IMI PBM

Marine & Offshore Valves

www.pbmvalve.com

- Air Systems
- Ballast Systems
- Cooling / Lubrication Systems
- Desanitation / Drinking / Water Treatment
- Fire Protection Systems
- Flare Gas Systems
- Injection Water
- Instrument Isolation
- Pump Skids
- Sea-Chest
- Storage Tanks
  Air / Fuel / Bilge / Grey-Black Water
- Utility Seawater
- Water Flood

IMI Critical Engineering

Breakthrough Engineering

Valves For Marine And Offshore Applications

IMI PBM ball valves are designed, tested and manufactured in the United States for long service life under arduous conditions and available in a wide choice of materials to meet the most aggressive marine corrosion environments.

- Air, Ballast, Cooling/Lubrication, and Fire Protection Systems
- Desanitation/Drinking/Water Treatment, Injection Water, and Water Flood
- Drinking Water Shipboard, Platform and Pier Transportation Systems - NSF 61 Certified
- Fuel, Flare Gas, Mud Transfer, Critical Utility and Process Systems for OSV, FPSO
- Liquid Natural Gas (LNG) Processing Storage and Transfer, Platform, Tankers
- Specialized Vessels and Terminal Facilities

- Pressures up to 2500# Class (6000 psi)
- Temperatures: From -320˚ (-200˚C) to 800˚F (427˚C)
- Sizes: 1/4" - 12"
- Materials:

Non-Ferrous:

- Bronze; 836, 922
- 955 and 958 NiAl-Bronze
- 953 and 954 Al-Bronze
- 70/30 and 90/10 CuNi
- (Bronze and Copper Nickel valve testing and acceptance criteria IAW MSS-72)

Ferrous:

- Stainless Steels: 304, 316, 316L, 317, etc.
- Duplex and Super Duplex Alloys
- High Performance alloys (Monel, Hastelloy, Alloy 20, etc.)
- (ASME B16.34 and MSS-61 and others as required)

- Laser etched high pressure to low pressure flow directive

APPROVALS:

- ABS Type Approval
- BV Type Approval
- DNV-GL Type Approval
- LR Type Approval
- API 607 Fire Test Design
- API 6D (certification per order)
- API 622 Low-E Packing
- CE
- CRN Registrations
- EU Pressure Equipment Directive (PED)
- ISO 9001
- NACE - MR 0175
- NSF-61* / ANSI-372
- USCG Category A

* COPPER ALLOYS C89833, C8935, AND C87600 HAVE BEEN EVALUATED BY NSF TO NSF/ANSI/CAN 61 FOR USE IN DRINKING WATER SUPPLIES PH OF 6.5 AND ABOVE. DRINKING WATER SUPPLIES THAT ARE LESS THAN PH 6.5 MAY REQUIRE CORROSION CONTROL TO LIMIT LEACHING OF COPPER INTO THE DRINKING WATER

IMI PBM's CRYOGENIC AND LNG VALVES ARE DESIGNED FOR LIQUEFIED NATURAL GAS PRODUCTION, PURIFICATION, TRANSPORTATION AND STORAGE.

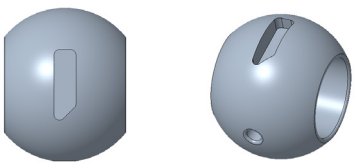
SAFETY IS #1

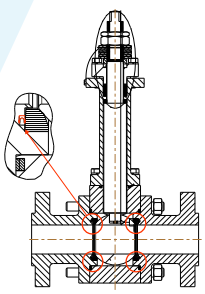
IMI PBM's Cryogenic Valves are designed to B16.34, tested to API 607 and meet seat leakage criteria of MSS SP-134 which exceeds BS 6364.

- Sizes ½" – 4"
- Temperatures from 400˚F (205˚C) to -320˚F (-200˚C)
- Pressures to ANSI Class 600# (1440 psi)
- V-TEF™ Seats/graphite seals
- Optional Low-e Packing (Cannot be lox cleaned)
- Cleaned for oxygen service
- Manual Locking lever handle, or optional oval locking handwheel with quarter turn operation
- Custom engineered pneumatic, electric and hydraulic automation and control packages.

KEYED STEM BALL INTERFACE

IMI PBM's stem to ball slot keying ensures proper orientation of the ball within the valve assembly with respect to flow direction and venting - reducing costly assembly and maintenance errors.



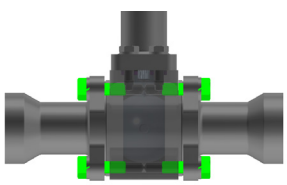


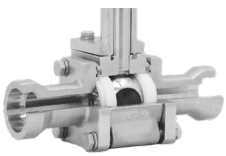
ENERGIZED SEAT BACK GASKETS

Standard Iconel energized seat back gaskets enhance sealing throughout temperature fluctuations.

THERMAL EXPANSION

Independent bolting for each valve end connection ensures consistent sealing throughout thermal cycles.



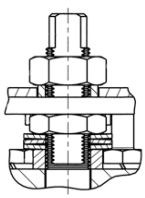


NO DISASSEMBLY

No disassembly is required for socket weld and butt weld end valves.

LIVE LOADED STEM PACKINGS

Robust live loaded stem packing ensures reliable positive seal engagement throughout operating the thermal cycle and pressure range.



Cryogenic Allowable Leakage Rate Comparison

		Allowable He scc/min	
NPS	DN	MSS-SP134-2010	BS 6364-1984
1/4	8	18.75	48
3/8	10	28.125	60
1/2	15	37.5	90
3/4	20	56.25	120
1	25	75	150
1-1/4	32	93.75	192
1-1/2	40	112.5	240
2	50	150	300
2-1/2	65	187.5	390
3	80	225	480
4	100	300	600


Fire Test Report
ANSI/API Standard 607, 6th Edition, 2010
ISO 10497: 2010
Performed for
PBM, Inc.
www.pbmvalve.com
2 inch Class 150
CPHLH7 CRYOGENIC BALL VALVE
Valve Code: SK-Q021
Project Number: 214142
Test Date: June 3, 2014
Performed by
YARMOUTH RESEARCH AND TECHNOLOGY, LLC
434 Walnut Hill Road
North Yarmouth, ME 04097 USA
(207) 829-5359
info@yarmouthresearch.com
www.yarmouthresearch.com

FIRE TESTED TO API-607

PLEASE VIEW OUR CRYOGENIC PRODUCT BULLETINS FOR MORE INFORMATION:

