



Marine & Offshore Valves

- *Ballast*
- *Bilge*
- *Fire Protection Systems*
- *Flare Gas Systems*
- *Injection Water*
- *Instrument Isolation*
- *Pump Skids*
- *Sea-Chest*
- *Utility Seawater*
- *Water Flood*



Marine and Offshore Valves

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.

- Bilge, Ballast Systems, Fire Protection Systems
- 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 1000°F (528°C)*
- Sizes: 1/2" - 12"*
- Materials:

Non-Ferrous:

Bronze; 836, 922

955 NiAl-Bronze, 953 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.)

(ASTM B16.34 and MSS-61 and others as required)

- ABS Type Approved Products, U.S. Coast Guard Category A*
- EU Pressure Equipment Directive (PED) pending
- CRN Registrations

**Vary based on product category and size.*

APPROVALS:*

- | | |
|------------------------------------|------------------------------|
| • USCG Category A | • NACE - MR 0175 |
| • ABS Type Approval | • ISO 9001 |
| • SIL 3 Capable | • CE |
| • API 6D (certification per order) | • API 607 Fire Tested Design |



CP Series
Cryogenic and LNG Valves



AN Series
ANSI Valve



SP Series
3-Piece Bronze Valve



TN Series
ANSI Trunnion

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

SAFETY is #1.

PBM's Cryogenic Valves are designed to B16.34, tested to API 607 Rev. 6 and meet seat leakage criteria of MSS SP-134.

- Sizes 1/2" – 4"
- Temperatures from 400°F, 205°C down to -320°F, -200°C
- Pressures to ANSI Class 300# (720 psi)
- TFM™ Seats/graphite seals
- Optional Low-e Packing (Cannot be lox cleaned)
- Cleaned for oxygen service
- Manual Locking lever handle, or optional oval locking hand wheel with quarter turn operation
- Custom engineered pneumatic, electric and hydraulic automation and control packages.



VENTED BALL

PBM Cryogenic balls are designed for a tight seal and undergo rigorous thermal cycle testing. Upstream vented balls are "keyed" to the stem ensuring error free installation and maintenance.



Open



Closed

Cryogenic Allowable Leakage Rate Comparison

NPS	DN	Allowable He scc/min	
		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



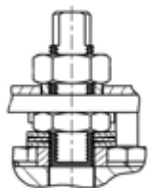
VALVE ORIENTATION

PBM's Cryogenic Valves are optimally oriented with the stem 90° from the horizontal plane. The valves are capable of operating with the stem oriented as low as 45° above the horizontal plane.



THERMAL EXPANSION

PBM's Cryogenic Valves are designed to seal consistently throughout thermal cycles. No disassembly is required for socket weld and butt weld end valves. Laser etched high pressure to low pressure flow direction.



