitrile
26	1	Body Grease Fitting	Alloy	316 SS
27	1	Handle Bolt	Stainless Steel	
28	2	Corrosion Gasket	EPDM	

¹ Consult factory for other material. ² Employed up to and including 6,170 CWP valves. ³ Employed on 10,000 psi CWP valves.

PB Check Valve Component Parts

Illustration shows swivel end connections.
Other end connections may apply.



Index	Qty	Description	Standard Materials	Optional Materials ¹
1	1	Body	Carbon Steel ² , Alloy Steel ³	316 SS, 17-4PH SS, Duplex SS
2	1	Flapper	17-4PH SS, Nitronic 60, 316 SS ⁴	316 SS, Nitronic 60, Duplex SS ⁴
3	1	Pivot Pin	17-4PH SS	
4	1	Spring	Nickel Alloy X-750	
5	1	Seat Seal	PTFE	
6	1	Retainer/Horse Shoe Retainer*	Carbon Steel	316 SS, Duplex SS
7	1	Carrier/Retainer Seal	Peroxide-Cured Nitrile	Viton®A, Low Temp Nitrile
8	2/1	Pin Support*	Stainless Steel	
9	2	Pin Support Seal*	Peroxide-Cured Nitrile	Viton®A, Low Temp Nitrile
10	2	Swivel Flange	Carbon Steel	316 SS
11	2	Bevel for Weld Nipple	Carbon Steel, Alloy Steel	316-L
12	4	Half Ring	Alloy Steel	
13	Varies	End Connection Cap Screw	A193-B7 (Xylan®)	A320-L7 (Xylan®)
14	2	End Connection Seal	Peroxide-Cured Nitrile	Viton®A, Low Temp Nitrile
15	2	Counter Sunk Socket Head Cap Screw	18-8 Stainless Steel	Consult Factory
16	2	Corrosion Gasket	EPDM	

• ¹ Consult factory for other material. • ² Employed up to and including 6,170 CWP valves.
 • ³ Employed on 10,000 psi CWP valves. • ⁴ Standard Flapper material varies with bore size and working pressure.
 * Horse Shoe Retainer Design is utilized on CC108, CCR24 and CAR32.
 Horse Shoe Retainer Design does not require part no. 8 or 9.

Piper's Swivel Flange Connection

Most Piper Series PB valves and block fittings utilize swivel flange and half-ring connections.

A convenient feature of the Series PB manifold system, this connection consists of the swivel flange, a nipple (or tube) with a half-ring groove, and two half-rings. The nipple-end can be a weld-end, male-threaded, hub-type, or other possible end configuration including a second half-ring groove to connect another swivel flange.

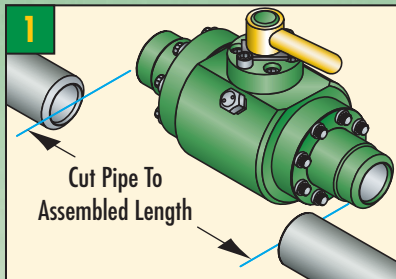
The versatility of Piper's Swivel Flange Connection results in lower cost for manufacturing and for the end user.



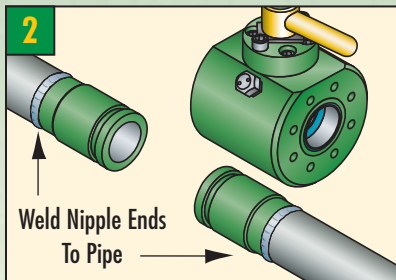
See The Steps Below
Illustrating The Ease of Installation

SWIVEL FLANGE DESIGN BENEFITS

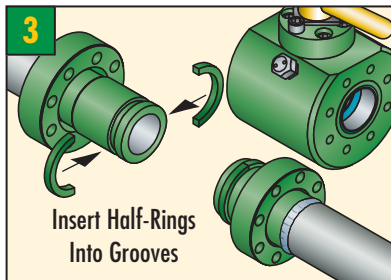
- Faster, easier installations.
- Minimal line spread facilitates easy installation and removal of valves.
- Unlimited end connection options.
- Ends match bore sizes to maximize *Piper's Optimum-Flow Technology*.



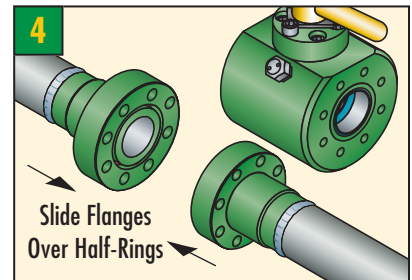
1. Measure assembled valve or component and cut pipe to appropriate length.



