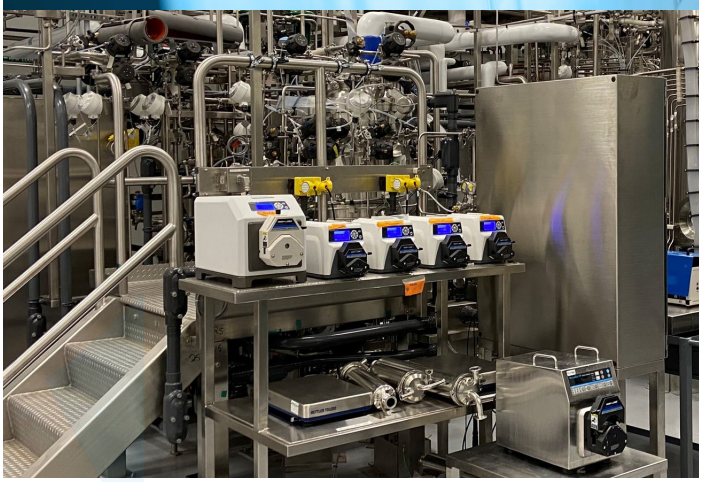
IMI PBM

SANITARY VALVES



IMI Critical Engineering

IMI PBM

Features

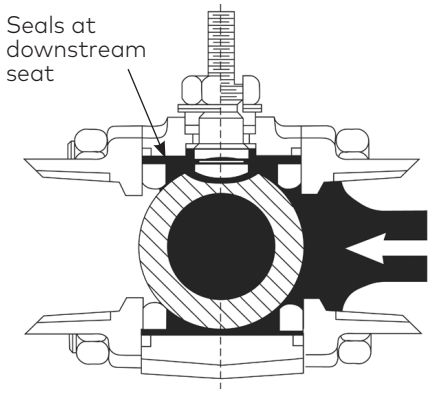
- ASME BPE Compliant
- Low controlled Ferrite, Cast and Forged
- 2, 3, 4, and 5-Way Configurations
- Inline Cleanability
- Optional Purge and Drain Ports
- Material Test Reports on Wetted Parts
- FDA and USP Class VI Compliant Elastomers
- US, DIN, & ISO True-Bore® Port Diameters
- In-house Polishing and Electropolishing
- Full Range of Automation and Controls
- Available in Stainless, Hastelloy, and Exotic Materials
- Optional Clean Steam and Trap Design

Adjust-O-Seal®

- IMI PBM valves provide bidirectional upstream sealing. Seats are compressed tightly against the ball in the valve.

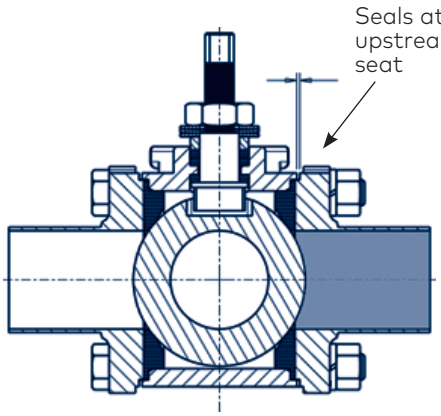
- Body bolts can be tightened to compensate for normal seat wear without having to remove the valve from service.

COMPETITOR'S DESIGN



Line pressure pushes ball downstream in the ball-closed position, providing sealing at the downstream seat. There is no adjustment to compensate for seat wear.

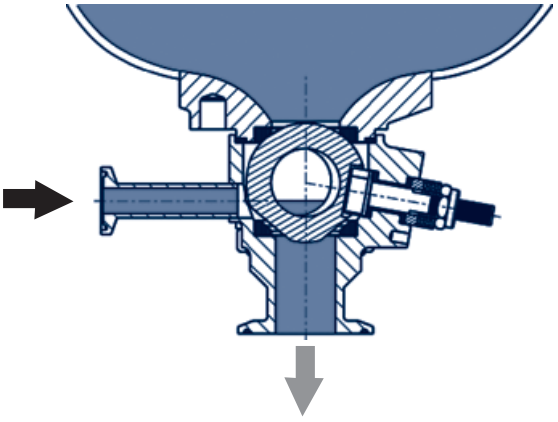
IMI PBM'S DESIGN



Valve body bolts compress valve seats against the ball, providing bidirectional sealing at the upstream seat. To compensate for seat wear, body bolts can be slightly tightened to re-compress seats against ball.

IMI PBM valves offer value over the life of the product with:

- Fewer process interruptions
- Longer life
- Clean/drain without process interruption
- Improved product yields



This means on valves mounted vertically like IMI PBM's Angle Stem Flush Tank valve, the valve seals on the upstream seat, thus allowing the body to be purged and drained without process interruption.

IMI PBM also offers:

- On-time delivery
- Documentation
- Solutions to tough applications

Table of Contents

VALVE CONFIGURATION ORDERING INFORMATION

Number(s) in parentheses indicate valve configuration part number position

Part Number Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Part Number Code Example	S	P	H	L	E	5	Q	–	G	–	–	–	3	4	A	–	Y	X	X	X

SANITARY VALVES

PRODUCT (1-2)

CS	Clean Steam
CT	Clean Steam Trap
DI	Diverter Port
DC	Diverter (Steam)
FI	Flush Tank
FC	Flush Tank (Steam)
MI	Multi-Port
SI	Sanitary 2-way
PV	see page 25
RD	see page 26
S-	see page 27
S2	see page 27
S3	see page 27
AF	See page 13 or 21

MATERIAL(2) (3-4)

C-	Hastelloy® C-276
HC	Alloy 20
HL	316L Stainless
HF	F316L Forged
H2	317L Stainless
I-	Inconel® 600
P-	AL6XN
T-	Gr. 5 Titanium
T2	Gr. 2 Titanium
T7	Gr. 7 Titanium
Y-	Hastelloy® C-22®
5-	Inconel® 625
25	254SMO®6Mo
22	Duplex 32760
76	Super Duplex 32760
	For other materials, Consult Factory

SIZE (5)

A	1/4
B	3/8
C	1/2
D	3/4
E	1
F	1-1/4
G	1-1/2
H	2
J	2-1/2
K	3
L	4
M	6

SERIES (6)

4	Series 4
5	Series 5
6	Series 6
8	Series 8
9	Series 9

END CONNECTION(3) (7-8)

F-	Ext tube buttweld
G-	Female CBI (7)
H-	Male CBI (7)
SM	Compression
X-	Hygenic Clamp
Z-	No end fittings
	For other end fittings, Consult Factory

SEAT & SEAL/FILLERS/O-RINGS (IF USED) (4) (9)

	SEAT	FILLER	O-RING
G	TF		VI
H	HT		VI
I	HT	VT	VI
J	TF	VT	VI
K	UT		VI
L	UT	VT	VI
M	UT	UT	VI
Z	TF		EP
0	HT		EP
1	HT	VT	EP
2	TF	VT	EP
3	UT		EP
4	UT	VT	EP
5	UT	UT	EP
9	TF		VV

CURRENT PRODUCT SERIES

1	AF, PV, RD, Bronze AN, DP, MP & SP, Ductile Iron MP
3	AF (Fire-safe API-607)
4	MP, MI (300# class maximum)
5	AN, DD, DP, FD, FT, Stainless MI (8), Stainless MP (8), SP, SD
6	AN, FI, SI, SP, FT (Fire-safe API-607)
6	CN, CP (Fire-safe API-607), CD (Fire-safe design)
8 & 9	CS, CT, DC, DI, FC, FI, SI

STEAM vs. SEAT COMPATIBILITY

V-TEF™ - ≤150psig AT ≤366°F
S-TEF® - ≤200psig AT ≤388°F

O-RING MATERIAL CODES

EP	EPR
VI	FKM
VV	FEP Encapsulated FKM

O-RINGS ARE NOT USED IN ALL VALVE PRODUCTS - SEE EACH RESPECTIVE PAGE

(2) For valves with 2 different materials, use the 1st position for body material and the 2nd position for end fitting material. (3) - For valves with 2 different end connections, use both end codes - e.g. - FX = extended buttweld for tube by clamp. (4) - For standard seat/seal material by series, please see appropriate pricing page. (6) - All Carbon Steel valves may be coated internally and externally with a rust inhibitor. Information on the rust inhibitor and/or an MSDS is available upon request. In addition, Carbon steel cast products are painted (black in color) externally prior to coating. (8) -150# class maximum. (9) Requires 17-4PH stem

View our Sanitary Product Bulletins online

www.pbmvalve.com/product-bulletins/

ANGLE STEM VALVES

- PB-AF1
- PB-AF3

CLEAN STEAM VALVES

- PB-CS89-US
- PB-CT89

DIVERTER PORT VALVES

- PB-DI89

FLUSH TANK VALVES

- PB-FC89
- PB-FI6
- PB-FI89

MULTI-PORT VALVES

- PB-MI5

PINCH VALVES

- PB-PINCH

RADIAL DIAPHRAGM VALVES

- PB-RDV
- PB-RDV-POLUMER

2-WAY VALVES

- PB-SI6
- PB-SI89-CE
- PB-SI89-US

VALVE CONFIGURATION ORDERING INFORMATION

Number(s) in parentheses indicate valve configuration part number position
PBM part numbers can have up to 20 alpha-numeric characters

Part Number Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Part Number Code Example	S	P	H	L	E	5	Q	–	G	–	–	–	3	4	A	–	Y	X	X	X

SANITARY VALVES

FLOW PATTERN/TANK PAD/PURGE OPTIONS (10 &11)

DIVERTER PORT AND MULTI-PORT VALVES

●	FOR DIVERTER AND MULTI-PORT VALVES, USE **POSITION 10 & 11** TO INDICATE THE FLOW PATTERN - SEE PAGE 8 FOR COMMON FLOW PATTERNS

FLUSH TANK OPTIONS (●●POSITION 10 & 11●●)

- -	Standard flush tank weld pad
02	Less tank weld pad but with plastic or wood shipping pad
05	w/1" bolt-on tank pad
06	w/1-1/2" bolt-on tank pad
07	w/2" bolt-on tank pad
08	w/3" bolt-on tank pad
09	w/4" bolt-on tank pad
10	w/6" bolt-on tank pad
11	w/8" bolt-on tank pad

PURGE PORT OPTIONS (●●POSITION 10 ONLY●●)

-	No purge option(s) selected[1]
A	(1) 1/2" clamp on center 90° from stem
B	(1) 1/2" clamp on center opposite stem
C	(1) 1/2" clamp upstream 90° from stem
D	(1) 1/2" clamp downstream opposite stem
E	(2) 1/2" clamp (1) on center 90° from stem & (1) opposite stem
F	(2) 1/2" clamp (1) upstream 90° from stem & (1) downstream opposite stem
G	(1) 1/2" BWTE on center 90° from stem
H	(1) 1/2" BWTE on center opposite stem
I	(1) 1/2" BWTE upstream 90° from stem
J	(1) 1/2" BWTE downstream opposite stem
K	(2) 1/2" BWTE on center (1) 90° from stem & (1) opposite stem
L	(2) 1/2" BWTE upstream 90° from stem & (1) downstream opposite stem
M	(1) 1/4" FNPT on center 90° from stem
N	(1) 1/4" FNPT on center opposite stem
O	(1) 1/4" FNPT upstream 90° from stem
P	(1) 1/4" FNPT downstream opposite stem
Q	(2) 1/4" FNPT on center 90° from stem & (1) opposite stem
R	(2) 1/4" FNPT (1) upstream 90° from stem & (1) downstream opposite stem

BALL HOLE & FLAT OPTIONS (●●POSITION 11 ONLY●●)

-	No ball options selected position
A	Flats in closed downstream position
B	Flats in closed upstream position
C	Flats in open upstream position
D	Flats in open downstream position
E	Flats in open upstream & downstream position
F	Holes in closed downstream position
G	Holes in closed upstream position
K	Ball with vent hole (downstream)
L	Ball with (2) crown flats
V	Standard width slotted ball
W	30° V-ball
X	45° V-ball
Y	60° V-ball
7	Self-flush ball with flats closed downstream
8	Self-flushing ball
9	Ball with vent hole (upstream)

