IMI PBM

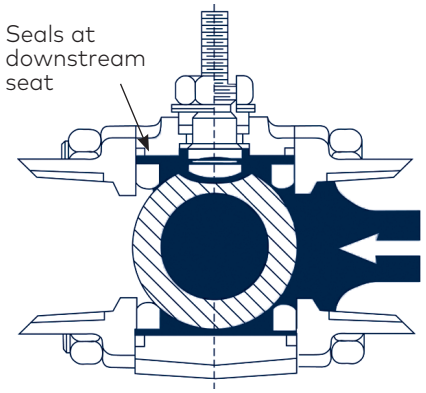
INDUSTRIAL VALVES

IMI Critical Engineering

Adjust-O-Seal® Feature

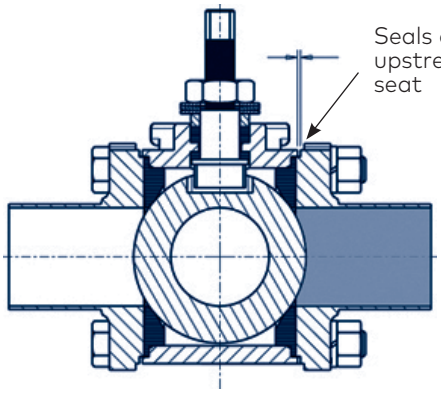
- IMI PBM valves with adjustable sealing provide bidirectional upstream sealing.
- Valve body bolts can be tightened to compensate for normal seat wear without having to remove the valve from service.

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 recompress 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

IMI PBM also offers:

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

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

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

INDUSTRIAL VALVES

PRODUCT (1-2)

AN	ANSI
CN	Cryogenic (ANSI)
CD	Cryogenic 3-way
CP	Cryogenic
DD	Diverter (Steam)
DP	Diverter Port
FD	Flush Tank (Steam)
FT	Flush Tank
MP	Multi-Port
SP	Industrial 2-way
SD	SP (Steam)

TI	see page 11
IM	see page 15
FR	see page 15
AF	See page 7 or 13

MATERIAL(2) (3-4)

A-	Aluminum
C-	Hastelloy® C-276
C1	Hastelloy® B2
D-	Iron(6)
E-	Carbon Steel(6)
G-	Lead Free Bronze
H-	316/316L Stainless (RF Flange Only)
HC	Alloy 20
HL	316L Stainless
HF	F316L Forged
H2	317L Stainless
I-	Inconel® 600
M-	Monel 400
N-	922 Bronze
P-	AL6XN
R-	955 NiAl-Bronze
S-	953 Al-Bronze
T-	Gr. 5 Titanium
T2	Gr. 2 Titanium
T7	Gr. 7 Titanium
W-	Nickel 200
X-	958 NiAl-Bronze
Z-	70/30 CuNi
1-	90/10 CuNi
5-	Iconel® 625
9-	954 Al-Bronze
25	254SMO®6Mo
22	Duplex 2205
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

END CONNECTION(3) (7-8)

B-	Ext. Sch 40 buttweld
D-	Ext. Sch 10 buttweld
J-	Ext. socket weld
L-	150# Flange
M-	300# Flange
P-	Male NPT
Q-	Female NPT
Q1	BSPT
S-	Sil-braze1 groove (pipe)
T-	Solder joint (tube)
U-	Socket weld (pipe)
-Z	No end fittings

For other end fittings, Consult Factory

Column 8 options

3	Non Adjust-O-Seal®
4	Reduced port
5	Non Adjust-O-Seal® & Reduced port
7	Flat-faced flanges
9	Bar-stock

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

	SEAT	FILLER	O-RING
F(9)	Metal		None
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
Q(9)	CG		None
Y	CT		FKM
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

SEAT/SEAL/MATERIAL CODES

CG	Carbon-Graphite
HT	S-TEF®
CT	C-TEF™
TF	V-TEF™
VT	VTFE (Cavity Fillers Only)
UT	UHMWPE
F	Metal Seats

O-RING MATERIAL CODES

EP	EPR
VI	FKM
VV	FEP Encapsulated FKM
FKM	FF350-75

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

View our Industrial Product Bulletins Online

www.pbmvalve.com/product-bulletins/

ANGLE STEM VALVES
- PB-AF 1
- PB-AF3

ANSI BALL VALVES
- PB-AN5
- PB-AN5-DBB
- PB-AN6
- PB-AN6-DBB

CRYOGENIC VALVES
- PB-C6
- PB-CD6
- PB-CN6
- PB-CN600#
- PB-CP6

DIVERTER PORT VALVES
- PD-DD5
- PB-DP5

FLUSH TANK VALVES
- PB-FD5
- PB-FT5
- PB-FT6

INSTRUMENT VALVES
- PB-IB
- PB-IB-DBB
- PB-IM

MULTIPORT VALVES
- PB-MP5

2-WAY VALVES
- PB-SD5
- PB-SP5
- PB-SP6

TRANSMITTER ISOLATION VALVES
- PB-TIV

OTHER
- PB-LFB

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	–	W	X	X	X

INDUSTRIAL 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: **WXXX** suffix at end of standard PBM part number

24vdc 24vdc 24vdc — PBM, Asco & Westlock combo

55	DA80 psig actr & GP Sol	⟺
56	DA80 psig actr & GP LS & Sol	
57	DA80 psig actr & XP Sol	⟺
58	DA80 psig actr & XP LS & Sol	
59	DA60 psig actr & GP Sol	⟺
60	DA60 psig actr & GP LS & Sol	
61	DA60 psig actr & XP Sol	⟺
62	DA60 psig actr & XP LS & Sol	
63	SR80 psig actr & GP Sol	⟺
64	SR80 psig actr & GP LS & Sol	
65	SR80 psig actr & XP Sol	⟺
66	SR80 psig actr & XP LS & Sol	
67	SR60 psig actr & GP Sol	⟺
68	SR60 psig actr & GP LS Sol	
69	SR60 psig actr & XP Sol	⟺
70	SR60 psig actr & XP LS & Sol	

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

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
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

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 of Construction

Stainless Steel

316 S/S complies with ASTM A 351-CF8M or A479, S31600

316L S/S complies with ASTM A 351-CF3M or A479, S31603

- Is exceptionally corrosion-resistant to acidic and basic enviroments and does not pit easily.
- Can be polished to a near-mirror finish for easy cleanability.
- Weld fittings have a carbon content of < 0.3% to facilitate welding.

Carbon Steel, A216-WCB

- This versatile material handles mildly corrosive media.

Bronze, Alloy 922

- Excellent resistance to sea water enviroments and good steam resistance. Also suitable for sub-zero temperature applications.

Hastelloy® C-276

- Very good in corrosion reducing and mildly oxidizing enviroments. Very good resistance to localized attack and stress corrosion cracking. Alloy CW-12MW in cast form.

Others

- Additional materials are available, including Alloy 20, Bronze, Duplex Stainless Steels, Hastelloys, Titanium, and Inconel®.

Seat and Seal Materials

DESIGNATION	DESCRIPTION	COLOR	PURPOSE
V-TEF™	Chemically Modified PTFE IMI PBM Standard for Series 4, 5 6, 8, & 9	White	Suitable for applications under 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-TEFTM also has much improved porosity control and deformation under load when compared to PTFE grades. FDA and USP Class VI compliant. Meets bubbletight seat leakage.
RTFE	Glass Reinforced PTFE	Slightly Off White	Suitable for applications under 400˚F. Used in a variety of applications. Bubbletight leakage.
VTFE	Virgin PTFE	White	Suitable for applications under 350˚F. A low stem torque material ideal for sanitary use. FDA and USP Class VI compliant. Meets bubbletight seat leakage.
S-TEF®	Stainless Steel Reinforced PTFE	Charcoal Gray	Suitable for applications under 450˚F. A suitable material for higher pressure/temperature applications. Higher stem torque than virgin grades and V-TEF™. USP Class VI compliant. Meets bubbletight seat leakage.
CARBON	Carbon/Graphite	Black	Suitable for applications under 750˚F (400˚C). A hard material impervious to high temperatures. It is used for heat transfer fluid applications and other high temperature applications. Meets Class V 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 bubbletight seat leakage.
PEEK®	Polyether ether ketone	Putty	Suitable for applications under 500˚F. PEEK® is a rugged, high strength material having fairly high stem torque. 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 bubbletight seat leakage.
C-TEF™	Hard Carbon 1 "X" with modified PTFE	Charcoal Gray	Suitable for applications under 600° F. C-TEF™ is a rugged, highly resilient, high strength material used in Chemical, Oil and Gas, LNG and Power and Steam applications; making it IMI PBM''s best performing soft seat material. Exceeds shut off versus PEEK. Meets bubbletight 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 above based on 0 psi. See Pressure & Temperature charts on Page 8.

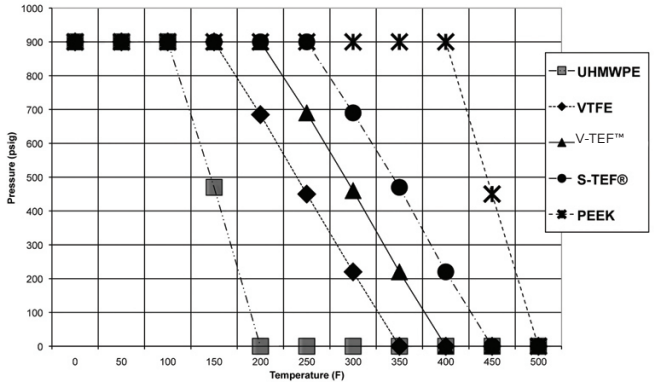
Allowable Working Pressures and Temperatures

Valve Style/ Series	Material	Size (inches)	Non-Flanged					
			-20 to 100°F	-28.9 to 37.8°C	300°F	148.9°C	450°F	232.2°C
			psig	barg	psig	barg	psig	barg
SP, SD, DP, DD Series 5	316 SS/316L	1-1/2" (DN40) and smaller	900	62.1	770	53.1	680	46.9
	316 SS/316L	2" and larger	720	49.6	620	42.7	540	37.2
	C-276	All	600	41.4	520	35.9	450	31.0
	Carbon Stl.	1-1/2" (DN40) and smaller	900	62.1	770	53.1	680	46.9
	Carbon Stl.	2" (DN50) and larger	740	51.0	655	45.2	620	42.7
SP, SD Series 5	922 Bronze	All	600	41.4	600	41.4	580	40.0
SP, FT Series 6 FD, FT Series 5	316 SS/316L	4" (DN100) and smaller	720	49.6	560	38.6	495	34.1
	C-276	3" (DN100) and smaller	6	41.4	520	35.9	475	32.8
	Carbon Stl.	3" (DN80) and smaller	740	51.0	655	45.2	620	42.7
CN	316 SS/316L	All	See Flanged Table at Right.					
AN, All Series	C-276	All						
	Carbon Steel	All						
	Bronze	All						
CP, CD Series 6	316 SS/316L	All	720	49.6	560	38.6	495	34.1
MP Series 1	836/922 Bronze	1-1/2" (DN40) and smaller	400	27.6	385	26.5	360	24.8
	836/922 Bronze	2" (DN50	350	24.1	340	23.4	315	21.7
	836/922 Bronze	3" (DN80)	300	20.7	290	20.0	270	18.6
	836/922 Bronze	4" (DN100)	See Flanged Table at Right					
	Ductile Iron	1-1/2" (DN40) and smaller	550	37.9	470	32.4	400	27.6
	Ductile Iron	2" (DN50	500	34.5	430	29.6	370	25.5
	Ductile Iron	3" (DN80)	450	31.0	380	26.2	330	22.8
	Ductile Iron	4" (DN100)	See Flanged Table at Right					
MP Series 4	316 SS/316L	3/4" (DN20) and smaller	900	62.1	770	53.1	680	46.9
	316 SS/316L	1" (DN 25) thru 4" (DN100)	720	49.6	620	42.7	540	37.2
	316 SS/316L	6" (DN150)	275	19.0	205	14.1	195	13.4
	C-276	3/4" (DN20) and smaller	900	62.1	770	53.1	680	46.9
	C-276	1" (DN25) thru 4" (DN100)	720	49.6	620	42.7	540	37.2
	C-276.	6" (DN150)	275	19.0	205	14.1	195	13.4
	Carbon Stl.	3/4" (DN20) and smaller	900	62.1	770	53.1	680	46.9
	Carbon Stl.	1" (DN25) thru 4" (DN100)	740	51.0	655	45.2	620	42.7
	Carbon Stl.	6" (DN150)	300	20.7	250	17.2	220	15.2
MP Series 5	316 SS/316L	All	275	19.0	205	14.1	195	13.4
	C-276	All	230	15.9	200	13.8	180	12.4
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)	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	4" (DN100)	550	37.9	540	37.2	525	36.2
	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	4" (DN100)	550	37.9	540	37.2	525	36.2
	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
	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	4" (DN100	550	37.9	540	37.2	525	36.2
	316 SS/316L	6" (DN150)	375	25.9	365	25.2	360	24.8
TIV Series 5, 6	316 SS/316L	All	See Flanged Table at Right					
	C-276	All						
	Carbon Stl.	All						