2. Disassemble valve ends and weld the beveled-for-weld nipples to the pipe.

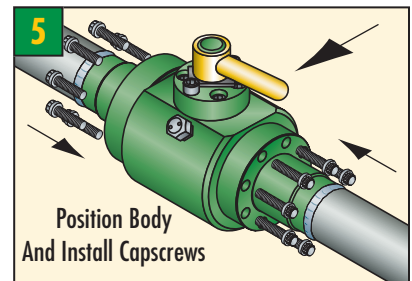


3. Slide Swivel Flanges onto nipples and insert half-rings into grooves.



4. Slide Swivel Flanges over half-rings to lock flanges into place.

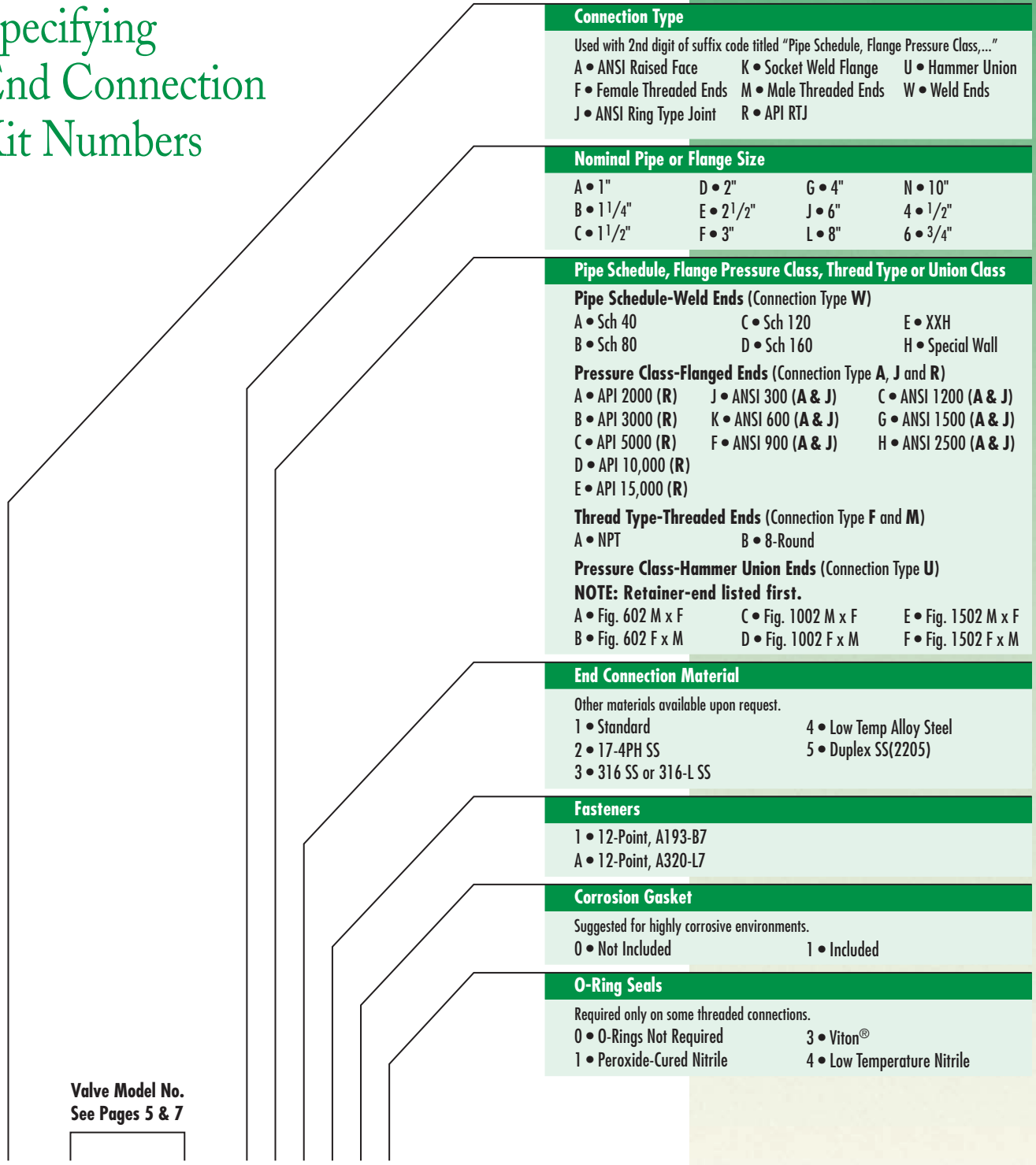
5. Install valve body between flanges, rotating flanges as necessary, and secure with 12-point capscrews.



Series PB End Connection Kits

This End Connection Kit Order Code Number Chart is for Series PB Ball and Check Valves, and is available to assist users in accurately ordering end connections.

Specifying End Connection Kit Numbers



Connection Type			
Used with 2nd digit of suffix code titled "Pipe Schedule, Flange Pressure Class,..."			
A • ANSI Raised Face	K • Socket Weld Flange	U • Hammer Union	
F • Female Threaded Ends	M • Male Threaded Ends	W • Weld Ends	
J • ANSI Ring Type Joint	R • API RTJ		
Nominal Pipe or Flange Size			
A • 1"	D • 2"	G • 4"	N • 10"
B • 1 1/4"	E • 2 1/2"	J • 6"	4 • 1 1/2"
C • 1 1/2"	F • 3"	L • 8"	6 • 3/4"
Pipe Schedule, Flange Pressure Class, Thread Type or Union Class			
Pipe Schedule-Weld Ends (Connection Type W)			
A • Sch 40	C • Sch 120	E • XXH	
B • Sch 80	D • Sch 160	H • Special Wall	
Pressure Class-Flanged Ends (Connection Type A, J and R)			
A • API 2000 (R)	J • ANSI 300 (A & J)	C • ANSI 1200 (A & J)	
B • API 3000 (R)	K • ANSI 600 (A & J)	G • ANSI 1500 (A & J)	
C • API 5000 (R)	F • ANSI 900 (A & J)	H • ANSI 2500 (A & J)	
D • API 10,000 (R)			
E • API 15,000 (R)			
Thread Type-Threaded Ends (Connection Type F and M)			
A • NPT	B • 8-Round		
Pressure Class-Hammer Union Ends (Connection Type U)			
NOTE: Retainer-end listed first.			
A • Fig. 602 M x F	C • Fig. 1002 M x F	E • Fig. 1502 M x F	
B • Fig. 602 F x M	D • Fig. 1002 F x M	F • Fig. 1502 F x M	
End Connection Material			
Other materials available upon request.			
1 • Standard	4 • Low Temp Alloy Steel		
2 • 17-4PH SS	5 • Duplex SS(2205)		
3 • 316 SS or 316-L SS			
Fasteners			
1 • 12-Point, A193-B7			
A • 12-Point, A320-L7			
Corrosion Gasket			
Suggested for highly corrosive environments.			
0 • Not Included		1 • Included	
O-Ring Seals			
Required only on some threaded connections.			
0 • O-Rings Not Required		3 • Viton®	
1 • Peroxide-Cured Nitrile		4 • Low Temperature Nitrile	

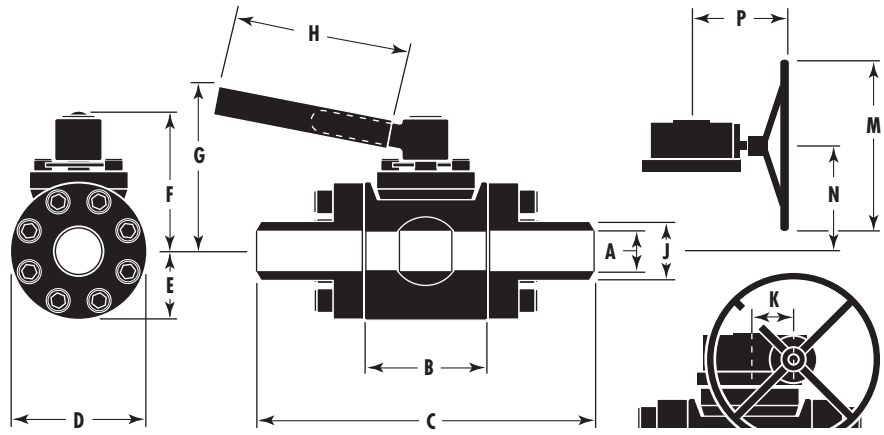
Valve Model No.
See Pages 5 & 7

E X - X X X X X - X X X X X X

Consult factory for other configurations.