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

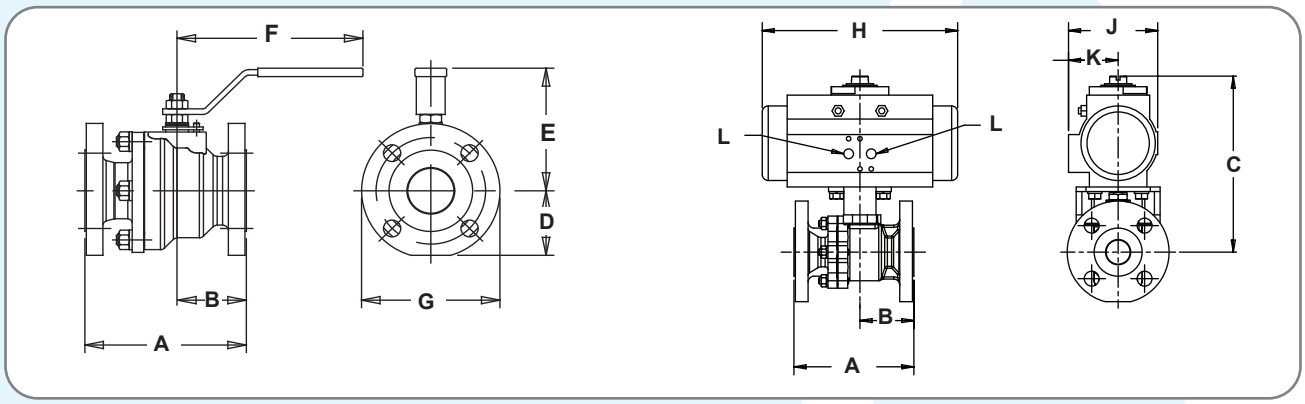
AN Series 1, 150# Class Manual Dimensions

AN Series seawater valves are 2-piece valves with two flanged end fittings and meet ANSI B16.10 long pattern face to face dimensions. In addition, encapsulated seats facilitate performance in high-velocity applications and support the seats in elevated temperature applications.

Valve Size		Port Dia.		A		B		D		E		F		G		Approx. Weight (lbs.)	
				Overall Length		℄ to Face End		℄ to Bottom of Flange		℄ to top of Handle		Handle Length from ℄		Flange Dia.			
		in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
1/2”	DN15	0.62	15.7	4.25	108.0	1.84	46.7	1.62	41.1	3.07	78.0	6.09	154.7	3.50	88.9	6	2.7
3/4”	DN20	0.81	20.6	4.62	117.3	2.01	51.1	1.88	47.8	3.14	79.8	6.09	154.7	3.88	98.6	9	4.1
1”	DN25	1.00	25.4	5.00	127.0	2.20	55.9	2.06	52.3	3.80	96.5	6.09	154.7	4.25	108.0	10	4.5
1-1/2”	DN40	1.50	38.1	6.50	165.1	2.78	70.6	2.38	60.5	5.25	133.4	8.06	204.7	5.00	127.0	20	9.1
2”	DN50	2.00	50.8	7.00	177.8	2.99	75.9	2.88	73.2	5.56	141.2	8.06	204.7	6.00	152.4	24	10.9
3”	DN80	3.00	76.2	8.00	203.2	3.62	91.9	3.75	95.3	7.08	179.8	12.06	306.3	7.50	190.5	55	24.9
4”	DN100	4.00	101.6	9.00	228.6	3.84	97.5	4.50	114.3	9.16	232.7	14.06	357.1	9.00	228.6	100	45.4
6”	DN150	6.07	154.2	15.50	393.7	7.33	186.2	6.98	177.3	CF[5]	CF[5]	CF[5]	CF[5]	11.00	279.4	310	140.6

Notes:

1. Standard product is 316 Stainless Steel. Carbon Steel, Bronze and other materials are available upon request. Consult PBM.
2. Dimensions meet ASME Standard B16.10 long pattern.
3. Stainless Steel valves and Carbon Steel valves have raised face flanges, but are also available with flat faced flanges. Bronze valves have flat face flanges only.
4. Drawings are for illustration purposes only. Consult PBM prior to any fabrication or installation work.
5. A gear operator is recommended for valves 6” and larger. Consult PBM.
6. Dimensions are for ANSI 150# Class valves. Consult PBM for 300# Class.



AN Series 1 Actuated Dimensions

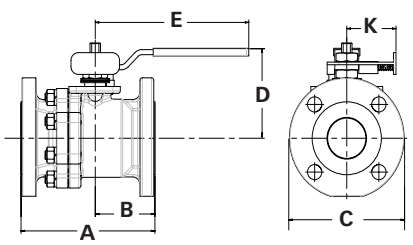
RTFE OR UHMWPE SEAT MATERIAL														
Size		Actuator	Air Pressure		C		H		J		K		L	
			psig	barg	in	mm	in	mm	in	mm	in	mm	NPT	
1/2”	DN15	Double Acting	60, 80	4.1/5.5	6.30	160.1	5.55	141.0	2.80	71.1	1.61	40.9	1/8	
		Spring Return	60, 80	4.1/5.5	6.75	171.6	6.46	164.1	3.17	80.5	1.77	45.0	1/8	
3/4”	DN20	Double Acting	60, 80	4.1/5.5	6.41	162.8	5.55	141.0	2.80	71.1	1.61	40.9	1/8	
		Spring Return	80	5.5	6.86	174.2	6.46	164.1	3.17	80.5	1.77	45.0	1/8	
		Spring Return	60	4.1	7.57	192.3	8.27	210.1	3.72	94.5	2.07	52.6	1/8	
1”	DN25	Double Acting	60, 80	4.1/5.5	7.64	194.1	5.55	141.0	2.80	71.1	1.61	40.9	1/8	
		Spring Return	80	5.5	8.80	223.5	8.27	210.1	3.72	94.5	2.07	52.6	1/8	
		Spring Return	60	4.1	9.35	237.5	9.47	240.5	4.17	105.9	2.30	58.4	1/8	
1-1/2”	DN40	Double Acting	60, 80	4.1/5.5	8.97	227.9	8.27	210.1	3.72	94.5	2.07	52.6	1/8	
		Spring Return	80	5.5	10.02	254.6	10.83	275.1	4.84	122.9	2.68	68.1	1/4	
		Spring Return	60	4.1	11.38	289.1	13.11	333.0	5.39	136.9	2.87	72.9	1/4	
2”	DN50	Double Acting	60, 80	4.1/5.5	9.28	235.7	8.27	210.1	3.72	94.5	2.07	52.6	1/8	
		Spring Return	80	5.5	10.33	262.3	10.83	275.1	4.84	122.9	2.68	68.1	1/4	
		Spring Return	60	4.1	11.69	296.9	13.11	333.0	5.39	136.9	2.87	72.9	1/4	
3”	DN80	Double Acting	60, 80	4.1/5.5	12.13	308.1	13.11	333.0	5.39	136.9	2.87	72.9	1/4	
		Spring Return	80	5.5	12.61	320.3	14.65	372.1	5.83	148.1	3.15	80.0	1/4	
		Spring Return	60	4.1	13.50	342.9	17.13	435.1	6.46	164.1	3.44	87.4	1/4	
4”	DN100	Double Acting	80	5.5	17.26	438.4	13.11	333.0	5.39	136.9	2.87	72.9	1/4	
		Double Acting	60	4.1	17.74	450.6	14.65	372.1	5.83	148.1	3.15	80.0	1/4	
		Spring Return	80	5.5	19.57	497.1	19.69	500.1	7.32	185.9	3.90	99.1	1/4	
		Spring Return	60	4.1	21.82	554.2	22.78	578.6	8.54	216.9	4.29	109.0	1/4	
6”	DN150	Double Acting	60, 80	4.1/5.5	21.54	547.1	19.69	500.1	7.32	185.9	3.90	99.1	1/4	
		Spring Return	80	5.5	23.79	604.3	22.78	578.6	8.54	216.9	4.29	109.0	1/4	
		Spring Return	60	4.1	28.55	725.2	26.46	672.1	11.42	290.1	5.71	145.0	1/4	