BALL / STEM OPTIONS (12)

-	Standard (316/316L ball & stem)
F	Internal / external grounding
G	17-4PH stem
I	Monel ball
J	932 Bronze ball
K	Monel stem & followers
L	Monel ball, stem & followers
M	Aluminum ball
N	922 Bronze ball
O	Hastelloy C-276 ball
P	C-276 ball, stem & followers
Q	922 Bronze ball w/Monel stem
R	Monel stem, followers & bolting
S	Monel ball, stem, followers & bolting
T	922 Bronze ball, Monel stem & followers, Silicon Bronze bolting & CuSi fasteners
U	922 Bronze ball w/Monel stem & followers
V	12" extended stem/body bonnet (cryo only)
1	Chrome carbide (ball & seat coating)
2	Tungsten carbide (ball & seat coating)

OPERATOR OPTIONS (13 & 14)

- -	w/handle
00	Stainless locking oval hand wheel(a)
02	w/o handles, w/stem actr prep
03	w/handle, w/stem actr prep
04	Locking lever handle
05	w/stainless oval hand wheel(a)
07	w/45° handle
08	w/gear operator
09	w/T-handle
10	w/manual spring return handle(b)
11	w/fusible link SR handle (165°F)
12	w/vane actr for 80psig
13	w/GP electric actuator
14	w/XP electric actuator
17/19	w/ext lockable oval hand wheel
18/16	w/ext lockable lever handle
71/16	w/ext lockable lever handle - Sanitary(a)
72/19	w/ext lockable oval hand wheel - Sanitary (a)

POLISH OPTIONS (15)

-	Standard polish
A	20Ra ID
B	32Ra OD
C	20Ra ID / 32Ra OD
D	15Ra ID
E	10Ra ID
F	20Ra ID after EP
G	15Ra ID after EP
H	10Ra ID after EP
I	5Ra ID
K	5Ra ID / 32Ra OD
L	20Ra ID / 32Ra OD / EP
M	EP ID
N	10 Ra ID / 32Ra OD
O	15Ra ID / 32Ra OD / EP
Q	15Ra ID / 32Ra OD
S	10Ra ID / 32Ra OD / EP

LOX & BOLTING OPTIONS (16)

-	No option(s) required
L	LOX cleaning per PBM procedure
M	LOX & CRN bolting
Z	CRN bolting

SPECIAL ENGINEERING# (17 - 20)

Special engineering number columns - consult PBM

Example: **YXXX** suffix at end of standard PBM part number

24vdc	24vdc	24vdc	PBM, Asco & Westlock combo	120vac	120vac	120vac	PBM, Asco & Westlock combo
				20			DA80 psig actr
				21			DA80 psig actr & GP LS
				22			DA80 psig actr & GP Sol
				23			DA80 psig actr & GP LS & Sol
				24			DA80 psig actr & XP LS
				25			DA80 psig actr & XP Sol
				26			DA80 psig actr & XP LS & Sol
				27			DA60 psig actr
				28			DA60 psig actr & GP LS
				29			DA60 psig actr & GP Sol
				30			DA60 psig actr & GP LS & Sol
				31			DA60 psig actr & XP LS
				32			DA60 psig actr & XP Sol
				33			DA60 psig actr & XP LS & Sol
				34			SR80 psig actr
				35			SR80 psig actr & GP LS
				36			SR80 psig actr & GP Sol
				37			SR80 psig actr & GP LS & Sol
				38			SR80 psig actr & XP LS
				39			SR80 psig actr & XP Sol
				40			SR80 psig actr & XP LS & Sol
				41			SR60 psig actr
				42			SR60 psig actr & GP LS
				43			SR60 psig actr & GP Sol
				44			SR60 psig actr & GP LS & Sol
				45			SR60 psig actr & XP LS
				46			SR60 psig actr & XP Sol
				47			SR60 psig actr & XP LS & Sol
55	56		DA80 psig actr & GP Sol / DA80 psig actr & GP LS & Sol				
57	58		DA80 psig actr & XP Sol / DA80 psig actr & XP LS & Sol				
59	60		DA60 psig actr & GP Sol / DA60 psig actr & GP LS & Sol				
61	62		DA60 psig actr & XP Sol / DA60 psig actr & XP LS & Sol				
63	64		SR80 psig actr & GP Sol / SR80 psig actr & GP LS & Sol				
65	66		SR80 psig actr & XP Sol / SR80 psig actr & XP LS & Sol				
67	68		SR60 psig actr & GP Sol / SR60 psig actr & GP LS Sol				
69	70		SR60 psig actr & XP Sol / SR60 psig actr & XP LS & Sol				
				51(d)			DA80 psig actr & position indicator
				52(d)			DA60 psig actr & position indicator
				53(d)			SR80 psig actr & position indicator
				54(d)			SR60 psig actr & position indicator

Standard Asco solenoids (12vac & 24vdc)
GP - WT8551A001MS
XP - EF8551A001MS
- solenoids are not wired to position monitors

Standard Westlock position monitors
GP - 2004NBY2A2M0200
XP - 2007NBY2B2M0200

Standard TopWorx position monitors
GP/XP - TXP-M21GNEM

Standard TopWorx prox. position monitor
GP/XP - TXP-P21GNEM

PBM, Asco & Topworx combo - 120vac

73	DA80 psig actr & XP LS
74	DA80 psig actr, XP LS+GP Sol
75	DA80 psig actr, XP LS+XP Sol
76	DA60 psig actr & XP LS
77	DA60 psig actr & XP LS+GP Sol
78	DA60 psig actr & XP LS+XP Sol
79	SR80 psig actr & XP LS
80	SR80 psig actr, XP LS+GP Sol
81	SR80 psig actr, XP LS+XP Sol
82	SR60 psig actr & XP LS
83	SR60 psig actr & XP LS+GP Sol
84	SR60 psig actr & XP LS+XP Sol
85	DA80 psig actr & XP Prox
86	DA80 actr, XP Prox+XP Sol
87	DA60 psig actr & XP Prox
88	DA60 actr, XP Prox+XP Sol
89	SR80 psig actr & XP Prox
90	SR80 actr, XP Prox+XP Sol
91	SR60 psig actr & XP Prox
92	SR60 actr, XP Prox+XP Sol

AUTOMATION NOTES

(a) for 2" and smaller valves
(b) for 1-1/2" and smaller valves
(c) for 3" and smaller valves
(d) consult PBM for beacon indicators

ABBREVIATION INDEX

GP = General Purpose
XP = Explosion Proof
LS = Limit Switch
Sol = Solenoid - **N/C**
DA = Double Acting
SR = Spring Return - **FCW**

Polish Notes

●On **ID polished** valves, the body, ball, seat retainer (if applicable) and end fittings are polished
●On **ID/OD polished** valves, the body, ball, seat retainer (if applicable) and end fittings are polished
●On **ID+EP polished** valves, the body, ball, seat retainer (if applicable) and end fittings are polished (Stem is EP'd)

Materials

316L Stainless Steel

Castings comply with A351, Alloy CF3M.
Forgings (Series 8) comply with A182, Alloy F316L and 1.4404.
Bar product complies with A479, Alloy S31603.
Cast weld pads comply with SA 351, Alloy CF3M and wrought weld pads comply with SA 479, Alloy S31603.

- Has a low (<0.03%) carbon level to reduce carbide precipitation.
- Is extremely corrosion resistant to acidic and basic environments and does not pit easily.
- Can be mechanically polished to a near-mirror finish for easy clean ability (electro polishing also available).
- Is preferred for sanitary and biotechnological uses.
- Extended butt weld ends have a sulfur content of 0.005 to 0.017% to support orbital welding.
- Low controlled ferrite cast product is available for all product lines. Standard ferrite level of Series 8 forgings is less than 1% and standard ferrite level of Series 9 castings is also low controlled.

Other
- Additional materials available include AL6XN®, duplex stainless, Hastelloy® alloys, Alloy 20, titanium alloys and Inconel® alloys.

Seat and Seal Materials

DESIGNATION	DESCRIPTION	COLOR	PURPOSE
V-TEF™	Chemically Modified PTFE IMI PBM Standard for Series 5, 6, 8 & 9	White	Suitable for applications up to 400˚F. This chemically modified PTFE material is IMI PBM's standard seat and seal material. It combines the ruggedness of a filled PTFE with the low coefficient of friction of virgin PTFE. V-TEF™ also has much improved porosity control and deformation under load when compared to PTFE grades. FDA and USP Class VI compliant. Meets bubble-tight seat leakage.
VTFE	Virgin PTFE	White	Suitable for applications up to 350˚F. A low stem torque material ideal for sanitary use. FDA and USP Class VI compliant. Meets bubble-tight seat leakage.
S-TEF®	Stainless Steel Reinforced PTFE	Charcoal Gray	Suitable for applications up to 450˚F. A suitable material for higher pressure/temperature applications. Higher stem torque than virgin grades and V-TEF™. USP Class VI compliant. Meets bubble-tight seat leakage.
UHMWPE	Ultra High Molecular Weight Polyethylene	Off White	Suitable for applications under 200˚F. An extremely wear resistant material having a wear rate about 1/10th that of PTFE. FDA compliant and is used in high cycle applications where possible. Meets bubble-tight seat leakage.
PEEK®	Poly Ether Ketone	Putty	For applications up to 500˚F. PEEK® is a rugged, high strength material having fairly high stem torque. FDA compliant. IMI PBM's PEEK® is 10 weight percent PTFE to reduce the hardness of virgin PEEK®. FDA compliant and meets Class V seat leakage.
KYNAR®	Polyvinylidene Fluoride	Slightly Transparent White	Suitable for applications under 250˚F. Kynar® has been used successfully in abrasive service and is suitable for radiation environments where gamma levels accumulate to 1,000 megarads. FDA and USP Class VI compliant. Meets bubble-tight seat leakage.

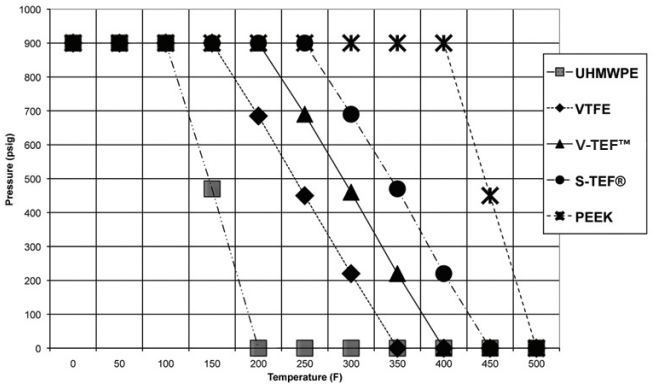
NOTES: (1) PTFE is Polytetrafluorethylene. (2) Seat and seal materials may be mixed in a valve in order to provide media-compatibility and the appropriate torque, temperature and pressure ratings. (3) Temperature ratings based on 0 psi. See Pressure and Temperature Charts on Page 7.