PB Ball Valve Dimensional Data

(Pressures are in PSI)
(Dimensions are in inches)

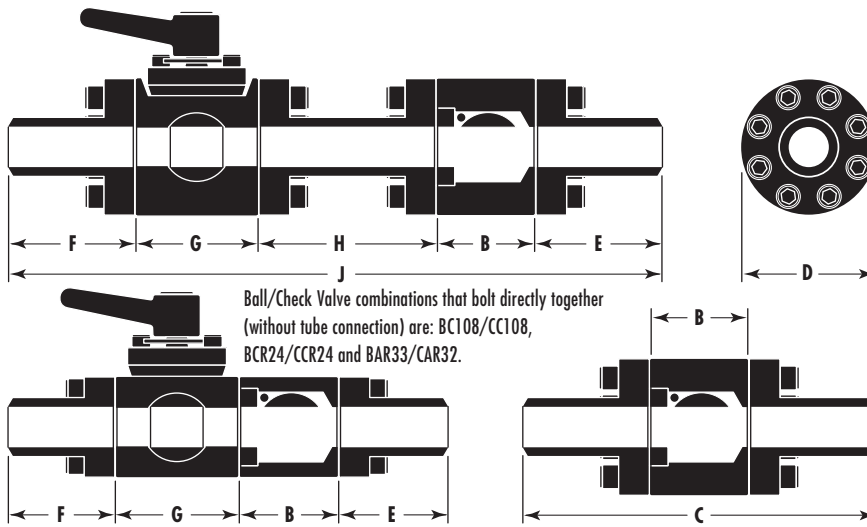


Working Pressure PSI	Nominal Size	Ball Valve Model	A	B	C	D	E	F	G	H	J	K	M	N	P	End* Connections
			Ball Port Diameter	Body Grp Length	Length of Weld Ends	Body Width	Height Below CL	Height Above CL	Height of Std Extens	Length of Std Extens	Nipple Max OD	GOP Shaft Offset	Hdwl Diameter	CLVlv to CL Hdwl	CLVlv to Hdwl Face	
ANSI 1500 — 3,705 PSI CWP	1	BCR13	0.81	4.00	12.00	4.13	2.06	5.31	7.88	12	1.63	—	—	—	—	SXS
	2	BC108	1.50	5.00	15.50	4.00	2.00	5.75	9.50	16	2.49	—	—	—	—	SXS
	2	BCR24	1.50	5.00	15.50	5.50	2.75	5.75	9.50	16	2.49	—	—	—	—	SXS
	2 1/2	BAR29	1.81	5.00	15.50	5.50	2.75	5.75	11.25	16	2.88	—	—	—	—	SXS
	3	BAR33	2.06	5.00	16.50	6.25	3.13	6.02	11.25	16	3.49	—	—	—	—	SXS
	3	BB209	2.56	7.00	18.50	8.00	4.00	8.35	12.50	24	3.74	—	—	—	—	SXS
	4	BA305	3.31	8.00	21.00	9.00	4.50	8.83	13.00	24	4.99	3.40	14.00	7.76	10.25	SXS
	4	BA312	3.75	10.00	21.50	10.00	5.00	9.56	14.63	32	4.99	3.40	16.00	8.66	11.45	WX S
	6	BA503	5.19	12.00	23.50	13.00	6.50	11.80	19.50	48	6.99	5.12	24.00	11.25	14.25	WX S
	8	BA700	7.06	15.00	29.00	16.25	8.13	—	—	—	9.74	8.31	24.00	12.98	16.70	WX S
10	BA808	8.50	17.00	32.00	20.00	10.00	—	—	—	12.75	10.36	24.00	14.50	18.70	WX S	
API 5000 — 5,000 PSI CWP	1	BCR13	0.81	4.00	12.00	4.13	2.06	5.31	7.88	12	1.63	—	—	—	—	SXS
	2	BC108	1.50	5.00	15.50	4.00	2.00	5.75	9.50	16	2.49	—	—	—	—	SXS
	2	BCR24	1.50	5.00	15.50	5.50	2.75	5.75	9.50	16	2.49	—	—	—	—	SXS
	2 1/2	BC113	1.81	5.50	16.00	6.00	3.00	6.00	11.25	16	2.99	—	—	—	—	SXS
	3	BB200	2.06	5.50	17.00	6.25	3.13	7.50	12.00	24	3.74	—	—	—	—	SXS
	3	BB209	2.56	7.00	18.50	8.00	4.00	8.35	12.50	24	3.74	—	—	—	—	SXS
	4	BC304	3.25	10.00	21.50	10.00	5.00	9.45	5.00	32	4.99	3.40	24.00	8.54	10.85	WX S
	6	BC402	4.13	11.00	24.00	11.88	5.94	11.33	19.75	48	7.49	5.12	24.00	11.00	14.25	SXS
	6	BB503	5.19	13.00	26.00	13.00	6.50	11.81	20.13	48	7.49	5.12	24.00	11.50	14.25	WX S
	8	BB700	7.06	15.00	29.00	16.25	8.13	—	—	—	9.75	8.31	24.00	12.98	16.70	WX S
10	BC808	8.50	18.00	33.00	20.00	10.00	—	—	—	10.75	10.36	36.00	14.33	17.28	WX S	
ANSI 2500 — 6,170 PSI CWP	1	BCR13	0.81	4.00	12.00	4.13	2.06	5.31	7.88	12	1.63	—	—	—	—	SXS
	2	BC108	1.50	5.00	15.50	4.00	2.00	5.75	9.50	16	2.49	—	—	—	—	SXS
	2	BCR24	1.50	5.00	15.50	5.50	2.75	5.75	9.50	16	2.49	—	—	—	—	SXS
	2 1/2	BC113	1.81	5.50	16.00	6.00	3.00	6.00	11.25	16	2.99	—	—	—	—	SXS
	3	BC204	2.25	7.00	18.50	8.00	4.00	8.32	12.50	24	3.74	—	—	—	—	SXS
	4	BC304	3.25	10.00	21.50	10.00	5.00	9.45	5.00	32	4.99	3.40	24.00	8.54	10.85	WX S
	6	BC402	4.13	11.00	24.00	11.88	5.94	11.33	19.75	48	7.49	5.12	24.00	11.00	14.25	SXS
	6	BC412	4.75	13.00	26.00	13.00	6.50	11.75	19.50	48	7.49	5.12	24.00	11.50	14.25	WX S
	8	BC701	7.06	15.00	29.00	16.25	8.13	—	—	—	8.63	10.63	24.00	13.58	18.70	WX S
	10	BC808	8.50	18.00	33.00	20.00	10.00	—	—	—	10.75	10.36	36.00	14.33	17.28	WX S
API 10000 — 10,000 PSI CWP	1	BDR13	0.81	4.00	12.00	4.13	2.06	5.31	7.88	12	1.63	—	—	—	—	SXS
	2	BD108	1.50	5.50	16.00	6.13	3.06	6.09	11.63	16	2.99	—	—	—	—	SXS
	2 1/2	BD113	1.81	5.50	16.00	6.63	3.31	6.32	11.88	16	2.99	—	—	—	—	SXS
	3	BD202	2.13	7.00	16.50	7.88	3.94	8.50	12.63	24	3.50	—	—	—	—	WX W
	3	BD210	2.63	8.00	18.00	9.00	4.50	9.25	14.25	32	5.00	—	—	—	—	WX W
	4	BD302	3.13	9.00	19.50	9.88	4.94	9.50	14.69	32	5.75	3.39	24.00	8.71	10.85	WX W
	6	BD402	4.13	12.00	24.50	12.75	6.38	11.75	19.38	48	7.00	5.12	24.00	11.50	14.25	WX S
	6	BD502	5.13	15.00	29.00	15.75	7.88	—	—	—	7.50	10.36	24.00	13.10	18.70	WX S
8	BD701	7.06	18.00	35.00	21.00	11.00	—	—	—	10.13	10.36	24.00	16.35	18.70	WX W	