AN Series 5, (Stainless and Carbon)

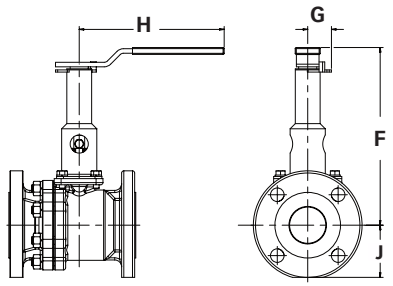
AN Series seawater valves are 2-piece valves with two flanged end fittings and meet ANSI B16.10 long pattern face to face dimensions. In addition, encapsulated seats facilitate performance in high-velocity applications and support the seats in elevated temperature applications.

Size		Units	Port Dia.	A		B		C		D	E	J		Ext. Locking Handle			Locking Handle	
				Overall Length		℄ to End		Flange Dia.		℄ to Top of Handle	Handle Length from ℄	℄ to bottom		F	G	H	K	Hole Dia. for Lock
				150#	300#	150#	300#	150#	300#			150#	300#					
1/2”	DN15	inch	0.50	4.25	5.50	1.85	2.52	3.50	3.75	2.66	4.15	1.62	1.75	7.19	1.00	5.09	1.62	0.25
		mm	12.7	108.0	139.7	47.0	64.0	88.9	95.3	67.6	105.4	41.1	44.5	182.6	25.4	129.3	41.1	6.4
3/4”	DN20	inch	0.75	4.62	6.00	2.12	2.90	3.88	4.62	2.78	4.15	1.80	2.15	7.34	1.00	5.09	1.62	0.25
		mm	19.1	117.3	152.4	53.8	73.7	98.6	117.3	70.6	105.4	45.7	54.6	186.4	25.4	129.3	41.1	6.4
1”	DN25	inch	1.00	5.00	6.50	2.25	3.15	4.25	4.88	3.09	5.06	2.06	2.38	7.63	1.00	5.09	2.08	0.28
		mm	25.4	127.0	165.1	57.2	80.0	108.0	124.0	78.5	128.5	52.3	60.5	193.8	25.4	129.3	52.8	7.1
1-1/2”	DN40	inch	1.50	6.50	7.50	2.68	3.18	5.00	6.12	4.16	8.03	2.38	3.00	9.50	1.31	8.00	2.58	0.38
		mm	38.1	165.1	190.5	68.1	80.8	127.0	155.4	105.7	204.0	60.5	76.2	241.3	33.3	203.2	65.5	9.7
2”	DN50	inch	2.00	7.00	8.50	3.12	3.84	6.00	6.50	4.46	8.03	2.88	3.12	9.81	1.31	8.00	2.58	0.38
		mm	50.8	177.8	215.9	79.2	97.5	152.4	165.1	113.3	204.0	73.2	79.2	249.2	33.3	203.2	65.5	9.7
3”	DN80	inch	3.00	8.00	11.12	3.57	5.19	7.50	8.25	7.00	12.06	3.50	4.00	11.69	1.50	12.06	3.47	0.38
		mm	76.2	203.2	282.4	90.7	131.8	190.5	209.6	177.8	306.3	88.9	101.6	296.9	38.1	306.3	88.1	9.7
4”	DN100	inch	4.00	9.00	12.00	3.84	5.34	9.00	10.00	7.39	24.06	4.38	4.75	13.03	3.50	24.06	NA	NA
		mm	101.6	228.6	304.8	97.5	135.6	228.6	254.0	187.7	611.1	111.3	120.7	331.0	88.9	611.1	NA	NA

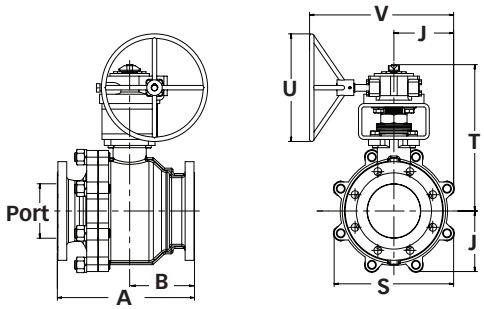
ANSI Valve with Locking Handle



ANSI Valve with Ext. Locking Handle



ANSI Valve with Gear Operator



TN Series 5 150# Class (Bronze, Aluminum Bronze, Stainless, Duplex and Carbon)

TN adds a trunnion to an AN Series valve.

Size		Units	Port Dia.	A		B		C		J		S		T	U	V	
				Overall Length		℄ to End		Flange Dia.		℄ to bottom		Body Width		℄ to Top of Gear Op	Handwheel Dia.	OAL Width	
				150#	300#	150#	300#	150#	300#	150#	300#	150#	300#			150#	300#
6”	DN150	inch	6.00	15.50	15.88	7.33	7.70	11.00	12.50	6.75	7.72	13.50	15.53	16.32	12.00	16.28	17.25
		mm	152.4	393.7	403.4	186.2	195.6	279.4	317.5	171.5	196.1	342.9	394.5	414.5	304.8	413.5	438.2
8”	DN200	inch	8.00	18.00	19.75	8.56	9.51	13.50	15.00	8.37	9.38	17.72	18.75	CF	CF	CF	CF
		mm	203.2	457.2	501.7	217.4	241.6	342.9	381.0	212.6	238.3	450.1	476.3	CF	CF	CF	CF
10”	DN250	inch	10.00	21.00	22.38	10.07	CF	16.00	17.50	10.75	CF	21.50	CF	CF	CF	CF	CF
		mm	254.0	533.4	568.5	255.8	CF	406.4	444.5	273.1	CF	546.1	CF	CF	CF	CF	CF
12”	DN300	inch	12.00	24.00	25.50	12.00	CF	19.00	20.50	12.00	CF	24.00	CF	CF	CF	CF	CF
		mm	304.8	609.6	647.7	304.8	CF	482.6	520.7	304.8	CF	609.6	CF	CF	CF	CF	CF