Allowable Working Pressures (psig, barg)

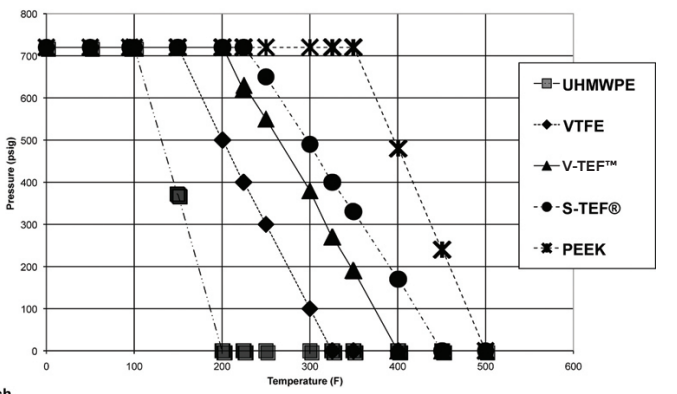
Non-Flanged Valve Style/ Series	Material	Size	-20˚F to 100˚F/ -28.9˚C to 37.8˚C		300˚F/148.9˚C		450˚F/232.2˚C	
		Inches/DIN	psig	barg	psig	barg	psig	barg
SI, FI Series 6	316 SS/316L	3" (DN80) and under	720	49.6	560, 38.6, 495, 34.1	42.7	540	37.2
SI, CS, DI, DC Series 8	316 SS/316L	All	600	41.4	455	31.4	397	27.4
	C-276	All	740	51.0	655	45.2	620	42.7
SI, CS, DI, DC Series 9	316 SS/316L	1-1/2" (DN40) and smaller	900	62.1	770	53.1	680	46.9
		2" (DN50) thru 4" (DN100)	720	49.6	620	42.7	540	37.2
		6" (DN150)	250, 17.2, 160, 11.0, 130, 9.0	25.9	320	22.1	280	19.3
	C-276	4" (DN100) and smaller	600	4.14	510	35.2	450	31.0
		6" (DN150)	250, 17.2, 160, 11.0, 130, 9.0	25.9	320	22.1	280	19.3
MI Series 5	316 SS/316L	All	275	19.0	205	14.1	195	13.4
AF Series 1	316 SS/316L	1-1/2" (DN40) and smaller	900	62.1	770	53.1	680	46.9
	316 SS/316L	2" (DN50), 4" (DN100)	550	37.9	540	37.2	525	36.2
	316 SS/316L	3" (DN80)	625	43.1	610	42.1	600	41.4
	316 SS/316L	6" (DN150)	375	25.9	365	25.2	360	24.8
	C-276	1-1/2" (DN40) and smaller	600	41.4	520	35.9	475	32.8
	C-276	2" (DN50), 4" (DN100)	550	37.9	540	37.2	525	36.2
	C-276	3" (DN80)	600	41.4	520	35.9	475	32.8
	C-276	6" (DN150)	375	25.9	320	22.1	280	19.3
AF Series 3	316 SS/316L	1-1/2" (DN40) and smaller	720	49.6	560, 38.6, 495, 34.1	42.7	540	37.2
	316 SS/316L	2" (DN50), 4" (DN100)	550	37.9	540	37.2	525	36.2
	316 SS/316L	3" (DN80)	625	43.1	610	42.1	600	41.4
	316 SS/316L	6" (DN150)	375	25.9	365	25.2	360	24.8
FI, FC Series 8 & 9	316 SS/316L	4" (DN100) and smaller	600	4.14	510	35.2	440	30.3
	316 SS/316L	6" (DN150)	375	25.9	320	22.1	280	19.3
	C-276	4" (DN100) and smaller	600	4.14	510	35.2	440	30.3
	C-276	6" (DN150)	375	25.9	320	22.1	280	19.3

Notes: (1) 316 SS and C-276 retain their CWP below minus 20˚F. (2) All valves rated for full vacuum. (3) Sanitary clamps and gaskets may limit pressure ratings to less than shown above.

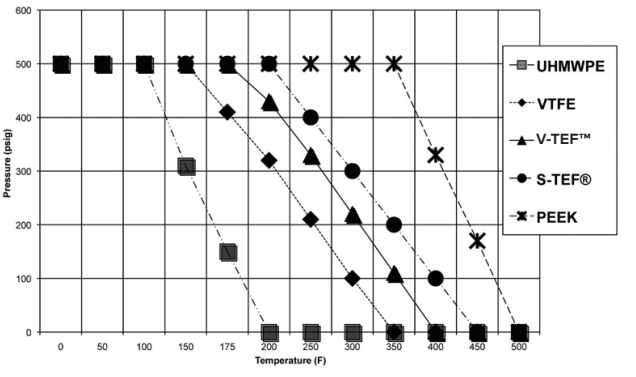
Valves 1-1/2-Inch and Smaller



2-Inch to 3-Inch



4 and 6-Inch



Seat and Seal Temperature and Pressure Charts

Cv Values (gpm)

Cv is defined as the number in U.S. gallons of water per minute, at ambient temperature, that will flow through a valve at 1 psi pressure drop.

VALVE SIZE	2-WAY SI, CS				FLUSH TANK FI SERIES 8 & 9 AF SERIES 1			DIVERTER PORT SERIES 8 & 9			MULTI-PORT SERIES 5			CT Valves
	SERIES 8 & 9		FIRESAFE SI		AF	FI	FIRESAFE FI	DI SERIES, X-ENDS			MI SERIES 5, X-ENDS			Trap Position
	End Connection				End Connection			L-PORT	T-PORT		T-PORT		L-PORT	Series
	F-	X-	F-	X-	X-	X-	X-		Straight	Branch	Straight	Branch		8 & 9
1/2"	6.5	8	7	8		8.9	8.9	4.0	4.7	3.0	3.8	2.5	3.8	0.41
3/4"	23	28	24	28		34	34	12	15	9.0	12	7	12	0.72
1"	55	65	55	60	63	62	62	25	29	18	25	15	25	0.96
1 1/2"	160	193	160	190	150	175	175	68	81	49	66	40	66	2.8
2"	365	420	370	420	280	480	480	133	160	92	129	78	129	2.7
2 1/2"	700	800	700	800										
3"	900	1,040	850	1,000	505	870	870	324	390	233	310	185	310	5.4
4"	1,800	2,080	1,600	1,900	690	1,550	1,550	590	715	430	570	340	570	15
6"	4,200	5,000	4,200	5,000	1,430	3,750	3,750	1,450	1,750	1,040				

* F- (extended buttweld) end
* X- (Sanitary) end

ID Surface Finish. Ra Readings for Valves per ASME BPE (Bioprocessing Equipment)

IMI PBM's IGENIX® forged valves have a standard internal polish of 20 R_a Max/0.50 µm or better.

Surface Description	IMI PBM Polish Code	Ra max.	
		µ-in.	µm
		Mechanical Polish	
SF 1	A	20	0.51
SF 2	A	25	0.64
SF 3	-	30	0.76
		Mechanical polish and electropolish	
SF 4	G	15	0.38
SF 5	F	20	0.51
SF 6	F	25	0.64

Default Polish:
Series 8 - 20 Ra (SF-1)
Series 9 - 30 Ra (SF-3)

Polish Notes:

- On ID polished valves, the body, ball, seat retainer (if applicable) and end fittings are polished.
- On ID/OD polished valves, the body, ball, seat retainer (if applicable and end fittings are polished.
- On ID+EP polished valves, the body, ball, seat retainer (if applicable), end fittings are polished. Stem is EP'd.
- IMI PBM achieves surface finishes without the use of ADIs (Animal Derived Ingredients).

O-Ring and Seat Compliancy

Material		Compliancy	
		FDA	USP Class VI
EPR O-ring*	E3609-70	Yes	Yes
Seat	Virgin V-TEF™	Yes	Yes
FKM/Viton	V1274	Yes	Yes

*O-rings used in "Clean Steam" Series CS, CT, FC, DC and SI, FI, AF Firesafe.

Stem Torque

Valve Style/ Series	Valve Size (in.)	As built Torque		V-TEFTM and VTFE Seats - Differential Pressure across Seats															
				0 psig	0 barg	100 psig	6.9 barg	200 psig	13.8 barg	300 psig	20.7 barg	400 psig	27.6 barg	500 psig	34.5 barg	600 psig	41.4 barg	700 psig	48.3 barg
		in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m
Fire-safe Series 6	1/4, 1/2	32	3.6	64	7.2	64	7.2	64	7.2	64	7.2	64	7.2	64	7.2	64	7.2	64	7.2
	3/4	40	4.5	80	9.0	80	9.0	80	9.0	80	9.0	80	9.0	96	10.8	112	10.8	128	12.7
	1	58	6.6	116	13.1	116	13.1	116	13.1	150	16.9	185	20.9	220	24.9	trun.			
	1-1/2	154	17.4	308	34.8	308	34.8	440	49.7	580	65.5	715	80.8	trun.	trun.				
	2	182	20.6	364	41.1	364	41.1	635	71.7	910	102.8	1,180	133.3	trun.	trun.				
	2-1/2	288	32.5	576	65.1	576	65.1	1,200	135.6	1,600	180.8	trun.							
	3	430	48.6	860	97.2	860	97.2	1,560	176.3	trun.	trun.								
	4	787	88.9	1,570	177.4	1,570	177.4	2,650	299.4	trun.	trun.								
	6	1,920	217.0	3,840	433.9	7,100	802.3	Use trunnion above 75 psig.											
All Series 8 & 9 2-Way and 3-Way	1/2	25	2.8	50	5.7	50	5.7	50	5.7	50	5.7	50	5.7	50	5.7	50	5.7	50	5.7
	3/4	30	3.4	60	6.8	60	6.8	60	6.8	60	6.8	60	6.8	60	6.8	60	6.8	80	9.0
	1	50	5.7	100	11.3	100	11.3	100	11.3	130	14.7	160	18.1	220	24.9	trun.	trun.		
	1-1/2	132	14.9	264	29.8	264	29.8	375	42.4	500	56.5	600	67.8	trun.	trun.				
	2	182	20.6	364	41.10	364	41.1	635	71.8	910	102.8	1,180	133.3	trun.	trun.				
	2-1/2	288	32.5	576	65.1	576	65.1	1,200	136	1,600	181	trun	trun.						
	3	430	49	860	97.2	860	97.2	1,560	176	trun.	trun.								
	4	672	76	1,340	151	1,340	151	2,250	254	trun.	trun.								
	6	1,920	217	3,840	434	7,100	802	Use trunnion above 75 psig.											
AF Series 1 and Series 3	1	58	6.6	116	13.1	116	13.1	116	13.1	150	17.0	185	20.9	220	24.9	255	28.8	288	32.5
	1-1/2	132	14.9	264	29.8	264	29.8	375	42.4	500	56.5	600	67.8	725	81.9	850	96.1	950	107
	2	154	17.4	308	34.8	308	34.8	440	49.7	580	65.5	715	80.8	850	96.1				
	3	336	38.0	675	76.3	675	76.3	1,400	158	1,900	215	2,400	271	2,900	328	3,400	384		
	4	432	49	860	97.2	860	97.2	1,560	176	2,050	232	2,540	287	3,030	342				
	6	1,056	119	2,100	237	3,950	446												

Valve Series	Size	As built Torque		0 psig	0 barg	100 psig	6.9 barg	200 psig	13.8 barg	275 psig	19.0 barg
MI Series 5	1/2	67	7.6	135	9.3	142	9.8	149	10.3	154	10.6
	3/4	80	9.0	160	11.0	167	11.5	174	12.0	182	12.5
	1	154	17.4	307	21.2	322	22.2	337	23.2	358	24.7
	1-1/2	313	35.4	627	43.2	670	46.2	759	52.3	843	58.1
	2	491	55.5	981	67.6	1,037	71.5	1,238	85.4	1,388	95.7
	3	840	95.0	1,679	115.8	2,084	143.7	2,761	190.4	3,268	225.3
	4	1,539	173.9	3,077	212.2	4,114	283.7	5,580	384.7	6,679	460.5

Notes: (1) For valves with UHMWPE seats, multiply the above values by 1.25. (2) For valves which have S-TEF® or Kynar® seats, multiply the above values by 1.56. (3) For valves with PEEK® seats, multiply the above values by 1.7. (4) Where trunnion is indicated, IMI PBM recommends trunnion mounting the ball to avoid excessive seat loads and stem torques. (5) To convert in-lbs. torques to N-m, multiply by 0.113.