LIVE LOADED STEM PACKINGS

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



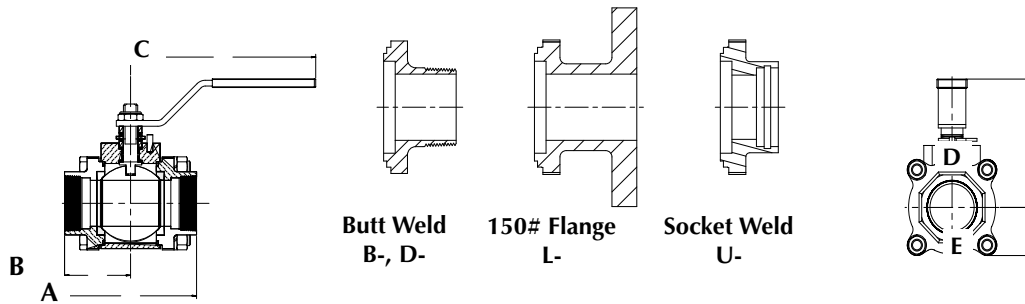
FIRE TESTED TO API-607 REV. 6

Marine and Offshore Valves

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				B				C		D		E							
				Face to Face				℄ to Face				Handle Length from ℄		℄ to Top of Handle		℄ to Bottom				Approx. Wgt.			
																Q- S- U-		L-		Q- S- U-		L-	
				inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inches	mm	inch	mm	inch	mm	inch	mm	lb	kg
1/4"	DN8	0.62	16	3.12	79	-	-	1.56	40	-	-	6.09	155	3.03	77	1.34	34	-	-	2	0.9	-	-
1/2"	DN15	0.62	16	3.12	79	5.38	137	1.56	40	2.69	68	6.09	155	3.03	77	1.34	34	1.81	46	2	0.9	5	2.3
3/4"	DN20	0.81	21	3.45	88	5.75	146	1.72	44	2.88	73	6.09	155	3.15	80	1.47	37	1.88	48	3	1.4	6	2.7
1"	DN25	1.00	25	3.90	99	6.30	160	1.95	50	3.15	80	8.69	221	3.53	90	1.69	43	2.13	54	4	1.8	9	4.1
1-1/4"	DN32	1.25	32	4.54	115	7.26	184	2.27	58	3.63	92	8.69	221	4.90	124	1.57	40	2.31	59	8	3.6	15	6.8
1-1/2"	DN40	1.50	38	5.36	136	6.98	177	2.68	68	3.49	89	8.69	221	5.08	129	1.71	43	2.50	64	10	4.5	17	7.7
2"	DN50	2.00	51	5.75	146	8.43	214	2.87	73	4.21	107	8.69	221	5.45	138	2.03	52	3.00	76	13	5.9	25	11.3
2-1/2"	DN65	2.50	64	8.36	212	10.86	276	4.18	106	5.42	138	12.44	316	5.50	140	2.81	71	3.50	89	33	15.0	52	23.6
3"	DN80	2.75	70	8.62	219	12.04	306	4.31	109	6.02	153	12.44	316	6.82	173	3.88	99	3.88	99	49	22.2	77	34.9
4"	DN100	3.50	89	10.46	266	12.90	328	5.23	133	6.45	164	12.44	316	7.32	186	4.50	114	4.50	114	84	38.1	115	52.2

- NOTES: face
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 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.



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		RTFE (Glass Filled Teflon)				TFM™				RTFE (Glass Filled Teflon)				TFM™			
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	5.0	2.3	2	0.9	4	1.8	3.12	79	5.38	137	3.12	79	5.50	140
3/4"	DN20	3	1.4	6.4	2.9	2	0.9	6	2.7	3.45	88	5.75	146	3.45	88	5.75	146
1"	DN25	4	1.8	8.6	3.9	5	2.3	9	4.1	3.90	99	6.30	160	4.25	108	6.50	165
1 1/4"	DN32	8	3.6	14.5	6.6	-	-	-	-	4.54	115	7.26	184	-	-	-	-
1 1/2"	DN40	9.5	4.3	17	7.7	11	5.0	17	7.7	5.36	136	6.98	177	5.50	140	8.00	203
2"	DN50	13	5.9	25	11.3	17	7.7	26	11.8	5.75	146	8.43	214	6.00	152	9.75	248
2 1/2"	DN65	33	15.0	52	23.6	37	16.8	53	24.0	8.36	212	10.86	276	8.00	203	11.50	292
3"	DN80	49	22.2	77	34.9	50**	22.7	64**	29.0	8.62	219	12.04	306	9.00	229	12.75	324
4"	DN100	84	38.1	115	52.2	133**	60.3	143**	64.9	10.46	266	12.90	328	12.00	305	15.00	381

** Series 1-3" valve has port I.D. of 2.75", Series 1-4" valve has port I.D. of 3.5". Series 5 valves are full port (3.00" and 4.00" respectively).

AN SERIES 1, 150# CLASS (BRONZE, ALUMINUM BRONZE, STAINLESS, DUPLEX, 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.