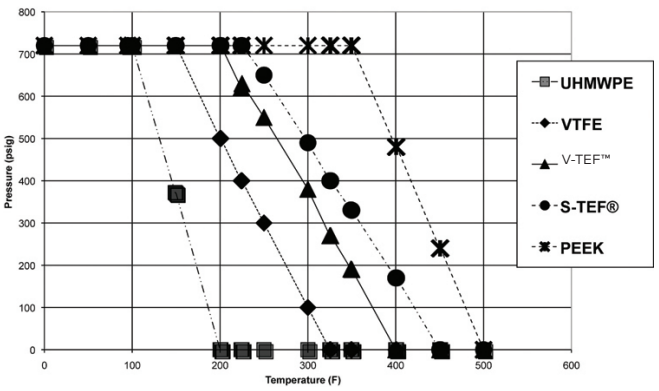
Valid for all Flanged Valves:

ANSI 150# FLANGE						
Valve Material	-20° to 100° F psig	-28° to 38° C barg	300° F psig	150° C barg	450° F psig	232° C barg
836 Bronze	225	15.5	180	12.4	135	9.3
922 Bronze	225	15.5	195	13.4	160	11.0
955 Bronze	225	15.5	195	13.4	160	11.0
C-276	230	15.9	200	13.8	180	12.4
316/316L S/S	275	19.0	215	14.8	180	12.4
Carbon Steel	285	19.7	230	15.9	185	12.8
ANSI 300# FLANGE						
Valve Material	-20° to 100° F. psig	-28° to 38° C. barg	300° F. psig	150° C. barg	450° F. psig	232° C. barg
C-276	600	41.4	520	35.9	475	32.8
316/316L S/S	720	49.6	560	38.6	495	34.1
Carbon Steel	740	51.0	655	45.2	620	42.7

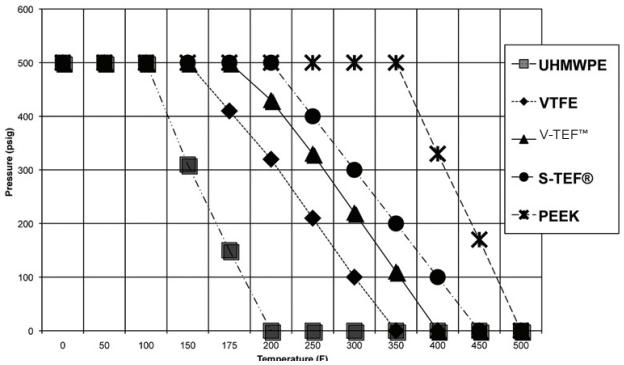
Valves 1-1/2-Inch and Smaller



2-Inch to 3-Inch



4 and 6-Inch



Seat & Seal Temperature and Pressure Charts

Cv Values (gpm)

VALVE SIZE	2-WAY			FLUSH TANK		DIVERTER PORT					
	SP	CP	AN, CN	AF	FT	DP SERIES 5 S/S			DP SERIES 1 BRONZE		
						L-PORT	T-PORT		L-PORT	T-PORT	
	SERIES 5	SERIES 6	SERIES 1/5	SERIES 1	SERIES 5		STRAIGHT	BRANCH		STRAIGHT	BRANCH
1/4"	5*										
3/8"	10*										
1/2"	12	12	13		14	6.6	7.4	5.2	12	14	8.7
3/4"	42*	42*	52		42	17	20	13	21	25	16
1"	73	73*	80	65	70	33	39	24	33	39	24
1-1/2"	170	170*	190	143	190	79	93	58	79	93	58
2"	360	360*	400	280	370	149	180	110	149	180	110
2-1/2"	650				600						
3"	935	935	1,100	700	900	350	415	250	290	345	210
4"	1,900	1,900	2,400	880	1,650	640	770	465	460	540	340
6"	4,800		5,600	1,500	3,900	1,550	1,860	1,110	1,050	1,220	790
8"			10,700	7,400							
10"			17,400		150# Flanged and Butt Weld, unless indicated otherwise noted (gpm at 1 psi d/p)						

VALVE SIZE	MULTI-PORT											
	MP SERIES 5				MP SERIES 4				MP SERIES 1			
	L-PORT	T-PORT		LL-PORT	L-PORT	T-PORT		LL-PORT	L-PORT	T-PORT		LL-PORT
		STRAIGHT	BRANCH			STRAIGHT	BRANCH			STRAIGHT	BRANCH	
1/2"	6.6*	6.6*	5.4*	6.0*	6.6	7.4	5.2	6.6	12	14	8.7	6.6
3/4"	16*	16*	12*	14*	17	20	13	16	17	20	13	16
1"	33	33	21	30	33	39	24	27	33	39	24	27
1-1/4"					32	36	23	26	32	37	23	26
1-1/2"	80	80	49	72	79	93	58	73	79	93	58	73
2"	147	147	89	126	149	180	110	128	149	180	110	128
3"	351	351	212	295	350	415	250	300	200	250	140	180
4"	613	613	368	443	640	770	465	530	365	450	260	340
6"					1,550	1,860	1,110		1,550	1,860	1,110	

*Q (FNPT) ends

Stem Torque

Valve Style/ Series	Valve Size (in.)	As built Torque		Minimum Actuator Sizing vs. 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
All Series 5 & 6 2-Way & 3-Way AN, SP, SD, DP, DD, FT, FD Series 5 & 6	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	2,650	299.4	trun.	trun.										
	6	1,920	217.0	3,840	433.9	7,100	802.3	Use trunnion above 75 psid.											
AF Series 1 & 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	107.4
	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	158.2	1,900	214.7	2,400	271.2	2,900	327.7	3,400	384.2		
	4	432	48.8	860	97.2	860	97.2	1,560	176.3	2,050	231.7	2,540	287.0	3,030	342.4				
	6	1056	119.3	2100	237.3	3950	446.4	Use trunnion above 75 psid.											
MP Series 5	1/2	67	7.57	135	15.3	142	16.0	149	16.8	154	17.4								
	3/4	80	9.04	160	18.1	167	18.9	174	19.7	182	20.6								
	1	154	17.4	307	34.7	322	36.4	337	38.1	358	40.5								
	1-1/2	313	35.4	627	70.9	670	75.7	759	85.8	843	95.3								
	2	491	55.5	981	110.9	1,037	117.2	1,238	139.9	1,388	156.8								
	3	840	94.9	1,679	189.7	2,084	235.5	2,761	312.0	3,268	369.3								
	4	1539	173.9	3,077	349.7	4,114	464.9	5,580	630.5	6,679	754.7								
MP Series 4	1/2, 3/4	77	8.7	144	16.3	144	16.3	144	16.3	144	16.3	144	16.3	144	16.3	144	16.3	144	16.3
	1	192	21.7	385	43.5	385	43.5	385	43.5	385	43.5	385	43.5	385	43.5	440	49.7	trun.	trun.
	1-1/2	384	43.4	770	87	770	87	770	87	940	106.2	trun.	trun.						
	2	432	48.8	865	97.7	865	97.7	865	97.7	1,200	135.6	trun.	trun.						
	3	864	97.6	1,730	195.5	1,730	195.5	trun.	trun.										
	4	1,920	216.9	3,840	433.9	3,840	433.9	trun.	trun.										
	6	3,000	339.0	6,000	678.0	8,800	994.4												
MP Series 1	1/2, 3/4	77	8.7	144	16.3	144	16.3	144	16.3	144	16.3	144	16.3						
	1	192	21.7	385	43.5	385	43.5	385	43.5	385	43.5	385	43.5						
	1-1/2	384	43.4	770	87	770	87	770	87	940	106.2	trun.	trun.						
	2	432	48.8	865	97.7	865	97.7	865	97.7	1,200	135.6	trun.	trun.						
	3	576	65.1	1,150	129.9	1,150	129.9	1,620	183	2,100	135.6								
	4	864	97.6	1,700	192.1	3,000	339	trun.	trun.										

Notes:

1. For valves with UHMWPE and RTFE seats, multiply the above values by 1.25.
2. For valves which have C-TEF™, S-TEF® or Kynar® seats multiply the above values by 1.56.
3. For valves with PEEK® or Carbon/Graphite 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. For AF Series 1 and 3 stem torques, refer to IMI PBM Sanitary Brochure, LT-34.
6. CP torque valves assume service at -320˚F.
7. For Series 5 SD, FD, DD valves ins steam service and having RTFE seats, multiply minimum V-TEF/VTFE actuator torques by 1.56.

		As Built Torque		Cryo As Built		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
CP Series 6 These are actuals, not sizing.	1/2	95	11	95	11	95	11	95	11	95	11	95	11	95	11	95	11	101	11	110	12
	3/4	95	11	95	11	95	11	95	11	95	11	95	11	95	11	95	11	101	11	110	12
	1	145	16	160	18	160	18	160	18	160	18	160	18	170	19	193	22	215	24	238	27
	1-1/2	420	47	420	47	420	47	420	47	420	47	420	47	477	54	544	61	611	69	677	76
	2	540	61	840	95	840	95	840	95	840	95	866	98	1013	114	1162	131	1310	148	1458	165
	3	1020	115	1320	149	1320	149	1320	149	1542	174	1984	224	2425	274	2866	324	3307	374	3749	424
	4	Consult IMI PBM Engineering.																			