IMI PBM

Testing

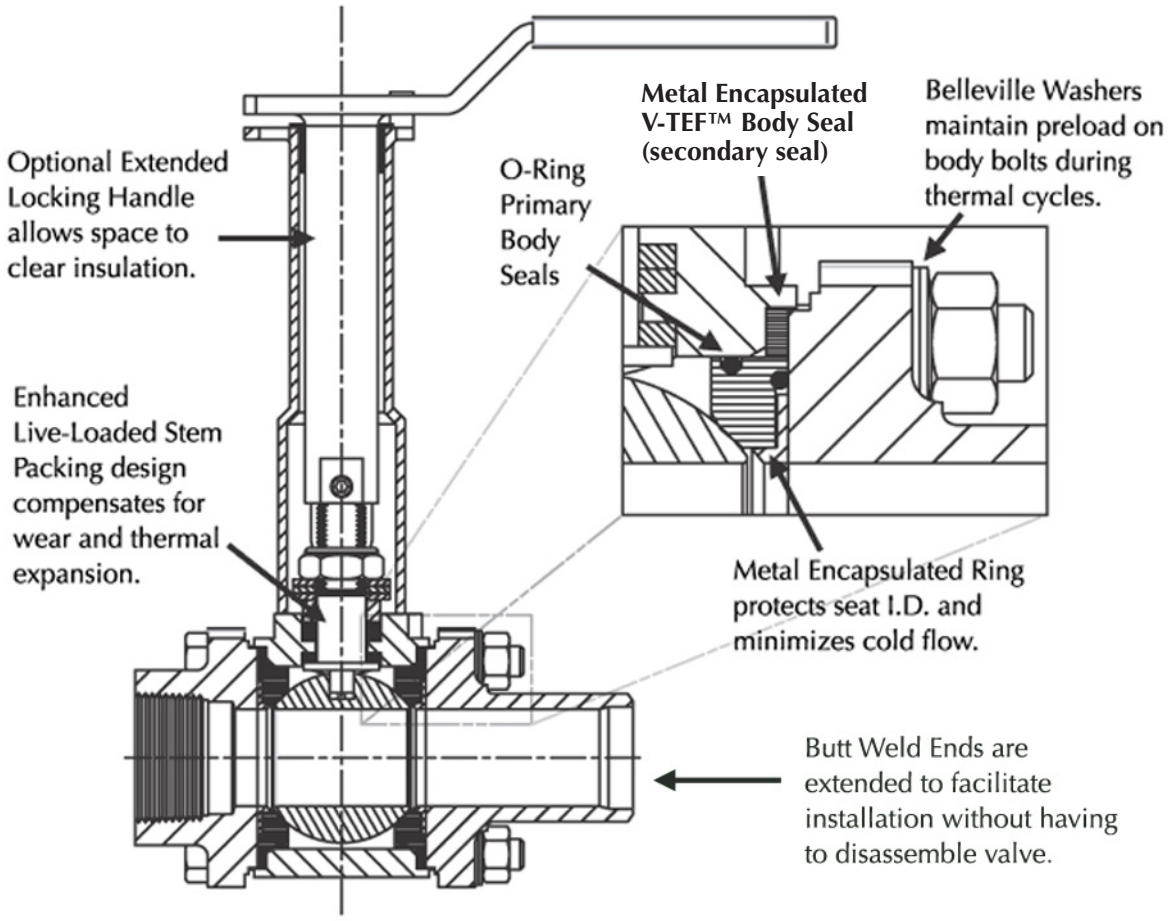
- Vacuum Testing*
- Cycle Testing
- Shock and Vibration
- Seismic
- Hydrostatic
- Material Test Reports
  - Physical Testing
  - Chemical Testing

Options

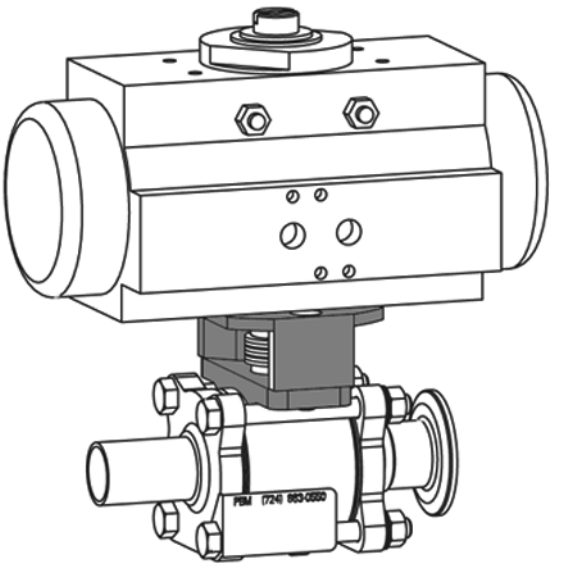
- Cryogenic
- Manual Spring Return Handles
- LOX (Cleaned for Oxygen Service)
- Body Cavity Fillers
- Steam Seats (Encapsulated)
- Purge Ports (SIP/CIP)
- Fire Rated, API 607
- Dribble Control Units
- High Alloys
- Fabflex® Manifolds
- Self Cleaning Flushable Ball
- V-Balls for Flow Control
- Internal and External Grounding
- Mechanical and Electro-Polishing
- Direct Mount Actuation
- Positioners
- Fieldbus, AS-i, DeviceNet
- Ball Flats and Purge Holes
- Locking Handle
- Extended Locking Handle
- Cylindrical Radius Weld Pads

IMI PBM valves are ideally suited for vacuum service. For valves intended for vacuum service, IMI PBM offers optional helium leakage test of the seats and shell. Also, the seats of the valve are helium leakage tested. IMI PBM valves will meet a leakage rate of 1 x 10-6 std. cc/sec. helium leakage for both tests.

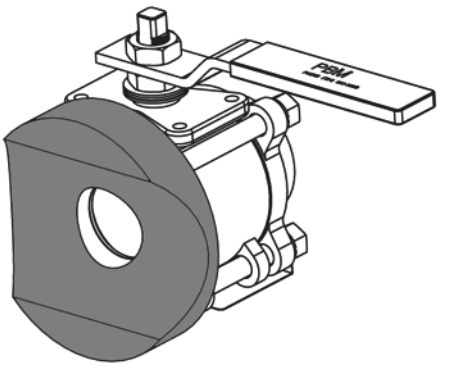
Steam Valves



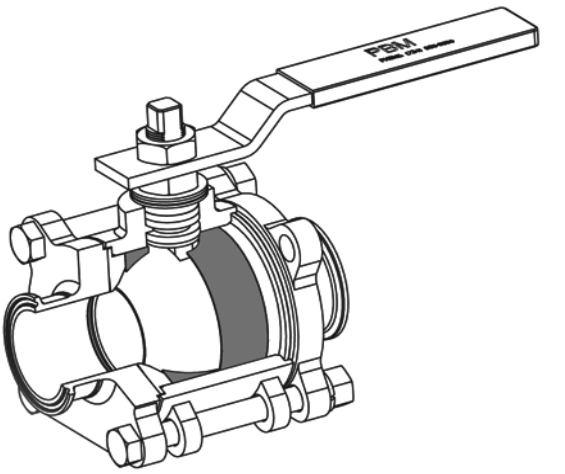
Options



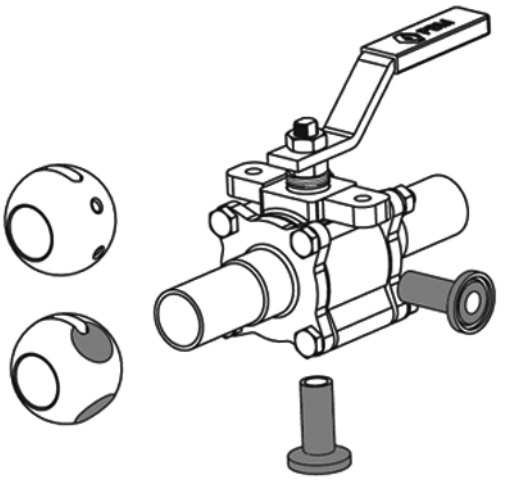
Direct Mount Actuation



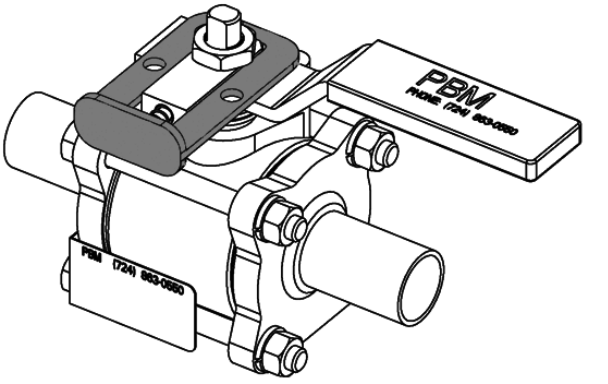
Cylindrical Radius Pad



Cavity Fillers



Purge Ports, Milled Flats and Purge Holes



Locking Handle

Written Specifications

FORGED VALVES

SI-SERIES 8 (1/2" through 4", DIN 11850 DN 8 through DN 100, ISO 1127 DN 8 through DN 80) IMI PBM's Forged Igenix® Sanitary Series 8, "True Bore"® Ball Valve with port through ball, seats and end fittings same as ID of tubing. Forged 316L Stainless Steel body and end fittings per ASTM A182F316L / DIN 1.4404, wrought or forged 316L ball and stem, less than 1% ferrite, three piece swing-out valve design. Seats and seals shall be white V-TEF™. Seats shall provide both upstream and downstream bubble-tight seal and be adjustable for inline wear. Stem packing shall be live loaded white V-TEF™ and S-TEF® material. End fittings shall match to tubing connections. Orbital weld end fittings should have wall thickness to match connecting tubing and have a controlled sulfur content of 0.005% through 0.017%. Valves shall not require disassembly for welding. Body bolts and nuts shall be 18-8 Stainless Steel. Interior surfaces shall be 20 RA or better with optional electropolish and finer mechanical finishes. Valve shall have integral mounting pad to allow adaptation to ISO 5211 for direct mount automation. All materials are FDA and USP23 Class VI compliant. Maximum working pressure to be 600 PSIG, but is limited based on valve size, valve material and end fitting type. Valves are full vacuum. To add Automation and Controls, see section "Automation and Controls." IMI PBM Model number SI (material) (size) 8 (end connection).

CS-SERIES 8 (1/2" through 4", DIN 11850 DN 8 through DN 100, ISO 1127 DN 8 through DN 80) IMI PBM's IGENIX® Clean Steam Series 8. Same Specification as SI-Series 8 above. "Seats and seals shall be white V-TEF™ with FDA approved EPR O-ring energizer. Seats shall have Stainless Steel encapsulation on ID. Body seal shall be FDA approved EPR O-rings with white V-TEF™ back up seal. Optional 300 Series Stainless Steel stem extension with locking lever handle for thick installation. IMI PBM Model number CS (material) (size) 8 (end connection); Trap Valve model number CT (material) (size) 8 (end connection).

CAST VALVES

SI-SERIES 9 (1/2" through 6", DIN 11850 DN 8 through DN 150, ISO 1127 DN 8 through DN 100) IMI PBM's Igenix® Sanitary Series 9 "True Bore®" Ball Valve with port through ball, seats and end fittings same as ID of tubing. Type (316 L Stainless Steel with low controlled Ferrite, Hastelloy® C-276 or C22®, or other) body, ball, stem, and end fittings, three piece swing-out valve design. Seats and seals shall be combined "cartridge" and be white V-TEF™. Seats shall provide both upstream and downstream bubble-tight seal and be adjustable for inline wear. All materials are FDA/USP Class VI Compliant. Stem packing shall be live loaded white V-TEF™ or S-TEF® material. End fittings shall match to tubing connections. Orbital weld end fittings should have wall thickness to match connecting tubing and have a controlled sulfur content of .005% through .017%. Valves shall not require disassembly for welding. Body bolts and nuts shall be 18-8 Stainless Steel. I.D. and O.D. surface finish shall be the same as specified for tubing. Maximum working pressure to be 900 PSIG, but is limited based on valve size, valve material and end fitting type. Valves are full vacuum. Valves shall be non-fire rated design unless otherwise specified. To add Automation and Controls, see section "Automation and Controls." IMI PBM Model number SI (material) (size) 9 (end connection).