*End Connections Description: S = Swivel Flange, W = Integral Weldneck Flange.

PB Check Valve Dimensional Data

(Pressures are in PSI)
(Dimensions are in inches)



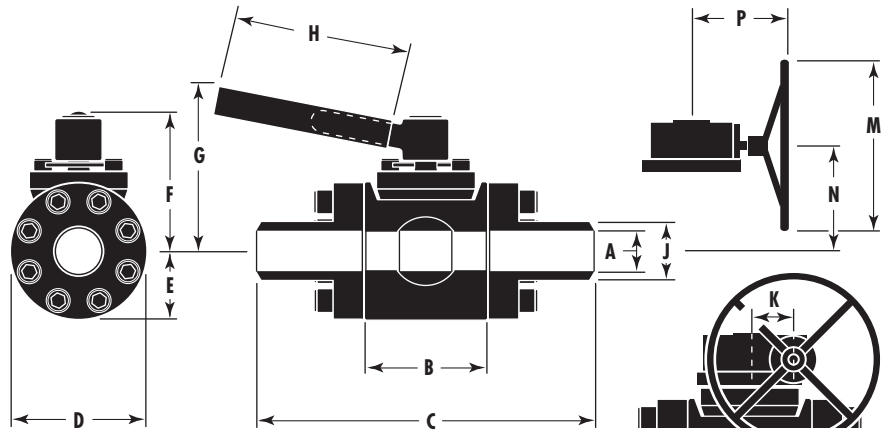
Working Pressure PSI	Nominal Size	Check Valve Model	A	B	C	D	E	F	G	H	J	Matching Ball Valve
			Seat Diameter	Body Group Length	Length of Weld Ends	Body Width	Check Nipple Length	Ball Nipple Length	Ball Body Grp Length	Tube/Spool Length	Ball/Check Assy Length	
ANSI 1500 — 3,705 PSI CWP	1	CCR13	0.81	4.00	12.00	4.13	4.00	4.00	4.00	6.00	22.00	BCR13
	2	CC108*	1.50	4.00	14.50	4.00	5.25	5.25	5.00	N/A	19.50	BC108
	2	CCR24	1.50	4.00	14.50	5.50	5.25	5.25	5.00	N/A	19.50	BCR24
	2 1/2	CC113	1.81	5.50	16.00	5.75	5.25	5.25	5.00	7.00	28.00	BAR29
	3	CAR32	2.00	4.50	16.00	6.25	5.75	5.75	5.00	N/A	21.00	BAR33
	3	CC206	2.38	5.00	16.50	6.25	5.75	5.75	7.00	8.00	31.50	BB209
	4	CC302	3.13	6.50	19.50	8.00	6.50	6.50	8.00	8.00	35.50	BA305
	4	CA310	3.63	7.00	20.00	8.00	6.50	5.00	10.00	8.50	37.00	BA312
	6	CA500	5.00	9.00	22.00	10.00	6.50	5.00	12.00	9.00	41.50	BA503
8	CA700	7.06	12.00	26.00	14.25	7.00	7.00	15.00	12.00	53.00	BA700	
10	CA808	8.50	15.00	30.00	16.75	7.50	7.50	17.00	12.00	59.00	BA808	
API 5000 — 5,000 PSI CWP	1	CCR13	0.81	4.00	12.00	4.13	4.00	4.00	4.00	6.00	22.00	BCR13
	2	CC108*	1.50	4.00	14.50	4.00	5.25	5.25	5.00	N/A	19.50	BC108
	2	CCR24	1.50	4.00	14.50	5.50	5.25	5.25	5.00	N/A	19.50	BCR24
	2 1/2	CC113	1.81	5.50	16.00	5.75	5.25	5.25	5.50	7.50	29.00	BAR29
	3	CC206	2.38	5.00	16.50	6.25	5.75	5.75	7.00	8.00	31.50	BB209
	4	CC302	3.13	6.50	19.50	8.00	6.50	5.00	10.00	8.00	36.00	BC304
	6	CC401	4.06	10.00	23.00	11.50	6.50	6.50	11.00	12.00	46.00	BC402
	6	CB500	5.00	10.00	23.00	11.50	6.50	6.50	13.00	12.00	48.00	BB503
	8	CB700	7.06	12.00	26.00	14.25	7.00	7.00	15.00	12.00	53.00	BB700
10	CC808	8.50	15.00	30.00	16.25	7.50	7.50	17.00	12.00	59.00	BC808	
ANSI 2500 — 6,170 PSI CWP	1	CCR13	0.81	4.00	12.00	4.13	4.00	4.00	4.00	6.00	22.00	BCR13
	2	CC108*	1.50	4.00	14.50	4.00	5.25	5.25	5.00	N/A	19.50	BC108
	2	CCR24	1.50	4.00	14.50	5.50	5.25	5.25	5.00	N/A	19.50	BCR24
	2 1/2	CC113	1.81	5.50	16.00	5.75	5.25	5.25	5.50	7.50	29.00	BAR29
	3	CC206	2.38	5.00	16.50	6.25	5.75	5.75	7.00	8.00	31.50	BC204
	4	CC302	3.13	6.50	19.50	8.00	6.50	5.00	10.00	8.00	36.00	BC304
	6	CC401	4.06	10.00	23.00	11.50	6.50	6.50	11.00	12.00	46.00	BC402
	6	CC410	4.63	10.00	23.00	11.50	6.50	6.50	13.00	12.00	48.00	BC412
	8	CC701	7.06	12.00	26.00	14.25	7.00	7.00	15.00	12.00	53.00	BC701
10	CC808	8.50	15.00	30.00	16.25	7.50	7.50	17.00	12.00	59.00	BC808	
API 10000 — 10,000 PSI CWP	1	CDR13	0.81	4.00	12.00	4.13	4.00	4.00	4.00	6.00	22.00	BDR13
	2	CD108	1.50	5.50	16.00	6.13	5.25	5.25	5.50	7.50	29.00	BD108
	2 1/2	CD113	1.81	5.50	16.00	5.75	5.25	5.25	5.50	7.50	29.00	BD113
	3	CD201	2.06	5.50	14.00	6.88	5.25	4.75	7.00	9.00	31.50	BD202
	3	CD212	2.75	8.00	18.00	8.75	5.00	5.00	8.00	9.00	35.00	BD210
	4	CD301	3.06	8.00	18.00	8.75	5.00	5.50	9.00	9.50	37.00	BD302
	6	CD401	4.06	10.00	23.00	11.50	6.50	6.25	12.00	13.00	47.75	BD402
	8	CD701	7.06	16.50	33.50	18.25	8.50	8.50	18.00	17.00	68.50	BD701

