PBM VALVE SOLUTIONS

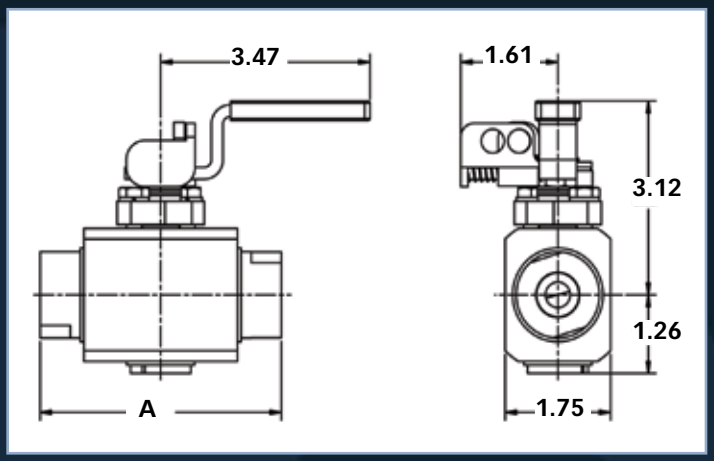
ENERGY INDUSTRY VALVES

- DOUBLE BLOCK AND BLEED
- FLUSH AND BLEED RINGS
- INSTRUMENT AND TRANSMITTER ISOLATION VALVES
- LOW-EMISSION PACKING DESIGN
- PROCESS FLOW
- SAMPLING

2-Way Instrument Valves
Instrument Isolation and Process Flow

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

PBM Double Block and Bleed Valves are custom engineered from standard components in a variety of alloys and pressure classifications to meet customer specifications. All PBM double block and bleed valves are made in the USA and have full supporting material and testing documentation available. PBM valves are trusted by major oil refineries where safety and reliability are critical. Valves are also designed to ASME B16.34.



SIZES

- 1/2" and 3/4" sizes with 0.41 bore

PRESSURE CLASS

- 1/4" - 3/4" 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

Certified SIL-3 Capable per IEC 61508

2-WAY VALVE with .41 dia. port 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 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

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

SEATING

- TFM™ Seats: 350˚F (176˚C)
- S-TEF® Seats: 400˚F (204˚C)
- PEEK® Seats: 500˚F (260˚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)
- TFM™ or S-TEF®
- API-622 Low-E Stem Packing Standard in 1/2" and 3/4" sizes with .41 bore. It is optional in larger sizes.

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

Double Block & Bleed
Instrument Isolation & Process Flow

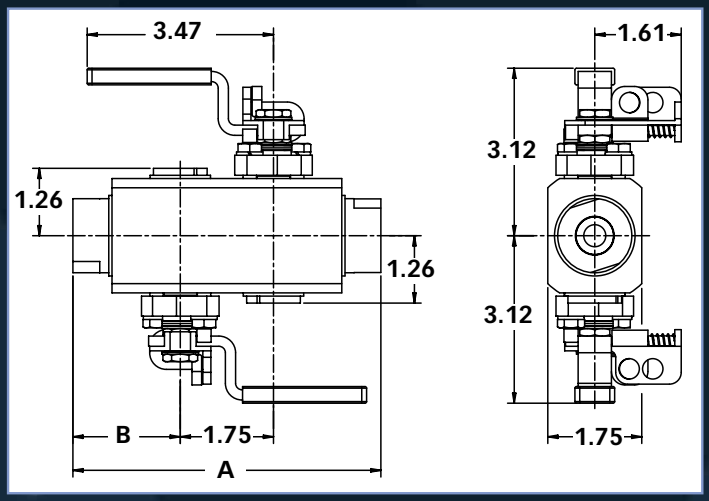
The PBM difference - True Double Positive Isolation

PBM double block and bleed valves provide true double positive isolation:

- **Two independent sealing members (two ball and seat combinations)**
- Two separate actuating mechanisms (two stems and handles or actuators)

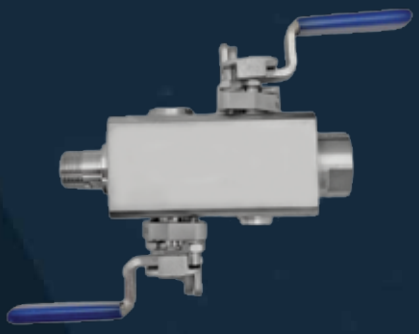
This configuration provides the best technology for the most severe isolation services where double block and bleed is required.

Double Positive Isolation when safety is critical.