CS-SERIES 9 (1/2" through 6"): IMI PBM's Igenix® Clean Steam Series 9, same specification as SI (cast) above. Add text "Seats shall be white V-TEF™ with FDA approved EPR O-ring energizer. Seats shall have Stainless Steel encapsulation on ID. Optional 300 Series S/S stem extensions for thick insulation. IMI PBM Model number CS (material) (size) 9 (end connection).

CT-SERIES 8 (forged) or SERIES 9 (cast): IMI PBM's Igenix® Clean Steam Series 8 or 9. Same specification as CS forged or cast above. "Valve shall have a dual chamber seat design to allow for a 1/2" Tri-Clamp® steam drain purge port positioned in the valve body to facilitate drainage of the body cavity to the trap. Ball shall have two steam purge holes to allow steam condensate to flow past seats in closed position to trap. Stem packing shall be live loaded white V-TEF™ and S-TEF®. Provide a 90˚ two position or 180˚ three position Stainless Steel handle with blue vinyl grip for closed/open, and/or trap isolated valve positions. A locking handle position mechanism shall be available if required. IMI PBM Model number CT (material) (size) 8 or 9 (end connection).

FI & AF SERIES

FI-SERIES 9 (1/2" through 6"): Flush Tank Bottom Ball Valve: IMI PBM's Igenix® Sanitary Series 9 Flush Tank Ball Valve. "True Bore®" Flush Bottom Tank Ball Valve with port through ball, seats, weld pad, and end fitting same as ID of tubing. Type 316L Stainless Steel with low controlled Ferrite, Hastelloy® C-276, Carbon Steel, Hastelloy® C-22®, or other materials for body, ball, stem, weld pad, and end fitting, three piece swing-out valve design. Seats and seals shall be white V-TEF™. Seats shall provide both upstream and downstream bubble-tight seal and be adjustable for inline wear. Stem packing shall be live loaded white V-TEF™ and/or S-TEF® material. End fitting shall match to tubing connections. Orbital weld end fittings should have wall thickness to match connecting tubing and have a controlled sulfur content of .005% through .017%. Valves shall not require disassembly for welding. Body bolts and nuts shall be 18-8 Stainless Steel. I.D. and O.D. surface finish shall be the same as specified for tubing. Maximum working pressure to be 600 PSIG, but is limited based on valve size, valve material and end fitting type. Valves are full vacuum. IMI PBM Model number FI (material) (size) 9 (end connection).

FC-SERIES 9 (1/2" through 6"): IMI PBM's Igenix® Clean Steam Series 9, same specification as SI (cast) above. "Seats shall be white V-TEF™ with FDA approved EPR O-ring energizer. Seats shall have Stainless Steel encapsulation on ID. Optional 300 Series S/S stem extensions for thick insulation. IMI PBM Model number FC (material) (size) 9 (end connection).

AF SERIES 1: Angle Stem Flush Tank Bottom Ball Valve; body, ball, stem, and end fitting material shall be (316 Stainless Steel,

Hastelloy® C276, Hastelloy® C-22®, or other). Weld pad shall be 316L grade Stainless Steel (or other) material (specify). Valve shall be two-piece design. Seats and seals shall be VTFE material and provide both upstream and downstream bubble-tight seal and be adjustable for inline wear. Stem packing shall be live loaded VTFE material. For manual valves, handle shall be 300 series Stainless Steel. Body bolts and nuts shall be 18-8 Stainless Steel. Maximum working pressure is 900 psig, but is limited based on valve size, valve material and end fitting type. Valves are full vacuum. Valves shall be non-firesafe design unless otherwise specified. For Fire Rated Valves to API 607, sizes 1" – 6", designate Series 3. To add Automation and Controls, see section "Automation and Controls." IMI PBM Model number AF (material) (size) 1 (end connection).

FIRE RATED

FIRE RATED 2-WAY, SI- AND FI- 1/2" TO 4", AF 1" TO 6": Valve design shall be tested and comply with criteria set forth in API-607 edition 4. Valve body bolts shall be fully encapsulated. Body seals shall be graphite material isolated from product stream under normal operation conditions by O-ring seals. Upon sublimation of seat and seal material in the event of a fire condition, a metal back up seat shall seal the valve at leakage rates in accordance with API-607. Model Number: Same as above, except Series "9" Changes to "6", and Series "1" changes to "3."

D SERIES

DI-SERI ES 9, 3-Way Diverter Port Ball Valve: "True Bore®" Diverter Port Ball Valve with port through ball, seats and end fitting same as ID of tubing. Type (316L Stainless Steel with low controlled Ferrite, Hastelloy® C-276 or C22®, or other) body, ball, stem, and end fittings, three piece swing-out valve design. Seats and seals shall be combined "cartridge" and be white V-TEF™. Seats shall provide both upstream and downstream bubble-tight seal and be adjustable for inline wear. Stem packing shall be live loaded white V-TEF™ or S-TEF® material. End fittings shall match to tubing connections. Orbital weld end fittings should have wall thickness to match connecting tubing and have a controlled sulfur content of .005% through .017%. Valves shall not require disassembly for welding. Body bolts and nuts shall be 18-8 Stainless Steel. I.D. and O.D. surface finish shall be the same as specified for tubing. Maximum working pressure to be 900 PSIG, but is limited based on valve size, valve material and end fitting type. Valves are full vacuum. Valves shall be non-fire rated design. To add Automation and Controls, see section "Automation and Controls." IMI PBM Model number DI (material) - (size) 9 (end connection) – (flow pattern).

DC-SERIES 9 (1/2" through 6"): IMI PBM's Igenix® Clean Steam Series 9 same specification as SI (cast) above. "Seats shall be white V-TEF™ with FDA approved EPR O-ring energizer. Seats shall have Stainless Steel encapsulation on ID. Optional 300 Series S/S stem extensions for thick insulation. IMI PBM Model number CS (material) (size) 9 (end connection).

M SERIES

MI-SERIES 5: 3, 4, or 5-Way Multi-Port Ball Valve; body, ball, stem, and end fitting material shall be 316L Stainless Steel. Valve shall have four or five V-TEF™-PTFE seats and seals and provide bubble-tight seal and be adjustable for inline wear. Stem packing shall be live loaded V-TEF™-PTFE material. For manual valves, handle shall be 300 series Stainless Steel. Body bolts and nuts shall be 18-8 Stainless Steel. Maximum working pressure to be 275 psig. Valves are full vacuum. Specify IMI PBM Flow Pattern for 3, 4, or 5-Way Valve. To add Automation and Controls, see section "Automation and Controls." IMI PBM Model number MI (material) (size) 5 (end connection) (flow pattern).

RISING STEM SAMPLING VALVES

S-, S2, S3 RISING STEM SAMPLING VALVES: Body and stem shall be wrought or cast 316L Stainless Steel, V-TEF™ seat and elastomer (Viton, EPR, or EPDM) O-ring seal. Handle knob shall be nylon 6/6. Bore is 1/4", with available inlets and outlets 90° or inline in sizes 1/2" through 2". IMI PBM Model number S- (sanitary wrought split-body), S2 (unibody cast sampling), or S3 (inline version).

AUTOMATION AND CONTROLS

IMI PBM'S DIRECT MOUNT AUTOMATED BALL VALVES: Valves as specified in the "Manual Valves" section with addition of a "Direct Mount" double acting or spring return pneumatic actuator. Actuators shall be of the double opposing piston, rack and pinion design with bi-directional pinion travel stops and hard anodized aluminum oxide body with co-deposited fluoropolymer. End caps to be polyester powder coated with 300 series Stainless Steel fasteners. Mounting bracket shall be Stainless Steel and valve stem shall insert directly into actuator drive adapter. Actuator shall be sized utilizing a 100% safety factor. Specify supply air pressure at actuator (60 or 80 psig). MI PBM Model Number "PA." IMI PBM's electric actuators, limit switches, positioners, solenoids, and field bus accessories. Specify according to all statutory and regulatory requirements. Include Nema rating requirements and electrical current.

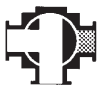
Flow Pattern Diagrams

The diagrams show the top view as though you were looking down on the stem. White areas indicate the path available for process flow. Shaded areas indicate unused ports for a given flow position.

Diverter Port Patterns

By specifying a T-Port, Double T-Port, Angle Port (L) or Double Angle Port (LL) Ball, different flow configurations are possible. For example, a DP valve with a T-Port Ball might be used to control flow to one or two simultaneous operations. The side entry Angle Port Ball and the bottom entry Double Angle Port Ball are ideal for connecting two relief valves to a system. The Double Angle Port Ball diverts flow from one outlet to another outlet 180° away, with only 90° stem rotation. This allows use of 90° double acting or spring return actuation, instead of 180°.

Side Entry

Code	03	04	06	10
Port Style	T-Port 90° Turn	T-Port 90° Turn	T-Port 180° Turn	L-Port 90° Turn
Position A				
Position B				
Position C				

Bottom Entry

Code	14	15	16	17	18
Port Style	L-Port 360° Turn	L-Port 180° Turn	T-Port 90° Turn	TT-Port 180° Turn	LL-Port 90° Turn
Position A					
Position B					
Position C					
Position D					

3-Way Multi-Port Patterns

The 3-Way Multi-Ports are a popular choice in a variety of industries. A seal at every port distinguishes the 3-Way MP/MI Series Valve from diverting-type valves. In some applications, the 3-Way MP/MI valve can take the place of two or three 2-Way Valves, with corresponding savings in piping and fittings. For applications requiring simultaneous process line changes, two 3-Way MP/MI Series valves may be mounted in tandem and controlled with a single actuator or handle for greater control and additional savings. Additional flow patterns are possible by using manifolds of two or more valves.

Side Entry

Code	01	02	03	04	05	06	07
Port Style	T-Port 90° Turn	T-Port 90° Turn	T-Port 90° Turn	T-Port 90° Turn	T-Port 180° Turn	T-Port 180° Turn	T-Port 180° Turn
Position A							
Position B							
Position C							

Code	08	09	10	11	12	13
Port Style	T-Port 180° Turn	T-Port 360° Turn	L-Port 90° Turn	L-Port 180° Turn	L-Port 180° Turn	L-Port 360° Turn
Position A						
Position B						
Position C						
Position D						

Bottom Entry

Code	14	15	16	17	18	19
Port Style	L-Port 360° Turn	L-Port 180° Turn	T-Port 90° Turn	TT-Port 180° Turn	LL-Port 90° Turn	L-Port 90° Turn
Position A						
Position B						
Position C						
Position D						

Fail position must be selected.

The 4-way Multi-Ports are a true Multi-Port Valve with seals at every port. This design makes the 4-way MP/MI Series ideal for flow switching operations. In some applications, this valve can replace as many as four ordinary 2-Way Valves, with corresponding savings in piping and fittings. The following illustrations show how different ball and port configurations create many flow patterns with a single 4-Way Multi-Port Valve.

4-Way Multi-Port Patterns

Bottom Entry

Code	20	21	22	23	24	25	26	27
Port Style	Double L-Port	Double L-Port	Double L-Port	Double L-Port	Double L-Port	Double L-Port	L-Port	T-Port
	90° Turn	180° Turn	180° Turn	180° Turn	180° Turn	360° Turn	360° Turn	90° Turn
Position A								
Position B								
Position C								
Position D								

Code	28	29	30	31	32	33	34	35
Port Style	Double T-Port	Double T-Port	Double T-Port	Double T-Port	Double T-Port	Double T-Port	Double T-Port	Double T-Port
	180° Turn	180° Turn	180° Turn	180° Turn	360° Turn	90° Turn	90° Turn	90° Turn
Position A								
Position B								
Position C								
Position D								

Code	36
Port Style	Double T-Port
	90° Turn
Position A	
Position B	

4-Way Multi-Port Patterns

Side Entry

Code	37	38	39	40	41	42	43
Port Style	Double L-Port	L-Port	L-Port	T-Port	Straight Port	T-Port	T-Port
	90° Turn	180° Turn	360° Turn	180° Turn	90° Turn	90° Turn	90° Turn
Position A							
Position B							
Position C							
Position D							

5-Way Multi-Port Patterns

The 5-way Multi-Ports are 5-seated to provide positive shut-off and flow control at each port. This design is not only versatile, but extremely economical. In some applications, this valve can replace as many as four ordinary 2-Way Valves, with corresponding savings in piping and fittings. The following illustrations show available flow patterns with a single 5-Way Multi-Port Valve.