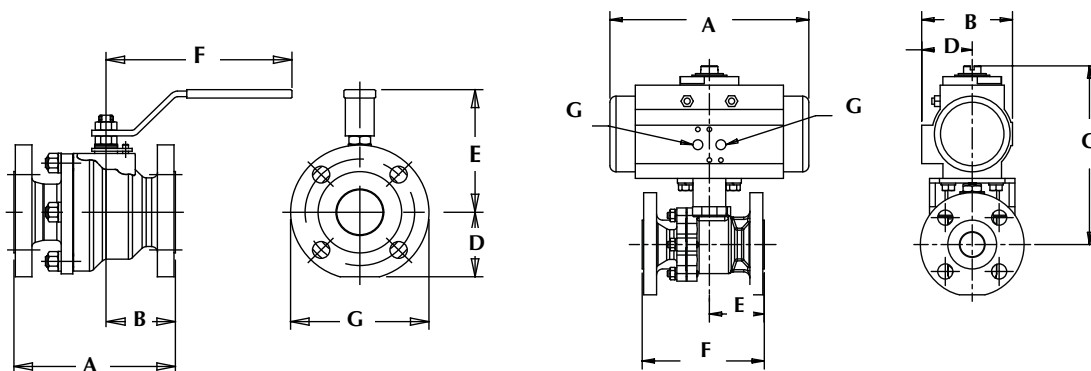
Valve Size		Port Diameter		A		B		D		E		F		G		Approx. Weight	
				Overall Length¹		C _L to Face End		C _L to Bottom of Flange		C _L to top of Handle		Handle Length from C _L		Flange Diameter			
		inch	mm	inch	mm	inch	mm	inches	mm	inch	mm	inch	mm	inch	mm	lb	kg
1/2	DN15	.62	16	4.25	108	1.76	45	1.62	41	3.07	78	6.09	155	3.50	89	6	2.7
3/4	DN20	.81	21	4.62	117	1.94	49	1.88	48	3.14	80	6.09	155	3.88	99	9	4.1
1	DN25	1.00	25	5.00	127	2.20	56	2.06	52	3.80	97	6.09	155	4.25	108	10	4.5
1-1/2	DN40	1.50	38	6.50	165	2.78	71	2.38	60	5.25	133	8.06	205	5.00	127	20	9.1
2	DN50	2.00	51	7.00	178	2.99	76	2.88	73	5.56	141	8.06	205	6.00	152	24	10.9
3	DN80	3.00	76	8.00	203	3.62	92	3.75	95	7.08	180	12.06	306	7.50	191	92	41.7
4	DN100	4.00	102	9.00	229	3.84	98	4.50	114	7.93	201	14.06	357	9.00	229	118	53.5
6	DN150	6.00	152	15.50	394	7.35	187	6.98	177	CF ⁵	CF ⁵	CF ⁵	CF ⁵	11.00	279	330	149.7

NOTES:

- Standard product is 316 Stainless Steel. Carbon Steel, Bronze and other materials are available upon request. Consult PBM.
- Dimensions meet ASME Standard B16.10 long pattern.
- 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.
- Drawings are for illustration purposes only. Consult PBM prior to any fabrication or installation work.
- A gear operator is recommended for valves 6" and larger. Consult PBM.
- Dimensions are for ANSI 150# Class valves. Consult PBM for 300# Class.

AN Series 1 Actuated

TFM™ OR VTFE SEAT MATERIAL																	
Size	Actuator	Air Pressure		A		B		C		D		E		F		G	
		psig	barg	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
1" DN 25	Double Acting	60, 80	4.1/5.5	5.00	127	2.25	57	4.25	108	5.49	139	2.80	71	6.23	158	1.61	41
	Spring Return	60, 80	4.1/5.5	5.00	127	2.25	57	4.25	108	8.15	207	3.72	94	7.32	186	2.07	53
1-1/2" DN 40	Double Acting	80	5.5	6.50	165	2.68	68	5.00	127	6.38	162	3.17	81	7.95	202	1.77	45
	Double Acting	60	4.1	6.50	165	2.68	68	5.00	127	8.15	207	3.72	94	8.60	218	2.07	53
	Spring Return	60, 80	4.1/5.5	6.50	165	2.68	68	5.00	152	10.69	272	4.84	123	9.56	243	2.68	68
	Double Acting	60, 80	4.1/5.5	7.00	178	3.12	79	6.00	152	8.15	207	3.72	94	8.91	226	2.07	53
2" DN 50	Double Acting	60	4.1	7.00	178	3.12	79	6.00	152	8.15	207	3.72	94	8.91	226	2.07	53
	Spring Return	80	5.5	7.00	178	3.12	79	6.00	152	10.69	272	4.84	123	9.86	250	2.68	68
	Spring Return	60	4.1	7.00	178	3.12	79	6.00	152	12.91	328	5.39	137	11.05	281	2.87	73
	Double Acting	60, 80	4.1/5.5	8.00	203	3.57	91	7.50	191	12.91	328	5.39	137	12.99	330	2.87	73
3" DN 80	Spring Return	80	5.5	8.00	203	3.57	91	7.50	191	14.41	366	5.83	148	13.46	342	3.15	80
	Spring Return	60	4.1	8.00	203	3.57	91	7.50	191	16.85	428	6.46	164	14.35	364	3.44	87
	Double Acting	60, 80	4.1/5.5	9.00	229	3.84	98	9.00	229	16.85	428	6.46	164	16.51	419	3.44	87
4" DN 100	Spring Return	80	5.5	9.00	229	3.84	98	9.00	229	20.55	522	7.36	187	16.98	431	3.94	100
	Spring Return	60	4.1	9.00	229	3.84	98	9.00	229	22.64	575	8.58	218	18.99	482	4.29	109
	Double Acting	60, 80	4.1/5.5	15.50	394	7.33	186	11.00	279	22.64	575	8.58	218	22.57	573	4.29	109
6" DN 150	Spring Return	80	5.5	15.50	394	7.33	186	11.00	279	22.64	575	8.58	218	22.57	573	4.29	109
	Spring Return	60	4.1	15.50	394	7.33	186	11.00	279	26.46	672	11.42	290	26.19	665	5.71	145