PBM DBB/DPI IM (Instrument valve)
with locking lever handles and ends and API 622 Low E Packing

Temp: <800˚F
Pressure: CL 2500
Sizes: 1/2" - 1 inch
Ends: Any



PBM Standard/ DPI IM (Instrument valve)
with locking lever handles

Temp: <800˚F
Pressure: 2000 WOG
Sizes: 1/4" - 1 inch
Ends: Any

DBB VALVE .41 dia. port End Fitting	A in.	A mm	B in.	B mm
Extended Male NPT	8.25	210	4.13	105
Male NPT	6.50	165	3.25	83
Female NPT	5.75	146	2.88	73
Ext. Female Socket Weld	8.25	210	4.13	105
Buttweld for Sch. 40 Pipe	8.25	210	4.13	105
Buttweld for Tube	8.25	210	4.13	105

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

PBM DBB/DPI Configurations)
3-piece High Temp, High Pressure DBB/DPI

Temp: <800˚F
Pressure: CL 1500
Sizes: 3, 4 CL600 only
Ends: Any

True DPI in 5 configurable body styles:

- Smaller than traditional 2 valve designs
- Lower potential emissions due to less flange connections
- 1/2 Inch through 12 inch
- Full or standard (reduced) port
- Fire rated to API 607 Rev. 4
- API-622 low emissions packing available
- Various bleed or purge options available
- Exteneded handles available
- 1/4 turn ball valve enables easy open/close and visual indication of valve position.

Certified SIL-3 Capable per IEC 61508

PBM Bolted Instrument Valves

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 Designs
- Customizable End Connections
- Quarter Turn Operation
- Bleed or Gauge Ports Available
- Bolted Body
- API-607 Fire Rated
- Braided Graphite Packing
- API-622 Low-E Stem Packing Standard
- Gear Operator recommended for 1-1/2" and above.

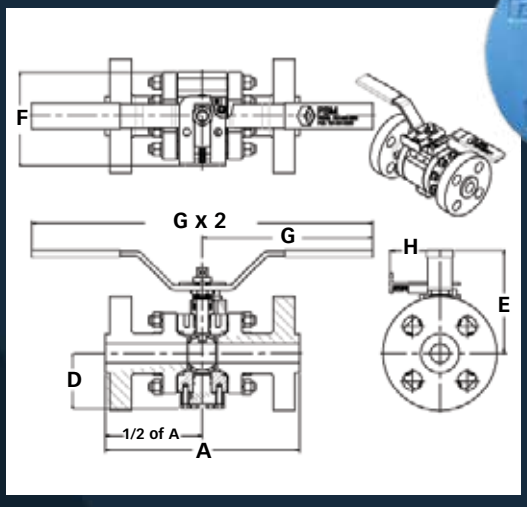
SIZES

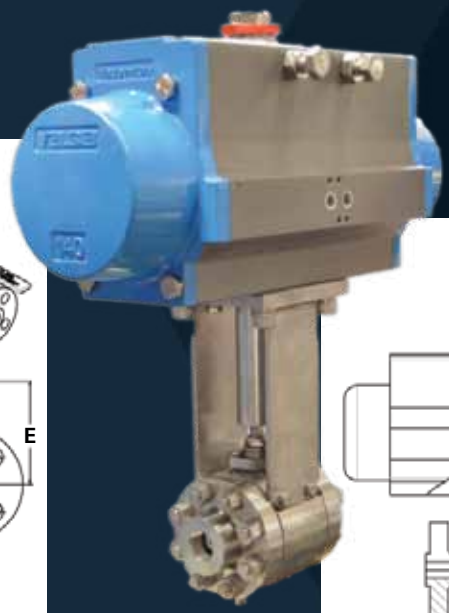
- 1/2" - 2" CL600, CL900 and CL1500

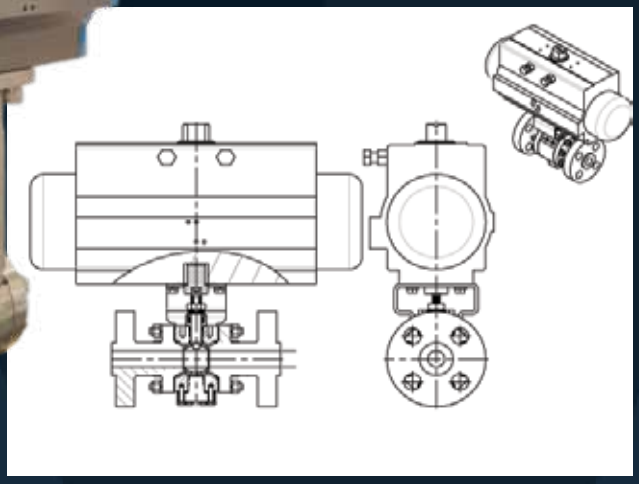
SEATING

- TFM™ Seats: 350˚F (176˚C)
- S-TEF® Seats: 400˚F (204˚C)
- PEEK® Seats: 500˚F (260˚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		℄ to Bottom of Valve (2-Way)		Distance to Top of Valve		Body Width without Ends		Handle Radius		℄ 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)		5.2 (132)		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)		3.96 (101)		3.75 (95)		5 (127)		2.08 (53)	
	Female NPT	in (mm)	5.5 (140)											
	Others	in (mm)	9 (229)											
1" DN 25	Flanged	in (mm)	8.5 (216)	10 (254)	2.92 (74)		5.2 (132)		4.5 (114)		8.81 (224)		2.57 (65)	
	Female NPT	in (mm)	6 (152)											
	Others	in (mm)	10 (254)											
1-1/2" DN 40	Flanged	in (mm)	9.5 (241)	12 (305)	2.82 (72)	4.17 (106)	5.76 (146)	7.18 (182)	5.38 (137)	7.5 (191)	11.8 (300)	12 (305)	N/A	
	Female NPT	in (mm)	6.5 (165)	7.5 (191)										
	Others	in (mm)	12 (305)											
2" DN 50	Flanged	in (mm)	11.5 (292)	14.5 (368)	3.42 (87)	4.82 (122)	6.13 (156)	7.43 (189)	6.25 (159)	8 (203)	11.8 (300)	12 (305)		
	Female NPT	in (mm)	8 (203)	10 (254)										
	Others	in (mm)	14.5 (368)											