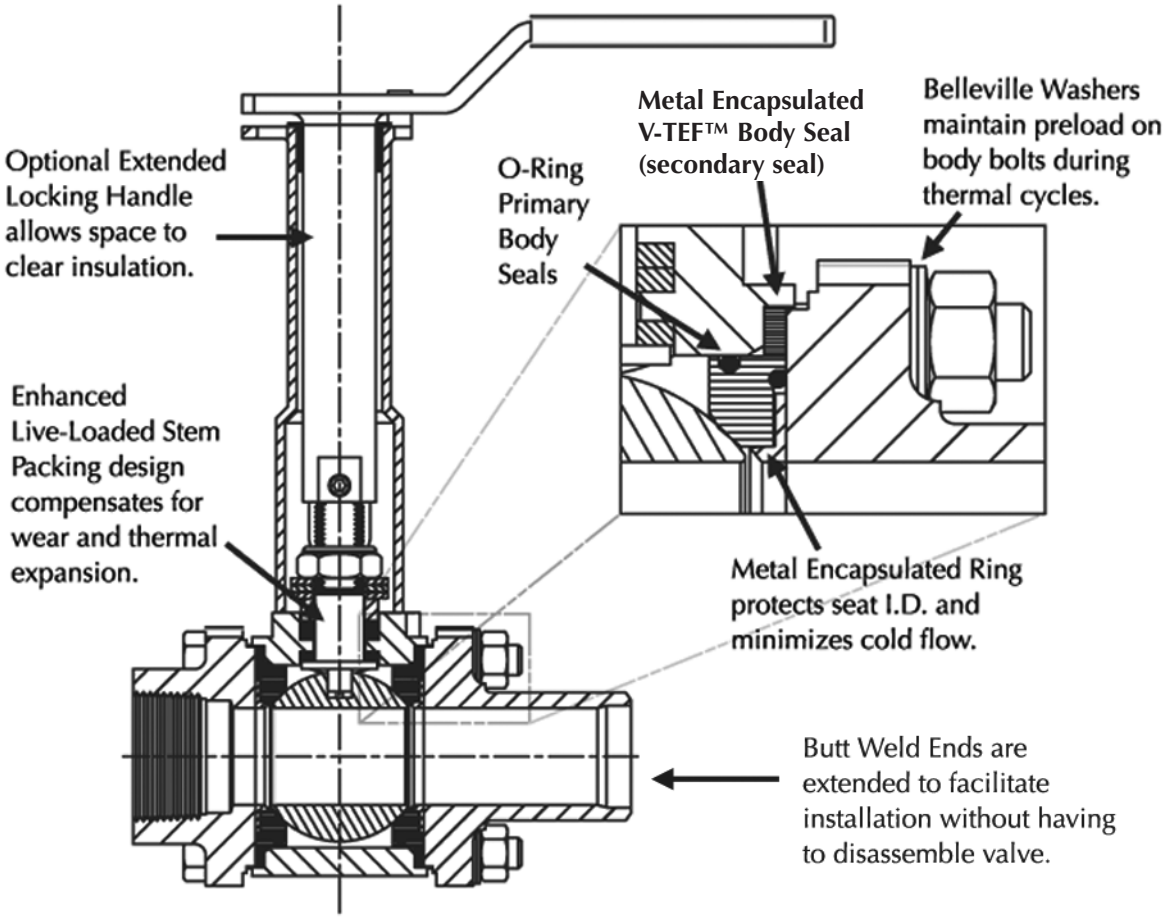
Testing

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

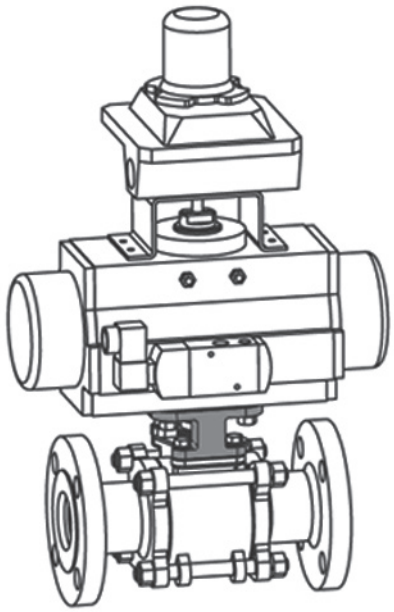
Options

- Trunnion
- 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
- USCG Category A
- ABS Type Approval
- Mechanical & Electro-Polishing
- Direct Mount Actuation
- Positioners
- Fieldbus, AS-i, DeviceNet
- Ball Flats or Purge Holes
- Locking & Ext. Locking Handles
- Internal & External Grounding
- Cylindrical Radius Weld Pads
- V-Balls for Flow Control

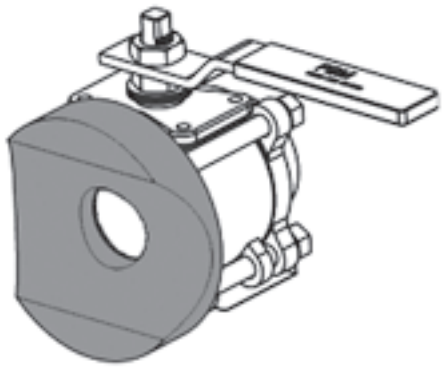
Steam Valves



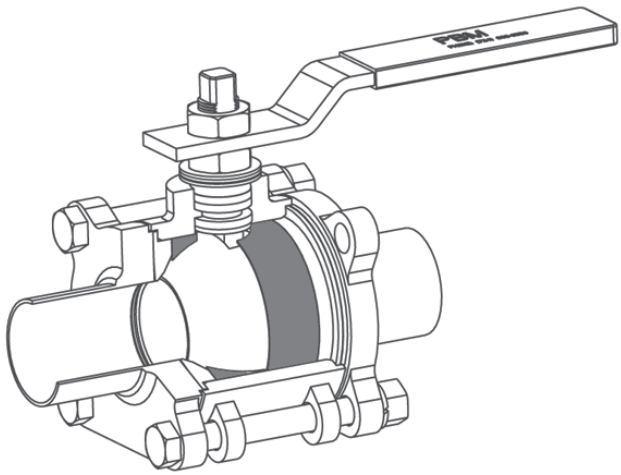
Options



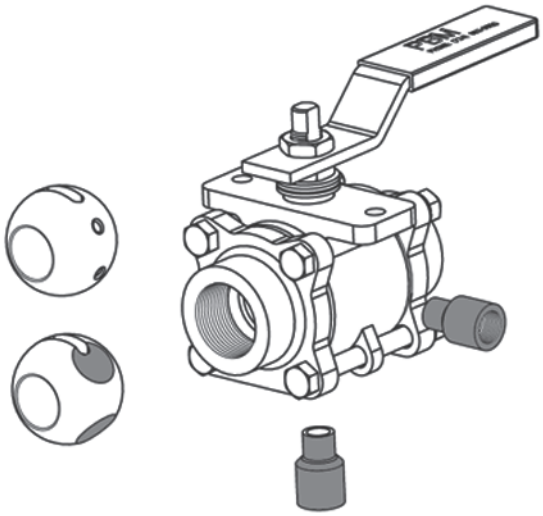
Direct Mount Actuation



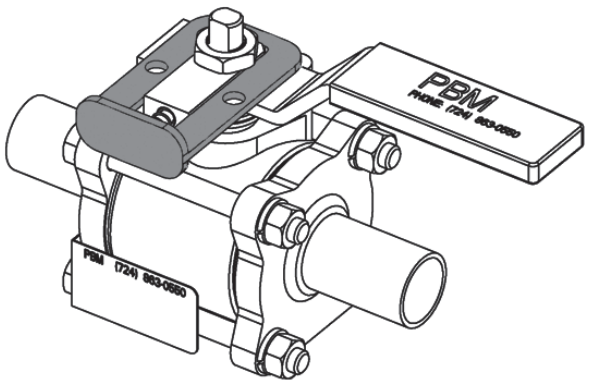
Cylindrical Radius Pad



Cavity Fillers

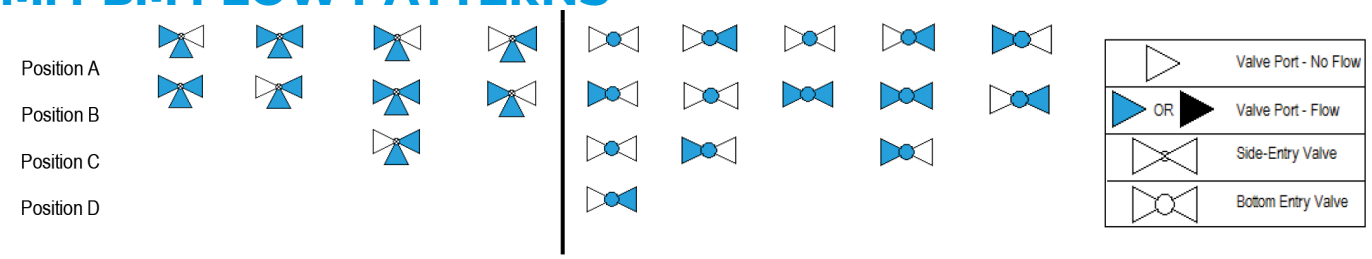


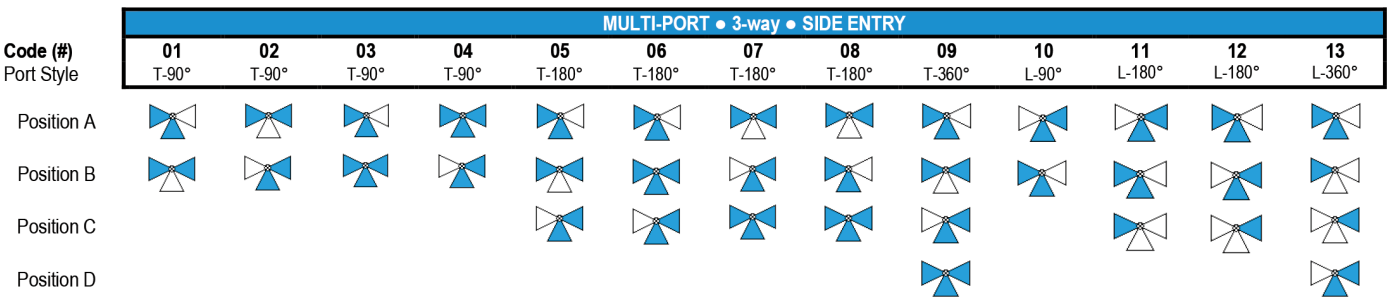
Purge Ports, Milled Flats and Purge Holes