Marine and Offshore Valves

AN SERIES 5, (STAINLESS AND CARBON) AND TN SERIES 5 150# CLASS (BRONZE, ALUMINUM BRONZE, STAINLESS, DUPLEX AND CARBON)

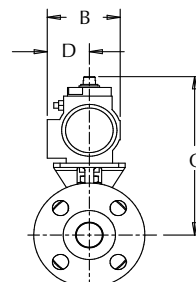
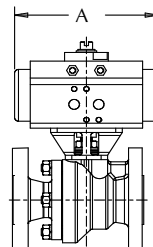
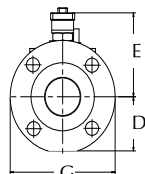
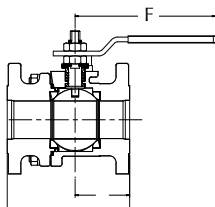
AN Series seawater valves are 2-piece valves with two flanged end fittings and meet ANSI B16.10 long pattern face to face dimensions. In addition, encapsulated seats facilitate performance in high-velocity applications and support the seats in elevated temperature applications. TN adds a trunnion to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

Size		Port		A		B		D		E		F		G		Approx. Weight Bronze	
				Overall Length		C _L to End		C _L to Bottom		C _L to top of handle		Handle Length from G		Flange Diameter			
		inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inches	mm	inch	mm	lb	kg
1/2"	DN15	0.62	16	4.25	108	1.84	47	1.62	41	3.07	78	5.09	129	3.50	89	6	2.7
3/4"	DN20	0.81	21	4.62	117	2.01	51	1.88	48	3.14	80	5.09	129	3.88	99	9	4.1
1"	DN25	1.00	25	5.00	127	2.20	56	2.06	52	4.33	110	6.09	155	4.25	108	10	4.5
1-1/2"	DN40	1.50	38	6.50	165	2.78	71	2.38	60	5.25	133	8.68	220	5.00	127	20	9.1
2"	DN50	2.00	51	7.00	178	2.99	76	2.88	73	5.56	141	8.68	220	6.00	152	24	10.9
3"	DN80	3.00	76	8.00	203	3.62	92	4.56	116	7.08	180	12.44	316	7.50	191	92	41.7
4"	DN100	4.00	102	9.00	229	3.84	98	4.75	121	7.93	201	14.44	367	9.00	229	118	53.5
6"	DN150	6.00	152	15.50	394	7.35	189	6.75	171	-	-	-	-	11.00	279	330	149.7
8"	DN200	8.00	203	18.00	457	8.54	217	8.37	213	-	-	-	-	13.50	343	550	249.5
10"	DN250	8.00	203	21.00	533	12.34	313	8.37	213	-	-	-	-	16.00	406	680	308.4
12"	DN300	10.00	254	24.00	610	12.00	305	10.15	258	-	-	-	-	19.00	483	1,040	471.7