*Square body design.

PB Ball Valve Dimensional Data

Metric

(Pressures are in BAR)
(Dimensions are in millimeters)

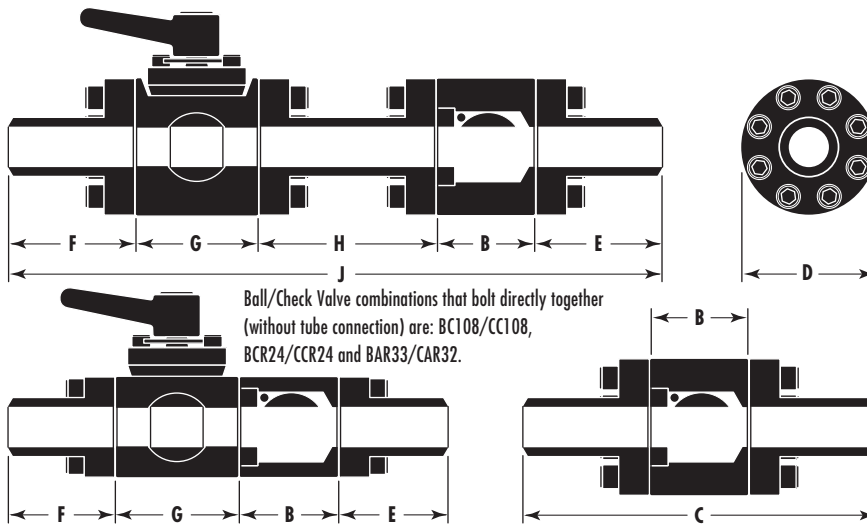


Working Pressure PSI	Nominal Size	Ball Valve Model	A	B	C	D	E	F	G	H	J	K	M	N	P	End* Connections
			Ball Port Diameter	Body Grp Length	Length of Weld Ends	Body Width	Height Below CL	Height Above CL	Height of Std Extens	Length of Std Extens	Nipple Max OD	GOP Shaft Offset	Hdwl Diameter	CLVlv to CL Hdwl	CLVlv to Hdwl Face	
ANSI 1500 — 255 Bar CWP	25	BCR13	21	102	305	105	52	135	200	305	41	—	—	—	—	S X S
	51	BC108	38	127	394	102	51	146	241	406	63	—	—	—	—	S X S
	51	BCR24	38	127	394	140	70	146	241	406	63	—	—	—	—	S X S
	64	BAR29	46	127	394	140	70	146	286	406	73	—	—	—	—	S X S
	76	BAR33	52	127	419	159	79	153	286	406	89	—	—	—	—	S X S
	76	BB209	65	178	470	203	102	212	318	610	95	—	—	—	—	S X S
	102	BA305	84	203	533	229	114	224	330	610	127	86	356	197	260	S X S
	102	BA312	95	254	546	254	127	243	372	813	127	86	406	220	291	W X S
	152	BA503	132	305	597	330	165	300	495	1219	178	130	610	286	362	W X S
	203	BA700	179	381	737	413	207	—	—	—	247	211	610	330	424	W X S
254	BA808	216	432	813	508	254	—	—	—	324	263	610	368	475	W X S	
API 5000 — 345 Bar CWP	25	BCR13	21	102	305	105	52	135	200	305	41	—	—	—	—	S X S
	51	BC108	38	127	394	102	51	146	241	406	63	—	—	—	—	S X S
	51	BCR24	38	127	394	140	70	146	241	406	63	—	—	—	—	S X S
	64	BC113	46	140	406	152	76	152	286	406	76	—	—	—	—	S X S
	76	BB200	52	140	432	159	80	191	305	610	95	—	—	—	—	S X S
	76	BB209	65	178	470	203	102	212	318	610	95	—	—	—	—	S X S
	102	BC304	83	254	546	254	127	240	127	813	127	86	610	217	276	W X S
	152	BC402	105	279	610	302	151	288	502	1219	190	130	610	279	362	S X S
	152	BB503	132	330	660	330	165	300	511	1219	190	130	610	292	362	W X S
	203	BB700	179	381	737	413	207	—	—	—	248	211	610	330	424	W X S
254	BC808	216	457	838	508	254	—	—	—	273	263	914	364	439	W X S	
ANSI 2500 — 425 Bar CWP	25	BCR13	21	102	305	105	52	135	200	305	41	—	—	—	—	S X S
	51	BC108	38	127	394	102	51	146	241	406	63	—	—	—	—	S X S
	51	BCR24	38	127	394	140	70	146	241	406	63	—	—	—	—	S X S
	64	BC113	46	140	406	152	76	152	286	406	76	—	—	—	—	S X S
	76	BC204	57	178	470	203	102	211	318	610	95	—	—	—	—	S X S
	102	BC304	83	254	546	254	127	240	127	813	127	86	610	217	276	W X S
	152	BC402	105	279	610	302	151	288	502	1219	190	130	610	279	362	S X S
	152	BC412	121	330	660	330	165	298	495	1219	190	130	610	292	362	W X S
	203	BC701	179	381	737	413	207	—	—	—	219	270	610	345	475	W X S
	254	BC808	216	457	838	508	254	—	—	—	273	263	914	364	439	W X S
API 10000 — 690 Bar CWP	25	BDR13	21	102	305	105	52	135	200	305	41	—	—	—	—	S X S
	51	BD108	38	140	406	156	78	155	295	406	76	—	—	—	—	S X S
	64	BD113	46	140	406	168	84	161	302	406	76	—	—	—	—	S X S
	76	BD202	54	178	419	200	100	216	321	610	89	—	—	—	—	W X W
	76	BD210	67	203	457	229	114	235	362	813	127	—	—	—	—	W X W
	102	BD302	80	229	495	251	125	241	373	813	146	86	610	221	276	W X W
	152	BD402	105	305	622	324	162	298	492	1219	178	130	610	292	362	W X S
	152	BD502	130	381	737	400	200	—	—	—	191	263	610	333	475	W X S
203	BD701	179	457	889	533	279	—	—	—	257	263	610	415	475	W X W	

*End Connections Description: S = Swivel Flange. W = Integral Weldneck Flange.