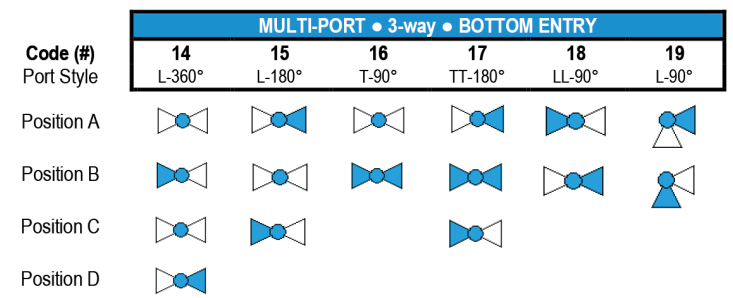


Locking Handle

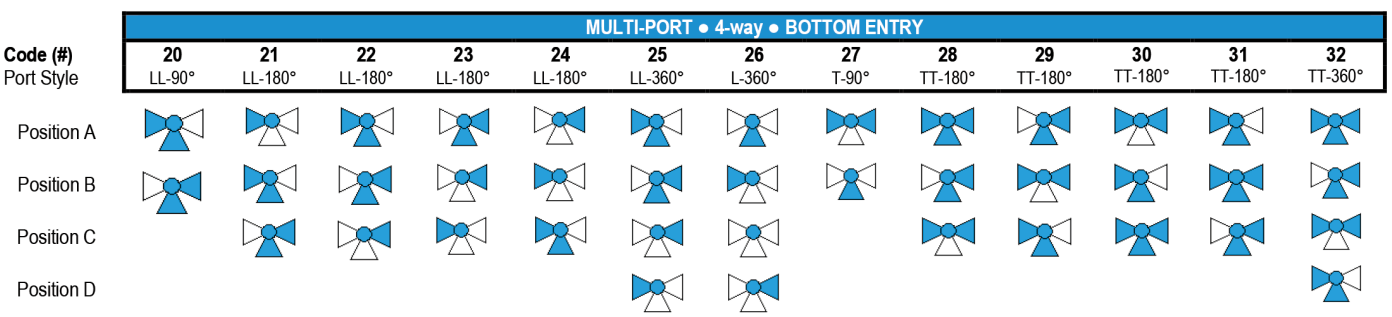
IMI PBM FLOW PATTERNS

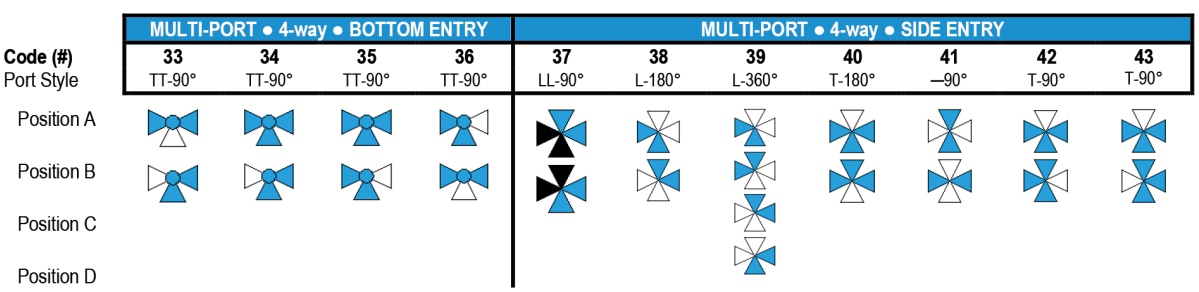


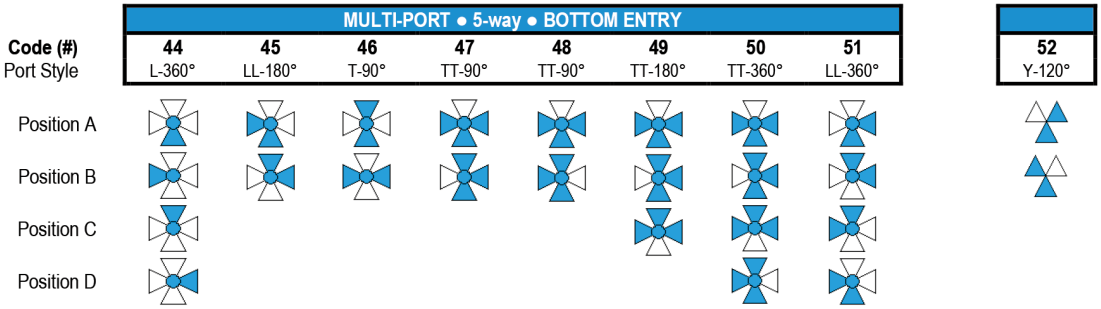




The flow patterns depicted are a birds-eye-view as though you are looking down on the stem.







Metal Seats

IMI PBM's Metal Seated Valve Applications include:

- STEAM SERVICE
- HIGH TEMPERATURE / PRESSURE
- ABRASION RESISTANCE
- MODULATING SERVICE

Design Features:

- 1/2" - 4" in Full Bore, CL150 and CL300 standard
- Design capability to manufacture larger sizes and higher pressure classes
- Temps up to 800˚F/427˚C
- Class V shut-off
- Live-loaded packing assures long maintenance-free operation
- IMI PBM's metal seated valves are fundamentally firesafe
- Valves with weld end fittings can be welded without disassembly.
- Optional patented locking lever handle and complete line of automation and controls
- Complete repair services available - fast turn around on valve repair
- Short lead times on stocked ANSI valves sizes 1/2" through 2"
- SIL-3 capable per IEC 61508
- Extended handles and automation brackets available for higher temperature services.

CHROME CARBIDE	
TYPICAL COMPOSITION, WT%	
Nickel Chrome	20%
Chrome Carbide	Balance
COATING CHARACTERISTICS	
Bond Strength, PSI	>10,000 / 690 bar
Hardness	67
Porosity	2%
Max. Service Temperature	800˚F 427˚C

TUNGSTEN CARBIDE	
TYPICAL COMPOSITION, WT%	
Carbon	3.7%
Iron	0.5%
Nickel	10.0%
Tungsten Carbide	Balance
COATING CHARACTERISTICS	
Bond Strength, PSI	>10,000 / 690 bar
Hardness	65-58 RC
Porosity	<1%
Max. Service Temperature	800˚F/427˚C

Specially designed carbide and/or ceramic thermal spray coatings are a valve industry standard. All of the coatings are applied robotically, using the Accuraspray Plume Sensor System, to insure consistently high quality coatings.

Coating Options:

Chrome Carbide, 20% Nickel/Chrome

A hard coating that does not oxidize at high temperatures. Provides good abrasion, particle erosion cavitation and fretting resistance in high temperature environments. Good corrosion resistance and sliding properties.

Tungsten Carbide, 10% Nickel

A hard, dense coating to resist high abrasive conditions, as well as particle erosion and fretting while providing the corrosion resistance of nickel with minimal loss of heat resistance.

Coating Testing:

- Bond Strength Tensile Test
- Shear Strength Tensile Test
- Macro Hardness Rockwell Test
- Porosity Determination
- Bond Line Contamination
- Abrasion Wear Testing

Written Specifications

SP, SD SERIES 5

Two-Way, Full Port Ball Valve; Body, ball, stem, and end fitting material shall be 316/316L Stainless Steel, HASTELLOY® C-276, Carbon Steel, Bronze Alloy 922, or other. Valve shall be three-piece "swing-out" body design. Seats and seals shall be V-TEF™ - PTFE material and provide both upstream and downstream bubbletight seal and be adjustable for in-line wear. (For SD Series 5 Only - Seats shall be V-TEF™ - PTFE material with EPR O-ring energizer. Seats shall have 316/316L Stainless Steel encapsulation on ID, provide both upstream and downstream bubbletight seal, and be adjustable for in-line wear. Body seal shall be EPR O-rings with V-TEF™ - PTFE back up seal. Body bolts shall be live loaded with Belleville washers). Stem packing shall be live loaded V-TEF™ - PTFE. For manual valves, handle shall be 300 series Stainless Steel with optional lever locking device. Body bolts, nuts, and Belleville washers shall be 18-8 Stainless Steel. 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 not require disassembly for butt welding. Valves shall be non-firesafe design unless otherwise specified. For fire rated valves to API 607, sizes 1/2" - 4", designate Series 6 (see section "FIRE RATED"). IMI PBM Model Number "SP" or "SD" (Material) (Size) 5 (End Connection) (Seat & Seal, Cavity Filler, O-Ring Material).

SD Series 5: Two-Way Full Port Steam Ball Valve; Body, ball, stem, and end fitting material shall be 316 Stainless Steel, HASTELLOY® C-276, Carbon Steel, HASTELLOY® C-22®, Bronze Alloy 922, or other. Valve shall be three-piece "swing-out" body. Seats shall be V-TEF™ - PTFE with EPR O-ring energizer. Seats shall have Stainless Steel encapsulation on ID, provide both upstream and downstream bubbletight seal and be adjustable for in-line wear. Stem packing shall be live loaded white V-TEF™ - PTFE. Body seal shall be EPR O-rings with white V-TEF™ - PTFE back up seal. Optional 300 Series S/S 2" stem extension for 4" thick installation. Valves shall not require disassembly for buttwelding. Body bolts, nuts, and belleville washers shall be 18-8 Stainless Steel. Body bolts shall be live-loaded with belleville washers. Maximum working pressure to be 720 PSIG and full vacuum but is limited based on valve size, valve material, and end fitting type. Valves shall be a non-firesafe design. To add automation and controls, see section "Automation and Controls". IMI PBM Model number SD (Material) (Size) 5 (End Connection).

FT, FD SERIES 5

Flush Tank Bottom Ball Valve; Body, ball, stem, and end fitting material shall be 316/316L Stainless Steel, Hastelloy® C-276, Carbon Steel, Bronze Alloy 922, or other. Weld Pad shall be 316L Stainless Steel or other material (specify). Valve shall be three-piece "swing-out" body design. Seats and seals shall be V-TEF™ - PTFE material and provide both upstream and downstream bubbletight seal and be adjustable for in-line wear. (For FD Series 5 Only - Seats shall be V-TEF™ - PTFE material with EPR O-ring energizer. Seats shall have 316/316L Stainless Steel encapsulation on ID, provide both upstream and downstream bubbletight seal, and be adjustable for in-line wear. Body seal shall be EPR O-rings with V-TEF™ - PTFE back up seal. Body bolts shall be live loaded with Belleville washers). Stem packing shall be live loaded V-TEF™ - PTFE. For manual valves, handle shall be 300 series Stainless Steel with optional lever locking device. Body bolts, nuts, and Belleville washers shall be 18-8 Stainless Steel. Valves shall be non-firesafe design unless otherwise specified. For fire rated valves to API 607, sizes 1/2" - 4", designate Series 6 (see section "FIRE RATED"). To add automation and controls, see section "AUTOMATION AND CONTROLS." IMI PBM Model Number "FT" or "FD"(Material) (Size) 5 (End Connection) (Seat & Seal, Cavity Filler, O-Ring Material).

AF SERIES 1

Angle Stem Flush Tank Bottom Ball Valve; Body, ball, stem, and end fitting material shall be 316/316L Stainless Steel, Hastelloy® C-276, Carbon Steel, Bronze Alloy 922, or other. Weld Pad shall be 316L Stainless Steel or other material (specify). Valve shall be two-piece design. Seats and seals shall be RTFE material and provide both upstream and downstream bubbletight seal and be adjustable for in-line wear. Stem packing shall be live loaded RTFE. For manual valves, handle shall be 300 series Stainless Steel with optional lever locking device. Body bolts and nuts shall be 18-8 Stainless Steel. Valves shall be non-firesafe design unless otherwise specified. For fire rated valves to API 607, sizes 1" - 6", designate Series 3 (see section "FIRE RATED"). To add automation and controls, see section "AUTOMATION AND CONTROLS." IMI PBM Model Number AF (Material) (Size) 1 (End Connection) (Seat & Seal, Cavity Filler, O-Ring Material).

CP SERIES 6, 2-Way Firesafe CRYOGENIC Valve

Uni-directional Flow and Vented Ball; Material shall be 316/316L Stainless Steel or other material (specify). Seats and seals shall be V-TEF™, seat and stem packings shall be live-loaded. Valve shall be uni-directional with body markings for flow direction and upstream vent hole in ball. End connections available include female NPT, 150# ANSI RF flanged, extended butt weld for Sch 40 pipe and extended socket weld ends. Extended ends do not require valve to be disassembled for welding. For manual valves, handle shall be 300 series Stainless Steel. Maximum working pressure to be 720 psig CWP and temperatures from ambient to -320 degrees F (-200 degrees C). Valve shall meet or exceed leakage performance per MSS SP-134. Valves with spiral wound graphite shall be cleaned for oxygen service. Valves with low-emission wire-braided graphite are not O2 clean. Optional automation (Pneumatic or electric), mechanical and electro-polishing surfaces, sizes ½-inch through 4-inch. IMI PBM Model Number CP (Material) (Size) (Series) (End Connection) (Seat & Seal, Cavity Filler, O-Ring Material).

DP, DD SERIES 5

Three-Way, Diverter Port Ball Valve; Body, ball, stem, and end fitting material shall be 316/316L Stainless Steel, Hastelloy® C-276, or other. Valve shall be three-piece design. Seats and seals shall be V-TEF™ - PTFE material and provide both upstream and downstream bubbletight seal and be adjustable for in-line wear. (For DD Series 5 Only - Seats shall be V-TEF™ - PTFE material with EPR O-ring energizer. Seats shall have 316/316L Stainless Steel encapsulation on ID, provide both upstream and downstream bubbletight seal, and be adjustable for in-line wear. Body seal shall be EPR O-rings with V-TEF™ - PTFE back up seal.

Body bolts shall be live loaded with Belleville washers.) Stem packing shall be live loaded V-TEF™- PTFE. For manual valves, handle shall be 300 series Stainless Steel with optional lever locking device. Body bolts, nuts, and Belleville washers shall be 18-8 Stainless Steel. Maximum working pressure to be 900 psig but is limited based on valve size, valve material, and end fitting type. Valves are full vacuum. Specify IMI PBM Flow Pattern. To add automation and controls, see section "AUTOMATION AND CONTROLS". IMII PBM Model Number "DP" or "DD" (Material) (Size) 5 (End Connection) (Seat & Seal, Cavity Filler, O-Ring Material) (IMI PBM Flow Pattern).