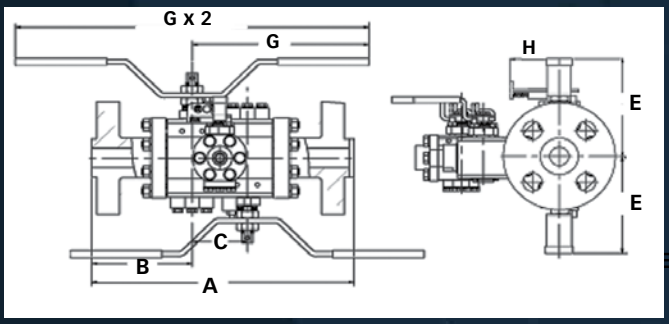


Bolted Double Block & Bleed Valves

PBM valves with Low-E packing offer solutions to emission reduction.
Design features:

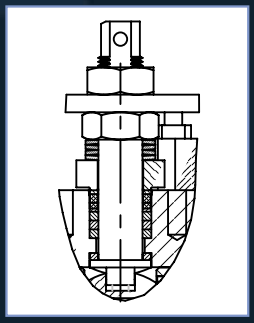
- Average stem packing leakage ≤ 10 ppmv for the duration of the test (100 ppm allowable)
- API 607 fire tested

PBM's 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 without 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)		5.2 (132)		2.4 (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)	9.75 (248)	11.25 (286)	3.75 (95)	4.5 (114)	2.25 (57)		3.96 (101)		3.75 (95)		5 (127)		2.08 (53)	
	Female NPT	in (mm)	7.75 (197)		2.75 (70)											
	Others	in (mm)	11.25 (286)		4.5 (114)											
1" DN 25	Flanged	in (mm)	11.25 (286)	12.75 (324)	4.25 (108)	5 (127)	2.75 (70)		5.2 (132)		4.5 (114)		8.81 (224)		2.57 (65)	
	Female NPT	in (mm)	8.75 (222)		3 (76)											
	Others	in (mm)	12.75 (324)		5 (127)											
1-1/2" DN 40	Flanged	in (mm)	13.25 (337)	15.75 (400)	4.75 (121)	6 (152)	3.75 (95)		5.76 (146)	7.18 (182)	6 (152)	7.5 (191)	12 (305)		N/A	
	Female NPT	in (mm)	10.25 (260)	11.25 (286)	3.25 (83)	3.75 (95)										
	Others	in (mm)	15.75 (400)		6 (152)											
2" DN 50	Flanged	in (mm)	15.25 (387)	18.5 (470)	5.75 (146)	7.25 (184)	3.75 (95)	4 (102)	6.13 (156)	7.43 (189)	6.75 (171)	8 (203)	12 (305)			
	Female NPT	in (mm)	11.75 (298)	14 (356)	4 (102)	5 (127)										
	Others	in (mm)	18.5 (470)		7.25 (184)											

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



Technical Information

How to Order IM or IB Valves

POS 1 & 2	POS 3 & 4 MATERIAL
IM	H- = 316 S/S Body & End Conn. (800° F Max.)
IB	HH = 316H S/S Body & End Conn. (800° F Max.)
	EL = A-350 LF2 Carbon Steel
	C- = Hastelloy C-276 Body & End Connections
	C1 = Hastelloy B-2 Body & End Connections
	Y- = Hastelloy C-22 Body & End Connections
	M- = Monel Body & End Connections
	P- = AL6XN Body & End Connections
	22 = Duplex 2205 Body & End Connections
	25 = 254 SMO 6 Moly Body & End Connections
	F9 = A182 Gr. F9 Carbon Steel Body & End Conn.
	5- = Inconel 625

Note: Other materials of construction available.

IM Valve = Instrument Valve - Welded W/ .41 Dia Port
IB Valve = Instrument Valve - Bolted W/ 1/2" Port and Larger.

POS 5 VALVE TYPE
C = 2-Way CL600
E = 2-Way CL1500
K = Double Block CL150
L = Double Block CL300
M = Double Block CL600
O = Double Block CL1500

POS 6 SERIES
5
6

POS 7 1ST END CONNECTION TYPE (HP / UPSTREAM)	POS 8 2ND END CONNECTION TYPE (LP / DOWNSTREAM)
B = Ext. Buttweld Sch. 40	B = Ext. Buttweld Sch. 40
D = Ext. Buttweld Sch. 10	D = Ext. Buttweld Sch. 10
F = Ext. Buttweld for Tube	F = Ext. Buttweld for Tube
G = Eye Flange	G = Eye Flange
L = RF Flange	L = RF Flange
N = Extended Male NPT	N = Extended Male NPT
P = Male NPT	P = Male NPT
Q = Female NPT	Q = Female NPT
R = Extended Female NPT	R = Extended Female NPT
S = Female Comp. Thread *	S = Female Comp. Thread *
J = Ext. Female Socket Weld	J = Ext. Female Socket Weld
V = Ext. Male Socket Weld	V = Ext. Male Socket Weld
W = RTJ Flange	W = RTJ Flange

*** Ferrules Not Included**

Note: other end connection types available.