AN Series
Bronze ANSI Prepped for Actuation

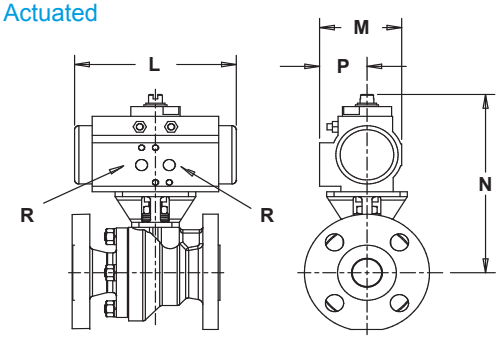
AN Series
Stainless ANSI Valve

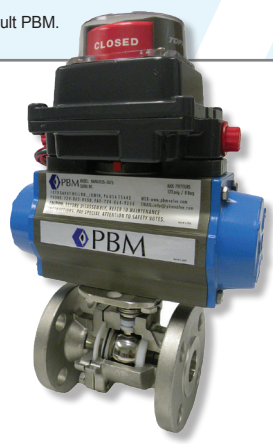
AN & TN Series 5 Actuated

Size	Units	Units	80 PSI Double Acting					60 PSI Double Acting					80 PSI Spring Return					60 PSI Spring Return				
			L	M	N	P	R	L	M	N	P	R	L	M	N	P	R	L	M	N	P	R
1/2”	DN15	inch	5.55	2.80	5.84	1.61	1/8	5.55	2.80	5.84	1.61	1/8	5.55	2.80	5.84	1.61	1/8	6.38	2.80	6.29	1.77	1/8
		mm	141.0	71.1	148.3	40.9		141.0	71.1	148.3	40.9		141.0	71.1	148.3	40.9		162.1	71.1	159.8	45.0	
3/4”	DN20	inch	5.55	2.80	5.99	1.61	1/8	5.55	2.80	5.99	1.61	1/8	6.38	3.17	6.44	1.77	1/8	6.38	3.17	6.44	1.77	1/8
		mm	141.0	71.1	152.1	40.9		141.0	71.1	152.1	40.9		162.1	80.5	163.6	45.0		162.1	80.5	163.6	45.0	
1”	DN25	inch	5.55	2.80	6.71	1.61	1/8	5.55	2.80	6.71	1.61	1/8	8.27	3.72	7.87	2.07	1/8	8.27	3.72	7.87	2.07	1/8
		mm	141.0	71.1	170.4	40.9		141.0	71.1	170.4	40.9		210.1	94.5	199.9	52.6		210.1	94.5	199.9	52.6	
1-1/2”	DN40	inch	6.46	3.17	8.44	1.77	1/8	8.27	3.72	9.15	2.07	1/8	10.83	4.84	10.20	2.68	1/4	10.83	4.84	10.20	2.68	1/4
		mm	164.1	80.5	214.4	45.0		210.1	94.5	232.4	52.6		275.1	122.9	259.1	68.1		275.1	122.9	259.1	68.1	
2”	DN50	inch	8.27	3.72	9.46	2.07	1/8	8.27	3.72	9.46	2.07	1/8	10.83	4.84	10.51	2.68	1/4	13.11	5.39	11.87	2.87	1/4
		mm	210.1	94.5	240.3	52.6		210.1	94.5	240.3	52.6		275.1	122.9	267.0	68.1		333.0	136.9	301.5	72.9	
3”	DN80	inch	13.11	5.39	13.81	2.87	1/4	13.11	5.39	13.81	2.87	1/4	14.65	5.83	14.29	3.15	1/4	17.13	6.46	15.18	3.44	1/4
		mm	333.0	136.9	350.8	72.9		333.0	136.9	350.8	72.9		372.1	148.1	363.0	80.0		435.1	164.1	385.6	87.4	
4”	DN100	inch	17.13	6.46	17.34	3.44	1/4	17.13	6.46	17.34	3.44	1/4	19.69	7.32	18.28	3.94	1/4	19.69	7.32	18.28	3.94	1/4
		mm	435.1	164.1	440.4	87.4		435.1	164.1	440.4	87.4		500.1	185.9	464.3	100.1		500.1	185.9	464.3	100.1	
6”	DN150	inch	22.78	8.54	24.11	4.29	1/4	22.78	8.54	24.11	4.29	1/4	22.78	8.54	24.11	4.29	1/4	26.46	11.42	28.87	5.71	1/4
		mm	578.6	216.9	612.4	109.0		578.6	216.9	612.4	109.0		578.6	216.9	612.4	109.0		672.1	290.1	733.3	145.0	

NOTES:
1. Dimensions meet ASME Standard B16.10 long pattern.
2. Stainless Steel valves and Carbon Steel valves have raised face flanges, but are also available with flat faced flanges. Bronze valves have flat face flanges only.
3. Drawings are for illustration purposes only. Consult PBM prior to any fabrication or installation work.
4. A gear operator is recommended for valves 6” and larger. Consult PBM.
5. Dimensions are for ANSI 150# Class valves. Consult PBM for 300# Class.
6. Trunnion mounted (Series TN) available for larger line sizes and pressure classifications. Consult PBM.