AN SERIES 1

Two-Way, ANSI Flanged Full Port Ball Valve; Body, ball, stem, and end fitting material shall be 316/316L Stainless Steel, Hastelloy® C-276, Carbon Steel, Bronze, Aluminum Bronze, or other. Valve shall be two-piece "split body" design. Seats and seals shall be RTFE material with Viton® or EPR O-Ring body seal. Seats shall provide both upstream and downstream bubbletight seal and be adjustable for in-line wear. Stem packing shall be live loaded RTFE. End fittings shall be ANSI 150# flanged per ANSI B16.5 and face-to-face dimension shall conform to ASME B16.10 Long Pattern. For manual valves, handle shall be 300 series Stainless Steel with optional lever locking device. Body bolts and nuts shall be 18-8 Stainless Steel. Maximum working pressure to be 285 psig, but is limited based on valve size, valve material, and end fitting type. Valves are full vacuum. Valves shall be 100% tested per ASME / ANSI B16.34. Valves shall be non-firesafe design unless otherwise specified. For fire rated valves to API 607, sizes 1/2" - 6", designate Series 3 or Series 6 (see section "FIRE RATED"). To add automation and controls, see section "AUTOMATION AND CONTROLS." IMI PBM Model Number AN (Material) (Size) 1 (End Connection) (Seat & Seal, Cavity Filler, O-Ring Material).

AN SERIES 5

Two-Way, ANSI Flanged Full Port Ball Valve; Body, ball, stem, and end fitting material shall be 316/316L Stainless Steel or Carbon Steel. Valve shall be two-piece "split body" design. Seats and seals shall be V-TEF™ - PTFE material with Viton® or EPR O-Ring body seal. Seats shall provide both upstream and downstream bubbletight seal and be adjustable for in-line wear. Stem packing shall be live loaded V-TEF™ - PTFE. End fittings shall be ANSI 150# flanged per ANSI B16.5 and face to face dimension shall conform to ASME B16.10 Long Pattern. For manual valves, handle shall be 300 series Stainless Steel with optional lever locking device. Body bolts and nuts shall be 18-8 Stainless Steel. Maximum working pressure to be 740 psig but is limited based on valve size, valve material, and end fitting type. Valves are full vacuum. Valves shall be 100% tested per ASME / ANSI B16.34. Valves shall be non-firesafe design unless otherwise specified. For fire rated valves to API 607 E, sizes 1/2" - 4", designate Series 6 (see section "FIRE RATED"). To add automation and controls, see section "AUTOMATION AND CONTROLS." IMI PBM Model Number AN (Material) (Size) 5 (End Connection) (Seat & Seal, Cavity Filler, O-Ring Material).

MP SERIES 1, 4 AND 5

Three, Four, or Five Way Multi-port Ball Valve; Body, ball, stem, and end fitting material shall be 316/316L Stainless Steel, Carbon Steel, Hastelloy® C-276, or other (Series 1 only - Ductile Iron and Bronze). Valve shall have 4 or 5 V-TEF™ - PTFE (Series 1 only - RTFE) seats and seals and provide bubbletight seal and be adjustable for in-line wear. Stem packing shall be live loaded V-TEF™ - PTFE (Series 1 only - RTFE). For manual valves, handle shall be 300 series Stainless Steel (Series 4 or 5 - optional lever locking device). Body bolts and nuts shall be 18-8 Stainless Steel. Maximum working pressure to be 720 psig, (Series 1 only - 400 psig) but is limited based on valve size, valve material, and end fitting type. 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 MP (Material) (Size) (Series) (End Connection) (Seat & Seal, Cavity Filler, O-Ring Material) (IMI PBM Flow Pattern).

TI SERIES 5

Transmitter Isolation Ball Valve; Body, ball, stem, and end fitting material shall be 316/316L Stainless Steel, Hastelloy®, Titanium, or others with 1" or 2-1/2" port diameter. Tank side flange to accommodate both standard ANSI 3", 150# flange drilling and a 25 to 27 degree offset flange pattern. Instrument side flange shall be drilled to accommodate a standard ANSI 3", 150# flange drilling. Valve shall have a 1/4 turn manual 300 series Stainless Steel handle with lever locking device. Valve shall have four (4) 1/4" FNPT Purge Ports, each with a 1/4" MNPT plug made from the same material as the valve body. Seats and seals shall be V-TEF™ - PTFE material with VTFE O-ring. IMI PBM Model Number TI (Material) (Size) 5 (End Connection) (Seat & Seal, Cavity Filler, O-Ring Material).

FIRE RATED (SERIES 3 AND SERIES 6)

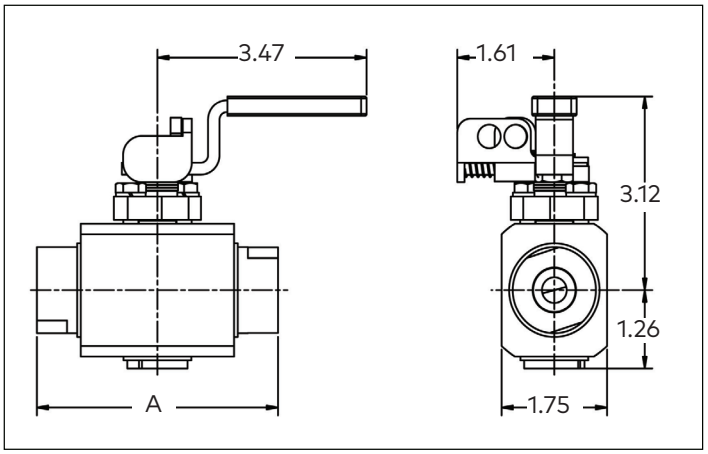
Two-Way, Industrial Ball Valve; SP Series 6 and FT Series 6, 1/2" - 3", AN Series 6, 1/2" -4", AN Series 3 and AF Series 3, 1" - 6". Valve design shall be tested and comply with criteria set forth in API-607. Valve body bolts to be fully encapsulated. Valve design is non-Adjust-O-Seal®. Body seals shall be graphite material isolated from product stream under normal operating 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. Maximum working pressure to be 720 PSIG and full vacuum but is limited based on valve size, valve material, and end fitting type. IMI PBM Model Number (Product)(Material) (Size) (Series) (End Connection) (Seat & Seal Material).

AUTOMATION AND CONTROLS

Direct Mount Automated Ball Valves; Valves as specified in "Manual Valves" section with the addition of a "Direct Mount" double acting or spring return pneumatic actuator. Actuator shall be of the double opposing piston, rack and pinion design with bidirectional pinion travel stops and hard anodized aluminum oxide body with co-deposited flouropolymer. 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 drove adapter. Actuators shall be sized utilizing a 100% safety factor. Specify supply air pressure at actuator (60 or 80 PSIG). IMI PBM Model Number starts with "PA". 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.

Instrument Valves

IMI PBM's Instrument Valve is used for process isolation or isolation of pressure gauges, orifice plates, flush rings and various measurement instruments. Valves are designed to ASME B16.34. They offer a higher performance solution to needle valves.



SIZES

- 1/4" to 2" with available bore sizes of .41", .50", and .75"

PRESSURE CLASS

- Up To ANSI Class 2500 (Class 1500 standard)

MATERIALS

- Stainless Steel
- Duplex Stainless Steel
- Carbon Steels
- Monel®
- Hastelloys®
- Others Available

END CONNECTIONS

- Extended Male or Female NPT
- Male or Female NPT
- Flanged
- Buttweld (tube or pipe)
- Ext. Socket Weld
- Compression
- Instrument Adapter Flange
- Others Available

2-WAY VALVE End Fitting	A inches	A mm
Ext. Male NPT	6.50	165
Male NPT	4.75	121
Female NPT	4.00	102
Ext. Female Socket Weld	6.50	165
Buttweld for Sch. 40 Pipe	6.50	165
Buttweld for Tube	6.50	165

Notes: Dimensions shown for Class 1500 1/2" valves only. Design is rodable with rod out tool.

FEATURES

- Quarter Turn Operation
- Optional Extended Handle with lock out
- Bleed or Gauge Ports Available
- Soft and Metal Seated Designs
- Welded Body
- Rodable in 1/4" - 3/4"
- API-622 Low-E Stem Packing Standard
- SIL-3 Capable per IEC 61508
- API-607 Fire Rated
- Certified to API-641
- Can comply with API-6D if specified

SEATING

- V-TEF™ Seats: 350° F (176° C)
- S-TEF® Seats: 400° F (204° C)
- PEEK® Seats: 500° F (260° C)
- C-TEF™ Seats: 600° F (315° C)
- Stellite® Ball & Seats: 800° F, (427°C)
- Tungsten or Chrome Carbide Coated S/S Ball & Seats: 800° F (427°C)

PACKING

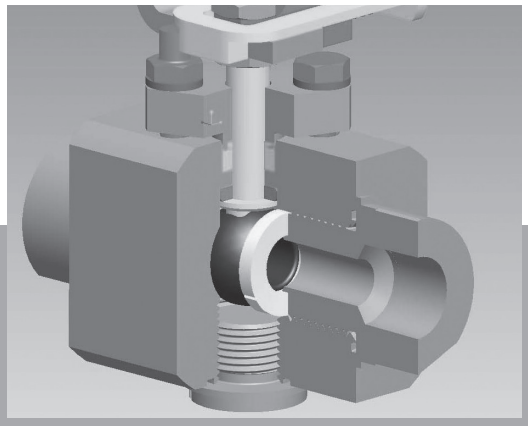
- Die molded Graphite (High Temperature)
- C-TEF™, V-TEF™ or S-TEF®
- API-622 Low-E Stem Packing Standard

TESTING AND DOCUMENTATION

- MTR Material Test Reports)
- PMI (Positive Material Identification)
- LP (Liquid penetrant)
- Radiographic examination
- Pressure testing per API 598
- Magnetic particle examination
- Ultrasonic examination

Notes: IMI PBM can comply with PI-6D if specified.

IMI PBM's New Style Instrument Valves are Tested & Proven to the API 622 Standard



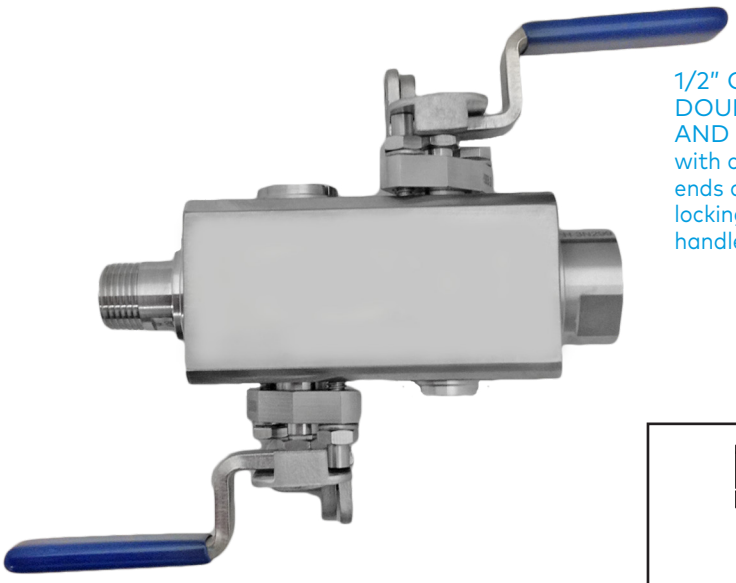
What makes IMI PBM valves API 622?