POS 9 SEAT / STEM PACKINGS / O-RINGS (GRAPHITE STEM PACKING FOR ALL)
G = TFM / Graphite / Viton or TFM / TFM / Viton "A"
H = S-TEF® / Graphite / Viton or S-TEF® / S-TEF® / Viton "A"
N = PEEK / Graphite / Kalrez or PEEK / PEEK / Kalrez
Q = Carbon Graphite - 750° F.
S = Stellite Seats / Graphite Seals - 800° F. Max.
T = Tungsten Carb. Ctd S/S Ball & Seats/Graphite Seals - 800° F. Max
U = Chrome Carb Ctd S/S Ball & Seats/Graphite Seals - 800° F. Max.

Valves seal HP to LP. Consult PBM for other configurations.

POS 10 1ST END CONNECTION SIZE (HP / UPSTREAM)	POS 11 2ND END CONNECTION SIZE (LP / DOWNSTREAM)
A = 1/4 inch, .41" Dia. Port	A = 1/4 inch, .41" Dia. Port
B = 3/8 inch, .41" Dia. Port	B = 3/8 inch, .41" Dia. Port
C = 1/2 inch, .41" Dia. Port	C = 1/2 inch, .41" Dia. Port
1 = 1/2 inch, .50" Dia. Port	1 = 1/2 inch, .50" Dia. Port
D = 3/4 inch, .41" Dia. Port	D = 3/4 inch, .41" Dia. Port
E = 3/4 inch, .75" Dia. Port	E = 3/4 inch, .75" Dia. Port
2 = 1 inch, .41" Dia. Port	2 = 1 inch, .41" Dia. Port
3 = 1 inch, .75" Dia Port	3 = 1 inch, .75" Dia Port
4 = 1 inch, 1" Dia. Port	4 = 1 inch, 1" Dia. Port
G = 1-1/2 inch, Full Port	G = 1-1/2 inch, Full Port
H = 2 inch, Full Port	H = 2 inch, Full Port
J = 2-1/2 inch, Full Port	J = 2-1/2 inch, Full Port
K = 3 inch, Full Port	K = 3 inch, Full Port
L = 4 inch, Full Port	L = 4 inch, Full Port
M = 6 inch, Full Port	M = 6 inch, Full Port

Note: Larger sizes available through 10" FP - 12" RP

Position 10 - H through M available in Class 150 and 300 only

POS 12 BLEED / GAUGE PORT OPTIONS
- = No Bleed or Gauge Ports (2-Way Only - STD)
A = (1) 1/4" FNPT Bleed Port 90° from Stem (Double Block Only - STD)
B = (2) 1/4" FNPT Bleed Ports 90° from Stem (Double Block Only)
C = (1) 3/8" FNPT Bleed Port 90° from Stem (Double Block Only)
D = (2) 3/8" FNPT Bleed Ports 90° from Stem (Double Block Only)
E = (1) 1/2" FNPT Bleed Port 90° from Stem (Double Block Only)
F = (2) 1/2" FNPT Bleed Ports 90° from Stem (Double Block Only)
J = (1) 1/4" Socket Weld Bleed Port 90° from Stem (Double Block Only)
K = (2) 1/4" Socket Weld Bleed Port 90° from Stem (Double Block Only)
L = (1) 3/8" Socket Weld Bleed Port 90° from Stem (Double Block Only)
M = (2) 3/8" Socket Weld Bleed Port 90° from Stem (Double Block Only)
N - (1) 1/2" Socket Weld Bleed Port 90° from Stem (Double Block Only)
P = (2) 1/2" Socket Weld Bleed Port 90° from Stem (Double Block Only)

Note: additional bleed / gauge port options available.

POS 13 & 14 OPERATOR OPTIONS
04 = manual locking lever handle - Right Hand Operation (CW) - STD
05 = manual locking lever handle - Left Hand Operation (CCW)
00 = manual lever handle - Right Hand Operation (CW)
01 = manual lever handle - Left Hand Operation (CCW)
02 = manual oval handwheel
03 = manual locking oval handwheel
08 = manual gear operator (recommended for valve > 1.5 inch
20 = 80 PSIG Double Acting Actuator
27 = 60 PSIG Double Acting Actuator
34 = 80 PSIG Spring Return Actuator
41 = 60 PSIG Spring Return Actuator

Note: Additional operator options available

POS 15 BLEED / GAUGE VALVE OPTIONS
- = No Bleed or Gauge Vlve (2-Way Only - STD)
A = 1/4" FNPT Ball Valve
B = 3/8" FNPT Ball Valve
C = 1/2" FNPT Ball Valve
D = 3/4" FNPT Ball Valve
E = 1" FNPT Ball Valve
F = 1/4" FNPT Needle Valve
G = 3/8" FNPT Needle Valve
H = 1/2" FNPT Needle Valve
D = 3/4" FNPT Needle Valve
E = 1" FNPT Needle Valve

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

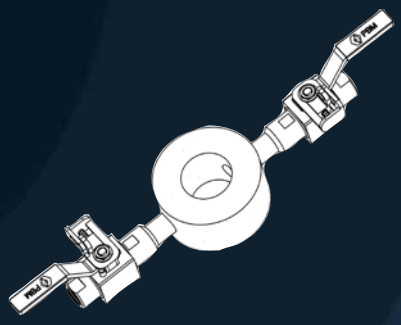
- Face-to-face is 2" standard. Con sult factory for other widths.