Actuated





Bronze 2-Way SP Series Valve Comparison

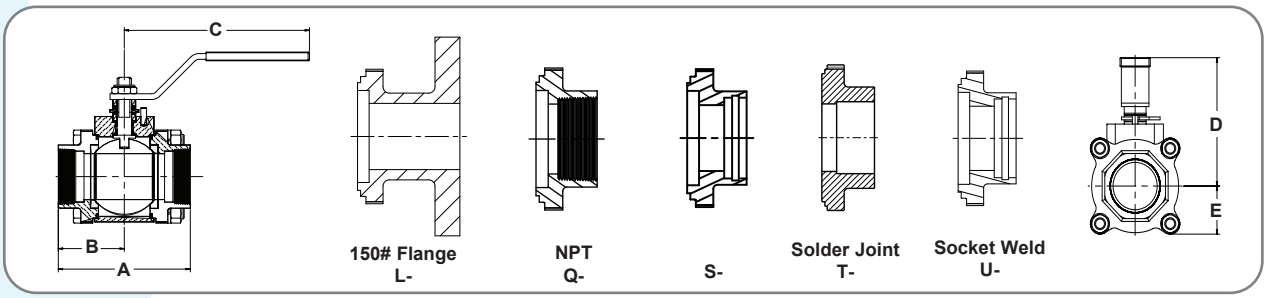
		VALVE WEIGHT								FACE-TO-FACE DIMENSIONS							
		SERIES 1				SERIES 5				SERIES 1				SERIES 5			
Std Body/End Material		836 Bronze (B62, C83600)				922 Bronze (B61, C92200)				836 Bronze (B62, C83600)				922 Bronze (B61, C92200)			
Std. Trim Material		316 Stainless Steel				316 Stainless Steel				316 Stainless Steel				316 Stainless Steel			
Standard Seat/Seal Material		Std: RTFE (Glass Filled Teflon) Opt: V-TEF™				V-TEF™				Std: RTFE (Glass Filled Teflon) Opt: V-TEF™				V-TEF™			
Swing Out Design		No				Yes				No				Yes			
Body Bolt Patterns		Non-Symmetric on 1/2”-1” and 3” sizes				Symmetric patterns on all sizes (4 bolts up to 3”, 8 bolts on 4”)				Non-Symmetric on 1/2”-1” and 3” sizes				Symmetric patterns on all sizes (4 bolts up to 3”, 8 bolts on 4”)			
Actuator Mounting		Standard except 1-1/4”				Standard				Standard except 1-1/4”				Standard			
End Connections		FNPT, Sil-Braze, SW, Solder Joint		150# F.F. Flange		FNPT, Sil-Braze, SW, Solder Joint		150# F.F. Flange		FNPT, Sil-Braze, SW, Solder Joint		150# F.F. Flange		FNPT, Sil-Braze, SW, Solder Joint		150# F.F. Flange	
Size		lb	kg	lb	kg	lb	kg	lb	kg	in	mm	in	mm	in	mm	in	mm
1/2”	DN15	2	0.9	5	2.3	2	0.9	4	2.0	3.12	79.2	5.38	136.7	3.12	79.2	5.51	140.0
3/4”	DN20	3	1.4	6	2.7	2	1.1	5	2.4	3.45	87.6	5.75	146.1	3.45	87.6	5.75	146.1
1”	DN25	4	1.8	9	4.1	5	2.4	9	3.9	3.90	99.1	6.30	160.0	4.25	108.0	6.50	165.1
1 1/4”	DN32	8	3.6	15	6.8	12	5.3	16	7.4	4.54	115.3	7.26	184.4	5.50	139.7	8.00	203.2
1 1/2”	DN40	10	4.5	17	7.7	13	5.9	18	8.2	5.36	136.1	6.98	177.3	5.50	139.7	8.00	203.2
2”	DN50	13	5.9	25	11.3	17	7.8	25	11.3	5.75	146.1	8.43	214.1	6.00	152.4	9.76	247.9
2 1/2”	DN65	33	15.0	52	23.6	37	16.6	53	24.0	8.36	212.3	10.86	275.8	8.00	203.2	11.50	292.1
3” *	DN80	49	22.2	77	34.9	52 ***	23.6	68 ***	30.8	8.62	218.9	12.04	305.8	9.00	228.6	12.76	324.1
4” **	DN100	84	38.1	115	52.2	118 ***	53.5	136 ***	61.7	10.46	265.7	12.90	327.7	12.00	304.8	15.00	381.0

*Series 1-3” valves have port I.D. of 2.75”. **Series 1-4” valves have port I.D. of 3.5”. ***Series 5 valves are full port (3.00” and 4.00” respectively).

SP Series 1 (836 Bronze) SP Series 1 seawater valves are 3-piece valves available in female NPT, socket-weld (for pipe), sil-braze (for pipe) and 150# flanged end fittings.

Size		Port Diameter		A Face to Face Q- T- S- U-		A Face to Face L-		B ℄ to Face Q- T- S- U-		B ℄ to Face L-		C Handle Length from ℄		D ℄ to Top of Handle		E ℄ to Bottom Q- T- S- U-		E ℄ to Bottom L-		Approx. Wgt. Q- T- S- U-		Approx. Wgt. L-	
		inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inches	mm	inch	mm	inch	mm	inch	mm	lb	kg	lb	kg
1/4”	DN8	0.62	15.7	3.12	79.2	-	-	1.56	39.6	-	-	6.09	154.7	3.03	77.0	1.34	34.0	-	-	2	0.9	-	-
3/8”	DN10	0.62	15.7	3.12	79.2	-	-	1.56	39.6	-	-	6.09	154.7	3.03	77.0	1.34	34.0	-	-	2	0.9	-	-
1/2”	DN15	0.62	15.7	3.12	79.2	5.38	136.7	1.56	39.6	2.69	68.3	6.09	154.7	3.03	77.0	1.34	34.0	1.75	44.5	2	0.9	5	2.3
3/4”	DN20	0.81	20.6	3.45	87.6	5.75	146.1	1.72	43.7	2.88	73.2	6.09	154.7	3.15	80.0	1.47	37.3	1.94	49.3	3	1.4	6	2.7
1”	DN25	1.00	25.4	3.90	99.1	6.30	160.0	1.95	49.5	3.15	80.0	6.09	154.7	3.53	89.7	1.69	42.9	2.13	54.1	4	1.8	9	4.1
1-1/4”	DN32	1.25	31.8	4.54	115.3	7.26	184.4	2.27	57.7	3.63	92.2	8.06	204.7	4.90	124.5	1.57	39.9	2.31	58.7	8	3.6	15	6.8
1-1/2”	DN40	1.50	38.1	5.36	136.1	6.98	177.3	2.68	68.1	3.49	88.6	8.06	204.7	5.08	129.0	1.71	43.4	2.50	63.5	10	4.5	17	7.7
2”	DN50	2.00	50.8	5.75	146.1	8.43	214.1	2.87	72.9	4.21	106.9	8.06	204.7	5.45	138.4	2.03	51.6	3.00	76.2	13	5.9	25	11.3
2-1/2”	DN65	2.50	63.5	8.36	212.3	10.86	275.8	4.18	106.9	5.42	137.7	12.06	306.3	5.50	139.7	2.81	71.4	3.50	88.9	33	15.0	52	23.6
3”	DN80	2.75	69.9	8.62	218.9	12.04	305.8	4.31	109.5	6.02	152.9	12.06	306.3	6.82	173.2	3.88	98.6	3.88	98.6	49	22.2	77	34.9
4”	DN100	3.50	88.9	10.46	265.7	12.90	327.7	5.23	132.8	6.45	163.8	12.06	306.3	7.32	185.9	4.50	114.3	4.50	114.3	84	38.1	115	52.2

NOTES:
1. SP Series valves with 150# flanges are 3-piece valves that do not meet ANSI face to face dimensions. Use AN Series 2-piece flanged valves if ANSI face to face dimensions are required.
2. Consult PBM for actuator mounting dimensions.
3. For flanged valves, flange holes straddle the center line except for the SP Series 1, 1-1/2” valves.

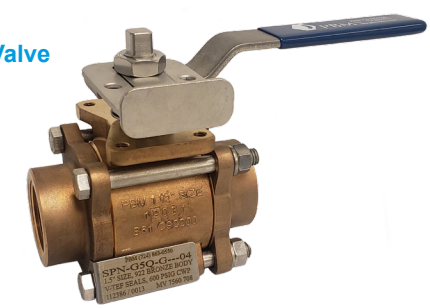


SP Series 5 (922 Bronze)