IMI PBM's Instrument (IM) new style valves standardize on a product offering with API 622 packing which certifies IMI PBM valves for low emission technology.

The API 622 packing features:

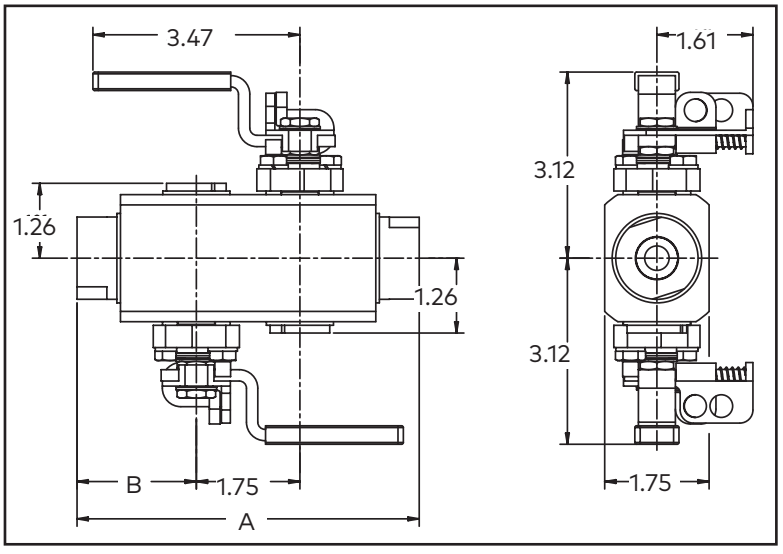
- Average stem packing leakage ≤ 10 ppmv for the duration of the test (100 ppm allowable)
- API-607 fire tested
- Successfully passed API-622 testing, test report available upon request.

Double Block & Bleed Valves



1/2" CL1500 DOUBLE BLOCK AND BLEED VALVE with compression ends and locking lever handles

API Standard 622 Test Report
"Type Testing of Process Valve Packing for Fugitive Emissions"
Second Edition, 2011
Performed for
PBM, Inc.
http://www.pbmvalve.com
1/2" Valve Stem Assembly
Product Code: SK-P001
Project Number: 213034
Test Start Date: January 25, 2013
Performed by
YARMOUTH RESEARCH AND TECHNOLOGY, LLC
434 Walnut Hill Road
North Yarmouth, ME 04097 USA
(207) 829-5359



DBB VALVE End Fitting	A in.	A mm	B in.	B mm
Extended Male NPT	8.25	210	3.25	83
Male NPT	6.50	165	2.37	60
Female NPT	5.75	146	2.00	51
Ext. Female Socket Weld	8.25	210	3.25	83
Buttweld for Sch. 40 Pipe	8.25	210	3.25	83
Buttweld for Tube	8.25	210	3.25	83

Notes: Dimensions shown for 1/2" valves only.
Design is rodable with rod out tool.

Bolted Instrument Valves

IMI PBM's bolted Instrument Valve design allows end connection design and fabrication flexibility. It is available in a wide range of materials for a variety of temperature and pressure classes to meet your most stringent process applications.

FEATURES

- Full and Reduced Port Design
- Customizable End Connections
- Quarter Turn Operation
- Bleed or Gauge Ports Available
- Bolted Body
- API-607 Fire Rated
- Braided Graphite Packing
- API-641 Low-E, Standard
- Gear Operator recommended for 1-1/2" and above

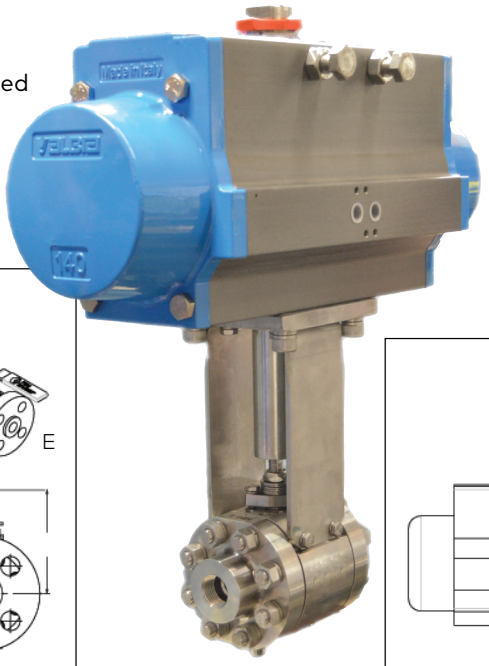
SIZES

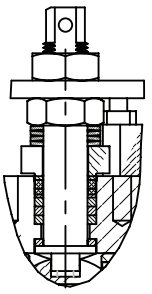
- 1/2" - 2" CL600, CL900 and CL1500

SEATING

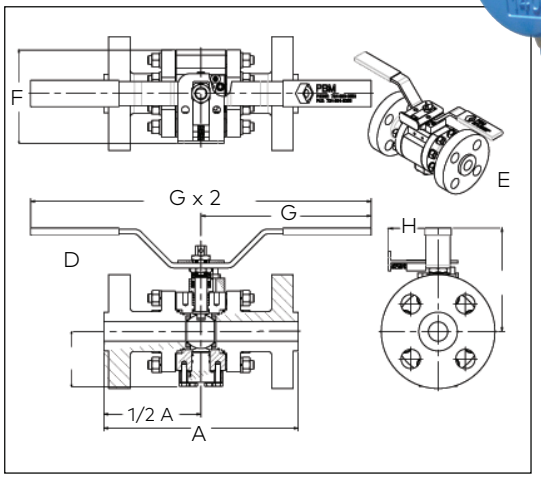
- V-TEF™ Seats: 350°F (176°C)
- S-TEF® Seats: 400°F (204°C)
- PEEK® Seats: 500°F (260°C)
- C-TEF™ Seats: 600°F (315°C)
- Stellite® Ball & Seats: 800°F (427°C)
- Tungsten or Chrome Carbide Coated S/S Ball & Seats: 800°F (427°C)

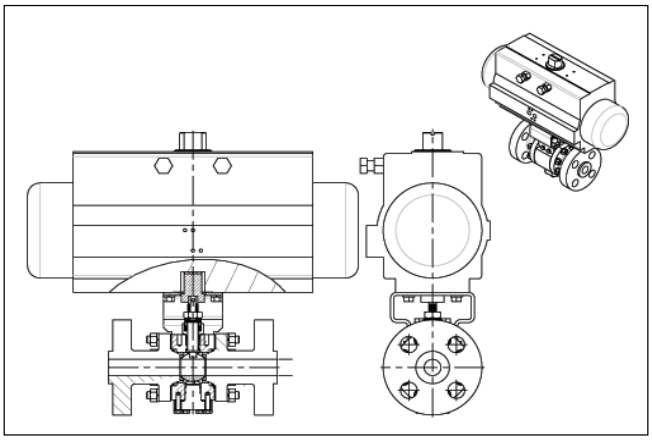
Size	Ends	Units	A		D		E		F		G		H	
			Overall Length		CL to Bottom of Valve (2-Way)		Distance to Top of Valve		Body Width Without Ends		Handle Radius		CL to Locking Mechanism	
			CL600	CL1500	CL600	CL1500	CL600	CL1500	CL600	CL1500	CL600	CL1500	CL600	CL1500
1/2" DN 15	Flanged	in (mm)	6.5 (165)	8.5 (216)	1.72 (44)		3.02 (77)		2.4 (61)		3.47 (88)		1.61 (41)	
	Female NPT	in (mm)	4.75 (121)											
	Others	in (mm)	8.5 (216)											
3/4" DN 20	Flanged	in (mm)	7.5 (191)	9 (229)	2.33 (59)		4.06 (103)		3.75 (95)		10.09 (256)		2.08 (53)	
	Female NPT	in (mm)	5.5 (140)											
	Others	in (mm)	9.06 (230)											
1" DN 25	Flanged	in (mm)	8.5 (216)	10 (254)	2.92 (74)		4.81 (122)		4.5 (114)		14.06 (357)		2.57 (65)	
	Female NPT	in (mm)	6 (152)											
	Others	in (mm)	10 (256)											
1-1/2" DN 40	Flanged	in (mm)	9.51 (242)	12.01 (305)	2.82 (72)	4.17 (106)	5.76 (146)	7.18 (182)	5.50 (140)	7.5 (191)	18.06 (459)	24.06 (611)	3.45 (88)	
	Female NPT	in (mm)	6.5 (165)	7.5 (191)										
	Others	in (mm)	12.31 (313)											
2" DN 50	Flanged	in (mm)	11.5 (292)	14.5 (368)	3.42 (87)	4.82 (122)	6.25 (159)	7.43 (189)	6.25 (159)	8..00 (203)	18.06 (459)	24.06 (611)	3.45 (88)	
	Female NPT	in (mm)	8 (203)	10 (254)										
	Others	in (mm)	13.31 (338)											



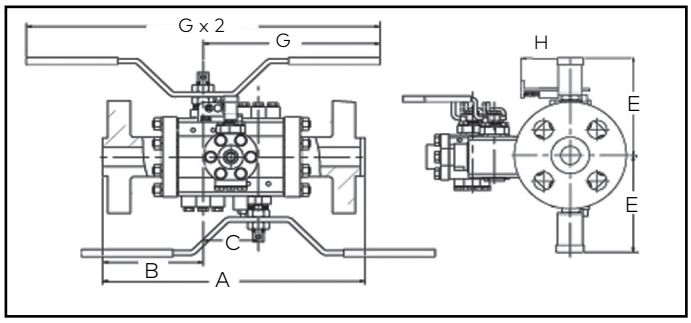


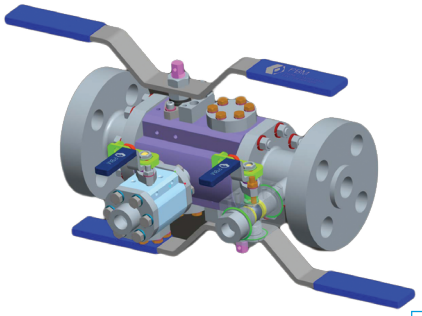
The high temperature valve version consists of carbide coating on the ball and seats.