Bottom Entry

Code	44	45	46	47	48	49	50	51
Port Style	L-Port	Double L-Port	T-Port	Double T-Port	Double T-Port	Double T-Port	Double T-Port	Double L-Port
	360° Turn	180° Turn	90° Turn	90° Turn	90° Turn	180° Turn	360° Turn	360° Turn
Position A								
Position B								
Position C								
Position D								

Fail position must be selected.

Clean Steam Trap Ball Valves

The 2-Way Sanitary Steam Trap valves use body purge port and ball purge holes to direct flow to the trap while shutting off flow downstream. Permits sampling of steam for purity and safely isolates trap for ease of maintenance.

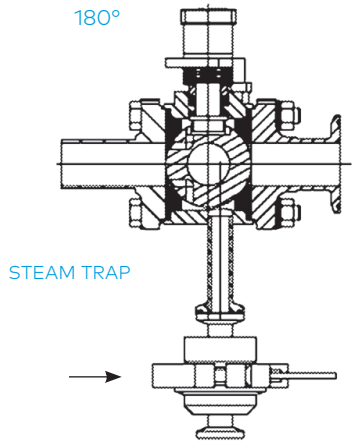
Dead leg piping is reduced where condensate can cool and cause contamination. These valves perform three functions and also reduce costs by eliminating unnecessary welds, "T"s and piping.

Sizes
- 1/2" - 2"

Materials
- 316L S/S
- Hastelloy® C276 and C-22®
- Titanium
- Others

Options
- Actuation
- Polishing
- Vertical or horizontal installation

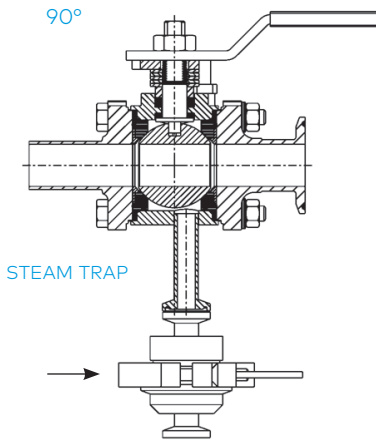
TRAP POSITION



CONDENSATE DRAINING THROUGH TRAP

The Trap Isolated Position allows condensate to flow past the ball purge holes during normal operation, bypassing the upstream seat. Condensate flows past the purge holes in the ball and out the purge port of the valve to the steam trap, allowing the body cavity to remain hot. The point-of-use, or sampling connection, is isolated by the surface of the ball without the purge holes pressing against the downstream seat.

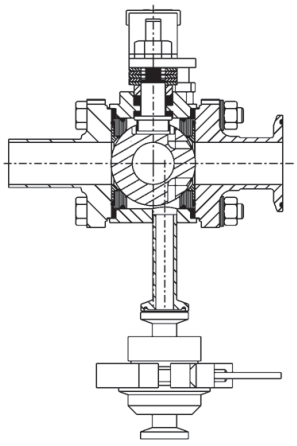
OPEN POSITION



CLEAN STEAM TO POINT OF USE

The Open Position allows the flow of steam. Appropriate sampling piping or equipment connections are made at the point-of-use port, and the ball is turned 90° counterclockwise, opening the valve. The trap is isolated from flow allowing full sterilization temperature to be quickly reached. The valve is then turned 90° clockwise to return the steam trap to service in the "Trap" position.

SERVICE POSITION



TRAP CAN BE REMOVED FOR SERVICE

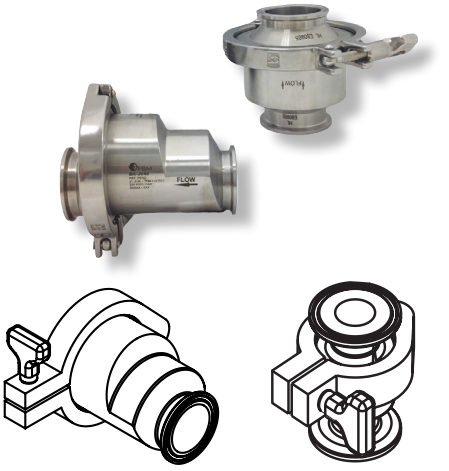
The Closed or Service Position allows steam trap maintenance by turning the ball 180° counterclockwise from the normal "Closed" position to the "Trap Isolated" position. As the ball is closed toward the steam-in port, it isolates the steam trap. Maintenance can then be performed on the steam trap. To return the trap to service, the ball is turned 180° clockwise to the "trap" position.

IMI PBM Check Valves
Use No Internal Spring and Guide

IMI PBM Sanitary Check Valves are specifically designed for use in biotech and pharmaceutical applications. The valves feature a springless design which eliminates the concern of media entrapment and particulate generation associated with spring loaded designs.

- 1/2" through to 4" (DN 15 - DN 100) vertical and horizontal design, larger sizes available
- Available in 316L, Hastelloy, AL6XN and other materials available
- Body interior is polished to 20 Ra (.51 µm) or better
- Sanitary clamp ends standard; extended sanitary tube weld ends upon request
- Innovative poppet design eliminates the use of a spring and guide
- No cracks, crevices, or other localized depressions which could otherwise trap fluid.
- Applicable for liquid and low pressure steam service
- Elastomer materials are FDA compliant, USP Class VI

U.S. Patent 8, 794, 256



HORIZONTAL (HC)	VERTICAL (VC)

REFER TO IMI PBM CHECK VALVE BROCHURE FOR MORE INFORMATION.

Materials of Construction

COMPONENT	MATERIAL	SPECIFICATION
Body (VC & HC) Bonnet (HC only)	316L Stainless steel	Bar Stock: A479, S31603
	Hastelloy® C-276	Bar Stock: B574, N10276
	AL6XN®	Bar Stock: B691, N08367
	Hastelloy® C-22®	Bar Stock: B574, N06022
Poppet	PTFE	Virgin PTFE, USP Class VI
Body Clamp Gasket	Viton, PTFE, EPDM	USP Class VI
Body Clamp	304 Stainless Steel	CF8 or F304

Testing: Maximum Allowable Leakage Rates

SIZE		PTFE POPPET
1/2", 3/4", 1"	DN 15, 20, 25	5 drops/min @ 3 psi (.2 bar)
1-1/2"	DN 40	8 drops/min @ 3 psi (.2 bar)
2"	DN 50	10 drops/min @ 3 psi (.2 bar)
2-1/2" – 3"	DN 65, 80	15 drops/min @ 3 psi (.2 bar)
4"	DN 100	20 drops/min @ 3 psi (.2 bar)

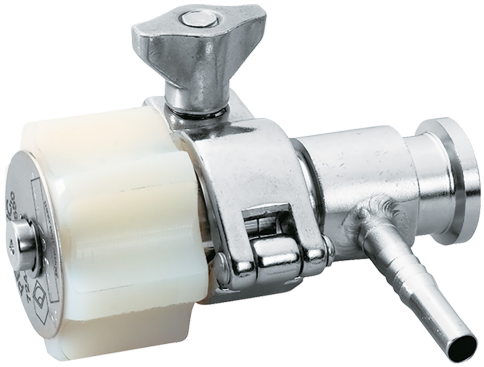
Standard Surface Finish*

COMPONENT	ID FINISH	OD FINISH	TYPE
Body, End*	20 Ra max	63 Ra max	Standard Finish, Mechanical
PTFE Poppet	-	-	Standard Finish, Mechanical

*Optional finer finishes and electropolish available

Rising Stem Sampling Valves

Cleanable and Maintainable. Reliable. Simple design, easy to maintain.



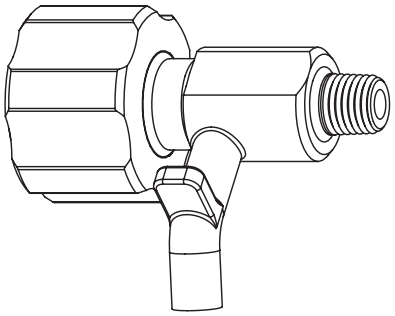
- 316L Stainless material
- All materials are FDA compliant
- Swickle outlet
- Autoclavable
- Torchable for sterilization
- Large nylon 6/6 handle knob
- Replaceable O-ring, V-TEF™ seat
- 3/8" straight thread, 1/4" MNPT, and sanitary clamp inlet connections

Sample process media quickly and easily with IMI PBM's Sampling Valve. Special pad design minimizes dead space. Easy CIP with Purge Ports and Milled Ball Flats ensures reliable samples. Valve can be shipped pre-mounted to piping for easy installation. Ideal for heavy duty and sanitary applications. Manual valve standard.

Sizes
- 1/2" - 2"

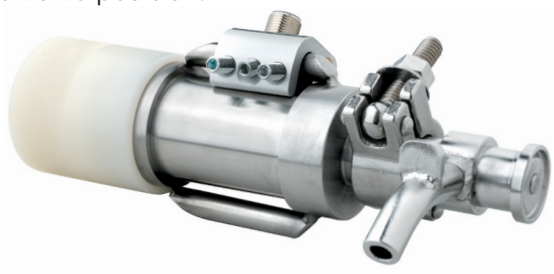
Materials
- 316 and 316L S/S
- Hastelloy®
- Titanium
- Others

Options
- Actuation
- Steam
- Polishing



Actuated Sampling Valves

The actuator is single acting, pneumatic and is spring return to the closed valve position. The Actuated Sampling Valve operates with 50 to 120 psig air pressure. A 1/8-inch FNPT tap is provided for connecting the air line from the solenoid valve.

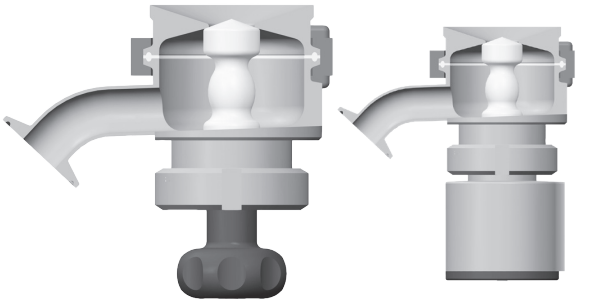


It features an adjustment to set full open flow to the desired level. This flow can be adjusted from a trickle flow to as much as 5 gpm at 25 psi pressure drop. A knob is provided to operate the valve manually in lieu of operating the valve with air.

Option

Position of the valve can be detected with one or two IFM Efector MK 5005 proximity switches that sense the position of a magnet above the piston in the valve. These low current switches operate at voltages of 10 to 30 VDC.

Igenix® Radial Diaphragm Tank Outlet Valves

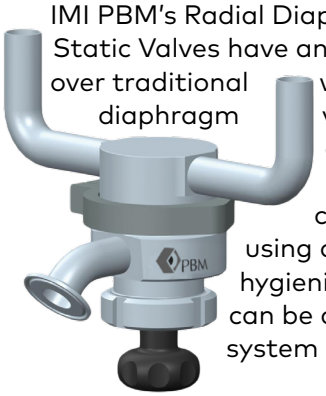


As an ISO 9001 manufacturer, IMI PBM produces standard and custom sanitary valve products for services required to minimize contamination, facilitate CIP/SIP and reduce downtime. IMI PBM Radial Diaphragm Valves comply with ASME BPE guidelines and offer valve certifications. Our absolute mission is to provide time lasting designs which help our users produce high quality biologicals and pharmaceuticals.