Size		Port Diameter		A Face to Face Q- T- S- U-		A Face to Face L-		B ℄ to Face Q- T- S- U-		B ℄ to Face L-		C Handle Length from ℄		D ℄ to Top of Handle		E ℄ to Bottom Q- T- S- U-		E ℄ to Bottom L-		Approx. Wgt. Q- T- S- U-		Approx. Wgt. L-	
		inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg	lb	kg
1/2”	DN15	0.50	12.7	3.12	79.2	5.51	140.0	1.56	39.6	2.76	70.1	4.15	105.4	2.63	66.8	0.92	23.4	1.75	44.5	2	0.9	4	2.0
3/4”	DN20	0.75	19.1	3.45	87.6	5.75	146.1	1.73	43.9	2.88	73.2	4.15	105.4	2.79	70.9	1.00	25.4	1.94	49.3	2	1.1	5	2.4
1”	DN25	1.00	25.4	4.25	108.0	6.50	165.1	2.13	54.1	3.25	82.6	5.09	129.3	3.06	77.7	1.33	33.8	2.13	54.1	5	2.4	9	3.9
1-1/4”	DN32	1.37	34.8	5.50	139.7	8.00	203.2	2.75	69.9	4.00	101.6	8.03	204.0	4.38	111.3	1.78	45.2	2.32	58.9	12	5.3	16	7.4
1-1/2”	DN40	1.50	38.1	5.50	139.7	8.00	203.2	2.75	69.9	4.00	101.6	8.03	204.0	4.38	111.3	1.78	45.2	2.50	63.5	13	5.9	18	8.2
2”	DN50	2.00	50.8	6.00	152.4	9.76	247.9	3.00	76.2	4.88	124.0	8.06	204.7	4.69	119.1	2.15	54.6	3.00	76.2	17	7.8	25	11.3
2-1/2”	DN65	2.50	63.5	8.00	203.2	11.50	292.1	4.00	101.6	5.75	146.1	12.06	306.3	6.51	165.4	2.79	70.9	3.50	88.9	37	16.6	53	24.0
3”	DN80	3.00	76.2	9.00	228.6	12.76	324.1	4.50	114.3	6.38	162.1	12.06	306.3	6.85	174.0	3.14	79.8	3.75	95.3	52	23.6	68	30.8
4”	DN100	4.00	101.6	12.00	304.8	15.00	381.0	6.00	152.4	7.50	190.5	24.06	611.1	9.0	228.6	4.91	124.7	4.91	124.7	118	53.5	136	61.7

SP Series
Bronze 2-Way Flanged Valve

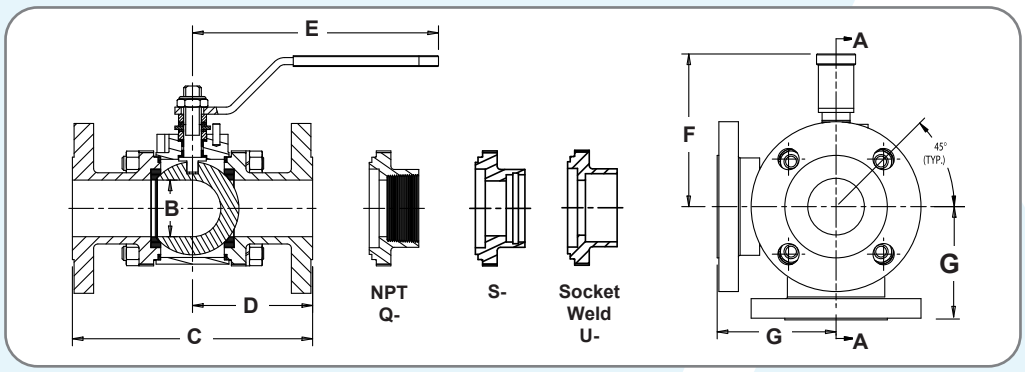
SP Series
Bronze 3-Piece Valve



DP Series 1 Dimensional Data (836 Bronze)

Diverter Port Valves with Female NPT (Q-), Sil-Braze (S-), Socket weld (U-) and 150# Flanged (L-) End Fittings

Valve Size		B Ball Port		C Face-to-Face				D ℄ to End				G ℄ to Bottom or Side				E Handle Length from ℄		F ℄ to Top of Handle		150# Flange Diam.		Approximate Weight			
				Q-S-U-		L-		Q-S-U-		L-		Q-S-U-		L-								Q-S-U-		L-	
Size		inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inches	mm	inch	mm	inch	mm	lb	kg	lb	kg
1/2”	DN15	0.62	15.7	3.12	79.2	-	-	1.56	39.6	-	-	2.50	63.5	-	-	6.09	154.7	3.03	77.0	3.50	88.9	2	0.9	-	-
3/4”	DN20	0.81	20.6	3.77	95.8	-	-	1.89	48.0	-	-	2.50	63.5	-	-	6.09	154.7	3.03	77.0	2.38	60.5	3	1.4	-	-
1”	DN25	1.00	25.4	3.90	99.1	6.28	159.5	1.95	49.5	3.14	79.8	2.44	62.0	3.16	80.3	6.09	154.7	3.53	89.7	4.25	108.0	5	2.3	10	4.5
1-1/2”	DN40	1.50	38.1	5.36	136.1	7.00	177.8	2.68	68.1	3.50	88.9	3.38	85.9	3.50	88.9	8.06	204.7	5.05	128.3	5.00	127.0	12	5.4	23	10.4
2”	DN50	2.00	50.8	5.75	146.1	8.40	213.4	2.86	72.6	4.20	106.7	3.25	82.6	4.20	106.7	8.06	204.7	5.42	137.7	6.00	152.4	15	6.8	30	13.6
3”	DN80	2.75	69.9	8.62	218.9	11.87	301.5	4.31	109.5	5.93	150.6	5.12	130.0	6.00	152.4	12.44	316.0	6.82	173.2	7.50	190.5	49	22.2	93	42.2
4”	DN100	3.50	88.9	-	-	12.91	327.9	-	-	6.45	163.8	-	-	6.44	163.6	12.44	316.0	7.21	183.1	9.00	228.6	-	-	120	54.4



MP Series 1 Dimensional Data (836 Bronze)

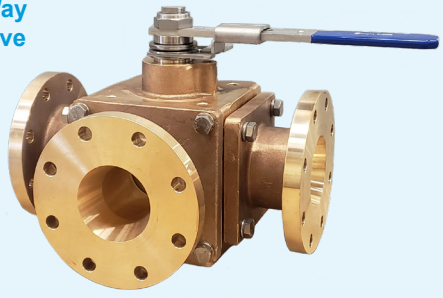
Multi-Port Valves with Female NPT (Q-), Sil-Braze (S-), Socket weld (U-) and 150# Flanged (L-) End Fittings