PB Check Valve Dimensional Data

Metric
(Pressures are in BAR)
(Dimensions are in millimeters)

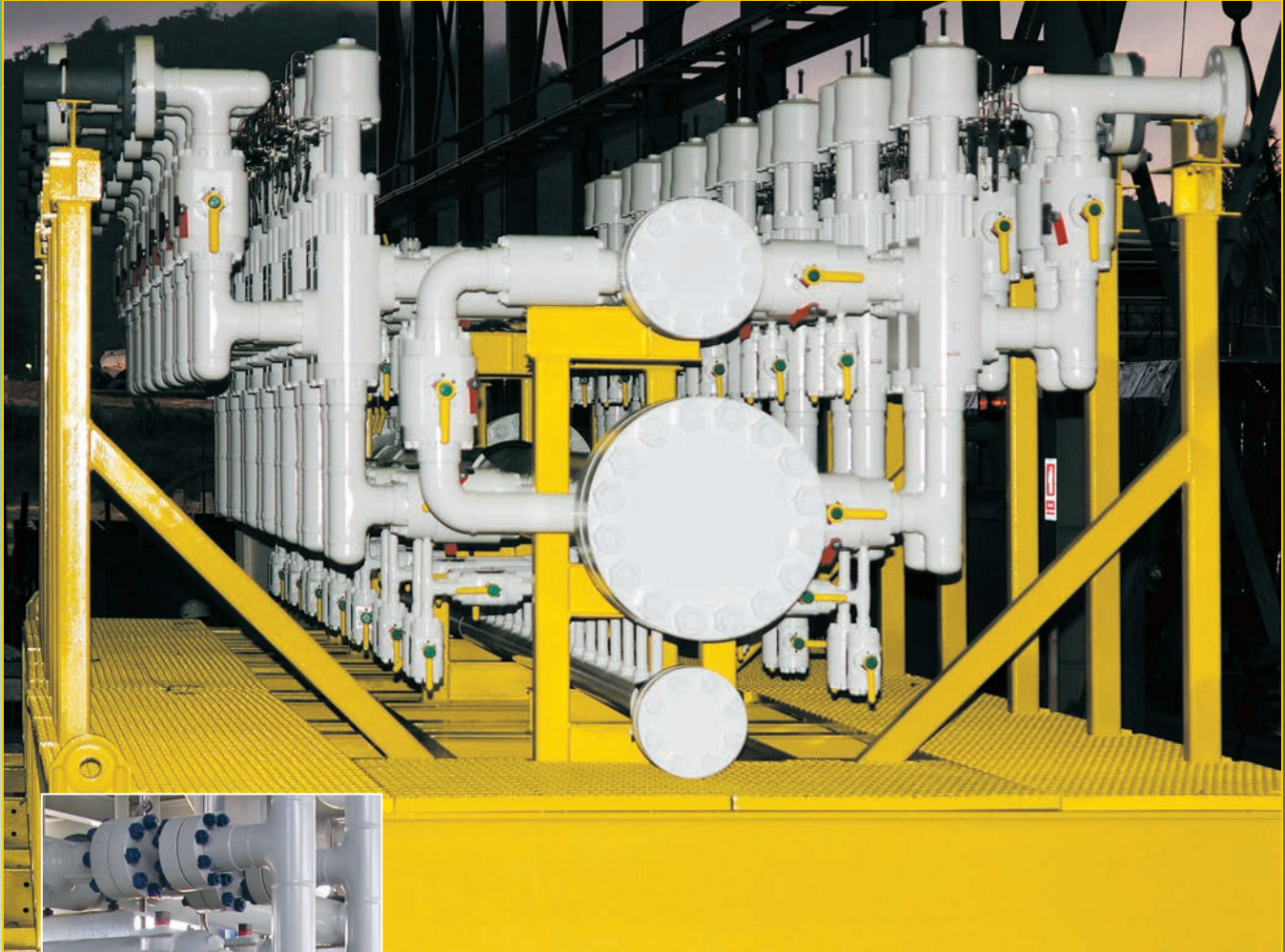


Working Pressure PSI	Nominal Size	Check Valve Model	A	B	C	D	E	F	G	H	J	Matching Ball Valve
			Seat Diameter	Body Group Length	Length of Weld Ends	Body Width	Check Nipple Length	Ball Nipple Length	Ball Body Grp Length	Tube/Spool Length	Ball/Check Assy Length	
ANSI 1500 — 255 Bar CWP	25	CCR13	21	102	305	105	102	102	102	152	559	BCR13
	51	CC108*	38	102	368	102	133	133	127	N/A	495	BC108
	51	CCR24	38	102	368	140	133	133	127	N/A	495	BCR24
	64	CC113	46	140	406	146	133	133	127	178	711	BAR29
	76	CAR32	51	114	406	159	146	146	127	N/A	533	BAR33
	76	CC206	60	127	419	159	146	146	178	203	800	BB209
	102	CC302	80	165	495	203	165	165	203	203	902	BA305
	102	CA310	92	178	508	203	165	127	254	216	940	BA312
	152	CA500	127	229	559	254	165	127	305	229	1054	BA503
	203	CA700	179	305	660	362	178	178	381	305	1346	BA700
254	CA808	216	381	762	425	191	191	432	305	1499	BA808	
API 5000 — 345 Bar CWP	25	CCR13	21	102	305	105	102	102	102	152	559	BCR13
	51	CC108*	38	102	368	102	133	133	127	N/A	495	BC108
	51	CCR24	38	102	368	140	133	133	127	N/A	495	BCR24
	64	CC113	46	140	406	146	133	133	140	191	737	BAR29
	76	CC206	60	127	419	159	146	146	178	203	800	BB209
	102	CC302	80	165	495	203	165	127	254	203	914	BC304
	152	CC401	103	254	584	292	165	165	279	305	1168	BC402
	152	CB500	127	254	584	292	165	165	330	305	1219	BB503
	203	CB700	179	305	660	362	178	178	381	305	1346	BB700
	254	CC808	216	381	762	413	191	191	432	305	1499	BC808
ANSI 2500 — 425 Bar CWP	25	CCR13	21	102	305	105	102	102	102	152	559	BCR13
	51	CC108*	38	102	368	102	133	133	127	N/A	495	BC108
	51	CCR24	38	102	368	140	133	133	127	N/A	495	BCR24
	64	CC113	46	140	406	146	133	133	140	191	737	BAR29
	76	CC206	60	127	419	159	146	146	178	203	800	BC204
	102	CC302	80	165	495	203	165	127	254	203	914	BC304
	152	CC401	103	254	584	292	165	165	279	305	1168	BC402
	152	CC410	118	254	584	292	165	165	330	305	1219	BC412
	203	CC701	179	305	660	362	178	178	381	305	1346	BC701
	254	CC808	216	381	762	413	191	191	432	305	1499	BC808
API 10000 — 690 Bar CWP	25	CDR13	21	102	305	105	102	102	102	152	559	BDR13
	51	CD108	38	140	406	156	133	133	140	191	737	BD108
	64	CD113	46	140	406	146	133	133	140	191	737	BD113
	76	CD201	52	140	356	175	133	121	178	229	800	BD202
	76	CD212	70	203	457	222	127	127	203	229	889	BD210
	102	CD301	78	203	457	222	127	140	229	241	940	BD302
	152	CD401	103	254	584	292	165	159	305	330	1213	BD402
	203	CD701	179	419	851	464	216	216	457	432	1740	BD701