MATERIALS

- Stainless Steel
- Duplex
- Hastelloy®
- Others Available

FEATURES

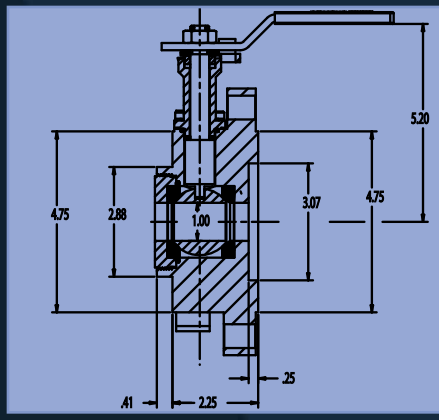
- Integral code-welded valve for flushing, purging and instrument isolation



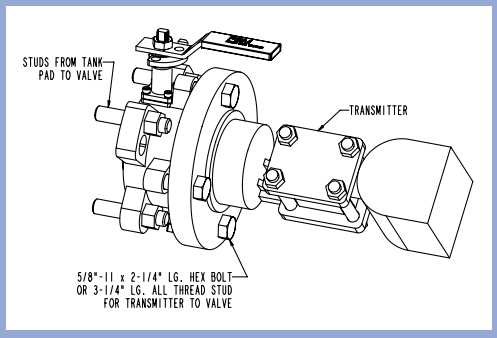
Transmitter Isolation Valves

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.

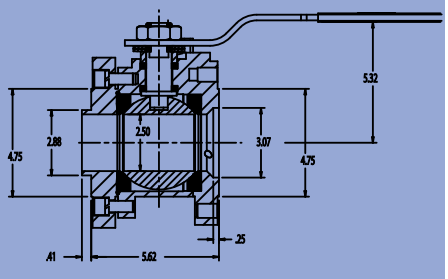
TIV valves feature minimal dead space and positive shut-off. They are available in CL150, CL300, and CL600 RF Flange. Calibration port, CIP port, and locking handle are standard. Cast body, universal design, in stock.

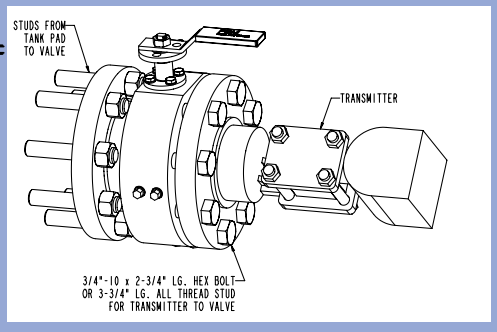


1" PORT X 3" FLANGED



2-1/2" PORT X 3" FLANGED

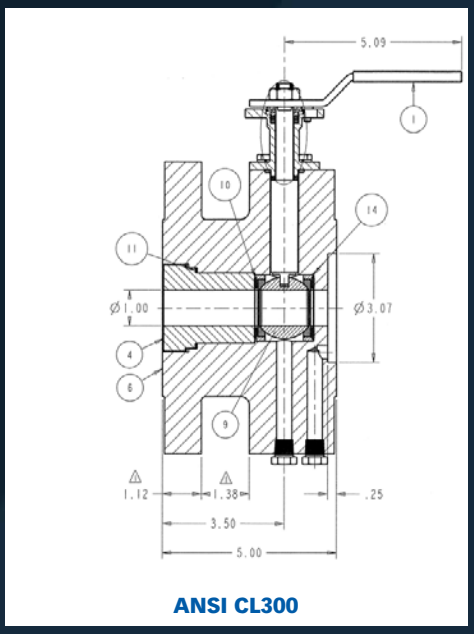




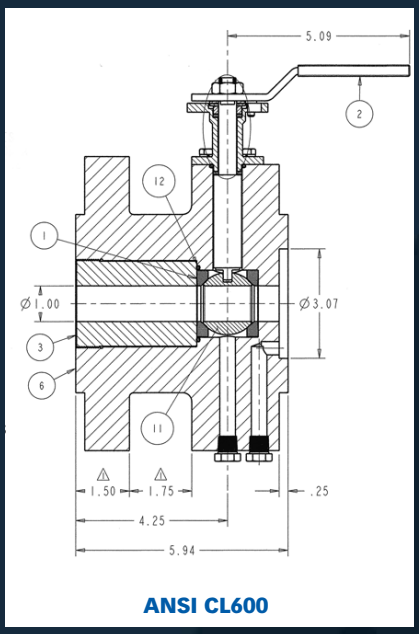
Full or True Bore® Port ANSI Style Transmitter Isolation Valves provide value to the customer.