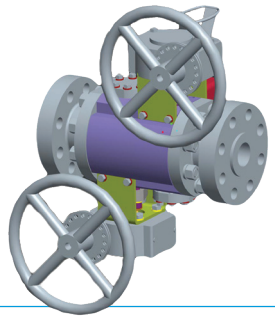




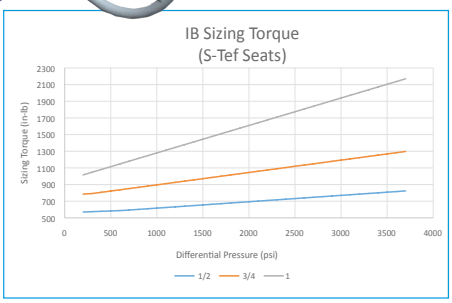
Bolted Double Block & Bleed Valves

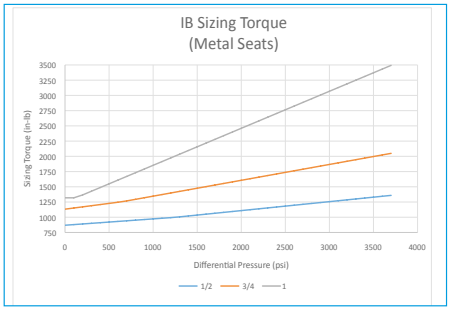


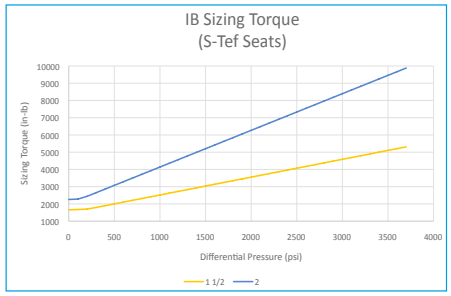


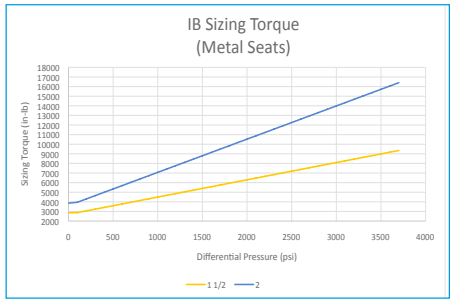


Size	Ends	Units	A		B		C		E		F		G		H	
			Overall Length		℄ to End		Ball Separation		Distance to Top of Valve		Body Width w/o Ends		Handle Radius		℄ to Locking Mechanism	
			CL600	CL1500	CL600	CL1500	CL600	CL1500	CL600	CL1500	CL600	CL1500	CL600	CL1500	CL600	CL1500
1/2" DN 15	Flanged	in (mm)	8.25 (210)	10.25 (260)	3.25 (83)	4.25 (108)	1.75 (44)		3.02 (77)		2.40 (61)		3.47 (88)		1.61 (41)	
	Female NPT	in (mm)	6.5 (165)		2.375 (60)											
	Others	in (mm)	10.25 (260)		4.25 (108)											
3/4" DN 20	Flanged	in (mm)	10 (254)	11.5 (292)	3.75 (95)	4.5 (114)	2.50 (64)		4.06 (103)		3.75 (95)		10.09 (256)		2.08 (53)	
	Female NPT	in (mm)	8 (203)		2.75 (70)											
	Others	in (mm)	11.56 (293)		4.53 (115)											
1" DN 25	Flanged	in (mm)	11 (279)	12.50 (318)	4.25 (108)	5 (127)	2.50 (64)		4.81 (122)		4.5 (114)		14.06 (357)		2.57 (65)	
	Female NPT	in (mm)	8.50 (216)		3 (76)											
	Others	in (mm)	12.56 (319)		5.03 (128)											
1-1/2" DN 40	Flanged	in (mm)	13.01 (330)	15.76 (400)	4.75 (121)	6 (152)	3.50 (89)	3.75 (95)	5.76 (146)	7.18 (182)	6 (152)	7.5 (191)	18.06 (459)	24.06 (611)	3.45 (88)	
	Female NPT	in (mm)	10 (254)	11.25 (286)	3.25 (83)	3.75 (95)										
	Others	in (mm)	15.81 (402)		6.16 (156)											
2" DN 50	Flanged	in (mm)	15.25 (387)	18.75 (476)	5.75 (146)	7.25 (184)	3.75 (95)	4.25 (108)	6.25 (159)	7.43 (189)	6.75 (171)	8 (203)	18.06 (459)	24.06 (611)	3.45 (88)	
	Female NPT	in (mm)	11.75 (298)	14.25 (362)	4 (102)	5 (127)										
	Others	in (mm)	17.06 (433)	17.56 (446)	6.67 (169)											

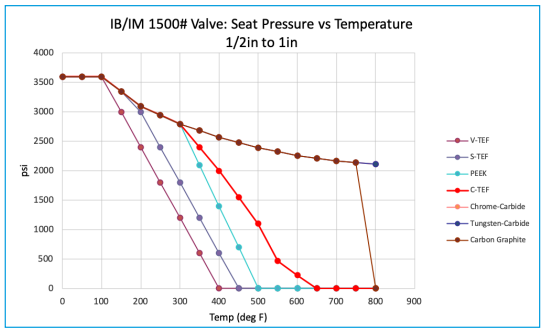


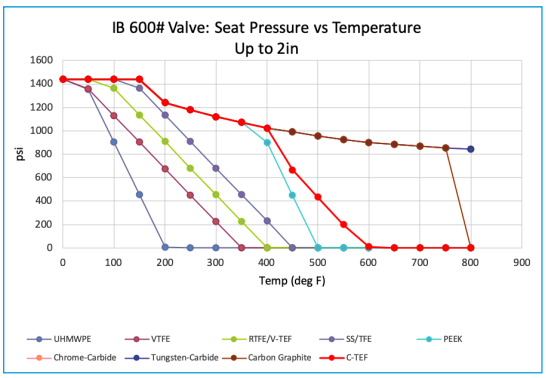






BOLTED INSTRUMENT VALVES
PRESSURE/TEMPERATURE AND TORQUE CHARTS

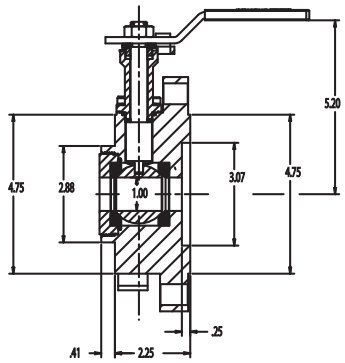


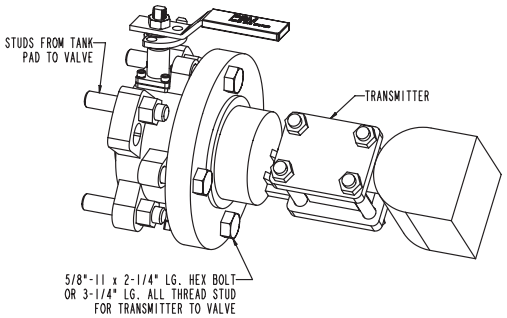


Transmitter Isolation Valves

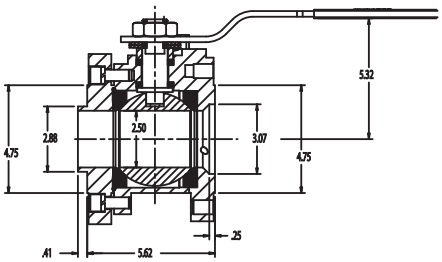
IMI PBM Transmitter Isolation Valves are valves used to isolate media in a tank from a pressure/level transmitter. The valve when in the open position creates a communication between the media in the tank and the transmitter. The valve is only closed when the transmitter needs to be isolated for service.

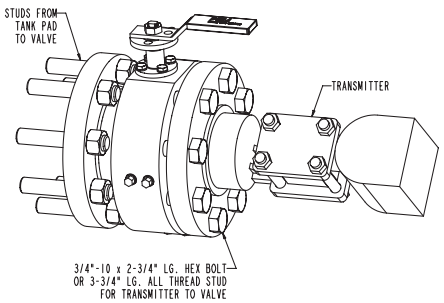
1" PORT X 3" FLANGED





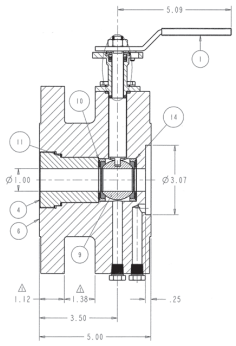
2-1/2" PORT X 3" FLANGED



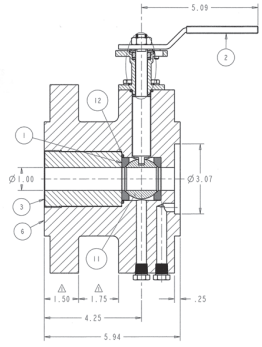


Full or True Bore® Port ANSI Style Transmitter Isolation Valves provide value to the customer.

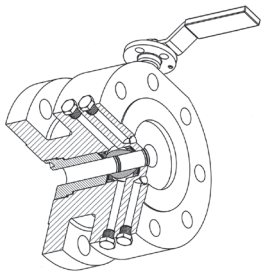
Transmitter Isolation Valves CL300, CL600



ANSI CL300



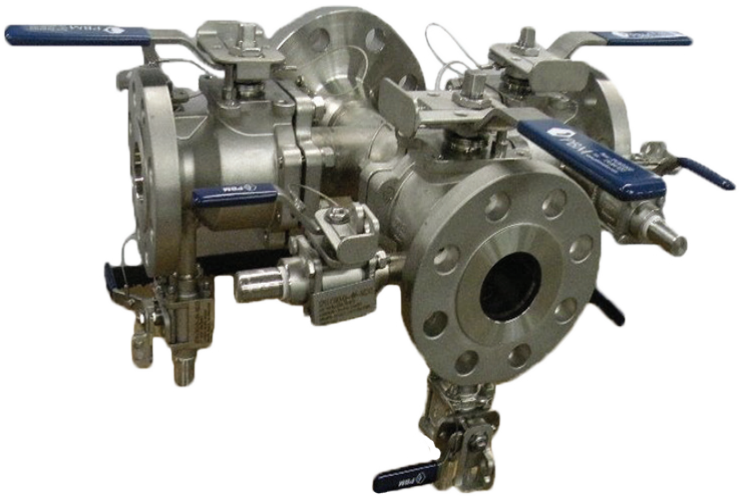
ANSI CL600

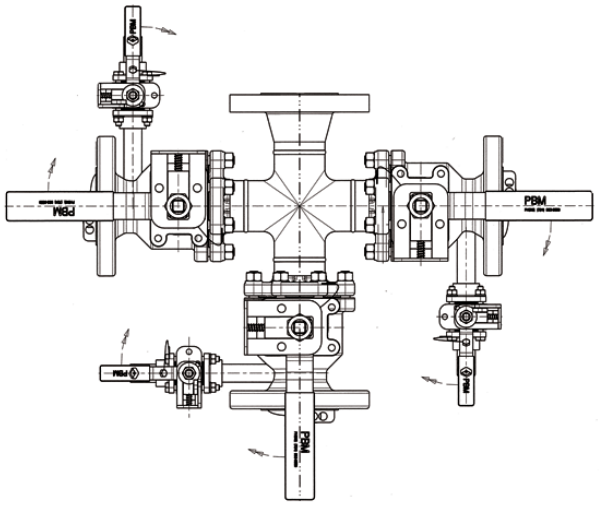


Pressure Classes: 150-600
Sizes: 1x2, 1x3, 2.5x3 inch (ball port size x flange size)
Any Materials, Temps <800°F
Purge/Cal Port Sizes: 1/4 or 1//2 inch FNPT (2 or 4 ports available)
Made to Order. Custom configurations availalbe.

Fabflex® Instrumentation Valve Manifolds

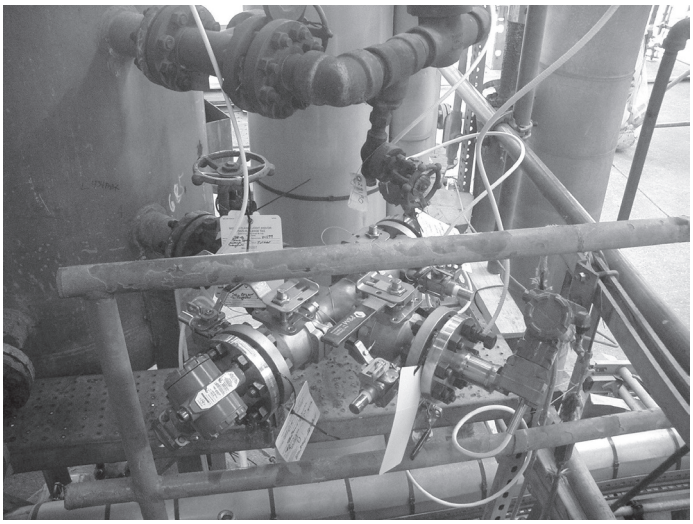
IMI PBM's Valve Manifolds have temperatures that range from 300˚ to 600˚ F, 149 to 316˚C with pressures from 150 to 400 psig, 10 to 28 barg. A refinery uses these manifolds for measuring as well as level indication.