AN & TN SERIES 5 ACTUATED VALVES

Size	Units	A				B				C				D			
		Double Act.		Spring Ret		Double Act.		Spring Ret		Double Act.		Spring Ret		Double Act.		Spring Ret.	
		60	80	60	80	60	80	60	80	60	80	60	80	60	80	60	80
1/2"	inches	5.49	5.49	8.15	6.38	2.80	2.80	3.72	3.17	5.83	5.83	6.91	6.26	1.61	1.61	2.07	1.77
DN15	mm	139	139	207	162	71	71	94	81	151	151	178	178	41	41	53	45
3/4"	inches	5.49	5.49	8.15	6.38	2.80	2.80	3.72	3.17	5.94	5.94	7.02	7.02	1.61	1.61	2.07	1.77
DN20	mm	139	139	207	162	71	71	94	81	151	151	178	178	41	41	53	45
1"	inches	5.49	5.49	9.35	8.15	2.80	2.80	4.17	3.72	7.18	7.18	8.72	8.27	1.61	1.61	2.30	2.07
DN25	mm	139	139	237	207	71	71	106	94	182	182	221	210	41	41	58	53
1-1/2"	inches	8.15	8.15	12.91	10.69	3.72	3.72	5.39	4.84	8.42	8.42	10.88	10.56	2.07	1.77	2.87	2.87
DN40	mm	207	207	328	272	94	94	137	123	214	214	276	268	53	45	73	73
2"	inches	8.15	8.15	12.91	10.69	3.72	3.72	5.39	4.84	8.74	8.74	10.88	9.69	2.07	2.07	2.87	2.67
DN50	mm	207	207	328	272	94	94	137	123	222	222	276	246	53	53	73	68
3"	inches	12.91	12.91	16.85	14.41	5.39	5.39	6.46	5.83	13.43	13.43	14.79	13.90	2.87	2.87	3.44	3.15
DN80	mm	328	328	428	366	137	137	164	148	341	341	376	353	73	73	87	80
4"	inches	14.41	12.91	22.64	20.55	6.46	5.39	8.58	7.36	18.92	16.44	22.29	20.28	3.44	3.44	4.29	3.94
DN100	mm	366	328	575	522	164	137	218	187	481	4718	566	515	87	87	109	100
6"	inches	20.55	20.55	26.46	22.64	7.36	7.36	11.42	8.58	20.24	20.24	25.87	22.25	3.94	3.94	5.71	4.29
DN150	mm	522	522	672	575	187	187	290	218	514	514	657	565	100	100	145	109
8"	inches	26.46	26.46	CF	26.46	11.42	11.42	CF	11.42	28.12	28.12	CF	28.12	5.71	5.71	CF	5.71
DN200"	mm	672	672	-	672	290	290	-	290	714	714	-	714	145	145	-	145
10"	inches	26.46	26.46	CF	26.46	11.42	11.42	CF	12.42	28.12	28.12	CF	28.12	5.71	5.71	CF	5.71
DN250	mm	672	672	-	672	290	290	-	315	714	714	-	714	145	145	-	145
12"	inches	26.46	26.46	CF	26.46	11.42	11.42	CF	13.42	29.94	29.94	CF	29.94	5.71	5.71	CF	5.71
DN300	mm	672	672	-	672	290	290	-	341	760	760	-	760	145	145	-	145

- Standard product is 316 Stainless Steel. Carbon Steel, Bronze and other materials are available upon request. Consult PBM.
- Dimensions meet ASME Standard B16.10 long pattern.
- 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.
- Drawings are for illustration purposes only. Consult PBM prior to any fabrication or installation work.
- A gear operator is recommended for valves 6" and larger. Consult PBM.
- Dimensions are for ANSI 150# Class valves. Consult PBM for 300# Class.
- Trunnion mounted (Series TN) available for larger line sizes and pressure classifications. Consult PBM.



DP SERIES 1 DIMENSIONAL DATA (836 BRONZE)

DIMENSIONAL DATA (INCHES)

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				D				G				E		F		150# Flange Diam.		Approximate Weight			
				Face-to-Face				℄ to End				℄ to Bottom or Side				Handle Length from ℄		℄ to Top of Handle							
		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	16	3.12	79	-	-	1.56	40	-	-	2.50	64	-	-	5.06	129	3.03	77	3.50	89	2	0.9	-	-
3/4"	DN20	0.81	21	3.44	87	-	-	1.77	45	-	-	2.50	64	-	-	5.06	129	3.03	77	2.38	60	2	0.9	-	-
1"	DN25	1.00	25	3.90	99	6.28	160	1.95	50	3.14	80	2.44	62	3.16	80	6.06	154	3.53	90	4.25	108	4	1.8	10	4.5
1-1/2"	DN40	1.50	38	5.36	136	7.00	178	2.68	68	3.50	89	3.25	583	3.50	89	8.06	205	5.05	128	5.00	127	10	4.5	23	10.4
2"	DN50	1.94	49	5.71	145	8.40	213	2.86	73	4.20	107	3.25	83	4.20	107	8.06	205	5.42	138	6.00	152	15	6.8	30	13.6
3"	DN80	2.75	70	8.62	219	11.87	301	4.31	109	5.93	151	5.12	130	6.00	152	12.06	306	6.71	170	7.50	191	49	22.2	79	35.8
4"	DN100	3.50	89	-	-	12.91	328	N/A		6.45	164	-	-	6.44	164	12.06	306	7.21	183	9.00	229	79	35.8	120	54.4