*Square body design

Offshore Production Manifolds

MANIFOLD SYSTEMS BUILT FOR VERSATILITY



28-Slot Offshore Production Manifold utilizing compact manifold ball valves, check valves and poppet diverter valves.

MANIFOLD SYSTEM FEATURES

- Production manifold designs which incorporate Piper Compact Manifold Ball Valves achieve a footprint area that is 50% - 60% less than manifolds utilizing API 6D Valves.
- Piper Compact Manifold Valves are specifically designed for maximum life in critical service, including sand-laden, unprocessed production fluids.
- Smallest line spread distance for quick and easy valve removal.

System Fittings

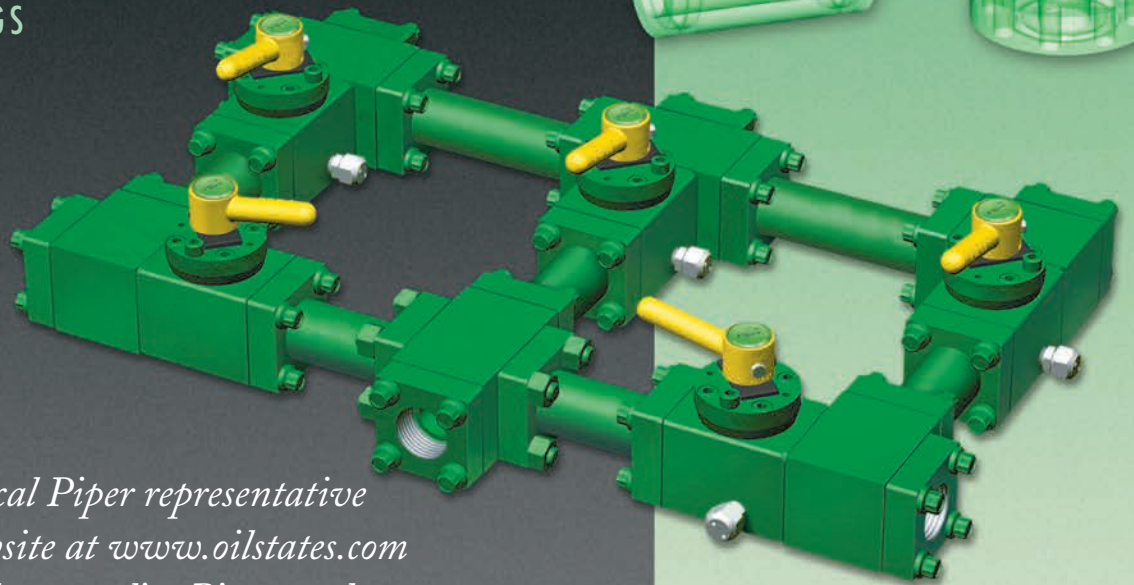
Weld-Free Manifold Construction

A TRULY MODULAR SYSTEM

In addition to our welded manifolds, we also offer components for weld-free manifold construction. This design is useful where material construction makes welding difficult, or for installations on producing locations where welding is prohibited.

SYSTEM FITTINGS

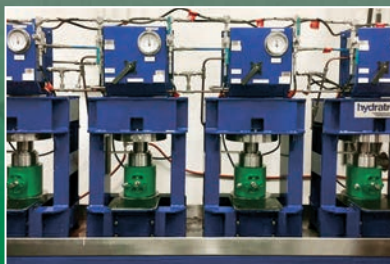
- Tees
- Crosses
- Elbows
- Swivel Flange Tubes
- Adapter Nipples
- Adapter Flanges
- Hub Connection



*Contact your local Piper representative
or visit our website at www.oilstates.com
to learn more about quality Piper products.*

Piper Certification

OSI Piper Valve has maintained ISO 9001 certification since August 2002.
OSI Piper Valve has also maintained API Q1 certification with API 6A
and 6D monogramming licenses since March 2012.



Series PB Poppet Diverter Valve

TOTAL SYSTEM OPTIMIZATION

- Valve Sizes Available: 2" - 6", with working pressures from 2,220 to 6,170 psi.