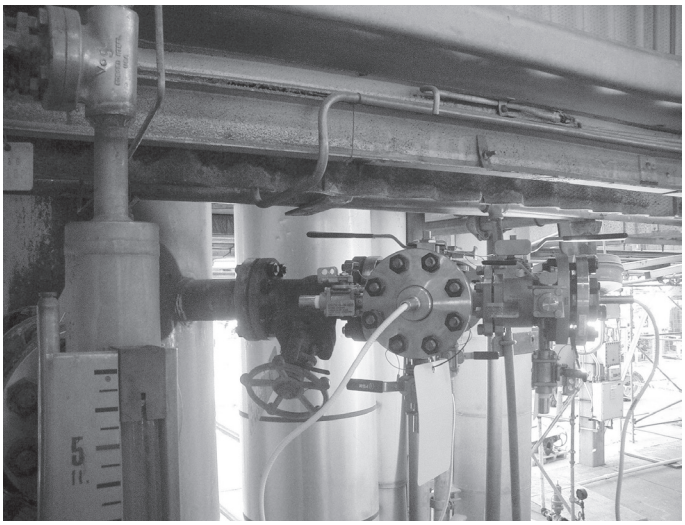




Fablex® Fabricated Manifold Solution

- Custom IMI PBM Fabflex® manifold design for multiple instrumentation mounts.
- Custom manifold design to optimize space utilization.
- Factory fabricated in a controlled manufacturing environment to ensure high quality welding fabrication process.
- Individual valves fabricated "into" the manifold eliminating many emission leak paths to improve the overall EPA rating of the system.
- Field installation simplified into bolting up one flange and installing the transmitters, transducers or other instrumentation.





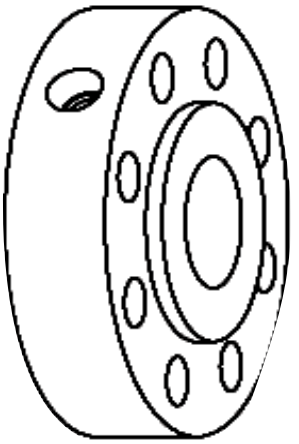
Flush Rings/Bleed Rings with Integral Valve

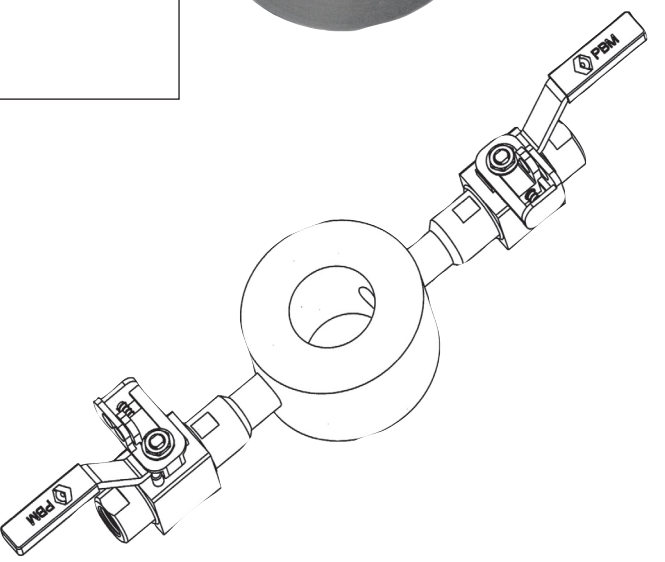
Flush Rings and Bleed Rings to customer material and pressure class specifications designed to fit between standard flanges using conventional flange gaskets. Integral ball valve allows venting purging, sampling and instrument isolation.

Sizes
- 2" width standard
- Consult IMI PBM for additional sizes

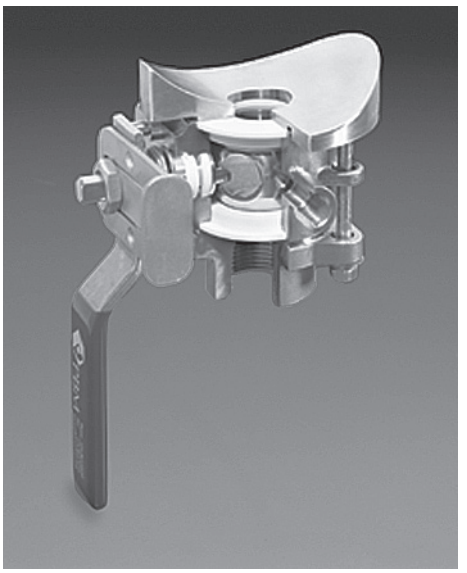
Features
- Integral code-welded valve for flushing purging and instrument isolation.

Materials
- Stainless Steel
- Duplex
- Hastelloy®
- Others





Sampling Tank Bottom 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 valves standard.

Sizes
- 1/2" - 2"

Materials
- 316 & 316L Stainless Steel
- Hastelloy®
- Titanium
- Others

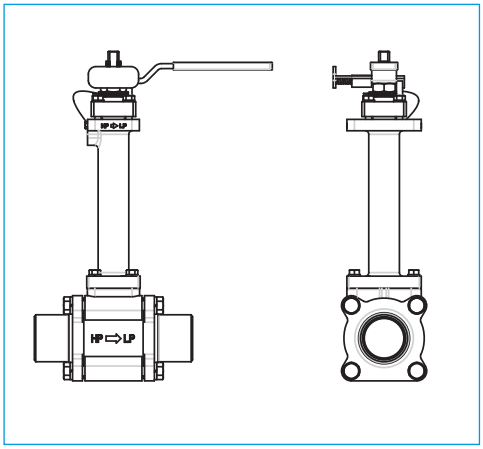
Options
- Actuation
- Steam
- Polishing

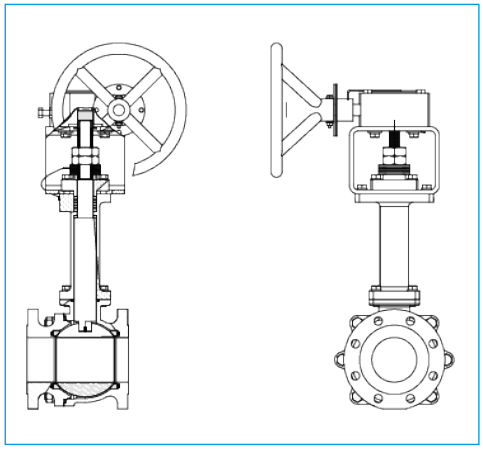
Cryogenic Ball Valves

IMI PBM Cryogenic Valves have a unique design that provides superior performance through cooling and heating cycles. The valves meet leakage criteria per MSS SP-134. Fire tested to API-607. "CN" series split body ANSI flanged Cryogenic Valves are also available.

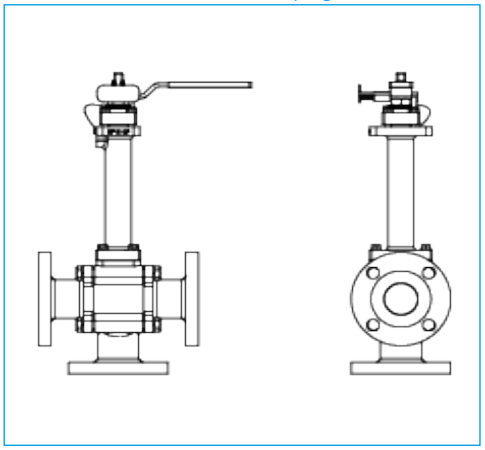
- Sizes 1/2" - 4" Consult IMI PBM for additional sizes.
- Temperatures from 400˚F (205˚C) down to -320˚F (-200˚ C)
- Live-loaded stem packings
- Fire safe to API 607
- Designed & Tested in accordance with ASME B31.1 and B16.34.
- Materials of construction: Stainless Steel, other materials available.
- Pressures to 720 psi CWP (ANSI CL300)
- Cleaned for oxygen service
- Quarter turn operation
- Locking lever handle or optional oval locking handwheel
- Automation available
- V-TEF™ seats/graphite seals
- Internal and external grounding
- Uni-directional flow and vented ball
- Valve meets or exceeds leakage performance per MSS SP-134
- Optional API-622 Low-e Packing (cannot be lox cleaned)

"CP" Series 2-Way Cryogenic Valves

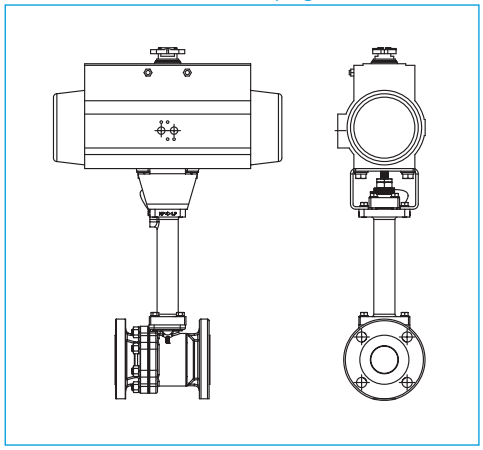




"CD" Series Diverter Cryogenic Valves



"CN" Series ANSI Cryogenic Valves



Actuator Features

Nominal Values:

Pressure rating of 120 psig (8 barg).
Standard temperature range is -4°F (-20°C) to 185°F (85°C). High temperature range is -4°F (-20°C) to 302°F (150°C). Low temperature range is -40°F (-40°C) to 185°F (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 counterclockwise 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 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 52-DIN 3337
- Optional Beacon Indicator

Operating Pressure

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

Operating Media

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

Stroke

- 90 degrees standard

Steel Pinion

- Nickel-plated for resistance to corrosion
- Stainless steel (optional) for corrosive enviroments
- 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 dimenstions and technical information.

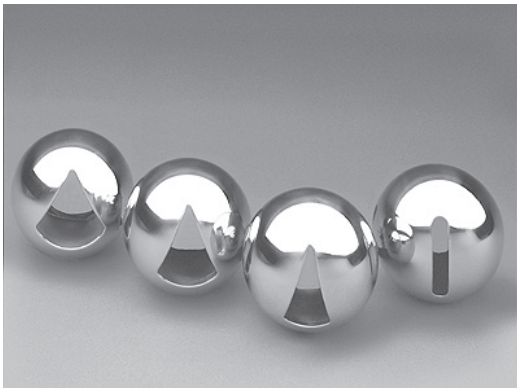
Control Valves

Use IMI PBM's 2-Way Control Valves in industrial and sanitary 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 Stainless Steel
- Hastelloy®
- Others

Options:
- Actuation
- 30°, 45°, 60° V Angle (Others Available)
- Slotted
- Locking Handle
- Polishing & Electropolishing
- Automation



Positioners

- Gauges/No gauges
- 4-20 mA (Electro-pneumatic)
- 3-15 psi (pneumatic)
- Weatherproof, explosion proof
- Proximity, Mechanical Switches
- Solid State Sensors
- Flat or Domed Indicator

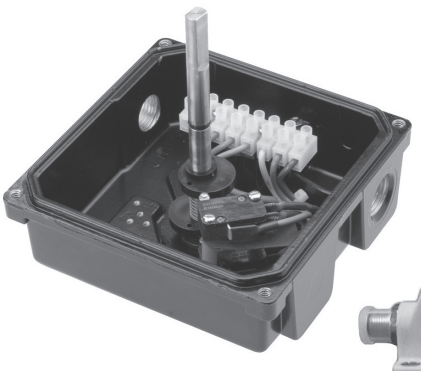
Electric Actuators

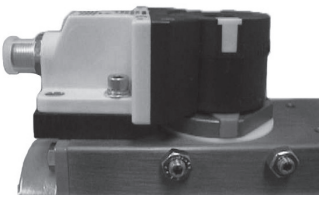
- Weatherproof, explosion proof
- Modulating or On/Off
- 2, 3, or 4 position
- Battery back-up
- Communication Bus interfaces available
- Auxiliary Limit Switches
- Motor Brake
- Handwheel override
- Potentiometers
- AC or DC

Solenoids

- 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





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

Breakthrough Engineering

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CE

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