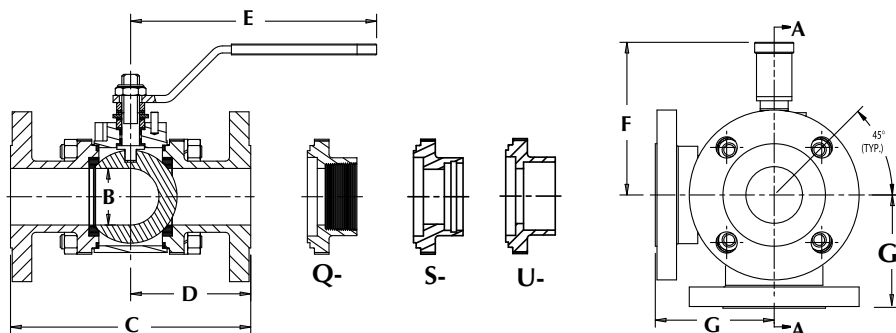
MP SERIES 1 DIMENSIONAL DATA (836 BRONZE)

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

Size		B		C				D, G				E		F		Approximate Weight			
		Ball Port		Face-to-Face				℄ to Face				Handle Length from ℄		℄ to Top of Handle					
				Q-S-U-		L-		Q-S-U-		L-									
		inch	mm	inch	mm	inch	mm	inch	mm	inches	mm	inch	mm	inch	mm	inch	mm	lb	kg
1/2"	DN15	0.62	16	4.00	102	-	-	2.00	51	-	-	6.09	155	3.83	97	8	3.6	-	-
3/4"	DN20	0.81	21	4.00	102	-	-	2.00	51	-	-	6.09	155	3.83	97	8	3.6	-	-
1"	DN25	1.00	25	4.72	120	-	-	2.36	60	-	-	8.06	205	4.99	127	12	5.4	-	-
1-1/2"	DN40	1.50	38	6.56	167	10.56	268	3.28	83	5.28	134	12.44	316	5.61	142	28	12.47	46	20.9
2"	DN50	1.94	49	7.76	197	11.94	303	3.88	99	5.97	152	12.44	316	6.05	154	40	18.1	64	29.0
3"	DN80	2.75	70	11.06	281	14.56	370	5.53	140	7.28	185	12.44	316	7.01	178	65	29.5	105	47.6
4"	DN100	3.50	89	-	-	17.00	432	-	-	8.50	216	14.06	357	8.75	222	-	-	220	99.8

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.



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 FT, FD 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	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 7	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 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)	550	37.9	440	30.3	340	23.4
	Ductile Iron	2" (DN50)	500	34.5	400	27.6	310	21.4
	Ductile Iron	3" (DN80)	450	31.0	360	24.8	280	19.3
MP, Series 4	Ductile Iron	4" (DN100)	See Flanged Table at Right					
	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
	Carbon Stl.	All	285	19.7	230	15.9	185	12.8
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	620	42.7	540	37.2
	316 SS/316L	2" (DN50), 4" (DN100)	550	37.9	540	37.2	525	36.2
	316 SS/316L	3" (DN80)	625	43.1	610	42.1	600	41.4
	316 SS/316L	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	- 2 8 ° 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	- 2 8 ° 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