- Smooth sloping design for complete drainage
- Weld pad easily detaches with a simple hygienic clamp
- ½" through 4", DIN 10 through DIN 100
- 45˚ outlet elbow and straight - outlet each with 2˚slope
- Pressure rating 175 psi/12 bar
- Outlet can be oriented in any position
- Machined by IMI PBM from wrought material
- Standard finish 15 Ra with EP (BPE SF4)
- 316L, Hastelloy™ C-276, C-22, AL6XN™, Duplex, others
- Silicone or V-TEF™ diaphragms, others available
- Full material traceability and documentation package
- Optional purge port and tank connections available
- Exceeds performance requirements of ASME-BPE testing
- Optional position switch options including AS-Interface, DeviceNet, Foundation Fieldbus and Modbus

Point of Use Valve - Zero Dead Leg

IMI PBM's Igenix® Radial Diaphragm Zero Static Valves eliminate dead-leg on critical process systems including WFI, clean steam and process media.



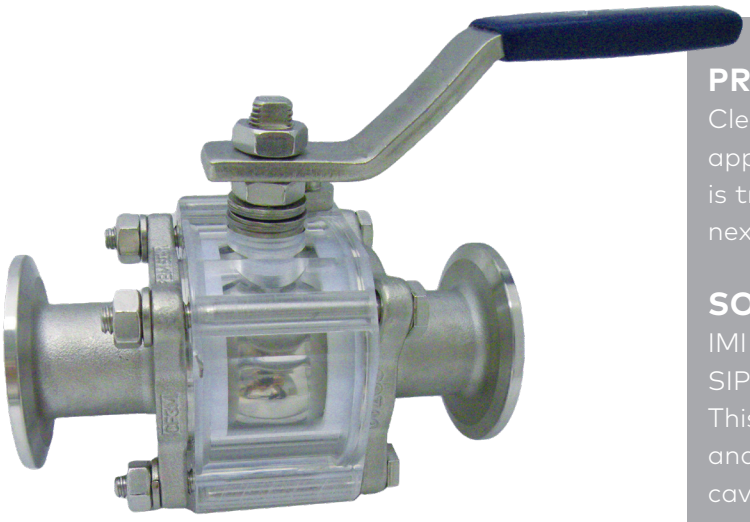
IMI PBM's Radial Diaphragm Zero Static Valves have an advantage over traditional diaphragm weir type valves due to a detachable body connection using a standard hygienic clamp that can be capped during system passivation.

VALVE SIZE	HEADER SIZE SELECTION						
	1/2" DIN 15	3/4" DIN 20	1" DIN 25	1-1/2" DN 40	2" DN 50	3" DN 80	4" DN 100
1/2", DIN 15	*	*	*	*	*	*	
3/4", DIN 20		*	*	*	*	*	
1", DIN 25			*	*	*	*	
1-1/2", DN 40				*	*	*	
2", DN 50					*	*	*
3", DN 80						*	*

Refer to IMI PBM RD Brochure for more details.

Self Cleaning Ball Valves

Unlike traditional ball valves, IMI PBM's Self-Cleaning Valve with Adjust-O-Seal® thoroughly cleans valve internals during CIP in the full open position. IMI PBM's Self-Cleaning Ball Valve also provides full, unobstructed flow and bidirectional, bubble-tight shutoff. These are significant advantages over floating ball designs, as well as diaphragm and butterfly valves.



PROBLEM

Cleaning valves and piping systems is critical in sanitary applications. If valves are not thoroughly cleaned, product is trapped in the valve cavity that can contaminate the next batch of product.

SOLUTION

IMI PBM's Self-Cleaning Ball Valve design allows full CIP/SIP access to all valve internals in the full open position. This allows first the process and then the cleaning solution and rinse solution to flow freely throughout the body cavity when the valve is in the open position.

Cleanable without External Purge Ports or Valve Removal
Quick Line Changeovers
Fire-Rated Option – Tested to API-607

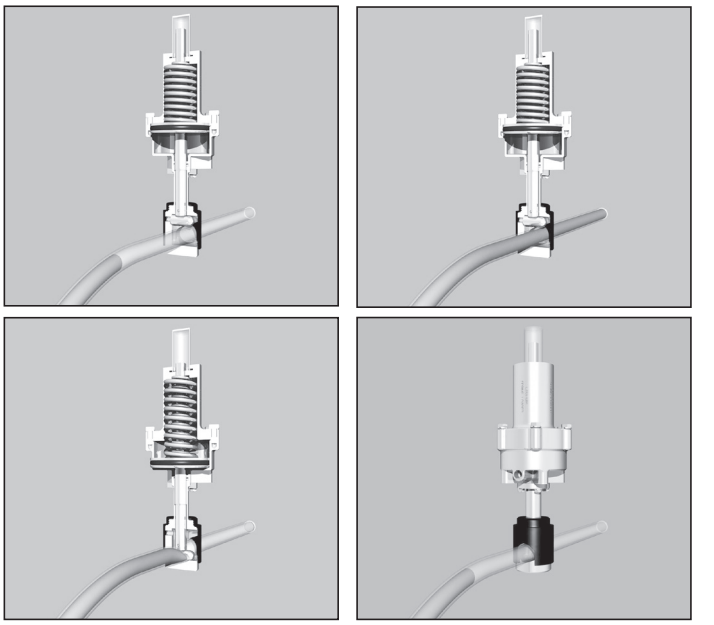
- USP Class VI elastomers and FDA complaint materials.
- Eliminates downtime and maintenance costs associated with removing valves for cleaning.
- Adjustable seats (Adjust O-Seal®) allows valve to retain bidirectional seating.
- Provides full unobstructed flow. Flow of a 1" IMI PBM valve is comparable to a 2" diaphragm valve.
- True-Bore® design ideal for pigging systems..
- Certified Material Test Reports (CMTRS) provided for wetted components.
- Independent Test Reports available.

Igenix® Pinch Valves

IMI PBM Pinch Valves shut off media flow by exerting a clamping force on your existing braided hose and clear tubing.

FEATURES

- IMI PBM's unique design offers true "Fail Closed" without air-assist for flexible tubing sizes up to and including 1", 25.4 mm ID.
- Fits over existing tubing without the need for process breaks.
- Has absolutely no contact with any process media, thus will never introduce contaminants.
- For automated version, designed to function with actuator pressure as low as 60 PSIG, 4.1 barg with a variety of optional limit switches.
- Can be fitted with limit switches and/or position sensors for your monitoring/flow control needs.
- Modular safety cover shields the pinch area when the valve is in service.
- It can be opened to load/unload the valve without the need for process breaks or complete removal from the valve body.
- Tested and proven to provide absolute shut off on tubing. Independent test report available on flexible braided hose and clear tubing on request.



U.S. Patents: 9, 127, 781, B2, D706 395S

Pinch Valve Applications

MANUAL VALVES

- Shut off valves on Bag Totes
- Manual flow control on bench top UF systems

AUTOMATED VALVES

- On/Off valves on automated UF and Chromatography skids
- Valves with positioners for flow and pressure control on automated UF and Chromatography skids
- Visual Indicator Standard
- Optional Limit Switch
- Complete shut off for all sizes
- Modular Safety Cover

Refer to IMI PBM Pinch Brochure for dimensions and technical information.

Flush Tank Sampling Valves

Sample process media quickly and easily with IMI PBM's Sampling Valve. Special pad design minimizes dead space. Easy CIP with Purge Ports and Milled Ball Flats ensures reliable samples. Valve can be shipped pre-mounted to piping for easy installation. Ideal for heavy duty and sanitary applications.

Manual valve standard.

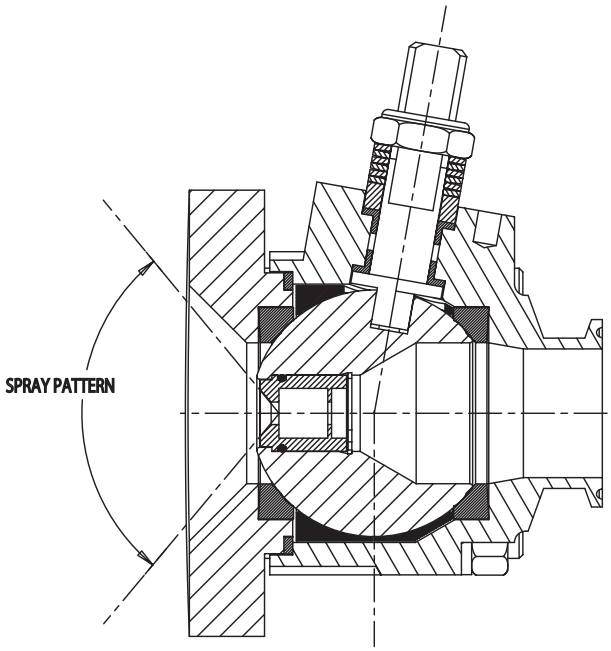
Sizes
- 1/2" - 2"

Materials
- 316 & 316L S/S
- Hastelloy
- Titanium
- Others

Options
- Actuation
- Steam
- Polishing
- Sample Cup Ball

Spray Ball Valves

For cleaning inside tanks and other vessels

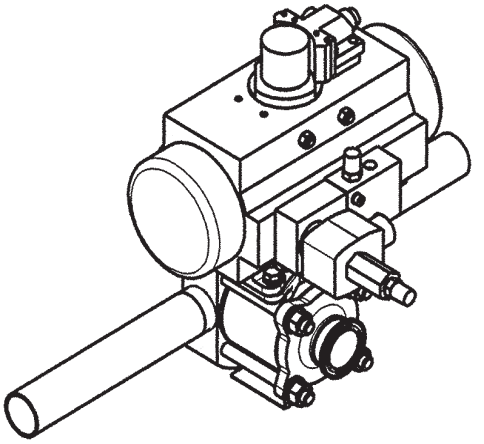


BENEFITS

The spray nozzle is not exposed to the inside of the vessel. This minimizes the potential for clogging or damage caused either by the process or by scraping the inside tank walls during cleaning or processing.

- Valve mounts flush with the inside vessel wall, minimizing dead space.
- Valve can be located anywhere on the vessel to accommodate specific needs.
- Many standard nozzles can be used in the Angle Stem Spray Ball Valve.
- Angle Stem Spray Ball Valve allows actuator clearance on jacketed or insulated tanks.
- Easily used while still maintaining a vacuum.

Z-Ball™ - Zero Dead Leg Ball Valve Design



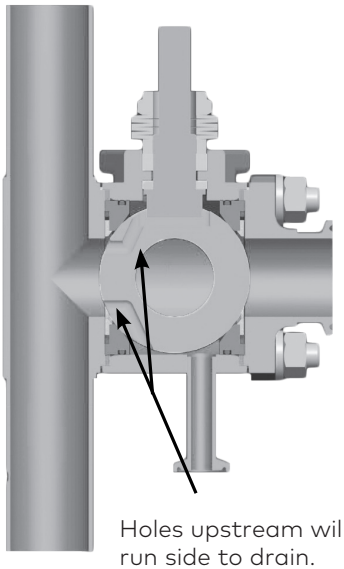
FEATURES

- Eliminates dead-legs in purified water systems and clean steam systems.
- Compact size - short branch geometry.
- 316L wrought low Ferrite Stainless Steel, other alloys available.
- Manual or pneumatic operation with optional device net.
- Mechanical and electropolished surfaces.
- Fully drainable.
- Adjustable seats (Adjust-O-Seal®) resulting in both upstream and downstream seal.
- Optional purge porting available.

IMI PBM's Z-Ball™ Zero Dead Leg Ball Valve replaces traditional diaphragm valve coupled with ball valve design used as a sterile barrier for purified water system loops and clean gas utilities. For clean steam header sterilization, the IMI PBM valve is opened to introduce clean steam into the process loop. In a closed position, to prevent condensate from accumulating, the purge port in the valve body removes condensate through trap to drain.