Energy Industry Valves

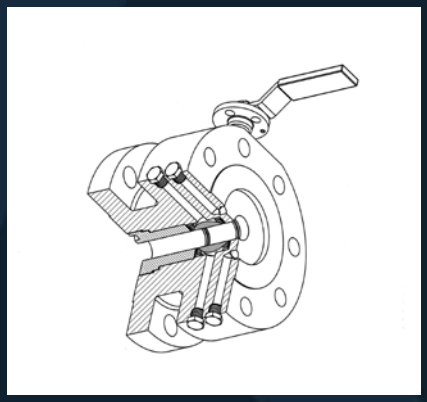
Transmitter Isolation Valves CL300, CL600



ANSI CL300

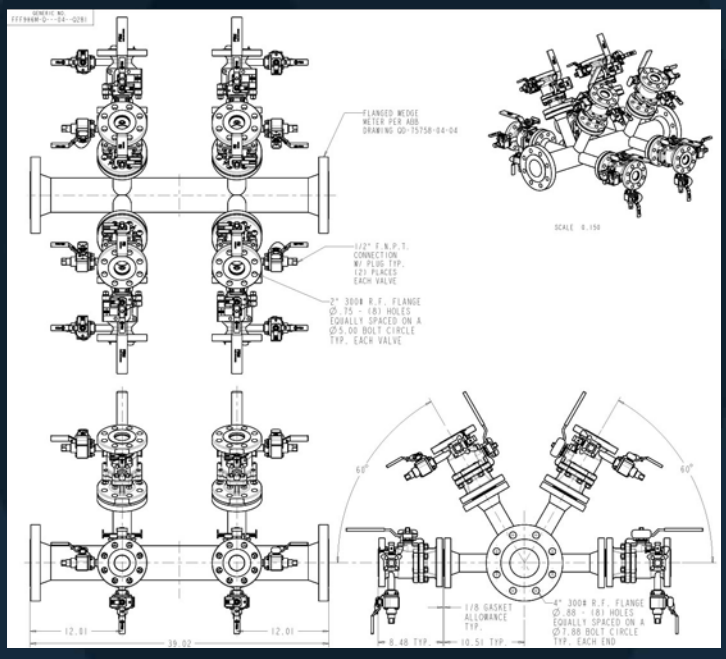


ANSI CL600



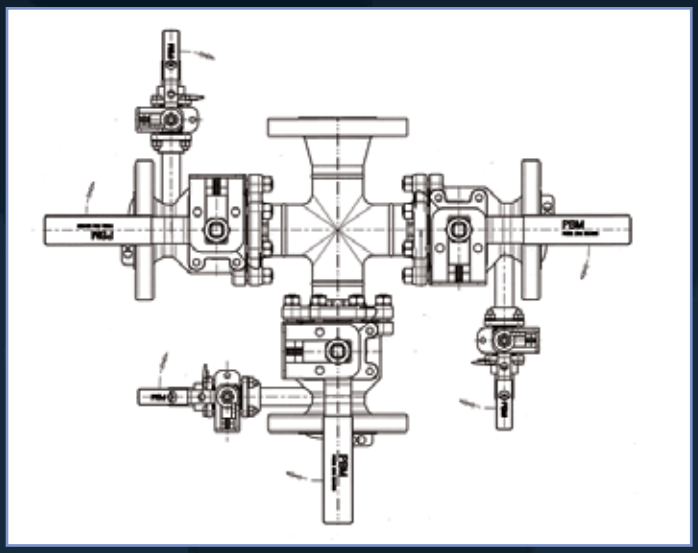
Pressure Classes: 150-600
Sizes: 1x2. 1x3. 2.5 x 3 Inch
(ball port size x flange size)
Any Materials, Temps <800˚F
Purge/Cal Port Sizes: 1/4 or 1/2 inch FNPT (2 or 4 ports available)
Make to Order. Custom configurations available.

2" PBM TIV on 4 inch ABB Wedge Meter
Heavy Crude Line in a Coker Unit



Fabflex® Instrumentation Valve Manifolds

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.



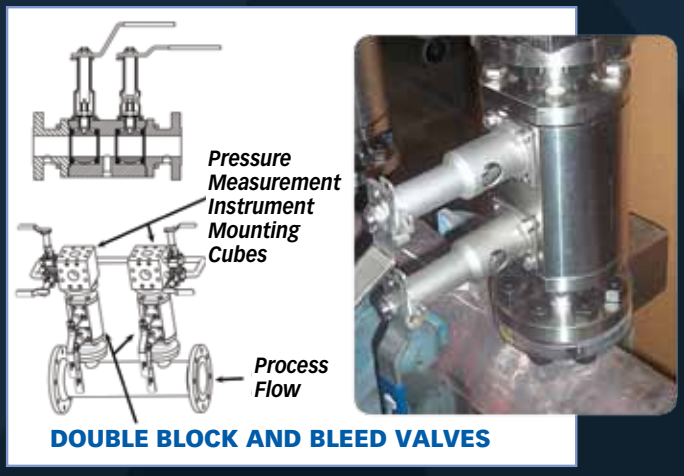
Fabflex® fabricated manifold solution:

- Custom 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.