Marine and Offshore Valves

ORDERING INFORMATION

INDUSTRIAL VALVES													
PRODUCT (1-2)		MATERIAL ² (3-4)		SIZE (5)		SERIES (6)		END CONNECTION ³ (7-8)		SEAT & SEAL / FILLERS / O-RINGS ⁴ (9)			
										SEAT	FILLER	O-RING	
AN	ANSI	A-	Aluminum	A	1/4	1	Series 1	B-	Sch 40 butt weld	A	RT		VI
CN	Cryogenic (ANSI)	B-	836 Bronze	B	3/8	3	Series 3	D-	Sch 10 butt weld	B	RT	VT	VI
CP	Cryogenic	C-	Hastelloy® C-276	C	1/2	4	Series 4	L-	150# Flange	F	Metal		
DP	Diverter Port	E-	Carbon Steel ⁵	D	3/4	5	Series 5	M-	300# Flange	G	TF		VI
MP	Multi-Port	H-	316 / 316L Stainless	E	1	6	Series 6	N-	600# Flange	H	HT		VI
SP	Industrial 2-way	HC	Alloy 20	F	1-1/4	7	Series 7	P-	Male NPT	I	HT	VT	VI
TN	Trunnion	HL	316L Stainless	G	1-1/2			Q-	Female NPT	J	TF	VT	VI
		N-	922 Bronze ⁵	H	2			Q1	BSPT	Q	CG		
		R-	955 NiAl-Bronze	J	2-1/2			R-	Sil-braze	U	VT	VT	EP
		S-	953 Al- Bronze	K	3			S-	Sil-braze 1 groove	V	RT		EP
		X-	958 NiAl-Bronze	L	4			T-	Solder joint	W	RT	VT	EP
		Y-	Hastelloy® C-22®	M	6			U-	Socket weld	Z	TF		EP
		9-	954 Al-Bronze	N	8					0	HT		EP
		22	Duplex 2205	P	10					1	HT	VT	EP
										2	TF	VT	EP

CURRENT PRODUCT SERIES		SEAT / SEAL / MATERIAL CODES		O-RING MATERIAL CODES	
1	AN, Bronze DP & MP	CG	Carbon-Graphite	EP	EPR
3	AN(Fire-safe API-607 Rev 4)	HT	S-TEF®	VI	Viton "A" 75 Durometer
4	Stainless & Carbon Steel MP -150# class maximum	RT	RTFE		
5	TN, AN, CN, DP, Stainless MP ⁵ , SP -150# class maximum	TF	TFM™		
6	TN, AN, SP (Fire-safe API-607 Rev 4)				
6	CP up to 4" (Fire-safe API-607 Rev 6)				

¹ - Not all options are available on all valve styles; consult PBM. ² - For valves with 2 different materials, use the 1st position for body material and the 2nd position for end fitting material. ³ - For standard seat/seal material by series, please see appropriate pricing page. PBM may substitute TFM™ for RTFE at our discretion without notice. TFM™ is a registered trademark of Dyneon™ - a 3M Company. Viton "A" is 75 Durometer. ⁴ - PBM reserves the right to use 922 Bronze in place of 836 Bronze without notification. ⁵ - All Carbon Steel valves will be coated internally and externally with Rust Veto 342, a rust inhibitor. Information on Rust Veto and/or an MSDS is available upon request. If Rust Veto is not acceptable, customer to advise specific coating required. Alternate coatings may impact price and delivery time. In addition, Carbon steel cast products are also painted (black in color) externally prior to Rust Veto coating. ⁶ -150# class maximum

FLOW PATTERN / TANK PAD / PURGE OPTIONS (10 & 11)		BALL / STEM OPTIONS (12)		OPERATOR OPTIONS (13 & 14)		OPTIONS & SPECIALS	
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 FLOW PATTERNS		-	Standard (316 / 316L ball & stem)	- -	w/handle	LOX & BOLTING OPTIONS (16)	
		F	Internal / external grounding	00	Stainless locking oval handle	L	No option(s) required
		G	17-4PH stem	02	w/o handle, w/stem actr prep	-	LOX cleaning per PBM
		I	Monel ball	03	w/handle, w/stem actr prep		procedure
		J	932 Bronze ball	04	Locking lever handle	M	LOX & CRN bolting
		K	Monel stem & followers	05	w/stainless oval handwheel	Z	CRN bolting
		L	Monel ball, stem & followers	08	w/gear operator		
		M	Aluminum ball	10	w/man. spring return handle		
		N	922 Bronze ball	11	w/fusible link SR handle (165°F)		
		O	Hastelloy C-276 ball	13	w/N4 electric actuator		
		P	C-276 ball, stem & followers	14	w/XP electric actuator		
		Q	922 Bronze ball w/Monel stem	17	w/4" ext lockable oval handwheel		
		R	Monel stem, followers & bolting	18	w/4" ext lockable lever handle		
		S	Monel ball, stem, followers & bolting	PBM, 110vac Asco & Westlock combo			
		T	922 Bronze ball, Monel stem & followers, Sil-braze bolting & CuSi fasteners	20	DA80 psig actr		
		U	922 Bronze ball w/Monel stem & followers	21	DA80 psig actr & GP LS		
		V	12" extended stem/body bonnet (cryo only)	22	DA80 psig actr & GP Sol	3 Add \$95 list for	
		1	Chrome carbide (ball & seat coating)	23	DA80 psig actr & GP LS & Sol	Westlock beacon only on	
		2	Tungsten carbide (ball & seat coating)	24	DA80 psig actr & GP LS	actuators	
				25	DA80 psig actr & XP Sol		
				26	DA80 psig actr & XP LS & Sol		
				27	DA60 psig actr		
				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		
		Abbreviation Index					
		GP = General Purpose					
		XP = Explosion Proof					
		LS = Limit Switch					
		Sol = Solenoid - N/C					
		DA = Double Acting					
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 (1) 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 (1) 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						
H	Holes in open upstream position						
I	Holes in open downstream position						
J	Holes in open upstream & downstream position						
V	Standard width slotted ball						
W	30° V-ball						
X	45° V-ball						
Y	60° V-ball						
Z	90° V-ball						
1	120° V-ball						
7	Self-flush ball with flats closed downstream						
8	Self-flushing ball						
9	Ball with vent hole						