Piper's Poppet 3-Way Diverter Valve

SWITCH FROM PRODUCTION TO TEST HEADER EASILY

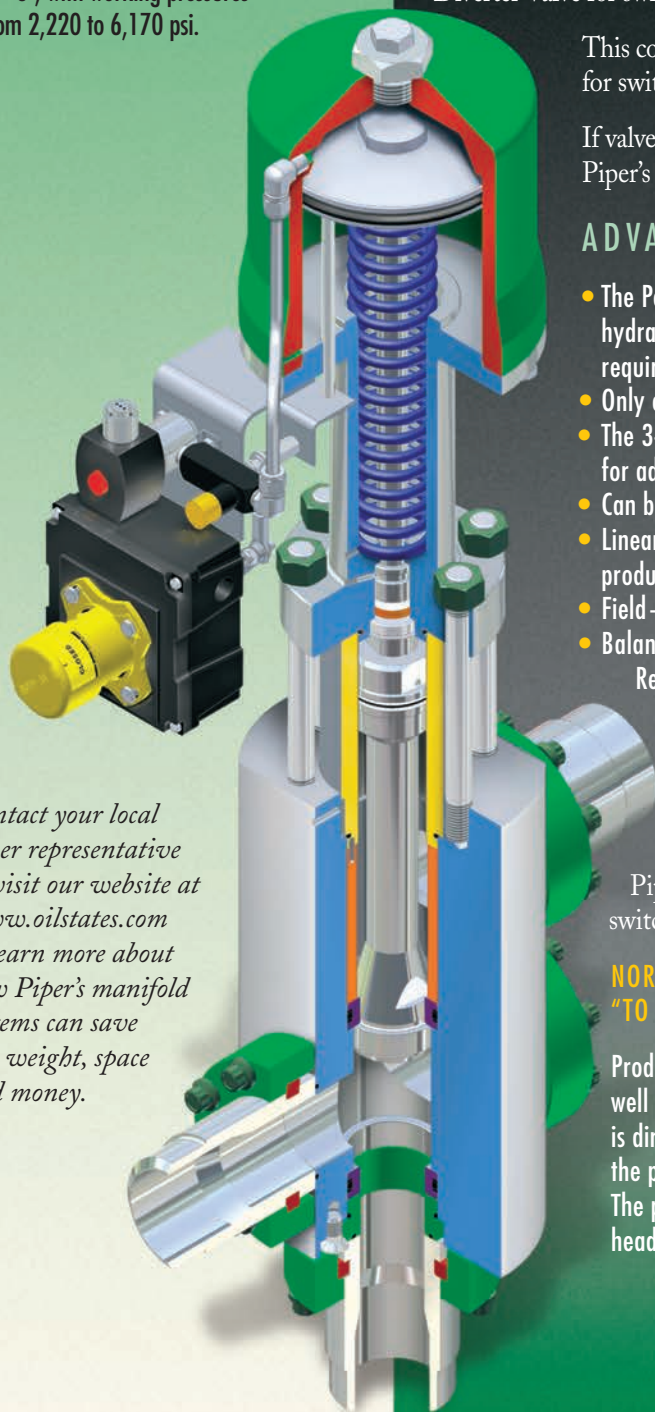
For total optimization of Piper's compact manifold systems, use the Poppet 3-Way Diverter Valve for switching each well from the production header to the test header.

This compact valve replaces two ball valves, pipe and fittings necessary for switching between headers on conventional API 6D manifolds.

If valve automation is required, the space and weight saved by utilizing Piper's Poppet Diverter Valve are even greater.

ADVANTAGES

- The Poppet Diverter Valve comes complete with a spring return hydraulic/pneumatic actuator. Conventional two-valve switching systems require two actuators.
- Only one instrumentation line required.
- The 3-way flow pattern of the Poppet Diverter Valve eliminates the need for additional weld fittings.
- Can be manually operated.
- Linear operation of valve is more resistant to seat damage in unprocessed production applications.
- Field-repairable with no line spread required for removal.
- Balanced design allows for switching with minimal operating pressure. Requires as little as 80 psi pneumatic pressure to operate the valve at 6,170 psi well pressure.



Contact your local Piper representative or visit our website at www.oilstates.com to learn more about how Piper's manifold systems can save you weight, space and money.

POPPET OPERATION

Piper's Poppet 3-way Diverter Valve is the easiest way to switch wells from production to test headers.

NORMAL POSITION "TO PRODUCTION HEADER"

Production flow from the well enters the inlet and is directed downward to the production header. The path to the test header is sealed off.



ACTUATED POSITION "TO TEST HEADER"

When actuated, the Poppet strokes downward to seal off the production header and flow is directed to the test header, via the annular space between the Poppet and the body inside diameter.



Topside & Subsea Valves

Double Ball Valves

DOUBLE BALL (DOUBLE BLOCK & BLEED) VALVES

For valve applications requiring double barrier safety, Piper offers a full range of double ball valves for umbilicals, risers, flow lines and manifold applications.

- Available in 1" thru 10" sizes.
- Pressures up to 10,000 psi C.W.P.
- Other sizes available on request.
- Variety of materials available to suit your specific application.

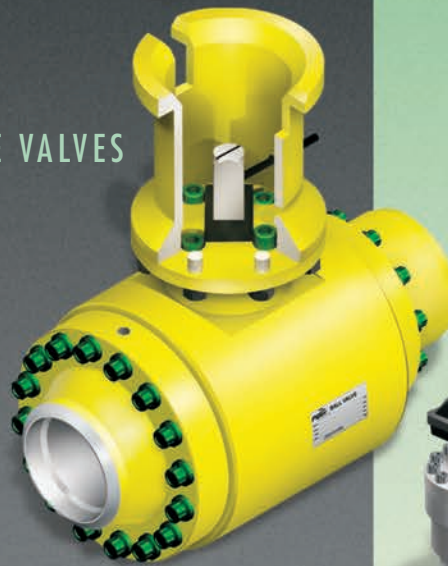


Subsea Valves

TEMPORARY & PERMANENT SERVICE VALVES

Piper offers a full line of reliable subsea ball valves and check valves.

- Available in all sizes and classes.
- Temporary service valves (five years).
- Permanent service valves (twenty years).
- Hyperbaric testing up to 12,000 ft. equivalent water depth.
- Subsea gear operation, ROV Operation or Hydraulic Actuated.
- Optional API 17D ROV interfaces available.

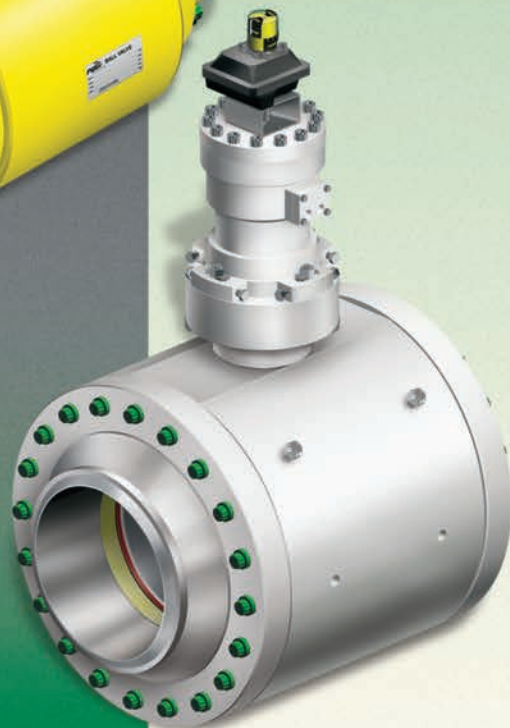


Series DC Ball Valves

DRILLING DIVERTER VALVES

Purpose-built for drilling diverter service. Bore sizes exactly match inside diameter of diverter overboard line, eliminating potential erosion points.

- Available in 10" thru 18" sizes.
- Available in ANSI 300, ANSI 600, and ANSI 900 pressure classes.
- Wide range of materials available to suit your application requirements.



Piper Corporate Headquarters



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