Unique Valve Applications

Double Block and Bleed
for hydrogen use

Fabflex Manifold® Assembly
Various configurations available.



DOUBLE BLOCK AND BLEED VALVES

Lockable Manual Handles
Standard and automation available.

ANSI Trunnion Valve

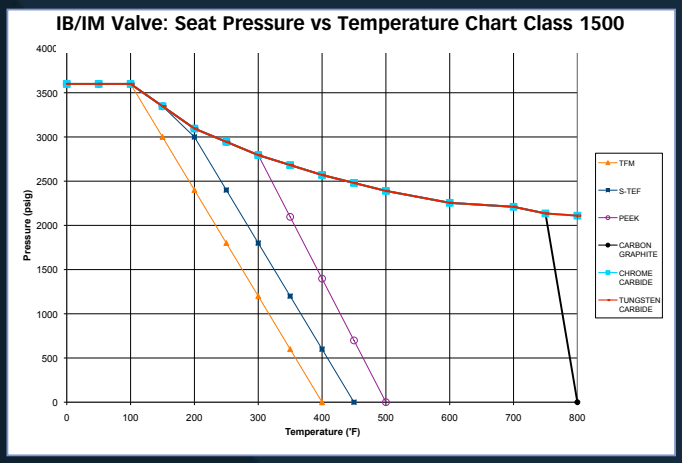
Sampling Valve
Available in single and double block configurations.

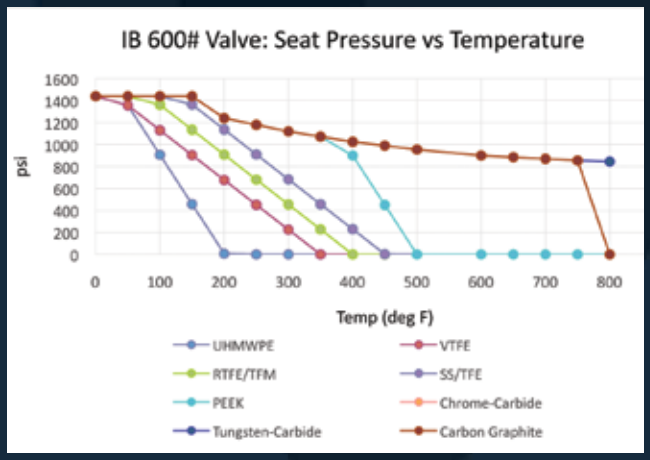
Rating Size	150	300	600	1500	2500
1/4″	•	•	•	•	•
1/2″	•	•	•	•	•
3/4″	•	•	•	•	
1″	•	•	•	•	
1-1/2″	•	•	•	•	
2″	•	•	•	•	
3″	•	•			
4″	•	•			
6″	•	•			
8″	•	•			
12″	•	•			