Abbreviation Index

GP = General Purpose
XP = Explosion Proof
LS = Limit Switch
Sol = Solenoid - N/C
DA = Double Acting

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°.

DP • 3-way • SIDE ENTRY					DP • 3-way • BOTTOM ENTRY				
Code (#)	03	04	06	10	14	15	16	17	18
Port Style	T-90°	T-90°	T-180°	L-90°	L-360°	L-180°	T-90°	TT-180°	LL-90°
Position A									
Position B									
Position C									
Position D									

The flow diagrams depicted below are a birds-eye-view - as though you are looking down on the stem. White areas indicate the path available for process flow. Shaded areas indicate unused ports for a given flow position.

MP • 3-way • SIDE ENTRY													
Code (#)	01	02	03	04	05	06	07	08	09	10	11	12	13
Port Style	T-90°	T-90°	T-90°	T-90°	T-180°	T-180°	T-180°	T-180°	T-360°	L-90°	L-180°	L-180°	L-360°
Position A													
Position B													
Position C													
Position D													

MP • 3-way • BOTTOM ENTRY					
Code (#)	14	15	16	17	18
Port Style	L-360°	L-180°	T-90°	TT-180°	LL-90°
Position A					
Position B					
Position C					
Position D					

For more information on PBM's flow patterns, please see our Industrial, Sanitary Brochures or visit us on the web!

www.pbmvalve.com

MP • 4-way • BOTTOM ENTRY													
Code (#)	20	21	22	23	24	25	26	27	28	29	30	31	32
Port Style	LL-90°	LL-180°	LL-180°	LL-180°	LL-180°	LL-360°	L-360°	T-90°	TT-180°	TT-180°	TT-180°	TT-180°	TT-360°
Position A													
Position B													
Position C													
Position D													

MP • 4-way • BOTTOM ENTRY				MP • 4-way • SIDE ENTRY						
Code (#)	33	34	35	36	37	38	39	40	41	42
Port Style	TT-90°	TT-90°	TT-90°	TT-90°	LL-90°	L-180°	L-360°	T-180°	-90°	T-90°
Position A										
Position B										
Position C										
Position D										

MULTI-PORT • 5-way • BOTTOM ENTRY							
Code (#)	44	45	46	47	48	49	50
Port Style	L-360°	LL-180°	T-90°	TT-90°	TT-90°	TT-180°	TT-360°
Position A							
Position B							
Position C							
Position D							



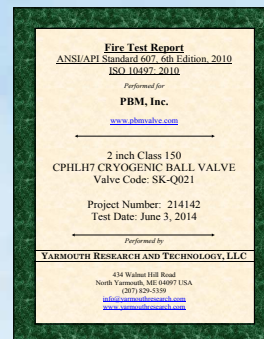
PBM WORLDWIDE REPRESENTATION

- United States • Canada • Australia • Mexico • Brazil • Argentina • Chile • UAE • United Kingdom
- Central Europe • Germany • Sweden • Spain • Belgium • France • Ireland • Switzerland • Austria • The Netherlands
- South Africa • India • Taiwan • China • Thailand • Singapore • Saudi Arabia • Malaysia • South Korea

APPROVALS:*

- USCG Category A
- ABS Type Approval
- SIL 3 Capable
- API 6D (certification per order)
- NACE - MR 0175
- ISO 9001
- CE
- API 607 Fire Tested Design
- API-622 Low-e Packing

* Vary based on product category



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