Size		B Ball Port		C Face-to-Face				D, G ℄ to Face				E Handle Length from ℄		F ℄ to Top of Handle		Approximate Weight			
				Q-S-U-		L-		Q-S-U-		L-						Q-S-U-		L-	
		inch	mm	inch	mm	inch	mm	inches	mm	inch	mm	inch	mm	inch	mm	lb	kg	lb	kg
1/2”	DN15	0.62	15.7	4.00	101.6	-	-	2.00	50.8	-	-	6.09	154.7	3.83	97.3	8	3.6	-	-
3/4”	DN20	0.75	19.1	4.00	101.6	-	-	2.00	50.8	-	-	6.09	154.7	3.83	97.3	12	5.4	-	-
1”	DN25	1.00	25.4	4.72	119.9	7.24	183.9	2.36	59.9	3.62	91.9	8.06	204.7	4.99	126.7	12	5.4	19	8.6
1-1/2”	DN40	1.50	38.1	6.56	166.6	10.56	268.2	3.28	83.3	5.28	134.1	12.44	316.0	5.42	137.7	33	15.0	46	20.9
2”	DN50	2.00	50.8	7.76	197.1	11.94	303.3	3.88	98.6	5.97	151.6	12.06	306.3	5.86	148.8	52	23.6	72	32.7
3”	DN80	2.75	69.9	11.06	280.9	14.56	369.8	5.53	140.5	7.28	184.9	12.06	306.3	6.82	173.2	81	36.7	119	54.0
4”	DN100	3.00	76.2	-	-	17.00	431.8	-	-	8.50	215.9	14.06	357.1	8.75	222.3	-	-	250	113.4

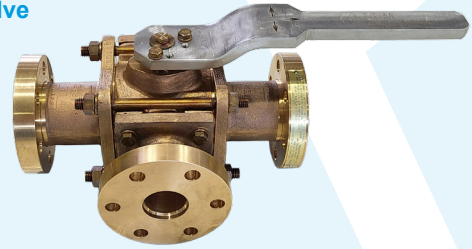
Notes:

1. Male NPT, Solder Joint, Camlock and Grooved end fittings are also available.
2. Other flanged end fittings are available upon request.
3. 1/2” through 1” valves have 3 bolts, 3/4” valves have 4 bolts, 1-1/4” through 2” valves have 4 bolts, 3” through 4” valves have 8 bolts.
4. Flange holes straddle the centerline except for Series 1, 1-1/2” size.
5. Drawings are for illustration purposes only. Consult PBM prior to any fabrication or installation work.
6. Using a welded connection on the common port of a DP or MP valve may complicate maintenance. Provisions must be made to allow removal of end fittings and body from the line.

MP Series
Bronze 3-Way
Flanged Valve



DP Series
Bronze Diverter Port
Valve



TORQUE CHARTS

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	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	1180	133.3	trun.	trun.				
	2-1/2	288	32.5	576	65.1	576	65.1	1200	135.6	1600	180.8	trun.							
	3	430	48.6	860	97.2	860	97.2	1560	176.3	trun.	trun.								
	4	787	88.9	1570	177.4	2650	2994	2650	299.4	trun.	trun.								
	6	1920	217.0	3840	433.9	7100	802.3	Use trunnion above 75 psid.											
AN Series 1 & 3	1/2	38	4.3	76	8.6	76	8.6	76	8.6	76	8.6								
	3/4	48	5.4	96	10.8	96	10.8	96	10.8	96	10.8								
	1	58	6.6	116	13.1	116	13.1	116	13.1	150	16.9								
	1-1/2	154	17.4	308	34.8	308	34.8	440	49.7	580	65.5								
	2	182	20.6	365	41.2	365	41.2	635	71.7	910	102.8								
	3	430	48.6	860	97.2	860	97.2	1560	176.3	2050	231.6								
	4	787	88.9	1570	177.4	2650	299.4	4300	485.8	6000	677.9								
	6	1920	216.9	3840	433.9	7200	813.5	12000	1355.8	trun.	trun.								
CP Series 6 These are actuals, not sizing.	1/2	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	101	11	110	12
	1	145	16	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	477	54	544	61	611	69	677	76
	2	540	61	840	95	840	95	840	95	866	98	1013	114	1162	131	1310	148	1458	165
	3	1020	115	1320	149	1320	149	1542	174	1984	224	2425	274	2866	324	3307	374	3749	424
	4	Consult IMI PBM Engineering																	
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	1200	135.6	trun.	trun.						
	3	576	65.1	1150	129.9	1150	129.9	1620	183	2100	135.6								
	4	864	97.6	1700	192.1	3000	339	trun.	trun.										
SP, DP Series 1	1/2	48	5	96	6.6	96	6.6	96	6.6	96	6.6	96	6.6	96	6.6	96	6.6	96	6.6
	3/4	60	7	120	8.3	120	8.3	120	8.3	120	8.3	120	8.3	120	8.3	136	136	142	9.8
	1	72	8.1	144	9.9	144	9.9	144	9.9	144	9.9	179	12.3	220	15.2	trun.	trun.		
	1-1/2	168	19	336	23.2	336	23.2	440	30.3	580	40.0	715	49.3	trun.					
	2	192	22	384	26.5	384	25.5	635	43.8	910	62.7	1180	81.4	trun.					
	2-1/2	300	34	600	41.4	600	41.4	1200	82.7	1600	110.3	trun.							
	3	420	48	860	59.3	860	59.3	1560	107.6	trun.									
	4	540	61	1080	74.5	2500	172.4	trun.											

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, DP 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, DP 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)	575	39.6	490	33.8	430	29.6
	316 SS/316L	3" (DN80) & 4" (DN100)	850	58.6	720	49.6	640	44.1
	836/922/L.F. Bronze	1-1/2" (DN40) and smaller	400	27.6	310	21.4	220	15.2
	836/922/L.F. Bronze	2" (DN50)	300	20.7	230	15.9	160	11.0
	836/922/L.F. Bronze	3" (DN80) & 4" (DN100)	350	24.1	270	18.6	190	13.1
SP Series 6	316 SS/316L	3" (DN80) and smaller	720	49.6	620	42.7	540	37.2
	Carbon Stl.	3" (DN80) and smaller	740	51.0	655	45.2	620	42.7
AN, CN All Series	316 SS/316L	All	See Flanged Table at Right.					
	C-276	All						
	Carbon Steel	All						
	Bronze	All						
CP Series 6	316 SS/316L	All	720	49.6	620	42.7	540	37.2
	C-276	All	600	41.4	520	35.9	450	31.0
	922 Bronze	All	600	41.4	600	41.4	580	40.0
MP Series 1	836/922/L.F Bronze	1-1/2" (DN40 and smaller)	400	27.6	310	21.4	220	15.2
	836/922/L.F Bronze	2" (DN50)	350	24.1	270	18.6	190	13.1
	836/922/L.F Bronze	3" (DN80)	300	20.7	230	15.9	160	11.0
	836/922/L.F Bronze	4" (DN100)	See Flanged Table at Right					
	Ductile Iron	1-1/2" (DN40)	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					

Valid for all flanged valves:

ANSI 150# FLANGE						
Valve Material	-20° to 100° F	-28° to 38° C	300° F	150° C	450° F	232° C
	psig	barg	psig	barg	psig	barg
836 Bronze	225	15.5	180	12.4	135	9.3
Lead-Free 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
Ductile Iron	250	17.2	215	14.8	185	12.8

ANSI 300# FLANGE						
Valve Material	-20° to 100° F	-28° to 38° C	300° F	150° C	450° F	232° C
	psig	barg	psig	barg	psig	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

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	–	V	X	X	X

INDUSTRIAL VALVES

PRODUCT (1-2)