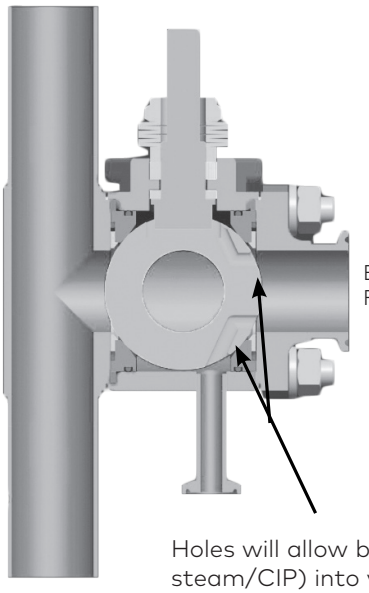
This design offers IMI PBM the ability to provide an ultra-sanitary process isolation valve which seals on both upstream and downstream seats resulting in significant savings compared to traditional methods of using a combination diaphragm valve coupled with a ball valve.

RUN SIDE
(UPSTREAM)



Holes upstream will allow run side to drain.

RUN SIDE



BRANCH SIDE
FLOW DIRECTION

Holes will allow branch side to flow (clean steam/CIP) into valve body and drain through purge port maintaining isolation from run side.

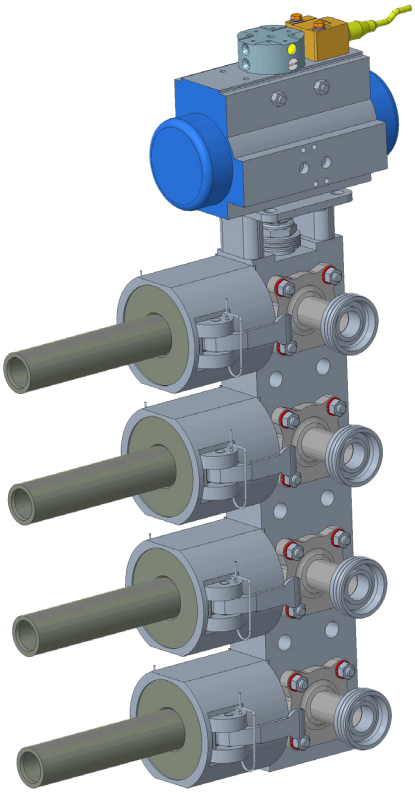
Fabflex® Manifolds

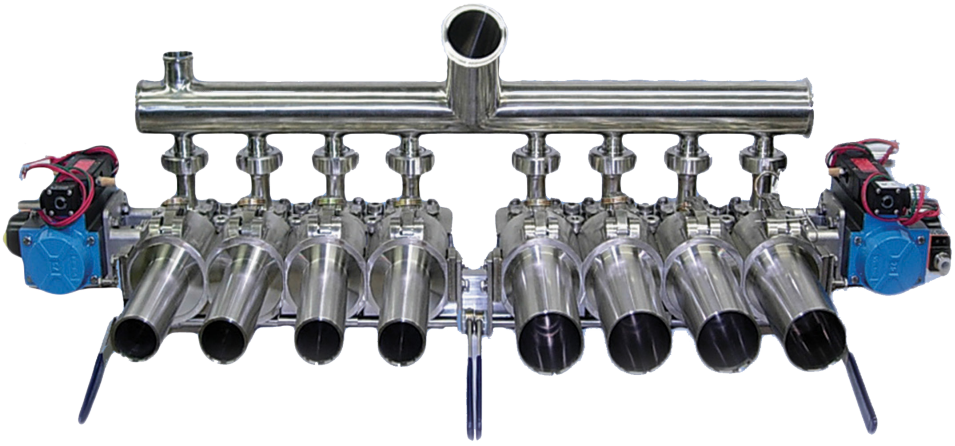
Fabflex® Manifolds are space-saving pipe and valve configurations designed to accommodate special industrial and sanitary applications. These manifolds can be shipped in lengths up to 18', with multiple manual and automated valves pre-installed. 100% testing before shipment ensures proper performance. Minimal dead space reduces areas where media could become trapped. Blank valve pads can be provided to accommodate future process expansion.

Sizes
- 1/4" - 6"

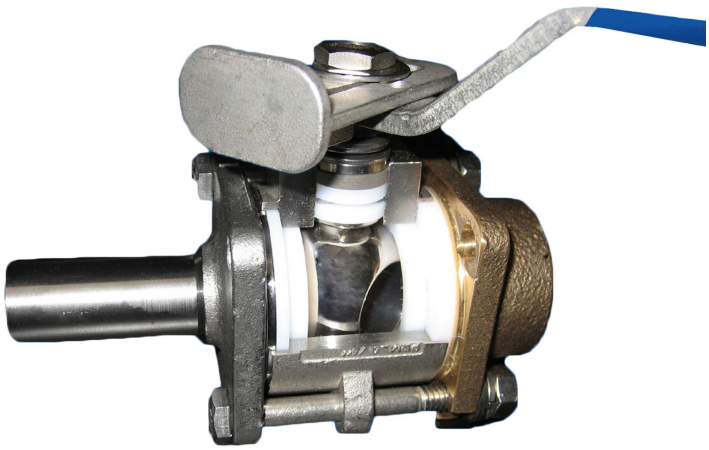
Materials
- 316 & 316L S/S
- Carbon Steel
- Hastelloy®

Options
- Fire-Test
- CIP/SIP
- Cavity Fillers
- Actuation
- Steam
- Polishing and Electropolishing





Process Break Valves



IMI PBM's Adjustable Seat design combined with this material transition could be the answer to failing dielectric unions in your header systems. IMI PBM's design provides an ideal spec transition and "leak resistant" dielectric union.

Sizes
- 1/2" - 2"

Materials
- 316/316L S/S
- 922 Bronze
- Others

Options
- Interchangeable Seats
- Stem Extension
- Direct Mount Actuation
- Locking Handle
- Body Cavity Fillers

Igenix® Sanitary Block & Bleed Valve

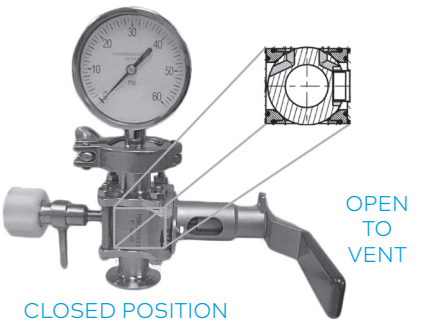
Use IMI PBM's Igenix® Sanitary Block & Bleed Valve to safely isolate the instrument. This valve allows pressure to be vented safely prior to removing the instrument in place.

PROBLEM

Common instrument isolation valves retain pressure at the instrument even when the isolation valve is off.

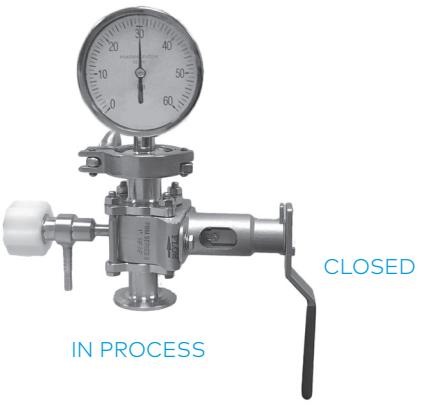
SAFE SOLUTION

IMI PBM Sanitary Block & Bleed Valve prevents pressure build up near instrument. Once the instrument is de-energized, it allows the operator to safely disconnect the instrument.



FEATURES

- Adjust-O-Seal® design safely allows for process isolation and instrument bleed.
- Ability to isolate, bleed off pressure and safely remove instruments which are in service on continuous service (i.e. clean steam lines).
- Allows instruments to be removed for calibration or replacement without shutting down main process lines.
- Retrofitable center section for existing installed IMI PBM valve.
- Standard material of construction is 316L Stainless Steel.
- Multiple end connections available, including BWTE for weld and hygienic-clamp for quick disconnect.



Control Valves

Use IMI PBM's 2-Way Control Valves in sanitary and industrial throttling or shearing applications to accurately control the flow of liquids or thick media. These valves feature characterized balls with various port shapes, including "V."

Manual valve standard.

Sizes
- 1/2" - 6"

Materials
- 316 & 316L S/S
- Hastelloy®
- Others

Options
- Actuation
- 30°, 45°, 60° V Angles
- Slotted
- Locking Handle
- Polishing and Electropolishing

Actuator Features

Nominal Values

Pressure rating of 120 psig (8 barg). Standard temperature range is -4°F to 185°F (-20°C to 85°C). High temperature range is -4°F to 302°F (-20°C; 150°C). Low temperature range is -40°F to 185°F (-40°C to 85°C). Pre-lubricated for life of actuator on assembly. Fully tested on manufacture 100%.

Rotation adjustment 0-90°

From MOD. 52 up to 200:

- Standard + or - 5° in both clockwise and counter clockwise direction by means of adjusting screws outside the internal air supply chambers
- Standard visual position indicators

MOD. 270:

- Standard + or - 5° in counterclockwise direction by means of adjusting screws in the caps
- Kit for + or - 5° in clockwise direction available on request

External connection

- Namur pinion mounting
- Namur solenoid valve mounting
- Bottom of pinion according to ISO 5211-DIN 3337
- Optional Beacon Indicator

Operating Pressure

Range - 40 psig to 120 psig (2.8 barg to 8 barg)

Operating Media

Clean, dry air or clean, dry, non-corrosive gas

Stroke

90° standard

Steel Pinion

- Nickel-plated for resistance to corrosion
- Stainless Steel (optional) for corrosive environments
- Anti-blowout design

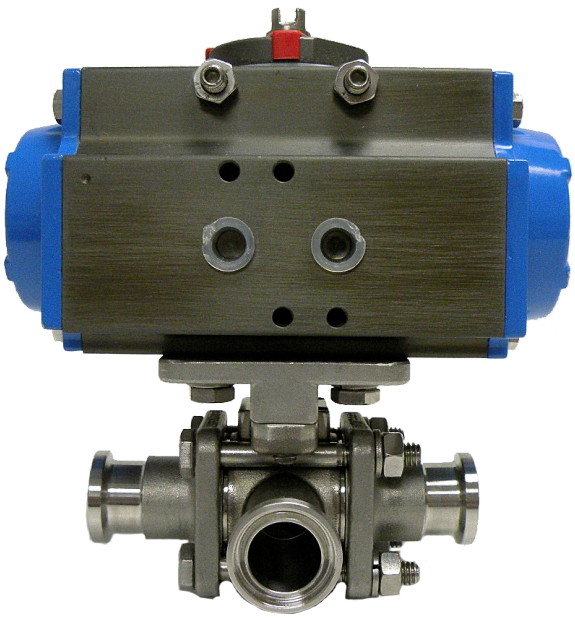
Body manufactured from extruded Aluminum UNI 6060

- Hard-coat anodized as standard finish 45-50 (micron)
- Good wear resistance
- Bore finished to high standard to ensure low friction and long life

Seals

- NBR standard
- Viton high temperature (optional)
- HNBR low temperature (optional)

Refer to Series "C" IMI PBM Actuator Brochure for dimensions and technical information.



Positioners

FEATURES

- Gauges/No Gauges
- 4-20 mA (Electro-Pneumatic)
- 3-15 psi (Pneumatic)
- Weatherproof and Explosion Proof
- Proximity, Mechanical Switches
- Solid State Sensors
- Flat or Domed Indicator

Electric Actuators

FEATURES

- Weatherproof and Explosion Proof
- Modulating or On/Off
- 2, 3, or 4 Position
- Battery Backup
- Communication Bus Interfaces available
- Auxiliary Limit Switches
- Motor Brake
- Handwheel Override
- Potentiometers
- AC or DC

Solenoids

FEATURES

- Compact spool valve with threaded port, direct mounts to actuator.
- All exhaust ports are pipeable, providing better protection against harsh environments.
- Standard manual override.
- DIN, weatherproof and explosion proof solenoids available.
- Single and dual-coil solenoid constructions.
- Mountable in any position.

Position Indicators & Limit Switches

OPTIONS

- Weatherproof and Explosion Proof
- Mechanical or Proximity Switches
- Fieldbus
- DeviceNet
- Visual Indication
- AS-i
- ATEX, IEC, CSA, NEMA, etc.

Breakthrough Engineering

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