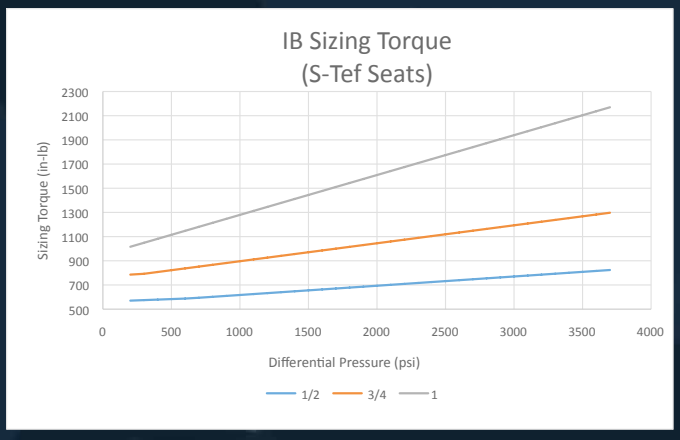
PBM Valve Pressure Class

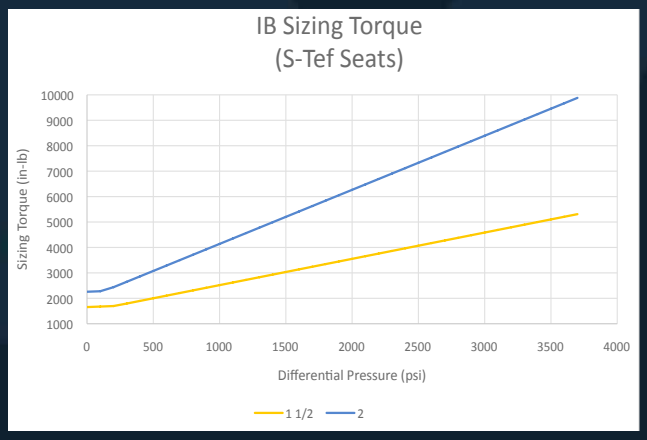
Technical Information

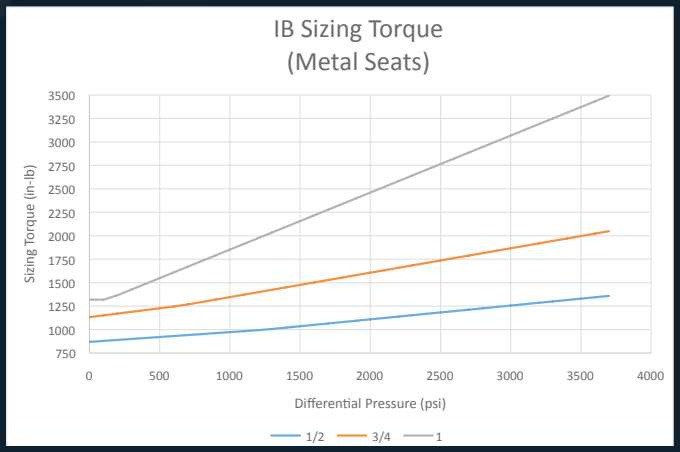
BOLTED INSTRUMENT VALVES PRESSURE/TEMPERATURE AND TORQUE CHARTS

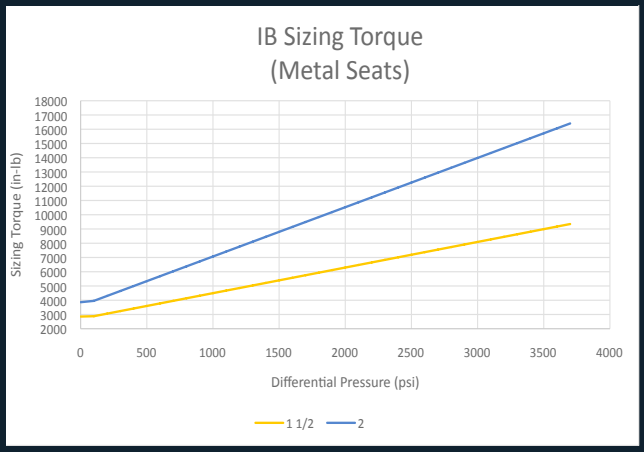


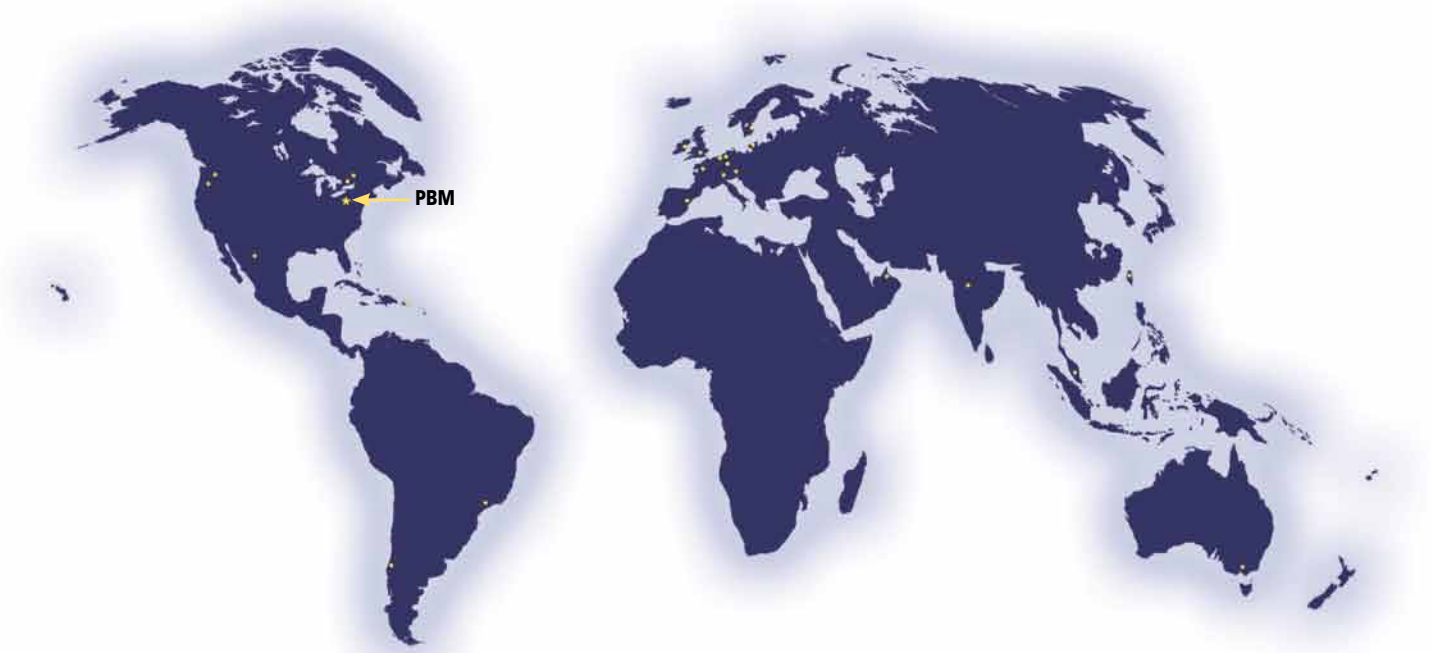












PBM VALVE SOLUTIONS

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