AN	ANSI
CN	Cryogenic (ANSI)
CD	Cryogenic 3-way
CP	Cryogenic
C6	Cryogenic
DP	Diverter Port
MP	Multi-Port
SP	Industrial 2-way

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
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

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		None
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

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/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

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

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
5	w/1" bolt-on tank pad
6	w/1.5" bolt-on tank pad
7	w/2" bolt-on tank pad
8	w/3" bolt-on tank pad
9	w/4" bolt-on tank pad
10	w/6" bolt-on tank pad
11	w/8" bolt-on tank pad

PURGE PORT OPTIONS (●●POSITION 1 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	w/ext lockable oval hand wheel (a)
18	w/ext lockable lever handle
71	w/ext lockable lever handle - Sanitary(a)
72	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: **VXXX** suffix at end of standard PBM part number

	24vdc	24vdc	24vdc	24vdc	24vdc	120vac	120vac	120vac
	PBM, Asco & Westlock combo					PBM, Asco & Westlock combo		
55	DA80 psig actr & GP Sol					20	DA80 psig actr	
56	DA80 psig actr & GP LS & Sol					21	DA80 psig actr & GP LS	
						22	DA80 psig actr & GP Sol	
57	DA80 psig actr & XP Sol					23	DA80 psig actr & GP LS & Sol	
58	DA80 psig actr & XP LS & Sol					24	DA80 psig actr & XP LS	
						25	DA80 psig actr & XP Sol	
59	DA60 psig actr & GP Sol					26	DA80 psig actr & XP LS & Sol	
60	DA60 psig actr & GP LS & Sol					27	DA60 psig actr	
						28	DA60 psig actr & GP LS	
61	DA60 psig actr & XP Sol					29	DA60 psig actr & GP Sol	
62	DA60 psig actr & XP LS & Sol					30	DA60 psig actr & GP LS & Sol	
						31	DA60 psig actr & XP LS	
63	SR80 psig actr & GP Sol					32	DA60 psig actr & XP Sol	
64	SR80 psig actr & GP LS & Sol					33	DA60 psig actr & XP LS & Sol	
						34	SR80 psig actr	
65	SR80 psig actr & XP Sol					35	SR80 psig actr & GP LS	
66	SR80 psig actr & XP LS & Sol					36	SR80 psig actr & GP Sol	
						37	SR80 psig actr & GP LS & Sol	
67	SR60 psig actr & GP Sol					38	SR80 psig actr & XP LS	
68	SR60 psig actr & GP LS Sol					39	SR80 psig actr & XP Sol	
						40	SR80 psig actr & XP LS & Sol	
69	SR60 psig actr & XP Sol					41	SR60 psig actr	
70	SR60 psig actr & XP LS & Sol					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	

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 proximity position monitor
GP/XP - TXP-P21GNEM

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

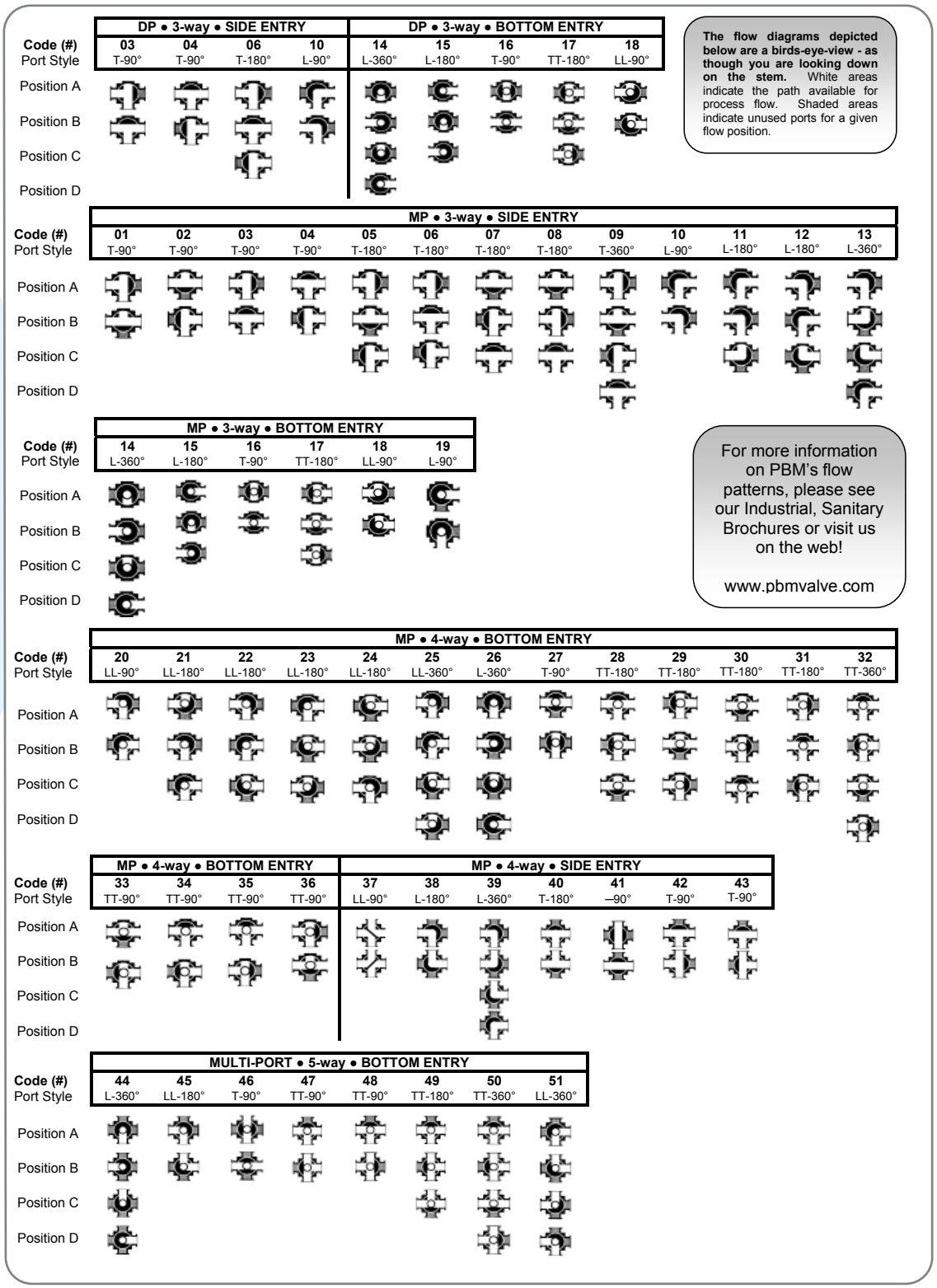
ABBREVIATION INDEX
GP = General Purpose
XP = Explosion Proof
LS = Limit Switch
Sol = Solenoid - **N/C**
DA = Double Acting
SR = Spring Return - **FCW**

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)

Flow Patterns and Technical Data

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 an Angle 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°.



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